

# Memorandum

Date: December 6, 2022

To: Mike Tassano, City of Pleasanton  
Liza Baskir, First Carbon Solutions

From: Bill Burton and Bruno Lertora, Fehr & Peers

**Subject: Pleasanton Housing Element Update – Intersection Levels of Service**

WC21-3840

This technical memorandum presents the results of the local transportation analysis prepared for the proposed Pleasanton Housing Element Update (Project) in Pleasanton, California. This memorandum documents the level of service (LOS), queueing, and transportation improvements assessment conducted for the proposed Project. Separately an assessment of the Housing Element Update's potential environmental impacts related to transportation, including an evaluation of the Project's effects on Vehicle Miles Traveled (VMT), has been prepared as part of the Project's CEQA documentation. While not necessary for CEQA compliance, an assessment of intersection service levels is required for General Plan compliance and to help inform local decision makers.

## Study Locations and Scenarios

Intersections are generally the critical capacity-controlling elements of suburban roadway networks. Therefore, the operations of critical intersections surrounding the Housing Element Update Project sites are used as indicators of the adequacy of the vehicular circulation system. The following intersections, also shown on **Figure 1**, were selected to analyze the Project potential effects during the weekday morning (7:00 to 9:00 AM) and weekday evening (4:00 to 6:00 PM) peak periods.

1. Foothill Road/I-580 WB Ramps
2. Foothill Road/I-580 EB Ramps
3. Foothill Road/Dublin Canyon Road/Canyon Way
4. Foothill Road/Laurel Creek Drive/Stoneridge Drive
5. Foothill Road/W Las Positas Boulevard
6. Foothill Road/Bernal Avenue



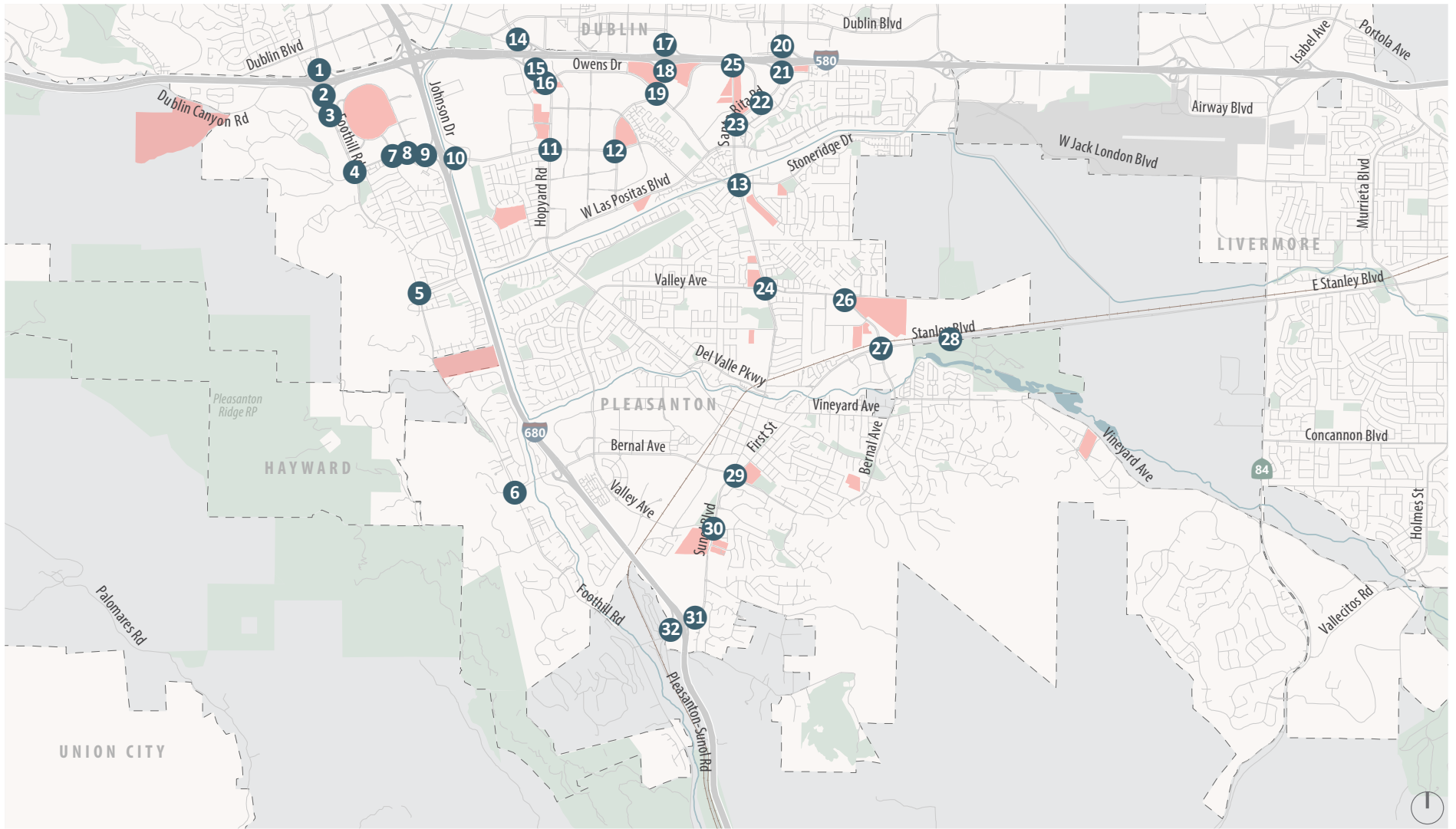
7. Springdale Avenue/Stoneridge Drive
8. Stoneridge Drive/Stoneridge Mall Road
9. Stoneridge Drive/I-680 SB Ramps
10. Stoneridge Drive/I-680 NB Ramps
11. Hopyard Road/Stoneridge Drive
12. Hacienda Drive/Stoneridge Drive
13. Santa Rita Road/Stoneridge Drive
14. Hopyard Road/I-580 WB Ramps
15. Hopyard Road/I-580 EB Ramps
16. Hopyard Road/Owens Drive
17. Hacienda Drive/I-580 WB Ramps
18. Hacienda Drive/I-580 EB Ramps
19. Hacienda Drive/Owens Drive
20. Tassajara Road/I-580 WB Ramps
21. Santa Rita Road/I-580 EB Ramps/Pimlico Drive
22. Santa Rita Road/Rosewood Drive
23. Santa Rita Road/Old Santa Rita Road/Pickens Lane
24. Santa Rita Road/Valley Avenue
25. Old Santa Rita Road/Rosewood Drive
26. Valley Avenue/Busch Road
27. Bernal Avenue/Valley Avenue/Stanley Boulevard
28. Stanley Boulevard/El Charro Road
29. Sunol Boulevard/First Street/Bernal Avenue
30. Sunol Boulevard/Valley Avenue/Junipero Street
31. Sunol Boulevard/I-680 NB Ramps
32. Sunol Boulevard/I-680 SB Ramps

Operations of signalized intersections were evaluated using the methodology of the Transportation Research Board's *Highway Capacity Manual 2000 Edition*. The following scenarios were evaluated:

- **Existing Conditions** – Existing volumes obtained from traffic counts and the existing roadway system configuration. Existing peak hour counts were collected during the weekday morning (7:00 to 9:00 AM) and weekday evening (4:00 to 6:00 PM) peak periods when local schools were in session.
- **Existing Conditions Plus Project** – Existing volumes obtained from traffic counts and the existing roadway system configuration plus traffic that would be generated by the development of the housing element update sites/projects. Under this scenario, the proposed housing element land uses are added to the baseline travel demand model, replacing current uses if applicable, to estimate traffic volume changes at the study



- intersections. The net volume changes are added/subtracted from the existing volumes. The roadway system is the same as existing conditions.
- **Existing Plus Approved Projects (EPAP) No Project Conditions** – Existing volumes plus traffic estimates for approved and pending developments and/or traffic increases due to regional growth and transportation system improvements anticipated to be completed, including improvements that are conditional upon approved development projects. Traffic volumes for this scenario were forecast using the City of Pleasanton’s travel demand model.
  - **Existing Plus Approved Projects (EPAP) Plus Project** – Traffic volumes from EPAP No Project conditions plus traffic that would be generated by the development of the project. Similar to Existing Conditions Plus Project, the proposed housing element land uses are added to the EPAP travel demand model, replacing current uses if applicable, to estimate traffic volume changes at the study intersections. The net volume changes are added/subtracted from the base forecast from EPAP No Project. The roadway system is the same as in the EPAP No Project scenario.
  - **Existing Plus Approved Projects Conditions Plus Project Plus El Charro Road Extension** – Land uses assumed in this scenario are consistent with EPAP Plus Project, but it evaluates traffic patterns with construction of the El Charro Road extension. To determine the effect of the El Charro Road extension (from Stoneridge Drive to Stanley Boulevard), the model is run with the roadway extension in place and the resulting changes in travel patterns are identified and applied to the forecasts presented in EPAP Plus Project.
  - **Far Term (Cumulative) No Project Conditions** – Projected traffic volumes and the projected roadway system using the City of Pleasanton Travel Demand Model. The El Charro Road extension is included in the cumulative scenarios.
  - **Far Term (Cumulative) Project Conditions** – Traffic volumes from Cumulative No Project plus changes from development of the housing element update sites. Similar to the other project scenarios, the proposed housing element update land uses are added to the Buildout travel demand model, replacing current or planned uses if applicable, to estimate traffic volume changes at the study intersections. The net volume changes are added/subtracted to the forecasts from Cumulative No Project.



- Housing Element Update (HEU) Sites
- # Study Intersection
- City Boundary



Figure 1

## Project Site and Study Locations



## Analysis Methods

The operations of roadway facilities are described with the term “level of service” (LOS). LOS is a qualitative description of traffic flow from a vehicle driver’s perspective based on factors such as speed, travel time, delay, and freedom to maneuver. Six levels of service are defined ranging from LOS A (free-flow conditions) to LOS F (over-capacity conditions). LOS E corresponds to operations “at capacity.” When volumes exceed capacity, stop-and-go conditions result, and operations are designated LOS F.

### Signalized Intersections

Traffic conditions at signalized intersections were evaluated using methods developed by the Transportation Research Board (TRB), as documented in the *Highway Capacity Manual 2000 Edition* for vehicles. The HCM method calculates control delay at an intersection based on inputs such as traffic volumes, lane geometry, signal phasing and timing, pedestrian crossing times, and peak hour factors. Control delay is defined as the delay directly associated with the traffic control device (i.e., a stop sign or a traffic signal) and specifically includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The relationship between LOS and control delay is summarized in **Table 1**.

### Unsignalized Intersections

For unsignalized (all-way stop controlled and side-street stop controlled) intersections, the HCM 2000 method for unsignalized intersections was used. With this method, operations are defined by the average control delay per vehicle (measured in seconds). The control delay incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue. **Table 2** summarizes the relationship between LOS and delay for unsignalized intersections. At side-street stop-controlled intersections, the delay is calculated for each stop-controlled movement, the left turn movement from the major street, as well as the intersection average. The intersection average delay and highest movement/approach delay are reported for side-street stop-controlled intersections.



**Table 1: Signalized Intersection LOS Criteria**

Level of Service	Description	Delay in Seconds
A	Progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	< 10.0
B	Progression is good, cycle lengths are short, or both. More vehicles stop than with LOS A, causing higher levels of average delay.	> 10.0 to 20.0
C	Higher congestion may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level, though many still pass through the intersection without stopping.	> 20.0 to 35.0
D	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	> 35.0 to 55.0
E	This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	> 55.0 to 80.0
F	This level is considered unacceptable with oversaturation, which is when arrival flow rates exceed the capacity of the intersection. This level may also occur at high V/C ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to such delay levels.	> 80.0

Source: *Highway Capacity Manual* 2000 Edition (Transportation Research Board).

**Table 2: Unsignalized Intersection LOS Criteria**

Level of Service	Description	Delay in Seconds
A	Little or no delays	≤ 10.0
B	Short traffic delays	> 10.0 to 15.0
C	Average traffic delays	> 15.0 to 25.0
D	Long traffic delays	> 25.0 to 35.0
E	Very long traffic delays	> 35.0 to 50.0
F	Extreme traffic, delays where intersection capacity exceeded	> 50.0

Source: *Highway Capacity Manual* 2000 Edition (Transportation Research Board).



## Regulatory Setting and LOS Policies

Intersection LOS has been evaluated in this study for General Plan compliance and to identify potential transportation improvements that could be implemented as part of the Project to improve the overall operations of the transportation system for all modes. The *Pleasanton 2025 General Plan (2005)* sets the LOS standard at LOS D with an exception for intersections in the Downtown Area and at the City of Pleasanton gateway intersections. These intersections may have a level of service below the LOS D standard if no reasonable mitigation exists or if the necessary mitigation is contrary to other goals and policies of the City. Generally, these policies limit the extent that these intersections may be widened, trying to preserve a pedestrian-friendly environment and limit the elimination of landscaping. There are 18 exempt study intersections, 17 of which correspond to gateway intersections and one (intersection 29) which corresponds to a Downtown Area intersection. The exempt study intersections include the following:

1. Foothill Road/I-580 WB Ramps
2. Foothill Road/I-580 EB Ramps
3. Foothill Road/Dublin Canyon Road/Canyon Way
9. Stoneridge Drive/I-680 SB Ramps
10. Stoneridge Drive/I-680 NB Ramps
14. Hopyard Road/I-580 WB Ramps
15. Hopyard Road/I-580 EB Ramps
16. Hopyard Road/Owens Drive
17. Hacienda Drive/I-580 WB Ramps
18. Hacienda Drive/I-580 EB Ramps
19. Hacienda Drive/Owens Drive
20. Tassajara Road/I-580 WB Ramps
21. Santa Rita Road/I-580 EB Ramps/Pimlico Drive
27. Bernal Avenue/Valley Avenue/Stanley Boulevard
28. Stanley Boulevard/El Charro Road
29. Sunol Boulevard/First Street/Bernal Avenue
31. Sunol Boulevard/I-680 NB Ramps
32. Sunol Boulevard/I-680 SB Ramps

The Project could have a noticeable detrimental effect on local and regional travel if it would cause an increase in traffic which is substantial in relation to the traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, or delay and congestion at intersections), or change the condition of an existing street (e.g., street closures, changing direction of travel) in a manner that would substantially change access or traffic load and capacity of the street system. Criteria were developed based on LOS policies contained within the City of Pleasanton General Plan.



## Existing Conditions

### Data Collection

Intersection turning movement counts, including separate counts of pedestrians, bicyclists, and heavy trucks for the weekday morning (7:00 to 9:00 AM) and weekday evening (4:00 to 6:00 PM) peak periods from the City’s travel demand model were incorporated within the analysis. Counts were collected during pre-pandemic non-holiday weeks when local schools were in session. Peak hour intersection volumes are summarized on **Figures 2A** and **2B** along with existing lane configurations and traffic controls.

### Existing Intersection Levels of Service

Existing intersection lane configurations, signal timings, and peak hour turning movement volumes were input into the Synchro 11.0 software program to calculate the LOS for the study intersections during each peak hour. Detailed LOS calculation worksheets can be found in **Attachment A**. As shown in **Table 3**, all but three signalized and unsignalized intersections currently operate within the level of service standards set by the City of Pleasanton. The LOS for intersection 24 is currently below city standards. Intersection 28 (Stanley Boulevard at El Charro Road) does not exist under this scenario.

**Table 3: Existing Intersection Levels of Service**

Intersection	Control <sup>1</sup>	Peak Hour <sup>2</sup>	Existing	
			Delay <sup>3</sup>	LOS
1 Foothill Road/I-580 WB Ramp	Signal	AM PM	10.0	A
			13.9	B
2 Foothill Road/I-580 EB Ramp	Signal	AM PM	19.0	B
			13.9	B
3 Foothill Road/Dublin Canyon Road/Canyon Way	Signal	AM PM	21.6	C
			32.8	C
4 Foothill Road/Laurel Creek Drive/Stoneridge Drive	Signal	AM PM	23.2	C
			22.9	C
5 Foothill Road/W Las Positas Boulevard	Signal	AM PM	22.7	C
			15.9	B
6 Foothill Road/Bernal Avenue	Signal	AM PM	19.7	C
			16.3	B
7 Springdale Avenue/Stoneridge Drive	Signal	AM PM	16.1	B
			26.4	C
8	Signal	AM	15.6	B





Intersection	Control <sup>1</sup>	Peak Hour <sup>2</sup>	Existing	
			Delay <sup>3</sup>	LOS
		PM	28.0	D
9 Stoneridge Drive/I-680 SB Ramp	Signal	AM	12.3	B
		PM	10.2	B
10 Stoneridge Drive/I-680 NB Ramp	Signal	AM	13.5	B
		PM	8.6	A
11 Hopyard Road/Stoneridge Drive	Signal	AM	33.2	C
		PM	42.2	D
12 Hacienda Drive/Stoneridge Drive	Signal	AM	24.1	C
		PM	25.5	C
13 Santa Rita Road/Stoneridge Drive	Signal	AM	38.7	D
		PM	36.7	D
14 Hopyard Road/I-580 WB Ramp	Signal	AM	8.0	A
		PM	8.5	A
15 Hopyard Road/I-580 EB Ramp	Signal	AM	20.2	C
		PM	29.6	C
16 Hopyard Road/Owens Drive	Signal	AM	33.1	C
		PM	46.7	D
17 Hacienda Drive/I-580 WB Ramp	Signal	AM	7.0	A
		PM	5.4	A
18 Hacienda Drive/I-580 EB Ramp	Signal	AM	15.0	B
		PM	13.8	B
19 Hacienda Drive/Owens Drive	Signal	AM	14.1	B
		PM	30.2	C
20 Tassajara Road/I-580 WB Ramp	Signal	AM	8.7	A
		PM	13.2	B
21 Santa Rita Road/I-580 EB Ramp/Pimlico Drive	Signal	AM	22.8	C
		PM	36.3	D
22 Santa Rita Road/Rosewood Drive	Signal	AM	7.1	A
		PM	16.2	B
23 Santa Rita Road/Old Santa Rita Road/Pickens Lane	Signal	AM	12.5	B
		PM	13.7	B
24 Santa Rita Road/Valley Avenue	Signal	AM	35.3	D
		PM	<b>100.2</b>	<b>F</b>



Intersection	Control <sup>1</sup>	Peak Hour <sup>2</sup>	Existing	
			Delay <sup>3</sup>	LOS
25 Old Santa Rita Road/Rosewood Drive	SSSC	AM	2.6 (9.2)	A (A)
		PM	1.8 (10.3)	A (B)
26 Valley Avenue/Busch Road	Signal	AM	14.2	B
		PM	7.1	A
27 Bernal Avenue/Valley Avenue/Stanley Boulevard	Signal	AM	41.8	D
		PM	37.0	D
28 Stanley Boulevard/El Charro Road	Signal	AM	-	-
		PM	-	-
29 Sunol Boulevard/First Street/Bernal Avenue	Signal	AM	42.2	D
		PM	36.5	D
30 Sunol Boulevard/Valley Avenue/Junipero Street	Signal	AM	36.4	D
		PM	23.2	C
31 Sunol Boulevard/I-680 NB Ramp	SSSC	AM	1.5 (8.2)	A (A)
		PM	5.3 (12.3)	A (B)
32 Sunol Boulevard/I-680 SB Ramp	SSSC	AM	3.9 (29.5)	A (D)
		PM	5.7 (31.4)	A (D)

