

California Department of Transportation (Caltrans), District 8  
San Bernardino Associated Governments (SANBAG)

## STATE ROUTE 210/PEPPER AVENUE INTERCHANGE - TRAFFIC VOLUMES

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TECHNICAL MEMORANDUM

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## 1. INTRODUCTION

This memorandum presents updated traffic volume data that will be used to update the traffic impact analysis prepared for the planned State Route 210/Pepper Avenue interchange project in Rialto, CA. The purpose of this update is to incorporate updated existing average daily traffic volumes on State Route 210 provided by Caltrans District 8.

The proposed interchange is located approximately one mile east of the existing SR-210/Riverside Avenue interchange and one mile west of the existing SR-210/State Street/University Parkway interchange.

The new interchange is proposed as a diamond configuration, with on and off-ramps provided in both directions on SR-210. This technical memorandum presents the following information for review:

- Existing peak hour intersection turning movement counts and 24-hour link volumes
- Forecast peak hour intersection turning movement volumes for analysis years 2016 and 2036, with and without the project

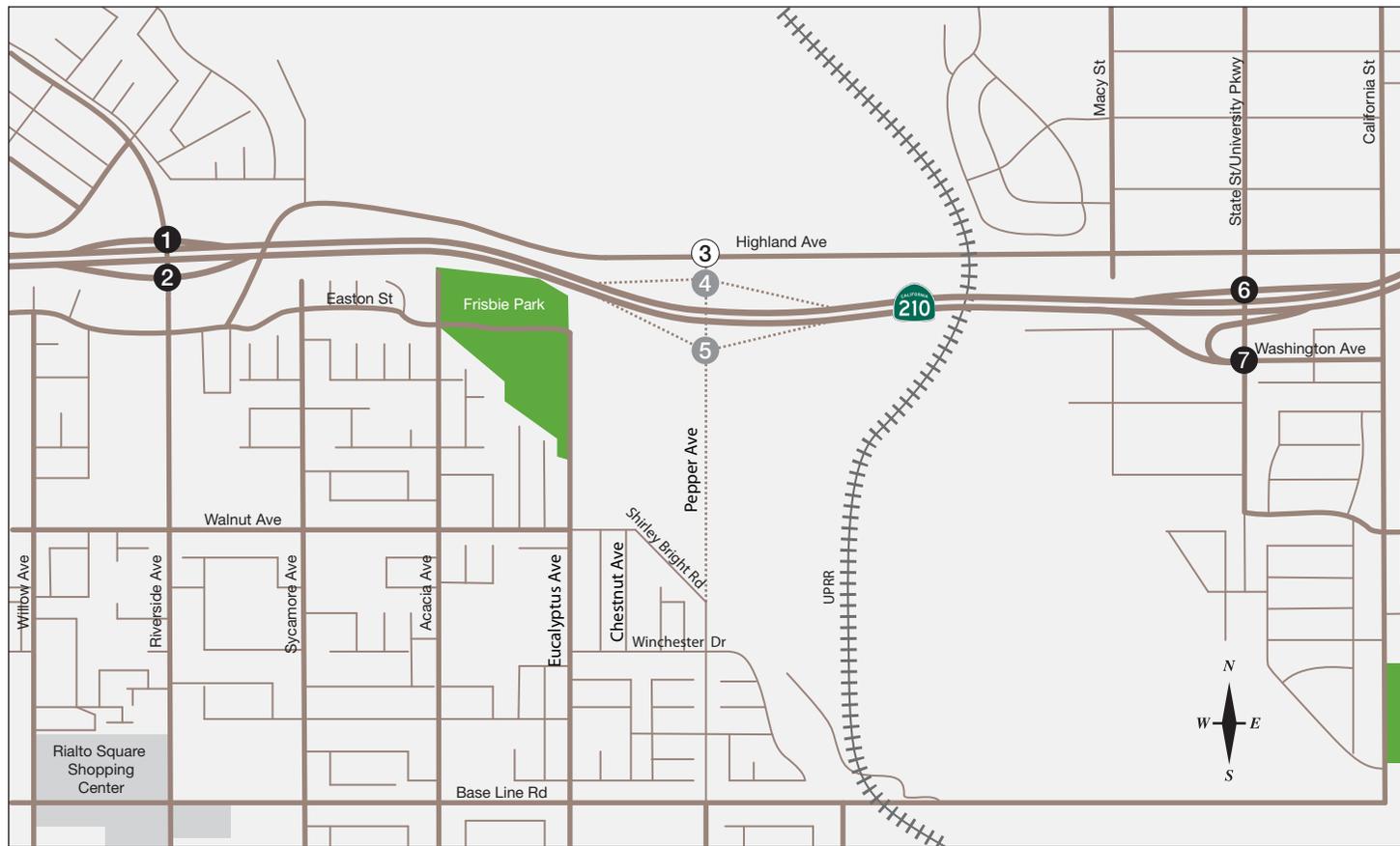
## 2. EXISTING TRAFFIC COUNT DATA

Four existing intersections have been identified for analysis. Three additional intersections, which will be created when Pepper Avenue is extended north to Highland Avenue and the SR-210 interchange is complete, will be analyzed in the With Project and future forecast scenarios. The seven project study intersections are:

1. SR-210 WB Ramps & Riverside Avenue
2. SR-210 EB Ramps & Riverside Avenue
3. Pepper Avenue & Highland Avenue (*Future and With Project Conditions Only*)
4. SR-210 WB Ramps & Pepper Avenue (*With Project Conditions Only*)
5. SR-210 EB Ramps & Pepper Avenue (*With Project Conditions Only*)
6. SR-210 WB Ramps & State Street/University Parkway
7. SR-210 EB Ramps & State Street/University Parkway

Turning movement counts were made at the four existing intersections on Tuesday, April 26<sup>th</sup>, 2011 from 6:00 AM to 9:00 AM and from 4:00 PM to 7:00 PM. Daily (24-hour) counts were also made on Riverside Avenue (just south of SR-210), Highland Avenue (at the approximate location of the future Pepper Avenue intersection) and on State Street (north of Highland Avenue). Ramp approach and departure volumes obtained from the counts were balanced according to methodology contained in Chapter 4 of the Federal Highway Administration's Traffic Monitoring Guide of 2001. The turning movement counts were adjusted to reflect the balanced ramp volumes and are passenger car equivalent (PCE) volumes. The count and ramp balancing sheets are included in the Appendix, and the AM and PM peak hour volumes are shown in Figure 1 and Figure 2. The

FIGURE 1 EXISTING YEAR (2011) INTERSECTION PCE VOLUMES – AM PEAK HOUR



Note: Volumes shown are PCE volumes. Truck percentages were obtained from the traffic counts.  
 The following factors have been applied to each class of vehicle:  
 • Class 2 – 1.5  
 • Class 3 – 2.0  
 • Class 4+ – 3.0

**LEGEND**

- ⊙ Existing Signalized Study Intersection
- ⊙ Existing Unsignalized Study Intersection
- ⊙ Proposed Signalized Intersection
- ⋯ Future Facilities
- ## ↘ Turning Movement Volume

