City of Vista

TRAFFIC CONGESTION MANAGEMENT PLAN

JANUARY 2020

Prepared for:
City of Vista

Prepared By:

TABLE OF CONTENTS

Contents

List of Figures

List of Tables

Appendix

1.0 INTRODUCTION

This Traffic Congestion Management Plan (TCMP) was developed through a process that identifies, evaluates and responds to traffic congestion. This TCMP provides a detailed analysis of traffic congestion on major routes in the City of Vista based upon the analysis of current traffic data. This information provides an understanding of traffic congestion levels on Vista's major travel routes and secondly, identifies strategies and projects to address congested locations.

The City of Vista has a network of several arterial and major roadways, which are mainly oriented in a north-south direction. The major roadway network combined with many collector streets provides a good connection for City residents to access commercial and employment destinations within the City. State Route 78 is the only east-west freeway facility in North San Diego County. Within the City, Emerald Drive, N. Melrose Drive, Vista Village Drive, Civic Center Drive, Mar Vista Drive and Sycamore Avenue provide access to SR-78. **Figure 1** shows the existing major roadways within the City of Vista. Eight major streets were studied, identified by the City of Vista as corridors where traffic congestion is a concern. The corridors are:

1. E. Vista Way – between Civic Center Drive and Warmlands Avenue
2. Civic Center Drive – between Crestview Road and Vista Village Drive
3. Vista Village Drive – between Hacienda Drive and Civic Center Drive
4. N. Melrose Drive – between SR-78 and North Avenue
5. S. Melrose Drive - between Park Center Drive and SR-78
6. N. Santa Fe Avenue – between Main Street and North Coast Church driveway
7. Sycamore Avenue – between S. Melrose Drive and SR-78
8. Emerald Drive – between Hacienda Drive and Olive Avenue

The existing roadway characteristics for these eight routes are described in **Table 1**. The information includes the current number of lanes, the City's designated ultimate functional classification and number of lanes identified in the City's Circulation Plan, median type, presences of sidewalks, presence of bicycle lanes, and presence of on-street parking.

At the regional level, the roadway network picture is different. Freeway connections between the coastal areas and the northeastern inland areas are lacking. This leaves local roadways as the only transportation option for trips between areas as far north as Temecula to connect to the coast and I-5, and vice versa. The geographic location of the City of Vista approximately halfway between the I-15 and I-5 and the availability of north-south arterials makes major streets through Vista an attractive option for regional trips. This adds to the traffic volumes on the local roadways and contributes to congestion**. Figure 2** shows a map of the region.

The local traffic combined with regional trips through the City result in clearly discernible directional travel patterns, where most traffic is moving southbound in the morning and northbound in the afternoon and evening.

Figure 1 Vista Study Corridors

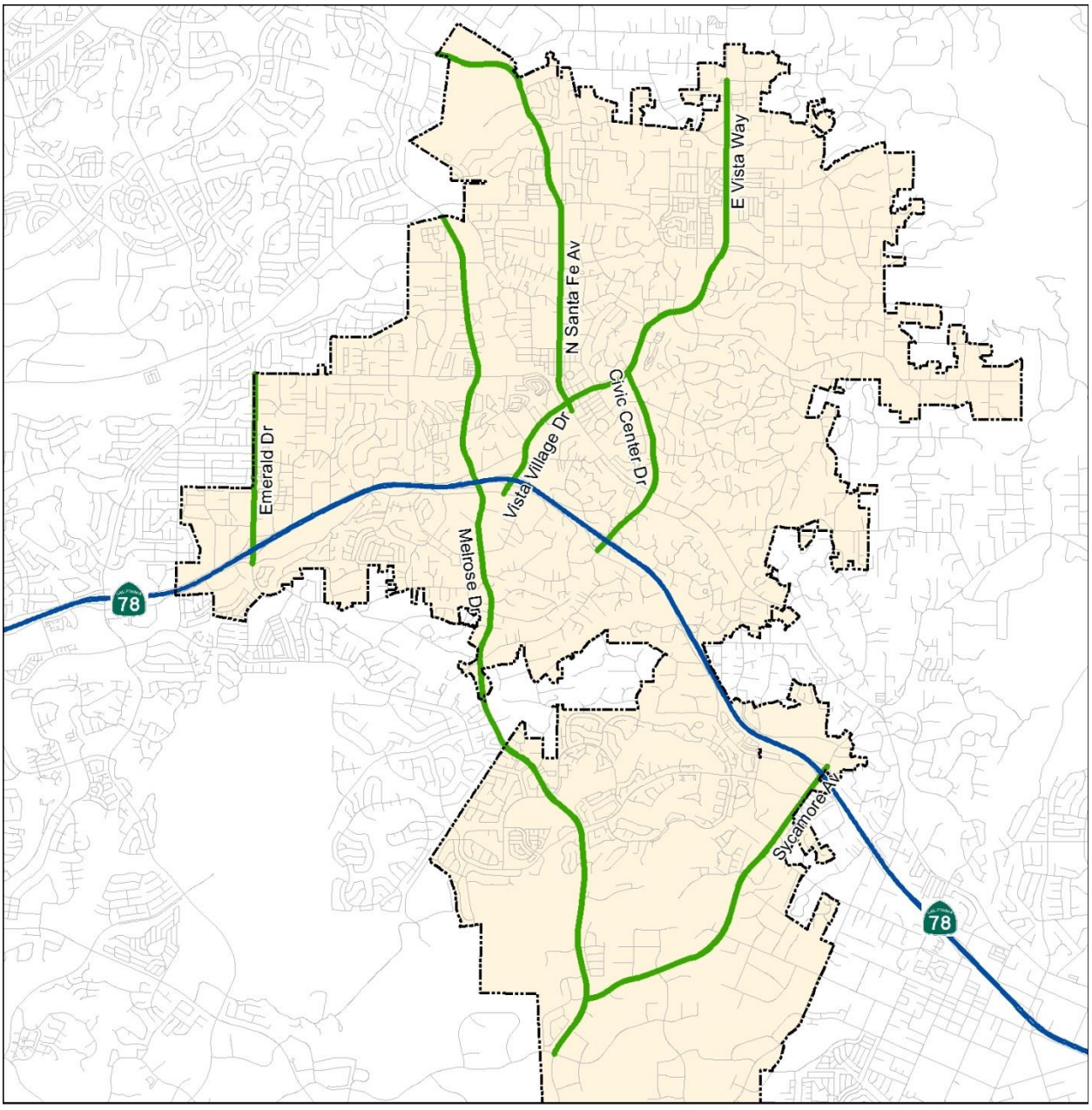


Figure 2 Vista Regional Location

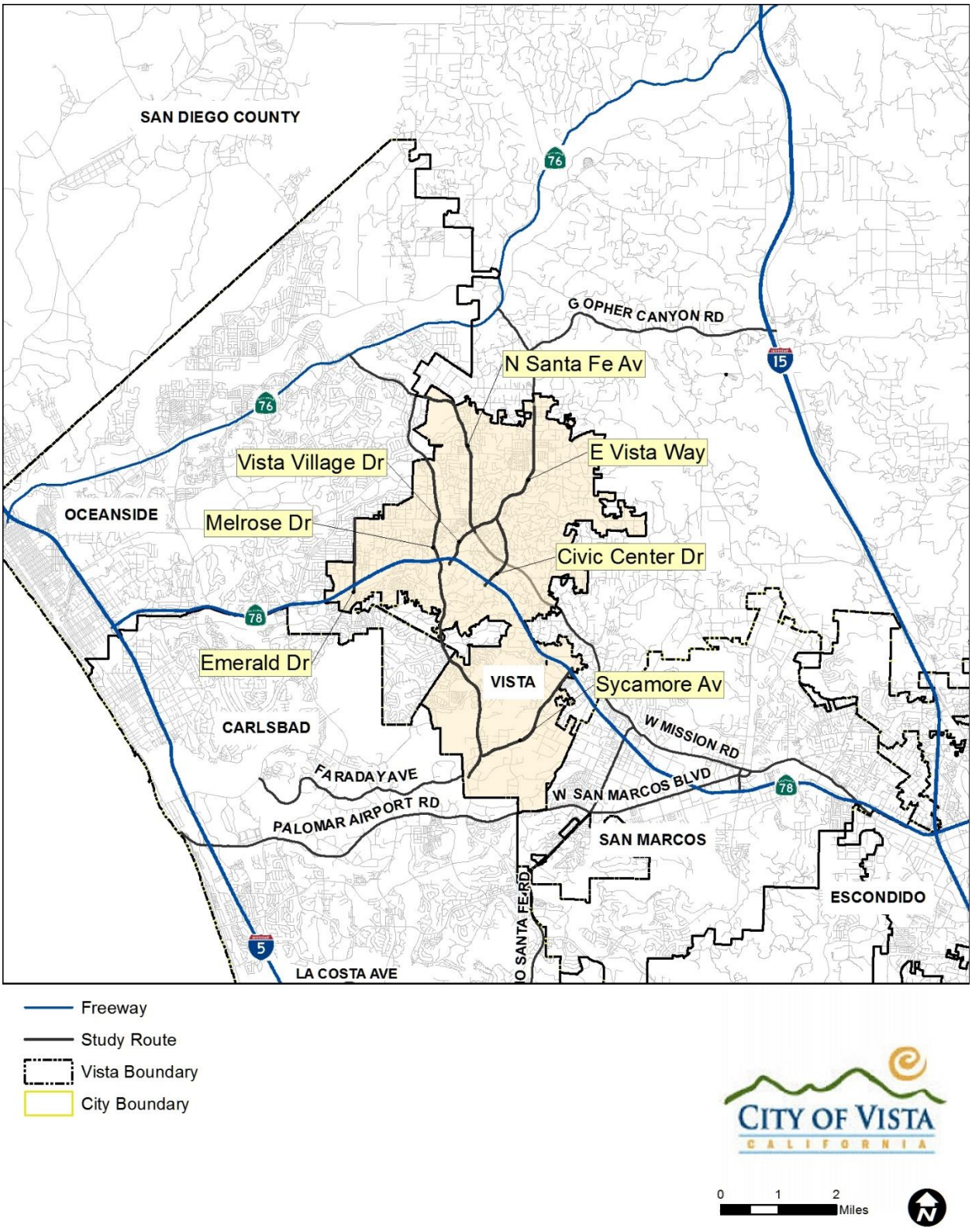


Table 1 Existing Roadway Characteristics

Roadway	From	To	# of Lanes	Functional Classification	Median	Sidewalks	Bicycle Lanes	On-Street Parking
E. Vista Way	Warmlands Avenue	E. Taylor Street	2	4 Major	N	N	N	N
	E. Taylor Street	Civic Center Drive	4	6 Major	TWLTL	Y	Y	Y
Civic Center Drive	E. Vista Way	Oceanview Drive	4	4 Major	TWLTL	Y	N	Y
	Oceanview Drive	SR-78 Ramps	4		Median	Y	N	N
Vista Village Drive	Civic Center Drive	N. Sante Fe Avenue	4	6 Major	Painted	Y	Y	N
	N. Sante Fe Ave	SR-78 Ramps	6		Median	Y	Y	N
N. Melrose Drive	Bobier Drive	W. Vista Way	6	6 Major	Painted	Y	Y	Y
S. Melrose Drive	Hacienda Drive	County Complex	6	6 Prime Arterial	Median	Y	Y	N
	County Complex	Breeze Hill Road	2 NB, 3 SB		Median	Y	N	N
	Breeze Hill Road	Sunset Drive	4		Painted	y	Y	N
	Sunset Drive	South of Sycamore	4	4 Major	Median	Y	Y	N
N. Santa Fe Avenue	Glenview Lane	Bobier Drive	2	4 Major	Painted	Y	Minimal	Minimal
	Bobier Drive	Cananea Street	4		Painted	Y	Y	N
	Cananea Street	Vista Village Drive	4		Median	Y	Y	N
Sycamore Avenue	SR-78 Ramps	Green Oak Road	6	6 Prime Arterial	Median	Y	N	N
	Green Oak Road	Business Park Road	2 NB, 3 SB		Median	Y	Y	N
	Business Park Road	Melrose Drive	4		Median	Y	Y	N
Emerald Drive	Olive Avenue	Borra Court	2	4 Collector	TWLTL	Y	N	N
	Borra Court	Galbar Street	2		None	Y	N	N
	Galbar Street	Date Street	2		Painted	Y	N	Y
	Date Street	West Street	4		Painted	Y	N	West Side
	West Street	Hacienda	6	6 Major	Painted	Y	N	N

2.0 CRITERIA

Traffic congestion is measured in a number of ways. The Highway Capacity Manual (HCM) provides the standards used to measure roadway operation. These standards include the following:

Travel Time

Travel time is a function of travel speed and distance. The 2010 HMC quantifies and describes the quality of traffic flow along arterials using travel speeds and assigning letter designating a level of service as described below. Travel speed is directly related to travel time, which to a driver, is a more meaningful parameter than speed. Therefore, travel time will be used in this report to describe congestion along the City's arterials. **For purposes of this analysis, a travel time along a roadway segment more than twice the base travel time will be considered as congested.**

Roadway Segment Level-of-Service

The 2010 HCM has developed level-of-service criteria based on the comparison of congested and free-flow travel speeds. Arterial level-of-service thresholds and descriptions based on the 2010 HCM are listed in **Table 2**. Travel time as detailed above will be used as the primary performance measure of congestion along roadway segments since it is more readily understood and recognizable by the non-professional transportation engineer or planner.

Table 2 Arterial Level of Service Criteria

Travel Speed as a Percentage of Base Speed	Level of Service	Congestion Duration
> 85	A	Not congested
>67-85	B	Not congested
>50-67	C	Brief period of congestion
>40-50	D	Congested for part of peak hour
>30-40	E	Congested much of peak hour
<30	F	Congested much of peak hour

Source: 2010 Highway Capacity Manual Exhibit 16-4

Intersection Level-of-Service

In accordance with the HCM, intersection level of service (LOS) is measured by calculating the average vehicle delay. The measure can be applied for the entire intersection and for individual movements (i.e. left turn, though, right turn) within each intersection. Average control delay is calculated using a volume-weighted average of all of the delays for all vehicles entering the intersection. Individual traffic movements are shown directly. The measure is typically computed for the heaviest traveled hour in the morning and the evening. This is measured in terms of seconds of delay. The LOS criteria are listed in **Table 3**.

The City's General Plan establishes LOS D as the threshold for acceptable operating conditions for intersections in the City of Vista. Intersections operating at LOS D or better (LOS A, B, or C) are considered to operate at acceptable levels of service. Intersections operating at LOS E or F are considered deficient.

The intersection level of service calculations provide a reasonable comparison of traffic performance, except when the intersection is saturated with traffic, such as when traffic is metered through a down-street intersection and backs up through the adjacent up-street intersection. In that

case, traffic is not moving through the intersection well, and traffic counts obtained during the peak hour show actual traffic movements less than the actual traffic demand. Consequently, the analysis then shows an acceptable level of service, when congestion actually exists. This condition is noted in Synchro, and will be reported in the results.

Table 3 Intersection Level of Service Criteria

Control Stopped Delay Per Vehicle (sec)	Level of Service (LOS) Characteristics
<10	LOS A describes operations with very low delay. This occurs when progression is extremely favorable, and most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
>10 – 20	LOS B describes operations with generally good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.
>20 – 35	LOS C describes operations with higher delays, which may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
>35 – 55	LOS D describes operations with high delay, resulting from some combination of unfavorable progression, long cycle lengths, or high volumes. The influence of congestion becomes more noticeable, and individual cycle failures are noticeable.
>55 - 80	LOS E is considered to be the limit of acceptable delay. Individual cycle failures are frequent occurrences.
>80	LOS F describes a condition of excessively high delay, considered unacceptable to most drivers. This condition often occurs when arrival flow rates exceed the capacity of the intersection. Poor progression and long cycle lengths may also be major contributing causes to such delay.

