



Memorandum

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Date: March 10, 2023

Subject: SR 1 Freedom Boulevard to State Park Auxiliary Lanes, Bus-on-Shoulder (BOS) Improvements and Coastal Rail Trail Segment 12 Project – Additional Traffic Analysis Memorandum

Introduction

The California Department of Transportation (Caltrans), in association with the Santa Cruz County Regional Transportation Commission (SCCRTC) and the County of Santa Cruz (County), proposes improvements along State Route 1 (i.e., Hwy 1) and the Santa Cruz Branch Line railroad right-of-way, within an unincorporated area of the County of Santa Cruz known as Aptos. Improvements under consideration include the construction of auxiliary lanes, implementation of bus-on-shoulder operations, widening and replacement of bridges, construction of Segment 12 of the Coastal Rail Trail, and the installation of sound walls and retaining walls.

The purposes of this memorandum are to:

- Describe prior traffic analysis contained in the Traffic Operations Analysis Report (TOAR) completed by CDM Smith in March 2021 in support of the Project EIR, which include demand, operational and safety benefits information on auxiliary lanes and bus-on-shoulder Project elements
- Describe the methodologies and show results of additional traffic analysis that was performed by CDM Smith to supplement the analyses in TOAR, which include demand, operational and safety benefits information associated with the Coastal Rail Trail Segment 12 project element, and
- Provide a comprehensive analysis of VMT for the Project as a whole

Project Description

The Project will construct multimodal improvements to enhance transit frequency and on-time performance, and safety and mobility for vehicles, transit, bicycles, and pedestrians. The Project

includes northbound and southbound segments of auxiliary lanes and bus-on-shoulder improvements between the State Park Drive and Freedom Boulevard interchanges, that is, between post mile PM 8.1 and PM 10.7 as shown in **Figure 1**. This section of Highway 1 provides access to Aptos Village, Rio del Mar, Aptos High School, and Aptos Hills/Corralitos.

The Project includes four auxiliary lane segments and two bus-on-shoulder segments within the Project limits as shown in **Figure 1**. The auxiliary lane segments are less than 1 mile in length as summarized in **Table 1** and act independent of each other as there is no through lane connecting the auxiliary lane segments on either sides of this interchange area. The auxiliary lanes will connect the on-ramps with the next off-ramp, thereby extending the weaving and merging distance between the ramps, improving traffic operations, and reducing cut-through traffic diverting to local streets and neighborhoods. All vehicles (except buses allowed to operate on the shoulder) that reach the end of an auxiliary lane have to exit through the off-ramp. Bus-on-shoulder use is restricted to buses and buses are allowed to use them only under congested mainline conditions.

Figure 1. Hwy 1 Auxiliary Lane and Bus-on-Shoulder Improvements Diagram

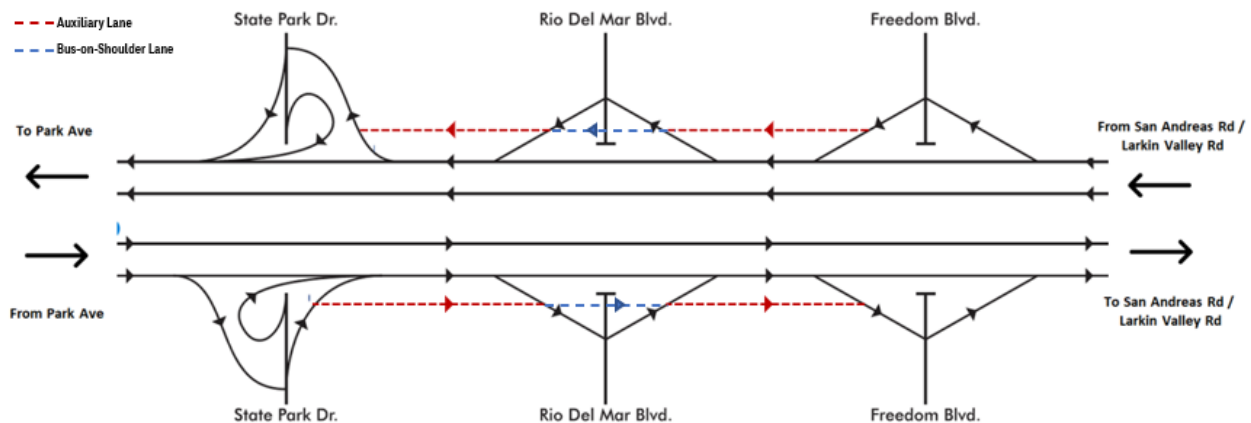


Table 1. Hwy 1 Auxiliary Lane Segment Lengths

| Highway / Direction | Auxiliary Lane Segment | Length (in miles) |
|---------------------|--|-------------------|
| NB Hwy 1 | Freedom Blvd on-ramp to Rio Del Mar Blvd off-ramp | 0.36 |
| | Rio Del Mar Blvd on-ramp to State Park Dr off-ramp | 0.99 |
| SB Hwy 1 | State Park Dr on-ramp to Rio Del Mar Blvd off-ramp | 0.98 |
| | Rio Del Mar Blvd on-ramp to Freedom Blvd off-ramp | 0.21 |

The Project will replace existing railroad bridges with longer span bridges to accommodate the addition of auxiliary lanes and wider shoulders along Hwy 1. The Hwy 1 bridge over Aptos Creek and Spreckles Drive will be widened as part of the Project. The new bridges, soundwalls, and retaining walls will incorporate aesthetic treatments consistent with the visual character of the corridor and the adjacent community.