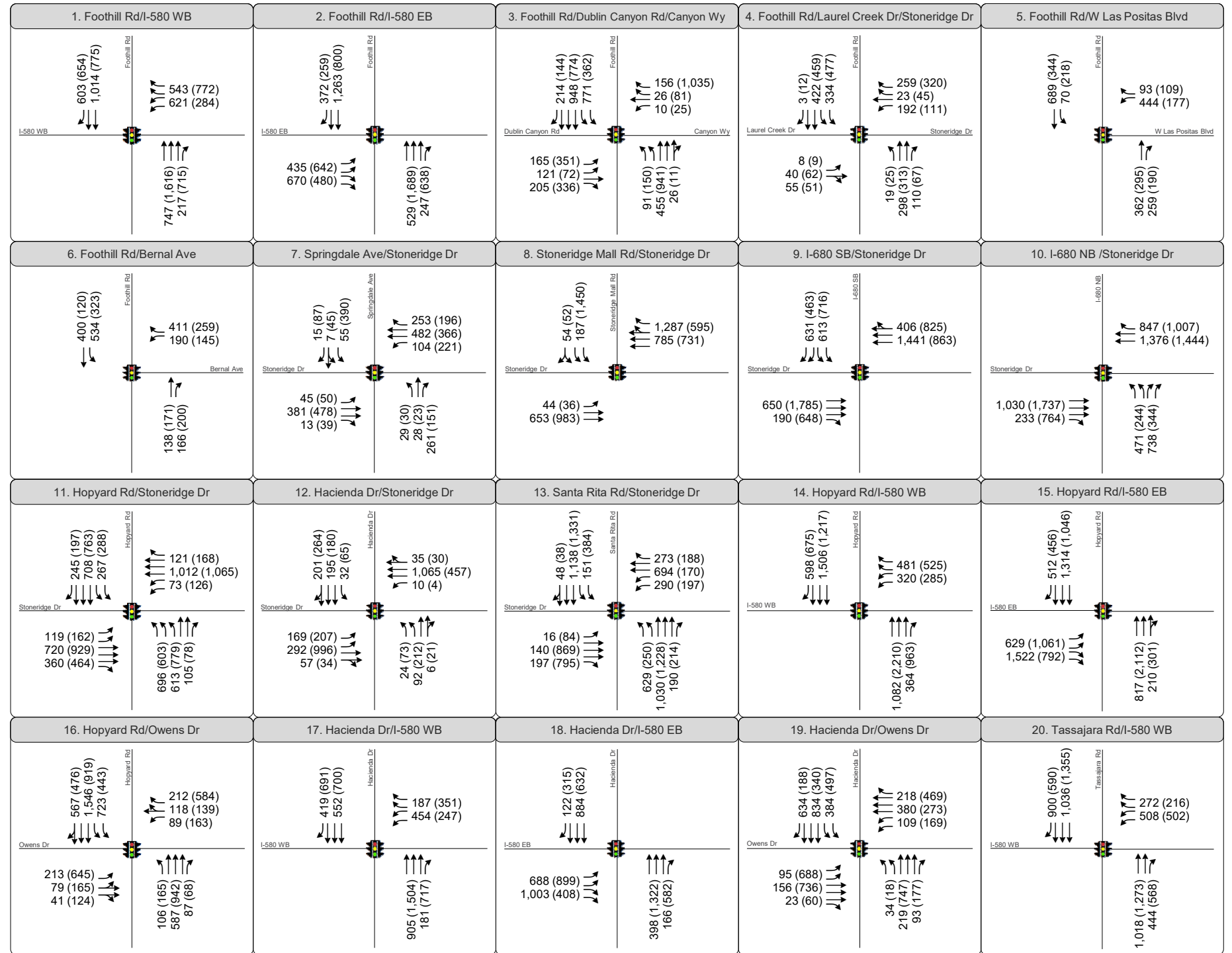
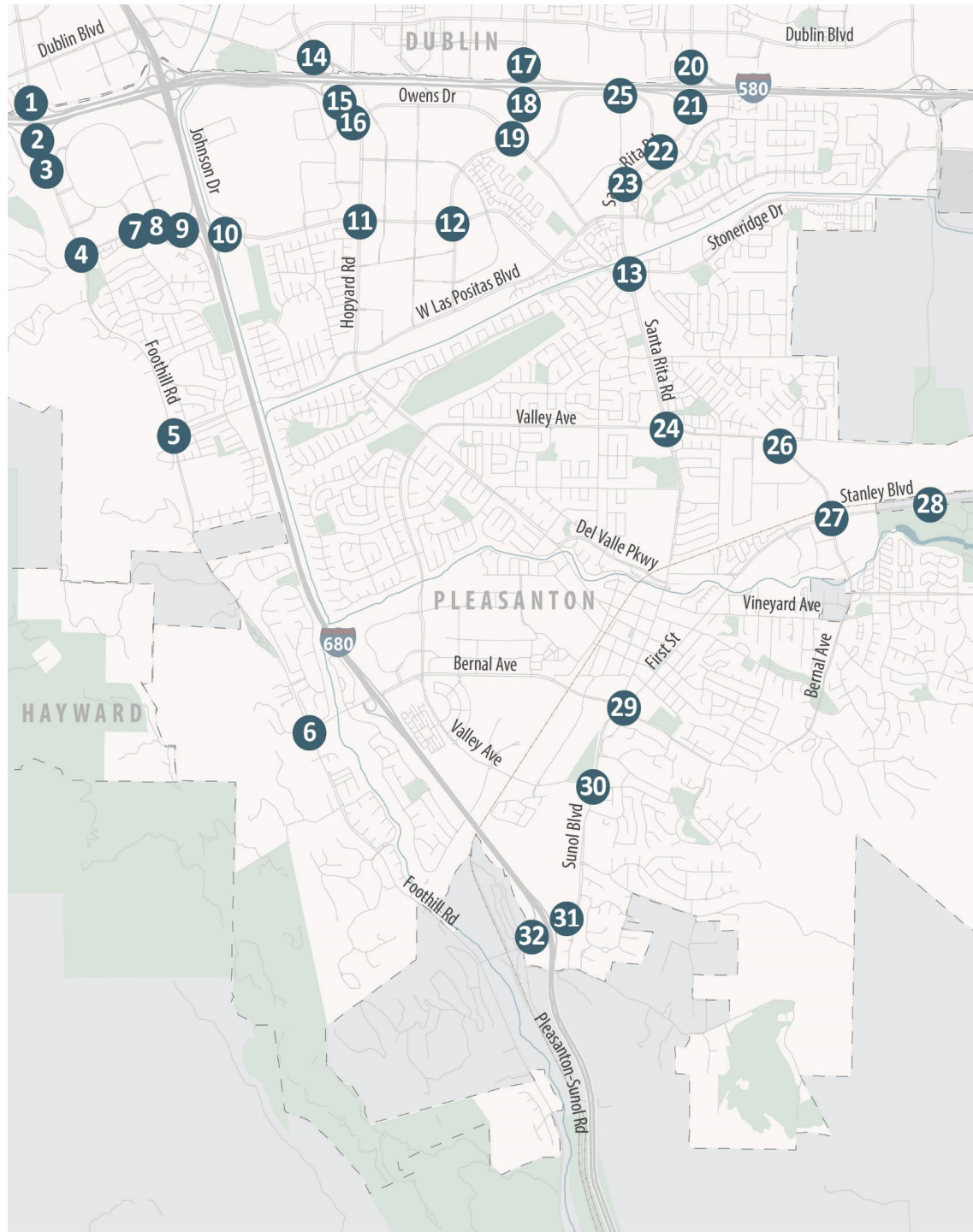
Notes:

1. Existing intersection traffic control type, (SSSC = Side-Street Stop-Controlled; Signal = Signalized)
2. AM= Weekday morning peak hour, PM = Weekday evening peak hour
3. Whole intersection average delay reported for signalized and all-way stop-controlled intersections. Side-Street stop-controlled delay presented as Whole Intersection Average Delay (Worst Movement Delay). Delay calculated per HCM 2000 methodologies.

**Bold** indicates LOS below the City of Pleasanton standard.

***Bold and italics*** indicates exempt intersections with LOS below the City of Pleasanton standard.

Source: Fehr & Peers, December 2022.



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

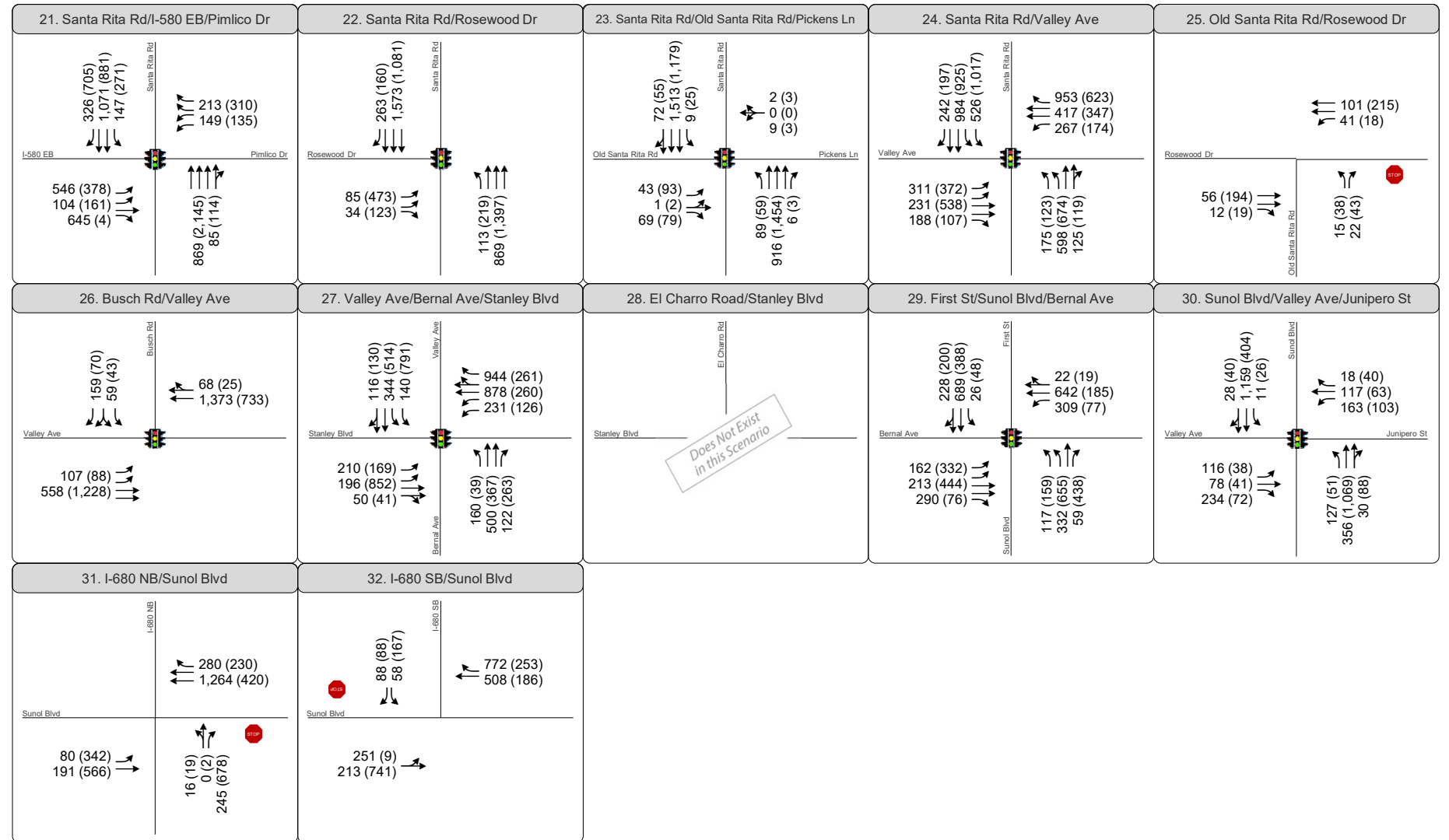
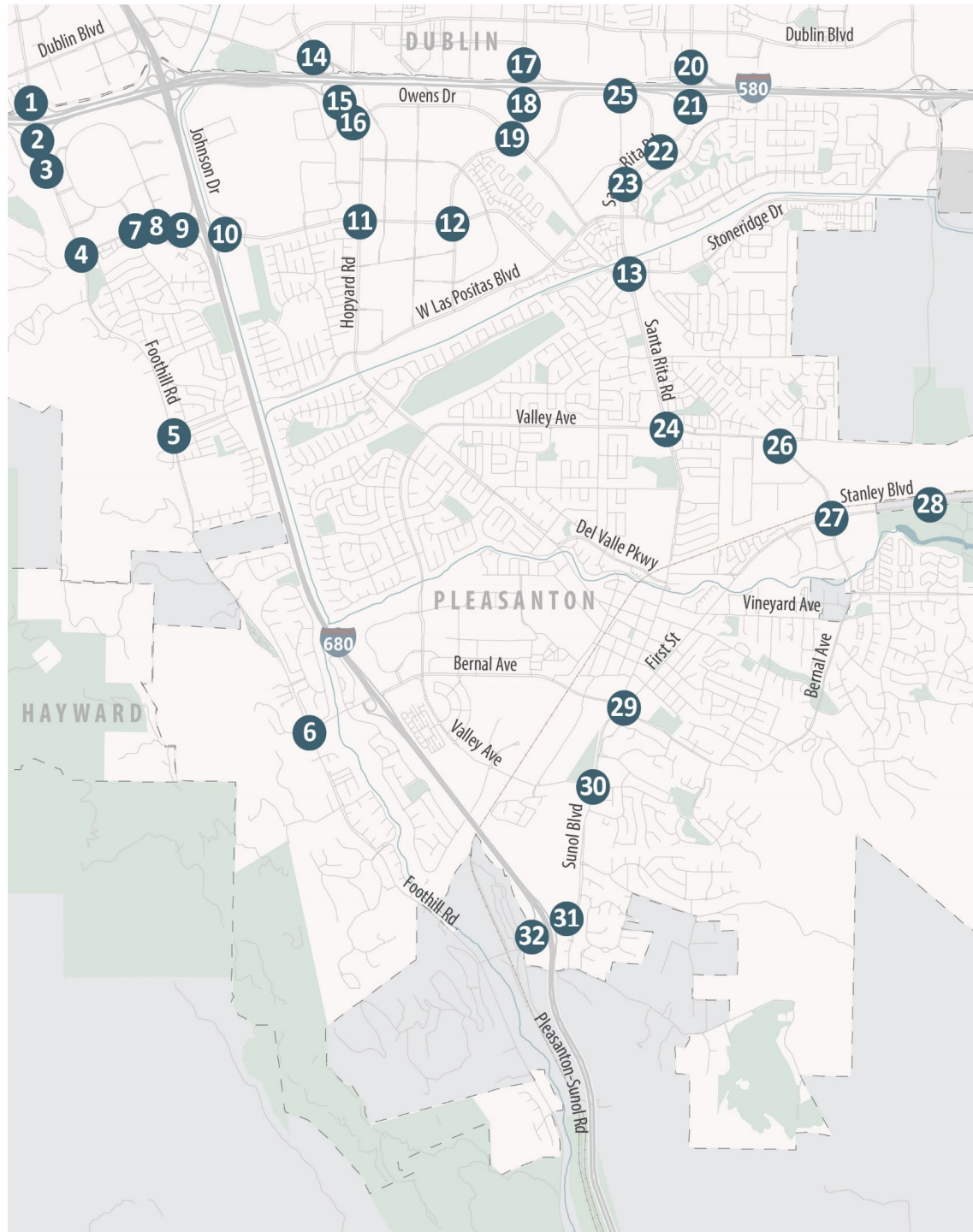
Housing Element Update (HEU) Sites    Study Intersection

City Boundary

Figure 2A

Existing AM and PM Peak Hour Intersection Volumes, Lane Configurations and Traffic Controls





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

Housing Element Update (HEU) Sites Study Intersection

City Boundary



Figure 2B

Existing AM and PM Peak Hour Intersection Volumes, Lane Configurations and Traffic Controls





## Existing Vehicle Queues

**Attachment B** presents a summary of AM and PM peak hour 95<sup>th</sup> percentile queue lengths for all study intersection movements and scenarios. These queues are indicative of maximum design queues occurring during periods of peak traffic. Queue worksheets are provided in **Attachment C**. The City of Pleasanton’s policies for vehicle queuing consider their standard to be violated if one of the two following conditions occur:

- A vehicle queue is considered significant if the queue length of a left turn pocket spills back outside of the turn pocket.
- A vehicle queue is considered significant if the queue length of a through movement blocks access to the left turn pocket.

## Project Characteristics

### Trip Generation

Trip generation refers to the process of estimating the amount of vehicular traffic a project would add to the surrounding roadway system. Estimates are created for the peak one-hour periods during the weekday morning and evening commute hours when traffic volumes on adjacent streets are typically at their highest and the Project is expected to generate the most traffic.

Trip generation rates for various land uses based on a sampling of sites throughout the United States are published in the Institute of Transportation Engineers (ITE) *Trip Generation Manual* (11<sup>th</sup> Edition). The trip generation estimates for each Housing Element Update site are presented in **Table 4**. These estimates also consider the existing land use that each project would remove if they were to be built; hence some of the projects may produce a reduction in total net trip generation. Based on these rates, the Project is expected to generate a total of 2,790 morning peak hour trips, 3,344 evening peak hour trips, and 42,658 daily trips.

**Table 4: Pleasanton Trip Generation Estimates**

Housing Element Projects		Weekday Trips		
Site Number/Name	Proposed Capacity Units	AM Peak Hour	PM Peak Hour	Daily Trips
1 – Lester	31	20	26	273
2 – Stoneridge Shopping Center	1,440	662	806	9,706
3 – PUSD – Donlon	28	19	25	264
4 – Owens (Motel 6 and Tommy T)	94	-39	-30	-71
5 – Laborer Council	54	-12	-6	93
6 – Signature Center	440	202	246	2,966



Housing Element Projects		Weekday Trips		
Site Number/Name	Proposed Capacity Units	AM Peak Hour	PM Peak Hour	Daily Trips
7 – Hacienda Terrace	80	37	45	539
8 – Muslim Community Center	125	58	70	843
9 – Metro 580	375	111	-20	122
11 – Old Santa Rita Area	1,311	603	734	8,836
12 – Pimlico Area	85	35	32	406
14 – St. Elizabeth Seton	51	23	29	344
15 – Rheem Drive Area	137	63	77	923
16 – Tri-Valley Inn	62	-15	-9	-122
18 – Valley Plaza	220	-61	-70	-378
19 – Black Avenue	65	-5	2	178
20 – Boulder Court	378	170	208	2,524
21a – Kiewit	760	350	426	5,122
22 – Merritt	91	60	80	830
23 – Sunol Boulevard	956	348	440	5,920
24 – Sonoma Drive Area	163	3	19	657
25 – PUSD – District	163	29	58	802
26 – St. Augustine	29	13	16	195
27 – PUSD – Vineyard	25	12	14	169
29 – Oracle	225	104	126	1,517
<b>Total</b>	<b>7,388</b>	<b>2,790</b>	<b>3,344</b>	<b>42,658</b>

Source: Fehr & Peers, 2022

## Existing Plus Project Traffic Conditions

This section presents the evaluation of intersection LOS under Existing Plus Project conditions. Per Senate Bill 743 and CEQA Guidelines §15064.3, a project’s effect on the operations of the circulation system (as measured by metrics such as LOS), is presumed to be less-than-significant for CEQA purposes by statute. Thus, the analysis of the project’s effect on the operations of the circulation system is for informational purposes only.

## Existing Plus Project Traffic Volumes

The Project traffic volumes were added to the existing traffic volumes from **Figure 2A** and **2B** to estimate the Existing Plus Project traffic volumes, as shown on **Figure 3A** and **3B**.



## Analysis of Existing Plus Project Conditions

### Intersection Operations

Intersection operations for the Existing plus Project scenario were evaluated using the methods previously described. The Existing Plus Project analysis results are presented in **Table 5**, based on the traffic volumes and intersection configurations presented on **Figure 3A** and **3B**. The following intersections would operate below the city's LOS standards under Existing and Existing plus Project conditions as noted:

#### Intersections with LOS below City standard (No Project and Plus Project conditions):

- 24 Santa Rita Road/Valley Avenue

#### Intersections with LOS below City standard (only Plus Project conditions):

- 13 Santa Rita Road/Stoneridge
- 16 Hopyard Road/Owens Drive (*Exempt*)
- 32 Sunol Boulevard/I-680 SB Ramp (*Exempt*)

**Table 5: Existing and Existing Plus Project Level of Service Summary**

Intersection	Control <sup>1</sup>	Peak Hour <sup>2</sup>	Existing		Existing Plus Project	
			Delay <sup>3</sup>	LOS	Delay <sup>3</sup>	LOS
1 Foothill Road/I-580 WB Ramp	Signal	AM	10.0	A	10.9	B
		PM	13.9	B	14.6	B
2 Foothill Road/I-580 EB Ramp	Signal	AM	19.0	B	20.2	C
		PM	13.9	B	14.5	B
3 Foothill Road/Dublin Canyon Road/Canyon Way	Signal	AM	21.6	C	23.9	C
		PM	32.8	C	33.7	C
4 Foothill Road/Laurel Creek Drive/Stoneridge Drive	Signal	AM	23.2	C	24.2	C
		PM	22.9	C	24.7	C
5 Foothill Road/W Las Positas Boulevard	Signal	AM	22.7	C	25.2	C
		PM	15.9	B	17.6	B
6 Foothill Road/Bernal Avenue	Signal	AM	19.7	C	21.3	C
		PM	16.3	B	17.5	B
7 Springdale Avenue/Stoneridge Drive	Signal	AM	16.1	B	17.2	B
		PM	26.4	C	28.5	C
8 Stoneridge Drive/Stoneridge Mall Road	Signal	AM	15.6	B	17.3	B
		PM	28.0	D	35.9	D
9	Signal	AM	12.3	B	12.2	B



Intersection	Control <sup>1</sup>	Peak Hour <sup>2</sup>	Existing		Existing Plus Project	
			Delay <sup>3</sup>	LOS	Delay <sup>3</sup>	LOS
		PM	10.2	B	10.8	B
10 Stoneridge Drive/I-680 NB Ramp	Signal	AM	13.5	B	16.5	B
		PM	8.6	A	9.8	A
11 Hopyard Road/Stoneridge Drive	Signal	AM	33.2	C	34.3	C
		PM	42.2	D	38.2	D
12 Hacienda Drive/Stoneridge Drive	Signal	AM	24.1	C	25.5	C
		PM	25.5	C	26.4	C
13 Santa Rita Road/Stoneridge Drive	Signal	AM	38.7	D	<b>57.1</b>	<b>E</b>
		PM	36.7	D	39.5	D
14 Hopyard Road/I-580 WB Ramp	Signal	AM	8.0	A	8.4	A
		PM	8.5	A	8.7	A
15 Hopyard Road/I-580 EB Ramp	Signal	AM	20.2	C	21.7	C
		PM	29.6	C	30.4	C
16 Hopyard Road/Owens Drive	Signal	AM	33.1	C	37.1	D
		PM	46.7	D	<b>55.3</b>	<b>E</b>
17 Hacienda Drive/I-580 WB Ramp	Signal	AM	7.0	A	7.0	A
		PM	5.4	A	5.5	A
18 Hacienda Drive/I-580 EB Ramp	Signal	AM	15.0	B	14.5	B
		PM	13.8	B	13.8	B
19 Hacienda Drive/Owens Drive	Signal	AM	14.1	B	15.7	B
		PM	30.2	C	31.9	C
20 Tassajara Road/I-580 WB Ramp	Signal	AM	8.7	A	8.5	A
		PM	13.2	B	15.6	B
21 Santa Rita Road/I-580 EB Ramp/Pimlico Drive	Signal	AM	22.8	C	24.0	C
		PM	36.3	D	40.1	D
22 Santa Rita Road/Rosewood Drive	Signal	AM	7.1	A	7.4	A
		PM	16.2	B	16.8	B
23 Santa Rita Road/Old Santa Rita Road/Pickens Lane	Signal	AM	12.5	B	21.3	C
		PM	13.7	B	31.7	C
24 Santa Rita Road/Valley Avenue	Signal	AM	35.3	D	40.0	D
		PM	<b>100.2</b>	<b>F</b>	<b>112.2</b>	<b>F</b>
25 Old Santa Rita Road/Rosewood Drive	SSSC	AM	2.6 (9.2)	A (A)	2.8 (9.3)	A (A)
		PM	1.8 (10.3)	A (B)	2.1 (11.0)	A (B)





Intersection	Control <sup>1</sup>	Peak Hour <sup>2</sup>	Existing		Existing Plus Project	
			Delay <sup>3</sup>	LOS	Delay <sup>3</sup>	LOS
26 Valley Avenue/Busch Road	Signal	AM	14.2	B	20.8	C
		PM	7.1	A	11.3	B
27 Bernal Avenue/Valley Avenue/Stanley Boulevard	Signal	AM	41.8	D	44.3	D
		PM	37.0	D	39.4	D
28 Stanley Boulevard/El Charro Road	Signal	AM	-	-	-	-
		PM	-	-	-	-
29 Sunol Boulevard/First Street/Bernal Avenue	Signal	AM	42.2	D	45.9	D
		PM	36.5	D	40.6	D
30 Sunol Boulevard/Valley Avenue/Junipero Street	Signal	AM	36.4	D	42.9	D
		PM	23.2	C	26.6	C
31 Sunol Boulevard/I-680 NB Ramp	SSSC	AM	1.5 (8.2)	A (A)	1.6 (8.7)	A (A)
		PM	5.3 (12.3)	A (B)	6.9 (18.2)	A (C)
32 Sunol Boulevard/I-680 SB Ramp	SSSC	AM	3.9 (29.5)	A (D)	4.3 (34.6)	A (D)
		PM	5.7 (31.4)	A (D)	<b>20.3 (91.2)</b>	<b>C (F)</b>

Notes:

- Existing intersection traffic control type, (SSSC = Side-Street Stop-Controlled; Signal = Signalized)
- AM= Weekday morning peak hour, PM = Weekday evening peak hour
- Whole intersection average delay reported for signalized and all-way stop-controlled intersections. Side-Street stop-controlled delay presented as Whole Intersection Average Delay (Worst Movement Delay). Delay calculated per HCM 2000 methodologies.