Source: 2000/2010 Highway Capacity Manual

Number of Stops

The level of congestion is also perceived based on the number of times a vehicle is made to stop along a corridor. Each stop and subsequent start increases the volume of emissions and fuel consumption and the amount of vehicle delay. The number of stops can be expressed as a ratio compared to the number of vehicles. While no criteria has been established that assigns a grade to the percentage of vehicles stopped, intersections that experience a higher ratio of stops to vehicles are indicative of traffic congestion.

Vehicle Queues

The length of vehicle queues can be perceived by motorists as an indication of traffic congestion. For example, when dedicated turn bays are insufficient in length to contain the number of vehicles wanting to turn, then the additional vehicles spill back into the through lane, blocking through traffic from moving through the intersection, contributing to longer queues and a perception of congestion. Also, motorists perceive an intersection is congested when through vehicle queues at a signal extend past the opening to a dedicated turn lane and block vehicles wanting to enter the turn lane.

3.0 EXISTING CONDITION ANALYSIS

KOA has utilized traffic data, including traffic counts, signal timings, and travel time data to measure the level of traffic congestion on City of Vista's major travel corridors.

Corridor Travel Times

Traffic operation for each corridor was evaluated during the morning and evening peak periods for both roadway travel directions using travel time as a performance measure as described in Section 2.0. Actual travel times on the corridors during the peak hours were obtained through the floating car method. This is a common method involving driving a corridor several runs in each direction during a peak travel period and averaging the travel time obtained from the various runs. Travel times were obtained for the various City corridors during the morning, midday, and evening peak periods.

Traffic operations for each corridor were evaluated during the morning and evening peak periods for both roadway travel directions. Listed below are the routes, by direction and time period that were identified as congested (LOS D or below), where peak travel times are twice or more of uncongested travel times. Congested a.m. corridors are listed in **Table 4**. Congested p.m. corridors are listed in **Table 5.**

Table 4 AM Congested Routes

Roadway	Direction	Segment	Travel Time (mins.)	Free-flow Time (mins.)	Distance	Speed	Percent of Free Flow Speed	LOS
Civic Center Drive	Northbound	SR-78 Ramps & E. Vista Way	4.8	2.1	1.4	17.0	44%	D
Vista Village Drive	Northbound	SR-78 Ramps & Civic Center Drive	4.5	1.8	1.2	15.9	40%	E
Vista Village Drive	Southbound	Civic Center Drive & SR-78	5.1	1.8	1.2	14.1	35%	E
S. Melrose Drive	Southbound	SR-78 Ramps & Sycamore Avenue	11.1	5.3	4.2	22.3	48%	D
N. Melrose Drive	Southbound	Oceanside Boulevard & SR-78 Ramps	5.2	2.2	1.5	17.5	42%	D
N. Santa Fe Avenue	Northbound	Vista Village Drive & North Coast Church	9.7	4.2	2.7	16.6	44%	D
N. Santa Fe Avenue	Southbound	North Coast Church & Vista Village Drive	9.5	4.2	2.7	17.0	44%	D
Emerald Drive	Southbound	Olive Drive & SR-78 EB Ramp	4.7	2.1	1.2	15.9	46%	D

Table 5 PM Congested Routes

Roadway	Direction	Segment	Travel Time (mins.)	Free-flow Time (mins.)	Distance	Speed	Percent of Free Flow Speed	LOS
Civic Center Drive	Northbound	SR-78 Ramps & E. Vista Way	4.7	2.1	1.4	17.5	46%	D
Civic Center Drive	Southbound	E. Vista Way & SR-78 Ramps	4.7	2.1	1.4	17.3	45%	D
Vista Village Drive	Northbound	SR-78 Ramps & Civic Center Drive	4.3	1.8	1.2	16.6	41%	D
Vista Village Drive	Southbound	Civic Center Drive & SR-78 Ramps	4.4	1.8	1.2	16.4	41%	D
N. Santa Fe Avenue	Southbound	North Coast Church & Vista Village Drive	9.5	4.2	2.7	17.0	44%	D

Congested individual segments between adjacent traffic signals, by direction and time period are listed in **Tables 6 and 7** for a.m. and p.m. peaks, respectively.

The detailed travel time data for each of the corridors is also shown in **Appendix A.**

Intersection Capacity Analysis

The operation of each signalized intersection was analyzed for each corridor both for the a.m. peak hour and for the p.m. peak hour. Information obtained included turning movement traffic counts, geometric information including the number of lanes and length of turns bays, and signal timings. The City of Vista employs separate coordination signal timing plan for the a.m. and p.m. peak periods. Using this information, the signalized intersections in each of the study corridors were evaluated using the traffic engineering program Synchro 10 to determine the average vehicle delay, level of service, and queue lengths in accordance with the HCM. Synchro's evaluation of coordination was also used to estimate the number of vehicle stops.

The intersection analysis is summarized in **Table 8**. This table presents the overall intersection level-of-service during the a.m. and p.m. peak hours. Also shown is the percentage of total vehicles entering the intersection that come to a complete stop. The maps depicting the level of service at the major intersections for each corridor are provided in **Appendix B**. The maps depicting the percentages of stops at the major intersections for each corridor are provided in **Appendix C**. Tables detailing the average vehicle delay and 95% queue lengths by individual turn movement are included in **Appendix D.** The peak hour turning movement count summary sheets are provided in **Appendix E**. The level-of-service Synchro worksheets for the existing conditions are provided in **Appendix F**.

Table 6 AM Congested Individual Corridor Segments

Roadway	Direction	Segment	Travel Time (sec)	Free-flow Time (sec)	Distance (ft)	Speed (mph)	Percent of Free Flow Speed	LOS
E. Vista Way	Northbound	Townsite Drive & Anza Avenue/ Vale Terrace Drive	42.7	19.9	1119	17.9	47%	D
E. Vista Way	Northbound	Oak Drive & E. Bobier Drive	55.7	27.6	1551	19.0	50%	D
E. Vista Way	Southbound	Palomar Place & E. Bobier Drive	98.3	40.3	2263	15.7	41%	D
E. Vista Way	Southbound	Williamston Street & Anza Avenue	49.3	11.9	670	9.3	24%	F
Civic Center Drive	Northbound	Crest View Road & SR-78 EB Ramp	10.3	2.9	127	8.4	28%	F
Civic Center Drive	Northbound	SR-78 WB Ramp & Phillips Street	58.7	9.9	369	4.3	17%	F
Civic Center Drive	Northbound	Natal Way/Postal Way & S. Santa Fe Avenue	39.3	14.5	542	9.4	37%	E
Civic Center Drive	Southbound	Natal Way/Postal Way & Pala Vista	37.0	14.3	534	9.8	39%	E
Civic Center Drive	Southbound	SR-78 WB Ramps & SR-78 EB Ramps	33.3	14.1	529	10.8	42%	E
Vista Village Drive	Northbound	Hacienda Drive & SR-78 EB Ramps	24.7	9.4	411	11.4	38%	E
Vista Village Drive	Northbound	SR-78 EB Ramps & SR-78 WB Ramps	27.7	9.5	416	10.3	34%	E
Vista Village Drive	Northbound	Olive Avenue & Santa Fe Avenue	15.0	5.2	227	10.3	35%	E
Vista Village Drive	Northbound	Citrus Avenue & Main Street/Palm Drive	14.7	7.3	320	14.9	50%	E
Vista Village Drive	Northbound	Main Street/Palm Drive & Civic Center Drive	70.0	19.5	853	8.3	28%	F
Vista Village Drive	Southbound	Civic Center Drive & Main Street/ Palm Drive	51.0	23.4	1023	13.7	46%	D
Vista Village Drive	Southbound	Main Street/Palm Drive & Citrus Avenue	16.0	7.3	320	15.0	46%	D
Vista Village Drive	Southbound	Citrus Avenue & Santa Fe Avenue	98.0	8.0	351	7.4	8%	F
Vista Village Drive	Southbound	Camino Patricia & W. Vista Way	60.7	29.3	1280	14.4	48%	D
N. Melrose Drive	Northbound	SR-78 EB Ramp & W. Vista Way	19.7	8.7	325	11.3	44%	D
N. Melrose Drive	Northbound	W. Los Angeles Drive & North Avenue	63.7	24.9	933	10.0	39%	E
N. Melrose Drive	Southbound	North Avenue & W. Los Angeles Drive	78.7	27.1	1012	8.8	34%	E
N. Melrose Drive	Southbound	Olive Avenue & Copper Drive	80.7	33.3	1246	10.5	41%	D
N. Melrose Drive	Southbound	Copper Drive & W. Vista Way	85.7	25.3	948	7.5	30%	F
S. Melrose Drive	Northbound	Oak Ridge Way & Sycamore Avenue	71.7	19.2	1314	12.5	27%	F
S. Melrose Drive	Northbound	Shadowridge Drive & Live Oak Road	69.0	24.2	1657	16.4	35%	E
S. Melrose Drive	Northbound	Live Oak Road & Buena Vista Drive	28.7	14.3	983	23.4	50%	D
S. Melrose Drive	Northbound	County Complex & Melrose Drive	21.0	8.8	602	19.5	42%	D
S. Melrose Drive	Northbound	Melrose Drive & Hacienda Drive	24.7	9.3	635	17.6	37%	E
S. Melrose Drive	Northbound	Hacienda Drive & SR-78 EB Ramp	15.3	3.2	220	9.8	21%	F
S. Melrose Drive	Southbound	Breeze Hill Road & Melrose Way	54.0	16.0	1095	13.8	30%	F
S. Melrose Drive	Southbound	Sunset Drive & Cannon Road	102.0	33.8	2317	15.5	33%	E
S. Melrose Drive	Southbound	Buena Vista Drive & Live Oak Road/ Longhorn Drive	36.3	13.7	940	17.6	38%	E
S. Melrose Drive	Southbound	Live Oak Road/Longhorn Drive & Shadowridge Drive	55.0	23.6	1619	20.1	43%	D
S. Melrose Drive	Southbound	Green Oak Road & Sycamore Avenue	126.7	53.4	3661	19.7	42%	D
S. Melrose Drive	Southbound	Oak Ridge Way & Park Center Drive	44.7	14.9	1020	15.6	33%	E

Table 6 AM Congested Individual Corridor Segments (continued)

Roadway	Direction	Segment	Travel Time (sec)	Free-flow Time (sec)	Distance (ft)	Speed (mph)	Percent of Free Flow Speed	LOS
N. Santa Fe Avenue	Northbound	Main Street & Vista Village Drive	51.3	8.0	450	6.0	16%	F
N. Santa Fe Avenue	Northbound	E. Orange Street & E. California Avenue	36.7	16.7	937	17.4	46%	D
N. Santa Fe Avenue	Northbound	E. California Avenue & W. Los Angeles Drive/Townsite Drive	55.7	26.0	1456	17.8	47%	D
N. Santa Fe Avenue	Northbound	Townsite Drive & East Drive	57.7	17.0	951	11.2	29%	F
N. Santa Fe Avenue	Northbound	East Drive & Cananea Street/ W. Indian Rock Road	73.7	22.0	1233	11.4	30%	F
N. Santa Fe Avenue	Northbound	CVS Pharmacy & E. Bobier Drive	66.0	9.8	551	5.7	15%	F
N. Santa Fe Avenue	Northbound	Museum Way & Osborne Street	53.3	25.6	1438	18.4	48%	D
N. Santa Fe Avenue	Southbound	Osborne Street & Museum Way	67.0	25.2	1411	14.4	38%	E
N. Santa Fe Avenue	Southbound	E. Bobier Drive & CVS Pharmacy	18.0	8.0	448	17.0	44%	D
N. Santa Fe Avenue	Southbound	CVS Pharmacy & Cananea Street/ W. Indian Rock Road	39.7	15.0	843	14.5	38%	E
N. Santa Fe Avenue	Southbound	East Drive & Townsite Drive	83.7	17.7	995	8.1	21%	F
N. Santa Fe Avenue	Southbound	E. Orange Street & Vista Village Drive	78.7	18.9	1063	9.2	24%	F
Sycamore Avenue	Northbound	SR-78 EB Ramps & SR-78 WB Ramps	19.3	3.2	178	6.3	16%	F
Sycamore Avenue	Southbound	SR-78 WB Ramps &SR-78 EB Ramps	22.0	4.7	266	8.2	22%	E
Emerald Drive	Northbound	SR-78 EB Ramps & SR-78 WB Ramps	25.0	10.7	465	12.7	43%	D
Emerald Drive	Northbound	SR-78 WB Ramps & W. Vista Way	14.3	4.4	191	9.1	31%	E
Emerald Drive	Southbound	Date Street & West Drive	139.7	27.3	1193	5.8	20%	F
Emerald Drive	Southbound	West Drive & W. Vista Way	20.0	9.3	404	13.8	46%	D

Table 7 PM Congested Individual Corridor Segments

Roadway	Direction	Segment	Travel Time (sec)	Free-flow Time (sec)	Distance (ft)	Speed (mph)	Percent of Free Flow Speed	LOS
E. Vista Way	Northbound	Oak Drive & E. Bobier Drive	58.0	28.0	1570	18.5	48%	D
E. Vista Way	Northbound	Palomar Place & Arcadia Avenue	29.7	11.9	668	15.4	40%	D
Civic Center Drive	Northbound	Crest View Rd. & SR-78 EB Ramps	7.0	2.5	110	10.7	36%	E
Civic Center Drive	Northbound	Railroad Crossing & Pala Vista Drive	20.7	8.6	376	12.1	42%	D
Civic Center Drive	Northbound	Natal Way/Postal Way & S. Santa Fe Avenue	47.3	12.3	538	7.7	26%	F
Civic Center Drive	Northbound	Alta Vista Drive & Vista Village Drive	24.0	11.8	514	14.6	49%	D
Civic Center Drive	Southbound	Crescent Drive & S. Santa Fe Avenue	78.7	36.7	1603	13.9	47%	D
Civic Center Drive	Southbound	S. Santa Fe Avenue & Natal Way/Postal Way	26.3	12.1	528	13.7	46%	D
Civic Center Drive	Southbound	Phillips Street & SR-78 WB Ramps	20.3	9.0	394	13.2	44%	D
Civic Center Drive	Southbound	SR-78 WB Ramps & SR-78 EB Ramps	35.3	12.1	529	10.2	34%	E
Vista Village Drive	Northbound	Hacienda Drive & SR-78 EB Ramps	42.0	9.7	425	6.9	23%	F
Vista Village Drive	Northbound	SR-78 EB Ramp & SR-78 WB Ramps	21.0	9.1	395	12.8	43%	D
Vista Village Drive	Northbound	SR-78 WB Ramps & Lado De Loma	25.7	12.7	554	14.7	49%	D
Vista Village Drive	Northbound	Lado De Loma Drive & W. Vista Way	23.0	10.7	466	13.8	46%	D
Vista Village Drive	Northbound	Main Street/Palm Drive & Civic Center Drive	38.7	19.2	838	14.8	50%	D
Vista Village Drive	Southbound	Citrus Avenue & Santa Fe Avenue	79.7	24.9	1086	9.3	31%	E
Vista Village Drive	Southbound	Olive Avenue & Camino Patricia	40.3	17.9	783	13.2	45%	E
N. Melrose Drive	Northbound	SR-78 & W. Vista Way	19.7	9.0	335	11.6	45%	D
S. Melrose Drive	Northbound	Jack in the Box & Hacienda Drive	40.0	9.1	625	10.7	23%	F
S. Melrose Drive	Northbound	Hacienda Drive & SR-78 EB Ramp	17.7	3.8	260	10.0	21%	F
S. Melrose Drive	Southbound	SR-78 EB Ramp & Hacienda Drive	25.0	3.5	238	6.5	14%	F
S. Melrose Drive	Southbound	Live Oak Road & Shadowridge Drive	50.3	25.3	1733	23.5	50%	D
N. Santa Fe Avenue	Northbound	Main Street & Vista Village Drive	40.3	8.8	495	8.4	22%	F
N. Santa Fe Avenue	Northbound	CVS Pharmacy & E. Bobier Drive	26.7	10.0	561	14.3	37%	E
N. Santa Fe Avenue	Southbound	Osborne Street & Museum Way	68.3	26.1	1467	14.6	38%	E
N. Santa Fe Avenue	Southbound	E. Bobier Drive & CVS Pharmacy	18.3	8.0	448	16.7	44%	D
N. Santa Fe Avenue	Southbound	CVS Pharmacy & W. Indian Rock Road	39.3	15.3	856	14.8	39%	E
N. Santa Fe Avenue	Southbound	East Drive & &wnsite Drive	83.3	17.3	973	8.0	21%	F
N. Santa Fe Avenue	Southbound	Townsite Drive & E. California Avenue	67.3	25.4	1423	14.4	38%	E
N. Santa Fe Avenue	Southbound	E Orange Street & Vista Village Drive	78.0	18.8	1052	9.2	24%	F
Sycamore Avenue	Northbound	Shadowridge Drive & Plumosa Avenue/ Thibodo Road	29.3	11.8	662	15.4	40%	E
Sycamore Avenue	Northbound	Plumosa Avenue/Thibodo Road & SR-78 EB Ramps	13.0	5.3	297	15.6	41%	D
Sycamore Avenue	Southbound	SR-78 EB Ramps & Plumosa Avenue/ Thibodo Road	16.0	7.5	420	17.9	47%	D
Emerald Drive	Northbound	Hacienda Drive & SR-78 EB Ramps	50.0	8.3	364	5.0	17%	F
Emerald Drive	Northbound	SR-78 EB Ramps & SR-78 WB Ramps	28.0	10.8	471	11.5	39%	E
Emerald Drive	Northbound	SR-78 WB Ramps & W. Vista Way	26.0	4.0	174	4.6	15%	F
Emerald Drive	Southbound	West Drive & W. Vista Way	38.3	9.5	413	7.3	25%	F
Emerald Drive	Southbound	W. Vista Way & SR-78 WB Ramps	21.7	5.5	242	7.6	26%	F