This Project also includes construction of Segment 12 of the Coastal Rail Trail, a bicycle and pedestrian trail along an approximately 1.14-mile long segment of the Santa Cruz Branch Rail Line right-of-way from State Park Drive to just south of Rio Del Mar Boulevard. This Project element would also involve construction of three bike/pedestrian bridges, and four at-grade street crossings.

Prior Traffic Analysis

To support the purpose and needs section and traffic impacts section of the Project environmental document, a Traffic Operations Analysis Report (TOAR) was completed by CDM Smith in March 2021.

The TOAR focuses on the auxiliary lanes and bus-on-shoulder Project elements of the project and contains the following information for the Existing Year (2019), the Opening Year (2025) No Build and Build, and the Horizon Year (2045) No Build and Build conditions:

- Changes in Hwy 1 traffic volumes (demand) and VMT
- Operational benefits of auxiliary lanes and bus-on-shoulder Project elements in terms of changes in Hwy 1 speed and level of service (density-based) by time period and daily delays
- Safety benefits of auxiliary lanes Project element and education/enforcement activities in the context of bus-on-shoulder Project element in terms of annual collisions avoided
- Bus travel time changes and ridership gain calculations

The TOAR does not contain information on Coastal Rail Trail Segment 12 trail Project element, and the TOAR is not a comprehensive analysis of VMT for the Project as a whole. It does not consider VMT reduction on local streets resulting from traffic diverting back to Hwy 1 because of the improved operations resulting from the auxiliary lanes, and the VMT reduction benefits due to bus-on-shoulder and Segment 12 pedestrian/bicycle trail Project elements as a result of mode shift.

Additional Traffic Analysis

To supplement the TOAR and fill gaps in the context of the Project EIR, additional traffic and VMT analysis was performed and the results are presented in this memorandum, which includes:

- Qualitative discussion of VMT impacts of auxiliary lanes Project element
- Quantitative analysis of:
 - Coastal Rail Trail Segment 12 Project element related demand calculations
 - Operational benefits of Coastal Rail Trail Segment 12 Project element
 - Safety benefits of Coastal Rail Trail Segment 12 Project element

- Coastal Rail Trail Segment 12 and bus-on-shoulder Project elements related auto VMT reduction

The methodologies for the additional traffic analysis were established during the SCCRTC's Unified Corridor Investment Study (UCS) completed in January 2019 and the benefit-cost analysis (BCA) for the California Transportation Commission's Trade Corridor Enhancement Program (TCEP) grant application in Fall 2022 prepared by CDM Smith in coordination with Mark Thomas for SCCRTC and Caltrans District 5.

Trail Demand

The trail demand analysis methodology developed in the UCS was adopted in the TCEP grant application for the Project and was also used in the Project EIR. The UCS trail demand analysis provides mile-by-mile bike/pedestrian demand estimates.

The UCS methodology involved the use of the 2012 California Household Travel Survey (CHTS) data that provided average bike trips per person, commute and college bike trips share, school bike trips share, weekday recreational bike trips share and other bike trips share. The methodology defined use likelihood values by distance range (the distance from the place of residence for categories within 0.5 mile, 0.5 mile to 1.0 mile and 1.0 mile to 1.5 mile). Use likelihood reduces with the increases in the distance range. Then the population within those distance ranges was identified. The methodology identified a target multiplier for growth in bike trips in the future based on the 2045 Regional Transportation Plan's bike mode share goal. This target multiplier was applied to all bike trips except weekday recreational bike trips. Commute and college bike trips and weekday recreational trips were assumed to be drawn from all three distance ranges, while school bike trips and other bike trips are assumed to be drawn only from the within 0.5 mile distance range. For each distance range, the bike demand was estimated as the product of the population growth factor (year 2045 over the year 2015), use likelihood, bike trips per person, share of bike trips by trip type and target multiplier for growth (if applicable to the trip type). The demand for all four bike trip types and their applicable distance ranges were aggregated and multiplied with an elasticity factor of 0.90 (assumed based on literature and professional judgement used in the UCS study) to estimate the weekday daily total bike trips. Pedestrian demand was estimated based on a ratio that ranged between 0.33 pedestrian trips per bike trip (based on spot bike/pedestrian counts taken by SCCRTC during the UCS study), where the bike trips included all four trip types but drawn only from the within 0.5 mile distance range.

