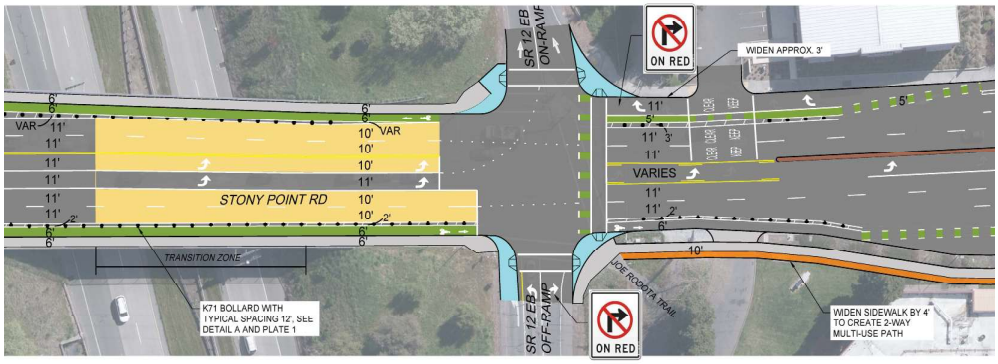
Exhibit B

Stony Point Road Corridor Study for Active Transportation Modes



Prepared for the City of Santa Rosa

Submitted by

W-Trans

August 12, 2021

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Executive Summary

Stony Point Road is a major north-south travel route connecting numerous neighborhoods and commercial areas within Santa Rosa. Carrying high volumes of traffic, conditions on Stony Point Road can be intimidating for many pedestrians and bicyclists. Due to the high number of collisions involving these vulnerable users, the *Santa Rosa Bicycle and Pedestrian Master Plan Update 2018* identified the Stony Point Road corridor for further study which the Bicycle and Pedestrian Advisory Board (BPAB) identified as the highest priority.

The recommendations herein grew out of an analysis of transportation facilities in the study area, existing traffic conditions, and identification of key issues by local residents. Caltrans was consulted during the process to provide input on the bicycle and pedestrian concept plans as they are ultimately responsible for implementing and maintaining facilities on the state highway system.

Study Area

The study area includes Stony Point Road from West Third Street to Sebastopol Road in west Santa Rosa, a distance of just under one-half mile. Abutting land uses are primarily commercial, although there are numerous residential neighborhoods nearby. State Route (SR) 12 is a limited access highway that runs east-west through the center of the study area and connects Santa Rosa with Sebastopol. Stony Point Road and SR 12 are connected by a grade-separated interchange.

Existing Conditions

Stony Point Road has four travel lanes and a raised median or left-turn lanes throughout most of the study area. There are five signalized intersections along the corridor as well as freeway access ramps at the SR 12 interchange. Bike lanes and sidewalks are present along both sides for the entire length of the corridor, while on-street parking is prohibited.

Traffic volumes along Stony Point Road are approximately 26,000 vehicles per day, and there is a speed limit of 35 mph. Speed surveys indicate that the 85th percentile speeds are approximately 37 mph, slightly above the speed limit. All study intersections are currently operating at LOS D or better.

Collisions

Due to the high rate of collisions and injuries, the study corridor was identified in the *Santa Rosa Bicycle and Pedestrian Master Plan Update 2018* as part of the High Injury Network for both bicyclists and pedestrians.

Community Engagement

Throughout the project, several strategies were used to consult with members of the community about local needs and to obtain comments on the proposed improvements. These included:

- **Community Meetings:** Two virtual community meetings were held, attracting 60 participants total.
- **Online Surveys:** Two online surveys were developed to solicit input on key issues for pedestrians and bicyclists in the study area and to weigh in on the draft concept plans. Nearly 600 responses were submitted to the two surveys.

- **Bicycle Pedestrian Advisory Board (BPAB) Meetings:** The BPAB received three presentations on the draft concept plans and were asked to provide input to staff and the consultant team. Members of the public also attended meetings and provided comments.

Key Issues

Through the analysis of existing conditions along the study corridor and input from the community, several issues to be addressed were identified:

Bicycle Safety – Bicyclists don't feel comfortable riding along Stony Point Road.

Pedestrian Crossings – Crossings along the corridor are wide due to the number of travel lanes, including turn lanes at the intersections. Vehicle speeds were perceived as high as they entered on-ramps to SR 12 and made right turns across crosswalks.

Joe Rodota Trail Crossing – The Joe Rodota Trail runs east-west and crosses Stony Point Road at the SR 12 East amps. Concerns were expressed about conflicts between vehicle traffic and high number of trail users, which include children traveling to school.

Recommendations

Recommendations include the following:

- Provide increased protection for bicyclists with the addition of Class IV separated bikeways along Stony Point Road throughout the study segment including vertical separators.

- Facilitate pedestrian crossings at the intersections of Stony Point Road with West Third Street, SR 12 West Ramps-Occidental Road, SR 12 Eastbound Ramps, and Sebastopol Road by constructing curb extensions to reduce the speed of turning vehicles and shorten pedestrian crossing distances.

- Install raised crosswalks or Rectangular Rapid Flashing Beacons (RRFBs) at the entrance to the SR 12 West on-ramps to reduce the speed of vehicles and raise awareness of drivers to the presence of pedestrians.

- Realign the pedestrian crossing at the SR 12 Eastbound Ramps, where the Joe Rodota Trail crosses Stony Point Road. Improvements include: the removal of the existing island and free right-turn movement for northbound traffic entering the ramp, add a second left-turn lane at the SR 12 East on-ramp for southbound traffic on Stony Point Road, allowing for additional green time for trail users at the crossing, no right on red, install bike cross, and remove one of the two eastbound left-turn lanes.

- Provide enhanced bike lane striping to establish a clear path of travel for bicyclists through intersections and increase awareness of drivers to the presence of bicyclists.

- Investigate the potential to construct a multi-use path along the west side of Stony Point Road between the Joe Rodota Trail and Sebastopol Road to provide a low stress connection for bicyclists between the trail and Cesar Chavez Language Academy on Sebastopol Road.

- Change westbound ramp approach from R, TR, L, L to R, T, L, L.

Implementation

The estimated cost to design and construct the recommended project is approximately $2.75 million. Potential funding sources for the proposed improvements include the State's Active Transportation Program, which is California's largest source of funding for pedestrian and bicycle projects. The Highway Safety Improvement Program could potentially provide funding for safety-related improvements, especially at locations where a high number of injury collisions have occurred.

Introduction and Setting

Purpose

Stony Point Road between West Third Street and Sebastopol Road was identified for further study in the City's *Bicycle and Pedestrian Master Plan Update 2018* due to the high rate of collisions involving bicyclists and pedestrians. The BPAB identified this corridor as the highest priority in the City.

Key challenges along the study corridor for bicyclists and pedestrians are the lack of separation between the existing bike lanes and vehicular traffic, the large volumes of traffic turning into and out of heavily used shopping areas, and crossings at the ramps at the SR 12/Stony Point Road interchange and the Joe Rodota Trail.

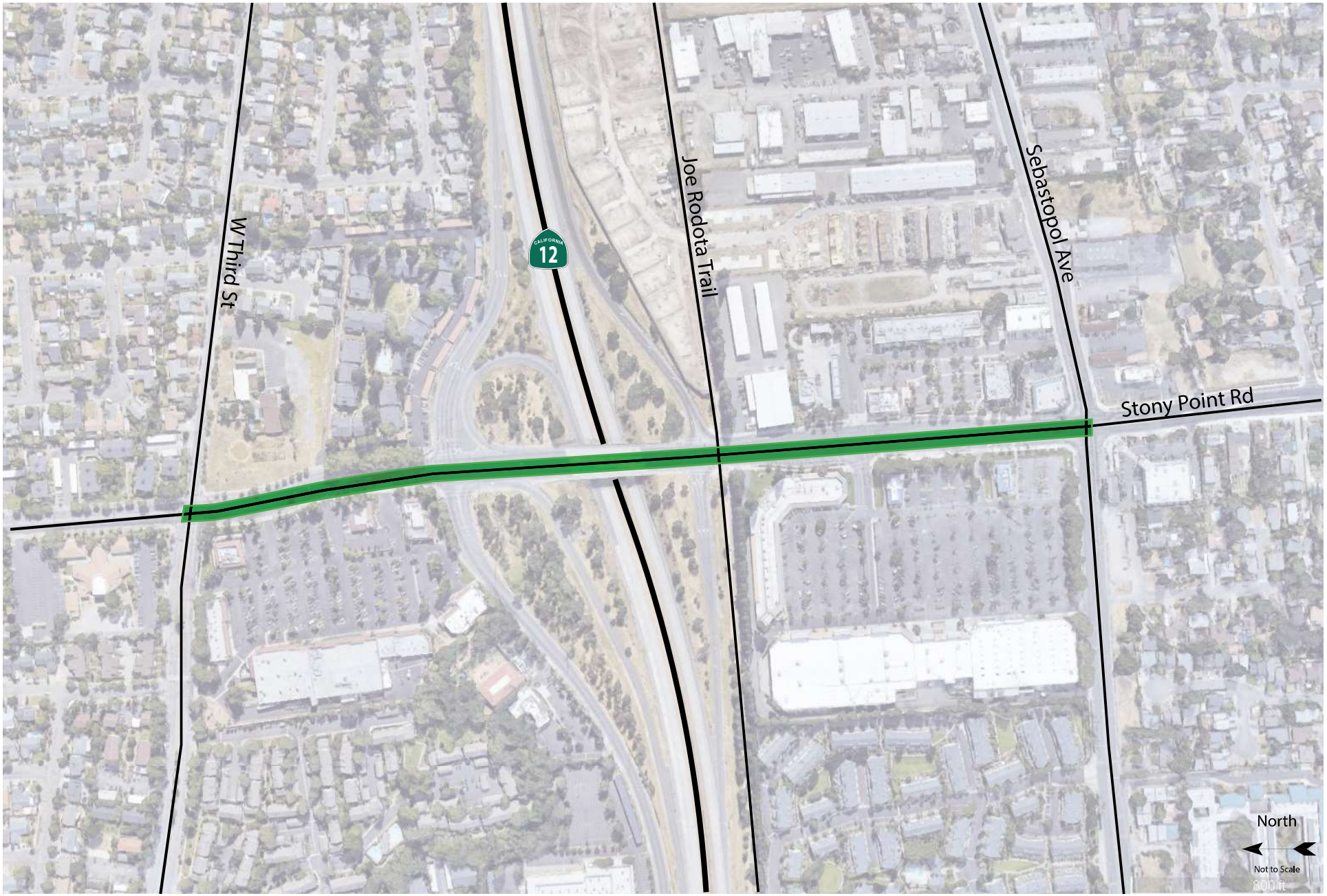
The purpose of this study was to develop a focused local roadway safety plan by evaluating the traffic conditions and collision history and develop recommendations to enhance safety and to create a more comfortable place for people to bike and walk, while maintaining adequate vehicle circulation and safety. The conceptual plans developed through this study are intended to provide the basis for grant funding applications to secure the resources needed to implement the proposed projects.

Study Area

The study area consists of a half-mile segment of Stony Point Road extending from West Third Street to Sebastopol Road, as presented in Figure 1. Stony Point Road is classified as a Regional Street in the City's General Plan and connects West College Avenue in Santa Rosa to Petaluma Boulevard North in Petaluma. In the project area, the land uses with frontage along Stony Point Road are primarily commercial, with shopping centers on the east and west sides of the street between SR 12 and Sebastopol Road and another shopping center on the west side of the street between Occidental Road and West Third Street. On the east side of the street between Occidental Road and West Third Street there are residential uses and a church.

Stony Point Road consists of four through travel lanes with turn lanes and medians. There are traffic signals at the intersections at West Third Street, SR 12 West off-ramp-Occidental Road, the SR 12 Eastbound Ramps, Shopping Center Plaza (entrances to shopping centers on both sides of the street), and Sebastopol Road. Where Stony Point Road crosses over SR 12 there is a grade-separated interchange.

Facilities for non-vehicle transportation include sidewalks and bike lanes along both sides of the entire study corridor. There is an intermittent landscape strip providing a buffer between the sidewalk and roadway. Marked crosswalks are present only at signalized intersections. The Joe Rodota Trail runs parallel to SR12 and intersects the corridor at the intersection with the SR12 Eastbound Ramps intersection. Transit service is available along Stony Point Road.



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Stony Point Road Corridor Study for Active Transportation Modes

Figure 1 – Study Area

W-Trans

Planning Context

This study builds on policies and previous analyses that were undertaken in several planning efforts, both at the City and regional level. Relevant highlights of these plans are summarized below.

General Plan 2035

The General Plan includes several policies that lay the foundation for the *Stony Point Road Corridor Study for Active Transportation Modes,* as follows.

- Provide attractive and safe streets for pedestrians and bicyclists.
- Develop a citywide system of designated bikeways that serves both experienced and casual bicyclists, and which maximizes bicycle use for commuting, recreation, and local transport.
- Develop a safe, convenient, and continuous network of pedestrian sidewalks and pathways that link neighborhoods with schools, parks, shopping areas, and employment centers.

The General Plan also identifies functional classifications of the City's street network. The segment of Stony Point Road under study is classified as a six-lane regional/arterial street.

Bicycle and Pedestrian Master Plan Update (2018)

Through the 2018 *Bicycle and Pedestrian Master Plan Update* (BPMP), Santa Rosa undertook a comprehensive assessment of existing facilities and analysis of options for enhancing facilities for bicyclists and pedestrians. The projects and priorities in the BPMP were the product of analysis as well as an extensive public engagement process which included three public open houses, a survey, an online interactive map, stakeholder interviews, and a series of pop-up outreach events.

Safety was an emphasis of this effort, as the BPMP identified a High Injury Network as a basis for establishing priorities for infrastructure projects. High Injury Network corridors were selected based on concentrations of collisions involving fatalities or severe injuries for bicyclists and pedestrians. The highest priority segment on the High Injury Network was the section of Stony Point Road from Sebastopol Road to Glenbrook Drive.

The current study supports the following BPMP policies and actions:

- **Policy 3:** Design a Low Stress Bikeway Network suitable for the "Interested but Concerned," to include people of all ages and ability levels riding bicycles.
- **Action 3.1:** Design a network of continuous Low Stress Bikeways as identified in this Plan Update 2018. Projects that improve comfort at intersections and along corridors with high stress should be prioritized.
- **Policy 4:** Design a connected, convenient, and comfortable pedestrian network to serve people of all ages and abilities.

Stony Point Road between Sebastopol Road and Guerneville Road was identified in the BPMP as a corridor for future study. The Plan also identified five priority locations for crossing enhancements in the study area at the intersections of Stony Point Road with Third Street, SR 12 West Ramps-Occidental Road, SR 12 Eastbound Ramps, Joe Rodota Trail, and Sebastopol Road.

In addition to the facilities in the study area, there are several bicycle facilities that are of citywide or regional significance, illustrating the importance of the study corridor to the larger bicycle network. These facilities include

the Santa Rosa Creek Trail and bike lanes along Sebastopol Road (a portion of which have been identified for a potential upgrade to Class IV facilities.

Roseland Area-Sebastopol Road Specific Plan (2016)

- **GOAL PBN-2:** Ensure pedestrian and bicycle facilities are designed with safety and comfort in mind.
- **Policy PBN-2.3:** Install high-visibility crosswalk markings and signage in areas with high pedestrian activity
- **Policy PBN-2.4:** Enhance safety at the Joe Rodota Trail crossing of Stony Point Road by eliminating the free-flow right-turn island at the SR 12 East ramps intersection, using curb extensions to reduce crossing distances where possible, and implementing pedestrian- and bicycle-friendly signal timing strategies.
- **Policy PBN-2.5:** Ensure that pedestrian and bicyclist safety and convenience are maintained where paths and trails cross streets through a variety of measures such as signing, special pavement markings or colors, raised crosswalks, and/or warning lights alerting motorists to the presence of bicyclists and pedestrians at major crossings.

In addition to the recommended facilities focusing on the needs of pedestrians and bicyclists, the plan recommends the addition of a second southbound left-turn lane at the intersection of Stony Point Road/SR 12 Eastbound Ramps-Joe Rodota Trail to enhance vehicle circulation.

California State Bicycle and Pedestrian Plan and Caltrans District 4 Active Transportation Plans

Toward an Active California (2017), the state bicycle and pedestrian plan, established a policy framework for bicycling and walking throughout the state, featuring the following goals:

- Safety: Reduce the number, rate, and severity of bicycle and pedestrian involved collisions
- Mobility: Increase walking and bicycling in California
- Preservation: Maintain a high-quality active transportation system
- Social Equity: Invest resources in communities that are most dependent on active transportation and transit

The *Caltrans District 4 Bike Plan for the San Francisco Bay Area* (2018) built on these overarching goals by identifying several emphasis areas to guide improvements to bicycle facilities in the Bay Area, particularly along or across the state highway system. Two of these emphasis areas are especially relevant to the Stony Point Road corridor project since enhancements to the ramps at the SR 12 interchange are a key focus of the study: 1) design safer and more intuitive highway crossings and interchanges, and 2) prioritize safety and comfort in creating complete bicycle networks.

In 2021, Caltrans completed the *District 4 Pedestrian Plan for the Bay Area*. Similar to the District 4 bike plan, the emphasis was on facilities for walking along or across the state highway system. In particular, the plan identified six characteristics of projects that represent the greatest need, three of which describe the Stony Point Road corridor: sidewalks along higher-speed roadways (defined as having a posted speed limit of 35 mph or higher), stressful pedestrian crossings, and freeway interchange needs.

Existing Transportation Conditions

General Conditions

Stony Point Road is a six-lane regional/local arterial street as identified in the Santa Rosa General Plan and serves as a truck route. The roadway is divided by a concrete median and on-street parking is prohibited throughout the study area. The posted speed is 35 mph. There are five traffic-signal controlled intersections – West Third Street, SR 12 West off-ramp-Occidental Road, SR 12 Eastbound Ramps, Stony Point Plaza (shopping center entrances), and Sebastopol Road. Sidewalks and bike lanes are present along both sides of Stony Point Road throughout the corridor.

Land uses along Stony Point Road are primarily commercial. Between West Third Street and Occidental Road there is a shopping center on the west side of the street, with three unsignalized access driveways. On the east side of the street at this location are a residential development that backs onto Stony Point Road and a church that takes access from West 3rd Street. Between SR 12 and Sebastopol Road, shopping centers are present on both sides of the street.

The curb-to-curb width along the corridor varies, ranging from approximately 75 to 105 feet. Plates 1 through 7 illustrate existing conditions at key locations in the study area.

Plate 1 Northbound approaching W. Third St.

Plate 2 Southbound at Occidental Rd.

Plate 3 Southbound at SR 12 West on-ramp

Plate 4 Northbound at SR 12 West on-ramp

Plate 5 Northbound at SR 12 East on-ramp

Plate 6 Southbound approaching Stony Point Plaza

Plate 7 Southbound traffic approaching Sebastopol Rd.

Pedestrian Facilities

Sidewalks are present along both sides of the street throughout the study area and are generally five to six feet wide. A landscape buffer is present along both sides of the street between West Third Street and Occidental Road. While there is no buffer along the section on the SR 12 overpass and it is intermittent between the eastbound ramps and Sebastopol Road, the bike lanes provide separation from travel lanes. Marked crosswalks are provided at all five signalized intersections along the corridor but are present on all legs only at the West Third Street and Sebastopol Road intersections.

Bicycle Network

The *Highway Design Manual*, Caltrans, 2017, classifies bikeways into four categories:

- **Class I Multi-Use Path** – a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flows of motorized traffic minimized.
- **Class II Bike Lane** – a striped and signed lane for one-way bike travel on a street or highway.
- **Class III Bike Route** – signing only for shared use with motor vehicles within the same travel lane on a street or highway.
- **Class IV Bikeway** – also known as a separated bikeway, is a bikeway for the exclusive use of bicycles and includes a separation between the bikeway and the motor vehicle traffic lane. The separation (or, "buffer") may include, but is not limited to, grade separation, flexible posts, inflexible physical barriers, or on-street parking. (Note: *Caltrans Design Information Bulletin Number 89, Class IV Bikeway Guidance*, December 2015, provides detailed guidance on Class IV Bikeways.)

Existing and proposed bicycle facilities in the study corridor are summarized in Table 1.

