MEMORANDUM

To: Michael Grubbs, City of San Bernardino

From: Steven Greene and Wahid Farhat, Iteris, Inc.

Date: November 3, 2009

Subject: Mount Vernon Avenue Bridge Traffic Conditions

Job #: J09–1638

Introduction

The purpose of this memorandum is to update the existing conditions traffic data for the Mount Vernon Avenue Bridge replacement project. A previous *Pedestrian and Vehicular Detour Analysis* (LSA Associates, 2004) documented the existing conditions at 22 intersections at that time.

This memorandum summarizes the results of the existing level of service (LOS) at all 22 study intersections. The analysis of traffic operations at intersections was conducted according to the *Highway Capacity Manual* (HCM 2000) Operations Methodology. The analysis was conducted using Synchro 6 software. This document also forecasts the year 2035 design hour volume (DHV) and average daily traffic (ADT) for the Mount Vernon Avenue Bridge using existing 2009 counts and model data from the base year and horizon year of the Southern California Association of Governments (SCAG) 2008 Regional Transportation Plan (RTP) travel demand model.

Existing (2009) Traffic Volumes

A detailed inventory of intersection geometrics and control type was conducted in October 2009 at the 22 study intersections. The lane geometry and control type of the study intersections are illustrated in **Figure 1**. Vehicle turning movement counts were conducted during the a.m. peak period (7:00 a.m. to 9:00 a.m.) and the p.m. peak period (4:00 p.m. to 6:00 p.m.) at the 22 study intersections in October 2009. The hour with the highest total traffic volume at each intersection was taken to be the peak hour for that peak period. Detailed vehicle turning movement data are included in **Appendix A**. Vehicle classification counts (e.g., passenger vehicle, 2-axle truck, 3-axle truck, and 4 or more axle truck), were conducted at the following four study intersections:

- 5th Street and Mount Vernon Avenue
- 3rd Street and H Street
- 2nd Street and Mount Vernon Avenue
- Rialto Avenue and Mount Vernon Avenue

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The traffic counts for these intersections were converted to passenger car equivalent (PCE) volumes using PCE factors of 1.5, 2.0, and 3.0 for 2-axle, 3-axle, and 4-axle trucks, respectively. Truck percentages for the remaining intersections for which classification counts were not collected were developed from the percentages at adjacent intersections. Volume development worksheets are included in **Appendix B**. Existing 2009 PCE volumes for the weekday peak hours are illustrated in **Figure 2.**

