



Vineyard Drive Corridor Plan

Templeton, CA

County of San Luis Obispo

November 28, 2023





VINEYARD DRIVE CORRIDOR PLAN

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GHD

1101 Monterey Street, Suite 120

San Luis Obispo, California 93401, United States

T +1 805 242 0461 | E info-northamerica@ghd.com | ghd.com

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ACKNOWLEDGEMENTS

County Board of Supervisors

John Peschong, Vice Chair – District 1

Bruce Gibson, Chair – District 2

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John Donovan – Delegate

Jerry Jones – Delegate

Scott Silveira – Delegate

Fred Russell – Delegate

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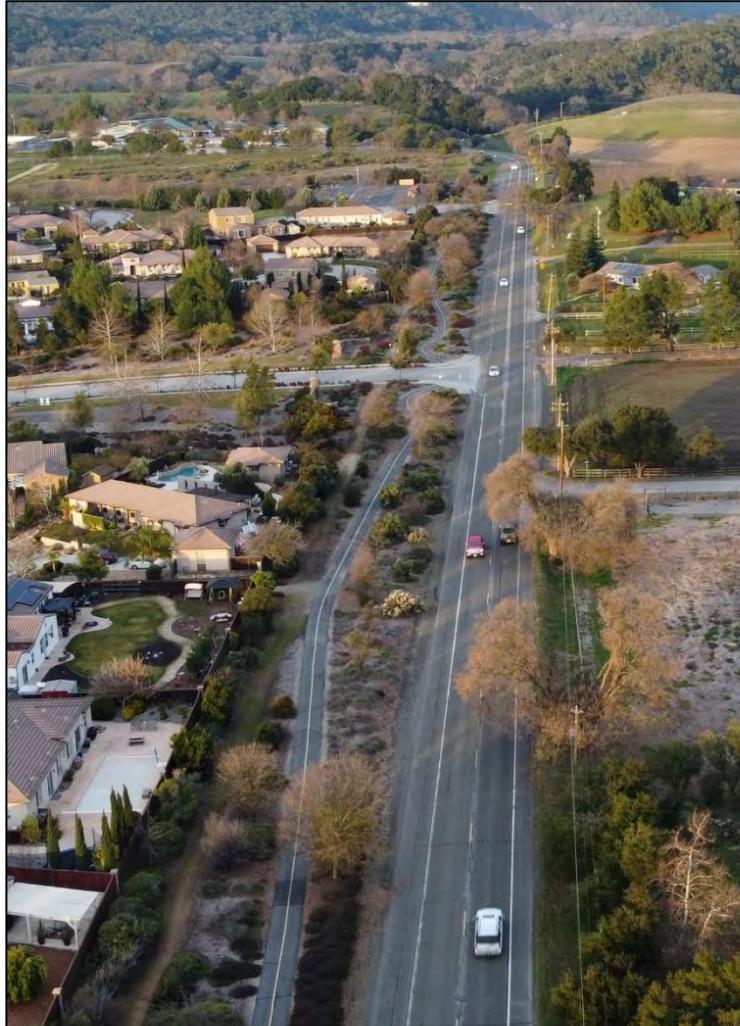
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Executive Summary

This Executive Summary provides a brief overview of the following Vineyard Drive Corridor Plan report and highlights the resulting **Preferred Concept**. While this Executive Summary was prepared to convey an overall summary of the report, the study and its appendices should be referenced for additional detail on methodology and findings.

The San Luis Obispo County Association of Governments (SLOCOG), in coordination and cooperation with the County of San Luis Obispo and Caltrans, initiated the preparation of the Plan. The Plan evaluates the portion of Vineyard Drive through the community of Templeton (from State Route 46 West to S. Main St). The objective of the Plan is to develop a Preferred Concept with comprehensive multimodal improvements that address the corridor's long-standing issues, including safety concerns, peak-hour congestion, and multimodal access and mobility. The multimodal improvements must be feasible, equitable, cost-effective, and have community support. The Preferred Concept will serve to guide future Vineyard Corridor programming decisions over a 20-year timeframe based on available funding.

Ultimately, this Preferred Concept proposes new parallel and connecting transportation facilities that have the potential to enhance multimodal connectivity, reduce corridor congestion, improve corridor reliability and livability, and expand access to winery visitor destinations, essential local services, and regional commerce. In addition, the Preferred Concept with associated multimodal improvements highlights the priorities for the Vineyard Corridor while positioning the corridor for funding opportunities which provide the highest return on investment (benefit-cost) of limited regional transportation funding over the next 20 years.

Plan Description

Upon review of past planning and other corridor-related documents (Chapter 1), establishment of evaluation performance metrics, and a thorough assessment of existing conditions (Chapter 2), the community was engaged for their input (Chapter 3). These combined efforts led to the identification and evaluation of a focused group of Corridor Concepts and Alternatives (Chapter 4). Ultimately, a list of multimodal improvements is identified and a Preferred Concept for the Vineyard Drive corridor. Cost estimates were developed for all alternatives, and for Bethel Road at Vineyard Drive intersection, the proposed roundabout and traffic signal options are compared for respective benefits and costs. Funding mechanisms and strategies for phasing and near-term improvements are then identified to implement the preferred concept (Chapter 5).

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Public Engagement

An effective community engagement program creates confidence in the planning process, promotes broad-based understanding, and reflects the interests and needs of the community. Successful implementation of the improvements recommended in this plan required cooperation between Caltrans, SLOCOG, SLO County, and the community as a whole. The Plan outreach effort was robust in its focus on reaching diverse communities. The input received through these various channels helped inform and select the Plan preferred improvement concept and associated multimodal improvements. The community workshops, their participation, insights, and other outreach efforts are more fully described in the Public Outreach section of this report.

This outreach effort included the following:

- Community Workshop – Farmer’s Market pop-up
- Agency Partners
 - SLO County
 - Caltrans District 5
 - San Luis Obispo Council of Governments
 - Templeton School District
 - Templeton Community Service District
 - Templeton Fire Department
 - Sheriff’s office
- Online Engagement
 - Interactive Mapping Tool
 - Online Corridor Travel Survey

Technical Analysis

This Corridor Plan evaluates various performance metrics along the corridor comparing existing and forecasted conditions against the plan alternatives. These performance metrics are summarized below and are used to assess alternatives in selecting a preferred plan and prioritization.

- Level of Service (LOS) and queuing analysis for traffic operations
 - Most intersections currently operate at LOS E or F during peak times, especially due to school traffic.
- Bicycle Level of Traffic Stress (LTS)
 - Entire corridor at LTS 4, which is worst ranking, highest stress cycling conditions only suitable for most experienced cyclists.
- Safety and Collision History
 - Most frequent collisions between Main Street and Bennett Way
 - Vineyard Drive at Rossi Road experienced a percentage of injury collisions over the past five years that is higher than the statewide average for similar intersections.
- Vehicle Miles of Travel
 - Constructing multimodal facilities would aim to reduce VMT and greenhouse gas emissions. Intersection improvements would be presumed to have no significant impact on VMT.



Legend

- Study Intersections
- Study Corridor
- Roadway

SAN LUIS OBISPO COUNTY

Study Corridor

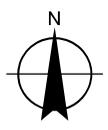
1. Vineyard Dr & Main St
2. Vineyard Dr & Old County Rd
3. Vineyard Dr & US 101 NB Ramps
4. Vineyard Dr & US 101 SB Ramps
5. Vineyard Dr & Rossi Rd
6. Vineyard Dr & Bennett Way
7. Vineyard Dr & Bethel Rd
8. Vineyard Dr & Vineyard Elem. School

Paper Size Legal

0 350 700 1,050 1,400

US Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California V FIPS 0405 Feet



Templeton
San Luis Obispo County
Vineyard Drive Corridor Plan

Project No. 12570229
Revision No. -
Date 5/7/2023

Study Corridor & Study Intersections

FIGURE E.1

VINEYARD DRIVE CORRIDOR PLAN

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Chapter 1. Introduction

The Vineyard corridor is one of the main corridors in Templeton that serves as the east-west entry into the area from State Route 46 (SR 46) West and US 101. The vineyard corridor is a highly traveled street in Templeton as it serves several institutions and connections to downtown Templeton. The corridor experiences congestion as a result of high vehicle volumes combined with frequently spaced intersections and driveways, creating unreliable travel conditions that highlight deficiencies in the transportation system.

As the primary link between the historic downtown, schools, US 101, commercial area on the south, residential areas, and agriculture and vineyards, the Vineyard Corridor accommodates a mix of local and regional travel demand needs. For most of the community's children, the segment serves significant roles in the daily walk, bike, or drive to school. The confluence of local and regional traffic in the vicinity of US 101 is known to create traffic delays and congestion at the interchange and overpass. School peak hours result in long queues and restricted mobility.

Vineyard drive also serves as a regional connector between the less developed areas of Vineyard Drive and SR 46 West at a new roundabout in the west. For many visitors, Vineyard Drive is a pleasant rural road winding through bucolic ranches and farmsteads on their way to world-renowned wineries of the greater Paso Robles AVA region, from El Pomar to Adelaida. This corridor plan must remain cognizant of this regional, tourist, and recreational context. For locals and visitors alike, there is a desire to maintain the pastoral qualities of Vineyard Drive that must be balanced with the need to improve multimodal transportation mobility and operations.

Therefore, with these concerns over corridor congestion, active transportation connectivity, and overall mobility, the County of San Luis Obispo, in coordination with the Templeton community, SLOCOG and Caltrans, initiated the preparation of the Vineyard Corridor multimodal Transportation Corridor Plan. Drawing on past plans and studies while expanding the scope beyond the roadway itself, the focus of the Templeton Vineyard Corridor Plan was to address the most pronounced issues in the corridor, included:

- Lack of multimodal connectivity, particularly for bicycle and pedestrian access.
- Safety considerations for the mix between motorists and active transportation users due to high traffic volumes, competing for mobility needs, lack of multimodal options, and the high proportion of driveways and access points along the corridor.
- Lack of easily accessible, continuous parallel routes to support local and regional travel demand.
- Capacity constraints at key intersections cause queuing and delays, extensive bottleneck durations, and unreliable travel times for both motorists and transit.
- Emergency response times, evacuation routes, and incident clearance capabilities.
- Aesthetic continuity, which affects the community feeling and sense of place.

1.1 About the Plan

This plan is organized into chapters. These chapters include:

- Chapter 1 – Introduction: includes a brief study background, study purpose, study approach/objectives, and organization of this Plan document.
 - Planning Guidance and Metrics - examines past planning documents for planning context.
- Chapter 2 – Existing Conditions: documents findings from field observations, technical analyses, and models.
- Chapter 3 - Public Engagement: summarizes outreach process conducted to gather feedback on potential solutions and preferred concepts.

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- Chapter 4 – Plan Concepts & Alternatives: provides detailed concepts and alternatives along the corridor to meet the Plan’s goals, evaluates forecasted operations with the improvements, and provides a comparative analysis of alternatives with a recommended concept identified.
- Chapter 5 – Funding Strategies & Implementation: identifies various federal, state, regional, and local funding opportunities, and potential opportunities for project phasing.

1.2 Purpose & Need

The purpose of this effort is to consolidate prior planning and engineering into one comprehensive document. This exercise also allows for the opportunity of refining these planning policies and conceptual design efforts with further specificity and accuracy. This study evaluates proven and creative improvement alternative concepts and selects a Preferred Concept with a set of the complimentary roadway and multimodal projects that would have independent utility, correct existing connectivity and congestion problems, and have a consensus of community support.

The Vineyard Drive Corridor Plan will provide a conceptual multi-modal planning foundation. This plan will aid the County in coordinating development and capital projects along the Vineyard Drive corridor. The County will serve as the Lead Agency, in cooperation with SLOCOG, and the California Department of Transportation (Caltrans) on implementation of this plan.

1.3 Goals & Objectives

- Balance the diverse travel needs of the corridor and coordinate prior planning efforts.
- Enhance and introduce efficient, connected, and comfortable multimodal mobility choices for all ages and abilities.
- Improve economic resiliency and environmental sustainability through good design.
- Bridge gaps in the multimodal infrastructure for local destinations and connect to existing and planned facilities.

The objective of the Vineyard Drive Corridor Plan is to create the buildout vision of the corridor.

1.4 Relationship to County Programs, Plans, & Projects

In providing an overall framework and planning guidance for the preparation of this Vineyard Drive Corridor Plan, an understanding of all past transportation related planning studies needed to be understood, as well as the performance criteria for establishing a Multimodal Corridor Plan that meets mobility needs, is fundable and implementable. This planning effort is consistent with the County General Plan, Templeton Area Community Plan, and County Bikeways Plan.

1.4.1 County General Plan

With the adoption of the County of San Luis Obispo General Plan Update, the County established a roadmap for the long-term physical, social and economic future of Templeton. It provided goals, policies and programs to direct land use and development decisions, manage resources, deliver public services, and provide infrastructure to unincorporated areas of the County, including Templeton.

VINEYARD DRIVE CORRIDOR PLAN

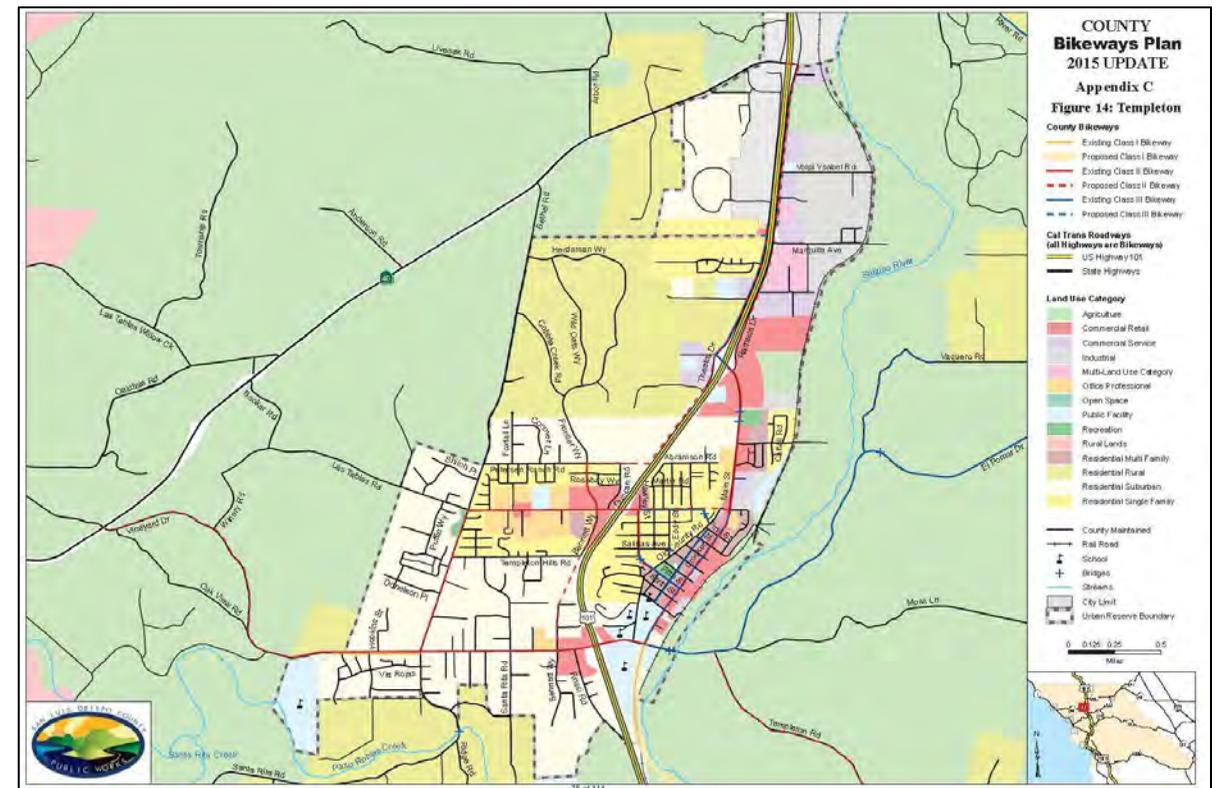
1.4.2 Templeton Area Community Plan



The Templeton Area Community Plan (TACP) guides land use and transportation for the Templeton community over the next 20 years. The TACP addresses special conditions in neighborhoods and helps implement the goals and policies of the North County Area Plan. These standards address land use, public services, circulation, sensitive resources, and natural hazards.

1.4.3 County Bikeways Plan

The purpose of the County Bikeways Plan is to identify and prioritize bikeway facilities throughout the county's unincorporated area, including bikeways, parking, connections with public transportation, educational programs, and funding. The plan sets priorities for the completion of Class I and II bikeways that commuters can travel from their home neighborhoods to work (or school) and back. Vineyard Drive class II bike lanes were constructed to complete a connection between Vineyard Elementary and Main Street. This project was one of the top projects in the 2010 County Bikeways Plan.

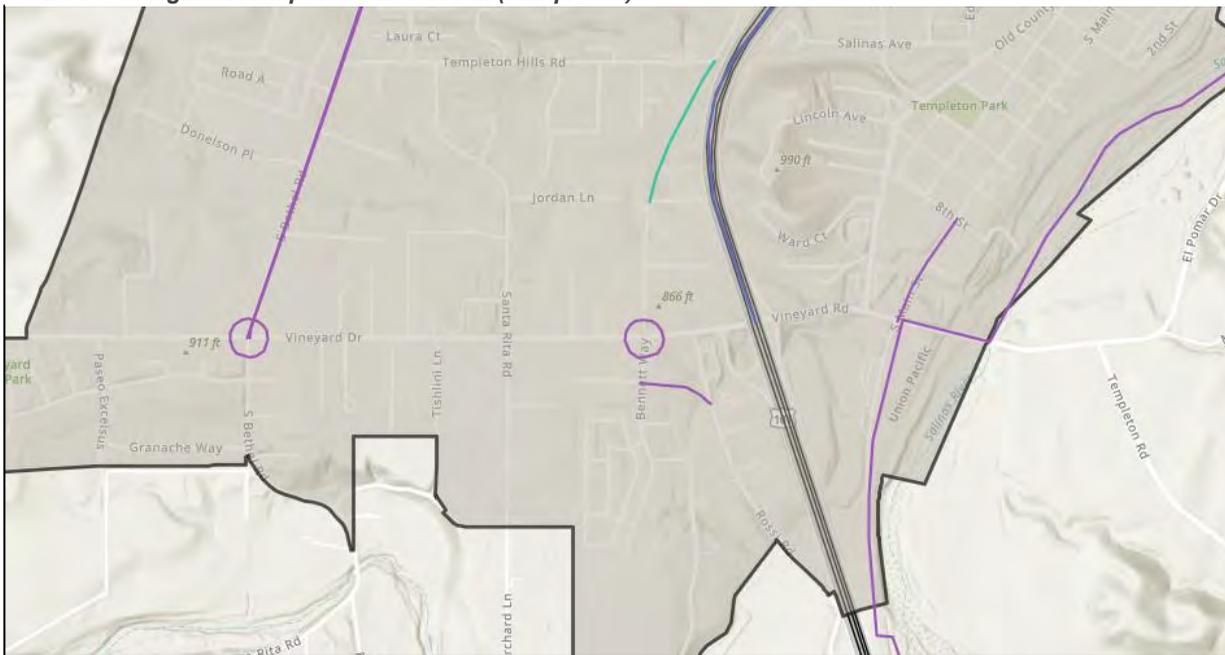


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1.4.4 Short Range Transit Plan

The San Luis Obispo Regional Transit Agency (RTA) maintains a fixed-route regional bus that serves Templeton currently (Route 9) with stops at the Park & Ride lot and Twin Cities Community Hospital located on Las Tablas Road. Route 9 provides service between San Miguel and San Luis Obispo. The 2016 RTA Short Range Transit Plan¹ identifies enhancing weekday service for Route 9 by adding mid-day limited stop express service, including at the Lab Tablas Park & Ride, and extending evening service.

SLOCOG Region Transportation Outlook (Templeton)



Source: SLOCOG Regional Transportation Outlook Map accessed via <https://experience.arcgis.com/experience/0f598d7b59804be494d2f3a51c3f7ff/> on June 5, 2023.

1.4.5 SLOCOG Regional Transportation Plan / Sustainable Communities Strategy (RTP/SCS)

The 2023 RTP/SCS is a collective effort to plan (out to 2045) for the region's future growth and transportation needs within San Luis Obispo County and the incorporated cities. The Plan makes it possible for the region to receive and spend Federal and State funding for local transportation projects and programs. The RTP/SCS presents several projects along the Vineyard Drive corridor in Templeton, as shown in the image on the left. Improvements identified in the RTP/SCS include intersection improvements at Bethel/Vineyard and at Bennett/Vineyard, bike lanes along Bethel Road, and sidewalks on Main Street connecting to Vineyard Drive. Additionally, a Class I bike path is proposed parallel to the Salinas River which is part of the Juan Bautista de Anza Trail corridor (also see the Salinas River Trail Master Plan, 2014), that will connect Atascadero to Templeton, and new roadway connections between Bennett Way and Rossi Road and the Bennett Way extension north to Templeton Hills Road. This Corridor Plan will consider these projects and aim to improve the livability of the corridor by planning for and providing connecting facilities to these improvements.

1.4.6 SLOCOG Regional Active Transportation Plan

The 2021 Regional Active Transportation Plan (ATP) is a compilation of active transportation corridor planning studies and technical reports addressing the San Luis Obispo County and seven cities. For Templeton, the SLOCOG ATP identifies the Atascadero-to-Templeton Connector (as identified in the RTP/SCS), Class II bike lanes along Bennett Way north of Vineyard Drive, and Class II Bike Lanes along Vineyard Drive west of the Elementary School.

¹ http://www.slorta.org/wordpress/wp-content/uploads/SLO_RT_A_S RTP_FinalReport.pdf

Chapter 2. Existing Conditions & Performance Metrics

2.1 Regional Context

US 101 is a key highway route within the central coast of California that also serves as the primary connection to the community of Templeton. The Vineyard Corridor is an essential east-west connection within the community of Templeton, serving as the primary route for both local and regional trips, as Vineyard Drive is the only connection between US 101 and SR 46 West. For many visitors, Vineyard Drive is a pleasant rural road winding through bucolic ranches and farmsteads on their way to world-renowned wineries of the greater Paso Robles AVA region, from El Pomar to Adelaide. For locals and visitors alike, there is a desire to maintain the pastoral qualities of Vineyard Drive that must be balanced with the need to improve active transportation mobility options and overall operations. Although Vineyard Drive continues west as a rural road passing various vineyards, this Plan focuses on Vineyard Drive between Main Street and SR 46 West serving the local community of Templeton.

2.2 Local Context

The community of Templeton is bisected by US 101 and is accessed via several arterial roadways connecting to US 101. The community's downtown and historic area are located along S Main Street from 8th Street to Gibson Road, on the east end of Vineyard Drive. Medical services including the Twin Cities Hospital are situated in the center along Las Tablas Road. Vineyard Drive is a rural arterial road that serves important community transportation needs as it connects the community to Vineyard Elementary, Templeton Elementary School, Templeton Middle school, and Templeton High School. This segment also includes popular stores, including Trader Joe's on Rossi Road, restaurants, shops, and parks which draw traffic onto Vineyard Drive from US 101 and SR 46 West. The corridor west of Bethel Road serves as a regional connector between the less developed areas of Vineyard Drive and SR 46 West. For most of the community's children, the segment serves significant roles in daily walks, bikes, or drives to school. The confluence of local and regional traffic in the vicinity of US 101 is known to create traffic delays and congestion at the interchange. School traffic results in congestion, cut-through traffic, and affects multimodal access.



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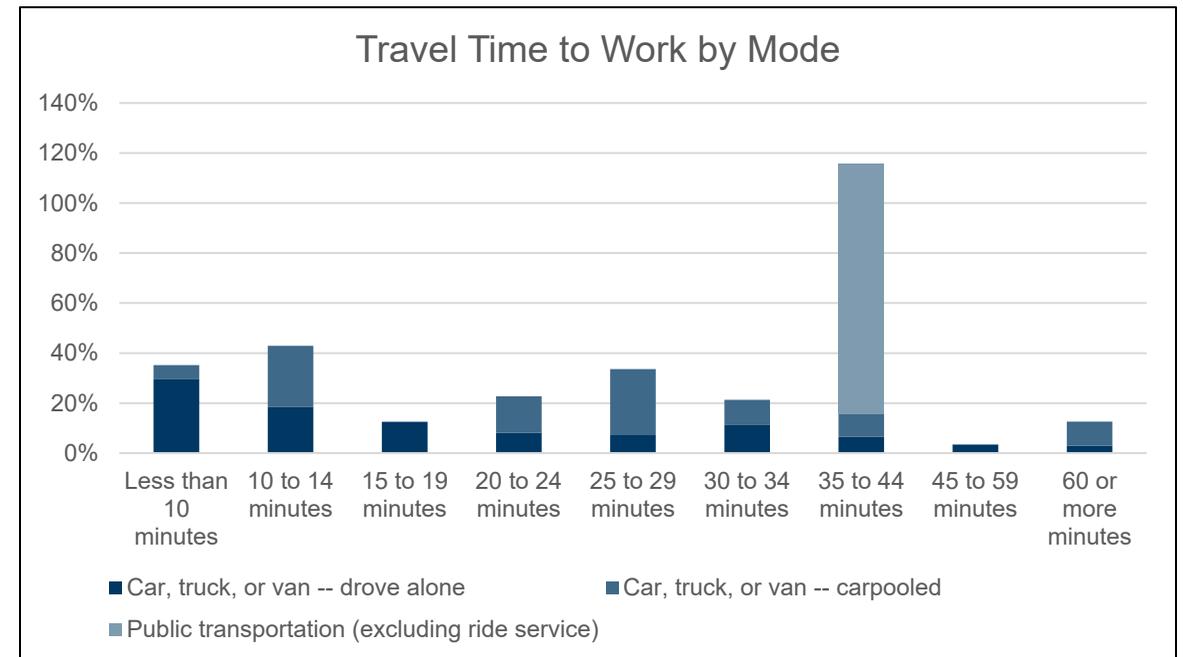


Based on California Healthy Places Index, the Templeton Community is healthier than 70.5% of other California areas (70th percentile), but below the countywide average of 78.6%.

Caltrans has conducted a Climate Change Vulnerability Assessment, finalized in 2020 that evaluates the climate change effects on the State Highway System. Based on this analysis, the areas around Vineyard Drive are projected to have an average maximum temperature change (7-day) of 4.91 – 5.06 degrees Fahrenheit by 2055, and a 7.8% - 8.5% change in 100-year precipitation depth by 2055.

2.3 Existing Transportation Patterns and Public Health

Based on ACS 5-year estimates, for Means of Transportation to Work in Templeton in 2021, 79% of workers drove alone and 13% carpooled. The remainder either take public transportation, ride hailing services, or walk or bike. The below chart shows the average travel time to work for Templeton in 2021 by mode. Based on the data, 60% of commuters who drove alone spend less than 20 minutes commuting with most single-occupancy commuters driving less than 10 minutes to work. Most people who carpooled either spend 10-14 minutes (25%) or 25 to 29 minutes (26%) commuting to work. All commuters using public transportation had an average travel time to work of 34 to 44 minutes.



Source: Means of Transportation to Work by Selected Characteristics, Templeton CSD, CA. Table S0802. American Community Survey 5-year Estimates Subject Tables. US Census Bureau. 2021.



2.4 Performance Metrics Methodology

2.4.1 Vehicles Miles Traveled (VMT)

SB 743 was signed into law in 2013, with the intent to better align CEQA practices with statewide sustainability goals related to infill development, active transportation, and greenhouse gas (GHG) emissions. SB 743 required the Governor's Office of Planning and Research (OPR) to identify new metrics for identifying and mitigating transportation impacts within CEQA. Among the changes to the State CEQA Guidelines was removal of vehicle delay and Level of Service (LOS) from consideration as environmental impacts under CEQA. For land use projects, OPR identified Vehicle Miles Traveled (VMT) as the new metric for transportation impact analysis under CEQA. Lead agencies have discretion, consistent with CEQA and planning requirements, to choose which methodology and threshold criteria to use to evaluate transportation impacts. The County of San Luis Obispo has established VMT Policy in their Traffic Impact Study Guidelines.

2.4.2 Level of Service Methodologies

Although VMT is the metric for identifying CEQA impacts, the County has retained quantifying traffic operations through the determination of "Level of Service" (LOS) within their General Plan (local policy) outside of CEQA. LOS is a qualitative measure of traffic operating conditions, whereby a letter grade "A" through "F" is assigned to an intersection, or roadway segment, representing progressively worsening traffic conditions. LOS "A" represents free-flow operating conditions and LOS "F" represents over-capacity conditions. Levels of Service will be calculated for all intersection control types using the methods documented in the Transportation Research Board publication Highway Capacity Manual, Sixth Edition, A Guide for Multimodal Mobility Analysis, 2016 (HCM 6).

2.4.3 Intersection Operations

The Synchro 11 (Trafficware) software program will be used to implement the HCM 6 analysis methodologies. Synchro 11 has the capability to produce results based on HCM 2000, HCM 2010, HCM 6, or Synchro methodologies, and takes into account intersection signal timings, peak hour factors, heavy vehicle factors, and queuing constraints when calculating delay. Intersection Level of Service (LOS) was calculated for all control types using the methods documented in HCM 6. For signalized or all-way stop-controlled (AWSC) intersections, a LOS determination is based on the calculated averaged delay for all approaches and movements. For two-way or side-street stop-controlled (TWSC) intersections, a LOS determination is based upon the worst control delay of each minor-street movement (or shared movement) or major-street left turn. The vehicular-based LOS criteria for different types of intersection controls are presented in Table 2.1.

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Table 2.1 Level of Service (LOS) Criteria for Intersections

Level of Service	Type of Flow	Delay	Maneuverability	Stopped Delay per Vehicle	
				Signalized	Un-signalized
A	Stable Flow	Very slight delay. Progression is very favorable, with most vehicles arriving during the green phase not stopping at all.	Turning movements are easily made, and nearly all drivers find freedom of operation.	≤10.0	≤10.0
B	Stable Flow	Good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.	Vehicle platoons are formed. Many drivers begin to feel somewhat restricted within groups of vehicles.	>10.0 and ≤20.0	>10.0 and ≤15.0
C	Stable Flow	Higher delays resulting 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, although many still pass through the intersection without stopping.	Back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted	>20.0 and ≤35.0	>15.0 and ≤25.0
D	Approaching Unstable Flow	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	Maneuverability is severely limited during short periods due to temporary back-ups.	>35.0 and ≤55.0	>25.0 and ≤35.0
E	Unstable Flow	Generally considered to be the limit of acceptable delay. Indicative of poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences.	There are typically long queues of vehicles waiting upstream of the intersection.	>55.0 and ≤80.0	>35.0 and ≤50.0
F	Forced Flow	Generally considered to be unacceptable to most drivers. Often occurs with over saturation. May also occur at high volume-to-capacity ratios. There are many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors.	Jammed conditions. Back-ups from other locations restrict or prevent movement. Volumes may vary widely, depending principally on the downstream back-up conditions.	>80.0	>50.0

2.4.4 Technical Analysis Parameters

This traffic study focuses on a “planning level” evaluation of traffic operating conditions. The planning level evaluation incorporates appropriate heavy vehicle adjustment factors, peak hour factors, and signal lost time factors and reports the resulting operational analysis as estimated using the HCM 6-based analysis methodologies. Additionally, a queuing analysis on intersection lane groups is included in this study to identify stacking length requirements.



VINEYARD DRIVE CORRIDOR PLAN

Table 2.2 presents the technical parameters that will be utilized for the evaluation of the study intersections and ramp segments for the analysis scenarios. All parameters not listed should be assumed as default values or calculated based on the parameters listed.

Table 2.2 Technical Parameter Assumptions

	Technical Parameter	Assumption
1	Intersection Peak Hour Factor	Based on counts, intersection overall
2	Intersection Heavy Vehicle Percent	Based on counts, intersection overall (minimum of 2%)
3	Intersection Peak Hour Factor	Existing scenarios: based on counts

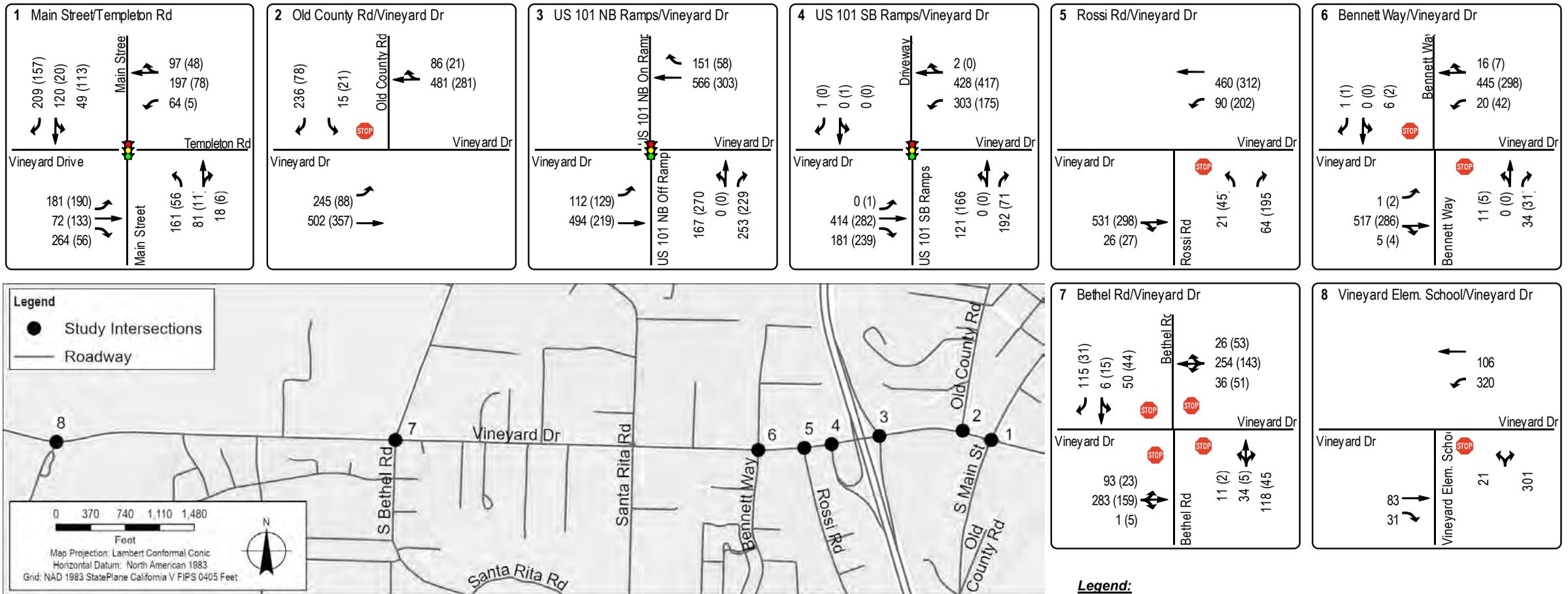
2.5 Existing Operations

The Vineyard Corridor study area extends from SR 46 West and ends at S Main Street. Vineyard’s corridor is two lanes major collector roads with limited left turn lane. Lane width is generally 12-foot wide lane, with one lane of travel in both directions. On-street parking is prohibited along Vineyard, except in some locations—primarily between Bennett Way and Rossi Road. Class II bike facility is available along the Vineyard corridor in both directions.

2.5.1 Existing Traffic Volumes

For this corridor plan, eight intersections have been identified to be evaluated for average weekday AM, School, and PM peak hour traffic operations. The AM peak hour is defined as the one-hour of peak traffic flow (which is the highest total volume count over four consecutive 15-minute count periods) counted between 7:00 am and 9:00 am on a typical weekday. The school peak hour is defined as the one hour of peak traffic flow counted between 2:00 pm and 4:00 pm on a typical weekday. The PM peak hour is defined as the one hour of peak traffic flow counted between 4:00 pm and 6:00 pm on a typical weekday. Peak hour turning movement counts were collected at these intersections on Tuesdays and Thursdays when local schools were in session between the week of August 30th and September 15th, 2022. The study intersections, existing peak hour turning movement volumes, lane geometry, and intersection controls are shown in the following Figures.

VINEYARD DRIVE CORRIDOR PLAN



Legend:
 XXX (XXX) = AM (PM) peak hour volumes
 Note: Intersection #8: Only AM and School Peaks are analyzed.

VINEYARD DRIVE CORRIDOR PLAN



Figure 2.2 Existing School Peak Hour Intersection Volumes

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2.5.2 Existing Level of Service (LOS)

Count data were collected for peak hour periods in the AM (7:00 to 9:00 AM), School (2:00-4:00 PM), and PM (4:00 to 6:00 PM) for eight key intersections on the Vineyard Corridor. Existing conditions for weekday AM, School, and PM peak hour intersection operations were quantified utilizing the existing traffic volumes and intersection lane geometrics and control. Table 2.3 provides the delay (in sec/veh) and resulting LOS for the study intersections under Existing conditions. The Synchro outputs are provided in **Appendix C**. The signal warrant analysis is provided in **Appendix D**. As shown in Table 2.3, the majority of study intersections operate below the target LOS during the Existing conditions AM and School peak hours while operating at or above the target LOS during the existing PM condition. The US 101 Southbound Ramps is currently operating at LOS E in the AM peak hour due to high vehicle volume on Vineyard Drive eastbound.

Table 2.3 Existing Conditions Intersection Operations

#	Intersection	Control Type ^{1,2}	Target LOS	AM Peak Hour			School PM Peak Hour			PM Peak Hour		
				Delay	LOS	Warrant Met? ³	Delay	LOS	Warrant Met? ³	Delay	LOS	Warrant Met? ³
1	Vineyard Dr & S. Main St	Signal	D	26.8	C	-	23.6	C	-	21.2	C	-
2	Vineyard Dr & Old County Road	TWSC	D	100.1	F	Yes	32.4	D	-	18.8	C	-
3	Vineyard Dr & US 101 Northbound Ramps	Signal	C	31.4	C	-	25.2	C	-	29.4	C	-
4	Vineyard Dr & US 101 Southbound Ramps	Signal	C	75.5	E	-	52.2	D	-	25.6	C	-
5	Vineyard Dr & Rossi Road	TWSC	D	40.4	E	No	52.2	F	Yes	33.9	D	-
6	Vineyard Dr & Bennett Way	TWSC	D	38.6	E	No	29.1	D	-	18.5	C	-
7	Vineyard Dr & Bethel Road	AWSC	D	50.8	F	Yes	16.8	C	-	9.8	A	-
8	Vineyard Dr & Vineyard Elem. School	TWSC	D	44.4	E	Yes	12.4	B	-	N/A	-	-

Notes:

1. AWSC = All Way Stop Control; TWSC = Two Way Stop Control; RNDTB = Roundabout
2. LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC, Signal, RNDTB
3. Warrant = Based on California MUTCD Warrant 3
4. **Bold** = Unacceptable Conditions
5. OVR = Delay over 300 seconds

2.5.3 Existing Peak Queues

The queues during the peak hours were observed in the field, and the maximum queues were documented. The queues were also simulated via a microsimulation software (SimTraffic) to approximate the maximum and 95th percentile queues at the study intersections. The table showing the observed queues, simulated maximum, and simulated 95th percentile queues are in **Table A.2** in the **Appendix**.

VINEYARD DRIVE CORRIDOR PLAN

During the AM Peak hour, the highest vehicle queues were observed along Vineyard Drive at S Main Street and at Bethel Road. During the School peak hour, the highest observed vehicle queue was along S Main Street going northbound and southbound, along Old County Road going southbound, and on Vineyard Drive going westbound at the US 101 NB off-ramp intersections. For the PM peak hour, the highest observed vehicle queues were along Vineyard Drive going eastbound at S Main Street and at NB US 101 northbound off ramps. PM peak hour queuing at Vineyard Drive and Bethel Road is roughly similar during the School peak hour.



Figure 2.3 Queue Lengths – AM Peak Hour (East)

VINEYARD DRIVE CORRIDOR PLAN



Figure 2.4 Queue Lengths – AM Peak Hour (Central)



Figure 2.5 Queue Lengths – School Peak Hour (East)

VINEYARD DRIVE CORRIDOR PLAN



Figure 2.6 Queue Lengths – School Peak Hour (Central)



Figure 2.7 Queue Lengths – PM Peak Hour (East)

VINEYARD DRIVE CORRIDOR PLAN

2.6 Forecasted Operations

2.6.1 Forecasted Traffic Volumes

Forecasted traffic volumes were derived based on the growth presented in both the Templeton local travel demand model (dated 2017) and the SLOCOG regional travel demand model (dated 2019) along the Vineyard Drive corridor. A linear growth rate of 1.0% per year was determined appropriate for developing the forecasts over the next approximate 20 years, out to 2042. Additionally, forecasts in the vicinity of the US 101 interchange were further developed for anticipated growth based on the General Plan land uses (Commercial Retail as shown in Figure 2.8) in the adjacent vacant parcels which will likely be highway-serving uses and local shopping and restaurants. These developments are not anticipated to be big-box retailers that would generate regional trips at this time. The study intersections forecasted peak hour turning movement volumes, lane geometry, and intersection controls are shown in the following Figures.

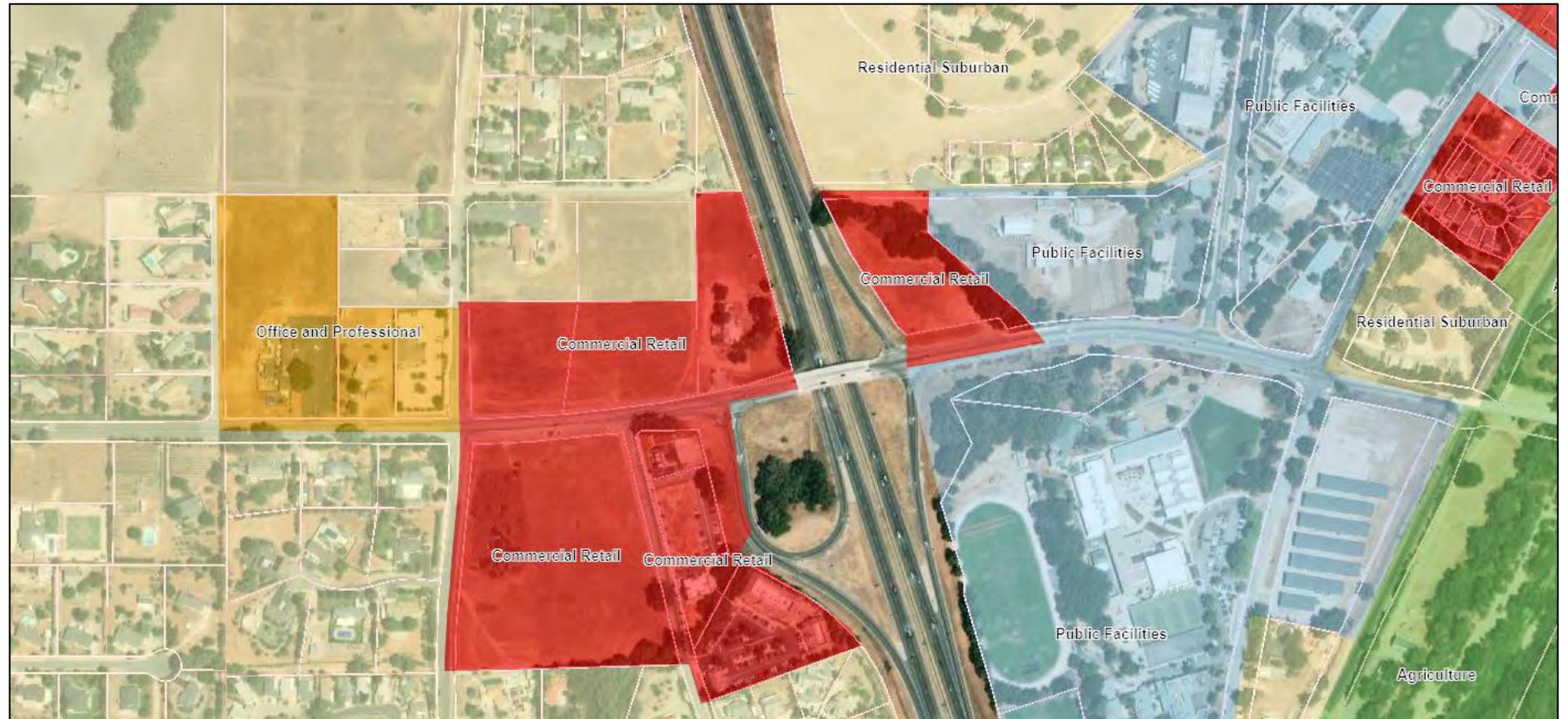


Figure 2.8 General Plan Land Uses (Vineyard Drive at US 101)

VINEYARD DRIVE CORRIDOR PLAN



Legend:
 XXX (XXX) = AM (PM) peak hour volumes
 Note: Intersection #8: Only AM and School Peaks are analyzed.