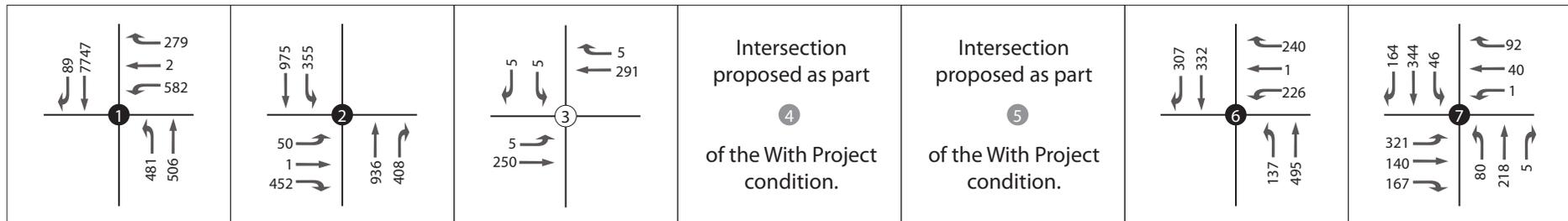
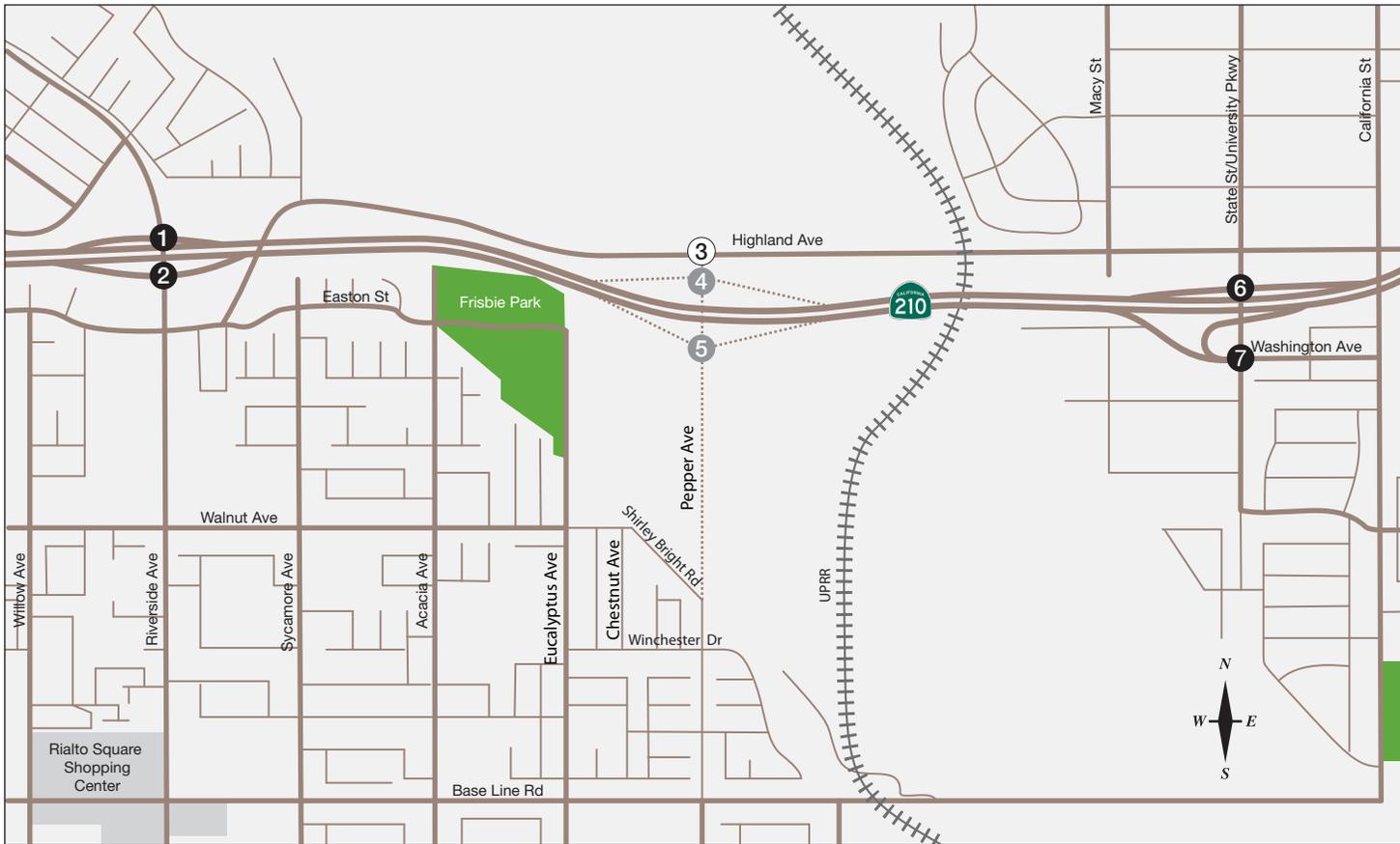


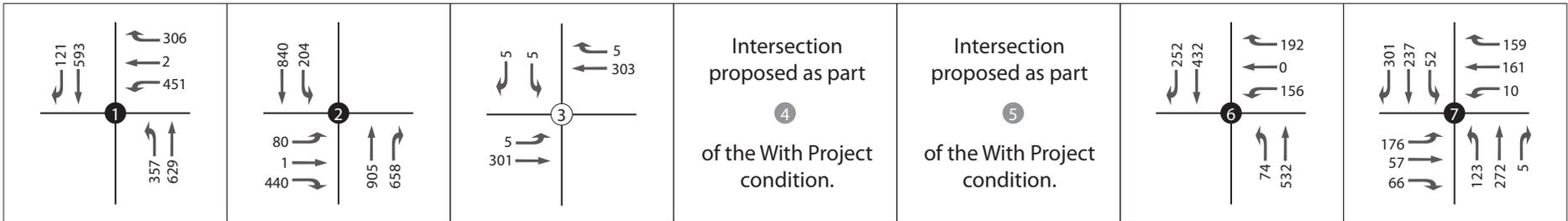
FIGURE 2 EXISTING YEAR (2011) INTERSECTION PCE VOLUMES – PM PEAK HOUR



Note: Volumes shown are PCE volumes. Truck percentages were obtained from the traffic counts.  
 The following factors have been applied to each class of vehicle:  
 • Class 2 – 1.5  
 • Class 3 – 2.0  
 • Class 4+ – 3.0

**LEGEND**

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- Ⓛ Existing Unsignalized Study Intersection
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- ⋯ Future Facilities
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### 3. FORECAST TRAFFIC VOLUMES

Future forecast traffic volumes with and without the project were previously derived from the San Bernardino Association of Governments (SANBAG) model developed for the analysis of the I-10 HOV lanes. Originally, the Southern California Association of Governments (SCAG) Regional Travel Demand Model was proposed for use in developing future traffic volume forecasts. However, in reviewing the SCAG model forecasts, it was determined that the SCAG model was forecasting unrealistic traffic volumes on Highland Avenue and Pepper Avenue, particularly for the northbound to eastbound flow and the westbound to southbound flow.

Given this condition, the consultant and SANBAG staff determined that the SANBAG I-10 HOV model could provide more appropriate forecasts of traffic volumes within the study area. These model forecasts were again used for this updated analysis. The SCAG model roadway network was likely not detailed enough within the study area, and recalibration of the model to address the observed unreasonable forecasts would require substantial time and effort by SCAG, making this approach infeasible for this analysis.

The SANBAG I-10 HOV model plots are available for a base year of 2003 and a horizon year of 2030. Model plots were obtained for the following scenarios:

- 2003 AM Peak Period Without Project
- 2003 PM Peak Period Without Project
- 2030 AM Peak Period With Project
- 2030 PM Peak Period With Project

Model volume plots for the model base year and horizon year for both the SANBAG I-10 HOV model and the SCAG regional model were provided in the appendix of the original traffic volume memorandum (dated November 2011) for reference.

The SANBAG model for the base year 2003 contains the current configuration of Pepper Avenue, and the With Project condition includes the extension of Pepper Avenue from Base Line Road to Highland Avenue and the SR-210 diamond interchange at Pepper Avenue.

#### 3.1 Intersection Turning Movement Volumes

The following process was used to derive peak hour intersection turning movement volumes from the SANBAG model data:

- Data from the year 2003 and 2030 models were used to derive the associated incremental growth between 2003 (existing) and 2030 (with project) conditions. This step also included the manual adjustments to ensure compatibility of the two networks, and the removal of unlikely high volumes on Highland Avenue due to modeling limitations related to freeway frontage road conditions.
  - Approach and departure balancing at the eastbound ramps at State Street (included in post-processor spreadsheet)

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- Reassignment of E-W volumes on Highland to the freeway (included in post-processor spreadsheet)
- 2003 model volumes were subtracted from the 2030 model volumes per leg and movement (approach and departure), resulting in the modeled growth for the period.
- The directional growth in approaches and departures between 2003 and 2030 was factored to represent the growth from 2011 to 2036 and was added to the 2011 approaches and departures, resulting in 2036 with project volumes to be post processed. The same step was followed to estimate the incremental growth for the 2016 With Project Condition
- Peak hour forecast ramp volumes were balanced to future mainline volumes, resulting in new ramp volumes for all future years
- New approach and departure volumes for the intersections that contained freeway ramps were obtained, considering the balanced ramp volumes as input and obtaining northbound and southbound volumes for the interchange (eastbound and westbound ramps were processed at the same time to ensure compatibility among adjacent intersections) as well as the same number of cars approaching and departing the intersections
- Approaches and departures for 2016 and 2036 were post processed considering the turning movements for the existing conditions as a base. A standard split of (1-3-1) (L-T-R) was considered as the initial split for the intersections along Pepper Avenue (these intersections do not exist in 2011)
- Approaches and departures for the year 2030 and no interchange were obtained through a 4-step process:
  - The portion of the network containing the SR-210/Pepper interchange and Pepper/Highland intersection was isolated from the rest of the network
  - A matrix for this “network” was estimated considering the 2030 SANBAG I-10 HOV model results as counts for the AM and PM peak hours
  - The ramps were removed and the estimated matrix was reassigned to the network to obtain the approaching and departing volumes for the no project condition for Pepper/Highland for both peak hours
  - Approaches and departures for the other intersections of the 2030 No Project condition were obtained by assigning the post processed Pepper ramp turning movements of the With Project condition to the approaches and departures of the neighboring intersections of the With Project condition
- The incremental growth in approaches and departures for the No Project condition was calculated considering the model 2003 volumes and 2030 volumes estimated above, and was factored to represent the growth from 2011 to 2016 and 2036, being added to the approaches and departures obtained from the traffic counts
- Peak hour forecast ramp volumes were balanced to future mainline volumes, resulting in new ramp volumes for all future years

