



Date: July 7, 2009

# Technical Memorandum

**To:** John Bates, County of Alameda Public Works Agency

**cc:** Art Carrera, County of Alameda Public Works Agency

**From:** Bill Cisco and Debbie Yeuh

**Reference #:** 08070

**Subject:** Traffic Operations Summary and Preferred Alternatives Presentation  
Castro Valley Circulation Study

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## Introduction and Background

This technical memorandum presents the summary of the traffic operations analysis for the preferred alternatives of the Castro Valley Circulation Study. Three previous technical memorandum reports have been prepared as part of this project, namely the Existing Conditions report (December 24, 2008), the Traffic Forecasting Report (February 13, 2009), and the Traffic Operations Report (February 25, 2009).

The objective of the study is to develop and evaluate potential alternative circulation improvements that would improve traffic operations within the study area. The primary area of focus is the vicinity of the westerly end of Norbridge Avenue, which includes Strobridge Avenue, Castro Valley Boulevard, and I-580 WB Strobridge Avenue off-ramp.

## Analysis Scenarios

Traffic projections and operations were performed throughout our work on this project for a total of nine (9) Alternatives for Year 2015 conditions, as well as for the "No Project" Year 2015 conditions and Existing Conditions. Namely, these nine alternatives included:

1. Relocating the WB off ramp at Strobridge to instead touch down directly to Castro Valley Boulevard west of the intersection of Castro Valley Boulevard and Strobridge Avenue/John Drive. Also, providing a two-way connection to Norbridge Av from Strobridge Av.
2. Keeping the WB off ramp at Strobridge essentially where it currently is (touching down at Strobridge), but converting this intersection to a roundabout and providing a one-way eastbound connection to Norbridge Av (to total a 2-way connection, since there is already a one-way westbound connection further north). Also, a sub-component of this alternative including a roundabout for the EB off ramp intersection was also evaluated ("2b").

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3. Keeping the WB off ramp at Strobridge essentially where it currently is (touching down at Strobridge), but signaling the intersection and providing a new west leg of the intersection (two-way) that connects to Castro Valley Boulevard west of the Strobridge/John intersection (connects at same point as in Alternative 1, but allows this to happen without the bridge work from the freeway). This alternative also includes a two-way connection to Norbridge Av east of Strobridge Av.
4. Modifying the segments of Strobridge and Norbridge south of Castro Valley Boulevard to both operate as two-way roadways.
5. Adding an additional westbound approach lane on Castro Valley Boulevard beginning east of the Norbridge Avenue/Stanton Avenue intersection.
6. Connecting the I-580 WB off-ramp directly to Strobridge Avenue, with Strobridge Avenue operating as a two-way roadway, and connecting Norbridge Avenue as a two-way roadway to Castro Valley Boulevard, closing off the connection between Strobridge Avenue and Norbridge Avenue. **This is a *Potentially Preferred Alternative*.**
7. Similar to Alternative 6, but additionally providing a new surface roadway connection (two-way) between the Strobridge Avenue/I-580 WB off-ramp intersection to Castro Valley Boulevard that connects to Castro Valley Boulevard west of the Strobridge/John intersection (similar to Alternative 3). **This is the Preferred Alternative.**
8. Widening Norbridge Avenue and closing Strobridge Avenue south of Castro Valley Boulevard to the I-580 WB off-ramp intersection.
9. Widening Strobridge Avenue, realigning Stanton Avenue north of Castro Valley Boulevard to intersect with Strobridge Avenue, and realigning Norbridge Avenue to the east. Both the Stanton and Norbridge realignments would require right-of-way takes.

Alternative 7 is the currently Preferred Alternative. Alternative 6 is also a potentially preferred alternative, although it would require significant widening of the northbound approach on Strobridge Avenue at its intersection with Castro Valley Boulevard.

### Analysis Methodologies

“Levels of service” describe the operating conditions experienced by motorists. Level of service is a qualitative measure of the effect of a number of factors, including speed and travel time, traffic interruptions, freedom to maneuver, driving comfort and convenience. Levels of service are designated "A" through "F" from best to worst, which cover the entire range of traffic operations that might occur. Level of Service (LOS) "A" through "E" generally represent traffic volumes at less than roadway capacity, while LOS "F" represents over capacity and/or forced flow conditions.

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### Unsignalized Intersections Analysis

Stop sign controlled intersections were analyzed utilizing the methodology outlined in the *Highway Capacity Manual* (Transportation Research Board, Washington, D.C., 2000, Chapters 10 and 17). This methodology determines the Level of Service by calculating an average total delay per vehicle for each controlled movement and for the intersection as a whole. A LOS designation is assigned based upon the average control delay of all movements. Table 1 presents the relationship of total delay to level of service for stop controlled intersections.

**Table 1**  
**Level of Service Criteria Unsignalized Intersections**

Level of Service	Average Control Delay (seconds/vehicle)
A	0 – 10
B	>10 – 15
C	>15 – 25
D	>25 – 35
E	>35 – 50
F	>50

Source: Transportation Research Board, *Highway Capacity Manual*, Washington, D.C., 2000, pages 10-16 and 16-2.

### Signalized Intersections Analysis

Signalized intersection analyses were conducted using the operational methodology outlined in the *Highway Capacity Manual* (Transportation Research Board, Washington, D.C., 2000, Chapters 10 and 16). This procedure calculates an average stopped delay per vehicle at a signalized intersection, and assigns a level of service designation based upon the delay. The method also provides a calculation of the volume-to-capacity (v/c) ratio of the critical movements at the intersection. Table 2 shows level of service criteria for signalized intersections.

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**Table 2**  
**Level of Service Criteria – Signalized Intersections**

Level of Service (LOS)	Average Delay (seconds/vehicle)	Description
A	$\leq 10$	Very Low Delay: This level of service occurs when progression is extremely favorable and most vehicles arrive during a green phase. Most vehicles do not stop at all.
B	$> 10$ and $< 20$	Minimal Delays: This level of service generally occurs with good progression, short cycle lengths, or both. More vehicles stop than at LOS A, causing higher levels of average delay.
C	$> 20$ and $< 35$	Acceptable Delay: Delay increases due to only fair progression, longer cycle lengths, or both. Individual cycle failures (to service all waiting vehicles) may begin to appear at this level of service. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.
D	$> 35$ and $< 55$	Approaching Unstable Operation/Significant Delays: The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume / capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	$> 55$ and $< 80$	Unstable Operation/Substantial Delays: These high delay values generally indicate poor progression, long cycle lengths, and high volume / capacity ratios. Individual cycle failures are frequent occurrences.
F	$> 80$	Excessive Delays: This level, considered unacceptable to most drivers, often occurs with oversaturation (that is, when arrival traffic volumes exceed the capacity of the intersection). It may also occur at nearly saturated conditions with many individual cycle failures. Poor progression and long cycle lengths may also contribute significantly to high delay levels.
Source: Transportation Research Board, <i>Highway Capacity Manual</i> , Washington, D.C., 2000, pages 10-16 and 16-2.		

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### Intersection Operations

The eleven study intersections were selected for evaluation upon consultation with County staff. These include:

1. Strobridge Avenue/Norbridge Avenue/Stanton Avenue and Castro Valley Boulevard
2. Strobridge Avenue/John Drive and Castro Valley Boulevard
3. Strobridge Avenue and I-580 Westbound off-ramp
4. Strobridge Avenue and I-580 Eastbound off-ramp/Gary Drive
5. Lake Chabot Road and Castro Valley Boulevard
6. Redwood Road and Castro Valley Boulevard
7. Redwood Road and Norbridge Avenue
8. Redwood Road and I-580 Westbound on-ramp
9. Redwood Road and I-580 Eastbound off-ramp
10. Center Street and Castro Valley Boulevard
11. Center Street and Grove Way

Additionally, as part of Alternatives 1, 3, and 7 an additional study intersection is created:

12. Castro Valley Boulevard & New I-580 WB off-ramp (for Alternative 1)
12. Castro Valley Boulevard & New Road (for Alternatives 3 and 7)

Also, note that for Alternative 1, Intersection #3 is no longer Strobridge Avenue and I-580 Westbound off-ramp, but is instead Strobridge Avenue and Norbridge Avenue, since the I-580 Westbound off-ramp would be relocated.

The Synchro software was utilized to calculate the Highway Capacity Manual based level of service for the study intersections for the AM and PM peak hours. The analysis of Strobridge Avenue & I-580 WB off-ramp/Norbridge Avenue (Intersection #3) as a stop-controlled intersection, as well as the analysis of Strobridge Avenue & I-580 WB off-ramp/Norbridge Avenue (Intersection #3) and Strobridge Avenue & I-580 EB ramps (Intersection #4) as roundabout intersections, were conducted using the TRAFFIX software due to limitations of the Synchro software for these analyses.

Table 3 presents the results for Year 2015 conditions showing all scenarios; while Table 4 presents the Year 2015 conditions for selected scenarios, namely Existing Conditions, No Project, the Potentially Preferred Alternative (Alternative 6) and the Preferred Alternative (Alternative 7). The traffic volumes and geometries are shown on the many Figures attached to this memorandum.

**Table 3**  
**Castro Valley Circulation Study**  
**Year 2015 Intersection Levels of Service**

Intersection	Peak Hour	Existing Conditions		2015 No Project		2015 Alt. 1		2015 Alt. 2a		2015 Alt. 2b		2015 Alt. 3		2015 Alt. 4		2015 Alt. 5		2015 Alt. 6		2015 Alt. 7		2015 Alt. 8		2015 Alt. 9	
		Delay*	LOS	Delay*	LOS	Delay*	LOS**	Delay*	LOS**	Delay*	LOS**	Delay*	LOS**	Delay*	LOS**	Delay*	LOS**	Delay*	LOS**	Delay*	LOS**	Delay*	LOS**	Delay*	LOS**
1 Castro Valley Blvd/Stanton-Norbridge Av	AM	47.1	D	124.7	F	55.6	E	126.8	F	126.8	F	30.0	C	18.6	B	68.1	E	19.9	B	23.3	C	62.6	E	3.9	A
	PM	38.1	D	107.7	F	45.2	D	82.9	F	82.9	F	61.3	E	43.4	D	76.2	E	23.4	C	25.9	C	55.8	E	5.6	A
2 Castro Valley Blvd/John Dr-Strobridge Av	AM	17.8	B	25.3	C	22.1	C	25.3	C	25.3	C	16.3	B	119.3	F	19.1	B	45.5	D	29.8	C	23.2	C	30.4	C
	PM	24.8	C	29.0	C	21.8	C	29.3	C	29.3	C	15.2	B	128.5	F	22.0	C	46.9	D	54.4	D	20.1	C	31.9	C
3 I-580 WB off-ramp-Norbridge Av/ Strobridge Av/New Rd ***	AM	38.4	E	49.2	E	2.4	A	2.7	A	2.7	A	17.5	B	78.3	E	49.2	E	23.5	C	20.0	C	25.6	C	23.4	C
	PM	52.5	F	102.7	F	4.1	A	3.7	A	3.7	A	12.6	B	90.0	F	102.7	F	31.8	C	25.1	C	36.5	D	31.9	C
4 I-580 EB ramps/Strobridge Av	AM	27.2	C	45.0	D	34.6	C	45.7	D	2.0	A	35.1	D	45.7	D	45.0	D	39.8	D	39.8	D	45.7	D	39.8	D
	PM	38.7	D	46.0	D	37.4	D	47.1	D	2.2	A	37.6	D	47.4	D	46.0	D	42.5	D	42.5	D	47.4	D	37.1	D
5 Castro Valley Blvd/Lake Chabot Rd	AM	24.1	C	40.0	D	41.8	D	40.7	D	40.7	D	41.6	D	39.4	D	40.1	D	40.5	D	41.9	D	38.3	D	42.1	D
	PM	33.7	C	65.0	E	69.6	E	69.6	E	69.6	E	68.9	E	69.6	E	66.9	E	68.9	E	69.4	E	64.8	E	68.9	E
6 Castro Valley Blvd/Redwood Rd	AM	34.3	C	44.0	D	43.8	D	43.9	D	43.9	D	43.4	D	44.2	D	44.0	D	43.7	D	43.4	D	44.0	D	43.2	D
	PM	38.0	D	67.8	E	69.6	E	70.1	E	70.1	E	68.6	E	68.7	E	67.9	E	69.1	E	68.9	E	75.5	E	73.8	E
7 Norbridge Ave/Redwood Rd	AM	36.9	D	28.4	C	30.9	C	30.9	C	28.4	C	25.3	C	30.9	C	28.4	C	25.8	C	25.7	C	30.9	C	25.7	C
	PM	37.6	D	29.4	C	29.4	C	29.4	C	29.4	C	31.7	C	29.4	C	27.9	C	27.9	C	27.9	C	31.7	C	27.9	C
8 I-580 WB ramp/Redwood Rd	AM	9.1	A	20.1	C	21.1	C	23.1	C	20.1	C	23.7	C	23.1	C	20.1	C	29.8	C	30.0	C	23.1	C	30.0	C
	PM	9.6	A	24.7	C	24.7	C	24.7	C	24.7	C	24.7	C	25.0	C	24.7	C	30.5	C	30.5	C	25.0	C	30.5	C
9 I-580 EB ramp/Redwood Rd	AM	10.7	B	21.8	C	20.6	C	24.5	C	21.8	C	35.0	D	24.5	C	21.8	C	36.5	D	36.0	D	24.5	C	36.0	D
	PM	11.4	B	21.7	C	21.7	C	21.7	C	21.7	C	22.2	C	21.7	C	29.8	C	29.8	C	22.2	C	29.8	C	29.8	C
10 Castro Valley Blvd/Center St	AM	35.3	D	38.2	D	38.7	D	38.8	D	38.8	D	37.8	D	38.8	D	38.1	D	36.9	D	37.0	D	38.8	D	37.9	D
	PM	34.2	C	32.5	C	32.8	C	32.8	C	32.8	C	32.4	C	33.0	C	32.5	C	32.4	C	32.8	C	34.4	C	32.9	C
11 Grove Wy/Center St	AM	117.7	F	145.0	F	144.0	F	144.0	F	144.0	F	144.0	F	144.0	F	145.0	F	144.0	F	144.0	F	144.0	F	144.0	F
	PM	86.7	F	95.9	F	95.9	F	95.9	F	95.9	F	95.9	F	95.9	F	95.9	F	95.9	F	88.8	F	95.9	F	95.9	F
12 Castro Valley Blvd/New Ramp-New Rd ****	AM	n/a	n/a	n/a	n/a	28.0	C	n/a	n/a	23.8	C	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	12.2	B	n/a	n/a
	PM	n/a	n/a	n/a	n/a	23.1	C	n/a	n/a	17.8	B	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	17.1	B	n/a	n/a

Notes:  
 \* Average control delay per vehicle (seconds)  
 \*\* Refer to Figures for traffic volumes and lane geometrics required to achieve this LOS  
 \*\*\* Intersection 3 is stop-controlled under Existing, No Project, Alternative 1 and Alternative 5 scenarios, roundabout-controlled under Alternative 2a and 2b, and signalized under Alternative 3, 4, 6, 7, 8 and 9.  
 \*\*\*\* The east leg of Intersection 12 is the new I-580 WB off-ramp under Alternative 1 and is the new surface road connection under Alternative 3 and 7.