Figure 2.9 Forecasted AM and PM Peak Hour Intersection Volumes

VINEYARD DRIVE CORRIDOR PLAN

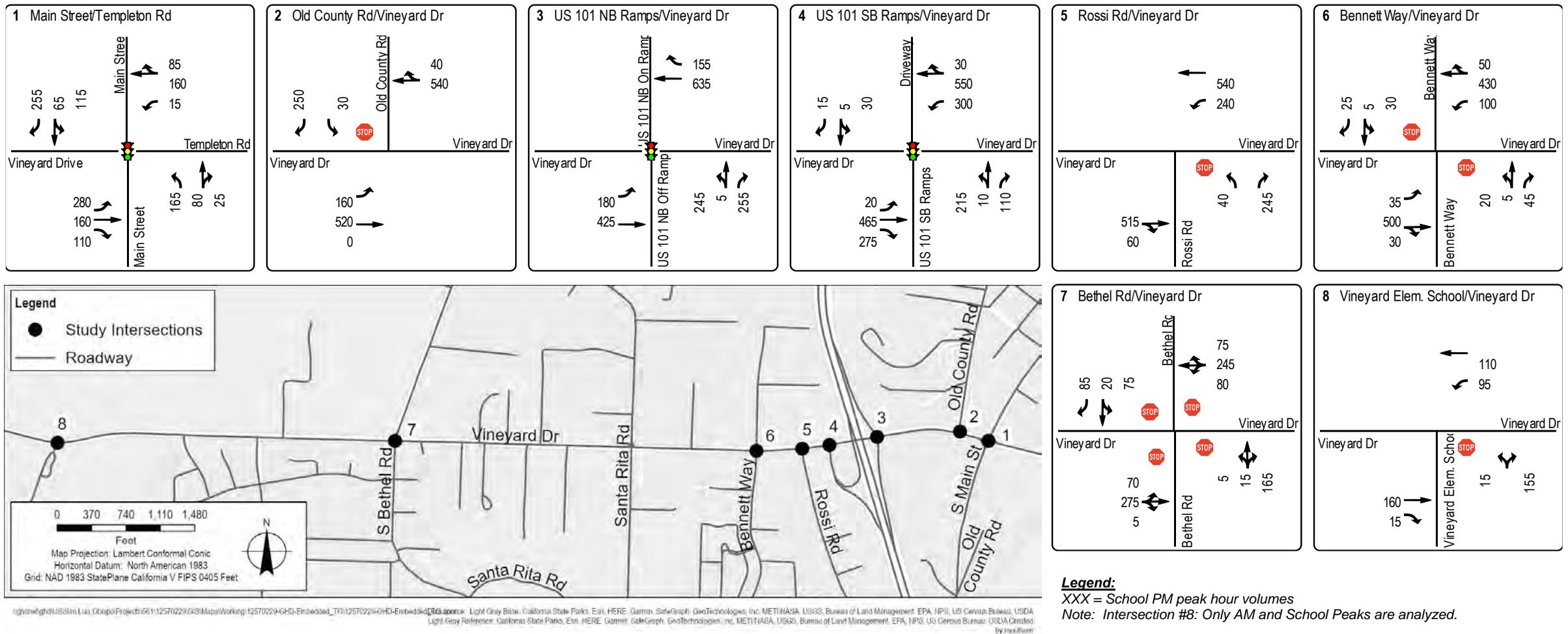


Figure 2.10 Forecasted School Peak Hour Intersection Volumes



VINEYARD DRIVE CORRIDOR PLAN

2.6.2 Forecasted Level of Service

Cumulative conditions for weekday AM, School, and PM peak hour intersection operations were quantified utilizing the forecasted traffic volumes and existing intersection lane geometrics and controls. The two traffic signals at the US 101 ramps were assumed to have optimized timings in the future. Table 2.4 provides the delay (in sec/veh) and resulting LOS for the study intersections under forecasted conditions. The Synchro outputs are provided in **Appendix C**. The signal warrant analysis is provided in **Appendix D**. As shown in Table 2.4, all study intersections apart from Main Street and the US 101 ramp termini (all signals) are projected to operate at LOS F during the AM peak hour, a few intersections operate at LOS F during the School and PM peak hours, and other locations generally operate at LOS C/D during the School peak and PM peak hours, under forecasted conditions.

Table 2.4 Forecasted Conditions Intersection Operations

#	Intersection	Control Type ^{1,2}	Target LOS	AM Peak Hour			School PM Peak Hour			PM Peak Hour		
				Delay	LOS	Warrant Met? ³	Delay	LOS	Warrant Met? ³	Delay	LOS	Warrant Met? ³
1	Vineyard Dr & S. Main St	Signal	D	34.7	C	-	26.0	C	-	21.2	C	-
2	Vineyard Dr & Old County Road	TWSC	D	>300	F	Yes	62.7	F	-	26.1	D	-
3	Vineyard Dr & US 101 Northbound Ramps	Signal	C	25.2	C	-	26.6	C	-	27.0	C	-
4	Vineyard Dr & US 101 Southbound Ramps	Signal	C	29.0	C	-	27.2	C	-	24.0	C	-
5	Vineyard Dr & Rossi Road	TWSC	D	115.5	F	Yes	163.5	F	Yes	96.9	F	Yes
6	Vineyard Dr & Bennett Way	TWSC	D	>300	F	Yes	>300	F	Yes	132.1	F	Yes
7	Vineyard Dr & Bethel Road	AWSC	D	83.9	F	Yes	20.5	C	-	11.5	B	-
8	Vineyard Dr & Vineyard Elem. School	TWSC	D	293.8	F	Yes	13.8	B	-	N/A	-	-

Notes:

1. AWSC = All Way Stop Control; TWSC = Two Way Stop Control; RNDDBT = Roundabout
2. LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC, Signal, RNDDBT
3. Warrant = Based on California MUTCD Warrant 3
4. **Bold** = Unacceptable Conditions
5. OVR = Delay over 300 seconds

2.6.3 Forecasted Peak Queues

Table A.2 in the **Appendix** presents the maximum and 95th percentile simulated queueing results for the eight study intersections. During the AM Peak hours, the highest vehicle queues were estimated to be along Vineyard Drive at S Main Street and at Bethel Road. During the School peak hours, the highest vehicle queues were estimated to be along S Main Street going northbound and southbound, on Old County Road going southbound, and on Vineyard Drive going westbound at the US 101 northbound off-ramp intersections. For the PM peak hour, the highest vehicle queues were estimated to be along Vineyard Drive going eastbound at S. Main Street and at US 101 NB off ramps. PM peak hour queueing at Vineyard Drive and Bethel Road is roughly similar during the School peak hour.

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2.7 Existing Multimodal Conditions

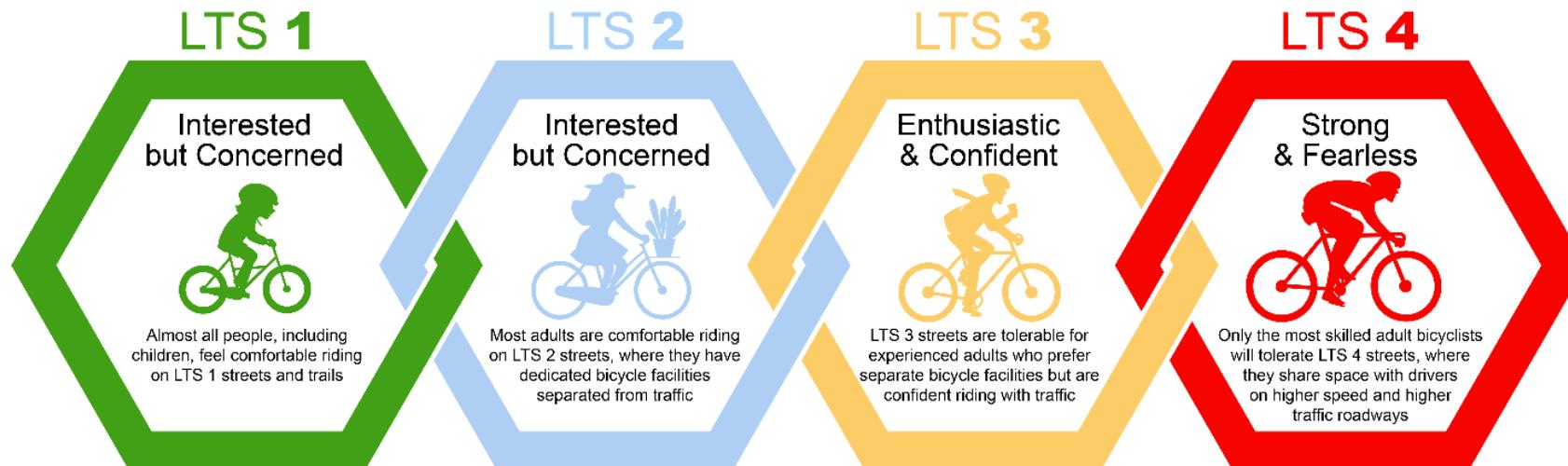
2.7.1 Existing Pedestrian & Bicycle Facilities and Access Constraints

Along the corridor, gaps in the multimodal network exist, including a large portion of the segments without sidewalks and intersections without marked crosswalks. In addition, some existing sidewalks do not sufficiently accommodate pedestrian demand and need to be replaced. Other potential challenges for pedestrians include signs that obstruct clear paths (e.g., a pole in the middle of a path), sight-line obstructions/restrictions (e.g., vegetation growing across or overhanging path), and lack of curb ramps. **Figure 2.12** presents the existing pedestrian and bicycle facilities.

2.7.2 Existing Bicycle Level of Traffic Stress (LTS)

Level of Traffic Stress (LTS) are calculated for roadway segments and intersections using the methods documented in the paper, Low Stress Bicycling and Network Connectivity, Mineta Transportation Institute, Report 11-19, May 2012. Bicycle LTS quantifies the stress level of a given roadway segment by considering a variety of criteria, including street width (number of lanes), speed limit or prevailing speed, presence and width of bike lanes, and the presence and width of parking lanes. Bicycle LTS is a suitability rating system of the safety, comfort, and convenience of transportation facilities from the perspective of the user. Moreover, the methodology allows planning practitioners to assess gaps in connectivity that may discourage active users from traversing roadways.

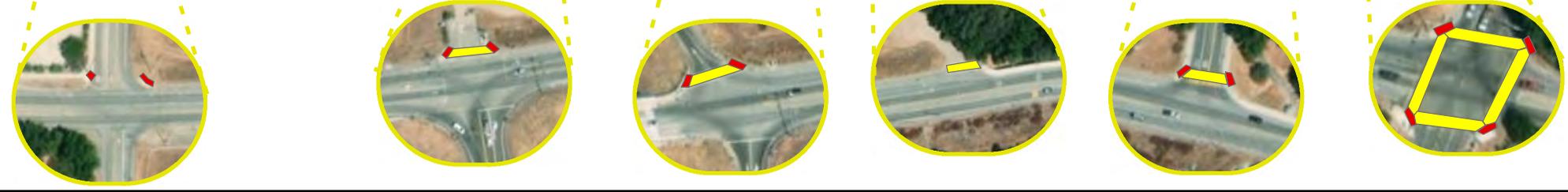
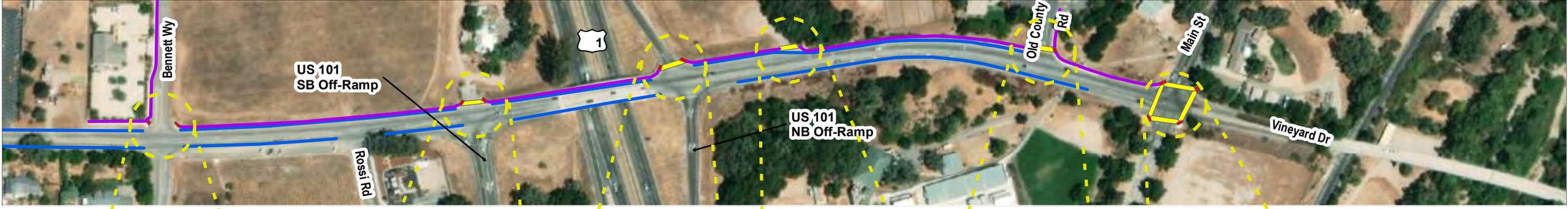
Bicycle LTS scores roadway facilities into one of four classifications or ratings for measuring the effects of traffic-based stress on bicycle riders, with 1 being the lowest stress or most comfortable, and 4 being the highest stress or least comfortable. The four Bicycle LTS scoring categories are defined in **Figure 2.11**. Generally, LTS score of 1 indicates the facility provides a traffic stress tolerable by most children and less experienced riders, such as multi-use paths that are separated from motorized traffic. An LTS score of 4 indicates a stress level tolerable by only the most experienced cyclists who are comfortable with high-volume and high-speed, mixed traffic environments. LTS 3 and 4 represent high stress conditions for bicyclists and reflect the need for visibility and safety improvements.



Corridor segments, intersection approaches, and intersection crossings along the corridor were evaluated for LTS. **Figure 2.13** displays the existing conditions bicycle LTS results for the study corridor. Most of the Vineyard Corridor and crossings of and approaches to the Vineyard Corridor are high stress due to the traffic volume and speed of the roadway. The main barriers to low stress connectivity for bicyclists within the Vineyard study corridor are the high traffic volumes, vehicular speeds greater than or equal to 45 miles per hour, and a lack of protected bicycle infrastructure. These high stress facilities serve to discourage access to and bicycling on the Vineyard Corridor. The Bicycle LTS results also relate to pedestrian comfort along the corridor and crossing the corridor, where sidewalks and crossings do not exist.

Figure 2.11 Bicycle Level of Traffic Stress (LTS) Definitions

Note:
There are no pedestrian facilities west of the elementary school.



Legend

- Trail
- Bike Lanes
- Sidewalk
- Ramps
- Crosswalks

Data Disclaimer:
Location of pedestrian facilities are for visual representation only.

Paper Size Legal

0 130 260
Feet

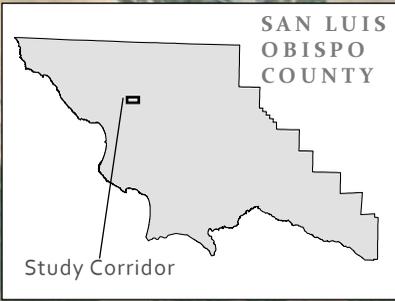
Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California V FIPS 0405 Feet

Templeton
San Luis Obispo County
Vineyard Drive Corridor Plan

Existing Pedestrian and Bicycle Facilities

Project No. 12570229
Revision No. -
Date Feb. 2023

FIGURE 2.12



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 0 660 1,320
 US Feet
 Map Projection: Lambert Conformal Conic
 Horizontal Datum: North American 1983
 Grid: NAD 1983 StatePlane California V FIPS 0405 Feet



Templeton
 San Luis Obispo County
 Vineyard Drive Corridor Plan

Existing Bicycle
 Level of Traffic Stress (LTS)

Project No. 12570229
 Revision No. -
 Date 7/25/2023

FIGURE 2.13

\\ghdnet\ghd\US\San Luis Obispo\Projects\12570229\GIS\Maps\Working\BicycleLTS\BicycleLTS.aprx
 Print date: 25 Jul 2023 - 21:56

Data source: Roads: TIGER, 2021; Bikeways: Urban Service Line: SLO County Open Data Portal; World Imagery: Maxar. Created by: rsouthern

2.8 Existing Collision Analysis

Collision data along Vineyard Drive for the past five latest available years (2017-2021) were obtained and processed from California Highway Patrol’s Statewide Integrated Traffic Records System (SWITRS) database. During the 5-year analysis period, there were 34 total crashes along Vineyard corridor, including 9 injury crashes. It should be noted that the overall collision chart below does not represent all collisions that may have occurred in the corridor—rather all reported collisions where a collision report is generated. Many collisions may be either unreported by the involved parties or reported by the parties without an officer investigation. Injury collisions are the most accurate representation of overall collision trends because these types of collisions are most consistently reported and investigated. Figure 2.14 presents the collisions by year and severity. Figure 2.15 presents the primary collision factor by collision type.

Collision rates were calculated at intersections which had 3 or more collisions in terms of “accidents per million vehicles entering”. The calculated collision rates were then compared with statewide average rates compiled by Caltrans as published in their most recent *2020 Collision Data on California State Highways* document. The document provides basic average accident rates for various types of roadways and intersections categorized by number of lanes, travel speed, terrain, control type, area type, and are derived from the SWITRS data statewide. Collision rates at Vineyard Drive intersections were significantly lower than the statewide basic average rate for similar facilities. Fatality and injury (F+I) rates were also calculated as a percentage of total recorded collisions; Rossi Road F+I rate was higher than the statewide average. Collisions were mapped to identify if specific locations have similar collisions, including evaluation of pedestrian- and bicycle-related collisions.

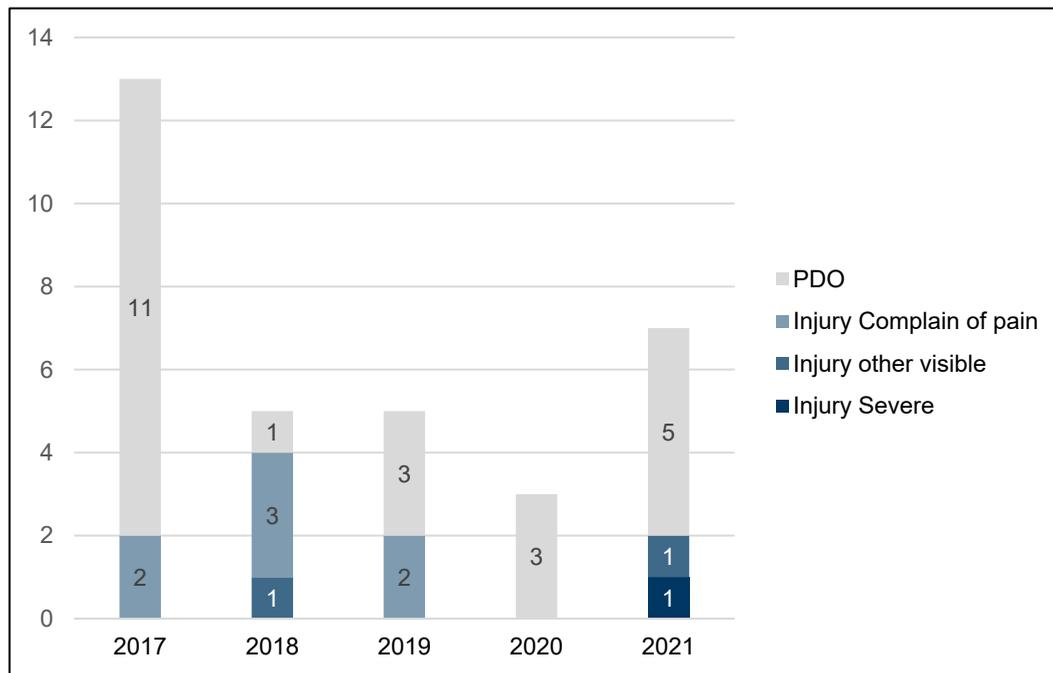


Figure 2.14 Collisions by Year and Severity

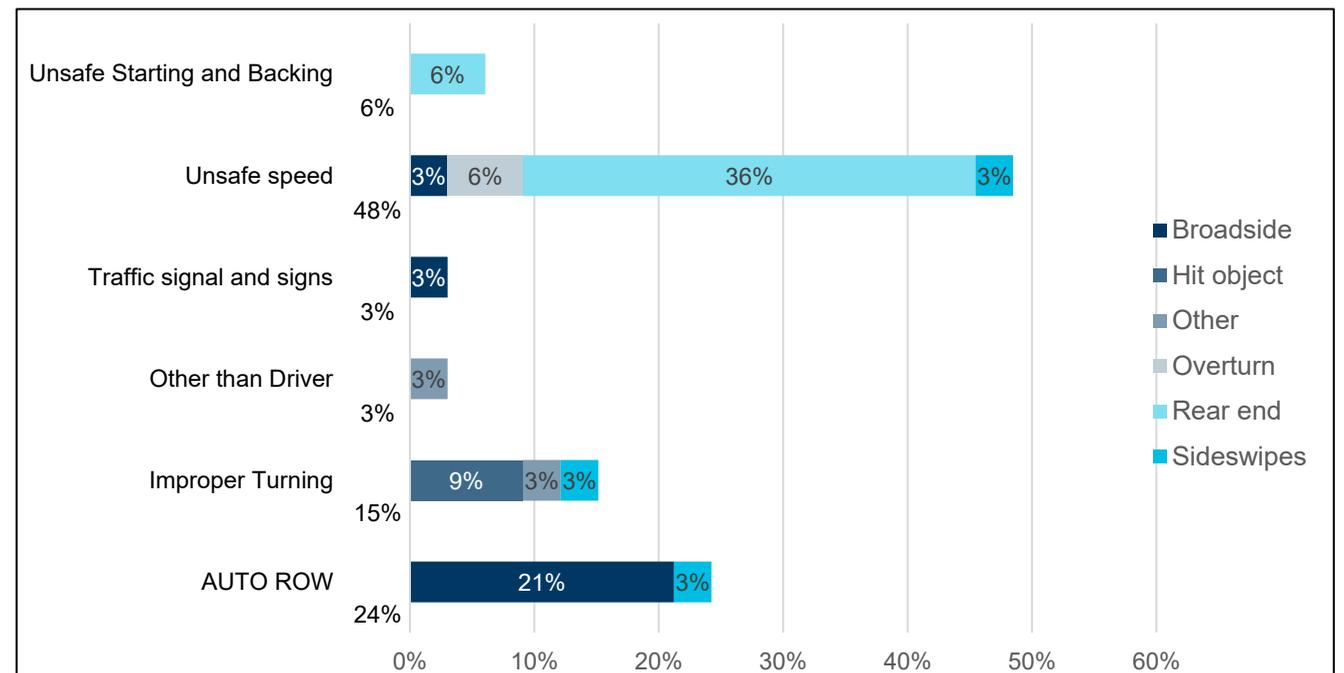


Figure 2.15 Collisions by Primary Collision Factor and by Collision Type

VINEYARD DRIVE CORRIDOR PLAN

2.8.1 Vineyard Drive Collision Trends

As shown in Figure 2.14, the majority of collisions along Vineyard Drive resulted from unsafe driving speed (48%) or automobile right-of-way (24%). One of the most effective ways to reduce collisions along the corridor is to identify the highest incident locations, analyze the collision patterns at those locations, develop targeted countermeasures to those patterns, then prioritize and implement the measures regularly and systematically. Although, this is typically done over a larger area (i.e., community-wide), this type of “hot-spot” analysis can be evaluated along the Vineyard Drive corridor.

Figure 2.16 presents the collision details including severity, the primary collision factor, and collision type. The highest concentration of collisions in the area is along Vineyard Drive between Bennet Way and Main Street, near the interchange with US 101. Collisions along Vineyard Drive between Bennett Way and Vineyard Elementary School mostly occurred at intersections and the primary collision factor was unsafe speed. Collisions along Vineyard Drive west of the Elementary School (west segment) were along curves and the majority involved improper turning.

As shown in Figure 2.15 and Figure 2.16, rear end, broadside, and hit object were the most common types of collisions reported in 2017-2021, representing 80% of the total recorded incidents. Rear-end and broadside collisions were the most prominent, with unsafe speed and auto right-of-way violations as the leading contributing factors. Broadside collisions, typically occur at intersections and often at higher speeds. These types of collisions can be largely eliminated with a roundabout intersection configuration.

Bicycle collisions have remained relatively minimal since 2017. There were 2 bicycle collision reported on record between the year 2017-2021. Because of the bicycle vulnerable nature compared to motor vehicles, bicycle collisions typically have a higher number of injuries, serious injuries, and fatalities.

VINEYARD DRIVE CORRIDOR PLAN

Chapter 3. Public Engagement

The County of San Luis Obispo, the San Luis Obispo County of Governments (SLOCOG), and Caltrans collaborated on this plan to identify projects that will be competitive to receive funding and can ultimately be constructed. The public outreach team for the project assisted with presentations to community, civic, business, and non-profit groups to provide information on the plan and to provide opportunities for input. The Plan's outreach effort focused on informing and engaging the public in the corridor concept alternative evaluation process and ultimate selection of the Preferred Concept. Project information, including event schedules, links to relevant documents, as well as a comment page, were made available via a Project Website and shared through County social media channels and via the County's website.

This outreach effort included:

- Public Workshop at Farmer's Market
- Stakeholder Focus Group
- Online Corridor Survey (Social Pinpoint)
- Online interactive mapping tool (Social Pinpoint)
- Online comment page via the project website from November to February

3.1 Public Workshop

A public workshop was held Saturday, November 12, 2022, at the Farmers Market in Templeton. It was promoted via social media and website postings. The purpose of the workshop was to introduce the project to the community and obtain feedback on current issues and concerns regarding multimodal transportation along the Vineyard Drive corridor between Main Street and SR 46 West. There were approximately 60 people that interacted with GHD and County staff to provide their input. Community members were also provided with background information, the link to the project website and project survey to continue to provide comments.

The following is a summary of comments received from the community. These comments assisted and guided the Concept Alternatives and preferred plan.

- Most people use the corridor to either access the schools or SR 46 West
- Most common concern is traffic congestion during the peak hours, affects access on east end of Vineyard especially with school traffic
- Sidewalk at US 101 is on north side, but destinations like Trader Joe's, etc. are on south side; no pedestrian crossings across Vineyard at interchange
- Discontinuous bike lanes on west end of Vineyard
- People driving either too fast or too slow (road conditions prior to recent repaving)
- Commenters opined that Vineyard Drive is okay apart from school traffic



3.2 Technical Advisory Committee (TAC) Meetings

The first TAC meeting was held on November 17, 2022, at the School District to introduce the project and solicit feedback from stakeholders including SLOCOG, Templeton Unified School District, Community Services District, local Fire and Sheriff representatives. The project purpose and background were presented, along with a review of the scope of work, the project website, a discussion on existing conditions and concerns, followed by project goals and improvement suggestions. Several comments were received and are documented in meeting minutes attached in **Appendix B**. The second TAC meeting was held on May 10, 2023, to present the draft concepts and improvement alternatives to the stakeholders. Comments received from the TAC included to extend the westbound left turn to Vineyard Elementary School because vehicles queue up and there's little sight distance before the hill and curve approaching the left turn. There were also comments that a roundabout at Bethel Road would result in increased vehicular flow and queues to the left turn to the school. The Fire Department requested that the roundabout have a minimum 50-foot turn radius to meet the requirements of emergency vehicles (aerial fire apparatus). Additionally, the Fire Department suggested striping double yellow lines to implement the turn restrictions at Old County Road, so that emergency access can be maintained. The TAC was in favor of Alternative 1 (trail with bike lanes) and the proposed roundabout at Bethel Road.

3.3 Templeton Area Advisory Group (TAAG) Meetings

The Vineyard Drive Corridor Plan was presented to the TAAG on December 15, 2022, to introduce the project and get the word out about the website. At the meeting, GHD presented the scope of work and analysis metrics, existing infrastructure and operational information, and the project timeline. The goal of the first meeting was to solicit public input on comments and concerns on existing issues and direct people to the Project Website for the map-based comments and survey. The Final Plan recommendations were presented to TAAG on October 19, 2023.

3.4 Project Website Interactive Map Comments

A Project Website was created via the Social Pinpoint platform to solicit feedback from the community on existing issues along the corridor, improvement ideas, and inform the community on project updates and upcoming meetings. As part of the website, an interactive comment map was available to the community to express their concerns about issues related to pedestrians, bicyclists, traffic (vehicle and trucks), lighting, or other concerns. The interactive map was open for public comment from November 12, 2022, through February 3rd, 2023. **Figure 3.1** shows the number of unique stakeholders, interactive map comments, and survey responses that the website gathered during the public input period, and the stakeholder engagement by day. Unique stakeholders are the number of unique people who are interacting with the website by adding comments and/or answering surveys. The 7-day period with the most engagement (highest number of comments and survey responses submitted) was December 21 to 28th.

There were 136 comments on the interactive map feature of the website, of which 18 were input from the first TAC meeting to start the comments and allow the public to expand on these topics if they agreed or disagreed with comments. This feature allowed the public to drag icons to a location within the project limits and leave a comment regarding automobile, bicycle, lighting, pedestrian, or other improvements desired at specific locations or the corridor in general. The top comment type was automobile improvements with 66 responses as seen in **Figure 3.2** below. The interactive map comments as they appear on Social Pinpoint are represented in **Figure 3.3**.

VINEYARD DRIVE CORRIDOR PLAN

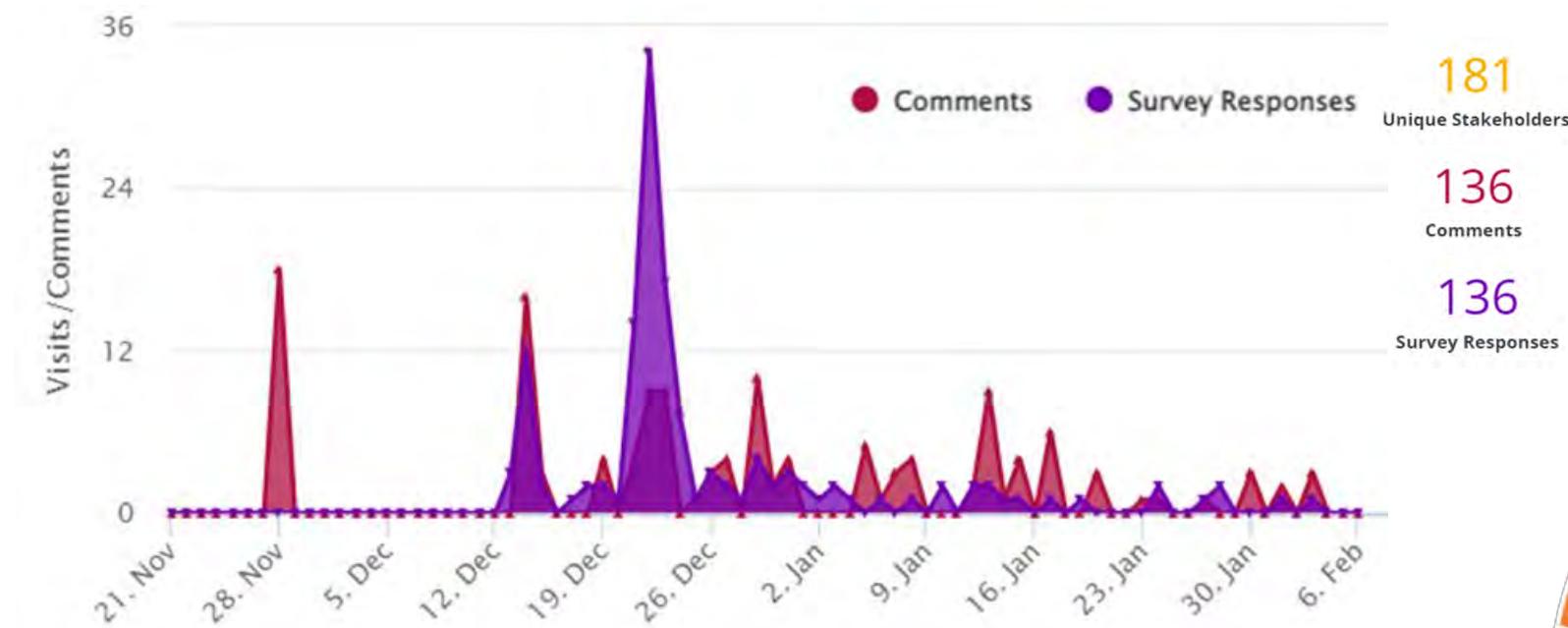


Figure 3.1 Stakeholder Engagement by Day

There were 136 comments on the interactive map feature of the website, of which 18 were input from the first TAC meeting to start the comments and allow the public to expand on these topics if they agreed or disagreed with comments. This feature allowed the public to drag icons to a location within the project limits and leave a comment regarding automobile, bicycle, lighting, pedestrian, or other improvements desired at specific locations or the corridor in general. The top comment type was automobile improvements with 66 responses as seen in **Figure 3.2**. The interactive map comments as they appeared on Social Pinpoint are shown in **Figure 3.3**.

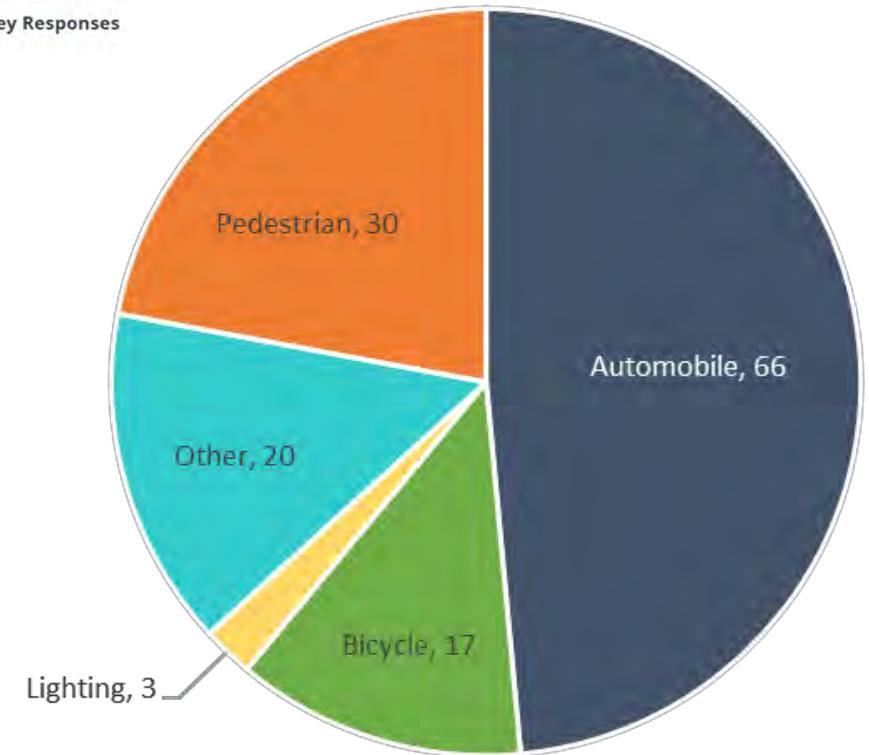


Figure 3.2 Number of Interactive Map Comments by Type

VINEYARD DRIVE CORRIDOR PLAN

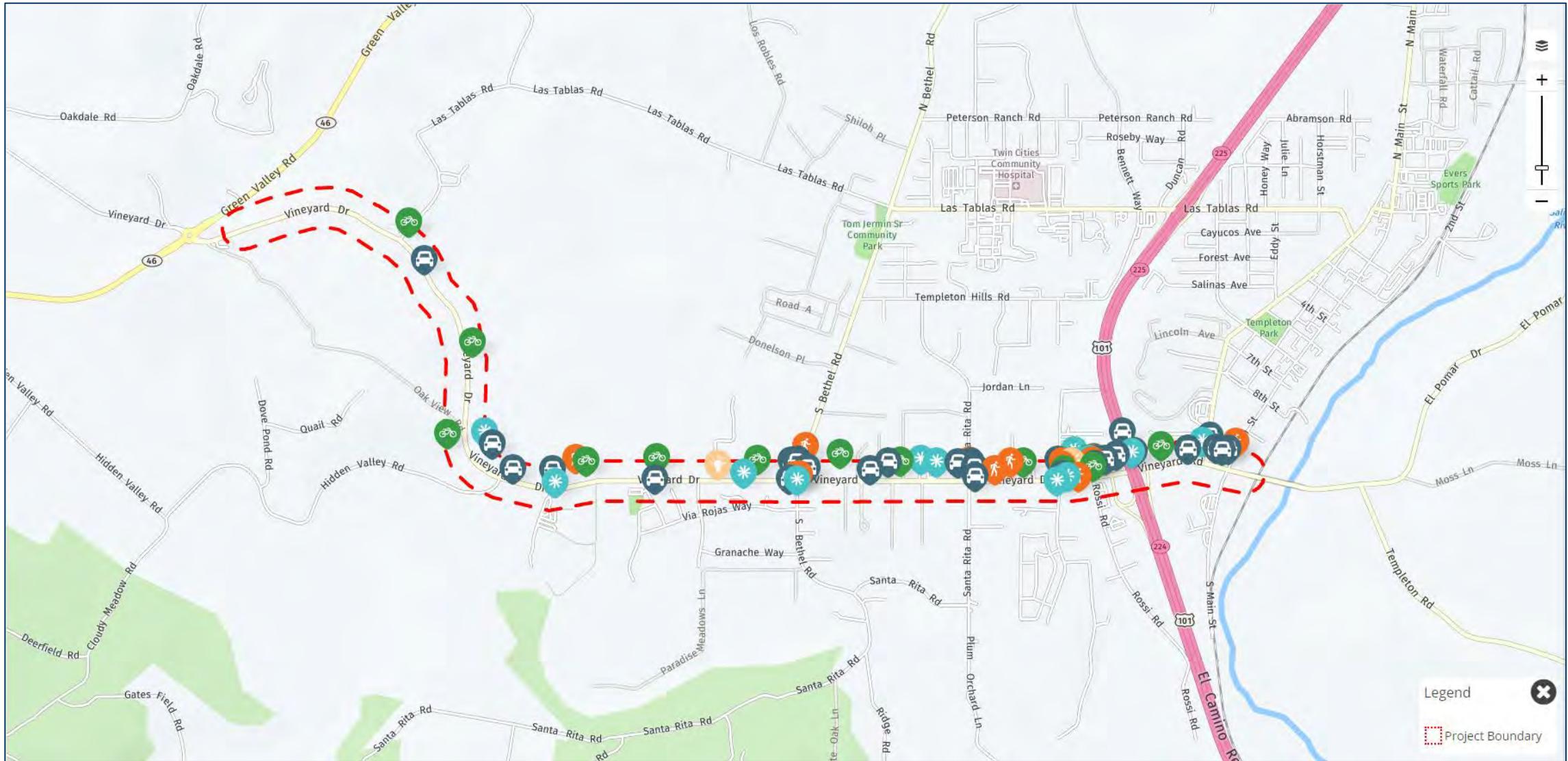


Figure 3.3 Location of Interactive Map Comments

VINEYARD DRIVE CORRIDOR PLAN

3.5 Summary of Interactive Map Comments by Location

The following summarizes the comments received by the public based on the location provided in the interactive map. The intersection with the most comments was Rossi Road (32), followed by Bethel Road (20), Santa Rita Road (14), Bennett Road (12), and the central section between US 101 and Bethel Road (12).

The comments with the most agreed-upon comments included:

- TAC comment stating, “No continuous walkway/jogging path between Vineyard Elementary School and Main Street” (26 agree, 0 disagree)
- At Bethel Road intersection, “to ensure traffic slowdown and continue traffic movement, this is an ideal location for a traffic circle” or roundabout (25 agree, 7 disagree)
- TAC comment stating, “Left turns in and out of Rossi during morning and evening peak are high risk” (19 agree, 0 disagree)
- TAC comment stating, “Needs to be better bike and pedestrian facilities” corridor-wide (19 agree, 2 disagree)
- Comment discussing bicycle facilities west of the elementary school are both difficult and dangerous and proposes a full bike lane on Vineyard from US 101 to the roundabout at SR 46 West (18 agree, 1 disagree)

Comments which the community disagreed with most included:

- A suggestion to add speed bumps to slow vehicles approaching and leaving Bethel Road intersection (6 agree, 8 disagree)
 - Note: The County follows California Fire Code Section 503.4 which states that fire apparatus access roads shall not be obstructed in any manner, including the parking of vehicles, and that traffic calming devices shall be prohibited unless approved by the fire code official (Section 503.4.1).
- A Suggestion to add streetlights near Hopkins Road and to add a center turn lane between US 101 and Bethel Road (2 agree, 8 disagree)

Main Street and Old County Road Intersections

The comments for these two intersections centered around school access and related congestion and queuing for both the high school and the middle school. Comments mention bringing back school buses to reduce traffic and employees directing traffic. Comments suggest lengthening the right turn lane on Vineyard and add sidewalks along Main Street to connect and provide a safe path to schools (4 comments). Comments from the TAC also included that the traffic signal helps but people drive too fast (6 agree).

Rossi Road and US 101 Southbound Ramps Intersections

Several comments centered around Rossi Road access, sight-distance issues due to the on-street parking area west of the intersection, vehicle conflicts with drivers heading to 101 on-ramp, and vehicles encroaching past the stop bar to see oncoming traffic to make the left turn. Comments stated there have been collisions here, and most recently, a bicyclist was hit. Comments also state that no crosswalks exist to cross the 101 bridge to get between the shopping area where Trader Joe’s is and areas east of 101 (i.e., to/from schools). Comments express safety concerns regarding the left turn and suggest adding a traffic signal. Comments also suggest adding a crosswalk with flashing lights and adding sidewalk on the south side of Vineyard to connect to residential areas. Comments also suggest adding another route out of the shopping area. Comments suggest restricting parking enough so that oncoming traffic is visible for left-turning traffic from Rossi Road or remove the parking entirely. Comments state that the bike lane approaching Rossi near the parking area needs to be restriped. Comments also suggest extending the shared-use path/trail that currently exists east to US 101, however, other commenters have concerns about right-of-way and property impacts with a trail extension. (35 comments)



VINEYARD DRIVE CORRIDOR PLAN

Bennet Road Intersection

Comments centered around the lack of pedestrian access at Bennett and the increased traffic congestion related to the future land developments in the vacant lots nearby. Comments state that a traffic signal should be required as part of this improvement project, which would also allow safer pedestrian and bicycle access across Vineyard. Comments state that an enhanced crosswalk with a flashing beacon would be good here as many students need to cross Vineyard, including people from the Meadowbrook Mobile Home Park and surrounding residents. Crossing Vineyard either by car, bike, or on foot is difficult as vehicle volumes and speeds are prohibitive. There are concerns for student safety. Additionally, comments request a sidewalk on the south side of Vineyard Drive for access to shopping areas on Rossi Road. There were also comments related to the lack of adequate lighting along the corridor in general, but particularly Bennett Road to Main Street, and that lighting should be compliant with modern practices and appropriate shielding for adjacent residential properties.

Santa Rita

Comments state that turning left from either approach of Santa Rita is difficult due to oncoming traffic speeding, additionally northbound can be hard to see oncoming vehicles due to bushes/trees and utilities. Several comments suggest slowing traffic down here due to safety concerns and multiple near-miss collisions. Additionally, there was a comment stating that while waiting to turn left from Vineyard, vehicles would pass via the shoulder, and there was a request to widen the intersection for deceleration or right turn lanes/tapers. There was one request to install a 4-way stop control to slow traffic and provide safer turning. Additional comments request lowering the speed limit in this area to 35 mph and to install pedestrian crossings.

Bethel Road

Comments state that traffic congestion is largely only occurring during the school peak hours, and several comments observing vehicles running the stop signs due to not seeing them or driving too fast. One commenter suggested adding speed bumps on the approaches to slow traffic entering and leaving the intersection, and another comment suggested adding a median island. Several comments note the lack of pedestrian crossings and sidewalks adjacent to the trail in a high-trafficked area (peds/bikes). Several suggestions and community approval for a roundabout here, and that a roundabout would be much better than a traffic signal. Comments also state that parents are cutting through the adjacent neighborhood (Via Rojas) to pick up or drop off kids at the elementary school. One commenter suggested signals at both Bethel Road and the elementary school to be timed together (coordinated). Comments also voiced concerns with the roundabout resulting in more speeding and pedestrian crossings with the continuous vehicular movement.

Vineyard Elementary School Driveway

Comments state that the westbound left turn queues back because turning left is difficult and that easing congestion at Bethel could worsen the traffic here due to Bethel metering traffic currently. One comment suggested to have a traffic light timed for only the school peak times. Comments suggested providing school bus services again. One comment suggested adding a pedestrian/bike path on both sides to the school.

Vineyard segment west of Elementary School

Comments requesting bike lanes because the shoulder narrows down to 0 feet and there are safety concerns. This is also a known area for deer crossings. Comments also suggest widening to include a shoulder. Bicyclists end up needing to ride in the vehicle lane and compete against other vehicles. Comments suggest lowering the speed limit due to some blind corners for intersecting driveways/roads.

VINEYARD DRIVE CORRIDOR PLAN

3.6 Project Website Corridor Survey

Additionally, a survey was conducted to gauge the use of the corridor and determine any desired improvements. The survey contained eight questions total – four multiple choice and four free responses. These questions and their corresponding responses are as follows. There was a total of 136 respondents.