Table 1 – Existing and Proposed Bicycle Facilities

Street	Project Limits	Facility Type
Existing		
Joe Rodota Trail	SMART Trail to Petaluma Ave (Sebastopol)	Class I
Stony Point Rd	W College Ave to Petaluma Blvd N (Petaluma)	Class II
Occidental Rd	Fulton Rd to Stony Point Rd	Class II
Proposed		
Third St	Stony Point Rd to Brittain Ln	Class IIB
Stony Point Rd	Guerneville Rd to Sebastopol Rd	Study

Source: *Santa Rosa Bicycle and Pedestrian Master Plan Update 2018,* City of Santa Rosa, 2018

Level of Traffic Stress

The BPMP conducted a citywide Bicycle Level of Traffic Stress (LTS) analysis, which evaluated the comfort level for typical bicyclists based on roadway characteristics, including traffic conditions and the presence of bicycle facilities. Variables that have been identified as contributing to increased stress for bicyclists include heavy traffic volumes, high vehicle speeds, narrow travel lanes, and minimal or no separation from vehicle traffic. Roadway segments throughout the City were analyzed and assigned a rating, ranging from LTS 1 for the lowest traffic stress roadways to LTS scores for the highest stress routes. These scores generally correspond to the categories of bicyclists that they best serve: All Ages and Abilities (LTS 1), Average Adult (LTS 2), Confident Adult (LTS 3), and Fearless Adult (LTS 4). While Stony Point Road includes designated bike lanes throughout the study area, it was

rated LTS 3 due to the physical characteristics of the roadway and traffic. Major roadways intersecting with Stony Point Road in the study area were also rated relatively high for traffic stress, as Sebastopol Road and Occidental Road were classified as LTS 3 and West Third Street as LTS 4.

Transit Operations

CityBus

Stony Point Road is served by CityBus Route 15. The route serves Stony Point Road between West College Avenue and Bellevue Avenue, and provides connections at the Coddingtown Mall transit hub. The route operates seven days a week with 60-minute headways, with service hours from 6:30 a.m. to 8:00 p.m. weekdays, 8:30 a.m. to 5:00 p.m. on Saturdays, and 10:30 a.m. to 5:00 p.m. on Sundays. Within the study area there are northbound and southbound stops north of Sebastopol Road, which include turnouts where buses can load and unload passengers. There is a northbound stop between Occidental Road and West Third Street with no turnout or shoulder, so the bus must straddle the bike lane and vehicle lane to stop for passengers.

Paratransit

The City of Santa Rosa offers next-day ADA Paratransit transportation service seven days a week to those who are unable (temporarily or permanently) to independently use Santa Rosa CityBus due to a disability or health related condition. This service is provided within three-quarters of a mile from existing CityBus routes as part of the requirements of the Americans with Disabilities Act (ADA).

Collision History

The collision history for the study area was reviewed to determine collision rates using collision records from the California Highway Patrol as published in their *Statewide Integrated Traffic Records System (SWITRS)* reports. The typical analysis period for collisions is five years, and the analysis period selected for this analysis was March 1, 2015 to February 29, 2020, as this predates the reduced traffic volumes associated with activity restrictions related to the COVID-19 pandemic. Collision rates were then compared to average rates for highway facilities statewide, as published by Caltrans in the *2016 Collision Data on California State Highways.* The results of the collision rate analysis are shown in Table 2 and the collision data is included in Appendix A.

Table 2 – Summary of Intersection Collision Analysis (2015-2020)

Intersection	MVE[1]	SWITRS Collisions	Actual Rate[2]	State Avg Rate
1. Stony Point Rd/W Third St	12.74	19	0.30	0.43
2. Stony Point Rd/SR 12 WB Off-Ramp-Occidental Rd	15.15	49	**0.65**	0.43
3. Stony Point Rd/SR12 EB Ramps	15.37	16	0.21	0.43
4. Stony Point Rd/Stony Point Plaza	13.61	29	0.43	0.43
5. Stony Point Rd/Sebastopol Rd	14.97	81	**1.08**	0.43
TOTAL		**194**		

Notes: [1]MVE = Million Vehicle Entering. Daily traffic entering intersections was calculated using the average of the AM and PM turning movement count volume multiplied by 10; [2]Collision rates are in units of collisions per million vehicles entering ; **Bold** text indicates rates substantially higher than the Statewide average

Based on SWITRS data, collision rates substantially exceeded the statewide average at the locations of Stony Point Road/SR 12 Westbound Off-Ramp-Occidental Road and Stony Point Road/Sebastopol Road. The data also

revealed that nearly 30 percent of the collisions recorded at Stony Point Road/Sebastopol Road were attributed to unsafe speeds and 37 percent were rear-end crashes. There were no distinct patterns for collisions recorded at Stony Point Road/SR 12 West Ramps-Occidental Road.

Based on the consultant team's experience conducting safety studies, five years is generally not an adequate time frame for pedestrian and bicycle collision analysis as there are significantly fewer collisions involving these modes. To obtain a larger sample size that could provide a more meaningful collision pattern, a ten-year analysis period was used for these modes, from March 1, 2010 through February 29, 2020. During this analysis period there were five collisions involving bicyclists and one collision involving pedestrians at the intersection of Stony Point Road/West Third Street. Five bicycle and six pedestrian collisions occurred at the Stony Point Road/SR 12 West Ramps-Occidental Road intersection; three out of five bicycle collisions were between northbound through bicyclists on Stony Point Road and eastbound Occidental Road right-turning drivers due to bicyclists traveling on the wrong side of the road. At the intersection of Stony Point Road/SR 12 Eastbound Ramps there were three bicycle collisions, two due to auto right-of-way violations and one to unsafe speed; there was one pedestrian collision attributed to a pedestrian right-of-way violation. For the intersection of Stony Point Road/Sebastopol Road, there were 13 bicycle and three pedestrian collisions; however, no pattern was observed.

Intersection Operations

The study included a detailed evaluation of operation at the following intersections on the corridor:

1. Stony Point Road/West Third Street
2. Stony Point Road/SR 12 Westbound Off-Ramp-Occidental Road
3. Stony Point Road/SR 12 Eastbound Ramps-Joe Rodota Trail
4. Stony Point Road/Stony Point Plaza
5. Stony Point Road/Sebastopol Road

Following are descriptions of the study intersections.

Stony Point Road/West Third Street is a signalized four-legged intersection with left-turn pockets and protected left-turn phasing on all four approaches. There are medians on the west and south legs and right-turn pockets are provided on the eastbound and northbound approaches. The northbound bike lane striping stops at the right-turn pocket, but striping is provided through the turn pocket to provide bike lane connectivity through the intersection. Marked crosswalks are present on all four legs.

Stony Point Road/SR 12 Westbound Off-Ramp-Occidental Road is a signalized four-legged intersection with right-turn lanes on the eastbound and westbound approaches. Left-turn pockets with protected left-turn phasing are provided on the northbound, westbound, and eastbound approaches. Marked crosswalks are present across all except the south leg. On-ramps to SR 12 westbound are located approximately 100 feet south of the intersection for northbound and southbound traffic along Stony Point Road as Occidental Road forms the west leg of the intersection across from the off-ramp.

Stony Point Road/SR 12 Eastbound Ramps is a signalized three-way, four-legged intersection, the east leg of which is an on-ramp to SR 12. There are right-turn lanes provided on the northbound and eastbound approaches and left-turn pockets on the eastbound and southbound approaches; protected left-turn phasing is provided on the southbound approach. The northbound right-turn lane is channelized and uncontrolled. Marked crosswalks are present on all except the north leg.

Stony Point Road/Stony Point Plaza is a signalized intersection with protected left-turn movements on the north-south Stony Point Road approaches and split, or exclusive, phasing on the east-west movements. Crosswalks are provided on all approaches except across the northern leg, where signs direct pedestrians to use marked crosswalks.

Stony Point Road/Sebastopol Road is a signalized intersection with protected left-turn phasing on all four approaches as well as right-turn overlaps on the southbound and westbound approaches. Crosswalks and pedestrian phasing are provided on all approaches.

Intersection Levels of Service

Level of Service (LOS) is used to rank traffic operation on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, Level of Service A represents free flow conditions and Level of Service F represents forced flow or breakdown conditions. A unit of measure that indicates a level of delay generally accompanies the LOS designation.

The study intersections are controlled by traffic signals and were evaluated using the signalized methodology from the *Highway Capacity Manual* (HCM), Transportation Research Board, 2018. This methodology is based on factors including traffic volumes, green time for each movement, phasing, whether the signals are coordinated or not, truck traffic, and pedestrian activity. Signal timing obtained from the City was used in the analysis. Average stopped delay per vehicle in seconds is used as the basis for evaluation in this LOS methodology.

The ranges of delay associated with the various levels of service are indicated in Table 3.

Table 3 – Signalized Intersection Level of Service Criteria

LOS A	Delay of 0 to 10 seconds. Most vehicles arrive during the green phase, so do not stop at all.
LOS B	Delay of 10 to 20 seconds. More vehicles stop than with LOS A, but many drivers still do not have to stop.
LOS C	Delay of 20 to 35 seconds. The number of vehicles stopping is significant, although many still pass through without stopping.
LOS D	Delay of 35 to 55 seconds. The influence of congestion is noticeable, and most vehicles have to stop.
LOS E	Delay of 55 to 80 seconds. Most, if not all, vehicles must stop and drivers consider the delay excessive.
LOS F	Delay of more than 80 seconds. Vehicles may wait through more than one cycle to clear the intersection.

Reference: *Highway Capacity Manual*, Transportation Research Board, 2018.

Under existing conditions, all study intersections along the corridor were found to be operating at LOS D or better, which is considered acceptable based on City standards, except for the intersection of Stony Point Road/SR 12 West Ramp-Occidental Road, which operates at LOS E during the p.m. peak hour. A summary of the intersection Level of Service calculations is contained in the Table 4. The calculations are included in Appendix B.

Table 4 – Existing Peak Hour Intersection Levels of Service

Study Intersection	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. Stony Point Rd/W Third St	35.5	D	52.4	D
2. Stony Point Rd/SR 12 WB Off-Ramp-Occidental Rd	43.3	D	59.3	E
3. Stony Point Rd/SR 12 EB Ramps	23.7	C	29.6	C
4. Stony Point Rd/Stony Point Plaza	10.2	B	20.4	C
5. Stony Point Rd/Sebastopol Rd	49.0	D	42.5	D

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

Summary of Key Issues

Based on analysis of conditions and a field review, several key issues to be addressed were identified.

Corridor Issues

- **Provide increased comfort for bicyclists:** While bike lanes are present along Stony Point Road throughout the study area, this segment was rated as LTS 3 in the City's BPMP, which means it is suitable for a "confident adult" bicyclist. Additional protection from traffic could reduce traffic stress levels and enable more bicyclists to feel comfortable riding along the corridor.

Intersection Issues

- **Reduce pedestrian crossing distances:** Pedestrians are required to cross up to seven travel lanes at intersections, which may be challenging, especially for people with mobility impairments.

- **Reduce speed of turning vehicles at intersections and on-ramps:** Large turning radii enable drivers to make right turns at high rates of speed, reducing their reaction time and posing a greater risk of injury to crossing pedestrians. Speed reduction is of particular concern at the uncontrolled crossings where vehicles access the SR 12 on-ramps.

- **Reduce vehicle-pedestrian conflicts:** While drivers are required to yield to pedestrians entering or in crosswalks, potential conflicts can be minimized especially at the two ramps to SR 12 West where there is high-speed traffic crossing uncontrolled pedestrian crosswalks.

- **Reduce vehicle-bicycle conflicts:** A common type of collision is the "right hook", by which a right-turning vehicle collides with a bicyclist traveling straight through an intersection.

Best Practices and Potential Improvement Measures

Based on the information collected, analysis of corridor conditions, and deficiencies noted, a "toolbox" of potential improvement measures representing best practices was identified for consideration in developing the recommendations for this plan. Community input regarding these treatments was solicited through the community engagement process, including the first community workshop, meetings of the Bicycle and Pedestrian Advisory Board, and online surveys.

Best Practices Toolbox

Buffered Bike Lanes

- Provide greater shy distance between motor vehicles and bicyclists
- Provide space for bicyclists to pass another bicyclist without encroaching into the vehicle travel lane
- Encourage bicycling by contributing to the perception of safety among users of the bicycle network

High Visibility Bike Lane Striping

- Used at high conflict zones, such as commercial driveways
- Alerts drivers, helps them anticipate bicyclists
- Designates space for bicycles, helps them maintain safe positioning in roadway

Narrow Lanes

- Reduce the likelihood/severity of crashes
- Promote slower driving speeds
- Need to use lane width appropriate for use of that street, such as buses and heavy trucks

Raised Crosswalk

- Reduces vehicle speeds
- Increases visibility of pedestrians
- Benefits mobility impaired individuals by eliminating need for ramps

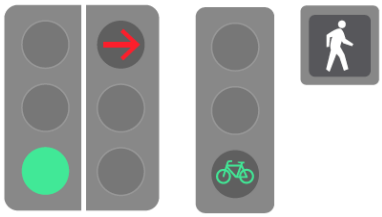
Protected Intersection

- Allocates space for all roadway users
- Slows turning vehicles
- Curb extensions reduce crossing distances

Bikecross

- Alerts drivers and helps them anticipate bicyclists
- Designates space for bicycles and helps bicyclists maintain safe positioning in the roadway
- Provides traffic calming

Protected Bike Signal



- Separates bicycle and vehicle movements
- Reduces conflicts between bicycles and turning vehicles
- Enhances bicyclist safety and comfort

Directional Curb Ramps

- Enhance safety for mobility-impaired individuals
- Create more direct transition from curb ramp to crosswalk
- Align detectable warnings with crosswalk markings

Multi-use Path

- Separates pedestrians and bicyclists from vehicle traffic
- Enhances comfort for users of varying ages and abilities
- Appeals to recreational users

Separated Bike Lanes (Cycle Track)

- Separate bicyclists from vehicle traffic
- Provide additional protection compared to standard bike lanes due to presence of buffer and vertical barrier
- Improve bicyclist perceived comfort and safety

Source: NACTO

Rectangular Rapid Flashing Beacon

- Increases driver awareness of pedestrians
- Requires pedestrian activation, minimizing impact on vehicle circulation
- Is effective near schools and other locations with high pedestrian volumes

Curb Extension

- Reduces crossing distance, allowing pedestrians to cross more safely
- Provides additional visibility and protection for pedestrians, especially children
- Slows and calms traffic, particularly fast traffic turning from a major to a minor road

Community Engagement

Overview

Due to the COVID-19 pandemic and the resulting restrictions on public gatherings, the planned outreach approach was modified and shifted to an online format. City staff and the consultant team used a combination of virtual meetings and online surveys to solicit input from residents of Santa Rosa, particularly the neighborhoods in the vicinity of the project. The City sought to develop an inclusive planning process, particularly since the area at the southern end of the study area – including the Roseland neighborhood – has been identified by the Metropolitan Transportation Commission (MTC) as a Community of Concern (CoC). The CoC designation is based on characteristics including income level, minority population, senior population, and the number of zero-vehicle households. Seeking to involve disadvantaged residents in the development of the project, the City provided Spanish translation at the two community meetings and offered the online survey in both English and Spanish.

The community engagement process included two phases:

Phase I – Identify Community Concerns and Solicit Concept Plan Input

- Bicycle and Pedestrian Advisory Board Meeting #1 (August 20, 2020)
- Community Meeting #1 (November 18, 2020, online)
- Online Survey #1 (November 2020)
- Bicycle and Pedestrian Advisory Board Meeting #2 (January 21, 2021)

Phase II – Refine Recommended Improvements

- Community Meeting #2 (March 3, 2021, online)
- Online Survey #2 (March 2021)
- Bicycle and Pedestrian Advisory Board Meeting #3 (March 18, 2021)

Outreach Process

City staff notified area residents about public meetings and the survey through the distribution channels indicated in Table 5.

Table 5 – Community Meeting and Survey Notifications		
Media	**Description**	**Date**
Direct mail postcards (8,257 per meeting)	Meeting notifications	December 2020, March 2021
Email bulletins (9,100 subscribers)	Community Meeting #1	November 2020
	Community Meeting #2	February 2021
	Survey #2 (2 mailings)	March 2021 (twice)
City web site	Project web page	ongoing
	news flash	November 2020, February 2021
	community calendar	November 2020, March 2021
Facebook posts	Community Meeting #1	November 2020
	Survey #1	December 2020
	Community Meeting #2	February 2021, March 2021
Facebook events	Community Meeting #1	November 2020
Twitter	Community Meeting #2	March 2021
Nextdoor	Community Meeting #1	November 2020
	Survey #2	March 2021

Community Engagement, Phase 1: Public Meetings and Survey Summary

Bicycle Pedestrian Advisory Board Meeting #1 (August 20, 2020)

Two design concepts for Stony Point Road were presented to the Bicycle Pedestrian Advisory Board (BPAB): 1) a bi-directional multi-use path along the west side of Stony Point Road plus a buffered bike lane along the east side of the roadway; and 2) one-way cycle tracks in both directions to provide a buffer and a vertical barrier between bicyclists and vehicle traffic. The BPAB expressed concerns with interactions between bicyclists and vehicles at intersections under the first option and supported the latter option.

Community Meeting #1 (November 18, 2020)

A virtual meeting was held to provide an overview of the study. The consultant team delivered a presentation to review existing conditions, including a summary of traffic conditions as well as key opportunities and constraints. Potential design options were discussed, and a question and answer session followed the presentation. There were approximately 35 participants at the meeting. The following requests were made by attendees.

- Improve the connection from Joe Rodota Trail to Cesar Chavez Language Academy on Sebastopol Road.
- Reduce potential conflicts between Joe Rodota Trail users and vehicles turning right from the eastbound off-ramp onto Stony Point Road.
- Provide bicyclists with additional protection from right-turning drivers at intersections and driveways.
- Install sturdy barriers in addition to the striped buffer to better protect bicycles from vehicle traffic.

Online Survey #1

Following the workshop, an online survey was made available through SurveyMonkey to solicit additional feedback regarding the preliminary design concepts as well as input regarding the needs of pedestrians and bicyclists in the study area. The survey generated 237 responses, with over 50 percent of respondents expressing support for project elements included in the preliminary designs, including a protected intersection, buffered bike lanes, bike lane striping through intersections, bikecross alongside crosswalks, and dashed green bike lane striping through conflict zones. Buffered bike lanes received the strongest support of any treatment, with 70 percent approval. A summary of the results is presented in Appendix C.

Community Engagement, Phase 2: Public Meetings and Survey

The second phase of community engagement for the project included a community meeting, survey, and two presentations to the Bicycle Pedestrian Advisory Board. The input received through this process is presented later in this study as part of the evaluation of the proposed alternatives.

Development and Refinement of Alternatives

Based on the recommendations developed through previously adopted plans, data analysis, information collected through field reviews, and input from the public, strategies were identified to best address the primary concerns in the corridor.

Preliminary Proposed Bikeway Improvements

For travel along Stony Point Road, a Class IV bikeway (also known as a separate bikeway or cycle track) was recommended to provide bicyclists with greater protection from vehicle traffic than the existing bike lane. Other bicycle facility improvements included striping bike lanes through intersections and providing dashed green bike lane markings at potential conflict points.

A multi-use path was considered along the east side of the bridge across SR 12, but was rejected after consultation with staff and the BPAB. One-way bicycle facilities were identified as the preferred design to provide consistency of the design along the entire corridor and avoid creating a bicycle circulation pattern that could confuse drivers.

Key considerations in the facility design included:

- It was assumed that the existing curb-to-curb width would remain the same for cost-effectiveness.
- The City identified the need for an additional southbound left turn lane at the SR 12 East on-ramp due to delays under current conditions. While the goal was to maintain 11-foot travel lanes, the existing space on the bridge could not accommodate this width and the Class IV bikeway.

Preliminary Proposed Pedestrian Crossing Improvements

Recommended pedestrian crossing improvements were developed for each intersection along the study corridor. Crosswalks are present at all signalized intersections, and there was no identified need to introduce additional crossings based on adjacent land uses. Proposed pedestrian improvements are summarized in Table 6.

Table 6 – Summary of Recommended Pedestrian Crossing Improvements

Location	Description
W Third St	Construct curb extension on southwest corner
Occidental Rd-SR 12 WB Off-Ramp	Construct curb extensions at northeast and southwest corners, restripe WB off ramp to a Right/Thru/Left/Left
SR 12 WB On-Ramp	Add raised crosswalks or RRFBs at existing crosswalks
SR 12 Eastbound Ramps-Joe Rodota Trail	Remove pork chop island/eliminate free right turn Realign crosswalk and install bikecross Add curb extensions on all four corners Restrict eastbound right turn movement to protect trail users Remove one lane on off-ramp to reduce crossing distance
Stony Point Plaza	No proposed improvements
Sebastopol Rd	Construct protected intersection Add curb extension/wider sidewalk at southwest corner

Stakeholder Input

The draft concept plan was presented to the public, the BPAB, City staff, and Caltrans. The outreach to the public included an online community meeting and an online survey.

Bicycle Pedestrian Advisory Board Meeting #2 (January 21, 2021)

The BPAB was presented with the alternatives from the first community meeting as well as public comments provided at the meeting and the results of the first survey. Recommendations provided by Board members included the following.

- Address potential conflicts between eastbound vehicles exiting SR 12 and turning right across the Joe Rodota Trail.
- Implement speed reduction measure due to high vehicle speeds at the northern end of the bridge over SR 12.
- Remove one of the westbound right-turn lanes at the Occidental Road intersection to reduce conflicts with crossing pedestrians.
- Close one of the three driveways into the shopping center between West Third Street and Occidental Road to reduce the number of conflict points for pedestrians and bicyclists.
- Add a vertical barrier between the bicycle facility and adjacent travel lane, something more substantial than a delineator or other device that could easily be driven over.

