2021

San Mateo County

# CMP Monitoring Report

FINAL REPORT

December 2021

TJKM

C/CAG
City/County Association of Governments
of San Mateo County

# TABLE OF CONTENTS

# TABLES

# FIGURES

# EXECUTIVE SUMMARY

*US-101 Express Lanes under construction*

San Mateo County maintains a Congestion Management Program (CMP) through the City/County Association of Governments of San Mateo County (C/CAG), the designated Congestion Management Agency (CMA), as required by the California Government Code 65089. C/CAG is also required to monitor the implementation of all elements of the CMP and prepare a monitoring report every other year. This report fulfils the biennial monitoring task as required by the State. This 2021 CMP Monitoring Report provides an insight into the performance of various freeways, multilane highways, two-lane highways, arterials and intersections throughout the County, and assists with key decisions on future investment of transportation dollars.

### CMP and Companion Monitoring Network

C/CAG established the CMP Network in 1991 that included all state highways and principal arterials in the County. In total, the 464.7 directional miles of the CMP network includes 301.4 miles of arterials/highways and 163.3 miles of freeways. The CMP network also includes 16 arterial intersections. Each CMP segment and intersection has an adopted LOS standard, discussed further in Chapter 1. New to this CMP monitoring effort is the Companion Monitoring Network (Companion Network), which grew out of a desire to see additional locations monitored besides the CMP network. There are a total of 10 roadway segments and 17 intersections in this network.

### Data Collection and Congestion Analysis

The biennial monitoring task requires extensive data collection for all established CMP and Companion Network segments/intersections included in the network. With changing needs and technological advancements, the data collection methodology has evolved over the last three decades since the first CMP was adopted.

In order to collect accurate and useful data that is consistent with prior monitoring efforts, certain data collection methods were followed. The data was collected during April-May 2021 only on normal commute travel days (i.e. Tuesdays, Wednesday, and Thursdays), and non-school days and days with any special events or incidents were eliminated. Available commercial speed data, 72-hour traffic counts, turning movement counts, and floating car surveys were utilized for the analysis. These typical data collection protocols were followed despite the impact of the COVID-19 pandemic on reducing traffic levels as normal work and school commutes were disrupted. The commercial speed data was analyzed to obtain average speeds for each freeway segment and convert to LOS using Highway Capacity Manual (HCM) 1994 methodologies. Arterials and highways were monitored using 72-hour traffic counts and turning movement counts which were used to calculate a volume/capacity (V/C) ratio and assign the LOS based on HCM 1994 procedures. Intersections were modeled in Synchro using either HCM 2010 or 2000 methodology. Further discussion on data collection efforts is included in Chapter 2.

### Monitoring Results

A total of 53 roadway segments and 16 intersections were monitored in this report during the AM and PM peak periods. The worst case direction was chosen as the official LOS, and a summary of these monitoring results are provided in **Table 1.**

**Table 1: 2021 CMP Network Monitoring Results**

| Roadway Type | # of CMP Segments | Before Interregional Exemption | | After Interregional Exemption | |
|---|---|---|---|---|---|
| | | LOS Standard Met | LOS Standard Not Met | LOS Standard Met | LOS Standard Not Met |
| Arterials | 27 | 26 | 1 | 27 | 0 |
| Multilane Highways | 1 | 1 | 0 | 1 | 0 |
| Two-Lane Highways | 9 | 9 | 0 | 9 | 0 |
| Freeways | 16 | 12 | 4 | 16 | 0 |
| Intersections | 16 | 15 | 1 | 16 | 0 |
| **TOTAL** | **69** | **63** | **6** | **69** | **0** |

In the 2021 Monitoring Cycle, all roadway segments met the LOS standard after interregional exemptions. These results are not surprising given the reduction in traffic levels as a result of the COVID-19 pandemic. Additional details for all arterial and freeway segments are provided in Chapter 2.