- Alternative Descriptions:**
- 1: Ramp Extension
  - 2: Roundabout(s)
  - 3: Surface Connection
  - 4: Two-Way Modifications
  - 5: Add WB Lane on Castro Valley Blvd.
  - 6: Ramp and Norbridge Connections to Castro Valley Boulevard
  - 7: Ramp and Norbridge Connections to Castro Valley Boulevard, With Surface Connection
  - 8: Widen Norbridge, Close Strobridge
  - 9: Widen Strobridge, Realign Stanton and Norbridge

**Table 4  
Castro Valley Circulation Study  
Year 2015 Intersection Levels of Service**

Intersection	Peak Hour	Existing Conditions		2015 No Project		2015 Alt. 6		2015 Alt. 7	
		Delay*	LOS	Delay*	LOS	Delay*	LOS**	Delay*	LOS**
1 Castro Valley Blvd/Stanton-Norbridge Av	AM	47.1	D	124.7	F	19.9	B	23.3	C
	PM	38.1	D	107.7	F	23.4	C	25.9	C
2 Castro Valley Blvd/John Dr-Strobridge Av	AM	17.8	B	25.3	C	45.5	D	29.8	C
	PM	24.8	C	29.0	C	46.9	D	54.4	D
3 I-580 WB off-ramp-Norbridge Av/ Strobridge Av/New Rd ***	AM	38.4	E	49.2	E	23.5	C	20.0	C
	PM	52.5	F	102.7	F	31.8	C	25.1	C
4 I-580 EB ramps/Strobridge Av	AM	27.2	C	45.0	D	39.8	D	39.8	D
	PM	38.7	D	46.0	D	42.5	D	42.5	D
5 Castro Valley Blvd/Lake Chabot Rd	AM	24.1	C	40.0	D	40.5	D	41.9	D
	PM	33.7	C	65.0	E	68.9	E	69.4	E
6 Castro Valley Blvd/Redwood Rd	AM	34.3	C	44.0	D	43.7	D	43.4	D
	PM	38.0	D	67.8	E	69.1	E	68.9	E
7 Norbridge Ave/Redwood Rd	AM	36.9	D	28.4	C	25.8	C	25.7	C
	PM	37.6	D	29.4	C	27.9	C	27.9	C
8 I-580 WB ramp/Redwood Rd	AM	9.1	A	20.1	C	29.8	C	30.0	C
	PM	9.6	A	24.7	C	30.5	C	30.5	C
9 I-580 EB ramp/Redwood Rd	AM	10.7	B	21.8	C	36.5	D	36.0	D
	PM	11.4	B	21.7	C	29.8	C	29.8	C
10 Castro Valley Blvd/Center St	AM	35.3	D	38.2	D	36.9	D	37.0	D
	PM	34.2	C	32.5	C	32.4	C	32.8	C
11 Grove Wy/Center St	AM	117.7	F	145.0	F	144.0	F	144.0	F
	PM	86.7	F	95.9	F	95.9	F	88.8	F
12 Castro Valley Blvd/New Ramp-New Rd ****	AM	n/a	n/a	n/a	n/a	n/a	n/a	12.2	B
	PM	n/a	n/a	n/a	n/a	n/a	n/a	17.1	B

Notes:

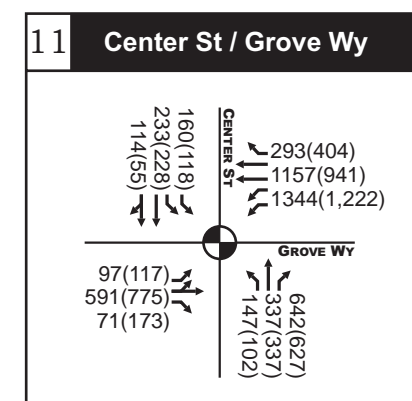
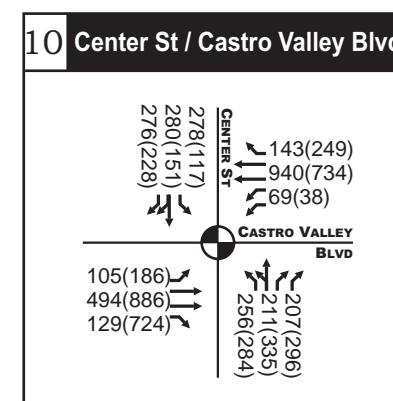
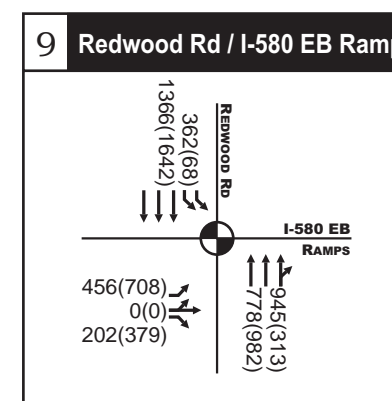
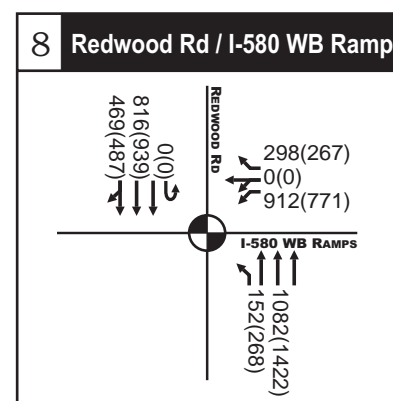
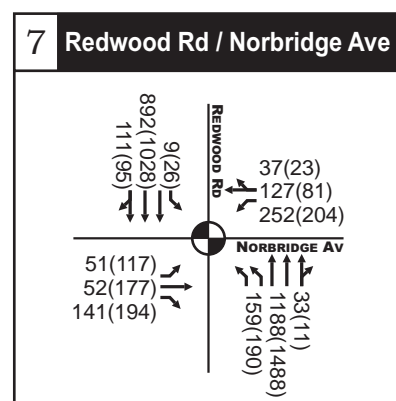
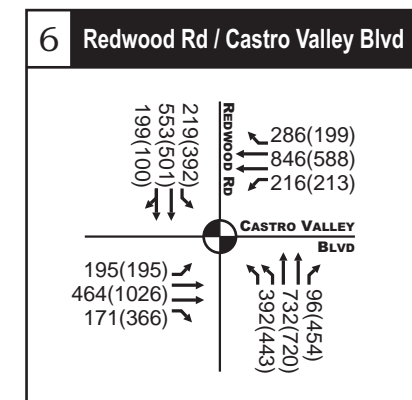
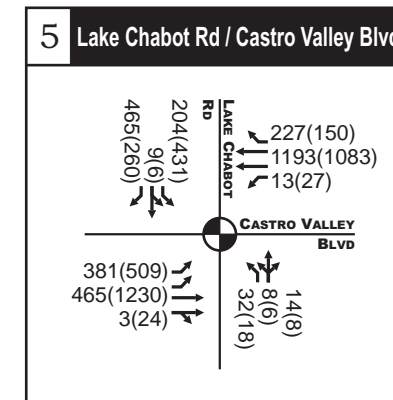
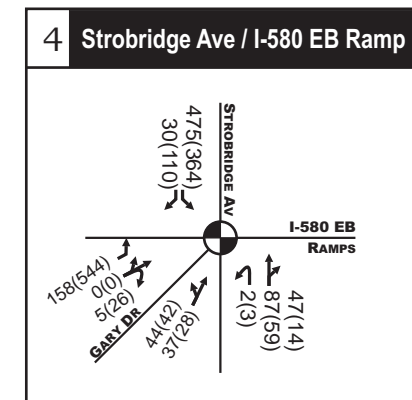
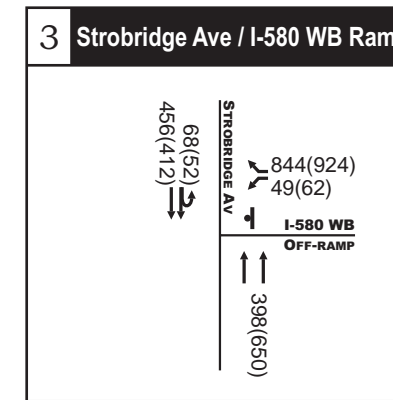
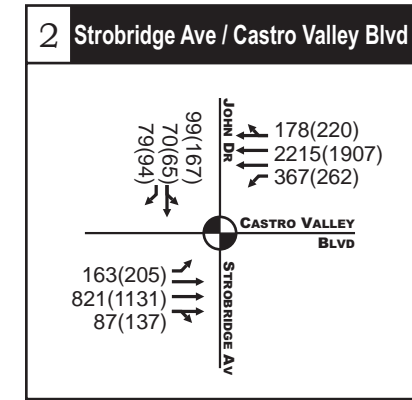
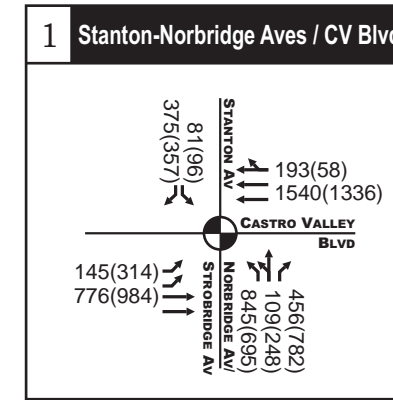
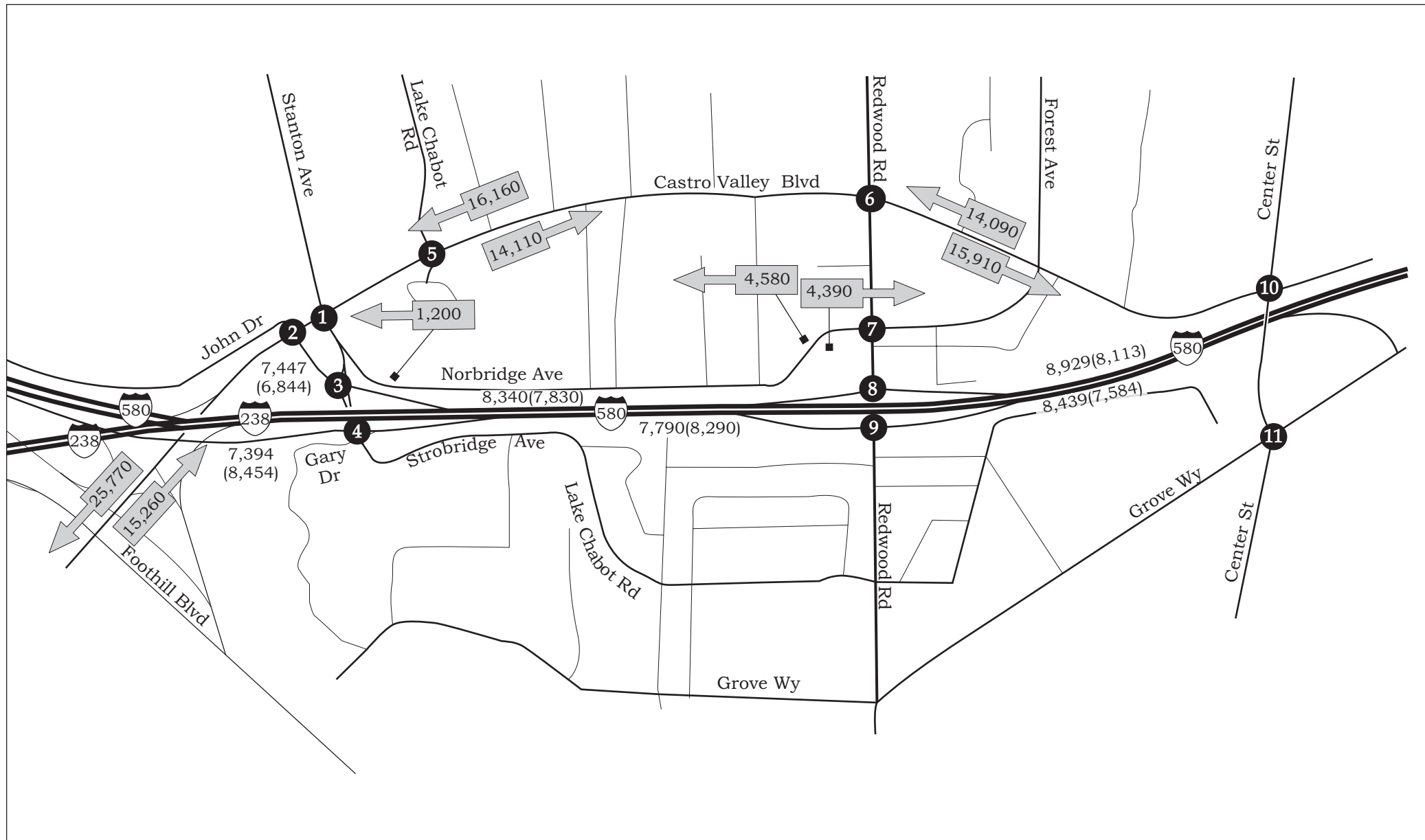
- \* Average control delay per vehicle (seconds)
- \*\* Refer to Figures for traffic volumes and lane geometrics required to achieve this LOS
- \*\*\* Intersection 3 is stop-controlled under Existing and No Project scenarios and signalized under Alternatives 6 and 7.
- \*\*\*\* The east leg of Intersection 12 is the new surface road connection under Alternative 7.