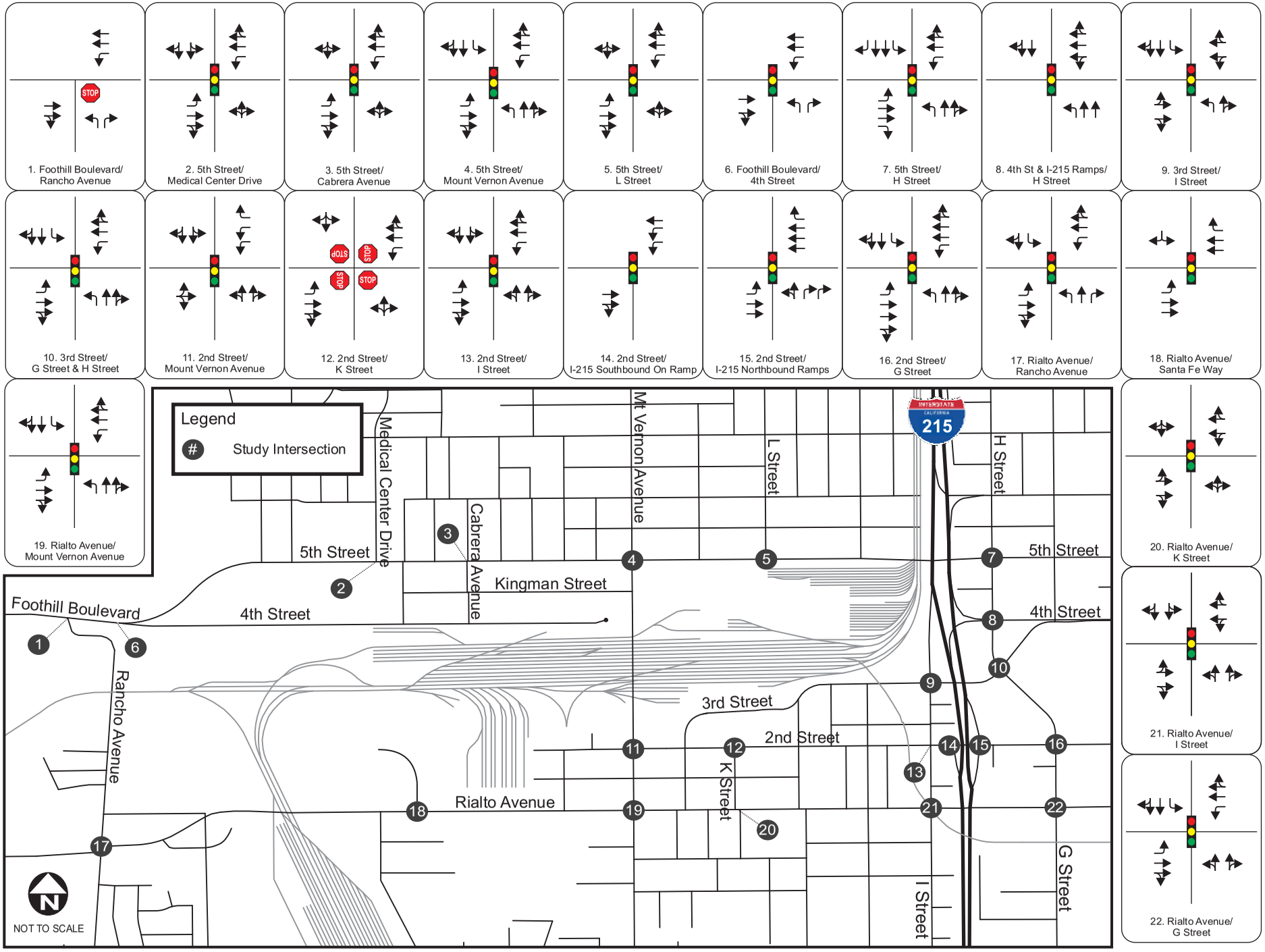
In addition, a 24-hour directional volume count was conducted for the Mount Vernon Avenue Bridge in October 2009. Approximately 14,700 vehicles per day cross the bridge. **Table 1** and **Table 2** summarize the 2009 peak hour and daily traffic volumes. The 24-hour directional volume counts are documented in **Appendix C**.

Table 1: Existing 2009 AM and PM Peak Hour Traffic Volume at the Mount Vernon Avenue Bridge

Location	AM Peak Hour Volume			PM Peak Hour Volume		
	Northbound	Southbound	Total	Northbound	Southbound	Total
Mount Vernon Avenue Bridge	494	537	1031	655	592	1247

