FEHR PEERS

TECHNICAL MEMORANDUM

Date: August 4, 2014

To: Phillip Cox, Caltrans District 4 Forecasting

Cc: Tim Lee, WMH Corporation

From: Kevin Johnson, Francisco Martin, and Julie Morgan, Fehr & Peers

Subject: ***SR 242/Clayton Road Interchange PA/ED: Final Travel Demand Forecasts Development***

WC11-2831

A key step in conducting the transportation operations analysis for the SR 242/Clayton Road Interchange PA/ED (Project) is to develop long-range forecasts of traffic demand within the study area, using forecasting tools available in this region. These forecasts will be used to analyze the design of project alternatives and the potential effects of the alternatives on the transportation network. This technical memorandum summarizes the forecasting process and presents traffic forecasts for the opening year (2020) and design year (2040), which are based on the following project documents that have previously been reviewed by Caltrans:

- *SR 242/Clayton Road Interchange PA/ED: Determination of Study Area for Mainline Analysis* dated December 2013
- *SR 242/Clayton Road Interchange PA/ED: Traffic Analysis Assumptions, Methodology, and Approach (Revised to Address Caltrans Comments)* dated January 2014
- *SR 242/Clayton Road Interchange PA/ED: Travel Demand Forecasting Model Validation Procedure and Results* dated February 2014
- *SR 242/Clayton Road Interchange PA/ED: ICE Analysis Approach* dated March 2014
- *SR 242/Clayton Road Interchange PA/ED: Final Existing Conditions Report* dated May 2014
- *SR 242/Clayton Road Interchange PA/ED: Draft Travel Demand Forecasts Development* dated June 2014

The Project study area is presented in **Figure 1**.

Summary of Existing Conditions

The *SR 242/Clayton Road Interchange PA/ED: Final Existing Conditions Report,* dated May 2014, describes the data collection process in detail and presents summaries of the existing (2013) traffic count data. Because periods of traffic congestion and delay can last for more than one hour in the morning and afternoon, all of the data was collected for the hours of 6:00 AM to 9:00 AM and 3:00 PM to 6:00 PM, to ensure that the beginning and end of the data collection period would experience free-flow speeds, and thus will reflect the true total demand for vehicle travel within the study area. For reference purposes, **Figures 2 through 4** display the existing peak

hour intersection volumes and peak period mainline and ramp volumes. Please see the Existing Conditions Report for further information about existing traffic observations in the study area.

Model Background and Validation

The traffic forecasts presented in this memorandum are based on applications of the Contra Costa Transportation Authority (CCTA) Travel Demand Forecasting Model. The CCTA Model is a regional travel demand model that covers the entire Bay Area, with higher level of geographic detail within Contra Costa County. The model receives its demographic inputs from the Association of Bay Area Governments (ABAG) regional land use projections, and produces estimates of regional travel flows based on a standard four-step modeling process. To ensure a high level of confidence in the forecasting process, the CCTA Model was first refined and validated within the project study area as described in the technical memorandum *SR 242/Clayton Road Interchange PA/ED: Travel Demand Forecasting Model Validation Procedure and Results* dated February 2014. The CCTA Model was updated to 2013 conditions and was validated to a level well within the applicable model validation guidelines, so the base year model for this project reflects year 2013 conditions.

Forecast Development

Following validation of the model to 2013 conditions, the same modifications made to the base year (2010) CCTA Model were applied to the future year (2040) CCTA Model to ensure consistency. The future year model also reflects regional land use projections consistent with ABAG Projections 2011, as well as roadway network improvements contained in Plan Bay Area (the current Regional Transportation Plan for the Bay Area).

A list and map of the major projects that are assumed to occur by the design year is shown in **Appendix A**. The 2040 CCTA Model also includes a number of local roadway improvements in the cities around the study area, consistent with the Regional Transportation Plan.

Design Year (2040) Traffic Forecasts

To develop design year (2040) traffic forecasts, the 2040 CCTA Model roadway network was first modified to reflect the "No Build" condition. The model was then run to obtain AM and PM peak period forecasted traffic volumes for the approach and departure links at each study intersection, and for the freeway mainline and ramp links in the study area. The forecasted traffic volumes were then compared to the 2013 traffic volumes from the validated base year CCTA Model to determine the projected change in traffic at each study location.

Upon inspection of the preliminary modeling results, traffic growth on individual links was found to vary widely from location to location, with some locations showing negative growth and other locations showing average annual growth rates exceeding 40%. Our experience with this model is that the results on individual links can be heavily influenced by very localized model responses to congested conditions. For example, in situations where the congested speeds on a freeway mainline are projected to be low, the model may assign many vehicles to exit the freeway at one off-ramp and re-enter the freeway at the next downstream on-ramp; this may be an unrealistic choice for most real-world travelers, and it causes the model to show excessively high volumes on the affected ramps. More realistic results can often be obtained by grouping the study locations into logical geographic groups. Model-predicted growth in vehicular traffic was then calculated for each grouping and checked for reasonableness.

The suggested groupings as well as the raw model-predicted change in vehicular traffic calculated for each grouping are provided in **Appendix B**. The annual traffic growth rates were first checked for reasonableness against average annual changes in counted traffic volumes on SR 242. A comparison of annual average daily traffic from the Caltrans Traffic Census website indicated average annual growth along the corridor over the past several years (2010 through 2012) of around three to four percent. Groupings that had unusual levels of change in projected traffic volumes (e.g., those that were projected to decline, or those where the average increase was greater than four percent per year) were then checked to determine if that result might be reasonable in light of the changes coded into the model inputs, such as changes to nearby land uses or modifications to the highway network. In cases where there was no change in inputs that should logically result in such an unusual change in projected traffic volumes, adjustments to the raw model-predicted growth rates were then made to bring the result to more consistent levels. The final recommended annual growth rates calculated for each group are provided in **Appendix B**.

As shown in the upper table on **Appendix B**, the recommended annual growth rates for each of the groupings are within a reasonable range, with all being positive numbers and the maximum growth rates being about 2.1% per year. Furthermore, we checked the effect on the mainline volumes of applying this grouped growth rate procedure, and the results indicated that the mainline volumes remained consistent with what was predicted by the CCTA Model (see the bottom table on **Appendix B**). The annual growth rates for the groupings were applied to the existing traffic volumes to produce the final design year (2040) "No Build" peak hour intersection and peak period mainline and ramp volumes which are shown on **Figures 5 through 7**.

Traffic Forecasts for the "Build" Alternatives

The proposed "Build" alternatives involve the construction of a northbound on-ramp to SR 242 and a southbound off-ramp from SR 242 within the vicinity of the existing SR 242/Clayton Road interchange. The memo titled *SR 242/Clayton Road Interchange PA/ED: Traffic Analysis Assumptions, Methodology, and Approach (Revised to Address Caltrans Comments)* dated January 2014, and subsequent discussions with Caltrans staff, addressed the question of the geographic extent of the project's effects. As indicated in that memo, and confirmed through subsequent applications of the travel model, the primary effect of the project will be to re-distribute traffic that would otherwise use the SR 242/Concord Avenue interchange. Thus, the overall traffic demand in the study area will be consistent between the "No Build" and the "Build" alternatives. Traffic forecasts for the design year (2040) "Build" alternatives were developed by manually re-distributing the final design year (2040) "No Build" traffic volumes.

Currently two project Build alternatives, Alternative 1 and Alternative 2, are being considered for further evaluation during the PA/ED phase. The two alternatives differ in terms of which local streets would serve as access points to the freeway:

- Alternative 1 proposes new access points to/from southbound SR 242 at Franquette Avenue and a new on-ramp to northbound SR 242 from the existing ramp-terminal intersection at Clayton Road/Market Street.

- Alternative 2 proposes new access to/from SR 242 at Willow Pass Road including a northbound on-ramp to SR 242, and a southbound SR 242 off-ramp and on-ramp. Alternative 2 would prohibit westbound left-turn access from Willow Pass Road onto the

proposed southbound SR 242 on-ramp condition, in addition to prohibiting eastbound left-turn access from Willow Pass Road onto the proposed northbound SR 242 on-ramp.

Proposed designs for Alternative 1 and Alternative 2 are provided in **Appendix C**. Design year (2040) traffic forecasts for Alternative 1 and Alternative 2 are shown on **Figures 8 through 13**.

As shown in **Appendix C**, the Alternative 2 design proposes a northbound SR 242 off-ramp extension to Willow Pass Road. That specific extension is currently in the process of being eliminated from further design consideration due to geometric, operational and environmental constraints. For purposes of the forecasts development, the northbound SR 242 off-ramp extension to Willow Pass Road is not assumed for Alternative 2 conditions.

Opening Year (2020) Traffic Forecasts

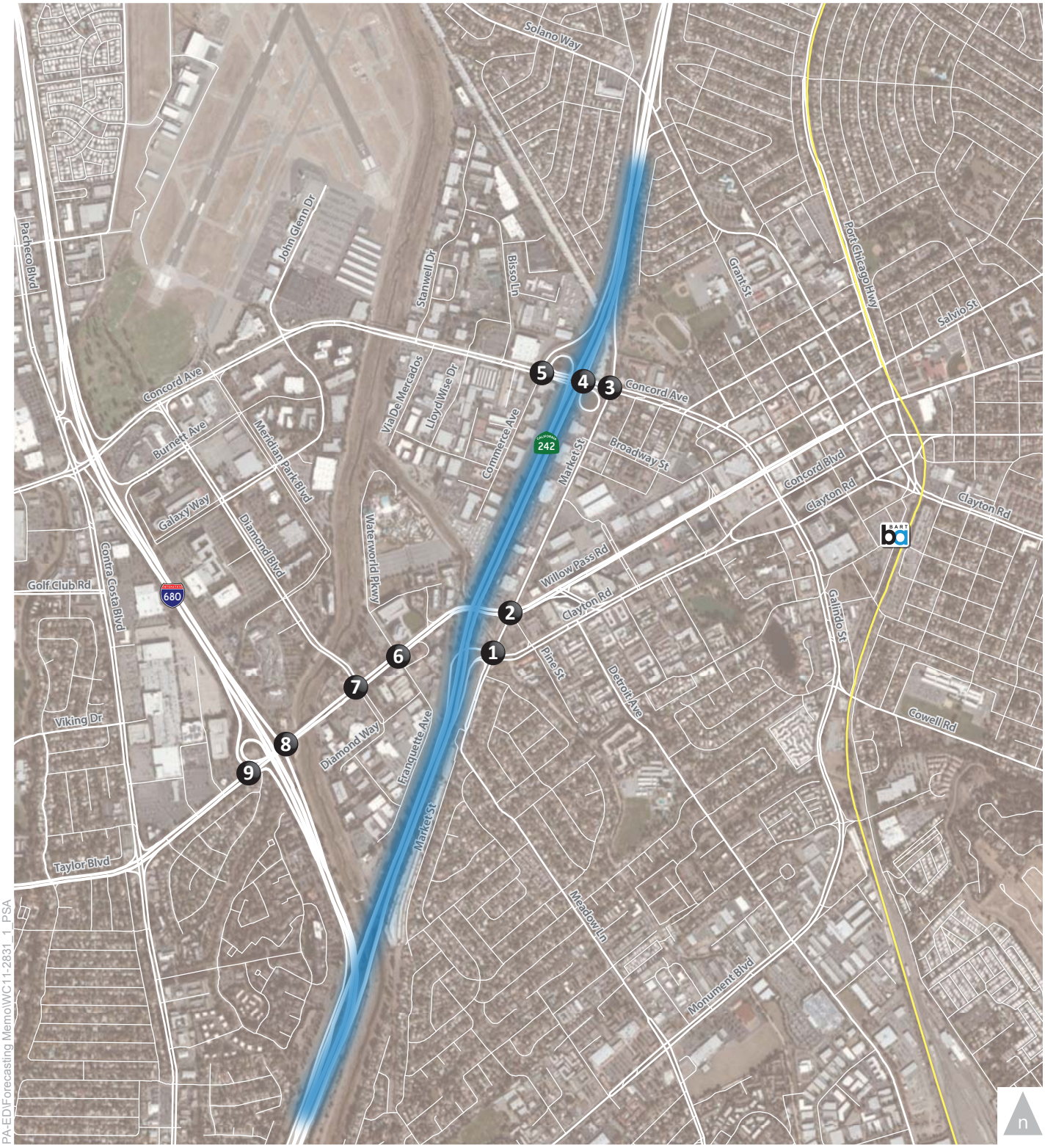
Forecasts for the opening year (2020) have been estimated by interpolating the traffic volumes between the existing (2013) traffic counts and the final design year (2040) traffic forecasts. Using the same procedure for the "No Build" and "Build" alternatives, final opening year (2020) peak hour intersection and peak period mainline and ramp volumes have been developed and are presented for "No Build" and the "Build" alternatives in **Figures 14 through 16** and **Figures 17 through 22**, respectively.

Please contact us with any questions.

ATTACHMENTS

Figure 1 – Study Area
Figure 2 – Existing (2013) Intersection Peak Hour Volumes and Lane Configurations
Figure 3 – Existing (2013) AM Peak Period Mainline and Ramp Volumes
Figure 4 – Existing (2013) PM Peak Period Mainline and Ramp Volumes
Figure 5 – Year 2040 Intersection Peak Hour Volume Forecasts – No Project Conditions
Figure 6 – Year 2040 AM Peak Period Mainline and Ramp Volumes – No Project Conditions
Figure 7 – Year 2040 PM Peak Period Mainline and Ramp Volumes – No Project Conditions
Figure 8 – Year 2040 Intersection Peak Hour Volume Forecasts – Alternative 1 Conditions
Figure 9 – Year 2040 AM Peak Period Mainline and Ramp Volumes – Alternative 1 Conditions
Figure 10 – Year 2040 PM Peak Period Mainline and Ramp Volumes – Alternative 1 Conditions
Figure 11 – Year 2040 Intersection Peak Hour Volume Forecasts – Alternative 2 Conditions
Figure 12 – Year 2040 AM Peak Period Mainline and Ramp Volumes – Alternative 2 Conditions
Figure 13 – Year 2040 PM Peak Period Mainline and Ramp Volumes – Alternative 2 Conditions
Figure 14 – Year 2020 Intersection Peak Hour Volume Forecasts – No Project Conditions
Figure 15 – Year 2020 AM Peak Period Mainline and Ramp Volumes – No Project Conditions
Figure 16 – Year 2020 PM Peak Period Mainline and Ramp Volumes – No Project Conditions
Figure 17 – Year 2020 Intersection Peak Hour Volume Forecasts – Alternative 1 Conditions
Figure 18 – Year 2020 AM Peak Period Mainline and Ramp Volumes – Alternative 1 Conditions
Figure 19 – Year 2020 PM Peak Period Mainline and Ramp Volumes – Alternative 1 Conditions
Figure 20 – Year 2020 Intersection Peak Hour Volume Forecasts – Alternative 2 Conditions
Figure 21 – Year 2020 AM Peak Period Mainline and Ramp Volumes – Alternative 2 Conditions
Figure 22 – Year 2020 PM Peak Period Mainline and Ramp Volumes – Alternative 2 Conditions

Appendix A – Major Roadway Improvements Assumed in CCTA Model
Appendix B – Annual Growth Rates
Appendix C – Proposed Build Alternatives