**Alternative Descriptions:**

- 6: Ramp and Norbridge Connections to Castro Valley Boulevard = PARTIAL BUILD WITHOUT SURFACE CONNECTION
- 7: Ramp and Norbridge Connections to Castro Valley Boulevard, With Surface Connection = PREFERRED ALTERNATIVE







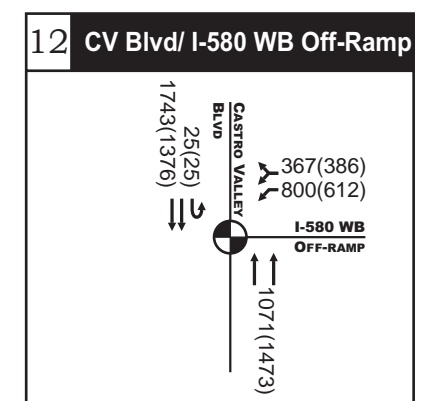
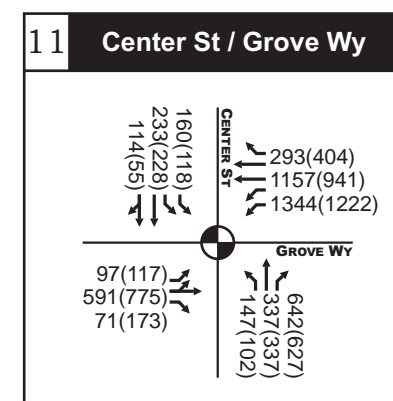
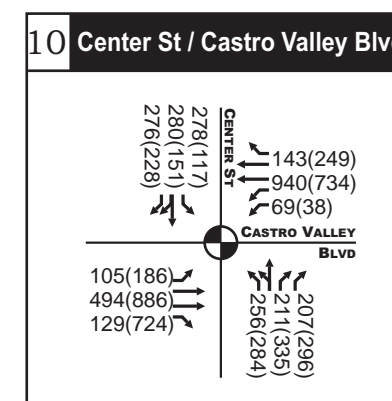
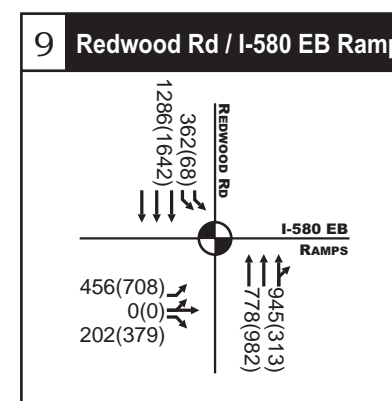
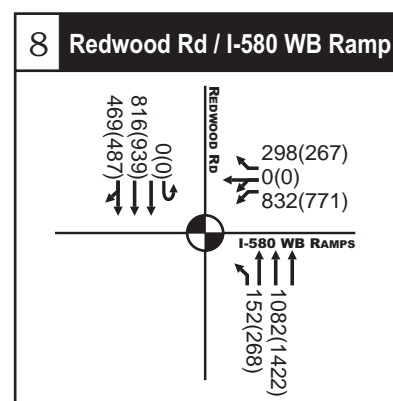
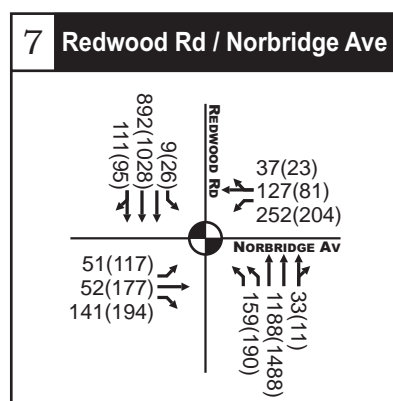
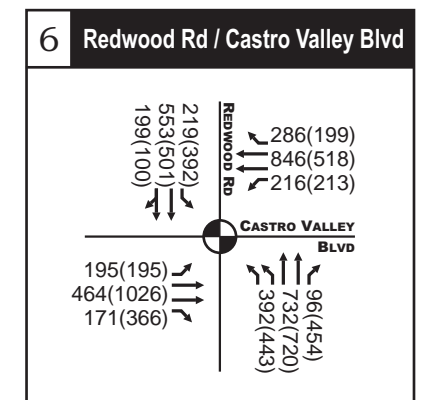
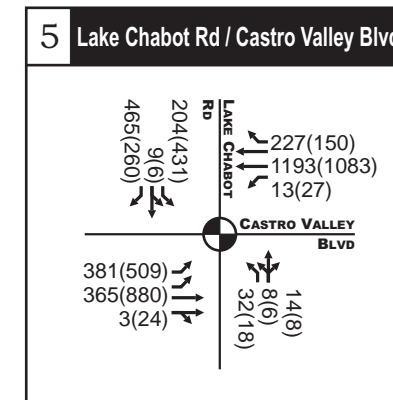
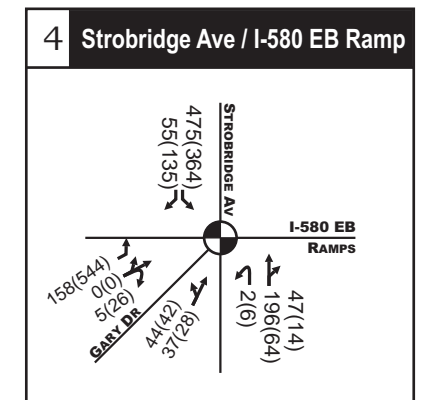
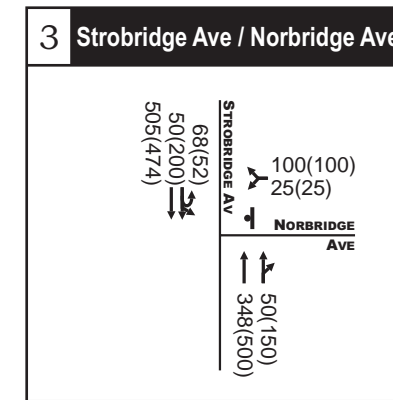
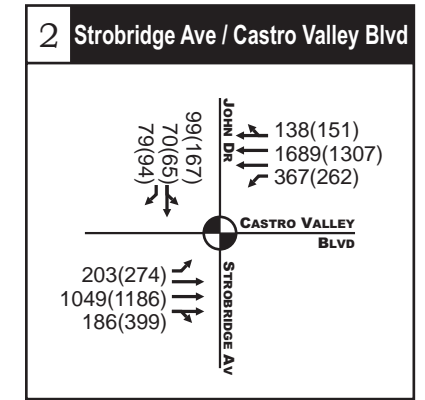
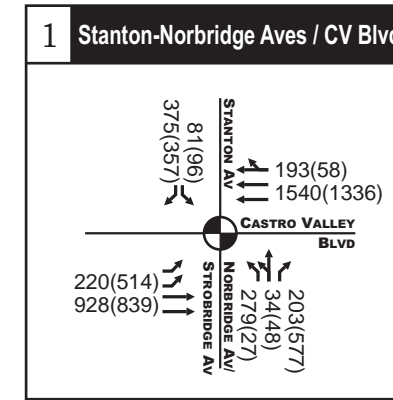
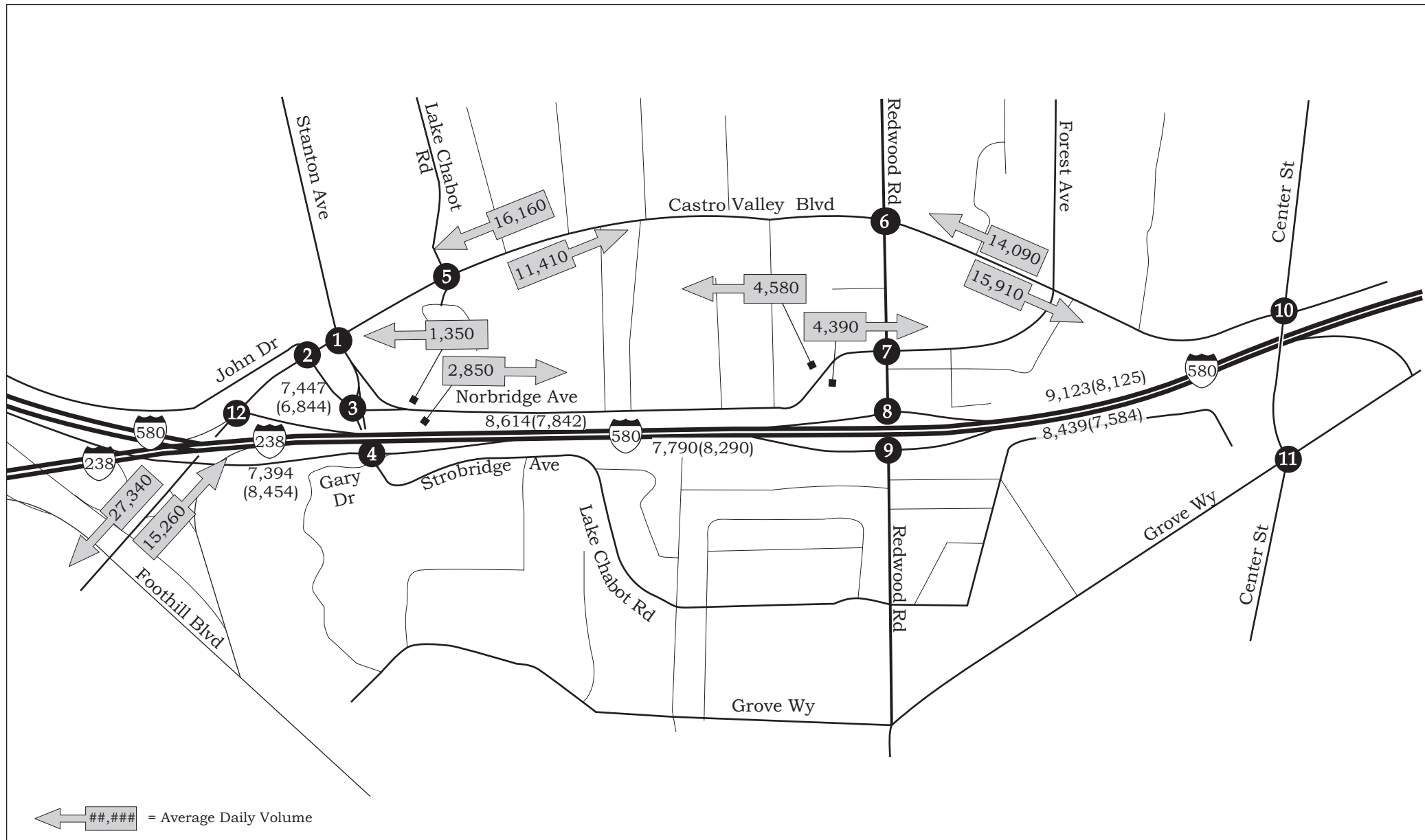
← ###,### = Average Daily Volume

**LEGEND**

- = Traffic lanes
- = Signalized Intersection
- = Stop sign control
- 34(76) = AM(PM) Peak Hour Volumes