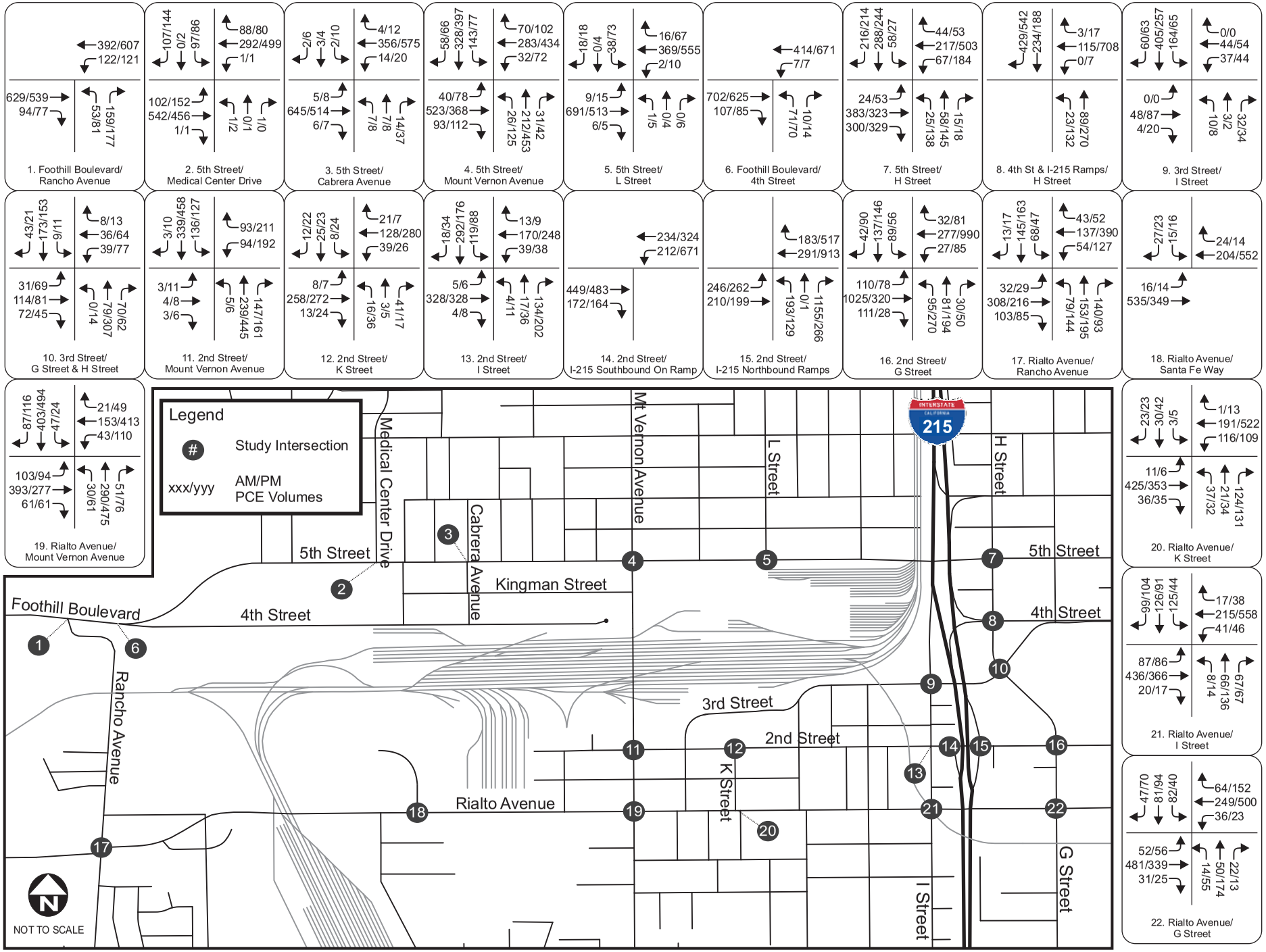
Table 2: Existing 2009 Daily Traffic Volume at the Mount Vernon Avenue Bridge

Location	Daily Traffic Volume		
	Northbound	Southbound	Total
Mount Vernon Avenue Bridge	7519	7158	14677



Mount Vernon Avenue Bridge
City of San Bernardino

FIGURE 1
Intersection Lane Geometry and Control Type



Mount Vernon Avenue Bridge
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FIGURE 2
Existing 2009 PCE Volumes

Existing (2009) Levels of Service

A level of service analysis using HCM 2000 methodologies was conducted to evaluate existing a.m. and p.m. peak hour traffic conditions at the study intersections. The results of the intersection level of service analysis are summarized in **Table 3**. Detailed level of service calculation worksheets are included in **Appendix D**.