PA-ED\Forecasting Memo\WC11-2831_1_PSA

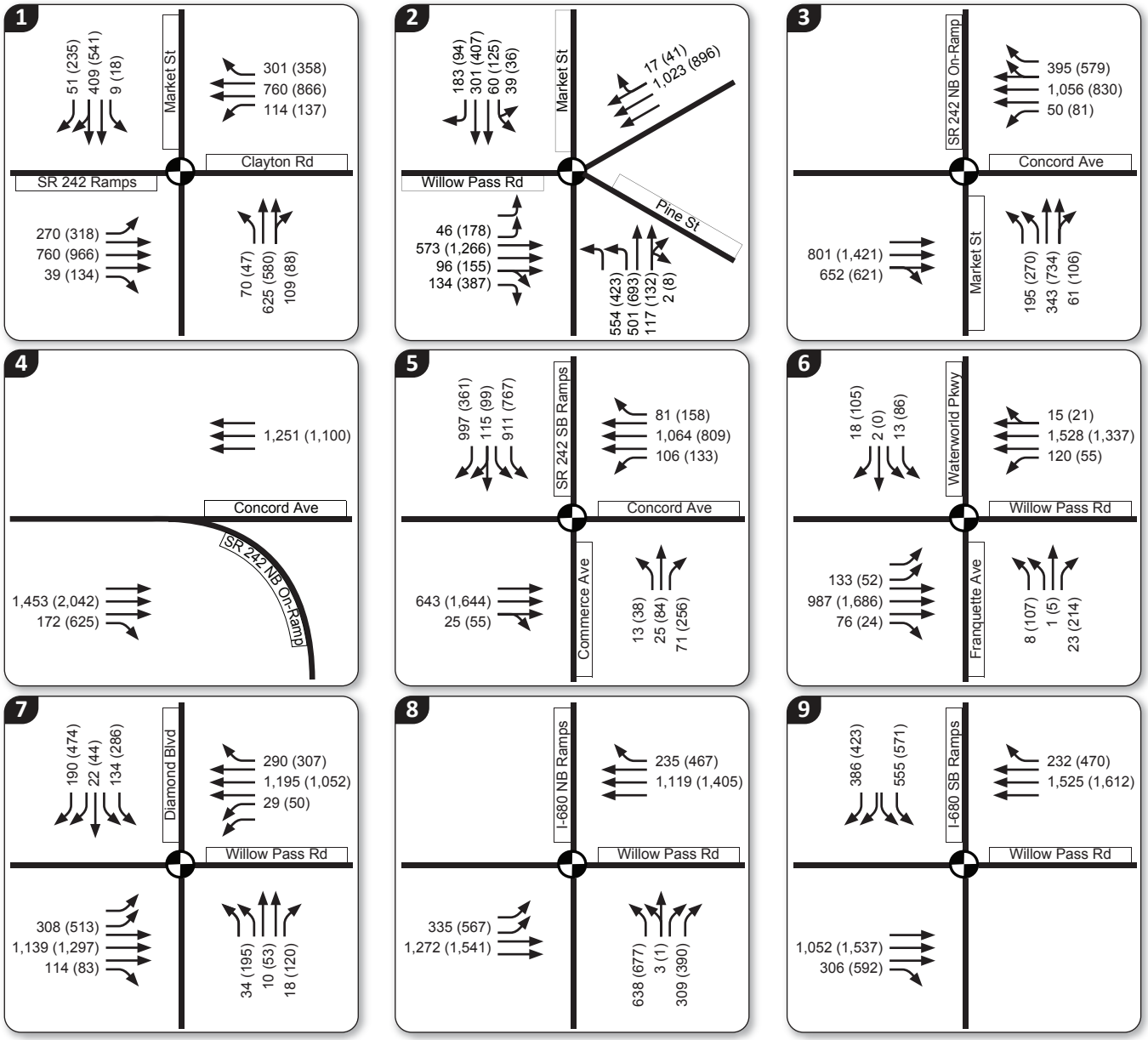
LEGEND

Study Intersection

Study Freeway Segment

Figure 1

Study Area



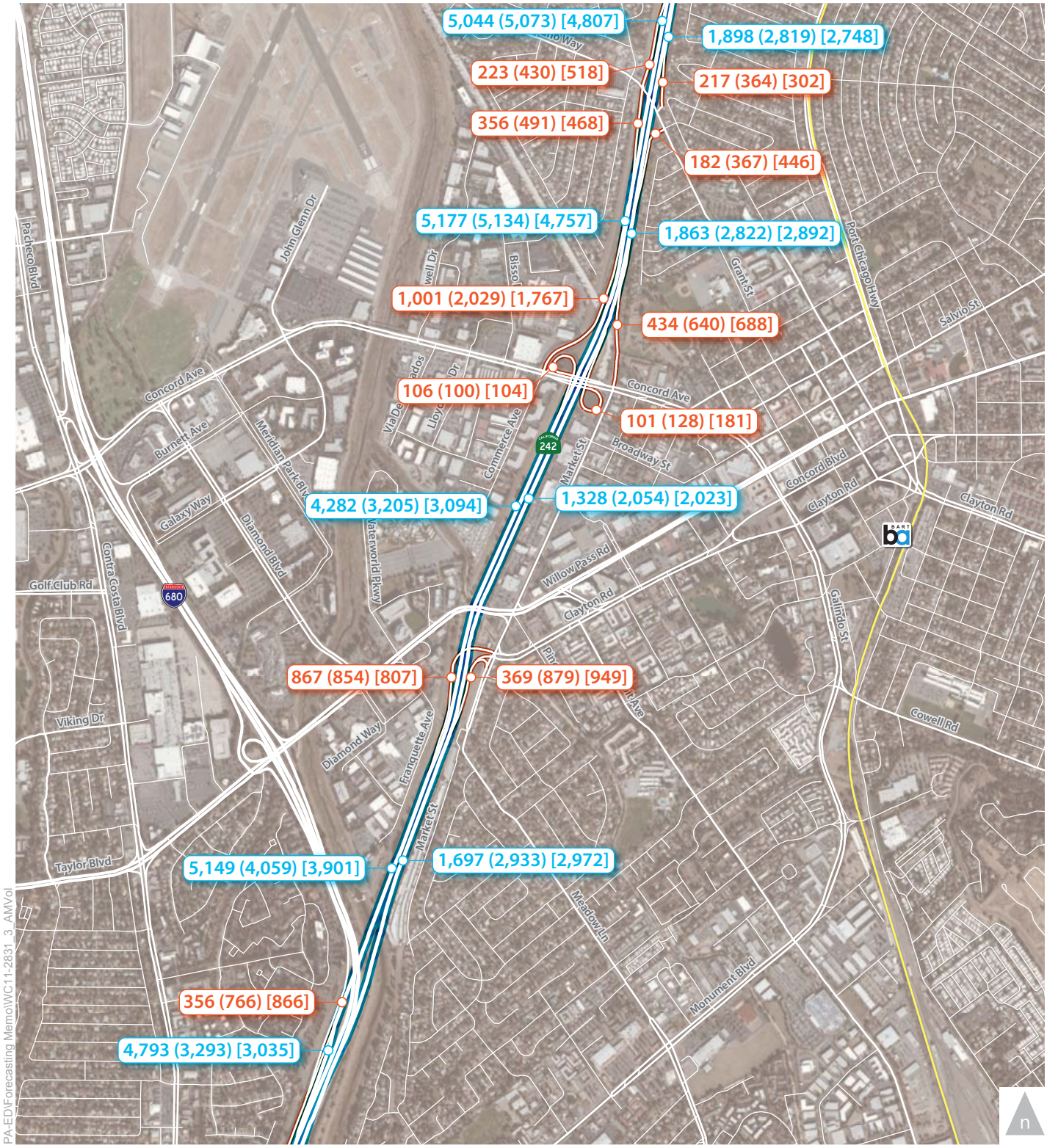
PA-ED\Forecasting Memo\WC11-2831_2_ExVols

LEGEND

XX (YY)	AM (PM) Peak Hour Traffic Volumes
	Signalized Intersection
	Stop Sign
#	Study Intersection

Figure 2

Existing (2013) Intersection Peak Hour Volumes and Lane Configurations



PA-ED\Forecasting Memo\WC11-2831_3_AMVol

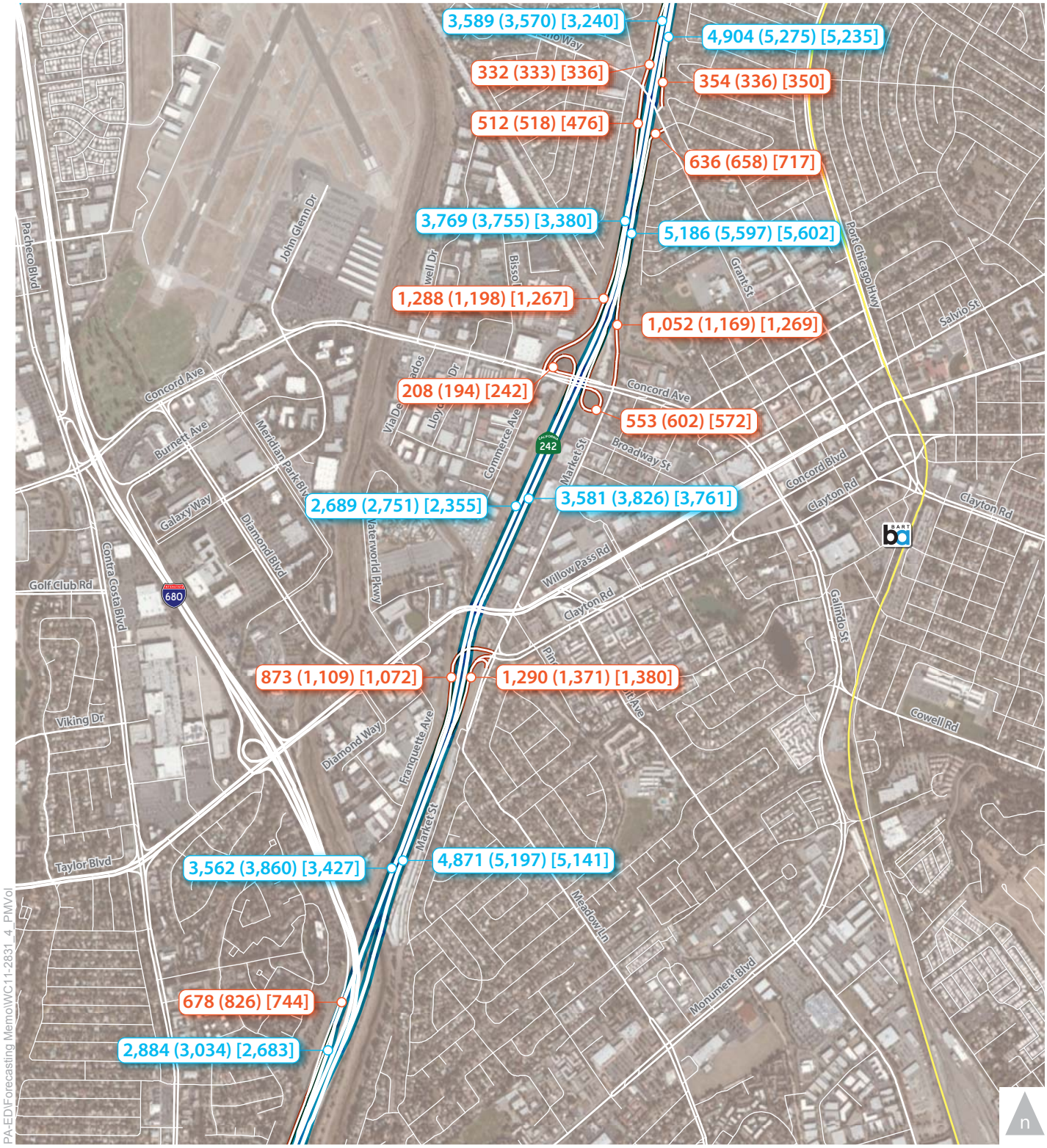
LEGEND

XX (YY) [ZZ] AM Mainline Volume
6-7 AM (7-8 AM) [8-9 AM]

XX (YY) [ZZ] AM Ramp Volume
6-7 AM (7-8 AM) [8-9 AM]

Figure 3

Existing (2013) AM Peak Period Mainline and Ramp Volumes



PA-ED\Forecasting Memo\WC11-2831_4_PMVol

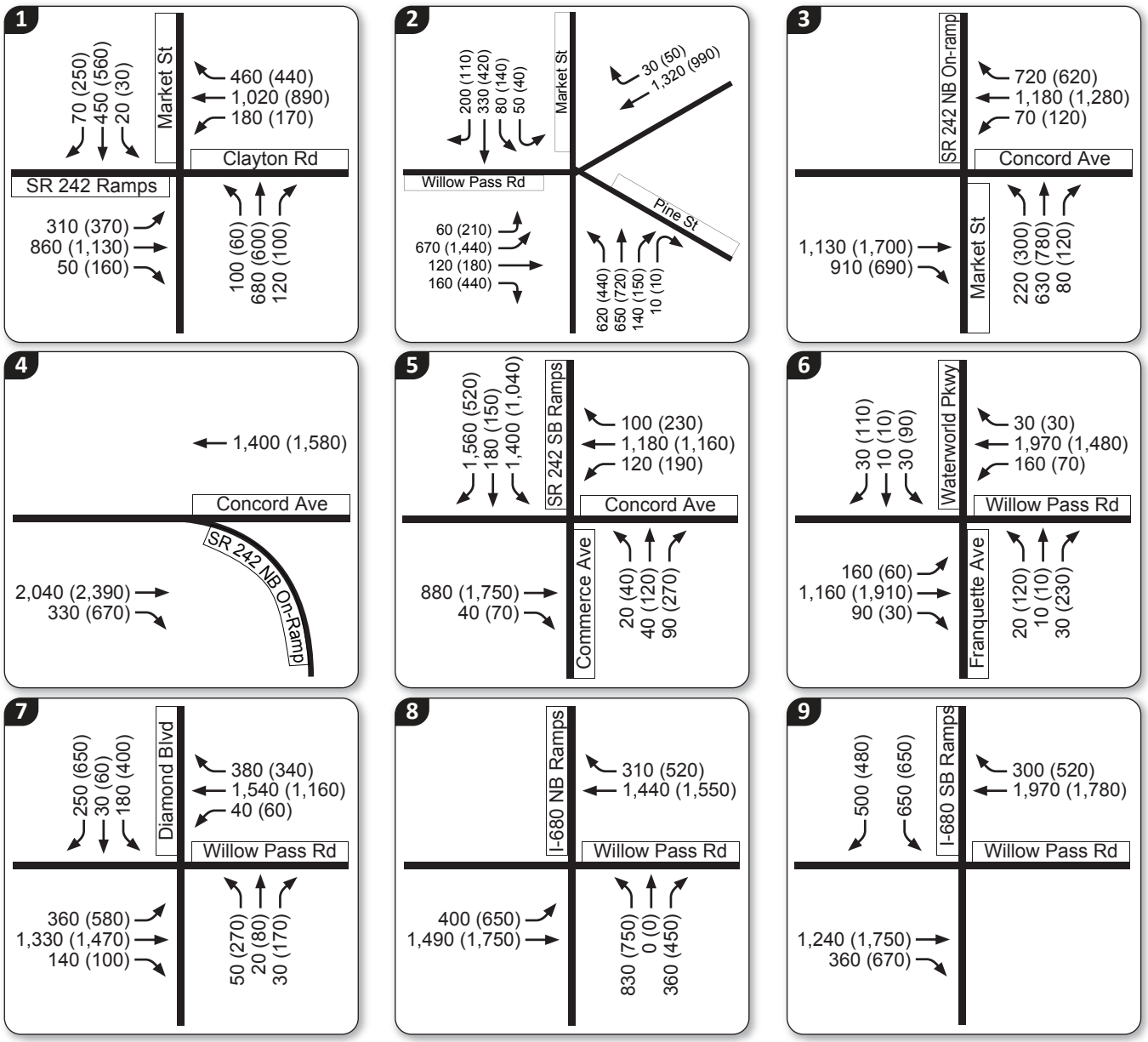
LEGEND

XX (YY) [ZZ] PM Mainline Volume
3-4 PM (4-5 PM) [5-6 PM]