Not to Scale

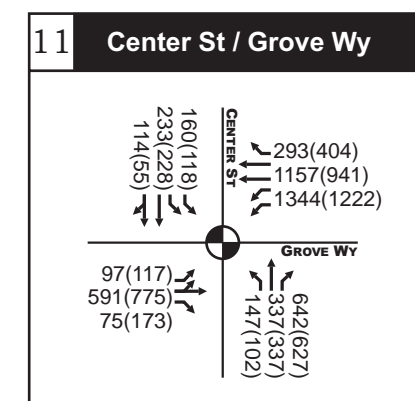
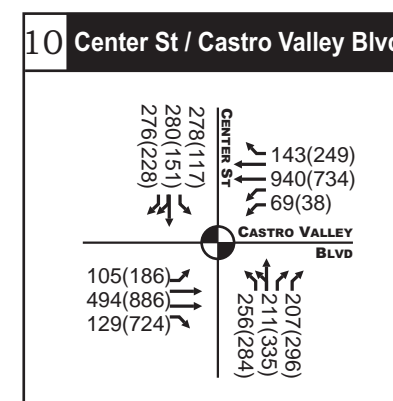
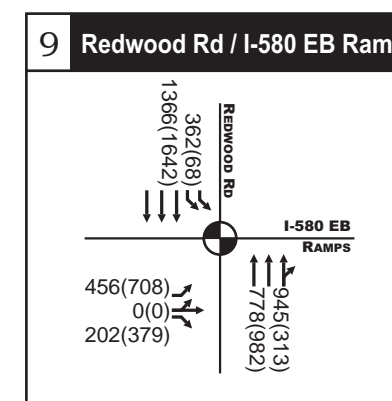
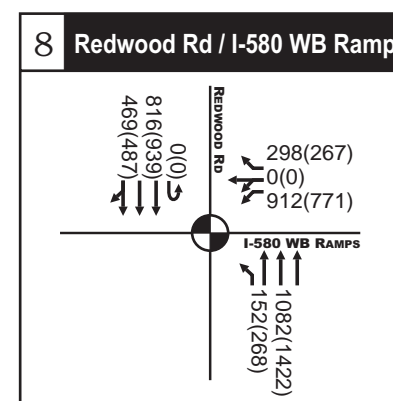
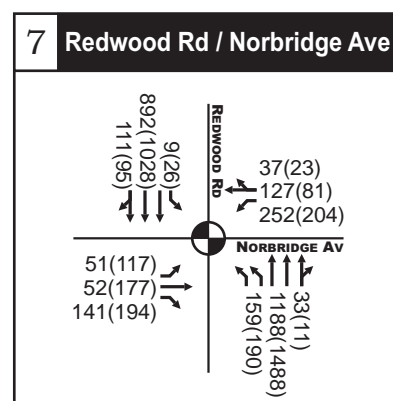
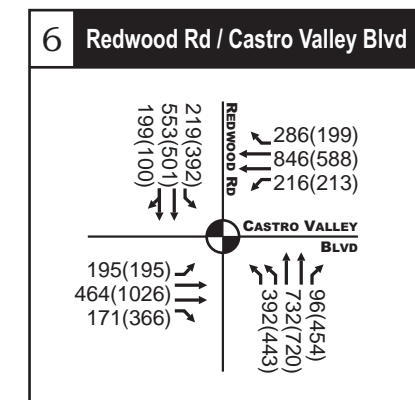
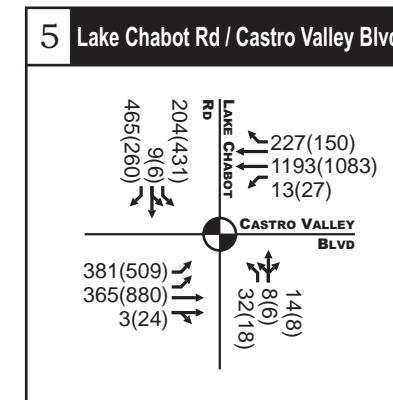
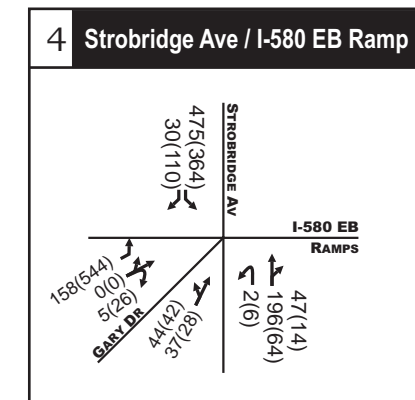
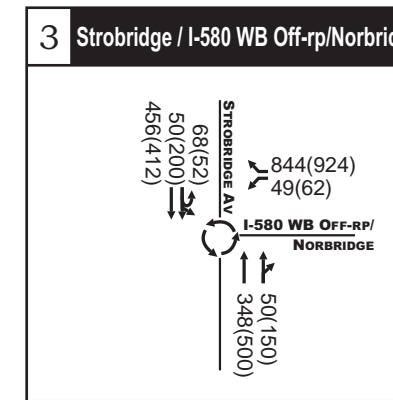
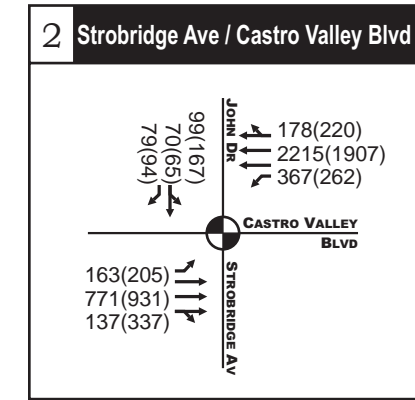
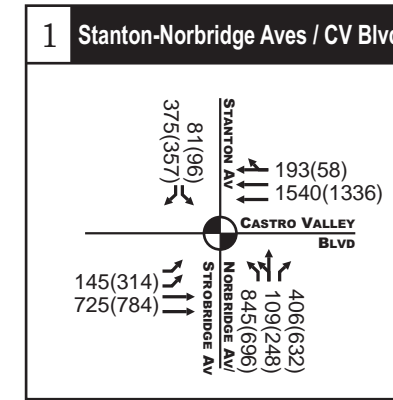
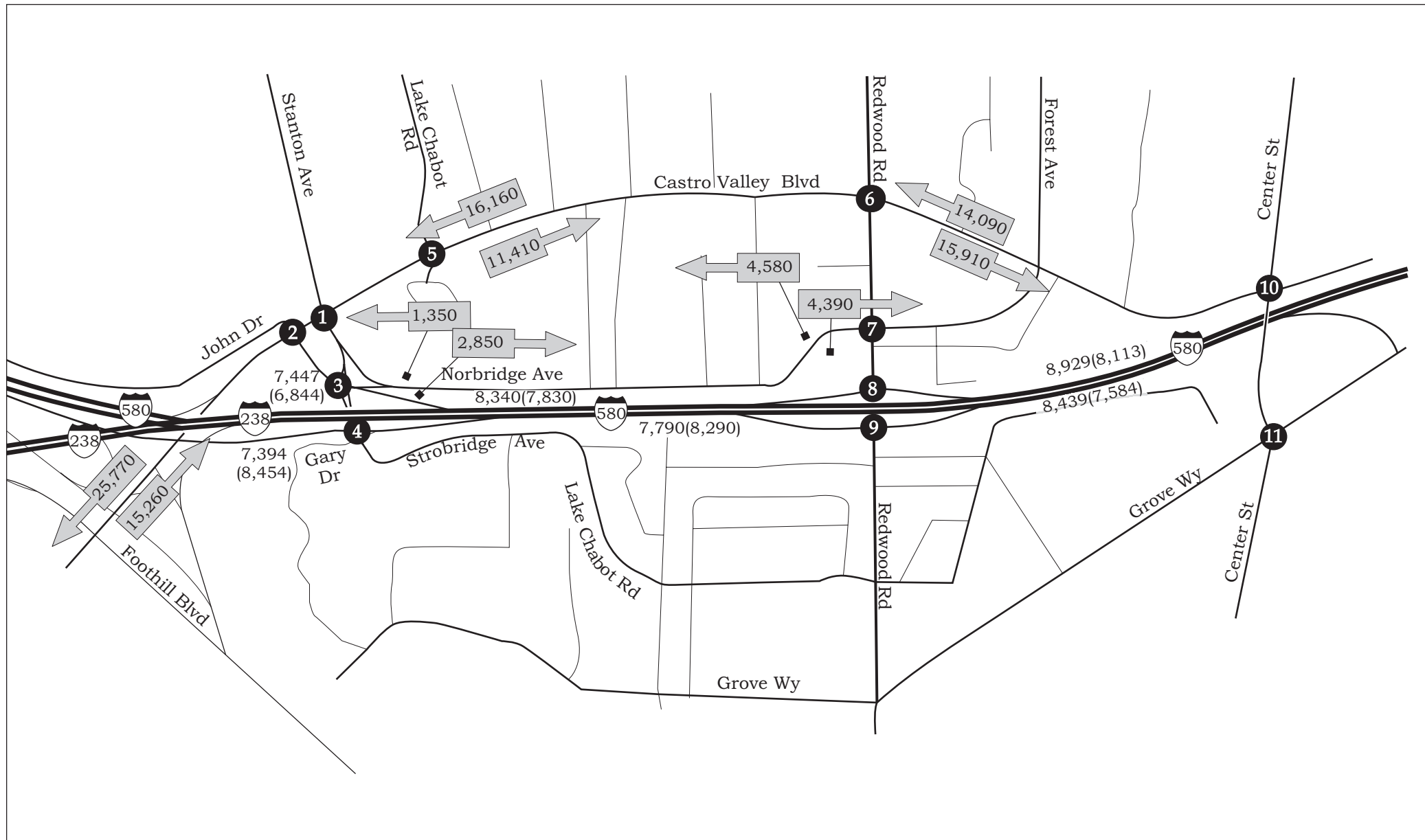


**LEGEND**

- Traffic lanes
- Signalized Intersection
- Stop sign control
- 34(76) = AM(PM) Peak Hour Volumes



Not to Scale



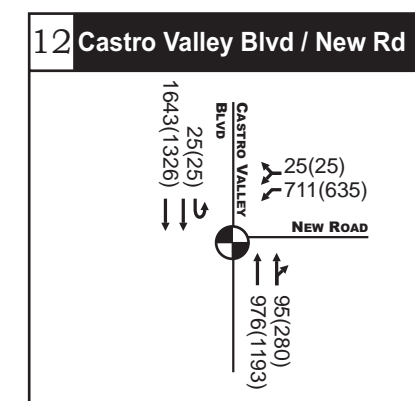
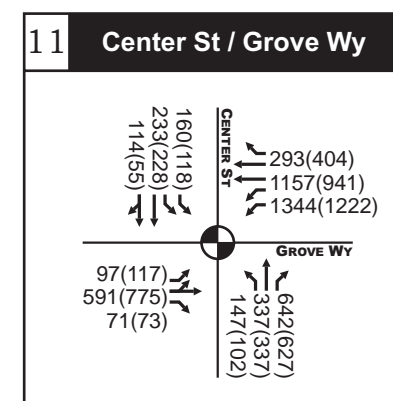
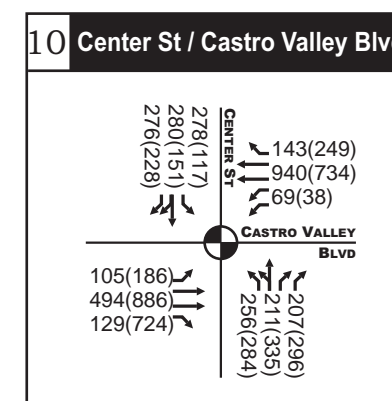
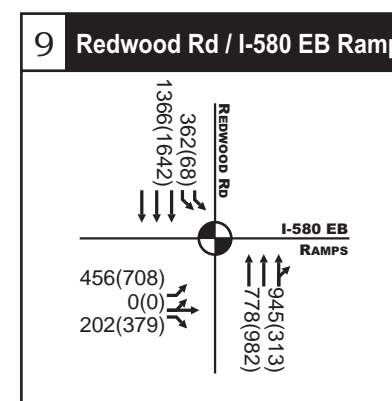
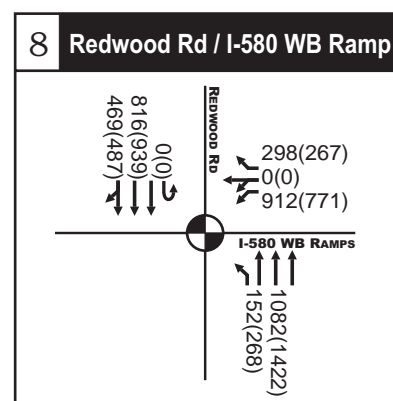
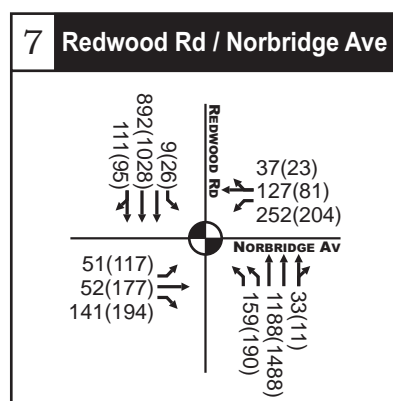
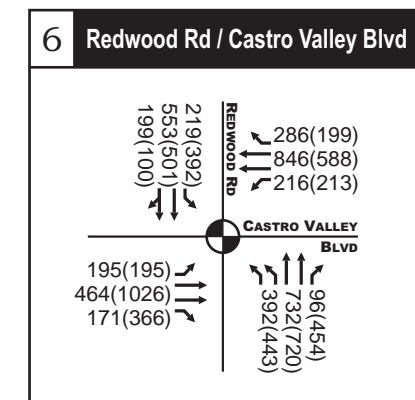
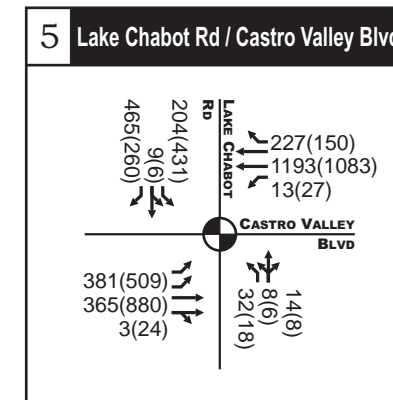
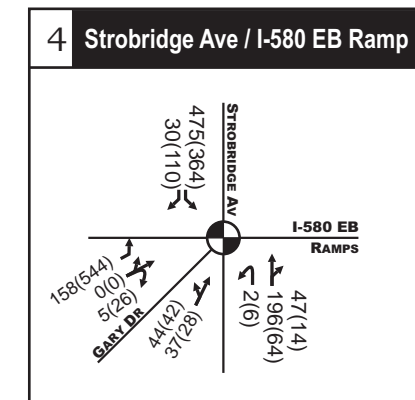
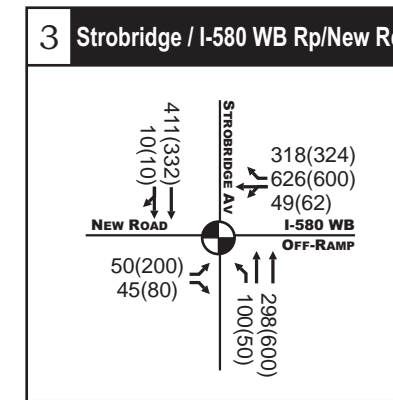
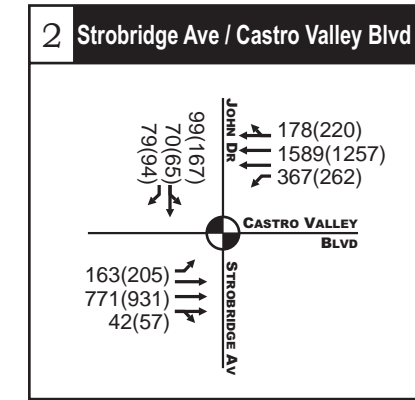
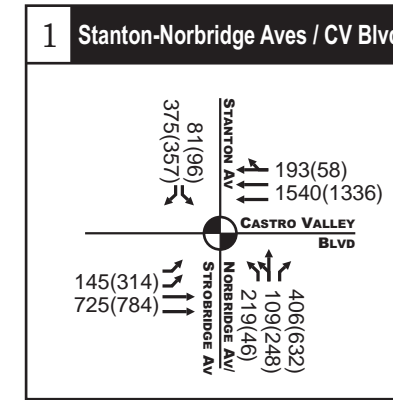
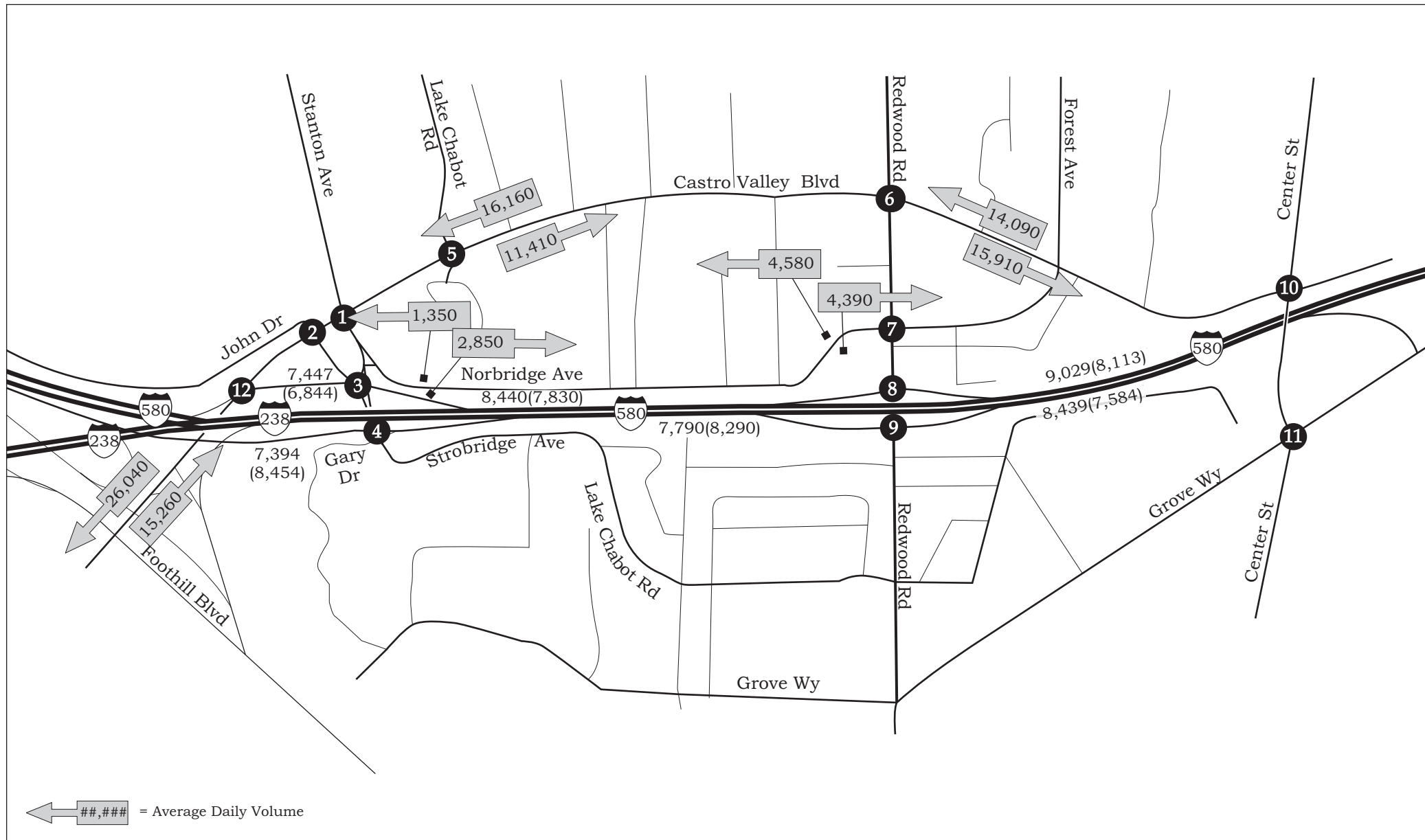
← ###,### = Average Daily Volume

