

SANTA YNEZ VALLEY

TRAFFIC CIRCULATION & SAFETY STUDY

FINAL REPORT

June 2, 2020





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1 INTRODUCTION

The Santa Barbara County Association of Governments (SBCAG), in partnership with the Santa Ynez Band of Chumash Indians, has undertaken the Santa Ynez Valley Traffic Circulation and Safety Study to comprehensively assess and identify needed current and forecasted future circulation and safety improvements for the multimodal transportation of the Santa Ynez Valley. This study is made possible through a Caltrans Sustainable Communities Planning grant, as well as funding from the Santa Ynez Band of Chumash Indians and the Santa Barbara County Association of Governments. This report provides both a quantitative and qualitative assessment of current travel conditions on the network, as well as potential short and long-term improvements to support growing travel demand, improved safety, increased connectivity, and increased quality of life and sustainability for residents.

Local residents, those that rely on the Santa Ynez Valley's transportation network on a daily basis, are keenly aware of numerous traffic safety and circulation concerns. Often, these concerns have been relayed to the Valley's elected representatives. This study sought to gain an understanding of those concerns, assess potential improvements, and position the Valley for a future of improved mobility. With the knowledge gained through this work, the elected representatives and public agency staffs can begin the process of delivering real-world improvements. The traffic safety and circulation issues in the Valley did not develop overnight, nor will they be solved overnight, but this study provides the foundation from which to make improvements into the future.

Mobility is defined as the movement of people and goods and not by a particular mode of travel. One person's priority may be crossing the road by foot while another's may be driving across the Valley in a personal car – both are equally important. The needs of all must be considered to ensure the Valley provides safe and convenient mobility options. Favoring mobility by one mode of travel results in an abundance of people traveling solely by that mode. A balanced approach is needed to ensure the quality of life that residents of the Valley demand, is provided.

This project involved a robust public process, described in the next section and further captured in Appendix A, as well as active participation by numerous public agencies, including: Caltrans District 5, County of Santa Barbara, City of Buellton, City of Solvang, California Highway Patrol – Buellton Command, as well as the Santa Ynez Band of Chumash Indians. The input provided by the public laid the foundation for the analyses included in this study.

It is important to recognize the contributions of the Santa Ynez Band of Chumash Indians. In addition to providing a cash contribution for this project, the Tribe donated meeting space for public meetings and the use of a Tribe-owned bus for the bus tour that occurred early in the study process. Without those contributions the depth of analysis undertaken for this study would not have been possible.

1.1. Public Outreach

Public input is a key component of identifying issues and concerns related to transportation and safety in the area. The project team has engaged residents and a range of stakeholders (i.e. local government agencies, community-based organizations (CBOs), businesses and business associations, and other interested parties) to gain additional insights into the opportunities, recommendations, and challenges associated with unique traffic circulation. Community input and feedback is essential to developing an effective plan that will create meaningful change in the community.



The project team, in collaboration with the Santa Ynez Band of Chumash Indians, conducted a Bus Tour in February 2019 to collect input from community members. Forty-three persons participated, including elected officials, members of the Technical Advisory Committee (TAC) and Chumash tribal leaders. The itinerary included stops or visits to twelve focus areas, which were pre-selected by the project team based on

documented and observed issues. Frequently mentioned issues or comments include bike/pedestrian safety, bottlenecks at intersections along SR-246, issues with signal timing, optimization/coordination, traffic speeds, and sight distance at intersections.

In September 2019, the project team held a Community Meeting at the Hotel Corque in Solvang. The purpose of the meeting was to provide an overview of the study and the process as well as the technical analysis and its findings related to existing conditions. An estimated 85 people attended the interactive, open house style meeting, and offering feedback on areas of concern and discussing ideas for needed improvements to enhance circulation and address safety issues.

From the public outreach efforts, some recurring concerns and ideas that were mentioned include the following:

- Seasonal variability in traffic patterns, with a feeling that traffic congestion in the Solvang area is largely attributed to tourist activity;
- High vehicle speeds along SR-154 in Los Olivos lead to unsafe conditions;
- High vehicle speeds along SR-246 in western Buellton lead to unsafe conditions; and
- Consideration installing roundabouts at multiple intersections along SR-246 and SR-154 in order to improve safety and access.

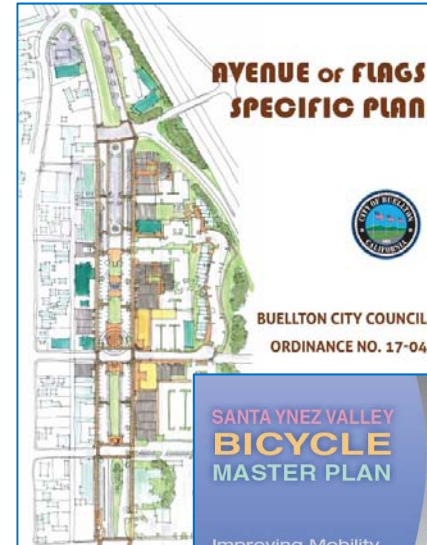
1.2. Planning Context

This report incorporates other recent, relevant multimodal transportation planning efforts within the Santa Ynez Valley area. These efforts include:

- **Santa Ynez Valley Bicycle Master Plan** – With the needs of four jurisdictions to consider (Cities of Solvang and Buellton, County of Santa Barbara, and Chumash Nation), as well as Caltrans, the plan presents a cohesive vision for the future of bicycle mobility in the Santa Ynez Valley. The plan includes an evaluation of current conditions, noting constraints and issues, as well as implementation. The highest priority project within the plan is the Santa Ynez River Trail, which would provide a cross-valley trail connecting Buellton to Solvang. The trail would be completely separated from SR-246, though an exact alignment has not yet been determined.

- **Avenue of Flags Specific Plan** – Within the City of Buellton, Avenue of Flags runs parallel to and west of US-101. The specific plan provides the framework to guide the transformation of the Avenue of Flags corridor into a vibrant downtown serving the community. In addition to land use development standards, the plan includes traffic calming and safety measures to facilitate multiple modes of transportation, consistent with the vision of converting the corridor into a major destination rather than a pass-through roadway.

In addition to these particular planning documents, to better understand the recent history of planning efforts in the region, several other studies were reviewed. These include studies prepared by SBCAG, the County of Santa Barbara, Caltrans District 5, the Cities of Solvang and Buellton, and the Santa Ynez Band of Chumash Indians. Key takeaways and conclusions were noted for each, are documented within **Appendix A**.





2 ANALYSIS STUDY AREA

The Santa Ynez Valley is located in the northern portion of Santa Barbara County, between the Santa Ynez Range to the south and the San Rafael Mountains to the north. The Santa Ynez Valley is mainly rural in nature and consists of roughly 20,000 residents mostly living in the incorporated cities of Buellton and Solvang, the small unincorporated communities of Los Olivos, Santa Ynez, and Ballard, and the Santa Ynez Band of Chumash Indians Reservation. The three state routes within the study area, US-101, SR-154 and SR-246, in addition to serving as the Valley's major circulation and access roads, also provide regional connectivity between the north and west of the County to the south and east of the County, leading to significant pass-through trips including long-distance commuters and heavy duty truck trips. The transportation network also consists of bike and pedestrian trails, inter-and intra-regional bus service, and the Santa Ynez Airport.

In addition to residential land use, the Valley has many attractions including the Chumash Casino Resort in Santa Ynez, which alone attracts up to 9,000 daily visitors and tourists on weekends, especially in the summer, as well as numerous local wineries. These tourist attractions are also primary job centers in the study area. There are also special events throughout the year, which attract large numbers of visitors including the Solvang Century and Taste of Solvang in March, and the Los Olivos Olive and Jazz Festival in June, among many others.

Figure 1 shows the study area. In conjunction with SBCAG, the Santa Ynez Band of Chumash Indians, and the Transportation Advisory Committee (TAC), twenty-four (24) intersections were selected for analysis. The 24 intersections, which include both signalized and stop-controlled locations, represent locations that may potentially be impacted by existing and future traffic conditions. The study intersections are listed in **Table 1**.

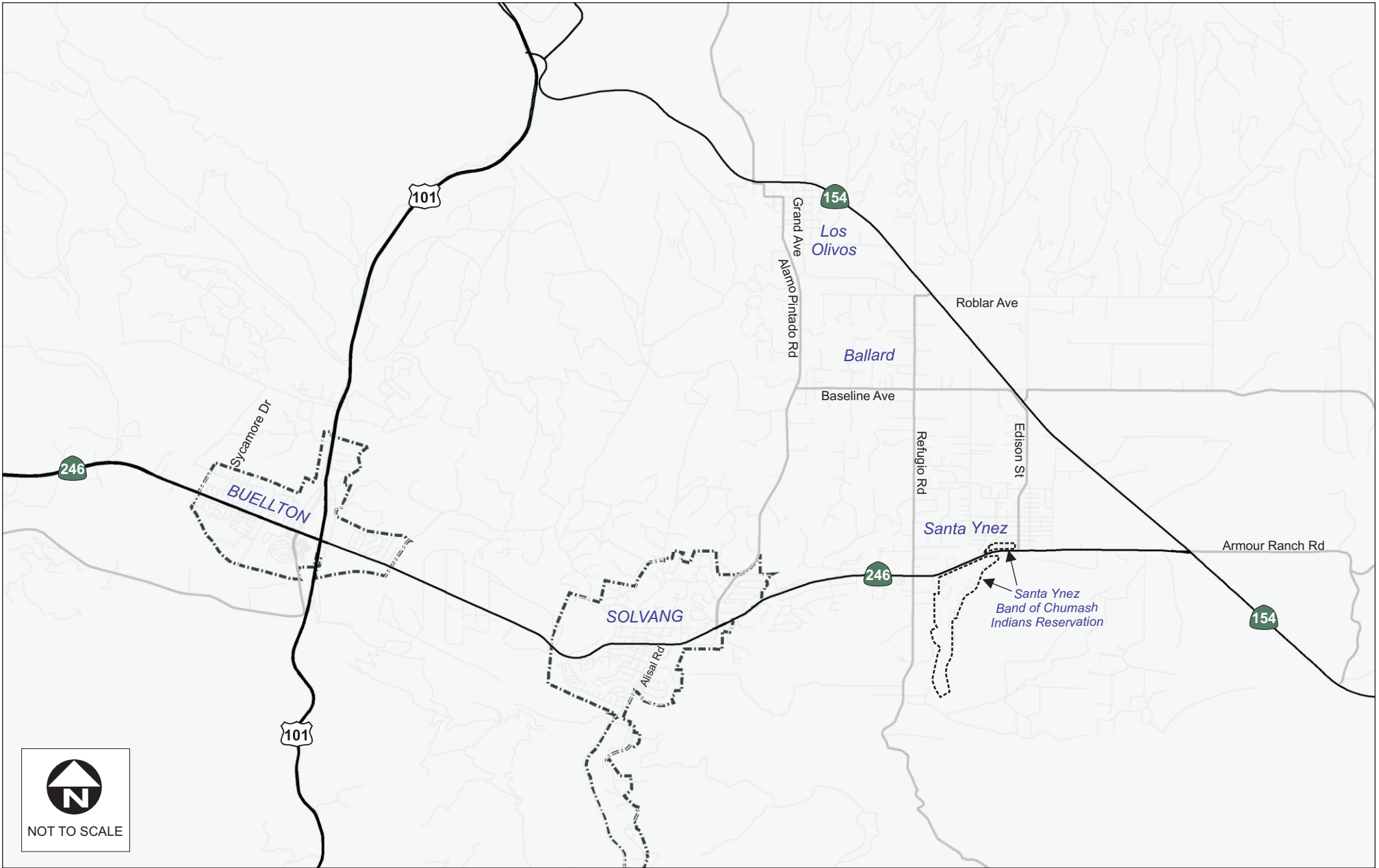


Table 1: Study Intersections

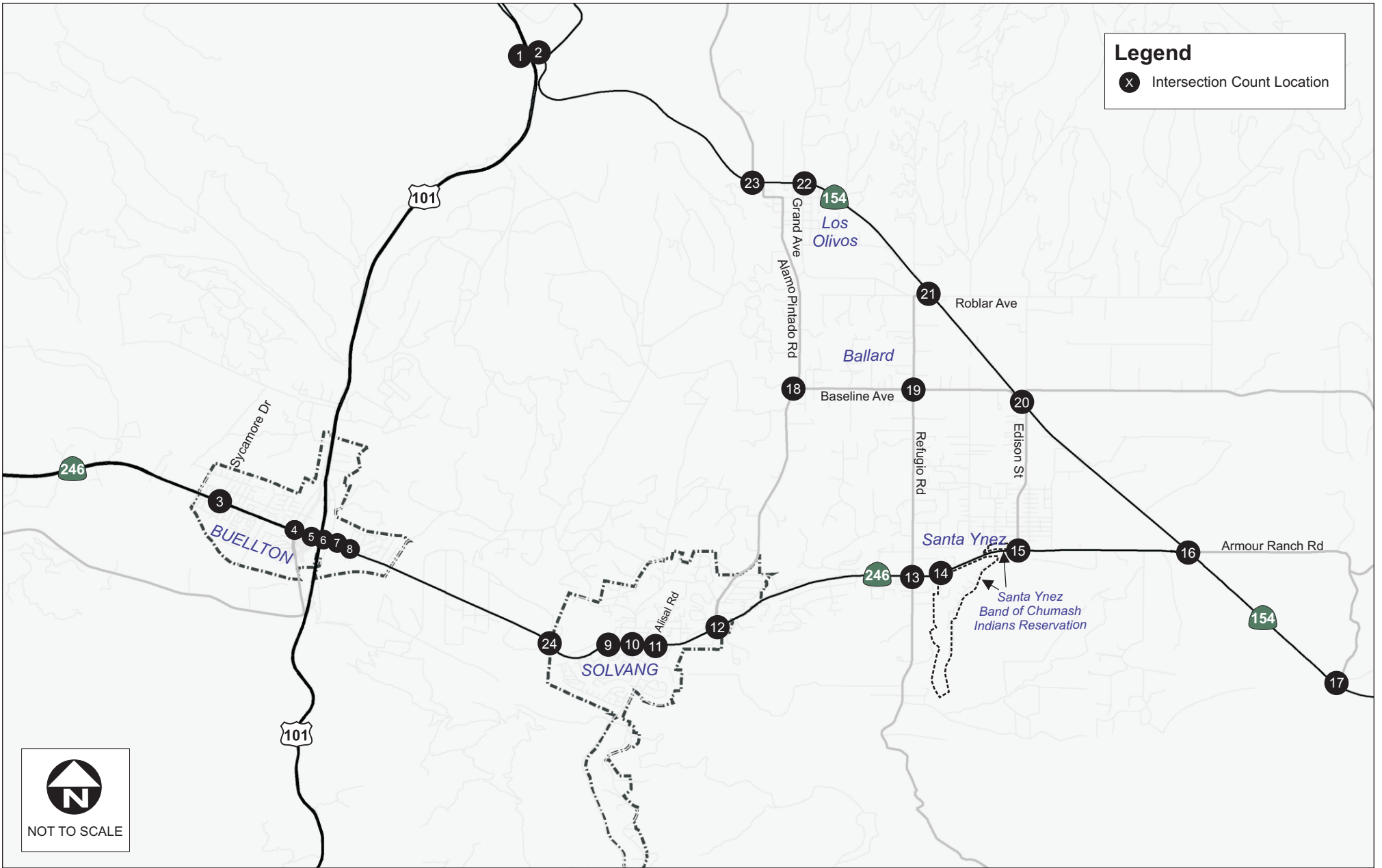
Intersection	Jurisdiction	Traffic Control Type
1 US-101 SB Ramps/SR-154	Caltrans (unincorporated County)	All-Way Stop
2 US-101 NB Ramps/SR-154	Caltrans (unincorporated County)	1-Way Stop (NB)
3 Sycamore Dr/SR-246	Caltrans (within Buellton)	2-Way Stop (NB/SB)
4 Ave of Flags/SR-246	Caltrans (within Buellton)	Signalized
5 US-101 SB Ramps/SR-246	Caltrans (within Buellton)	Signalized
6 US-101 NB Ramps/SR-246	Caltrans (within Buellton)	Signalized
7 McMurray Road/SR-246	Caltrans (within Buellton)	Signalized
8 Freear Dr/SR-246	Caltrans (within Buellton)	Signalized
9 Fifth St/SR-246 (Mission Dr)	Caltrans (within Solvang)	Signalized
10 Atterdag Road/SR-246 (Mission Dr)	Caltrans (within Solvang)	Signalized
11 Alisal Rd/SR-246 (Mission Dr)	Caltrans (within Solvang)	Signalized
12 Alamo Pintado Rd/SR-246 (Mission Dr)	Caltrans (within Solvang)	Signalized
13 Refugio Rd/SR-246	Caltrans (unincorporated County)	Signalized
14 Via Juana Rd/SR-246	Caltrans (unincorporated County)	1-Way Stop (NB)
15 Edison St/SR-246	Caltrans (unincorporated County)	Signalized
16 SR-154/SR-246 Armour Ranch Rd	Caltrans (unincorporated County)	Roundabout (4-Way Yield)
17 SR-154/Armour Ranch Rd	Caltrans (unincorporated County)	1-Way Stop (WB)
18 Alamo Pintado Rd/Baseline Ave	County (Ballard)	All-Way Stop
19 Refugio Rd/Baseline Ave	County (Ballard)	All-Way Stop
20 SR-154/Edison St	Caltrans (unincorporated County)	All-Way Stop
21 SR-154/Roblar Ave	Caltrans (unincorporated County)	2-Way Stop (EB/WB)
22 Grand Ave/SR-154	Caltrans (unincorporated County)	2-Way Stop (NB/SB)
23 Foxen Canyon Rd/SR-154	Caltrans (unincorporated County)	2-Way Stop (NB/SB)
24 Skytt Mesa Dr/SR-246	Caltrans (within Solvang)	2-Way Stop (NB/SB)