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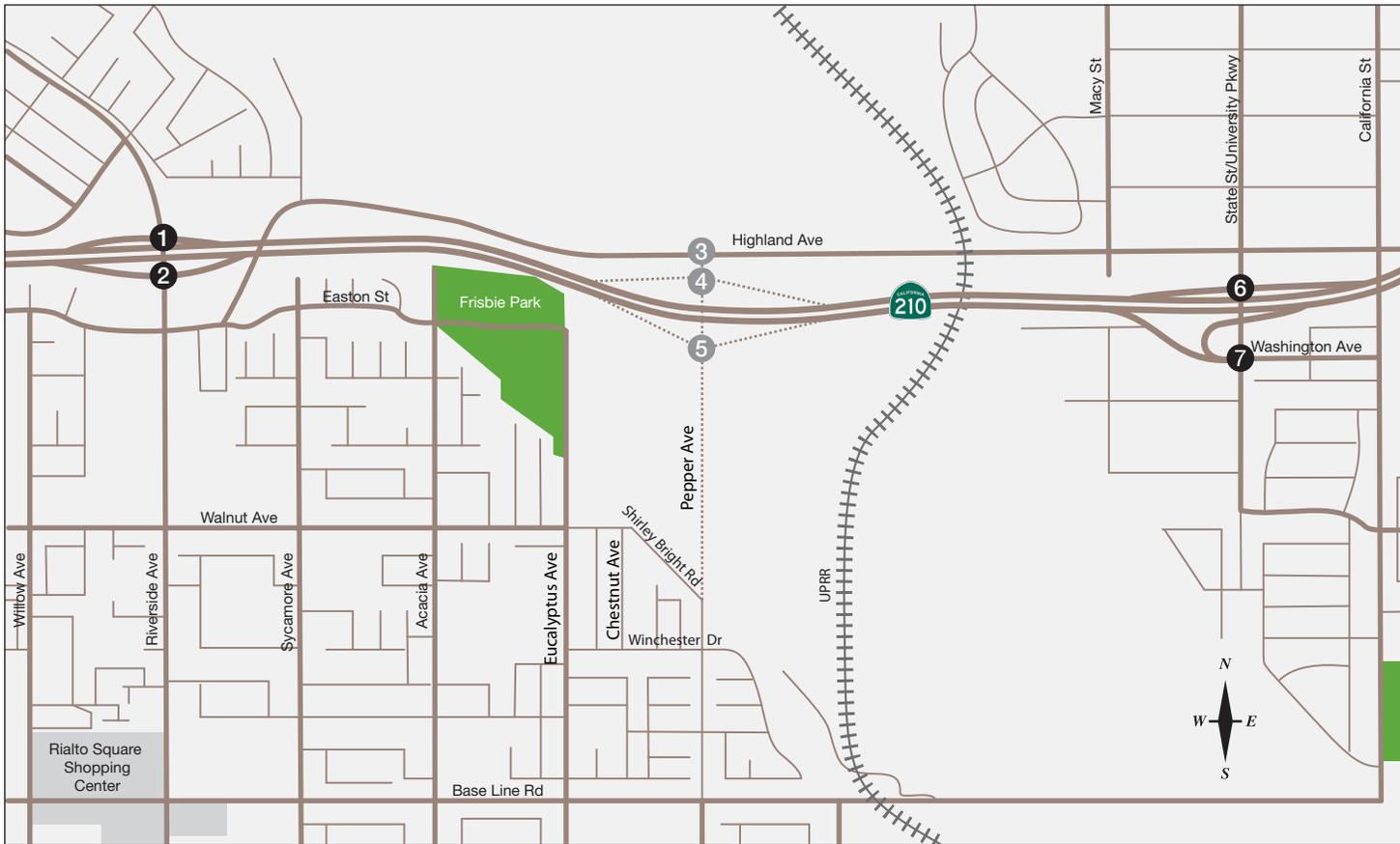
- New approach and departure volumes for the intersections that contained freeway ramps were obtained, considering the balanced ramp volumes as input and obtaining northbound and southbound volumes for the interchange (eastbound and westbound ramps were processed at the same time to ensure compatibility among adjacent intersections) as well as the same number of cars approaching and departing the intersections
- The volumes for the No Project condition for years 2016 and 2036 were post processed considering the new approaches and departures calculated in the previous step and the turning movement counts for the existing conditions

The peak hour link volumes for each scenario were post processed to intersection turning movement volumes using an Excel-based spreadsheet that utilizes the methodology described in National Cooperative Highway Research Program (NCHRP) Report 255. The post-processing procedure uses an iterative process to balance the intersection throughput volumes, which provides the best combination of reasonable turning movement volumes and traceability of results. Post processed volumes were rounded to the closest 5 and volumes were added to the 2016 and 2036 scenarios to account for movements in and out of the mining facility located north of the intersection of Pepper Avenue and Highland Avenue.

Year 2016 Without Project AM and PM peak hour forecast intersection PCE volumes are shown in Figures 3 and 4. Year 2016 With Project AM and PM peak hour forecast intersection PCE volumes are shown in Figures 5 and 6.

Year 2036 Without Project AM and PM peak hour forecast intersection PCE volumes are shown in Figures 7 and 8. Year 2036 With Project AM and PM peak hour forecast intersection PCE volumes are shown in Figures 9 and 10.

FIGURE 3 OPENING YEAR (2016) WITHOUT PROJECT VOLUMES – AM PEAK HOUR



Note: Volumes shown are PCE volumes. Truck percentages considered the same as existing conditions.  
 The following factors have been applied to each class of vehicle:

- Class 2 – 1.5
- Class 3 – 2.0
- Class 4+ – 3.0

**LEGEND**

- Existing Signalized Study Intersection
- ⊙ Proposed Signalized Study Intersection
- ⋯ Future Facilities
- ## ↘ Turning Movement Volume

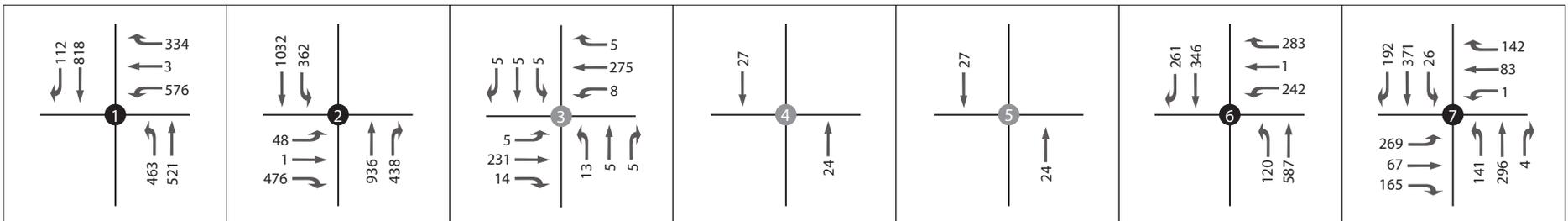
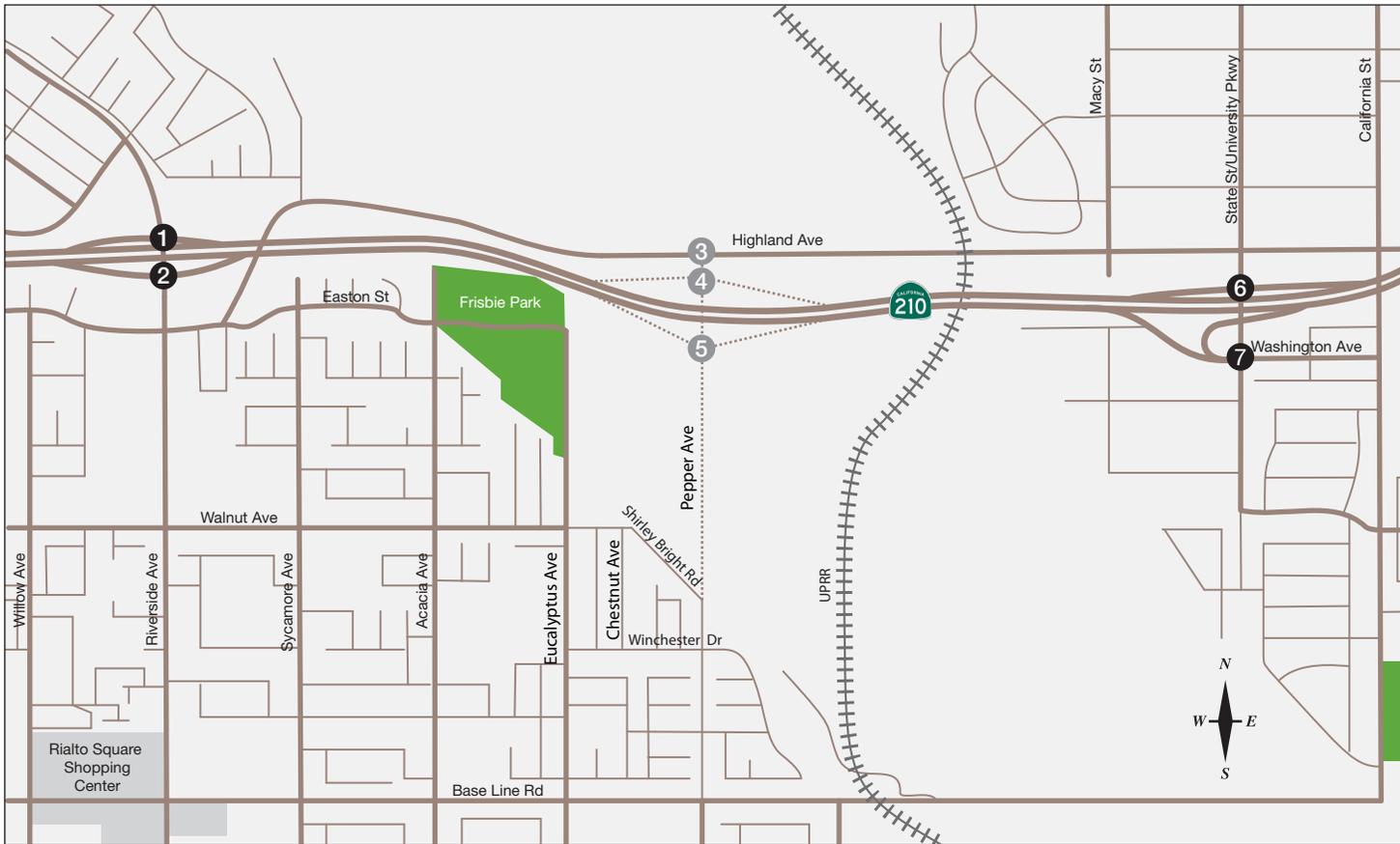