**Bold** indicates LOS below the City of Pleasanton standard.

**Bold and italics** indicates exempt intersections with LOS below the City of Pleasanton standard.

Source: Fehr & Peers, December 2022.

## Vehicle Queues

The addition of Project traffic is expected to cause queues to exceed the existing length of a left turn pocket or make a through movement block access to a left turn pocket for the movements shown in **Table 6**. It should be noted that Table 6 only reports new queues exceeding the available storage with the addition of Project traffic. Appendix B provides a complete summary of intersection queuing, including those locations wherein the storage is already exceeded in existing conditions prior to the addition of project generated traffic.



**Table 6: Existing Plus Project Conditions 95<sup>th</sup> Percentile Turn Pocket Queue Summary at Signalized Intersections**

	Intersection	Movement	Storage Length (ft) <sup>1</sup>	Peak Hour	Existing Queue Length (ft)	Existing Plus Project Queue Length (ft)
3	Foothill Rd & Dublin Canyon Rd/Canyon Wy	NBT	225	AM	175	<b>250</b>
4	Foothill Rd & Laurel Creek Dr/Stoneridge Dr	WBL	150	PM	150	<b>175</b>
		NBT	175	AM	175	<b>225</b>
6	Foothill Rd & Bernal Ave	SBL	300	PM	275	<b>325</b>
10	I-680 NB & Stoneridge Dr	WBT	500	AM	250	<b>725</b>
				PM	275	<b>725</b>
16	Hopyard Rd & Owens Dr	NBL	175	AM	175	<b>275</b>
23	Santa Rita Rd & Old Santa Rita Rd/Pickens Ln	EBL	150	AM	50	<b>150</b>
				PM	75	<b>125</b>
		NBL	250	PM	100	<b>525</b>
24	Santa Rita Rd & Valley Ave	SBL	300	AM	300	<b>350</b>
29	Sunol Blvd/First St & Bernal Ave	SBT	250	PM	225	<b>300</b>
30	Sunol Blvd & Valley Ave/Junipero St	NBL	175	AM	175	<b>350</b>
		NBT	600	PM	575	<b>675</b>

Notes:

1. An additional 60 to 90 feet of storage is typically provided in the taper area outside of the through lane, which is not reflected in the storage length above.
2. **Bold** indicates queue potentially extends beyond available storage.

Source: Fehr & Peers, December 2022.

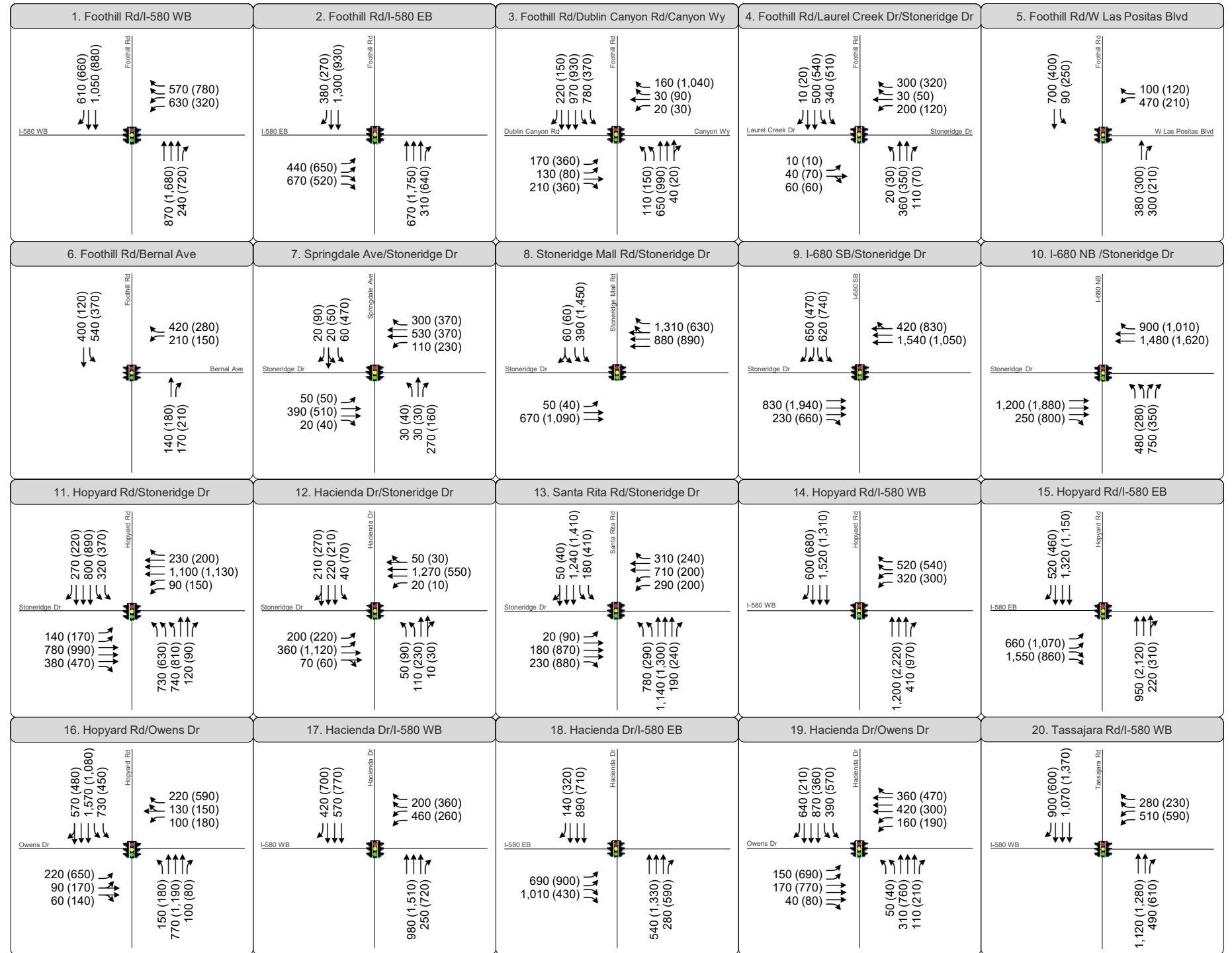
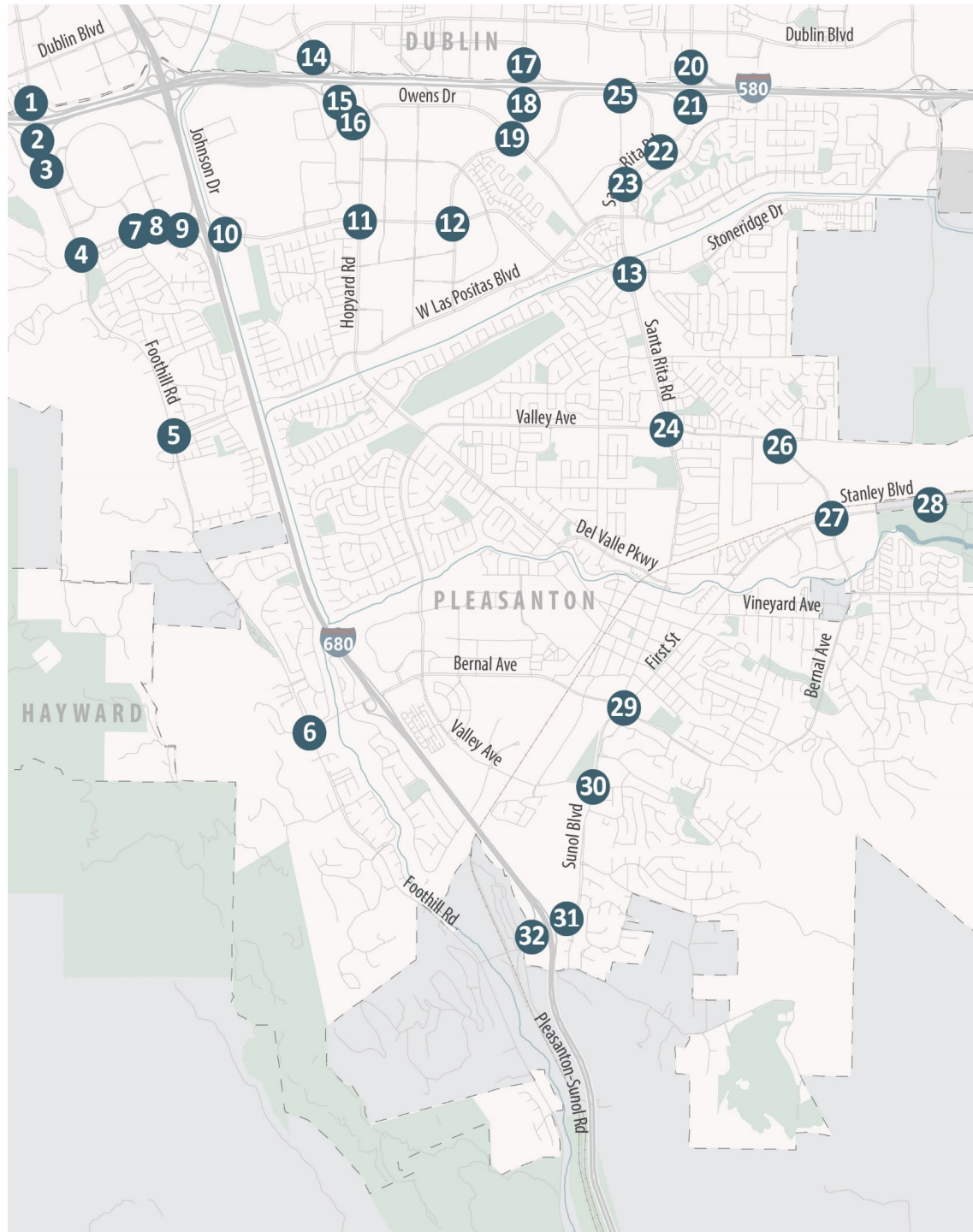
### Existing Plus Project Intersection Improvement Measures

Potential improvement measures were developed for intersections found to operate below the city's LOS standards under Existing plus Project conditions. Those potential improvement measures are as follows:

- *Intersection 13: Santa Rita Road & Stoneridge Drive* – This intersection is projected to operate at a deficient LOS E during the AM peak hour under Existing Plus Project Conditions. Operations at this intersection can be improved to LOS D by optimizing the traffic signal timing to adjust for forecast changes in AM peak hour volumes.
- *Intersection 16: Hopyard Road & Owens Drive* – This intersection is projected to operate at a deficient LOS E during the PM peak hour under Existing Plus Project Conditions.



- Operations at this intersection can be improved to LOS D by optimizing the traffic signal timing to adjust for forecast changes in PM peak hour volumes.
- Intersection 24: Santa Rita Road & Valley Avenue – This intersection is projected to operate at a deficient LOS F during the PM peak hour under Existing and Existing Plus Project Conditions. The City’s Traffic Impact Fee program identifies two modifications to this intersection: the addition of a third southbound left turn lane and the addition of a second westbound left turn lane. These two improvements along with signal timing adjustments bring the Existing conditions intersection LOS to an acceptable level. The addition of the Project drops this improved intersection below an acceptable LOS, with the TIF improvements included.
  - Intersection 32: Sunol Boulevard & I-680 Southbound – This intersection is projected to operate at a deficient LOS F (southbound approach at this unsignalized intersection) during the PM peak hour under Existing Plus Project conditions. The installation of a traffic signal at this location would result in acceptable operations. The installation of a traffic signal at the intersection is planned, and that installation is reflected in subsequent analyses of EPAP and Cumulative baseline conditions.



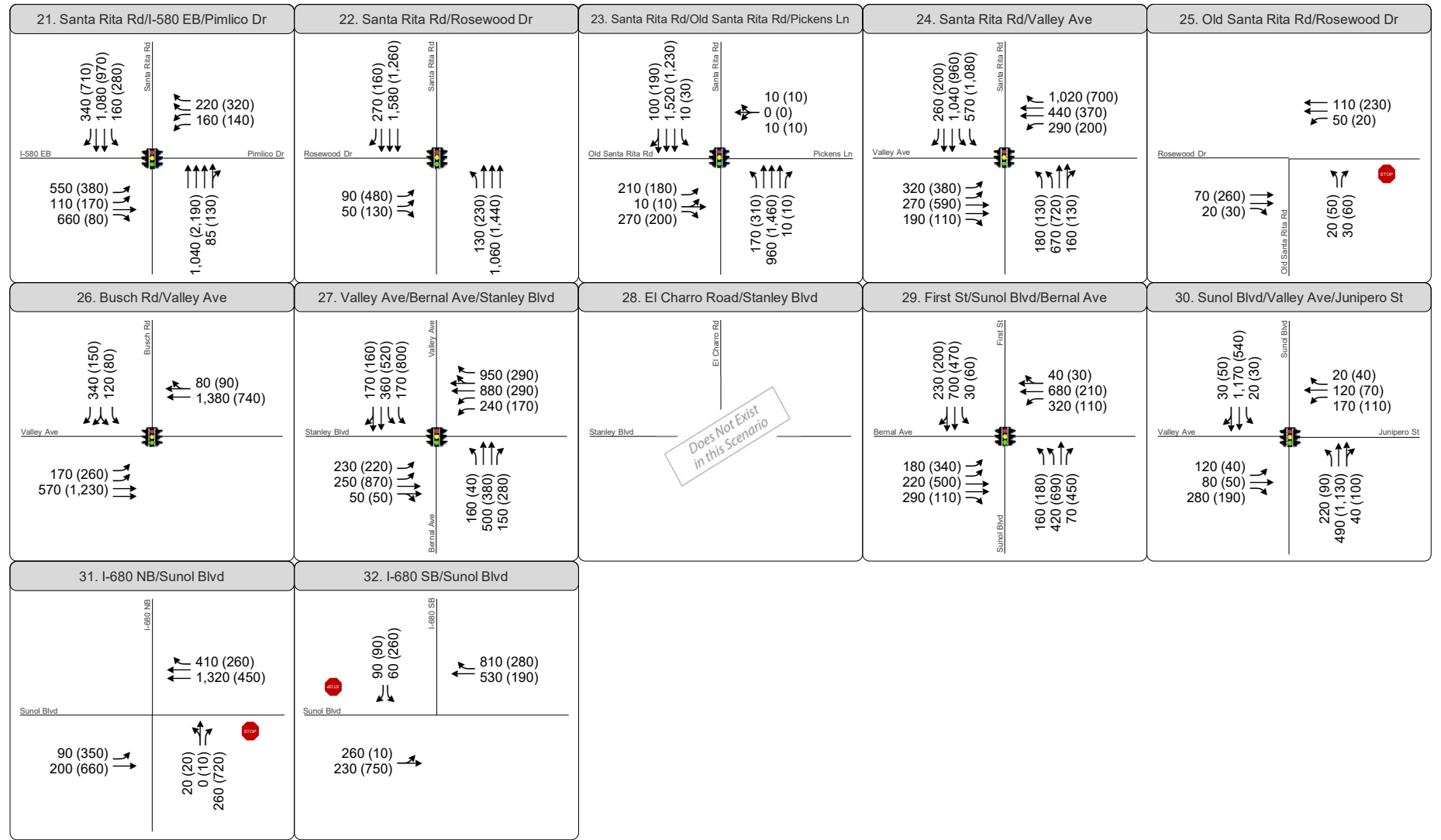
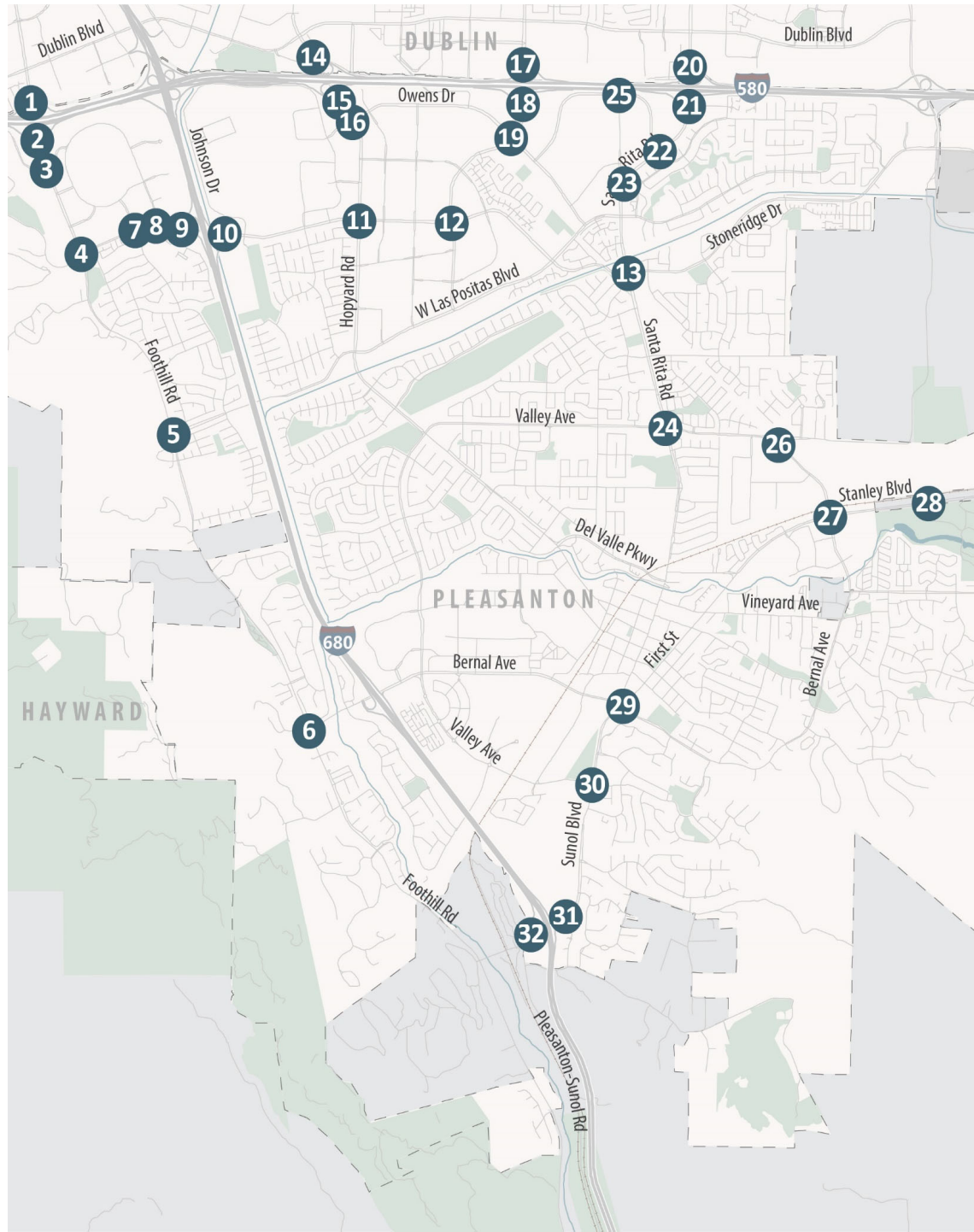
XX (YY) AM (PM) Peak Hour Traffic Volumes    Signalized Intersection    Stop Sign  
 Housing Element Update (HEU) Sites    Study Intersection  
 City Boundary



Figure 3A

Existing Plus Project AM and PM Peak Hour Intersection Volumes, Lane Configurations and Traffic Controls





XX (YY) AM (PM) Peak Hour Traffic Volumes    🚦 Signalized Intersection    🛑 Stop Sign

🏠 Housing Element Update (HEU) Sites    # Study Intersection

▭ City Boundary

Figure 3B

Existing Plus Project AM and PM Peak Hour Intersection Volumes, Lane Configurations and Traffic Controls





## Existing Plus Approved Projects (EPAP) Conditions

The Existing with Approved Projects (EPAP) scenario is intended to reflect conditions at the “opening day” of the proposed Project. It is also known as Near-Term or Background Conditions. EPAP Conditions are defined as existing traffic volumes plus traffic generated by projects that are approved but not yet built and built but not yet occupied. Other projects in the Project development or approvals process have also been considered in this scenario. The City of Pleasanton’s travel demand model incorporates these projects and was the tool used in this analysis. This section presents the results of the level of service calculations under EPAP Conditions both with and without the Project, as well as an alternative scenario that includes the El Charro Road Extension in addition to the Project.