**LEGEND**

- = Traffic lanes
- = Signalized Intersection
- = Roundabout
- = Stop sign control
- 34(76) = AM(PM) Peak Hour Volumes



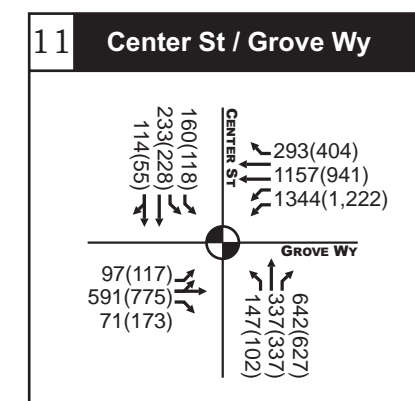
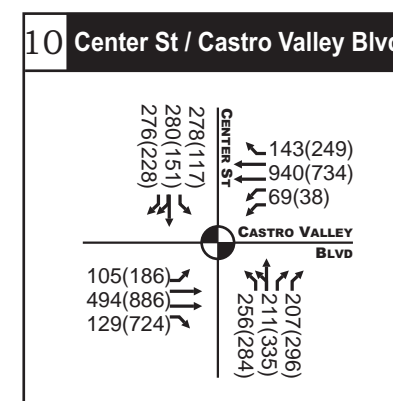
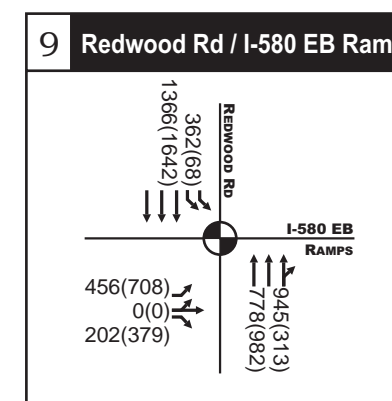
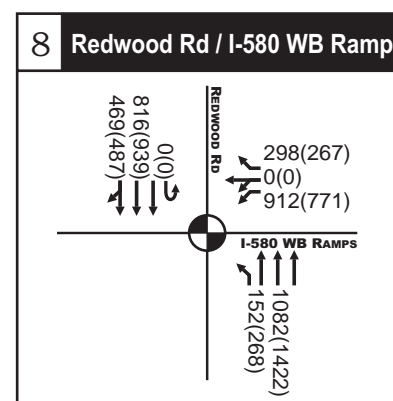
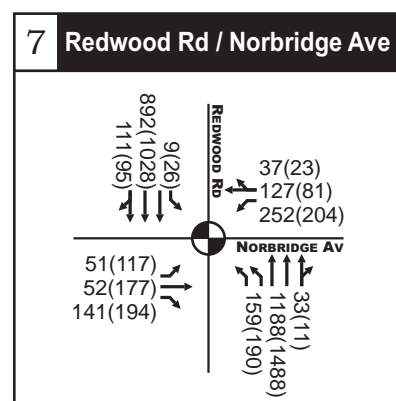
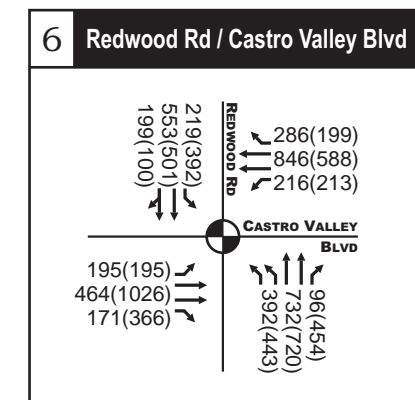
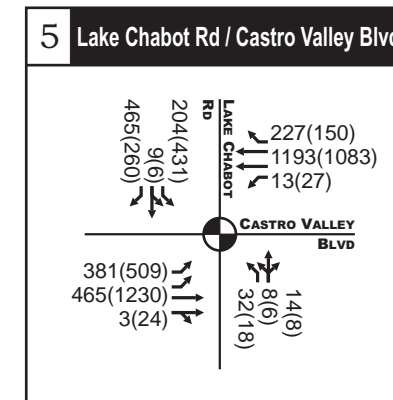
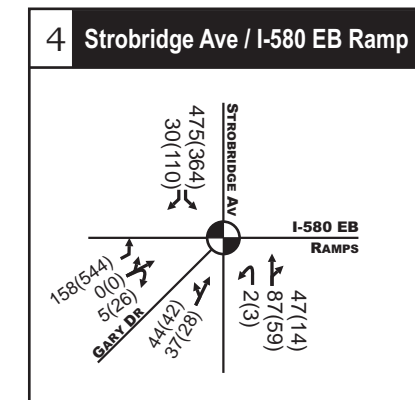
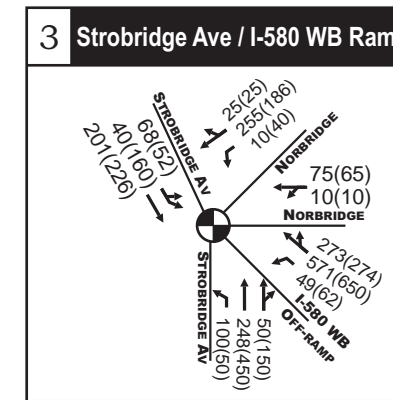
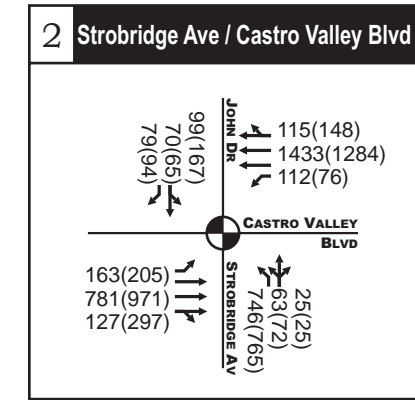
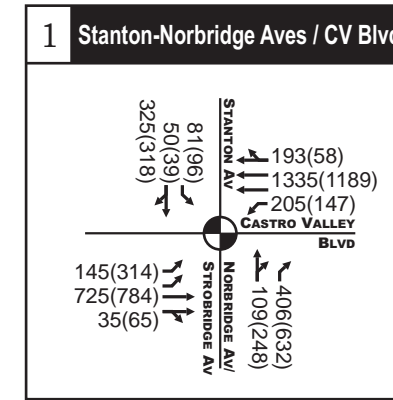
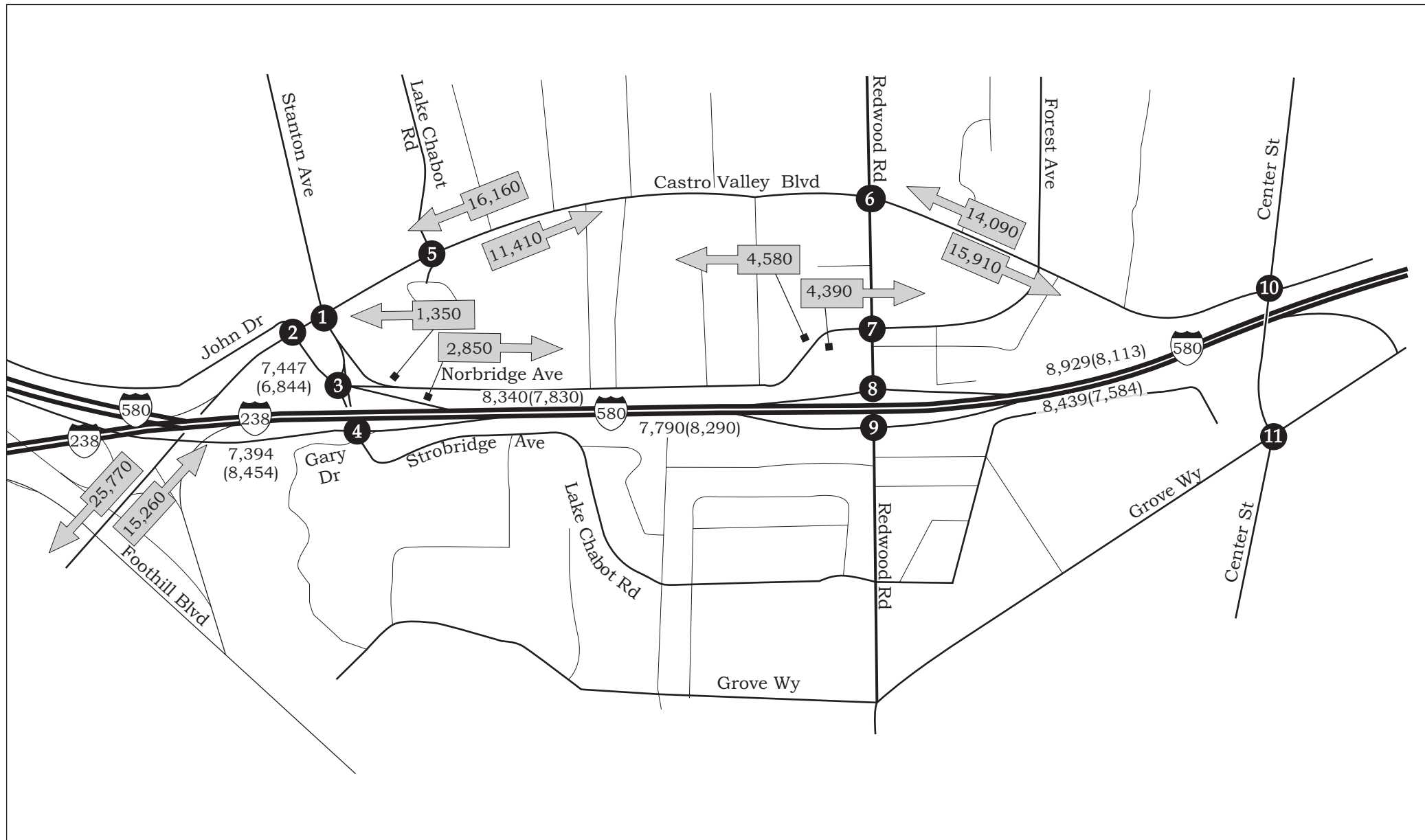
Not to Scale