XX (YY) [ZZ] PM Ramp Volume
3-4 PM (4-5 PM) [5-6 PM]

Figure 4

Existing (2013) PM Peak Period Mainline and Ramp Volumes



PA-ED\Forecasting Memo\WC11-2831_5_2040NP.vol

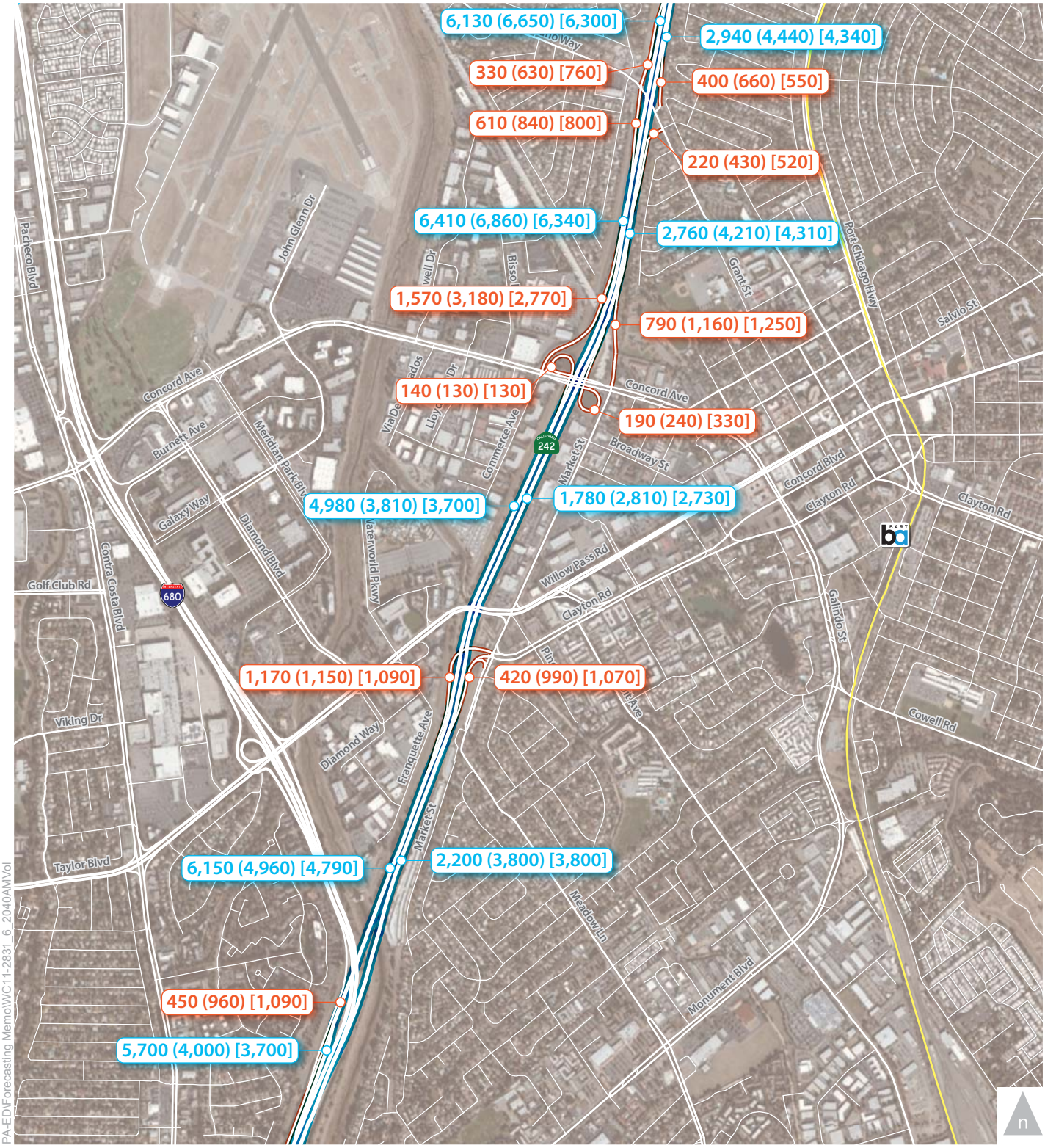
LEGEND

XX (YY)	AM (PM) Peak Hour Traffic Volumes
	Signalized Intersection
	Stop Sign
#	Study Intersection

Figure 5

Year 2040

Intersection Peak Hour Volume Forecasts – No Project Conditions



PA-ED\Forecasting Memo\WC11-2831_6_2040AMVol

LEGEND

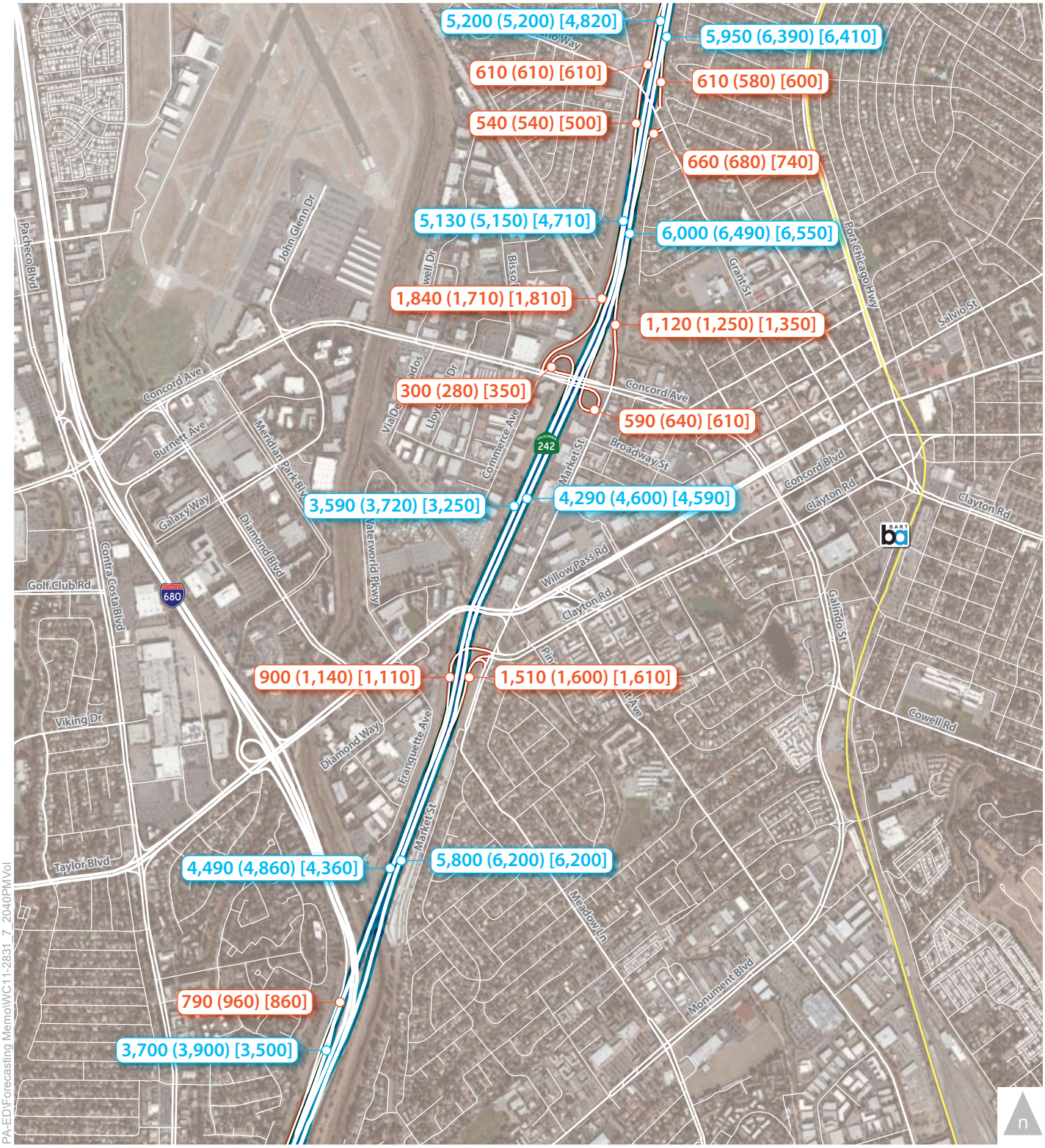
XX (YY) [ZZ] AM Mainline Volume
6-7 AM (7-8 AM) [8-9 AM]

XX (YY) [ZZ] AM Ramp Volume
6-7 AM (7-8 AM) [8-9 AM]

Figure 6

Year 2040

AM Peak Period Mainline and Ramp Volumes – No Project Conditions



PA-ED\Forecasting Memo\WC11-2831_7_2040PMVol

LEGEND

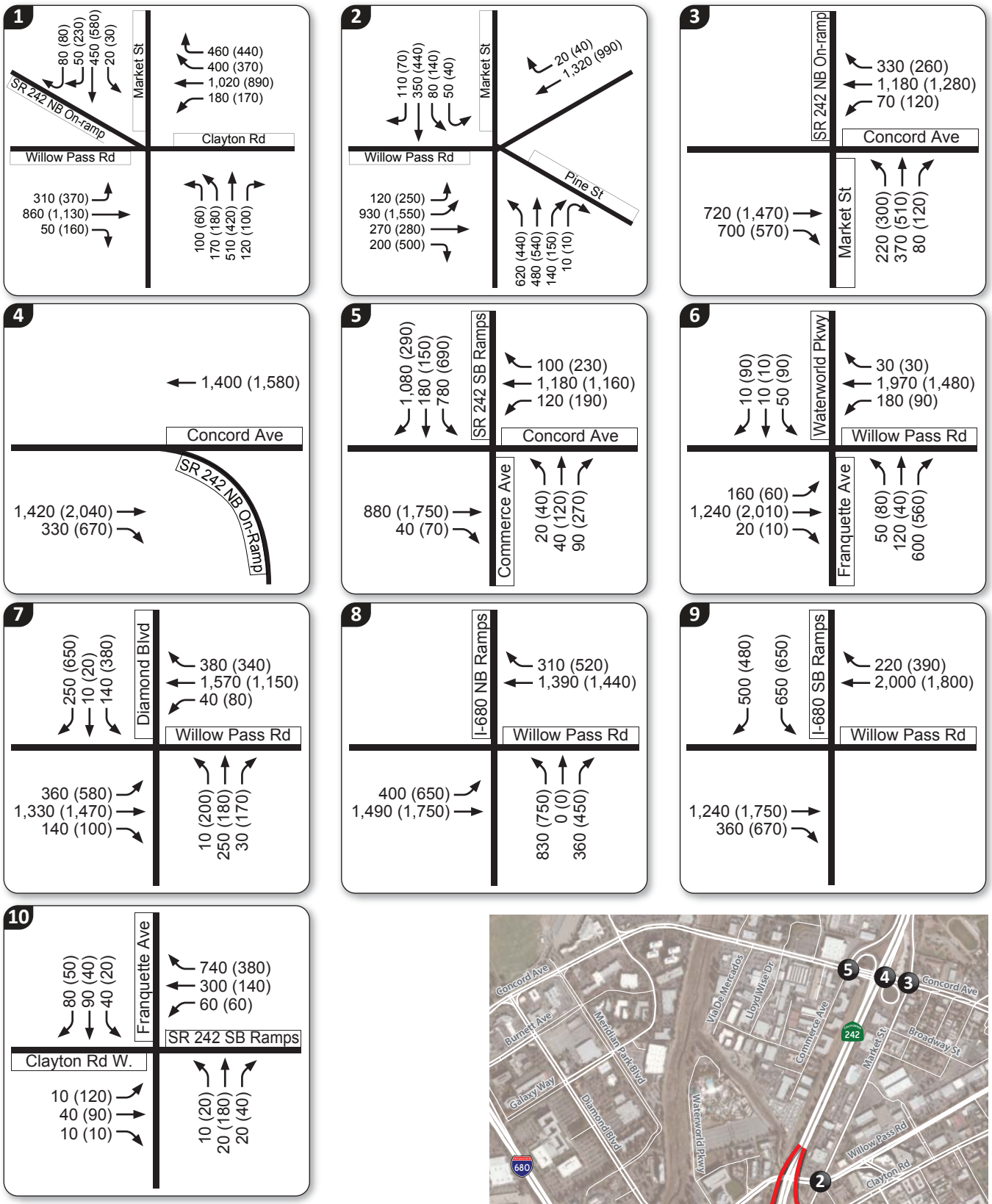
XX (YY) [ZZ] PM Mainline Volume
3-4 PM (4-5 PM) [5-6 PM]

XX (YY) [ZZ] PM Ramp Volume
3-4 PM (4-5 PM) [5-6 PM]