1. How do you use the Vineyard Drive corridor?

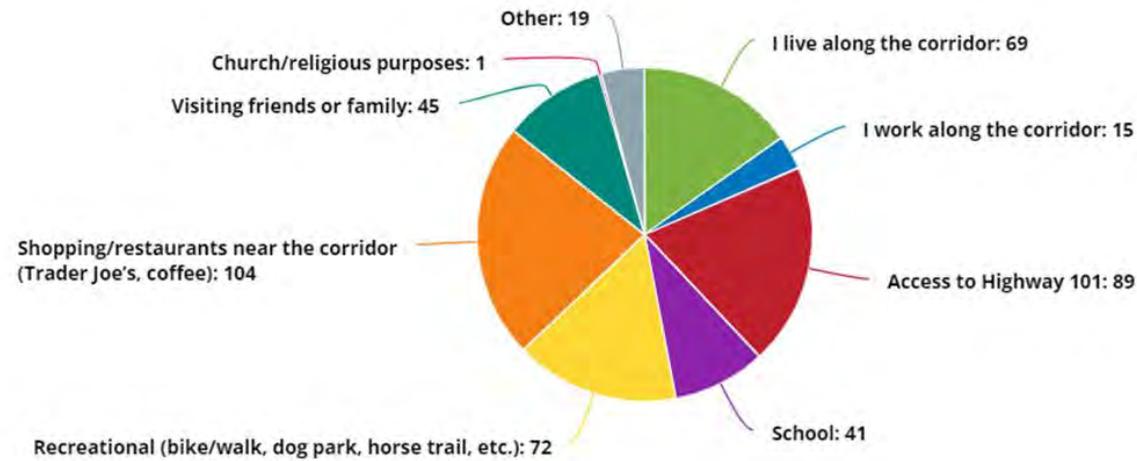


Figure 3.4 Use of Vineyard Drive Corridor by Respondents

2. If you have kids that attend schools along the corridor, which school(s)?

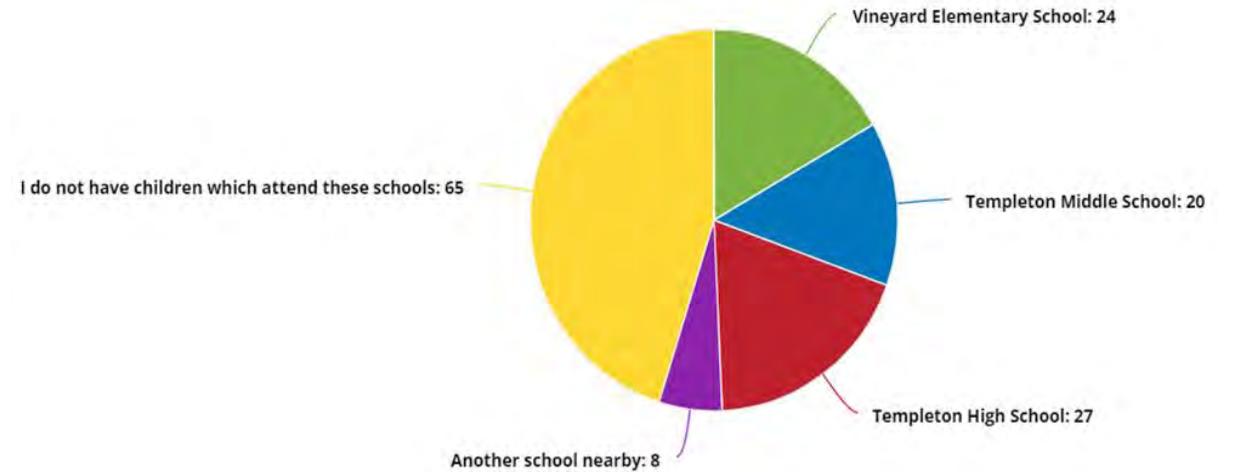


Figure 3.5 Schools Attended by Respondents' Children

VINEYARD DRIVE CORRIDOR PLAN

3. How often do you use Vineyard Drive as a cyclist?

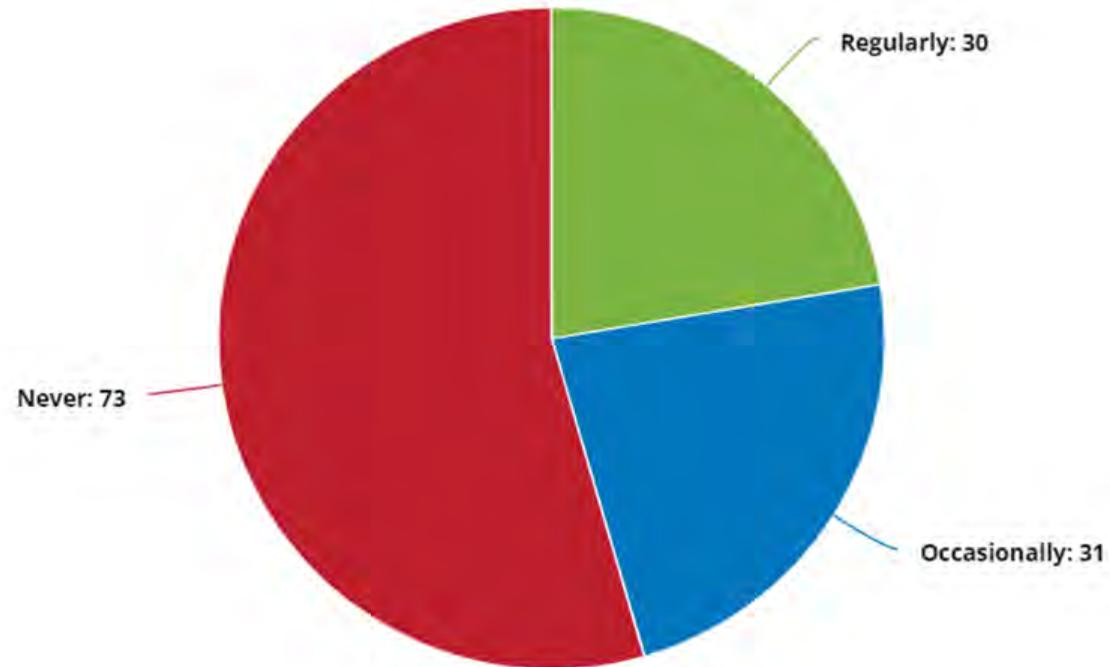


Figure 3.6 Use of Vineyard Drive as a Cyclist

4. How often do you use Vineyard Drive as a pedestrian?

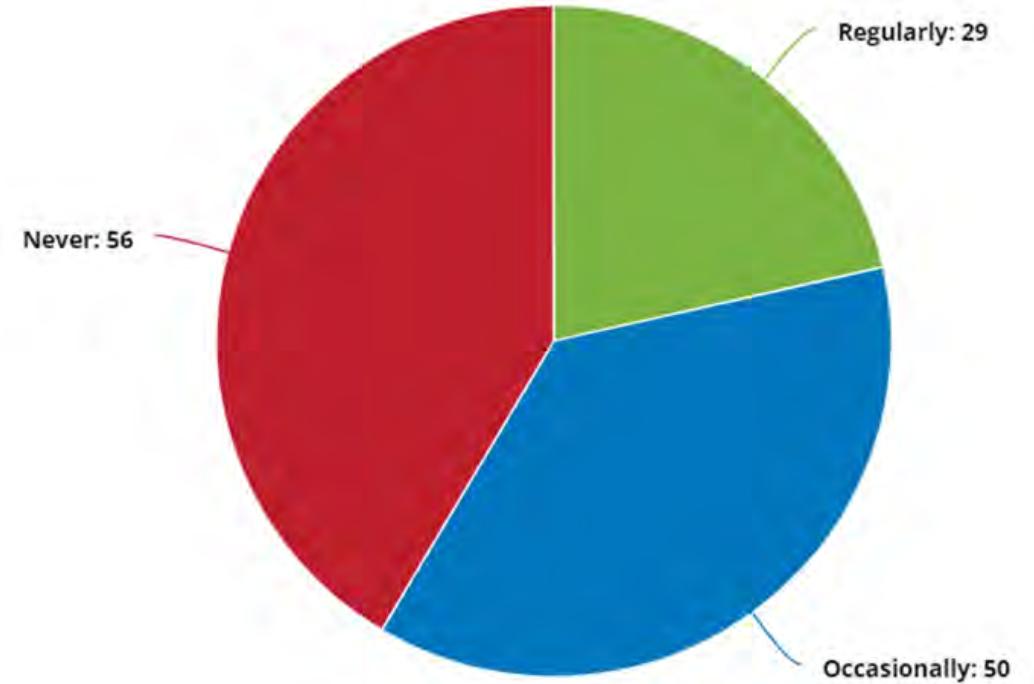


Figure 3.7 Use of Vineyard Drive as a Pedestrian

VINEYARD DRIVE CORRIDOR PLAN

5. What transportation improvements would you most desire along Vineyard Drive?

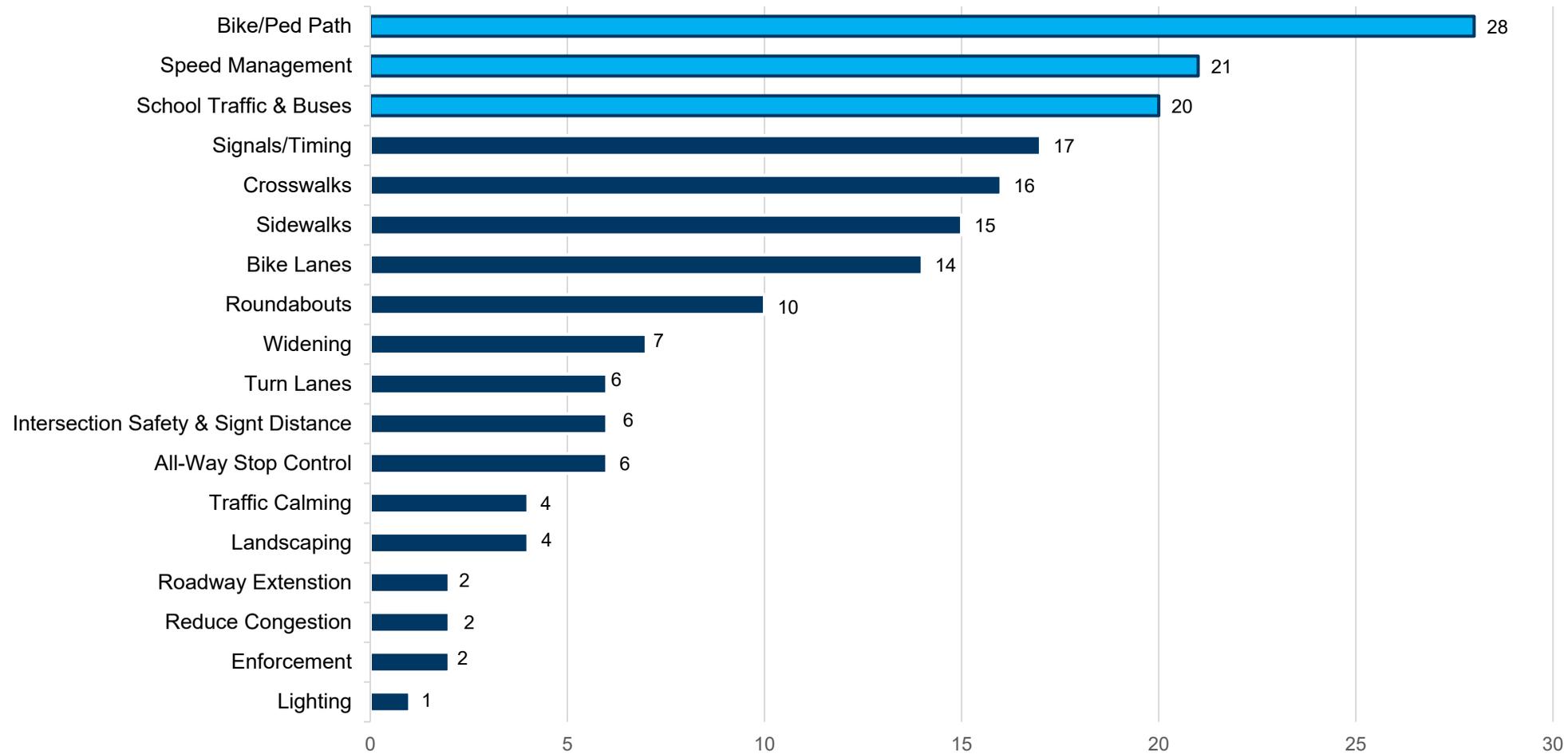


Figure 3.8 Desired Transportation Improvements Along Vineyard Drive



VINEYARD DRIVE CORRIDOR PLAN

Many respondents indicated multiple desired improvements along the corridor with the overwhelming response being access and infrastructure for vulnerable roadway users (i.e., pedestrians and bicyclists). A separated bicycle and pedestrian path was the most requested multimodal improvement followed by speed management, school traffic, signal timings, and then by marked crosswalks and connected sidewalks. Additionally, many requested the use of school buses to reduce congestion during school drop-off and pickup times.

For questions 6-8, respondents were asked about their experience at three different intersections along the corridor and if there are any desired improvements at these locations. Each response regarding experience was classified into one of three categories: Positive, Neutral, or Negative. A positive classification indicates the respondent has no issues with the specified intersection. A neutral classification indicates the respondent has no major issues with the specified intersection but would not be opposed to changes. A negative classification indicates the respondent has issues with the specified intersection and wants improvements. Many respondents either did not have experience with the intersection or did not provide a response. These non-responses are not included in the charts.

Desired improvements were categorized based on the suggested improvement or issue that the respondent determined needs to be addressed. The multimodal category includes any bicycle or pedestrian improvements, including but not limited to, crosswalks, bike lanes, and sidewalks. The operations category includes congestion from school traffic, difficulty with turning movements, and driver non-compliance (i.e., running stop signs, passing on the shoulder).

6. What is your experience at the intersection of Rossi and Vineyard, and what improvements if any would you like to see at this intersection?

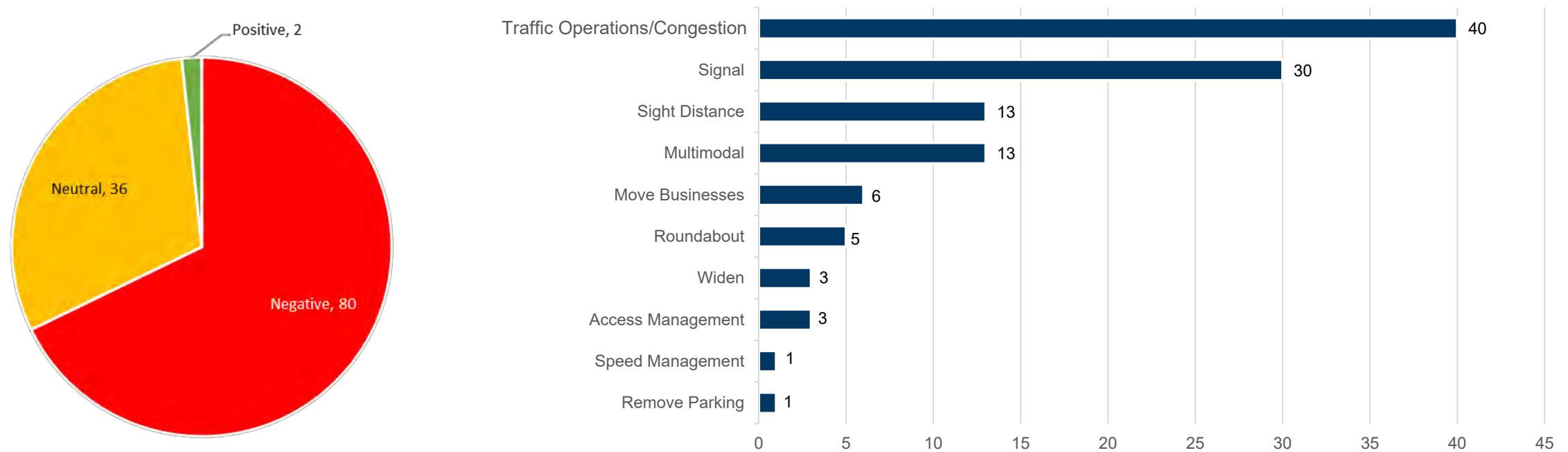


Figure 3.9 Overall Experience and Desired Improvements at Rossi Road and Vineyard Drive Intersection

VINEYARD DRIVE CORRIDOR PLAN

Overall, the majority of respondents have negative experiences at the Rossi Road and Vineyard Drive intersection. Many indicated difficulties turning left onto Vineyard Drive due to lack of gaps in traffic, especially during school drop-off and pickup times.

7. What is your experience at the intersection of Bennett and Vineyard, and what improvements if any would you like to see at this intersection?

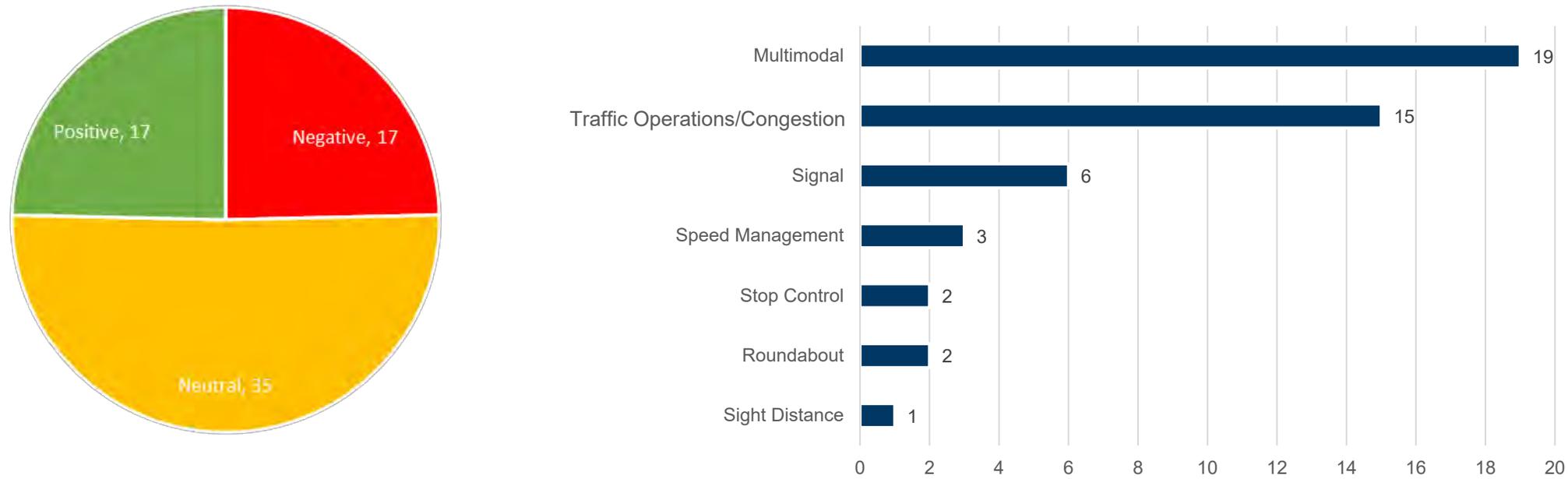


Figure 3.10 Overall Experience and Desired Improvements at Bennett Way and Vineyard Drive Intersection

Most respondents had a neutral experience regarding the intersection of Bennett Way and Vineyard Drive. Many indicated the need for crosswalks and bike paths for students who live in the area to walk and bike to school. Many attempt to cross Vineyard Drive at this location despite the lack of marked crosswalks.

8. What is your experience at the intersection of Bethel and Vineyard, and what improvements if any would you like to see at this intersection?

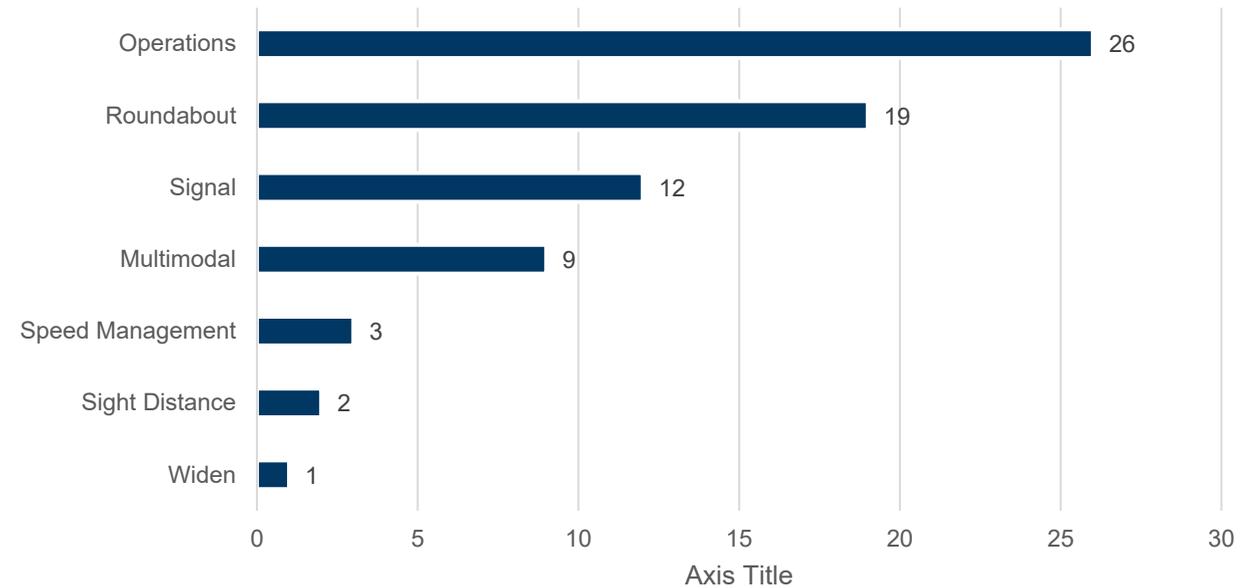
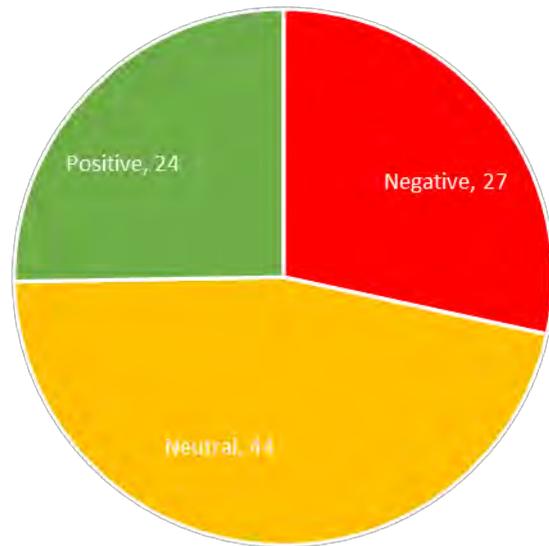


Figure 3.11 Overall Experience and Desired Improvements at Bethel Road and Vineyard Drive Intersection

Previous improvements to the stop signs were made at Bethel Road and Vineyard Drive and many respondents indicated that no changes need to be made to the intersection. Of those with neutral and negative experiences at this location, most indicated the need for improved operations during school drop-off and pickup hours and ideally through the installation of a roundabout.

VINEYARD DRIVE CORRIDOR PLAN

Chapter 4. Corridor Concepts & Alternatives

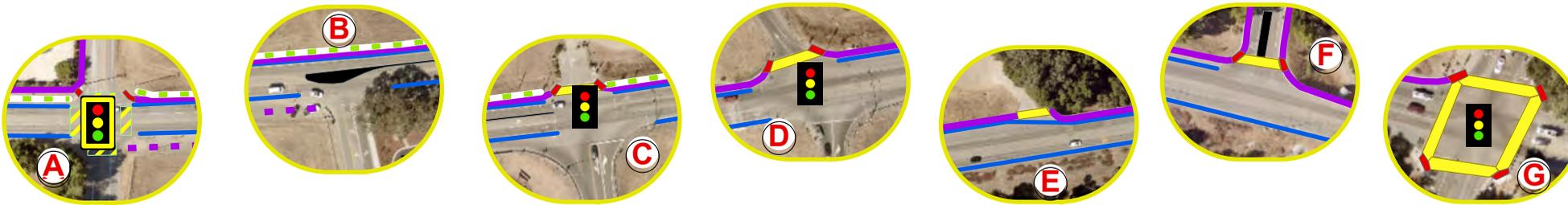
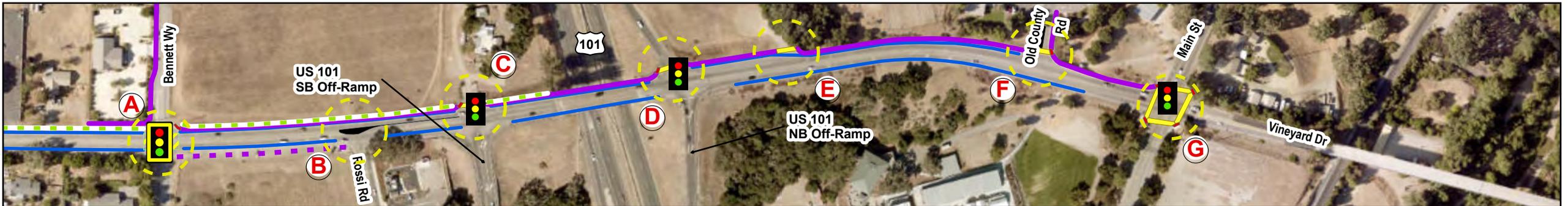
This section presents the improvement concepts developed for Vineyard Drive. These concepts reflect an iterative public engagement process with the community as well as from the TAC, and were informed by the in-depth analysis, identified needs, and corridor vision and goals documented in earlier chapters. The improvements identified are conceptual and further design considerations will need to be conducted separately.

The proposed improvement concepts presented for the Vineyard Drive Multimodal Corridor Plan are divided into the following segments:

- West Segment (SR 46 West to Vineyard Elementary School)
- Central Segment (Vineyard Elementary School to US 101 Southbound Ramps)
 - Alternative 1 (Multipurpose Trail on north side)
 - Alternative 2 (Buffered Bike Lanes and Sidewalks on both sides)
- East Segment (US 101 Southbound Ramps to Main Street)

The Plan includes two segment concept alternatives for the Central Segment as well as a few intersections where more than one alternative is presented. Some of these locations represent alternative treatments or alignments that will require additional study or discussion with relevant partners to determine the preferred concept to implement. Some concepts can be implemented at a relatively lower cost and will be easier to implement paired with a longer-term concept for a more complex improvement.

The following Figure 4.1 and Figure 4.2 present the overview of the two proposed alternatives along the entire corridor.



Alternative 1:
Elevated 8' Detached Path, 8' BikeLane/Shoulder
(Min. 13' Buffer From Travel-Way)
With Dike On Trial Side Only

- | | | | |
|--------------------------------------|-------------------------------------|--------------------------|--------------------|
| Proposed Intersection Control | Signal / Roundabout | Proposed Sidewalk | Proposed Crosswalk |
| All-Way Stop | New Traffic Signal | Existing Trail | Existing Ramps |
| Improve Signal Timing | Sidewalk / Bike Lane / Trail | Proposed Trail | Proposed Median |
| | Existing Bike Lane | Crosswalk / Ramps | |
| | Existing Sidewalk | Existing Crosswalk | |

Paper Size Legal

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Feet

Map Projection: Lambert Conformal Conic
 Horizontal Datum: North American 1983
 Grid: NAD 1983 StatePlane California V FIPS 0405 Feet



San Luis Obispo County
 Vineyard Drive Corridor Plan

Alternative 1 Overview

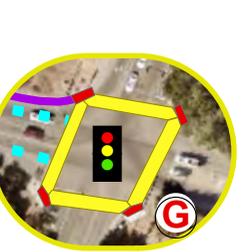
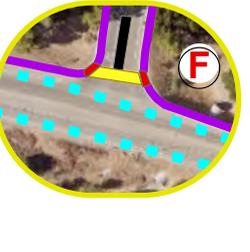
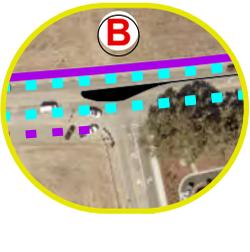
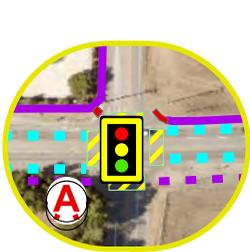
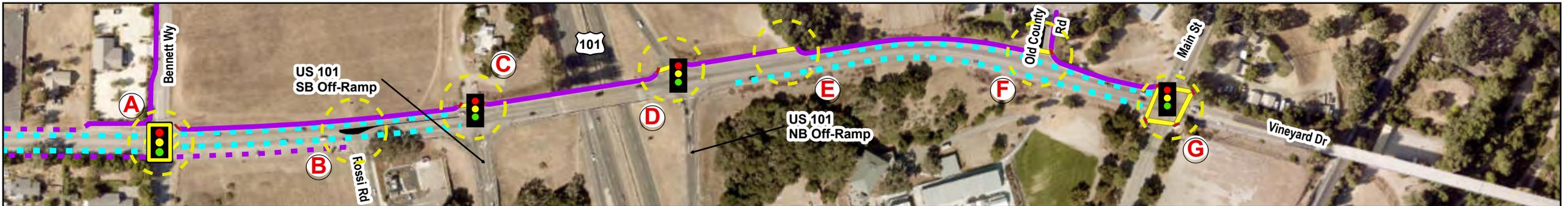
Project No. 12570229
 Revision No. 5
 Date 7/25/2023

FIGURE 4.1

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Data Disclaimer:
 Location of pedestrian facilities are for visual representation only.

Data source: GIS TigerLine Shape Files (2018), CA State Geoport, SWITRS/TIMS Collision data World Imagery: County of San Luis Obispo, Maxar; Microsoft World Imagery: County of San Luis Obispo, Maxar. Created by: rsouthern



Alternative 2:

**Buffered Bike Lanes (Protected) 18" Min.
To Meet 8' Shoulder
With Asphalt Sidewalk (6')**

Proposed Intersection Control

- All-Way Stop
- Improve Signal Timing
- Signal / Roundabout



New Traffic Signal

Sidewalk / Bike Lane / Trail

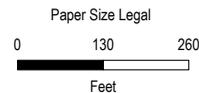
- Existing Sidewalk
- Proposed Sidewalk

Proposed Buffered Bike Lanes

- Existing Trail
 - Proposed Trail
- Crosswalk / Ramps**
- Existing Crosswalk

Proposed Crosswalk

- Existing Ramps
- Proposed Median



Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California V FIPS 0405 Feet



San Luis Obispo County
Vineyard Drive Corridor Plan

Alternative 2 Overview

Project No. 12570229
Revision No. 5
Date Feb. 2023

FIGURE 4.2

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Data Disclaimer:
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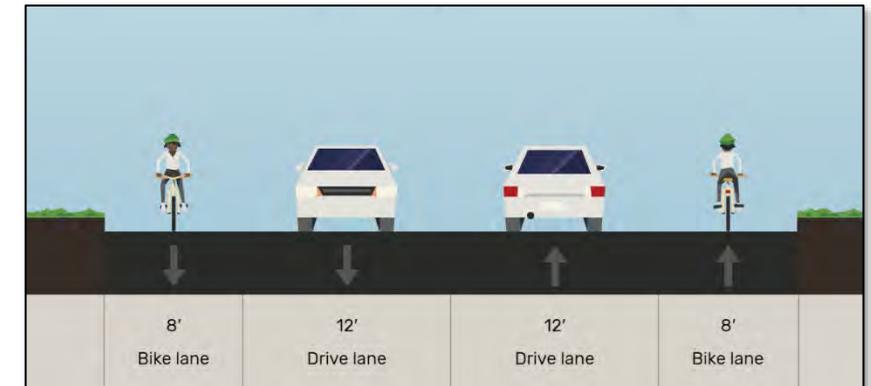
Data source: GIS TigerLine Shape Files (2018), CA State Geoportal, SWITRS/TIMS Collision data World Imagery: County of San Luis Obispo, Maxar; Microsoft World Imagery: County of San Luis Obispo, Maxar. Created by: rsouthern

4.1 West Segment

STATE ROUTE 46 WEST TO VINEYARD ELEMENTARY SCHOOL

On the westernmost end of Vineyard Drive within the study area, between SR 46 West and Vineyard Elementary School (VES), the roadway typology and surrounding land uses are primarily rural and agricultural, with vineyards, wineries, and bucolic open spaces. The existing roadway lacks sufficient shoulder width to incorporate new active transportation facilities, like designated Class II bicycle lanes. To better connect people traveling in all modes of transportation between SR 46 West and the community of Templeton, and regional recreational cyclists, widening the road to the County standard 8-foot paved shoulder widths is proposed in this segment. When implemented, these widened shoulders would accommodate bicyclists separately from the vehicular travel lane and close the gap between the active transportation facilities proposed for destinations east and SR 46 West. Figure 4.3 presents the concept for a portion of the West Segment.

Figure 4.3 West Segment Concept: SR 46 West to Vineyard Elementary School



VINEYARD DRIVE CORRIDOR PLAN

4.2 Central Segment

VINEYARD ELEMENTARY SCHOOL TO US 101

The proposed improvements to the central segment of Vineyard Drive, extending from Vineyard Elementary School to US 101, are captured in two different segment concept alternatives. For Alternative 1, a separated and elevated multipurpose trail is proposed with a 5' buffer along much of the segment length. This is paired with 6' Class II bicycle lanes (which currently exists in most places along the Central Segment), and 11' travel lanes for motor vehicles. For Alternative 2, Class II buffered bicycle lanes and new sidewalk on both sides of the street are proposed. Regardless of the alternative concept selected, improvements proposed for the Central Segment of Vineyard Drive also include intersection improvements, including the intersections of Vineyard Drive and Bethel Road, Santa Rita Road, Bennett Way, and Rossi Road. Where Buffered Bicycle Lanes or Class II Bike Lanes are implemented, this Plan proposes green paint in the conflict areas where cyclists and vehicles would need to merge on intersection approaches and through the intersection along the extension of the marked bicycle lane. Green paint as a supplement to the bike lane markings will make cyclists more visible to drivers and provide a clearly defined route for bicycles on the roadway, reinforcing the priority of bicyclists to drivers. Additionally, new roadway connections are planned, as identified in the Templeton Circulation Study (2016) and as part of the Capital Improvements Program. The new roadway connections include the Rossi Road realignment and the Bennett Way extension north to Templeton Hills Road.

SPEED MANAGEMENT

Community comments display a concern for vehicular speeds along the corridor during off-peak times, and speed management was a top priority for desired improvements. There are limited ways to implement effective traffic calming measures for rural roads, like the Vineyard Drive corridor. Currently, there are speed feedback signs west of Santa Rita Road, adding another set near VES could be effective. These can also be accompanied by having the word "SLOW" appear in the feedback sign for speeding vehicles, which may help effectiveness. Pavement markings that display the posted speed limit can be used to emphasize the speed limit signage. Additionally, transverse bar pavement markings or "optical speeds bars" can also be implemented, but sparingly, at intersection approaches (e.g., Bethel Road) to reduce approach speeds. Flashing advance intersection warning signs may also help reduce speeds and collisions approaching the intersection of VES (for the westbound turn lane) or Bethel Road (eastbound and westbound). Narrowing lane widths can also be effective to reduce speeds; this Plan proposes 11-foot-wide lanes from Main Street to VES. The County may conduct supplemental speed surveys to determine if a systematic disregard for the posted speed limit is present.

4.2.1 Intersection Improvements

VINEYARD DRIVE AT BETHEL ROAD

The intersection of Bethel Road and Vineyard Drive will be improved to make it more efficient for all road users to access key destinations to the north and south and connecting the existing trail along the south side of the street to a proposed new 8-foot multipurpose trail on the north side, continuing east of Bethel Road. New striped crosswalks will improve access for pedestrians crossing. Two alternatives are proposed to improve traffic operations and multimodal access at this intersection: a new traffic signal or a new roundabout, replacing the existing stop sign control. The roundabout concept is provided in **Appendix E**.

- **Traffic Signals** control vehicle traffic passing through the intersection of two or more roadways by visually indicating when to proceed, when to slow, and when to stop. The traffic signal option would include new 11' turn lanes on Vineyard Drive in both directions to accommodate left turns onto Bethel Road, and improved pedestrian and bicycle facilities.
- **Roundabouts** are an intersection design treatment that decrease conflict points compared to traffic signals, stop signs, or yield-controlled intersections. They can also improve operations and reduce delay for drivers by allowing continuous flow from all directions. A roundabout at this location would also serve to calm traffic as it enters the community. Flashing beacons can also be installed at the crosswalks if desired, and the approaches would be designed to slow vehicles down in advance of the intersection.



VINEYARD DRIVE CORRIDOR PLAN

Local feasibility and community support of each alternative should be examined prior to selection.

VINEYARD DRIVE AT SANTA RITA ROAD

The intersection of Santa Rita Road and Vineyard Drive will be improved to increase mobility options across the intersection and reduce travel speeds along the corridor. New high-visibility striped crosswalks across the northern and eastern approaches, a new Rectangular Rapid Flashing Beacon (RRFB) for the crosswalk crossing Vineyard Drive, as well as new curb ramps will improve visibility and accessibility for pedestrians crossing.

The installation of stop signs on Vineyard Drive at Santa Rita Road are also proposed, creating an all-way stop controlled intersection that will aid turning vehicles as well as slow traffic speeds through this section of the corridor. The stop control should be implemented once warranted, however, all other proposed improvements for this intersection should be delivered regardless of stop sign warrant, including the new crossing with RRFB.

VINEYARD DRIVE AT BENNETT WAY & AT ROSSI ROAD

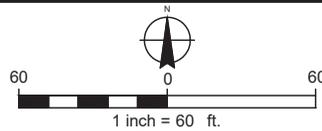
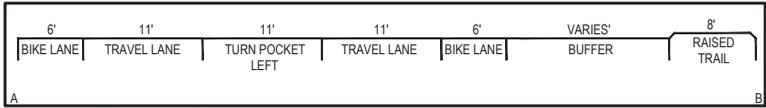
The Plan proposes to install a traffic signal at Bennett Way and restrict left turns in and out of Rossi Road. With future development in the vacant land between these two intersections, a new roadway connecting Bennett Way to Rossi Road will be constructed south of Vineyard Drive. Bennett Way will serve as a more efficient way to access destinations on Rossi Road. The intersection of Bennett Way and Vineyard Drive will be improved to make it more accessible for all road users and connect to other adjacent facilities that facilitate walking and biking. A new traffic signal is proposed at this intersection as well as new striped crosswalks across all four approaches and new curb ramps at the southeast and southwest corners, improving comfort and access for pedestrians crossing. Traffic will be rerouted to connect left turning northbound traffic on Rossi Road to Vineyard Drive via the new roadway link with Bennett Way through the adjacent vacant parcel. New 'No Left Turn' restrictions and new roadway medians will be added to Rossi Road at Vineyard Drive to direct motorists and prevent collisions.

4.2.2 Central Segment – Corridor Alternative 1

VINEYARD ELEMENTARY SCHOOL TO US 101 SOUTHBOUND RAMPS

Central Segment Corridor Alternative 1 includes a new 8' separated and elevated multipurpose trail starting just east of the Vineyard Elementary School driveway on the south side of Vineyard Drive, connecting with the existing Vineyard Trail near the surface parking lot adjoining Vineyard Dog Park, and continuing on the north side of Vineyard Drive east of Bethel Road. The north side of Vineyard Drive was chosen rather than the south side because of rights-of-way availability, utilities, and drainage concerns. Separated by a 5' buffer, this new trail runs parallel to the existing roadway and will accommodate bicyclists and pedestrians in both directions, providing physical separation from traffic for community members, including VES students and their families, traveling on foot or by bicycle. The buffer separating the trail from traffic may incorporate green infrastructure and resiliency best practices, including landscaped vegetation and/or water management techniques, like an embankment or dike, with buffer width varying by location. As seen in the cross-section, existing 6' Class II bicycle lanes will remain on both sides of the street, with one 11' travel lane in each direction and shoulders of varying widths. Although buffered bike lanes are not shown as part of this Alternative, striping a buffer where there is room along portions of the bike lane is ideal. A minimum of 18" would be required for striping a buffer (NACTO). Alternatively, a thicker stripe (10"-12" can be used to delineate the bike lane for better visibility). This will need to be determined and considered in further detail during the design of the project when funded. An extended 11' wide left turn lane is included at the VES driveway, westbound, and 11' turn lanes at Bethel Road, Bennett Way, and the US 101 Southbound ramps. At Rossi Road, travel lanes widen to 12' in each direction and turn pockets narrow to 10'.

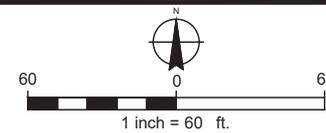




San Luis Obispo County
 VINEYARD DRIVE CORRIDOR PLAN
 Central Segment
 Alternative 1
 (Layout and Detail)

Project No. 12570229
 Report No. 001
 Date April 2023

FIGURE 4.4a

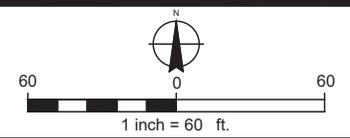


San Luis Obispo County
VINEYARD DRIVE CORRIDOR PLAN

Central Segment
Alternative 1
(Layout and Detail)

Project No. 12570229
Report No. 001
Date April 2023

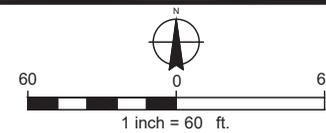
FIGURE 4.4b



San Luis Obispo County
 VINEYARD DRIVE CORRIDOR PLAN
 Central Segment
 Alternative 1
 (Layout and Detail)

Project No. 12570229
 Report No. 001
 Date Feb. 2023

FIGURE 4.4c
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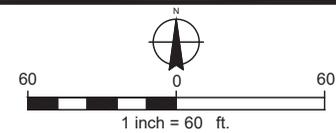
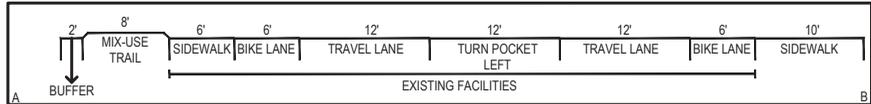
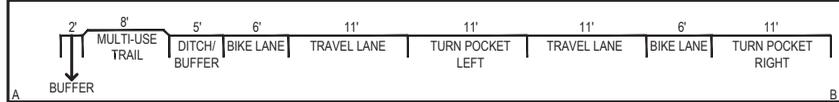


San Luis Obispo County
VINEYARD DRIVE CORRIDOR PLAN

Central Segment
Alternative 1
(Layout and Detail)

Project No. 12570229
Report No. 001
Date April 2023

FIGURE 4.4d

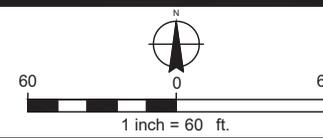


San Luis Obispo County
VINEYARD DRIVE CORRIDOR PLAN

Central Segment
Alternative 1
(Layout and Detail)

Project No. 12570229
Report No. 001
Date Feb. 2023

FIGURE 4.4e



San Luis Obispo County
 VINEYARD DRIVE CORRIDOR PLAN
 Central Segment
 Alternative 1
 (Layout and Detail)

Project No. 12570229
 Report No. 001
 Date April 2023

FIGURE 4.4f
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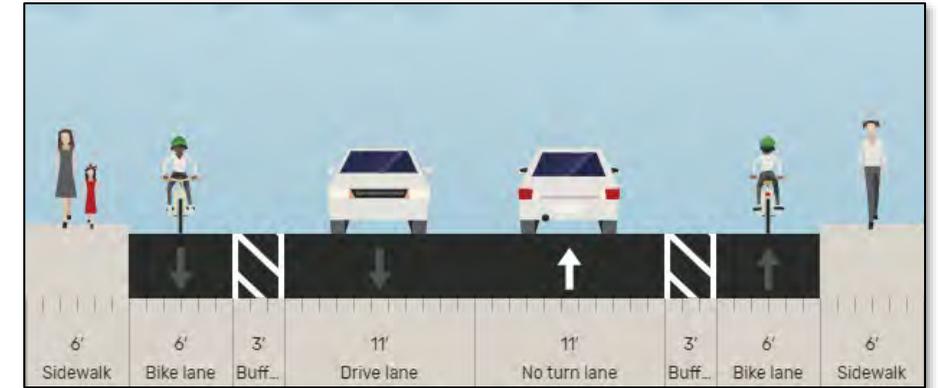
VINEYARD DRIVE CORRIDOR PLAN

4.2.3 Central Segment – Corridor Alternative 2

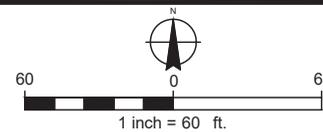
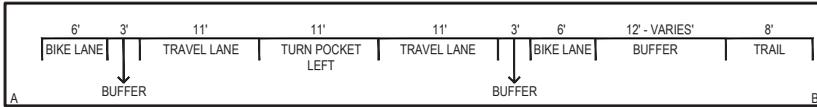
VINEYARD ELEMENTARY SCHOOL TO US 101 SOUTHBOUND RAMPS

Central Segment Corridor Alternative 2 upgrades the existing Class II bicycle lanes on Vineyard Drive to Class II buffered bicycle lanes, beginning just east of the Vineyard Elementary School driveway on the south side of the street and continuing to the US 101 Southbound ramps. Each buffered bicycle lane will be 6' wide with a 3' buffer. On intersection approaches with no dedicated right turn only lane the buffer markings should transition to a conventional dashed line². Additionally, a new extension of the existing Vineyard Trail from its current terminus near Vineyard Dog Park to Vineyard Elementary School will improve connectivity for residents and students with a key community destination. Beginning just east of the VES driveway and running parallel to the existing roadway, this trail extension will accommodate bicyclists and pedestrians in both directions. Like in the alternative mentioned above, the buffer separating the trail from traffic may incorporate green infrastructure and resiliency best practices, with typical buffer widths of 5'.

New 6' sidewalk on both sides of the street is proposed for Vineyard Drive between Bethel Road and Bennett Way. Between Bennett Way and Rossi Road, new 10' sidewalk is proposed only along the south side of the street (due to commercial zoning requirements), as sidewalk already exists on the north side between Bennett Way and US 101. Alternative 2 incorporates one 11' travel lane in each direction, an extended 11' wide left turn lane is included at the VES driveway, and 11' turn lanes at Bethel Road, Bennett Way, and US 101 Southbound ramps. The bicycle lane buffer narrows from 3' to 1.5' east of Bennett Way.



² *Urban Bikeway Design Guide, Second Edition*. National Association of City Transportation Officials (NACTO). March 2014.

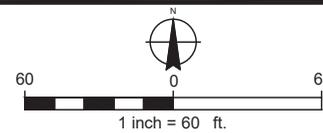


San Luis Obispo County
VINEYARD DRIVE CORRIDOR PLAN

Central Segment
Alternative 2
(Layout and Detail)

Project No. 12570229
Report No. 001
Date April 2023

FIGURE 4.5a

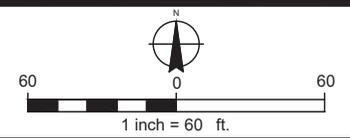


San Luis Obispo County
VINEYARD DRIVE CORRIDOR PLAN

Central Segment
Alternative 2
(Layout and Detail)

Project No. 12570229
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Date April 2023

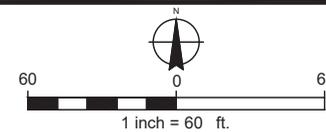
FIGURE 4.5b



San Luis Obispo County
 VINEYARD DRIVE CORRIDOR PLAN
 Central Segment
 Alternative 2
 (Layout and Detail)

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 Report No. 001
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FIGURE 4.5c
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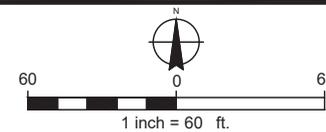


San Luis Obispo County
VINEYARD DRIVE CORRIDOR PLAN

Central Segment
Alternative 2
(Layout and Detail)

Project No. 12570229
Report No. 001
Date April 2023

FIGURE 4.5d

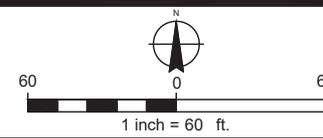


San Luis Obispo County
VINEYARD DRIVE CORRIDOR PLAN

Central Segment
Alternative 2
(Layout and Detail)

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Date April 2023

FIGURE 4.5e



San Luis Obispo County
 VINEYARD DRIVE CORRIDOR PLAN
 Central Segment
 Alternative 2
 (Layout and Detail)

Project No. 12570229
 Report No. 001
 Date April 2023

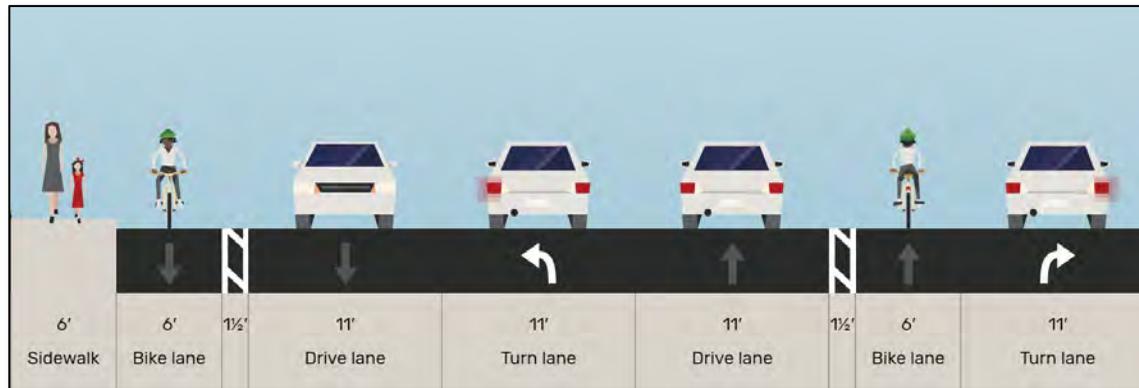
FIGURE 4.5f
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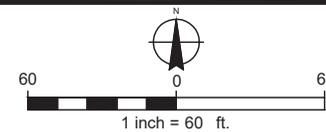
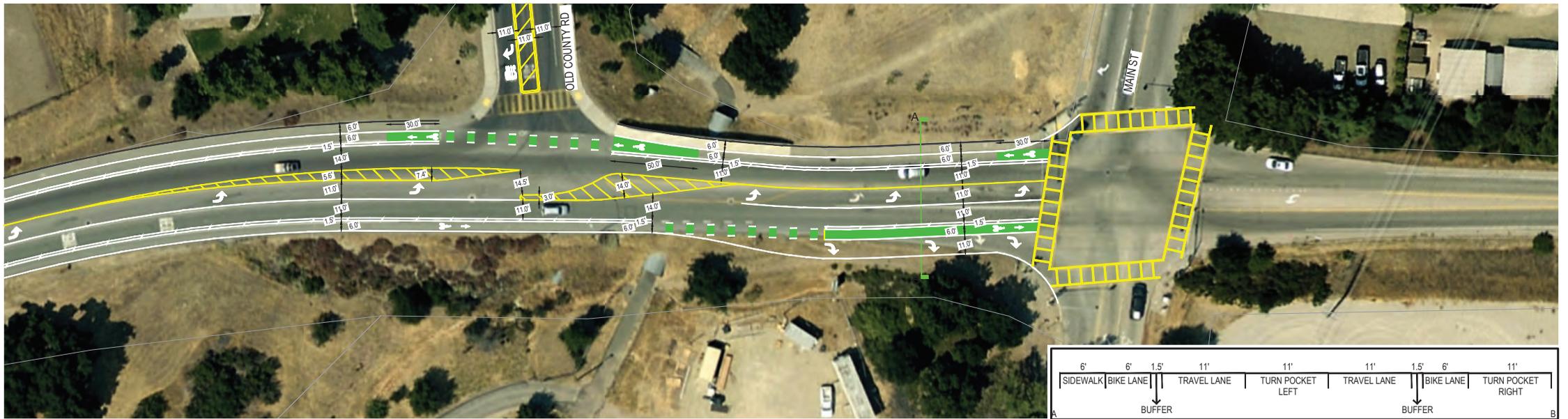
4.3 East Segment

US 101 SOUTHBOUND RAMPS TO MAIN STREET

The proposed improvements to the East Segment of Vineyard Drive, extending from US 101 southbound ramps to Main Street, include intersection timing adjustments, access modifications, improved pedestrian crossings, and improved bikeways. The improvements include upgrading the existing Class II bicycle lanes to Class II buffered bicycle lanes. The Class II buffered bicycle lanes begin east of the US 101 northbound ramps and extending to Main Street. Buffered bicycle lanes here are 6' wide with 1.5-3' buffers, depending on existing roadway widths, and will provide a more comfortable active transportation connection to and from Main Street and its destinations. Additionally, the bike lanes will have green paint at intersection approaches to improve visibility of the designated bikeway and dashed green paint marking in the conflict zones where vehicles merge across the bike lane in advance of a turn and through the intersections where vehicles would turn across the bike lane. The green-painted bike lanes increase the visibility of the facility, identifies potential areas of conflict, and reinforces priority of bicyclists to drivers. 11' travel lanes and 11-11.5' turn pockets at the Vineyard Drive intersections with Old County Road and Main Street will aim to reduce travel speeds during off-peak times while providing more room for active transportation modes. Existing 6' sidewalk remains along the north side of Vineyard Drive, extending the full length of the East Segment.