FIGURE 4 OPENING YEAR (2016) WITHOUT PROJECT VOLUMES – PM PEAK HOUR



Note: Volumes shown are PCE volumes. Truck percentages considered the same as existing conditions.  
 The following factors have been applied to each class of vehicle:  
 • Class 2 – 1.5  
 • Class 3 – 2.0  
 • Class 4+ – 3.0

**LEGEND**

- Existing Signalized Study Intersection
- ⊕ Proposed Signalized Study Intersection
- ..... Future Facilities
- ## ↘ Turning Movement Volume

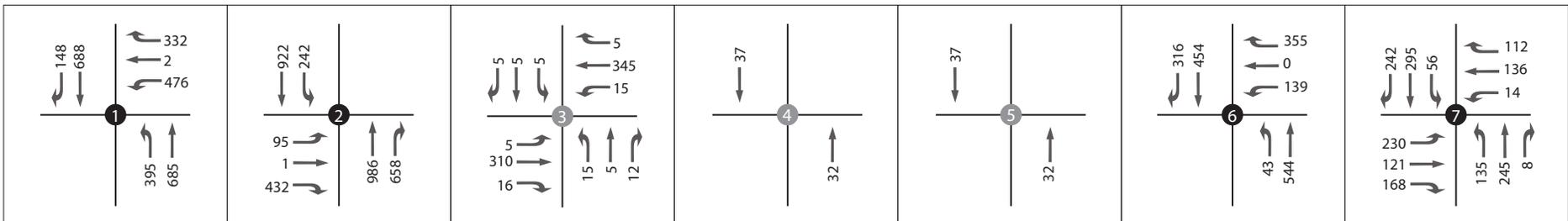
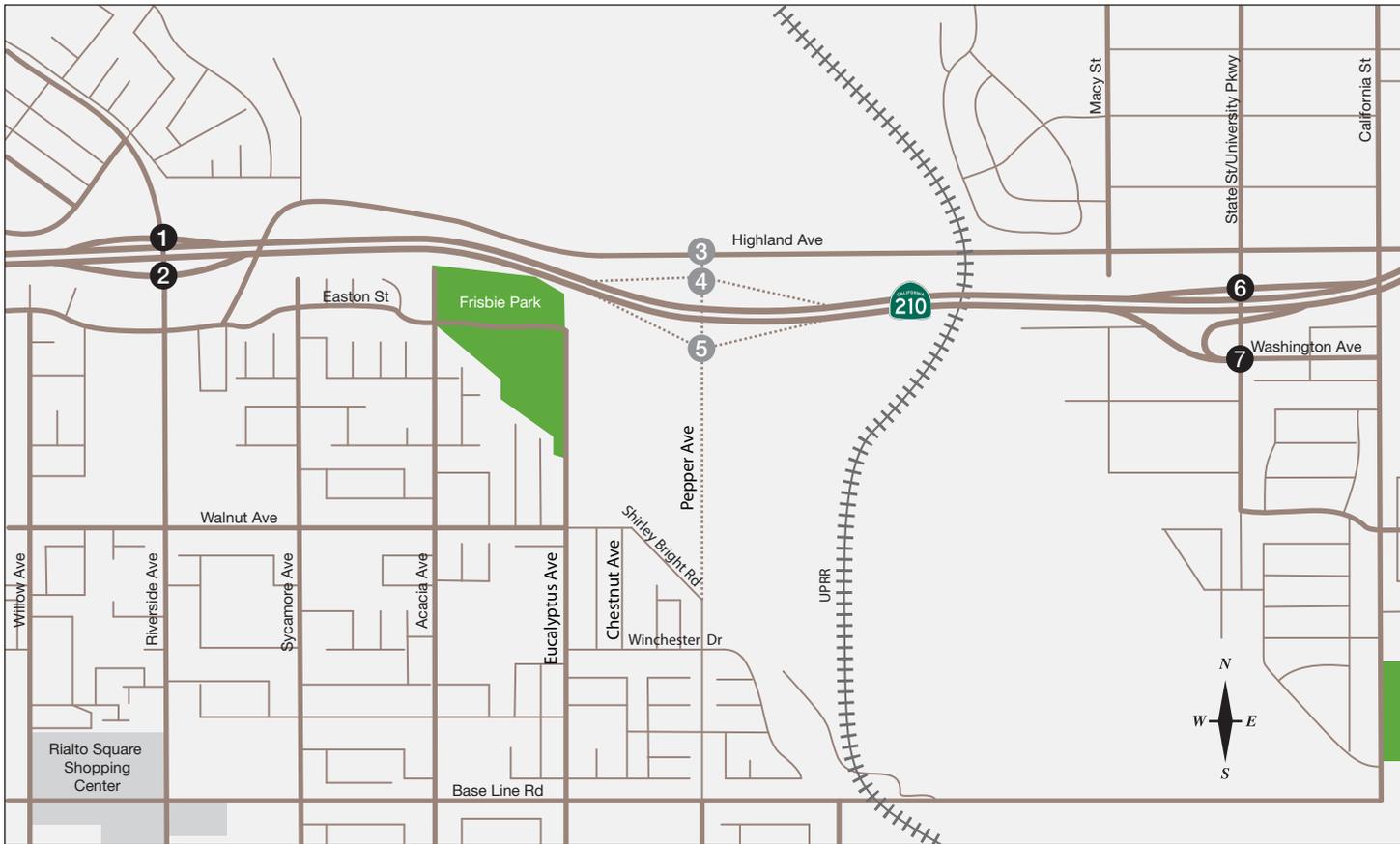


FIGURE 5 HORIZON YEAR (2036) WITHOUT PROJECT VOLUMES – AM PEAK HOUR



Note: Volumes shown are PCE volumes. Truck percentages considered the same as existing conditions.  
 The following factors have been applied to each class of vehicle:

- Class 2 – 1.5
- Class 3 – 2.0
- Class 4+ – 3.0

**LEGEND**

- Existing Signalized Study Intersection
- Proposed Signalized Study Intersection
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- ## ↘ Turning Movement Volume

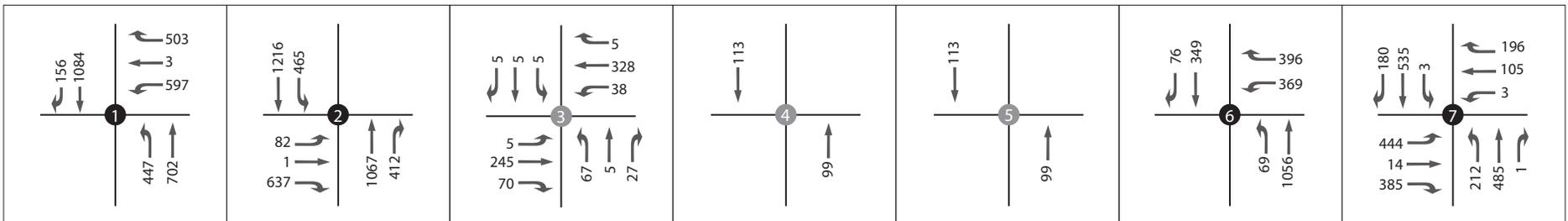
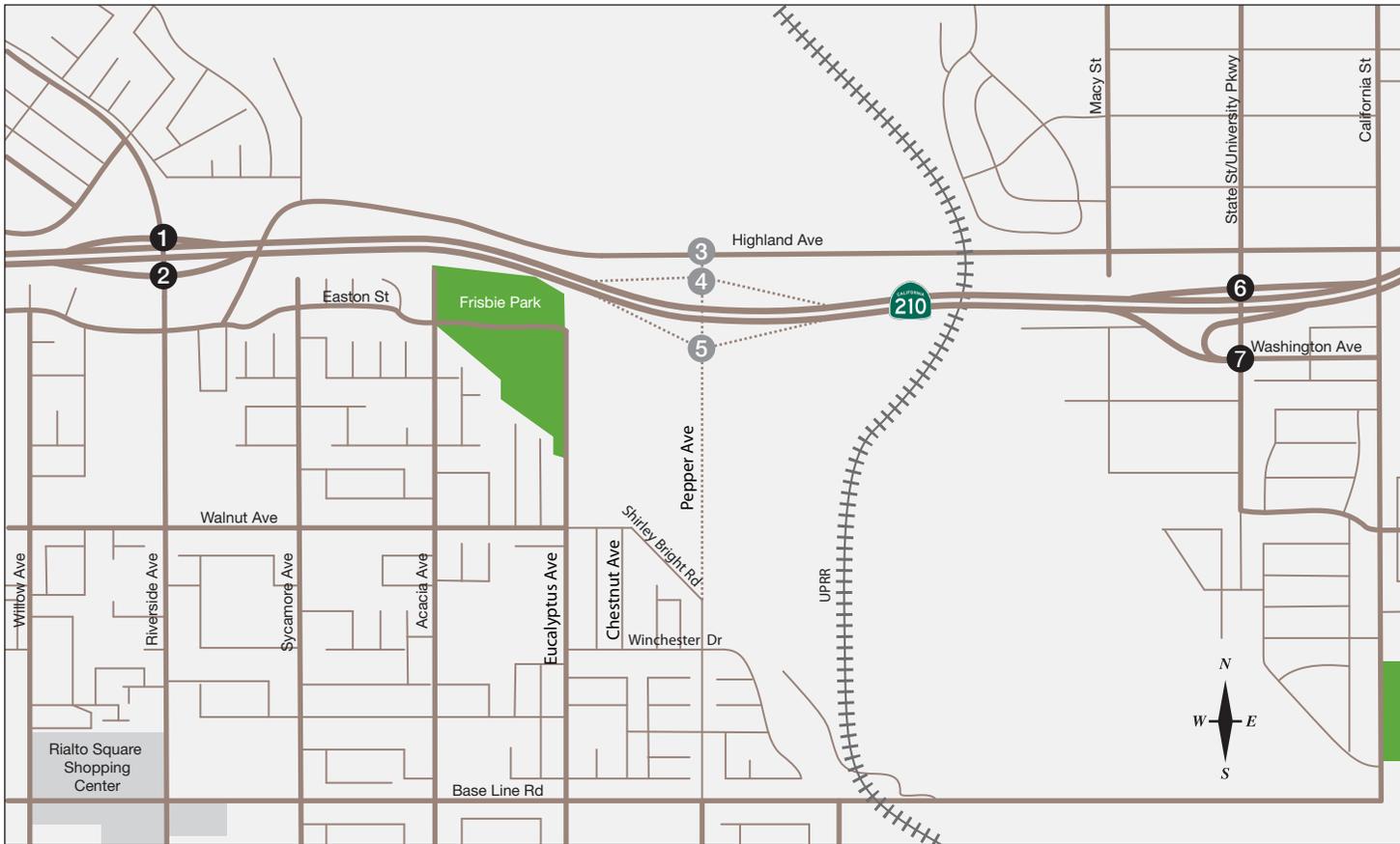