Community Meeting #2 (March 3, 2021)

Incorporating comments from the public, the BPAB, and City staff, the consultant team revised the draft concept plans. A second virtual meeting was held to review the revised concept plan, with approximately 25 attendees. Comments provided by attendees included the following.

- There appears to be a tight turning radius for eastbound vehicles on West Third Street making a right turn onto Stony Point Road.
- There appears to be a tight turning radius for southbound vehicles on Stony Point Road turning right onto Sebastopol Road, which may be problematic for trucks. Perhaps bollards near the intersection could be removed to address this.
- Perhaps both the raised crosswalk and flashing beacons (RRFB) could be used at the SR 12 on-ramps.
- Could a speed hump be added in front of the raised crosswalk so drivers would slow down earlier?
- Consider adding a bicycle/pedestrian bridge at the Joe Rodota Trail crossing.
- The plan should address needs of bicyclists of all ages and abilities, especially by providing paths where possible.

Online Survey #2

The second online survey focused on identifying support for or opposition to the proposed corridor improvements and generated 354 responses. The survey included a detailed presentation of the proposed improvements, including the proposed bike lane enhancements and pedestrian crossing recommendations at each intersection. The proposed enhancements to the Stony Point Road bike lanes and the improvements to the study intersections all received high levels of support. Respondent preferences for each proposal were assessed based on ratings of 1 through 5, with 1 representing strong support and 5 representing strong opposition. Consolidating the responses of 1 and 2 to indicate support for each item, proposals were supported by at least 60 percent of respondents and as high as 90 percent. Survey results are summarized in Table 7.

Table 7 – Summary of Online Survey #2 Results						
Location	**Key Improvements**	**Rating (1 = Strongly Approve, 5 = Strongly Oppose)**				
		1	**2**	**3**	**4**	**5**
Roadway						
Stony Point Rd	Bike lane buffer with bollards	64%	15%	7%	5%	9%
Intersection						
W Third St	Curb extensions	44%	19%	14%	9%	13%
Occidental Rd	Curb extensions	49%	19%	15%	6%	11%
SR 12 Westbound Ramps	Raised crosswalks	59%	12%	14%	6%	9%
	RRFBs*	73%	13%	9%	2%	3%
	High-visibility crosswalks	78%	12%	5%	1%	4%
SR 12 Eastbound Ramps	Realign intersection/remove NB free right turn	57%	16%	14%	3%	10%
	Remove lane on off-ramp	51%	15%	15%	5%	14%
	Cross-bike adjacent to crosswalk	57%	16%	13%	4%	10%
	No right on red from off-ramp	46%	14%	14%	7%	19%
Sebastopol Rd	Protected intersection	47%	17%	17%	6%	12%

Notes: * Rectangular Rapid Flashing Beacon

Bicycle Pedestrian Advisory Board Meeting # 3 (March 18, 2021)

A third presentation was delivered to the BPAB of the results of the second online survey and to solicit comments on the revised concept plans. Comments from Board members included:

- The proposed design indicates that the bollards along the Class IV bikeway be spaced 36 feet apart to allow drivers to pull over to permit emergency vehicles to pass more quickly along Stony Point Road. Several members indicated that this spacing would provide inadequate protection for bicyclists and reduce the benefit of the proposed design.
- The curb extension at the southwest corner of the Stony Point Road/SR 12 West Ramps-Occidental Road intersection should be expanded to channelize southbound vehicles entering the westbound on-ramp onto SR 12.
- A bike lane should be retained up to the intersection on the eastbound approach to the Stony Point Road/Sebastopol Road intersection. The existing turn pocket was retained to maintain acceptable flow for eastbound through traffic, but the proposed curb extension would reduce the roadway width; the proposed design includes a shared space for the turn pocket and bike lane.

The following additional comments were provided by members of the public.

- Are there any opportunities to implement elements of the recommended design as a "quick build" project?
- If the "no right on red" at the SR 12 East off-ramp requires activation by pedestrians, drivers will not expect it and compliance will be problematic.

Emergency Services Staff

Staff from the City's Fire and Police departments were consulted on the draft designs to ensure that they provided adequate access for emergency vehicles throughout the study area. The primary concern was the impact of the bollards for the separated bikeway to impact emergency vehicle access along Stony Point Road between West Third Street and Occidental Road. Under the roadway's existing configuration, with wider travel lanes and a striped bike lane, vehicle traffic can more easily move toward the curb to provide space for emergency vehicles. To address this concern, the recommended plan provides for bollards spaced 36 feet apart along the west side of the street to enable vehicles to pull into the bike lane to make way for emergency vehicles. Another consideration was the impact of curb extensions on the curb radii at study area intersections; development of the concept designs included a turning template analysis to determine the needs for trucks, so this was determined not to be problematic.

Caltrans Comments

Upon review of the draft concept plan, Caltrans District 4 staff identified several concerns, including:

- **Lane width:** The proposed cross-section of Stony Point Road on the overpass over SR 12 included travel lanes that were 10 feet wide. Staff indicated that a minimum lane width of 11 feet would be required within Caltrans right-of-way based on the Caltrans *Highway Design Manual* standards for multi-lane roadways. Deviation from the standards would require a Design Standard Decision Document (DSDD) to provide a justification for the non-standard design, including a safety assessment.
- **Potential traffic operation impacts:** Adjacent intersections north and south of the ramp terminals may need to be included in the study to evaluate operational impacts.
- **Turning radii:** Adequate turning radii should be maintained for truck traffic.
- **Signal timing:** Modifications of the overcrossing may require signal timing changes.

Caltrans has released guidance regarding the selection of appropriate bicycle facilities, which cite an intention of serving the needs of users of "all ages and abilities". In 2019, the "Caltrans Contextual Guidance for Preferred Bicycle Facilities" was issued, providing recommended facilities based on the posted speed limit, traffic volume, and land use context. Stony Point Road, with a speed limit of 35 mph, average daily traffic of 26,000 vehicles per day, and urban location, meets the criteria for a Class IV facility. In 2020, a memorandum was issued by the Caltrans Division of Design regarding bicycle facility selection guidance. Similarly, the Stony Point Road corridor met the criteria for Class IV facilities based on traffic characteristics and context. Both of these documents note that these recommendations were developed to supplement previously existing guidelines and are generally provided at the Project Initiation Development (PID) and Project Approval and Environmental Document (PA&ED) phases.

The complete comments from Caltrans, the relevant guidance documents, and responses from City staff and the consultant team are presented in Appendix D.

Recommended Plan

In response to comments from the public, Caltrans, and emergency responders, the draft plan was modified and the final recommended plan developed. The following treatments are included in the plan:

- Class IV bikeways to increase protection over existing Class II bike lanes
- Dashed green bike lane striping through intersections and at conflict points (e.g., where vehicle traffic is required to cross bike lanes to make right turns)
- Inclusion of protected bike lane signals for north-south bicycle movements on the Stony Point Road traffic signals.
- Curb extensions to reduce crossing distances at intersections and reduce speed of right-turning vehicles
- Raised crosswalks or RRFBs to reduce speeds and highlight presence of pedestrians at uncontrolled crossings
- Multiple enhancements at the crossing of the Joe Rodota Trail to enhance trail user safety
- Addition of a second southbound left-turn lane on Stony Point Road approaching SR 12 Eastbound Ramps to reduce vehicle queuing and allow for more pedestrian crossing time.

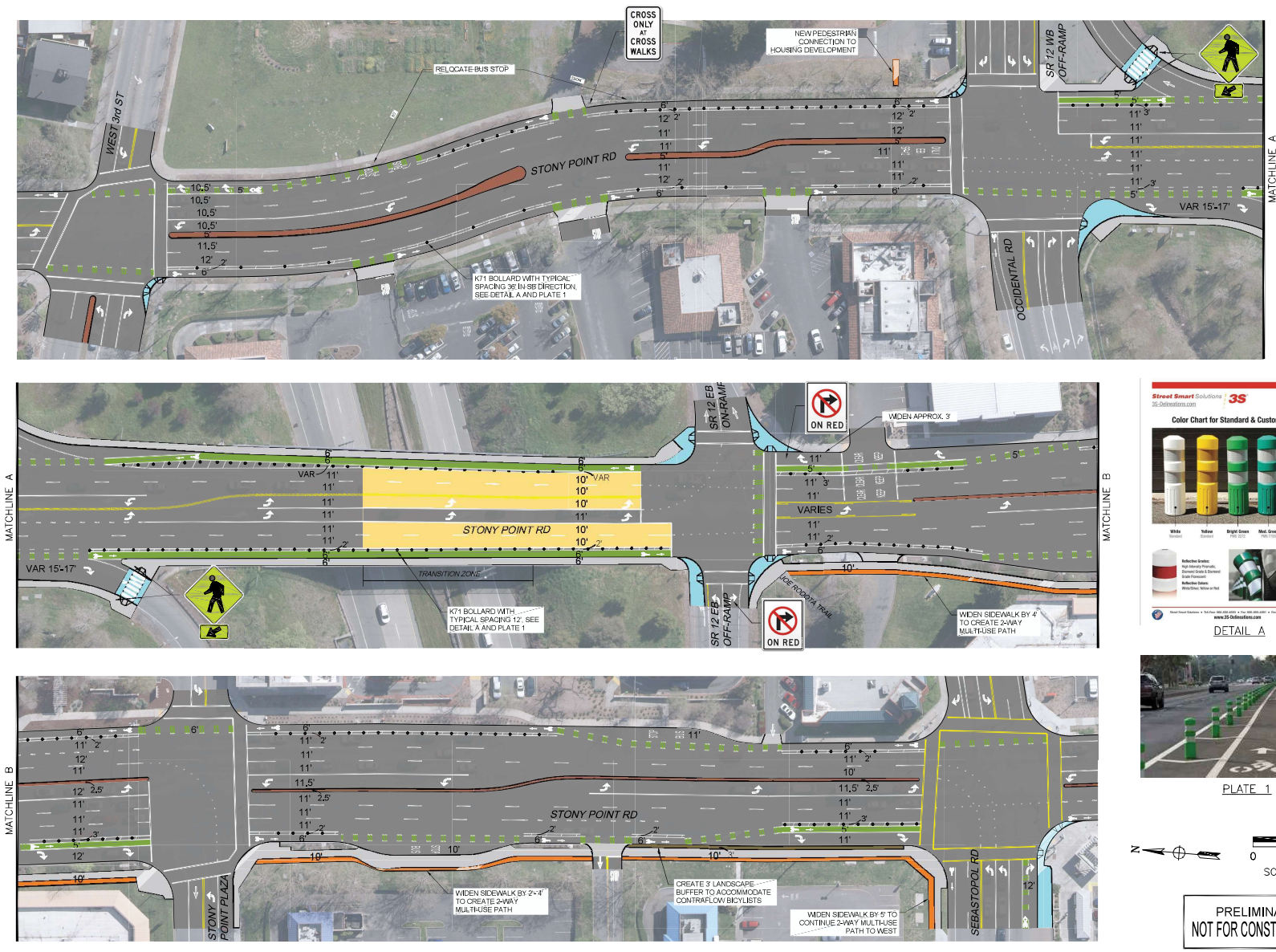
It should be noted that the resulting design includes approximately 210 feet on the SR 12 overpass where travel lanes are less than 11 feet, but at least 10 feet wide. Caltrans has indicated that use of lanes less than 11 feet will require the City to pursue a design exception in order to implement this plan. Through the design process the plan was modified as much as possible to include 11-foot lanes without sacrificing a minimum 2-foot buffer space for the bike lanes. If 11-foot lanes were used in the plan, it would not be possible to include buffer space for the bicycle lanes on this section off the SR 12 overpass. It is recommended that the City pursue the design exception.

Also referenced is a suggestion to consolidate the Oliver's Shopping Center driveways. The City will investigate this further.

The complete list of improvements is described in greater detail below.

Intersection Modifications

Recommended improvements at the study area intersections are illustrated in the close-ups of the concept plan in Plates 8 through 17. The plan indicates striping modifications, lane widths, and proposed hardscape improvements (shown in blue). The full concept plan is presented as Figure 2. It should be noted that the yellow highlighted pavement on the plan indicates where the lanes on the SR 12 overpass would be less than 11 feet wide.



DETAIL A

PLATE 1

0 40' 80'

SCALE: 1"=40'

PRELIMINARY
NOT FOR CONSTRUCTION

FOR REDUCED PLANS, THE ORIGINAL SCALE IS IN INCHES 0 1 2 3

W-Trans
490 Mendocino Avenue, Suite 201
Santa Rosa, CA 95401
(707) 542-9500 Fax (707) 542-9590

DRAWN BY: CN
DATE: JUNE 2021
DESIGNED BY: SW
REVIEWED BY: DW
STEPHEN J. WEHBERGER, R.C.E. NO. 43159
CIVIL STATE OF CALIFORNIA

STONY POINT ROAD CORRIDOR STUDY FOR ACTIVE TRANSPORTATION MODES

30% Concept Plan

City of Santa Rosa

SCALE: 1" = 40'
DATE: JUNE 2021
JOB NUMBER: SRO910-2
DRAWING NUMBER: 1 OF 2

sro910.ai 5/21

Stony Point Road Corridor Study for Active Transportation Modes

Figure 2 – Recommended Plan

West Third Street

- Add a curb extension at the southwest corner to reduce the crossing distance.

Plate 8 W. Third St. – Existing

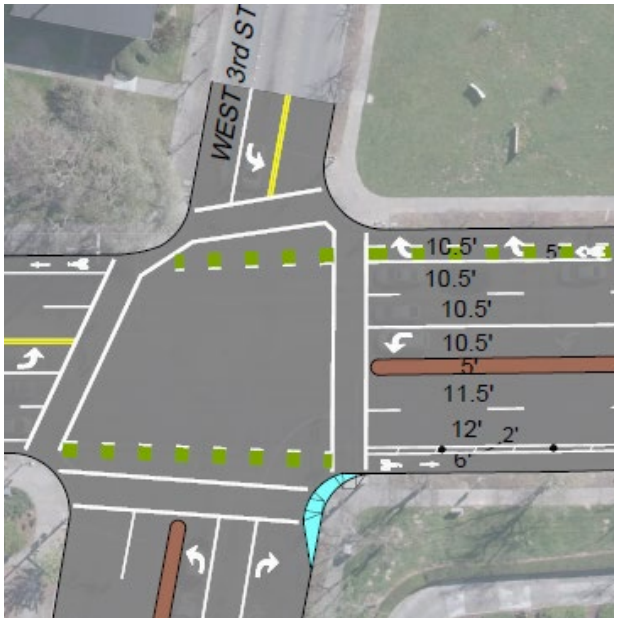


Plate 9 W. Third St. – Proposed

SR 12 Westbound Off-Ramp-Occidental Road

- Add a curb extension at the southwest corner. This will shorten the crossing distance across Occidental Road and channelize southbound traffic entering the westbound on-ramp, reducing vehicle speed, and narrowing the bicycle-vehicle conflict zone.
- Add a curb extension at the northeast corner.
- Install a raised crosswalk or RRFB at the SR 12 on-ramps.
- Modify lane striping to reduce the size of the intersection, encouraging reduced speeds.
- Modify the lane configuration for the westbound off-ramp approach, converting the through/right-turn lane to through only. As a result, only one lane would turn right across the crosswalk.
- Provide a new pedestrian connection between Stony Point Road and the housing development at the northeast corner of Stony Point Road/SR12 WB Off-Ramp.

Plate 10 Occidental Rd. – Existing

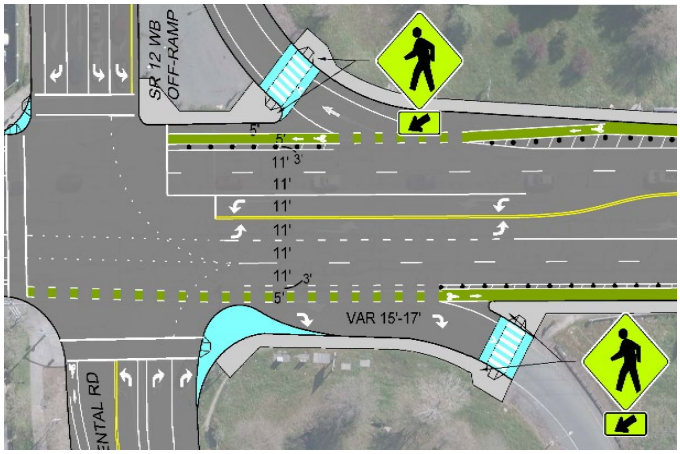


Plate 11 Occidental Rd. – Proposed

SR 12 Eastbound Ramps-Joe Rodota Trail

- Remove the pork chop island/free right turn to reduce speed of northbound right-turning vehicles.
- Realign the crosswalk to create a more direct path for trail users.
- Add curb extensions on all four corners.
- Provide a second southbound left-turn lane onto the SR 12 East on-ramp; this would reduce delay and allow for additional crossing time for Joe Rodota Trail users.
- Remove one of the eastbound left-turn lanes from the off-ramp.
- Install bikecross markings adjacent to the crosswalk to identify the path of travel for bicyclists.
- Install dashed bike lane striping along Stony Point Road through the intersection.
- Include either "No Right Turn on Red" signage for the northbound right-turn and eastbound left-turn lanes, "No Right Turn" blank-out sign, or separated signal phasing that gives a red right arrow while trail users have a green.

Plate 13 SR 12 Eastbound Ramps-Joe Rodota Trail – Existing

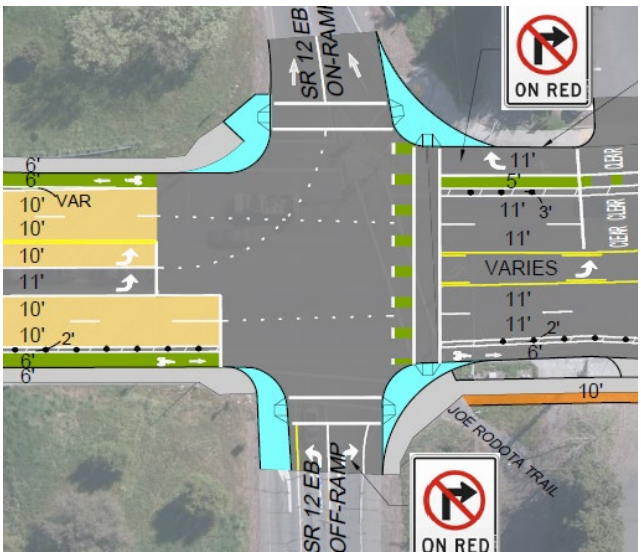


Plate 12 SR 12 Eastbound Ramps-Joe Rodota Trail – Proposed

Stony Point Plaza

- Provide a bike lane buffer with bollards to help channelize vehicle traffic and provide protection for bicyclists from turning vehicles.
- Consider potential for installing a multi-use path along the west side of Stony Point Road as a long-term improvement to enhance the connection between Joe Rodota Trail and Sebastopol Road.

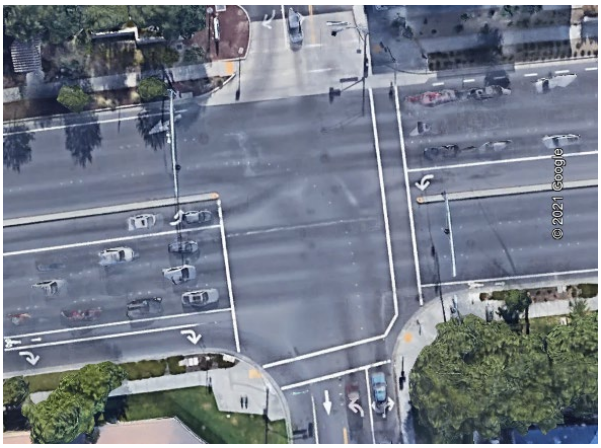


Plate 14 Stony Point Plaza – Existing

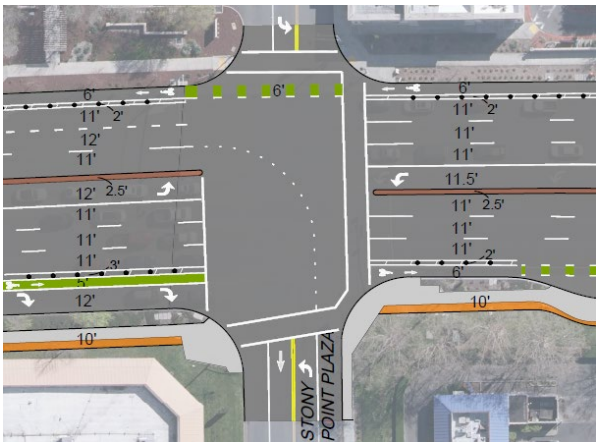


Plate 15 Stony Point Plaza – Proposed

Sebastopol Road

- Add a curb extension on the southwest corner and widen the sidewalk along the adjacent segment on Sebastopol Road.
- Install green dashed bike lane striping along Stony Point Road through the intersection.
- Consider the potential for extending a multi-use path along the west side of Stony Point Road, including the segment along the north side of Sebastopol Road, to connect to Cesar Chavez Language Academy.