Table 8 Intersection Evaluation (Corridors 1-5)

Roadway	Intersection	2018 Existing					
		AM Peak Hour			PM Peak Hour		
		Delay (sec)	LOS	Stop %	Delay (sec)	LOS	Stop %
E. Vista Way	Warmlands Avenue	19.2	B	57%	10.9	B	46%
	Taylor Street	20.3	C	46%	14.5	B	40%
	Arcadia Avenue	8.1	A	20%	8.6	A	32%
	E. Cascade Drive & Palomar Place	18.9	B	40%	7.0	A	26%
	E. Bobier Drive & Foothill Drive	40.9	D	73%	34.6	C	68%
	Oak Drive	4.5	A	20%	16.2	B	40%
	Williamston Street	24.4	C	25%	18.5	B	37%
	Vale Terrace Drive & Anza Avenue	20.7	C	69%	20.8	C	63%
	Townsite Drive	36.2	D	48%	10.2	B	53%
	Civic Center Drive & Hillside Terrace	22.9	C	55%	48.1	D	67%
Civic Center Drive	Alta Vista Drive	13.0	B	28%	129.2	F	31%
	Eucalyptus Avenue	59.5	E	57%	28.5	C	67%
	Crescent Drive	8.2	A	45%	7.7	A	43%
	S. Santa Fe Avenue	50.3	D	84%	40.0	D	79%
	Natal Way & Postal Way	17.3	B	70%	11.5	B	51%
	Pala Vista Drive	17.6	B	40%	8.1	A	15%
	Phillips Street	10.6	B	33%	34.0	C	41%
	SR-78 WB	16.9	B	25%	27.1	C	64%
	SR-78 EB	159.2	F	17%	98.4	F	30%
	Seaview Place & Crest View Road	47.9	D	55%	51.9	D	54%
Vista Village Drive	Palm Drive & Main Street	6.2	A	31%	8.1	A	46%
	Citrus Avenue	8.7	A	27%	21.3	C	17%
	N. Santa Fe Avenue	49.1	D	77%	42.6	D	79%
	Olive Avenue	9.4	A	24%	8.2	A	21%
	Camino Patricia/Wave Drive	24.0	C	34%	24.0	C	38%
	W. Vista Way	40.3	D	65%	29.5	C	54%
	Lado De Loma Drive	19.2	B	33%	25.7	C	63%
	SR-78 WB	35.2	D	27%	98.9	F	55%
	SR-78 EB	34.6	C	43%	52.2	D	52%
	Hacienda Drive	27.9	C	44%	32.6	C	65%
Melrose Drive	North Avenue	50.1	D	77%	40.0	D	75%
	W. Los Angeles Drive	7.0	A	33%	4.5	A	16%
	Highland Drive	4.0	A	22%	5.0	A	14%
	Olive Avenue	56.5	E	74%	40.7	D	52%
	Copper Drive	26.3	C	61%	25.6	C	81%
	W. Vista Way	63.1	E	69%	57.8	E	73%
	SR-78 EB OFF	9.6	A	21%	16.2	B	42%
	Hacienda Drive	45.7	D	68%	44.3	D	65%
	Breeze Hill Community Center	6.0	A	50%	8.0	A	45%
	County Complex	12.0	B	14%	8.0	A	23%

Table 8 Intersection Evaluation, continued (Corridors 5-8)

Roadway	Intersection	2018 Existing					
		AM Peak Hour			PM Peak Hour		
		Delay (sec)	LOS	Stop %	Delay (sec)	LOS	Stop %
Melrose Drive	Breeze Hill Drive & Matagual Drive	10.8	B	14%	20.2	C	23%
	Melrose Way	17.4	B	67%	3.9	A	17%
	S. Sunset Drive	56.6	E	62%	27.6	C	41%
	Canon Road	35.1	D	66%	49.7	D	81%
	Buena Vista Drive	16.8	B	68%	25.2	C	47%
	Longhorn Drive & Live Oak Road	18.8	B	59%	12.3	B	36%
	Shadowridge Drive	60.3	E	74%	88.7	F	67%
	Green Oak Road	5.4	A	35%	2	A	45%
	Sycamore Avenue	116.6	F	75%	66.3	E	69%
	Oak Ridge Way	2.5	A	62%	4.8	A	32%
	Park Center Drive	60	E	64%	42.5	D	79%
N. Santa Fe Avenue	Osborne Street	72.6	E	69%	210.7	F	61%
	Museum Way	46.1	D	57%	11.6	B	48%
	Taylor Street	145.0	F	69%	44.4	D	74%
	Bobier Drive	94.5	F	74%	43.6	D	71%
	Autozone	8.5	A	40%	13.7	B	60%
	Indian Rock Road	11.2	B	51%	20.8	C	58%
	East Drive	23.3	C	29%	40.2	D	61%
	Los Angeles Drive	31.4	C	65%	31.8	C	65%
	California Avenue	46.2	D	35%	52.1	D	49%
	Orange Street	12.7	B	34%	22.1	C	57%
	Vista Village Drive	42.8	D	76%	133.0	F	74%
	Main Street	21.1	C	51%	21.4	C	45%
Sycamore Avenue	SR-78 WB	36.4	D	62%	49.3	D	62%
	SR-78 EB	29.7	C	46%	14.1	B	46%
	Thibodo Road & Plumosa Avenue	6.7	A	69%	9.8	A	58%
	Shadowridge Drive	11.4	B	73%	15.8	B	31%
	Watson Way & Hibiscus Avenue	20.5	C	36%	35.6	D	70%
	Green Oak Road	13.3	B	28%	5.3	A	30%
	Grand Avenue	5.4	A	36%	8.2	A	28%
	La Mirada Avenue	92.5	F	41%	53.1	D	65%
	Business Park Drive	24.1	C	65%	35.5	D	68%
Emerald Drive	West Drive	25.4	C	56%	25.7	C	49%
	W. Vista Way	28.8	C	63%	44.3	D	57%
	SR-78 WB	49.7	D	69%	50.4	D	37%
	SR-78 EB OFF/ON	86.0	F	50%	118.0	F	45%
	Hacienda Drive	37.3	D	49%	48.9	D	63%

Vehicle Stops

Because driver perception of congestion often comes from feelings of being stopped in traffic, the numbers of vehicle stops were extracted from the Synchro LOS analysis. This measure provides an indication of where traffic congestion may be perceived to be greatest. **Table 9** shows intersections with 70% or more of vehicles stopping at them during either of the a.m. or p.m. peak periods.

Table 9 Vehicle Stops

Roadway	Intersection	AM Peak Hour Stop %	PM Peak Hour Stop %
E. Vista Way	E. Bobier Drive/Foothill Drive	73%	68%
Civic Center Drive	S. Santa Fe Avenue	84%	79%
	Natal Way/Postal Way	70%	51%
Vista Village Drive	N. Santa Fe Avenue	77%	79%
Melrose Drive	North Avenue	77%	75%
	Olive Avenue	74%	52%
	Copper Drive	61%	81%
	W. Vista Way	69%	73%
	Canon Drive	66%	81%
	Shadowridge Drive	74%	67%
	Sycamore Avenue	75%	69%
	Park Center Drive	64%	79%
N. Santa Fe Avenue	Taylor Street	69%	74%
	Bobier Drive	74%	71%
	Vista Village Drive	76%	74%
Sycamore Avenue	Shadowridge Drive	73%	31%
	Watson Way & Hibiscus Avenue	36%	70%

4.0 DESCRIPTION OF ANALYSIS RESULTS

Section 1.0 describes the City's major roadway network and travel patterns. The local traffic combined with regional trips through the City result in clearly discernible directional travel patterns, where most traffic is moving southbound in the morning and northbound in the afternoon and evening.

The review of the existing conditions for the eight corridors provides a large amount of information about traffic operations. Three main performance measures were selected to be used in the discussion below to describe the traffic conditions on the City's arterials as explained in detail in Section 3.0 These parameters are the most representative of intersection operation and actual driving conditions that a driver may experience along an arterial. The travel time data from **Tables 6 and 7** in Section 3.0 shows that travel times are significantly increased (more than twice the base travel time) on some segments in both directions in all eight corridors during both peak hour periods. On these corridors, more than half the traffic can expect to come to a vehicle stop at more than half of the intersections during one or both of the peak hours. Motorists can expect frequent stops while driving at about half the speed they might experience during non-peak periods.

Level of Service (LOS) is the next performance parameter used in describing the operation of the City's major roadway network. The City of Vista criteria for analysis of traffic impacts generated by new development define a LOS D or better as acceptable and LOS E or worse as needing improvement. Accordingly, and as shown in **Table 8** in Section 3.0, 14 intersections in the a.m. peak hour and 9 in the p.m. peak hour were identified as congested. A more detailed review of the intersection capacity results also show that most through movements at intersections along the major arterials operate at LOS D or better because signals are timed to promote through traffic movements. Delays tend to be higher for left turning movements and movements from side streets onto the main arterial routes because of the preference given to straight through movements on the arterials.

The third metric used to describe the conditions on the major streets is the number of vehicle stops. From **Table 7** in Section 3.0, 70 percent of the vehicles were estimated to stop while waiting for a green signal at 12 intersections during the a.m. peak. During the p.m. peak hour, 11 intersections experienced a similar level of stops.

To more easily present the existing traffic flow conditions as defined by the three performance measures described above, the three measures were combined into a single composite map for each commuter peak**. Figures 3 and 4** graphically represent these performance measures in the a.m. and p.m. commute peak hours, showing the travel time results at the corridor level, respectively. The figures show congested routes where the travel time doubled or more from the free flow travel time. They also show intersections operating at LOS E or F. **Figures 5 and 6** graphically represent these performance measures in the a.m. and p.m. commuter peak hours, showing the travel time results at the segment level.

Individual Corridor Results

A brief description of the assessment results by corridor is provided below:

1. E. Vista Way – between Civic Center Drive and Warmlands Avenue

- Travel times are more than twice the free flow speed on four corridor segments during the morning peak hour and on three segments during the evening peak hour and contribute to the perceptions of congestion.

- Ten signalized intersections operate at LOS D or better during the a.m. and p.m. peak hours

- The analysis shows lengthy queues and a high number of stops southbound in the morning between Williamston Street and Civic Center Drive. The high number of vehicle stops is a result of heavy peak hour through traffic volumes, heavy side street volumes and heavy pedestrian volumes.

2. Civic Center Drive – between Crestview Road and Vista Village Drive

- Travel times are more than twice the free flow speed in the northbound direction during the morning peak period and in both directions during the evening peak period and contribute to the perceptions of congestion.

- The intersection at Seaview Place/Crest View Road operates at LOS F during both the a.m. and p.m. peak hours and the SR 78 Eastbound Ramp operates at LOS E during the p.m. peak hour. The operation at these intersections is complex requiring serving each leg of the intersections separately, which is the least efficient method of phasing signal operation.

- There is a high percentage of stops at S. Santa Fe Avenue, with higher numbers of stops for southbound through in the a.m. peak hour and on all four approaches in the p.m. peak hour. This is the intersection of two major streets carrying heavy vehicle and pedestrian traffic.

- There is a high percentage of vehicle stops at Natal Way and at Postal Way during the morning, mainly from the heavy southbound through movement.

- Long queues form on the westbound exit ramp from SR-78 to turn right onto Civic Center Drive during the evening peak period. The heavy northbound traffic flow during the evening peak hour contributes to traffic queues between S. Santa Fe Avenue and SR 78. The numerous driveways in this section also contribute to traffic friction and slower speeds. The reverse pattern is true during the morning peak hour when southbound traffic queues between SR 78 and S. Santa Fe Avenue. When the railroad crossing arms are activated by the Sprinter, traffic queues in both directions during both peak periods.

3. Vista Village Drive – between Hacienda Drive and Civic Center Drive

- Travel times are more than twice the free flow speed in both directions during both the morning peak period and during the evening peak period and contribute to the perceptions of congestion.

- Ten signalized intersections operate at LOS D or better during the a.m. and nine during the p.m. peak hours

- During the a.m. peak, the higher traffic volumes are southbound. This leads to a high number of stops for southbound through traffic at N. Santa Fe Avenue and Vista Village Drive. There is also a long queue for southbound right turns from N. Santa Fe Avenue to Vista Village Drive during the a.m. peak hour. The railroad pre-emptions every half hour and high pedestrian volumes impact the operation of this intersection.

- During the p.m. peak hour, there is a high percentage of stops at the intersection with N. Sana Fe Avenue. The stops occur for both northbound and southbound through movements, and to a lesser extent to the other movements. High traffic volumes and railroad pre-

emptions every half hour impact the operation of this intersection.

4. N. Melrose Drive – between SR-78 and North Avenue

- Travel times are more than twice the free flow speed in both directions on four corridor segments during the morning peak period and contribute to the perceptions of congestion.

- The intersections at Olive Avenue and at W. Vista Way operate at LOS E during the a.m. and p.m. peak hours. The highest delay is for the southbound movements. The other four signalized intersections operate at LOS D or better during the a.m. and p.m. peak hours.

- During the a.m. peak hour, the longer traffic queues and higher percentages of stops occur for southbound movements at North Avenue and Olive Avenue. Maryland Elementary School traffic has a significant impact on the operation on the North Avenue intersection. Olive Avenue has high vehicle volumes and high pedestrian traffic. There are also delays for southbound left turns at Copper Drive and W. Vista Way.