### Intersection Level of Service Analysis

The following presents the specific steps used to develop EPAP No Project scenario forecasts from the City of Pleasanton travel demand model:

- **Step 1** – Run the Base Year (2015) model to estimate AM and PM peak hour traffic volumes.
- **Step 2** – Run the Year 2025 model to estimate AM and PM peak hour traffic volumes.
- **Step 3** – Compare total entering volumes at study intersections to develop growth volumes.
- **Step 4** – Check for reasonableness (e.g., ensure that volumes do not drop below Existing levels, or grow exponentially unless there is a specific reason).

Then, to develop a EPAP Plus Project volumes, the following steps were used:

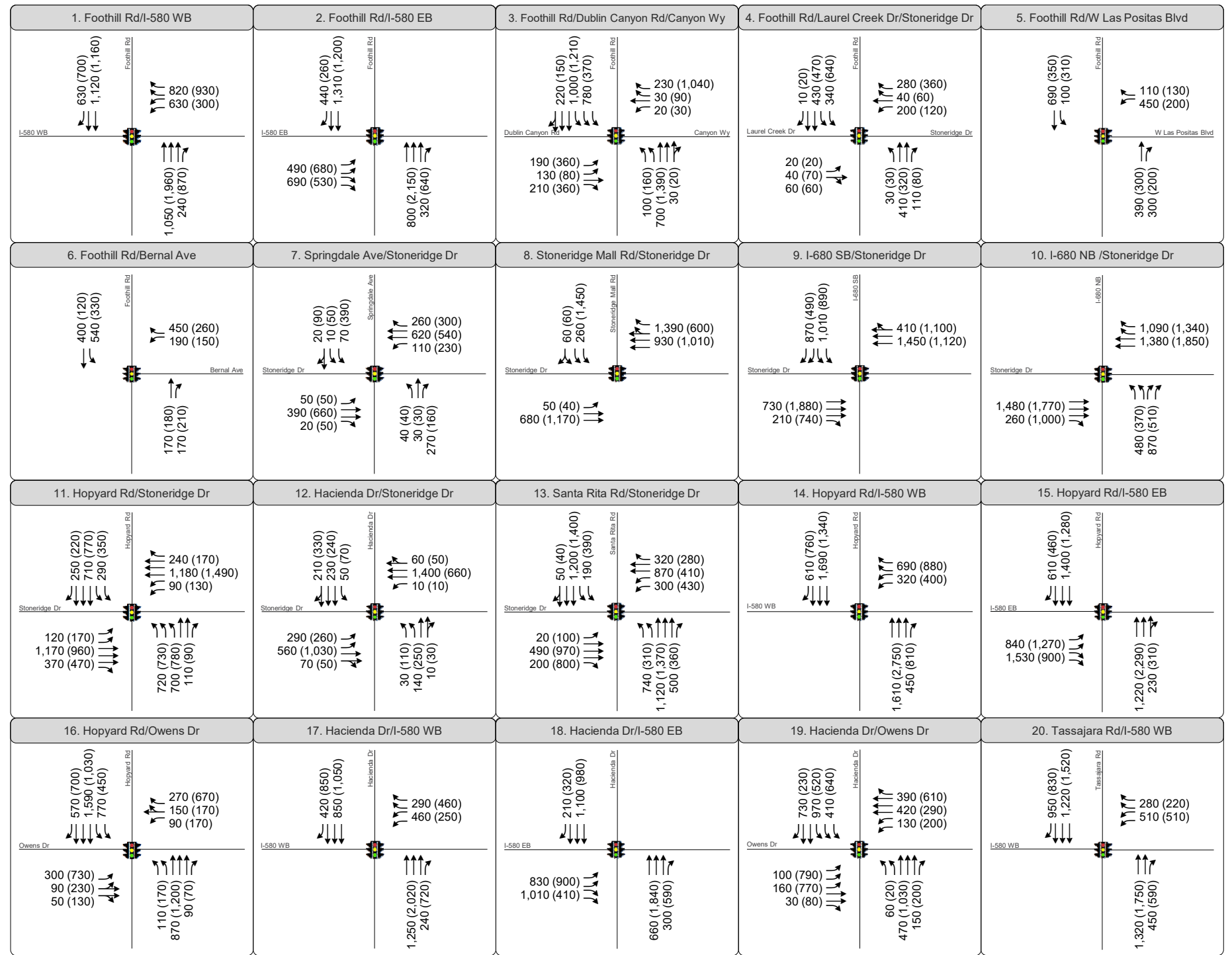
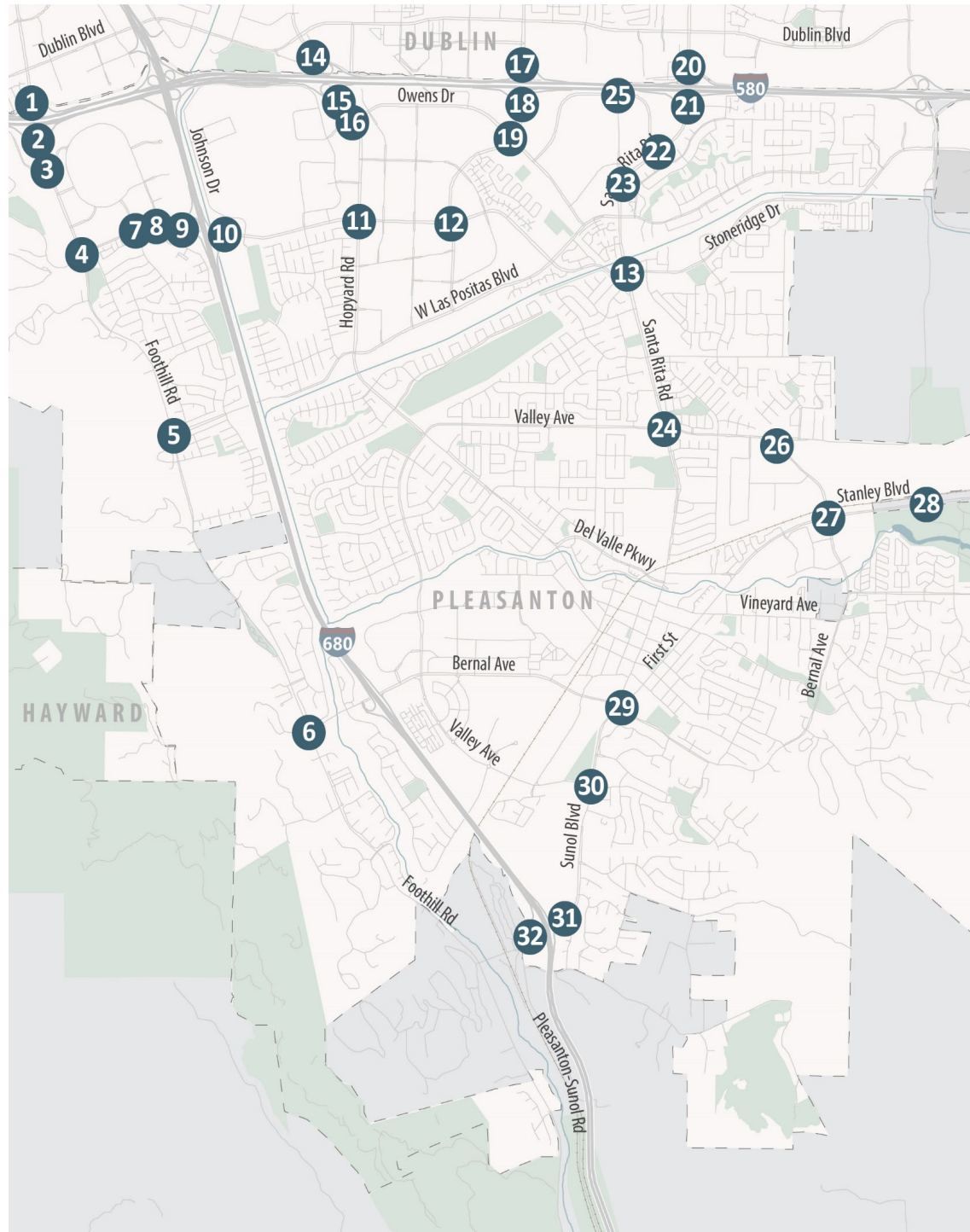
- **Step 5** – Run the Year 2025 model including the Project’s land use to estimate AM and PM peak hour traffic volumes.
- **Step 6** – Compare total entering volumes at study intersections with Base Year results to develop growth volumes
- **Step 7** – Check for reasonableness (e.g., ensure that volumes do not drop inexplicably below EPAP No Project levels, or grow exponentially unless there is a specific reason).

Finally, to develop volumes for the EPAP Plus Project Plus El Charro Road Extension scenario, steps 5 to 7 were repeated with the inclusion of the El Charro Road extension within the model.

The above process relies on the Base Year 2015 model for the estimation of future growth with planned development in the City of Pleasanton. Traffic forecasts within the immediate study area were reviewed to ensure that known developments were adequately reflected in the forecasts. Minor adjustments were made to the forecasts to balance traffic volumes between closely spaced



intersections in the study area. The resulting EPAP No Project forecasts are presented on **Figure 4A** and **4B**. Traffic volumes for the EPAP Plus Project scenario are presented on **Figure 5A** and **5B**. Peak hour volumes for the EPAP Plus Project Plus El Charro Road Extension scenario are presented on **Figure 6A** and **6B**.



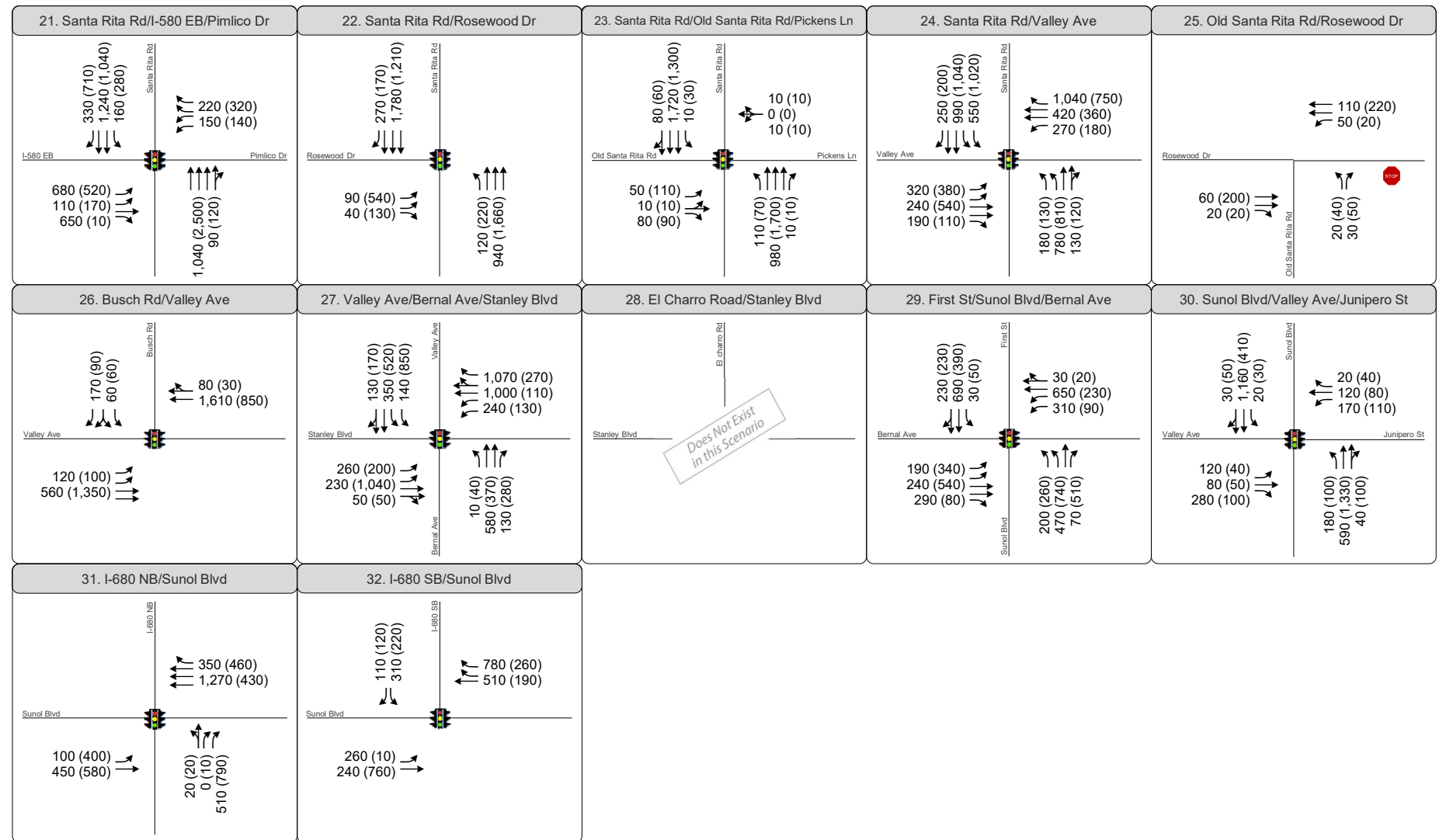
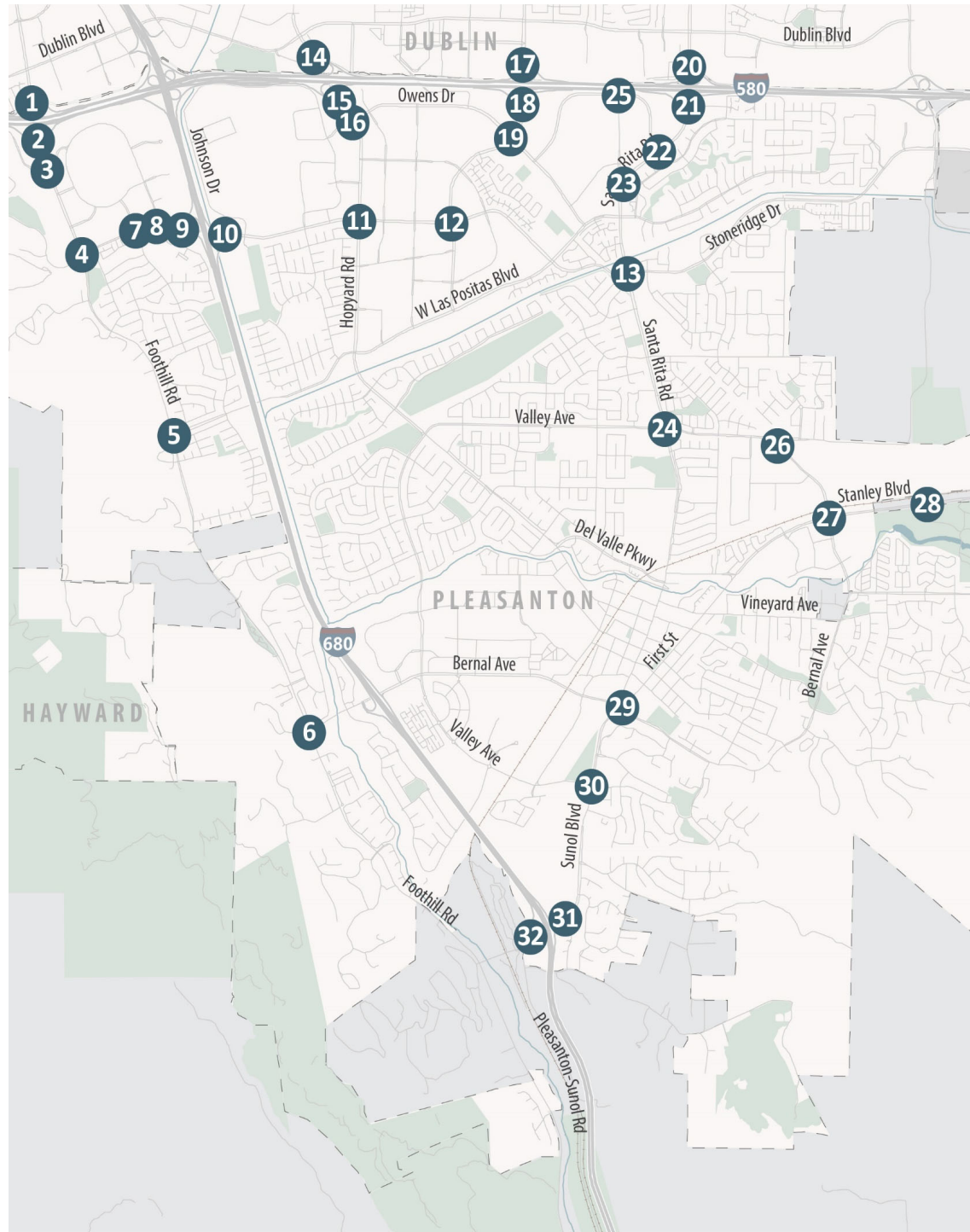
XX (YY) AM (PM) Peak Hour Traffic Volumes  
 Signalized Intersection  
 Stop Sign  
 Housing Element Update (HEU) Sites  
 Study Intersection  
 City Boundary

Figure 4A

Existing Plus Approved Projects (EPAP) AM and PM Peak Hour Intersection Volumes, Lane Configurations and Traffic Controls