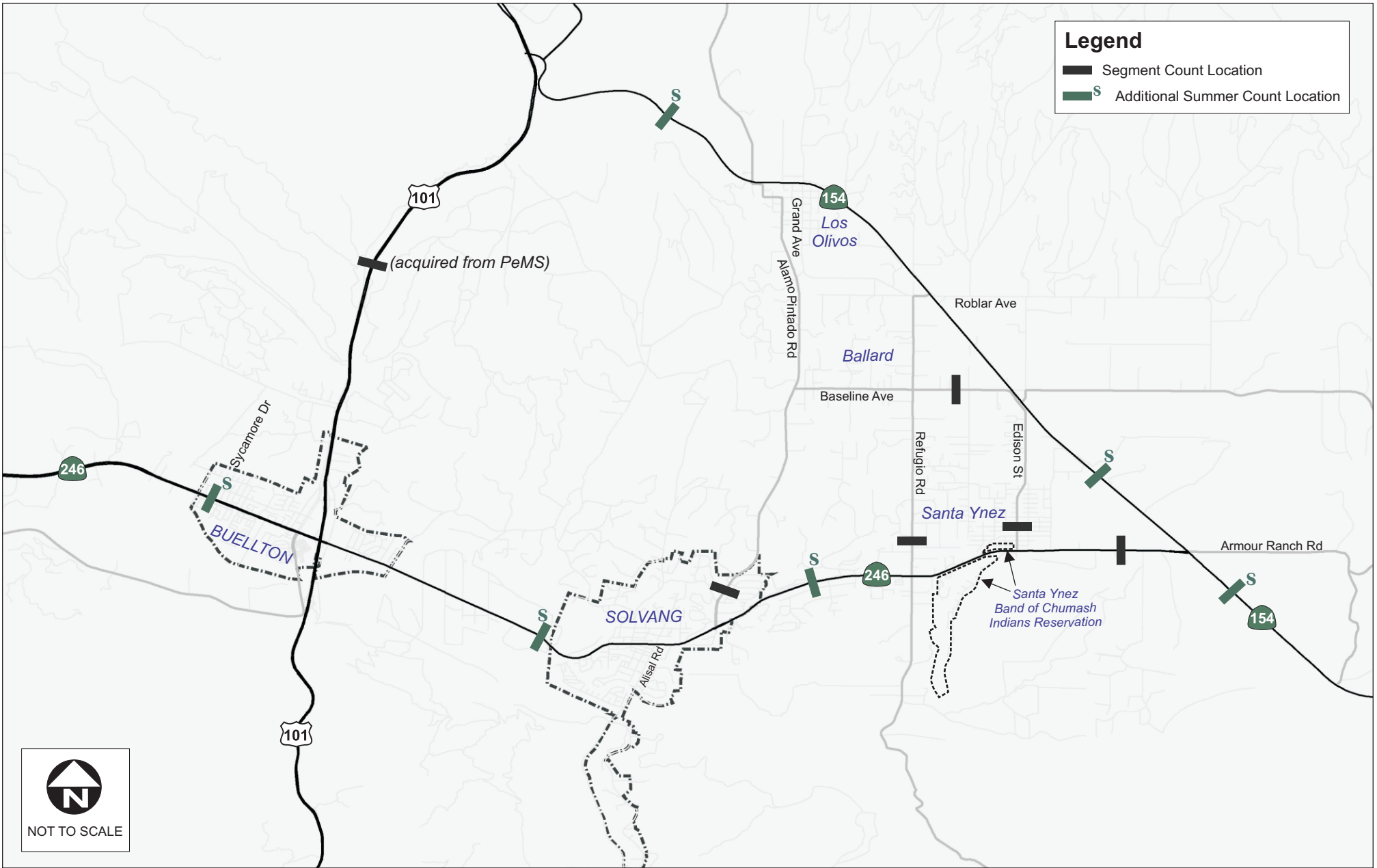
In addition to intersections, the following eleven (11) roadway segments are included as part of traffic count data collection. The study roadway segments are listed in **Table 2**.

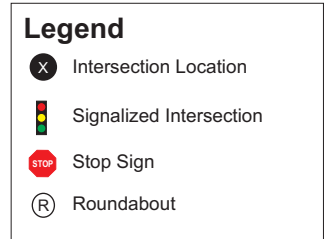
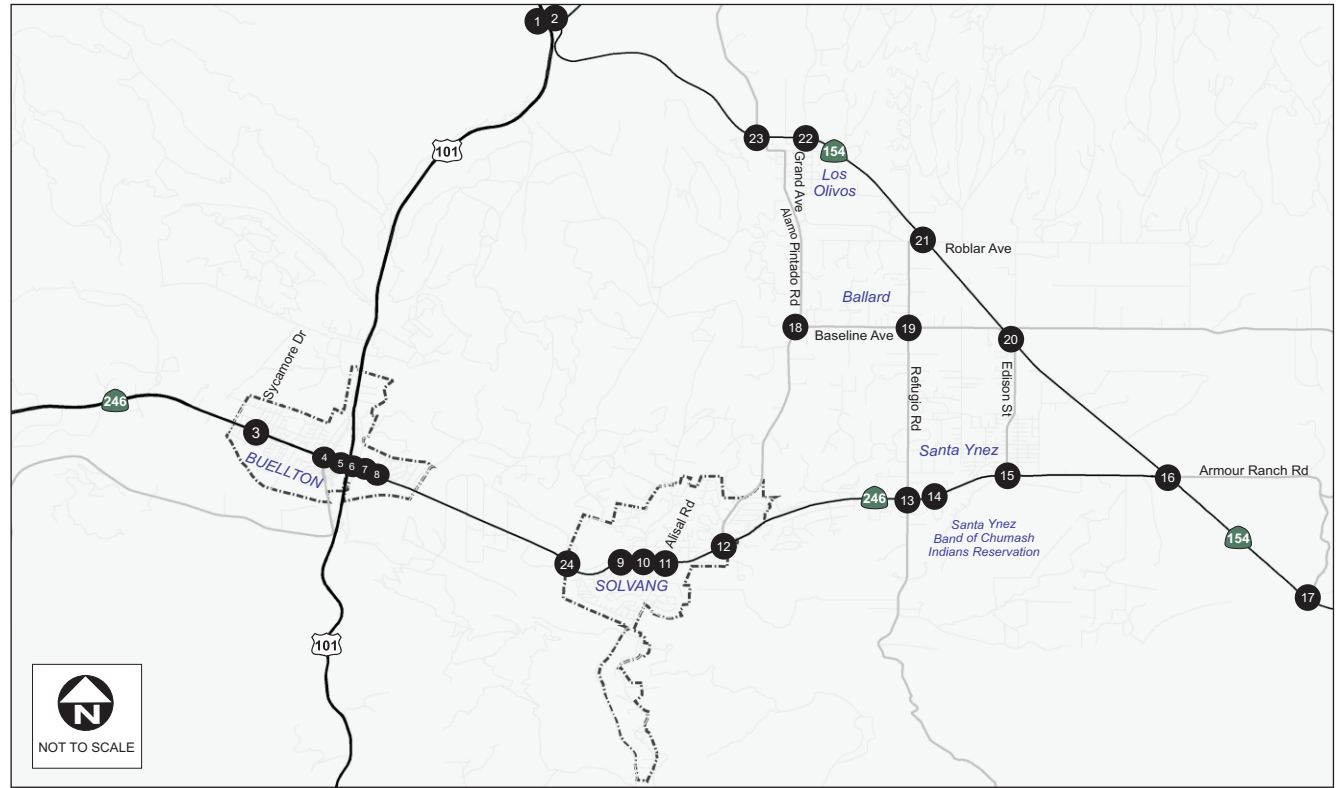
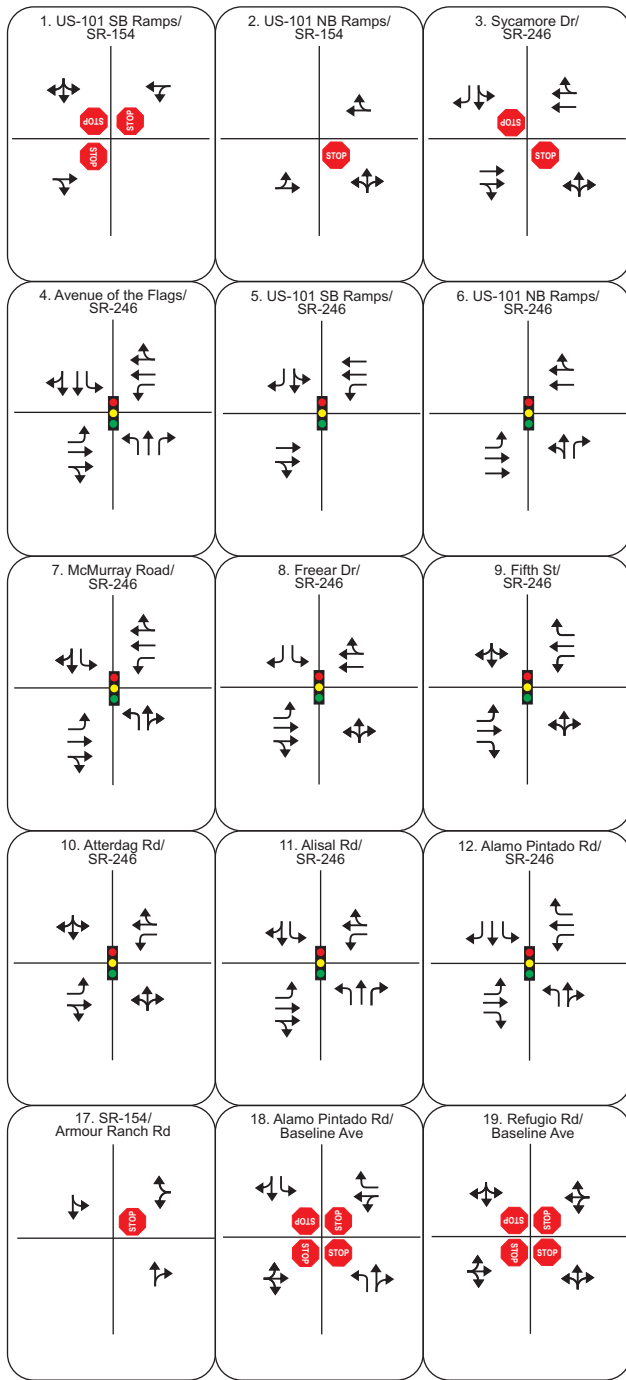
Table 2: Roadway Segments

Segment	Jurisdiction	Classification	Number of Lanes
1 SR-246 West of Sycamore Dr	Caltrans (within Buellton)	Highway	4
2 SR-246 (Mission Dr) West of Skytt Mesa Dr	Caltrans (within Solvang)	Highway	2
3 Alamo Pintado Rd North of SR-246 (Mission Dr)	Solvang	Arterial	4
4 SR-246 Between Alamo Pintado Rd & Refugio Rd	Caltrans (unincorporated County)	Highway	2
5 Refugio Rd North of SR-246	County (Santa Ynez)	Arterial	2
6 Edison St North of SR-246	County (Santa Ynez)	Arterial	2
7 SR-246 Between Edison St & SR-154	Caltrans (unincorporated County)	Highway	2
8 SR-154 South of SR-246	Caltrans (unincorporated County)	Highway	2
9 SR-154 Between Edison St & SR-246	Caltrans (unincorporated County)	Highway	2
10 Baseline Ave Between Refugio Rd & Edison St	County (Ballard)	Arterial	2
11 SR-154 Between US-101 & Foxen Canyon Rd	Caltrans (unincorporated County)	Highway	2

The intersections and segments, shown in **Figure 2** and **Figure 3**, respectively, were selected due to their significance in the roadway network within the study area, and are locations that could be affected by adjustments to traffic patterns in the future. **Figure 4** shows the current lane configurations of the study intersections.









3 EXISTING SETTING

This section presents an overview of the existing roadway and transportation network within the study area and describes the methodology for developing existing traffic volumes.

3.1. Roadway Descriptions

The following are descriptions of the key roadways that provide access to the study area:

- The **U.S. Route 101 (US-101)** is a major north-south freeway that traverses the Valley and Santa Barbara County. It runs through the western portion of the study area through Buellton. It is the main transportation link between the urban areas in the County. The freeway consists of two lanes in each direction. This facility accommodates approximately 20,000 vehicles per day in the study area.
- **State Route 154 (SR-154)** runs in a north-south orientation through the eastern portion of the study area that runs from Los Olivos to Santa Barbara. It is considered a scenic bypass alternative to US-101 for intra-regional travelers. The highway spurs from US-101 in the northern portion of the study area, traverses Los Olivos, passes east of Ballard and Santa Ynez, and goes through the east end of SR 246. The highway has two lanes with some passing lanes and accommodates approximately 13,000 vehicles per day. SR-154 provides an approximately eight-mile distance savings between its two termini with US-101 as compared to travel through on US-101, thereby encouraging long-distance traffic to frequently favor SR-154 over US-101. This condition contributes to higher traffic volumes on SR-154 than what would otherwise be destined for locations within the Valley or used by the Valley's residents.
- **State Route 246 (SR-246)** runs in an east-west orientation through the southern portion of the study area. The highway runs through the communities of Buellton, Solvang, and Santa Ynez. In these three communities, SR-246 serves as a main thoroughway, often without a viable alternative, and the roadway is named Mission Drive with Solvang. West of the City of Buellton, SR-246 consists of two lanes in each direction. In Buellton SR-246 consists of two lanes in each direction with a center turn lane. East of Buellton the highway is one lane in each direction with some passing lanes and center turn lane. The highway accommodates approximately 21,000 vehicles per day.