Figure 7

Year 2040

PM Peak Period Mainline and Ramp Volumes – No Project Conditions

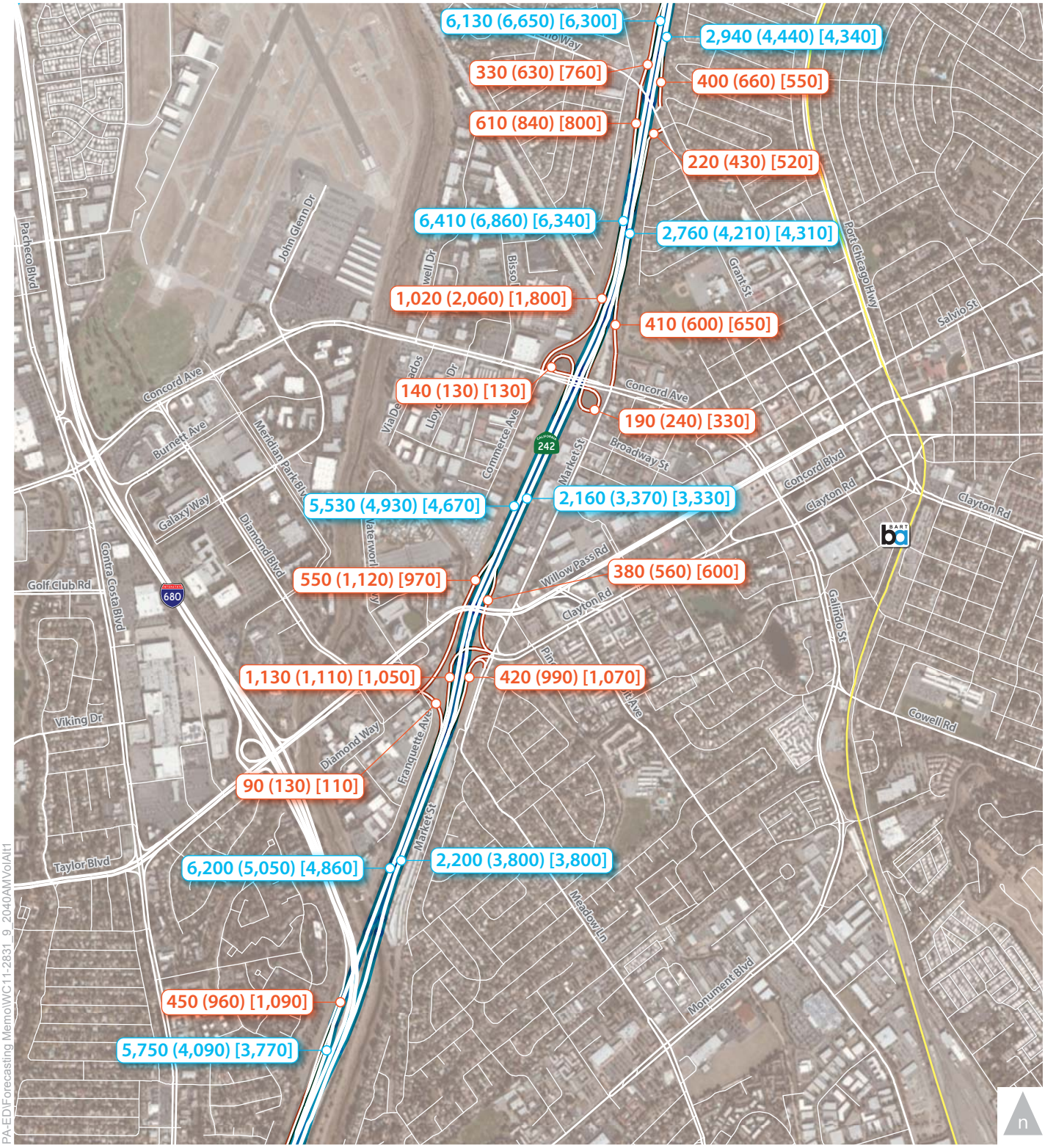


PA-ED\Forecasting Memo\WC11-2831_8_2040Alt1vol

Figure 8

Year 2040

Intersection Peak Hour Volume Forecasts – Alternative 1 Conditions



PA-ED\Forecasting Memo\WC11-2831_9_2040AMVolAlt1

LEGEND

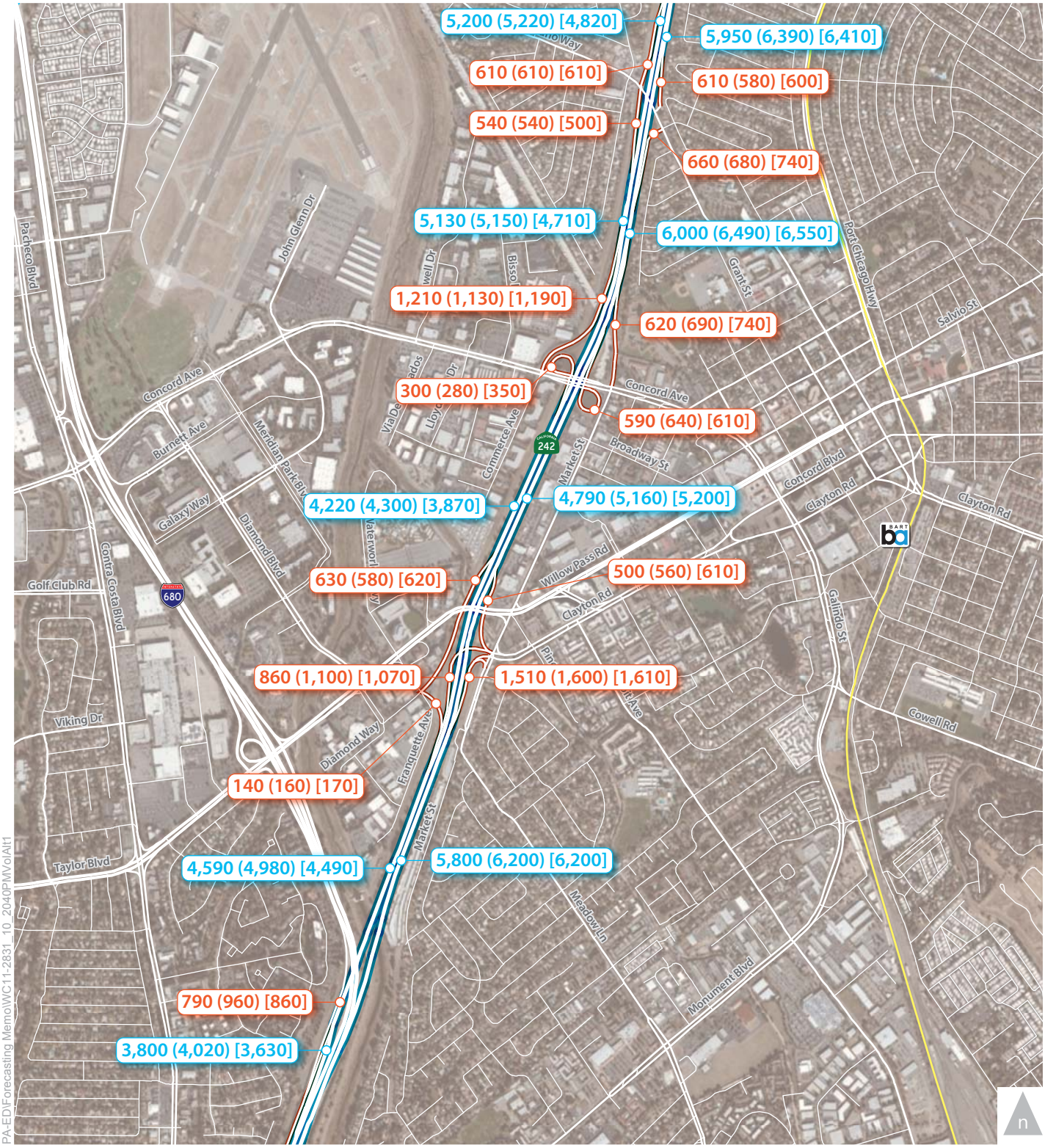
XX (YY) [ZZ] AM Mainline Volume
6-7 AM (7-8 AM) [8-9 AM]

XX (YY) [ZZ] AM Ramp Volume
6-7 AM (7-8 AM) [8-9 AM]

Figure 9

Year 2040

AM Peak Period Mainline and Ramp Volumes – Alternative 1 Conditions



PA-ED\Forecasting Memo\WC11-2831_10_2040PMVolAlt1

LEGEND

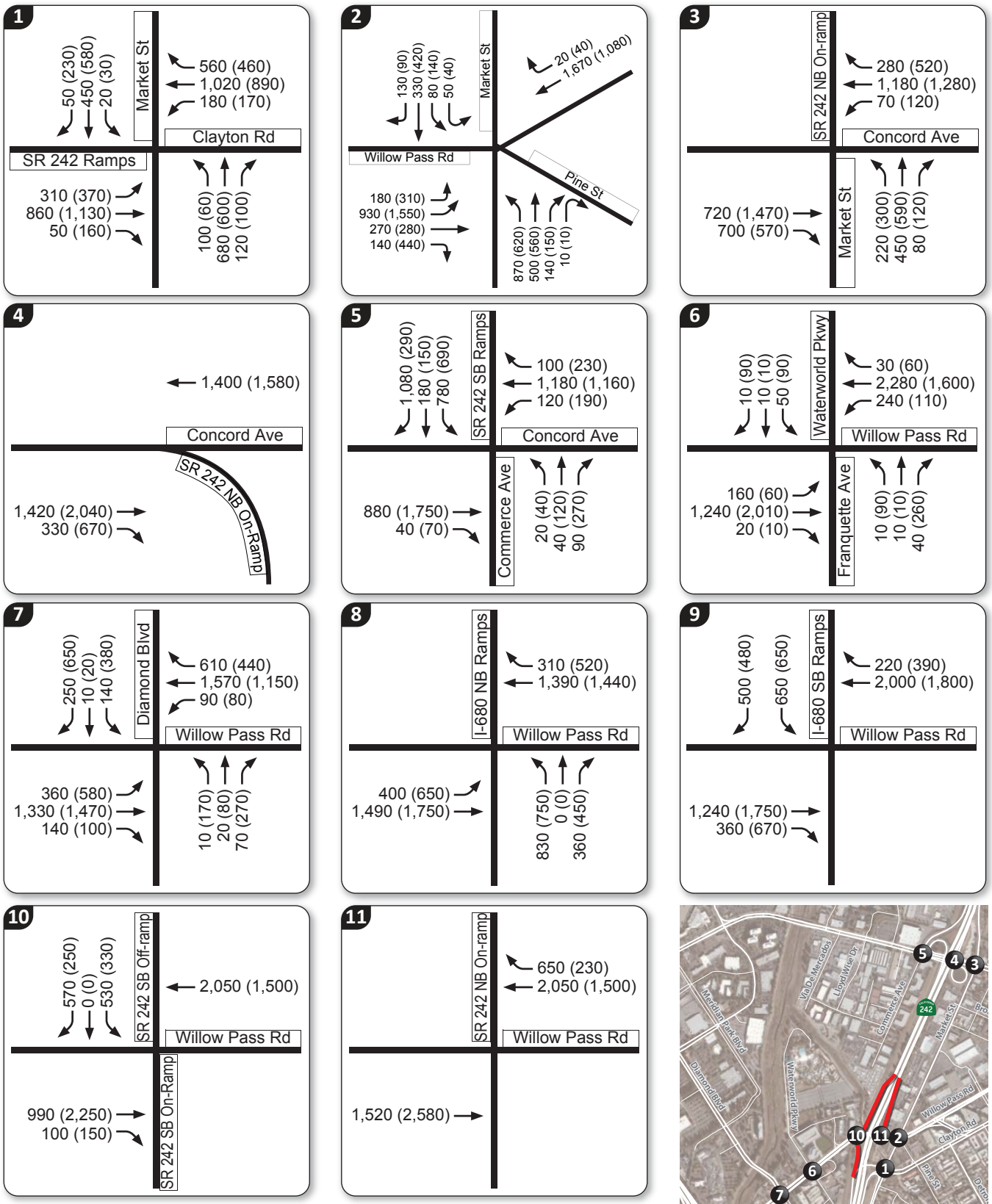
XX (YY) [ZZ] PM Mainline Volume
3-4 PM (4-5 PM) [5-6 PM]

XX (YY) [ZZ] PM Ramp Volume
3-4 PM (4-5 PM) [5-6 PM]

Figure 10

Year 2040

PM Peak Period Mainline and Ramp Volumes – Alternative 1 Conditions

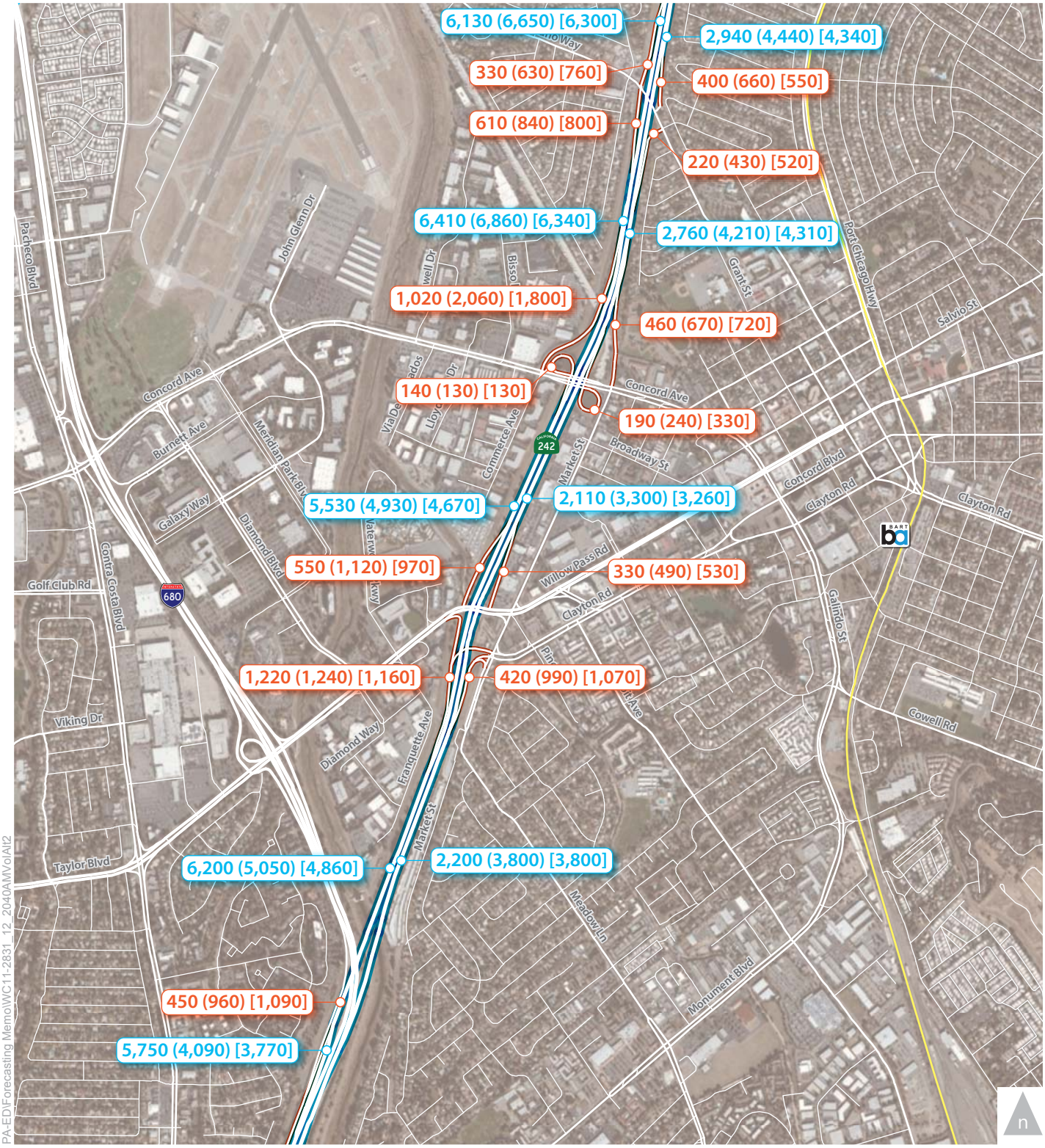


PA-ED\Forecasting Memo\WC11-2831_11_2040Alt2vol

Figure 11

Year 2040

Intersection Peak Hour Volume Forecasts – Alternative 2 Conditions



LEGEND

XX (YY) [ZZ] AM Mainline Volume
6-7 AM (7-8 AM) [8-9 AM]