- The northbound traffic on N. Melrose is heavy in the p.m. peak. During the p.m. peak hour, there are a high number of stops at North Avenue, Copper Drive, and W. Vista Way, with the highest number of stops occurring on the southbound through movement.

5. S. Melrose Drive - between Park Center Drive and SR-78

- Travel times are more than twice the free flow speed in both directions on eight corridor segments during the morning peak period and contribute to the perceptions of congestion.

- Of the fifteen intersections in this corridor, during the a.m. peak hour, Hacienda Drive, Sunset Drive, Shadowridge Drive, and Faraday Street/Park Center Drive operate at LOS E, and Sycamore Avenue operates at LOS F. The intersection of Sunset Drive has high side street volumes. The intersection of S. Melrose Drive and Sycamore Avenue has high southbound through and westbound left turn movements resulting in one of the highest vehicle delays in the City of Vista. At Faraday Avenue/Park Center Drive, there are high southbound volumes, including a high southbound right turn movement (over 1,000 vehicles). This appears to be a movement through Vista that uses Sycamore Avenue to S. Melrose Drive to Faraday Avenue in Carlsbad.

- During the p.m. peak hour, the intersection of S. Melrose Drive and Sycamore Avenue operates at LOS E. Sycamore Avenue has a high northbound volume during the p.m. peak hour. Shadowridge Drive operates at level of service F. The northbound traffic volumes are very heavy in the p.m. peak. This combines with heavy volumes from Sycamore Avenue and from Shadowridge Drive, as well as heavy left turns from S. Melrose Drive, to result in failing levels of service at these two intersections.

- There are a high number of stops for the southbound through movement during the a.m. peak hour at Shadowridge Drive and at Sycamore Avenue.

6. N. Santa Fe Avenue – between Main Street and North Coast Church driveway

- Travel times are more than twice the free flow speed in both directions on seven corridor segments during the morning peak period and five corridor segments during the evening peak hour.

- Three of the 12 intersections operate at LOS E or F during the a.m. peak hour, and two intersections operating at LOS F during the p.m. peak hour. The three intersections are at Osborne Street, Taylor Street, and Bobier Drive. N. Santa Fe Avenue and Taylor Street during the a.m. peak hour is the most congested intersection in Vista. The delay for the southbound through movement is a LOS F, and the northbound through movement is at LOS F also. Guajome Park Academy school traffic substantially contributes to this delay.

- There is a high percentage of vehicle stops at Taylor Street, Bobier Drive, and Vista Village Drive (a.m. and p.m.). Factors could include the traffic associated with the multitude of schools along N. Santa Fe Avenue, substantial pedestrian volumes and high vehicle volumes entering the signalized intersections from the side streets.

- Two other movements experiencing high vehicle delay are the westbound and southbound left turns at Bobier Drive during the a.m. peak hour.

7. Sycamore Avenue – between S. Melrose Drive and SR-78

- Travel times are more than twice the free flow speed in both directions on three corridor segments during the morning peak period and two corridor segments during the evening peak hour.

- The ten signalized intersections along Sycamore Avenue operate at LOS D or better during the a.m. peak hour and nine operate at LOS D or better during the p.m. peak hour.

- During the a.m. peak hour, high traffic volumes move on Sycamore Avenue from SR-78 to the Vista industrial park, added to regional traffic that travels to locations southeast of the City. During this time, a high percentage of vehicle stops occur in the southbound direction at Shadowridge Drive because of the high traffic volumes coming from Shadowridge Drive.

- During the p.m. peak hour, traffic from the Vista industrial park combines with regional traffic from southwest of the City uses Sycamore Avenue to access SR-78. The result of this is traffic congestion.

8. Emerald Drive – between Hacienda Drive and Olive Avenue

- Travel times are more than twice the free flow speed in both directions on two corridor segments during the morning peak period and two corridor segments during the evening peak hour and.

- Of the seven signalized intersections in this corridor, SR-78 EB ramps operate at LOS F in the a.m. peak hour and in the p.m. peak hour. The highest delay occurs for the southbound left turn to the eastbound on ramp.

- During the a.m. peak hour, the right turn from the SR-78 WB off ramp operates at LOS F and forms an extensive queue.

- During the p.m. peak hour, the left turn from the SR-78 EB off ramp and right turn from the SR-78 WB off ramp operate at LOS F and both movements form extensive queues.

- On this segment of Emerald Drive, there are five closely spaced intersections without sufficient storage space for stopped vehicles. This requires a very complex signal operation

to synchronize the five signals and minimize traffic backing up through the intersections. This results in inefficiencies in the signal phasing and timing and leads to congestion in the peaks.