- **Alamo Pintado Road/Santa Barbara Avenue** runs in a north-south orientation through the center of the study area. The road is named Santa Barbara Avenue in the Los Olivos area and is named Alamo Pintado south of Los Olivos. The arterial runs through Los Olivos, Ballard and Solvang. It serves as an alternative to the area's highways for intra-community travel between the three communities. The roadway forks, with one portion splitting into Santa Barbara Avenue in west Los Olivos and the other becoming Grand Avenue running through central Los Olivos (intersecting with SR-154). The arterial is mostly two lanes..
- **Refugio Road** runs in a north-south orientation through the eastern portion of the study area. The arterial runs through Santa Ynez and just west of the Santa Ynez Band of Chumash Indians Reservation, terminating on the north end (in the study area) at Roblar Avenue. It serves as an alternative to highways for intra-community travel. The arterial mostly consists of one lane in each direction.
- **Baseline Avenue** runs in an east-west orientation through the eastern portion of the study area. The two-lane undivided roadway runs through the Ballard area, between Alamo Pintado Road on the west and Edison Street on the east.
- **Roblar Avenue** runs in an east-west orientation through the eastern portion of the study area. The two-lane undivided roadway runs south of Los Olivos area and north of the Ballard area, intersecting with SR-154.
- **Alisal Road** runs in a north-south orientation within the City of Solvang, providing access to the Downtown area. On-street parking is provided via both parallel and angled parking south of SR-246. South of Solvang, the roadway continues through unincorporated Santa Barbara County, terminating at Old Coast Highway near US-101. North of SR-246, Alisal Road serves residential uses, terminating on the north at Viborg Road. Alisal Road is identified as a key regional/emergency access route to and from Solvang.

3.2. Traffic Volumes

Based on discussions with SBCAG, the Santa Ynez Band of Chumash Indians, and the TAC, traffic data collection was focused on time periods in which the study area experiences high traffic demand. As such, existing traffic counts were conducted on Wednesday, May 29, 2019 (typical weekday) and Saturday, June 1, 2019 (typical weekend day) at

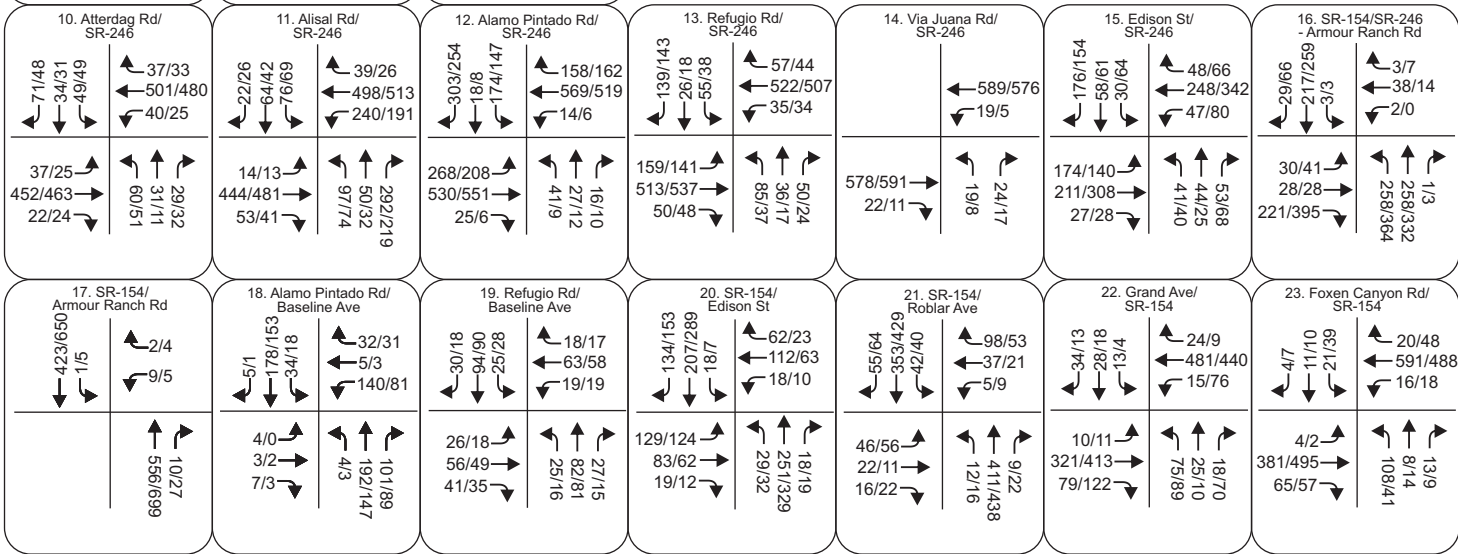
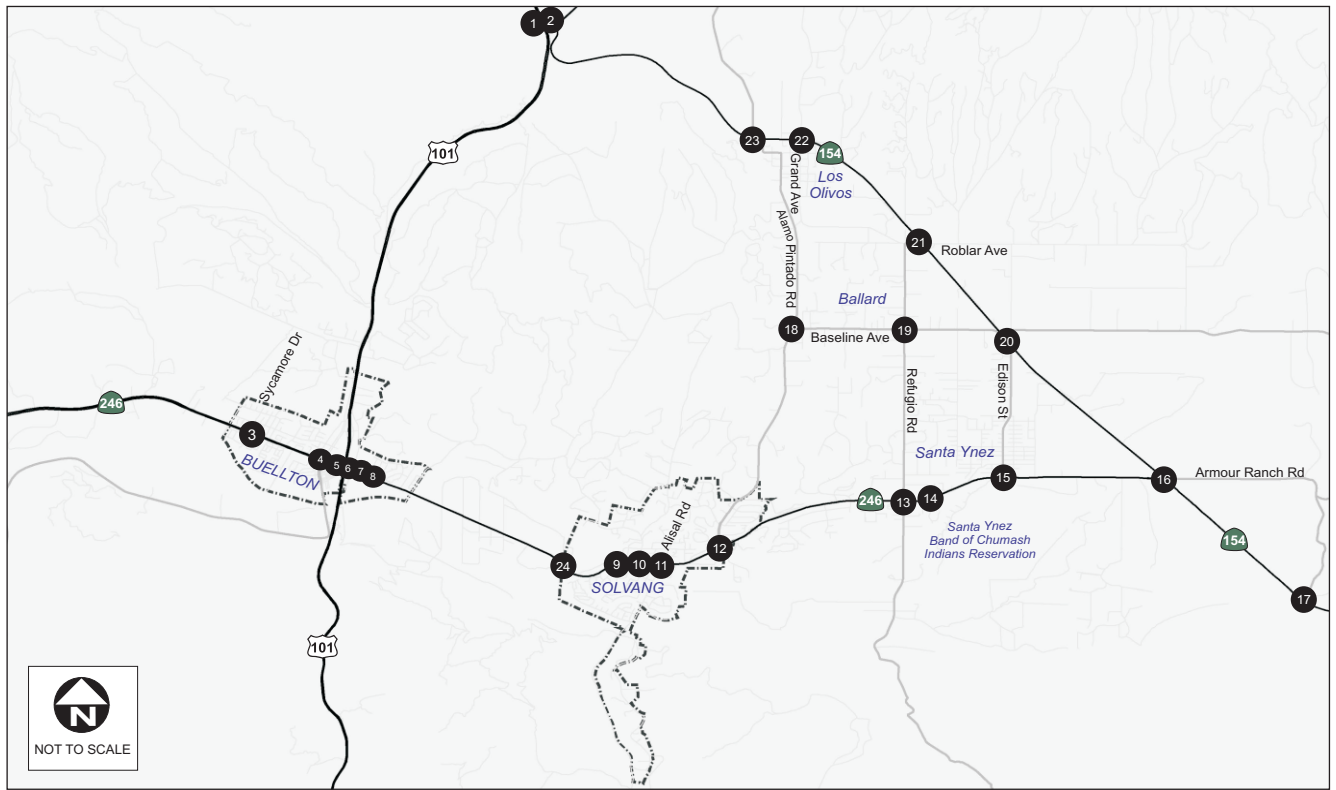
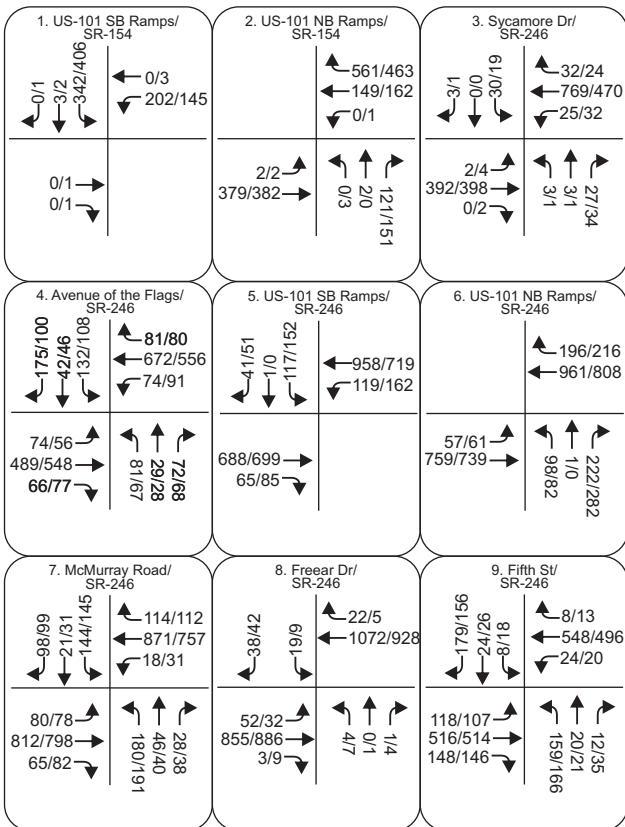
the study intersections. All counts were conducted during afternoon or evening peak periods, which was 3:00 – 6:00 p.m. during the weekday and 1:00 – 4:00 p.m. during the Saturday. Traffic counts at the Skytt Mesa Drive/SR-246 intersection were collected in January 2020 (weekday p.m. peak period only), as this intersection was added to the study later. The traffic analysis is based on the highest single hour of traffic during each time period at each location.

Intersection count data shows that intersections in the study area with the highest volume are in the City of Buellton. In particular, the US-101 Southbound Ramps/SR-246 and US-101 Northbound Ramps/SR-246 intersections have the highest peak hour traffic volumes during the weekend and weekday. Intersection movement data shows many vehicles heading east-west on SR-246. During the peak, vehicles pass through the intersections traveling to destinations on the west side of Buellton or pass through the region towards Lompoc. Nearly as many vehicles pass through the intersections to travel east on SR-246 heading towards Solvang and Santa Ynez. During the weekday p.m. peak, the Alamo Pintado Road/SR-246 intersection in Solvang also experiences high traffic volume. During the weekday, a high volume of traffic is observed turning onto and from Alamo Pintado Road, likely reflecting commuters traveling to residential locations. **Figure 5** shows the existing weekday p.m. peak and Saturday mid-day peak hour volumes at the study intersections.

In addition, 24-hour roadway segments counts were conducted on the same days (Wednesday, May 29, 2019 and Saturday, June 1, 2019) and on Saturday, July 27, 2019 to represent typical summer weekend traffic at selected study area roadway segments. Non-summer traffic counts were collected at eleven (11) locations while schools were still in session, avoiding any holiday-related shifts in traffic patterns. Summer traffic counts were collected at six (6) locations to capture shifts in traffic patterns and volume due to summer tourism activity. **Figure 6** shows the existing Spring weekday and Saturday 24-hour volumes, as well as the summer Saturday volumes at the roadway segments.

Roadway Average Daily Traffic (ADT) count data shows that weekend traffic exceeds weekday traffic on SR-154, whereas weekday traffic exceeds weekend traffic on most portions of SR-246. An exception is the portion of SR-246 from Edison Street to SR-154 where weekend traffic exceeds weekday traffic. The high weekend volumes on the SR-154 and in Santa Ynez are likely due to tourist traffic to and from the Chumash Casino Resort.

Detailed traffic count data are included in **Appendix B**.

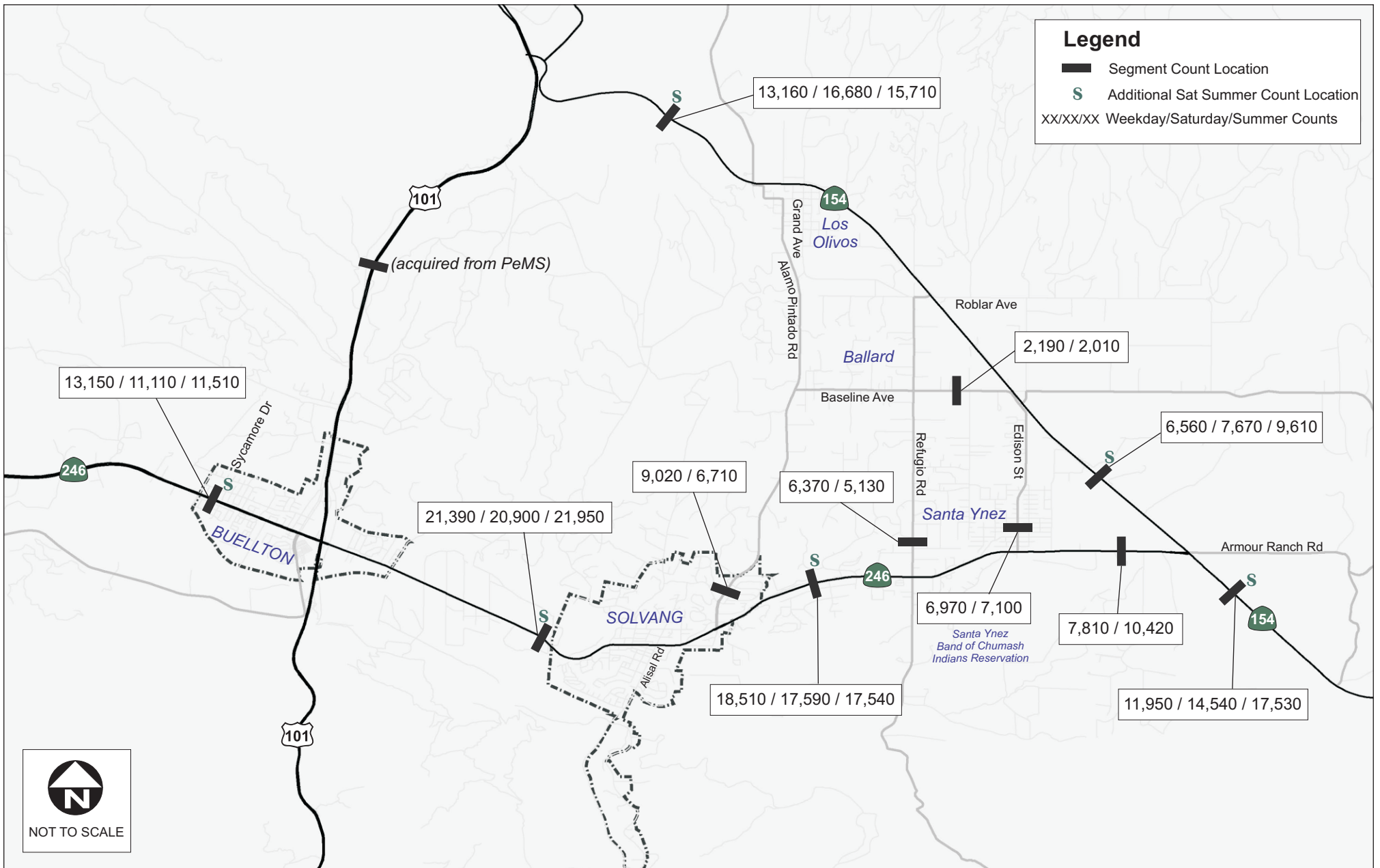


Legend

Study Intersection

XX/XX Weekday/Weekend PM Peak Hour Volumes

Note: Only Weekday PM volume counts shown



3.3. Traffic Travel Time and Speeds

Existing traffic travel time and speeds were collected from the Iteris ClearGuide transportation analytics platform. The ClearGuide platform calculates performance measurements on roadways using third-party probe data. Average travel times and speeds were measured for roadway segments in the region for all one-hour time periods for weekday and weekends in May 2019. Weekdays include all Tuesdays, Wednesdays, and Thursdays and weekends include Saturdays and Sundays.