FIGURE 6 HORIZON YEAR (2036) WITHOUT PROJECT VOLUMES – PM PEAK HOUR



Note: Volumes shown are PCE volumes. Truck percentages considered the same as existing conditions.  
 The following factors have been applied to each class of vehicle:

- Class 2 – 1.5
- Class 3 – 2.0
- Class 4+ – 3.0

**LEGEND**

- Existing Signalized Study Intersection
- ⦿ Proposed Signalized Study Intersection
- ⋯ Future Facilities
- ## ↘ Turning Movement Volume

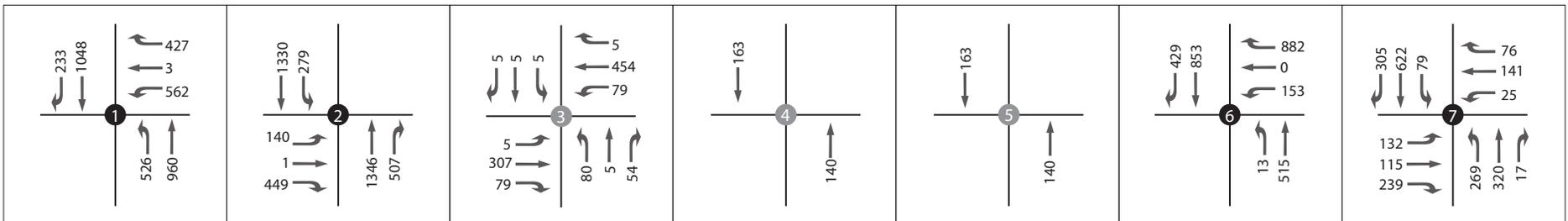
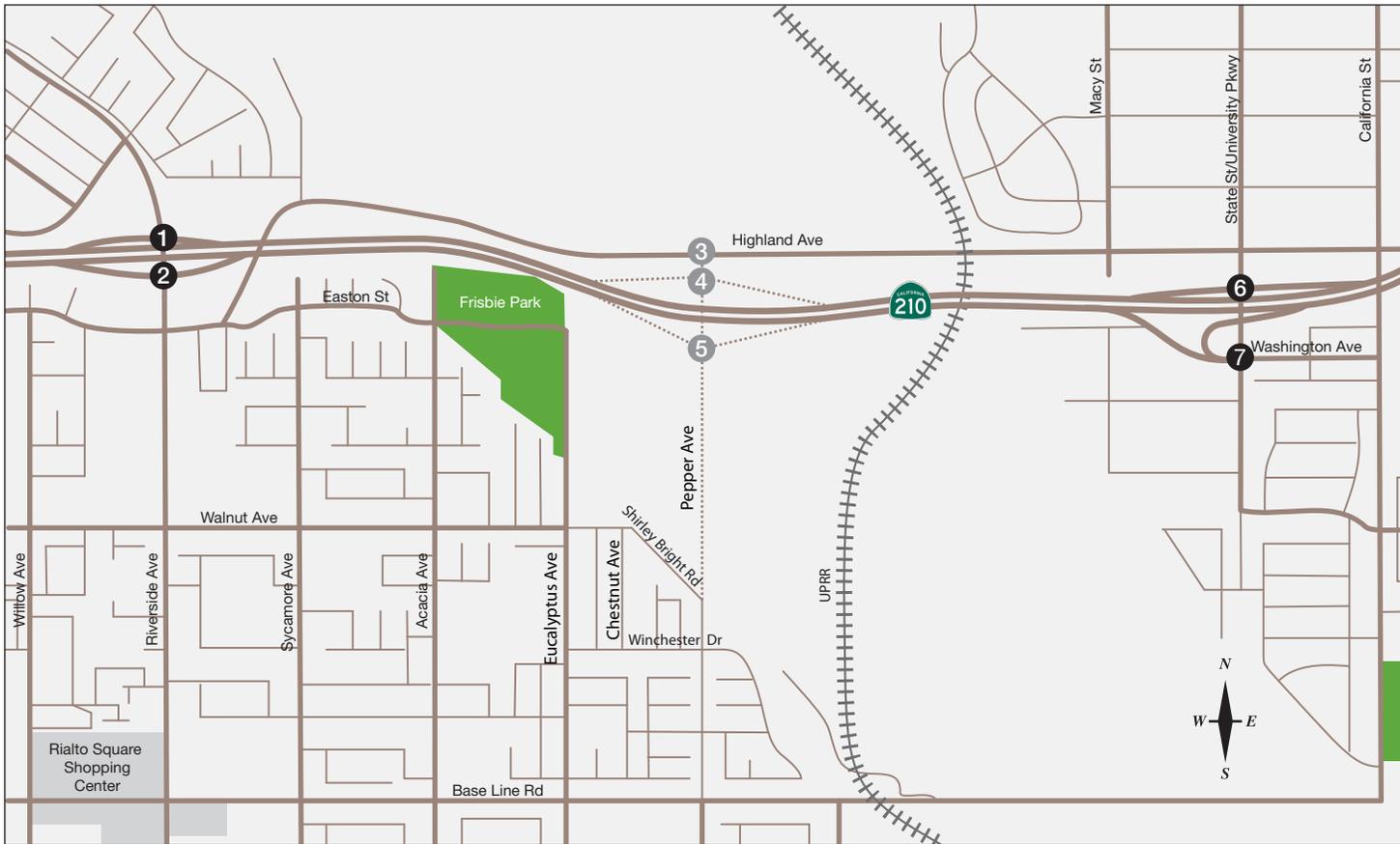


FIGURE 7 OPENING YEAR (2016) WITH PROJECT VOLUMES – AM PEAK HOUR



Note: Volumes shown are PCE volumes. Truck percentages considered the same as existing conditions.  
 The following factors have been applied to each class of vehicle:  
 • Class 2 – 1.5  
 • Class 3 – 2.0  
 • Class 4+ – 3.0

**LEGEND**

- Existing Signalized Study Intersection
- ⊕ Proposed Signalized Study Intersection
- ..... Future Facilities
- ## ↘ Turning Movement Volume