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

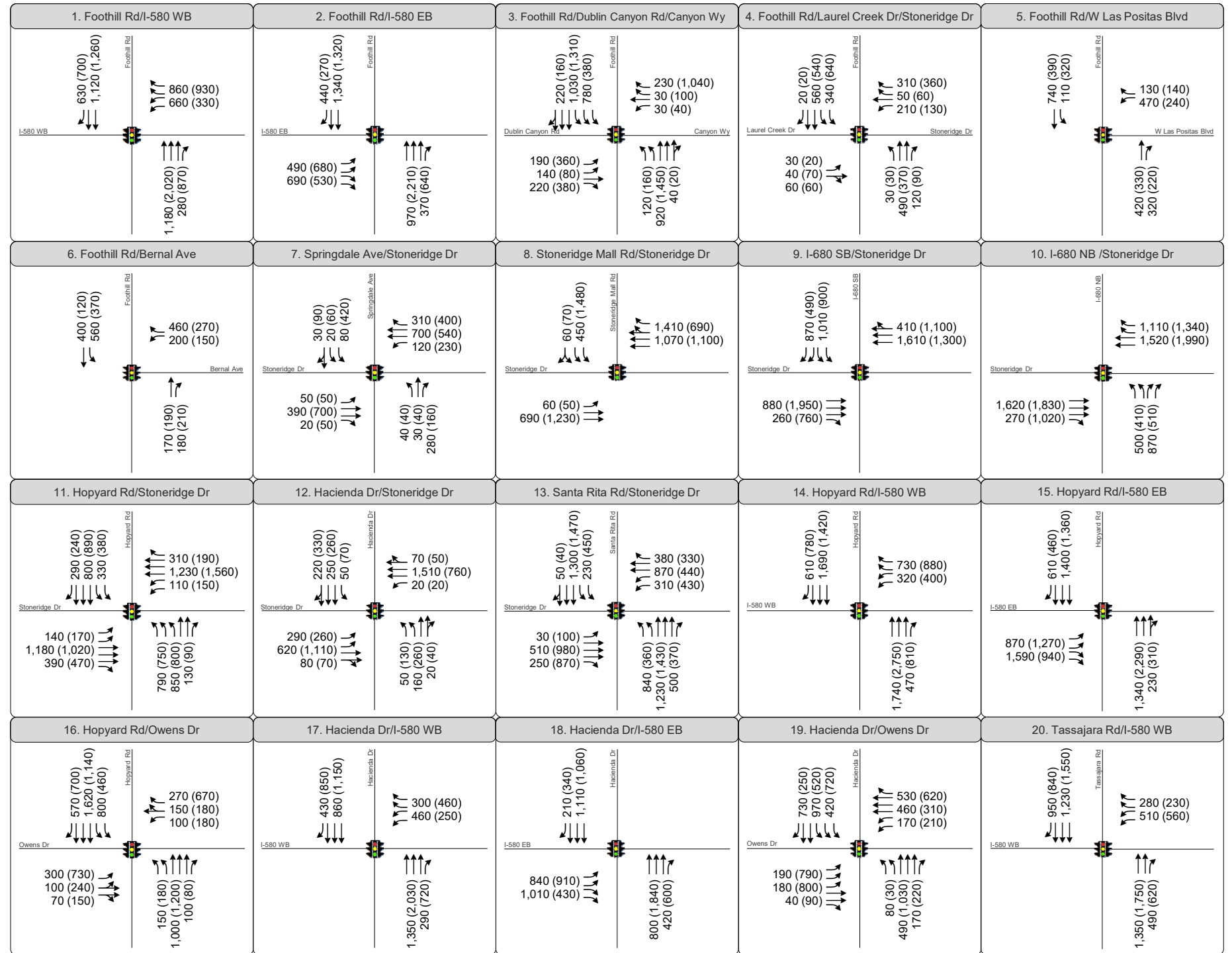
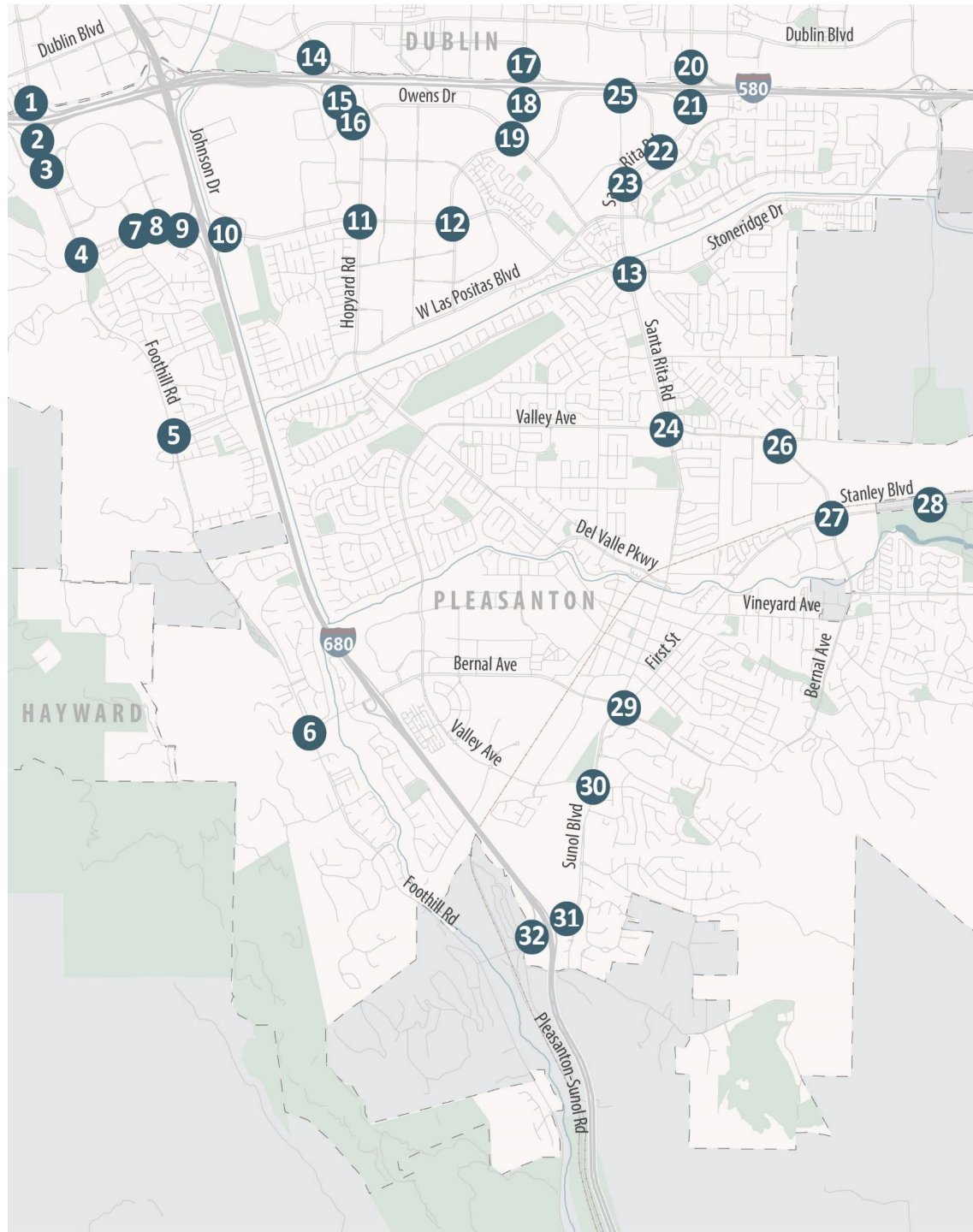
Housing Element Update (HEU) Sites Study Intersection

City Boundary



Figure 4B

Existing Plus Approved Projects (EPAP) AM and PM Peak Hour Intersection Volumes, Lane Configurations and Traffic Controls



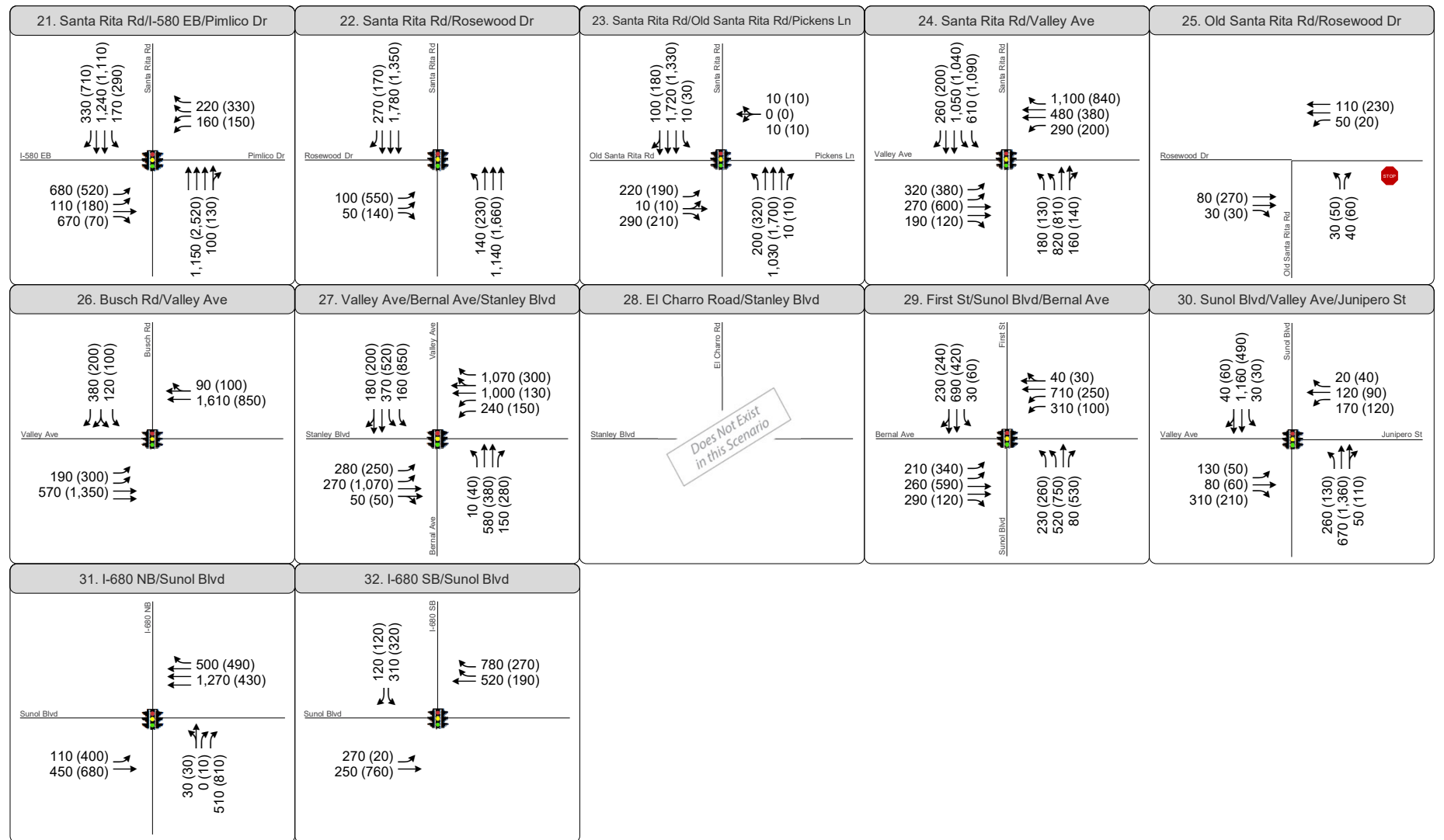
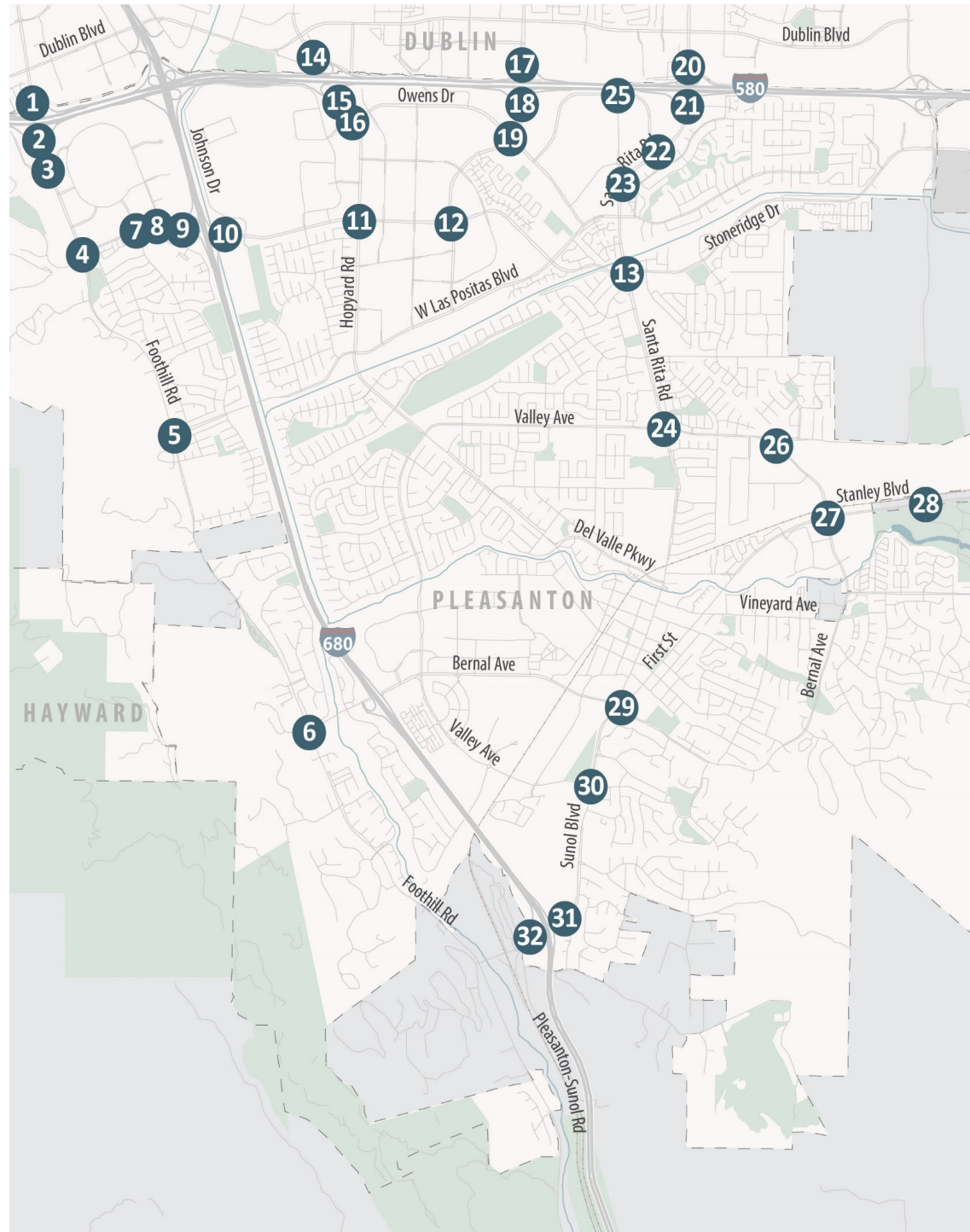
XX (YY) AM (PM) Peak Hour Traffic Volumes  
 Signalized Intersection  
 Stop Sign  
 Housing Element Update (HEU) Sites  
 Study Intersection  
 City Boundary

Figure 5A

EPAP Plus Project AM and PM Peak Hour Intersection Volumes, Lane Configurations and Traffic Controls







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

Housing Element Update (HEU) Sites Study Intersection

City Boundary

Figure 5B

EPAP Plus Project AM and PM Peak Hour Intersection Volumes, Lane Configurations and Traffic Controls





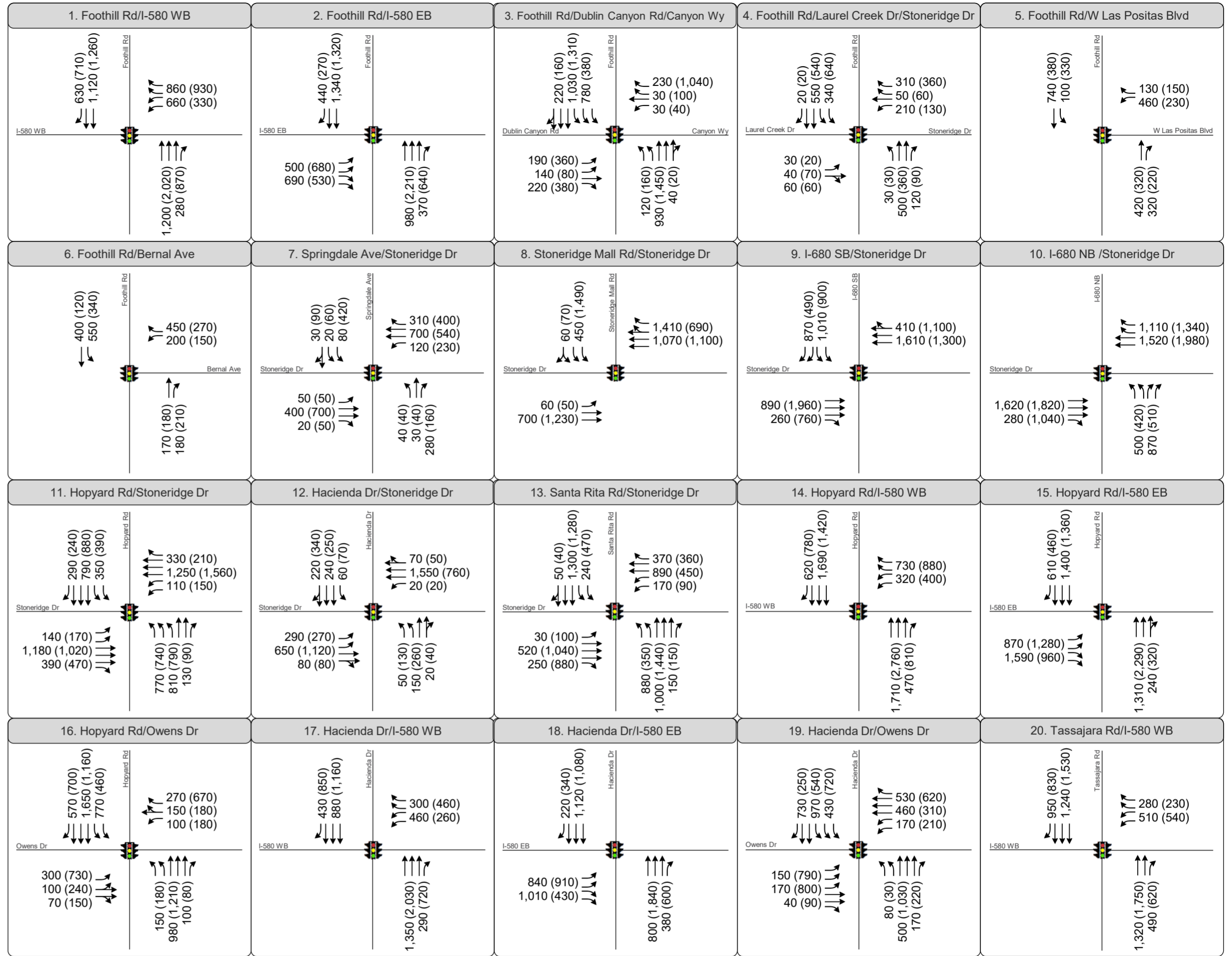
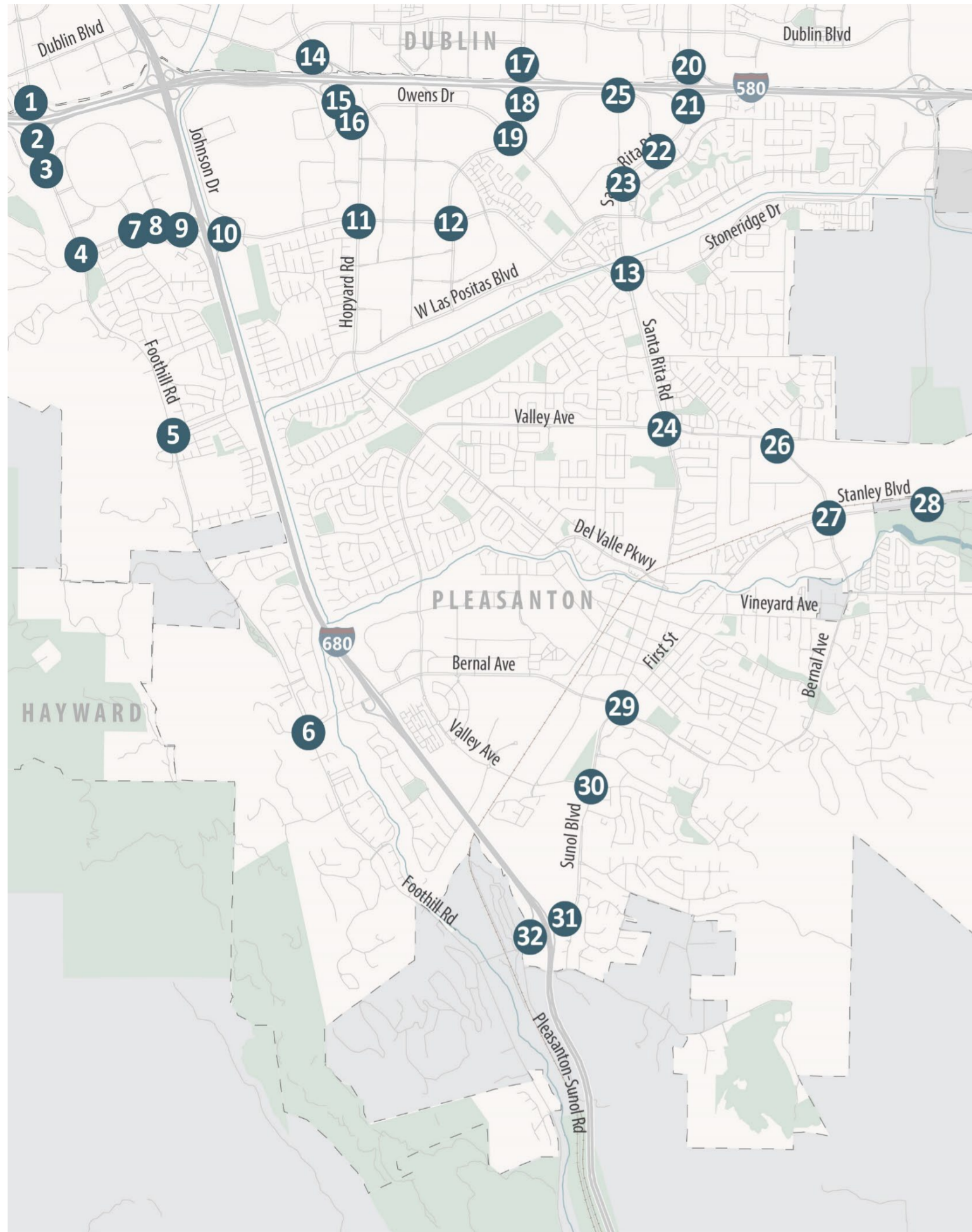
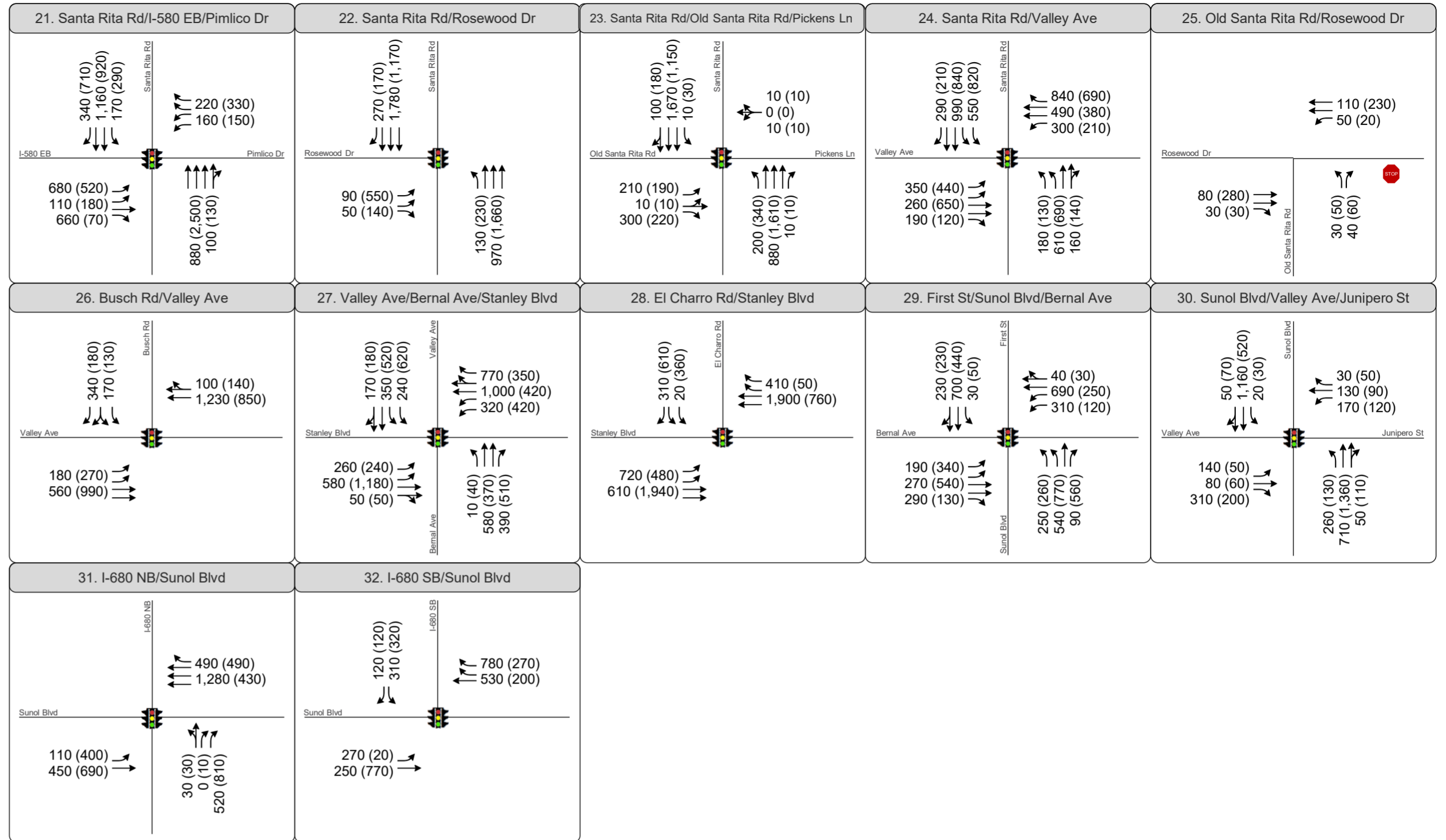
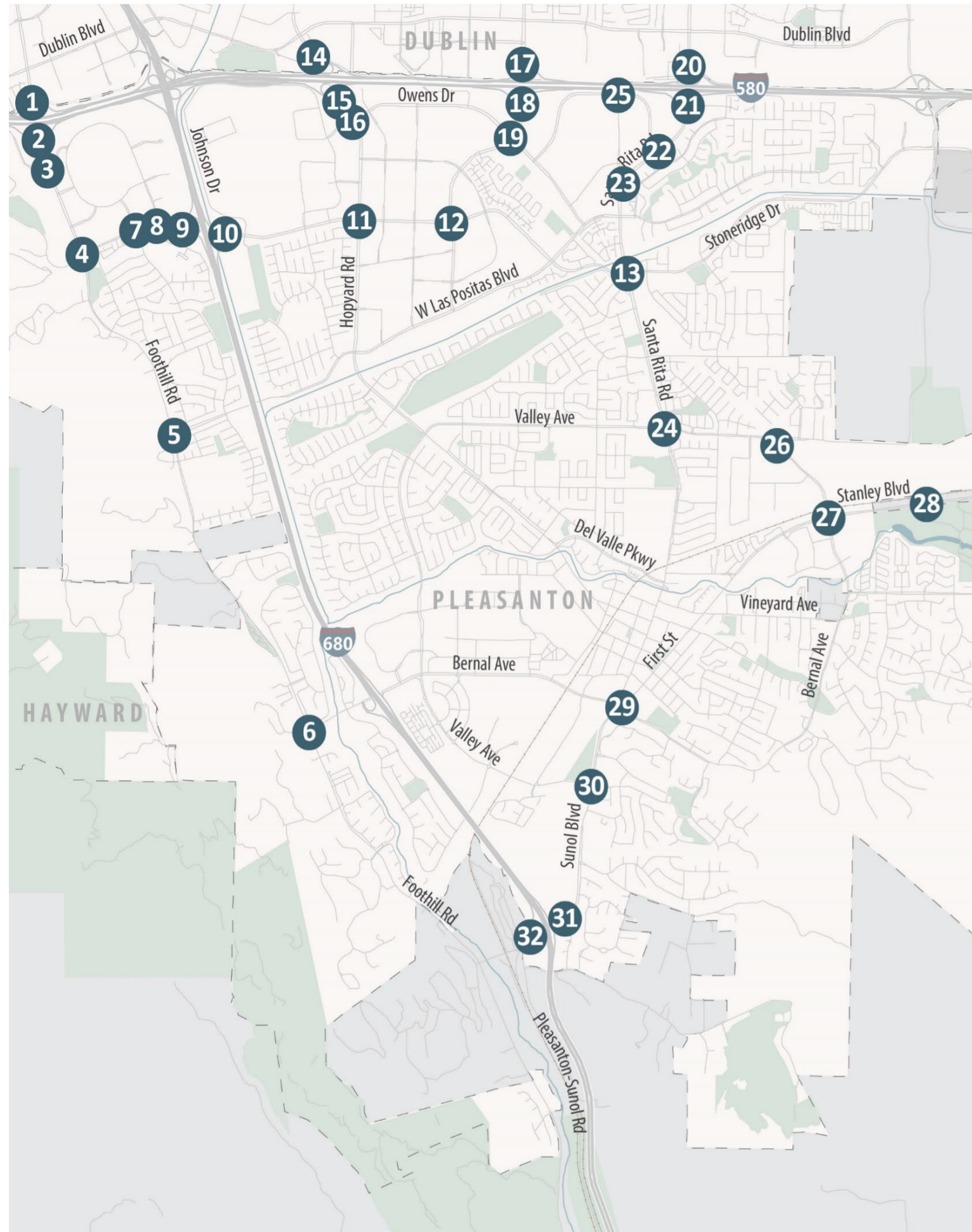