Traffic signal timing adjustments and coordination to accommodate "Time of Day" timing plans are proposed for the intersections of Vineyard Drive and the US 101 southbound ramps, northbound ramps, and Main Street, improving overall traffic flow between Bennett Way and Main Street. Additionally, at Main Street, a Leading Pedestrian Interval (LPI) is proposed, which gives the pedestrians the opportunity to enter the crosswalk 3-7 seconds before vehicles are given the green indication.





San Luis Obispo County
VINEYARD DRIVE CORRIDOR PLAN

East Segment
(Layout and Detail)

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FIGURE 4.6

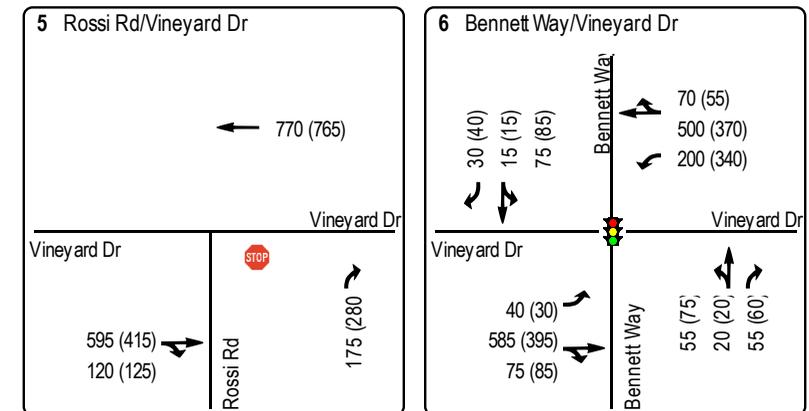
4.4 Forecasted Operations with Improvements

4.4.1 Forecasted Traffic Volumes with Improvements

With the new proposed roadway linking Bennett Way and Rossi Road, and the proposed turn restrictions at Rossi Road, traffic will be diverted to Bennett Way for inbound traffic from the east and outbound traffic heading west. Therefore, traffic volumes at Bennett Way will increase, especially for the westbound left turn, and the turn lane will need to be extended back approximately 350 feet to accommodate the anticipated turning vehicles. The forecasted peak hour turning movement volumes, lane geometry, and intersection controls are shown in Figure 4.7 to the right.



AM (PM) peak hour volumes:



School peak hour volumes:

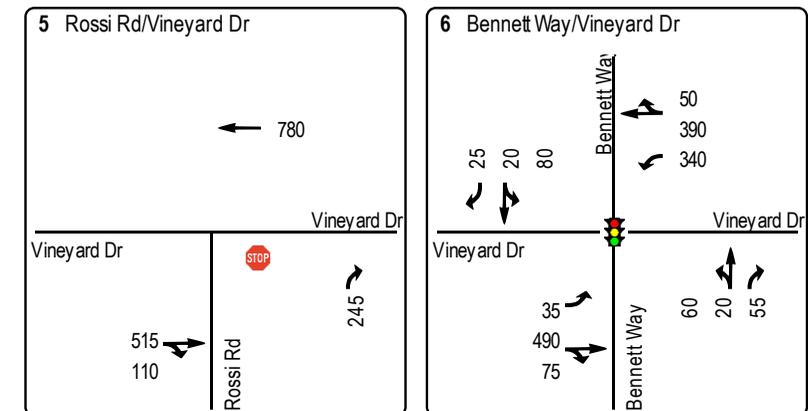


Figure 4.7 Forecasted Peak Hour Intersection Volumes at Rossi Road and Bennett Way with Improvements

VINEYARD DRIVE CORRIDOR PLAN

4.4.2 Forecasted Level of Service with Improvements

Cumulative conditions for weekday AM, School, and PM peak hour intersection operations with the proposed improvements, including alternative intersection controls, were quantified. Table 4.1 provides the delay (in sec/veh) and resulting LOS for the study intersections under forecasted conditions with the improvement options. The Synchro outputs are provided in **Appendix C**. The signal warrant analysis is provided in **Appendix D**. As shown in Table 4.1 all study intersections, apart from Old County Road and the VES driveway during the AM peak hour, are projected to operate acceptably.

Table 4.1 Forecasted Conditions Intersection Operations with Improvement Options

#	Intersection	Control Type ^{1,2}	Target LOS	AM Peak Hour			School PM Peak Hour			PM Peak Hour		
				Delay	LOS	Warrant Met? ³	Delay	LOS	Warrant Met? ³	Delay	LOS	Warrant Met? ³
1	Vineyard Dr & S. Main St	Signal	D	34.3	C	-	27.4	C	-	23.0	C	-
2	Vineyard Dr & Old County Road	TWSC	D	78.3	F	Yes	23.1	C	-	11.8	B	-
3	Vineyard Dr & US 101 Northbound Ramps	Signal	C	26.5	C	-	27.6	C	-	29.6	C	-
4	Vineyard Dr & US 101 Southbound Ramps	Signal	C	30.4	C	-	27.3	C	-	25.4	C	-
5	Vineyard Dr & Rossi Road	TWSC	D	25.3	D		23.2	C		17.4	C	
6	Vineyard Dr & Bennett Way	Signal	D	27.5	C	Yes	31.8	C	Yes	25.0	C	Yes
		RNDBT	D	25.8	C	Yes	21.0	C	Yes	13.7	B	Yes
7	Vineyard Dr & Bethel Road	Signal	D	32.7	C	Yes	22.4	C	-	17.6	B	-
		RNDBT	D	8.7	A	Yes	6.5	A	-	5.1	A	-
8	Vineyard Dr & Vineyard Elem. School	TWSC	D	293.8	F	Yes	13.8	B	-		N/A	-

Notes:

1. AWSC = All Way Stop Control; TWSC = Two Way Stop Control; RNDBT = Roundabout
2. LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC, Signal, RNDBT
3. Warrant = Based on California MUTCD Warrant 3
4. **Bold** = Unacceptable Conditions
5. OVR = Delay over 300 seconds



VINEYARD DRIVE CORRIDOR PLAN

4.4.3 Forecasted Peak Queues with Improvements

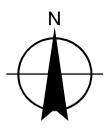
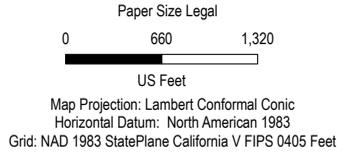
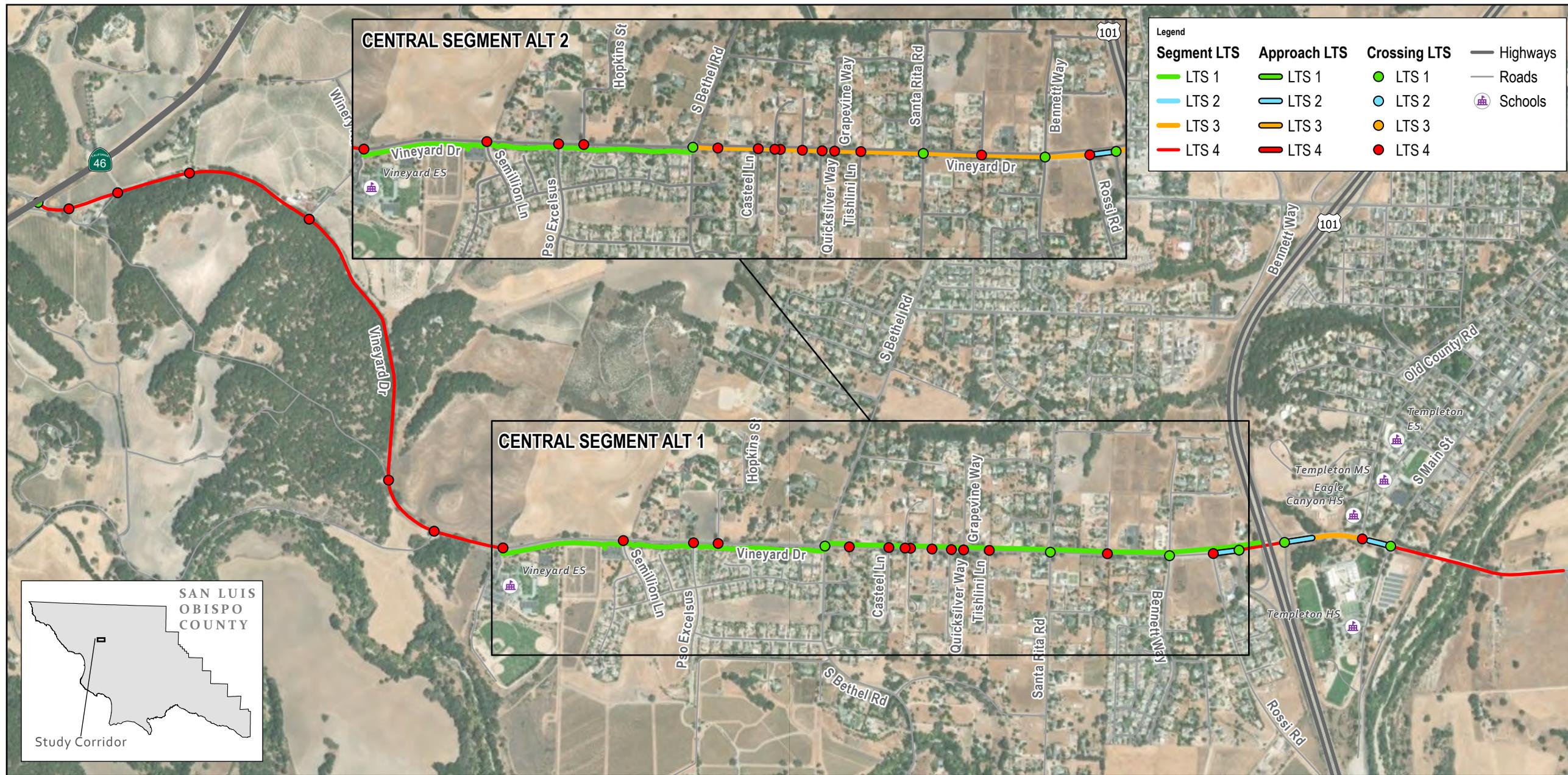
The forecasted peak hour queue lengths with the proposed intersection improvements are presented in **Table A.3** in **Appendix A**, with the simulated maximum and 95th percentile queueing results for the eight study intersections. The highest estimated vehicle queues occur during the AM Peak hour and are along Vineyard Drive at Bennett Way where a traffic signal is proposed. Traffic signal timing modifications and optimization can be made to reduce certain queue lengths, however that may impact other opposing queue lengths. Installing a roundabout at Bethel Road will significantly reduce queue lengths compared to both current conditions and conditions with a traffic signal.

4.5 Projected Bicycle LTS with Improvements

The proposed bikeway improvements along Vineyard Drive make a significant change for the Central segment and the East Segment. With a multipurpose trail connecting from VES to US 101 (Alternative 1) the segment improves from LTS 4 to LTS 1. Installing a marking crossing with an RRFB at Santa Rita Road will also provide a crossing score of LTS 1. These relate to the pedestrian comfort and connectivity along the corridor as well, as currently there are no sidewalks or multiuse paths between Ashton Way and Bethel Road. Installing sidewalks and buffered bike lanes on both sides of the road (Alternative 2) would provide access to both pedestrians and bicycles, however, the corridor only improves to LTS 3. This is due to having little separation from the traveled way, which has high speeds (45 mph). Installing a roundabout or traffic signal at Bethel Road, and a traffic signal at Bennett Way will also facilitate easier, controlled crossings for both pedestrians and bicyclists. Along the East Segment, the buffered bike lanes with green paint in the conflict zones creates a space for bicyclists that is more visible to vehicles. Additionally, having the bike lane to the left of the right turn lane is recommended as this design enables bicyclists to correctly position themselves to reduce the conflict with turning vehicles. It also alerts motorists to expect and yield to merging bicycle traffic.

4.6 Vehicle Miles Traveled (VMT) Considerations

Per SB 743, VMT is the measure to determine transportation impacts under CEQA. The project's potential CEQA impacts on transportation are included in this section. This Plan proposes to improve or construct new pedestrian and bicycle facilities along the corridor, including a roundabout or traffic signal at Bethel Road, a new traffic signal at Bennett Way, additional turn lanes or turn restrictions. Per the County's VMT guidance, which are consistent with the Governor's Office of Planning and Research *Technical Advisory on Evaluating Transportation Impacts in CEQA* (OPR, 2018), these are all identified as transportation projects which would not likely lead to an increase in VMT as they aim to reduce vehicular travel. This does not include the evaluation of the new roadway connections of Bennett Way extension north or the Rossi Road realignment to Bennett Way. These will need to undergo an evaluation of environmental impacts, in addition to VMT, through the CEQA process when funded.



Templeton
San Luis Obispo County
Vineyard Drive Corridor Plan
**Bicycle Level of
Traffic Stress (LTS)
with Improvements**

Project No. 12570229
Revision No. -
Date 7/25/2023

FIGURE 4.8



VINEYARD DRIVE CORRIDOR PLAN

4.7 Cost Estimates

Preliminary opinions of costs were prepared for the segments and alternatives identified in Chapter 4, based on recent construction bids and coordination with County staff. The detailed cost estimates are provided in **Appendix F**.

Table 4.2 Total Cost Estimates by Alternative

Central Segment Alternatives	Total Cost of Corridor
Alt 1 (Trail) w/Roundabout	\$ 13,320,000
Alt 1 (Trail) w/Traffic Signal	\$ 8,620,000
Alt 2 (sidewalks, buffered bike lanes) w/Roundabout	\$ 14,900,000
Alt 2 (sidewalks, buffered bike lanes) w/Traffic Signal	\$ 10,770,000

Table 4.3 Cost Estimates by Segment

Segment	Cost	% of Total Cost
East	\$ 660,000	2% - 3%
Central	\$ 8.6M - \$ 14.9M	39% - 52%
West	\$ 7,710,000	27% - 35%
Rossi Rd Realignment	\$ 5,160,000	18% - 23%
Total Cost:	\$ 22.1M - \$ 28.4M	

4.8 Alternatives Analysis & Recommendations

Life-Cycle Benefit/Cost (B/C) Analysis

This section briefly discusses the parameters used to assess and monetize the life-cycle benefits and costs for one of the alternatives along the Vineyard Drive Corridor. Alternatives 1 and 2 of the Central Segment were considered for the B/C analysis, however, in coordination with County staff, the Central Segment Alternative 1 (trail) is preferred as the anticipated costs for Alternative 2 outweigh its benefits compared to Alternative 1. Therefore, the two alternatives (roundabout and traffic signal) for the intersection of Bethel Road at Vineyard Drive were evaluated for a B/C comparison. The B/C analysis is presented for comparison of the two alternatives solely at the Bethel Road intersection and does not present the benefit of the whole corridor. The benefits of each alternative are evaluated against a “No Build” scenario which would not improve the existing intersection configuration over a 20-year period.

Safety Benefit

To calculate the safety benefit, the cost of collisions is evaluated based on the existing collision rate, forecasted traffic volumes, and collision reduction factors for the proposed improvements.

To compute the existing collision rate, existing collision data over a five-year period was utilized. The intersection average daily traffic was converted to a Million Vehicles Entering (MVE) per year. The number of collisions were then divided by the total number of vehicles to obtain a collision rate (collisions/MVE). This determines the base cost of collisions for existing conditions. In the future as traffic volumes increase, more collisions may occur without any improvements, therefore improving the intersection would result in a larger safety benefit over the 20-year life-cycle. Costs associated with collisions anticipated for each proposed intersection alternative were quantified using the Caltrans Intersection Control Evaluation Collision Cost Analysis spreadsheet. As previously mentioned, the benefits of converting to a roundabout includes reducing the number of conflict points for vehicles. Additionally, roundabouts reduce the entry speed of vehicles which in turn reduce the severity of collisions. Signal improvements aim to reduce congestion, which would in turn reduce potential collisions, however higher speeds and right-angle collisions are not reduced.

Vehicular Delay Reduction Benefit

To calculate the delay reduction benefit, the value of travel time was quantified for each proposed alternative. Costs associated with vehicular delay were computed using the delay for the AM and PM peak hour periods of all the alternatives. In assessing the delay costs, the weighted average for costing the value of time for automobiles and trucks was used. An average delay cost of

VINEYARD DRIVE CORRIDOR PLAN

\$25.75/person/hour was used — based on the values published in the Cal-B/C tools for Vehicle Operation Costs Parameters, 2022 (*Transportation Economics | Caltrans*). The rate was grown by 38% from the 2016 values. The delay reduction benefit, therefore, includes the reduction in delay in dollar amounts compared to No Build conditions.

Fuel Benefit

To calculate the fuel cost for the alternatives, the vehicle operating costs were quantified. The fuel costs (vehicle operating costs) were computed using the delay for the AM and PM peak hour periods of all alternatives. An average fuel price for regular unleaded automobile fuel of \$4.79 was used based on the average price of unleaded gas for 2022 in San Luis Obispo County.

Environmental Benefit

To calculate the environmental cost, the greenhouse gas emissions costs were quantified for the project. The health cost of Carbon Monoxide (CO) in a rural/suburban California town is \$80/ton. The health cost of Nitrogen Oxide is \$15,100/ton. The methodology for using the environmental costs comes from the Cal-B/C tools, 2022.

Construction Cost

Based on the concept-level preliminary project costs estimates, the total estimated project construction costs (including design, environmental, right of way, construction, and construction management costs) for each alternative are presented in the Life Cycle Benefit/Cost Analysis results tables below.

Other Costs

Operation and maintenance costs are other important components of the cost associated within the various alternatives. The operation and maintenance costs for a traffic signal include providing power service to the signal and street lighting (\$750/year), signal retiming (\$1,000/year), and signal maintenance for power outages/new detector loops/etc. (\$1,500/year). The roundabout alternative would have lower operation and maintenance costs limited to power service for street lighting (\$750/year). These values are typical industry averages.

Life Cycle Benefit/Cost Analysis Results

Table 4.4 presents a summary of the life-cycle benefits and costs for the two proposed intersection alternatives at Bethel Road and Vineyard Drive, and Table 4.5, presents the summary of the benefit/cost (B/C) analysis. The B/C summary for each alternative is calculated in comparison to the “No Build” scenario.

As shown, the Roundabout Alternative has a higher B/C of 0.4 and the Traffic Signal has a B/C of -2.3. Generally, B/C ratios less than 1.0 are less favorable. However, negative ratios show that benefits would not be sufficient to justify the cost. Other potential benefits of roundabouts, which are not quantified here, include particulate matter/pollutants for air quality considerations. Based on the benefit-cost analysis of the Bethel Road/Vineyard Drive intersection, the roundabout is the preferred alternative.



VINEYARD DRIVE CORRIDOR PLAN

Table 4.4 Life-Cycle Costs

Life-Cycle Costs (20-year design)	No Build	Roundabout Alternative 1	Traffic Signal Alternative 2
Collision and Mobility Costs			
Collision Costs of predicted crashes	\$737,000	\$537,000	\$7,040,000
Delay Costs	\$2,280,000	\$390,000	\$1,280,000
Fuel and GHG Costs	\$1,416,000	\$1,463,000	\$1,070,000
Project Costs Including Design, Construction and Maintenance			
Operations and Maintenance Costs	\$12,000	\$34,000	\$60,000
Construction Costs	\$0	\$5,100,000	\$2,085,000
Total Life Cycle Costs	\$4,445,000	\$7,524,000	\$11,535,000

Table 4.5 B/C Analysis Summary of Bethel Road at Vineyard Drive

Life Cycle Benefit/Cost Ratios		
	No Build VS Roundabout	No Build VS Signal
<i>Safety Benefit</i>	\$ 200,000	\$ (6,303,000)
<i>Delay Reduction Benefit</i>	\$ 1,890,000	\$ 1,000,000
<i>Fuel and GHG Benefit</i>	\$ (47,000)	\$ 346,000
Total Benefits	\$ 2,043,000	\$ (4,957,000)
<i>Added Operations & Maintenance Costs</i>	\$ 22,000	\$ 48,000
<i>Construction Costs</i>	\$ 4,475,000	\$ 987,500
Total Costs	\$ 5,122,000	\$ 2,133,000
Life Cycle Benefit/Cost Ratio	0.4	(-2.3)

VINEYARD DRIVE CORRIDOR PLAN

4.9 Alternatives Analysis Summary

If the existing intersection at Vineyard Drive & Bethel Road is not improved with either a traffic signal or roundabout, then traffic operations will deteriorate with severe delays and queuing, likely beyond the peak periods. With installation of either the traffic signal or a roundabout, multimodal improvements will also be improved at this intersection. However, installing a traffic signal at Bethel Road does not slow vehicles entering the community during off-peak hours. The traffic signal also does not rid the potential of more severe right-angle collisions like a roundabout does. Constructing a roundabout at Bethel Road/Vineyard Drive will provide a more accessible and more comfortable environment for vulnerable road users including schoolchildren, pedestrians, and bicyclists alike, as well as provide higher efficiency for motorists through the intersection while serving as a gateway treatment to the Templeton community. **A roundabout at Vineyard Drive/Bethel Road is the preferred option.**

This Corridor Plan will transform the current vehicle-centric Vineyard Drive to one that balances the diverse travel needs and introduces efficient, connected, and comfortable multimodal mobility options for all ages and abilities. This Corridor Plan proposes to enhance pedestrian and bicycle access throughout, by reassigning the right-of-way to active transportation modes. In addition to bridging the gaps in multimodal mobility, this Plan proposes intersection improvements to increase efficiency, reduce congestion during peak times, and aims to reduce travel speeds along the corridor through speed management techniques. The two alternatives for the Central Segment are compared qualitatively in Table 4.6, as to how well each alternative meets the Plan’s purpose and goals. A Poor rating does not meet the goals or improve from existing conditions, a Fair rating minimally improves from existing, and a Good rating provides optimal improvements.

Table 4.6 Alternatives Comparison Summary

Metric	Existing	Alternative 1 (Trail & Bike Lanes)	Alternative 2 (Sidewalks & Buffered Bike Lanes)
Pedestrian Access			
Allows optimum sidewalk width	Poor	Good	Good
Provides buffer from travel lane	Poor	Good	Fair
Bicycle Access			
Provides buffer from travel lane	Poor	Fair	Good
LTS Score	Poor	Good	Fair
Minimizes conflicts at intersections	Poor	Good	Good
Auto Circulation			
Promotes traffic flows with reasonable congestion limits	Poor	Good	Good
Promotes slower speeds	Poor	Good	Good
Conceptual Design			
Right-of-Way Encroachment	n/a	Good	Fair
Estimated Cost	n/a	Good	Poor

- The multipurpose trail in Alternative 1 provides better pedestrian access as it has a greater buffer from the roadway than the sidewalks.
- For bicyclists, either option would provide a more comfortable setting, less-confident or less-experienced cyclists can take the trail, and more experienced and confident riders can stay in the bike lane. The benefit with Alternative 2 is that the bike lanes would have a 3’ buffer from vehicular traffic. With the trail option, bicyclists would be sharing the trail with other users who walk or roll (including scooters, or wheelchairs). The separated trail would provide an optimum LTS score.
- Either Alternative 1 or 2 would provide optimum vehicular circulation during peak times while aiming to slow travel speeds during off-peak times. The intersection improvements are consistent between the two alternatives and both segment concepts include speed management techniques.
- For the design considerations, at this early conceptual-level stage, right-of-way (ROW) encroachment, including potential impacts to properties, utilities, and drainage, and preliminary cost estimates were generally considered. Alternative 2 is rated Fair and Poor in these categories because of the impacts to the south side of Vineyard Drive and the associated cost increase as compared to Alternative 1. Alternative 1 minimizes ROW encroachment by reassigning existing ROW for the trail and reduces cost.
- **Alternative 1 (Trail with Bike Lanes) is the preferred concept because it provides the best option that meets all the goals.**

Chapter 5. Funding Strategies & Implementation

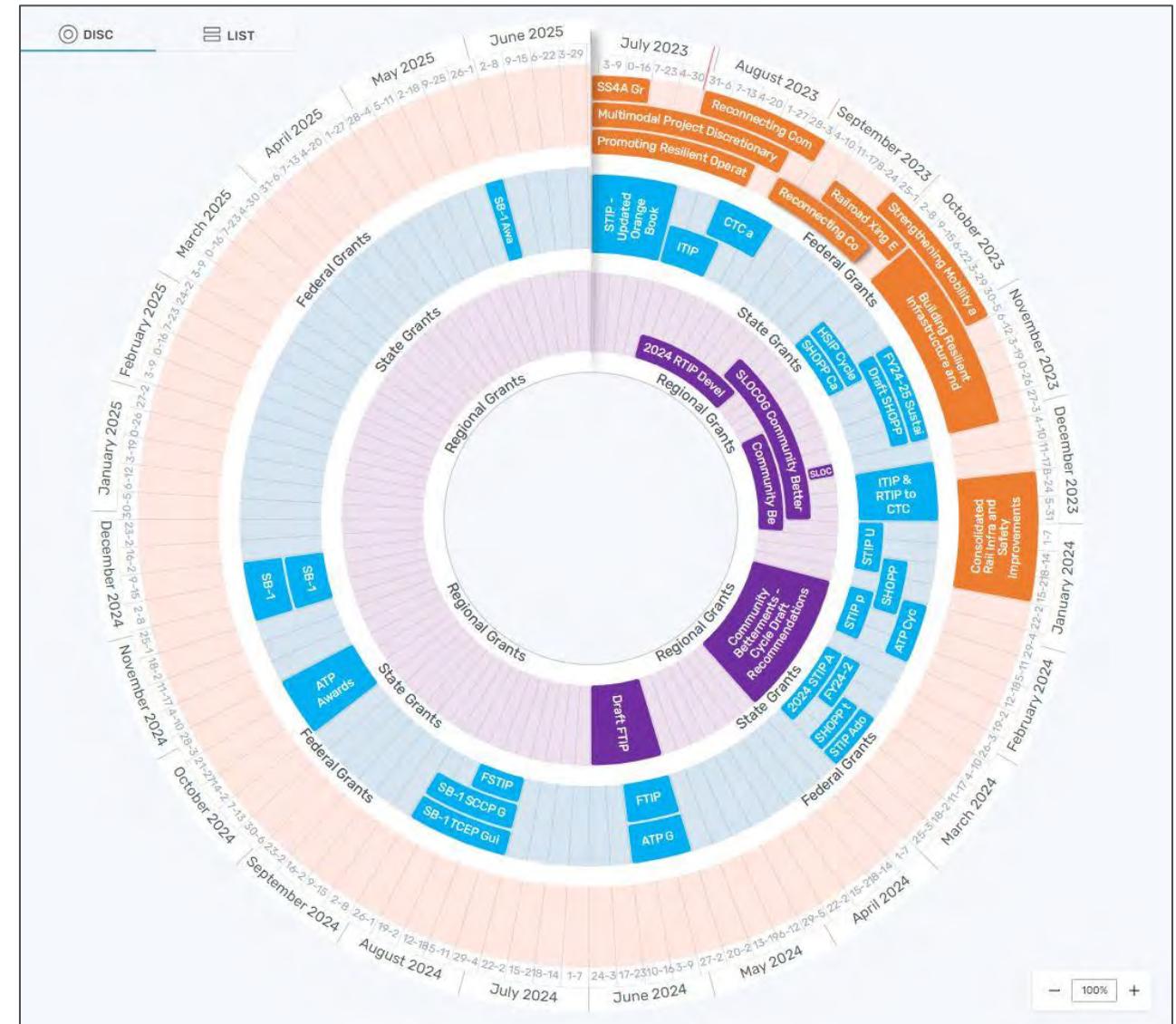
5.1 Funding Opportunities

This chapter provides potential phasing for implementation of the Vineyard Drive Corridor Plan as well as a listing of available funding sources with a brief description of each source, and the processes for obtaining the funds. Some funding sources are designed for planning and preliminary engineering level studies while other sources are intended for design and construction of improvements. Funding for the construction of bike and pedestrian improvement projects is available through various State & Federal Programs (i.e., Active Transportation Program). Funding for the construction of a roundabout at Bethel Road could possibly come from the federal Congestion Mitigation and Air Quality (CMAQ) Program or the Regional Surface Transportation Program (RSTP).

Federal Funding Programs

Congestion Mitigation and Air Quality

The Congestion Mitigation and Air Quality (CMAQ) program was implemented to support surface transportation projects and other related efforts that contribute air quality improvements and provide congestion relief. Funds are directed to transportation projects and programs, which contribute to the attainment and maintenance of National Ambient Air Quality Standards in non-attainment or air quality maintenance areas for ozone, carbon monoxide, or particulate matter under provisions in the Federal Clean Air Act. Eligible CMAQ projects include public transit improvements; high occupancy vehicle lanes; Intelligent Transportation System Infrastructure; traffic management and traveler information systems (i.e., electric toll collection systems); employer-based transportation management plans and incentives; traffic flow improvement programs (signal coordination); fringe parking facilities serving multiple occupancy vehicles; shared ride services; bicycle and pedestrian facilities; flexible work-hour programs; outreach activities establishing Transportation Management Associations; fare/fee subsidy programs; and under certain conditions, Particulate Matter improvement projects.



Source: SLOCOG <https://slocoq.org/programs/funding-programming/grants>

VINEYARD DRIVE CORRIDOR PLAN

Reconnecting Communities: Highways to Boulevards (RC:H2B) Program

The RC:H2B program was established, to be administered by the California Department of Transportation (Caltrans), with guidance from the California State Transportation Agency, and in consultation with the California Transportation Commission, the Department of Housing and Community Development, the Strategic Growth Council, and the Governor's Office of Planning and Research, to provide funding, upon appropriation by the Legislature, for the purpose of awarding competitive grants to eligible entities, in partnership with Caltrans, for planning or implementing the conversion or transformation of underutilized state highways into multimodal corridors that serve residents of underserved communities. The primary goal of the RC:H2B Pilot Program is to reconnect communities harmed by transportation infrastructure, through community-supported planning activities and capital construction projects that are championed by those communities.

Rural Surface Transportation Grant (Rural)

Under the Bipartisan Infrastructure Law (BIL), the Rural Surface Transportation Grant Program (Rural) supports projects that will improve and expand the surface transportation infrastructure in rural areas to increase connectivity, improve the safety and reliability of the movement of people and freight, generate regional economic growth, and improve quality of life. Eligible uses include highway, bridge, tunnel, or highway freight projects eligible under the National Highway Performance Program, Surface Transportation Block Grant Program, or the Tribal Transportation Program, highway safety improvement projects, and projects on a publicly owned highway or bridge that improve access to an agricultural, commercial, energy, or intermodal facility, as well as integrated mobility management systems, transportation demand management system, or on-demand mobility services.

Safe Streets and Roads for All (SS4A)

The Bipartisan Infrastructure Law (BIL) established the new Safe Streets and Roads for All (SS4A) discretionary program, with \$5 billion in appropriated funds over 5 years, 2022-2026. The SS4A program funds regional, local, and Tribal initiatives through grants to prevent roadway deaths and serious injuries. The program supports the development of a comprehensive safety action plan that identifies the most significant roadway safety concerns in a community and the implementation of projects and strategies to address roadway safety issues. Action Plans are the foundation of the SS4A grant program. SS4A requires an eligible Action Plan be in place before applying to implement projects and strategies.

Surface Transportation Block Grant Program (STBG)

The STBG is a program under the Bipartisan Infrastructure Law (BIL) and has the most flexible eligibilities among all Federal-Aid highway programs. The STBG promotes flexibility in State and local transportation decisions and provides flexible funding to best address State and local transportation needs. (*See RSTP*)

State Funding Programs

Active Transportation Program (ATP)

On September 26, 2013, Governor Brown signed legislation creating the Active Transportation Program (ATP) in the Department of Transportation (Senate Bill 99, Chapter 359 and Assembly Bill 101, Chapter 354). The ATP consolidates existing federal and state transportation programs, including the Transportation Alternatives Program (TAP), Bicycle Transportation Account (BTA), and State Safe Routes to School (SR2S), into a single program with a focus to make California a national leader in active transportation. The ATP is administered by the Division of Local Assistance, Office of Active Transportation and Special Programs. The purpose of ATP is to encourage increased use of active modes of transportation by achieving the following goals:

- Increase the proportion of trips accomplished by biking and walking.



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- Increase safety and mobility for non-motorized users.
- Advance the active transportation efforts of regional agencies to achieve greenhouse gas reduction goals.
- Enhance public health.
- Ensure that disadvantaged communities fully share in the benefits of the program.
- Provide a broad spectrum of projects to benefit many types of active transportation users.

Highway Safety Improvement Program (HSIP)

The intent of this program is to significantly reduce public roadway fatalities and serious injuries. The emphasis will be at locations that are data and strategically driven. The HSIP has several major program features; separate fact sheets are available on each of these:

- Strategic Highway Safety Plan (SHSP)
- High Risk Rural Roads (HRRR)
- Reporting Requirements (HSIP Reports)

The project must be on any public road or publicly owned bicycle, pedestrian pathway, or trail. Projects must identify a specific safety problem that can be corrected or improved substantially. City or County transportation planning agencies can apply for these funds. The maximum funding amount for a project is \$1 million, and the federal reimbursement rate is 90 percent. Caltrans district staff will solicit candidate projects from eligible public agencies. Interested agencies must apply by the due date to compete for funding. Caltrans staff will evaluate applications based on a Safety Index (calculated based on traffic safety data). A notice is made once a year to local agencies to submit applications for candidate HSIP projects.

Local Streets and Roads (LSR) Program

The purpose of the program is to provide approximately \$1.5 billion per year to cities and counties for basic road maintenance, rehabilitation, and critical safety projects on the local streets and roads system.

Regional Surface Transportation Program (RSTP)

Surface Transportation Block Grant Program funds are apportioned to States to provide flexible funding that may be used by States and localities for projects to preserve or improve conditions and performance on any Federal-Aid highway, bridge projects on any public road, facilities for active transportation, transit capital projects and public bus terminals and facilities. Fifty percent of a State's funds are to be distributed to areas based on population, known as Regional Surface Transportation Program (RSTP) funds. In addition, a portion of its RSTP funds is to be set aside for bridges not on Federal-Aid highways. Furthermore, a special rule is provided to allow a portion of funds reserved for rural areas to be spent on rural minor collectors. Examples of projects eligible for RSTP include highway projects; bridges (including construction, reconstruction, seismic retrofit, and painting); transit capital improvements; carpool, parking, bicycle, and pedestrian facilities; safety improvements and hazard elimination; research; traffic management systems; surface transportation planning; transportation enhancement activities and control measures; and wetland and other environmental mitigation.

Safe Routes To School (SRTS)

Safe Routes to School (SRTS) is an approach that promotes walking and bicycling to school through infrastructure improvements, enforcement, tools, safety education, and incentives to encourage walking and bicycling to school. Separate state and federal Safe Routes to School programs serve California. Caltrans distributes Safe Routes funding from the Federal Highway Administration.

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State Highway Operations and Protection Program (SHOPP)

The State Highway Operating and Protection Plan (SHOPP) is a four-year program of projects that have the purpose of collision reduction, major damage restoration, bridge preservation, roadway preservation, roadside preservation, mobility enhancement, and preservation of other transportation facilities related to the state highway system. Non-capital projects are programmed through the SHOPP. The SHOPP is adopted simultaneously with the STIP every two years. While SLOCOG is allowed input to the SHOPP, the State has sole discretionary authority over the use of SHOPP funds. The SHOPP program includes projects designed to maintain the safety and operational integrity of the state highway system. Most of the projects are for pavement rehabilitation, bridge rehabilitation, and traffic safety improvements. Other projects may include such things as operational improvements (e.g., traffic signalization) and roadside rest areas. It does not include projects to add through lanes to increase capacity.

State Transportation Improvement Program (STIP) and Interregional Transportation Improvement Program (ITIP)

At the State level, these funds are divided into two programs: (1) the Regional Improvement Program (RIP) funded from a local share of the 75 percent of State Highway Account (SHA) funds set aside for regional transportation agency programming, and the Interregional Improvement Program (IIP), funded from the remaining 25 percent available for State programming. SLOCOG has authority to decide how to program the San Luis Obispo County regional share of RIP funds, subject to STIP eligibility guidelines. To be eligible, projects must be nominated by the regional agency in their Regional Transportation Improvement Program (RTIP).

Caltrans has the authority to program the Interregional Transportation Improvement Funds. Similar to the RTIP, Caltrans must nominate projects within the ITIP. STIP funds are primarily intended for capital projects. Eligible projects include constructing and widening state highways, local roads, public transit (including buses), pedestrian and bicycle facilities, grade separations, intermodal facilities, and safety projects. While these funds may also be used for local road rehabilitation, the California Transportation Commission (CTC), which has authority over the STIP, has not supported the programming of STIP funds for road rehabilitation projects in recent STIP cycles.

Sustainable Transportation Planning Grant

The Sustainable Transportation Planning Grant Program was created to support the California Department of Transportation's (Caltrans) Mission: Provide a safe and reliable transportation network that serves all people and respects the environment. The purpose of the Sustainable Communities grants is to fund local and regional multimodal transportation and land use planning projects that further the region's RTP SCS/APS (where applicable), contribute to the State's GHG reduction targets, and assist in achieving the Caltrans Mission and Grant Program Objectives.

Developer In-Kind Contributions

Infrastructure frontage improvements in correlation with land development are typically the responsibility of the developer unless other funding sources can be identified. This cost would be included within the project budget. Developer-responsibility for improvements within the corridor would include frontage roads providing access to commercial and/or residential development along the corridor.

Regional Programs

Communities Betterment Grant

This grant is administered by SLOCOG and is for community-level infrastructure improvements that support sustainable transportation goals. Funding for the program includes uncommitted funds from the Surface Transportation Block Grant (STBG) and CMQA and CRP. Priority shall be given to projects that have demonstrated performance benefits in mobility and accessibility, safety and security, and



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healthy communities. The guidelines for Cycle 2 will be developed in fall 2023, additionally a Call for Projects is anticipated in early November/December 2023. This grant is meant for smaller-scale infrastructure improvements and could potentially be used for constructing improved bike lanes with green paint or implementing a Leading Pedestrian Interval (LPI) at traffic signals.

County Road Impact Fee (RIF) Program

San Luis Obispo County has a transportation impact fee program in the Templeton community consistent with Government Code 66000, which was created by AB 1600. Recognizing the arterial function of Vineyard Drive, this roadway and its intersections have been and will continue to be in Templeton Road Impact Fee program. Therefore, transportation impact fees could be a resource for at least a portion of the costs for the identified improvements in this Plan. The transportation impact fee program funds the expansion of existing traffic facilities and the construction of new facilities that will be needed to provide and maintain adequate traffic circulation within the fee area to support new development. Currently, improvements to Bethel Road at Vineyard Drive, and the new roadways such as the Rossi Road realignment are programmed in the Templeton planning area Capital Improvements Program and RIF.

Additional Grant Programs

Additional grant programs that may fund active transportation improvements like those included in this Plan include:

- Clean Mobility Options
- Local Partnership Program
- Office of Traffic Safety Grant Program
- Solutions for Congested Corridors
- Sustainable Transportation Equity Project
- Transformative Climate Communities
- Transportation Development Act Funding

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5.2 Phasing Potential

The key elements of the Plan and recommended alternatives as presented in Chapter 4 consists of installing green-painted bike lanes through all traffic signals, constructing a multiuse trail along the north side of Vineyard Drive between US 101 and Bethel Road, and installing a roundabout at Bethel Road. The multiuse trail provides a dedicated path for pedestrians and cyclists separate from the traveled way. Should the County consider implementing portions of this Plan via a phased approach, most improvements can be constructed individually. Funding for the largest projects will require the most time and effort to secure. Therefore, a phased approach can be implemented near-term, where the roundabout or trail could be constructed once funding is secured:

- Green-painted bike lanes can be implemented on existing bike lanes in conflict zones as the 1st phase. This would be low-cost and would improve access and visibility for cyclists along the corridor and through intersections.
- Prioritize pedestrian improvements at Vineyard Drive/Main Street by installing high-visibility crosswalks and a Leading Pedestrian Interval (LPI) for the traffic signal.
- Speed management techniques are relatively low-cost and can be implemented in the near-term. This could include additional speed feedback signs (use sparingly), pavement speed limit markings, flashing advance intersection warning signs, optical speed bars, and lane narrowing.
- The County should consider a roundabout **Pilot Project** at the intersection of Bethel Road & Vineyard drive.
 - Prioritize installing a roundabout at Bethel Road.
- Prioritize extending the westbound left turn pocket at the elementary school.





Appendices

Appendix A

Queuing Analysis Tables



VINEYARD DRIVE CORRIDOR PLAN

Table A.1 Existing Conditions Queue Results

Int. #	Intersection/Approach	Control Type	Available Storage	Existing Conditions – Approximate Queue Lengths (ft)								
				AM Peak			School Peak			PM Peak		
				Observed Max	SimTraffic Max	SimTraffic 95th	Observed	SimTraffic Max	SimTraffic 95th	Observed	SimTraffic Max	SimTraffic 95th
1	Vineyard Drive/Main Street		--	--	--	--	--	--	--	--	--	--
	Eastbound Left	Signal	120	225	153	125	275	165	137	225	130	111
	Eastbound Thru		-	75	96	70	125	140	97	150	139	101
	Eastbound Right		50	75	105	86	75	97	61	0	95	51
	Westbound Left		60	125	119	103	25	55	33	25	28	18
	Westbound Thru/Right		-	525	387	277	100	163	128	75	116	97
	Northbound Left		290	175	181	143	350	116	106	100	75	64
	Northbound Thru/Right		-	75	132	89	275	83	73	25	29	24
	Southbound Left/Thru		-	175	180	151	750	146	125	100	121	99
	Southbound Right		110	100	150	103	125	129	89	50	74	61
2	Vineyard Drive/Old County		--	--	--	--	--	--	--	--	--	--
	Eastbound Left	Side Street Stop	295	200	181	128	75	76	65	25	45	45
	Eastbound Thru		-	0	0	0	0			0	0	0
	Westbound Thru/right		-	0	41	26	25	14	8	0	0	0
	Southbound Left		-	50	133	75	25	62	48	25	40	36
	Southbound Right		80	200	127	103	250	85	74	25	56	47
3	Vineyard Drive/US 101 NB Ramps		--	--	--	--	--	--	--	--	--	--
	Eastbound Left	Signal	80	100	123	101	125	134	122	150	132	117
	Eastbound Thru		-	200	147	103	125	182	121	75	182	98
	Westbound Thru		-	250	323	241	375	214	182	175	156	137
	Westbound Right		200	0	172	95	75	43	25	50	24	12
	Northbound Left/Thru		-	175	190	160	225	199	164	225	288	229
	Northbound Right		190	225	190	146	125	151	110	75	192	146
4	Vineyard Drive/US 101 SB Ramps		--	--	--	--	--	--	--	--	--	--
	Eastbound Left	Signal	60	0	0	0	0			0	16	8
	Eastbound Thru		-	150	221	202	250	216	189	150	178	136

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Int. #	Intersection/Approach	Control Type	Available Storage	Existing Conditions – Approximate Queue Lengths (ft)								
				AM Peak			School Peak			PM Peak		
				Observed Max	SimTraffic Max	SimTraffic 95th	Observed	SimTraffic Max	SimTraffic 95th	Observed	SimTraffic Max	SimTraffic 95th
	Eastbound Right		225	75	98	81	100	100	84	125	77	70
	Westbound Left		240	175	266	230	250	217	189	125	180	148
	Westbound Thru/Right		-	150	104	64	175	128	66	150	105	63
	Northbound Left/Thru		-	75	143	114	150	204	157	150	218	167
	Northbound Right		170	100	136	102	75	96	71	25	62	53
	Southbound Left/Thru		-	0	0	0	0	18	11	0	23	11
	Southbound Right		50	0	18	9	0			0		
5	<i>Vineyard Drive/Rossi Road</i>		--	--	--	--	--	--	--	--	--	--
	Eastbound Thru/Right	Side Street Stop	-	125	38	34	200	50	24	0	19	9
	Westbound Left		120	50	57	55	100	116	96	75	110	91
	Westbound Thru		-	0	0	0	0	50	49	0	0	
	Northbound Left		-	0	34	29	50	60	51	50	78	55
	Northbound Right		105	25	59	51	150	88	72	75	126	94
6	<i>Vineyard Drive/Bennett Way</i>		--	--	--	--	--	--	--	--	--	--
	Eastbound Left	Side Street Stop	250	0	5	4	0	0	0	0	5	4
	Eastbound Thru/Right		-	0	0	0	0			0	0	
	Westbound Left		100	0	27	25	25	43	36	50	40	30
	Westbound Thru/Right		-	0	0	0	0			0	0	
	Northbound Left/Thru		-	75	39	34	25	31	27	25	31	20
	Northbound Right		110	0	48	46	25	45	46	25	46	45
	Southbound Left/Thru		-	50	34	27	0	34	24	25	24	11
	Southbound Right		110	0	23	14	0	29	14	0	23	10
7	<i>Vineyard Drive/Bethel Rd</i>		--	--	--	--	--	--	--	--	--	--
	Eastbound Left/Thru/Right	All-way Stop	-	1600	231	165		112	89		69	60
	Westbound Left/Thru/Right		-	1100	204	151		130	113		106	88
	Northbound Left/Thru/Right		-	150	102	75		79	62		54	46
	Southbound Left/Thru		-	50	50	38		40	33		38	33
	Southbound Right		100	75	56	44		45	32		40	27



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Int. #	Intersection/Approach	Control Type	Available Storage	Existing Conditions – Approximate Queue Lengths (ft)								
				AM Peak			School Peak			PM Peak		
				Observed Max	SimTraffic Max	SimTraffic 95th	Observed	SimTraffic Max	SimTraffic 95th	Observed	SimTraffic Max	SimTraffic 95th
8	Vineyard Drive/Vineyard Elem. School		--	--	--	--	--	--	--	--	--	--
	Eastbound Thru	Side Street Stop	-		4	3						
	Eastbound Right		300		13	6	25	0	0			
	Westbound Left		340		106	81	125	40	32			
	Westbound Thru		-		0	0						
	Northbound Left/Right		-		386	232	150	88	62			

Notes:

1. Observed maximum queue lengths estimated from peak 15-min intervals from video footage. Simulated queue lengths calculated using Sim-Traffic, maximum and 95th percentile queues reported.
2. Available storage for thru movements is the distance until the upstream intersection.