**LEGEND**

- Traffic lanes
- Stop sign control
- Signalized Intersection
- 34(76) = AM(PM) Peak Hour Volumes





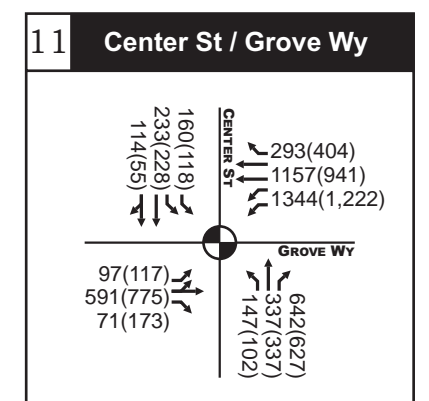
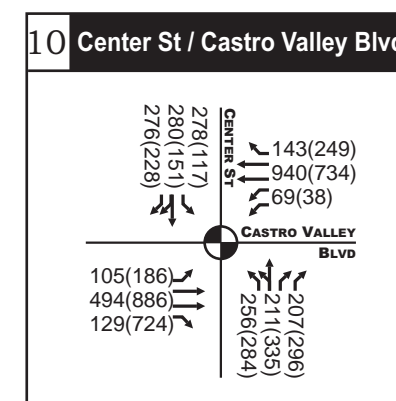
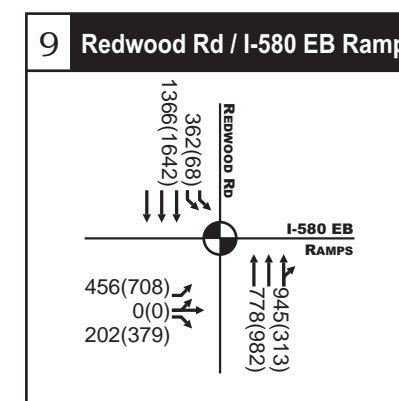
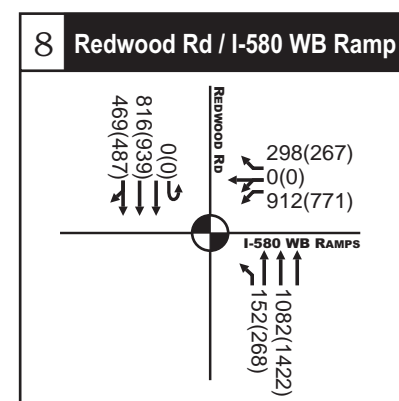
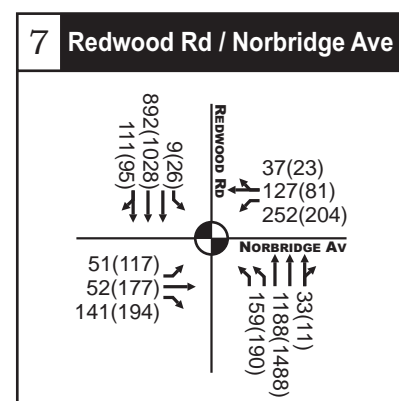
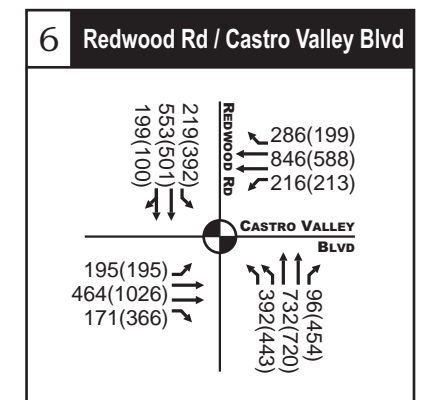
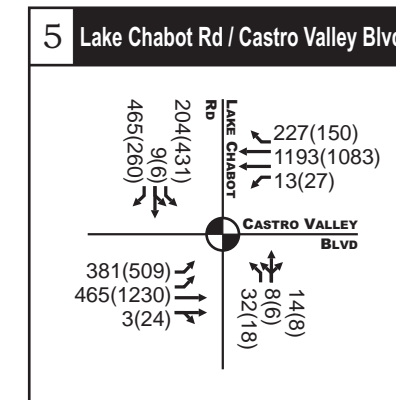
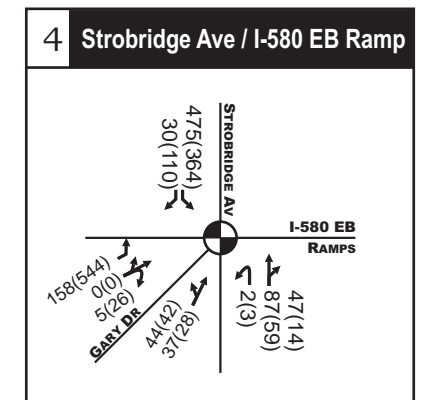
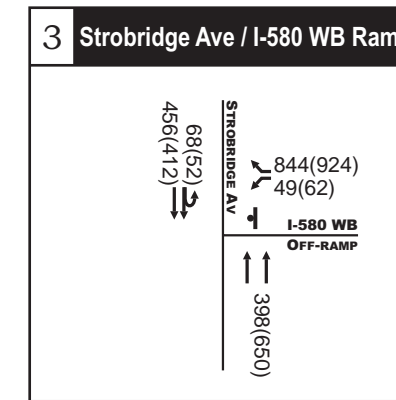
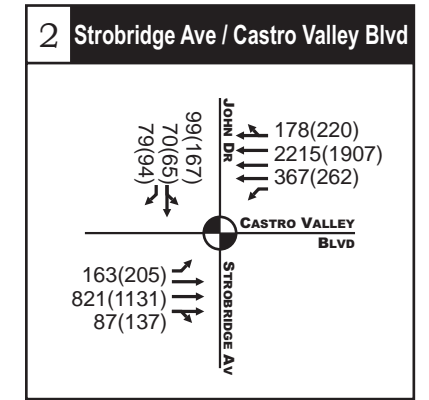
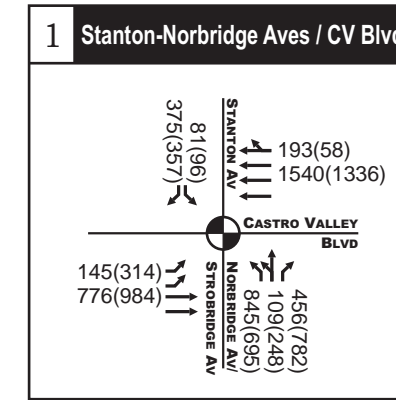
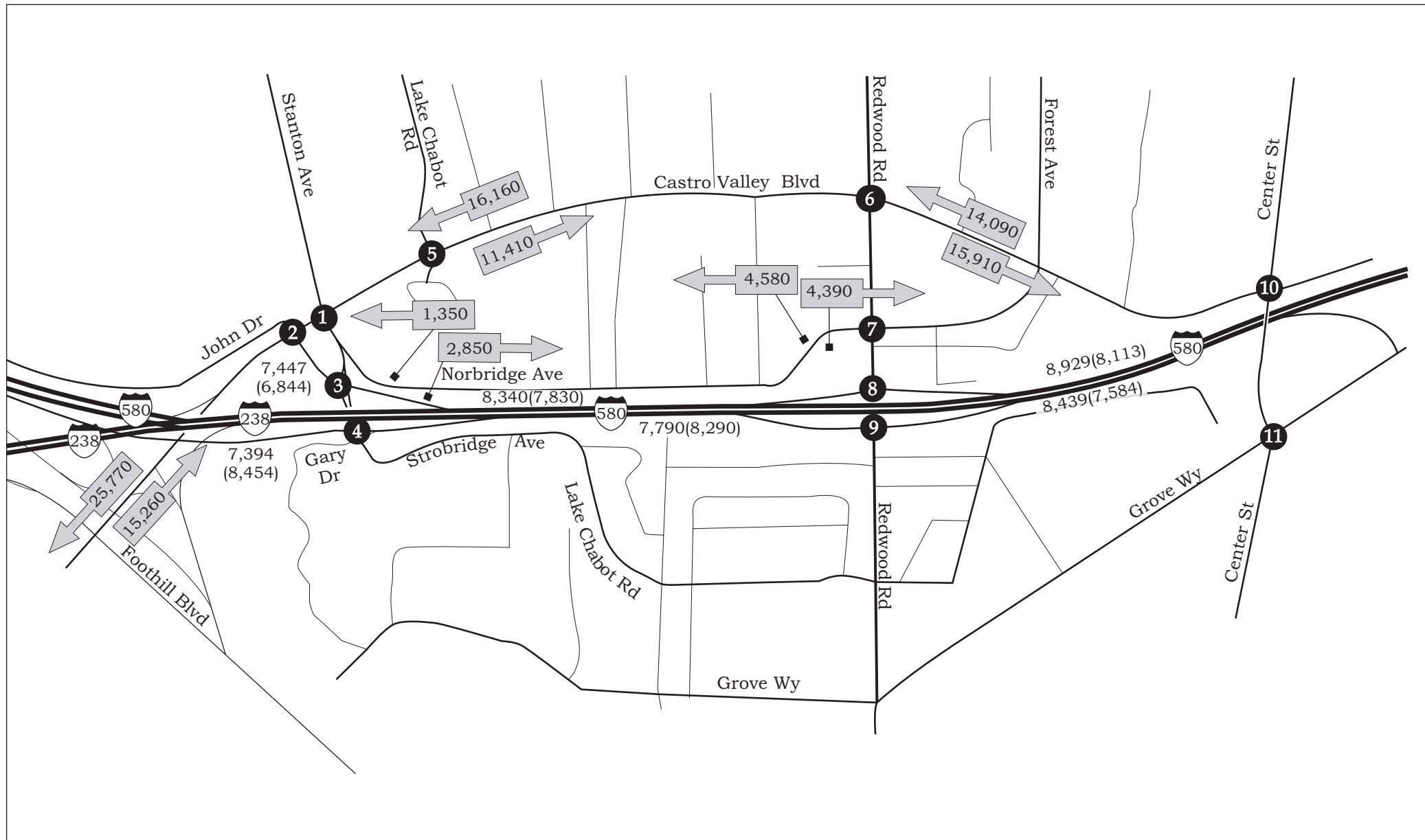
← ###,### = Average Daily Volume

**LEGEND**

- = Traffic lanes
- = Signalized Intersection
- = Stop sign control
- 34(76) = AM(PM) Peak Hour Volumes