The TCEP BCA derived "No Build" bike/walk demand by setting the active transportation mode share assumption to "no increase" (by setting target mode share growth factor to 1.0) in the UCS trail spreadsheet-based demand model. The TCEP BCA derived "Build" bike/walk demand by setting the active transportation mode share assumption to the target mode share growth of 2.21 for 2025 and 3.14 for 2045, and assuming 80% of the UCS estimated demand to use the Trail Segment 12 and the remaining 20% to use existing bike/walk facilities. This is based on the SCCRTC's assumption that 100 percent of existing bike/pedestrian recreational users and 75

percent of existing bike/pedestrian commuters / college users are likely to be attracted to the Project trail facility where bikes and pedestrians will be separated from automobiles. The high percentage cycling/walk route shift assumption is driven by a combination of user perceived benefits of a protected path providing a shorter route with fewer intersections and improved safety.

Auto trips avoided due to the trail Project element were then derived from the new users demand (“Build” minus “No Build”) in person-trips by dividing it by auto vehicle occupancy, which was assumed as 1.29 based on SCCRTC field data on a general roadway collected in 2016.

Table 2 summarizes the TCEP BCA’s estimated active transportation demand on Trail Segment 12 and its components, along with the auto trips avoided.

Table 2 Trail Segment 12 Active Transportation Demand and Auto Trips Avoided

| Description | 2020 (Existing) | 2025 No Build | 2025 Build | 2045 No Build | 2045 Build |
|--------------------------|-----------------|---------------|------------|---------------|------------|
| Daily Bike Trips | 293 | 301 | 469 | 319 | 706 |
| Daily Pedestrian Trips | 91 | 92 | 164 | 98 | 246 |
| Daily Auto Trips Avoided | N/A | N/A | 186 | N/A | 416 |

Source: UCS; CDM Smith’s Derivative Demand Calculations

Trail Benefits

Coastal Rail Trail Segment 12 would improve travel time, safety and health for travelers by reducing conflicts between bikes/pedestrians and non-freeway vehicles (on Soquel Drive, State Park Drive and Rio Del Mar Avenue), encouraging travelers to shift mode from auto to a protected bike/walk trail facility and increase use of active transportation, which in turn can reduce mortality rates. This section presents additional information to support the purpose and needs section of the Project.