Table A.2 Future Conditions (No Improvements) Queue Results

Int. #	Intersection/Approach	Control Type	Available Storage	Future Conditions (No Build) Approximate Queue Lengths (ft)					
				AM Peak		School Peak		PM Peak	
				Cumulative		Cumulative		Cumulative	
				SimTraffic Max	SimTraffic 95th	SimTraffic Max	SimTraffic 95th	SimTraffic Max	SimTraffic 95th
1	Vineyard Drive/Main Street		--	--	--	--	--	--	--
	Eastbound Left	Signal	120	178	159	179	173	159	135
	Eastbound Thru		-	254	184	236	176	163	104
	Eastbound Right		50	110	103	110	80	84	48
	Westbound Left		60	120	139	72	42	50	34
	Westbound Thru/Right		-	623	537	266	214	159	118
	Northbound Left		290	251	206	187	149	101	83
	Northbound Thru/Right		-	153	119	126	95	42	31
	Southbound Left/Thru		-	279	219	231	170	144	122
	Southbound Right		110	184	180	181	127	119	83

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Int. #	Intersection/Approach	Control Type	Available Storage	Future Conditions (No Build) Approximate Queue Lengths (ft)					
				AM Peak		School Peak		PM Peak	
				Cumulative		Cumulative		Cumulative	
				SimTraffic Max	SimTraffic 95th	SimTraffic Max	SimTraffic 95th	SimTraffic Max	SimTraffic 95th
2	<i>Vineyard Drive/Old County</i>		--	--	--	--	--	--	
	Eastbound Left	Side Street Stop	295	325	208	99	77	74	59
	Eastbound Thru		-	266	162	19	16	0	0
	Westbound Thru/Right		-	73	48	27	12	5	3
	Southbound Left		-	348	405	96	71	45	41
	Southbound Right		80	135	152	123	103	74	55
3	<i>Vineyard Drive/US 101 NB Ramps</i>		--	--	--	--	--	--	
	Eastbound Left	Signal	80	140	138	139	143	136	137
	Eastbound Thru		-	352	264	253	197	239	176
	Westbound Thru		-	248	269	241	257	215	196
	Westbound Right		200	69	51	53	36	33	21
	Northbound Left/Thru		-	299	224	270	233	385	315
	Northbound Right		190	204	189	204	175	205	212
4	<i>Vineyard Drive/US 101 SB Ramps</i>		--	--	--	--	--	--	
	Eastbound Left	Signal	60	114	91	120	76	109	72
	Eastbound Thru		-	247	272	235	249	220	194
	Eastbound Right		225	179	128	155	118	138	107
	Westbound Left		240	294	287	268	233	189	171
	Westbound Thru/Right		-	348	280	314	238	230	203
	Northbound Left/Thru		-	227	191	254	214	251	199
	Northbound Right		170	198	154	175	113	194	95
	Southbound Left/Thru		-	72	62	73	58	85	70
	Southbound Right		50	56	48	43	40	60	51
5	<i>Vineyard Drive/Rossi Road</i>		--	--	--	--	--	--	
	Eastbound Thru/Right	Side Street Stop	-	278	188	151	83	41	27
	Westbound Left		120	94	81	138	121	140	115
	Westbound Thru		-	35	30	98	66	170	71



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Int. #	Intersection/Approach	Control Type	Available Storage	Future Conditions (No Build) Approximate Queue Lengths (ft)					
				AM Peak		School Peak		PM Peak	
				Cumulative		Cumulative		Cumulative	
				SimTraffic Max	SimTraffic 95th	SimTraffic Max	SimTraffic 95th	SimTraffic Max	SimTraffic 95th
	Northbound Left		-	159	104	88	85	128	101
	Northbound Right		105	297	258	186	134	210	141
6	Vineyard Drive/Bennett Way		--	--	--	--	--	--	--
	Eastbound Left	Side Street Stop	250	53	43	40	19	44	34
	Eastbound Thru/Right		-	18	8	19	9	19	8
	Westbound Left		100	62	52	82	59	68	57
	Westbound Thru/Right		-	3	4	11	9	28	16
	Northbound Left/Thru		-	120	102	119	93	161	119
	Northbound Right		110	113	71	96	64	105	70
	Southbound Left/Thru		-	156	123	138	115	121	96
	Southbound Right		110	96	65	50	45	53	51
7	Vineyard Drive/Bethel Rd		--	--	--	--	--	--	--
	Eastbound Left/Thru/Right	All-way Stop	-	475	362	160	121	77	68
	Westbound Left/Thru/Right		-	252	206	149	128	148	107
	Northbound Left/Thru/Right		-	108	84	77	69	46	43
	Southbound Left/Thru		-	66	53	57	44	49	39
	Southbound Right		100	52	45	61	43	35	27
8	Vineyard Drive/Vineyard Elem. School		--	--	--	--	--	--	--
	Eastbound Thru	Side Street Stop	-						
	Eastbound Right		300						
	Westbound Left		340	64	47	64	47		
	Westbound Thru		-						
	Northbound Left/Right		-	117	86	117	86		

Notes:

- Observed maximum queue lengths estimated from peak 15-min intervals from video footage. Simulated queue lengths calculated using Sim-Traffic, maximum and 95th percentile queues reported.
- Available storage for thru movements is the distance until the upstream intersection.

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Table A.3 Future Conditions (With Improvements) Queue Results

Int. #	Intersection/Approach	Control Type	Available Storage	Approximate Queue Lengths (ft)					
				AM Peak		School Peak		PM Peak	
				Cumulative		Cumulative		Cumulative	
				SimTraffic Max	SimTraffic 95th	SimTraffic Max	SimTraffic 95th	SimTraffic Max	SimTraffic 95th
1	Vineyard Drive/Main Street		--	--	--	--	--	--	--
	Eastbound Left	Signal	175	179	169	176	174	170	147
	Eastbound Thru		-	277	185	248	166	210	128
	Eastbound Right		125	109	102	108	67	58	40
	Westbound Left		125	120	123	73	50	22	18
	Westbound Thru/Right		-	464	374	232	207	198	126
	Northbound Left		285	231	191	196	162	88	70
	Northbound Thru/Right		-	195	133	119	98	37	29
	Southbound Left/Thru		-	436	313	310	223	169	132
	Southbound Right		200	185	195	182	145	117	88
2	Vineyard Drive/Old County		--	--	--	--	--	--	--
	Eastbound Left	Side Street Stop	310	226	171	104	79	65	56
	Eastbound Thru		-	162	76	26	12	6	5
	Westbound Thru		-	78	43	17	8	4	3
	Southbound Right		-	287	195	160	121	74	55
3	Vineyard Drive/US 101 NB Ramps		--	--	--	--	--	--	--
	Eastbound Left	Signal	80	139	139	138	147	140	148
	Eastbound Thru		-	342	284	287	222	310	236
	Westbound Thru		-	306	324	300	295	255	205
	Westbound Right		200	70	42	106	61	38	20
	Northbound Left/Thru		-	359	283	288	243	456	381
	Northbound Right		190	205	214	205	175	205	245
4	Vineyard Drive/US 101 SB Ramps		--	--	--	--	--	--	--
	Eastbound Left	Signal	200	179	115	157	86	117	90
	Eastbound Thru		-	231	265	226	257	223	215
	Eastbound Right		225	165	127	160	135	140	115



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Int. #	Intersection/Approach	Control Type	Available Storage	Approximate Queue Lengths (ft)					
				AM Peak		School Peak		PM Peak	
				Cumulative		Cumulative		Cumulative	
				SimTraffic Max	SimTraffic 95th	SimTraffic Max	SimTraffic 95th	SimTraffic Max	SimTraffic 95th
	Westbound Left		240	298	295	286	238	231	187
	Westbound Thru/Right		-	361	281	306	237	247	199
	Northbound Left/Thru		-	210	173	255	213	218	182
	Northbound Right		170	183	138	192	101	81	68
	Southbound Left/Thru		-	79	69	91	63	97	78
	Southbound Right		50	70	49	47	40	63	51
5	Vineyard Drive/Rossi Road		--	--	--	--	--	--	--
	Eastbound Thru/Right	Side Street Stop	-	408	325	208	136	74	38
	Westbound Thru		-	6	6	11	0	0	0
	Northbound Right		-	289	269	188	148	161	128
6	Vineyard Drive/Bennett Way		--	--	--	--	--	--	--
	Eastbound Left	Signal	260	265	182	319	197	170	117
	Eastbound Thru		-	729	617	536	472	429	338
	Eastbound Right		175	160	144	160	160	160	163
	Westbound Left		350	257	219	366	325	311	272
	Westbound Thru/Right		-	350	304	370	257	234	209
	Northbound Left/Thru		-	131	104	116	95	124	107
	Northbound Right		110	61	46	69	47	52	39
	Southbound Left/Thru		-	155	120	173	131	137	116
	Southbound Right		110	123	65	49	42	91	65
7	Vineyard Drive/Bethel Rd		--	--	--	--	--	--	--
	Eastbound Left/Thru/Right	Roundabout	-		86		47		29
	Westbound Left/Thru/Right		-		67		54		37
	Northbound Left/Thru/Right		-		43		27		8
	Southbound Left/Thru/Right		-		45		24		16

This document is in draft form. The contents, including any opinions, conclusions or recommendations contained in, or which may be implied from, this draft document must not be relied upon. GHD reserves the right, at any time, without notice, to modify or retract any part or all of the draft document. To the maximum extent permitted by law, GHD disclaims any responsibility or liability arising from or in connection with this draft document.

VINEYARD DRIVE CORRIDOR PLAN

Int. #	Intersection/Approach	Control Type	Available Storage	Approximate Queue Lengths (ft)					
				AM Peak		School Peak		PM Peak	
				Cumulative		Cumulative		Cumulative	
				SimTraffic Max	SimTraffic 95th	SimTraffic Max	SimTraffic 95th	SimTraffic Max	SimTraffic 95th
8	<i>Vineyard Drive/Vineyard Elem. School</i>		--	--	--	--	--	--	
	Eastbound Thru	Side Street Stop	-	6	4	8	4		
	Westbound Left		330	161	122	65	47		
	Northbound Left/Right		-	607	431	99	72		

- Notes:
1. Simulated queue lengths calculated using Sim-Traffic for stop-controlled and signalized intersections, with maximum and 95th percentile queues reported. For the proposed roundabout at Bethel Road, SIDRA software was utilized to estimate the 95th percentile queues.
 2. Available storage for thru movements is the distance until the upstream intersection.

Appendix B

TAC Meeting #1 – Meeting Minutes



Meeting minutes

November 21, 2022

Project name	SLO County Vineyard Drive Corridor Plan	From	Rosanna Southern
Subject	Technical Advisory Committee (TAC) Meeting #1	Tel / email address	+1 916 245-4213
Date / Time	Thursday, November 17, 2022 10:00 am – 12:00 pm	Project no.	12570229
Attendees inc. company	Josh Roberts (County); Riley Gajdos (County); Todd Tregenza (GHD); John DiNunzio (SLOCOG); Lesli Bogart (TUSD); Randy Botts (TUSD); Tina Mayer (CSD); Tom Peterson (Fire); Michael Manuela (Sherriff)	Apologies inc. company	Rosanna Southern (GHD); CHP, Caltrans D5, SLORTA
Copy to	Rosanna Southern, GHD	Location	Templeton School District Board 950 Old County Road, Templeton, CA 93465
Objective	Project Introduction and corridor concerns/issues		

Agenda Item	Minutes
Welcome & Introductions	<ul style="list-style-type: none"> – County, GHD, attendees
Project Purpose & Background	<ul style="list-style-type: none"> – “The purpose of this effort is to consolidate prior efforts and identify a Corridor Alternatives and a Preferred Concept with comprehensive multimodal improvements that address the corridor’s long-standing issues, including safety, multimodal access and mobility, and peak-hour congestion” – Josh - General info on the Current Road Fee Study – Tom: Comment about doing something about Vineyard and Bennet/Rossi. Delays for EMS due to school traffic
Review Scope of Work	<ul style="list-style-type: none"> – Todd - Documenting existing conditions. Traffic counts, drone footage, farmers market outreach – Traffic modeling and forecasting: for emanate needs, short term and long term – Experience for Active Transportation Users – Todd – This group is to meet 3 times - Next meeting to show improvements/solutions for comments and last will be a draft of plan. TAAG meeting a few times (first to be December 15th). – Todd - Implementation and funding plan: need to be creative with how improvements are packaged for grants (low collision rates). – Todd - Do not anticipate a large Environmental Impact Report. Within developed area/rights-of-way
Workshop at Farmers Market	<ul style="list-style-type: none"> – Held on Saturday 11/12 – Josh/Todd – Commented there was lots of interest in the booth (about 60 people) – Comments /Summary attached in Agenda

Agenda Item	Minutes
	<ul style="list-style-type: none"> - Summary: Most people use corridor for school access, during school pick up/drop off is the roadway peaks, congestion at interchange. - Local Issues: lack of pedestrian accessibility. Sidewalk on 101 is on North side - People driving too fast/slow along Vineyard was a popular complaint
Social Pinpoint Website	<ul style="list-style-type: none"> - Website Link: https://lrsp.mysocialpinpoint.com/vdcp - Working with County PIO - Randy Botts: Push out link to parents for input? (Yes please!) - Interactive Map – on website - Survey – on website
Existing Conditions	<ul style="list-style-type: none"> - Summary attached in Agenda - Covered during intro - John: Question about equestrian input - Is there a demand for riverbed access from Vineyard drive? <ul style="list-style-type: none"> • Multiple: Not that we can tell. A lot of people park in Atascadero, end of Main Street, or at the end of 10th and ride down from there.
Corridor concerns/ issues	<ul style="list-style-type: none"> - Roundtable Discussion - Lack of pedestrian crossing at Bennett / Rossi - Josh: Calls are frequent about no crosswalk across Vineyard to access Rossi - What does future growth look like? What will be needed to support development that is planned? - John: comment about clarification regarding growth along Vineyard. (There is potential for growth/development). Expressed environmental concern/ questions. Does this corridor feel like any other corridor in this area? - Tom: Nothing comparable to Vineyard, particularly intersection @ Rossi and Vineyard. There are lots of 'near-misses' here regarding collisions, broadside collision risk is high - Leslie: (referring to recent accident with cyclist) There is a lack of lighting along the Corridor - CalFire: Location of collision was just West of Rossi on Vineyard Dr – cyclist was a high school student, struck by car when avoiding a trash bin that was obstructing the bike lane - Corridor wide lack of adequate lighting, particularly Bennett to Main - Randy: Templeton plans to expand Vineyard Elementary School (Vineyard Annex Project). <ul style="list-style-type: none"> • Has jogged the road and after the bridge there is no room to get off the road. No continuous walking / jogging path between Vineyard Elementary and Main Street. • Concerns about left turn lane going into the school. Left turns into and out of Vineyard Elementary are hard today. Queues and delay frustrate drivers, they can take small gaps and create broadside risk. There may still be congestion at school left turn lane, even if a solution is made for Bethel Rd. Easing congestion at Bethel could worsen left turn queue into school since the stop sign meters traffic today. • Todd: Does the school have an enrollment projection for the next 20 years for our traffic model? 5-10-year outlook is relatively stable for student population, but that could increase. Vineyard Elementary expansion (Vineyard Annex) planned to accommodate increased enrollment and possibly new grade (pre-K). • Josh: Do you have a scatterplot of student residence so that we can see the concentration along Vineyard Dr? • Leslie: May be able to get an enrollment projection and will try to get residence plot. However, there are about 20% of students that are inter-district transfers - Tina: Comments about water resources and future developments. Water has historically limited development. Waitlist for water on ADUs – required to provide water access as long as it's connected to existing water access. Affordable housing to be built at Bennet and Rossi. <ul style="list-style-type: none"> • Todd: ADUs bring more traffic due to larger population in the area.

Agenda Item	Minutes
	<ul style="list-style-type: none"> • Upcoming water project may increase development potential • Currently seeing 4 to 5 ADU permits per month in Templeton. Unrestricted by water issue. • ADU demand attributable to school desirability. More local families expected. <ul style="list-style-type: none"> – Affordable Housing planned between Rossi & Bennett – Tom: Rolling Hills housing community. Question about connecting Las Tablas and Vineyard (takes money). Comments about ADU impact within the community and school. Comments about speed and poor bike lanes and pedestrian facilities • Leslie: Comment about multigenerational homes due to cost of living. (more/larger families = more traffic) • Rolling Hills III on Las Tables multifamily development – Michael: Concern about EMS timing on Vineyard when there is traffic (difficult to navigate). Needs to be better bike and pedestrian facilities. Areas for criminal activity (homeless camps, kids causing issues?). Lighting could help reduce criminal activity. Traffic calming measures to help reduce speed. Any plans for public transportation? • Tom: Las Tables has a Park n Ride • Lack of connectivity to Park & Ride at Las Tablas. No bus on Vineyard. – Leslie: Question about Templeton Trader Joes being the only one present in North County and how that affects traffic. What is traffic like on the weekend when tourism is high? – Todd: wants to relieve traffic during peak hours. Included in model – Tom: Question about time frame on improvements <ul style="list-style-type: none"> • Todd: No current time frame, Road Impact Fee takes time to generate. We are looking to fund based on grants with this corridor plan. <p><u>Experiences At:</u></p> <p>Main Street:</p> <ul style="list-style-type: none"> – Tom: Traffic signal helps, very few issues. People drive too fast <p>Old County Rd:</p> <ul style="list-style-type: none"> – Tom: Vineyard Elementary School expansion and driveway backup into queuing area for left turn <p>Rossi Rd:</p> <ul style="list-style-type: none"> – Tom: Left turns in & out of Rossi during morning and evening peaks are high risk. A lot of people from the Coast come over and go the Trader Joes = Traffic and makes it difficult to take a left turn in and/or out of Rossi. Restrict Rossi to right-hand turn in and out to reduce conflicts – Tom: Witnessed many near-misses due to roadway being near 101 on-ramp. People are pulling out in front of drivers due to thinking they are turning on Rossi and not 101 on-ramp. <ul style="list-style-type: none"> • Turn restrictions or signal at Rossi may not be feasible, even if desirable from circulation / safety perspective <p>Bethel Road</p> <ul style="list-style-type: none"> – Randy: Delay due to school traffic. People cut through housing development to avoid waiting in traffic – Tom: Has seen a lot of near misses due to people not stopping and blowing through intersection (sometimes people not even seeing the stop sign!) <p>Vineyard Elementary School</p> <ul style="list-style-type: none"> – Left turns at Vineyard Elementary queue back toward Vineyard Drive – congestion problems during pick up and drop off – If school bus service returns, could influence student drop off activity <p>Other/General</p> <ul style="list-style-type: none"> – Speeding is an issue, need to develop traffic calming strategies. – Tom: A major injury recently (9/4) at Santa Rita – broadside collision, daylight conditions, high speed. Side street stop. Similar conditions exist elsewhere on corridor.

Agenda Item	Minutes
	<ul style="list-style-type: none"> - Tom: Emergency access on the overcrossing can be an issue during peak periods, hard time squeezing through, insufficient width between travel lanes prevents emergency vehicles from passing through. Is there anything we can do on either side of bridge? - Corridor speed, lack of bike lanes an issue for recreational users - Lack of clearly defined road space for each user causes conflict, stress, and confusion - Visitors, including winery tourists, typically take trips off peak when speeds are higher. Desire to look at off-peak issues in addition to peak hour conditions. - Right turn confusion at Rossi, where indicator may be on to signal right turn at US 101 SB Ramp instead, the vehicles exiting Rossi Road lack understanding of driver intent. - Tom: Permitted building supposed to go in near the Human Bean which could add traffic. Office/mixed-use permitting with underground parking. May be proposed as doctor's offices. There is a large amount of weekend traffic.
Project Goals & Multimodal Improvement Suggestions	<ul style="list-style-type: none"> - Roundtable Discussion - Fix 4-way stops at Vineyard & Bethel. People roll through the stops. No control. - John: More build-out on south side of the corridor and "patch work" on north. Will new development take care of sidewalk issues? - Randy: The state is considering mandating school transportation which may reduce traffic - Todd: Thoughts on turn restriction at Rossi? <ul style="list-style-type: none"> • Tom: I like it for the safety factor but, makes the commute for those who live on Vineyard or need to go left more difficult/time consuming. However, the small inconvenience is worth not risking a collision. 2 fatalities on Las Tablas due to people pulling out in front of vehicles • Randy & Michael: There would be an outrage from Trader Joes and the community - Randy: Traffic light at Bennett for controlled u-turn and right turn in – out at Rossi. - Michael: Are roundabouts being considered for this? <ul style="list-style-type: none"> • Josh: This area is a prime candidate for a roundabout whereas a signal can only do so much - Tom: Anything that could be done to the Rossi intersection would be beneficial - Michael: Will Caltrans allow a controlled intersection? - Todd: what would be the reaction to a roundabout? <ul style="list-style-type: none"> • Tom: I would like it. We just need to slow people down. People have difficulty navigating for EMS in a roundabout • Todd: There could be a solution at the interchange with a roundabout - Todd: Signaled crosswalk? Sidewalk on both sides? <ul style="list-style-type: none"> • Leslie: Dangerous to have a crosswalk across Vineyard at Old County Rd
Plan & Outcome	<ul style="list-style-type: none"> - Todd: What would Success look like for this Corridor Plan? - Near-term solutions that have funding or the potential to have funding - Randy: fixes at Rossi and Bethel will be expensive but are necessary. A cheap fix may make it worse. - Desire for short-term action, implementable projects with funding opportunities.
Close	<ul style="list-style-type: none"> - Thank you for the feedback, please get the word out

Attachments: Existing Conditions Summary and Farmer's Markey Outreach Summary Memorandum

This confirms and records GHD's interpretation of the discussions which occurred and our understanding reached during this meeting. Unless notified in writing within 7 days of the date issued, we will assume that this recorded interpretation or description is complete and accurate.

NOTE: If the information in this report does not agree with your record of this meeting or if there are any omissions, will you kindly advise us immediately, otherwise we shall assume its contents to be correct.

Distribution: All Present/Absent



Memorandum

November 16, 2022

To	Riley Gajdos, SLO County	From	Rosanna Southern, EIT
Copy to	Josh Roberts, San Luis Obispo County	Project No.	12570229
Project Name	SLO County Vineyard Drive Corridor Plan		
Subject	Existing Conditions Summary and Farmers Market Outreach Comment Summary		

Introduction

This memorandum has been prepared to present the project background and purpose, a brief summary of the existing conditions analysis to-date, and a summary of the comments received from the public at the workshop held at the Templeton Farmer’s Market.

Project Background & Purpose

Vineyard Drive between Highway 101 and Highway 46 has been the subject of multiple planning efforts over the years, including the Templeton Community Plan, Templeton Circulation Study, and County Bikeways Plan. The purpose of this effort is to consolidate prior efforts and identify a Corridor Alternatives and a Preferred Concept with comprehensive multimodal improvements that address the corridor’s long-standing issues, including safety, multimodal access and mobility, and peak-hour congestion. This exercise also allows for the opportunity of refining these planning policies and design efforts with further specificity and accuracy. The multimodal improvements must be feasible, equitable, cost-effective, and have community support. The Preferred Concept will serve to guide future Vineyard Corridor programming decisions over a 20-year timeframe based on available funding. The Vineyard Drive Corridor Plan will remain as a conceptual design tool to facilitate corridor improvements and financial investment estimates in preparation of capital project delivery or development frontage improvements. The County will serve as the Lead Agency, in cooperation with SLOCOG and Caltrans on implementation of this plan. The following Plan Goals and Objectives are drafted and will be refined based on TAC, TAAG, and community input:

Plan Goals & Objectives:

- Enhance corridor safety
- Enhance multimodal connectivity and access
- Reduce corridor congestion and improve travel reliability
- Identify potential funding mechanisms

Existing Conditions Summary

Below is a summary of the existing conditions analysis to-date (currently ongoing) including traffic operations, field observations, multi-modal infrastructure and facility analysis, and collision analysis.

- Traffic counts at 8 key intersections were collected 8/30 – 9/20, 2022 on Tuesdays and Thursdays.
- Queue observations via drone (11/1 - ongoing, delayed due to resurfacing and fog)
- Level of Service Analysis – Intersections beyond LOS D target:

- Old County Road, Bethel Road, and Vineyard Elem. School Driveway
- Field observations & Queues
 - Bike Lanes exist from Main St to Vineyard Elem. School; West end is “share the road” Class III; Between Bethel and Santa Rita – bike lanes
 - Class I separated trail and separate horse path on south side between Semillon and Bethel
 - Sidewalk on north side between Main St and US 101; only marked x-walk across Vineyard is at Main
 - Long queues during school peak at Bethel Road westbound during AM, and eastbound Main Street and Old County Road, queueing from High School traffic northbound at Main St
- Bicycle Level of Traffic Stress (LTS) Analysis (rating scale of 1-4 for segments, approaches, and crossings)
 - All roadway segments LTS 4, separate trail between Semillon Ln and Bethel Rd is LTS 1
 - Signalized intersection crossings and roundabout at LTS 1 (protected movements), all other crossings are at LTS 4
 - Westbound approach at US 101 Northbound Ramps at LTS 3 because bike lane is separate from right turn lane
- Collisions Analysis
 - 34 collisions over a 5-yr period (2017-2021); 1 severe injury, 2 other visible injury, 6 complaint of pain, and 25 property damage only; 2 bicycle collisions (both near Bennett Way)
 - Most collisions occurred between Main Street and Bennett Way
 - Most frequent collision types were rear-end, broadside, and hit-object

Farmer’s Market Outreach Summary

GHD and County staff held a pop-up workshop at the Templeton Farmer’s Market on Saturday, November 12, 2022. The purpose of the workshop was to introduce the project to the community and obtain feedback on current issues and concerns regarding multimodal transportation along the Vineyard Drive corridor between Main Street and SR 46. There were approximately 60 people that interacted with GHD and County staff to provide their input. Community members were also provided with background information, the link to the project website and project survey to continue to provide comments.

The following is a summary of comments received from the community. These comments will assist and guiding the Concept Alternatives and preferred plan.

- Most people use the corridor to either access the schools or SR 46
- Most common concern is traffic congestion during the peak hours, affects access on east end of Vineyard especially with school traffic
- Sidewalk at US 101 is on north side, but destinations like Trader Joe’s, etc. are on south side; no pedestrian crossings across Vineyard at interchange
- Discontinuous bike lanes on west end of Vineyard
- People driving either too fast or too slow (road conditions prior to recent repaving)
- Commenters opined that Vineyard Drive is okay apart from school traffic

The following QR code was provided at the workshop, which links to the project website, also listed below.



<https://lrsp.mysocialpinpoint.com/vdcp>

Appendix C

Synchro Outputs

HCM 6th Signalized Intersection Summary
1: Vineyard Dr & Main St

Existing Conditions
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	181	72	264	64	197	97	161	81	18	49	120	209
Future Volume (veh/h)	181	72	264	64	197	97	161	81	18	49	120	209
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	232	92	146	82	253	106	206	104	14	63	154	51
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	368	576	744	471	299	125	287	260	35	82	200	440
Arrive On Green	0.12	0.31	0.31	0.06	0.24	0.24	0.16	0.16	0.16	0.15	0.15	0.15
Sat Flow, veh/h	1781	1870	1585	1781	1252	524	1781	1614	217	535	1308	1585
Grp Volume(v), veh/h	232	92	146	82	0	359	206	0	118	217	0	51
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1776	1781	0	1831	1844	0	1585
Q Serve(g_s), s	6.7	2.6	3.9	2.5	0.0	14.0	8.0	0.0	4.2	8.2	0.0	1.7
Cycle Q Clear(g_c), s	6.7	2.6	3.9	2.5	0.0	14.0	8.0	0.0	4.2	8.2	0.0	1.7
Prop In Lane	1.00		1.00	1.00		0.30	1.00		0.12	0.29		1.00
Lane Grp Cap(c), veh/h	368	576	744	471	0	424	287	0	295	282	0	440
V/C Ratio(X)	0.63	0.16	0.20	0.17	0.00	0.85	0.72	0.00	0.40	0.77	0.00	0.12
Avail Cap(c_a), veh/h	760	695	845	814	0	587	687	0	706	635	0	743
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.0	18.3	11.3	18.9	0.0	26.4	28.9	0.0	27.3	29.5	0.0	19.6
Incr Delay (d2), s/veh	1.3	0.1	0.1	0.1	0.0	8.2	4.7	0.0	1.2	3.3	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	1.1	1.8	1.0	0.0	6.6	3.6	0.0	1.9	3.8	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.3	18.4	11.4	19.0	0.0	34.5	33.6	0.0	28.5	32.8	0.0	19.7
LnGrp LOS	B	B	B	B	A	C	C	A	C	C	A	B
Approach Vol, veh/h		470			441			324			268	
Approach Delay, s/veh		16.7			31.6			31.8			30.3	
Approach LOS		B			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.6	28.7		17.3	14.7	23.7		17.0				
Change Period (Y+Rc), s	5.6	6.3		5.6	5.6	6.3		5.9				
Max Green Setting (Gmax), s	18.0	27.0		28.0	25.0	24.0		25.0				
Max Q Clear Time (g_c+I1), s	4.5	5.9		10.0	8.7	16.0		10.2				
Green Ext Time (p_c), s	0.1	0.9		1.8	0.4	1.3		1.0				
Intersection Summary												
HCM 6th Ctrl Delay				26.8								
HCM 6th LOS				C								

Intersection						
Int Delay, s/veh	6.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙	↑	↘		↙	↘
Traffic Vol, veh/h	245	502	481	86	15	236
Future Vol, veh/h	245	502	481	86	15	236
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	75
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	299	612	587	105	18	288

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	692	0	-	0	1850 640
Stage 1	-	-	-	-	640 -
Stage 2	-	-	-	-	1210 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	903	-	-	-	82 475
Stage 1	-	-	-	-	525 -
Stage 2	-	-	-	-	282 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	903	-	-	-	55 475
Mov Cap-2 Maneuver	-	-	-	-	55 -
Stage 1	-	-	-	-	351 -
Stage 2	-	-	-	-	282 -

Approach	EB	WB	SB
HCM Control Delay, s	3.6	0	28.2
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	903	-	-	-	55	475
HCM Lane V/C Ratio	0.331	-	-	-	0.333	0.606
HCM Control Delay (s)	10.9	-	-	-	100.1	23.6
HCM Lane LOS	B	-	-	-	F	C
HCM 95th %tile Q(veh)	1.5	-	-	-	1.2	3.9

HCM 6th Signalized Intersection Summary
 3: US 101 NB Off Ramp/US 101 NB On Ramp & Vineyard Dr

Existing Conditions
 AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	112	494	0	0	566	151	167	0	253	0	0	0
Future Volume (veh/h)	112	494	0	0	566	151	167	0	253	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	133	588	0	0	674	94	199	0	47			
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	552	1368	0	0	657	557	247	0	220			
Arrive On Green	0.62	1.00	0.00	0.00	0.35	0.35	0.14	0.00	0.14			
Sat Flow, veh/h	1781	1870	0	0	1870	1585	1781	0	1585			
Grp Volume(v), veh/h	133	588	0	0	674	94	199	0	47			
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1585	1781	0	1585			
Q Serve(g_s), s	2.3	0.0	0.0	0.0	24.6	2.9	7.6	0.0	1.8			
Cycle Q Clear(g_c), s	2.3	0.0	0.0	0.0	24.6	2.9	7.6	0.0	1.8			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	552	1368	0	0	657	557	247	0	220			
V/C Ratio(X)	0.24	0.43	0.00	0.00	1.03	0.17	0.80	0.00	0.21			
Avail Cap(c_a), veh/h	552	1368	0	0	657	557	382	0	340			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.73	0.73	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	9.6	0.0	0.0	0.0	22.7	15.7	29.2	0.0	26.7			
Incr Delay (d2), s/veh	0.1	0.7	0.0	0.0	41.7	0.7	3.4	0.0	0.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.8	0.3	0.0	0.0	17.5	1.1	3.3	0.0	0.7			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.7	0.7	0.0	0.0	64.4	16.3	32.7	0.0	26.9			
LnGrp LOS	A	A	A	A	F	B	C	A	C			
Approach Vol, veh/h		721			768			246				
Approach Delay, s/veh		2.4			58.5			31.6				
Approach LOS		A			E			C				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		56.1			26.6	29.5		13.9				
Change Period (Y+Rc), s		4.9			4.9	* 4.9		4.2				
Max Green Setting (Gmax), s		45.9			13.4	* 25		15.0				
Max Q Clear Time (g_c+I1), s		2.0			4.3	26.6		9.6				
Green Ext Time (p_c), s		2.0			0.1	0.0		0.2				
Intersection Summary												
HCM 6th Ctrl Delay					31.4							
HCM 6th LOS					C							
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary
 4: US 101 SB Ramps/Driveway & Vineyard Dr

Existing Conditions
 AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	414	181	303	428	2	121	0	192	0	0	1
Future Volume (veh/h)	0	414	181	303	428	2	121	0	192	0	0	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	493	75	361	510	2	144	0	52	0	0	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	3	347	294	903	1420	6	191	0	170	0	3	2
Arrive On Green	0.00	0.19	0.19	1.00	1.00	1.00	0.11	0.00	0.11	0.00	0.00	0.00
Sat Flow, veh/h	1781	1870	1585	1781	1862	7	1781	0	1585	0	1870	1585
Grp Volume(v), veh/h	0	493	75	361	0	512	144	0	52	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1869	1781	0	1585	0	1870	1585
Q Serve(g_s), s	0.0	13.0	2.8	0.0	0.0	0.0	5.5	0.0	2.1	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	13.0	2.8	0.0	0.0	0.0	5.5	0.0	2.1	0.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	3	347	294	903	0	1425	191	0	170	0	3	2
V/C Ratio(X)	0.00	1.42	0.25	0.40	0.00	0.36	0.75	0.00	0.31	0.00	0.00	0.00
Avail Cap(c_a), veh/h	127	347	294	903	0	1425	280	0	249	0	134	113
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.67	0.00	0.67	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	28.5	24.4	0.0	0.0	0.0	30.3	0.0	28.8	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	204.8	2.1	0.1	0.0	0.5	3.0	0.0	0.4	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	25.3	1.2	0.0	0.0	0.2	2.4	0.0	0.8	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	233.3	26.4	0.1	0.0	0.5	33.3	0.0	29.2	0.0	0.0	0.0
LnGrp LOS	A	F	C	A	A	A	C	A	C	A	A	A
Approach Vol, veh/h		568			873			196				0
Approach Delay, s/veh		206.0			0.3			32.2				0.0
Approach LOS		F			A			C				
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	40.4	17.9		0.0	0.0	58.3		11.7				
Change Period (Y+Rc), s	4.9	* 4.9		4.0	3.5	4.9		4.2				
Max Green Setting (Gmax), s	20.0	* 13		5.0	5.0	32.4		11.0				
Max Q Clear Time (g_c+1), s	12.0	15.0		0.0	0.0	2.0		7.5				
Green Ext Time (p_c), s	0.8	0.0		0.0	0.0	2.9		0.2				

Intersection Summary

HCM 6th Ctrl Delay	75.5
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	2.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔	↑	↔	↔
Traffic Vol, veh/h	531	26	90	460	21	64
Future Vol, veh/h	531	26	90	460	21	64
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	120	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	648	32	110	561	26	78

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	680	0	1445 664
Stage 1	-	-	-	-	664 -
Stage 2	-	-	-	-	781 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	912	-	145 461
Stage 1	-	-	-	-	512 -
Stage 2	-	-	-	-	451 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	912	-	127 461
Mov Cap-2 Maneuver	-	-	-	-	127 -
Stage 1	-	-	-	-	512 -
Stage 2	-	-	-	-	396 -

Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	20.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	127	461	-	-	912	-
HCM Lane V/C Ratio	0.202	0.169	-	-	0.12	-
HCM Control Delay (s)	40.4	14.4	-	-	9.5	-
HCM Lane LOS	E	B	-	-	A	-
HCM 95th %tile Q(veh)	0.7	0.6	-	-	0.4	-

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↖	↗		↖	↗
Traffic Vol, veh/h	1	517	5	20	445	16	11	0	34	6	0	1
Future Vol, veh/h	1	517	5	20	445	16	11	0	34	6	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	260	-	-	100	-	-	-	-	110	-	-	110
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	77	77	77	77	77	77	77	77	77
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	671	6	26	578	21	14	0	44	8	0	1

Major/Minor	Major1		Major2		Minor1			Minor2				
Conflicting Flow All	599	0	0	677	0	0	1317	1327	674	1339	1320	589
Stage 1	-	-	-	-	-	-	676	676	-	641	641	-
Stage 2	-	-	-	-	-	-	641	651	-	698	679	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	978	-	-	915	-	-	134	155	455	130	157	508
Stage 1	-	-	-	-	-	-	443	453	-	463	469	-
Stage 2	-	-	-	-	-	-	463	465	-	431	451	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	978	-	-	915	-	-	131	151	455	115	152	508
Mov Cap-2 Maneuver	-	-	-	-	-	-	131	151	-	115	152	-
Stage 1	-	-	-	-	-	-	443	453	-	463	456	-
Stage 2	-	-	-	-	-	-	449	452	-	389	451	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	0		0.4		19.2		34.8	
HCM LOS					C		D	

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	131	455	978	-	-	915	-	-	115	508
HCM Lane V/C Ratio	0.109	0.097	0.001	-	-	0.028	-	-	0.068	0.003
HCM Control Delay (s)	35.8	13.8	8.7	-	-	9	-	-	38.6	12.1
HCM Lane LOS	E	B	A	-	-	A	-	-	E	B
HCM 95th %tile Q(veh)	0.4	0.3	0	-	-	0.1	-	-	0.2	0

Intersection	
Intersection Delay, s/veh	50.8
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Traffic Vol, veh/h	93	283	1	36	254	26	11	34	118	50	6	115
Future Vol, veh/h	93	283	1	36	254	26	11	34	118	50	6	115
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	135	410	1	52	368	38	16	49	171	72	9	167
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	85.2	45.5	19.1	14.9
HCM LOS	F	E	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	7%	25%	11%	89%	0%
Vol Thru, %	21%	75%	80%	11%	0%
Vol Right, %	72%	0%	8%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	163	377	316	56	115
LT Vol	11	93	36	50	0
Through Vol	34	283	254	6	0
RT Vol	118	1	26	0	115
Lane Flow Rate	236	546	458	81	167
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.506	1.066	0.893	0.201	0.359
Departure Headway (Hd)	8.076	7.025	7.29	9.28	8.088
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	449	514	499	389	448
Service Time	6.076	5.104	5.29	6.98	5.788
HCM Lane V/C Ratio	0.526	1.062	0.918	0.208	0.373
HCM Control Delay	19.1	85.2	45.5	14.3	15.2
HCM Lane LOS	C	F	E	B	C
HCM 95th-tile Q	2.8	16.5	10	0.7	1.6

Intersection						
Int Delay, s/veh	20					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Vol, veh/h	83	31	320	106	21	301
Future Vol, veh/h	83	31	320	106	21	301
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	300	330	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	60	60	60	60
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	138	52	533	177	35	502

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	190	0	1381
Stage 1	-	-	-	-	138
Stage 2	-	-	-	-	1243
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1384	-	159
Stage 1	-	-	-	-	889
Stage 2	-	-	-	-	272
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1384	-	98
Mov Cap-2 Maneuver	-	-	-	-	98
Stage 1	-	-	-	-	889
Stage 2	-	-	-	-	167

Approach	EB	WB	NB
HCM Control Delay, s	0	6.9	44.4
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	591	-	-	1384	-
HCM Lane V/C Ratio	0.908	-	-	0.385	-
HCM Control Delay (s)	44.4	-	-	9.2	-
HCM Lane LOS	E	-	-	A	-
HCM 95th %tile Q(veh)	11.2	-	-	1.8	-

HCM 6th Signalized Intersection Summary
1: Vineyard Dr & Main St

Existing Conditions
School Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	225	124	90	10	117	70	136	66	22	97	54	198
Future Volume (veh/h)	225	124	90	10	117	70	136	66	22	97	54	198
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	256	141	-68	11	133	64	155	75	17	110	61	33
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	457	562	692	365	198	95	242	201	46	187	104	490
Arrive On Green	0.15	0.30	0.00	0.01	0.17	0.17	0.14	0.14	0.14	0.16	0.16	0.16
Sat Flow, veh/h	1781	1870	1585	1781	1193	574	1781	1476	334	1166	646	1585
Grp Volume(v), veh/h	256	141	-68	11	0	197	155	0	92	171	0	33
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1767	1781	0	1810	1812	0	1585
Q Serve(g_s), s	6.6	3.4	0.0	0.3	0.0	6.3	5.0	0.0	2.8	5.3	0.0	0.9
Cycle Q Clear(g_c), s	6.6	3.4	0.0	0.3	0.0	6.3	5.0	0.0	2.8	5.3	0.0	0.9
Prop In Lane	1.00		1.00	1.00		0.32	1.00		0.18	0.64		1.00
Lane Grp Cap(c), veh/h	457	562	692	365	0	293	242	0	246	291	0	490
V/C Ratio(X)	0.56	0.25	-0.10	0.03	0.00	0.67	0.64	0.00	0.37	0.59	0.00	0.07
Avail Cap(c_a), veh/h	932	839	926	873	0	704	828	0	842	752	0	894
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.7	15.9	0.0	20.4	0.0	23.6	24.6	0.0	23.7	23.4	0.0	14.7
Incr Delay (d2), s/veh	0.8	0.2	0.0	0.0	0.0	2.7	4.0	0.0	1.3	1.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	1.4	0.0	0.1	0.0	2.7	2.2	0.0	1.2	2.2	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.5	16.2	0.0	20.4	0.0	26.2	28.6	0.0	25.0	24.8	0.0	14.7
LnGrp LOS	B	B	A	C	A	C	C	A	C	C	A	B
Approach Vol, veh/h		329			208			247			204	
Approach Delay, s/veh		19.7			25.9			27.2			23.2	
Approach LOS		B			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.4	24.4		13.8	14.5	16.3		15.6				
Change Period (Y+Rc), s	5.6	6.3		5.6	5.6	6.3		5.9				
Max Green Setting (Gmax), s	18.0	27.0		28.0	25.0	24.0		25.0				
Max Q Clear Time (g_c+I1), s	2.3	5.4		7.0	8.6	8.3		7.3				
Green Ext Time (p_c), s	0.0	0.7		1.4	0.5	0.9		0.8				
Intersection Summary												
HCM 6th Ctrl Delay				23.6								
HCM 6th LOS				C								

Intersection						
Int Delay, s/veh	4.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙	↑	↘		↙	↘
Traffic Vol, veh/h	125	412	418	33	27	196
Future Vol, veh/h	125	412	418	33	27	196
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	75
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	144	474	480	38	31	225

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	518	0	-	0	1261 499
Stage 1	-	-	-	-	499 -
Stage 2	-	-	-	-	762 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1048	-	-	-	188 572
Stage 1	-	-	-	-	610 -
Stage 2	-	-	-	-	461 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1048	-	-	-	162 572
Mov Cap-2 Maneuver	-	-	-	-	162 -
Stage 1	-	-	-	-	526 -
Stage 2	-	-	-	-	461 -

Approach	EB	WB	SB
HCM Control Delay, s	2.1	0	17.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1048	-	-	-	162	572
HCM Lane V/C Ratio	0.137	-	-	-	0.192	0.394
HCM Control Delay (s)	9	-	-	-	32.4	15.3
HCM Lane LOS	A	-	-	-	D	C
HCM 95th %tile Q(veh)	0.5	-	-	-	0.7	1.9

HCM 6th Signalized Intersection Summary
 3: US 101 NB Off Ramp/US 101 NB On Ramp & Vineyard Dr