Travel time and speed data shows traffic flows close to free flow on many of the study area’s roadway segments during the weekday p.m. peak and weekend mid-day peak. Traffic congestion is most notable in and around Solvang likely due to deteriorated operations at the intersections on SR-246 and heavy tourist pedestrian traffic in downtown Solvang. For example, the westbound traffic on SR-246 between Fifth Street and Alisal Road travels on average at just 12.6 Miles Per Hour (MPH) during the weekend mid-day peak (compared to the 25 mph speed limit).

Table 3 shows the existing weekday and weekend travel time and speeds at select study roadway segments.



Table 3: Roadway Segment Weekday PM Peak and Weekend Mid-day Travel Time and Speed

Route	Jurisdiction	Segment	Length	Avg. Speed Limit	Weekday				Weekend			
					NB/EB		SB/WB		NB/EB		SB/WB	
					Travel Time (min)	Speed (mph)	Travel Time (min)	Speed (mph)	Travel Time (min)	Speed (mph)	Travel Time (min)	Speed (mph)
SR-246	Buellton	City limits (Riverview Dr) to Avenue of Flags	0.98	39.2	1.25	47.4	1.18	50.3	1.19	49.7	1.13	52.3
	Buellton	Avenue of Flags to Freear Drive	0.46	35.0	0.71	39.3	0.97	32.0	0.66	41.6	0.79	36.7
	Buellton	Freear Drive to Ballard Canyon Road	0.44	35.0	0.75	35.6	0.82	34.3	0.74	36.2	0.80	34.3
	Buellton to Solvang	Ballard Canyon Road to Fifth Street	2.35	45.5	3.98	34.7	4.07	33.8	4.34	32.3	3.95	35.0
	Solvang	Fifth Street to Alisal Road	0.48	25.0	2.18	15.4	1.69	16.8	2.42	13.7	2.23	12.6
	Solvang	Alisal Road to Alamo Pintado Road	0.58	28.4	1.32	26.9	1.71	21.8	1.28	27.6	1.66	22.4
	Solvang to Santa Ynez area	Alamo Pintado Road to Refugio Road	1.88	47.4	2.68	42.2	3.45	34.5	2.56	44.3	2.74	41.3
	Santa Ynez area	Refugio Road to Edison Street	1.12	41.3	1.70	35.4	1.87	37.7	1.66	36.2	1.59	37.7
	Santa Ynez area	Edison Street to SR-154 roundabout	1.63	49.6	1.99	47.5	2.08	45.0	2.06	46.1	2.08	44.9
SR-154	Los Olivos area	US-101 to Foxen Canyon Road	2.88	51.8	3.48	49.9	3.33	51.9	3.45	50.9	3.27	52.9
	Los Olivos area	Foxen Canyon Road to Alamo Pintado Road	0.83	55.0	0.94	53.4	0.84	54.4	0.93	53.7	0.86	52.9
	Los Olivos to Santa Ynez area	Alamo Pintado Road to Baseline Ave/Edison Ave	2.77	55.0	3.13	53.40	3.06	54.4	3.09	54.10	3.13	53.3
	Santa Ynez area	Baseline Ave/Edison Street to SR-246 Roundabout	2.22	55.0	2.58	51.90	2.52	52.8	2.59	51.70	2.60	51.2

Note: Peak hour is defined by count data

1 = The Average Speed Limit is a calculation of the varying speed limits across along a segment, weighted by the length of sub-segments.

3.4. Pedestrian and Bicycle Facilities

This section presents a description of the existing pedestrian and bicycle facilities in the study area.

3.4.1. Bicycle Facilities

The existing bicycle network consists of bike routes and bike lanes in the project study area. Recreational bicycling is popular. The following includes facilities provided along the corridors of the study area:

Regional Facilities:

- Alamo Pintado Road/Grand Avenue from SR-246/Mission Drive to SR-154 – Class II
- Refugio Road from SR-246/Mission Drive to Ontiveros Road – Class II
- Roblar Avenue from Alamo Pintado Road/Grand Avenue to Refugio Road – Class II
- SR-246/Mission Drive (north side) between Alamo Pintado Road and Refugio Road – Class I

City of Buellton:

- SR-246 within Buellton City limits – Class II
 - Bicycle lanes are not continuous along SR-246 in Buellton. West of Avenue of Flags bicycle lanes are present for both directions. Between Avenue of Flags and McMurray Road, through the US-101 interchange, there is no accommodation for bicyclists. East of McMurray Road to the Buellton city limit there is only a westbound bicycle lane.
- McMurray Road between Damassa Road and SR-246/Mission Drive – Class II
- Avenue of Flags – Class II
- Shadow Mountain Drive between Six Flags Circle and Avenue of Flags – Class III
- 2nd Street between Riverview Drive and Avenue of Flags – Class III

City of Solvang:

- Alisal Road between Fjord Drive and Elverhoy Way – Class II
- Atterdag Road/Chalk Hill Road between Eucalyptus Drive and Solvang Mesa Drive – Class II
- Fjord Drive between Alisal Road to the western City boundary – Class II
- Viborg Road Class II

3.4.2. Pedestrian Facilities

In the City of Buellton most streets within the City have concrete sidewalks along both sides, with a few exceptions. Along the Damasa Road overcrossing above US-101, there are currently no sidewalks on both sides and there is a need for a pedestrian railing on the structure. Similarly, along the SR-246 overcrossing above US-101, there is a need for a pedestrian railing. In addition, there are currently along the east side of McMurray Road between Hampton Inn and Vineyard Village.

In the City of Solvang, there are sidewalks throughout the Village area for high tourist-related pedestrian traffic. Many of the other streets in Solvang do not have sidewalks to preserve the rural character of the City.

In addition, a new pedestrian bridge is currently being constructed in Los Olivos (replacing the current structure), across the Alamo Pintado Creek, parallel to and south of SR-154. Upon completion, the bridge will provide the community with a key enhancement to pedestrian and bicycle mobility between residential areas to the west (including Los Alamos) and the Los Olivos commercial area to the east. This bridge is envisioned to one day be part of a multimodal trail connecting Los Olivos with Los Alamos along the former Pacific Coast Narrow Gauge Railroad.

3.4.3. Bicycle and Pedestrian Traffic Volumes

Existing bicycle and pedestrian traffic counts were conducted on Wednesday, May 29, 2019 (typical weekday) and Saturday, June 1, 2019 (typical weekend day) at the following sub-set of intersections:

- Sycamore Drive/SR-246;
- Avenue of Flags/SR-246;
- Fifth Street/SR-246;
- Atterdag Road/SR-246;
- Alisal Road/SR-246;
- Alamo Pintado Road/SR-246;
- Refugio Road/SR-246; and
- Via Juana Road/SR-246.

All counts were conducted during afternoon or evening peak periods (similar to the vehicle counts), which was 3:00 – 6:00 p.m. during the weekday and 1:00 – 4:00 p.m. during the Saturday in Spring. In addition to the Spring counts, pedestrian data during a typical Summer Saturday was collected at the Alisal Drive/SR-246 intersection during the same 1:00 – 4:00 p.m. period as the Spring counts. The data is generally summarized as follows:

- The highest pedestrian volume occurred at the Atterdag Road/SR-246 intersection:
 - Approximately 250 pedestrians during the weekday peak hour
 - Approximately 660 pedestrians during the Saturday peak hour
- The second highest pedestrian volume occurred at the Alisal Road/SR-246 intersection:
 - Approximately 140 pedestrians during the weekday peak hour
 - Approximately 400 pedestrians during the Saturday peak hour (Spring)
 - Approximately 540 pedestrians during the Summer Saturday peak hour
- The third highest pedestrian volume occurred at the Fifth Street/SR-246 intersection, with approximately 50 weekday and 150 Saturday pedestrians.
- Pedestrian volumes on Saturday were roughly three times higher than volumes on the weekday.
- Bike volumes on Saturday were roughly 40% higher than volumes on the weekday:
 - The highest hourly bike volume, 27 bicyclists, occurred at the Alisal Drive/SR-246 intersection on Saturday.
 - The second highest hourly bike volume, 21 bicyclists, occurred at the Refugio Road/SR-246 intersection on the weekday.

In addition, based on input provided by the TAC and members of the public, there is bicycle and pedestrian traffic associated with the high school, summarized as follows:

- High school students residing on the Chumash Reservation connect to the school by walking or bicycling along the shoulder of SR-246 where there is no formal accommodation for either mode.
- High school students frequently visit El Rancho Market south of SR-246. The current pedestrian crossing facilities at Refugio Road are not conveniently located to satisfy this demand and result in significant walking detours.

3.5. Transit

The transit system serving the study area is comprised of bus services provided by Santa Ynez Valley Transit (SYVT), City of Lompoc Transit (COLT), and Clean Air Express (CAE). Transit routes serving the study area are described as follows:

- **SYVT Express Route** – Route runs between Buellton, Solvang, and Santa Ynez. The route runs from 6:30 a.m. to 7:00 p.m. with 30 minute headways. A general fare is \$1.50.
- **SYVT Los Olivos Loop** – The Los Olivos Loop runs between Solvang, Santa Ynez, and Los Olivos. The route runs from 7:00 a.m. to 6:20 p.m. with one hour headways in the morning and up to two hour headways in the afternoon. A general fare is \$1.50.
- **COLT Wine County Express** – The Wine County Express runs between Lompoc, Buellton, and Solvang. The route has three trips a day in each direction in the morning, mid-day, and afternoon. A general fare is \$2.00.
- **CAE Santa Ynez Valley to Goleta** – Route runs from Goleta to Buellton and Solvang. The route serves residents of the Valley commuting to their jobs in Goleta. The route has one trip from Solvang/Buellton to Goleta in the a.m. and one trip in the reverse direction in the p.m. on weekdays. A general fare is \$7.00.
- **CAE Santa Ynez Valley to Santa Barbara** – Route runs from Santa Barbara to Buellton. The route serves residents of the Valley commuting to their jobs in Santa Barbara. The route has one trip from Buellton to Santa Barbara in the a.m. and one trip in the reverse direction in the p.m. on weekdays. A general fare is \$7.00.
- **SMAT Breeze 200 Bus** – Route runs from Santa Maria to Buellton and Solvang.

SYVT also provides curb-to-curb dial-a-ride service for seniors and ADA-certified patrons.



4 TRAFFIC OPERATIONS ANALYSIS

This section describes the traffic analysis tools, methodology, evaluation criteria, and the current traffic operations of the study intersections in the area.

4.1. Analysis Tools

Iteris, in consultation with SBCAG staff, proposed evaluating traffic conditions in the study area via a microsimulation traffic model. The VISSIM 11 traffic software, provided by PTV Group, was concluded to be the most suitable for this project. VISSIM is a powerful microsimulation software well-known within the traffic engineering industry and is well suited for the type of detailed analysis necessary for this type of study, which entails assessing existing conditions across a wide area with unique traffic conditions and testing various improvements to the roadway and circulation network in the area.

The study area of interest is large in nature, with each “side” of the triangular perimeter highways forming around 10 miles of freeway or arterial roadway. In order to properly input, calibrate, and run that size of microsimulation model, major model development time and extensive data collection would be required. For the sake of more efficiently modeling the large study area, Iteris modeled the study area via a “hybrid” model (using VISSIM). The hybrid modeling approach is done by modeling only select areas via full microsimulation and via a simplified mesosimulation for the remaining areas, which are mostly rural and uncongested portions of the study area, all within the same model file. This hybrid combination model allow for locations where congestion and safety are of top concern to still be modeled in full detail, while more efficiently processing the large network size.

4.2. Evaluation Methodology

Analysis of existing traffic operations was conducted according to the traffic impact analysis guidelines used by SBCAG. SBCAG utilizes the Highway Capacity Manual (HCM) methodology, which uses vehicular delay criteria to determine Levels of Service (LOS). **Table 4** presents a brief description of each level of service letter grade, as well as the range of HCM average intersection delay associated with each grade for signalized intersections. It should be noted that LOS focuses on one mode of travel – automobiles. In fact, areas with high volumes of pedestrians or bicyclists may negatively impact the LOS result. As mobility and quality of life are not defined solely by the flow of automobile traffic, LOS is only one aspect of assessing improvements. Careful consideration of the relationship between all modes of travel must be part of any traffic analysis.

Table 4: Intersection Level of Service Definitions – HCM Methodology

LOS	Description	Signalized Intersection Delay (seconds per vehicle)	Unsignalized Intersection Delay (seconds per vehicle)
A	Excellent operation. All approaches to the intersection appear quite open, turning movements are easily made, and nearly all drivers find freedom of operation.	≤ 10	≤ 10
B	Very good operation. Many drivers begin to feel somewhat restricted within platoons of vehicles. This represents stable flow. An approach to an intersection may occasionally be fully utilized and traffic queues start to form.	>10 and ≤ 20	>10 and ≤ 15
C	Good operation. Occasionally drivers may have to wait more than 60 seconds, and back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted.	>20 and ≤ 35	>15 and ≤ 25
D	Fair operation. Cars are sometimes required to wait more than 60 seconds during short peaks. There are no long-standing traffic queues.	>35 and ≤ 55	>25 and ≤ 35
E	Poor operation. Some long-standing vehicular queues develop on critical approaches to intersections. Delays may be up to several minutes.	>55 and ≤ 80	>35 and ≤ 50
F	Forced flow. Represents jammed conditions. Backups form locations downstream or on the cross street may restrict or prevent movement of vehicles out of the intersection approach lanes; therefore, volumes carried are not predictable. Potential for stop and go type traffic flow.	> 80	> 50

Source: Highway Capacity Manual, Sixth Edition, Transportation Research Board, Washington, D.C., 2016

4.3. Intersection Traffic Analysis

This section summarizes the existing intersection LOS during a typical weekday p.m. and Saturday mid-day peak hour utilizing the existing traffic volumes described earlier. The intersection analysis utilized both the VISSIM 11 and Synchro 10 software packages, depending on the intersection location. **Table 5** summarizes the existing weekday p.m. and Saturday mid-day peak hour traffic operating conditions at the study intersections. Detailed LOS calculation sheets are provided in **Appendix C**.