Not to Scale



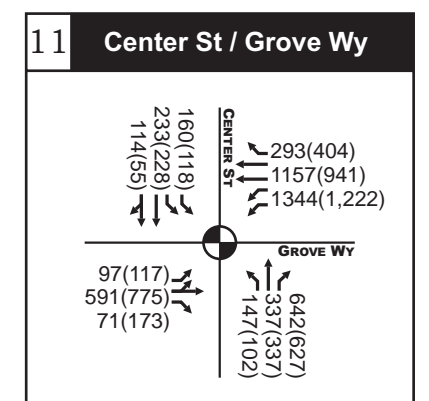
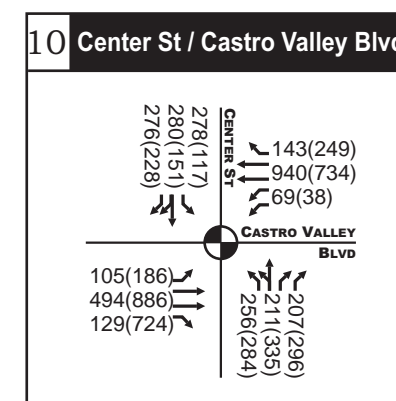
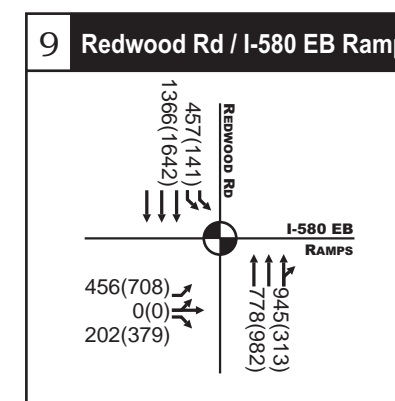
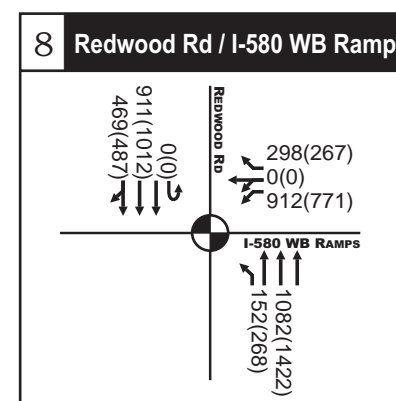
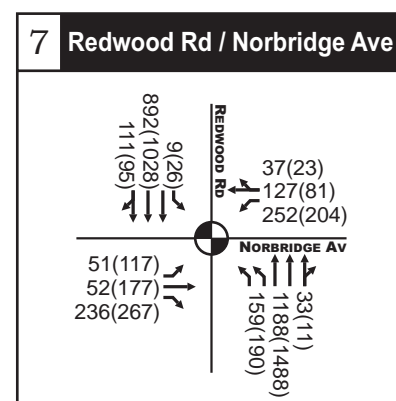
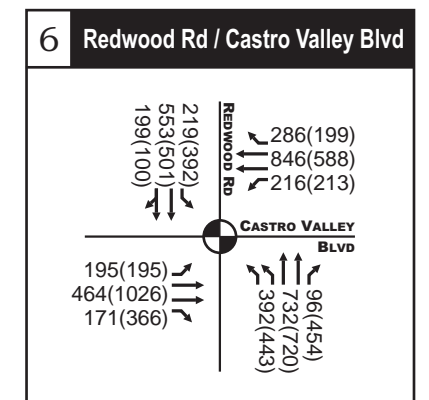
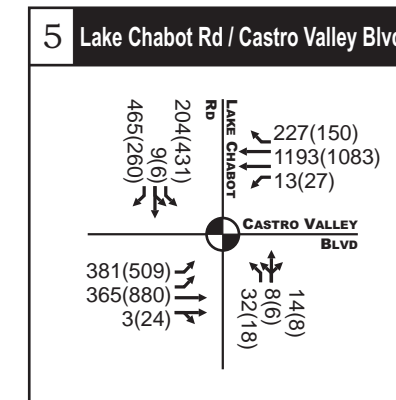
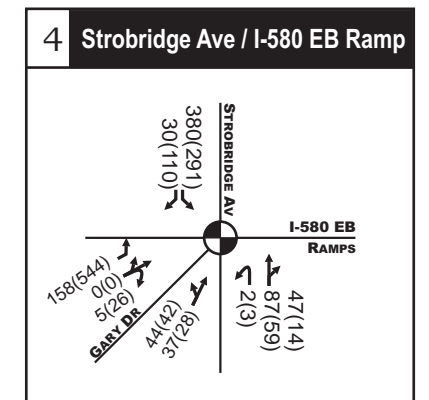
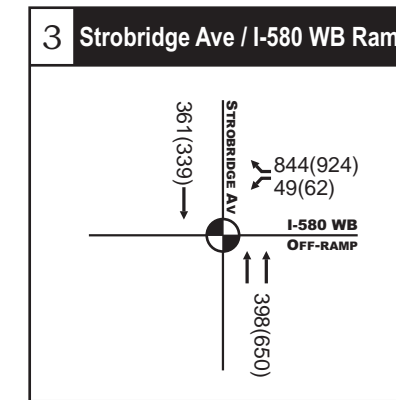
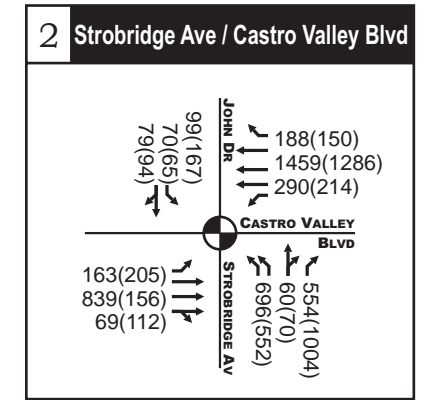
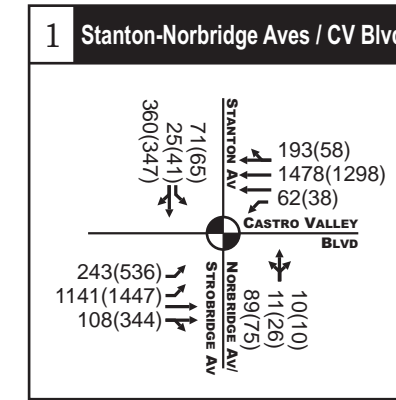
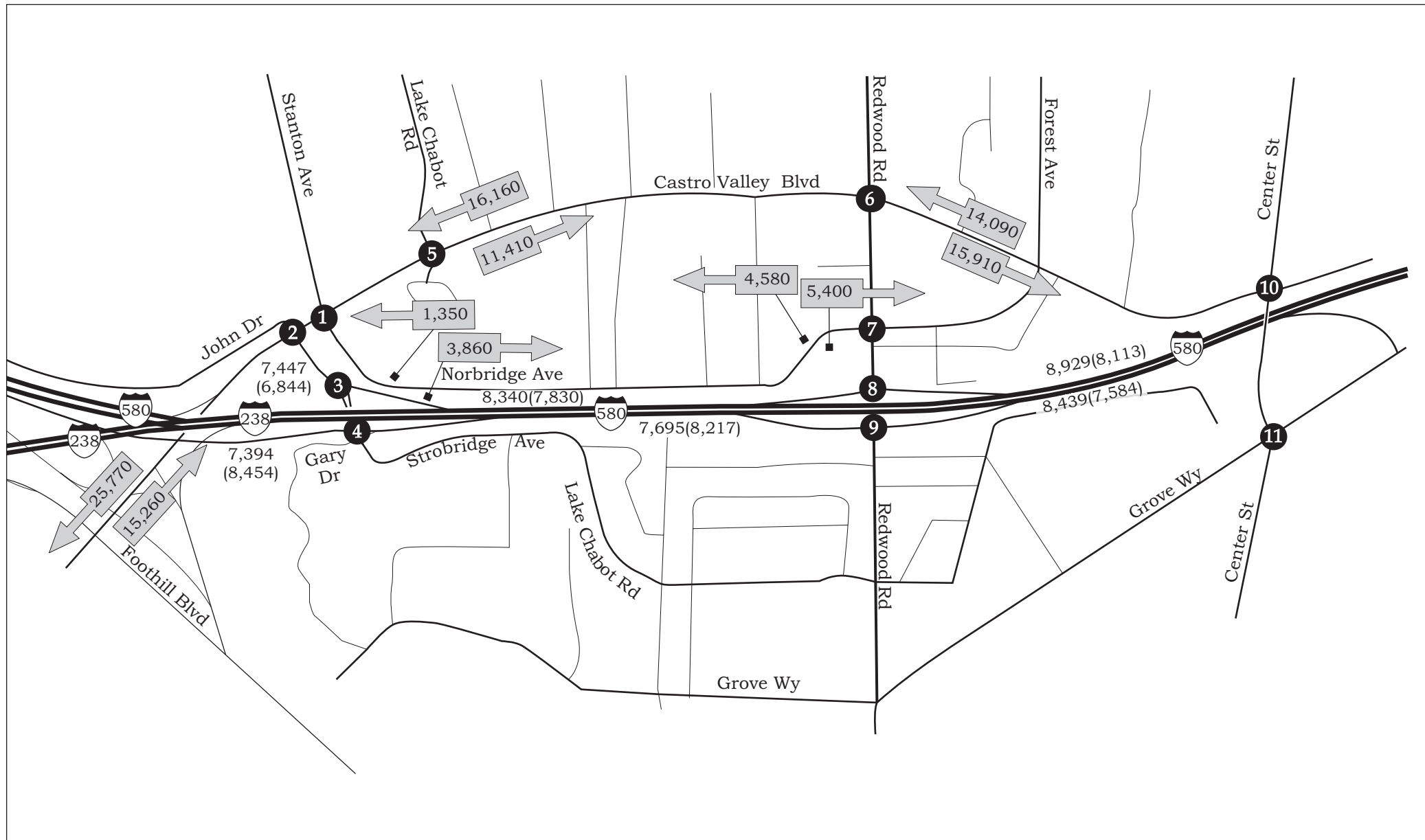
← ###,### = Average Daily Volume

**LEGEND**

- = Traffic lanes
- = Signalized Intersection
- = Stop sign control
- 34(76) = AM(PM) Peak Hour Volumes



Not to Scale



← ###,### = Average Daily Volume

**LEGEND**

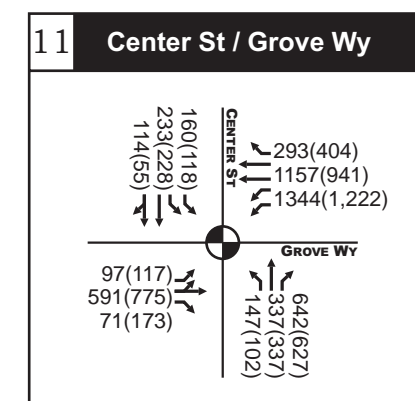
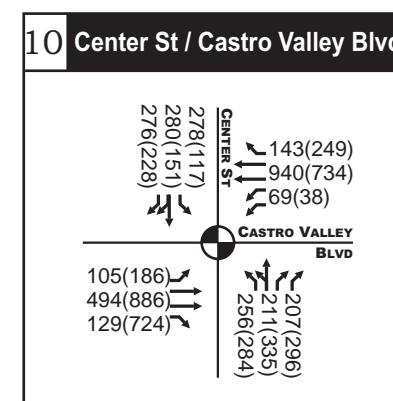
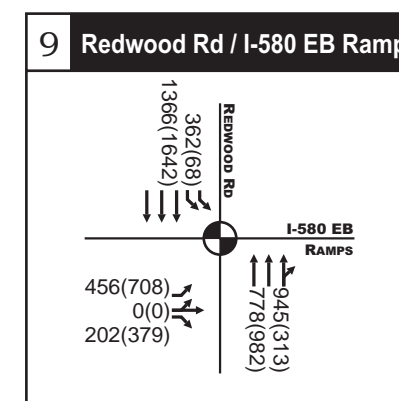
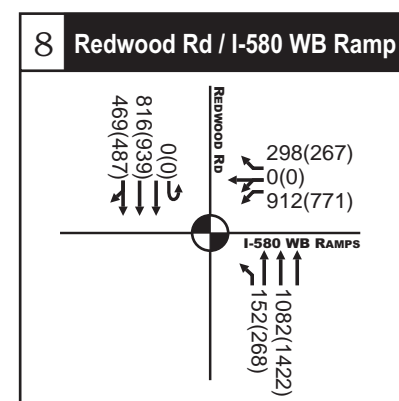
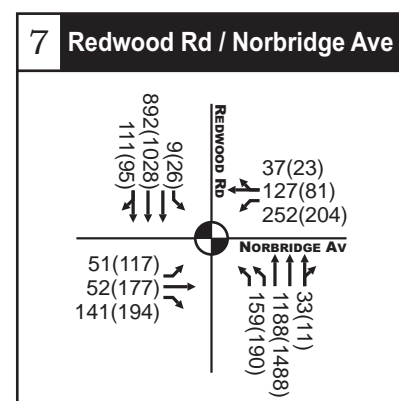
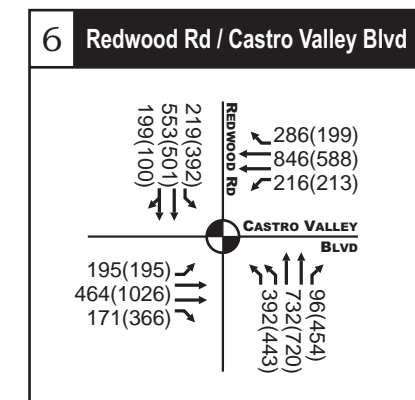
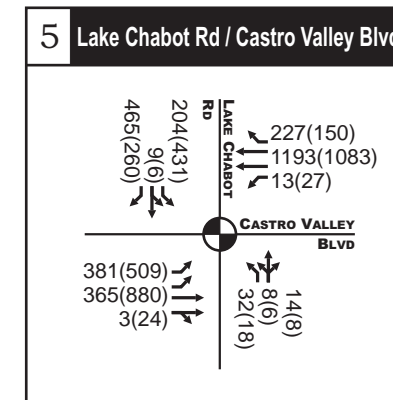
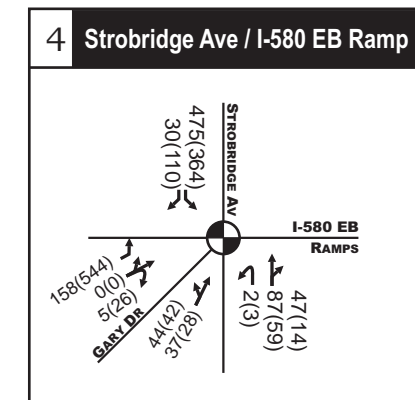
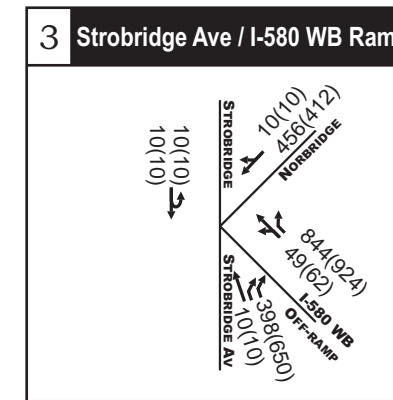
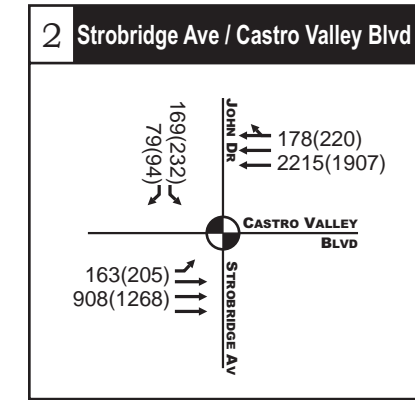
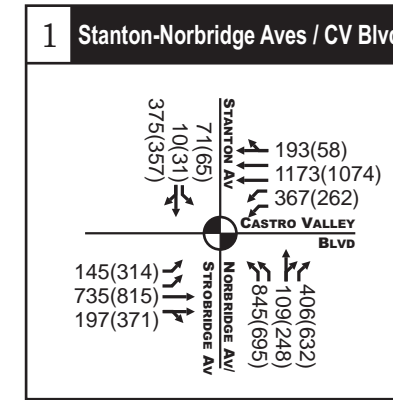
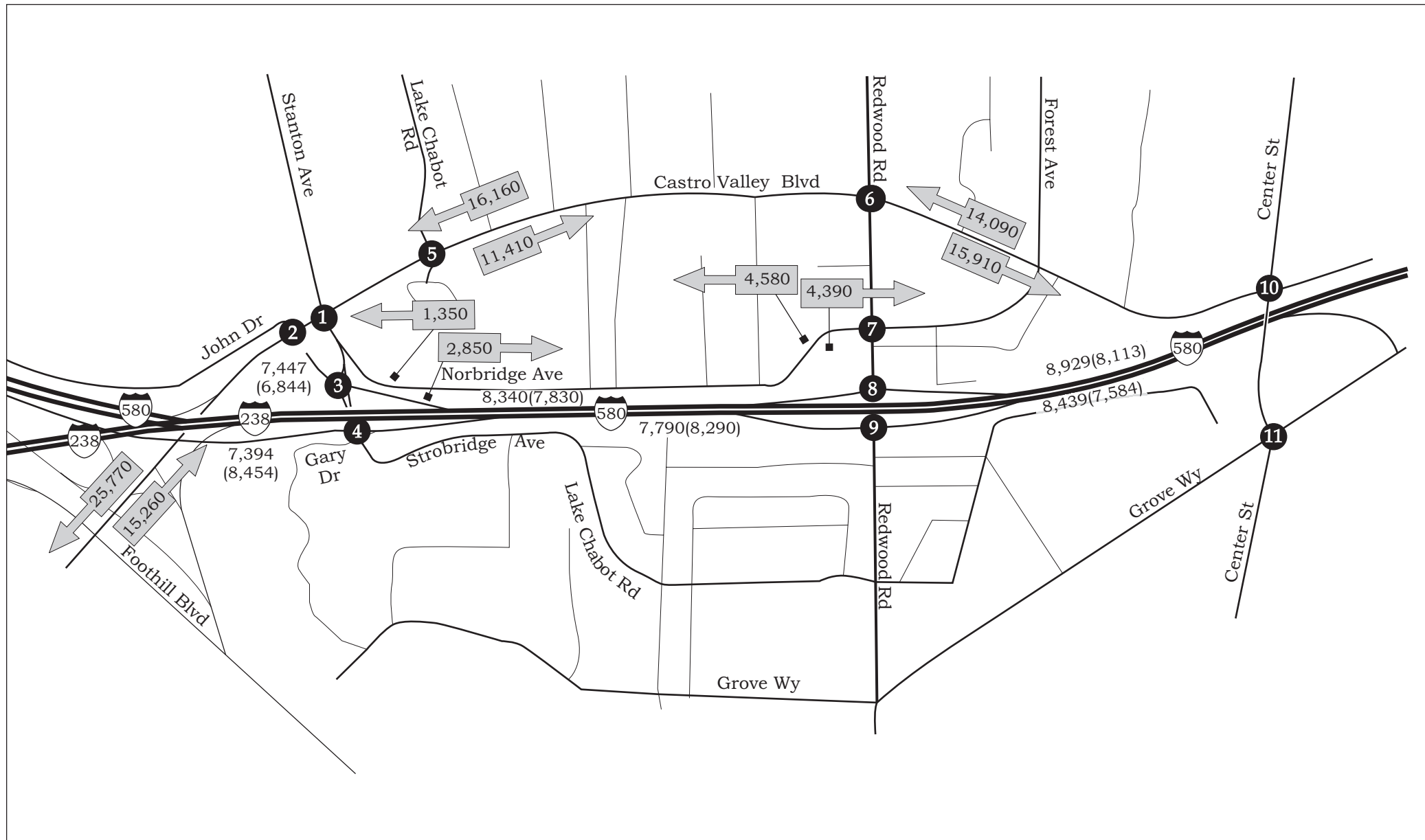
- = Traffic lanes
- = Signalized Intersection
- = Stop sign control
- 34(76) = AM(PM) Peak Hour Volumes