Existing Conditions
 School Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	139	323	0	0	485	129	184	3	214	0	0	0
Future Volume (veh/h)	139	323	0	0	485	129	184	3	214	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	156	363	0	0	545	64	207	3	1			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	603	1359	0	0	595	504	252	4	227			
Arrive On Green	0.68	1.00	0.00	0.00	0.32	0.32	0.14	0.14	0.14			
Sat Flow, veh/h	1781	1870	0	0	1870	1585	1757	25	1585			
Grp Volume(v), veh/h	156	363	0	0	545	64	210	0	1			
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1585	1783	0	1585			
Q Serve(g_s), s	2.4	0.0	0.0	0.0	19.6	2.0	8.0	0.0	0.0			
Cycle Q Clear(g_c), s	2.4	0.0	0.0	0.0	19.6	2.0	8.0	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	0.99		1.00			
Lane Grp Cap(c), veh/h	603	1359	0	0	595	504	256	0	227			
V/C Ratio(X)	0.26	0.27	0.00	0.00	0.92	0.13	0.82	0.00	0.00			
Avail Cap(c_a), veh/h	603	1359	0	0	657	557	382	0	340			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.86	0.86	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	7.9	0.0	0.0	0.0	23.0	17.0	29.1	0.0	25.7			
Incr Delay (d2), s/veh	0.1	0.4	0.0	0.0	21.1	0.5	5.2	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.8	0.2	0.0	0.0	11.5	0.8	3.6	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.9	0.4	0.0	0.0	44.1	17.5	34.3	0.0	25.7			
LnGrp LOS	A	A	A	A	D	B	C	A	C			
Approach Vol, veh/h		519			609			211				
Approach Delay, s/veh		2.7			41.3			34.3				
Approach LOS		A			D			C				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		55.8			28.6	27.2		14.2				
Change Period (Y+Rc), s		4.9			4.9	* 4.9		4.2				
Max Green Setting (Gmax), s		45.9			13.4	* 25		15.0				
Max Q Clear Time (g_c+I1), s		2.0			4.4	21.6		10.0				
Green Ext Time (p_c), s		1.1			0.1	0.7		0.2				
Intersection Summary												
HCM 6th Ctrl Delay					25.2							
HCM 6th LOS					C							
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary
 4: US 101 SB Ramps/Driveway & Vineyard Dr

Existing Conditions
 School Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	369	222	252	416	1	162	0	92	1	0	0
Future Volume (veh/h)	0	369	222	252	416	1	162	0	92	1	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	419	118	286	473	1	184	0	-64	1	0	-1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	3	347	294	781	1295	3	212	0	189	3	0	2
Arrive On Green	0.00	0.19	0.19	0.88	1.00	1.00	0.12	0.00	0.00	0.00	0.00	0.00
Sat Flow, veh/h	1781	1870	1585	1781	1866	4	1781	0	1585	1781	0	1585
Grp Volume(v), veh/h	0	419	118	286	0	474	184	0	-64	1	0	-1
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1870	1781	0	1585	1781	0	1585
Q Serve(g_s), s	0.0	13.0	4.6	2.0	0.0	0.0	7.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	13.0	4.6	2.0	0.0	0.0	7.1	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	3	347	294	781	0	1297	212	0	189	3	0	2
V/C Ratio(X)	0.00	1.21	0.40	0.37	0.00	0.37	0.87	0.00	-0.34	0.39	0.00	-0.44
Avail Cap(c_a), veh/h	127	347	294	781	0	1297	280	0	249	127	0	113
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.80	0.00	0.80	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	28.5	25.1	2.6	0.0	0.0	30.3	0.0	0.0	35.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	116.9	4.0	0.2	0.0	0.6	16.3	0.0	0.0	60.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	16.8	2.0	0.6	0.0	0.2	3.9	0.0	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	145.4	29.1	2.7	0.0	0.6	46.6	0.0	0.0	95.1	0.0	0.0
LnGrp LOS	A	F	C	A	A	A	D	A	A	F	A	A
Approach Vol, veh/h		537			760			120				0
Approach Delay, s/veh		119.8			1.4			71.4				0.0
Approach LOS		F			A			E				
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	35.6	17.9		4.0	0.0	53.5		12.5				
Change Period (Y+Rc), s	4.9	* 4.9		4.0	3.5	4.9		4.2				
Max Green Setting (Gmax), s	20.0	* 13		5.0	5.0	32.4		11.0				
Max Q Clear Time (g_c+14), s	14.0	15.0		2.0	0.0	2.0		9.1				
Green Ext Time (p_c), s	0.5	0.0		0.0	0.0	2.6		0.1				

Intersection Summary

HCM 6th Ctrl Delay	52.2
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔	↑	↔	↔
Traffic Vol, veh/h	417	50	194	384	35	174
Future Vol, veh/h	417	50	194	384	35	174
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	120	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	491	59	228	452	41	205

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	550	0	1429 521
Stage 1	-	-	-	-	521 -
Stage 2	-	-	-	-	908 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1020	-	149 555
Stage 1	-	-	-	-	596 -
Stage 2	-	-	-	-	393 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1020	-	116 555
Mov Cap-2 Maneuver	-	-	-	-	116 -
Stage 1	-	-	-	-	596 -
Stage 2	-	-	-	-	305 -

Approach	EB	WB	NB
HCM Control Delay, s	0	3.2	21.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	116	555	-	-	1020	-
HCM Lane V/C Ratio	0.355	0.369	-	-	0.224	-
HCM Control Delay (s)	52.2	15.2	-	-	9.5	-
HCM Lane LOS	F	C	-	-	A	-
HCM 95th %tile Q(veh)	1.4	1.7	-	-	0.9	-

Intersection												
Int Delay, s/veh	1.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↖	↗		↖	↗
Traffic Vol, veh/h	1	426	9	46	366	7	7	1	36	5	1	1
Future Vol, veh/h	1	426	9	46	366	7	7	1	36	5	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	260	-	-	100	-	-	-	-	110	-	-	110
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	79	79	79	79	79	79	79	79	79
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	539	11	58	463	9	9	1	46	6	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	472	0	0	550	0	0	1132	1135	545	1154	1136	468
Stage 1	-	-	-	-	-	-	547	547	-	584	584	-
Stage 2	-	-	-	-	-	-	585	588	-	570	552	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1090	-	-	1020	-	-	180	202	538	174	202	595
Stage 1	-	-	-	-	-	-	521	517	-	498	498	-
Stage 2	-	-	-	-	-	-	497	496	-	506	515	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1090	-	-	1020	-	-	171	190	538	152	190	595
Mov Cap-2 Maneuver	-	-	-	-	-	-	171	190	-	152	190	-
Stage 1	-	-	-	-	-	-	520	516	-	498	470	-
Stage 2	-	-	-	-	-	-	466	468	-	462	514	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1	15	26.5
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	173	538	1090	-	-	1020	-	-	157	595
HCM Lane V/C Ratio	0.059	0.085	0.001	-	-	0.057	-	-	0.048	0.002
HCM Control Delay (s)	27.1	12.3	8.3	-	-	8.7	-	-	29.1	11.1
HCM Lane LOS	D	B	A	-	-	A	-	-	D	B
HCM 95th %tile Q(veh)	0.2	0.3	0	-	-	0.2	-	-	0.2	0

Intersection	
Intersection Delay, s/veh	16.8
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Traffic Vol, veh/h	59	211	4	61	196	57	3	11	131	46	14	61
Future Vol, veh/h	59	211	4	61	196	57	3	11	131	46	14	61
Peak Hour Factor	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	80	285	5	82	265	77	4	15	177	62	19	82
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	17.9	20	12.4	11.2
HCM LOS	C	C	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	2%	22%	19%	77%	0%
Vol Thru, %	8%	77%	62%	23%	0%
Vol Right, %	90%	1%	18%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	145	274	314	60	61
LT Vol	3	59	61	46	0
Through Vol	11	211	196	14	0
RT Vol	131	4	57	0	61
Lane Flow Rate	196	370	424	81	82
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.338	0.611	0.678	0.172	0.15
Departure Headway (Hd)	6.215	5.94	5.755	7.65	6.539
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	578	611	632	469	547
Service Time	4.27	3.957	3.769	5.407	4.295
HCM Lane V/C Ratio	0.339	0.606	0.671	0.173	0.15
HCM Control Delay	12.4	17.9	20	12	10.5
HCM Lane LOS	B	C	C	B	B
HCM 95th-tile Q	1.5	4.1	5.2	0.6	0.5

Intersection						
Int Delay, s/veh	5.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↘	↙
Traffic Vol, veh/h	115	10	80	82	12	131
Future Vol, veh/h	115	10	80	82	12	131
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	300	330	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	54	54	54	54	54	54
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	213	19	148	152	22	243

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	232	0	661	213
Stage 1	-	-	-	-	213	-
Stage 2	-	-	-	-	448	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1336	-	427	827
Stage 1	-	-	-	-	823	-
Stage 2	-	-	-	-	644	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1336	-	380	827
Mov Cap-2 Maneuver	-	-	-	-	380	-
Stage 1	-	-	-	-	823	-
Stage 2	-	-	-	-	573	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4	12.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	753	-	-	1336	-
HCM Lane V/C Ratio	0.352	-	-	0.111	-
HCM Control Delay (s)	12.4	-	-	8	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	1.6	-	-	0.4	-

HCM 6th Signalized Intersection Summary
1: Vineyard Dr & Main St

Existing Conditions
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	192	135	56	5	83	48	60	11	6	113	20	168
Future Volume (veh/h)	192	135	56	5	83	48	60	11	6	113	20	168
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	221	155	-108	6	95	39	69	13	-1	130	23	-1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	513	574	630	396	231	95	162	170	0	252	45	470
Arrive On Green	0.13	0.31	0.00	0.01	0.18	0.18	0.09	0.09	0.00	0.17	0.17	0.00
Sat Flow, veh/h	1781	1870	1585	1781	1260	517	1781	1870	0	1524	270	1585
Grp Volume(v), veh/h	221	155	-108	6	0	134	69	12	0	153	0	-1
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1777	1781	1870	0	1794	0	1585
Q Serve(g_s), s	5.0	3.4	0.0	0.1	0.0	3.6	2.0	0.3	0.0	4.2	0.0	0.0
Cycle Q Clear(g_c), s	5.0	3.4	0.0	0.1	0.0	3.6	2.0	0.3	0.0	4.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.29	1.00		0.00	0.85		1.00
Lane Grp Cap(c), veh/h	513	574	630	396	0	326	162	170	0	296	0	470
V/C Ratio(X)	0.43	0.27	-0.17	0.02	0.00	0.41	0.43	0.07	0.00	0.52	0.00	0.00
Avail Cap(c_a), veh/h	1096	927	929	970	0	783	915	961	0	823	0	935
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	13.4	14.3	0.0	17.9	0.0	19.7	23.4	22.7	0.0	20.8	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.3	0.0	0.0	0.0	0.8	2.5	0.2	0.0	1.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	1.3	0.0	0.1	0.0	1.4	0.9	0.1	0.0	1.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.9	14.5	0.0	17.9	0.0	20.5	26.0	22.9	0.0	21.8	0.0	0.0
LnGrp LOS	B	B	A	B	A	C	C	C	A	C	A	A
Approach Vol, veh/h		268			140			81			152	
Approach Delay, s/veh		19.8			20.4			25.5			21.9	
Approach LOS		B			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.0	23.0		10.5	12.8	16.3		14.9				
Change Period (Y+Rc), s	5.6	6.3		5.6	5.6	6.3		5.9				
Max Green Setting (Gmax), s	18.0	27.0		28.0	25.0	24.0		25.0				
Max Q Clear Time (g_c+I1), s	2.1	5.4		4.0	7.0	5.6		6.2				
Green Ext Time (p_c), s	0.0	0.8		0.3	0.4	0.6		0.6				
Intersection Summary												
HCM 6th Ctrl Delay				21.2								
HCM 6th LOS				C								

Intersection						
Int Delay, s/veh	2.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙	↑	↘		↙	↘
Traffic Vol, veh/h	89	362	290	21	21	81
Future Vol, veh/h	89	362	290	21	21	81
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	75
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	96	389	312	23	23	87

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	335	0	-	0	905 324
Stage 1	-	-	-	-	324 -
Stage 2	-	-	-	-	581 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1224	-	-	-	307 717
Stage 1	-	-	-	-	733 -
Stage 2	-	-	-	-	559 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1224	-	-	-	283 717
Mov Cap-2 Maneuver	-	-	-	-	283 -
Stage 1	-	-	-	-	676 -
Stage 2	-	-	-	-	559 -

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	12.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1224	-	-	-	283	717
HCM Lane V/C Ratio	0.078	-	-	-	0.08	0.121
HCM Control Delay (s)	8.2	-	-	-	18.8	10.7
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.3	0.4

HCM 6th Signalized Intersection Summary
 3: US 101 NB Off Ramp/US 101 NB On Ramp & Vineyard Dr

Existing Conditions
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	131	222	0	0	313	58	279	0	229	0	0	0
Future Volume (veh/h)	131	222	0	0	313	58	279	0	229	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	142	241	0	0	340	-15	303	0	17			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	697	1263	0	0	400	339	347	0	309			
Arrive On Green	0.78	1.00	0.00	0.00	0.21	0.00	0.19	0.00	0.19			
Sat Flow, veh/h	1781	1870	0	0	1870	1585	1781	0	1585			
Grp Volume(v), veh/h	142	241	0	0	340	-15	303	0	17			
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1585	1781	0	1585			
Q Serve(g_s), s	1.4	0.0	0.0	0.0	12.2	0.0	11.6	0.0	0.6			
Cycle Q Clear(g_c), s	1.4	0.0	0.0	0.0	12.2	0.0	11.6	0.0	0.6			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	697	1263	0	0	400	339	347	0	309			
V/C Ratio(X)	0.20	0.19	0.00	0.00	0.85	-0.04	0.87	0.00	0.06			
Avail Cap(c_a), veh/h	697	1263	0	0	657	557	382	0	340			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.96	0.96	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	4.8	0.0	0.0	0.0	26.4	0.0	27.3	0.0	22.9			
Incr Delay (d2), s/veh	0.1	0.3	0.0	0.0	19.7	0.0	17.0	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.5	0.1	0.0	0.0	7.3	0.0	6.3	0.0	0.2			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.8	0.3	0.0	0.0	46.1	0.0	44.3	0.0	23.0			
LnGrp LOS	A	A	A	A	D	A	D	A	C			
Approach Vol, veh/h		383			325			320				
Approach Delay, s/veh		2.0			48.3			43.2				
Approach LOS		A			D			D				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		52.2			32.3	19.9		17.8				
Change Period (Y+Rc), s		4.9			4.9	* 4.9		4.2				
Max Green Setting (Gmax), s		45.9			13.4	* 25		15.0				
Max Q Clear Time (g_c+I1), s		2.0			3.4	14.2		13.6				
Green Ext Time (p_c), s		0.7			0.1	0.8		0.1				
Intersection Summary												
HCM 6th Ctrl Delay					29.4							
HCM 6th LOS					C							
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary
 4: US 101 SB Ramps/Driveway & Vineyard Dr

Existing Conditions
 PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	282	239	175	417	0	166	0	71	0	1	0
Future Volume (veh/h)	1	282	239	175	417	0	166	0	71	0	1	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1	297	128	184	439	0	175	0	-82	0	1	-1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	127	343	291	807	1094	0	190	0	169	0	3	2
Arrive On Green	0.07	0.18	0.18	0.91	1.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00
Sat Flow, veh/h	1781	1870	1585	1781	1870	0	1781	0	1585	0	1870	1585
Grp Volume(v), veh/h	1	297	128	184	439	0	175	0	-82	0	1	-1
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	0	1781	0	1585	0	1870	1585
Q Serve(g_s), s	0.0	10.8	5.0	0.9	0.0	0.0	6.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	10.8	5.0	0.9	0.0	0.0	6.8	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	127	343	291	807	1094	0	190	0	169	0	3	2
V/C Ratio(X)	0.01	0.87	0.44	0.23	0.40	0.00	0.92	0.00	-0.48	0.00	0.37	-0.44
Avail Cap(c_a), veh/h	127	347	294	807	1094	0	280	0	249	0	134	113
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.92	0.92	0.00	1.00	0.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	30.2	27.7	25.4	1.8	0.0	0.0	31.0	0.0	0.0	0.0	35.0	0.0
Incr Delay (d2), s/veh	0.0	24.2	4.8	0.1	1.0	0.0	21.3	0.0	0.0	0.0	54.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	6.9	2.2	0.3	0.3	0.0	3.9	0.0	0.0	0.0	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.2	51.9	30.2	1.9	1.0	0.0	52.3	0.0	0.0	0.0	89.1	0.0
LnGrp LOS	C	D	C	A	A	A	D	A	A	A	F	A
Approach Vol, veh/h		426			623			93				0
Approach Delay, s/veh		45.4			1.3			98.4				0.0
Approach LOS		D			A			F				
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	36.6	17.7		4.0	8.5	45.8		11.7				
Change Period (Y+Rc), s	4.9	* 4.9		4.0	3.5	4.9		4.2				
Max Green Setting (Gmax), s	20.0	* 13		5.0	5.0	32.4		11.0				
Max Q Clear Time (g_c+1), s	12.9	12.8		2.0	2.0	2.0		8.8				
Green Ext Time (p_c), s	0.3	0.0		0.0	0.0	2.4		0.1				

Intersection Summary

HCM 6th Ctrl Delay	25.6
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	5.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶		↷	↶	↷	↷
Traffic Vol, veh/h	316	27	229	354	45	206
Future Vol, veh/h	316	27	229	354	45	206
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	120	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	326	28	236	365	46	212

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	354	0	1177 340
Stage 1	-	-	-	-	340 -
Stage 2	-	-	-	-	837 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1205	-	211 702
Stage 1	-	-	-	-	721 -
Stage 2	-	-	-	-	425 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1205	-	170 702
Mov Cap-2 Maneuver	-	-	-	-	170 -
Stage 1	-	-	-	-	721 -
Stage 2	-	-	-	-	342 -

Approach	EB	WB	NB
HCM Control Delay, s	0	3.4	16.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	170	702	-	-	1205	-
HCM Lane V/C Ratio	0.273	0.303	-	-	0.196	-
HCM Control Delay (s)	33.9	12.3	-	-	8.7	-
HCM Lane LOS	D	B	-	-	A	-
HCM 95th %tile Q(veh)	1.1	1.3	-	-	0.7	-

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↖	↗		↖	↗
Traffic Vol, veh/h	2	309	4	48	343	8	5	0	32	2	0	1
Future Vol, veh/h	2	309	4	48	343	8	5	0	32	2	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	260	-	-	100	-	-	-	-	110	-	-	110
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	329	4	51	365	9	5	0	34	2	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	374	0	0	333	0	0	807	811	331	824	809	370
Stage 1	-	-	-	-	-	-	335	335	-	472	472	-
Stage 2	-	-	-	-	-	-	472	476	-	352	337	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1184	-	-	1226	-	-	300	313	711	292	314	676
Stage 1	-	-	-	-	-	-	679	643	-	573	559	-
Stage 2	-	-	-	-	-	-	573	557	-	665	641	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1184	-	-	1226	-	-	290	299	711	269	300	676
Mov Cap-2 Maneuver	-	-	-	-	-	-	290	299	-	269	300	-
Stage 1	-	-	-	-	-	-	678	642	-	572	536	-
Stage 2	-	-	-	-	-	-	548	534	-	632	640	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1	11.3	15.8
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	290	711	1184	-	-	1226	-	-	269	676
HCM Lane V/C Ratio	0.018	0.048	0.002	-	-	0.042	-	-	0.008	0.002
HCM Control Delay (s)	17.6	10.3	8	-	-	8.1	-	-	18.5	10.3
HCM Lane LOS	C	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	0.2	0	-	-	0.1	-	-	0	0

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Traffic Vol, veh/h	23	159	5	51	143	53	2	5	45	44	15	31
Future Vol, veh/h	23	159	5	51	143	53	2	5	45	44	15	31
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	192	6	61	172	64	2	6	54	53	18	37
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	9.8	10.4	8.4	9.2
HCM LOS	A	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	4%	12%	21%	75%	0%
Vol Thru, %	10%	85%	58%	25%	0%
Vol Right, %	87%	3%	21%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	52	187	247	59	31
LT Vol	2	23	51	44	0
Through Vol	5	159	143	15	0
RT Vol	45	5	53	0	31
Lane Flow Rate	63	225	298	71	37
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.085	0.296	0.377	0.122	0.053
Departure Headway (Hd)	4.895	4.732	4.562	6.177	5.092
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	725	755	786	577	698
Service Time	2.974	2.787	2.612	3.95	2.864
HCM Lane V/C Ratio	0.087	0.298	0.379	0.123	0.053
HCM Control Delay	8.4	9.8	10.4	9.8	8.2
HCM Lane LOS	A	A	B	A	A
HCM 95th-tile Q	0.3	1.2	1.8	0.4	0.2

HCM 6th Signalized Intersection Summary
1: Vineyard Dr & Main St

Cumulative Conditions - No Build
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	230	95	325	75	255	115	195	95	20	60	145	275
Future Volume (veh/h)	230	95	325	75	255	115	195	95	20	60	145	275
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	280	116	213	91	311	123	238	116	15	73	177	129
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	347	646	819	453	335	133	305	278	36	90	217	479
Arrive On Green	0.14	0.35	0.35	0.05	0.26	0.26	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	1781	1870	1585	1781	1275	504	1781	1623	210	538	1305	1585
Grp Volume(v), veh/h	280	116	213	91	0	434	238	0	131	250	0	129
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1780	1781	0	1833	1843	0	1585
Q Serve(g_s), s	9.6	3.8	6.7	3.3	0.0	21.1	11.4	0.0	5.7	11.6	0.0	5.5
Cycle Q Clear(g_c), s	9.6	3.8	6.7	3.3	0.0	21.1	11.4	0.0	5.7	11.6	0.0	5.5
Prop In Lane	1.00		1.00	1.00		0.28	1.00		0.11	0.29		1.00
Lane Grp Cap(c), veh/h	347	646	819	453	0	468	305	0	314	307	0	479
V/C Ratio(X)	0.81	0.18	0.26	0.20	0.00	0.93	0.78	0.00	0.42	0.81	0.00	0.27
Avail Cap(c_a), veh/h	606	646	819	718	0	481	561	0	577	518	0	661
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.2	20.3	12.0	21.9	0.0	31.9	35.2	0.0	32.9	35.7	0.0	23.5
Incr Delay (d2), s/veh	3.3	0.1	0.2	0.1	0.0	24.0	6.1	0.0	1.3	4.0	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	1.7	3.3	1.3	0.0	11.9	5.3	0.0	2.6	5.4	0.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.5	20.4	12.2	21.9	0.0	55.9	41.3	0.0	34.1	39.7	0.0	23.8
LnGrp LOS	C	C	B	C	A	E	D	A	C	D	A	C
Approach Vol, veh/h		609			525			369				379
Approach Delay, s/veh		19.4			50.0			38.7				34.3
Approach LOS		B			D			D				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.4	37.0		20.8	17.7	29.7		20.7				
Change Period (Y+Rc), s	5.6	6.3		5.6	5.6	6.3		5.9				
Max Green Setting (Gmax), s	18.0	27.0		28.0	25.0	24.0		25.0				
Max Q Clear Time (g_c+I1), s	5.3	8.7		13.4	11.6	23.1		13.6				
Green Ext Time (p_c), s	0.1	1.3		1.9	0.5	0.3		1.2				
Intersection Summary												
HCM 6th Ctrl Delay			34.7									
HCM 6th LOS			C									

Intersection						
Int Delay, s/veh	19.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙	↑	↘		↙	↘
Traffic Vol, veh/h	305	630	620	105	20	305
Future Vol, veh/h	305	630	620	105	20	305
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	75
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	372	768	756	128	24	372

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	884	0	-	0	2332 820
Stage 1	-	-	-	-	820 -
Stage 2	-	-	-	-	1512 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	765	-	-	-	41 375
Stage 1	-	-	-	-	433 -
Stage 2	-	-	-	-	201 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	765	-	-	-	~ 21 375
Mov Cap-2 Maneuver	-	-	-	-	~ 21 -
Stage 1	-	-	-	-	223 -
Stage 2	-	-	-	-	201 -

Approach	EB	WB	SB
HCM Control Delay, s	4.6	0	105.1
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	765	-	-	-	21	375
HCM Lane V/C Ratio	0.486	-	-	-	1.161	0.992
HCM Control Delay (s)	14.1	-	-	-	\$ 514.3	78.3
HCM Lane LOS	B	-	-	-	F	F
HCM 95th %tile Q(veh)	2.7	-	-	-	3.2	11.6

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th Signalized Intersection Summary

Cumulative Conditions - No Build

3: US 101 NB Off Ramp/US 101 NB On Ramp & Vineyard Dr

AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	630	0	0	745	185	235	0	310	0	0	0
Future Volume (veh/h)	150	630	0	0	745	185	235	0	310	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	179	750	0	0	887	134	280	0	115			
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	243	1307	0	0	930	788	321	0	285			
Arrive On Green	0.27	1.00	0.00	0.00	0.50	0.50	0.18	0.00	0.18			
Sat Flow, veh/h	1781	1870	0	0	1870	1585	1781	0	1585			
Grp Volume(v), veh/h	179	750	0	0	887	134	280	0	115			
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1585	1781	0	1585			
Q Serve(g_s), s	6.9	0.0	0.0	0.0	34.0	3.5	11.5	0.0	4.8			
Cycle Q Clear(g_c), s	6.9	0.0	0.0	0.0	34.0	3.5	11.5	0.0	4.8			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	243	1307	0	0	930	788	321	0	285			
V/C Ratio(X)	0.74	0.57	0.00	0.00	0.95	0.17	0.87	0.00	0.40			
Avail Cap(c_a), veh/h	243	1307	0	0	975	826	328	0	292			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.51	0.51	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	26.1	0.0	0.0	0.0	18.0	10.4	29.9	0.0	27.2			
Incr Delay (d2), s/veh	5.3	0.9	0.0	0.0	20.3	0.5	20.8	0.0	0.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.8	0.3	0.0	0.0	18.1	1.2	6.6	0.0	1.8			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.3	0.9	0.0	0.0	38.3	10.8	50.7	0.0	27.5			
LnGrp LOS	C	A	A	A	D	B	D	A	C			
Approach Vol, veh/h		929			1021			395				
Approach Delay, s/veh		6.8			34.7			43.9				
Approach LOS		A			C			D				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		57.3			15.1	42.2		17.7				
Change Period (Y+Rc), s		4.9			4.9	* 4.9		4.2				
Max Green Setting (Gmax), s		52.1			9.5	* 39		13.8				
Max Q Clear Time (g_c+I1), s		2.0			8.9	36.0		13.5				
Green Ext Time (p_c), s		2.8			0.0	1.3		0.0				

Intersection Summary

HCM 6th Ctrl Delay	25.2
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
4: US 101 SB Ramps/Driveway & Vineyard Dr

Cumulative Conditions - No Build
AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	520	225	365	580	35	165	5	230	30	5	25
Future Volume (veh/h)	25	520	225	365	580	35	165	5	230	30	5	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	30	619	128	435	690	42	196	6	97	36	6	29
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	119	643	545	488	994	61	210	6	192	79	13	82
Arrive On Green	0.07	0.34	0.34	0.55	1.00	1.00	0.12	0.12	0.12	0.05	0.05	0.05
Sat Flow, veh/h	1781	1870	1585	1781	1745	106	1731	53	1585	1537	256	1585
Grp Volume(v), veh/h	30	619	128	435	0	732	202	0	97	42	0	29
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1851	1784	0	1585	1793	0	1585
Q Serve(g_s), s	1.2	24.3	4.3	16.2	0.0	0.0	8.4	0.0	4.3	1.7	0.0	1.3
Cycle Q Clear(g_c), s	1.2	24.3	4.3	16.2	0.0	0.0	8.4	0.0	4.3	1.7	0.0	1.3
Prop In Lane	1.00		1.00	1.00		0.06	0.97		1.00	0.86		1.00
Lane Grp Cap(c), veh/h	119	643	545	488	0	1055	216	0	192	92	0	82
V/C Ratio(X)	0.25	0.96	0.23	0.89	0.00	0.69	0.93	0.00	0.50	0.45	0.00	0.36
Avail Cap(c_a), veh/h	121	643	545	488	0	1055	216	0	192	120	0	106
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.33	0.00	0.33	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.2	24.1	17.6	16.0	0.0	0.0	32.6	0.0	30.8	34.5	0.0	34.4
Incr Delay (d2), s/veh	0.4	27.3	1.0	7.2	0.0	1.3	42.3	0.0	0.8	2.6	0.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	14.8	1.7	4.9	0.0	0.4	6.1	0.0	1.6	0.8	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.6	51.4	18.6	23.1	0.0	1.3	75.0	0.0	31.7	37.1	0.0	36.3
LnGrp LOS	C	D	B	C	A	A	E	A	C	D	A	D
Approach Vol, veh/h		777			1167			299			71	
Approach Delay, s/veh		45.3			9.4			60.9			36.8	
Approach LOS		D			A			E			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	25.4	30.7		7.9	8.5	47.6		13.3				
Change Period (Y+Rc), s	4.9	* 4.9		4.0	3.5	4.9		4.2				
Max Green Setting (Gmax), s	10.5	* 26		5.0	5.1	39.2		9.1				
Max Q Clear Time (g_c+1/2), s	10.2	26.3		3.7	3.2	2.0		10.4				
Green Ext Time (p_c), s	0.0	0.0		0.0	0.0	4.9		0.0				

Intersection Summary

HCM 6th Ctrl Delay	29.0
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	5.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔	↑	↔	↔
Traffic Vol, veh/h	595	120	130	640	25	175
Future Vol, veh/h	595	120	130	640	25	175
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	726	146	159	780	30	213

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	872	0	1897	799
Stage 1	-	-	-	-	799	-
Stage 2	-	-	-	-	1098	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	773	-	76	386
Stage 1	-	-	-	-	443	-
Stage 2	-	-	-	-	319	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	773	-	60	386
Mov Cap-2 Maneuver	-	-	-	-	60	-
Stage 1	-	-	-	-	443	-
Stage 2	-	-	-	-	253	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.8	36.6
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	60	386	-	-	773	-
HCM Lane V/C Ratio	0.508	0.553	-	-	0.205	-
HCM Control Delay (s)	115.5	25.3	-	-	10.9	-
HCM Lane LOS	F	D	-	-	B	-
HCM 95th %tile Q(veh)	2	3.2	-	-	0.8	-

Intersection												
Int Delay, s/veh	83.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↖	↗		↖	↗
Traffic Vol, veh/h	40	585	75	70	525	70	55	20	55	75	15	30
Future Vol, veh/h	40	585	75	70	525	70	55	20	55	75	15	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	260	-	-	100	-	-	-	-	110	-	-	110
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	713	91	85	640	85	67	24	67	91	18	37

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	725	0	0	804	0	0	1737	1752	759	1755	1755	683
Stage 1	-	-	-	-	-	-	857	857	-	853	853	-
Stage 2	-	-	-	-	-	-	880	895	-	902	902	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	878	-	-	820	-	-	68	85	406	~ 67	85	449
Stage 1	-	-	-	-	-	-	352	374	-	354	376	-
Stage 2	-	-	-	-	-	-	342	359	-	332	356	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	878	-	-	820	-	-	~ 45	72	406	~ 37	72	449
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 45	72	-	~ 37	72	-
Stage 1	-	-	-	-	-	-	332	353	-	334	337	-
Stage 2	-	-	-	-	-	-	266	322	-	244	336	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	1	\$ 335.6	\$ 755.1
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	50	406	878	-	-	820	-	-	40	449
HCM Lane V/C Ratio	1.829	0.165	0.056	-	-	0.104	-	-	2.744	0.081
HCM Control Delay (s)	\$ 570.3	15.6	9.3	-	-	9.9	-	-	\$ 1002.2	13.7
HCM Lane LOS	F	C	A	-	-	A	-	-	F	B
HCM 95th %tile Q(veh)	9	0.6	0.2	-	-	0.3	-	-	12.1	0.3

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Intersection Delay, s/veh	83.9
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Traffic Vol, veh/h	110	365	5	50	320	35	15	40	150	80	15	160
Future Vol, veh/h	110	365	5	50	320	35	15	40	150	80	15	160
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	134	445	6	61	390	43	18	49	183	98	18	195
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	150.7	77.1	23.4	17.6
HCM LOS	F	F	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	7%	23%	12%	84%	0%
Vol Thru, %	20%	76%	79%	16%	0%
Vol Right, %	73%	1%	9%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	205	480	405	95	160
LT Vol	15	110	50	80	0
Through Vol	40	365	320	15	0
RT Vol	150	5	35	0	160
Lane Flow Rate	250	585	494	116	195
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.572	1.242	1.022	0.297	0.439
Departure Headway (Hd)	9.025	7.764	8.067	9.934	8.763
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	403	474	454	364	414
Service Time	7.025	5.764	6.067	7.634	6.463
HCM Lane V/C Ratio	0.62	1.234	1.088	0.319	0.471
HCM Control Delay	23.4	150.7	77.1	16.8	18.1
HCM Lane LOS	C	F	F	C	C
HCM 95th-tile Q	3.5	23.3	13.7	1.2	2.2

Intersection						
Int Delay, s/veh	109.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Vol, veh/h	125	35	385	140	25	360
Future Vol, veh/h	125	35	385	140	25	360
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	300	330	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	60	60	60	60
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	208	58	642	233	42	600

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	266	0	1725 208
Stage 1	-	-	-	-	208 -
Stage 2	-	-	-	-	1517 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1298	-	98 832
Stage 1	-	-	-	-	827 -
Stage 2	-	-	-	-	200 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1298	-	49 832
Mov Cap-2 Maneuver	-	-	-	-	49 -
Stage 1	-	-	-	-	827 -
Stage 2	-	-	-	-	101 -

Approach	EB	WB	NB
HCM Control Delay, s	0	7.7	293.8
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	408	-	-	1298	-
HCM Lane V/C Ratio	1.573	-	-	0.494	-
HCM Control Delay (s)	293.8	-	-	10.5	-
HCM Lane LOS	F	-	-	B	-
HCM 95th %tile Q(veh)	35.9	-	-	2.8	-

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	930	920	5	5	10
Future Vol, veh/h	10	930	920	5	5	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	1011	1000	5	5	11

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1005	0	0 2036 1003
Stage 1	-	-	- 1003 -
Stage 2	-	-	- 1033 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	689	-	- 62 294
Stage 1	-	-	- 355 -
Stage 2	-	-	- 343 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	689	-	- 61 294
Mov Cap-2 Maneuver	-	-	- 61 -
Stage 1	-	-	- 349 -
Stage 2	-	-	- 343 -

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	36.9
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	689	-	-	-	129
HCM Lane V/C Ratio	0.016	-	-	-	0.126
HCM Control Delay (s)	10.3	-	-	-	36.9
HCM Lane LOS	B	-	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	0.4

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	90	40	20	130	30
Future Vol, veh/h	10	90	40	20	130	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	98	43	22	141	33
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	7.5	7.5	8.6
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	10%	81%
Vol Thru, %	67%	0%	19%
Vol Right, %	33%	90%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	60	100	160
LT Vol	0	10	130
Through Vol	40	0	30
RT Vol	20	90	0
Lane Flow Rate	65	109	174
Geometry Grp	1	1	1
Degree of Util (X)	0.074	0.119	0.21
Departure Headway (Hd)	4.06	3.956	4.339
Convergence, Y/N	Yes	Yes	Yes
Cap	868	912	821
Service Time	2.153	1.956	2.397
HCM Lane V/C Ratio	0.075	0.12	0.212
HCM Control Delay	7.5	7.5	8.6
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0.4	0.8

Intersection	
Intersection Delay, s/veh	9
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	60	75	40	140	90	160
Future Vol, veh/h	60	75	40	140	90	160
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	65	82	43	152	98	174
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left SB		EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right NB			EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	8.8	9.2	9
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	22%	44%	0%
Vol Thru, %	78%	0%	36%
Vol Right, %	0%	56%	64%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	180	135	250
LT Vol	40	60	0
Through Vol	140	0	90
RT Vol	0	75	160
Lane Flow Rate	196	147	272
Geometry Grp	1	1	1
Degree of Util (X)	0.251	0.191	0.312
Departure Headway (Hd)	4.61	4.695	4.127
Convergence, Y/N	Yes	Yes	Yes
Cap	779	763	870
Service Time	2.641	2.734	2.154
HCM Lane V/C Ratio	0.252	0.193	0.313
HCM Control Delay	9.2	8.8	9
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1	0.7	1.3

Intersection						
Int Delay, s/veh	4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	↷
Traffic Vol, veh/h	70	80	30	170	55	70
Future Vol, veh/h	70	80	30	170	55	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	76	87	33	185	60	76

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	218	0	-	0	365 126
Stage 1	-	-	-	-	126 -
Stage 2	-	-	-	-	239 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1352	-	-	-	635 924
Stage 1	-	-	-	-	900 -
Stage 2	-	-	-	-	801 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1352	-	-	-	598 924
Mov Cap-2 Maneuver	-	-	-	-	598 -
Stage 1	-	-	-	-	847 -
Stage 2	-	-	-	-	801 -

Approach	EB	WB	SB
HCM Control Delay, s	3.6	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1352	-	-	-	745
HCM Lane V/C Ratio	0.056	-	-	-	0.182
HCM Control Delay (s)	7.8	0	-	-	10.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.7

HCM 6th Signalized Intersection Summary
1: Vineyard Dr & Main St

Cumulative Conditions - No Build
School Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	280	160	110	15	160	85	165	80	25	115	65	255
Future Volume (veh/h)	280	160	110	15	160	85	165	80	25	115	65	255
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	318	182	-45	17	182	81	188	91	20	131	74	98
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	459	632	777	375	230	102	271	226	50	176	99	511
Arrive On Green	0.17	0.34	0.00	0.02	0.19	0.19	0.15	0.15	0.15	0.15	0.15	0.15
Sat Flow, veh/h	1781	1870	1585	1781	1226	546	1781	1485	326	1158	654	1585
Grp Volume(v), veh/h	318	182	-45	17	0	263	188	0	111	205	0	98
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1772	1781	0	1812	1812	0	1585
Q Serve(g_s), s	9.2	4.9	0.0	0.5	0.0	9.8	6.9	0.0	3.8	7.5	0.0	3.1
Cycle Q Clear(g_c), s	9.2	4.9	0.0	0.5	0.0	9.8	6.9	0.0	3.8	7.5	0.0	3.1
Prop In Lane	1.00		1.00	1.00		0.31	1.00		0.18	0.64		1.00
Lane Grp Cap(c), veh/h	459	632	777	375	0	332	271	0	276	275	0	511
V/C Ratio(X)	0.69	0.29	-0.06	0.05	0.00	0.79	0.69	0.00	0.40	0.75	0.00	0.19
Avail Cap(c_a), veh/h	799	730	860	802	0	614	721	0	733	655	0	843
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.2	16.8	0.0	21.9	0.0	26.8	27.8	0.0	26.5	28.1	0.0	17.0
Incr Delay (d2), s/veh	1.4	0.2	0.0	0.0	0.0	4.2	4.5	0.0	1.3	3.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	2.0	0.0	0.2	0.0	4.3	3.2	0.0	1.7	3.3	0.0	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.6	17.1	0.0	22.0	0.0	31.1	32.3	0.0	27.8	31.1	0.0	17.1
LnGrp LOS	B	B	A	C	A	C	C	A	C	C	A	B
Approach Vol, veh/h		455			280			299				303
Approach Delay, s/veh		19.8			30.5			30.6				26.5
Approach LOS		B			C			C				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.0	29.7		16.1	17.4	19.3		16.4				
Change Period (Y+Rc), s	5.6	6.3		5.6	5.6	6.3		5.9				
Max Green Setting (Gmax), s	18.0	27.0		28.0	25.0	24.0		25.0				
Max Q Clear Time (g_c+I1), s	2.5	6.9		8.9	11.2	11.8		9.5				
Green Ext Time (p_c), s	0.0	0.9		1.6	0.6	1.2		1.0				
Intersection Summary												
HCM 6th Ctrl Delay				26.0								
HCM 6th LOS				C								

Intersection						
Int Delay, s/veh	6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗		↘	↗
Traffic Vol, veh/h	160	520	540	40	30	250
Future Vol, veh/h	160	520	540	40	30	250
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	75
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	182	591	614	45	34	284

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	659	0	-	0	1592 637
Stage 1	-	-	-	-	637 -
Stage 2	-	-	-	-	955 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	929	-	-	-	118 477
Stage 1	-	-	-	-	527 -
Stage 2	-	-	-	-	374 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	929	-	-	-	95 477
Mov Cap-2 Maneuver	-	-	-	-	95 -
Stage 1	-	-	-	-	424 -
Stage 2	-	-	-	-	374 -

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	27.3
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	929	-	-	-	95	477
HCM Lane V/C Ratio	0.196	-	-	-	0.359	0.596
HCM Control Delay (s)	9.8	-	-	-	62.7	23.1
HCM Lane LOS	A	-	-	-	F	C
HCM 95th %tile Q(veh)	0.7	-	-	-	1.4	3.8

HCM 6th Signalized Intersection Summary

Cumulative Conditions - No Build

3: US 101 NB Off Ramp/US 101 NB On Ramp & Vineyard Dr

School Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	180	425	0	0	635	155	245	5	255	0	0	0
Future Volume (veh/h)	180	425	0	0	635	155	245	5	255	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	202	478	0	0	713	93	275	6	48			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	395	1303	0	0	766	649	317	7	288			
Arrive On Green	0.44	1.00	0.00	0.00	0.41	0.41	0.18	0.18	0.18			
Sat Flow, veh/h	1781	1870	0	0	1870	1585	1745	38	1585			
Grp Volume(v), veh/h	202	478	0	0	713	93	281	0	48			
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1585	1783	0	1585			
Q Serve(g_s), s	6.1	0.0	0.0	0.0	27.3	2.8	11.5	0.0	1.9			
Cycle Q Clear(g_c), s	6.1	0.0	0.0	0.0	27.3	2.8	11.5	0.0	1.9			
Prop In Lane	1.00		0.00	0.00		1.00	0.98		1.00			
Lane Grp Cap(c), veh/h	395	1303	0	0	766	649	324	0	288			
V/C Ratio(X)	0.51	0.37	0.00	0.00	0.93	0.14	0.87	0.00	0.17			
Avail Cap(c_a), veh/h	395	1303	0	0	863	731	376	0	334			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.69	0.69	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	17.9	0.0	0.0	0.0	21.1	13.9	29.8	0.0	25.9			
Incr Delay (d2), s/veh	0.3	0.6	0.0	0.0	19.5	0.5	15.4	0.0	0.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.1	0.2	0.0	0.0	15.0	1.0	6.1	0.0	0.7			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.2	0.6	0.0	0.0	40.6	14.4	45.2	0.0	26.0			
LnGrp LOS	B	A	A	A	D	B	D	A	C			
Approach Vol, veh/h		680			806			329				
Approach Delay, s/veh		5.8			37.6			42.4				
Approach LOS		A			D			D				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		57.2			21.6	35.6		17.8				
Change Period (Y+Rc), s		4.9			4.9	* 4.9		4.2				
Max Green Setting (Gmax), s		50.1			12.0	* 35		15.8				
Max Q Clear Time (g_c+I1), s		2.0			8.1	29.3		13.5				
Green Ext Time (p_c), s		1.5			0.1	1.4		0.2				

Intersection Summary

HCM 6th Ctrl Delay	26.6
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
4: US 101 SB Ramps/Driveway & Vineyard Dr

Cumulative Conditions - No Build
School Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	465	275	300	550	30	215	10	110	30	5	15
Future Volume (veh/h)	20	465	275	300	550	30	215	10	110	30	5	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	23	528	178	341	625	34	244	11	-44	34	6	16
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	119	575	487	432	882	48	281	13	261	70	12	73
Arrive On Green	0.07	0.31	0.31	0.48	1.00	1.00	0.16	0.16	0.00	0.05	0.05	0.05
Sat Flow, veh/h	1781	1870	1585	1781	1758	96	1708	77	1585	1525	269	1585
Grp Volume(v), veh/h	23	528	178	341	0	659	255	0	-44	40	0	16
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1853	1785	0	1585	1794	0	1585
Q Serve(g_s), s	0.9	20.4	6.6	12.0	0.0	0.0	10.4	0.0	0.0	1.6	0.0	0.7
Cycle Q Clear(g_c), s	0.9	20.4	6.6	12.0	0.0	0.0	10.4	0.0	0.0	1.6	0.0	0.7
Prop In Lane	1.00		1.00	1.00		0.05	0.96		1.00	0.85		1.00
Lane Grp Cap(c), veh/h	119	575	487	432	0	930	293	0	261	82	0	73
V/C Ratio(X)	0.19	0.92	0.37	0.79	0.00	0.71	0.87	0.00	-0.17	0.49	0.00	0.22
Avail Cap(c_a), veh/h	119	601	509	432	0	930	305	0	271	120	0	106
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.55	0.00	0.55	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.1	25.1	20.3	17.7	0.0	0.0	30.5	0.0	0.0	34.9	0.0	34.5
Incr Delay (d2), s/veh	0.3	22.0	2.1	5.3	0.0	2.5	21.0	0.0	0.0	3.3	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	12.0	2.6	4.1	0.0	0.7	6.0	0.0	0.0	0.8	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.4	47.1	22.4	23.0	0.0	2.5	51.6	0.0	0.0	38.2	0.0	35.6
LnGrp LOS	C	D	C	C	A	A	D	A	A	D	A	D
Approach Vol, veh/h		729			1000			211			56	
Approach Delay, s/veh		40.6			9.5			62.3			37.4	
Approach LOS		D			A			E			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	33.1	28.0		7.4	8.5	42.5		16.5				
Change Period (Y+Rc), s	4.9	* 4.9		4.0	3.5	4.9		4.2				
Max Green Setting (Gmax), s	16.5	* 24		5.0	5.0	35.6		12.8				
Max Q Clear Time (g_c+1/4), s	11.0	22.4		3.6	2.9	2.0		12.4				
Green Ext Time (p_c), s	0.2	0.6		0.0	0.0	4.2		0.0				

Intersection Summary

HCM 6th Ctrl Delay	27.2
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	8.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔	↑	↔	↔
Traffic Vol, veh/h	515	110	240	540	40	245
Future Vol, veh/h	515	110	240	540	40	245
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	585	125	273	614	45	278

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	710	0	1808 648
Stage 1	-	-	-	-	648 -
Stage 2	-	-	-	-	1160 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	889	-	87 470
Stage 1	-	-	-	-	521 -
Stage 2	-	-	-	-	298 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	889	-	60 470
Mov Cap-2 Maneuver	-	-	-	-	60 -
Stage 1	-	-	-	-	521 -
Stage 2	-	-	-	-	207 -