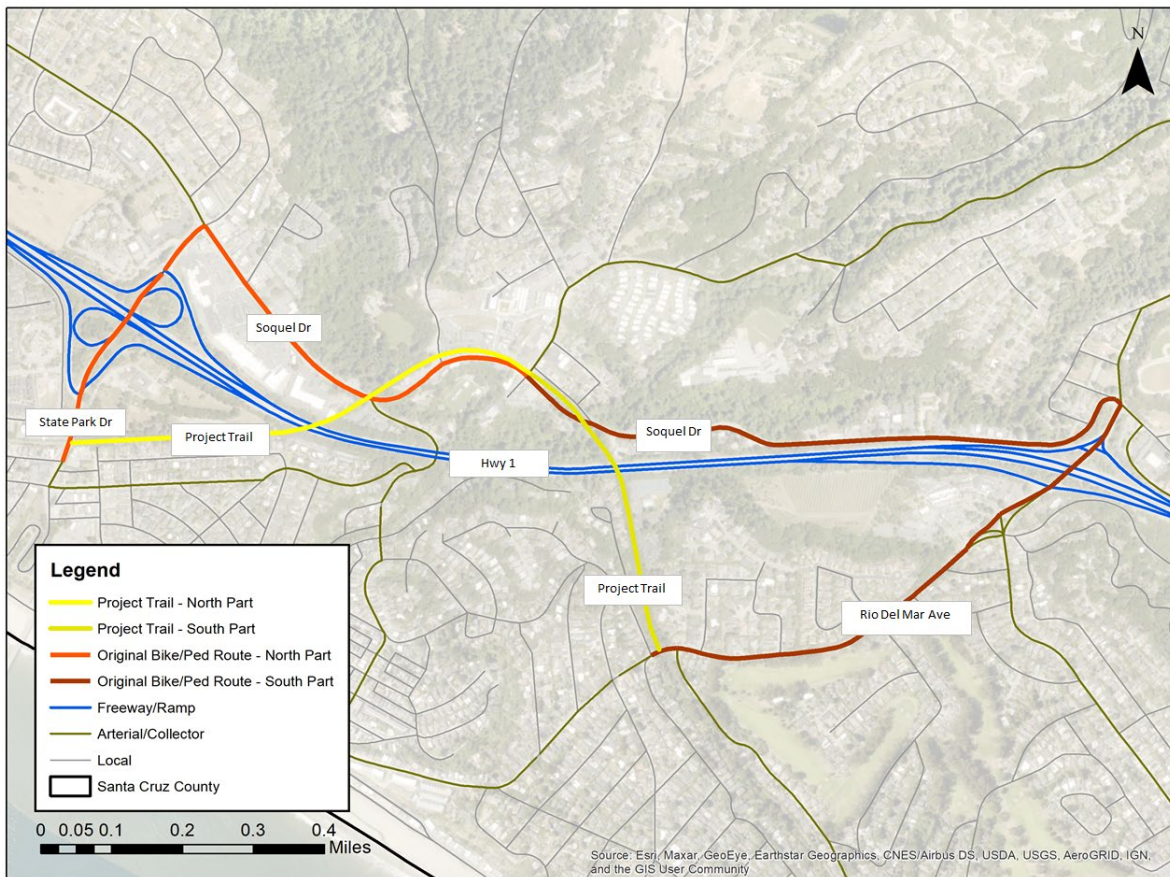
Operational Benefits

The TCEP BCA estimated Trail Segment 12 related travel time benefits using the following data/assumptions:

- A 50:50 share of trips approaching from the north part of the Project trail (from Capitola to Aptos) and the south part of the Project trail (from Rio Del Mar to Aptos) (See **Figure 2**)
- Estimated travel time savings to active transportation modes due to shortening of bike/walk travel distances as shown in **Table 3**
- The travel time benefit to the trips from the north part for both bike and walk modes as well as the trips from the south part for bike mode were found to be reasonable and calculated using the changes in travel distance and average trail speed for bike and walk modes as shown in **Table 3**

- However, for the trips from the south part for walk mode, the distance under No Build conditions is much larger compared to average walk trip (about 1 mile/trip) and thus not likely to appeal to the typical pedestrian under No Build conditions – as a result no travel time benefit to the trips from the south part for walk mode was calculated
- Assumed bike miles per trip of 2.7 miles and walk miles per trip of 1.0 mile as shown in **Table 3** provided by the SCCRTC based on existing trail usage information.
- The travel time benefits to the users of the new Project trail facility was factored by 50 percent based on the well-known “Rule of Half” principle associated with consumer surplus that is described in the TCEP and other federal BCA guidelines

Figure 2 Trail Segment 12 Active Transportation Market Segmentation for Travel Time Benefit Analysis



Source: CDM Smith’s Active Transportation GIS Analysis for the TCEP BCA

Table 3 Trail Segment 12 Travel Time Benefit Parameters

| Parameter | Source | Value |
|--|---|-------|
| Travel Distance (miles) <ul style="list-style-type: none"> • From North Part of Trail (50% demand) <ul style="list-style-type: none"> ○ No Build Conditions (without Trail) 1.01 ○ Build Conditions (with Trail) 0.68 ○ Change 0.33 • From South Part of Trail (50% demand) <ul style="list-style-type: none"> ○ No Build Conditions (without Trail) 1.71 ○ Build Conditions (with Trail) 0.46 ○ Change 1.25 | CDM Smith's Trail Travel Time Analysis for the TCEP Grant Application | |
| Average Trail speed (mph) <ul style="list-style-type: none"> • Cycling 12.1 • Walking 3.2 | 2022 US DOT BCA (Revised) Guidance | |
| Per Trip Travel Time Saved by Trail (minutes) <ul style="list-style-type: none"> • From North Part of Trail (50% demand) <ul style="list-style-type: none"> ○ Cycling 1.59 ○ Walking 7.10 • From South Part of Trail (50% demand) <ul style="list-style-type: none"> ○ Cycling 6.95 ○ Walking Not Used | CDM Smith's Trail Travel Time Analysis for the TCEP Grant Application | |

Source: TCEP BCA Parameters

Table 4 summarizes the TCEP BCA's estimated daily travel time savings in person-hours due to the Trail Segment 12 in the years 2025 and 2045. This was done by multiplying the daily trip estimates in **Table 2** with per trip travel time saving estimates in **Table 3**, while also assuming that the benefit to existing trips (No Build) is not factored (100% of this benefit is used) and the benefit to new trips (Build minus No Build) are factored by 50 percent for reasons explained under the operational benefit assumptions.

Table 4 Trail Segment 12 Active Transportation Travel Time Savings

| Benefit Element | Daily Travel Time Savings (in person-hours) | |
|--------------------------------|---|------|
| | 2025 | 2045 |
| Bike Travel Time Savings | 17.2 | 25.1 |
| Pedestrian Travel Time Savings | 5.0 | 7.3 |

Source: CDM Smith's Travel Time Savings Analysis for the TCEP BCA

Safety

The TCEP BCA estimated Trail Segment 12 related safety benefits using the following data/assumptions:

- Collected historical period fatal and injury crash data¹ from the University of California at Berkeley's (UCB) Transportation Injury Mapping System (TIMS) / California Active Transportation Program (ATP) data (for vehicle/bike and vehicle/pedestrian crashes)