Figure 3 AM Congestion Composite

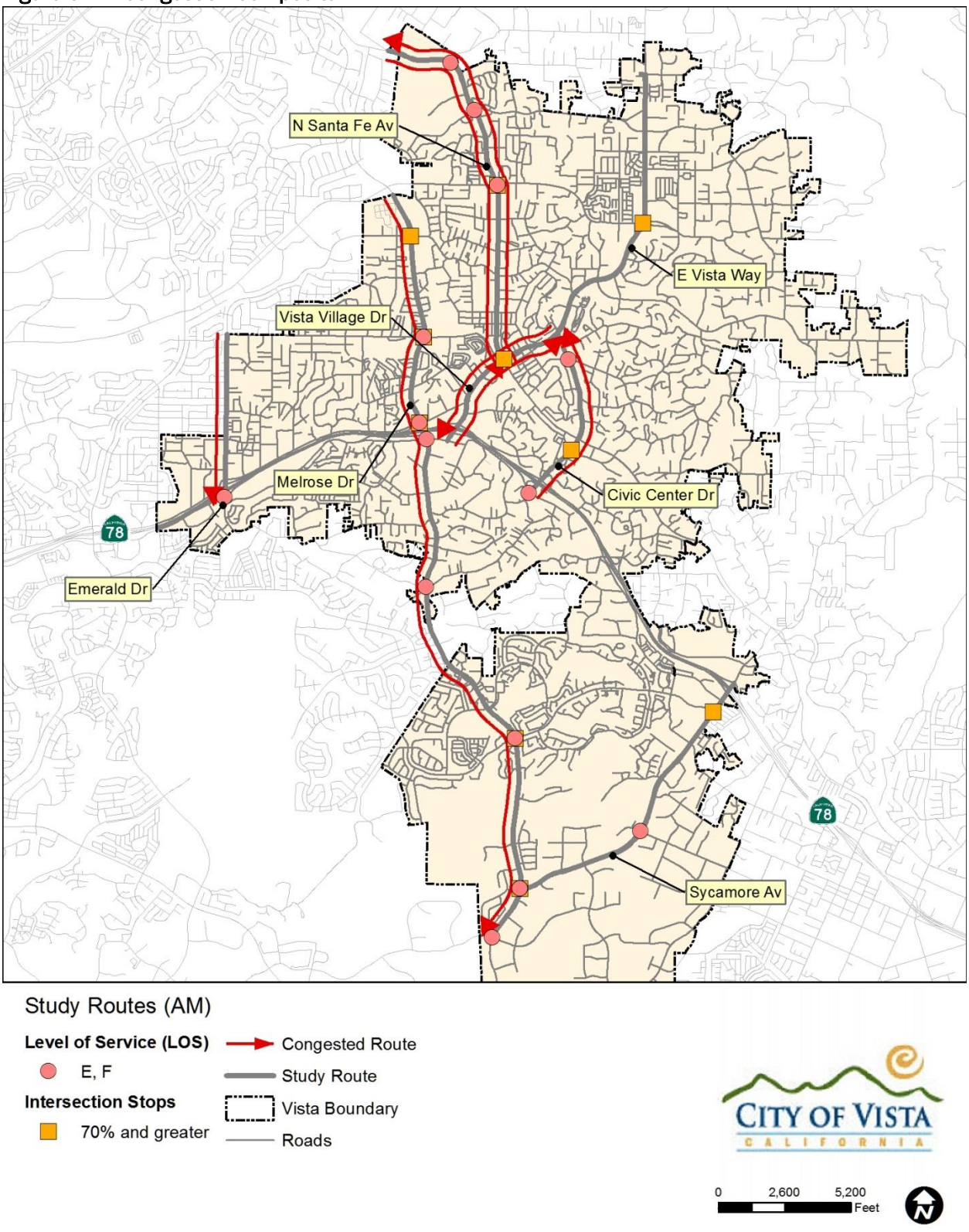


Figure 4 PM Congestion Composite

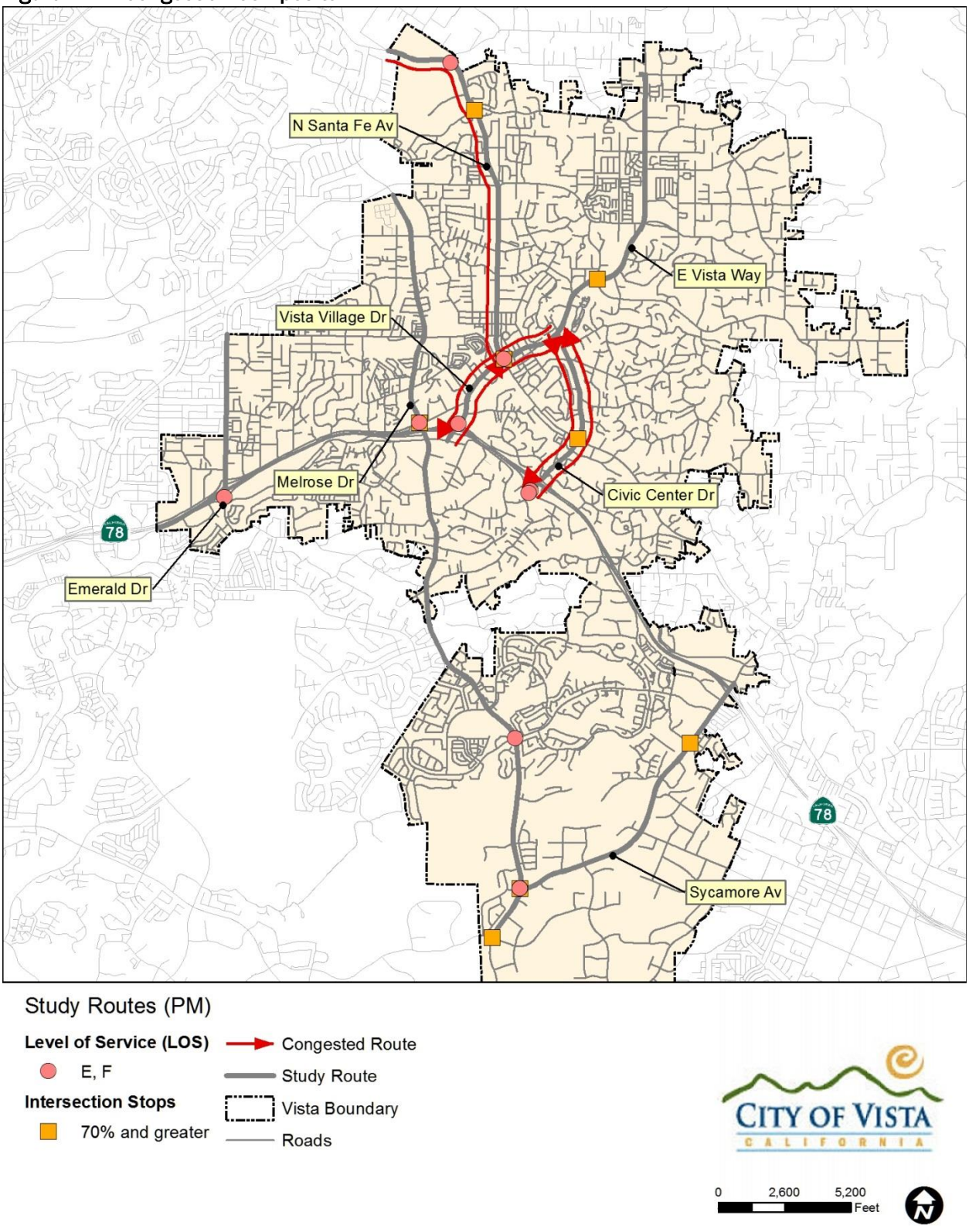


Figure 5 AM Congested Segments

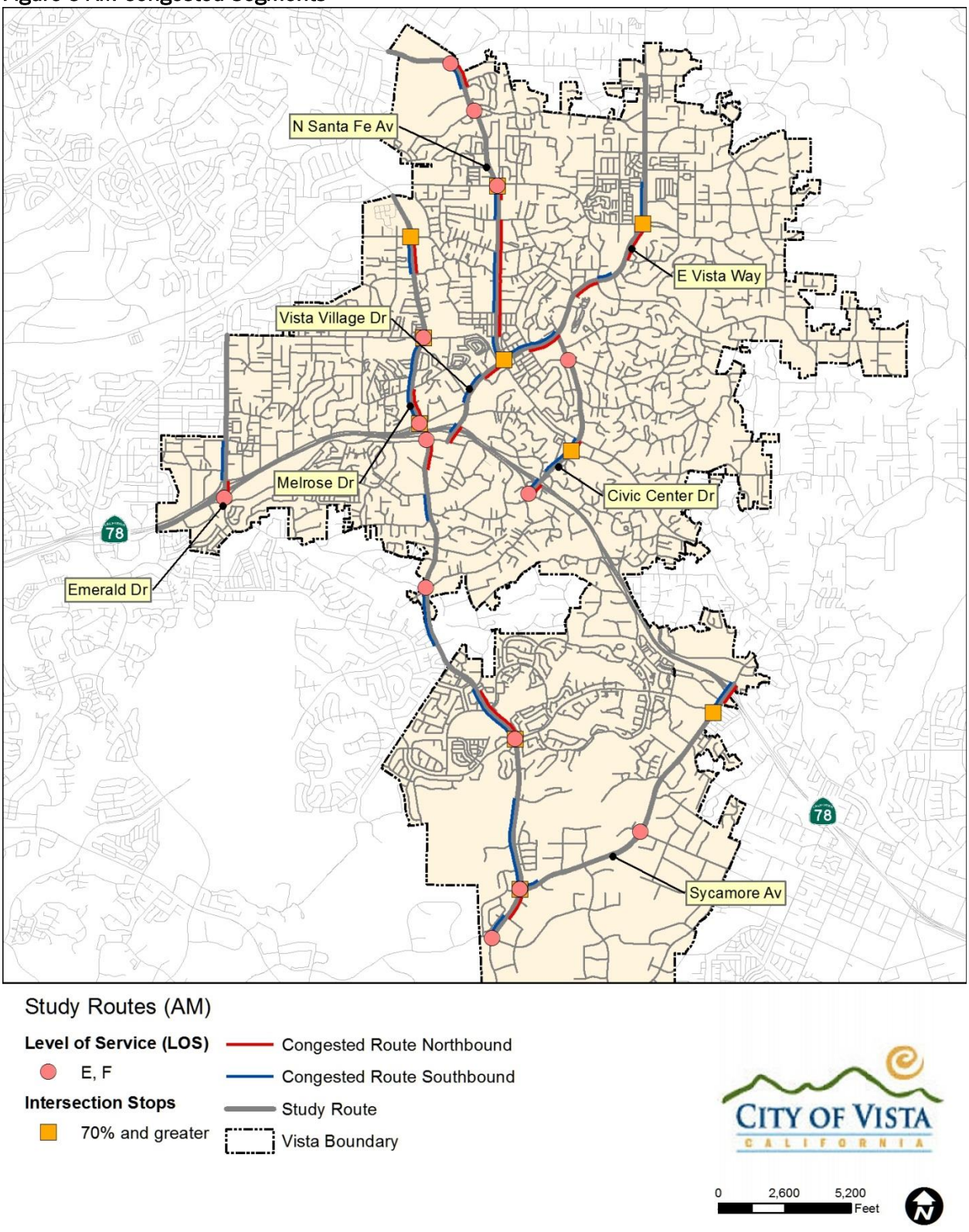
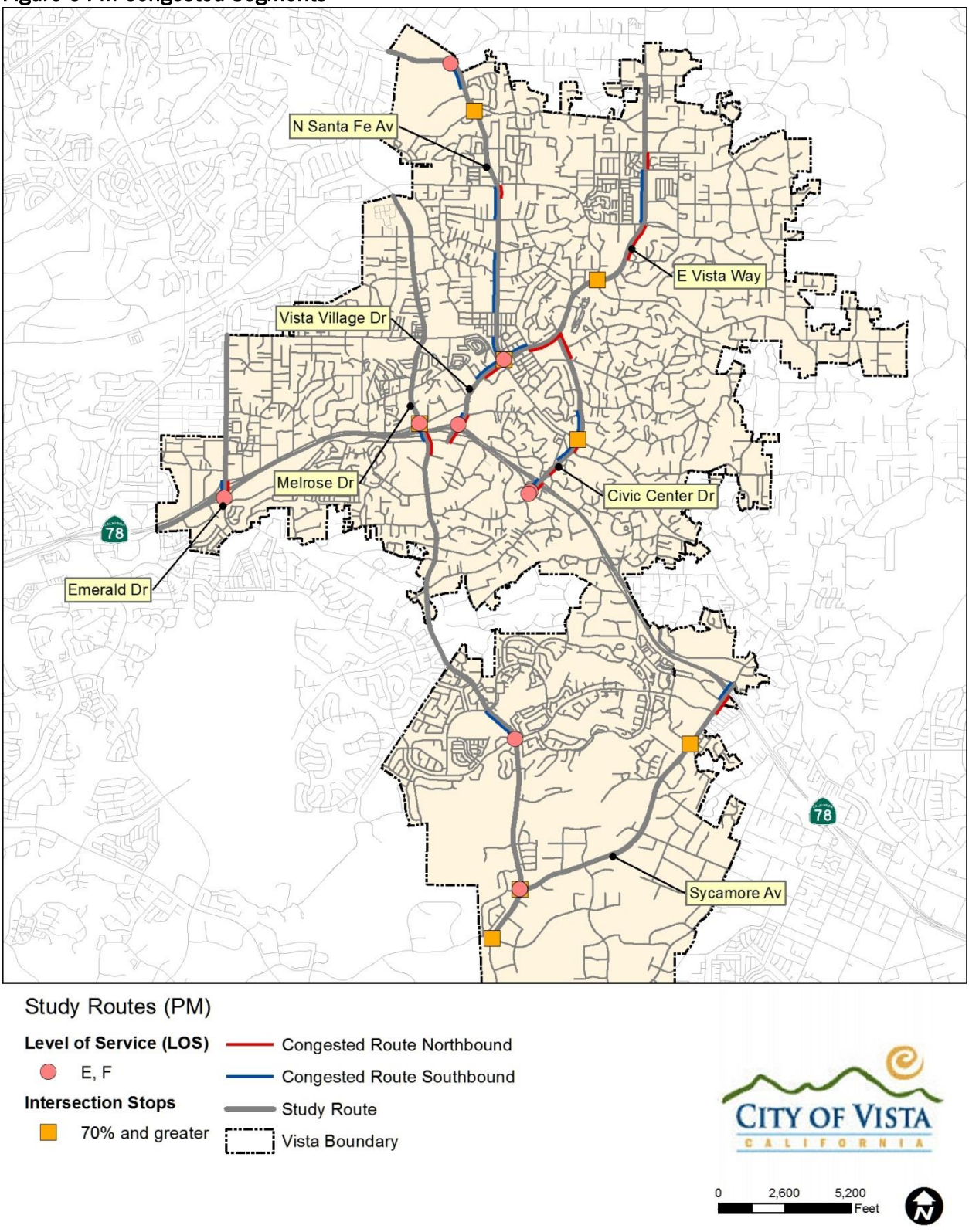


Figure 6 PM Congested Segments



5.0 ONGOING TRAFFIC CONGESTION MANAGEMENT ACTIVITIES

City staff has implemented many projects to help mitigate some of the traffic congestion on City roadways. Some of these improvements include signal timing modifications, signal timing coordination of various corridors and restriping to accommodate additional turn lanes.

The following provides a brief description of recently completed and ongoing traffic congestion management projects:

Completed Projects

1. Downtown Intersection Improvements: This project includes improvements at three intersections and has recently been completed at a cost of approximately $500,000. Under this project, the following improvements were made:

a) Civic Center Drive at Eucalyptus Avenue: Restripe the lane assignment for an exclusive eastbound right turn lane.

b) Civic Center Drive at Vista Village Drive: Widen to add a second northbound left turn lane.

c) Vista Village Drive at N. Santa Fe Avenue: Relocate existing median to add a second southbound left turn lane.

2. Vista Village Drive at N. Santa Fe Avenue: Restripe to add a third through lane for westbound traffic.

3. S. Melrose Drive at Sycamore Avenue: Restripe the lane assignment to add a third left turn lane for westbound traffic.

4. N. Melrose Drive at W. Vista Way: Widen and restripe to add a third southbound through lane and an exclusive right turn lane.

5. N. Melrose Drive at W. Vista Way: Restripe to add a third northbound through lane.

6. N. Melrose Drive between W. Vista Way and Bobier Drive: Restripe to add a third through lane in both directions.

7. E. Vista Way between Civic Center Drive and Williamston Street: Restripe to add a third northbound through lane.

8. Civic Center Drive between Railroad Tracks and Phillips Street: Widen to add a third southbound though lane.

9. Traffic Signal Timing: Maintaining and updating signal timing for individual intersections and corridors is a task carried out by staff on a continuous basis. Changes to the various timing parameters at individual intersections are regularly made to correspond with changing traffic conditions and patterns as well as in response to requests from the public.

Ongoing Projects

1. **Civic Center Drive at Postal Way:** Similar to Civic Center Drive at S. Santa Fe Avenue, right turn at this intersection impede through traffic. This project would also install a right turn lane for northbound traffic.

2. **E. Vista Way at Bobier Drive/Foothill Drive:** Install second left turn lanes for eastbound and westbound traffic (on Bobier Drive and on Foothill Drive) to accommodate high traffic volumes. A developer will widen and install the left turn lanes.

3. **Traffic Signal Interconnect Upgrade South:** This $1.2M project with an 870,000 grant will upgrade signal controllers, improve continually malfunctioning signal communications and install 16 CCTV (Closed Circuit Television) cameras for 48 traffic signals in the southern part of the City. This project will allow staff to monitor traffic and make timing changes from the office, which greatly saves on the limited staff time. The project is currently in design.

4. **Traffic Signal Interconnect Upgrade North:** This project will upgrade the existing traffic signal and communications equipment in the northern half of the City to state of the art technology with a $710,200 grant and an equal amount in City matching funds. This project grant with an equal City match for this project.

5. **Vista Village at N. Santa Fe; Vista Village at Olive; and N. Santa Fe at Main Street:** Operate three existing traffic signals at these three closely spaced intersections with one traffic signal controller. This will allow for better management of the interaction between these intersections as well as with the SPRINTER crossing. This project is included in the Traffic Signal Interconnect Upgrade North Project and is 50% funded with the same grant.

6. **Traffic Measurement System:** This is a system that is implemented to monitor congestion, quantify performance measures and conduct origin destination studies on vehicle trips. The cost for this system is approximately $105,000.

6.0 IMPROVEMENT PROJECTS

Physical Improvement Projects

A number of intersections and roadway segments were identified in Chapter 4 as being congested. Possible congestion relief strategies were identified for those locations. Each strategy was evaluated and assigned a point value based on its characteristics and expected impacts.

Strategies were assigned to one of four levels of construction, with points earned based on the complexity and cost of implementation. Less intrusive implementation earned more points and was generally considered more desirable.

- Striping only earned 20 points.
- Striping and signal modification earned 17 points.
- Striping and minor widening earned 13 points.
- Major widening earned 10 points.

Higher cost projects also earned fewer points than lower cost projects:

- Low cost projects <$100,000 earned 20 points.
- Medium cost projects $100,000 - $500,000 earned 15 points.
- Medium-high cost projects $500,000 – $2,500,000 earned 10 points.
- High cost projects >$2,500,000 earned 0 points.

Since signalized intersection capacity is shared between conflicting and competing traffic movements, it has a greater impact on travel time delay than do the segments in between intersections. Therefore, intersection improvement projects were awarded 15 points and segment improvement projects were awarded 10 points.

One of the goals of the Traffic Congestion Management Plan is to reduce traffic congestion for citizens of Vista and not just to accommodate through traffic. Consequently, locations further away from SR 78 and from the City Limits received higher points.

- 3 or more signals away from City Limits earned 10 points.
- 2 signals away from the City Limits earned 7 points.
- 1 signal away from the City Limits earned 5 points.

- 3 or more signals away from SR 78 earned 15 points.
- 2 signals away forms 78 earned 10 points.
- 1 signal away from SR 78 earned 5 points.

Points were also awarded for effectiveness in reducing travel time delay.

- High reduction of delay at intersections (>20%) earned 20 points.
- Medium reduction of delay at intersections (10%-20%) earned 15 points.
- Low reduction in delay at intersections (<10%) earned 10 points.
- High reduction in travel time on segments (>20%) earned 20 points.
- Medium reduction in travel time on segments (10%-20%) earned 15 points.

- Low reduction in travel time on segments (<10%) earned 10 points.

Projects were also assigned either positive or negative points for adjacent community impacts depending on whether the impacts were positive or negative.

- Impacts to bikes -5 to +5
- Impacts to pedestrians -5 to +5
- Impacts to mail delivery -5 to +5
- Impacts to trash pick up -5 to +5
- Impacts to driveway access -5 to +5
- Impact to landscaping -5 to +5
- Impacts to parking -5 to +5
- Impacts to right of way -5 to +5
- Impacts to utilities -3 to +3
- Impacts to drainage -3 to +3

Thirteen project strategies were evaluated and ranked with these criteria.

1) **N. Melrose Drive and West Vista Way:** Provide a westbound right turn overlap signal phase.
2) **S. Melrose Drive and Hacienda Drive:** Remove median on east leg and restripe to provide three west bound left turn lanes
3) **S. Melrose Drive and Sunset Drive:** Widen 4 feet to provide 150' long plus taper additional southbound through lane. Requires pavement, new curb and gutter, sidewalk replacement, signal pole relocation, and retaining wall. Keep bike lane. Widen 11' to provide 100' long plus taper westbound right turn lane. Requires pavement, curb and gutter, retaining wall, signal pole relocation, and right of way acquisition.
4) **S. Melrose Drive and Shadowridge Drive:** Provide double eastbound right turn lane.
5) **S. Melrose Drive and Buena Vista Drive (Westbound):** Widen south side of Buena Vista Dr. to add a second westbound left turn lane.
6) **S. Melrose Drive and Buena Vista Drive (Eastbound):** Modify west approach to provide three lanes.
7) **N. Santa Fe Avenue from Bobier Drive to north City Limits:** Widen N. Santa Fe Avenue to two through lanes in each direction from Bobier Dr. to north City Limits.
8) **E. Vista Way from Taylor Street to City Limits:** Widen E. Vista Way from Taylor St. to City Limits.
9) **Civic Center at SR 78 EB Ramps/ Crest View/Seaview Place Option 1:** Construct Roundabout.
10) **Civic Center Drive and S. Santa Fe Avenue:** Modify intersection to include northbound right turn lane to address traffic spillback.
11) **Civic Center at SR 78 EB Ramps/Crest View/Seaview Place Option 2:** Construct conventional intersection improvement.
12) **N. Melrose Drive from Copper Drive to Olive Avenue:** Widen N. Melrose Drive from Copper Drive to Olive Avenue to six lane urban major arterial, including turn lanes at intersections.
13) **E. Vista Way from Civic Center Drive to Bobier Drive:** Widen E. Vista Way from Civic Center Drive to Bobier Drive to a six lane urban major arterial and include turn lanes at intersections.
14) **Civic Center Drive from SR 78 to S. Santa Fe Avenue:** Widen Civic Center Drive from SR 78 to S. Santa Fe Avenue to 3 thru lanes in each direction, and include turn lanes at intersections.

Table 10 summarizes the scoring of each of the projects. The details of the scoring have been included in **Appendix G**.

Table 10: Project Rating Summary

Number	Project	Rating
1	N. Melrose Drive and W. Vista Way	87
2	S. Melrose Drive and Hacienda Drive	85
3	S. Melrose Drive and Sunset Drive	80
4	S. Melrose Drive and Shadowridge Drive	78
5	S. Melrose Drive and Buena Vista Drive - Westbound	74
6	S. Melrose Drive and Buena Vista Drive – Eastbound	73
7	N. Santa Fe Avenue from Bobier Drive to north City Limits	72
8	E. Vista Way from Taylor Street to City Limits	64
9	Civic Center at SR 78 EB Ramps and Crest View Road/Seaview Place Option 1	62
10	Civic Center Drive and S. Santa Fe Avenue	61
11	Civic Center at SR 78 EB Ramps and Crest View Road/Seaview Place Option 2	52
12	N. Melrose Dr. from Copper Drive to Olive Avenue	49
13	E. Vista Way from Civic Center Drive to Bobier Drive	44
14	Civic Center Drive - SR 78 to S. Santa Fe Avenue	39

To understand the benefits of the improvements proposed in the above projects, the results were modeled in Synchro. **Table 11** shows a comparison of LOS and delay with existing conditions. **Appendix H** contains the Synchro worksheets used to model the results of the above referenced projects.