Approach	EB	WB	NB
HCM Control Delay, s	0	3.3	42.9
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	60	470	-	-	889	-
HCM Lane V/C Ratio	0.758	0.592	-	-	0.307	-
HCM Control Delay (s)	163.5	23.2	-	-	10.8	-
HCM Lane LOS	F	C	-	-	B	-
HCM 95th %tile Q(veh)	3.3	3.8	-	-	1.3	-

Intersection												
Int Delay, s/veh	41											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↖	↗		↖	↗
Traffic Vol, veh/h	35	490	75	100	430	50	60	20	55	80	20	25
Future Vol, veh/h	35	490	75	100	430	50	60	20	55	80	20	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	260	-	-	100	-	-	-	-	110	-	-	110
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	40	557	85	114	489	57	68	23	63	91	23	28

Major/Minor	Major1		Major2		Minor1			Minor2				
Conflicting Flow All	546	0	0	642	0	0	1451	1454	600	1469	1468	518
Stage 1	-	-	-	-	-	-	680	680	-	746	746	-
Stage 2	-	-	-	-	-	-	771	774	-	723	722	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1023	-	-	943	-	-	109	130	501	106	128	558
Stage 1	-	-	-	-	-	-	441	451	-	405	421	-
Stage 2	-	-	-	-	-	-	393	408	-	417	431	-
Platoon blocked, %		-	-	-	-	-						
Mov Cap-1 Maneuver	1023	-	-	943	-	-	77	110	501	~ 69	108	558
Mov Cap-2 Maneuver	-	-	-	-	-	-	77	110	-	~ 69	108	-
Stage 1	-	-	-	-	-	-	424	433	-	389	370	-
Stage 2	-	-	-	-	-	-	308	359	-	332	414	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	0.5		1.6		134.3		\$ 317.2	
HCM LOS					F		F	

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	83	501	1023	-	-	943	-	-	74	558
HCM Lane V/C Ratio	1.095	0.125	0.039	-	-	0.121	-	-	1.536	0.051
HCM Control Delay (s)	217.6	13.2	8.7	-	-	9.3	-	-	\$ 393.6	11.8
HCM Lane LOS	F	B	A	-	-	A	-	-	F	B
HCM 95th %tile Q(veh)	6.4	0.4	0.1	-	-	0.4	-	-	9.5	0.2

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Intersection Delay, s/veh	20.5
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Traffic Vol, veh/h	70	275	5	80	245	75	5	15	165	75	20	85
Future Vol, veh/h	70	275	5	80	245	75	5	15	165	75	20	85
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	79	309	6	90	275	84	6	17	185	84	22	96
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	22.1	25.9	13.8	12.3
HCM LOS	C	D	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	3%	20%	20%	79%	0%
Vol Thru, %	8%	79%	61%	21%	0%
Vol Right, %	89%	1%	19%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	185	350	400	95	85
LT Vol	5	70	80	75	0
Through Vol	15	275	245	20	0
RT Vol	165	5	75	0	85
Lane Flow Rate	208	393	449	107	96
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.384	0.686	0.759	0.237	0.182
Departure Headway (Hd)	6.642	6.279	6.079	7.998	6.871
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	538	574	593	447	520
Service Time	4.719	4.343	4.14	5.776	4.649
HCM Lane V/C Ratio	0.387	0.685	0.757	0.239	0.185
HCM Control Delay	13.8	22.1	25.9	13.3	11.2
HCM Lane LOS	B	C	D	B	B
HCM 95th-tile Q	1.8	5.3	6.8	0.9	0.7

Intersection						
Int Delay, s/veh	5.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↘	↙
Traffic Vol, veh/h	160	15	95	110	15	155
Future Vol, veh/h	160	15	95	110	15	155
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	300	330	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	60	60	60	60
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	267	25	158	183	25	258

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	292	0	766 267
Stage 1	-	-	-	-	267 -
Stage 2	-	-	-	-	499 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1270	-	371 772
Stage 1	-	-	-	-	778 -
Stage 2	-	-	-	-	610 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1270	-	325 772
Mov Cap-2 Maneuver	-	-	-	-	325 -
Stage 1	-	-	-	-	778 -
Stage 2	-	-	-	-	534 -

Approach	EB	WB	NB
HCM Control Delay, s	0	3.8	13.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	688	-	-	1270	-
HCM Lane V/C Ratio	0.412	-	-	0.125	-
HCM Control Delay (s)	13.8	-	-	8.2	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	2	-	-	0.4	-

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	670	780	10	10	10
Future Vol, veh/h	10	670	780	10	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	728	848	11	11	11

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	859	0	0
Stage 1	-	-	854
Stage 2	-	-	750
Critical Hdwy	4.12	-	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.218	-	3.518
Pot Cap-1 Maneuver	782	-	116
Stage 1	-	-	417
Stage 2	-	-	467
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	782	-	114
Mov Cap-2 Maneuver	-	-	114
Stage 1	-	-	411
Stage 2	-	-	467

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	28.8
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	782	-	-	-	173
HCM Lane V/C Ratio	0.014	-	-	-	0.126
HCM Control Delay (s)	9.7	-	-	-	28.8
HCM Lane LOS	A	-	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.4

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	95	40	10	150	45
Future Vol, veh/h	10	95	40	10	150	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	103	43	11	163	49
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	7.6	7.6	8.9
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	10%	77%
Vol Thru, %	80%	0%	23%
Vol Right, %	20%	90%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	50	105	195
LT Vol	0	10	150
Through Vol	40	0	45
RT Vol	10	95	0
Lane Flow Rate	54	114	212
Geometry Grp	1	1	1
Degree of Util (X)	0.065	0.127	0.255
Departure Headway (Hd)	4.28	4.018	4.33
Convergence, Y/N	Yes	Yes	Yes
Cap	840	897	822
Service Time	2.29	2.021	2.397
HCM Lane V/C Ratio	0.064	0.127	0.258
HCM Control Delay	7.6	7.6	8.9
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0.4	1

Intersection

Intersection Delay, s/veh	10.4
Intersection LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	65	40	15	220	240	110
Future Vol, veh/h	65	40	15	220	240	110
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	71	43	16	239	261	120
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB		
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	9.3	10	11
HCM LOS	A	A	B

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	6%	62%	0%
Vol Thru, %	94%	0%	69%
Vol Right, %	0%	38%	31%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	235	105	350
LT Vol	15	65	0
Through Vol	220	0	240
RT Vol	0	40	110
Lane Flow Rate	255	114	380
Geometry Grp	1	1	1
Degree of Util (X)	0.33	0.165	0.458
Departure Headway (Hd)	4.646	5.205	4.333
Convergence, Y/N	Yes	Yes	Yes
Cap	771	686	829
Service Time	2.686	3.264	2.368
HCM Lane V/C Ratio	0.331	0.166	0.458
HCM Control Delay	10	9.3	11
HCM Lane LOS	A	A	B
HCM 95th-tile Q	1.4	0.6	2.4

Intersection

Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	
Traffic Vol, veh/h	125	35	25	100	70	80
Future Vol, veh/h	125	35	25	100	70	80
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	136	38	27	109	76	87
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.9	7.8	8.5
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	78%	0%	47%
Vol Thru, %	22%	20%	0%
Vol Right, %	0%	80%	53%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	160	125	150
LT Vol	125	0	70
Through Vol	35	25	0
RT Vol	0	100	80
Lane Flow Rate	174	136	163
Geometry Grp	1	1	1
Degree of Util (X)	0.222	0.152	0.199
Departure Headway (Hd)	4.603	4.029	4.394
Convergence, Y/N	Yes	Yes	Yes
Cap	781	891	818
Service Time	2.623	2.047	2.414
HCM Lane V/C Ratio	0.223	0.153	0.199
HCM Control Delay	8.9	7.8	8.5
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.8	0.5	0.7

HCM 6th Signalized Intersection Summary
1: Vineyard Dr & Main St

Cumulative Conditions - No Build
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	250	170	70	5	105	60	70	15	10	135	25	220
Future Volume (veh/h)	250	170	70	5	105	60	70	15	10	135	25	220
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	284	193	-90	6	119	52	80	17	3	153	28	58
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	513	609	669	360	212	93	172	149	26	255	47	523
Arrive On Green	0.16	0.33	0.00	0.01	0.17	0.17	0.10	0.10	0.10	0.17	0.17	0.17
Sat Flow, veh/h	1781	1870	1585	1781	1234	539	1781	1548	273	1517	278	1585
Grp Volume(v), veh/h	284	193	-90	6	0	171	80	0	20	181	0	58
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1773	1781	0	1821	1795	0	1585
Q Serve(g_s), s	7.0	4.5	0.0	0.2	0.0	5.1	2.5	0.0	0.6	5.4	0.0	1.5
Cycle Q Clear(g_c), s	7.0	4.5	0.0	0.2	0.0	5.1	2.5	0.0	0.6	5.4	0.0	1.5
Prop In Lane	1.00		1.00	1.00		0.30	1.00		0.15	0.85		1.00
Lane Grp Cap(c), veh/h	513	609	669	360	0	305	172	0	175	302	0	523
V/C Ratio(X)	0.55	0.32	-0.13	0.02	0.00	0.56	0.47	0.00	0.11	0.60	0.00	0.11
Avail Cap(c_a), veh/h	990	867	888	896	0	731	857	0	876	770	0	937
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.4	14.8	0.0	19.7	0.0	22.1	24.9	0.0	24.0	22.4	0.0	13.6
Incr Delay (d2), s/veh	0.7	0.3	0.0	0.0	0.0	1.6	2.8	0.0	0.4	1.4	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	1.8	0.0	0.1	0.0	2.1	1.1	0.0	0.3	2.2	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.1	15.1	0.0	19.7	0.0	23.7	27.7	0.0	24.4	23.8	0.0	13.6
LnGrp LOS	B	B	A	B	A	C	C	A	C	C	A	B
Approach Vol, veh/h		387			177			100				239
Approach Delay, s/veh		18.6			23.6			27.0				21.4
Approach LOS		B			C			C				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.1	25.3		11.2	15.0	16.3		15.7				
Change Period (Y+Rc), s	5.6	6.3		5.6	5.6	6.3		5.9				
Max Green Setting (Gmax), s	18.0	27.0		28.0	25.0	24.0		25.0				
Max Q Clear Time (g_c+I1), s	2.2	6.5		4.5	9.0	7.1		7.4				
Green Ext Time (p_c), s	0.0	1.0		0.4	0.5	0.8		0.9				
Intersection Summary												
HCM 6th Ctrl Delay				21.2								
HCM 6th LOS				C								

Intersection						
Int Delay, s/veh	2.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙	↑	↘		↙	↘
Traffic Vol, veh/h	110	465	370	25	25	100
Future Vol, veh/h	110	465	370	25	25	100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	75
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	118	500	398	27	27	108

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	425	0	-	0	1148 412
Stage 1	-	-	-	-	412 -
Stage 2	-	-	-	-	736 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1134	-	-	-	220 640
Stage 1	-	-	-	-	669 -
Stage 2	-	-	-	-	474 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1134	-	-	-	197 640
Mov Cap-2 Maneuver	-	-	-	-	197 -
Stage 1	-	-	-	-	599 -
Stage 2	-	-	-	-	474 -

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	14.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1134	-	-	-	197	640
HCM Lane V/C Ratio	0.104	-	-	-	0.136	0.168
HCM Control Delay (s)	8.5	-	-	-	26.1	11.8
HCM Lane LOS	A	-	-	-	D	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.5	0.6

HCM 6th Signalized Intersection Summary
 3: US 101 NB Off Ramp/US 101 NB On Ramp & Vineyard Dr

Cumulative Conditions - No Build
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	300	0	0	400	70	365	0	280	0	0	0
Future Volume (veh/h)	175	300	0	0	400	70	365	0	280	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	190	326	0	0	435	-2	397	0	72			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	510	1159	0	0	492	417	446	0	397			
Arrive On Green	0.57	1.00	0.00	0.00	0.26	0.00	0.25	0.00	0.25			
Sat Flow, veh/h	1781	1870	0	0	1870	1585	1781	0	1585			
Grp Volume(v), veh/h	190	326	0	0	435	-2	397	0	72			
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1585	1781	0	1585			
Q Serve(g_s), s	4.1	0.0	0.0	0.0	15.6	0.0	15.0	0.0	2.5			
Cycle Q Clear(g_c), s	4.1	0.0	0.0	0.0	15.6	0.0	15.0	0.0	2.5			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	510	1159	0	0	492	417	446	0	397			
V/C Ratio(X)	0.37	0.28	0.00	0.00	0.88	0.00	0.89	0.00	0.18			
Avail Cap(c_a), veh/h	510	1159	0	0	644	546	555	0	494			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.87	0.87	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	11.6	0.0	0.0	0.0	24.8	0.0	25.3	0.0	20.6			
Incr Delay (d2), s/veh	0.1	0.5	0.0	0.0	20.1	0.0	12.4	0.0	0.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.4	0.2	0.0	0.0	9.2	0.0	7.5	0.0	0.9			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.7	0.5	0.0	0.0	44.8	0.0	37.7	0.0	20.7			
LnGrp LOS	B	A	A	A	D	A	D	A	C			
Approach Vol, veh/h		516			433			469				
Approach Delay, s/veh		4.6			45.0			35.1				
Approach LOS		A			D			D				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		48.3			24.9	23.3		21.7				
Change Period (Y+Rc), s		4.9			4.9	* 4.9		4.2				
Max Green Setting (Gmax), s		39.1			11.5	* 24		21.8				
Max Q Clear Time (g_c+I1), s		2.0			6.1	17.6		17.0				
Green Ext Time (p_c), s		1.0			0.1	0.8		0.5				
Intersection Summary												
HCM 6th Ctrl Delay					27.0							
HCM 6th LOS					C							
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary
 4: US 101 SB Ramps/Driveway & Vineyard Dr

Cumulative Conditions - No Build
 PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	360	305	210	520	35	215	5	85	30	15	30
Future Volume (veh/h)	30	360	305	210	520	35	215	5	85	30	15	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	32	379	197	221	547	37	226	5	-68	32	16	31
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	127	455	385	522	839	57	263	6	239	68	34	89
Arrive On Green	0.07	0.24	0.24	0.59	0.97	0.97	0.15	0.15	0.00	0.06	0.06	0.06
Sat Flow, veh/h	1781	1870	1585	1781	1732	117	1745	39	1585	1207	603	1585
Grp Volume(v), veh/h	32	379	197	221	0	584	231	0	-68	48	0	31
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1849	1783	0	1585	1810	0	1585
Q Serve(g_s), s	1.2	13.5	7.5	4.8	0.0	1.8	8.8	0.0	0.0	1.8	0.0	1.3
Cycle Q Clear(g_c), s	1.2	13.5	7.5	4.8	0.0	1.8	8.8	0.0	0.0	1.8	0.0	1.3
Prop In Lane	1.00		1.00	1.00		0.06	0.98		1.00	0.67		1.00
Lane Grp Cap(c), veh/h	127	455	385	522	0	896	269	0	239	101	0	89
V/C Ratio(X)	0.25	0.83	0.51	0.42	0.00	0.65	0.86	0.00	-0.28	0.47	0.00	0.35
Avail Cap(c_a), veh/h	130	617	523	522	0	896	326	0	290	129	0	113
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.80	0.00	0.80	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.7	25.2	22.9	11.2	0.0	0.6	29.0	0.0	0.0	32.0	0.0	31.8
Incr Delay (d2), s/veh	0.4	16.3	4.8	0.3	0.0	2.9	15.3	0.0	0.0	2.5	0.0	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	7.7	3.2	1.6	0.0	1.0	4.8	0.0	0.0	0.8	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.1	41.5	27.7	11.6	0.0	3.5	44.3	0.0	0.0	34.6	0.0	33.5
LnGrp LOS	C	D	C	B	A	A	D	A	A	C	A	C
Approach Vol, veh/h		608			805			163				79
Approach Delay, s/veh		36.4			5.7			62.8				34.2
Approach LOS		D			A			E				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	25.4	21.9		7.9	8.5	38.8		14.8				
Change Period (Y+Rc), s	4.9	* 4.9		4.0	3.5	4.9		4.2				
Max Green Setting (Gmax), s	12.5	* 23		5.0	5.1	30.5		12.8				
Max Q Clear Time (g_c+1), s	10.8	15.5		3.8	3.2	3.8		10.8				
Green Ext Time (p_c), s	0.2	1.5		0.0	0.0	3.4		0.2				

Intersection Summary

HCM 6th Ctrl Delay	24.0
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	7.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔	↑	↔	↔
Traffic Vol, veh/h	415	125	270	495	55	280
Future Vol, veh/h	415	125	270	495	55	280
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	428	129	278	510	57	289

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	557	0	1559 493
Stage 1	-	-	-	-	493 -
Stage 2	-	-	-	-	1066 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1014	-	124 576
Stage 1	-	-	-	-	614 -
Stage 2	-	-	-	-	331 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1014	-	90 576
Mov Cap-2 Maneuver	-	-	-	-	90 -
Stage 1	-	-	-	-	614 -
Stage 2	-	-	-	-	240 -

Approach	EB	WB	NB
HCM Control Delay, s	0	3.5	30.5
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	90	576	-	-	1014	-
HCM Lane V/C Ratio	0.63	0.501	-	-	0.275	-
HCM Control Delay (s)	96.9	17.4	-	-	9.9	-
HCM Lane LOS	F	C	-	-	A	-
HCM 95th %tile Q(veh)	3	2.8	-	-	1.1	-

Intersection												
Int Delay, s/veh	18.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	395	85	100	395	55	75	20	60	85	15	40
Future Vol, veh/h	30	395	85	100	395	55	75	20	60	85	15	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	260	-	-	100	-	-	-	-	110	-	-	110
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	32	420	90	106	420	59	80	21	64	90	16	43

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	479	0	0	510	0	0	1220	1220	465	1234	1236	450
Stage 1	-	-	-	-	-	-	529	529	-	662	662	-
Stage 2	-	-	-	-	-	-	691	691	-	572	574	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1083	-	-	1055	-	-	157	180	597	153	176	609
Stage 1	-	-	-	-	-	-	533	527	-	451	459	-
Stage 2	-	-	-	-	-	-	435	446	-	505	503	-
Platoon blocked, %		-	-	-	-	-						
Mov Cap-1 Maneuver	1083	-	-	1055	-	-	122	157	597	111	154	609
Mov Cap-2 Maneuver	-	-	-	-	-	-	122	157	-	111	154	-
Stage 1	-	-	-	-	-	-	517	511	-	437	413	-
Stage 2	-	-	-	-	-	-	350	401	-	419	488	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.5			1.6			63.7			97.6		
HCM LOS							F			F		

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	128	597	1083	-	-	1055	-	-	116	609
HCM Lane V/C Ratio	0.79	0.107	0.029	-	-	0.101	-	-	0.917	0.07
HCM Control Delay (s)	96.4	11.8	8.4	-	-	8.8	-	-	132.1	11.4
HCM Lane LOS	F	B	A	-	-	A	-	-	F	B
HCM 95th %tile Q(veh)	4.7	0.4	0.1	-	-	0.3	-	-	5.7	0.2

Intersection	
Intersection Delay, s/veh	11.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Traffic Vol, veh/h	30	200	5	65	190	70	5	5	60	60	20	45
Future Vol, veh/h	30	200	5	65	190	70	5	5	60	60	20	45
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	34	227	6	74	216	80	6	6	68	68	23	51
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	11.2	12.7	9.2	10
HCM LOS	B	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	7%	13%	20%	75%	0%
Vol Thru, %	7%	85%	58%	25%	0%
Vol Right, %	86%	2%	22%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	70	235	325	80	45
LT Vol	5	30	65	60	0
Through Vol	5	200	190	20	0
RT Vol	60	5	70	0	45
Lane Flow Rate	80	267	369	91	51
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.12	0.379	0.501	0.167	0.079
Departure Headway (Hd)	5.416	5.113	4.888	6.629	5.536
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	661	708	742	542	647
Service Time	3.456	3.123	2.896	4.364	3.272
HCM Lane V/C Ratio	0.121	0.377	0.497	0.168	0.079
HCM Control Delay	9.2	11.2	12.7	10.7	8.7
HCM Lane LOS	A	B	B	B	A
HCM 95th-tile Q	0.4	1.8	2.8	0.6	0.3

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	
Traffic Vol, veh/h	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	300	330	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	54	54	54	54	54	54
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	2	0	4
Stage 1	-	-	-	-	2
Stage 2	-	-	-	-	2
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1620	-	1018
Stage 1	-	-	-	-	1021
Stage 2	-	-	-	-	1021
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1620	-	1018
Mov Cap-2 Maneuver	-	-	-	-	1018
Stage 1	-	-	-	-	1021
Stage 2	-	-	-	-	1021

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1620	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	565	460	10	10	10
Future Vol, veh/h	15	565	460	10	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	614	500	11	11	11

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	511	0	-	0	1152 506
Stage 1	-	-	-	-	506 -
Stage 2	-	-	-	-	646 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1054	-	-	-	219 566
Stage 1	-	-	-	-	606 -
Stage 2	-	-	-	-	522 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1054	-	-	-	216 566
Mov Cap-2 Maneuver	-	-	-	-	216 -
Stage 1	-	-	-	-	597 -
Stage 2	-	-	-	-	522 -

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	17.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1054	-	-	-	313
HCM Lane V/C Ratio	0.015	-	-	-	0.069
HCM Control Delay (s)	8.5	-	-	-	17.4
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	125	30	25	145	55
Future Vol, veh/h	25	125	30	25	145	55
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	136	33	27	158	60
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	8	7.6	9.1
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	17%	72%
Vol Thru, %	55%	0%	28%
Vol Right, %	45%	83%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	55	150	200
LT Vol	0	25	145
Through Vol	30	0	55
RT Vol	25	125	0
Lane Flow Rate	60	163	217
Geometry Grp	1	1	1
Degree of Util (X)	0.071	0.186	0.266
Departure Headway (Hd)	4.253	4.105	4.413
Convergence, Y/N	Yes	Yes	Yes
Cap	844	879	802
Service Time	2.269	2.11	2.511
HCM Lane V/C Ratio	0.071	0.185	0.271
HCM Control Delay	7.6	8	9.1
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0.7	1.1

Intersection

Intersection Delay, s/veh 11.7
Intersection LOS B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	85	30	45	250	250	145
Future Vol, veh/h	85	30	45	250	250	145
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	92	33	49	272	272	158
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left SB		EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right NB			EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	10	11.4	12.4
HCM LOS	A	B	B

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	15%	74%	0%
Vol Thru, %	85%	0%	63%
Vol Right, %	0%	26%	37%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	295	115	395
LT Vol	45	85	0
Through Vol	250	0	250
RT Vol	0	30	145
Lane Flow Rate	321	125	429
Geometry Grp	1	1	1
Degree of Util (X)	0.425	0.193	0.529
Departure Headway (Hd)	4.772	5.55	4.432
Convergence, Y/N	Yes	Yes	Yes
Cap	750	641	811
Service Time	2.83	3.635	2.482
HCM Lane V/C Ratio	0.428	0.195	0.529
HCM Control Delay	11.4	10	12.4
HCM Lane LOS	B	A	B
HCM 95th-tile Q	2.1	0.7	3.2

Intersection

Intersection Delay, s/veh	9
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Vol, veh/h	130	40	30	160	75	120
Future Vol, veh/h	130	40	30	160	75	120
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	141	43	33	174	82	130
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left SB			WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	9.4	8.5	9.2
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	76%	0%	38%
Vol Thru, %	24%	16%	0%
Vol Right, %	0%	84%	62%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	170	190	195
LT Vol	130	0	75
Through Vol	40	30	0
RT Vol	0	160	120
Lane Flow Rate	185	207	212
Geometry Grp	1	1	1
Degree of Util (X)	0.246	0.238	0.265
Departure Headway (Hd)	4.8	4.147	4.507
Convergence, Y/N	Yes	Yes	Yes
Cap	747	865	795
Service Time	2.836	2.18	2.545
HCM Lane V/C Ratio	0.248	0.239	0.267
HCM Control Delay	9.4	8.5	9.2
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1	0.9	1.1

HCM 6th Signalized Intersection Summary
1: Vineyard Dr & Main St

Cumulative Conditions - Improved
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	230	90	310	75	255	115	195	95	20	65	160	275
Future Volume (veh/h)	230	90	310	75	255	115	195	95	20	65	160	275
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	280	110	195	91	311	123	238	116	15	79	195	129
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	351	665	828	467	353	139	297	271	35	94	232	488
Arrive On Green	0.13	0.36	0.36	0.05	0.28	0.28	0.17	0.17	0.17	0.18	0.18	0.18
Sat Flow, veh/h	1781	1870	1585	1781	1275	504	1781	1623	210	532	1312	1585
Grp Volume(v), veh/h	280	110	195	91	0	434	238	0	131	274	0	129
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1780	1781	0	1833	1844	0	1585
Q Serve(g_s), s	10.0	3.8	6.3	3.4	0.0	21.9	12.1	0.0	6.0	13.5	0.0	5.8
Cycle Q Clear(g_c), s	10.0	3.8	6.3	3.4	0.0	21.9	12.1	0.0	6.0	13.5	0.0	5.8
Prop In Lane	1.00		1.00	1.00		0.28	1.00		0.11	0.29		1.00
Lane Grp Cap(c), veh/h	351	665	828	467	0	492	297	0	306	326	0	488
V/C Ratio(X)	0.80	0.17	0.24	0.20	0.00	0.88	0.80	0.00	0.43	0.84	0.00	0.26
Avail Cap(c_a), veh/h	447	923	1046	484	0	658	475	0	489	476	0	617
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.1	20.8	12.2	22.3	0.0	32.6	37.7	0.0	35.2	37.4	0.0	24.5
Incr Delay (d2), s/veh	7.0	0.1	0.1	0.1	0.0	10.6	7.0	0.0	1.4	7.6	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	1.7	3.1	1.4	0.0	10.6	5.8	0.0	2.8	6.7	0.0	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.1	20.9	12.4	22.4	0.0	43.1	44.6	0.0	36.5	45.0	0.0	24.7
LnGrp LOS	C	C	B	C	A	D	D	A	D	D	A	C
Approach Vol, veh/h		585			525			369			403	
Approach Delay, s/veh		22.0			39.6			41.8			38.5	
Approach LOS		C			D			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.5	39.7		21.3	17.9	32.3		22.5				
Change Period (Y+Rc), s	5.6	6.3		5.6	5.6	6.3		5.9				
Max Green Setting (Gmax), s	5.8	46.4		25.1	17.4	34.8		24.3				
Max Q Clear Time (g_c+I1), s	5.4	8.3		14.1	12.0	23.9		15.5				
Green Ext Time (p_c), s	0.0	1.3		1.6	0.3	2.1		1.1				
Intersection Summary												
HCM 6th Ctrl Delay			34.3									
HCM 6th LOS			C									

Intersection						
Int Delay, s/veh	14.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗			↗
Traffic Vol, veh/h	305	630	620	105	0	305
Future Vol, veh/h	305	630	620	105	0	305
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	372	768	756	128	0	372

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	884	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.12	-	6.22
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.218	-	3.318
Pot Cap-1 Maneuver	765	-	0
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	765	-	375
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	4.6	0	78.3
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	765	-	-	-	375
HCM Lane V/C Ratio	0.486	-	-	-	0.992
HCM Control Delay (s)	14.1	-	-	-	78.3
HCM Lane LOS	B	-	-	-	F
HCM 95th %tile Q(veh)	2.7	-	-	-	11.6

HCM 6th Signalized Intersection Summary

Cumulative Conditions - Improved

3: US 101 NB Off Ramp/US 101 NB On Ramp & Vineyard Dr

AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	630	0	0	745	185	235	0	310	0	0	0
Future Volume (veh/h)	150	630	0	0	745	185	235	0	310	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	179	750	0	0	887	134	280	0	115			
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	283	1338	0	0	933	791	317	0	282			
Arrive On Green	0.32	1.00	0.00	0.00	0.50	0.50	0.18	0.00	0.18			
Sat Flow, veh/h	1781	1870	0	0	1870	1585	1781	0	1585			
Grp Volume(v), veh/h	179	750	0	0	887	134	280	0	115			
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1585	1781	0	1585			
Q Serve(g_s), s	7.3	0.0	0.0	0.0	38.4	3.9	13.0	0.0	5.5			
Cycle Q Clear(g_c), s	7.3	0.0	0.0	0.0	38.4	3.9	13.0	0.0	5.5			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	283	1338	0	0	933	791	317	0	282			
V/C Ratio(X)	0.63	0.56	0.00	0.00	0.95	0.17	0.88	0.00	0.41			
Avail Cap(c_a), veh/h	283	1338	0	0	1014	860	331	0	295			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.51	0.51	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	26.9	0.0	0.0	0.0	20.3	11.7	34.1	0.0	31.0			
Incr Delay (d2), s/veh	1.8	0.9	0.0	0.0	19.7	0.5	21.9	0.0	0.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.8	0.3	0.0	0.0	20.2	1.4	7.4	0.0	2.1			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.7	0.9	0.0	0.0	40.0	12.1	56.0	0.0	31.3			
LnGrp LOS	C	A	A	A	D	B	E	A	C			
Approach Vol, veh/h		929			1021			395				
Approach Delay, s/veh		6.2			36.3			48.8				
Approach LOS		A			D			D				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		65.7			18.4	47.3		19.3				
Change Period (Y+Rc), s		4.9			4.9	* 4.9		4.2				
Max Green Setting (Gmax), s		60.1			10.5	* 46		15.8				
Max Q Clear Time (g_c+I1), s		2.0			9.3	40.4		15.0				
Green Ext Time (p_c), s		2.8			0.0	2.0		0.1				

Intersection Summary

HCM 6th Ctrl Delay	26.5
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
4: US 101 SB Ramps/Driveway & Vineyard Dr

Cumulative Conditions - Improved
AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	520	225	365	580	35	165	5	230	30	5	25
Future Volume (veh/h)	25	520	225	365	580	35	165	5	230	30	5	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	30	619	128	435	690	42	196	6	97	36	6	29
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	105	657	557	467	996	61	220	7	201	74	12	76
Arrive On Green	0.06	0.35	0.35	0.52	1.00	1.00	0.13	0.13	0.13	0.05	0.05	0.05
Sat Flow, veh/h	1781	1870	1585	1781	1745	106	1731	53	1585	1537	256	1585
Grp Volume(v), veh/h	30	619	128	435	0	732	202	0	97	42	0	29
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1851	1784	0	1585	1793	0	1585
Q Serve(g_s), s	1.4	27.3	4.8	19.3	0.0	0.0	9.5	0.0	4.8	1.9	0.0	1.5
Cycle Q Clear(g_c), s	1.4	27.3	4.8	19.3	0.0	0.0	9.5	0.0	4.8	1.9	0.0	1.5
Prop In Lane	1.00		1.00	1.00		0.06	0.97		1.00	0.86		1.00
Lane Grp Cap(c), veh/h	105	657	557	467	0	1057	227	0	201	86	0	76
V/C Ratio(X)	0.29	0.94	0.23	0.93	0.00	0.69	0.89	0.00	0.48	0.49	0.00	0.38
Avail Cap(c_a), veh/h	107	676	572	467	0	1057	227	0	201	105	0	93
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.40	0.00	0.40	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.3	26.7	19.4	19.5	0.0	0.0	36.5	0.0	34.5	39.5	0.0	39.3
Incr Delay (d2), s/veh	0.6	23.4	1.0	13.2	0.0	1.5	31.6	0.0	0.7	3.2	0.0	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	15.8	1.9	6.5	0.0	0.4	6.0	0.0	1.9	0.9	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.8	50.1	20.4	32.7	0.0	1.5	68.1	0.0	35.2	42.6	0.0	41.6
LnGrp LOS	D	D	C	C	A	A	E	A	D	D	A	D
Approach Vol, veh/h		777			1167			299			71	
Approach Delay, s/veh		44.8			13.1			57.4			42.2	
Approach LOS		D			B			E			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	27.2	34.8		8.1	8.5	53.4		15.0				
Change Period (Y+Rc), s	4.9	* 4.9		4.0	3.5	4.9		4.2				
Max Green Setting (Gmax), s	21.9	* 31		5.0	5.1	47.5		10.8				
Max Q Clear Time (g_c+Y), s	21.3	29.3		3.9	3.4	2.0		11.5				
Green Ext Time (p_c), s	0.1	0.6		0.0	0.0	5.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay	30.4
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	2.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↑		↗
Traffic Vol, veh/h	595	120	0	770	0	175
Future Vol, veh/h	595	120	0	770	0	175
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	726	146	0	939	0	213

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	-	-	799
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	3.318
Pot Cap-1 Maneuver	-	-	0	-	386
Stage 1	-	-	0	-	-
Stage 2	-	-	0	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	386
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	25.3
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	386	-	-	-
HCM Lane V/C Ratio	0.553	-	-	-
HCM Control Delay (s)	25.3	-	-	-
HCM Lane LOS	D	-	-	-
HCM 95th %tile Q(veh)	3.2	-	-	-

HCM 6th Signalized Intersection Summary
6: Bennett Wy & Vineyard Dr

Cumulative Conditions - Improved
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	585	75	200	500	70	55	20	55	75	15	30
Future Volume (veh/h)	40	585	75	200	500	70	55	20	55	75	15	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	49	713	91	244	610	85	67	24	67	91	18	37
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	70	816	692	282	892	124	102	37	122	128	25	136
Arrive On Green	0.04	0.44	0.44	0.16	0.56	0.56	0.08	0.08	0.08	0.09	0.09	0.09
Sat Flow, veh/h	1781	1870	1585	1781	1606	224	1328	476	1585	1499	296	1585
Grp Volume(v), veh/h	49	713	91	244	0	695	91	0	67	109	0	37
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1830	1804	0	1585	1795	0	1585
Q Serve(g_s), s	2.4	30.9	3.1	11.9	0.0	24.3	4.4	0.0	3.6	5.3	0.0	1.9
Cycle Q Clear(g_c), s	2.4	30.9	3.1	11.9	0.0	24.3	4.4	0.0	3.6	5.3	0.0	1.9
Prop In Lane	1.00		1.00	1.00		0.12	0.74		1.00	0.83		1.00
Lane Grp Cap(c), veh/h	70	816	692	282	0	1017	139	0	122	154	0	136
V/C Ratio(X)	0.70	0.87	0.13	0.86	0.00	0.68	0.66	0.00	0.55	0.71	0.00	0.27
Avail Cap(c_a), veh/h	138	1270	1076	438	0	1550	466	0	409	463	0	409
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	42.3	22.9	15.0	36.6	0.0	14.2	40.0	0.0	39.6	39.7	0.0	38.1
Incr Delay (d2), s/veh	4.6	4.4	0.1	6.8	0.0	0.8	5.2	0.0	3.8	5.9	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	13.8	1.1	5.6	0.0	9.3	2.1	0.0	1.5	2.6	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.9	27.3	15.1	43.3	0.0	15.0	45.1	0.0	43.5	45.6	0.0	39.2
LnGrp LOS	D	C	B	D	A	B	D	A	D	D	A	D
Approach Vol, veh/h		853			939			158				146
Approach Delay, s/veh		27.1			22.4			44.4				43.9
Approach LOS		C			C			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	19.2	45.2		12.0	8.6	55.8		12.7				
Change Period (Y+Rc), s	5.1	6.3		5.1	5.1	6.3		5.1				
Max Green Setting (Gmax), s	21.9	60.5		23.0	6.9	75.5		23.0				
Max Q Clear Time (g_c+I1), s	13.9	32.9		6.4	4.4	26.3		7.3				
Green Ext Time (p_c), s	0.2	6.0		0.6	0.0	6.0		0.6				
Intersection Summary												
HCM 6th Ctrl Delay				27.5								
HCM 6th LOS				C								

HCM 6th Signalized Intersection Summary
7: Bethel Rd & Vineyard Dr

Cumulative Conditions - Improved
AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	365	5	50	320	45	15	40	150	80	15	160
Future Volume (veh/h)	110	365	5	50	320	45	15	40	150	80	15	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	134	445	6	61	390	55	18	49	183	98	18	195
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	170	594	8	90	446	63	22	59	219	238	44	248
Arrive On Green	0.10	0.32	0.32	0.05	0.28	0.28	0.18	0.18	0.18	0.16	0.16	0.16
Sat Flow, veh/h	1781	1841	25	1781	1604	226	119	323	1206	1516	278	1585
Grp Volume(v), veh/h	134	0	451	61	0	445	250	0	0	116	0	195
Grp Sat Flow(s),veh/h/ln	1781	0	1866	1781	0	1830	1647	0	0	1795	0	1585
Q Serve(g_s), s	5.0	0.0	14.6	2.3	0.0	15.7	9.9	0.0	0.0	3.9	0.0	8.0
Cycle Q Clear(g_c), s	5.0	0.0	14.6	2.3	0.0	15.7	9.9	0.0	0.0	3.9	0.0	8.0
Prop In Lane	1.00		0.01	1.00		0.12	0.07		0.73	0.84		1.00
Lane Grp Cap(c), veh/h	170	0	602	90	0	508	299	0	0	281	0	248
V/C Ratio(X)	0.79	0.00	0.75	0.68	0.00	0.88	0.84	0.00	0.00	0.41	0.00	0.79
Avail Cap(c_a), veh/h	224	0	745	132	0	595	390	0	0	425	0	375
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.9	0.0	20.4	31.6	0.0	23.3	26.7	0.0	0.0	25.7	0.0	27.4
Incr Delay (d2), s/veh	12.8	0.0	3.3	8.6	0.0	12.3	11.6	0.0	0.0	1.0	0.0	6.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.0	6.4	1.2	0.0	8.0	4.5	0.0	0.0	1.6	0.0	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.8	0.0	23.7	40.2	0.0	35.6	38.3	0.0	0.0	26.7	0.0	33.6
LnGrp LOS	D	A	C	D	A	D	D	A	A	C	A	C
Approach Vol, veh/h		585			506			250			311	
Approach Delay, s/veh		28.1			36.2			38.3			31.0	
Approach LOS		C			D			D			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.9	26.8		15.6	11.0	23.8		17.3				
Change Period (Y+Rc), s	4.5	5.0		5.0	4.5	5.0		5.0				
Max Green Setting (Gmax), s	5.0	27.0		16.0	8.5	22.0		16.0				
Max Q Clear Time (g_c+1/3), s	14.3	16.6		10.0	7.0	17.7		11.9				
Green Ext Time (p_c), s	0.0	2.1		0.6	0.0	1.1		0.5				
Intersection Summary												
HCM 6th Ctrl Delay												32.7
HCM 6th LOS												C

Intersection						
Int Delay, s/veh	109.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Vol, veh/h	125	35	385	140	25	360
Future Vol, veh/h	125	35	385	140	25	360
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	300	330	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	60	60	60	60
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	208	58	642	233	42	600

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	266	0	1725 208
Stage 1	-	-	-	-	208 -
Stage 2	-	-	-	-	1517 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1298	-	98 832
Stage 1	-	-	-	-	827 -
Stage 2	-	-	-	-	200 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1298	-	49 832
Mov Cap-2 Maneuver	-	-	-	-	49 -
Stage 1	-	-	-	-	827 -
Stage 2	-	-	-	-	101 -

Approach	EB	WB	NB
HCM Control Delay, s	0	7.7	293.8
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	408	-	-	1298	-
HCM Lane V/C Ratio	1.573	-	-	0.494	-
HCM Control Delay (s)	293.8	-	-	10.5	-
HCM Lane LOS	F	-	-	B	-
HCM 95th %tile Q(veh)	35.9	-	-	2.8	-

HCM 6th Signalized Intersection Summary
1: Vineyard Dr & Main St

Cumulative Conditions - Improved
School Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	280	140	100	15	160	85	165	80	25	135	75	255
Future Volume (veh/h)	280	140	100	15	160	85	165	80	25	135	75	255
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	318	159	-56	17	182	81	188	91	20	153	85	98
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	453	631	771	379	231	103	265	221	49	197	110	536
Arrive On Green	0.17	0.34	0.00	0.02	0.19	0.19	0.15	0.15	0.15	0.17	0.17	0.17
Sat Flow, veh/h	1781	1870	1585	1781	1226	546	1781	1485	326	1165	647	1585
Grp Volume(v), veh/h	318	159	-56	17	0	263	188	0	111	238	0	98
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1772	1781	0	1812	1812	0	1585
Q Serve(g_s), s	9.6	4.4	0.0	0.5	0.0	10.2	7.2	0.0	4.0	9.1	0.0	3.1
Cycle Q Clear(g_c), s	9.6	4.4	0.0	0.5	0.0	10.2	7.2	0.0	4.0	9.1	0.0	3.1
Prop In Lane	1.00		1.00	1.00		0.31	1.00		0.18	0.64		1.00
Lane Grp Cap(c), veh/h	453	631	771	379	0	334	265	0	270	307	0	536
V/C Ratio(X)	0.70	0.25	-0.07	0.04	0.00	0.79	0.71	0.00	0.41	0.78	0.00	0.18
Avail Cap(c_a), veh/h	706	1214	1265	467	0	723	620	0	631	631	0	819
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.0	17.3	0.0	22.8	0.0	27.9	29.2	0.0	27.8	28.6	0.0	16.8
Incr Delay (d2), s/veh	1.5	0.2	0.0	0.0	0.0	4.1	4.9	0.0	1.4	3.2	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	1.8	0.0	0.2	0.0	4.5	3.3	0.0	1.8	4.0	0.0	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.5	17.5	0.0	22.8	0.0	32.0	34.1	0.0	29.2	31.8	0.0	17.0
LnGrp LOS	B	B	A	C	A	C	C	A	C	C	A	B
Approach Vol, veh/h		421			280			299				336
Approach Delay, s/veh		21.3			31.4			32.3				27.5
Approach LOS		C			C			C				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.0	30.6		16.3	17.8	19.9		18.1				
Change Period (Y+Rc), s	5.6	6.3		5.6	5.6	6.3		5.9				
Max Green Setting (Gmax), s	5.0	46.8		25.1	22.4	29.4		25.1				
Max Q Clear Time (g_c+I1), s	2.5	6.4		9.2	11.6	12.2		11.1				
Green Ext Time (p_c), s	0.0	0.9		1.5	0.5	1.4		1.2				
Intersection Summary												
HCM 6th Ctrl Delay				27.4								
HCM 6th LOS				C								

Intersection						
Int Delay, s/veh	4.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗			↗
Traffic Vol, veh/h	160	520	540	40	0	250
Future Vol, veh/h	160	520	540	40	0	250
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	182	591	614	45	0	284

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	659	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.12	-	6.22
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.218	-	3.318
Pot Cap-1 Maneuver	929	-	0
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	929	-	477
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	23.1
HCM LOS			C

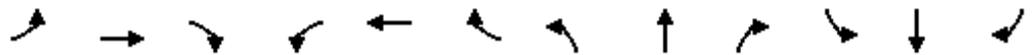
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	929	-	-	-	477
HCM Lane V/C Ratio	0.196	-	-	-	0.596
HCM Control Delay (s)	9.8	-	-	-	23.1
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.7	-	-	-	3.8

HCM 6th Signalized Intersection Summary

Cumulative Conditions - Improved

3: US 101 NB Off Ramp/US 101 NB On Ramp & Vineyard Dr

School Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	180	425	0	0	635	155	245	5	255	0	0	0
Future Volume (veh/h)	180	425	0	0	635	155	245	5	255	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	202	478	0	0	713	93	275	6	48			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	418	1320	0	0	766	649	315	7	286			
Arrive On Green	0.47	1.00	0.00	0.00	0.41	0.41	0.18	0.18	0.18			
Sat Flow, veh/h	1781	1870	0	0	1870	1585	1745	38	1585			
Grp Volume(v), veh/h	202	478	0	0	713	93	281	0	48			
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1585	1783	0	1585			
Q Serve(g_s), s	6.2	0.0	0.0	0.0	29.1	2.9	12.3	0.0	2.0			
Cycle Q Clear(g_c), s	6.2	0.0	0.0	0.0	29.1	2.9	12.3	0.0	2.0			
Prop In Lane	1.00		0.00	0.00		1.00	0.98		1.00			
Lane Grp Cap(c), veh/h	418	1320	0	0	766	649	322	0	286			
V/C Ratio(X)	0.48	0.36	0.00	0.00	0.93	0.14	0.87	0.00	0.17			
Avail Cap(c_a), veh/h	418	1320	0	0	888	753	374	0	333			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.72	0.72	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	17.9	0.0	0.0	0.0	22.5	14.8	31.9	0.0	27.7			
Incr Delay (d2), s/veh	0.2	0.6	0.0	0.0	19.4	0.5	16.2	0.0	0.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.2	0.2	0.0	0.0	15.9	1.1	6.6	0.0	0.8			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.1	0.6	0.0	0.0	41.9	15.3	48.1	0.0	27.8			
LnGrp LOS	B	A	A	A	D	B	D	A	C			
Approach Vol, veh/h		680			806			329				
Approach Delay, s/veh		5.8			38.9			45.1				
Approach LOS		A			D			D				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		61.4			23.7	37.7		18.6				
Change Period (Y+Rc), s		4.9			4.9	* 4.9		4.2				
Max Green Setting (Gmax), s		54.1			12.6	* 38		16.8				
Max Q Clear Time (g_c+I1), s		2.0			8.2	31.1		14.3				
Green Ext Time (p_c), s		1.5			0.1	1.7		0.2				

Intersection Summary

HCM 6th Ctrl Delay	27.6
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
 4: US 101 SB Ramps/Driveway & Vineyard Dr