¹ 5-year (January 1, 2016 to December 31, 2020) SWITRS Accidents Data on Soquel Dr from State Park Dr to Freedom Blvd and roads near to the Trail Project facility

impacted by the Project as summarized in **Table 5** over a Project influence area as shown in **Figure 3**

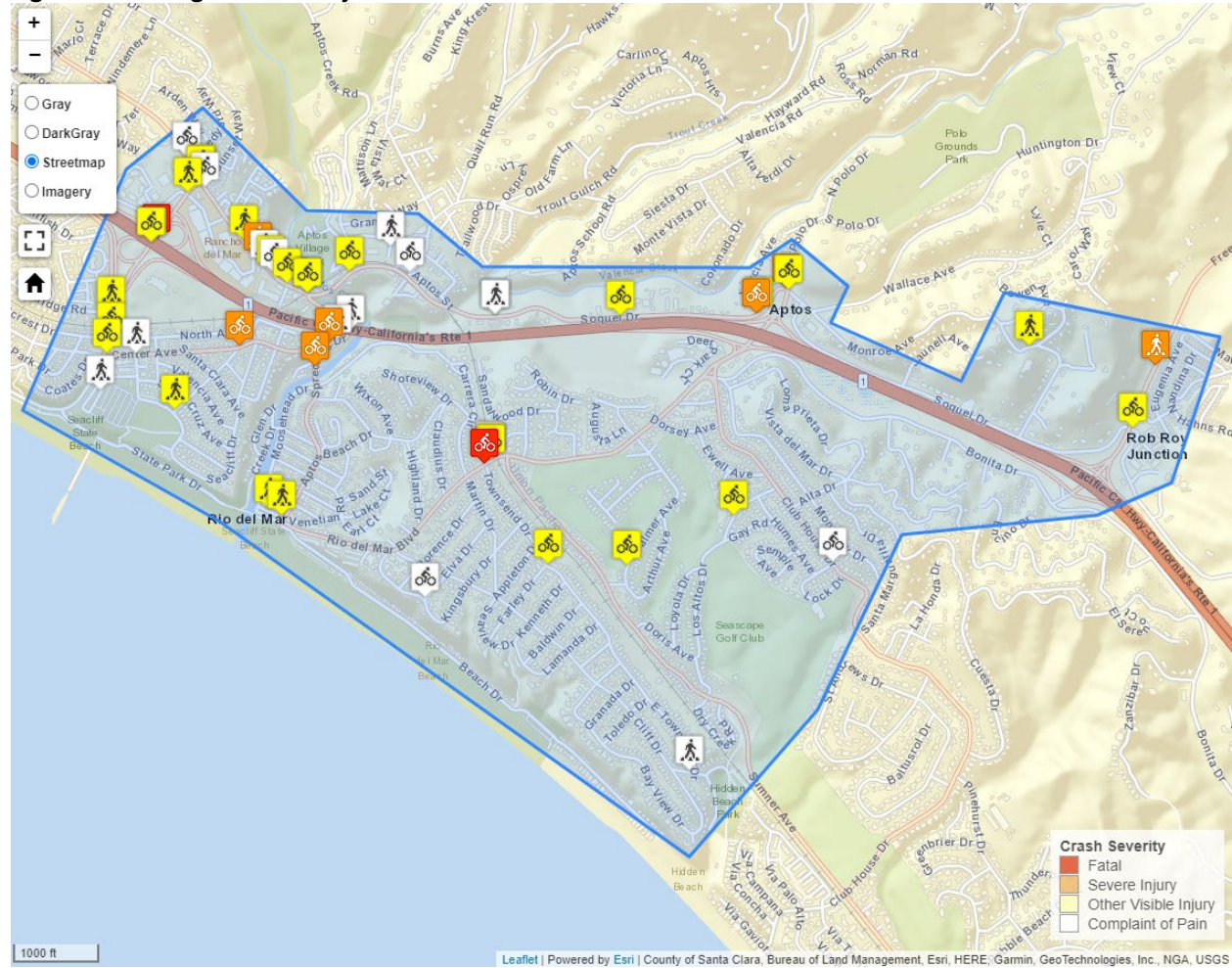
- The Project would eliminate vehicle/pedestrian and vehicle/bike conflicts for a majority (80 percent) of the bike/pedestrian traffic under Build conditions
- Since the UCB TIMS crash data does not include property damage only (PDO) crashes, these crashes were estimated using a ratio of PDO crash rate to total of fatal and injury crash rate in urban area derived from the Cal-B/C spreadsheet V8.1 tool as indicated in **Table 6**

Table 5 Active Transportation-Involved Crash Data for Project Influence Area

| Type of Crash | Total | Severity | | | | Victims | | | |
|--------------------|-------|----------|---------------|--------------|-----------------|----------------|-----------------------|----------------------|-------------------------|
| | | Fatal | Severe Injury | Minor Injury | Possible Injury | Persons Killed | Severe Injury Persons | Minor Injury Persons | Possible Injury Persons |
| Vehicle/Bike | 30 | 1 | 5 | 18 | 6 | 1 | 5 | 21 | 6 |
| Vehicle/Pedestrian | 22 | 1 | 3 | 9 | 9 | 1 | 3 | 9 | 9 |