Table 11 Peak Hour Intersection LOS and Delay Results – Improvement Conditions Compared to Existing Conditions

Roadway	Intersection	Existing Conditions					Proposed Improvement Conditions				
		Control	AM Peak		PM Peak		Control	AM Peak		PM Peak	
			Avg. Delay (sec)	LOS	Avg. Delay (sec.)	LOS		Avg. Delay (sec)	LOS	Avg. Delay (sec.)	LOS
E. Vista Way	Warmlands Avenue	Signal	19.2	B	10.9	B	Signal	6.4	A	7.8	A
	Taylor Street	Signal	20.3	C	14.5	B	Signal	20.0	A	14.5	B
	Bobier Drive/Foothill Drive	Signal	40.9	D	34.6	C	Signal	41.0	D	34.6	C
	Oak Drive	Signal	4.5	A	16.2	B	Signal	4.4	A	14.8	B
	Williamston Street	Signal	24.4	C	18.5	B	Signal	13.7	B	16.9	B
	Anza Avenue/Vale Terrace Drive	Signal	20.7	C	20.8	C	Signal	18.2	B	18.5	B
	Townsite Drive	Signal	36.2	D	10.2	B	Signal	8.3	A	9.1	A
	Civic Center Drive/Hillside Terrace	Signal	22.9	C	48.1	D	Signal	21.7	C	48.2	D
Civic Center Drive	S. Santa Fe Avenue	Signal	50.3	D	40	D	Signal	49.9	D	39.5	D
	Natal Way/Postal Way	Signal	17.3	B	11.5	B	Signal	21.7	C	10.6	B
	Pala Vista Drive	Signal	17.6	B	8.1	A	Signal	12.6	B	6.9	A
	Phillips Street	Signal	10.6	B	34	C	Signal	8.9	A	31.3	C
	SR-78 WB Ramps	Signal	16.9	B	27.1	C	Signal	17.1	B	27.1	C
	SR-78 EB Ramps (Option 1)	Signal	159.2	F	98.4	F	Roundabout	27.6	D	24.6	C
	Sunset Drive & Crest View Road/Seaview Place	Signal	47.9	D	51.9	D	TWSC	1.9	C	1.2	C
	SR-78 EB Ramps/Crest View Road (Option 2)	Signal	159.2	F	98.4	F	Signal	46.0	D	43.6	D
Melrose Drive	Olive Avenue	Signal	56.5	E	40.7	D	Signal	58.1	E	42.8	D
	Copper Drive	Signal	26.3	C	25.6	C	Signal	26.3	C	25.6	C
	W. Vista Way	Signal	63.1	E	57.8	E	Signal	49.4	D	33.3	C
	Hacienda Drive	Signal	45.7	D	44.3	D	Signal	53.3	D	43.5	D
	Sunset Drive	Signal	56.6	E	27.6	C	Signal	26.5	D	25.4	C
	Buena Vista Drive - Eastbound	Signal	16.8	B	25.2	C	Signal	16.2	B	24.6	C
	Buena Vista Drive - Westbound	Signal	16.8	B	25.2	C	Signal	12.9	B	25.1	C
	Shadowridge Drive	Signal	60.3	E	88.7	F	Signal	29.5	C	91.6	F
N. Santa Fe Avenue	Osborne Street	Signal	72.6	E	210.7	F	Signal	43.6	D	209.4	F
	Museum Way	Signal	46.1	D	11.6	B	Signal	22.2	C	10.6	B
	Taylor Street	Signal	145.0	F	44.4	D	Signal	49.0	D	27.0	C
	Bobier Drive	Signal	94.5	F	43.6	D	Signal	94.5	F	43.6	D

Figures 7 through 21 depict the locations and project limits of these potential projects.