Plate 16 Sebastopol Rd. – Existing

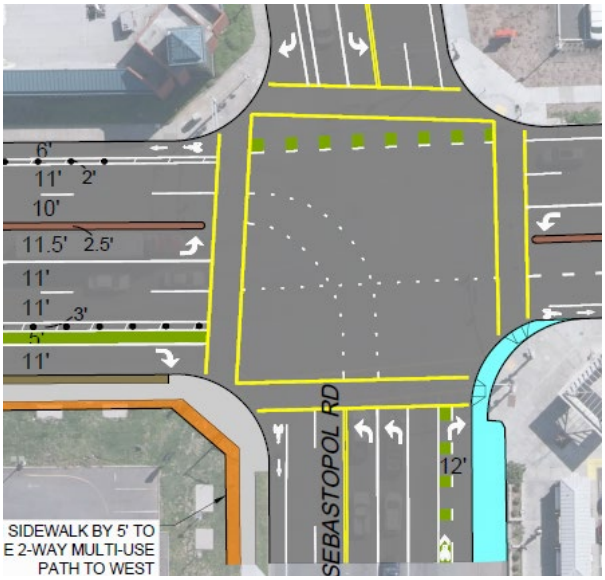


Plate 17 Sebastopol Rd. – Proposed

Intersection Levels of Service

Intersection Levels of Service and delay were determined for the study intersections with implementation of the Recommended Plan using existing peak hour volumes. The resulting service levels under these conditions are shown in Table 8. The calculations are included in Appendix B.

Table 8 – Peak Hour Intersection Levels of Service with Recommended Modifications

Study Intersection	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. Stony Point Rd/W Third St	35.5	D	54.0	D
2. Stony Point Rd/SR 12 WB Off-Ramp-Occidental Rd	44.3	D	56.6	E
3. Stony Point Rd/SR 12 EB Ramps	18.4	B	17.9	B
4. Stony Point Rd/Stony Point Plaza	10.2	B	20.4	C
5. Stony Point Rd/Sebastopol Rd	42.7	D	45.2	D

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service

Following is a summary of the changes in delay at each of the study intersections:

Stony Point Road/West Third Street – The intersection would be expected to have virtually no change with only a 1.5 second increase in delay during the p.m. peak hour.

Stony Point Road/SR 12 Westbound Off-Ramp-Occidental Road – With the Recommended Plan, which includes the removal of one of the SR 12 West off-ramp right turn lanes, the intersection would experience a 3-second decrease in delay during the p.m. peak hour.

Stony Point Road/SR 12 Eastbound Ramps – Primarily due to the addition of the second southbound left-turn lane, delay at the intersection would decrease 5 seconds during the a.m. peak hour and 12 seconds during the p.m. peak hour.

Stony Point Road/Stony Point Plaza – This intersection would experience no change in intersection delay or Level of Service with the plan.

Stony Point Road/Sebastopol Road – The Recommended Plan would result in a mix of results with changes ranging from approximately a 7-second decrease in delay during the a.m. peak hour to a 2-second increase during the p.m. peak hour.

Cost Estimate of Recommended Plan

Table 9 is a summary of the construction cost estimates for the infrastructure recommendations in each of the three segments. The total cost estimate for the project is $3,260,000.

Table 9 – Summary of Construction Cost Estimates

Location	Description	Estimate ($)
Segment 1	Pavement Rehab, Striping, Bollards, Signage, Bulbouts, curb ramps	$1,236,000
Segment 2	Pavement Rehab, Striping, Bollards, Signage, Bulbouts, curb ramps, raised crosswalks, RRFBs	$1,259,000
Segment 3	Pavement Rehab, Striping, Bollards, Signage, Bulbouts, curb ramps, multi-use path	$765,000
Total		$3,260,000

Cost estimate details are included Appendix E.

Implementation and Funding

The timing and access to project funding are unpredictable. While the recommendations from this study could potentially be funded with a single grant, the City may need to be opportunistic in pursuing selected project elements and assembling resources from multiple funding programs.

Next Steps with Caltrans

Design Exception

The City will need to pursue a design exception for the plan with Caltrans due the inclusion of the lanes on the SR 12 overpass which are less than 11 feet. In addition, a design exception would be needed if the City pursues the raised crosswalks on the two SR12 on ramps.

Intersection Control Evaluation

Modifications to Caltrans intersections require the completion of an Intersection Control Evaluation (ICE). The ICE should identify the alternatives considered and the public input process which led to the proposed modifications. Most of the information needed for an ICE is included in this document.

Potential Long-Term Recommendations

Through the development of this plan a need was identified for an enhanced connection between the Joe Rodota Trail and the Cesar Chavez Language academy on Sebastopol Road. While a detailed evaluation of this facility was beyond the scope of the current study, it is recommended that development of a Class I facility be investigated along the west side of Stony Point Road from the Joe Rodota Trail to Sebastopol Road.

There are numerous challenges with the development of a Class I path at this location, including coordination with the property owner, utilities, existing structures, and a bus stop, so such a facility would need to be planned in coordination with other facilities being developed in the area. For example, the BPMP recommended that a Class IV separated bikeway be constructed along Sebastopol Road from Corporate Center Parkway to the SMART path. The existing landscape strip along the west side of Stony Point Road is presented in Plates 18 and 19.

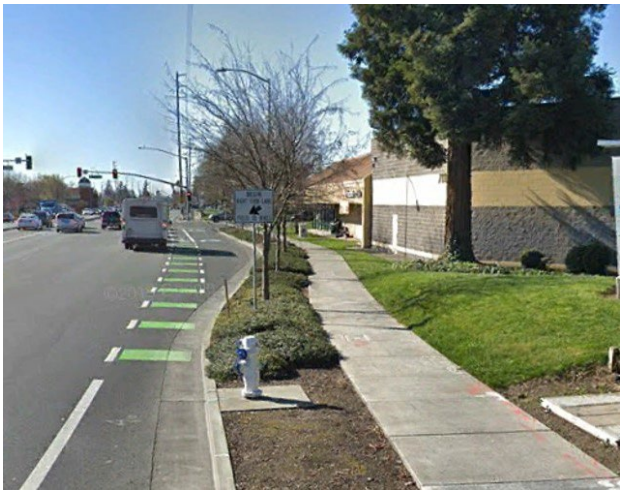


Plate 18 Stony Pt. Rd. south of Joe Rodota Trail

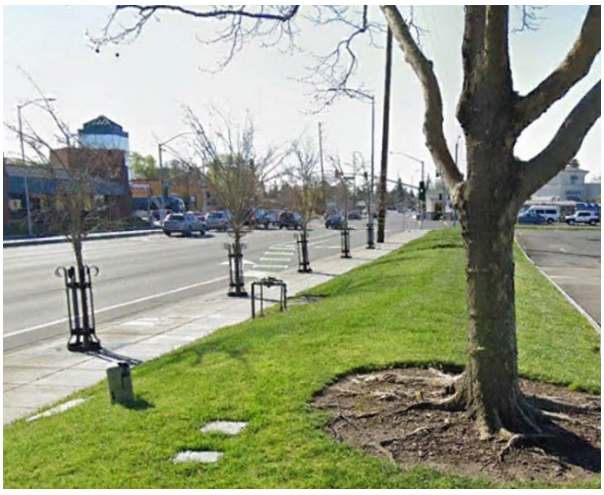


Plate 19 Stony Pt. Rd. north of Sebastopol Rd.

Potential Project Funding

Active Transportation Program

The Active Transportation Program (ATP) is the largest program in the state for projects designed to improve conditions for bicycling and walking, distributing over $200 million per year with cycles every two years. The program is highly competitive. The application scoring criteria prioritize funding to disadvantaged communities, and the location of the project would benefit a Community of Concern, which qualifies as disadvantaged under the ATP evaluation criteria. ATP is administered by the California Transportation Commission (CTC) and Caltrans.

Information about the program is available at the CTC web site (https://catc.ca.gov/programs/active-transportation-program) and the Caltrans web site (https://dot.ca.gov/programs/local-assistance/fed-and-state-programs/active-transportation-program).

Highway Safety Improvement Program (HSIP)

The HSIP program provides funding for safety improvements, including pedestrian and bicycle facilities. Larger projects are selected based on a benefit/cost analysis, which prioritizes locations where fatalities and/or severe injury collisions have been recorded. Smaller grants are available for pedestrian crossing improvements that do not meet the benefit/cost threshold.

HSIP funding cycles are typically every two years. Funding levels vary; the amount awarded in 2021 for Cycle 10 was $228 million. Information about the program is available on the Caltrans web site (https://dot.ca.gov/programs/local-assistance/fed-and-state-programs/highway-safety-improvement-program).

Quick Strike

MTC's Safe and Seamless Mobility Quick-Strike program provided funding to local agencies for mobility-enhancing projects that could be implemented quickly to address changes in mobility patterns associated with COVID-19-related restrictions. While this was established as a one-time-only program, there has been a growing interest in such quick-build projects; if similar grants are made available in the future, such funds could potentially be used for the recommended Stony Point Road improvements.

Study Participants and References

Study Participants

City of Santa Rosa

Rob Sprinkle – *Deputy Public Works Director*
Nancy Adams – *Transportation Planner*
Bjorn Griepenburg – *Active Transportation Planner*
Jaime Smedes – *Marketing and Outreach Coordinator*

Consultant Team

W-Trans

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Barry Bergman, AICP – *Senior Planner*
Cameron Nye – *Associate Engineer*
Alex Scrobonia – *Editing/Formatting*
Dalene J. Whitlock, PE, PTOE – *Quality Control*

References

2016 Collision Data on California State Highways, California Department of Transportation, 2018
Active Transportation Program, https://catc.ca.gov/programs/active-transportation-program
Active Transportation Program, https://dot.ca.gov/programs/local-assistance/fed-and-state-programs/active-transportation-program
Bicycle and Pedestrian Master Plan Update 2018, City of Santa Rosa, 2018
California Manual on Uniform Traffic Control Devices (CA-MUTCD), California Department of Transportation, 2014
California Vehicle Code, State of California, 2018, http://leginfo.legislature.ca.gov/faces/codesTOCSelected.xhtml?tocCode=VEH&tocTitle=+Vehicle+Code+-+VEH
Caltrans Design Information Bulletin Number 89, Class IV Bikeway Guidance, California Department of Transportation, 2015
Highway Capacity Manual, Transportation Research Board, 2018
Highway Design Manual, 6th Edition, California Department of Transportation, 2017
Highway Safety Manual, 1st Edition, American Association of State Highway and Transportation Officials, 2010
Improving Pedestrian Safety at Unsignalized Crossings (NCHRP 562), Transportation Research Board, 2006
NACTO Urban Bikeway Design Guide, 2nd Edition, National Association of City Transportation Officials, 2012
Statewide Integrated Traffic Records System (SWITRS), California Highway Patrol, 2015-2020

SRO910-2

Appendix A

Collision Data

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Intersection Collision Rate Worksheet

Stony Point Road Corridor Study

Intersection # 1: Stony Point Road & West 3rd Street
Date of Count: Saturday, January 0, 1900

Number of Collisions: 19
Number of Injuries: 12
Number of Fatalities: 1
Average Daily Traffic (ADT): 34900
Start Date: March 1, 2015
End Date: February 29, 2020
Number of Years: 5

Intersection Type: Multi-Legged
Control Type: Signals
Area: Suburban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{19 \times 1{,}000{,}000}{34{,}900 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.30 c/mve**	**5.3%**	**63.2%**
Statewide Average*	**0.43 c/mve**	**0.4%**	**36.1%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2016 Collision Data on California State Highways, Caltrans

Intersection # 2: Stony Point Road & Occidental Road - SR-12 WB Off-Ramp
Date of Count: Saturday, January 0, 1900

Number of Collisions: 49
Number of Injuries: 18
Number of Fatalities: 2
Average Daily Traffic (ADT): 41500
Start Date: March 1, 2015
End Date: February 29, 2020
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Suburban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{49 \times 1{,}000{,}000}{41{,}500 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.65 c/mve**	**4.1%**	**36.7%**
Statewide Average*	**0.43 c/mve**	**0.4%**	**36.1%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2016 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Worksheet

Stony Point Road Corridor Study

Intersection # 3: Stony Point Road & SR-12 EB Ramps
Date of Count: Saturday, January 0, 1900

Number of Collisions: 16
Number of Injuries: 3
Number of Fatalities: 0
Average Daily Traffic (ADT): 42100
Start Date: March 1, 2015
End Date: February 29, 2020
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Suburban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{16 \times 1{,}000{,}000}{42{,}100 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.21 c/mve**	**0.0%**	**18.8%**
Statewide Average*	**0.43 c/mve**	**0.4%**	**36.1%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2016 Collision Data on California State Highways, Caltrans

Intersection # 4: Stony Point Road & Stony Point Plaza
Date of Count: Saturday, January 0, 1900

Number of Collisions: 29
Number of Injuries: 14
Number of Fatalities: 0
Average Daily Traffic (ADT): 37300
Start Date: March 1, 2015
End Date: February 29, 2020
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Suburban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{29 \times 1{,}000{,}000}{37{,}300 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.43 c/mve**	**0.0%**	**48.3%**
Statewide Average*	**0.43 c/mve**	**0.4%**	**36.1%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2016 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Worksheet

Stony Point Road Corridor Study

Intersection # 5: Stony Point Road & Sebastopol Road
Date of Count: Saturday, January 0, 1900

Number of Collisions: 81
Number of Injuries: 35
Number of Fatalities: 0
Average Daily Traffic (ADT): 41000
Start Date: March 1, 2015
End Date: February 29, 2020
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Suburban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{81 \times 1{,}000{,}000}{41{,}000 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**1.08 c/mve**	**0.0%**	**43.2%**
Statewide Average*	**0.43 c/mve**	**0.4%**	**36.1%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2016 Collision Data on California State Highways, Caltrans

Intersection # 6: &
Date of Count: Saturday, January 0, 1900

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
Average Daily Traffic (ADT): 0
Start Date: January 0, 1900
End Date: January 0, 1900
Number of Years: 0

Intersection Type: 0
Control Type: 0
Area: 0

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{0 \times 1{,}000{,}000}{0 \times 365 \times 0}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.00 c/mve**	**0.0%**	**0.0%**
Statewide Average*	**0.22 c/mve**	**1.0%**	**34.6%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2016 Collision Data on California State Highways, Caltrans

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Appendix B

Intersection Delay and Levels of Service

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HCM 6th Signalized Intersection Summary
1: Stony Point Rd & W 3rd St

03/01/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	177	260	259	114	106	35	152	1011	95	55	726	68
Future Volume (veh/h)	177	260	259	114	106	35	152	1011	95	55	726	68
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		0.98	1.00		0.99
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	190	280	278	123	114	38	163	1087	102	59	781	73
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	283	327	443	148	138	46	190	1904	831	76	1548	145
Arrive On Green	0.16	0.18	0.18	0.08	0.10	0.10	0.11	0.54	0.54	0.04	0.47	0.47
Sat Flow, veh/h	1781	1870	1564	1781	1342	447	1781	3554	1550	1781	3281	307
Grp Volume(v), veh/h	190	280	278	123	0	152	163	1087	102	59	423	431
Grp Sat Flow(s),veh/h/ln	1781	1870	1564	1781	0	1790	1781	1777	1550	1781	1777	1810
Q Serve(g_s), s	13.1	18.9	14.4	8.8	0.0	10.8	11.7	26.6	2.7	4.3	21.4	21.5
Cycle Q Clear(g_c), s	13.1	18.9	14.4	8.8	0.0	10.8	11.7	26.6	2.7	4.3	21.4	21.5
Prop In Lane	1.00		1.00	1.00		0.25	1.00		1.00	1.00		0.17
Lane Grp Cap(c), veh/h	283	327	443	148	0	184	190	1904	831	76	838	854
V/C Ratio(X)	0.67	0.86	0.63	0.83	0.00	0.83	0.86	0.57	0.12	0.78	0.50	0.50
Avail Cap(c_a), veh/h	311	442	538	227	0	344	270	1904	831	119	838	854
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.5	52.0	22.0	58.7	0.0	57.2	57.1	20.2	6.2	61.6	23.8	23.8
Incr Delay (d2), s/veh	4.9	11.7	1.6	13.9	0.0	9.0	17.2	1.2	0.3	15.5	2.2	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	6.2	9.9	5.4	4.5	0.0	5.3	6.1	11.0	1.5	2.2	9.4	9.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.4	63.7	23.6	72.5	0.0	66.1	74.3	21.4	6.5	77.2	26.0	25.9
LnGrp LOS	E	E	C	E	A	E	E	C	A	E	C	C
Approach Vol, veh/h		748			275			1352			913	
Approach Delay, s/veh		47.0			69.0			26.7			29.2	
Approach LOS		D			E			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.1	28.1	19.2	66.6	25.9	18.3	10.8	75.0
Change Period (Y+Rc), s	5.3	5.3	5.3	5.3	5.3	4.9	5.3	5.3
Max Green Setting (Gmax), s	16.6	30.7	19.7	41.8	22.7	25.0	8.7	52.8
Max Q Clear Time (g_c+I1), s	10.8	20.9	13.7	23.5	15.1	12.8	6.3	28.6
Green Ext Time (p_c), s	0.1	1.9	0.2	5.1	0.3	0.5	0.0	8.8

Intersection Summary	
HCM 6th Ctrl Delay	35.5
HCM 6th LOS	D

Notes

User approved changes to right turn type.

HCM 6th Signalized Intersection Summary
2: Stony Point Rd & Occidental Rd/SR 12 WB Off-Ramp

03/01/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	62	0	233	713	71	406	44	550	72	0	789	41
Future Volume (veh/h)	62	0	233	713	71	406	44	550	72	0	789	41
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		0.97
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	0	1870	1870
Adj Flow Rate, veh/h	73	0	274	839	178	147	52	647	0	0	928	48
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	0	2	2
Cap, veh/h	155	0	499	931	489	413	33	1882		0	1978	102
Arrive On Green	0.09	0.00	0.09	0.26	0.26	0.26	0.09	0.53	0.00	0.00	0.40	0.40
Sat Flow, veh/h	1781	0	2742	3563	1870	1581	356	3647	0	0	5131	256
Grp Volume(v), veh/h	73	0	274	839	178	147	52	647	0	0	636	340
Grp Sat Flow(s),veh/h/ln	1781	0	1371	1781	1870	1581	356	1777	0	0	1702	1814
Q Serve(g_s), s	5.1	0.0	11.3	29.6	10.1	9.8	12.1	13.6	0.0	0.0	18.0	18.0
Cycle Q Clear(g_c), s	5.1	0.0	11.3	29.6	10.1	9.8	12.1	13.6	0.0	0.0	18.0	18.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	0.00		0.14
Lane Grp Cap(c), veh/h	155	0	499	931	489	413	33	1882		0	1357	723
V/C Ratio(X)	0.47	0.00	0.55	0.90	0.36	0.36	1.56	0.34		0.00	0.47	0.47
Avail Cap(c_a), veh/h	155	0	499	1006	528	446	85	1882		0	1357	723
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	1.00	1.00	0.68	0.68	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	56.5	0.0	48.5	46.4	39.2	39.1	58.9	17.6	0.0	0.0	28.9	28.9
Incr Delay (d2), s/veh	2.2	0.0	1.3	10.6	0.5	0.5	289.0	0.3	0.0	0.0	1.2	2.2
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	2.4	0.0	4.1	14.4	4.7	3.9	3.8	5.6	0.0	0.0	7.5	8.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.7	0.0	49.8	57.0	39.7	39.6	347.9	17.9	0.0	0.0	30.1	31.1
LnGrp LOS	E	A	D	E	D	D	F	B		A	C	C
Approach Vol, veh/h		347			1164			699	A		976	
Approach Delay, s/veh		51.7			52.1			42.5			30.4	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	2	3	4	6	8
Phs Duration (G+Y+Rc), s	17.0	17.0	56.8	39.3	73.7
Change Period (Y+Rc), s	5.7	4.9	4.9	5.3	4.9
Max Green Setting (Gmax), s	11.3	31.1	30.1	36.7	66.1
Max Q Clear Time (g_c+I1), s	13.3	14.1	20.0	31.6	15.6
Green Ext Time (p_c), s	0.0	0.1	4.4	2.4	5.0

Intersection Summary	
HCM 6th Ctrl Delay	43.3
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
3: Stony Point Rd & SR 12 EB Off-Ramp/SR 12 EB On-Ramp