Not to Scale







← ###,### = Average Daily Volume

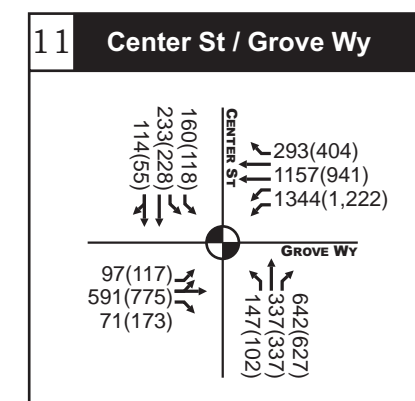
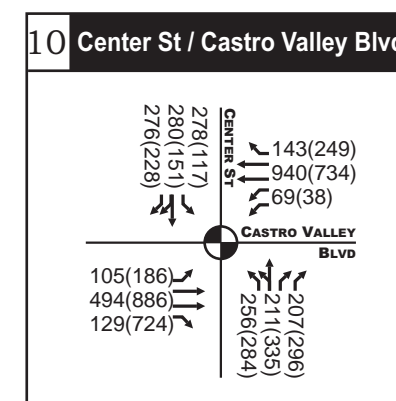
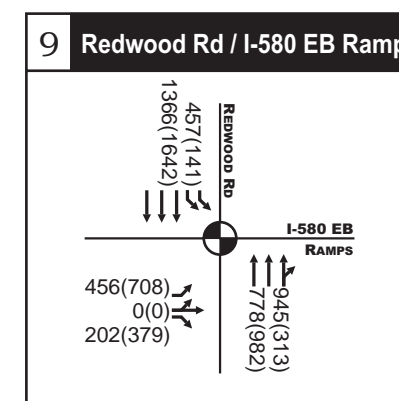
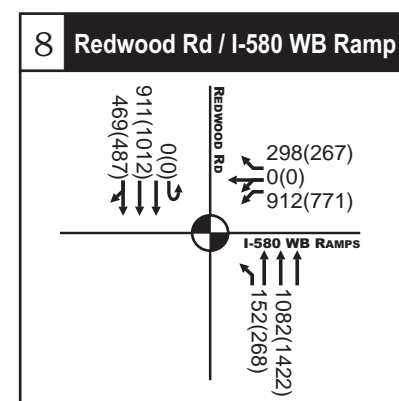
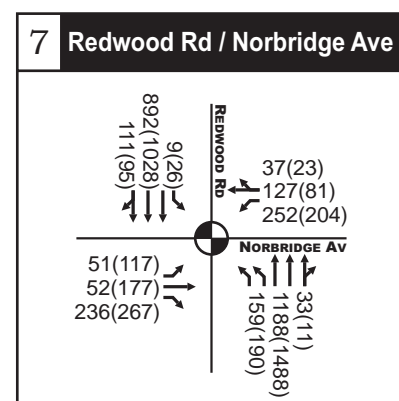
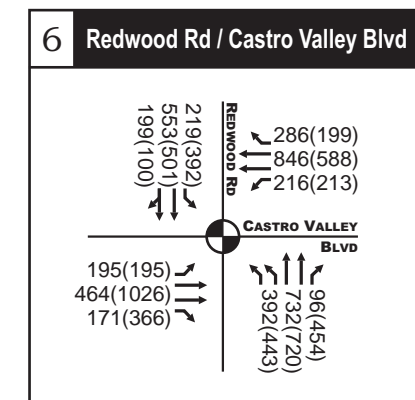
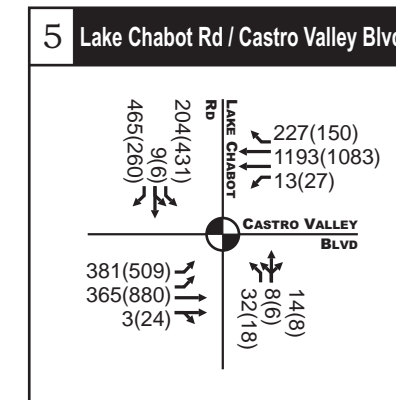
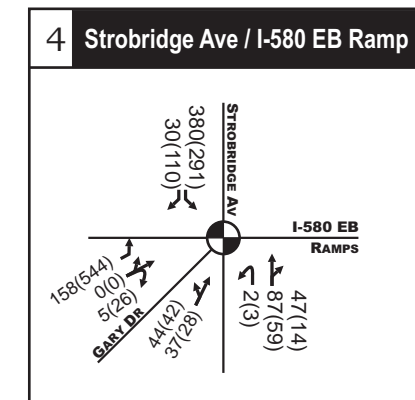
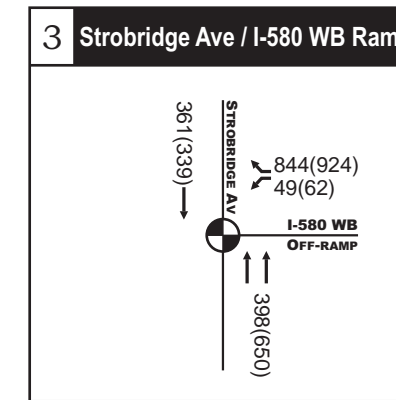
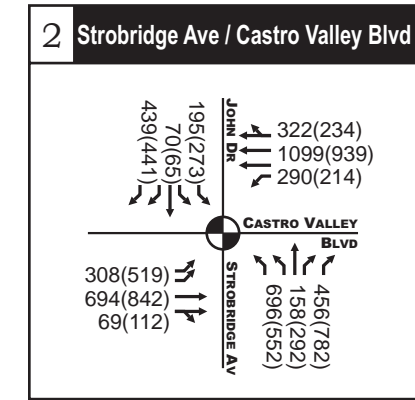
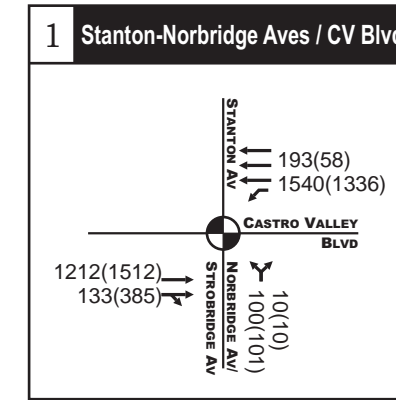
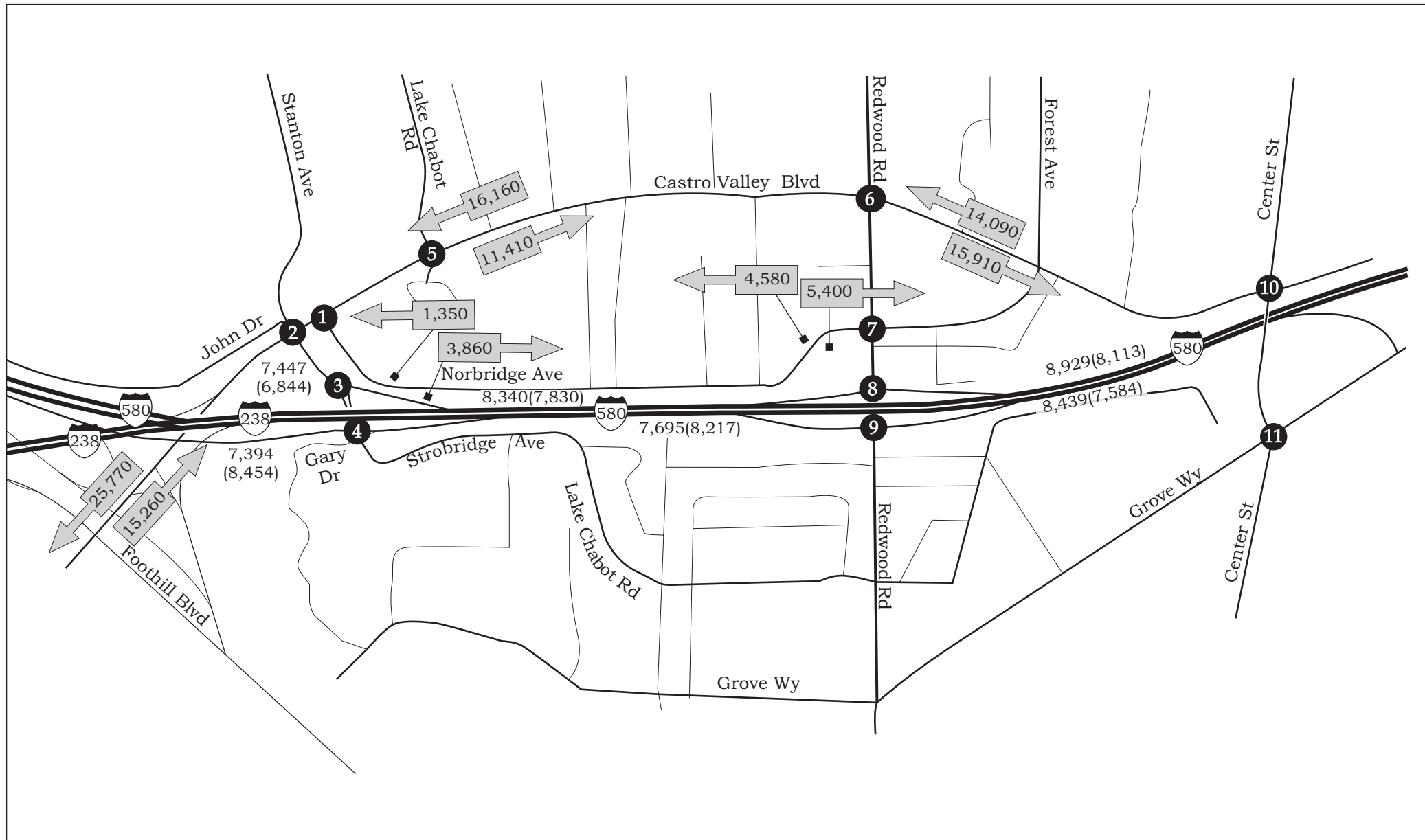
**LEGEND**

- Traffic lanes
- Stop sign control
- Signalized Intersection
- 34(76) = AM(PM) Peak Hour Volumes



Not to Scale

Castro Valley Circulation Study  
 Figure 24  
 YEAR 2015 PROJECT ALTERNATIVE 8 WIDEN NORBRIDGE, CLOSE STROBRIDGE  
 FORECASTS AND GEOMETRIES



← ###,### = Average Daily Volume

**LEGEND**

- = Traffic lanes
- = Signalized Intersection
- = Stop sign control
- 34(76) = AM(PM) Peak Hour Volumes



Not to Scale