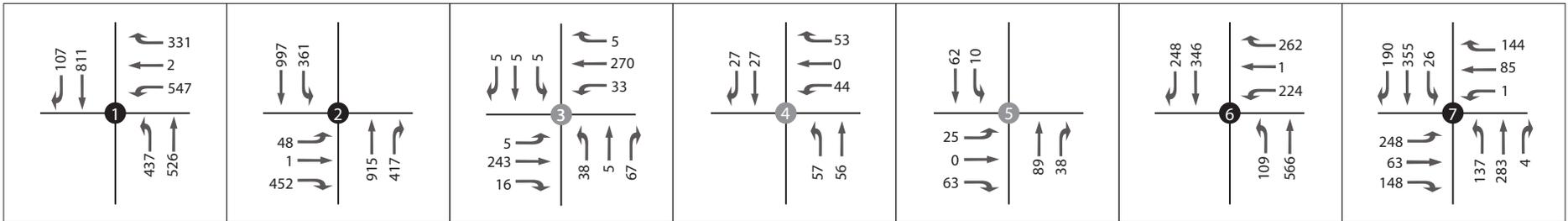
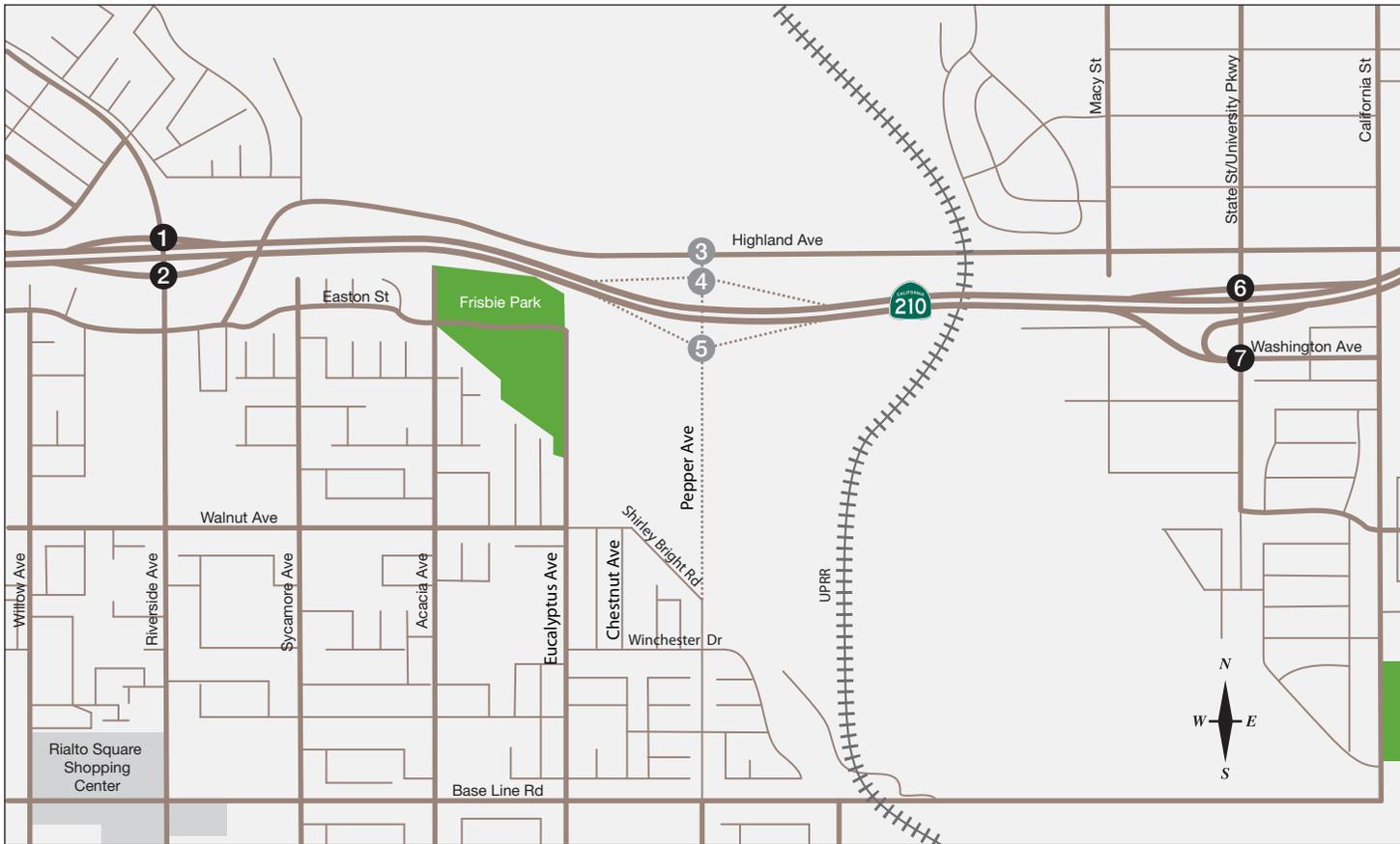


FIGURE 8 OPENING YEAR (2016) WITH PROJECT VOLUMES – PM PEAK HOUR



Note: Volumes shown are PCE volumes. Truck percentages considered the same as existing conditions.  
 The following factors have been applied to each class of vehicle:  
 • Class 2 – 1.5  
 • Class 3 – 2.0  
 • Class 4+ – 3.0

**LEGEND**

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- ⦿ Proposed Signalized Study Intersection
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- ## ↘ Turning Movement Volume

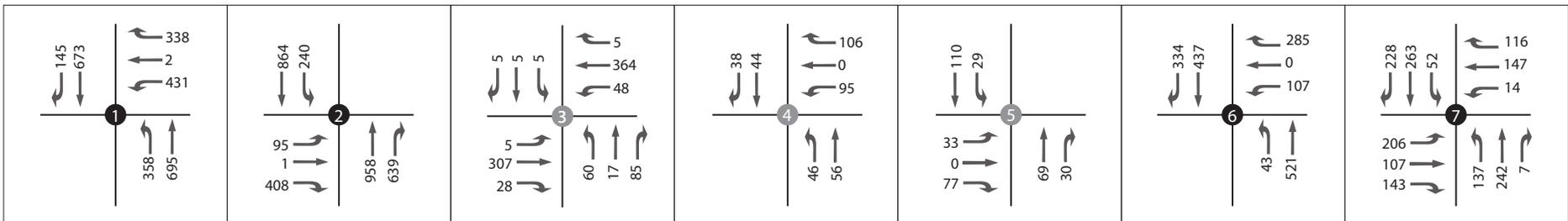
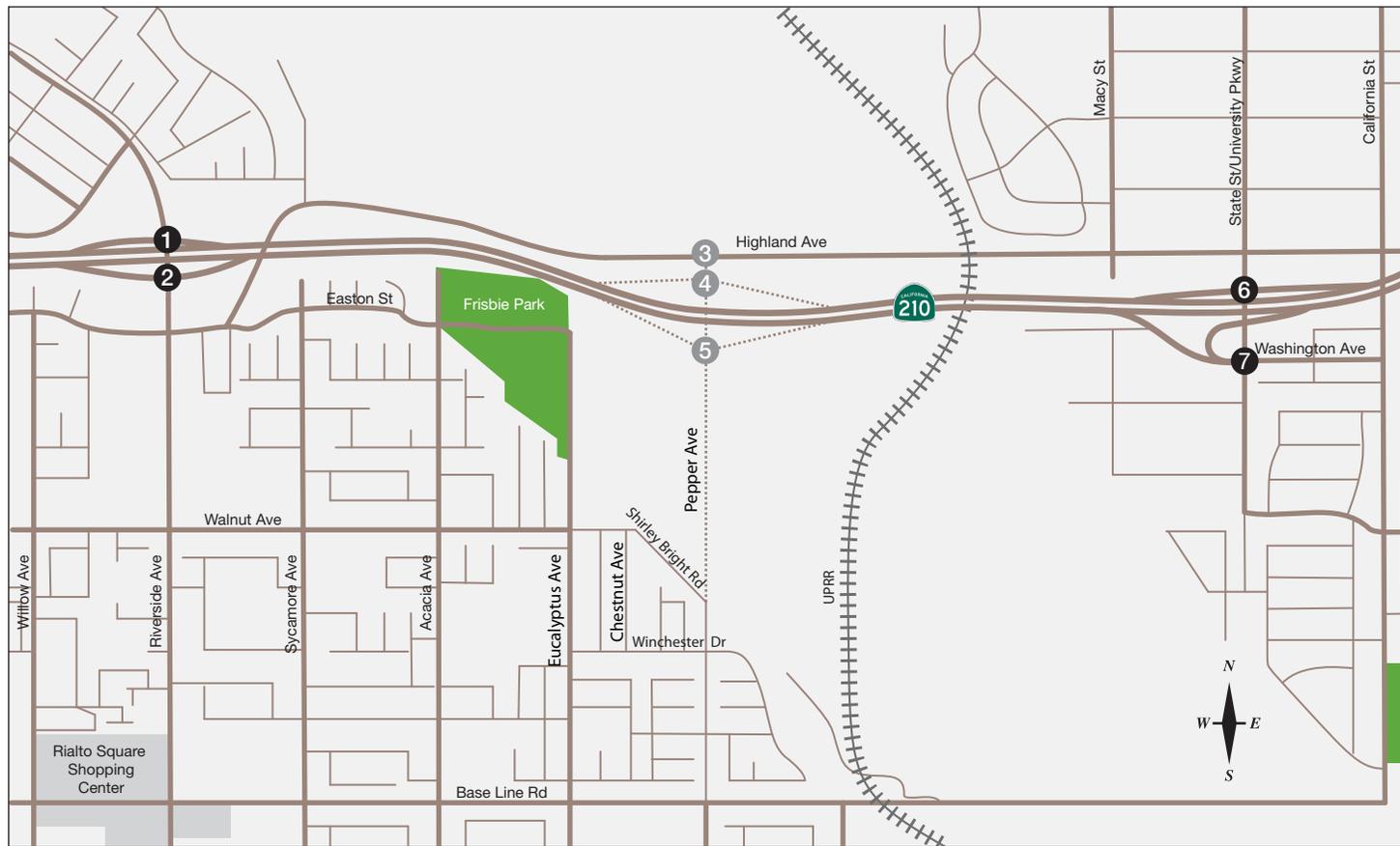


FIGURE 9 HORIZON YEAR (2036) WITH PROJECT VOLUMES – AM PEAK HOUR



Note: Volumes shown are PCE volumes. Truck percentages considered the same as existing conditions.  
 The following factors have been applied to each class of vehicle:  
 • Class 2 – 1.5  
 • Class 3 – 2.0  
 • Class 4+ – 3.0

**LEGEND**

- Existing Signalized Study Intersection
- Proposed Signalized Study Intersection
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- ## ↘ Turning Movement Volume