03/01/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	0	72	0	0	0	0	665	630	462	1222	0
Future Volume (veh/h)	50	0	72	0	0	0	0	665	630	462	1222	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95				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	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	59	0	85				0	782	0	544	1438	0
Peak Hour Factor	0.85	0.85	0.85				0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	285	0	121				0	1389		736	2996	0
Arrive On Green	0.08	0.00	0.08				0.00	0.13	0.00	0.41	0.84	0.00
Sat Flow, veh/h	3563	0	1510				0	3647	1585	1781	3647	0
Grp Volume(v), veh/h	59	0	85				0	782	0	544	1438	0
Grp Sat Flow(s),veh/h/ln	1781	0	1510				0	1777	1585	1781	1777	0
Q Serve(g_s), s	2.0	0.0	7.1				0.0	26.9	0.0	33.6	13.9	0.0
Cycle Q Clear(g_c), s	2.0	0.0	7.1				0.0	26.9	0.0	33.6	13.9	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	285	0	121				0	1389		736	2996	0
V/C Ratio(X)	0.21	0.00	0.70				0.00	0.56		0.74	0.48	0.00
Avail Cap(c_a), veh/h	740	0	314				0	1389		736	2996	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.88	0.00	0.68	0.68	0.00
Uniform Delay (d), s/veh	55.9	0.0	58.3				0.0	46.2	0.0	32.3	2.7	0.0
Incr Delay (d2), s/veh	0.4	0.0	7.2				0.0	0.5	0.0	2.7	0.4	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	0.9	0.0	3.0				0.0	12.9	0.0	14.9	3.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.3	0.0	65.5				0.0	46.7	0.0	35.0	3.1	0.0
LnGrp LOS	E	A	E				A	D		C	A	A
Approach Vol, veh/h		144						782	A		1982	
Approach Delay, s/veh		61.7						46.7			11.8	
Approach LOS		E						D			B	

Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		15.3		114.7			58.8	55.9				
Change Period (Y+Rc), s		4.9		5.1			5.1	* 5.1				
Max Green Setting (Gmax), s		27.0		93.0			48.0	* 41				
Max Q Clear Time (g_c+I1), s		9.1		15.9			35.6	28.9				
Green Ext Time (p_c), s		0.4		18.2			1.5	4.3				

Intersection Summary			
HCM 6th Ctrl Delay			23.7
HCM 6th LOS			C

Notes

User approved volume balancing among the lanes for turning movement.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
4: Stony Point Rd & Stony Point Plaza

03/01/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	10	10	41	4	161	25	1252	70	119	1262	114
Future Volume (veh/h)	64	10	10	41	4	161	25	1252	70	119	1262	114
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
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	46	44	11	44	4	173	27	1346	75	128	1357	123
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	120	97	24	207	19	196	218	2884	161	153	2793	849
Arrive On Green	0.07	0.07	0.07	0.13	0.13	0.13	0.24	1.00	1.00	0.17	1.00	1.00
Sat Flow, veh/h	1781	1436	359	1639	149	1552	1781	4942	275	1781	5106	1552
Grp Volume(v), veh/h	46	0	55	48	0	173	27	927	494	128	1357	123
Grp Sat Flow(s),veh/h/ln	1781	0	1795	1788	0	1552	1781	1702	1814	1781	1702	1552
Q Serve(g_s), s	3.2	0.0	3.8	3.1	0.0	14.2	1.5	0.0	0.0	9.0	0.0	0.0
Cycle Q Clear(g_c), s	3.2	0.0	3.8	3.1	0.0	14.2	1.5	0.0	0.0	9.0	0.0	0.0
Prop In Lane	1.00		0.20	0.92		1.00	1.00		0.15	1.00		1.00
Lane Grp Cap(c), veh/h	120	0	121	226	0	196	218	1986	1058	153	2793	849
V/C Ratio(X)	0.38	0.00	0.45	0.21	0.00	0.88	0.12	0.47	0.47	0.84	0.49	0.14
Avail Cap(c_a), veh/h	206	0	207	261	0	227	218	1986	1058	289	2793	849
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.85	0.85	0.85
Uniform Delay (d), s/veh	58.0	0.0	58.3	51.0	0.0	55.8	43.7	0.0	0.0	53.0	0.0	0.0
Incr Delay (d2), s/veh	2.0	0.0	2.6	0.5	0.0	27.9	0.3	0.8	1.5	9.9	0.5	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	1.8	1.5	0.0	7.1	0.7	0.2	0.4	4.1	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.0	0.0	61.0	51.4	0.0	83.7	44.0	0.8	1.5	62.9	0.5	0.3
LnGrp LOS	E	A	E	D	A	F	D	A	A	E	A	A
Approach Vol, veh/h		101			221			1448			1608	
Approach Delay, s/veh		60.5			76.7			1.8			5.5	
Approach LOS		E			E			A			A	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		12.8	20.8	76.0		20.5	16.0	80.7				
Change Period (Y+Rc), s		4.0	4.9	4.9		4.0	4.9	4.9				
Max Green Setting (Gmax), s		15.0	7.1	71.1		19.0	21.1	57.1				
Max Q Clear Time (g_c+I1), s		5.8	3.5	2.0		16.2	11.0	2.0				
Green Ext Time (p_c), s		0.2	0.0	15.2		0.2	0.2	13.8				

Intersection Summary			
HCM 6th Ctrl Delay			10.2
HCM 6th LOS			B

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
5: Stony Point Rd & Sebastopol Rd

03/01/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	384	202	100	88	228	240	80	871	76	190	778	678
Future Volume (veh/h)	384	202	100	88	228	240	80	871	76	190	778	678
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		0.98	1.00		0.97
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	431	227	112	99	256	270	80	979	85	213	874	762
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	1.00	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	496	291	241	288	325	602	306	1052	91	369	1257	773
Arrive On Green	0.14	0.16	0.16	0.16	0.17	0.17	0.17	0.32	0.32	0.35	0.59	0.59
Sat Flow, veh/h	3456	1870	1545	1781	1870	1577	1781	3303	287	1781	3554	1541
Grp Volume(v), veh/h	431	227	112	99	256	270	80	527	537	213	874	762
Grp Sat Flow(s),veh/h/ln	1728	1870	1545	1781	1870	1577	1781	1777	1812	1781	1777	1541
Q Serve(g_s), s	15.9	15.2	8.6	6.4	17.0	0.0	5.1	37.3	37.3	12.7	22.2	40.7
Cycle Q Clear(g_c), s	15.9	15.2	8.6	6.4	17.0	0.0	5.1	37.3	37.3	12.7	22.2	40.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.16	1.00		1.00
Lane Grp Cap(c), veh/h	496	291	241	288	325	602	306	566	577	369	1257	773
V/C Ratio(X)	0.87	0.78	0.47	0.34	0.79	0.45	0.26	0.93	0.93	0.58	0.70	0.99
Avail Cap(c_a), veh/h	630	531	439	288	403	668	306	566	577	369	1257	773
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.5	52.7	49.9	48.4	51.4	30.0	46.7	42.9	42.9	37.9	21.7	16.6
Incr Delay (d2), s/veh	10.3	4.5	1.4	0.7	8.1	0.5	0.4	24.1	23.8	2.2	3.2	29.1
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	7.5	7.4	3.4	2.9	8.7	6.4	2.3	19.9	20.2	5.2	7.6	16.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.7	57.2	51.3	49.1	59.5	30.5	47.1	67.0	66.7	40.1	24.9	45.7
LnGrp LOS	E	E	D	D	E	C	D	E	E	D	C	D
Approach Vol, veh/h		770			625			1144			1849	
Approach Delay, s/veh		60.6			45.4			65.5			35.2	
Approach LOS		E			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.3	25.6	27.2	50.9	24.0	27.9	31.8	46.3
Change Period (Y+Rc), s	5.3	5.3	4.9	4.9	5.3	5.3	4.9	4.9
Max Green Setting (Gmax), s	14.8	36.9	11.9	46.0	23.7	28.0	16.5	41.4
Max Q Clear Time (g_c+I1), s	8.4	17.2	7.1	42.7	17.9	19.0	14.7	39.3
Green Ext Time (p_c), s	0.1	1.5	0.1	2.5	0.8	1.7	0.1	1.3

Intersection Summary	
HCM 6th Ctrl Delay	49.0
HCM 6th LOS	D

HCM 6th Signalized Intersection Summary
1: Stony Point Rd & W 3rd St

03/01/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	176	214	202	138	201	57	255	1040	130	66	1045	105
Future Volume (veh/h)	176	214	202	138	201	57	255	1040	130	66	1045	105
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.99
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	189	230	217	148	216	61	274	1118	140	71	1124	113
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	212	270	486	255	235	66	296	1652	722	171	1286	129
Arrive On Green	0.12	0.14	0.14	0.14	0.17	0.17	0.17	0.47	0.47	0.10	0.39	0.39
Sat Flow, veh/h	1781	1870	1542	1781	1393	394	1781	3554	1552	1781	3257	327
Grp Volume(v), veh/h	189	230	217	148	0	277	274	1118	140	71	613	624
Grp Sat Flow(s),veh/h/ln	1781	1870	1542	1781	0	1787	1781	1777	1552	1781	1777	1807
Q Serve(g_s), s	14.6	16.8	9.9	10.9	0.0	21.4	21.2	34.4	7.4	5.3	44.6	44.7
Cycle Q Clear(g_c), s	14.6	16.8	9.9	10.9	0.0	21.4	21.2	34.4	7.4	5.3	44.6	44.7
Prop In Lane	1.00		1.00	1.00		0.22	1.00		1.00	1.00		0.18
Lane Grp Cap(c), veh/h	212	270	486	255	0	301	296	1652	722	171	702	713
V/C Ratio(X)	0.89	0.85	0.45	0.58	0.00	0.92	0.93	0.68	0.19	0.42	0.87	0.88
Avail Cap(c_a), veh/h	214	375	573	255	0	320	302	1652	722	171	702	713
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.8	58.4	17.9	56.1	0.0	57.3	57.5	29.2	22.0	59.6	39.1	39.2
Incr Delay (d2), s/veh	34.0	12.6	0.6	3.3	0.0	29.5	32.8	2.2	0.6	1.6	14.1	14.1
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	8.6	8.9	3.5	5.1	0.0	12.0	12.2	14.9	2.8	2.4	21.9	22.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	94.8	71.1	18.6	59.3	0.0	86.8	90.3	31.5	22.6	61.2	53.3	53.3
LnGrp LOS	F	E	B	E	A	F	F	C	C	E	D	D
Approach Vol, veh/h		636			425			1532			1308	
Approach Delay, s/veh		60.2			77.2			41.2			53.7	
Approach LOS		E			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	25.3	25.5	28.6	60.6	21.9	28.9	18.7	70.4
Change Period (Y+Rc), s	5.3	5.3	5.3	5.3	5.3	* 5.3	5.3	5.3
Max Green Setting (Gmax), s	13.4	28.1	23.7	53.6	16.8	* 25	12.2	65.1
Max Q Clear Time (g_c+I1), s	12.9	18.8	23.2	46.7	16.6	23.4	7.3	36.4
Green Ext Time (p_c), s	0.0	1.4	0.0	4.2	0.0	0.3	0.0	9.9

Intersection Summary	
HCM 6th Ctrl Delay	52.4
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.

HCM 6th Signalized Intersection Summary
2: Stony Point Rd & Occidental Rd/SR 12 WB Off-Ramp

03/01/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	0	244	606	200	536	127	928	71	0	1313	113
Future Volume (veh/h)	85	0	244	606	200	536	127	928	71	0	1313	113
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		0.98	1.00		1.00	1.00		0.96
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	0	1870	1870
Adj Flow Rate, veh/h	86	0	191	612	246	231	128	937	0	0	1326	114
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	0	2	2
Cap, veh/h	80	0	1044	678	356	296	117	2314		0	1367	118
Arrive On Green	0.05	0.00	0.05	0.19	0.19	0.19	0.33	0.65	0.00	0.00	0.29	0.29
Sat Flow, veh/h	1781	0	2790	3563	1870	1557	356	3647	0	0	4937	410
Grp Volume(v), veh/h	86	0	191	612	246	231	128	937	0	0	946	494
Grp Sat Flow(s),veh/h/ln	1781	0	1395	1781	1870	1557	356	1777	0	0	1702	1775
Q Serve(g_s), s	6.3	0.0	6.3	23.5	17.2	19.7	46.1	17.5	0.0	0.0	38.5	38.5
Cycle Q Clear(g_c), s	6.3	0.0	6.3	23.5	17.2	19.7	46.1	17.5	0.0	0.0	38.5	38.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	0.00		0.23
Lane Grp Cap(c), veh/h	80	0	1044	678	356	296	117	2314		0	976	509
V/C Ratio(X)	1.07	0.00	0.18	0.90	0.69	0.78	1.09	0.41		0.00	0.97	0.97
Avail Cap(c_a), veh/h	80	0	1044	705	370	308	117	2314		0	976	509
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	1.00	1.00	0.37	0.37	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	66.9	0.0	29.4	55.4	52.8	53.9	47.0	11.6	0.0	0.0	49.3	49.3
Incr Delay (d2), s/veh	121.8	0.0	0.1	14.6	5.2	11.7	77.1	0.2	0.0	0.0	22.4	33.0
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	5.6	0.0	0.0	11.9	8.6	8.7	6.5	6.7	0.0	0.0	19.2	21.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	188.7	0.0	29.5	70.0	58.0	65.5	124.1	11.8	0.0	0.0	71.7	82.4
LnGrp LOS	F	A	C	E	E	E	F	B		A	E	F
Approach Vol, veh/h		277			1089			1065	A		1440	
Approach Delay, s/veh		78.9			66.3			25.3			75.3	
Approach LOS		E			E			C			E	

Timer - Assigned Phs	2	3	4		6		8					
Phs Duration (G+Y+Rc), s	12.0	51.0	45.0		32.0		96.0					
Change Period (Y+Rc), s	5.7	4.9	4.9		5.3		4.9					
Max Green Setting (Gmax), s	6.3	46.1	39.1		27.7		90.1					
Max Q Clear Time (g_c+I1), s	8.3	48.1	40.5		25.5		19.5					
Green Ext Time (p_c), s	0.0	0.0	0.0		1.1		8.2					

Intersection Summary	
HCM 6th Ctrl Delay	59.3
HCM 6th LOS	E

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
3: Stony Point Rd & SR 12 EB Off-Ramp/SR 12 EB On-Ramp

03/01/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	0	165	0	0	0	0	1074	785	542	1575	0
Future Volume (veh/h)	70	0	165	0	0	0	0	1074	785	542	1575	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96				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	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	72	0	170				0	1107	0	559	1624	0
Peak Hour Factor	0.97	0.97	0.97				0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	469	0	200				0	1381		663	2832	0
Arrive On Green	0.13	0.00	0.13				0.00	0.26	0.00	0.37	0.80	0.00
Sat Flow, veh/h	3563	0	1518				0	3647	1585	1781	3647	0
Grp Volume(v), veh/h	72	0	170				0	1107	0	559	1624	0
Grp Sat Flow(s),veh/h/ln	1781	0	1518				0	1777	1585	1781	1777	0
Q Serve(g_s), s	2.5	0.0	15.3				0.0	40.8	0.0	40.2	23.9	0.0
Cycle Q Clear(g_c), s	2.5	0.0	15.3				0.0	40.8	0.0	40.2	23.9	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	469	0	200				0	1381		663	2832	0
V/C Ratio(X)	0.15	0.00	0.85				0.00	0.80		0.84	0.57	0.00
Avail Cap(c_a), veh/h	687	0	293				0	1381		663	2832	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.75	0.00	0.30	0.30	0.00
Uniform Delay (d), s/veh	53.9	0.0	59.5				0.0	46.7	0.0	40.2	5.3	0.0
Incr Delay (d2), s/veh	0.2	0.0	14.5				0.0	2.6	0.0	3.2	0.3	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	1.1	0.0	6.7				0.0	19.3	0.0	18.1	7.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.0	0.0	74.0				0.0	49.4	0.0	43.4	5.6	0.0
LnGrp LOS	D	A	E				A	D		D	A	A
Approach Vol, veh/h		242						1107	A		2183	
Approach Delay, s/veh		68.0						49.4			15.3	
Approach LOS		E						D			B	

Timer - Assigned Phs	2		4				7	8				
Phs Duration (G+Y+Rc), s	23.3		116.7				57.2	59.5				
Change Period (Y+Rc), s	4.9		5.1				5.1	* 5.1				
Max Green Setting (Gmax), s	27.0		103.0				50.0	* 49				
Max Q Clear Time (g_c+I1), s	17.3		25.9				42.2	42.8				
Green Ext Time (p_c), s	0.6		23.4				1.3	3.8				

Intersection Summary	
HCM 6th Ctrl Delay	29.6
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

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

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
4: Stony Point Rd & Stony Point Plaza

03/01/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	198	38	46	68	14	234	57	1428	89	184	1312	201
Future Volume (veh/h)	198	38	46	68	14	234	57	1428	89	184	1312	201
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.97	1.00		0.98
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	145	122	47	70	14	241	59	1472	92	190	1353	207
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	201	144	56	214	43	223	200	2440	152	213	2579	783
Arrive On Green	0.11	0.11	0.11	0.14	0.14	0.14	0.22	1.00	1.00	0.24	1.00	1.00
Sat Flow, veh/h	1781	1280	493	1496	299	1564	1781	4903	306	1781	5106	1550
Grp Volume(v), veh/h	145	0	169	84	0	241	59	1022	542	190	1353	207
Grp Sat Flow(s),veh/h/ln	1781	0	1773	1796	0	1564	1781	1702	1806	1781	1702	1550
Q Serve(g_s), s	11.0	0.0	13.1	5.9	0.0	20.0	3.9	0.5	0.5	14.4	0.0	0.0
Cycle Q Clear(g_c), s	11.0	0.0	13.1	5.9	0.0	20.0	3.9	0.5	0.5	14.4	0.0	0.0
Prop In Lane	1.00		0.28	0.83		1.00	1.00		0.17	1.00		1.00
Lane Grp Cap(c), veh/h	201	0	200	257	0	223	200	1694	898	213	2579	783
V/C Ratio(X)	0.72	0.00	0.84	0.33	0.00	1.08	0.30	0.60	0.60	0.89	0.52	0.26
Avail Cap(c_a), veh/h	267	0	266	257	0	223	200	1694	898	319	2579	783
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.78	0.78	0.78
Uniform Delay (d), s/veh	60.0	0.0	60.9	54.0	0.0	60.0	49.7	0.2	0.2	52.4	0.0	0.0
Incr Delay (d2), s/veh	6.2	0.0	16.8	0.7	0.0	82.8	0.8	1.6	3.0	15.1	0.6	0.6
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	5.4	0.0	6.9	2.8	0.0	13.0	1.7	0.5	0.8	6.5	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.2	0.0	77.7	54.7	0.0	142.8	50.5	1.8	3.2	67.5	0.6	0.6
LnGrp LOS	E	A	E	D	A	F	D	A	A	E	A	A
Approach Vol, veh/h		314			325			1623			1750	
Approach Delay, s/veh		72.4			120.0			4.0			7.9	
Approach LOS		E			F			A			A	

Timer - Assigned Phs	2	3	4		6	7	8					
Phs Duration (G+Y+Rc), s	19.8	20.6	75.6		24.0	21.6	74.6					
Change Period (Y+Rc), s	4.0	4.9	4.9		4.0	4.9	4.9					
Max Green Setting (Gmax), s	21.0	10.5	70.7		20.0	25.1	56.1					
Max Q Clear Time (g_c+I1), s	15.1	5.9	2.0		22.0	16.4	2.5					
Green Ext Time (p_c), s	0.7	0.0	15.8		0.0	0.3	16.2					

Intersection Summary	
HCM 6th Ctrl Delay	20.4
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
5: Stony Point Rd & Sebastopol Rd

03/01/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	507	276	88	143	215	332	96	736	97	253	943	414
Future Volume (veh/h)	507	276	88	143	215	332	96	736	97	253	943	414
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.95	1.00		0.97	1.00		0.97
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	523	285	91	147	222	342	99	759	100	261	972	427
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	577	454	370	172	323	621	249	901	119	407	1333	843
Arrive On Green	0.17	0.24	0.24	0.10	0.17	0.17	0.14	0.29	0.29	0.46	0.75	0.75
Sat Flow, veh/h	3456	1870	1521	1781	1870	1502	1781	3145	414	1781	3554	1542
Grp Volume(v), veh/h	523	285	91	147	222	342	99	429	430	261	972	427
Grp Sat Flow(s),veh/h/ln	1728	1870	1521	1781	1870	1502	1781	1777	1783	1781	1777	1542
Q Serve(g_s), s	20.8	19.1	4.9	11.4	15.6	0.0	7.1	31.8	31.8	15.8	21.1	0.0
Cycle Q Clear(g_c), s	20.8	19.1	4.9	11.4	15.6	0.0	7.1	31.8	31.8	15.8	21.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.23	1.00		1.00
Lane Grp Cap(c), veh/h	577	454	370	172	323	621	249	509	511	407	1333	843
V/C Ratio(X)	0.91	0.63	0.25	0.85	0.69	0.55	0.40	0.84	0.84	0.64	0.73	0.51
Avail Cap(c_a), veh/h	627	454	370	261	374	662	249	509	511	407	1333	843
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.3	47.3	22.1	62.3	54.4	32.0	54.9	47.0	47.0	33.6	13.6	6.6
Incr Delay (d2), s/veh	16.2	2.7	0.3	15.6	4.3	0.9	1.0	15.5	15.5	3.4	3.5	2.2
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	10.3	9.1	2.5	5.9	7.8	9.0	3.3	16.1	16.2	5.9	5.3	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.5	50.1	22.4	77.9	58.7	32.9	55.9	62.5	62.5	37.1	17.1	8.8
LnGrp LOS	E	D	C	E	E	C	E	E	E	D	B	A
Approach Vol, veh/h		899			711			958			1660	
Approach Delay, s/veh		60.9			50.2			61.8			18.1	
Approach LOS		E			D			E			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.8	39.3	24.5	57.4	28.7	29.5	36.9	45.0				
Change Period (Y+Rc), s	5.3	5.3	4.9	4.9	5.3	5.3	4.9	4.9				
Max Green Setting (Gmax), s	20.5	32.9	13.7	52.5	25.4	28.0	26.1	40.1				
Max Q Clear Time (g_c+I1), s	13.4	21.1	9.1	23.1	22.8	17.6	17.8	33.8				
Green Ext Time (p_c), s	0.2	1.4	0.1	10.0	0.6	2.0	0.5	2.8				