Figure 7 Proposed Improvement Locations

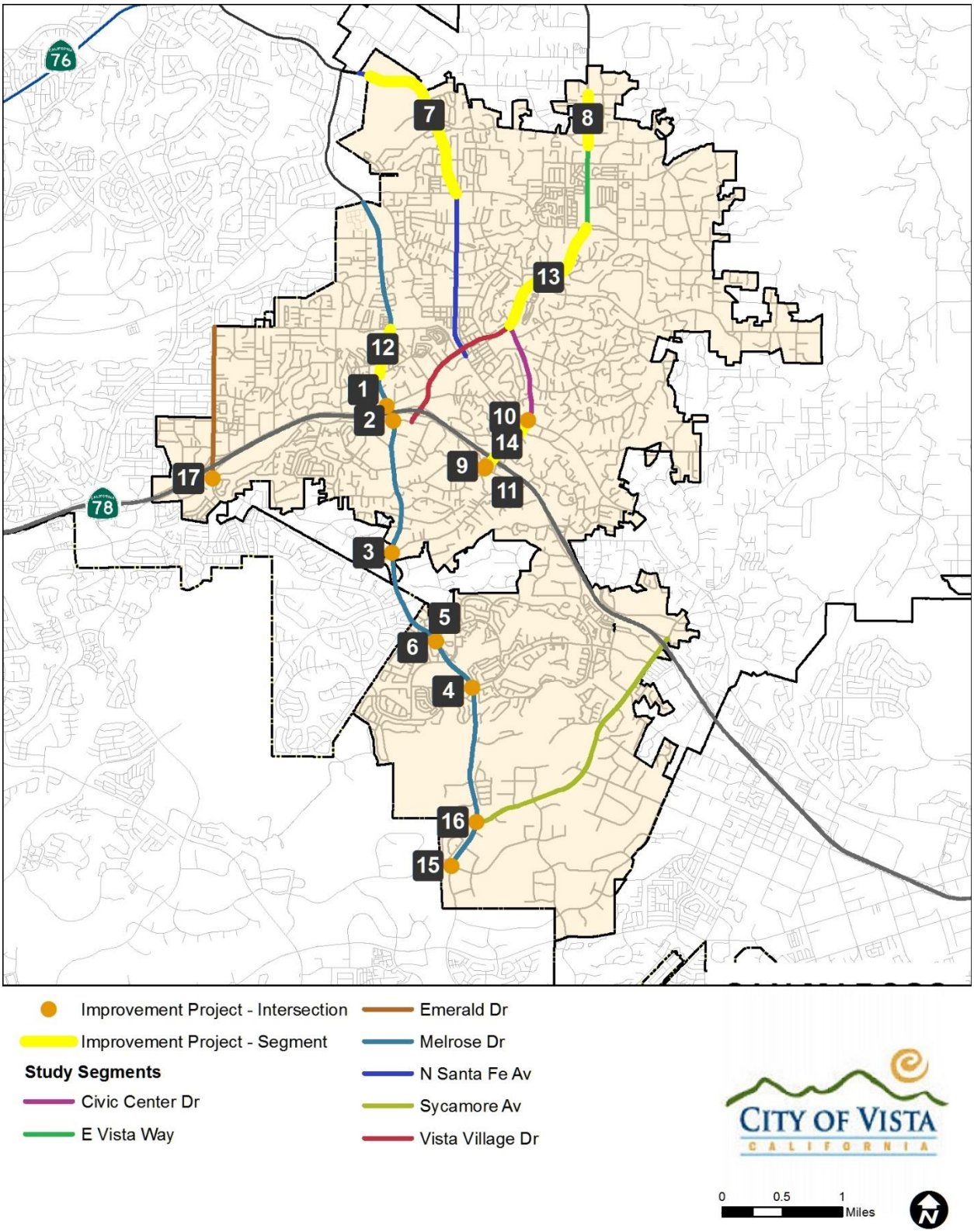


Figure 8 N. Melrose Drive and W. Vista Way

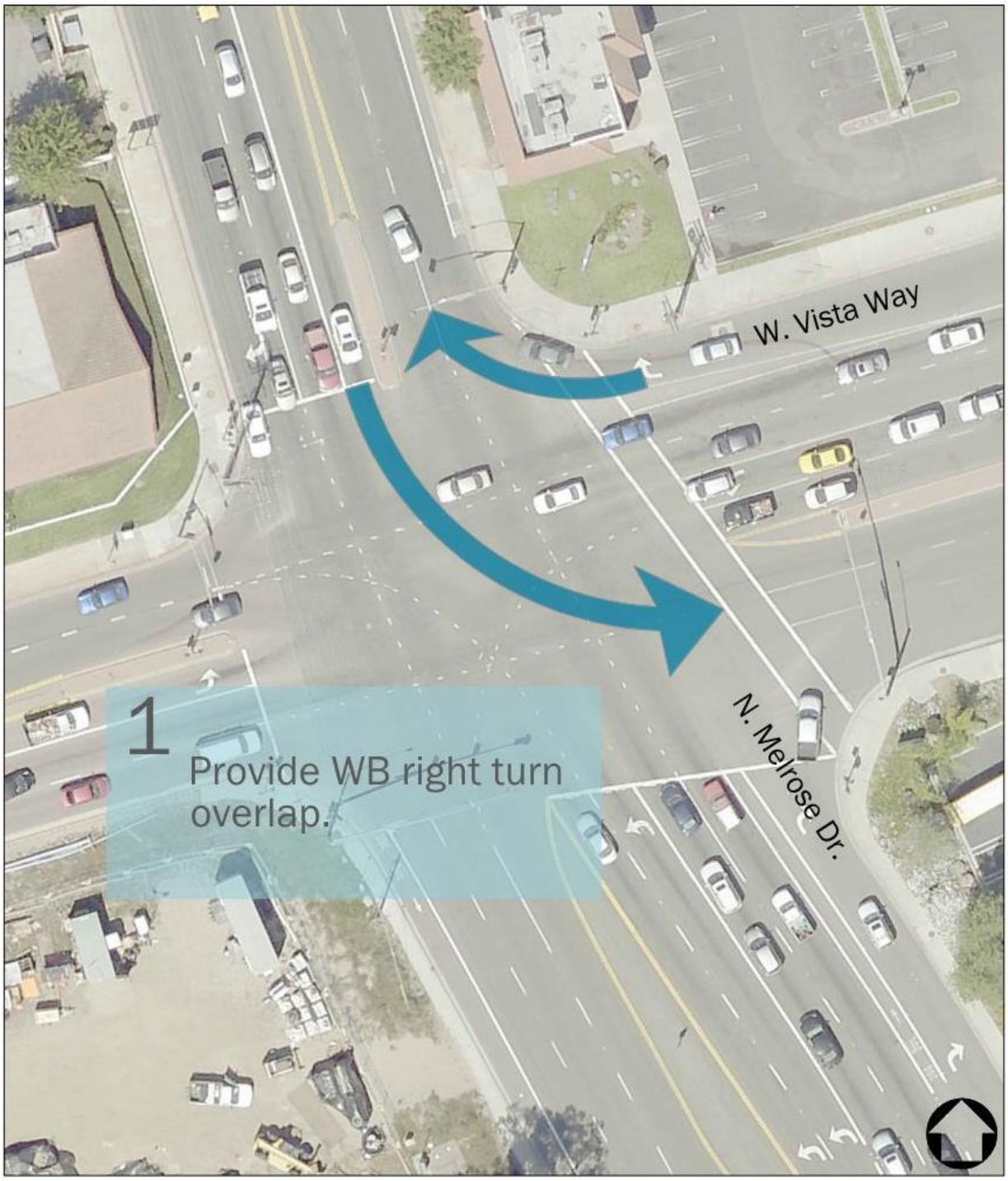


Figure 9 S. Melrose Drive and Hacienda Drive

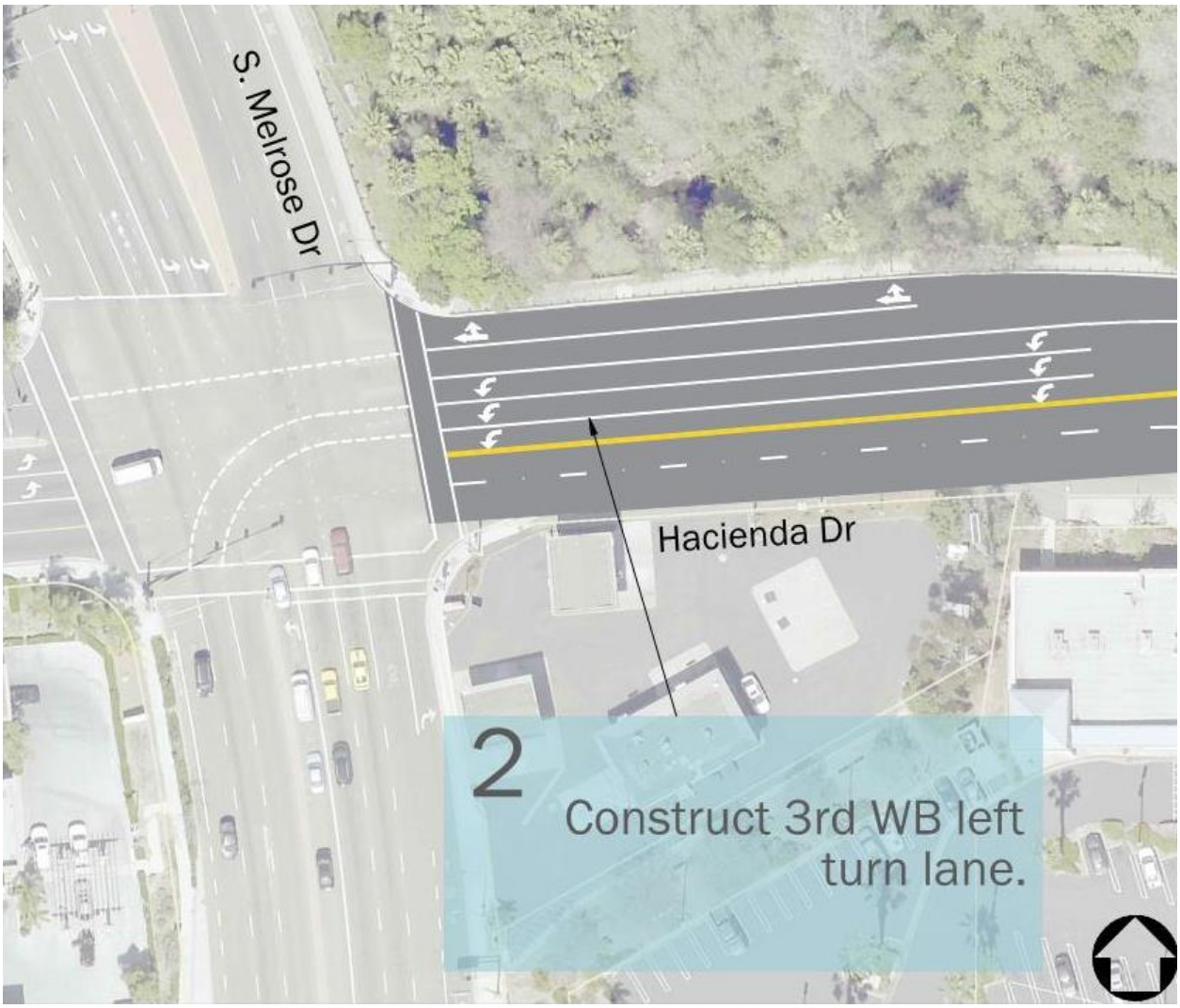


Figure 10 S. Melrose Drive and Sunset Drive

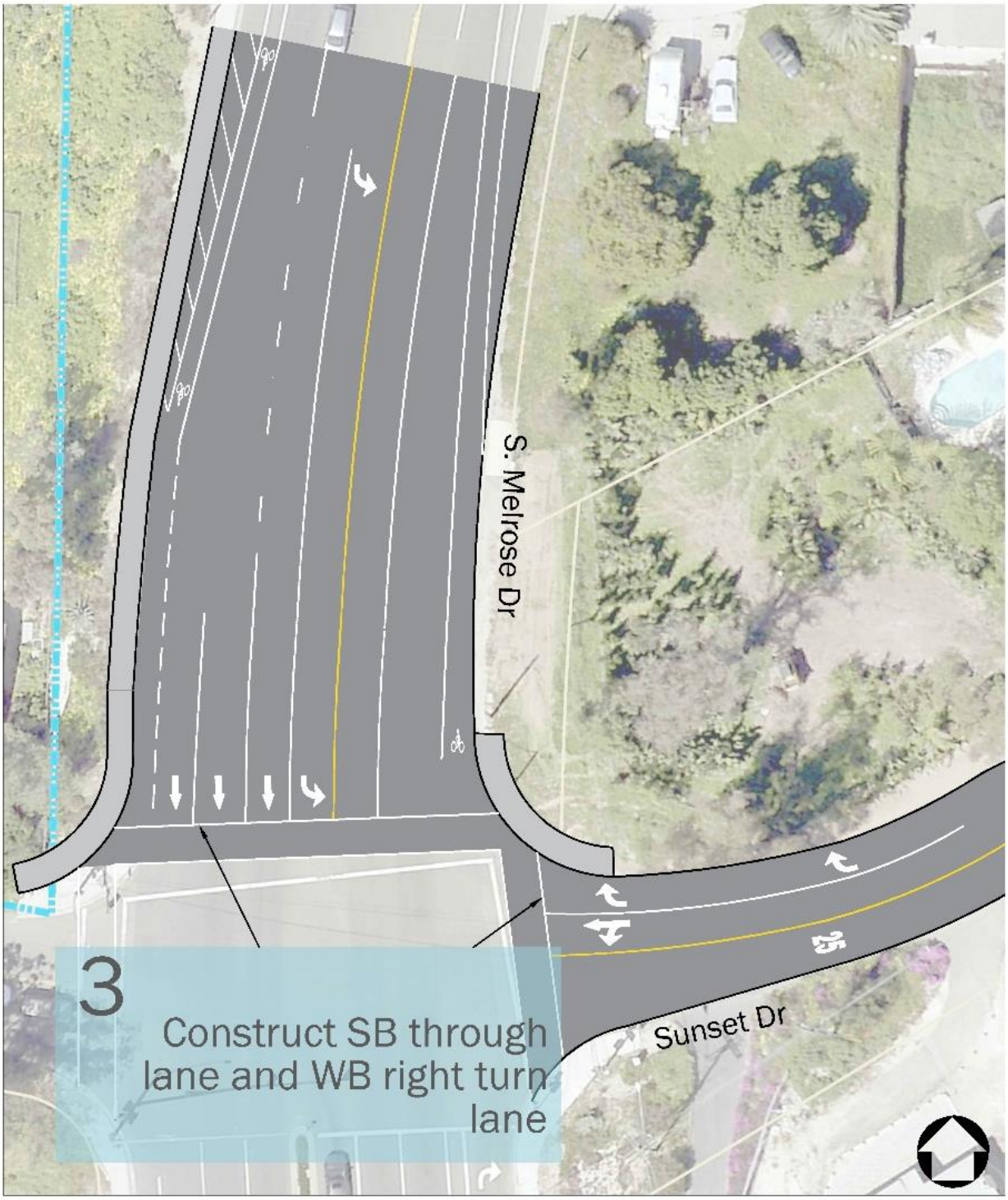


Figure 11 S. Melrose Drive and Shadowridge Drive

Figure 12 S. Melrose Drive and Buena Vista Drive - Westbound

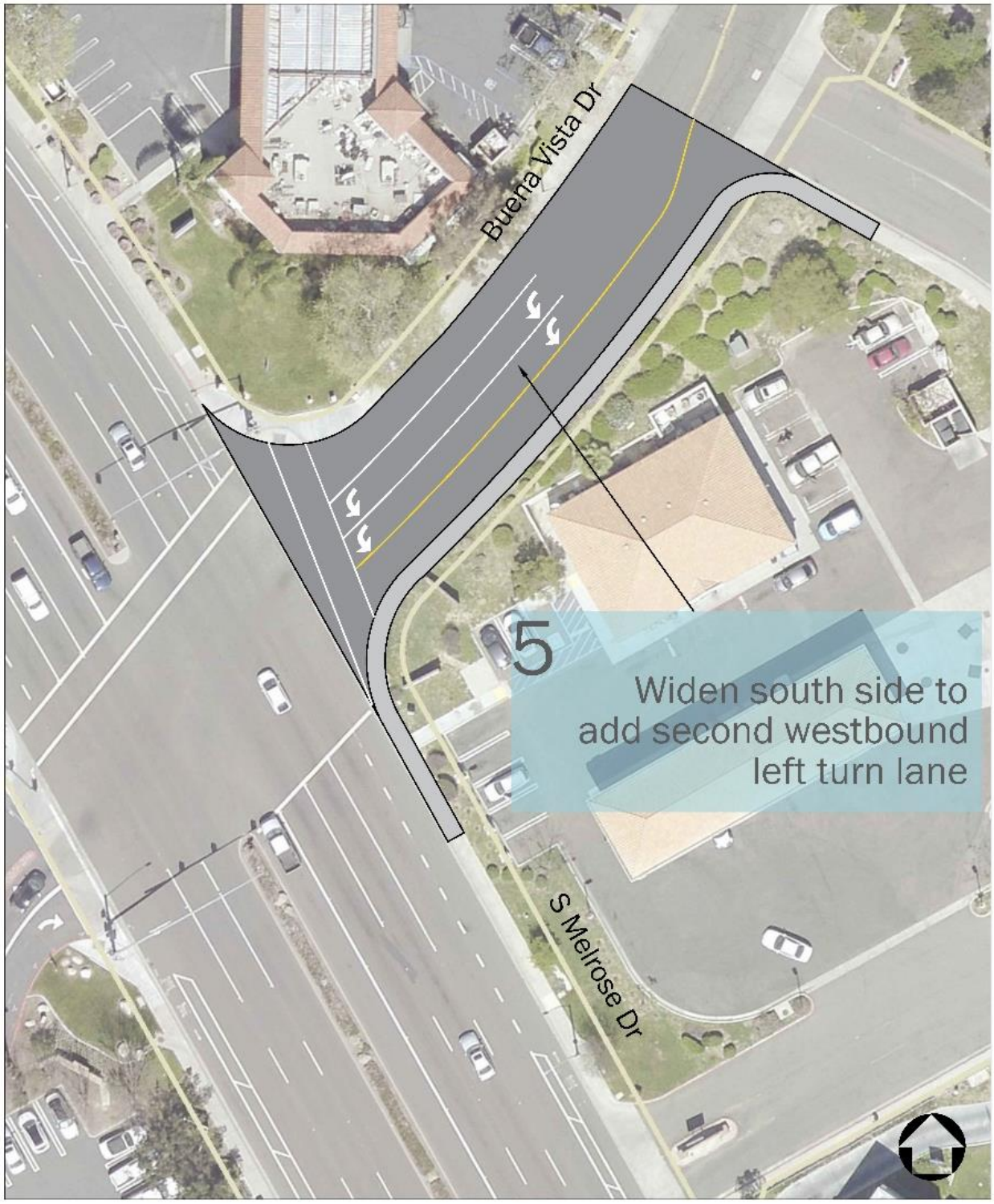


Figure 13 S. Melrose Drive and Buena Vista Drive – Eastbound

Figure 14 N. Santa Fe Avenue from Bobier Drive to North City Limits

Figure 15 E. Vista Way from Taylor Street to City Limits

Figure 16 Civic Center at SR 78 EB Ramps and Crest View Road/Seaview Place Option 1

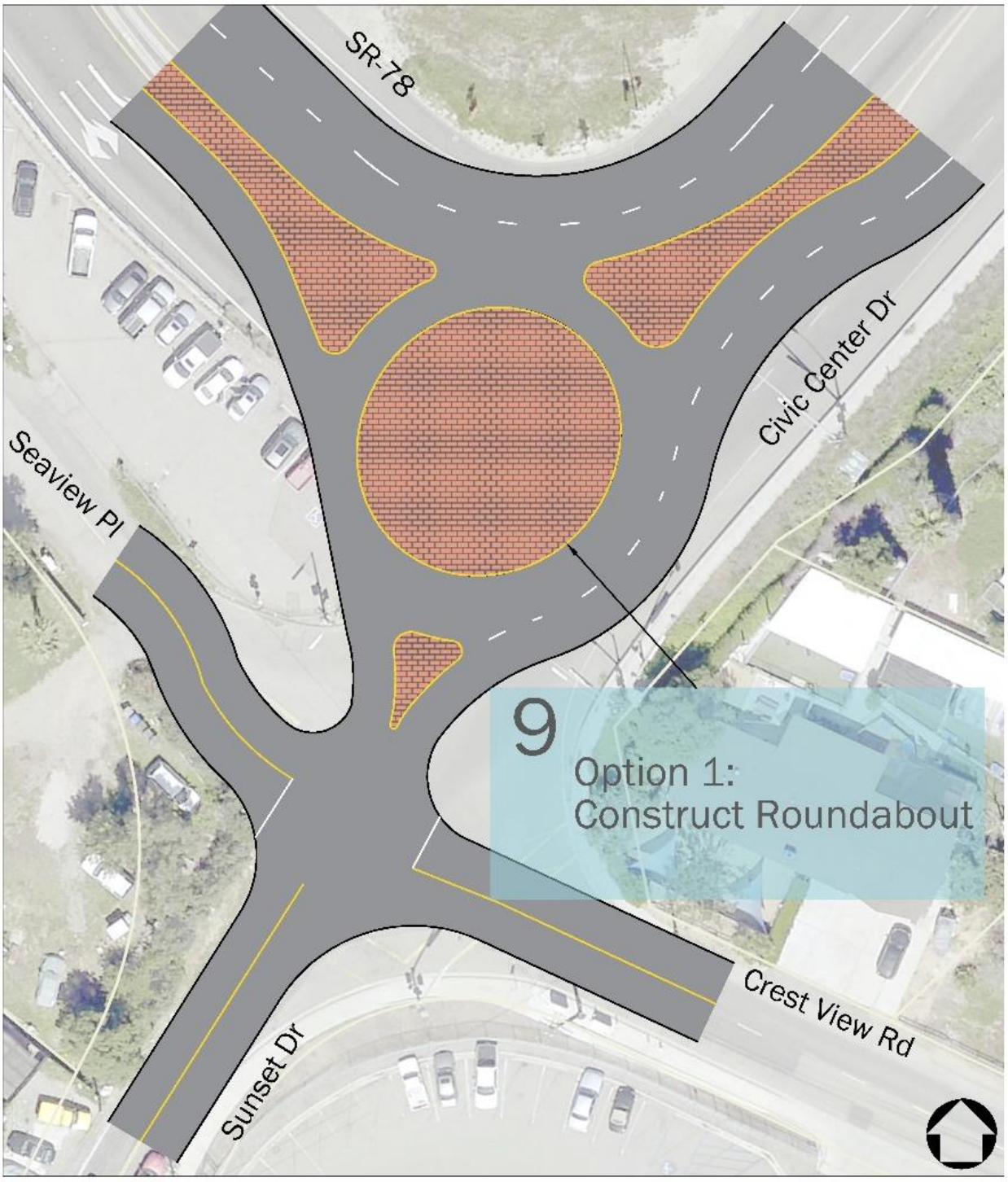


Figure 17 Civic Center Drive and S. Santa Fe Avenue

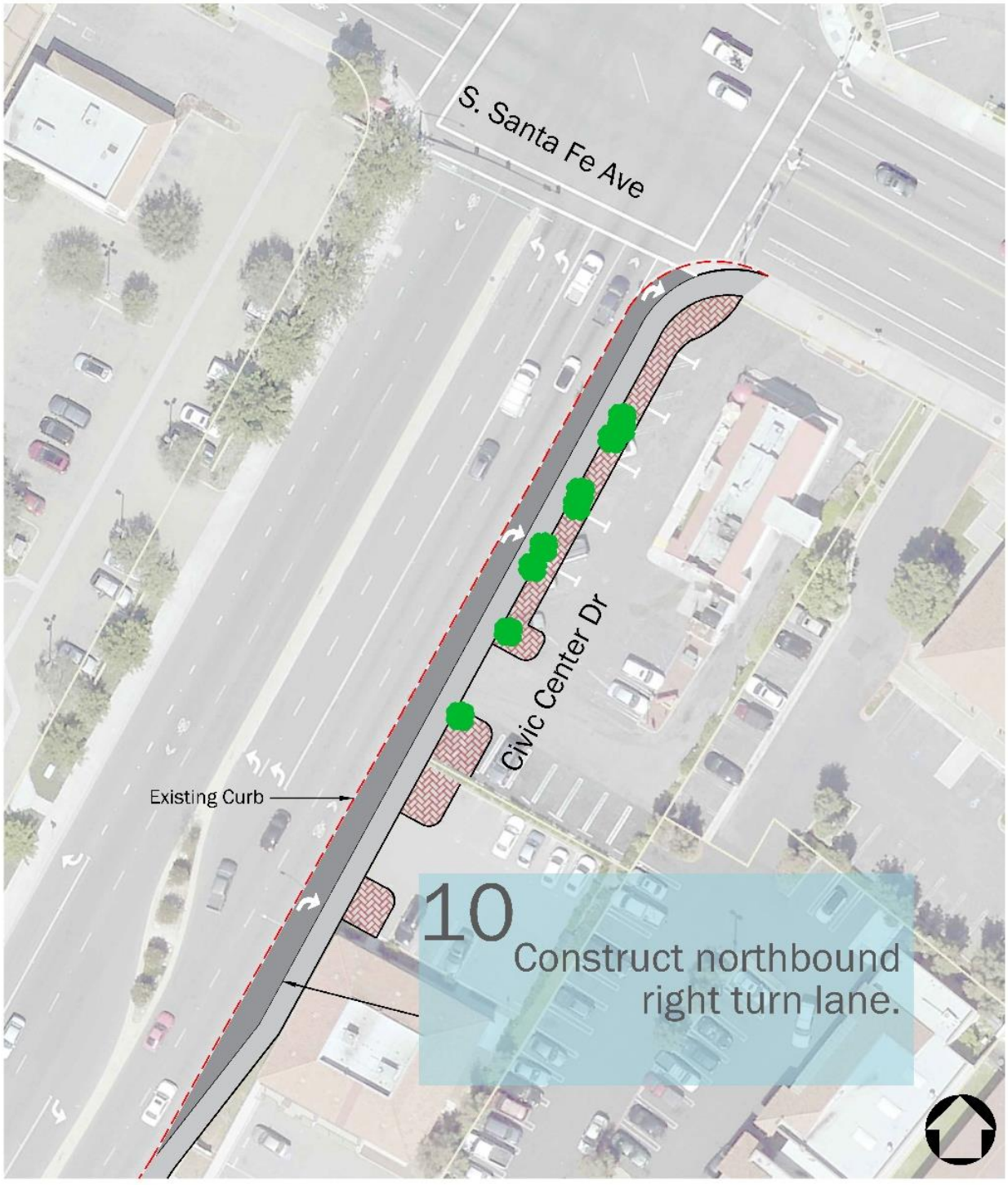


Figure 18 Civic Center at SR 78 EB Ramps and Crest View Road/Seaview Place Option 2