Figure 6A

EPAP Plus Project Plus Extension AM and PM Peak Hour Intersection Volumes, Lane Configurations and Traffic Controls







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

Housing Element Update (HEU) Sites Study Intersection

City Boundary

Figure 6B

EPAP Plus Project Plus Extension AM and PM Peak Hour Intersection Volumes, Lane Configurations and Traffic Controls





**Table 7** presents the results of the LOS analysis conducted for the EPAP No Project, EPAP Plus Project and EPAP Plus Project Plus El Charro Road scenarios. Detailed intersection LOS calculation worksheets are provided in **Attachment A**.

The following list summarizes the intersections that operate below the city’s LOS standards under EPAP No Project conditions, as well as with the addition of traffic generated by the Project. It should be noted that the installation of a traffic signal at the intersection 32 planned under EPAP scenarios would improve its operations to an acceptable LOS from an unacceptable level under Existing conditions.

**Intersections with LOS below City standard (No Project, Plus Project and Plus Project Plus Extension conditions):**

- 13 Santa Rita Road/Stoneridge Road
- 16 Hopyard Road/Owens Drive (*Exempt*)
- 21 Santa Rita Road/I-580 EB Ramp/Pimlico Drive (*Exempt*)
- 24 Santa Rita Road/Valley Avenue

**Table 7: EPAP, EPAP Plus Project, and EPAP Plus Project Plus Extension Level of Service Summary**

Intersection	Control <sup>1</sup>	Peak Hour <sup>2</sup>	EPAP		EPAP Plus Project		EPAP Plus Project Plus Extension	
			Delay <sup>3</sup>	LOS	Delay <sup>3</sup>	LOS	Delay <sup>3</sup>	LOS
1 Foothill Road/I-580 WB Ramp	Signal	AM PM	13.2	B	14.6	B	14.7	B
			30.0	C	34.7	C	34.6	C
2 Foothill Road/I-580 EB Ramp	Signal	AM PM	19.4	B	20.4	C	20.3	C
			17.3	B	18.2	B	18.2	B
3 Foothill Road/Dublin Canyon Road/Canyon Way	Signal	AM PM	23.6	C	25.9	C	25.9	C
			42.2	D	44.8	D	44.8	D
4 Foothill Road/Laurel Creek Drive/Stoneridge Drive	Signal	AM PM	24.9	C	25.6	C	25.7	C
			25.4	C	26.5	C	26.4	C
5 Foothill Road/W Las Positas Boulevard	Signal	AM PM	23.9	C	27.9	C	26.6	C
			19.4	B	21.9	C	21.8	C
6 Foothill Road/Bernal Avenue	Signal	AM PM	21.6	C	24.2	C	23.1	C
			16.7	B	17.8	B	16.9	B
7 Springdale Avenue/Stoneridge Drive	Signal	AM PM	17.3	B	17.7	B	17.7	B
			27.3	C	28.3	C	28.3	C
8	Signal	AM	21.2	C	24.7	C	24.7	C



Intersection	Control <sup>1</sup>	Peak Hour <sup>2</sup>	EPAP		EPAP Plus Project		EPAP Plus Project Plus Extension	
			Delay <sup>3</sup>	LOS	Delay <sup>3</sup>	LOS	Delay <sup>3</sup>	LOS
		PM	43.0	D	53.0	D	54.3	D
9	Signal	AM	18.7	B	18.6	B	18.6	B
		PM	15.1	B	16.1	B	16	B
10	Signal	AM	30.2	C	29.7	C	29.7	C
		PM	10.9	B	13.8	B	13.5	B
11	Signal	AM	35.1	D	38.8	D	37.8	D
		PM	46.8	D	52.3	D	51.8	D
12	Signal	AM	26.3	C	28.0	C	28.5	C
		PM	28.8	C	29.8	C	30.0	C
13	Signal	AM	48.9	D	<b>65.3</b>	<b>E</b>	<b>63.5</b>	<b>E</b>
		PM	<b>67.7</b>	<b>E</b>	<b>75.9</b>	<b>E</b>	38.5	D
14	Signal	AM	11.4	B	13.0	B	12.9	B
		PM	22.9	C	22.7	C	22.7	C
15	Signal	AM	20.3	C	24.1	C	24.1	C
		PM	52.3	D	52.5	D	54.2	D
16	Signal	AM	30.6	C	31.7	C	31.7	C
		PM	<b>63.6</b>	<b>E</b>	<b>64.3</b>	<b>E</b>	<b>64.6</b>	<b>E</b>
17	Signal	AM	7.1	A	7.0	A	7.0	A
		PM	7.1	A	7.1	A	7.2	A
18	Signal	AM	15.3	B	15.1	B	15.1	B
		PM	14.1	B	14.2	B	14.2	B
19	Signal	AM	16.4	B	17.5	B	17.1	B
		PM	34.1	C	35.3	D	35.3	D
20	Signal	AM	8.1	A	8.2	A	8.3	A
		PM	13.1	B	14.1	B	13.7	B
21	Signal	AM	25.4	C	26.2	C	25.7	C
		PM	<b>81.9</b>	<b>F</b>	<b>88.8</b>	<b>F</b>	<b>55.9</b>	<b>E</b>
22	Signal	AM	6.9	A	7.5	A	7.4	A
		PM	17.9	B	17.7	B	17.5	B
23	Signal	AM	13.7	B	22.2	C	22.5	C
		PM	16.8	B	32.8	C	29.2	C



Intersection	Control <sup>1</sup>	Peak Hour <sup>2</sup>	EPAP		EPAP Plus Project		EPAP Plus Project Plus Extension	
			Delay <sup>3</sup>	LOS	Delay <sup>3</sup>	LOS	Delay <sup>3</sup>	LOS
24 Santa Rita Road/Valley Avenue	Signal	AM PM	39.8	D	51.4	D	39.3	D
			<b>99.8</b>	<b>F</b>	<b>115.9</b>	<b>F</b>	<b>61.5</b>	<b>E</b>
25 Old Santa Rita Road/Rosewood Drive	SSSC	AM PM	2.9 (9.3)	A (A)	3.1 (9.5)	A (A)	3.1 (9.5)	A (A)
			2.0 (10.3)	A (B)	2.1 (11.0)	A (B)	2.1 (11.1)	A (B)
26 Valley Avenue/Busch Road	Signal	AM PM	30.1	C	41.0	D	19.5	C
			7.8	A	12.6	B	13.3	B
27 Bernal Avenue/Valley Avenue/Stanley Boulevard	Signal	AM PM	51.2	D	54.5	D	49.9	D
			43.5	D	46.2	D	52.6	D
28 Stanley Boulevard/El Charro Road	Signal	AM PM	-	-	-	-	49.6	D
			-	-	-	-	20.0	B
29 Sunol Boulevard/First Street/Bernal Avenue	Signal	AM PM	39.2	D	39.2	D	39.3	D
			40.8	D	42.6	D	42.0	D
30 Sunol Boulevard/Valley Avenue/Junipero Street	Signal	AM PM	39.4	D	48.3	D	48.6	D
			28.5	C	31.3	C	31.3	C
31 Sunol Boulevard/I-680 NB Ramp	Signal	AM PM	6.0	A	6.9	A	6.9	A
			14.0	B	13.7	B	13.7	B
32 Sunol Boulevard/I-680 SB Ramp	Signal	AM PM	50.4	D	49.3	D	49.1	D
			16.8	B	21.8	C	21.7	C

Notes:

- Existing intersection traffic control type, (SSSC = Side-Street Stop-Controlled; Signal = Signalized)
- AM= Weekday morning peak hour, PM = Weekday evening peak hour
- Whole intersection average delay reported for signalized and all-way stop-controlled intersections. Side-Street stop-controlled delay presented as Whole Intersection Average Delay (Worst Movement Delay). Delay calculated per HCM 2000 methodologies.

**Bold** indicates LOS below the City of Pleasanton standard.

**Bold and italics** indicates exempt intersections with LOS below the City of Pleasanton standard.

Source: Fehr & Peers, December 2022.

## Vehicle Queues

The addition of Project traffic to EPAP conditions is expected to cause queues to exceed the existing length of a left turn pocket or make a through movement block access to a left turn pocket for the movements shown in **Table 8**. It should be noted that Table 8 only reports new queues exceeding the available storage with the addition of Project traffic. Appendix B provides a complete summary of intersection queuing, including those locations wherein the storage is already exceeded in existing conditions prior to the addition of project generated traffic.





**Table 8: EPAP Plus Project and EPAP Plus Project Plus Extension Conditions 95<sup>th</sup> Percentile Turn Pocket Queue Summary at Signalized Intersections**

	Intersection	Movement	Storage Length (ft) <sup>1</sup>	Peak Hour	EPAP Queue Length (ft)	EPAP Plus Project Queue Length (ft)	EPAP Plus Project Plus Extension Queue Length (ft)
6	Foothill Rd & Bernal Ave	SBL	300	PM	300	<b>325</b>	300
13	Santa Rita Rd & Stoneridge Dr	SBL	325	PM	325	<b>400</b>	325
21	Santa Rita Rd & I-580 EB/Pimlico Dr	SBL	425	PM	425	425	<b>450</b>
23	Santa Rita Rd & Old Santa Rita Rd/Pickens Ln	EBL	100	AM	50	<b>175</b>	<b>150</b>
				PM	100	<b>150</b>	<b>150</b>
		NBL	250	AM	150	<b>300</b>	<b>300</b>
				PM	100	<b>500</b>	<b>425</b>
24	Santa Rita Rd & Valley Ave	EBL	200	AM	200	200	<b>225</b>
				PM	<b>250</b>	<b>250</b>	<b>325</b>

Notes:

1. An additional 60 to 90 feet of storage is typically provided in the taper area outside of the through lane, which is not reflected in the storage length above.
2. **Bold** indicates queue potentially extends beyond available storage.

Source: Fehr & Peers, December 2022.

### EPAP Conditions Intersection Improvement Measures

Potential improvement measures were developed for intersections operating below the city's LOS standards under any of the EPAP conditions' scenarios. Those potential improvement measures are as follows:

- Intersection 13: Santa Rita Road/Stoneridge Road – The addition of project generated traffic to EPAP baseline conditions would result in this intersection degrading from LOS D to LOS E during the AM peak hour and increasing delay in PM peak hour under EPAP Plus Project Conditions. Under EPAP Plus Project Plus Extension Conditions, the intersection would operate at LOS E with lower delay in the AM peak hour and operate at an acceptable LOS D in the PM peak hour. Further mitigation was not identified due to the widening required and the presence of adjacent land uses abutting the roadway.
- Intersection 16: Hopyard Road/Owens Drive – This intersection would operate at LOS E during the PM peak hour under EPAP, EPAP Plus Project and EPAP Plus Project Plus Extension conditions. This is an exempt intersection with LOS below the City of



Pleasanton standard, and there are no reasonable mitigation measures for this intersection.

- *Intersection 21: Santa Rita Road/I-580 EB Ramp/Pimlico Drive* – This intersection would operate at LOS F during the PM peak hour under EPAP baseline and EPAP Plus Project conditions. The addition of project generated traffic to EPAP baseline conditions would result in increased average delay at this intersection while in LOS F operations. Under EPAP Plus Project Plus Extension Conditions, this intersection would improve to LOS E during the PM peak hour. This is an exempt intersection with LOS below the City of Pleasanton standard, and there are no reasonable mitigation measures for this intersection.
- *Intersection 24: Santa Rita Road/Valley Avenue* – This intersection would operate at LOS F during the PM peak hour under EPAP baseline and EPAP Plus Project conditions. The addition of project generated traffic to EPAP baseline conditions would result in increased average delay at this intersection while in LOS F operations. Under EPAP Plus Project conditions, operations at this intersection can be improved to an average delay of 78 seconds per vehicle, decreasing delay from EPAP baseline conditions, by optimizing the traffic signal timing to adjust for changes in project generated traffic. Under EPAP Plus Project Plus Extension Conditions, this intersection would improve to LOS E during the PM peak hour.

## Cumulative (Year 2040) Conditions

The Cumulative condition represents conditions in the 2040 horizon year, consistent with the City of Pleasanton travel demand model. To evaluate the potential effect of traffic generated by the proposed project on the surrounding street system, volume estimates representing Cumulative without Project Conditions were prepared. Traffic conditions without the project under this future scenario reflect traffic increases due to nearby and regional development along with background roadway network changes and street improvements. The forecasted Cumulative without Project Conditions traffic volumes were then used as the baseline to identify the project's effects on the operations of the circulation system. This chapter presents the results of the level of service calculations under Cumulative Conditions both with and without the Project.