Intersection Summary	
HCM 6th Ctrl Delay	42.5
HCM 6th LOS	D

HCM 6th Signalized Intersection Summary
1: Stony Point Rd & W 3rd St

03/01/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	177	260	259	114	106	35	152	1011	95	55	726	68
Future Volume (veh/h)	177	260	259	114	106	35	152	1011	95	55	726	68
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		0.98	1.00		0.99
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	190	280	278	123	114	38	163	1087	102	59	781	73
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	283	327	443	148	138	46	190	1904	831	76	1548	145
Arrive On Green	0.16	0.18	0.18	0.08	0.10	0.10	0.11	0.54	0.54	0.04	0.47	0.47
Sat Flow, veh/h	1781	1870	1564	1781	1342	447	1781	3554	1550	1781	3281	307
Grp Volume(v), veh/h	190	280	278	123	0	152	163	1087	102	59	423	431
Grp Sat Flow(s),veh/h/ln	1781	1870	1564	1781	0	1790	1781	1777	1550	1781	1777	1810
Q Serve(g_s), s	13.1	18.9	14.4	8.8	0.0	10.8	11.7	26.6	2.7	4.3	21.4	21.5
Cycle Q Clear(g_c), s	13.1	18.9	14.4	8.8	0.0	10.8	11.7	26.6	2.7	4.3	21.4	21.5
Prop In Lane	1.00		1.00	1.00		0.25	1.00		1.00	1.00		0.17
Lane Grp Cap(c), veh/h	283	327	443	148	0	184	190	1904	831	76	838	854
V/C Ratio(X)	0.67	0.86	0.63	0.83	0.00	0.83	0.86	0.57	0.12	0.78	0.50	0.50
Avail Cap(c_a), veh/h	311	442	538	227	0	344	270	1904	831	119	838	854
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.5	52.0	22.0	58.7	0.0	57.2	57.1	20.2	6.2	61.6	23.8	23.8
Incr Delay (d2), s/veh	4.9	11.7	1.6	13.9	0.0	9.0	17.2	1.2	0.3	15.5	2.2	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	6.2	9.9	5.4	4.5	0.0	5.3	6.1	11.0	1.5	2.2	9.4	9.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.4	63.7	23.6	72.5	0.0	66.1	74.3	21.4	6.5	77.2	26.0	25.9
LnGrp LOS	E	E	C	E	A	E	E	C	A	E	C	C
Approach Vol, veh/h		748			275			1352			913	
Approach Delay, s/veh		47.0			69.0			26.7			29.2	
Approach LOS		D			E			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.1	28.1	19.2	66.6	25.9	18.3	10.8	75.0
Change Period (Y+Rc), s	5.3	5.3	5.3	5.3	5.3	4.9	5.3	5.3
Max Green Setting (Gmax), s	16.6	30.7	19.7	41.8	22.7	25.0	8.7	52.8
Max Q Clear Time (g_c+I1), s	10.8	20.9	13.7	23.5	15.1	12.8	6.3	28.6
Green Ext Time (p_c), s	0.1	1.9	0.2	5.1	0.3	0.5	0.0	8.8

Intersection Summary	
HCM 6th Ctrl Delay	35.5
HCM 6th LOS	D

Notes

User approved changes to right turn type.

HCM 6th Signalized Intersection Summary
2: Stony Point Rd & Occidental Rd/SR 12 WB Off-Ramp

03/01/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	62	0	233	713	71	406	44	550	72	0	789	41
Future Volume (veh/h)	62	0	233	713	71	406	44	550	72	0	789	41
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		0.97
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	0	1870	1870
Adj Flow Rate, veh/h	73	0	274	839	84	210	52	647	0	0	928	48
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	0	2	2
Cap, veh/h	155	0	498	917	497	420	33	1867		0	1957	101
Arrive On Green	0.09	0.00	0.09	0.27	0.27	0.27	0.09	0.53	0.00	0.00	0.39	0.39
Sat Flow, veh/h	1781	0	2742	3456	1870	1581	356	3647	0	0	5131	256
Grp Volume(v), veh/h	73	0	274	839	84	210	52	647	0	0	636	340
Grp Sat Flow(s),veh/h/ln	1781	0	1371	1728	1870	1581	356	1777	0	0	1702	1814
Q Serve(g_s), s	5.1	0.0	11.3	30.6	4.5	14.6	12.1	13.7	0.0	0.0	18.1	18.2
Cycle Q Clear(g_c), s	5.1	0.0	11.3	30.6	4.5	14.6	12.1	13.7	0.0	0.0	18.1	18.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	0.00		0.14
Lane Grp Cap(c), veh/h	155	0	498	917	497	420	33	1867		0	1343	716
V/C Ratio(X)	0.47	0.00	0.55	0.91	0.17	0.50	1.57	0.35		0.00	0.47	0.48
Avail Cap(c_a), veh/h	155	0	498	976	528	446	82	1867		0	1343	716
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	1.00	1.00	0.89	0.89	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	56.5	0.0	48.6	46.3	36.7	40.4	58.9	17.9	0.0	0.0	29.3	29.3
Incr Delay (d2), s/veh	2.2	0.0	1.3	12.4	0.2	0.9	302.8	0.5	0.0	0.0	1.2	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	2.4	0.0	4.1	14.7	2.1	5.8	3.9	5.7	0.0	0.0	7.6	8.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.7	0.0	49.8	58.7	36.9	41.4	361.7	18.4	0.0	0.0	30.5	31.6
LnGrp LOS	E	A	D	E	D	D	F	B		A	C	C
Approach Vol, veh/h		347			1133			699	A		976	
Approach Delay, s/veh		51.7			53.9			43.9			30.9	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	2	3	4	6	8
Phs Duration (G+Y+Rc), s	17.0	17.0	56.2	39.8	73.2
Change Period (Y+Rc), s	5.7	4.9	4.9	5.3	4.9
Max Green Setting (Gmax), s	11.3	30.1	31.1	36.7	66.1
Max Q Clear Time (g_c+I1), s	13.3	14.1	20.2	32.6	15.7
Green Ext Time (p_c), s	0.0	0.1	4.6	1.9	5.0

Intersection Summary	
HCM 6th Ctrl Delay	44.3
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
3: Stony Point Rd & SR 12 EB Off-Ramp/SR 12 EB On-Ramp

03/01/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	0	72	0	0	0	0	665	630	462	1222	0
Future Volume (veh/h)	50	0	72	0	0	0	0	665	630	462	1222	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95				1.00		0.98	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	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	59	0	85				0	782	741	544	1438	0
Peak Hour Factor	0.85	0.85	0.85				0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	144	0	122				0	1773	774	998	2938	0
Arrive On Green	0.08	0.00	0.08				0.00	1.00	1.00	0.19	0.55	0.00
Sat Flow, veh/h	1781	0	1510				0	3647	1552	3456	3647	0
Grp Volume(v), veh/h	59	0	85				0	782	741	544	1438	0
Grp Sat Flow(s),veh/h/ln	1781	0	1510				0	1777	1552	1728	1777	0
Q Serve(g_s), s	4.1	0.0	7.1				0.0	0.1	3.0	18.5	32.2	0.0
Cycle Q Clear(g_c), s	4.1	0.0	7.1				0.0	0.1	3.0	18.5	32.2	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	144	0	122				0	1773	774	998	2938	0
V/C Ratio(X)	0.41	0.00	0.70				0.00	0.44	0.96	0.55	0.49	0.00
Avail Cap(c_a), veh/h	370	0	314				0	1773	774	998	2938	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	2.00	2.00	0.67	0.67	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.88	0.88	0.68	0.68	0.00
Uniform Delay (d), s/veh	56.8	0.0	58.2				0.0	0.1	0.1	44.7	12.2	0.0
Incr Delay (d2), s/veh	1.9	0.0	7.0				0.0	0.2	20.6	0.4	0.4	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	1.9	0.0	3.0				0.0	0.1	4.5	8.3	14.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.7	0.0	65.1				0.0	0.2	20.6	45.2	12.6	0.0
LnGrp LOS	E	A	E				A	A	C	D	B	A
Approach Vol, veh/h		144						1523			1982	
Approach Delay, s/veh		62.5						10.2			21.5	
Approach LOS		E						B			C	

Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		17.4		112.6			42.6	70.0				
Change Period (Y+Rc), s		6.9		5.1			5.1	* 5.1				
Max Green Setting (Gmax), s		27.0		91.0			23.0	* 64				
Max Q Clear Time (g_c+I1), s		9.1		34.2			20.5	5.0				
Green Ext Time (p_c), s		0.5		17.3			0.6	12.4				

Intersection Summary			
HCM 6th Ctrl Delay		18.4	
HCM 6th LOS		B	

Notes

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

HCM 6th Signalized Intersection Summary
4: Stony Point Rd & Stony Point Plaza

03/01/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	10	10	41	4	161	25	1252	70	119	1262	114
Future Volume (veh/h)	64	10	10	41	4	161	25	1252	70	119	1262	114
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
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	46	44	11	44	4	173	27	1346	75	128	1357	123
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	120	97	24	207	19	196	218	2884	161	153	2793	849
Arrive On Green	0.07	0.07	0.07	0.13	0.13	0.13	0.24	1.00	1.00	0.17	1.00	1.00
Sat Flow, veh/h	1781	1436	359	1639	149	1552	1781	4942	275	1781	5106	1552
Grp Volume(v), veh/h	46	0	55	48	0	173	27	927	494	128	1357	123
Grp Sat Flow(s),veh/h/ln	1781	0	1795	1788	0	1552	1781	1702	1814	1781	1702	1552
Q Serve(g_s), s	3.2	0.0	3.8	3.1	0.0	14.2	1.5	0.0	0.0	9.0	0.0	0.0
Cycle Q Clear(g_c), s	3.2	0.0	3.8	3.1	0.0	14.2	1.5	0.0	0.0	9.0	0.0	0.0
Prop In Lane	1.00		0.20	0.92		1.00	1.00		0.15	1.00		1.00
Lane Grp Cap(c), veh/h	120	0	121	226	0	196	218	1986	1058	153	2793	849
V/C Ratio(X)	0.38	0.00	0.45	0.21	0.00	0.88	0.12	0.47	0.47	0.84	0.49	0.14
Avail Cap(c_a), veh/h	206	0	207	261	0	227	218	1986	1058	289	2793	849
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.84	0.84	0.84
Uniform Delay (d), s/veh	58.0	0.0	58.3	51.0	0.0	55.8	43.7	0.0	0.0	53.0	0.0	0.0
Incr Delay (d2), s/veh	2.0	0.0	2.6	0.5	0.0	27.9	0.3	0.8	1.5	9.8	0.5	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	1.8	1.5	0.0	7.1	0.7	0.2	0.4	4.1	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.0	0.0	61.0	51.4	0.0	83.7	44.0	0.8	1.5	62.8	0.5	0.3
LnGrp LOS	E	A	E	D	A	F	D	A	A	E	A	A
Approach Vol, veh/h		101			221			1448			1608	
Approach Delay, s/veh		60.5			76.7			1.8			5.5	
Approach LOS		E			E			A			A	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		12.8	20.8	76.0		20.5	16.0	80.7				
Change Period (Y+Rc), s		4.0	4.9	4.9		4.0	4.9	4.9				
Max Green Setting (Gmax), s		15.0	7.1	71.1		19.0	21.1	57.1				
Max Q Clear Time (g_c+I1), s		5.8	3.5	2.0		16.2	11.0	2.0				
Green Ext Time (p_c), s		0.2	0.0	15.2		0.2	0.2	13.8				

Intersection Summary			
HCM 6th Ctrl Delay		10.2	
HCM 6th LOS		B	

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
5: Stony Point Rd & Sebastopol Rd

03/01/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	384	202	100	88	228	240	80	871	76	190	778	678
Future Volume (veh/h)	384	202	100	88	228	240	80	871	76	190	778	678
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.98	1.00		0.97
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	431	227	112	99	256	270	80	979	85	213	874	762
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	1.00	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	481	251	124	177	325	580	194	1113	97	344	1498	872
Arrive On Green	0.14	0.21	0.21	0.10	0.17	0.17	0.11	0.34	0.34	0.32	0.70	0.70
Sat Flow, veh/h	3456	1174	579	1781	1870	1577	1781	3303	287	1781	3554	1545
Grp Volume(v), veh/h	431	0	339	99	256	270	80	527	537	213	874	762
Grp Sat Flow(s),veh/h/ln	1728	0	1753	1781	1870	1577	1781	1777	1813	1781	1777	1545
Q Serve(g_s), s	15.9	0.0	24.5	6.9	17.0	0.0	5.4	36.3	36.3	13.2	16.1	2.4
Cycle Q Clear(g_c), s	15.9	0.0	24.5	6.9	17.0	0.0	5.4	36.3	36.3	13.2	16.1	2.4
Prop In Lane	1.00		0.33	1.00		1.00	1.00		0.16	1.00		1.00
Lane Grp Cap(c), veh/h	481	0	375	177	325	580	194	599	611	344	1498	872
V/C Ratio(X)	0.90	0.00	0.90	0.56	0.79	0.47	0.41	0.88	0.88	0.62	0.58	0.87
Avail Cap(c_a), veh/h	497	0	483	177	403	646	194	599	611	344	1498	872
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.0	0.0	49.8	55.9	51.4	31.4	54.1	40.6	40.6	40.0	13.5	8.5
Incr Delay (d2), s/veh	18.4	0.0	17.3	4.0	8.1	0.6	1.4	16.8	16.5	3.3	1.7	11.8
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	8.1	0.0	12.3	3.3	8.7	6.5	2.5	18.4	18.7	5.5	4.9	9.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.4	0.0	67.1	59.8	59.5	32.0	55.5	57.4	57.2	43.3	15.2	20.4
LnGrp LOS	E	A	E	E	E	C	E	E	E	D	B	C
Approach Vol, veh/h		770			625			1144			1849	
Approach Delay, s/veh		70.6			47.7			57.2			20.6	
Approach LOS		E			D			E			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.2	33.1	19.0	59.7	23.4	27.9	30.0	48.7
Change Period (Y+Rc), s	5.3	5.3	4.9	4.9	5.3	5.3	4.9	4.9
Max Green Setting (Gmax), s	10.9	35.8	8.1	54.8	18.7	28.0	19.1	43.8
Max Q Clear Time (g_c+I1), s	8.9	26.5	7.4	18.1	17.9	19.0	15.2	38.3
Green Ext Time (p_c), s	0.0	1.3	0.0	12.4	0.1	1.7	0.2	3.0

Intersection Summary	
HCM 6th Ctrl Delay	42.7
HCM 6th LOS	D

Notes

User approved changes to right turn type.

HCM 6th Signalized Intersection Summary
1: Stony Point Rd & W 3rd St

03/01/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	176	214	202	138	201	57	255	1040	130	66	1045	105
Future Volume (veh/h)	176	214	202	138	201	57	255	1040	130	66	1045	105
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.99
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	189	230	217	148	216	61	274	1118	140	71	1124	113
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	212	270	505	255	235	66	317	1652	722	171	1247	125
Arrive On Green	0.12	0.14	0.14	0.14	0.17	0.17	0.18	0.47	0.47	0.10	0.38	0.38
Sat Flow, veh/h	1781	1870	1542	1781	1393	394	1781	3554	1552	1781	3256	327
Grp Volume(v), veh/h	189	230	217	148	0	277	274	1118	140	71	613	624
Grp Sat Flow(s),veh/h/ln	1781	1870	1542	1781	0	1787	1781	1777	1552	1781	1777	1807
Q Serve(g_s), s	14.6	16.8	0.0	10.9	0.0	21.4	20.9	34.4	7.4	5.3	45.5	45.6
Cycle Q Clear(g_c), s	14.6	16.8	0.0	10.9	0.0	21.4	20.9	34.4	7.4	5.3	45.5	45.6
Prop In Lane	1.00		1.00	1.00		0.22	1.00		1.00	1.00		0.18
Lane Grp Cap(c), veh/h	212	270	505	255	0	301	317	1652	722	171	680	692
V/C Ratio(X)	0.89	0.85	0.43	0.58	0.00	0.92	0.86	0.68	0.19	0.42	0.90	0.90
Avail Cap(c_a), veh/h	214	375	592	255	0	320	317	1652	722	171	680	692
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.8	58.4	37.2	56.1	0.0	57.3	55.9	29.2	22.0	59.6	40.7	40.7
Incr Delay (d2), s/veh	34.0	12.6	0.6	3.3	0.0	29.5	21.0	2.2	0.6	1.6	17.3	17.3
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	8.6	8.9	5.9	5.1	0.0	12.0	11.2	14.9	2.8	2.4	22.8	23.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	94.8	71.1	37.8	59.3	0.0	86.8	76.8	31.5	22.6	61.2	58.0	58.1
LnGrp LOS	F	E	D	E	A	F	E	C	C	E	E	E
Approach Vol, veh/h		636			425			1532			1308	
Approach Delay, s/veh		66.8			77.2			38.8			58.2	
Approach LOS		E			E			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	25.3	25.5	30.2	58.9	21.9	28.9	18.7	70.4
Change Period (Y+Rc), s	5.3	5.3	5.3	5.3	5.3	* 5.3	5.3	5.3
Max Green Setting (Gmax), s	13.4	28.1	23.7	53.6	16.8	* 25	12.2	65.1
Max Q Clear Time (g_c+I1), s	12.9	18.8	22.9	47.6	16.6	23.4	7.3	36.4
Green Ext Time (p_c), s	0.0	1.4	0.1	3.7	0.0	0.3	0.0	9.9

Intersection Summary	
HCM 6th Ctrl Delay	54.0
HCM 6th LOS	D

Notes

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

User approved changes to right turn type.