Source: University of California Berkeley Transportation Injury Mapping System (TIMS) Accidents Data developed for California Active Transportation Program (ATP), Pedestrian and Bicycle-involved Crash Data, Jan 1, 2016 - December 31, 2020 (5 years)

Figure 3 Trail Segment 12 Project Influence Area



Source: University of California Berkeley Transportation Injury Mapping System (TIMS) Accidents Data developed for California Active Transportation Program (ATP), Pedestrian and Bicycle-involved Crash Data, Jan 1, 2016 - December 31, 2020 (5 years)

Table 6 Trail Segment 12 Safety Benefit Parameters

| Parameter | Source | Value |
|--|--|-------|
| PDO Crashes to Fatal + Injury Crashes Ratio (Urban Area) NOTE: Used only for Soquel Dr where Fatal and Injury crash count data was available but PDO crash count data was missing | Cal-B/C Sketch Tool v8.1, PARAMETERS tab | 2.09 |

Source: TCEP BCA Parameters

Table 7 summarizes the TCEP BCA’s estimated annual crashes avoided due to the Trail Segment 12 in the years 2025 and 2045. Although, within a given year 80 percent of the active transportation demand shifts from existing facilities to the Project facility, the active transportation demand on

existing facilities grows across the years (between 2025 and 2045), which results in a slight reduction in crashes avoided benefits between these years.

Table 7 Trail Segment 12 Active Transportation-Involved Crashes Avoided

| Benefit Element | Value by Year (in crashes/year) | |
|---------------------------------|---------------------------------|--------------|
| | 2025 | 2045 |
| Fatal Crashes Avoided | 0.24 | 0.18 |
| Serious Injury Crashes Avoided | 0.72 | 0.40 |
| Minor Injury Crashes Avoided | 3.22 | 2.53 |
| Possible Injury Crashes Avoided | 1.85 | 1.48 |
| PDO Crashes Avoided | 12.59 | 9.57 |
| Total Crashes Avoided | 18.61 | 14.15 |

Source: CDM Smith's Safety Benefits Analysis for the TCEP BCA

Health

The TCEP BCA also estimated Trail Segment 12 related health benefits of the Project trail facility including Trail related journey quality value to cyclists, Trail related sidewalk/walking path expansion value to pedestrians and cycling/walking related health benefits (mortality reduction) in the years of 2025 and 2045 using:

- Percentage cyclists in 16-64 years range and percentage pedestrians in 16-74 years range as provided in **Table 8**
- Mortality rates in the age ranges and percentage reduction in mortality per 365 annual miles of cycling and walking as also provided in **Table 8**

Table 8 Trail Segment 12 Health Benefit Parameters

| Parameter | Source | Value |
|--|---|-------|
| % Cyclists in 16-64 years range | Cal-B/C Sketch Tool v8.1, <i>PARAMETERS</i> tab | 54.9% |
| % Pedestrians in 16-74 years range | | 80.5% |
| Percentage Reduction in Mortality per 365 Annual Miles | Cal-B/C Sketch Tool v8.1, <i>PARAMETERS</i> tab | |
| • Cycling | | 4.5% |
| • Walking | | 9.0% |
| Mortality Rate per 100,000 people | Cal-B/C Sketch Tool v8.1, <i>PARAMETERS</i> tab | |
| • 16-64 years range | | 252 |
| • 20-74 years range | | 392 |

Source: TCEP BCA Parameters

Table 9 summarizes the TCEP BCA's estimated mortality risk reduced in persons per year due to the Trail Segment 12 in the years 2025 and 2045.

Table 9 Trail Segment 12 Active Transportation Mortality Reduction Benefits

| Benefit Element | Mortality Risk Reduced (in persons/year) | |
|----------------------|--|--------|
| | 2026 (also 2025) | 2045 |
| Bike Health Benefits | 0.0491 | 0.1055 |

| Benefit Element | Mortality Risk Reduced (in persons/year) | |
|------------------------------|--|--------------|
| | 2026 (also 2025) | 2045 |
| Pedestrian Health Benefits | 0.0264 | 0.0515 |
| Total Health Benefits | 0.0755 | 0.157 |

Source: CDM Smith's Mortality Reduction Benefits Analysis for the TCEP BCA

VMT Changes

Caltrans has prepared the Transportation Analysis Framework (TAF) and Transportation Analysis under CEQA (TAC) published in September 2020 to guide transportation impact analysis for projects on the State Highway System (SHS) as part of the California Environmental Quality Act (CEQA) process. The California Department of Transportation (Caltrans) has prepared these documents to guide implementation of Senate Bill (SB) 743 (Steinberg, 2013). The TAF provides guidance as to the methodology to be used in measuring the VMT impacts for projects on state highways.