## Cumulative (Year 2040) Circulation System Effects

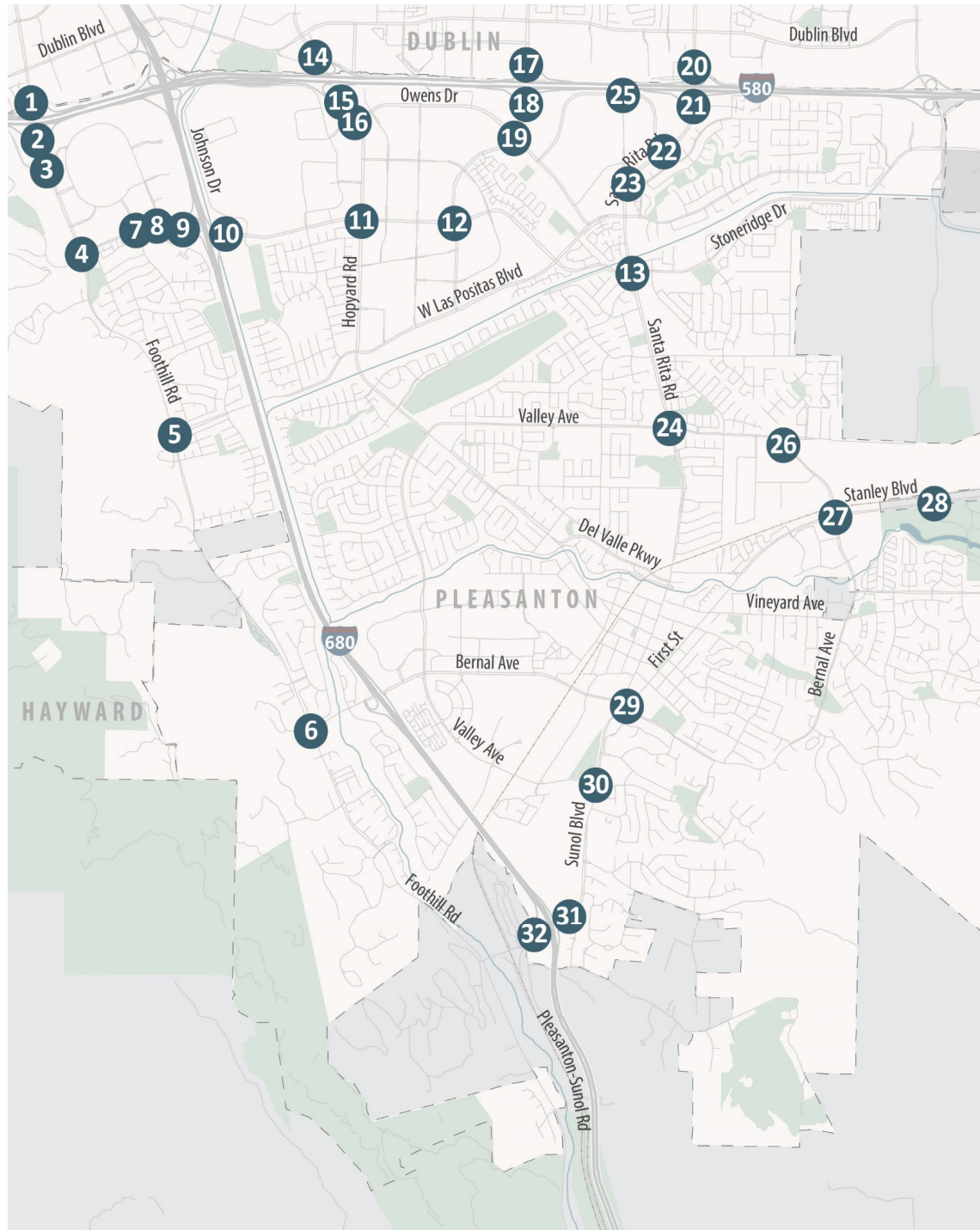
This subsection identifies the cumulative, long-term effects, of the addition of project generated peak hour trips on the operations of the local circulation system. Traffic volumes for Cumulative Conditions are comprised of Existing Conditions volumes plus traffic generated by anticipated local and regional land use growth. Cumulative conditions were forecast using the City of Pleasanton's travel demand model and reflect buildout of the city's General Plan and the general plans of surrounding communities. The extension of El Charro Road from Stoneridge Drive to



Stanley Boulevard is included within the Cumulative scenarios. The same steps previously described to develop forecasts and adjustments present under the EPAP scenarios were used to develop cumulative Year 2040 traffic growth forecasts from the model.

### **Intersection Level of Service Analysis**

Traffic volumes forecast to occur in the Cumulative No Project scenario are presented on **Figure 7A** and **7B**. Traffic volumes representing Cumulative Plus Project conditions are presented on **Figure 8A** and **8B**.



<p><b>1. Foothill Rd/I-580 WB</b></p>	<p><b>2. Foothill Rd/I-580 EB</b></p>	<p><b>3. Foothill Rd/Dublin Canyon Rd/Canyon Wy</b></p>	<p><b>4. Foothill Rd/Laurel Creek Dr/Stoneridge Dr</b></p>	<p><b>5. Foothill Rd/W Las Positas Blvd</b></p>
<p><b>6. Foothill Rd/Bernal Ave</b></p>	<p><b>7. Springdale Ave/Stoneridge Dr</b></p>	<p><b>8. Stoneridge Mall Rd/Stoneridge Dr</b></p>	<p><b>9. I-680 SB/Stoneridge Dr</b></p>	<p><b>10. I-680 NB/Stoneridge Dr</b></p>
<p><b>11. Hopyard Rd/Stoneridge Dr</b></p>	<p><b>12. Hacienda Dr/Stoneridge Dr</b></p>	<p><b>13. Santa Rita Rd/Stoneridge Dr</b></p>	<p><b>14. Hopyard Rd/I-580 WB</b></p>	<p><b>15. Hopyard Rd/I-580 EB</b></p>
<p><b>16. Hopyard Rd/Owens Dr</b></p>	<p><b>17. Hacienda Dr/I-580 WB</b></p>	<p><b>18. Hacienda Dr/I-580 EB</b></p>	<p><b>19. Hacienda Dr/Owens Dr</b></p>	<p><b>20. Tassajara Rd/I-580 WB</b></p>

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

Housing Element Update (HEU) Sites    Study Intersection

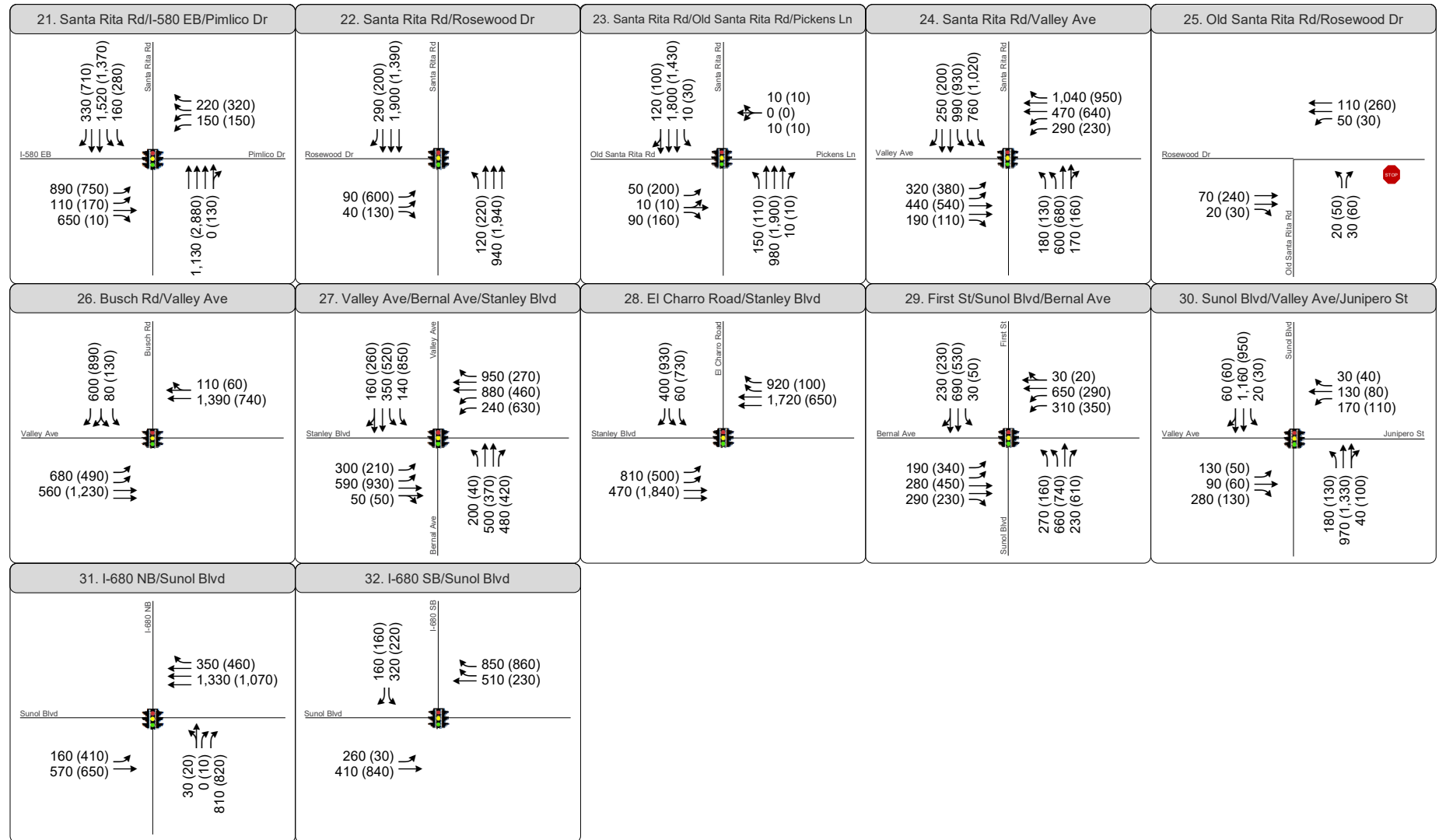
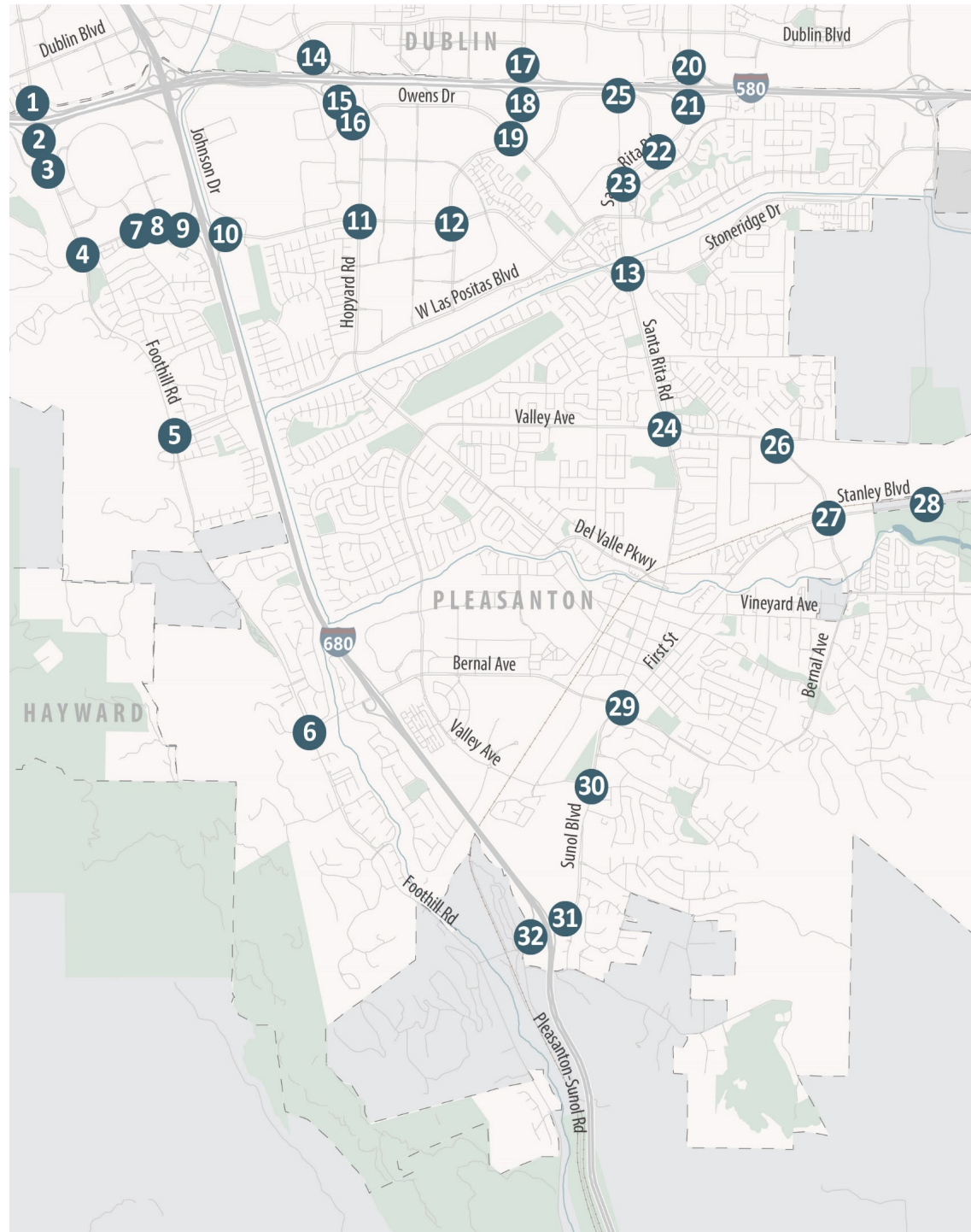
City Boundary

Figure 7A

Cumulative AM and PM Peak Hour Intersection Volumes, Lane Configurations and Traffic Controls







XX (YY) AM (PM) Peak Hour Traffic Volumes    🚦 Signalized Intersection    🛑 Stop Sign

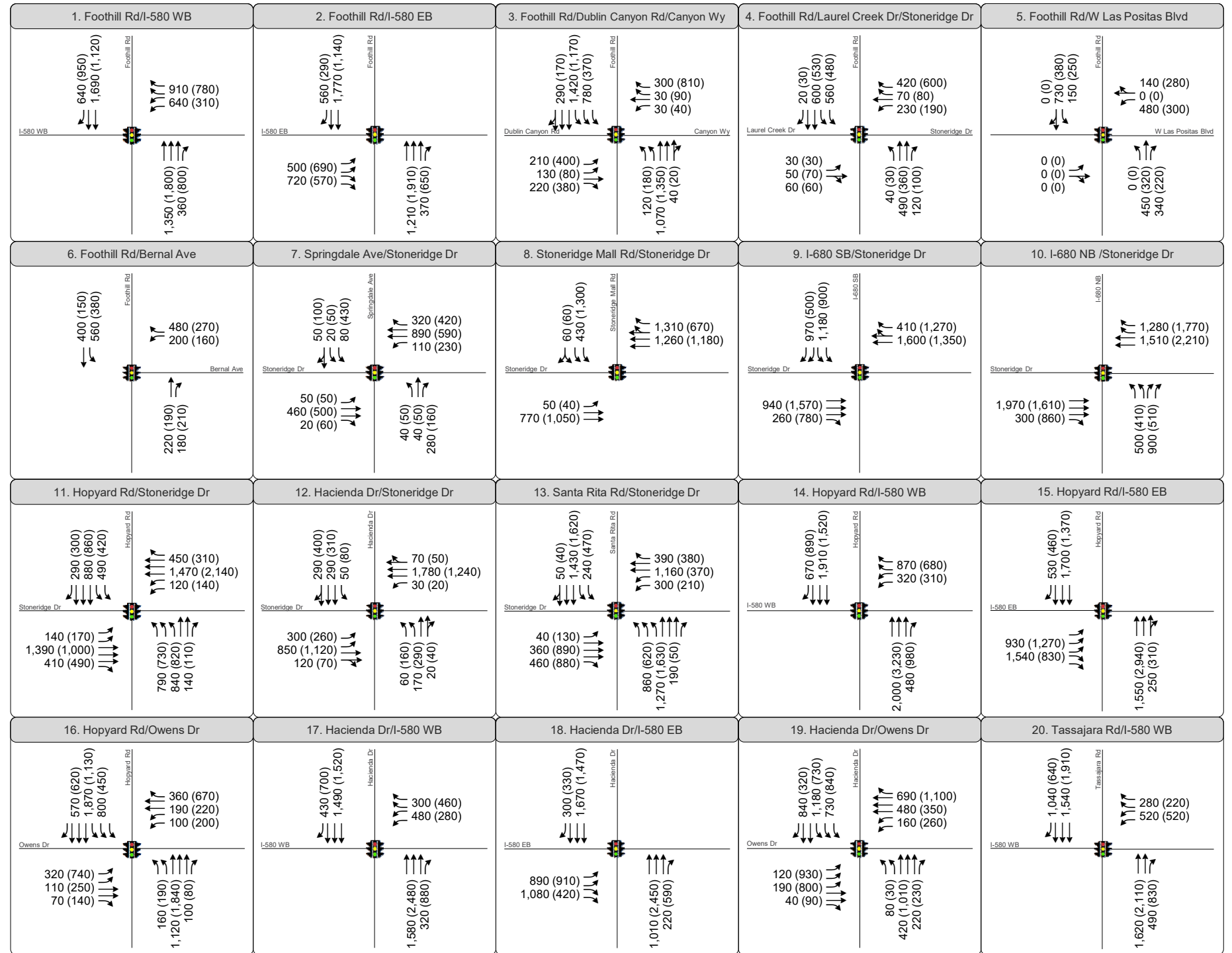
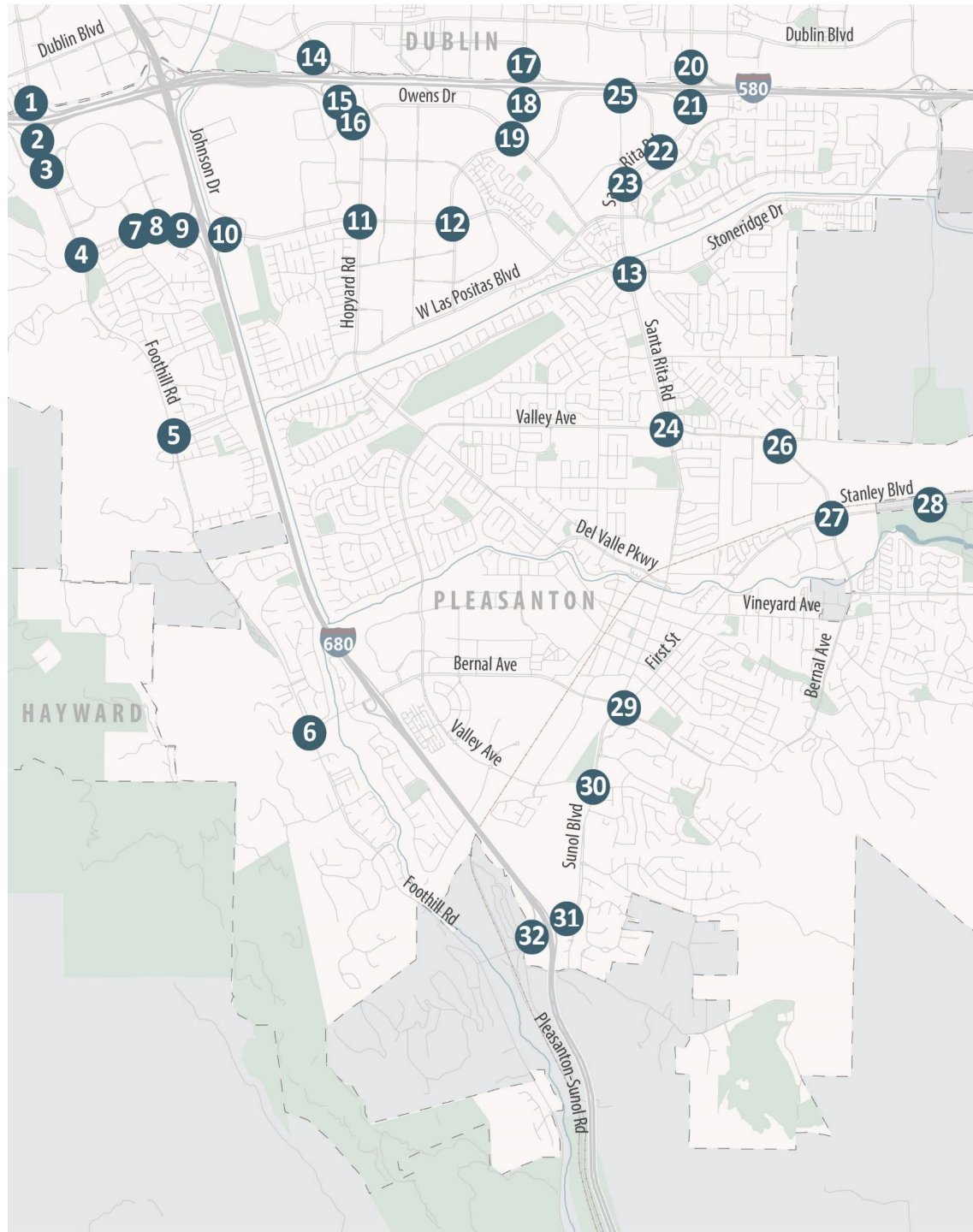
🏠 Housing Element Update (HEU) Sites    # Study Intersection

🗺️ City Boundary

Figure 7B

Cumulative AM and PM Peak Hour Intersection Volumes, Lane Configurations and Traffic Controls