**Multi-Modal Performance Measures**

C/CAG monitors four multi-modal performance measures: LOS, multi-modal travel times, bicycle/pedestrian improvements, and transit ridership/person throughput. LOS results are provided in Chapter 3. Multi-modal travel times along the US-101 corridor are reported with each biannual CMP monitoring effort. Travel times are measured from county line to county line on US-101 for four modes: single occupancy vehicle, HOV lane, Caltrain, and SamTrans. Overall, travel times improved for both single occupancy vehicles and the HOV lane. Caltrain travel times increased slightly from 2019, while SamTrans travel times decreased in the NB direction and increased in the southbound (SB) direction. A comparison of scheduled vs. actual travel times on SamTrans is also provided. Overall, the actual travel time was found to be faster than the scheduled travel time in both directions and peak periods. Bicycle/pedestrian planning efforts and counts with historical comparisons are summarized in this section, as is transit ridership for SamTrans, BART, and Caltrain. Overall, all three agencies have seen ridership declines between FY 19 and FY 21. SamTrans total ridership decreased by 58%, while Caltrain and BART saw more drastic decreases. Caltrain's ridership decreased by 92% between FY 19 and FY 21, while BART decreased by 87%.

# CHAPTER 1: INTRODUCTION

C/CAG has an established CMP to monitor the transportation network within the county. All roadways included in the CMP network are evaluated for conformity at least every two years by the agency, which is the designated CMA for San Mateo County. The goal of the monitoring program is to improve the performance of the transportation system by identifying congested areas and related transportation deficiencies. This information is then used to help prioritize transportation funding decisions in light of system performance, land use factors, multimodal characteristics, and other considerations.

*CMP Intersection SR-82 at Whipple Avenue in Redwood City*

Biennial monitoring provides an opportunity to monitor established LOS standards for the arterial, highway, and freeway segments, and identify appropriate strategies to employ when a segment fails to meet the established LOS standards. While the CMP is very critical to San Mateo County's transportation vision, it also supports the broader transportation goals of the Regional Transportation Plan (RTP) developed by the Metropolitan Transportation Commission (MTC), the San Francisco Bay Area's regional transportation planning agency. The San Mateo CMP roadway system is consistent with the RTP, as well as the CMPs of adjoining San Francisco, Alameda, and Santa Clara counties.

## 1.1: Designated CMP Network

Per state statute, all state highways are included in the CMP network. The current San Mateo County CMP network includes approximately 464.7 directional miles of freeways and arterials, as well as 16 highway and arterial intersections. The segments and intersections are summarized below in **Tables 2** and **3**, and mapped in **Figure 1**.

**Table 2: CMP Network Segments**

| Route | From | To | Facility Type |
|---|---|---|---|
| SR-1 | San Francisco County Line | Linda Mar Blvd | Multi-Lane Highway |
| SR-1 | Linda Mar Blvd | Frenchmans Creek Rd | Two-Lane Highway |
| SR-1 | Frenchmans Creek Rd | Miramontes Rd | Two-Lane Highway |
| SR-1 | Miramontes Rd | Santa Cruz County Line | Two-Lane Highway |
| SR-35 | San Francisco County Line | Sneath Ln | Arterial |
| SR-35 | Sneath Ln | I-280 | Arterial |
| SR-35 | I-280 | SR-92 | Two-Lane Highway |
| SR-35 | SR-92 | SR-84 | Two-Lane Highway |
| SR-35 | SR-84 | Santa Clara County Line | Two-Lane Highway |
| SR-82 | San Francisco County Line | John Daly Blvd | Arterial |
| SR-82 | John Daly Blvd | Hickey Blvd | Arterial |
| SR-82 | Hickey Blvd | I-380 | Arterial |
| SR-82 | I-380 | Trousdale Dr | Arterial |
| SR-82 | Trousdale Dr | 3rd Ave | Arterial |
| SR-82 | 3rd Ave | SR-92 | Arterial |
| SR-82 | SR-92 | Hillsdale Ave | Arterial |
| SR-82 | Hillsdale Ave | 42nd Ave | Arterial |
| SR-82 | 42nd Ave | Holly St | Arterial |
| SR-82 | Holly St | Whipple Ave | Arterial |
| SR-82 | Whipple Ave | SR-84 | Arterial |
| SR-82 | SR-84 | Glenwood Ave | Arterial |
| SR-82 | Glenwood Ave | Santa Cruz Ave | Arterial |
| SR-82 | Santa Cruz Ave | Santa Clara County Line | Arterial |
| SR-84 | SR-1 | Portola Rd | Two-Lane Highway |