HCM 6th Signalized Intersection Summary
2: Stony Point Rd & Occidental Rd/SR 12 WB Off-Ramp

03/01/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	0	244	606	200	536	127	928	71	0	1313	113
Future Volume (veh/h)	85	0	244	606	200	536	127	928	71	0	1313	113
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		0.98	1.00		1.00	1.00		0.96
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	0	1870	1870
Adj Flow Rate, veh/h	86	0	191	612	202	260	128	937	0	0	1326	114
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	0	2	2
Cap, veh/h	80	0	964	707	383	319	107	2263		0	1436	123
Arrive On Green	0.05	0.00	0.05	0.20	0.20	0.20	0.30	0.64	0.00	0.00	0.30	0.30
Sat Flow, veh/h	1781	0	2790	3456	1870	1557	356	3647	0	0	4938	410
Grp Volume(v), veh/h	86	0	191	612	202	260	128	937	0	0	946	494
Grp Sat Flow(s),veh/h/ln	1781	0	1395	1728	1870	1557	356	1777	0	0	1702	1776
Q Serve(g_s), s	6.3	0.0	6.3	24.0	13.5	22.3	42.1	18.2	0.0	0.0	37.7	37.7
Cycle Q Clear(g_c), s	6.3	0.0	6.3	24.0	13.5	22.3	42.1	18.2	0.0	0.0	37.7	37.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	0.00		0.23
Lane Grp Cap(c), veh/h	80	0	964	707	383	319	107	2263		0	1025	535
V/C Ratio(X)	1.07	0.00	0.20	0.87	0.53	0.82	1.19	0.41		0.00	0.92	0.92
Avail Cap(c_a), veh/h	80	0	964	807	437	364	107	2263		0	1025	535
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	1.00	1.00	0.77	0.77	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	66.9	0.0	32.2	53.8	49.6	53.2	49.0	12.5	0.0	0.0	47.4	47.4
Incr Delay (d2), s/veh	121.8	0.0	0.1	8.9	1.1	12.1	138.0	0.4	0.0	0.0	14.8	23.9
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	5.6	0.0	2.3	11.3	6.5	9.8	7.8	7.2	0.0	0.0	17.9	20.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	188.7	0.0	32.3	62.7	50.8	65.2	187.0	13.0	0.0	0.0	62.1	71.3
LnGrp LOS	F	A	C	E	D	E	F	B		A	E	E
Approach Vol, veh/h		277			1074			1065	A		1440	
Approach Delay, s/veh		80.8			61.1			33.9			65.3	
Approach LOS		F			E			C			E	

Timer - Assigned Phs	2	3	4		6		8					
Phs Duration (G+Y+Rc), s	12.0	47.0	47.1		33.9		94.1					
Change Period (Y+Rc), s	5.7	4.9	4.9		5.3		4.9					
Max Green Setting (Gmax), s	6.3	42.1	38.1		32.7		85.1					
Max Q Clear Time (g_c+I1), s	8.3	44.1	39.7		26.0		20.2					
Green Ext Time (p_c), s	0.0	0.0	0.0		2.7		8.2					

Intersection Summary	
HCM 6th Ctrl Delay	56.6
HCM 6th LOS	E

Notes

User approved volume balancing among the lanes for turning movement.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
3: Stony Point Rd & SR 12 EB Off-Ramp/SR 12 EB On-Ramp

03/01/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	0	165	0	0	0	0	1074	785	542	1575	0
Future Volume (veh/h)	70	0	165	0	0	0	0	1074	785	542	1575	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96				1.00		0.98	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	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	72	0	170				0	1107	809	559	1624	0
Peak Hour Factor	0.97	0.97	0.97				0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	235	0	201				0	1846	809	782	2780	0
Arrive On Green	0.13	0.00	0.13				0.00	1.00	1.00	0.23	0.78	0.00
Sat Flow, veh/h	1781	0	1519				0	3647	1558	3456	3647	0
Grp Volume(v), veh/h	72	0	170				0	1107	809	559	1624	0
Grp Sat Flow(s),veh/h/ln	1781	0	1519				0	1777	1558	1728	1777	0
Q Serve(g_s), s	5.1	0.0	15.3				0.0	0.0	0.0	20.9	25.7	0.0
Cycle Q Clear(g_c), s	5.1	0.0	15.3				0.0	0.0	0.0	20.9	25.7	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	235	0	201				0	1846	809	782	2780	0
V/C Ratio(X)	0.31	0.00	0.85				0.00	0.60	1.00	0.71	0.58	0.00
Avail Cap(c_a), veh/h	344	0	293				0	1853	813	782	2780	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.75	0.75	0.34	0.34	0.00
Uniform Delay (d), s/veh	55.0	0.0	59.4				0.0	0.0	0.0	50.0	6.1	0.0
Incr Delay (d2), s/veh	0.7	0.0	14.2				0.0	0.4	27.2	1.1	0.3	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	2.4	0.0	6.7				0.0	0.1	6.1	9.2	8.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.7	0.0	73.5				0.0	0.4	27.2	51.0	6.4	0.0
LnGrp LOS	E	A	E				A	A	C	D	A	A
Approach Vol, veh/h		242						1916			2183	
Approach Delay, s/veh		68.2						11.7			17.9	
Approach LOS		E						B			B	

Timer - Assigned Phs	2		4				7	8				
Phs Duration (G+Y+Rc), s	25.4		114.6				36.8	77.8				
Change Period (Y+Rc), s	6.9		5.1				5.1	* 5.1				
Max Green Setting (Gmax), s	27.0		101.0				24.0	* 73				
Max Q Clear Time (g_c+I1), s	17.3		27.7				22.9	2.0				
Green Ext Time (p_c), s	0.7		23.1				0.3	20.3				

Intersection Summary	
HCM 6th Ctrl Delay	17.9
HCM 6th LOS	B

Notes

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

HCM 6th Signalized Intersection Summary
4: Stony Point Rd & Stony Point Plaza

03/01/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	198	38	46	68	14	234	57	1428	89	184	1312	201
Future Volume (veh/h)	198	38	46	68	14	234	57	1428	89	184	1312	201
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.97	1.00		0.98
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	145	122	47	70	14	241	59	1472	92	190	1353	207
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	201	144	56	214	43	223	200	2440	152	213	2579	783
Arrive On Green	0.11	0.11	0.11	0.14	0.14	0.14	0.22	1.00	1.00	0.24	1.00	1.00
Sat Flow, veh/h	1781	1280	493	1496	299	1564	1781	4903	306	1781	5106	1550
Grp Volume(v), veh/h	145	0	169	84	0	241	59	1022	542	190	1353	207
Grp Sat Flow(s),veh/h/ln	1781	0	1773	1796	0	1564	1781	1702	1806	1781	1702	1550
Q Serve(g_s), s	11.0	0.0	13.1	5.9	0.0	20.0	3.9	0.5	0.5	14.4	0.0	0.0
Cycle Q Clear(g_c), s	11.0	0.0	13.1	5.9	0.0	20.0	3.9	0.5	0.5	14.4	0.0	0.0
Prop In Lane	1.00		0.28	0.83		1.00	1.00		0.17	1.00		1.00
Lane Grp Cap(c), veh/h	201	0	200	257	0	223	200	1694	898	213	2579	783
V/C Ratio(X)	0.72	0.00	0.84	0.33	0.00	1.08	0.30	0.60	0.60	0.89	0.52	0.26
Avail Cap(c_a), veh/h	267	0	266	257	0	223	200	1694	898	319	2579	783
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.75	0.75	0.75
Uniform Delay (d), s/veh	60.0	0.0	60.9	54.0	0.0	60.0	49.7	0.2	0.2	52.4	0.0	0.0
Incr Delay (d2), s/veh	6.2	0.0	16.8	0.7	0.0	82.8	0.8	1.6	3.0	14.6	0.6	0.6
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	5.4	0.0	6.9	2.8	0.0	13.0	1.7	0.5	0.8	6.5	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.2	0.0	77.7	54.7	0.0	142.8	50.5	1.8	3.2	67.0	0.6	0.6
LnGrp LOS	E	A	E	D	A	F	D	A	A	E	A	A
Approach Vol, veh/h		314			325			1623			1750	
Approach Delay, s/veh		72.4			120.0			4.0			7.8	
Approach LOS		E			F			A			A	

Timer - Assigned Phs	2	3	4	6	7	8
Phs Duration (G+Y+Rc), s	19.8	20.6	75.6	24.0	21.6	74.6
Change Period (Y+Rc), s	4.0	4.9	4.9	4.0	4.9	4.9
Max Green Setting (Gmax), s	21.0	10.5	70.7	20.0	25.1	56.1
Max Q Clear Time (g_c+I1), s	15.1	5.9	2.0	22.0	16.4	2.5
Green Ext Time (p_c), s	0.7	0.0	15.8	0.0	0.3	16.2

Intersection Summary	
HCM 6th Ctrl Delay	20.4
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
5: Stony Point Rd & Sebastopol Rd

03/01/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	507	276	88	143	215	332	96	736	97	253	943	414
Future Volume (veh/h)	507	276	88	143	215	332	96	736	97	253	943	414
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.95	1.00		0.97	1.00		0.97
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	523	285	91	147	222	342	99	759	100	261	972	427
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	577	309	99	195	323	621	249	901	119	407	1333	843
Arrive On Green	0.17	0.23	0.23	0.11	0.17	0.17	0.14	0.29	0.29	0.46	0.75	0.75
Sat Flow, veh/h	3456	1342	429	1781	1870	1502	1781	3145	414	1781	3554	1542
Grp Volume(v), veh/h	523	0	376	147	222	342	99	429	430	261	972	427
Grp Sat Flow(s),veh/h/ln	1728	0	1771	1781	1870	1502	1781	1777	1783	1781	1777	1542
Q Serve(g_s), s	20.8	0.0	29.1	11.2	15.6	0.0	7.1	31.8	31.8	15.8	21.1	0.0
Cycle Q Clear(g_c), s	20.8	0.0	29.1	11.2	15.6	0.0	7.1	31.8	31.8	15.8	21.1	0.0
Prop In Lane	1.00		0.24	1.00		1.00	1.00		0.23	1.00		1.00
Lane Grp Cap(c), veh/h	577	0	407	195	323	621	249	509	511	407	1333	843
V/C Ratio(X)	0.91	0.00	0.92	0.75	0.69	0.55	0.40	0.84	0.84	0.64	0.73	0.51
Avail Cap(c_a), veh/h	627	0	474	202	374	662	249	509	511	407	1333	843
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.3	0.0	52.7	60.5	54.4	32.0	54.9	47.0	47.0	33.6	13.6	6.6
Incr Delay (d2), s/veh	16.2	0.0	21.9	14.2	4.3	0.9	1.0	15.5	15.5	3.4	3.5	2.2
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	10.3	0.0	15.2	5.9	7.8	9.0	3.3	16.1	16.2	5.9	5.3	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.5	0.0	74.6	74.7	58.7	32.9	55.9	62.5	62.5	37.1	17.1	8.8
LnGrp LOS	E	A	E	E	E	C	E	E	E	D	B	A
Approach Vol, veh/h		899			711			958			1660	
Approach Delay, s/veh		74.0			49.6			61.8			18.1	
Approach LOS		E			D			E			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.6	37.5	24.5	57.4	28.7	29.5	36.9	45.0
Change Period (Y+Rc), s	5.3	5.3	4.9	4.9	5.3	5.3	4.9	4.9
Max Green Setting (Gmax), s	15.9	37.5	13.7	52.5	25.4	28.0	26.1	40.1
Max Q Clear Time (g_c+I1), s	13.2	31.1	9.1	23.1	22.8	17.6	17.8	33.8
Green Ext Time (p_c), s	0.1	1.1	0.1	10.0	0.6	2.0	0.5	2.8

Intersection Summary	
HCM 6th Ctrl Delay	45.2
HCM 6th LOS	D

Notes

User approved changes to right turn type.

Appendix C

Outreach

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Stony Point Road Pedestrian and Bicycle Improvements – SURVEY #1

Stony Point Road between West 3rd Street and Sebastopol Road has been identified as a high priority for improvements in the Santa Rosa Bicycle and Pedestrian Master Plan Update. The City is now working to redesign this corridor to make it a safer and more comfortable place to walk or bike. This survey describes the different design options that have been proposed for locations throughout the study area, and your input is important to help make sure this project meets the needs of the community. Thank you for taking the time to provide your comments!

1. How do you currently travel along Stony Point Rd between W. 3rd Street and Sebastopol Road? (check all that apply)

- [ ] Walk
- [ ] Bike
- [ ] Drive
- [ ] Other (please specify)

2. If you walk along Stony Point Road, how often?

- ○ More than 5 times a week
- ○ 1 to 5 times a week
- ○ 1 time a month
- ○ A few times a year
- ○ I don't walk along Stony Point Road.

3. If you bike along Stony Point Road, how often?

- ○ More than 5 times a week
- ○ 1 to 5 times a week

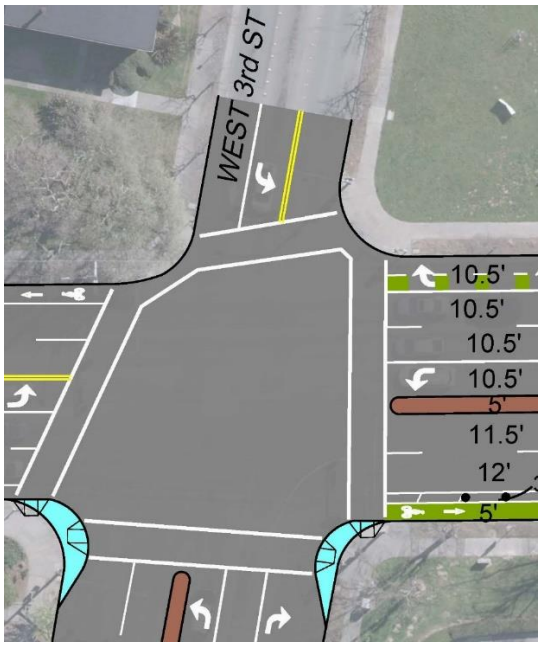
- ○ 1 time a month
- ○ A few times a year
- ○ I don't bike along Stony Point Road

4. For what purpose do you walk or bike along Stony Point Road? (check all that apply)

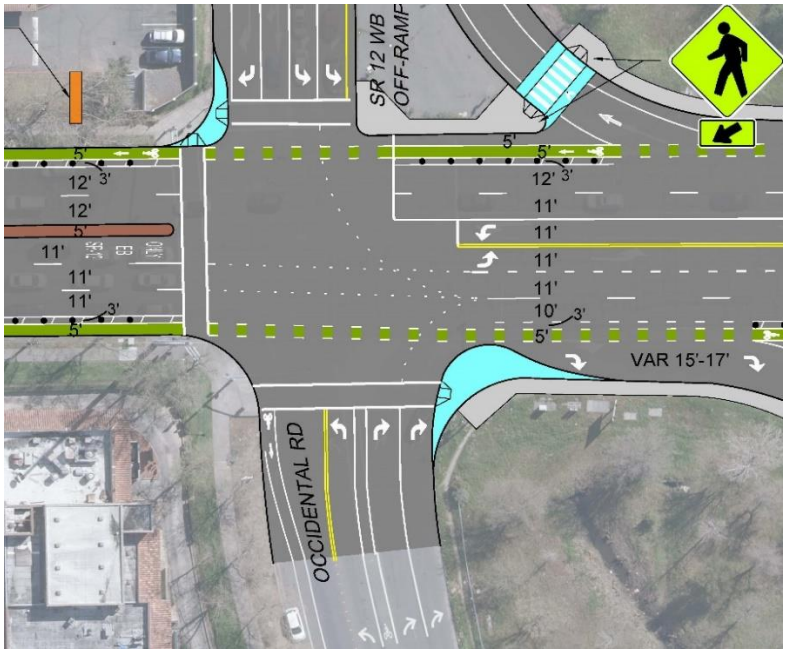
- ☐ travel to or from work
- ☐ travel to or from school
- ☐ travel to or from shopping
- ☐ for recreation
- ☐ Other (please specify)

5. **Stony Point Road bike lanes:** The picture below shows bike facilities that are similar to what is proposed along Stony Point Road. Rate this proposal on a scale of 1 to 5 (1 = strongly support, 5 = strongly oppose):

6. **West 3rd Street intersection:** Curb extensions have been recommended to shorten crossing distance and reduce vehicle speeds. Rate this proposal on a scale of 1 to 5 (1 = strongly support, 5 = strongly oppose)

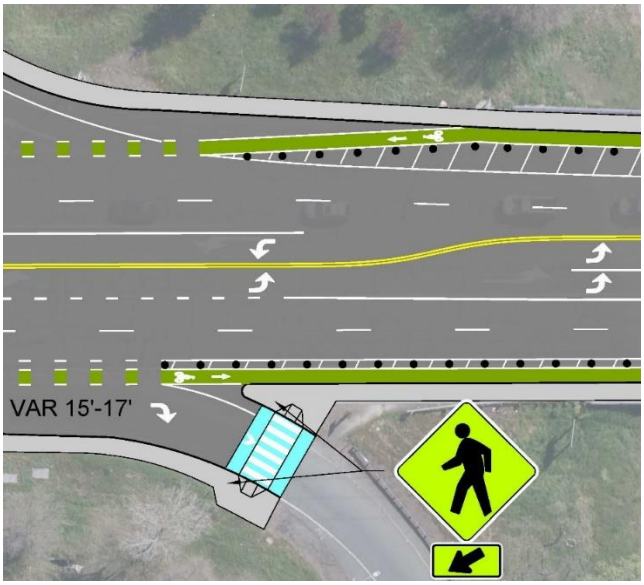


7. **Occidental Road intersection:** Curb extensions are proposed to shorten the crossing distance for pedestrians and reduce the speeds at the corners and ramp entrance. Rate this proposal on a scale of 1 to 5 (1 = strongly support, 5 = strongly oppose)



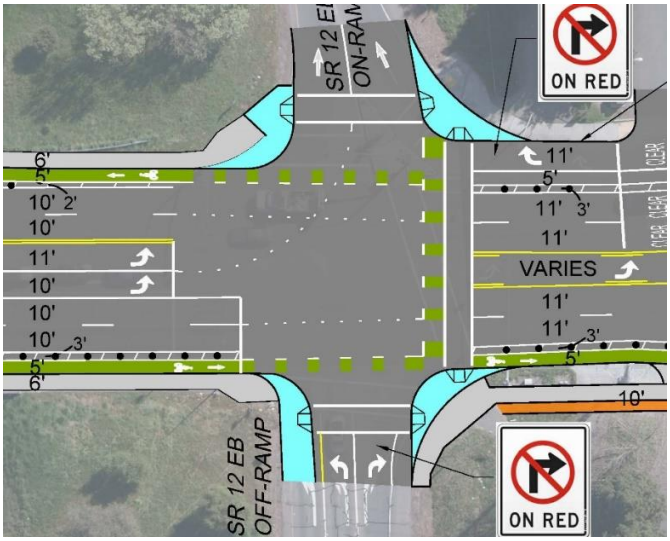
8. **Highway 12 westbound on-ramps:** Raised crosswalks or flashing beacons have been proposed for to improve pedestrian crossings at the on-ramp entrances. Rate each of these options on a scale of 1 to 5 (1 = strongly support, 5 = strongly oppose)

- raised crosswalks
- Rectangular rapid flashing beacon (RRFB)
- high visibility crosswalk striping

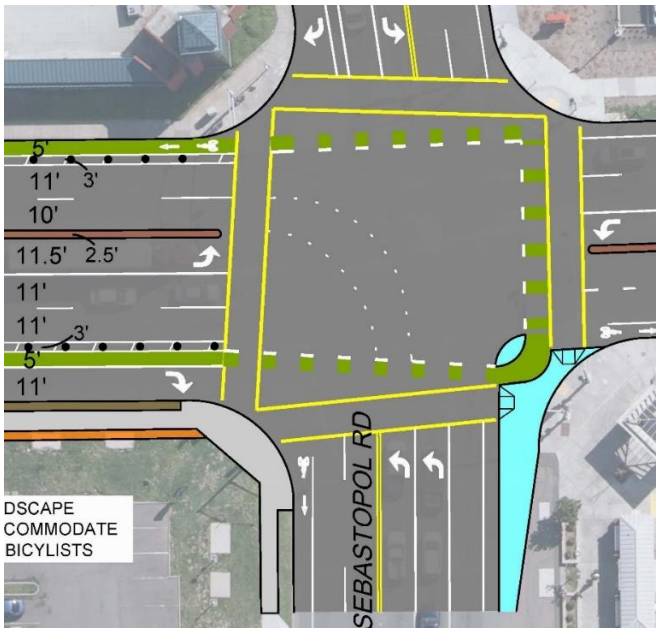


9. **Eastbound Highway 12 ramps-Joe Rodota Trail crossing:** Rate each of the proposed improvements on a scale of 1 to 5 (1 = strongly support, 5 = strongly oppose)

- Remove island to straighten crosswalk and reduce vehicle conflicts
- Remove lane on off-ramp, add curb extensions to reduce crossing distance
- Add "crossbike" for bicyclists next to pedestrian crosswalk
- No right turn on red onto Stony Point Road



10. **Stony Point Road/Sebastopol Road intersection:** Rate the proposed "protected intersection" on a scale of 1 to 5 (1 = strongly support, 5 = strongly oppose).



11. Would you choose to walk or bike more along Stony Point Rd if bicycle and pedestrian facilities were improved?

- Yes
- No
- I don't know

12. Information about you - age (optional)

- 18 or under
- 19-30
- 31-45
- 46-60
- 61-75
- over 75

13. Information about you - Gender (optional)

- Male
- Female
- Other/prefer not to state

14. What is your zip code?

- 95401
- 95402
- 95403
- 95404
- 95405
- 95406
- 95407
- 95409
- Other (please specify)

Stony Point Road Pedestrian and Bicycle Improvements – SURVEY #1

Monday, December 14, 2020

Q1: How do you currently travel along Stony Point Rd between W. 3rd Street and Sebastopol Road? (check all that apply)

Answered: 234 Skipped: 0

ANSWER CHOICES	RESPONSES	
Walk	21.37%	50
Bike	48.29%	113
Drive	82.05%	192
Other (please specify)	3.42%	8
Total Respondents: 234		

Q2: If you walk along Stony Point Road, how often?

Answered: 215 Skipped: 19

ANSWER CHOICES	RESPONSES	
More than 5 times a week	2.33%	5
1 to 5 times a week	6.05%	13
1 time a month	9.30%	20
A few times a year	26.51%	57
I don't walk along Stony Point Road.	55.81%	120
TOTAL		215

Q3: If you bike along Stony Point Road, how often?

Answered: 228 Skipped: 6

ANSWER CHOICES	RESPONSES	
More than 5 times a week	3.95%	9
1 to 5 times a week	20.18%	46
1 time a month	13.60%	31
A few times a year	22.37%	51
I don't bike along Stony Point Road	39.91%	91
TOTAL		228

Q4: For what purpose do you walk or bike along Stony Point Road? (check all that apply)

Answered: 194 Skipped: 40

ANSWER CHOICES	RESPONSES	
travel to or from work	20.62%	40
travel to or from school	1.55%	3
travel to or from shopping	32.99%	64
for recreation	74.23%	144
Other (please specify)	13.92%	27
Total Respondents: 194		

Q5: On the map above, how comfortable are you walking across the street at the locations shown on the map (Rate on a scale of 1 to 5, 1=most comfortable, 5= least comfortable)?