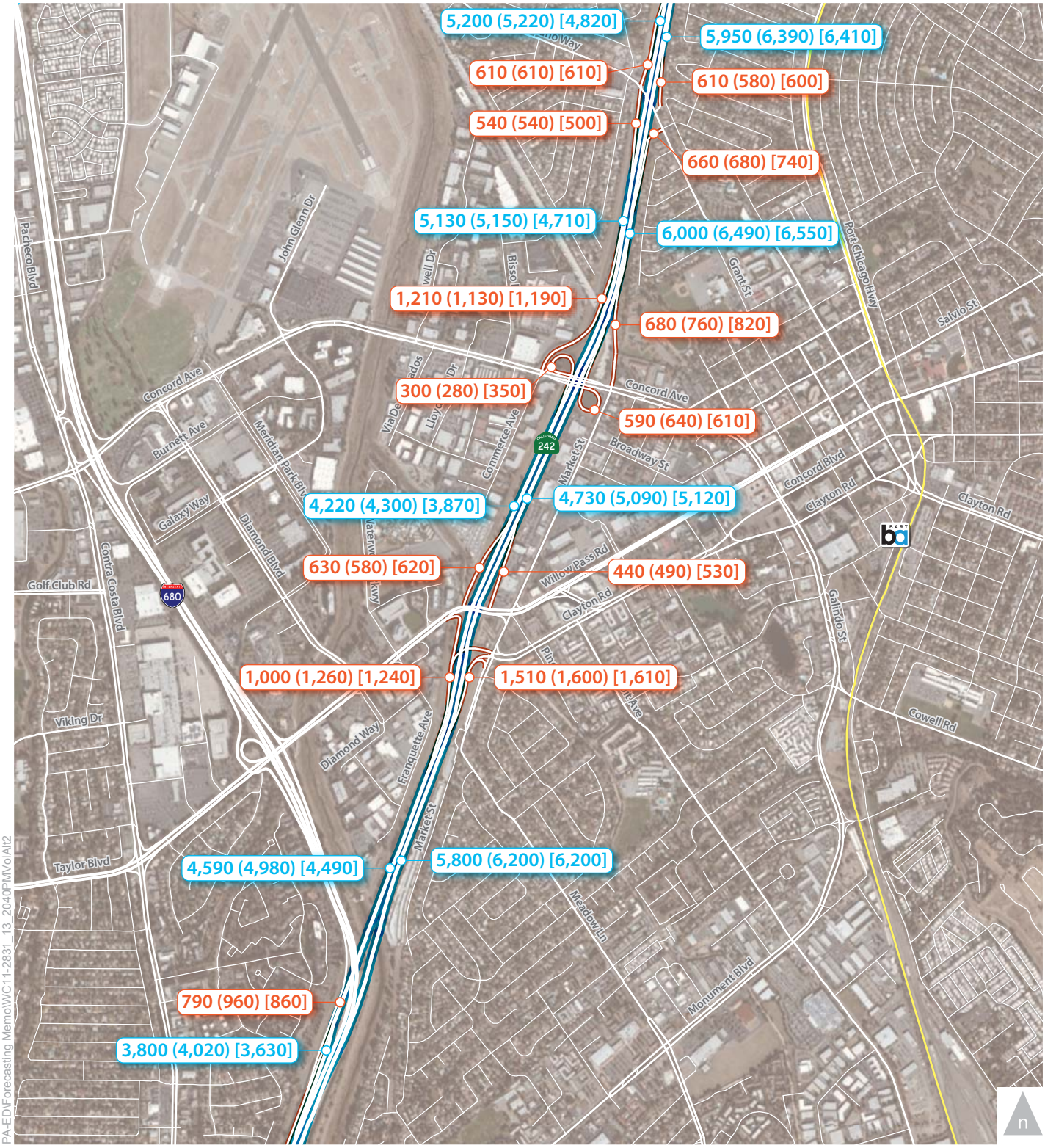
XX (YY) [ZZ] AM Ramp Volume
6-7 AM (7-8 AM) [8-9 AM]

Figure 12

Year 2040

AM Peak Period Mainline and Ramp Volumes – Alternative 2 Conditions

PA-ED\Forecasting Memo\WC11-2831_12_2040AMVolAlt2



LEGEND

XX (YY) [ZZ] PM Mainline Volume
3-4 PM (4-5 PM) [5-6 PM]

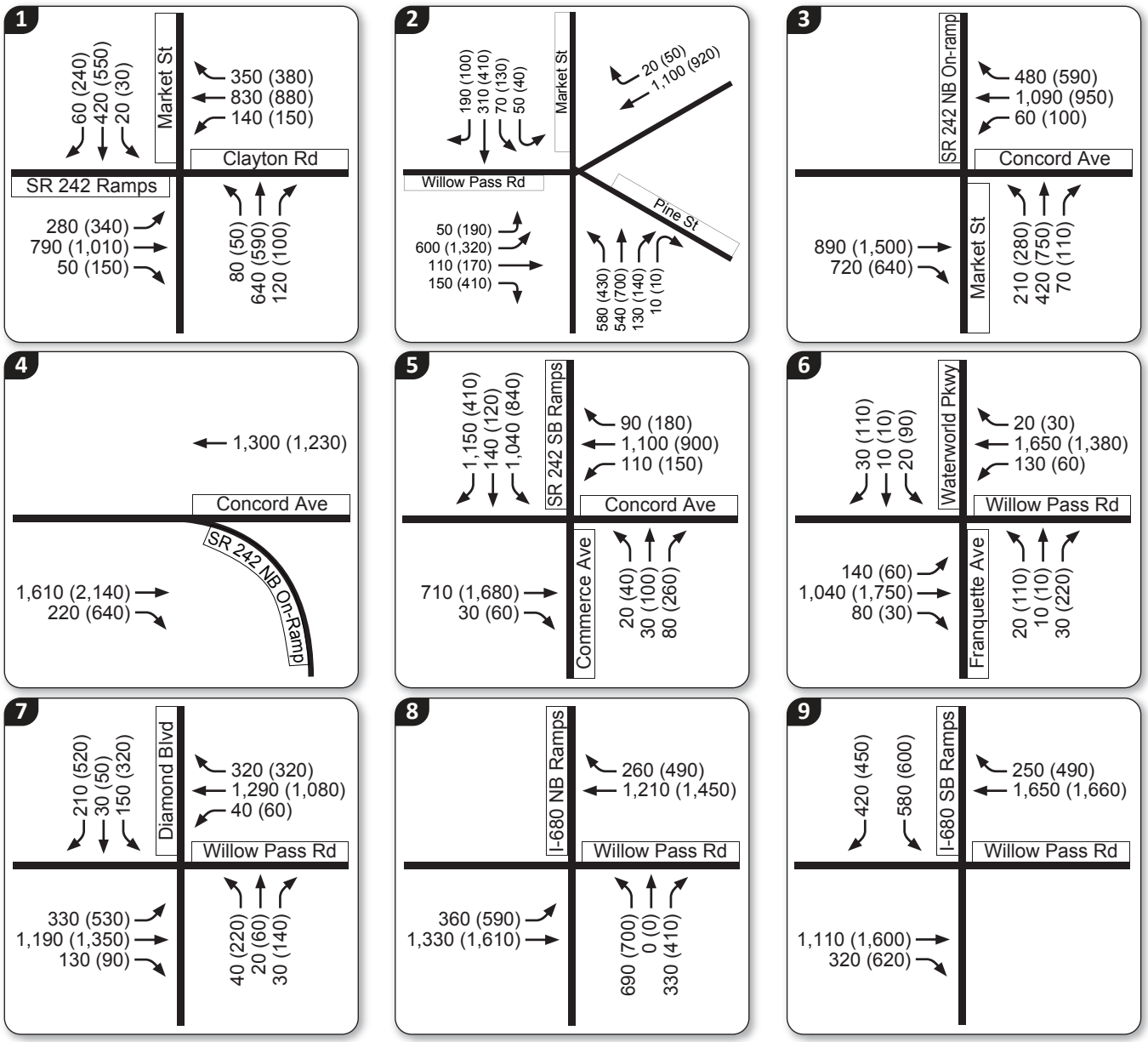
XX (YY) [ZZ] PM Ramp Volume
3-4 PM (4-5 PM) [5-6 PM]

PA-ED\Forecasting Memo\WC11-2831_13_2040PMVolAlt2

Figure 13

Year 2040

PM Peak Period Mainline and Ramp Volumes – Alternative 2 Conditions



PA-ED\Forecasting Memo\WC11-2831_14_2020NPvol

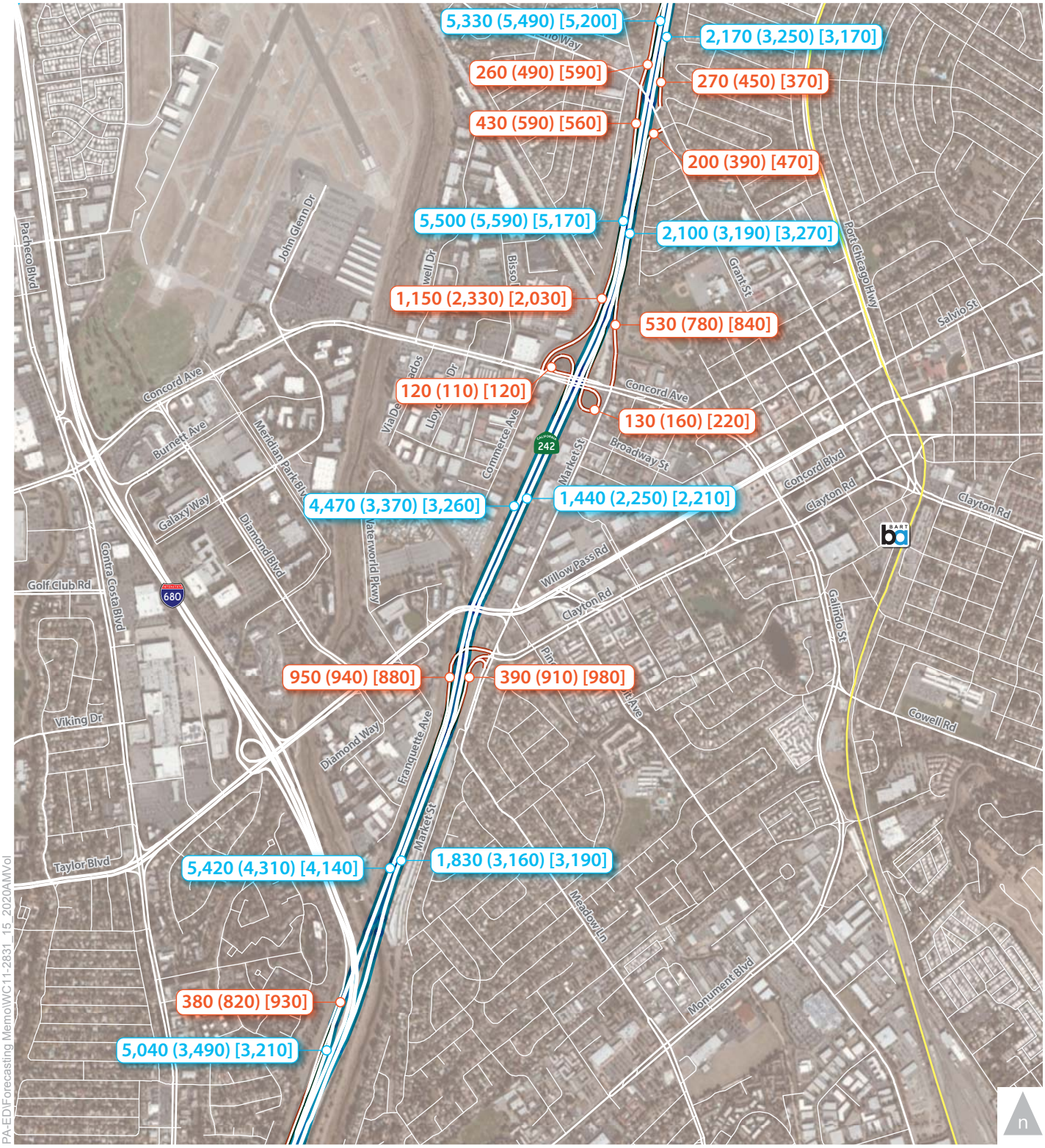
LEGEND

XX (YY)	AM (PM) Peak Hour Traffic Volumes
◐	Signalized Intersection
●	Stop Sign
#	Study Intersection

Figure 14

Year 2020

Intersection Peak Hour Volume Forecasts – No Project Conditions



LEGEND

XX (YY) [ZZ] AM Mainline Volume
6-7 AM (7-8 AM) [8-9 AM]

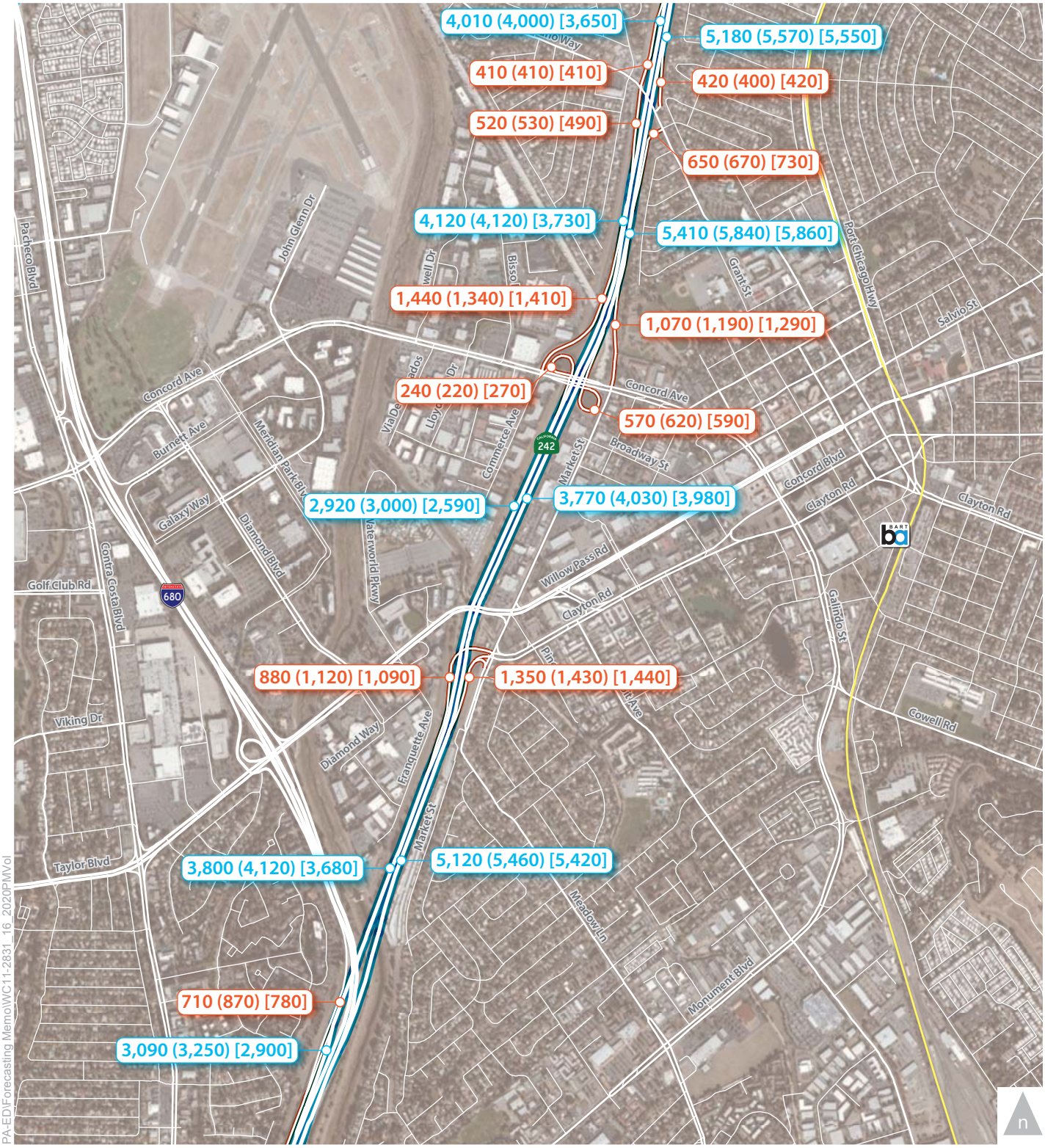
XX (YY) [ZZ] AM Ramp Volume
6-7 AM (7-8 AM) [8-9 AM]