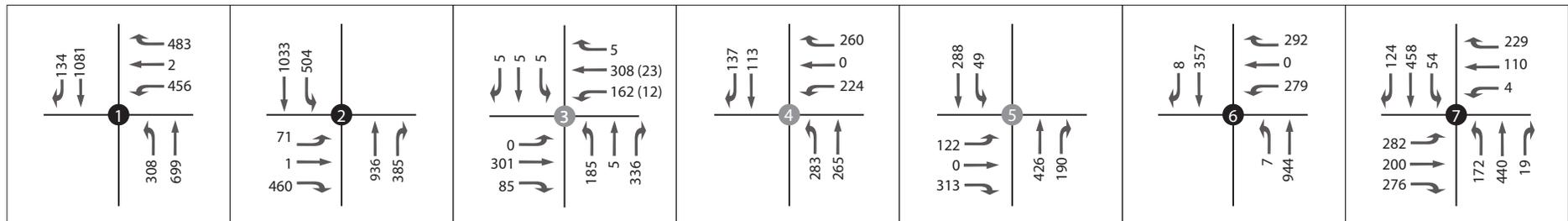
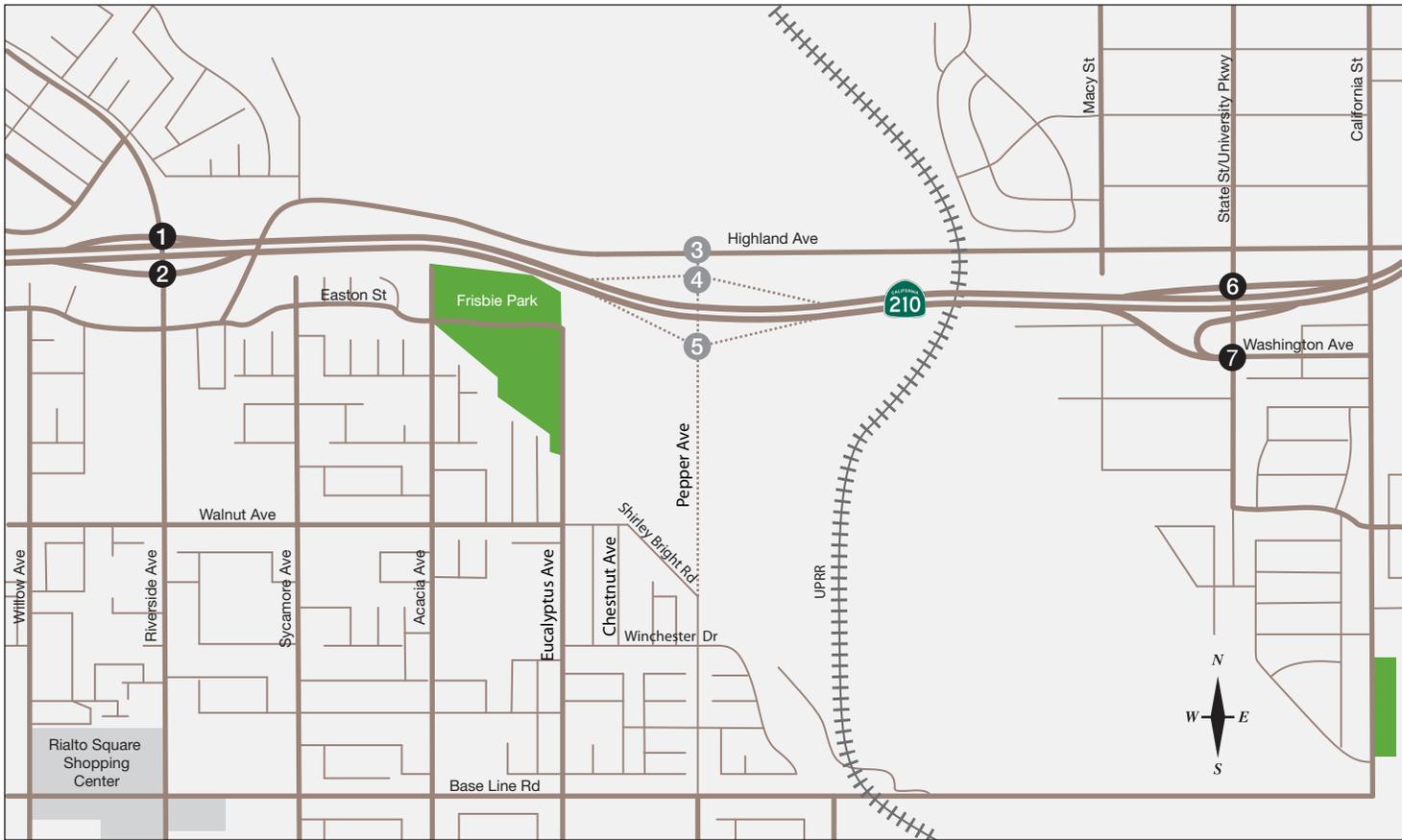


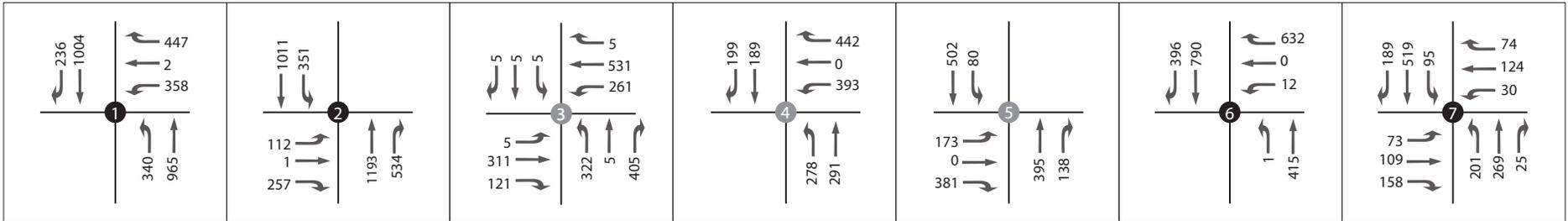
FIGURE 10 HORIZON YEAR (2036) WITH PROJECT VOLUMES – PM PEAK HOUR



Note: Volumes shown are PCE volumes. Truck percentages considered the same as existing conditions.  
 The following factors have been applied to each class of vehicle:  
 • Class 2 – 1.5  
 • Class 3 – 2.0  
 • Class 4+ – 3.0

**LEGEND**

- Existing Signalized Study Intersection
- ⦿ Proposed Signalized Study Intersection
- ..... Future Facilities
- ## ↘ Turning Movement Volume



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## 3.2 Segment Volumes

The methodology to estimate the mainline mixed flow and HOV lane volumes is presented in this section. Detailed spreadsheets are included in the Appendix.

The existing conditions volumes for the mainline were extracted from the traffic sensor data provided by Caltrans District 8. The available data is for year 2011. The data is summarized in Table 1.

**Table 1. Year 2011 Volumes on the SR-210**

Dist.	Route	Co.	Postmile	Description	Back Peak Hour	Back AADT	Ahead Peak Hour	Ahead AADT
8	210 U	SBD	19.521	Rialto, Riverside Ave	6,715	102,000	7,275	110,500
8	210 U	SBD	20.02	Acacia Ave (Pepper proxy)	7,545	110,500	7,174	110,500
8	210 U	SBD	21.68	Cajon Blvd (proxy east of State)	7,275	111,000	7,275	111,000

Source: Caltrans District 8

Note: Back usually represents traffic south or west of the count location, and ahead represents traffic north or east of the count location. For the purpose of the study, it will be assumed that Ahead volumes for Acacia Avenue are the same as the Back volumes for Acacia Avenue. Original volumes were 2,700 for ahead peak hour, 28,500 for ahead peak month and 28,000 for ahead AADT.

Volumes related to the Acacia Avenue count are used as a proxy for the Pepper Avenue location, and back volumes related to Cajon Blvd are used as a proxy for volumes east of State Avenue.

Daily volumes for the ramps were estimated through the expansion of the balanced approach and departure volumes for each of the existing ramps. The expansion factor considered is 0.078<sup>1</sup>, and the estimated daily ramp volumes are summarized in Table 2.

**Table 2. Year 2011 Daily Volumes on Interchange Ramps**

Interchange	Direction	Estimated Daily Volume
Riverside	WB off	9,400
Riverside	WB on	6,000
Riverside	EB off	6,600
Riverside	EB on	10,800
State	WB off	4,300
State	WB on	4,100
State	EB off	3,400
State	EB on	7,100

The procedure to obtain future volumes on the freeway mainline and the ramps is similar to the one utilized to forecast intersection turning movements. Forecast volumes on the mainline and ramps

<sup>1</sup> [http://www.dot.ca.gov/hq/tpp/offices/ote/benefit\\_cost/models/calbc.html](http://www.dot.ca.gov/hq/tpp/offices/ote/benefit_cost/models/calbc.html)

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were obtained by adding the estimated growth in vehicular traffic between base year and horizon year obtained from the SANBAG model to the existing traffic counts. Tables 3 and 4 summarize the forecast daily volumes for the mainline and the ramps for years 2016 and 2036 for the Without Project and With Project condition.