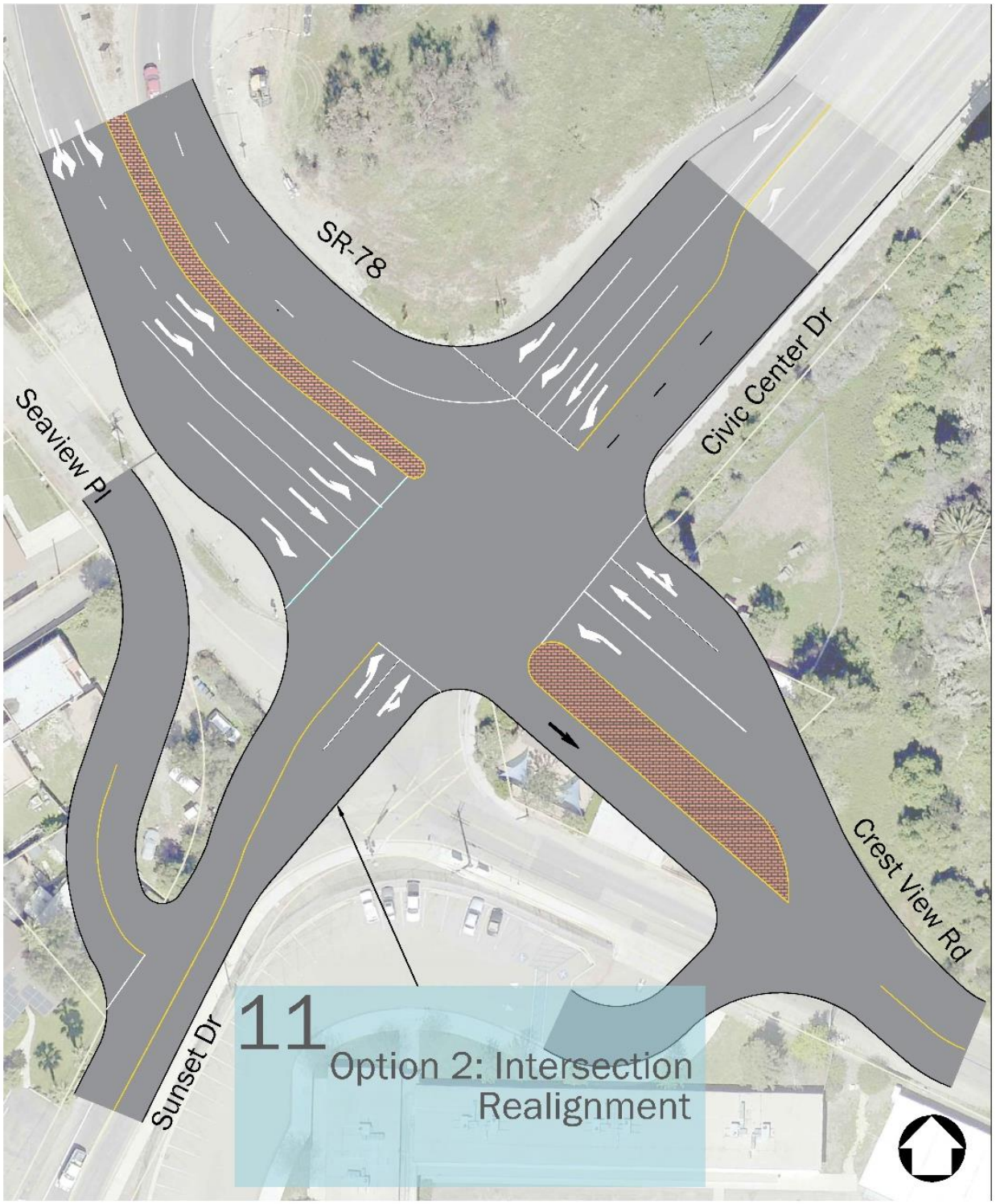


Figure 19 N. Melrose Dr. from Copper Drive to Olive Avenue

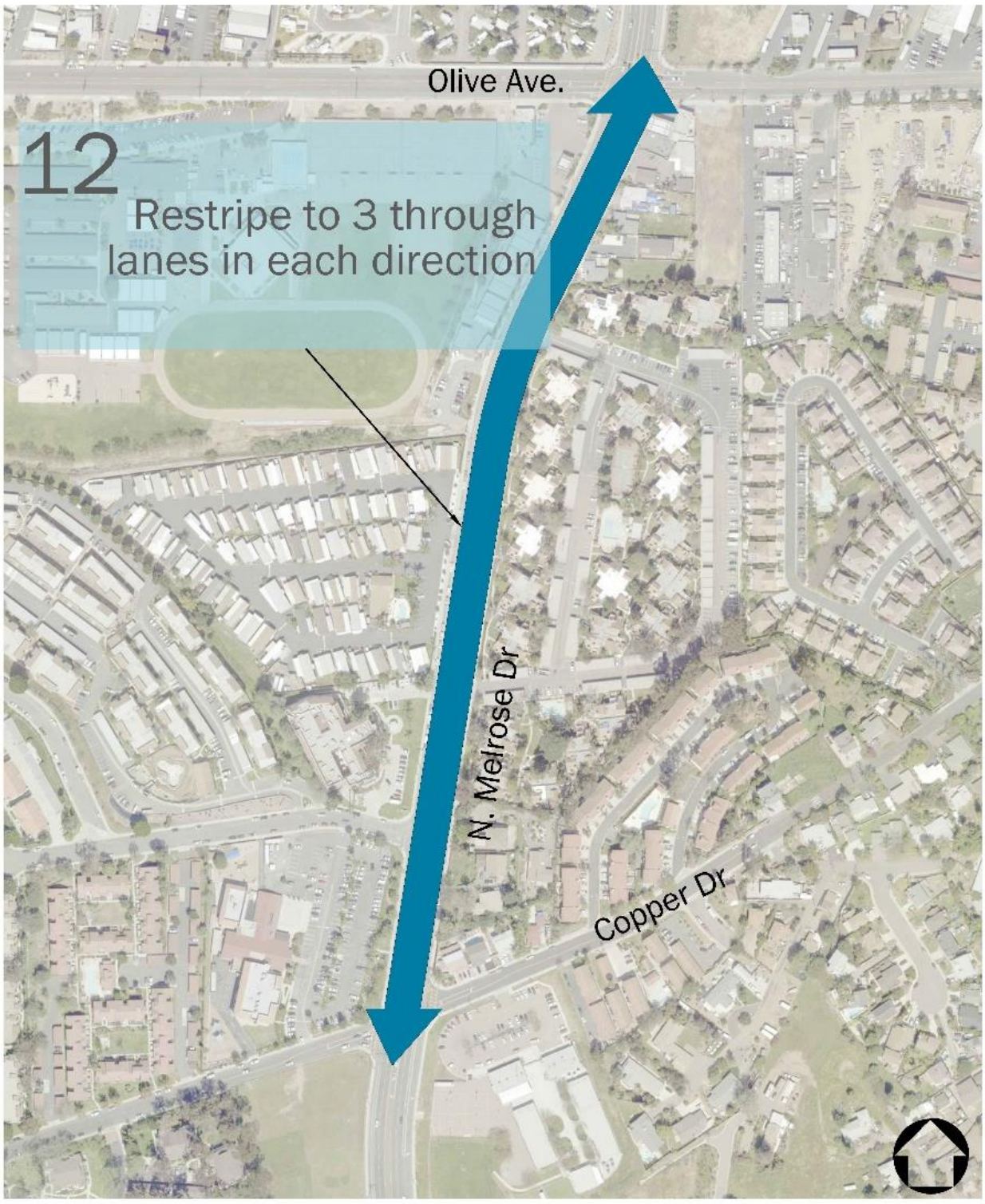


Figure 20 E. Vista Way from Civic Center Drive to Bobier Drive

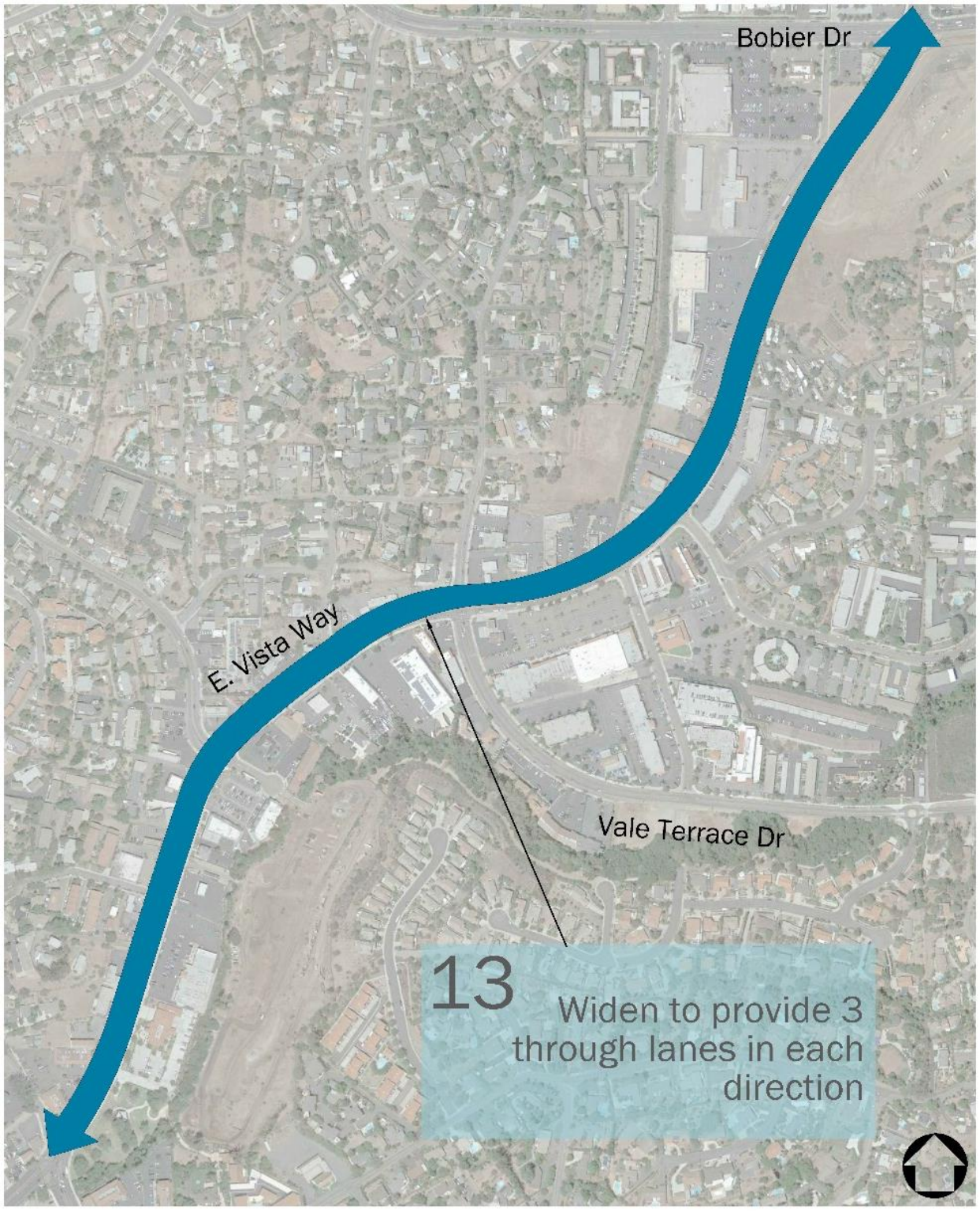
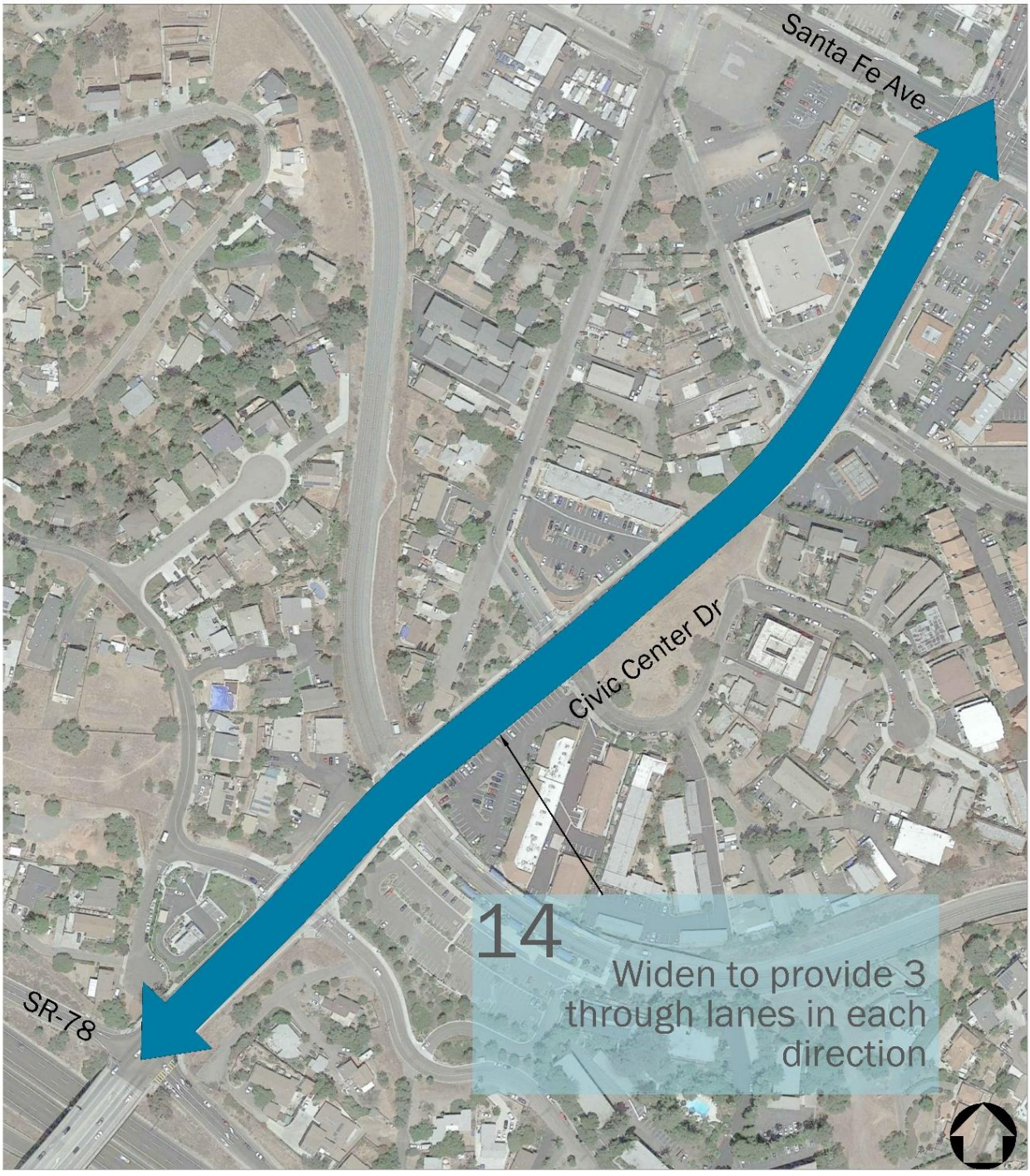


Figure 21 Civic Center Drive - SR 78 to S. Santa Fe Avenue



Three congested locations were identified, for which no practical strategies could be identified because of the magnitude of physical constraints:

- S. Melrose Drive and Park Center Drive/Faraday Street – Double southbound right turn lane and triple eastbound left turn lane not feasible because of extensive right of way impacts.
- S. Melrose Drive and Sycamore Avenue – Double northbound right turn lane not feasible because of single receiving lane on Sycamore and extensive right of way impacts.
- Emerald Drive and Hacienda Drive– No feasible strategy short of complete interchange reconstruction.

Signal Timing Improvements

Proper signal timing constitutes a critical component for traffic congestion management. The full capacity of a roadway segment for the through movement on an arterial cannot be realized without an adequate signal timing coordination plan to progress traffic. Similarly, the benefits of a good signal timing coordination plan when the capacity of a roadway is exceeded are not seen. This is the reason why an arterial can be observed to operating very well just prior to the peak travel volumes, but once the peak volume is reached, the arterial is completely congested even though the same signal timing coordination is in effect.

The City of Vista employs three distinct traffic signal coordination plans, one for each of the a.m., midday and p.m. traffic peaks. City staff is continually monitoring traffic signal coordination on the City's arterials and making adjustments and refinements as necessary. As part of developing this report, City staff requested analyzing adjusting up the existing cycle lengths by ten seconds for the a.m. and p.m. peak periods and giving the additional ten seconds to the through movements on the arterial street while maintaining the existing green splits as is for all the other movements.

The results of the analysis reveal that changes in delay at most intersections were not significant, with some intersections experiencing minor increases in delay and other intersections experiencing minor decreases. The Synchro analysis worksheets are included in **Appendix I**. The detailed summary of results is included in **Appendix J.**

7.0 CONCLUSION

This Traffic Congestion Management Plan provides a data based evaluation of traffic congestion on major travel routes through the City of Vista. Analysis was performed on traffic volumes and travel times to document where traffic congestion is occurring during the morning and evening commuter peak periods.

Most of the traffic congestion reduction opportunities in the City have already been implemented. However, through the course of the study several additional projects were identified that can be expected to significantly reduce delay at some of the most congested locations in the City. Strategies for reducing congestion were identified for the most severely congested locations. Each of these projects was then evaluated for cost efficiency, effectiveness in congestion reduction, and potential impacts to the community. These projects represent a range of projects from low cost solutions to high cost solutions.

The process established through this study has predicted the traffic congestion relief expected through implementing the identified projects. The same process can be used following implementation to evaluate the effectiveness of the projects.