Figure 15

Year 2020

AM Peak Period Mainline and Ramp Volumes – No Project Conditions

PA-ED\Forecasting Memo\WC11-2831_15_2020AMVol



PA-ED\Forecasting Memo\WC11-2831_16_2020PMVol

LEGEND

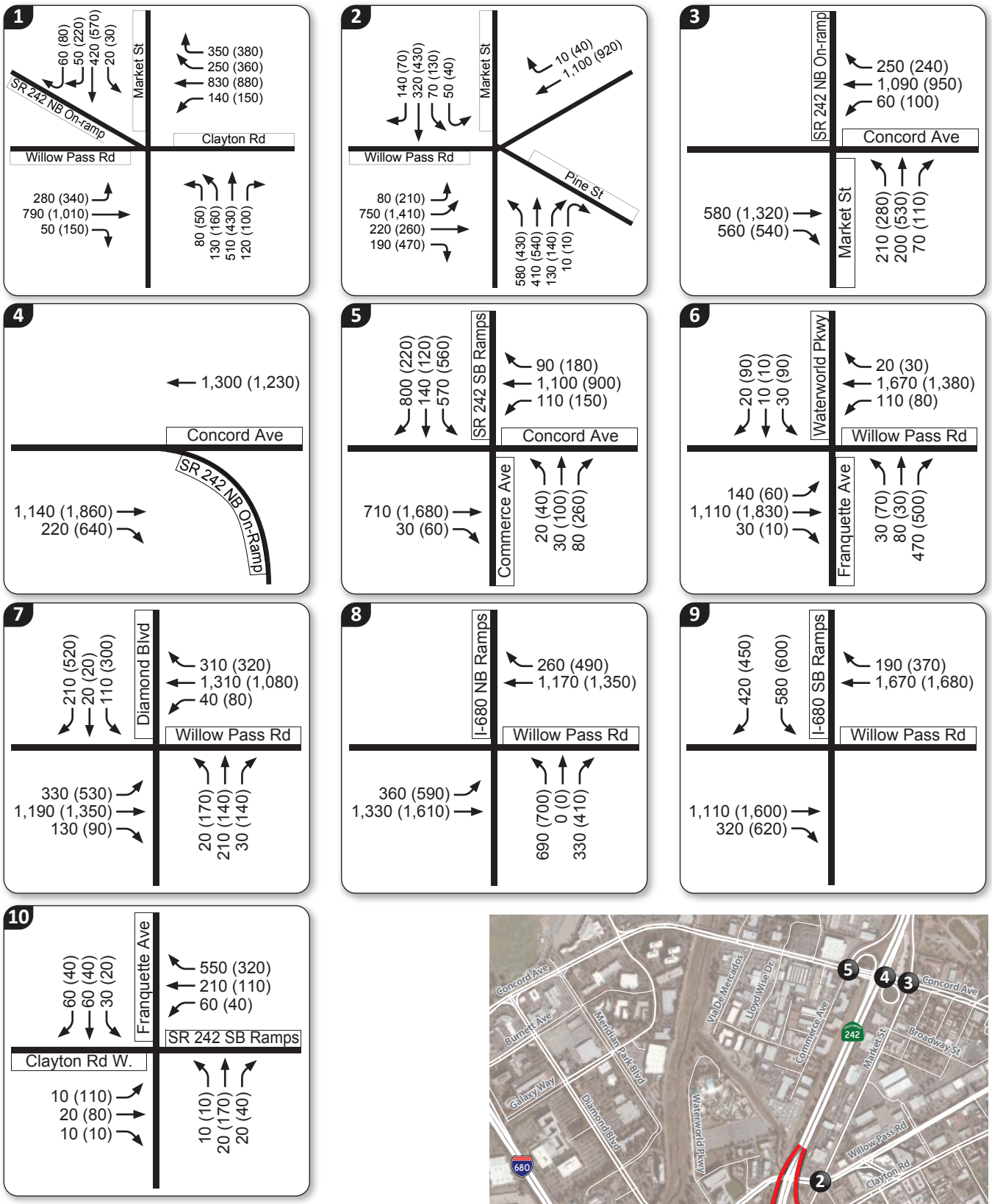
XX (YY) [ZZ] PM Mainline Volume
3-4 PM (4-5 PM) [5-6 PM]

XX (YY) [ZZ] PM Ramp Volume
3-4 PM (4-5 PM) [5-6 PM]

Figure 16

Year 2020

PM Peak Period Mainline and Ramp Volumes – No Project Conditions



PA-ED\Forecasting Memo\WC11-2831_17_2020Alt1vol

LEGEND

XX (YY)	AM (PM) Peak Hour Traffic Volumes		Stop Sign
	Signalized Intersection	#	Study Intersection

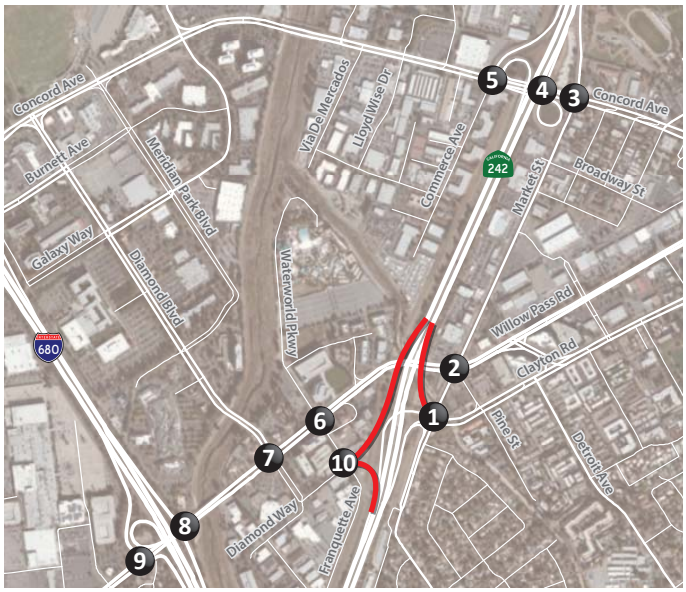
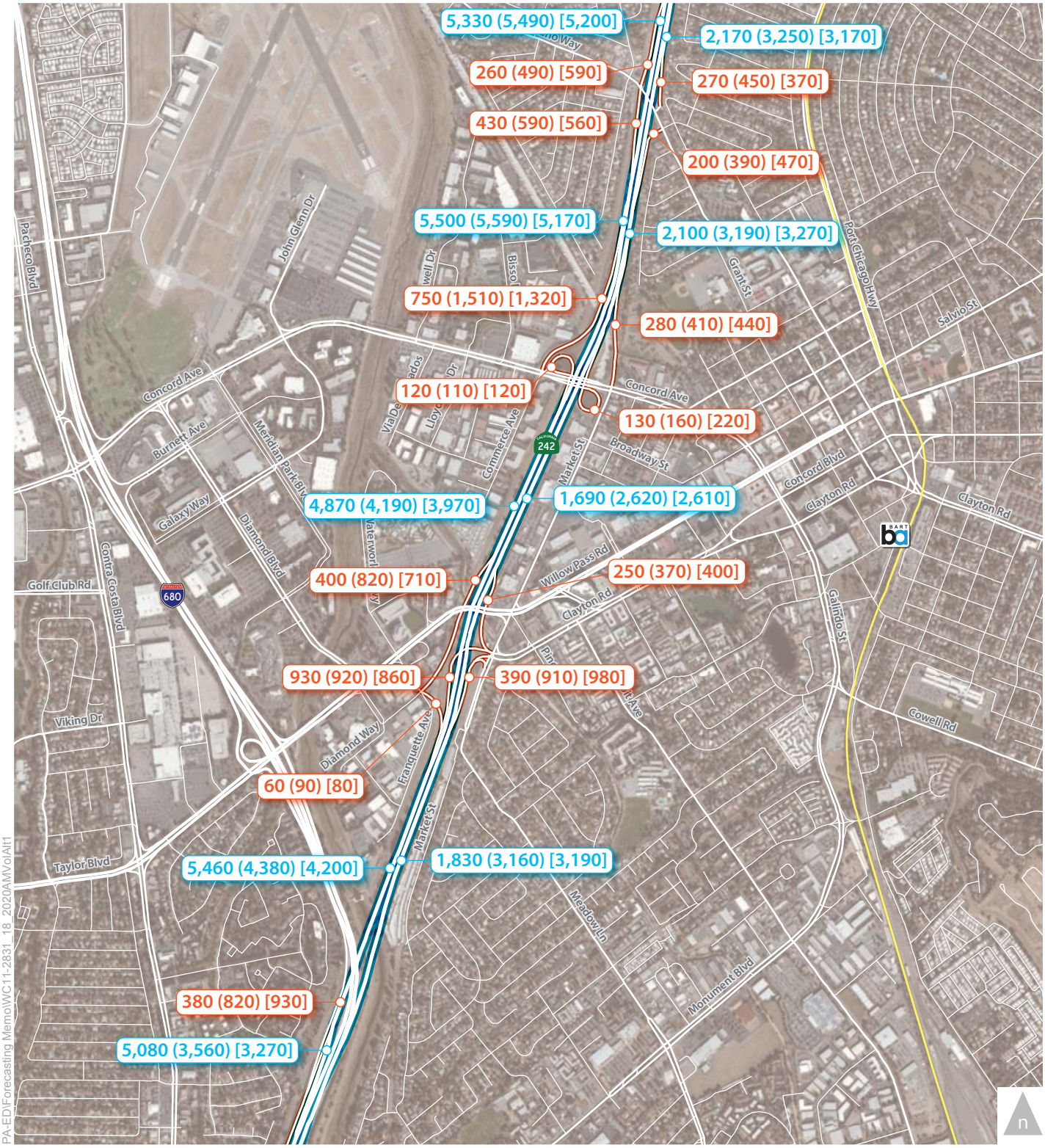


Figure 17

Year 2020

Intersection Peak Hour Volume Forecasts – Alternative 1 Conditions



PA-ED\Forecasting Memo\WC11-2831_18_2020AMVolAlt1

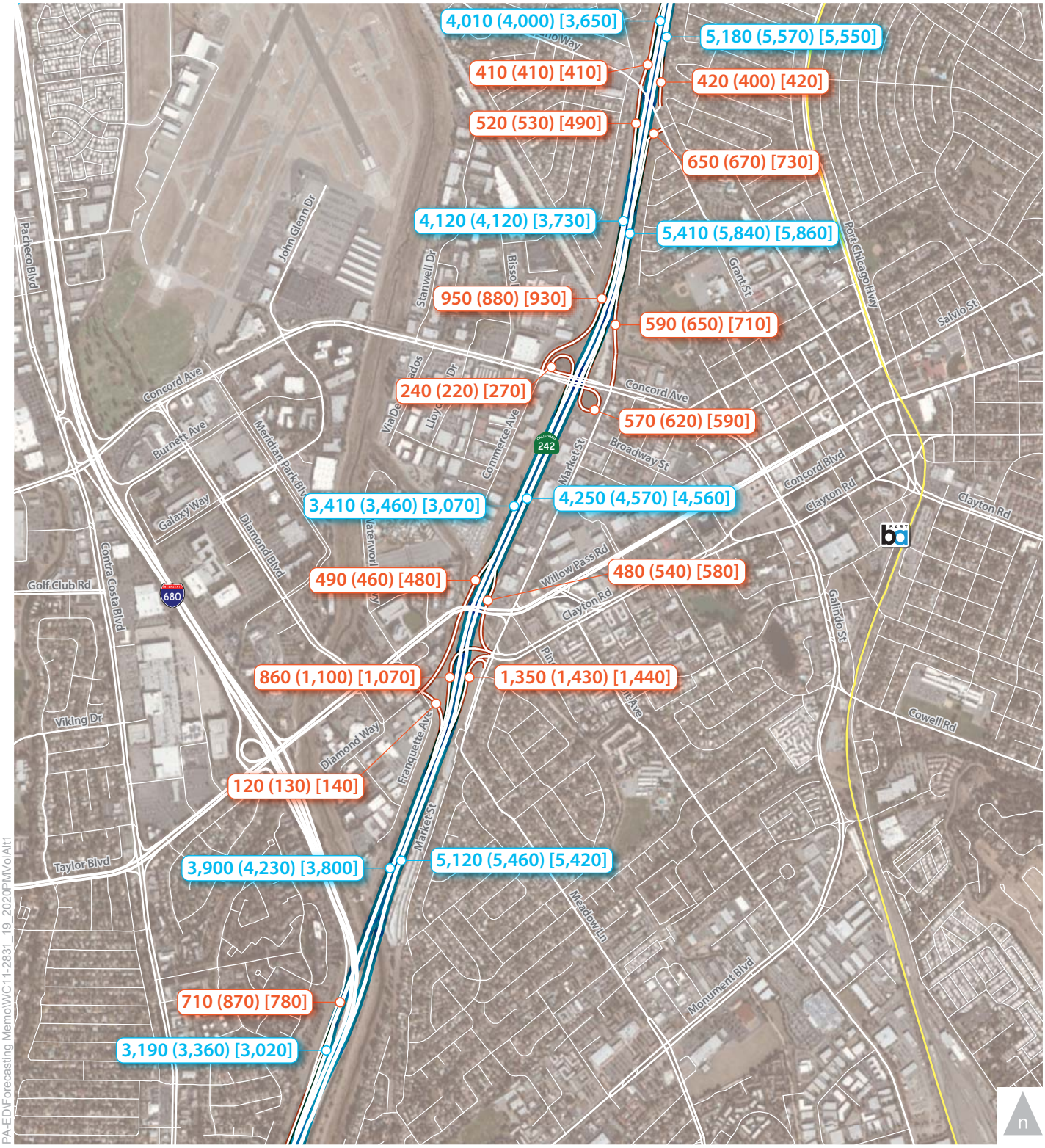
LEGEND

XX (YY) [ZZ] AM Mainline Volume
6-7 AM (7-8 AM) [8-9 AM]

XX (YY) [ZZ] AM Ramp Volume
6-7 AM (7-8 AM) [8-9 AM]