Answered: 206 Skipped: 28

	1 = MOST COMFORTABLE	2	3	4	5 = LEAST COMFORTABLE	TOTAL
Location 1 – Intersection of Stony Point Road/West Third Street	15.92% 32	14.93% 30	25.87% 52	23.88% 48	19.40% 39	201
Location 2 – Intersection of Stony Point Road/Occidental Road-SR12 Offramp	3.47% 7	7.92% 16	13.86% 28	31.68% 64	43.07% 87	202
Location 3 – Entrance to SR12 On-Ramps	3.47% 7	3.96% 8	11.39% 23	24.26% 49	56.93% 115	202
Location 4 – Intersection of Stony Point Road/SR12 EB Ramps	3.55% 7	5.08% 10	12.18% 24	27.41% 54	51.78% 102	197
Location 5 – Crossing Stony Pt Rd while using the Joe Rodota Trail	4.95% 10	10.40% 21	12.87% 26	25.25% 51	46.53% 94	202
Location 6 – Intersection of Stony Point Road/Stony Point Plaza entrance	6.03% 12	12.06% 24	23.12% 46	29.65% 59	29.15% 58	199
Location 7 – Intersection of Stony Point Road/Sebastopol Road	6.93% 14	17.33% 35	26.24% 53	21.29% 43	28.22% 57	202

Q6: As a pedestrian in the corridor, which statements do you agree with? (check all that apply)

Answered: 213 Skipped: 21

ANSWER CHOICES	RESPONSES	
Turning vehicles often don't yield to pedestrians	66.20%	141
It takes a long time to make it all the way across Stony Point Road	36.15%	77
I don't feel safe because of the heavy traffic	59.62%	127
I feel safe as a pedestrian on this corridor.	7.04%	15
I don't walk on Stony Point Road	35.21%	75
Total Respondents: 213		

Q7: As a pedestrian, which do you think would make you feel more comfortable crossing intersections on Stony Point Road (see photos below)? (Rate on a scale of 1 to 5, 1=most comfortable, 5= least comfortable)?

Answered: 200 Skipped: 34

	1 = MOST COMFORTABLE	2	3	4	5 = LEAST COMFORTABLE	TOTAL
Median/Pedestrian refuge island (see photo below)	21.94% 43	29.08% 57	30.61% 60	12.24% 24	6.12% 12	196
Curb extensions (shortens crossing distance - see photo below)	9.95% 19	23.04% 44	31.94% 61	16.23% 31	18.85% 36	191
Longer crossing time	20.63% 39	24.87% 47	32.28% 61	12.70% 24	9.52% 18	189
Protected intersection (see photo below)	56.57% 112	18.18% 36	15.15% 30	3.03% 6	7.07% 14	198

Q9: How comfortable are you biking on Stony Point Road at the locations shown on the map above (Rate on a scale of 1 to 5, 1=most comfortable, 5= least comfortable)?

Answered: 203 Skipped: 31

	1 = MOST COMFORTABLE	2	3	4	5 = LEAST COMFORTABLE	TOTAL
Location 1 – Intersection of Stony Point Road/West Third Street	10.61% 21	19.70% 39	22.22% 44	18.18% 36	29.29% 58	198
Location 2 – Intersection of Stony Point Road/Occidental Road-SR12 Offramp	4.59% 9	8.67% 17	14.80% 29	24.49% 48	47.45% 93	196
Location 3 – Entrance to SR12 On-Ramps	2.54% 5	5.58% 11	11.68% 23	21.83% 43	58.38% 115	197
Location 4 – Intersection of Stony Point Road/SR12 EB Ramps	3.57% 7	4.59% 9	11.73% 23	24.49% 48	55.61% 109	196
Location 5 – Crossing Stony Pt Rd while using the Joe Rodota Trail	6.03% 12	10.55% 21	13.57% 27	18.09% 36	51.76% 103	199
Location 6 – Intersection of Stony Point Road/Stony Point Plaza entrance	3.54% 7	12.63% 25	21.21% 42	24.75% 49	37.88% 75	198
Location 7 – Intersection of Stony Point Road/Sebastopol Road	4.62% 9	18.46% 36	21.03% 41	18.97% 37	36.92% 72	195

Q10: How comfortable do you feel using the bike lanes along Stony Point Rd? (Rate on a scale of 1 to 5, 1=very comfortable, 5= I do not feel safe)

Answered: 178 Skipped: 56

	VERY COMFORTABLE	(NO LABEL)	(NO LABEL)	(NO LABEL)	I DO NOT FEEL SAFE	TOTAL	WEIGHTED AVERAGE
☆	3.93% 7	9.55% 17	20.79% 37	19.66% 35	46.07% 82	178	3.94

Q11: As a bicyclist on Stony Point Road, which statements do you agree with? (check all that apply)

Answered: 199 Skipped: 35

ANSWER CHOICES	RESPONSES	
Bike lanes are too close to vehicle traffic	63.82%	127
Heavy traffic volumes make bike riding difficult	77.89%	155
Speeding vehicles make bike riding difficult	70.35%	140
It is difficult to deal with turning vehicles at intersections	77.39%	154
I feel safe as a bicyclist on this corridor.	6.53%	13
Total Respondents: 199		

Q12: What do you think would make you feel more comfortable at these locations (see images below)? (Rate on a scale of 1 to 5, 1=most comfortable, 5= least comfortable)?

Answered: 202 Skipped: 32

	1 = MOST COMFORTABLE	2	3	4	5 = LEAST COMFORTABLE	TOTAL	WEIGHTED AVERAGE
Buffered bike lanes (see photo below)	37.06% 73	32.49% 64	15.74% 31	5.58% 11	9.14% 18	197	2.17
Green dashed bike striping (see photo below)	26.90% 53	24.87% 49	26.40% 52	8.63% 17	13.20% 26	197	2.56
Protected intersection (see photo below)	49.24% 97	18.27% 36	17.26% 34	7.11% 14	8.12% 16	197	2.07
Crossbike next to crosswalk (see photo below)	27.46% 53	24.87% 48	25.39% 49	12.44% 24	9.84% 19	193	2.52
Bike lane striping through intersections	30.93% 60	22.68% 44	28.35% 55	9.79% 19	8.25% 16	194	2.42

Q13: Would you choose to walk or bike more along Stony Point Rd if bicycle and pedestrian facilities were improved?

Answered: 226 Skipped: 8

ANSWER CHOICES	RESPONSES	
Yes	70.80%	160
No	8.85%	20
I don't know	20.35%	46
TOTAL		226

Q14: Information about you - age (optional)

Answered: 220 Skipped: 14

ANSWER CHOICES	RESPONSES	
18 or under	0.00%	0
19-30	8.18%	18
31-45	24.55%	54
46-60	30.00%	66
61-75	34.09%	75
over 75	3.18%	7
TOTAL		220

Q15: Information about you - Gender (optional)

Answered: 218 Skipped: 16

ANSWER CHOICES	RESPONSES	
Male	45.41%	99
Female	48.17%	105
Other/prefer not to state	6.42%	14
TOTAL		218

Q16: What is your zip code?

Answered: 227 Skipped: 7

ANSWER CHOICES	RESPONSES	
95401	22.91%	52
95402	0.44%	1
95403	12.33%	28
95404	17.62%	40
95405	8.37%	19
95406	0.00%	0
95407	26.87%	61
95409	6.17%	14
Other (please specify)	5.29%	12
TOTAL		227

Stony Point Road Pedestrian and Bicycle Improvements – SURVEY #2

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1. How do you currently travel along Stony Point Rd between W. 3rd Street and Sebastopol Road? (check all that apply)

- [ ] Walk
- [ ] Bike
- [ ] Drive
- [ ] Other (please specify)

2. If you walk along Stony Point Road, how often?

- More than 5 times a week
- 1 to 5 times a week
- 1 time a month
- A few times a year
- I don't walk along Stony Point Road.

3. If you bike along Stony Point Road, how often?

- More than 5 times a week
- 1 to 5 times a week
- 1 time a month
- A few times a year
- I don't bike along Stony Point Road

4. For what purpose do you walk or bike along Stony Point Road? (check all that apply)

- ☐ travel to or from work
- ☐ travel to or from school
- ☐ travel to or from shopping
- ☐ for recreation
- ☐ Other (please specify)

Stony Point Road Corridor Study Area

5. On the map above, how comfortable are you walking across the street at the locations shown on the map (Rate on a scale of 1 to 5, 1=most comfortable, 5= least comfortable)?

Location 1 – Intersection of Stony Point Road/West Third Street

Location 2 – Intersection of Stony Point Road/Occidental Road-SR12 Offramp

Location 3 – Entrance to SR12 On-Ramps

Location 4 – Intersection of Stony Point Road/SR12 EB Ramps

Location 5 – Crossing Stony Pt Rd while using the Joe Rodota Trail

Location 6 – Intersection of Stony Point Road/Stony Point Plaza entrance

Location 7 – Intersection of Stony Point Road/Sebastopol Road

6. As a pedestrian in the corridor, which statements do you agree with? (check all that apply)

- ☐ Turning vehicles often don't yield to pedestrians
- ☐ It takes a long time to make it all the way across Stony Point Road
- ☐ I don't feel safe because of the heavy traffic
- ☐ I feel safe as a pedestrian on this corridor.

☐ I don’t walk on Stony Point Road

7. As a pedestrian, which do you think would make you feel more comfortable crossing intersections on Stony Point Road (see photos below)? (Rate on a scale of 1 to 5, 1=most comfortable, 5= least comfortable)?

Curb Extension

Pedestrian Refuge Island

Protected Intersection

8. Are there any locations where you would like to be able to cross Stony Point Road where there are currently no crosswalks? Please list locations.

9. How comfortable are you biking on Stony Point Road at the locations shown on the map above (Rate on a scale of 1 to 5, 1=most comfortable, 5= least comfortable)?

Location 1 – Intersection of Stony Point Road/West Third Street

Location 2 – Intersection of Stony Point Road/Occidental Road-SR12 Offramp

Location 3 – Entrance to SR12 On-Ramps

Location 4 – Intersection of Stony Point Road/SR12 EB Ramps

Location 5 – Crossing Stony Pt Rd while using the Joe Rodota Trail

Location 6 – Intersection of Stony Point Road/Stony Point Plaza entrance

Location 7 – Intersection of Stony Point Road/Sebastopol Road

10. How comfortable do you feel using the bike lanes along Stony Point Rd? (Rate on a scale of 1 to 5, 1=very comfortable, 5= I do not feel safe)

11. As a bicyclist on Stony Point Road, which statements do you agree with? (check all that apply)

- ☐ Bike lanes are too close to vehicle traffic
- ☐ Heavy traffic volumes make bike riding difficult
- ☐ Speeding vehicles make bike riding difficult
- ☐ It is difficult to deal with turning vehicles at intersections
- ☐ I feel safe as a bicyclist on this corridor.

12. What do you think would make you feel more comfortable at these locations (see images below)? (Rate on a scale of 1 to 5, 1=most comfortable, 5= least comfortable)?

Green dashed bike lanes

Buffered Bike Lane

Cross-bike

Protected Intersection

13. Would you choose to walk or bike more along Stony Point Rd if bicycle and pedestrian facilities were improved?

- Yes
- No
- I don't know

14. Information about you - age (optional)

- 18 or under
- 19-30
- 31-45
- 46-60
- 61-75
- over 75

15. Information about you - Gender (optional)

- Male
- Female
- Other/prefer not to state

16. What is your zip code?

- 95401
- 95402
- 95403
- 95404
- 95405
- 95406
- 95407
- 95409
- Other (please specify)

Stony Point Road Pedestrian and Bicycle Improvements – SURVEY #2

Tuesday, March 16, 2021

Q1: How do you currently travel along Stony Point Rd between W. 3rd Street and Sebastopol Road? (check all that apply)

Answered: 353 Skipped: 1

ANSWER CHOICES	RESPONSES	
Walk	18%	62
Bike	50%	175
Drive	82%	291
Other (please specify)	2%	7
Total Respondents: 353		

Q2: If you walk along Stony Point Road, how often?

Answered: 306 Skipped: 48

ANSWER CHOICES	RESPONSES	
More than 5 times a week	3%	10
1 to 5 times a week	9%	29
1 time a month	7%	22
A few times a year	13%	40
I don't walk along Stony Point Road.	67%	205
TOTAL		306

Q3: If you bike along Stony Point Road, how often?

Answered: 342 Skipped: 12

ANSWER CHOICES	RESPONSES	
More than 5 times a week	3%	9
1 to 5 times a week	20%	70
1 time a month	16%	54
A few times a year	24%	82
I don't bike along Stony Point Road	37%	127
TOTAL		342

Q4: For what purpose do you walk or bike along Stony Point Road? (check all that apply)

Answered: 276 Skipped: 78

ANSWER CHOICES	RESPONSES	
travel to or from work	18%	49
travel to or from school	6%	16
travel to or from shopping	34%	93
for recreation	73%	201
Other (please specify)	16%	44
Total Respondents: 276		

Q5: Stony Point Road bike lanes: The picture below shows bike facilities that are similar to what is proposed along Stony Point Road. Rate this proposal on a scale of 1 to 5 (1 = strongly support, 5 = strongly oppose):

Answered: 349 Skipped: 5

	1 = STRONGLY SUPPORT	2	3	4	5 = STRONGLY OPPOSE	TOTAL	WEIGHTED AVERAGE
(no label)	64% 222	15% 54	7% 26	5% 16	9% 31	349	1.80

Q6: West 3rd Street intersection: Curb extensions have been recommended to shorten crossing distance and reduce vehicle speeds. Rate this proposal on a scale of 1 to 5 (1 = strongly support, 5 = strongly oppose)

Answered: 352 Skipped: 2

	1 = STRONGLY SUPPORT	2	3	4	5 = STRONGLY OPPOSE	TOTAL	WEIGHTED AVERAGE
(no label)	44% 156	19% 68	14% 49	9% 33	13% 46	352	2.28

Q7: Occidental Road intersection: Curb extensions are proposed to shorten the crossing distance for pedestrians and reduce the speeds at the corners and ramp entrance. Rate this proposal on a scale of 1 to 5 (1 = strongly support, 5 = strongly oppose)

Answered: 346 Skipped: 8

	1 = STRONGLY SUPPORT	2	3	4	5 = STRONGLY OPPOSE	TOTAL	WEIGHTED AVERAGE
(no label)	49% 168	19% 66	15% 53	6% 20	11% 39	346	2.12

Q8: Highway 12 westbound on-ramps: Raised crosswalks or flashing beacons have been proposed for to improve pedestrian crossings at the on-ramp entrances. Rate each of these options on a scale of 1 to 5 (1 = strongly support, 5 = strongly oppose)

Answered: 351 Skipped: 3

	1 = STRONGLY SUPPORT	2	3	4	5 = STRONGLY OPPOSE	TOTAL
raised crosswalks	59% 203	12% 42	14% 48	6% 22	9% 31	346
flashing beacon (RRFB)	73% 242	13% 44	9% 29	2% 7	3% 10	332
high visibility crosswalk striping	78% 263	12% 39	5% 17	1% 4	4% 15	338

Q9: Eastbound Highway 12 ramps-Joe Rodota Trail crossing: Rate each of the proposed improvements on a scale of 1 to 5 (1 = strongly support, 5 = strongly oppose)

Answered: 352 Skipped: 2

	1 = STRONGLY SUPPORT	2	3	4	5 = STRONGLY OPPOSE	TOTAL	WEIGHTED AVERAGE
Remove island to straighten crosswalk and reduce vehicle conflicts	57% 199	16% 57	14% 48	3% 10	10% 33	347	1.91
Remove lane on off-ramp, add curb extensions to reduce crossing distance	51% 176	15% 50	15% 51	5% 17	14% 49	343	2.16
Add "crossbike" for bicyclists next to pedestrian crosswalk	57% 197	16% 55	13% 44	4% 14	10% 33	343	1.92
No right turn on red onto Stony Point Road	46% 157	14% 47	14% 49	7% 25	19% 65	343	2.40

Q10: Stony Point Road/Sebastopol Road intersection: Rate the proposed "protected intersection" on a scale of 1 to 5 (1 = strongly support, 5 = strongly oppose).

Answered: 315 Skipped: 39

	1 = STRONGLY SUPPORT	2	3	4	5 = STRONGLY OPPOSE	TOTAL	WEIGHTED AVERAGE
(no label)	47% 149	17% 54	17% 55	6% 19	12% 38	315	2.18

Q11: Would you choose to walk or bike more along Stony Point Rd if bicycle and pedestrian facilities were improved?

Answered: 354 Skipped: 0

ANSWER CHOICES	RESPONSES	
Yes	65%	230
No	18%	64
I don't know	17%	60
TOTAL		354

Q12: Information about you - age (optional)

Answered: 343 Skipped: 11

ANSWER CHOICES	RESPONSES	
18 or under	0%	1
19-30	4%	14
31-45	19%	66
46-60	31%	108
61-75	38%	132
over 75	6%	22
TOTAL		343

Q13: Information about you - Gender (optional)

Answered: 337 Skipped: 17

ANSWER CHOICES	RESPONSES	
Male	50%	169
Female	45%	151
Other/prefer not to state	5%	17
TOTAL		337

Q14: What is your zip code?

Answered: 350 Skipped: 4

ANSWER CHOICES	RESPONSES	
95401	26%	90
95402	1%	4
95403	15%	52
95404	19%	65
95405	11%	38
95406	0%	1
95407	17%	61
95409	5%	16
Other (please specify)	7%	23
TOTAL		350

Appendix D

Caltrans Comments

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Highway Operations3/11/21:

1. Were traffic turning movements at the both WB/EB SR 12 available? If so, please provide for our review.
2. Modifications to the lane assignments/configuration at the EB SR 12 ramp terminal may trigger an ICE evaluation, besides adding a left-turn lane from SB Stony Point Road, what other alternatives were considered?
3. Modifications on the overcrossing may require signal timing changes, this should be coordinated with the Office of Signal Operations
4. Was a traffic study prepared that was used for the basis of the proposed restriping? How about a safety analysis?
5. Although our main concern are the ramp terminals, adjacent intersections north and south of the terminals may have to be included in the study for synchronization and to avoid operational conflicts with the ramp terminals.
6. Need to check truck turning radius at the intersections.

Traffic Safety:

- No objection to RRFB installation, if the raised crosswalk is not approved at on ramp crosswalks.

Bike/Ped Office:

- Please see the attached plan sheets for comments

Other comments:

- 10' lanes are not allowed in State R/W- 11' may be acceptable
- More signage and delineation may be needed

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Appendix E

Cost Estimates

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STONY POINT ROAD CORRIDOR STUDY FOR ACTIVE TRANSPORTATION MODES

Planning Level Construction Cost Estimate

DATE: 8/17/2021

COST ITEM	Units	Segment 1 - West 3rd Street to North of Occidental Road Quantity	Segment 2 - Occidental Road to SR 12 East Ramps Quantity	Segment 3 - South of SR 12 East Ramps to Sebastopol Road Quantity	Totals	Unit Cost	Total Cost	
Pavement Rehabilitation	$	850,000	200,000	200,000		$ 1,250,000.00	$ 1,250,000.00	
Pavement Rehabilitation - Overlay	LF		220		220	$ 250.00	$ 55,000.00	
Striping	LF	8,140	10,530	15,820	34,490	$ 4.00	$ 137,960.00	
Pavement Legends	EA	18	28	46	92	$ 200.00	$ 18,400.00	
K-71 Bollards	EA	42	77	73	192	$ 250.00	$ 48,000.00	
Dashed Green Conflict Crossings	EA	7	3	10	20	$ 1,000.00	$ 20,000.00	
Signage	LS	1	8	3	12	$ 2,500.00	$ 30,000.00	
Sidewalk Connection to Apartments	LS	1			1	$ 20,000.00	$ 20,000.00	
Bulbouts/Curb Extensions	SF	150	2,695	895	3,740	$ 70.00	$ 261,800.00	
Curb Ramps	EA	2	13	2	17	$ 5,000.00	$ 85,000.00	
Raised Pedestrian Crossing	SF		1,105		1,105	$ 50.00	$ 55,250.00	
Single-Sided RRFB Assembly	EA		4		4	$ 12,500.00	$ 50,000.00	
Widen Roadway 3'	SF			180	180	$ 200.00	$ 36,000.00	
Reconstruct Curb, Gutter, Sidewalk	LF			60	60	$ 150.00	$ 9,000.00	
Signal Modification at SR 12 East Ramps	LS		1		1	$ 500,000.00	$ 500,000.00	
Widen Sidewalk 2-4' to Create Multi-Use Path	LF			1,000	1,000	$ 80.00	$ 80,000.00	#
Retaining Wall for Multi-Use Path	LF			615	615	$ 120.00	$ 73,800.00	
Subtotal per Segment		*$ 946,660*	*$ 1,203,870*	*$ 579,680*				
Traffic Control & Mobilization per Segment		*$ 94,666*	*$ 120,387*	*$ 57,968*				
Contingency per Segment		*$ 208,265*	*$ 264,851*	*$ 127,530*				
Total per Segment		*$ 1,249,591*	*$ 1,589,108*	*$ 765,178*	$ 3,603,877			

Sub-Total:	$ 2,730,000
Traffic Control & Mobilization (10%):	$ 273,000
Contingency (20%):	$ 601,000
TOTAL:	**$ 3,604,000**

 # = may require ROW which was not included.

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