Cumulative Conditions - Improved
 School Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	465	275	300	550	30	215	10	110	30	5	15
Future Volume (veh/h)	20	465	275	300	550	30	215	10	110	30	5	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	23	528	178	341	625	34	244	11	-44	34	6	16
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	111	581	492	456	917	50	280	13	259	68	12	71
Arrive On Green	0.06	0.31	0.31	0.51	1.00	1.00	0.16	0.16	0.00	0.04	0.04	0.04
Sat Flow, veh/h	1781	1870	1585	1781	1758	96	1708	77	1585	1525	269	1585
Grp Volume(v), veh/h	23	528	178	341	0	659	255	0	-44	40	0	16
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1853	1785	0	1585	1794	0	1585
Q Serve(g_s), s	1.0	21.7	7.0	12.1	0.0	0.0	11.2	0.0	0.0	1.7	0.0	0.8
Cycle Q Clear(g_c), s	1.0	21.7	7.0	12.1	0.0	0.0	11.2	0.0	0.0	1.7	0.0	0.8
Prop In Lane	1.00		1.00	1.00		0.05	0.96		1.00	0.85		1.00
Lane Grp Cap(c), veh/h	111	581	492	456	0	967	292	0	259	80	0	71
V/C Ratio(X)	0.21	0.91	0.36	0.75	0.00	0.68	0.87	0.00	-0.17	0.50	0.00	0.23
Avail Cap(c_a), veh/h	114	634	537	456	0	967	308	0	273	112	0	99
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.58	0.00	0.58	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	35.6	26.5	21.4	17.5	0.0	0.0	32.6	0.0	0.0	37.4	0.0	36.9
Incr Delay (d2), s/veh	0.3	20.6	2.1	3.8	0.0	2.3	21.1	0.0	0.0	3.6	0.0	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	12.5	2.8	4.0	0.0	0.6	6.4	0.0	0.0	0.8	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.0	47.1	23.5	21.2	0.0	2.3	53.7	0.0	0.0	40.9	0.0	38.1
LnGrp LOS	D	D	C	C	A	A	D	A	A	D	A	D
Approach Vol, veh/h		729			1000			211				56
Approach Delay, s/veh		40.9			8.7			64.9				40.1
Approach LOS		D			A			E				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	25.4	29.8		7.6	8.5	46.6		17.3				
Change Period (Y+Rc), s	4.9	* 4.9		4.0	3.5	4.9		4.2				
Max Green Setting (Gmax), s	5	* 27		5.0	5.1	39.5		13.8				
Max Q Clear Time (g_c+1/4), s	14	23.7		3.7	3.0	2.0		13.2				
Green Ext Time (p_c), s	0.3	1.2		0.0	0.0	4.2		0.1				

Intersection Summary

HCM 6th Ctrl Delay	27.3
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	3.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↑		↗
Traffic Vol, veh/h	515	110	0	780	0	245
Future Vol, veh/h	515	110	0	780	0	245
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	585	125	0	886	0	278

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	- - - 648
Stage 1	-	-	- - -
Stage 2	-	-	- - -
Critical Hdwy	-	-	- - - 6.22
Critical Hdwy Stg 1	-	-	- - -
Critical Hdwy Stg 2	-	-	- - -
Follow-up Hdwy	-	-	- - - 3.318
Pot Cap-1 Maneuver	-	- 0	- 0 470
Stage 1	-	- 0	- 0 -
Stage 2	-	- 0	- 0 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	- - - 470
Mov Cap-2 Maneuver	-	-	- - -
Stage 1	-	-	- - -
Stage 2	-	-	- - -

Approach	EB	WB	NB
HCM Control Delay, s	0	0	23.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	470	-	-	-
HCM Lane V/C Ratio	0.592	-	-	-
HCM Control Delay (s)	23.2	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	3.8	-	-	-

HCM 6th Signalized Intersection Summary
6: Bennett Wy & Vineyard Dr

Cumulative Conditions - Improved
School Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	490	75	340	390	50	60	20	55	80	20	25
Future Volume (veh/h)	35	490	75	340	390	50	60	20	55	80	20	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	40	557	85	386	443	57	68	23	62	91	23	28
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	63	639	541	424	906	117	103	35	122	126	32	139
Arrive On Green	0.04	0.34	0.34	0.24	0.56	0.56	0.08	0.08	0.08	0.09	0.09	0.09
Sat Flow, veh/h	1781	1870	1585	1781	1624	209	1347	456	1585	1436	363	1585
Grp Volume(v), veh/h	40	557	85	386	0	500	91	0	62	114	0	28
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1833	1803	0	1585	1799	0	1585
Q Serve(g_s), s	2.0	24.9	3.3	18.8	0.0	14.8	4.4	0.0	3.4	5.5	0.0	1.5
Cycle Q Clear(g_c), s	2.0	24.9	3.3	18.8	0.0	14.8	4.4	0.0	3.4	5.5	0.0	1.5
Prop In Lane	1.00		1.00	1.00		0.11	0.75		1.00	0.80		1.00
Lane Grp Cap(c), veh/h	63	639	541	424	0	1023	138	0	122	158	0	139
V/C Ratio(X)	0.64	0.87	0.16	0.91	0.00	0.49	0.66	0.00	0.51	0.72	0.00	0.20
Avail Cap(c_a), veh/h	176	889	754	599	0	1307	465	0	409	464	0	409
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	42.5	27.5	20.4	33.0	0.0	12.0	40.0	0.0	39.6	39.6	0.0	37.8
Incr Delay (d2), s/veh	3.9	7.1	0.1	11.5	0.0	0.4	5.2	0.0	3.3	6.1	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	11.9	1.2	9.2	0.0	5.7	2.1	0.0	1.4	2.7	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.4	34.6	20.6	44.5	0.0	12.3	45.3	0.0	42.8	45.7	0.0	38.5
LnGrp LOS	D	C	C	D	A	B	D	A	D	D	A	D
Approach Vol, veh/h		682			886			153				142
Approach Delay, s/veh		33.5			26.4			44.3				44.3
Approach LOS		C			C			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	27.5	36.8		11.9	8.2	56.1		12.9				
Change Period (Y+Rc), s	6.3	* 6.3		5.1	5.1	6.3		5.1				
Max Green Setting (Gmax), s	30.0	* 42		23.0	8.8	63.6		23.0				
Max Q Clear Time (g_c+I1), s	20.8	26.9		6.4	4.0	16.8		7.5				
Green Ext Time (p_c), s	0.4	3.6		0.6	0.0	3.7		0.6				
Intersection Summary												
HCM 6th Ctrl Delay				31.8								
HCM 6th LOS				C								
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary
7: Bethel Rd & Vineyard Dr

Cumulative Conditions - Improved
School Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	275	5	80	245	75	5	15	165	75	20	85
Future Volume (veh/h)	70	275	5	80	245	75	5	15	165	75	20	85
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	79	309	6	90	275	84	6	17	185	84	22	96
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	117	468	9	125	358	109	8	22	238	183	48	204
Arrive On Green	0.07	0.26	0.26	0.07	0.26	0.26	0.17	0.17	0.17	0.13	0.13	0.13
Sat Flow, veh/h	1781	1828	36	1781	1375	420	46	132	1432	1426	373	1585
Grp Volume(v), veh/h	79	0	315	90	0	359	208	0	0	106	0	96
Grp Sat Flow(s),veh/h/ln	1781	0	1864	1781	0	1795	1610	0	0	1799	0	1585
Q Serve(g_s), s	2.2	0.0	7.8	2.5	0.0	9.5	6.4	0.0	0.0	2.8	0.0	2.9
Cycle Q Clear(g_c), s	2.2	0.0	7.8	2.5	0.0	9.5	6.4	0.0	0.0	2.8	0.0	2.9
Prop In Lane	1.00		0.02	1.00		0.23	0.03		0.89	0.79		1.00
Lane Grp Cap(c), veh/h	117	0	477	125	0	468	267	0	0	231	0	204
V/C Ratio(X)	0.67	0.00	0.66	0.72	0.00	0.77	0.78	0.00	0.00	0.46	0.00	0.47
Avail Cap(c_a), veh/h	260	0	855	343	0	907	501	0	0	560	0	493
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.5	0.0	17.1	23.4	0.0	17.6	20.5	0.0	0.0	20.8	0.0	20.8
Incr Delay (d2), s/veh	6.6	0.0	1.6	7.5	0.0	2.7	4.9	0.0	0.0	1.4	0.0	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	3.1	1.2	0.0	3.8	2.4	0.0	0.0	1.1	0.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.1	0.0	18.7	30.9	0.0	20.3	25.4	0.0	0.0	22.2	0.0	22.5
LnGrp LOS	C	A	B	C	A	C	C	A	A	C	A	C
Approach Vol, veh/h		394			449			208			202	
Approach Delay, s/veh		21.0			22.4			25.4			22.3	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.1	18.2		11.6	7.9	18.4		13.5				
Change Period (Y+Rc), s	4.5	5.0		5.0	4.5	5.0		5.0				
Max Green Setting (Gmax), s	9.5	23.6		16.0	7.5	26.0		16.0				
Max Q Clear Time (g_c+1), s	14.5	9.8		4.9	4.2	11.5		8.4				
Green Ext Time (p_c), s	0.1	1.5		0.6	0.0	1.9		0.6				

Intersection Summary

HCM 6th Ctrl Delay	22.4
HCM 6th LOS	C

Intersection						
Int Delay, s/veh	5.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↘	↙
Traffic Vol, veh/h	160	15	95	110	15	155
Future Vol, veh/h	160	15	95	110	15	155
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	300	330	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	60	60	60	60
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	267	25	158	183	25	258

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	292	0	766 267
Stage 1	-	-	-	-	267 -
Stage 2	-	-	-	-	499 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1270	-	371 772
Stage 1	-	-	-	-	778 -
Stage 2	-	-	-	-	610 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1270	-	325 772
Mov Cap-2 Maneuver	-	-	-	-	325 -
Stage 1	-	-	-	-	778 -
Stage 2	-	-	-	-	534 -

Approach	EB	WB	NB
HCM Control Delay, s	0	3.8	13.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	688	-	-	1270	-
HCM Lane V/C Ratio	0.412	-	-	0.125	-
HCM Control Delay (s)	13.8	-	-	8.2	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	2	-	-	0.4	-

HCM 6th Signalized Intersection Summary
1: Vineyard Dr & Main St

Cumulative Conditions - Improved
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	250	145	70	5	105	60	70	15	10	160	30	220
Future Volume (veh/h)	250	145	70	5	105	60	70	15	10	160	30	220
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	284	165	-90	6	119	52	80	17	3	182	34	58
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	407	493	579	400	233	102	181	158	28	280	52	425
Arrive On Green	0.08	0.26	0.00	0.01	0.19	0.19	0.10	0.10	0.10	0.19	0.19	0.19
Sat Flow, veh/h	1781	1870	1585	1781	1234	539	1781	1548	273	1512	283	1585
Grp Volume(v), veh/h	284	165	-90	6	0	171	80	0	20	216	0	58
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1773	1781	0	1821	1795	0	1585
Q Serve(g_s), s	4.4	3.8	0.0	0.1	0.0	4.6	2.2	0.0	0.5	5.9	0.0	1.5
Cycle Q Clear(g_c), s	4.4	3.8	0.0	0.1	0.0	4.6	2.2	0.0	0.5	5.9	0.0	1.5
Prop In Lane	1.00		1.00	1.00		0.30	1.00		0.15	0.84		1.00
Lane Grp Cap(c), veh/h	407	493	579	400	0	334	181	0	185	333	0	425
V/C Ratio(X)	0.70	0.33	-0.16	0.02	0.00	0.51	0.44	0.00	0.11	0.65	0.00	0.14
Avail Cap(c_a), veh/h	407	797	837	554	0	776	840	0	859	812	0	849
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.8	15.8	0.0	17.2	0.0	19.3	22.4	0.0	21.6	20.0	0.0	14.7
Incr Delay (d2), s/veh	4.8	0.4	0.0	0.0	0.0	1.2	2.4	0.0	0.4	1.6	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	1.5	0.0	0.1	0.0	1.8	1.0	0.0	0.2	2.4	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.6	16.2	0.0	17.2	0.0	20.5	24.8	0.0	22.0	21.6	0.0	14.8
LnGrp LOS	C	B	A	B	A	C	C	A	C	C	A	B
Approach Vol, veh/h		359			177			100			274	
Approach Delay, s/veh		26.1			20.4			24.2			20.2	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.0	20.3		11.0	10.0	16.3		15.7				
Change Period (Y+Rc), s	5.6	6.3		5.6	5.6	6.3		5.9				
Max Green Setting (Gmax), s	5.0	22.6		25.0	4.4	23.2		24.0				
Max Q Clear Time (g_c+I1), s	2.1	5.8		4.2	6.4	6.6		7.9				
Green Ext Time (p_c), s	0.0	0.7		0.4	0.0	0.8		1.0				
Intersection Summary												
HCM 6th Ctrl Delay				23.0								
HCM 6th LOS				C								

Intersection						
Int Delay, s/veh	2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗			↗
Traffic Vol, veh/h	110	465	370	25	0	100
Future Vol, veh/h	110	465	370	25	0	100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	118	500	398	27	0	108

Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	425	0	-	0	-	412
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.12	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.218	-	-	-	-	3.318
Pot Cap-1 Maneuver	1134	-	-	-	0	640
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1134	-	-	-	-	640
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	11.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1134	-	-	-	640
HCM Lane V/C Ratio	0.104	-	-	-	0.168
HCM Control Delay (s)	8.5	-	-	-	11.8
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.6

HCM 6th Signalized Intersection Summary

Cumulative Conditions - Improved

3: US 101 NB Off Ramp/US 101 NB On Ramp & Vineyard Dr

PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	300	0	0	400	70	365	0	280	0	0	0
Future Volume (veh/h)	175	300	0	0	400	70	365	0	280	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	190	326	0	0	435	-2	397	0	72			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	563	1193	0	0	487	413	442	0	393			
Arrive On Green	0.63	1.00	0.00	0.00	0.26	0.00	0.25	0.00	0.25			
Sat Flow, veh/h	1781	1870	0	0	1870	1585	1781	0	1585			
Grp Volume(v), veh/h	190	326	0	0	435	-2	397	0	72			
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1585	1781	0	1585			
Q Serve(g_s), s	4.0	0.0	0.0	0.0	17.9	0.0	17.2	0.0	2.9			
Cycle Q Clear(g_c), s	4.0	0.0	0.0	0.0	17.9	0.0	17.2	0.0	2.9			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	563	1193	0	0	487	413	442	0	393			
V/C Ratio(X)	0.34	0.27	0.00	0.00	0.89	0.00	0.90	0.00	0.18			
Avail Cap(c_a), veh/h	563	1193	0	0	657	557	574	0	511			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.89	0.89	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	10.8	0.0	0.0	0.0	28.5	0.0	29.1	0.0	23.7			
Incr Delay (d2), s/veh	0.1	0.5	0.0	0.0	21.3	0.0	12.2	0.0	0.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.3	0.2	0.0	0.0	10.6	0.0	8.6	0.0	1.1			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.9	0.5	0.0	0.0	49.8	0.0	41.3	0.0	23.8			
LnGrp LOS	B	A	A	A	D	A	D	A	C			
Approach Vol, veh/h		516			433			469				
Approach Delay, s/veh		4.3			50.1			38.6				
Approach LOS		A			D			D				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		55.9			30.2	25.7		24.1				
Change Period (Y+Rc), s		4.9			4.9	* 4.9		4.2				
Max Green Setting (Gmax), s		45.1			13.5	* 28		25.8				
Max Q Clear Time (g_c+I1), s		2.0			6.0	19.9		19.2				
Green Ext Time (p_c), s		1.0			0.1	0.9		0.6				
Intersection Summary												
HCM 6th Ctrl Delay					29.6							
HCM 6th LOS					C							
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary
 4: US 101 SB Ramps/Driveway & Vineyard Dr

Cumulative Conditions - Improved
 PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	360	305	210	520	35	215	5	85	30	15	30
Future Volume (veh/h)	30	360	305	210	520	35	215	5	85	30	15	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	32	379	197	221	547	37	226	5	-68	32	16	31
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	111	449	381	592	914	62	263	6	239	62	31	82
Arrive On Green	0.06	0.24	0.24	0.66	1.00	1.00	0.15	0.15	0.00	0.05	0.05	0.05
Sat Flow, veh/h	1781	1870	1585	1781	1732	117	1745	39	1585	1207	603	1585
Grp Volume(v), veh/h	32	379	197	221	0	584	231	0	-68	48	0	31
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1849	1783	0	1585	1810	0	1585
Q Serve(g_s), s	1.4	15.4	8.6	4.4	0.0	0.0	10.1	0.0	0.0	2.1	0.0	1.5
Cycle Q Clear(g_c), s	1.4	15.4	8.6	4.4	0.0	0.0	10.1	0.0	0.0	2.1	0.0	1.5
Prop In Lane	1.00		1.00	1.00		0.06	0.98		1.00	0.67		1.00
Lane Grp Cap(c), veh/h	111	449	381	592	0	975	269	0	239	94	0	82
V/C Ratio(X)	0.29	0.84	0.52	0.37	0.00	0.60	0.86	0.00	-0.28	0.51	0.00	0.38
Avail Cap(c_a), veh/h	114	634	537	592	0	975	352	0	313	113	0	99
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.83	0.00	0.83	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	35.8	29.0	26.4	9.7	0.0	0.0	33.1	0.0	0.0	37.0	0.0	36.7
Incr Delay (d2), s/veh	0.5	17.3	5.0	0.2	0.0	2.3	12.5	0.0	0.0	3.2	0.0	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	8.8	3.7	1.5	0.0	0.6	5.2	0.0	0.0	1.0	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.3	46.3	31.3	9.9	0.0	2.3	45.6	0.0	0.0	40.2	0.0	38.8
LnGrp LOS	D	D	C	A	A	A	D	A	A	D	A	D
Approach Vol, veh/h		608			805			163			79	
Approach Delay, s/veh		40.9			4.4			64.6			39.6	
Approach LOS		D			A			E			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	31.5	24.1		8.1	8.5	47.1		16.3				
Change Period (Y+Rc), s	4.9	* 4.9		4.0	3.5	4.9		4.2				
Max Green Setting (Gmax), s	15.5	* 27		5.0	5.1	37.5		15.8				
Max Q Clear Time (g_c+I), s	10.4	17.4		4.1	3.4	2.0		12.1				
Green Ext Time (p_c), s	0.3	1.8		0.0	0.0	3.5		0.3				

Intersection Summary

HCM 6th Ctrl Delay	25.4
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	3.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↑		↗
Traffic Vol, veh/h	415	125	0	765	0	280
Future Vol, veh/h	415	125	0	765	0	280
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	428	129	0	789	0	289

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	-	-	-	493
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	-	-	0	-	0	576
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	576
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	17.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	576	-	-	-
HCM Lane V/C Ratio	0.501	-	-	-
HCM Control Delay (s)	17.4	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	2.8	-	-	-

HCM 6th Signalized Intersection Summary
6: Bennett Wy & Vineyard Dr

Cumulative Conditions - Improved
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	395	85	340	370	55	75	20	60	85	15	40
Future Volume (veh/h)	30	395	85	340	370	55	75	20	60	85	15	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	32	420	90	362	394	59	80	21	64	90	16	43
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	59	514	435	411	751	112	136	36	151	143	25	149
Arrive On Green	0.03	0.27	0.27	0.23	0.47	0.47	0.10	0.10	0.10	0.09	0.09	0.09
Sat Flow, veh/h	1781	1870	1585	1781	1589	238	1425	374	1585	1523	271	1585
Grp Volume(v), veh/h	32	420	90	362	0	453	101	0	64	106	0	43
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1828	1799	0	1585	1794	0	1585
Q Serve(g_s), s	1.2	14.8	3.1	13.9	0.0	12.3	3.8	0.0	2.7	4.0	0.0	1.8
Cycle Q Clear(g_c), s	1.2	14.8	3.1	13.9	0.0	12.3	3.8	0.0	2.7	4.0	0.0	1.8
Prop In Lane	1.00		1.00	1.00		0.13	0.79		1.00	0.85		1.00
Lane Grp Cap(c), veh/h	59	514	435	411	0	863	171	0	151	168	0	149
V/C Ratio(X)	0.54	0.82	0.21	0.88	0.00	0.52	0.59	0.00	0.42	0.63	0.00	0.29
Avail Cap(c_a), veh/h	166	842	713	703	0	1373	654	0	577	584	0	516
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.6	24.0	19.7	26.2	0.0	13.1	30.6	0.0	30.1	30.8	0.0	29.8
Incr Delay (d2), s/veh	2.9	3.3	0.2	3.3	0.0	0.5	3.2	0.0	1.9	3.9	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	6.6	1.1	5.9	0.0	4.6	1.8	0.0	1.1	1.9	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.5	27.2	19.9	29.5	0.0	13.6	33.9	0.0	32.0	34.7	0.0	30.9
LnGrp LOS	D	C	B	C	A	B	C	A	C	C	A	C
Approach Vol, veh/h		542			815			165				149
Approach Delay, s/veh		26.6			20.6			33.1				33.6
Approach LOS		C			C			C				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	21.4	25.7		11.8	7.4	39.7		11.7				
Change Period (Y+Rc), s	5.1	6.3		5.1	5.1	6.3		5.1				
Max Green Setting (Gmax), s	27.9	31.8		25.7	6.6	53.1		23.0				
Max Q Clear Time (g_c+I1), s	15.9	16.8		5.8	3.2	14.3		6.0				
Green Ext Time (p_c), s	0.5	2.6		0.7	0.0	3.3		0.6				
Intersection Summary												
HCM 6th Ctrl Delay				25.0								
HCM 6th LOS				C								

HCM 6th Signalized Intersection Summary
7: Bethel Rd & Vineyard Dr

Cumulative Conditions - Improved
PM Peak



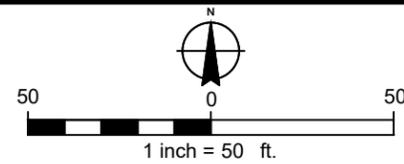
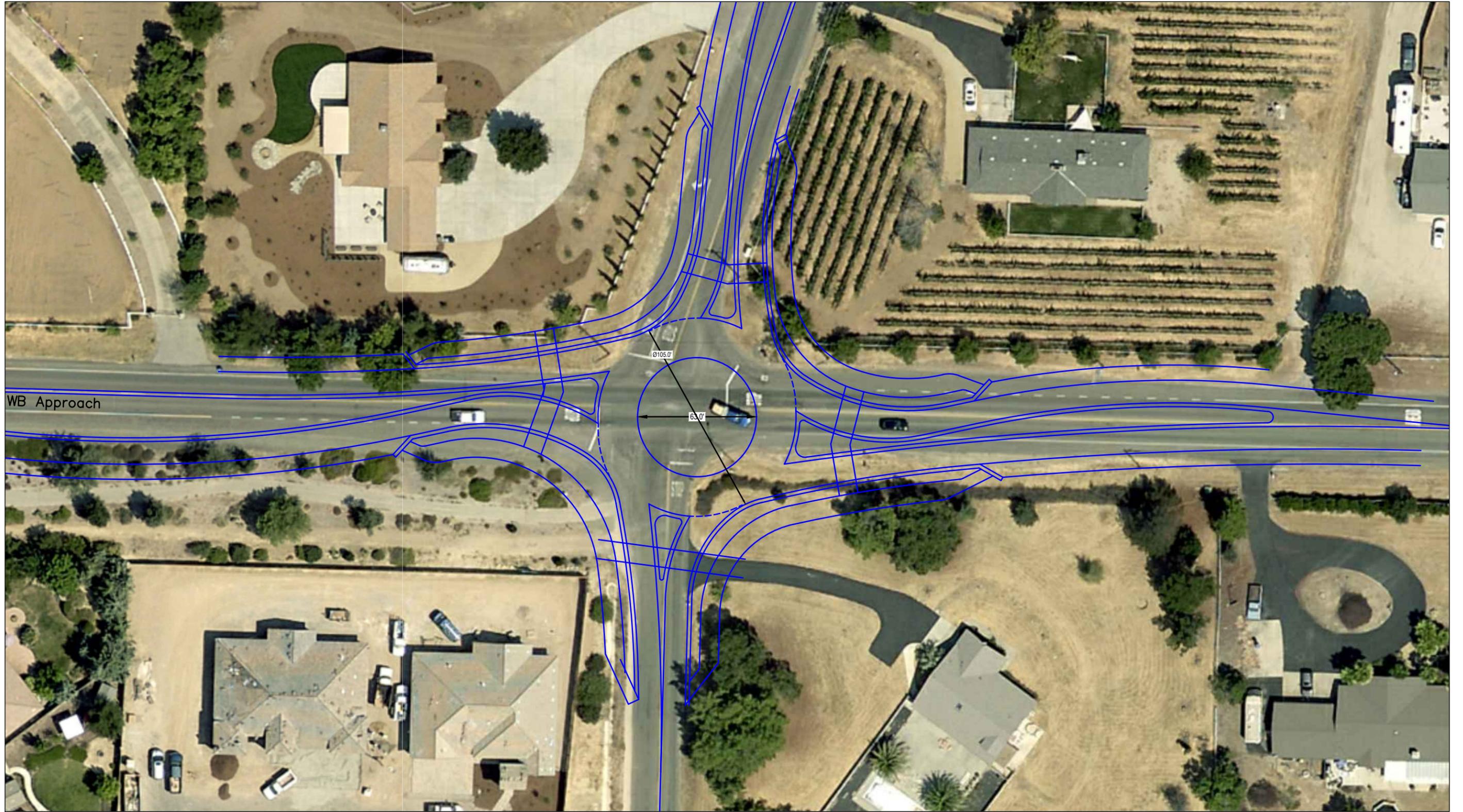
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	200	5	65	190	70	5	15	60	60	25	45
Future Volume (veh/h)	30	200	5	65	190	70	5	15	60	60	25	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	34	227	6	74	216	80	6	17	68	68	28	51
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	70	381	10	123	313	116	12	34	135	177	73	219
Arrive On Green	0.04	0.21	0.21	0.07	0.24	0.24	0.11	0.11	0.11	0.14	0.14	0.14
Sat Flow, veh/h	1781	1814	48	1781	1302	482	108	307	1228	1280	527	1585
Grp Volume(v), veh/h	34	0	233	74	0	296	91	0	0	96	0	51
Grp Sat Flow(s),veh/h/ln	1781	0	1862	1781	0	1784	1644	0	0	1806	0	1585
Q Serve(g_s), s	0.8	0.0	4.7	1.7	0.0	6.2	2.2	0.0	0.0	2.0	0.0	1.2
Cycle Q Clear(g_c), s	0.8	0.0	4.7	1.7	0.0	6.2	2.2	0.0	0.0	2.0	0.0	1.2
Prop In Lane	1.00		0.03	1.00		0.27	0.07		0.75	0.71		1.00
Lane Grp Cap(c), veh/h	70	0	391	123	0	428	181	0	0	250	0	219
V/C Ratio(X)	0.49	0.00	0.60	0.60	0.00	0.69	0.50	0.00	0.00	0.38	0.00	0.23
Avail Cap(c_a), veh/h	281	0	1101	393	0	1167	638	0	0	701	0	615
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.4	0.0	14.7	18.6	0.0	14.3	17.3	0.0	0.0	16.2	0.0	15.8
Incr Delay (d2), s/veh	5.2	0.0	1.5	4.6	0.0	2.0	2.2	0.0	0.0	1.0	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	1.8	0.8	0.0	2.3	0.8	0.0	0.0	0.7	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.6	0.0	16.2	23.2	0.0	16.3	19.5	0.0	0.0	17.2	0.0	16.4
LnGrp LOS	C	A	B	C	A	B	B	A	A	B	A	B
Approach Vol, veh/h		267			370			91			147	
Approach Delay, s/veh		17.2			17.7			19.5			16.9	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.4	13.7		10.7	6.1	14.9		9.5				
Change Period (Y+Rc), s	4.5	5.0		5.0	4.5	5.0		5.0				
Max Green Setting (Gmax), s	24.4	24.4		16.0	6.5	27.0		16.0				
Max Q Clear Time (g_c+1/3), s	13.5	6.7		4.0	2.8	8.2		4.2				
Green Ext Time (p_c), s	0.1	1.2		0.4	0.0	1.7		0.3				
Intersection Summary												
HCM 6th Ctrl Delay											17.6	
HCM 6th LOS											B	

Appendix D

Traffic Signal Warrant Analysis

Appendix E

Bethel Road/Vineyard Drive Roundabout Concept



San Luis Obispo County
 Vineyard Drive Corridor Plan

 Vineyard Dr & Bethel Rd
 Roundabout Concept

Project No. 12570229
 Report No. 000
 Date March 2023

FIGURE E.1

Appendix F

Preliminary Cost Estimates

Preliminary Opinion of Costs (Capital & Support)

Vineyard Drive Corridor Plan

West Segment (widening 8' shoulders)

San Luis Obispo County



8/29/2023

No.	Item Description	UOM	Quantity	Unit Cost	Item Total
Construction Costs					
1	Traffic Control	LS	1	\$120,000.00	\$120,000
2	Micro-surfacing	SY	23,000	\$3.60	\$82,800
3	Centerline	LF	16,000	\$2.00	\$32,000
4	General Striping	LF	32,000	\$2.00	\$64,000
5	General Signage	EA	10	\$400.00	\$4,000
6	Turn Arrows	EA	10	\$2,000.00	\$20,000
7	Roadway Widening	SF	118,800	\$16.00	\$1,900,800
8	Driveway Entrance Improvements (Paved)	EA	5	\$10,000.00	\$50,000
9	Driveway Entrance Improvements (Dirt)	EA	5	\$5,000.00	\$25,000
10	Drainage	EA	1	\$150,000.00	\$150,000
11	Mobilization	LS	5%	\$2,298,600.00	\$114,930
12	Minor / Supplemental Items	LS	15%	\$2,298,600.00	\$344,790
13	Adjust Utilities to Grade	LS	1	\$50,000.00	\$50,000
	Subtotal (Construction Costs)				\$2,960,000
	Construction Contingency			30%	\$890,000
	Total Construction Costs				\$3,850,000
Right of Way (Capital) and Utility Relocation Costs					
1	Right of Way	SF	118,800	\$20.00	\$2,376,000
2	Utility Relocation (by Utility Owner)	ALLOW	0	\$0.00	\$0
	Total Right of Way and Utility Relocation Costs				\$2,376,000
	Total Project Capital Cost				\$6,226,000
Project Support Costs					
1	Environmental Clearance (CEQA/NEPA)		Capital Costs	5%	\$ 311,300
2	PS&E		Con. Costs	12%	\$ 462,000
3	Right of Way Engineering & Acquisition		LS	\$48,000	\$ 48,000
4	Construction Support and Management		Con. Costs	10%	\$ 385,000
5	Overhead & Legal		Con. Costs	7%	\$ 269,500
	Total Project Support Costs				\$ 1,475,800
	Total Estimated Project Costs				\$ 7,701,800
	Rounded				\$ 7,710,000

Preliminary Opinion of Costs (Capital & Support)

Vineyard Drive Corridor Plan

Central Segment - Alternative 1 (Trail) with Roundabout at Bethel

San Luis Obispo County



8/29/2023

No.	Item Description	Units	Quantity	Unit Cost	Item Total
Construction Costs					
1	Traffic Control	LS	1	\$120,000.00	\$120,000
2	Trail	SF	59,000	\$12.00	\$708,000
3	Sidewalk	SF	4,400	\$12.00	\$52,800
4	Curb Ramps	EA	12	\$12,500.00	\$150,000
5	Micro-surfacing	SY	46,000	\$3.60	\$165,600
6	Raised Median	SF	4,000	\$12.00	\$48,000
7	Centerline	LF	11,000	\$2.00	\$22,000
8	Green Bike Lane Paint	LF	400	\$8.00	\$3,200
9	Crosswalks	LF	600	\$4.00	\$2,400
10	General Striping	LF	37,000	\$2.00	\$74,000
11	General Signage	EA	25	\$400.00	\$10,000
12	Turn Arrows	EA	32	\$2,000.00	\$64,000
13	Traffic Signal Bennet	EA	1	\$750,000.00	\$750,000
14	Rounabout Bethel	EA	1	\$3,000,000.00	\$3,000,000
15	Roadway Widening	SF	10,000	\$16.00	\$160,000
16	Driveway Entrance Improvements (Paved)	EA	12	\$10,000.00	\$120,000
17	Driveway Entrance Imporvements (Dirt)	EA	6	\$5,000.00	\$30,000
18	"STOP" Pavement Marker	EA	9	\$2,000.00	\$18,000
19	Bike Lane Pavement Marker	EA	22	\$2,000.00	\$44,000
20	Signals/Lighting - RRFB	LS	2	\$7,500.00	\$15,000
21	Drainage	EA	1	\$250,000.00	\$250,000
22	Mobilization	LS	5%	\$5,810,000.00	\$290,500
23	Minor / Supplemental Items	LS	15%	\$5,810,000.00	\$871,500
24	Adjust Utilities to Grade	LS	1	\$50,000.00	\$50,000
	Subtotal (Construction Costs)				\$7,020,000
	Construction Contingency			30%	\$2,110,000
	Total Construction Costs				\$9,130,000
Right of Way (Capital) and Utility Relocation Costs					
1	Right of Way	LS	1	\$1,000,000.00	\$1,000,000
2	Utility Relocation (by Utility Owner)	ALLOW	0	\$0.00	\$0
	Total Right of Way and Utility Relocation Costs				\$1,000,000
	Total Project Capital Cost				\$10,130,000
Project Support Costs					
1	Environmental Clearance (CEQA/NEPA)		Capital Costs	5%	\$ 506,500
2	PS&E		Con. Costs	12%	\$ 1,095,600
3	Right of Way Engineering & Acquisition		2-Parcels	\$15k/EA	\$ 30,000
4	Construction Support and Management		Con. Costs	10%	\$ 913,000
5	Overhead & Legal		Con. Costs	7%	\$ 639,100
	Total Project Support Costs				\$ 3,184,200
	Total Estimated Project Costs				\$ 13,314,200
	Rounded				\$ 13,320,000

Preliminary Opinion of Costs (Capital & Support)

Vineyard Drive Corridor Plan

Central Segment - Alternative 1 (Trail) with Traffic Signal at Bethel

San Luis Obispo County



8/29/2023

No.	Item Description	Units	Quantity	Unit Cost	Item Total
Construction Costs					
1	Traffic Control	LS	1	\$120,000.00	\$120,000
2	Trail	SF	59,000	\$12.00	\$708,000
3	Sidewalk	SF	4,400	\$12.00	\$52,800
4	Curb Ramps	EA	12	\$12,500.00	\$150,000
5	Micro-surfacing	SY	46,000	\$3.60	\$165,600
6	Raised Median	SF	4,000	\$12.00	\$48,000
7	Centerline	LF	11,000	\$2.00	\$22,000
8	Green Bike Lane Paint	LF	400	\$8.00	\$3,200
9	Crosswalks	LF	600	\$4.00	\$2,400
10	General Striping	LF	37,000	\$2.00	\$74,000
11	General Signage	EA	25	\$400.00	\$10,000
12	Turn Arrows	EA	32	\$2,000.00	\$64,000
13	Traffic Signal Bennet	EA	1	\$750,000.00	\$750,000
14	Traffic Signal Bethel	EA	1	\$750,000.00	\$750,000
15	Roadway Widening	SF	10,000	\$16.00	\$160,000
16	Driveway Entrance Improvements (Paved)	EA	12	\$10,000.00	\$120,000
17	Driveway Entrance Improvements (Dirt)	EA	6	\$5,000.00	\$30,000
18	"STOP" Pavement Marker	EA	9	\$2,000.00	\$18,000
19	Bike Lane Pavement Marker	EA	22	\$2,000.00	\$44,000
20	Signals/Lighting - RRFB	LS	2	\$7,500.00	\$15,000
21	Drainage	EA	1	\$250,000.00	\$250,000
22	Mobilization	LS	5%	\$3,560,000.00	\$178,000
23	Minor / Supplemental Items	LS	15%	\$3,560,000.00	\$534,000
24	Adjust Utilities to Grade	LS	1	\$50,000.00	\$50,000
	Subtotal (Construction Costs)				\$4,320,000
	Construction Contingency			30%	\$1,300,000
	Total Construction Costs				\$5,620,000
Right of Way (Capital) and Utility Relocation Costs					
1	Right of Way	LS	1	\$1,000,000.00	\$1,000,000
2	Utility Relocation (by Utility Owner)	ALLOW	0	\$0.00	\$0
	Total Right of Way and Utility Relocation Costs				\$1,000,000
	Total Project Capital Cost				\$6,620,000
Project Support Costs					
1	Environmental Clearance (CEQA/NEPA)		Capital Costs	5%	\$ 331,000
2	PS&E		Con. Costs	12%	\$ 674,400
3	Right of Way Engineering & Acquisition		2-Parcels	\$15k/EA	\$ 30,000
4	Construction Support and Management		Con. Costs	10%	\$ 562,000
5	Overhead & Legal		Con. Costs	7%	\$ 393,400
	Total Project Support Costs				\$ 1,990,800
	Total Estimated Project Costs				\$ 8,610,800
	Rounded				\$ 8,620,000

Preliminary Opinion of Costs (Capital & Support)

Vineyard Drive Corridor Plan

Central Segment- Alternative 2 (Sidewalks, Buffered Bike Lanes) w/Roundabout at Bethel

San Luis Obispo County



8/29/2023

No.	Item Description	Units	Quantity	Unit Cost	Item Total
Construction Costs					
1	Traffic Control	LS	1	\$120,000.00	\$120,000
2	Trail	SF	11,450	\$12.00	\$137,400
3	Sidewalk	SF	46,640	\$12.00	\$559,680
4	Curb Ramps	EA	12	\$12,500.00	\$150,000
5	Micro-surfacing	SY	46,000	\$3.60	\$165,600
6	Raised Median	SF	4,000	\$12.00	\$48,000
7	Centerline	LF	11,000	\$2.00	\$22,000
8	Green Bike Lane Paint	LF	400	\$8.00	\$3,200
9	Crosswalks	LF	600	\$4.00	\$2,400
10	General Striping	LF	37,000	\$2.00	\$74,000
11	General Signage	EA	25	\$400.00	\$10,000
12	Turn Arrows	EA	32	\$2,000.00	\$64,000
13	Traffic Signal Bennet	EA	1	\$750,000.00	\$750,000
14	Rounabout Bethel	EA	1	\$3,000,000.00	\$3,000,000
15	Roadway Widening	SF	61,000	\$16.00	\$976,000
16	Driveway Entrance Improvements (Paved)	EA	12	\$10,000.00	\$120,000
17	Driveway Entrance Imporvements (Dirt)	EA	6	\$5,000.00	\$30,000
18	"STOP" Pavement Marker	EA	9	\$2,000.00	\$18,000
19	Bike Lane Pavement Marker	EA	22	\$2,000.00	\$44,000
20	Signals/Lighting - RRFB	LS	2	\$7,500.00	\$15,000
21	Drainage	EA	1	\$250,000.00	\$250,000
22	Mobilization	LS	5%	\$6,560,000.00	\$328,000
23	Minor / Supplemental Items	LS	15%	\$6,560,000.00	\$984,000
24	Adjust Utilities to Grade	LS	1	\$50,000.00	\$50,000
	Subtotal (Construction Costs)				\$7,930,000
	Construction Contingency			30%	\$2,380,000
	Total Construction Costs				\$10,310,000
Right of Way (Capital) and Utility Relocation Costs					
1	Right of Way	LS	1	\$1,000,000.00	\$1,000,000
2	Utility Relocation (by Utility Owner)	ALLOW	0	\$0.00	\$0
	Total Right of Way and Utility Relocation Costs				\$1,000,000
	Total Project Capital Cost				\$11,310,000
Project Support Costs					
1	Environmental Clearance (CEQA/NEPA)		Capital Costs	5%	\$ 565,500
2	PS&E		Con. Costs	12%	\$ 1,237,200
3	Right of Way Engineering & Acquisition		2-Parcels	\$15k/EA	\$ 30,000
4	Construction Support and Management		Con. Costs	10%	\$ 1,031,000
5	Overhead & Legal		Con. Costs	7%	\$ 721,700
	Total Project Support Costs				\$ 3,585,400
	Total Estimated Project Costs				\$ 14,895,400
	Rounded				\$ 14,900,000

Preliminary Opinion of Costs (Capital & Support)

Vineyard Drive Corridor Plan

Central Segment- Alternative 2 (Sidewalks, Buffered Bike Lanes) w/Traffic Signal at Bethel

San Luis Obispo County



8/29/2023

No.	Item Description	Units	Quantity	Unit Cost	Item Total
Construction Costs					
1	Traffic Control	LS	1	\$120,000.00	\$120,000
2	Trail	SF	11,450	\$12.00	\$137,400
3	Sidewalk	SF	46,640	\$18.00	\$839,520
4	Curb Ramps	EA	12	\$12,500.00	\$150,000
5	Micro-surfacing	SY	46,000	\$3.60	\$165,600
6	Raised Median	SF	4,000	\$12.00	\$48,000
7	Centerline	LF	11,000	\$2.00	\$22,000
8	Green Bike Lane Paint	LF	400	\$8.00	\$3,200
9	Crosswalks	LF	600	\$4.00	\$2,400
10	General Striping	LF	37,000	\$2.00	\$74,000
11	General Signage	EA	25	\$400.00	\$10,000
12	Turn Arrows	EA	32	\$2,000.00	\$64,000
13	Traffic Signal Bennet	EA	1	\$750,000.00	\$750,000
14	Traffic Signal Bethel	EA	1	\$750,000.00	\$750,000
15	Roadway Widening	SF	61,000	\$16.00	\$976,000
16	Driveway Entrance Improvements (Paved)	EA	12	\$10,000.00	\$120,000
17	Driveway Entrance Improvements (Dirt)	EA	6	\$5,000.00	\$30,000
18	"STOP" Pavement Marker	EA	9	\$2,000.00	\$18,000
19	Bike Lane Pavement Marker	EA	22	\$2,000.00	\$44,000
20	Signals/Lighting - RRFB	LS	2	\$7,500.00	\$15,000
21	Drainage	EA	1	\$250,000.00	\$250,000
22	Mobilization	LS	5%	\$4,590,000.00	\$229,500
23	Minor / Supplemental Items	LS	15%	\$4,590,000.00	\$688,500
24	Adjust Utilities to Grade	LS	1	\$50,000.00	\$50,000
	Subtotal (Construction Costs)				\$5,560,000
	Construction Contingency			30%	\$1,670,000
	Total Construction Costs				\$7,230,000
Right of Way (Capital) and Utility Relocation Costs					
1	Right of Way	LS	1	\$1,000,000.00	\$1,000,000
2	Utility Relocation (by Utility Owner)	ALLOW	0	\$0.00	\$0
	Total Right of Way and Utility Relocation Costs				\$1,000,000
	Total Project Capital Cost				\$8,230,000
Project Support Costs					
1	Environmental Clearance (CEQA/NEPA)		Capital Costs	5%	\$ 411,500
2	PS&E		Con. Costs	12%	\$ 867,600
3	Right of Way Engineering & Acquisition		2-Parcels	\$15k/EA	\$ 30,000
4	Construction Support and Management		Con. Costs	10%	\$ 723,000
5	Overhead & Legal		Con. Costs	7%	\$ 506,100
	Total Project Support Costs				\$ 2,538,200
	Total Estimated Project Costs				\$ 10,768,200
	Rounded				\$ 10,770,000

Preliminary Opinion of Costs (Capital & Support)

Vineyard Drive Corridor Plan

East Segment Improvements

San Luis Obispo County



8/29/2023

No.	Item Description	UOM	Quantity	Unit Cost	Item Total
Construction Costs					
1	Traffic Control	LS	1	\$50,000.00	\$50,000
2	Curb Ramps	EA	2	\$12,500.00	\$25,000
3	Micro-surfacing	SY	12,000	\$3.60	\$43,200
4	Striped Median	SF	6,000	\$1.00	\$6,000
5	Centerline	LF	3,000	\$2.00	\$6,000
6	Green Bike Lane Paint	LF	700	\$8.00	\$5,600
7	Crosswalks	LF	400	\$4.00	\$1,600
8	General Striping	LF	6,000	\$2.00	\$12,000
9	General Signage	EA	2	\$400.00	\$800
10	Turn Arrows	EA	14	\$2,000.00	\$28,000
11	Signals - controller upgrade	LS	1	\$50,000.00	\$50,000
12	Drainage	EA	1	\$50,000.00	\$50,000
13	Mobilization	LS	5%	\$178,200.00	\$8,910
14	Minor / Supplemental Items	LS	15%	\$178,200.00	\$26,730
15	Adjust Utilities to Grade	LS	1	\$50,000.00	\$50,000
	Subtotal (Construction Costs)				\$370,000
	Construction Contingency			30%	\$120,000
	Total Construction Costs				\$490,000
1	Right of Way	SF	0	\$20.00	\$0
2	Utility Relocation (by Utility Owner)	ALLOW	0	\$0.00	\$0
	Total Right of Way and Utility Relocation Costs				\$0
	Total Project Capital Cost				\$490,000
Project Support Costs					
1	Environmental Clearance (CEQA/NEPA)		Capital Costs	5%	\$ 24,500
2	PS&E		Con. Costs	12%	\$ 58,800
3	Right of Way Engineering & Acquisition			N/A	\$ -
4	Construction Support and Management		Con. Costs	10%	\$ 49,000
5	Overhead & Legal		Con. Costs	7%	\$ 34,300
	Total Project Support Costs				\$ 166,600
	Total Estimated Project Costs				\$ 656,600
	Rounded				\$ 660,000

Preliminary Opinion of Costs (Capital & Support)

Vineyard Drive Corridor Plan

Rossi Road Realignment

San Luis Obispo County



8/29/2023

No.	Item Description	UOM	Quantity	Unit Cost	Item Total
Construction Costs					
1	Traffic Control	LS	1	\$50,000.00	\$50,000
2	Sidewalk	SF	24,150	\$12.00	\$289,800
3	Curb Ramps	EA	18	\$12,500.00	\$225,000
4	Raised Median	SF	710	\$12.00	\$8,520
5	Centerline	LF	1,185	\$2.00	\$2,370
6	Crosswalks	LF	430	\$4.00	\$1,720
7	General Striping	LF	200	\$2.00	\$400
8	General Signage	EA	5	\$400.00	\$2,000
9	Pavement Markers	EA	11	\$2,000.00	\$22,000
10	Roadway Pavement	SF	50,000	\$30.00	\$1,500,000
11	Landscape Buffer	SF	2,090	\$12.00	\$25,080
12	Drainage	EA	1	\$50,000.00	\$50,000
13	Mobilization	LS	5%	\$601,810.00	\$30,091
14	Minor / Supplemental Items	LS	15%	\$601,810.00	\$90,272
15	Adjust Utilities to Grade	LS	1	\$50,000.00	\$50,000
	Subtotal (Construction Costs)				\$2,350,000
	Construction Contingency			30%	\$710,000
	Total Construction Costs				\$3,060,000
1	Right of Way	SF	50,000	\$20.00	\$1,000,000
2	Utility Relocation (by Utility Owner)	ALLOW	1	\$0.00	\$0
	Total Right of Way and Utility Relocation Costs				\$1,000,000
	Total Project Capital Cost				\$4,060,000
Project Support Costs					
1	Environmental Clearance (CEQA/NEPA)		Capital Costs	5%	\$ 203,000
2	PS&E		Con. Costs	12%	\$ 367,200
3	Right of Way Engineering & Acquisition			N/A	\$ -
4	Construction Support and Management		Con. Costs	10%	\$ 306,000
5	Overhead & Legal		Con. Costs	7%	\$ 214,200
	Total Project Support Costs				\$ 1,090,400
	Total Estimated Project Costs				\$ 5,150,400
	Rounded				\$ 5,160,000



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