Figure 18

Year 2020
AM Peak Period Mainline and Ramp Volumes – Alternative 1 Conditions



LEGEND

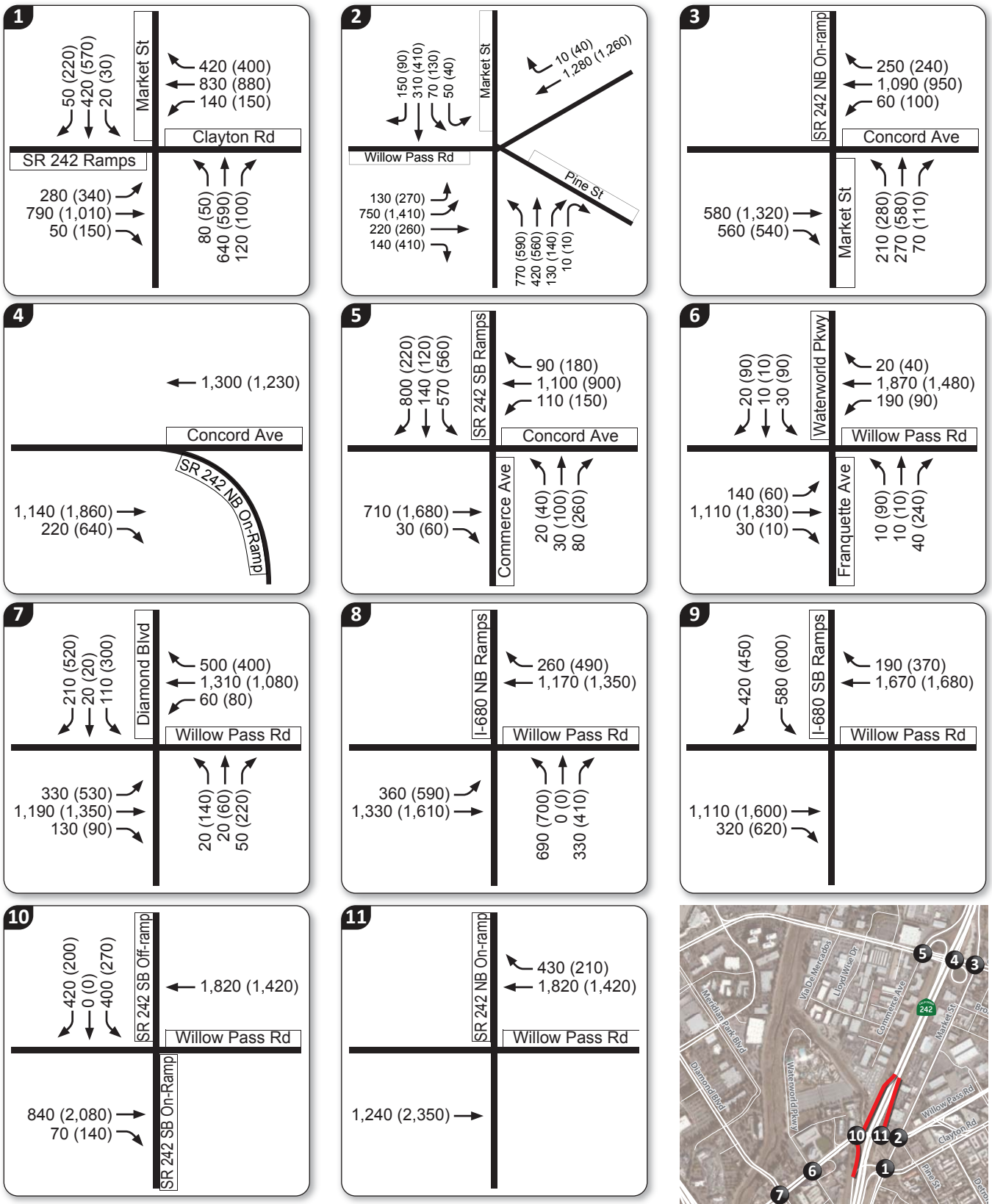
XX (YY) [ZZ] PM Mainline Volume
3-4 PM (4-5 PM) [5-6 PM]

XX (YY) [ZZ] PM Ramp Volume
3-4 PM (4-5 PM) [5-6 PM]

Figure 19

Year 2020

PM Peak Period Mainline and Ramp Volumes – Alternative 1 Conditions

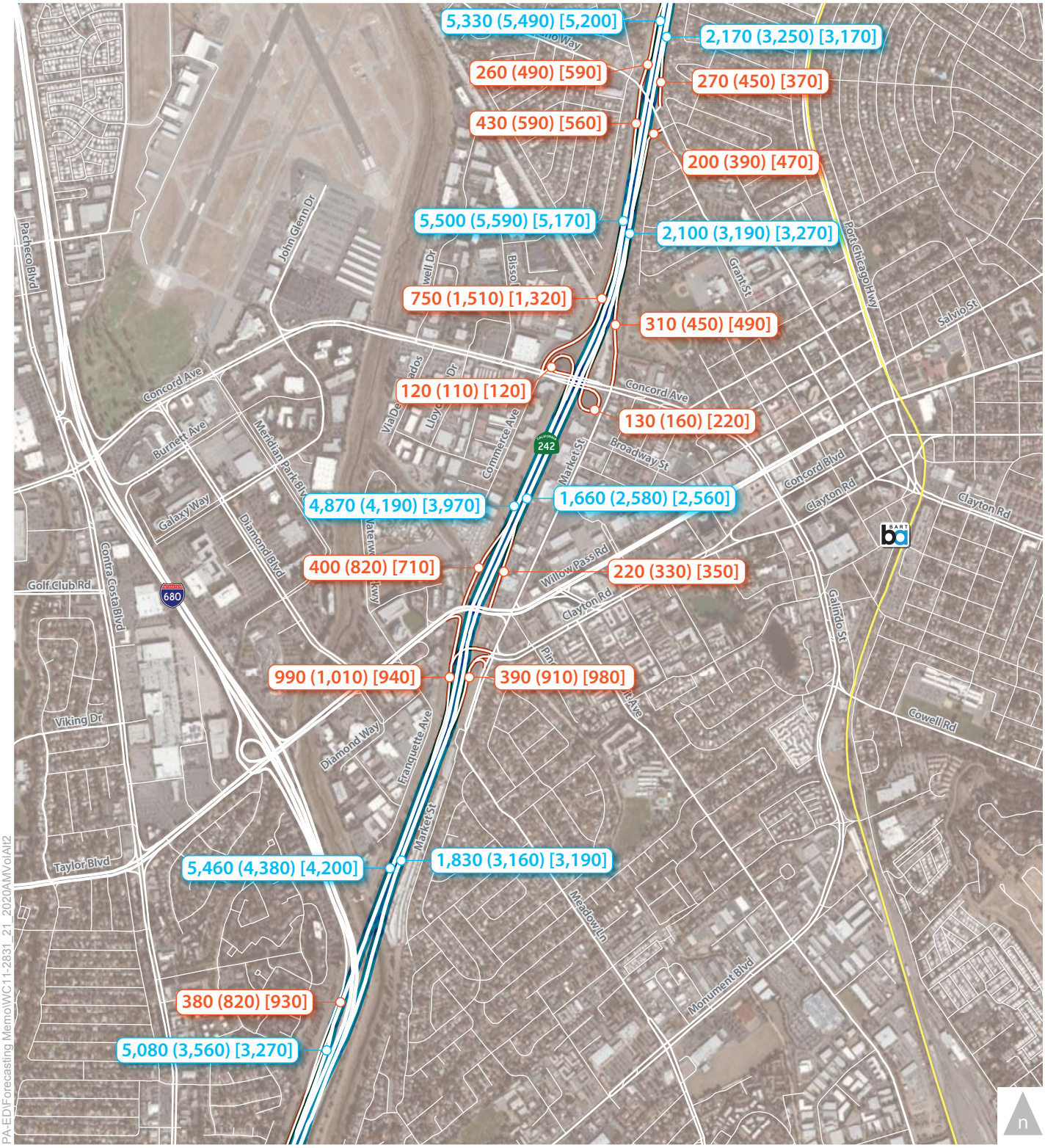


PA-ED\Forecasting Memo\WC11-2831_20_2020Alt2vol

Figure 20

Year 2020

Intersection Peak Hour Volume Forecasts – Alternative 2 Conditions



LEGEND

XX (YY) [ZZ] AM Mainline Volume
6-7 AM (7-8 AM) [8-9 AM]

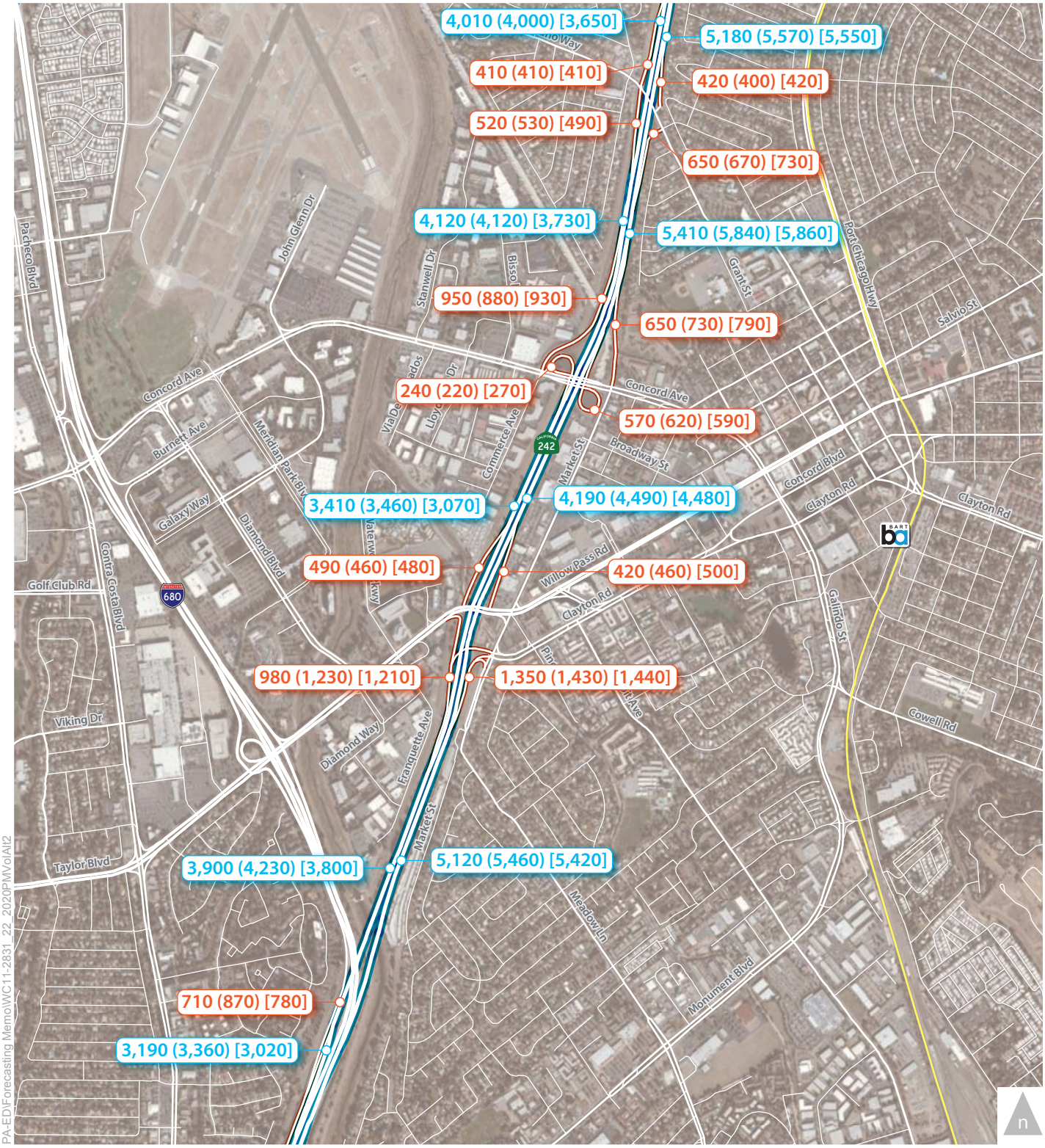
XX (YY) [ZZ] AM Ramp Volume
6-7 AM (7-8 AM) [8-9 AM]

Figure 21

Year 2020

AM Peak Period Mainline and Ramp Volumes – Alternative 2 Conditions

PA-ED\Forecasting Memo\WC11-2831_21_2020AMVolAlt2



LEGEND

XX (YY) [ZZ] PM Mainline Volume
3-4 PM (4-5 PM) [5-6 PM]

XX (YY) [ZZ] PM Ramp Volume
3-4 PM (4-5 PM) [5-6 PM]

PA-ED\Forecasting Memo\WC11-2831_22_2020PMVolAlt2

Figure 22

Year 2020

PM Peak Period Mainline and Ramp Volumes – Alternative 2 Conditions

APPENDIX A

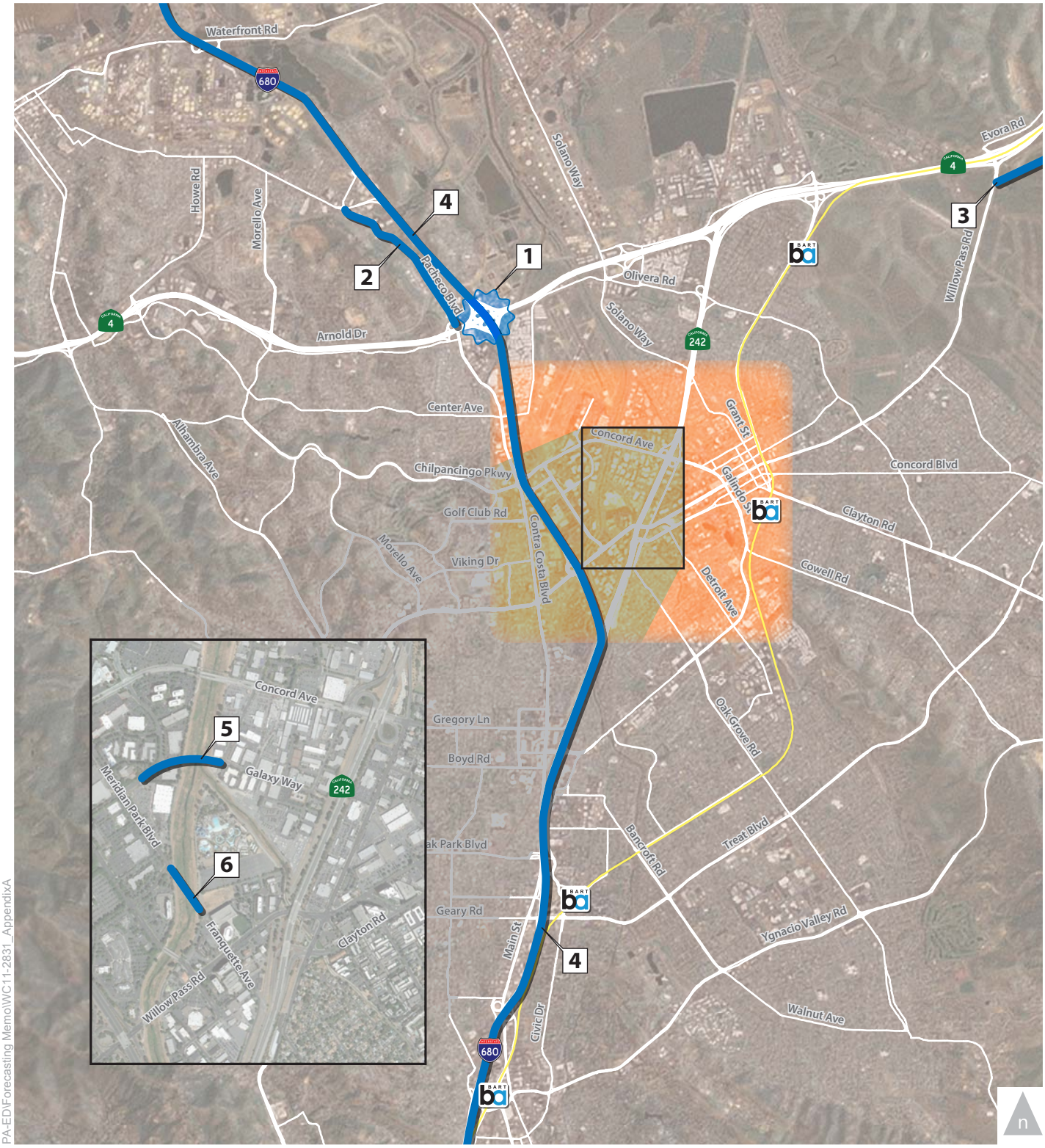
MAJOR ROADWAY IMPROVEMENTS ASSUMED IN CCTA MODEL

SR 242/Clayton Road Interchange PA/ED: Major Projects that are Assumed to Occur by the Design Year (2040)