Table 5: Existing Intersection LOS/Delay

Intersection	Traffic Control	Weekday PM Peak Hour			Saturday Mid-day Peak Hour		
		Volume	Avg. Vehicle Delay (s)	LOS	Volume	Avg. Vehicle Delay (s)	LOS
1 US-101 SB Ramps/SR-154^	Stop-control	547	11.5	B	559	12.4	B
2 US-101 NB Ramps/SR-154^	Stop-control	1,214	12.1 (NB)	B	1,164	12.8 (NB)	B
3 Sycamore Dr/SR-246	Stop-control	1,286	12.9 (NB)	B	986	12.9 (NB)	B
4 Ave of Flags/SR-246	Signalized	1,987	17.3	B	1,825	15.4	B
5 US-101 SB Ramps/SR-246	Signalized	1,989	7.7	A	1,868	11.7	B
6 US-101 NB Ramps/SR-246	Signalized	2,294	12.8	B	2,188	15.4	B
7 McMurray Road/SR-246	Signalized	2,477	22.2	C	2,402	31.6	C
8 Freear Dr/SR-246	Signalized	2,066	8.1	A	1,923	8.8	A
9 Fifth St/SR-246 (Mission Dr)	Signalized	1,764	36.7	D	1,718	27.8	C
10 Atterdag Road/SR-246 (Mission Dr)	Signalized	1,363	15.7	B	1,272	13.1	B
11 Alisal Rd/SR-246 (Mission Dr)	Signalized	1,889	52.3	D	1,727	21.7	C
12 Alamo Pintado Rd/SR-246 (Mission Dr)	Signalized	2,143	24.3	C	1,892	18.2	B
13 Refugio Road/SR-246	Signalized	1,727	16.5	B	1,588	13.5	B
14 Via Juana Rd/SR-246	Stop-control	1,251	11.0 (NB)	B	1,208	11.8 (NB)	B

Intersection	Traffic Control	Weekday PM Peak Hour			Saturday Mid-day Peak Hour		
		Volume	Avg. Vehicle Delay (s)	LOS	Volume	Avg. Vehicle Delay (s)	LOS
15 Edison St/SR-246	Signalized	1,157	15.2	B	1,376	16.5	B
16 SR-154/SR-246 Armour Ranch Rd	Yield**	1,088	4.7 (WB)	A	1,512	7.3 (SEB)	A
17 SR-154/Armour Ranch Rd^	Stop-control	1,001	19.0 (WB)	C	1,390	24.9 (WB)	C
18 Alamo Pintado Rd/Baseline Ave^	All-way Stop-control	705	10.5	B	531	9.2	A
19 Refugio Rd/Baseline Ave^	All-way Stop-control	506	8.7	A	444	8.4	A
20 SR-154/Edison St	All-way Stop-control	1,080	19.0	B	1,123	23.1	C
21 SR-154/Roblar Ave	Stop-control	1,106	58.6 (WB)	F	1,181	34.9 (WB)	C
22 Grand Ave/SR-154	Stop-control	1,123	49.8 (NB)	D	1,275	>100 (NB)	F
23 Foxen Canyon Rd/SR-154	Stop-control	1,242	60.6 (NB)	F	1,228	39.4 (SB)	D
24 Skytt Mesa Dr/SR-246	Stop-control	1,811	99.9 (NB)	F	N/A	N/A	N/A

Notes:

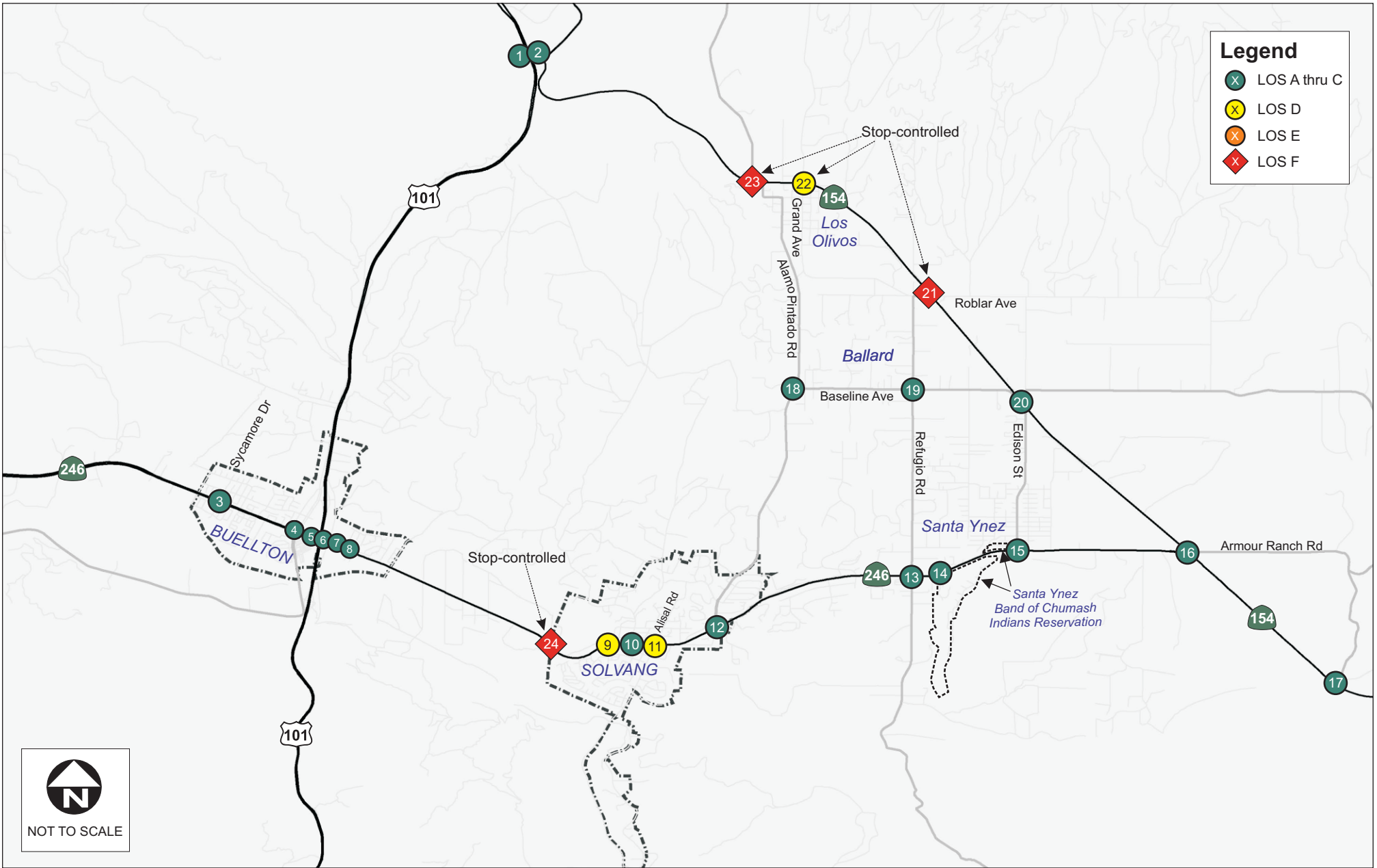
Unsignalized Intersection; ** Roundabout; ^ Analyzed using HCM 6TH Edition Methodology in Synchro
 LOS = Level of Service; Delay = Average Vehicle Delay (Seconds)

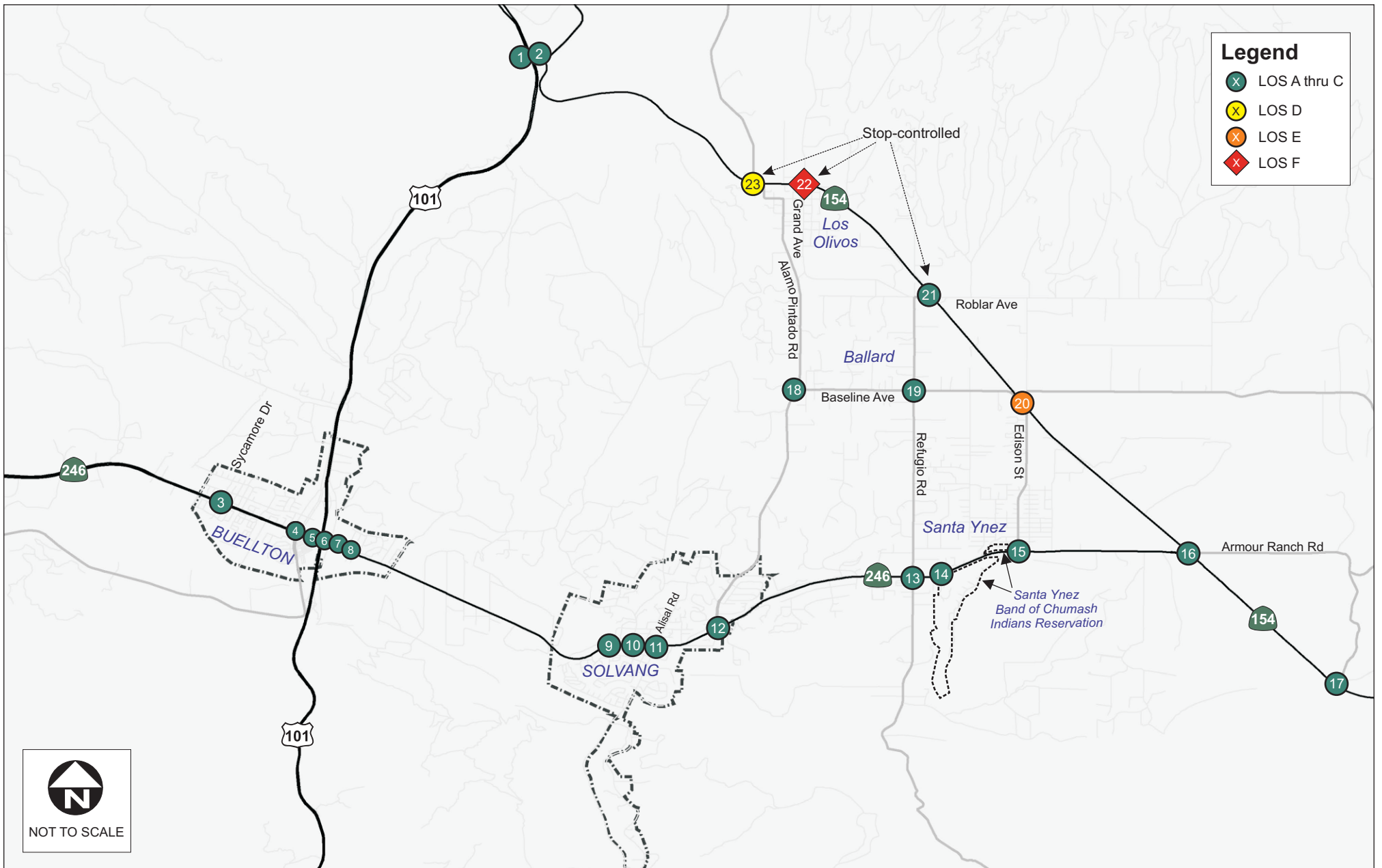
Stop-controlled intersections show highest approach delay and LOS.
 LOS E and F conditions are highlighted in **BOLD**.

As shown in **Table 5**, 20 out of 24 of the study intersections are currently operating at satisfactory levels (LOS D or better), while four intersections are currently operating at LOS F. Three of the study intersections located along the SR-154 corridor (SR-154/Roblar Avenue; Grand Avenue/SR-154; and Foxen Canyon Road/SR-154) operate at LOS F during either the weekday p.m. peak or Saturday mid-day peak. Note that all four of the intersections are stop-controlled. Thus, the deficient vehicle delays are experienced by minor street vehicles (as opposed to vehicles traveling on SR-154 or SR-246) and in turn have the tendency to be more detrimental to local residents and visitors. **Figure 7** and **Figure 8** show the weekday p.m. and Saturday mid-day LOS results, respectively.

As a background consideration, note that Caltrans is currently in the process of planning improvements at the SR-154/Edison Street intersection, through the construction of a roundabout. The current configuration consists of two closely spaced all-way stop-controlled intersections. The construction capital cost of the roundabout is approximately \$6.8 million, and is anticipated for construction bidding in 2021.







4.4. Roadway Segment Evaluation

As mentioned, roadway segment ADT counts were collected on a typical weekday in May/June 2019 at the eleven locations selected within the study area (shown in **Figure 3**). **Table 6** provides a summary of the weekday ADT volumes (total of both directions) and **Table 7** provides a summary of the weekend ADT volumes, noting the highest a.m. and p.m. hour of traffic during the count day.

Table 6: Existing Weekday ADT Volume

Segment	Number of Lanes (Both Directions)	Classification	Average Daily Traffic (ADT)	AM Peak Hour	AM Peak Volume	PM Peak Hour	PM Peak Volume
1 SR-246 west of Sycamore Dr	4	Highway	13,146	7:30 AM	1,069	3:30 PM	1,176
2 SR-246 west of Skytt Mesa Dr	2	Highway	21,387	7:30 AM	1,553	3:15 PM	1,719
3 Alamo Pintado Rd north of SR-246	4	Arterial	9,018	11:45 AM	788	3:15 PM	833
4 SR-246 between Alamo Pintado Rd & Refugio Rd	2	Highway	18,509	11:30 AM	1,343	3:45 PM	1,525
5 Refugio Rd north of SR-246	2	Arterial	6,366	11:45 AM	565	12:00 PM	588
6 Edison St north of SR-246	2	Arterial	6,965	11:45 AM	578	12:00 PM	605
7 SR-246 between Edison St & SR-154	2	Highway	7,802	11:45 AM	533	4:00 PM	617
8 SR-154 south of SR-246	2	Highway	11,946	11:30 AM	799	4:45 PM	978
9 SR-154 between Edison St & SR-246	2	Highway	6,552	11:15 AM	466	3:15 PM	550
10 Baseline Ave between Refugio Rd & Edison St	2	Arterial	2,189	7:30 AM	185	3:15 PM	204
11 SR-154 between US-101 & Foxen Canyon Rd	2	Highway	13,157	7:45 AM	831	4:30 PM	1,195

As shown in **Table 6**, the p.m. peak hour volumes along the roadway segments are higher than the a.m. peak hour during a typical weekday.

Table 7: Existing Saturday ADT Volume

Segment	Number of Lanes	Classification	Average Daily Traffic (ADT)	AM Peak Hour	AM Peak Volume	PM Peak Hour	PM Peak Volume
1 SR-246 west of Sycamore Dr	4	Highway	11,110	11:00 AM	800	3:00 PM	876
2 SR-246 west of Skytt Mesa Dr	2	Highway	20,896	11:45 AM	1,626	3:00 PM	1,644
3 Alamo Pintado Rd north of SR-246	4	Arterial	6,703	11:45 AM	610	12:30 PM	635
4 SR-246 between Alamo Pintado Rd & Refugio Rd	2	Highway	17,582	11:45 AM	1,319	2:00 PM	1,330
5 Refugio Rd north of SR-246	2	Arterial	5,122	11:30 AM	461	3:15 PM	427
6 Edison St north of SR-246	2	Arterial	7,094	11:45 AM	523	1:30 PM	553
7 SR-246 between Edison St & SR-154	2	Highway	10,413	11:15 AM	698	2:15 PM	922
8 SR-154 south of SR-246	2	Highway	14,532	11:15 AM	1,121	2:15 PM	1,322
9 SR-154 between Edison St & SR-246	2	Highway	7,668	11:15 AM	700	12:00 PM	691
10 Baseline Ave between Refugio Rd & Edison St	2	Arterial	2,004	11:15 AM	191	3:15 PM	181
11 SR-154 between US-101 & Foxen Canyon Rd	2	Highway	13,679	11:30 AM	1,025	12:45 PM	1,090

As shown in **Table 7**, during a typical Saturday, the a.m. and p.m. peak hours are both closer to the middle of the day, reflecting tourist activity during the day.

4.5. Future Year Traffic Conditions

Iteris reviewed the SBCAG Regional Travel Demand model as a means of developing future year traffic forecasts as well as regional travel patterns and trips to, from, and through the Santa Ynez Valley. The SBCAG model uses the TransCAD software to run trip generation, trip distribution, and mode split for each of the trip purposes and from there develops vehicle and transit trip tables. Vehicular trips are all developed separately for automobiles and trucks.

It was concluded that the projected growth in volumes between base and future years would be minimal (below 5%). In addition, per United States Census Data, Santa Barbara County's population is growing by approximately 0.2% per year. Based on this review and the results of the existing conditions traffic analysis, it was determined that a separate future year 2040 traffic analysis scenario would not be necessary, as the results would be nearly identical to existing. The existing conditions results, along with community feedback, are sufficient in developing and evaluating improvement measure options throughout the Santa Ynez Valley.