The limitation of the VMT analysis performed in the TOAR – namely, the VMT change did not account for diversion of traffic from local streets to Hwy 1 – and the inclusion of Coastal Rail Trail Segment 12 Project element as part of the additional traffic analysis prompted an expansion of the VMT analysis to address the regional changes in VMT due to the auxiliary lanes, the BOS improvements, and the Coastal Rail Trail.

VMT management is also a subject of considerable interest to SCCRTC, so this section includes both qualitative and quantitative information on the likely VMT impacts of the Project. The VMT changes are discussed for each Project element and also for the overall Project.

Auxiliary Lanes Project Element

On Pages 12 through 15 the TAC states under the heading - Project Types Not Likely to Lead to a Measurable and Substantial Increase in Vehicle Travel: “Addition of an auxiliary lane of less than one mile in length designed to improve roadway safety.” As described earlier under Project Description, the Project has four segments of auxiliary lanes, two in each travel direction. All of these segments are less than one mile in length, which means that it is exempt from a VMT analysis under the TAF and TAC guidelines. In addition, these auxiliary lanes are independent, meaning that they are not continuous through interchange areas. So, they would not have any cumulative effects on VMT. Their purpose is to improve operations and safety in the areas between interchanges. The mainline capacity of the freeway at the interchanges is unchanged by the Project, which limits the type of time savings benefits to through traffic that could generate added VMT.

Qualitatively speaking, the Project auxiliary lanes would not result in a measurable or substantial change in countywide trips. A small portion of trips traveling on local streets may divert to freeway facility due to the improved operations due to the addition of auxiliary lanes, which the TOAR demonstrates. Based on the VMT analysis in the TOAR, the diversion could result in Hwy 1 daily VMT under 2025 Build to be 0.6 percent higher than 2025 No Build and Hwy 1 daily VMT under 2045 Build to be 2.7 percent higher than 2045 No Build, both directions of travel combined. The

VMT reduction on local streets would happen simultaneously to the VMT increase on Hwy 1, however the TOAR analysis is limited to the Hwy 1 corridor only and does not capture the overall change in VMT considering the local street network diversions back onto to the Highway.

The distance between State Park Drive and Freedom Blvd on Hwy 1 and the parallel arterial of Soquel Drive are: 2.2 miles and 2.4 miles, respectively. In other words, the local route is slightly more circuitous route than the freeway route. Therefore, the VMT reduction on local streets is expected to be of the same or slightly higher magnitude than the VMT increase on Hwy 1. All diversions due to the auxiliary lanes are also expected to happen within the Santa Cruz County limits. Therefore, the net countywide VMT change due to the auxiliary lanes is expected to be zero or a small negative value. The diversion between the parallel arterial and freeway, however, may result in mixed VMT impact results (increases and decreases) on the roadways and ramps linking the parallel arterial (Soquel Drive) and Hwy 1 and the collectors to Soquel Drive.

Bus-on-Shoulder Project Element

The TCEP BCA expanded the bus-on-shoulder ridership and auto trips avoided analysis conducted in the TOAR by estimating off-peak demand changes due to the Project. The services and average ridership estimates for 91X bus service under the 2025 and 2045 No Build and Build conditions based on the TCEP BCA are shown in **Table 10**. 658 riders per day are added as a result of the new express BOS operations under both the 2025 and 2045 Build conditions. At an average auto vehicle occupancy of 1.29 (based on SCCRTC 2016 traffic counts data), 510 auto trips per day would be diverted to 91X express BOS service under both the 2025 and 2045 Build conditions, both directions combined. The average trip length per passenger was assumed to be 75 percent of the end-to-end bus trip length due to the long distance nature of this route which has no stops on the freeway between Watsonville and Santa Cruz. An estimated 6,958 vehicle-miles per day of auto travel would be avoided due to 91X express BOS service under both the 2025 and 2045 Build conditions, both directions combined. At the same time, the increase in 91X bus services to improve the service frequency would add 937 vehicle-miles per day of bus travel. As a net effect, the bus-on-shoulder Project element would reduce 6,021 vehicle-miles per day of vehicular travel. The TCEP BCA also estimated additional VMT reduction benefits for 69A and 69W transit service routes, however, they are negligible in comparison to 91X, hence ignored in the context of the Project.