**Table 3. Forecast Daily Volumes on SR-210**

Segment	2016 Without Project		2016 With Project		2036 Without Project		2036 With Project	
	Back Volume	Ahead Volume	Back Volume	Ahead Volume	Back Volume	Ahead Volume	Back Volume	Ahead Volume
Rialto, Riverside Ave	113,760	123,200	113,760	123,740	160,800	174,000	160,800	176,700
Acacia Ave (Pepper proxy)	123,200	123,200	123,740	123,660	174,000	174,000	176,700	176,300
Cajon Blvd (proxy east of State)	125,470	-	125,470	-	183,300	-	183,300	-

Note: volumes were rounded to the closest 10

**Table 4. Forecast Daily Volumes on Interchange Ramps**

Interchange	Direction	2016 Without Project Volume	2016 With Project Volume	2036 Without Project Volume	2036 With Project Volume
Riverside	WB off	10,090	9,620	12,350	10,050
Riverside	WB on	6,820	6,350	9,540	7,240
Riverside	EB off	6,640	6,360	7,420	4,640
Riverside	EB on	11,360	11,080	9,880	11,090
State	WB off	6,120	4,860	12,860	8,030
State	WB on	4,490	4,720	5,540	4,960
State	EB off	6,180	5,400	5,810	4,060
State	EB on	6,100	6,130	8,410	6,030
Pepper	WB off	-	2,380	-	9,910
Pepper	WB on	-	900	-	5,650
Pepper	EB off	-	1,320	-	6,580
Pepper	EB on	-	510	-	2,590

Note: volumes were rounded to the closest 10

Peak hour volume forecast considered as a base the peak hour volumes for the existing condition, and were split directionally utilizing D factors available for the closest segment to the study area. Volumes were split proportionally among mixed flow lanes and HOV lanes as the freeway does not operate under congested conditions in Year 2011, and the respective modeled growth was added to these volumes to obtain the forecast volumes. Table 5 contains the data related to Year 2011 and Tables 6 to 9 contain the summary for the directional volumes for the analyzed segments for each of the peak hours and scenarios.

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**Table 5. Directional Split AM and PM Peak Hour Volumes on SR-210 - Year 2011**

Segment	Dir	2011 AM Mixed Flow		2011 AM HOV		2011 PM Mixed Flow		2011 PM HOV	
		Back Volume	Ahead Volume	Back Volume	Ahead Volume	Back Volume	Ahead Volume	Back Volume	Ahead Volume
Rialto, Riverside Ave	WB	3,046	3,300	235	255	3,176	3,470	258	280
	EB	2,918	3,169	132	143	4,010	4,344	486	526
Acacia Ave (Pepper proxy)	WB	3,300	3,300	255	255	3,440	3,440	280	280
	EB	3,161	3,161	143	143	4,344	4,344	526	526
Cajon Blvd (proxy east of State)	WB	3,315	-	256	-	3,456	-	281	-
	EB	3,175	-	143	-	4,364	-	529	-

**Table 6. Forecast AM Peak Hour Volumes on SR-210 – Mixed Flow Lanes**

Segment	Dir	2016 Without Project		2016 With Project		2036 Without Project		2036 With Project	
		Back Volume	Ahead Volume	Back Volume	Ahead Volume	Back Volume	Ahead Volume	Back Volume	Ahead Volume
Rialto, Riverside Ave	WB	3,223	3,511	3,223	3,511	3,932	4,354	3,932	4,354
	EB	3,245	3,467	3,245	3,504	4,552	4,692	4,552	4,874
Acacia Ave (Pepper proxy)	WB	3,511	3,511	3,511	3,523	4,354	4,354	4,354	4,413
	EB	3,467	3,467	3,504	3,467	4,692	4,692	4,874	4,692
Cajon Blvd (proxy east of State)	WB	3,638	-	3,638	-	4,928	-	4,928	-
	EB	3,411	-	3,411	-	4,353	-	4,353	-

**Table 7. Forecast AM Peak Hour Volumes on SR-210 – HOV Lanes**

Segment	Dir	2016 Without Project		2016 With Project		2036 Without Project		2036 With Project	
		Back Volume	Ahead Volume	Back Volume	Ahead Volume	Back Volume	Ahead Volume	Back Volume	Ahead Volume
Rialto, Riverside Ave	WB	311	342	311	342	616	689	616	689
	EB	230	251	230	251	624	683	624	683
Acacia Ave (Pepper proxy)	WB	342	342	342	342	689	689	689	689
	EB	251	251	251	251	683	683	683	683
Cajon Blvd (proxy east of State)	WB	343	-	343	-	690	-	690	-
	EB	251	-	251	-	683	-	683	-

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**Table 8. Forecast PM Peak Hour Volumes on SR-210 – Mixed Flow Lanes**

Segment	Dir	2016 Without Project		2016 With Project		2036 Without Project		2036 With Project	
		Back Volume	Ahead Volume	Back Volume	Ahead Volume	Back Volume	Ahead Volume	Back Volume	Ahead Volume
Rialto, Riverside Ave	WB	3,623	3,878	3,623	3,878	5,410	5,629	5,410	5,629
	EB	4,229	4,534	4,229	4,597	5,104	5,296	5,104	5,607
Acacia Ave (Pepper proxy)	WB	3,878	3,878	3,878	3,944	5,629	5,629	5,629	5,961
	EB	4,534	4,534	4,597	4,537	5,296	5,296	5,607	5,296
Cajon Blvd (proxy east of State)	WB	4,005	-	4,005	-	6,200	-	6,200	-
	EB	4,591	-	4,591	-	5,499	-	5,499	-

**Table 9. Forecast PM Peak Hour Volumes on SR-210 – HOV Lanes**

Segment	Dir	2016 Without Project		2016 With Project		2036 Without Project		2036 With Project	
		Back Volume	Ahead Volume	Back Volume	Ahead Volume	Back Volume	Ahead Volume	Back Volume	Ahead Volume
Rialto, Riverside Ave	WB	400	448	400	448	968	1120	968	1120
	EB	537	630	537	630	739	1046	739	1046
Acacia Ave (Pepper proxy)	WB	448	448	448	448	1120	1120	1120	1120
	EB	630	630	630	630	1046	1046	1046	1046
Cajon Blvd (proxy east of State)	WB	449	-	449	-	1121	-	1121	-
	EB	633	-	633	-	1049	-	1049	-

Peak hour ramp volumes were obtained by balancing the forecast peak hour ramp volumes with the mainline volumes presented in Tables 6 and 8. Balancing was done following the methodology included in FHWA's Traffic Monitoring Guide 2001 (Chapter 4). Tables 10 to 14 summarize the balanced ramp volumes for the AM and PM peak hours.

**Table 10. Forecast Peak Hour Ramp Volumes on SR-210 – Year 2011**

Segment	Dir	AM Peak Hour Balanced Ramp Volume		PM Peak Hour Balanced Volume	
		On	Off	On	Off
Riverside Ave	WB	549	803	467	731
	EB	469	712	846	512
State Street	WB	417	431	317	333
	EB	354	368	557	267

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**Table 11. Forecast Peak Hour Ramp Volumes on SR-210 – Year 2016 Without Project**

Segment	Dir	AM Peak Hour Balanced Ramp Volume		PM Peak Hour Balanced Volume	
		On	Off	On	Off
Rialto, Riverside Ave	WB	554	842	532	787
	EB	748	489	886	518
Acacia Ave (Pepper proxy)	WB	-	-	-	-
	EB	-	-	-	-
Cajon Blvd (proxy east of State)	WB	359	486	350	477
	EB	385	478	476	482

**Table 12. Forecast Peak Hour Ramp Volumes on SR-210 – Year 2016 With Project**

Segment	Dir	AM Peak Hour Balanced Ramp Volume		PM Peak Hour Balanced Volume	
		On	Off	On	Off
Rialto, Riverside Ave	WB	823	811	495	750
	EB	726	467	864	496
Acacia Ave (Pepper proxy)	WB	78	90	70	186
	EB	44	81	40	103
Cajon Blvd (proxy east of State)	WB	337	452	368	379
	EB	380	436	478	421

**Table 13. Forecast Peak Hour Ramp Volumes on SR-210 – Year 2036 Without Project**

Segment	Dir	AM Peak Hour Balanced Ramp Volume		PM Peak Hour Balanced Volume	
		On	Off	On	Off
Rialto, Riverside Ave	WB	581	1003	744	963
	EB	813	673	771	579
Acacia Ave (Pepper proxy)	WB	-	-	-	-
	EB	-	-	-	-
Cajon Blvd (proxy east of State)	WB	136	710	432	1003
	EB	466	805	656	453

**Table 14. Forecast Peak Hour Ramp Volumes on SR-210 – Year 2036 With Project**

Segment	Dir	AM Peak Hour Balanced Ramp Volume		PM Peak Hour Balanced Volume	
		On	Off	On	Off
Rialto, Riverside Ave	WB	425	847	565	784
	EB	820	498	815	362
Acacia Ave (Pepper proxy)	WB	389	448	441	773
	EB	221	403	202	513
Cajon Blvd (proxy east of State)	WB	15	530	387	626
	EB	380	719	470	317

## 4. CONCLUSIONS

According to the results obtained from the processing of the SANBAG I-10 HOV Model, the predominant flow at the intersection of Pepper Avenue and Highland Avenue is expected to remain in the east-west direction, for both 2016 and 2036. Volumes on Pepper Avenue are reasonably balanced in the northbound and southbound directions, and one-way peak hour volumes are expected to grow from about 25 vehicles in 2016 to about 100 vehicles in 2036.

Volumes on Pepper Avenue are expected increase significantly with the addition of the interchange, and are forecast to reach 485 vehicles in the northbound direction and about 235 vehicles in the southbound direction in the 2036 AM peak hour. The 2036 PM peak hour is forecast to operate with higher volumes, about 680 in the northbound direction and 360 in the southbound direction.