Table 3: Existing AM and PM Peak Hour Intersection Level of Service

Intersection	Control	AM Peak Hour			PM Peak Hour		
		V/C	Delay	LOS	V/C	Delay	LOS
1. Foothill Boulevard and Rancho Avenue	TWSC	-	18.2	C	-	18.3	C
2. 5th Street and Medical Center Drive	Signal	0.30	8.1	A	0.36	9.3	A
3. 5th Street and Cabrera Avenue	Signal	0.23	1.8	A	0.21	2.7	A
4. 5th Street and Mount Vernon Avenue	Signal	0.49	10.8	B	0.45	11.6	B
5. 5th Street and L Street	Signal	0.28	2.9	A	0.27	4.1	A
6. 5th Street (Foothill Boulevard) and 4th Street	Signal	0.34	3.4	A	0.28	3.3	A
7. 5th Street and H Street	Signal	0.33	13.0	B	0.45	17.3	B
8. 4th Street (I-215 On Ramps) and H Street	Signal	0.24	4.0	A	0.54	8.1	A
9. 3rd Street and I Street	Signal	0.18	4.3	A	0.16	5.4	A
10. 3rd Street and H Street	Signal	0.18	8.0	A	0.22	9.0	A
11. 2nd Street and Mount Vernon Avenue	Signal	0.42	14.7	B	0.54	18.7	B
12. 2nd Street and K Street	AWSC	0.20	8.5	A	0.24	9.3	A
13. 2nd Street and I Street	Signal	0.29	5.0	A	0.23	4.6	A
14. 2nd Street and I-215 SB On Ramp	Signal	0.29	3.9	A	0.48	5.9	A
15. 2nd Street and I-215 NB On Ramp	Signal	0.52	13.1	B	0.48	13.5	B
16. 2nd Street and G Street	Signal	0.43	14.4	B	0.51	18.1	B
17. Rialto Avenue and Rancho Avenue	Signal	0.25	6.3	A	0.31	6.3	A
18. Rialto Avenue and Santa Fe Way	Signal	0.21	2.8	A	0.19	2.4	A
19. Rialto Avenue and Mount Vernon Avenue	Signal	0.39	6.0	A	0.36	5.8	A
20. Rialto Avenue and K Street	Signal	0.29	8.1	A	0.39	9.3	A
21. Rialto Avenue and I Street	Signal	0.36	5.5	A	0.31	4.7	A
22. Rialto Avenue and G Street	Signal	0.30	5.6	A	0.31	5.0	A

Notes
HCM 2000 Operation Methodology.
V/C = Volume-to-Capacity Ratio
Delay = Average Vehicle Delay (Seconds). At TWSC intersections, worst-case approach is reported
LOS = Level of Service
TWSC = Two-Way Stop Control
AWSC = All way Stop Control

An examination of the data in Table 3 indicates that all 22 study intersections are currently operating at satisfactory levels of service. In the 2004 *Pedestrian and Vehicular Detour Analysis* study, the intersection of Foothill Boulevard and Rancho Avenue was operating at an unsatisfactory level of service due to the closure of the Mount Vernon Avenue Bridge and the resulting redistribution of traffic through Rancho Avenue. Under current conditions, that intersection has returned to a satisfactory LOS.

Year 2035 DHV and ADT Calculations

To develop year 2035 design hour and daily traffic forecasts, year 2008 peak period and daily link (roadway segment) volumes were obtained from the travel demand model. Year 2035 peak period and daily link volumes were also obtained from the travel demand model. Raw modeled traffic volumes were post-processed using the methodology described below.

The change in directional, peak period volumes on each roadway segment was calculated by subtracting year 2008 modeled volumes from year 2035 modeled volumes. Since the model uses a four-hour p.m. peak period, the peak period growth was factored to determine the growth during the p.m. peak hour. Based on SCAG guidelines, the growth during the p.m. peak period was multiplied by a factor of 0.28.

The changes in peak hour and daily traffic volumes represent growth in traffic over the 27-year period from 2008 to 2035. Since there are 26 years between the year of the existing counts (2009) and 2035, this growth was multiplied by 26/27 to calculate the growth expected through 2035. This factored growth was then added to the existing (2009) volumes on each roadway segment to develop post-processed year 2035 roadway segment volumes.

Table 4 and **Table 5** summarize the year 2035 DHV and ADT calculations. Model plots are contained in **Appendix E**.

Table 4: Year 2035 DHV Calculation

Existing 2009 Volume (PM Peak Hour)	2008 Model Volume (Peak Period)	2035 Model Volume (Peak Period)	Growth (2008 to 2035)	Factored Growth (2009 to 2035)	Peak Hour Growth	2035 DHV
1247	6206	6718	512	494	139	1386

Table 5: Year 2035 ADT Calculation

Existing ADT	2008 Model ADT	2008 Model ADT	Growth (2008 to 2035)	Factored Growth (2009 to 2035)	2035 ADT
14677	15619	17104	1485	1430	16107