Table 10 91X Services and Ridership Gains

| Direction | Trip Type | Number of Services/Day | | | | | Ridership (Number of Persons/Day) | | | | | | |
|------------------------|--------------------|------------------------|---------------|------------|---------------|------------|-----------------------------------|---------------|--------------|-------------|---------------|--------------|-------------|
| | | 2019 | 2025 No Build | 2025 Build | 2045 No Build | 2045 Build | 2019 | 2025 No Build | 2025 Build | 2025 Change | 2045 No Build | 2045 Build | 2045 Change |
| Northbound | AM Peak | 7 | 7 | 16 | 7 | 16 | 217 | 266 | 411 | 145 | 278 | 426 | 148 |
| | PM Peak | 4 | 4 | 16 | 4 | 16 | 93 | 110 | 305 | 195 | 113 | 314 | 201 |
| | Off-Peak | 6 | 6 | 12 | 6 | 12 | 72 | 76 | 106 | 30 | 78 | 109 | 31 |
| | Daily Total | 17 | 17 | 44 | 17 | 44 | 382 | 452 | 822 | 370 | 469 | 849 | 380 |
| Southbound | AM Peak | 7 | 7 | 16 | 7 | 16 | 130 | 153 | 237 | 84 | 158 | 247 | 89 |
| | PM Peak | 5 | 5 | 16 | 5 | 16 | 118 | 148 | 336 | 188 | 151 | 323 | 172 |
| | Off-Peak | 6 | 6 | 12 | 6 | 12 | 42 | 44 | 60 | 16 | 46 | 63 | 17 |
| | Daily Total | 18 | 18 | 44 | 18 | 44 | 290 | 345 | 633 | 288 | 355 | 633 | 278 |
| Both Directions | Daily Total | 35 | 35 | 88 | 35 | 88 | 672 | 797 | 1,455 | 658 | 824 | 1,482 | 658 |

Source: Bus Services and Ridership Analysis for the TCEP BCA

Trail Project Element

The TCEP BCA converted auto trips avoided due to the trail Project element to auto VMT avoided using an average trip length of 5.0 miles (Santa Cruz County Travel Demand Model-based weighted average across all trip purposes). This Project element is expected to reduce 931 and 2,073 auto-miles per day under 2025 and 2045 Build conditions.

Overall Project

The TCEP BCA gathered 2015 countywide VMT from the SCCRTC’s UCS, and estimated 2019, 2025 No Build and 2045 No Build countywide VMT estimates using AMBAG 2022 Regional Growth Forecast based population projections. The TCEP BCA then adjusted the countywide transit VMT using estimates in the most recent 2045 Regional Transportation Plan. The countywide VMT impacts due to the overall Project are summarized in **Table 11**. The Project would result in a net decrease of 6,952 VMT per day and 8,094 VMT per day under 2025 and 2045 Build conditions, respectively.

Table 11 Summary of Countywide VMT Impacts due to Project

| Mode | Countywide vehicle-miles traveled (VMT) per day | | | | | | |
|---------------------------------|---|------------------|------------------|---------------|------------------|------------------|---------------|
| | 2019 | 2025 No Build | 2025 Build | 2025 Change | 2045 No Build | 2045 Build | 2045 Change |
| Auto | 5,060,458 | 5,235,996 | 5,228,107 | -7,889 | 5,595,699 | 5,586,668 | -9,031 |
| - Bus-on-Shoulders | | | | -6,958 | | | -6,958 |
| - Coastal Rail Segment 12 Trail | | | | -931 | | | -2,073 |
| Truck | 406,787 | 330,847 | 330,847 | 0 | 297,227 | 297,227 | 0 |
| Transit Vehicles | 10,625 | 8,023 | 8,960 | 937 | 8,579 | 9,516 | 937 |
| Total | 5,477,870 | 5,574,866 | 5,567,914 | -6,952 | 5,901,505 | 5,893,411 | -8,094 |

Source: SCCRTC Unified Corridor Investment Study (UCS), 2019; AMBAG 2022 Regional Growth Forecast; Hwy 1 State Park to Freedom TOAR; 2045 Regional Transportation Plan-based Transit VMT Adjustments; Bus-on-Shoulder and Trail VMT Analysis for the TCEP BCA. (NOTE: VMT impacts due to auxiliary lanes less than 1 mile long are assumed as zero based on the qualitative analysis in this memorandum.)

Construction Traffic Management Plan Effect on VMT

There will be temporary lane closures for construction on State Route 1 and local streets due to widening and replacement of bridges and trail improvements, so there will be some unavoidable VMT impacts during the construction. The traffic management plan (TMP) will reduce detour related VMT impacts by avoiding construction during peak hours of travel and keeping one through lane open on local streets with more than one lane in a road direction.

Summary

During the Project construction, there will some unavoidable VMT impacts which will be reduced using mitigation measures in the Traffic Management Plan.

During the Project operations, there will be a net reduction in VMT due to the Project.

It is noted that:

- The Project would add auxiliary lane segments that are less than one mile in length each, which means that it is exempt from a VMT analysis under the TAF and TAC guidelines. The auxiliary lane segments of the Project would act independently and thus not expected to have cumulative effects.
- The SCCRTC interest to manage VMT in Santa Cruz County is met through net countywide VMT reduction due to bus-on-shoulder and Coastal Rail Trail Segment 12 Project elements.