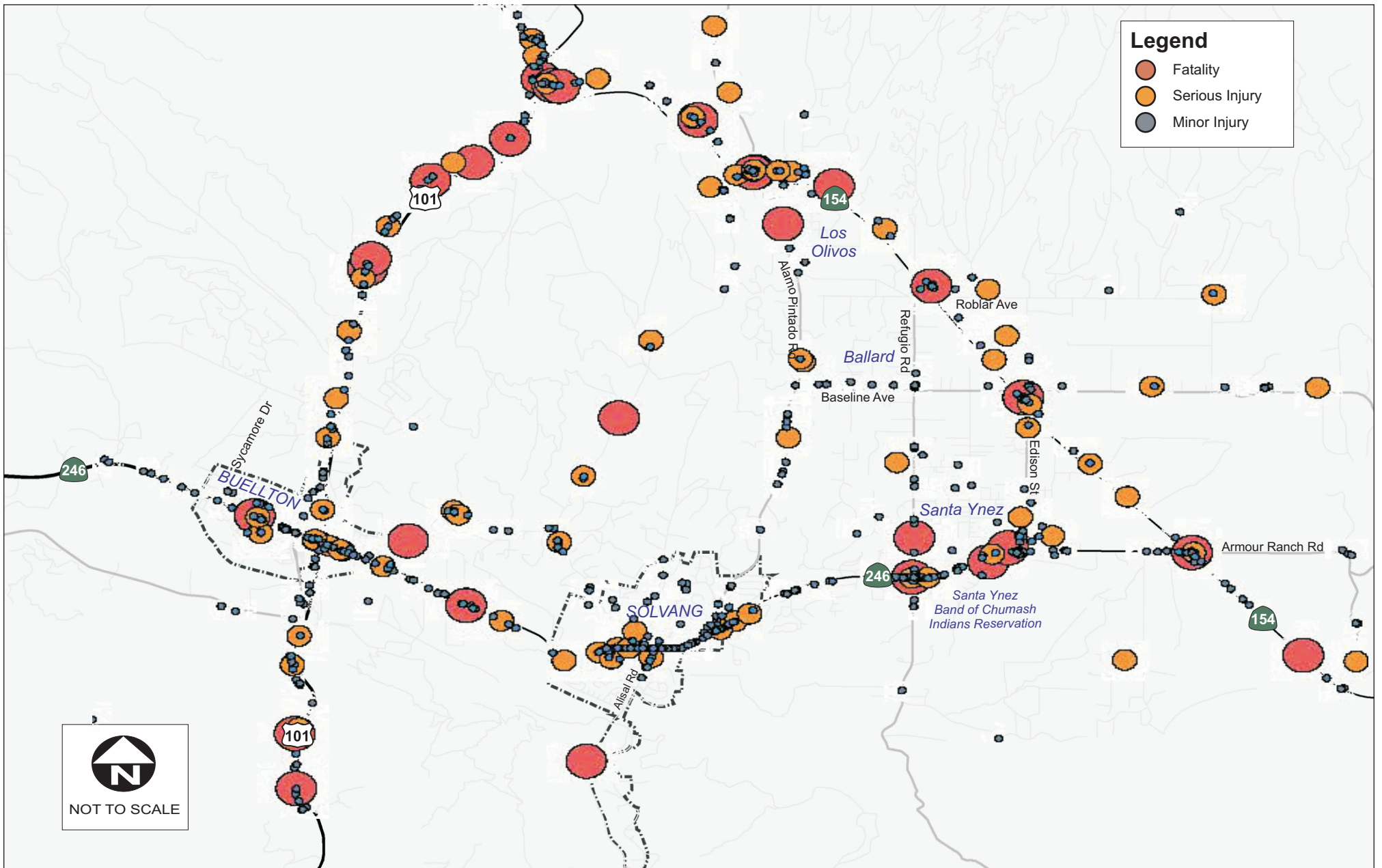


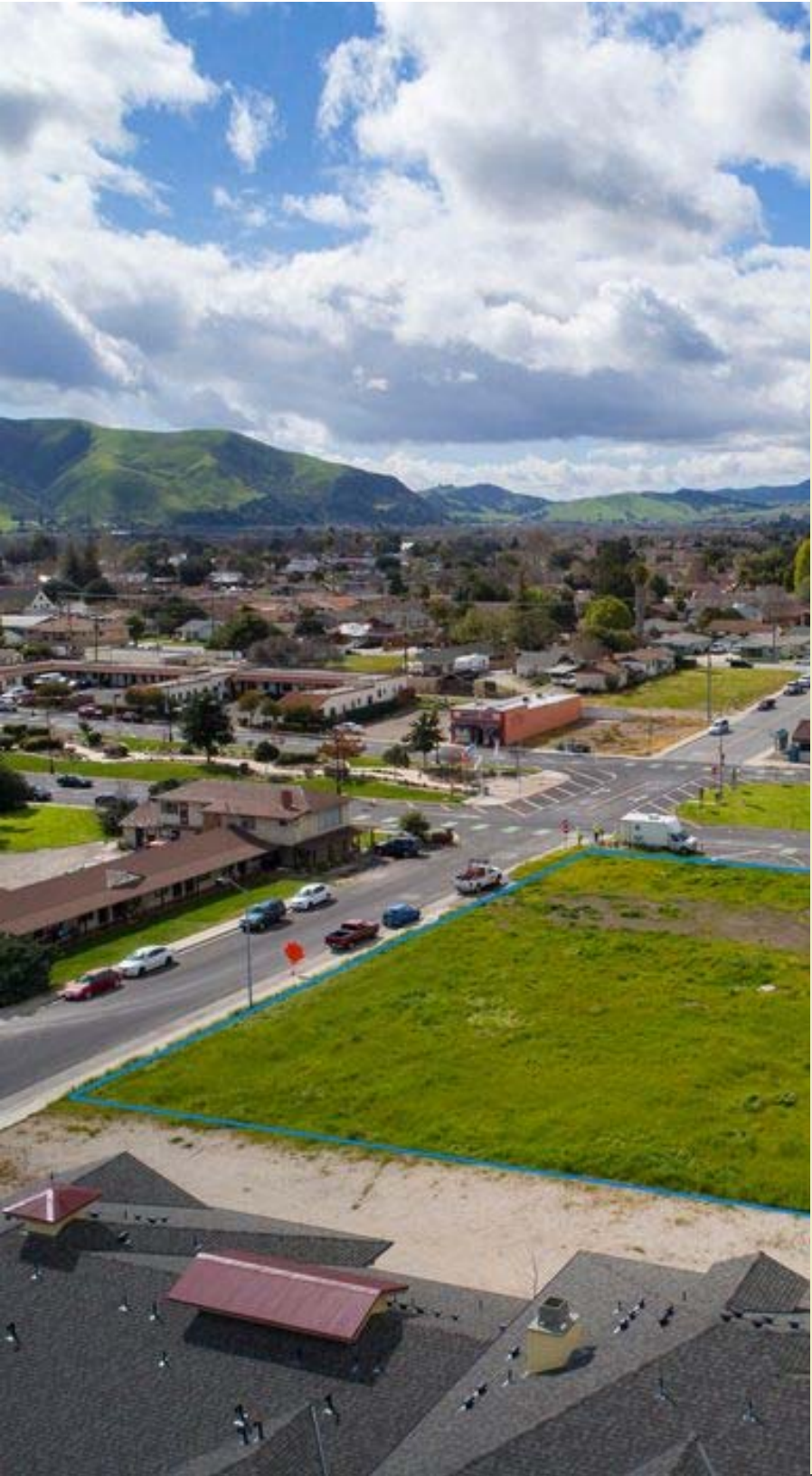
5 COLLISION DATA

This section presents a description traffic collision data within the study area from CHP SWITRS (California Highway Patrol Statewide Integrated Traffic Records System) from 2006-2016. In 2016, over 50 traffic crashes resulting in fatalities, major injuries or minor injuries were reported on Valley roadways. Fortunately, over 86 percent of those crashes resulted in only minor injuries. However between 2008 and 2016 on average, three (3) fatalities occurred and eight (8) people suffered serious injuries every year on Valley highways, arterials and local streets. While vehicle technology advancements should help reduce the number of collisions in the coming years, enhancing the safety of our existing roads to save more lives remains a key transportation priority.

The collision data also includes details on incidents involving pedestrians and bicyclists. Over the 10-year period, 2 pedestrian fatalities resulted along roadways within the Santa Ynez Valley study area. No bicyclist fatalities occurred within the study area.

Figure 9 shows the location of traffic collisions from 2008 to 2016 in the study area. Note that while data for 2017 and 2018 is available, it is considered preliminary and subject to change/deletion. Thus, it is excluded from the figure in this report. This is considered a standard practice when using SWITRS data.





6 IMPROVEMENT OPTIONS ANALYSIS

This section presents an analysis of concepts to inform decision makers on opportunities for improved safety and mobility within the study area. The measures were developed through a combination of traffic data analysis and community outreach. The measures range from low-cost, short-term improvements to long-range measures that could require significant costs in order to implement.

Note that for intersection-level options within Caltrans' jurisdiction, implementation will require adherence to Caltrans' Intersection Control Evaluation (ICE) process. The purpose of this process, during the planning phase, is to contemplate the addition, expansion, or full control of intersections. This may involve the use of signal, stop, or yield control at major intersection movements. When considering these modified traffic control options, a warrant study/analysis consistent with the California Manual on Uniform Traffic Control Design (MUTCD) is typically incorporated.

The majority of the study locations are along Caltrans-operated facilities. At locations, within the Cities of Solvang and Buellton, the Cities could explore the possibility of relinquishment. Relinquishment would allow the Cities to have full control of intersections and roadways, allowing them to implement improvement measures that are consistent with City goals and standards.

6.1. Focus Areas

The improvements are broken up into four focus areas within the larger study area. **Figures 10a** and **10b** show the four improvement focus areas within the study area, noting the location of potential improvement measures described in this section.

6.1.1. Focus Area 1 – Los Olivos Area

In the northern portion of the study area, Los Olivos includes the SR-154 intersections of Foxen Canyon and Grand Avenue. The following improvement options are considered in this area:

1. At the Foxen Canyon Road/SR-154 intersection, consider the installation of a roundabout to replace the current two-way stop-controlled operation. This improvement type is aimed at providing safety benefits through reductions in speed along SR-154, as typical speeds within a roundabout are between 15 and 20 MPH. The feasibility of designing a roundabout at this location would need to consider the close proximity of Ballard Canyon Road/Steele Street to the south.

2. Similarly, at the Grand Avenue/SR-154 intersection approximately 0.45 miles to the east, the installation of either a roundabout, traffic signal, or all-way stop-control is considered as an option to replace the current two-way stop-controlled operation.
3. Consistent with the Santa Ynez Valley Bicycle Master Plan, consider a multimodal trail between Los Olivos and Los Alamos to provide recreational and mobility options for the area's residents and visitors. The trail would begin in the vicinity of Mattie's Tavern and include the pedestrian bridge alongside SR-154 which is in the early stages of being replaced by Caltrans.



6.1.2. Focus Area 2 – Santa Ynez/Ballard Area

In the eastern portion of the study area, Santa Ynez and Ballard include intersections along SR-154 and SR-246. The following improvement options are considered in this area:

4. At the Roblar Avenue/SR-154 intersection, consider the installation of either a roundabout, traffic signal, or all-way stop-control to replace the current two-way stop-controlled operation. Another option would be to close off this intersection, resulting in traffic being rerouted south to Baseline Avenue/Edison Street.
5. Along SR-154, consider installation of speed feedback signs to enhance drivers' awareness of the posted speed limit and encourage drivers to comply with the law. By displaying both the

- posted speed limit and their actual traveling speed, motorists are reminded how far above the speed limit they are traveling.
6. At the Via Juana Road/SR-246 intersection, consider the installation of a left-turn refuge/acceleration lane, which is an auxiliary lane that allows for left-turning vehicles off a minor street to accelerate along a major street before merging into the through lane. As a related project, in response to pedestrian movements between Via Juana and Refugio Road (at the high school), the Santa Ynez Valley Bicycle Master Plan includes a trail project along the north side of SR-246 between Edison Street and the high school).
7. At the El Rancho Market driveway (approximately 700 feet west of Refugio Road), consider installing either a traffic signal or signalized crosswalk. The signalized intersection would include the High School parking lot driveway (as the southbound approach) which is slightly offset with the El Rancho Market driveway. This option would facilitate improved/protected left-turn movements out of the El Rancho Market and the High School driveway, as well as provide another pedestrian crossing option between the market and the high school. Through community feedback, it is understood that unsafe pedestrian crossings occur in this vicinity as opposed to crossings at the signalized Refugio Road intersection. Note that any proposed crosswalks would be subject to an engineering evaluation report to determine need and deficiency per the MUTCD.
8. The Santa Ynez Valley Bicycle Master Plan identified the need for a multimodal trail to connect the Chumash Reservation and the Village of Santa Ynez with Refugio Road. The trail would be aligned alongside SR-246 and extend between Refugio Road and Edison Street. In addition to providing an unmet connection between the two end points, it would connect to the existing Class 1 facility that extends to Alamo Pintado Road. This would be one segment of a future multimodal trail extending from the Village of Santa Ynez to the City of Buellton.

In addition to the Via Juana Road location, a similar one-way stop-controlled "T-intersection" condition occurs to the east along SR-246 at Amber Farms Road. The installation of a left-turn refuge/acceleration lane at this location could be considered as a safety improvement for the southbound left-turn movement onto eastbound SR-246. Unlike Via Juana Road, though, there is currently not a painted median along SR-246 adjacent to Amber Farms Road. Thus, given the current width of the roadway, further analysis would be required to determine feasibility.

At Edison Street/SR-246, a consideration noted through public outreach was the potential re-striping of the southbound Edison Street approach to add a dedicated right-turn lane. This new right-turn pocket option could alleviate delay experienced by right-turning motorists that have to wait behind left-turning or through movement motorists during the red phase of the signal. Caltrans had previously reviewed this consideration and determined that adequate right-of-way was not available for an inexpensive re-striping only improvement. The traffic signal pole would need to be relocated and the hill would need to be cut back in order to accommodate a wider Edison Street. Further analysis would be required to evaluate the costs and associated benefits to improve this intersection.

Another consideration within this area is the installation of advanced warning signage along northbound SR-154 approaching the SR-154/SR-246 roundabout intersection. The signage would inform motorists, many of whom are traveling at high speeds, that a roundabout intersection is approaching, and that they should be prepared to reduce speeds and yield. Given the fact that a roundabout is more of an atypical configuration, especially for tourists not familiar with the area, the warning signage would serve as a measure to improve driver awareness.

6.1.3. Focus Area 3 – Solvang Area

In the southern portion of the study area, the City of Solvang includes intersections along SR-246. The following improvement options are considered in this area:

9. At the Alamo Pintado Road/SR-246 (Mission Drive) intersection, consider the installation of a roundabout to replace the current signalized operation.
10. At the Alisal Drive/SR-246 (Mission Drive) intersection, consider adding a pedestrian scramble crosswalk operation. A pedestrian scramble is a type of pedestrian signal timing in which vehicle traffic is stopped in all directions, allowing pedestrians to cross in all directions (including diagonally) within an exclusive phase. In addition, consider construction of curb extensions to reduce

- pedestrian crossing distances (if bike lanes are not implemented).
11. At the First Street/SR-246 (Mission Drive) intersection, consider installing Rectangular Rapid Flashing Beacons (RRFB) at the current northbound-southbound crosswalk (for pedestrians crossing SR-246). Note that due to the proximity of this location to a current



- crossing with RRFB operations along SR-246 (approximately 230 feet west), it is unlikely that Caltrans would favor this option.
12. At the Atterdag Drive/SR-246 (Mission Drive) intersection, consider adding a pedestrian scramble crosswalk operation. In addition, consider adding protected plus permitted signal phasing along the eastbound and westbound SR-246 movements in order to reduce vehicle-pedestrian conflicts that occur when left-turning vehicle movements occur simultaneously with pedestrian crosswalk movements.
13. At the Fifth Street/SR-246 (Mission Drive) intersection, consider adding a pedestrian scramble crosswalk operation. In addition, consider construction of curb extensions to reduce pedestrian crossing distances (if bike lanes are not implemented).
14. Along SR-246 within the Downtown area, consider providing coordinated pedestrian crossing of SR-246 at signalized crossings. In addition consider the removal of on-street parking along both sides of SR-246 in order to enhance bicycle mobility and safety with the reduction in roadway "friction".
15. At the Skytt Mesa Drive/SR-246 (Mission Drive) intersection, consider

the installation of either a roundabout, traffic signal, or all-way stop-control to replace the current two-way stop-controlled operation.