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

Housing Element Update (HEU) Sites    Study Intersection

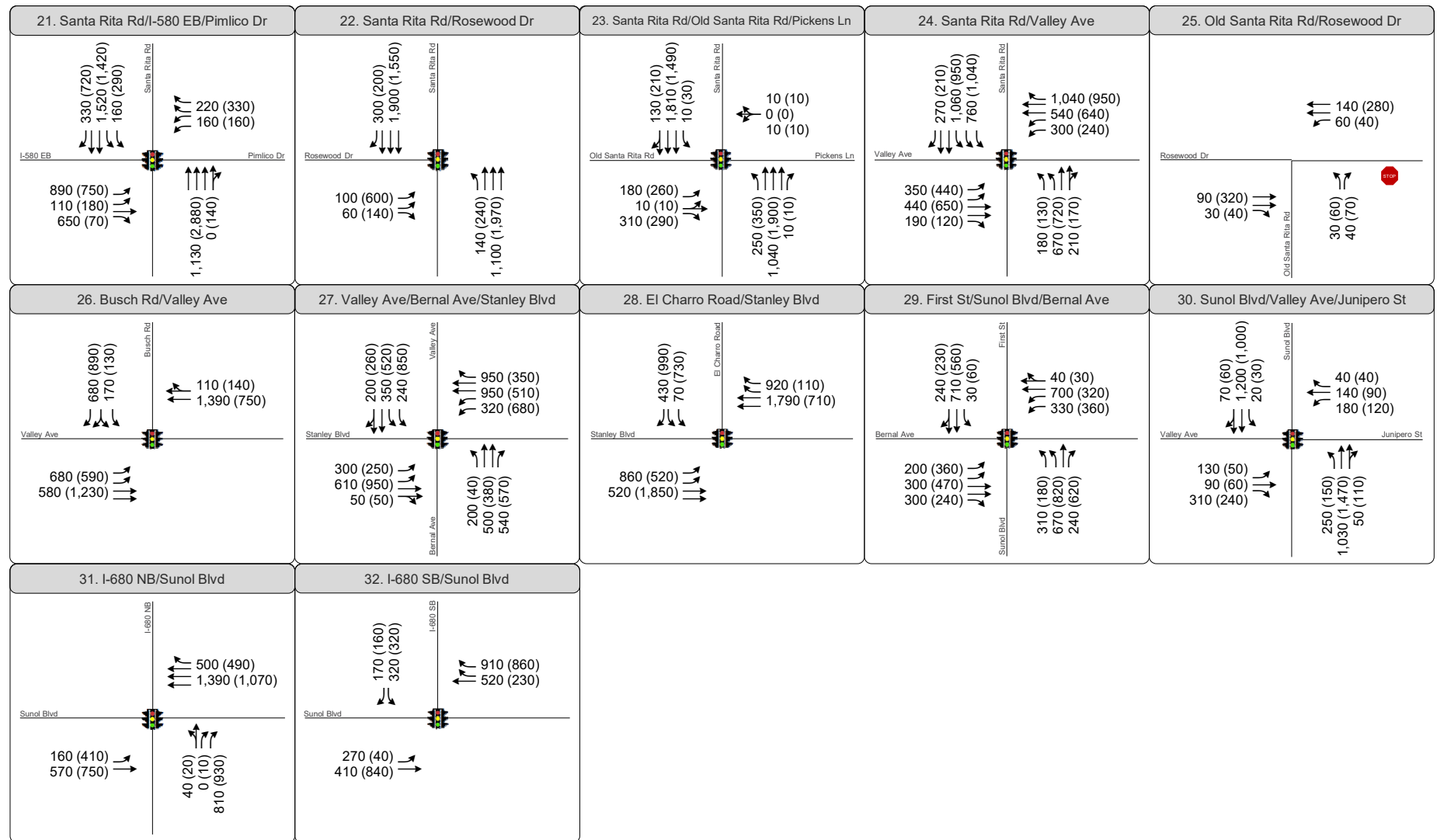
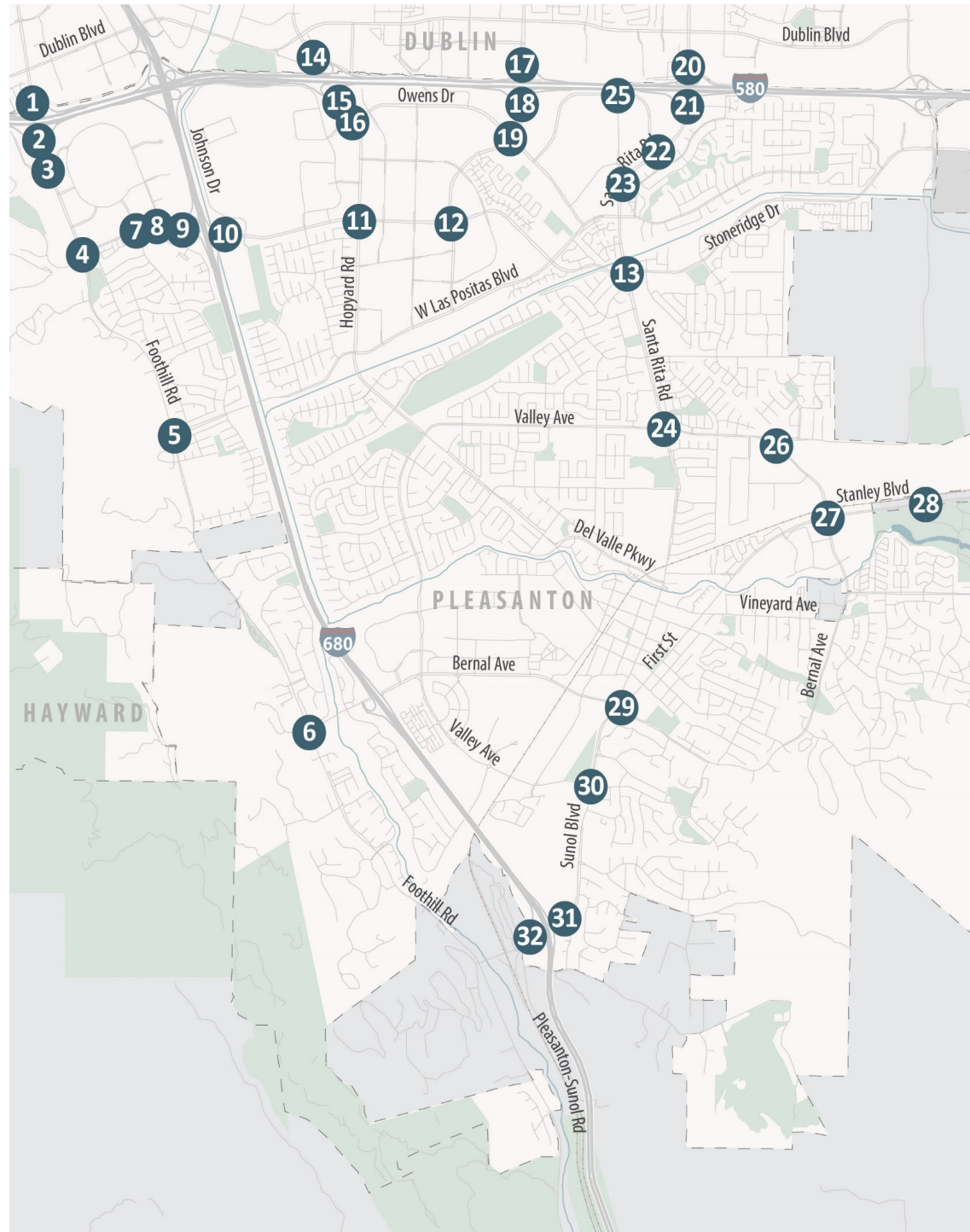
City Boundary

Figure 8A

Cumulative Plus Project AM and PM Peak Hour Intersection Volumes, Lane Configurations and Traffic Controls







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

Housing Element Update (HEU) Sites Study Intersection

City Boundary

Figure 8B

Cumulative Plus Project AM and PM Peak Hour Intersection Volumes, Lane Configurations and Traffic Controls





**Table 9** presents the results of the intersection LOS analysis for the Cumulative and Cumulative Plus Project scenarios. Detailed intersection LOS calculation worksheets are provided in **Attachment A**. Cumulative traffic signal timings, peak hour factors, heavy vehicle percentages, and pedestrian and bicycle activity at the study intersections were assumed to remain the same as current conditions in the Cumulative Plus Project Conditions scenario. The following list summarizes the intersections that operate below the city's LOS standards under Cumulative No Project conditions, as well as with the addition of traffic generated by the Project. It should be noted that future planned improvements within the Cumulative scenarios, including widening, at intersection 16 would improve its operations to an acceptable LOS from an unacceptable level under EPAP conditions.

**Intersections with LOS below City standard (No Project and Plus Project conditions):**

- 11 Hopyard Road/Stoneridge Drive
- 13 Santa Rita Road/Stoneridge
- 15 Hopyard Road/I-580 EB Ramp (*Exempt*)
- 21 Santa Rita Road/I-580 EB Ramp/Pimlico Drive (*Exempt*)
- 24 Santa Rita Road/Valley Avenue
- 27 Bernal Avenue/Valley Avenue/Stanley Boulevard (*Exempt*)

**Intersections with LOS below City standard (only Plus Project conditions)**

- 8 Stoneridge Drive/Stoneridge Mall Road
- 26 Valley Avenue/Busch Road
- 28 Stanley Boulevard/El Charro Road (*Exempt*)

**Table 8: Cumulative and Cumulative Plus Project Level of Service Summary**

Intersection		Control <sup>1</sup>	Peak Hour <sup>2</sup>	Cumulative Conditions		Cumulative Plus Project Conditions	
				Delay <sup>3</sup>	LOS	Delay <sup>3</sup>	LOS
1	Foothill Road/I-580 WB Ramp	Signal	AM	16.8	B	18.1	B
			PM	31.2	C	42.3	D
2	Foothill Road/I-580 EB Ramp	Signal	AM	31.0	C	34.1	C
			PM	18.5	B	19.5	B
3	Foothill Road/Dublin Canyon Road/Canyon Way	Signal	AM	25.5	C	27.7	C
			PM	43.9	D	46.6	D
4	Foothill Road/Laurel Creek Drive/Stoneridge Drive	Signal	AM	25.8	C	29.2	C
			PM	23.2	C	24.1	C
5	Foothill Road/W Las Positas Boulevard	Signal	AM	34.4	C	37.8	D
			PM	22.5	C	25.6	C





Intersection	Control <sup>1</sup>	Peak Hour <sup>2</sup>	Cumulative Conditions		Cumulative Plus Project Conditions	
			Delay <sup>3</sup>	LOS	Delay <sup>3</sup>	LOS
6 Foothill Road/Bernal Avenue	Signal	AM	20.0	B	20.4	C
		PM	25.7	B	16.7	B
7 Springdale Avenue/Stoneridge Drive	Signal	AM	17.9	B	18.6	B
		PM	27.1	C	28.9	C
8 Stoneridge Drive/Stoneridge Mall Road	Signal	AM	20.9	C	23.2	C
		PM	44.1	D	<b>57.2</b>	<b>E</b>
9 Stoneridge Drive/I-680 SB Ramp	Signal	AM	34.5	C	39.7	D
		PM	27.1	C	25.8	C
10 Stoneridge Drive/I-680 NB Ramp	Signal	AM	32.3	C	31.7	C
		PM	15.1	B	24.7	C
11 Hopyard Road/Stoneridge Drive	Signal	AM	47.4	D	52.2	D
		PM	<b>83.9</b>	<b>F</b>	<b>88.0</b>	<b>F</b>
12 Hacienda Drive/Stoneridge Drive	Signal	AM	26.2	C	28.3	C
		PM	29.4	C	31.3	C
13 Santa Rita Road/Stoneridge Drive	Signal	AM	51.5	D	<b>61.3</b>	<b>E</b>
		PM	<b>58.1</b>	<b>E</b>	<b>70.8</b>	<b>E</b>
14 Hopyard Road/I-580 WB Ramp	Signal	AM	21.1	C	22.9	C
		PM	31.7	C	31.9	C
15 Hopyard Road/I-580 EB Ramp	Signal	AM	19.7	B	21.0	C
		PM	<b>94.4</b>	<b>F</b>	<b>94.7</b>	<b>F</b>
16 Hopyard Road/Owens Drive	Signal	AM	28.4	C	29.6	C
		PM	36.5	D	37.4	D
17 Hacienda Drive/I-580 WB Ramp	Signal	AM	7.3	A	7.4	A
		PM	8.6	A	9.0	A
18 Hacienda Drive/I-580 EB Ramp	Signal	AM	20.0	B	20.7	C
		PM	16.9	B	18.4	B
19 Hacienda Drive/Owens Drive	Signal	AM	17.7	B	18.5	B
		PM	33.6	C	36.1	D
20 Tassajara Road/I-580 WB Ramp	Signal	AM	9.6	A	9.7	A
		PM	28.6	C	28.8	C
21 Santa Rita Road/I-580 EB Ramp/Pimlico Drive	Signal	AM	28.8	C	29.0	C
		PM	<b>95.7</b>	<b>F</b>	<b>97.6</b>	<b>F</b>
22	Signal	AM	6.7	A	7.4	A



Intersection	Control <sup>1</sup>	Peak Hour <sup>2</sup>	Cumulative Conditions		Cumulative Plus Project Conditions	
			Delay <sup>3</sup>	LOS	Delay <sup>3</sup>	LOS
		PM	18.2	B	19.5	B
23	Signal	AM	14.1	B	22.0	C
		PM	21.1	C	38.7	D
24	Signal	AM	37.0	D	41.1	D
		PM	<b>57.1</b>	<b>E</b>	<b>64.9</b>	<b>E</b>
25	SSSC	AM	2.8 (9.3)	A (A)	2.9 (9.7)	A (A)
		PM	2.2 (11.0)	A (B)	2.4 (12.3)	A (B)
26	Signal	AM	49.2	D	<b>56.9</b>	<b>E</b>
		PM	17.8	B	19.9	B
27	Signal	AM	50.8	D	52.3	D
		PM	<b>61.7</b>	<b>E</b>	<b>64.7</b>	<b>E</b>
28	Signal	AM	46.1	D	<b>56.9</b>	<b>E</b>
		PM	37.5	D	45.6	D
29	Signal	AM	38.6	D	44.1	D
		PM	41.8	D	49.6	D
30	Signal	AM	38.7	D	49.5	D
		PM	29.5	C	33.3	C
31	Signal	AM	7.6	A	8.4	A
		PM	14.3	B	13.3	B
32	Signal	AM	44.6	D	46.0	D
		PM	23.9	C	29.7	C

Notes:

1. Existing intersection traffic control type, (SSSC = Side-Street Stop-Controlled; Signal = Signalized)
2. AM= Weekday morning peak hour, PM = Weekday evening peak hour
3. Whole intersection average delay reported for signalized and all-way stop-controlled intersections. Side-Street stop-controlled delay presented as Whole Intersection Average Delay (Worst Movement Delay). Delay calculated per HCM 2000 methodologies.

**Bold** indicates LOS below the City of Pleasanton standard.

**Bold and italics** indicates exempt intersections with LOS below the City of Pleasanton standard.

Source: Fehr & Peers, December 2022.

## Vehicle Queues

The addition of Project traffic to Cumulative conditions is expected to cause queues to exceed the existing length of a left turn pocket or make a through movement block access to a left turn pocket for the movements shown in **Table 10**. It should be noted that Table 10 only reports new



queues exceeding the available storage with the addition of Project traffic. Appendix B provides a complete summary of intersection queuing, including those locations wherein the storage is already exceeded in existing conditions prior to the addition of project generated traffic.

**Table 10: Cumulative with Project Conditions 95<sup>th</sup> Percentile Turn Pocket Queue Summary at Signalized Intersections**

	Intersection	Movement	Storage Length (ft) <sup>1</sup>	Peak Hour	Cumulative Queue Length	Cumulative Plus Project Queue Length
3	Foothill Rd & Dublin Canyon Rd/Canyon Wy	EBL	225	PM	225	<b>250</b>
6	Foothill Rd & Bernal Ave	SBL	300	PM	300	<b>350</b>
11	I-680 NB & Stoneridge Dr	WBT	600	AM	600	<b>625</b>
		SBL	325	AM	325	<b>375</b>
13	Santa Rita Rd & Stoneridge Dr	NBT	475	PM	400	<b>600</b>
		SBL	325	PM	325	<b>400</b>
19	Hacienda Dr & Owens Dr	WBL	175	PM	175	<b>200</b>
22	Santa Rita Rd & Rosewood Dr	NBL	300	PM	300	<b>325</b>
23	Santa Rita Rd & Old Santa Rita Rd/Pickens Ln	EBL	100	AM	50	<b>150</b>
		NBL	250	AM	175	<b>400</b>
				PM	125	<b>575</b>
24	Santa Rita Rd & Valley Ave	EBL	200	AM	200	<b>225</b>
30	Sunol Blvd & Valley Ave/Junipero St	NBL	175	PM	175	<b>200</b>
		SBT	750	AM	750	<b>800</b>

Notes:

4. An additional 60 to 90 feet of storage is typically provided in the taper area outside of the through lane, which is not reflected in the storage length above.
5. **Bold** indicates queue potentially extends beyond available storage.

Source: Fehr & Peers, December 2022.

### Cumulative Conditions Intersection Improvement Measures

Potential improvement measures were developed for intersections operating below the city's LOS standards under the Cumulative conditions' scenarios. Those potential improvement measures are as follows:

- Intersection 8: Stoneridge Drive/Stoneridge Mall Road – The addition of project generated traffic to Cumulative baseline conditions would result in this intersection degrading to



- LOS E during the PM peak hour under Cumulative Plus Project Conditions. Operations at this intersection can be improved to LOS C by optimizing the traffic signal timing to adjust for forecast changes in PM peak hour volumes.
- Intersection 11: Hopyard Road/Stoneridge Drive – This intersection would operate at LOS F during the PM peak hour under Cumulative and Cumulative Plus Project conditions. Operations at the intersection can be improved to LOS E by optimizing traffic signal timing, but operations would not improve to within City of Pleasanton standards. Further mitigation was not identified due to the widening required and the presence of adjacent land uses abutting the intersection.
  - Intersection 13: Santa Rita Road/Stoneridge Drive – The addition of project generated traffic to Cumulative baseline conditions would result in this intersection degrading from LOS D to LOS E during the AM peak hour. During the PM peak hour, this intersection would operate at LOS E under both, Cumulative and Cumulative Plus Project conditions. Cumulative Plus Project AM peak hour operations at this intersection could be improved to LOS E by optimizing the traffic signal timing and modifying phasing. However, AM peak hour operations would not improve to within the City of Pleasanton’s standard with the modifications. PM peak hour operations at this intersection can be improved to LOS D by optimizing the traffic signal timing to adjust for forecast changes in volumes.
  - Intersection 15: Hopyard Road/I-580 EB Ramp – This intersection operated at LOS F during the PM peak hour under Cumulative and Cumulative Plus Project conditions. Operations at this intersection can be improved to LOS C by optimizing the traffic signal timing to adjust for forecast changes in PM peak hour volumes.
  - Intersection 21: Santa Rita Road/I-580 EB Ramp/Pimlico Drive – During the PM peak hour, this intersection operates under LOS F conditions within Cumulative and Cumulative Plus Project scenarios. Operations at this intersection can be improved to LOS D by optimizing the traffic signal timing to adjust for forecast changes in PM peak hour volumes.
  - Intersection 24: Santa Rita Road/Valley Avenue – This intersection operates at LOS E during the PM peak hour under Cumulative and Cumulative Plus Project conditions. Operations at this intersection can be improved to LOS D by optimizing the traffic signal timing to adjust for forecast changes in PM peak hour volumes.
  - Intersection 26: Valley Avenue & Busch Road – The addition of project generated traffic to Cumulative baseline conditions would result in this intersection degrading to LOS E during the AM peak hour under Cumulative Plus Project Conditions. Operations at this intersection can be improved to LOS C by optimizing the traffic signal timing to adjust for forecast changes in AM peak hour volumes.
  - Intersection 27: Bernal Avenue/Valley Avenue/Stanley Boulevard – This intersection operates at LOS E during the PM peak hour under Cumulative and Cumulative Plus Project conditions. However, this intersection is an exempted gateway intersection. Signal timing optimization and/or adjustments would not achieve an acceptable level of



- intersection operations. Further widening which would be contrary to City of Pleasanton's other multimodal policies and goals cannot be applied at this intersection.
- Intersection 28: Stanley Boulevard/El Charro Road – The addition of project generated traffic to Cumulative baseline conditions would result in this intersection degrading to LOS E during the AM peak hour under Cumulative Plus Project Conditions. However, this intersection is an exempted gateway intersection. Signal timing optimization and/or adjustments would not achieve an acceptable level of intersection operations. Further widening which would be contrary to City of Pleasanton's other multimodal policies and goals cannot be applied at this intersection.

## Conclusions

The results of this transportation assessment indicate that operations of most critical intersections surrounding the Housing Element Update Project sites would not appreciably change with the addition of project generated traffic. The intersections that would deteriorate and fall below the City of Pleasanton's LOS standard with the Project either have feasible mitigations to improve their operations or have been identified as exempt intersections in the City of Pleasanton's General Plan. However, conditions at several critical intersections would deteriorate below the city's standards and not be mitigatable, particularly in the Cumulative scenario.

The following intersections would experience an increase in delay of approximately 10 seconds with the inclusion of Project traffic under at least one of the scenarios analyzed.

- 3 Foothill Road/Dublin Canyon Road/Canyon Way
- 8 Stoneridge Drive/Stoneridge Mall Road
- 13 Santa Rita Road/Stoneridge Drive
- 23 Santa Rita Road/Old Santa Rita Road/Pickens Lane
- 24 Santa Rita Road/Valley Avenue
- 26 Valley Avenue/Busch Road
- 28 Stanley Boulevard/El Charro Road
- 30 Sunol Boulevard/Valley Avenue/Junipero Street

At many locations the increase in delay does not alter the total intersection LOS to an unacceptable level. Additionally, the addition of project traffic would accelerate the need to make intersection improvements identified in the City's Traffic Impact Fee Program.

With the addition of traffic associated with the Housing Element sites to existing traffic levels, four study intersections would operate below the city's LOS standards. These conditions could be remedied through signal timing changes, the implementation of TIF improvements and traffic signalization.



In the Existing plus Approved Projects scenarios, four study intersections were found to operate below the city's LOS standards. Appropriate improvements were identified for some, but not all these locations. The construction of the El Charro Road extension project would improve operations at many locations in the Existing plus Approved Project scenario, particularly those along the Santa Rita Road corridor.

In the Cumulative baseline scenario six study intersections were found to operate below the city's LOS standards. The addition of traffic associated with the Housing Element sites would result in an additional three failing intersections, with conditions degraded further at the six intersections operating poorly in the Cumulative baseline scenario. In all scenarios, the addition of project traffic would result in the exacerbation of existing queueing issues at some locations and the introduction of new queueing issues at additional intersections.

**Attachments:**

- Attachment A: LOS Calculation Worksheets
- Attachment B: 95<sup>th</sup> Percentile Queue Summary
- Attachment C: Queue Calculation Worksheets