#	Reference Number	Project	Total Project Cost*	Committed Funds*	Discretionary Funds*	Project Notes
1	21205	Improve the I-680/Route 4 interchange with direct connectors and widen Route 4 from 2 lanes to 3 lanes in each direction between Route 242 and Morello Ave	$205	$33	$172	2004 Measure J sales tax project
2	98133	Widen Pacheco Boulevard from 2 to 4 lanes from Blum Road to Arthur Road	$58	$58	$0	2004 Measure J sales tax project
3	230237	Extend West Leland Road from San Marco Boulevard to Willow Pass Road	$16	$15	$2	
4	230685	Express Lanes on I-680: Widen I-680 northbound for express lane from Rudgear to North Main; Convert HOV lanes to express lanes between Benicia Bridge and Alcosta Boulevard in each direction	$24	$0	$0	New Commitment Project
5	N/A	Galaxy Way Extension from Via De Mercados to John Glenn Dr	N/A	N/A	N/A	
6	230216	Construct a two-lane bridge connecting Waterworld Pkwy with Meridan Park Blvd	$14	$9	$5	

* Amounts shown in millions of year of expenditure dollars

Source: Final Plan Bay Area Project List (http://onebayarea.org/pdf/final_supplemental_reports/FINAL_PBA_Project_List.pdf)



PA-ED\Forecasting Memo\WC11-2831_AppendixA

LEGEND

Study Area

BART

Major Project

Major Project Assumed to Occur by Design Year (2040)

APPENDIX B

ANNUAL GROWTH RATES

Recommended Annual Traffic Growth Rate for Intersections

Intersection		AM Peak Period				PM Peak Period			
		Northbound	Southbound	Eastbound	Westbound	Northbound	Southbound	Eastbound	Westbound
1	Clayton Road/Market Street/SR 242 Ramps	0.3%[1]	0.3%[1]	0.4%	1.9%[1]	0.1%[1]	0.1%[1]	0.6%	0.8%[1]
2	Willow Pass Road/Market Street	0.3%[1]	0.3%	0.6%	1.1%	0.1%[1]	0.1%	0.5%	0.4%
3	Concord Avenue/Market Street/SR 242 Northbound On-Ramp	0.3%[1]	--	1.4%	0.4%[1]	0.1%[1]	--	0.4%	1.6%[1]
4	Concord Avenue/SR 242 Northbound Loop On-Ramp	--	--	1.4%[1]	0.4%	--	--	0.4%[1]	1.6%
5	Concord Avenue/Commerce Avenue/SR 242 Southbound Ramps	0.1%[1]	2.1%	1.4%	0.4%[1]	0.1%[1]	1.6%	0.4%	1.6%[1]
6	Willow Pass Road/Franquette Avenue	0.1%	0.1%	0.6%	1.1%	0.1%	0.1%	0.5%	0.4%
7	Willow Pass Road/Diamond Way	1.1%	1.1%	0.6%	1.1%	1.4%	1.4%	0.5%	0.4%
8	Willow Pass Road/I-680 Northbound Ramps	0.6%/1.1%[2]	--	0.6%	1.1%	0.5%/0.4%[2]	--	0.5%	0.4%
9	Willow Pass Road/I-680 Southbound Ramps	--	0.6%/1.1%[2]	0.6%	1.1%	--	0.5%/0.4%[2]	0.5%	0.4%

1. Turning movement volumes on-to and off-of freeway ramps used ramp growth presented in table below.

2. Turning movement volumes from ramps used EB and WB growth rates on Willow Pass Road. For example, the Willow Pass Road westbound growth rate was applied to NBL at Intersection 8 and eastbound growth rate to NBR.

Recommended Annual Traffic Growth Rate for Freeway Ramps

Ramps		AM Peak Period	PM Peak Period
NB	Mainline south of Clayton Road/Market Street	1.0%	0.7%
	Off-Ramp to Clayton Road/Market Street	0.4%	0.6%
	Loop On-Ramp from Concord Avenue	3.0%	0.2%
	Diagonal On-Ramp from Concord Avenue	3.0%	0.2%
	Off-Ramp to Grant Street	0.6%	0.1%
	On-Ramp from Grant Street	3.0%	2.6%
SB	Off-Ramp to Grant Street	1.7%	3.0%
	On-Ramp from Grant Street	2.6%	0.1%
	Off-Ramp to Concord Ave	2.1%	1.6%
	On-Ramp from Concord Ave	0.9%	1.6%
	On-Ramp from Clayton Road/Market Street	1.3%	0.1%
	Off-Ramp to CC/Monument	0.9%	0.6%
	Mainline south of CC/Monument	0.7%	1.0%

Raw Model Annual Traffic Growth Rate for Intersections

Intersection		AM Peak Period				PM Peak Period			
		Northbound	Southbound	Eastbound	Westbound	Northbound	Southbound	Eastbound	Westbound
1	Clayton Road/Market Street/SR 242 Ramps	0.3%[1]	0.3%[1]	0.4%	1.9%[1]	-0.1%[1]	-0.1%[1]	0.6%	0.8%[1]
2	Willow Pass Road/Market Street	0.3%[1]	0.3%	0.6%	1.1%	-0.1%[1]	-0.1%[1]	0.5%	0.4%
3	Concord Avenue/Market Street/SR 242 Northbound On-Ramp	0.3%[1]	--	1.4%	0.4%[1]	-0.1%[1]	--	0.4%	1.6%[1]
4	Concord Avenue/SR 242 Northbound Loop On-Ramp	--	--	1.4%[1]	0.4%	--	--	0.4%[1]	1.6%
5	Concord Avenue/Commerce Avenue/SR 242 Southbound Ramps	0.1%[1]	2.1%	1.4%	0.4%[1]	0.1%[1]	1.6%	0.4%	1.6%[1]
6	Willow Pass Road/Franquette Avenue	0.1%	0.1%	0.6%	1.1%	-0.9%	-0.9%	0.5%	0.4%
7	Willow Pass Road/Diamond Way	1.1%	1.1%	0.6%	1.1%	1.4%	1.4%	0.5%	0.4%
8	Willow Pass Road/I-680 Northbound Ramps	0.6%/1.1%[2]	--	0.6%	1.1%	0.5%/0.4%[2]	--	0.5%	0.4%
9	Willow Pass Road/I-680 Southbound Ramps	--	0.6%/1.1%[2]	0.6%	1.1%	--	0.5%/0.4%[2]	0.5%	0.4%

1. Turning movement volumes on-to and off-of freeway ramps used ramp growth presented in table below.

2. Turning movement volumes from ramps used EB and WB growth rates on Willow Pass Road. For example, the Willow Pass Road westbound growth rate was applied to NBL at Intersection 8 and eastbound growth rate to NBR.

Raw Model Annual Traffic Growth Rate for Freeway Ramps

Ramps		AM Peak Period	PM Peak Period
NB	Mainline south of Clayton Road/Market Street	0.7%	0.3%
	Off-Ramp to Clayton Road/Market Street	0.4%	0.6%
	Loop On-Ramp from Concord Avenue	3.0%	0.2%
	Diagonal On-Ramp from Concord Avenue	3.0%	0.2%
	Off-Ramp to Grant Street	0.6%	-0.3%
	On-Ramp from Grant Street	6.5%	2.6%
SB	Off-Ramp to Grant Street	1.7%	4.1%
	On-Ramp from Grant Street	2.6%	0.1%
	Off-Ramp to Concord Ave	2.1%	1.6%
	On-Ramp from Concord Ave	0.9%	1.6%
	On-Ramp from Clayton Road/Market Street	1.3%	0.1%
	Off-Ramp to CC/Monument	0.9%	0.6%
	Mainline south of CC/Monument	0.4%	0.4%

Adjustments to Raw Model Annual Traffic Growth Rate for Intersections

Intersection		AM Peak Period				PM Peak Period			
		Northbound	Southbound	Eastbound	Westbound	Northbound	Southbound	Eastbound	Westbound
1	Clayton Road/Market Street/SR 242 Ramps	0.0%[1]	0.0%[1]	0.0%	0.0%[1]	0.2%[1]	0.2%[1]	0.0%	0.0%[1]
2	Willow Pass Road/Market Street	0.0%[1]	0.0%	0.0%	0.0%	0.2%[1]	0.2%[1]	0.0%	0.0%
3	Concord Avenue/Market Street/SR 242 Northbound On-Ramp	0.0%[1]	--	0.0%	0.0%[1]	0.2%[1]	--	0.0%	0.0%[1]
4	Concord Avenue/SR 242 Northbound Loop On-Ramp	--	--	0.0%[1]	0.0%	--	--	0.0%[1]	0.0%
5	Concord Avenue/Commerce Avenue/SR 242 Southbound Ramps	0.0%[1]	0.0%	0.0%	0.0%[1]	0.0%[1]	0.0%	0.0%	0.0%[1]
6	Willow Pass Road/Franquette Avenue	0.0%	0.0%	0.0%	0.0%	1.0%	1.0%	0.0%	0.0%
7	Willow Pass Road/Diamond Way	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
8	Willow Pass Road/I-680 Northbound Ramps	0.0%/0.0%[2]	--	0.0%	0.0%	0.0%/0.0%[2]	--	0.0%	0.0%
9	Willow Pass Road/I-680 Southbound Ramps	--	0.0%/0.0%[2]	0.0%	0.0%	--	0.0%/0.0%[2]	0.0%	0.0%

1. Turning movement volumes on-to and off-of freeway ramps used ramp growth presented in table below.

2. Turning movement volumes from ramps used EB and WB growth rates on Willow Pass Road. For example, the Willow Pass Road westbound growth rate was applied to NBL at Intersection 8 and eastbound growth rate to NBR.

Adjustments to Raw Model Annual Traffic Growth Rate for Freeway Ramps

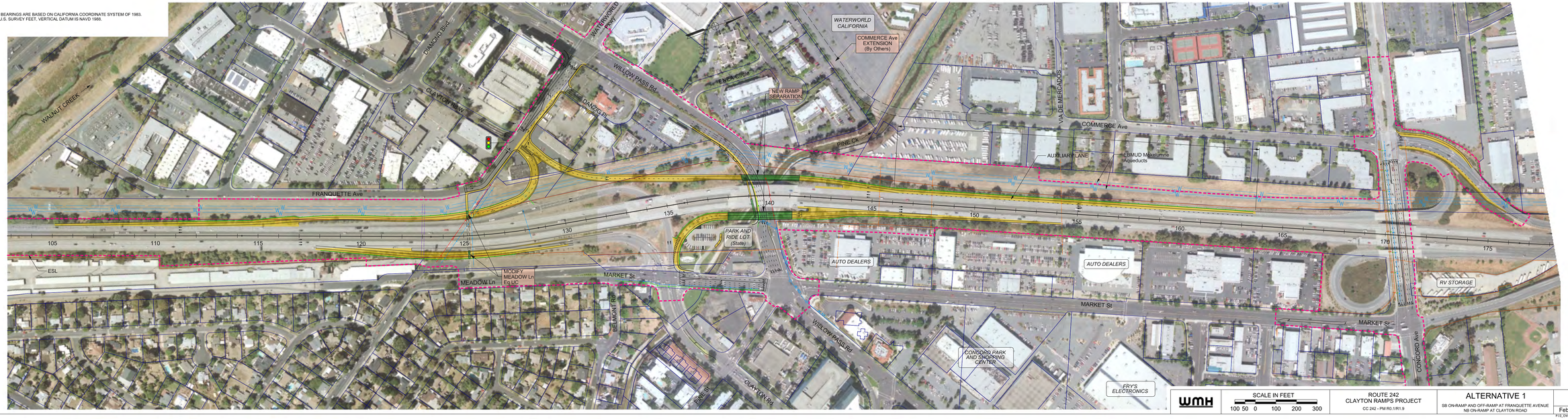
Ramps		AM Peak Period	PM Peak Period
NB	Mainline south of Clayton Road/Market Street	0.3%	0.4%
	Off-Ramp to Clayton Road/Market Street	0.0%	0.0%
	Loop On-Ramp from Concord Avenue	0.0%	0.0%
	Diagonal On-Ramp from Concord Avenue	0.0%	0.0%
	Off-Ramp to Grant Street	0.0%	0.4%
	On-Ramp from Grant Street	-3.5%	0.0%
SB	Off-Ramp to Grant Street	0.0%	-1.1%
	On-Ramp from Grant Street	0.0%	0.0%
	Off-Ramp to Concord Ave	0.0%	0.0%
	On-Ramp from Concord Ave	0.0%	0.0%
	On-Ramp from Clayton Road/Market Street	0.0%	0.0%
	Off-Ramp to CC/Monument	0.0%	0.0%
	Mainline south of CC/Monument	0.3%	0.6%

APPENDIX C

PROPOSED BUILD ALTERNATIVES

NOTE:

1. COORDINATES AND BEARINGS ARE BASED ON CALIFORNIA COORDINATE SYSTEM OF 1983. DISTANCES ARE IN U.S. SURVEY FEET, VERTICAL DATUM IS NAVD 1988.



WMH

SCALE IN FEET

100 50 0 100 200 300

ROUTE 242
CLAYTON RAMPS PROJECT
CC 242 - PM R0.1/R1.9

ALTERNATIVE 1
SB ON-RAMP AND OFF-RAMP AT FRANQUETTE AVENUE
NB ON-RAMP AT CLAYTON ROAD

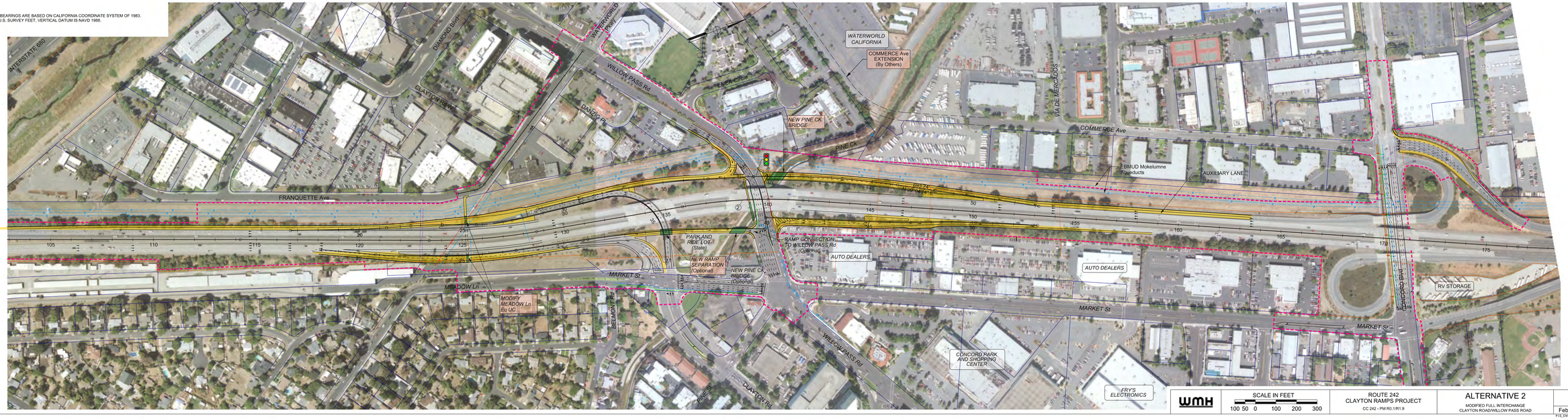
L-1

February 2014

F10_ENV-SR242_ALTA.dgn

NOTE:

1. COORDINATES AND BEARINGS ARE BASED ON CALIFORNIA COORDINATE SYSTEM OF 1983. DISTANCES ARE IN U.S. SURVEY FEET, VERTICAL DATUM IS NAVD 1988.



WMH

SCALE IN FEET

100 50 0 100 200 300

ROUTE 242
CLAYTON RAMPS PROJECT
CC 242 - PM R0.1/R1.9

ALTERNATIVE 2
MODIFIED FULL INTERCHANGE
CLAYTON ROAD/WILLOW PASS ROAD

L-3

February 2014

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