16. The Santa Ynez Valley Bicycle Master Plan identified a multimodal trail connecting Solvang and Buellton as the highest priority multimodal improvement. Currently, only SR-246 provides a connection between the two cities and there is no accommodation for bicyclists or pedestrians other than highway shoulders. Additionally, the posted speed limit is as high as 55 MPH thereby being an impediment to all but the more fearless pedestrians and bicyclists.

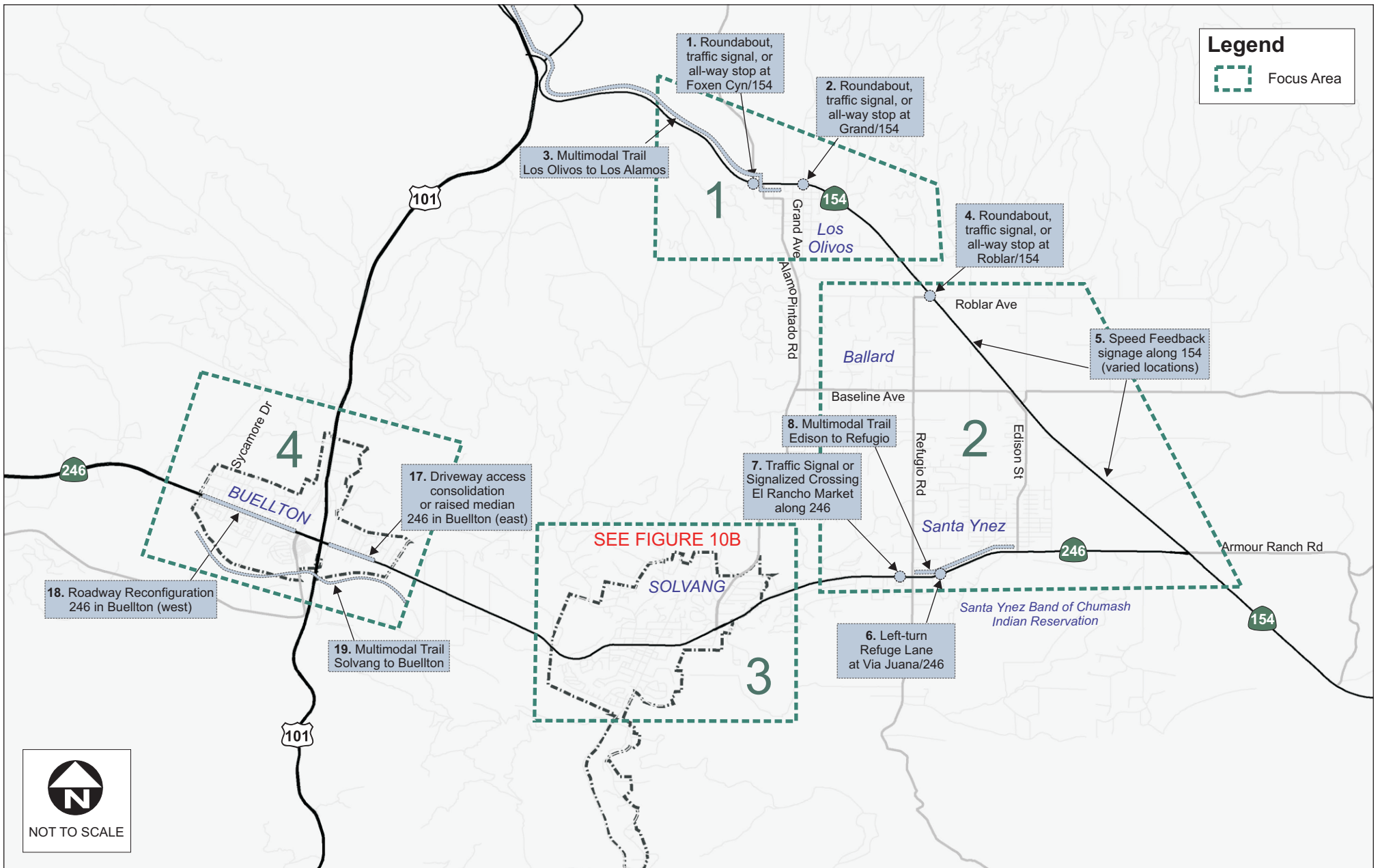
Curb extensions were discussed as a potential safety improvement option along SR-246. This measure would reduce the pedestrian crossing distance at an intersection, though would result in reduced curb-to-curb widths. The Solvang City Council had previously noted that the reduced widths present potential conflicts with fire truck and delivery truck maneuverability. Thus, this design feature may not be feasible.

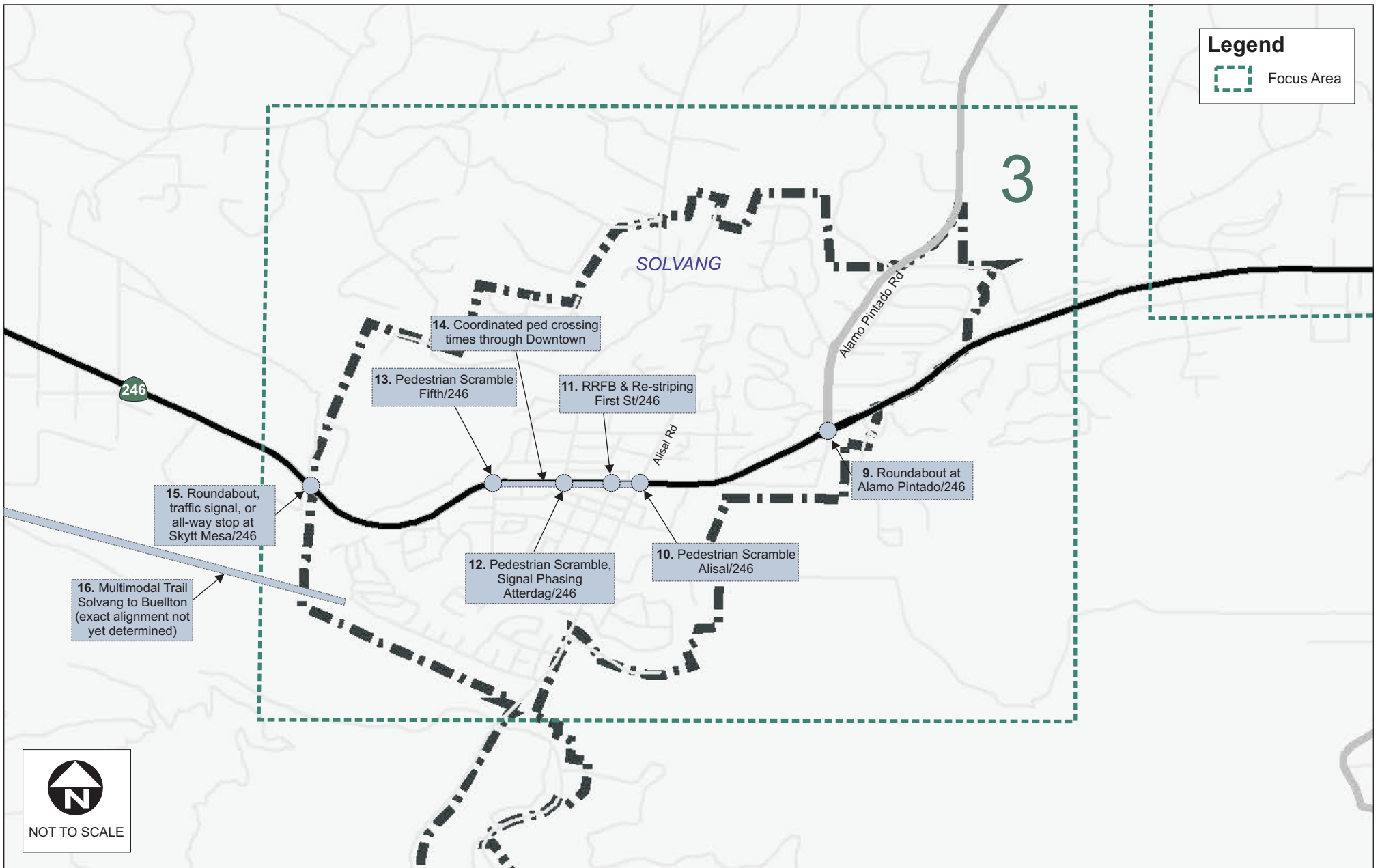
Another consideration at the Fifth Street/SR-246 intersection is the addition of protected plus permitted signal phasing along the northbound and southbound Fifth Street movements, in order to reduce conflicts between left-turning vehicles and pedestrians within the crosswalk. This measure would require re-striping or potentially widening in order to delineate dedicated left-turn pockets along the approaches. These left-turn pockets would likely have storage for up to approximately two to three vehicles in a queue. Further analysis would be required to evaluate whether additional right-of-way would be required in order to provide this lane at one of both of the approaches, along with the adequate vehicle storage to act as an effective left-turn lane.

6.1.4. Focus Area 4 – Buellton Area

In the western portion of the study area, the City of Buellton includes intersections along SR-246 and US-101. The following improvement options are considered in this area:

17. Along SR-246, between McMurray Road and Freear Drive, consider access management strategies to consolidate and/or eliminate driveways that may result in conflicting left-turn movements into and out of commercial properties, or consider constructing a raised median along this segment.
18. Along SR-246, at the western Buellton City limit, consider reconfiguration of the roadway from two travel lanes in each direction to one lane in each direction. The reconfiguration would allow for a potential re-study of an appropriate speed limit along SR-246. As part of the reconfiguration, features such as a raised median, widened sidewalks, and adjacent parkways can be incorporated.
19. Pedestrian and bicycle connections across US-101 are currently limited to two locations and neither provide a desirable option. The multimodal trail discussed in Focus Area 3 is considered in order to provide a connection along the Santa Ynez River and under US-101 providing an option for pedestrians and bicyclists that is free from automobile traffic.





6.2. Improvement Measures Evaluation

Table 8 presents a matrix summarizing the improvement measures, noting the metric by which their potential effect on circulation and safety is measured and rough order of magnitude cost estimates for implementation. The cost estimates are presented for the purposes of project prioritization. In addition, the matrix describes the trade-offs of each option (benefits and disadvantages) as they relate to transportation and safety.

Table 8: Improvement Measures Matrix

Area	Location	Description	Metric to evaluate	Benefit	Disadvantage	Improvement Cost Estimate Range	
Los Olivos	1	Foxen Cyn Rd/SR-154	Roundabout	Vehicle delay	Safety (speed reduction), Local street access	SR-154 travel time	\$6.5 - \$7.5 mil
			Roundabout	Vehicle delay	Safety (speed reduction), Local street access	SR-154 travel time	\$6.5 - \$7.5 mil
	2	Grand Ave/SR-154	Traffic Signal	Vehicle delay	Safety (speed reduction), Local street access	SR-154 travel time	\$350 - \$450k
			All-way stop	Vehicle delay	Safety (speed reduction), Local street access	SR-154 travel time	\$50k - \$100k
	3	Between Los Olivos and Los Alamos	Multimodal Trail	Qualitative	Bike and Ped Circulation	Negligible	\$5 mil+*
Santa Ynez / Ballard	4	Roblar Ave/SR-154	Roundabout	Vehicle delay	Safety (speed reduction), Local street access	SR-154 travel time	\$6.5 - \$7.5 mil
			Traffic Signal	Vehicle delay	Safety (speed reduction), Local street access	SR-154 travel time	\$350 - \$450k
			All-way stop	Vehicle delay	Safety (speed reduction), Local street access	SR-154 travel time	\$50k - \$100k
	5	SR-154	Speed feedback	Qualitative	Safety (speed reduction)	Loses effectiveness	\$10k - \$15k
	6	Via Juana Rd/SR-246	Left-turn refuge lane	Qualitative	Safety, Access	Negligible	\$20k - \$50k
	7	SR-246 West of Refugio Rd (El Rancho)	Traffic Signal	Vehicle delay	Safety, local street/land use access	SR-246 travel time	\$350 - \$450k
			Signalized ped Crossing	Qualitative	Ped Safety	SR-246 travel time	\$100k - \$150k
8		Multimodal Trail	Qualitative	Bike and Ped Circulation	Negligible	\$5 mil+*	
Solvang	9	Alamo Pintado Rd/ SR-246	Roundabout	Vehicle delay	Safety, Queuing, Access from Alamo Pintado	SR-246 travel time	\$6.5 - \$7.5 mil
	10	Alisal Dr/SR-246	Curb extensions at SW corner	Qualitative	Ped Safety (shorter crossing distances)	Vehicle delay	\$50k - \$70k
			Pedestrian scramble (with curb extensions)	Vehicle delay	Ped Safety	Vehicle delay	\$70k - \$100k
	11	First St/SR-246	RRFB for north-south crosswalk	Qualitative	Ped Safety	Vehicle delay	\$50k - \$70k
	12	Atterdag Dr/SR-246	Pedestrian scramble	Vehicle delay	Ped Safety, ped delay	Vehicle delay	\$70k - \$100k
			Protected + Permitted Left-turn Phasing	Vehicle delay	Ped Safety	Vehicle delay	\$70k - \$100k

Area	Location	Description	Metric to evaluate	Benefit	Disadvantage	Improvement Cost Estimate Range
13	Fifth St/SR-246	Curb extensions at SW corner	Qualitative	Ped Safety (shorter crossing distances)	Vehicle delay	\$50k - \$70k
		Pedestrian scramble (with curb extensions)	Vehicle delay	Ped Safety	Vehicle delay	\$70k - \$100k
14	SR-246 from Alisal Dr to Fifth St	Coordinated ped crossing	Qualitative	Vehicle delay, coordinated vehicle flow	SR-246 travel time	\$250k - \$500k
		Removal of on-street parking	Qualitative	Vehicle flow	Parking availability adjacent to local businesses	\$50k - \$100k
15	Skytt Mesa Dr/SR-246	Traffic Signal	Vehicle delay	Local street access, Vehicle safety (protected left-turns, removes sight distance issues)	SR-246 travel time	\$350-\$450k
		Roundabout	Vehicle delay	Local street access, Vehicle safety (removes sight distance issues)	SR-246 travel time	\$6.5 - \$7.5 mil
16	Solvang to Buellton	Multimodal Trail	Qualitative	Bike and Ped Circulation	Negligible	\$5 mil+*
Buellton	SR-246 from west City border to Avenue of Flags	Lane reduction (4 lanes to 2 lanes)	Travel time	Safety (speed reduction)	SR-246 travel time	\$150 - \$200k
	SR-246 between McMurray Rd and Freear Dr	Driveway access consolidation or raised median	Qualitative	Safety (reducing vehicle conflicts)	Vehicle delay	\$750k - \$1.5 mil**
	19	US-101 Crossing	Multimodal Trail	Qualitative	Bike and Ped Circulation	Negligible

* Exact alignment not yet determined

** Costs could vary significantly depending on type of design implemented

As shown in **Table 8**, roundabouts and traffic signals are the higher cost items of the potential options, while short-term options such as speed feedback signage and curb extensions are lower in costs and would be easier to implement as a result.

6.2.1. Quantitative Evaluation

The quantitative evaluation of improvement options was conducted using the VISSIM model to determine their potential effects on the circulation network during peak conditions. **Table 9** summarizes the intersection-level delay and LOS at affected locations incorporating the improvement options, during the weekday p.m. peak hour. As previously noted, LOS evaluation only considers the effect to automobile traffic and must be balanced by considering the needs of all road users.

Table 9: Intersection LOS/Delay with Improvement Measures – Weekday PM Peak Hour

Intersection	Existing Conditions		With Improvement Measures		
	Avg. Vehicle Delay (s)	LOS	Measure	Avg. Vehicle Delay (s)	LOS
3 Sycamore Dr/SR-246	13.7 (NB)	B	Lane reduction (road diet)	16.6 (NB)	B
9 Fifth St/SR-246 (Mission Dr)	36.7	D	Pedestrian Scramble ¹	57.2	E
10 Atterdag Road/SR-246 (Mission Dr)	15.7	B	Pedestrian Scramble	24.5	C
			Protected + Permitted left-turn phasing	19.6	B
11 Alisal Rd/SR-246 (Mission Dr)	52.3	D	Pedestrian Scramble ¹	56.1	E
12 Alamo Pintado Rd/SR-246 (Mission Dr)	24.3	C	Roundabout	24.2	C
21 SR-154/Roblar Ave	58.6 (WB)	F	Roundabout	3.4	A
			Traffic Signal	10.2	A
			All-way Stop	4.0	A
22 Grand Ave/SR-154	49.8 (NB)	D	Roundabout	4.2	A
			Traffic Signal	9.3	A
			All-way Stop	36.2	D
23 Foxen Canyon Rd/SR-154	60.6 (NB)	F	Roundabout	5.1	A
24 Skytt Mesa Dr/SR-246	99.9 (NB)	F	Roundabout	6.4	A
			Traffic Signal	6.3	A

Notes:

¹= Evaluated in combination with curb extension improvements
 LOS = Level of Service; Delay = Average Vehicle Delay (Seconds)

Stop-controlled intersections show highest approach delay and LOS.
 LOS E and F conditions are highlighted in **BOLD**.

As shown in **Table 9**, within the Los Olivos area, implementation of roundabouts could significantly reduce vehicle delay experienced by minor street traffic. However, at the signalized Alamo Pintado/SR-246 intersection, implementing a roundabout is forecast to result in a minimal delay reduction for the overall intersection. Within Solvang, implementing pedestrian scramble crosswalks is forecast to increase the average vehicle delay as longer pedestrian crossing times are required. However, when coupled with curb extension improvements, the longer minimum required pedestrian crossing times for a scramble crosswalk can be reduced to limit the extent of vehicle delay.

Table 10 summarizes the intersection-level delay and LOS at affected locations incorporating the improvement options, during the Saturday mid-day peak hour.

Table 10: Intersection LOS/Delay with Improvement Measures – Saturday Mid-day Peak Hour

Intersection	Existing Conditions		With Improvement Measures		
	Avg. Vehicle Delay (s)	LOS	Measure	Avg. Vehicle Delay (s)	LOS
3 Sycamore Dr/SR-246	12.9 (NB)	B	Lane reduction (road diet)	15.6 (NB)	B
9 Fifth St/SR-246 (Mission Dr)	27.8	C	Pedestrian Scramble ¹	79.2	E
10 Atterdag Road/SR-246 (Mission Dr)	13.1	B	Pedestrian Scramble	44.6	D
			Protected + Permitted left-turn phasing	18.9	B
11 Alisal Rd/SR-246 (Mission Dr)	21.7	C	Pedestrian Scramble ¹	40.5	D
12 Alamo Pintado Rd/SR-246 (Mission Dr)	18.2	B	Roundabout	12.1	B
21 SR-154/Roblar Ave	34.9 (WB)	C	Roundabout	3.7	A
			Traffic Signal	9.8	A
			All-way Stop	3.7	A
22 Grand Ave/SR-154	>100 (NB)	F	Roundabout	4.2	A
			Traffic Signal	10.5	A
			All-way Stop	60.9	E
23 Foxen Canyon Rd/SR-154	39.4 (SB)	D	Roundabout	4.3	A

Notes:

1= Evaluated in combination with curb extension improvements
 LOS = Level of Service; Delay = Average Vehicle Delay (Seconds)

Stop-controlled intersections show highest approach delay and LOS.
 LOS E and F conditions are highlighted in **BOLD**.

As shown in **Table 10**, during the Saturday mid-day peak hour condition, implementation of roundabouts could significantly reduce vehicle delay experienced by minor street traffic at the Los Olivos intersections. At the Grand Avenue/SR-154 intersection, the all-way stop-controlled option is not forecast to provide the vehicle delay benefits that the other options would. In addition to the effects at the intersection level, the increases to corridor travel times with these options was evaluated, as the options are geared towards traffic calming which is intended to reduce vehicle speeds.

Table 11 summarizes the high-level travel time effects of incorporating the improvement options along the SR-154 and SR-246 corridors, using the VISSIM model, for the weekday p.m. peak hour.

Table 11: Travel Time Summary – Weekday PM Peak Hour

Corridor	Existing Average Travel Time (min:sec)	Measure	Percent Change in Travel Time with Measures	Approximate Change in Travel Time with Measures (min:sec)
SR-154	EB from US-101 to SR-246	Roundabouts Traffic Signals All-way Stops	+10-15%	+1:20
			<+5%	< +0:30
	+5-10%		+0:50	
	+10-15%		+1:15	
WB from SR-246 to US-101	9:50	<+5%	< +0:30	
		+10-15%	+1:15	
SR-246	EB from Fifth St to Alamo Pintado Rd (Solvang)	Pedestrian Scrambles + Roundabout	+20-25%	+0:50
	WB from Alamo Pintado Rd to Fifth St (Solvang)		+50-55%	+1:45
SR-246	EB from Buellton west city limit to Ballard Cyn Rd	Lane reduction (road diet)	+5-10%	+0:15
	WB from Ballard Cyn Rd to Buellton west city limit		+5-10%	+0:15

As shown in **Table 11**, the largest travel time effects are forecast to occur as a result of implementing the set of pedestrian scrambles along SR-246 within the Downtown Solvang area.

Table 12 summarizes the high-level travel time effects of incorporating the improvement measures along the SR-154 and SR-246 corridors, using the VISSIM model, for the Saturday mid-day peak hour.

Table 12: Travel Time Summary – Saturday Mid-day Peak Hour

Corridor	Existing Average Travel Time (min:sec)	Measure	Percent Change in Travel Time with Measures	Approximate Change in Travel Time with Measures (min:sec)
SR-154	EB from US-101 to SR-246	Roundabouts Traffic Signals All-way Stops	+10-15%	+1:20
			<+5%	< +0:30
	+10-15%		+0:50	
	+10-15%		+1:15	
WB from SR-246 to US-101	10:00	<+5%	< +0:30	
		+5-10%	+0:45	
SR-246	EB from Fifth St to Alamo Pintado Rd (Solvang)	Pedestrian Scrambles + Roundabout	+20-25%	+0:50
	WB from Alamo Pintado Rd to Fifth St (Solvang)		+65-70%	+2:45
SR-246	EB from Buellton west city limit to Ballard Cyn Rd	Lane reduction (road diet)	+5-10%	+0:15
	WB from Ballard Cyn Rd to Buellton west city limit		+5-10%	+0:15

As shown in **Table 12**, similar to the weekday conditions, the largest travel time effects are forecast to occur as a result of implementing the set of pedestrian scrambles along SR-246 within the Downtown Solvang area.

The roundabout option is considered at multiple locations, primarily for safety benefits. As an example of the safety benefits of a roundabout, detailed SWITRS data at the SR-246/SR-154 intersection was reviewed over the ten-year period of 2008 to 2018. The data showed that the installation of a roundabout in 2013 resulted in an overall reduction in total collisions by approximately 60%, but more importantly a significant reduction in severe injury collisions was found. Within the data period, there were two collisions resulting in a fatality and two collisions resulting in severe injury before the roundabout was installed. After the roundabout was installed, no fatal or severe injury collisions occurred, as all collisions resulted in only minor injuries.

6.2.2. Qualitative Evaluation

For improvement measures that are not evaluated using technical metrics, a qualitative assessment of potential effects is presented. These measures are discussed as they relate to safety and quality of life. The following discussion describes the qualitative analysis of these measures:

- **SR-246 West of Refugio Road (El Rancho Market)** - As an option to installing a full traffic signal at this location, the addition of a High intensity Activated Crosswalk (HAWK) pedestrian crossing beacon across SR-246 would provide enhanced safety for pedestrians accessing the market, particularly from Santa Ynez Valley Union High School. The HAWK crossing is a preferred method to support safe pedestrian crossings of multi-lane highways with high traffic volumes. The signal would operate with a push-button at the pedestrian crossing. In comparison to a full traffic signal, the HAWK beacon would result in less delay to SR-246 through traffic.
- **SR-154 between US-101 and SR-246** - The installation of speed feedback signs with the Santa Ynez/Ballard area, along roadways where vehicles typically travel at higher speeds, can result in drivers slowing down, particularly in the immediate timespan following installation. Speed feedback signs can enhance drivers' awareness of the posted speed limit and encourage drivers to comply with the law. By displaying both the posted speed limit and their actual traveling speed, motorists are reminded how far above the speed limit they are traveling. There are various types of solar and/or battery-powered signs available.
- **Alisal Drive/SR-246** - The construction of a curb extension (or "bulb-out") at an intersection results in the extension of the sidewalk or curb line into the street or parking lane, thus reducing the street width and improving sight distance between the driver and pedestrian. An extension at the southwest corner of the Alisal Drive/SR-246 intersection, along the south leg intersection departure, could reduce the south leg crossing distance from approximately 78-80 feet to 61-63 feet.
- **First Street/SR-246** - The option to install an RRFB along SR-246 would provide traffic calming benefits. RRFBs are user-actuated amber LEDs that can be manually activated by pedestrians using a push button. In conjunction with this option, re-striping to include a high-visibility crosswalk design such as the continental design at intersection's south leg should be implemented. The high-visibility crosswalk is considered to be easier for an approaching motorist to see than the traditional parallel lines.
- **Fifth Street/SR-246** - As an option to the pedestrian scramble, the construction of curb extensions at the southwest and southeast corners of the intersection would reduce crossing distances of 76-78 feet across SR-246 to approximately 63-65 feet, enhancing safety through the improved visibility of pedestrians. At the southeast corner of the intersection, to accommodate the curb extension within the intersection's departure, one on-street parking space may need to be eliminated.
- **SR-246 from Alisal Drive to Fifth Street (Downtown Solvang) - Within the Downtown area, the following options are evaluated:**
 - Providing coordinated pedestrian crossing of the SR-246 signalized crossings within Downtown Solvang would enhance vehicle flow, similar to how coordinating traffic signal phases at closely-spaced intersections would. This could be accomplished with Hybrid Beacons. While the option has the potential to improve vehicle flow and pedestrian crossing efficiency, it could limit the pedestrian crossing opportunities compared to current conditions.
 - Removing on-street parking along both sides of SR-246 would result in enhanced bicycle mobility and safety with the reduction in roadway "friction" that results when vehicles enter and exit parking spaces along a two-lane roadway. The reduced friction would enhance vehicle flow as well, though would result in increased turning movement volumes into and out of designated public parking lots off SR-246.
- **SR-246 between McMurray Road and Freear Drive** – Consolidating shopping center driveway access points along SR-246 in Buellton would reduce opposing left-turn vehicle conflicts that occur within the two-way left-turn median along SR-246. An option to consolidating driveways is the construction of a raised median in place of the two-way left-turn lane. The raised median would divert left-turning movements to specific driveways and result in minor driveways converting to a right-in/right-out operation.

6.2.3. Acknowledging Tradeoffs

Caltrans considers safety benefits to be the highest priority when considering infrastructure modifications. The options described in this planning study are anticipated to provide enhanced safety throughout the area. Caltrans considers the next highest priority to be improvements that benefit multiple modes of transportation, as opposed to solely benefitting vehicle traffic. These priorities are consistent with addressing safety, connectivity, and quality of life concerns raised by the community.

Given these priorities, though, this report acknowledges that certain tradeoffs are involved, should these measures be implemented. These tradeoffs would be adverse effects to the delay and congestion experienced by motorists. For example, modifying a free-flowing traffic movement (i.e., the major movement) along an SR-154 or SR-246 intersection to allow for improved access from minor streets will result in increased delay for the major movement of traffic, as well as increased travel times for those same movements. Additional examples of adverse vehicle congestion in the study area include:

- Average vehicle delay increase of approximately 50 seconds at the Fifth Street/SR-246 intersection with the implementation of a pedestrian scramble crosswalk.
- Estimated 65-70% travel time increase along westbound SR-246 from Alamo Pintado Road to Fifth Street with implementation of a roundabout in conjunction with pedestrian scramble crosswalks in Downtown Solvang

Tradeoffs should not be confused as always being negative. For instance, public input overwhelmingly supported decreasing travel times along SR-154 for the benefit of safer conditions and improved mobility among intersecting county roads.



7 CONCLUSIONS

The Santa Barbara County Association of Governments (SBCAG), in partnership with the Santa Ynez Band of Chumash Indians, has undertaken the Santa Ynez Valley Traffic Circulation and Safety Study to comprehensively assess and identify needed current and forecasted future circulation and safety improvements for the multimodal transportation of the Santa Ynez Valley.

Traffic data collection was focused on time periods in which the study area experiences high traffic demand. As such, existing traffic counts were conducted on a typical weekday p.m. period and Saturday mid-day period at the study intersections. In addition, roadway segment ADT counts were conducted on the same days. The count data shows that weekend traffic exceeds weekday traffic on SR-154, whereas weekday traffic exceeds weekend traffic on most portions of SR-246. An exception is the portion of SR-246 from Edison Street to SR-154 where weekend traffic exceeds weekday traffic. The high weekend volumes on the SR-154 and in Santa Ynez are likely due to tourist traffic to and from the Chumash Casino Resort.

Based on the count data, intersection analysis was performed utilizing both the VISSIM 11 and Synchro 10 software packages, depending on the intersection location. The LOS results showed that the majority of the study intersections are currently operating at satisfactory levels (LOS D or better). Four of the study intersections located in the Los Olivos area along the SR-154 corridor (SR-154/Edison Street; SR-154/Roblar Avenue; Grand Avenue/SR-154; and Foxen Canyon Road/SR-154) operate at LOS E and/or LOS F during either the weekday p.m. peak or Saturday mid-day peak. Note that all four of these intersections are stop-controlled.

Improvement measures or options were developed in order to address improved safety and mobility within the study area. The measures were developed through a combination of traffic data analysis and community outreach, and focus mostly on traffic calming that would result in reduced speeds. The measures range from low-cost, short-term improvements to long-range measures that could require significant costs in order to implement.

Based on the analysis, the implementation of roundabouts within the Los Olivos area could significantly reduce vehicle delay experienced by minor street traffic, while minimally affecting travel times on SR-154 which is currently free-flow. However, during both the weekday and Saturday condition, large relative travel time increases are forecast to occur as a result of implementing the set of pedestrian scrambles (and curb extensions) along SR-246 within the Downtown Solvang area.



8 NEXT STEPS

Upon completion of this study, SBCAG will have a list of safety/multimodal improvement projects for which to coordinate implementation with respective agencies. Local jurisdictions/elected officials will be able to prioritize the improvement options in a manner that best aligns with community values, using the benefits and tradeoffs described in this report.

Implementation will require seeking funding from outside sources and likely a certain amount of local matching. This may be facilitated through Caltrans' State Highway Operation and Protection Program (SHOPP). The SHOPP is California's "fix-it-first" program that funds the repair and preservation, emergency repairs, safety improvements, and some highway operational improvements on the state highway system. SHOPP funds are limited to capital improvements that do not add capacity (no new highway lanes). The majority of transportation improvements identified in this report fall within the Transportation Management Systems (TMS) core asset class within the program. SBCAG will weigh regional priorities in determining funding as well as the short-term and long-term pursuits.