| Route | From | To | Facility Type |
|---|---|---|---|
| SR-84 | Portola Rd | I-280 | Two-Lane Highway |
| SR-84 | I-280 | Alameda de las Pulgas | Arterial |
| SR-84 | Alameda de las Pulgas | US-101 | Arterial |
| SR-84 | US-101 | Willow Rd | Arterial |
| SR-84 | Willow Rd | University Ave | Arterial |
| SR-84 | University Ave | Alameda County Line | Arterial |
| SR-92 | SR-1 | I-280 | Two-Lane Highway |
| SR-92 | I-280 | US-101 | Freeway |
| SR-92 | US-101 | Alameda County Line | Freeway |
| US-101 | San Francisco County Line | I-380 | Freeway |
| US-101 | I-380 | Millbrae Ave | Freeway |
| US-101 | Millbrae Ave | Broadway | Freeway |
| US-101 | Broadway | Peninsula Ave | Freeway |
| US-101 | Peninsula Ave | SR-92 | Freeway |
| US-101 | SR-92 | Whipple Ave | Freeway |
| US-101 | Whipple Ave | Santa Clara County Line | Freeway |
| SR-109 | Kavanaugh Dr | SR-84 | Arterial |
| SR-114 | US-101 | SR-84 | Arterial |
| I-280 | San Francisco County Line | SR-1 (North) | Freeway |
| I-280 | SR-1 (North) | SR-1 (South) | Freeway |
| I-280 | SR-1 (South) | San Bruno Ave | Freeway |
| I-280 | San Bruno Ave | SR-92 | Freeway |
| I-280 | SR-92 | SR-84 | Freeway |
| I-280 | SR-84 | Santa Clara County Line | Freeway |
| I-380 | I-280 | US-101 | Freeway |

| Route | From | To | Facility Type |
|---|---|---|---|
| I-380 | US-101 | Airport Access Rd | Arterial |
| Mission St | San Francisco County Line | SR-82 | Arterial |
| Geneva Ave | San Francisco County Line | Bayshore Blvd | Arterial |
| Bayshore Blvd | San Francisco County Line | Geneva Ave | Arterial |

**Table 3: CMP Network Intersections**

| ID | Jurisdiction | Intersection |
|---|---|---|
| 1 | Daly City/Brisbane | Bayshore Blvd/Geneva Ave |
| 2 | Daly City | SR-35/John Daly Blvd |
| 3 | Daly City | SR-82/Hillside Blvd/John Daly Blvd |
| 4 | San Bruno | SR-82/San Bruno Ave |
| 5 | Millbrae | SR-82/Millbrae Ave |
| 6 | Burlingame | SR-82/Broadway |
| 7 | Burlingame/San Mateo | SR-82/Peninsula Ave/Park Rd |
| 8 | Belmont | SR-82/Ralston Ave |
| 9 | San Carlos | SR-82/Holly St |
| 10 | Redwood City | SR-82/Whipple Ave |
| 11 | Menlo Park | University Ave/SR-84 |
| 12 | Menlo Park | Willow Rd/SR-84 |
| 13 | Menlo Park | Marsh Rd/SR-84 |
| 14 | Redwood City | Middlefield Rd/SR-84 |
| 15 | Half Moon Bay | SR-1/SR-92 |
| 16 | Half Moon Bay | SR-92/Main St |

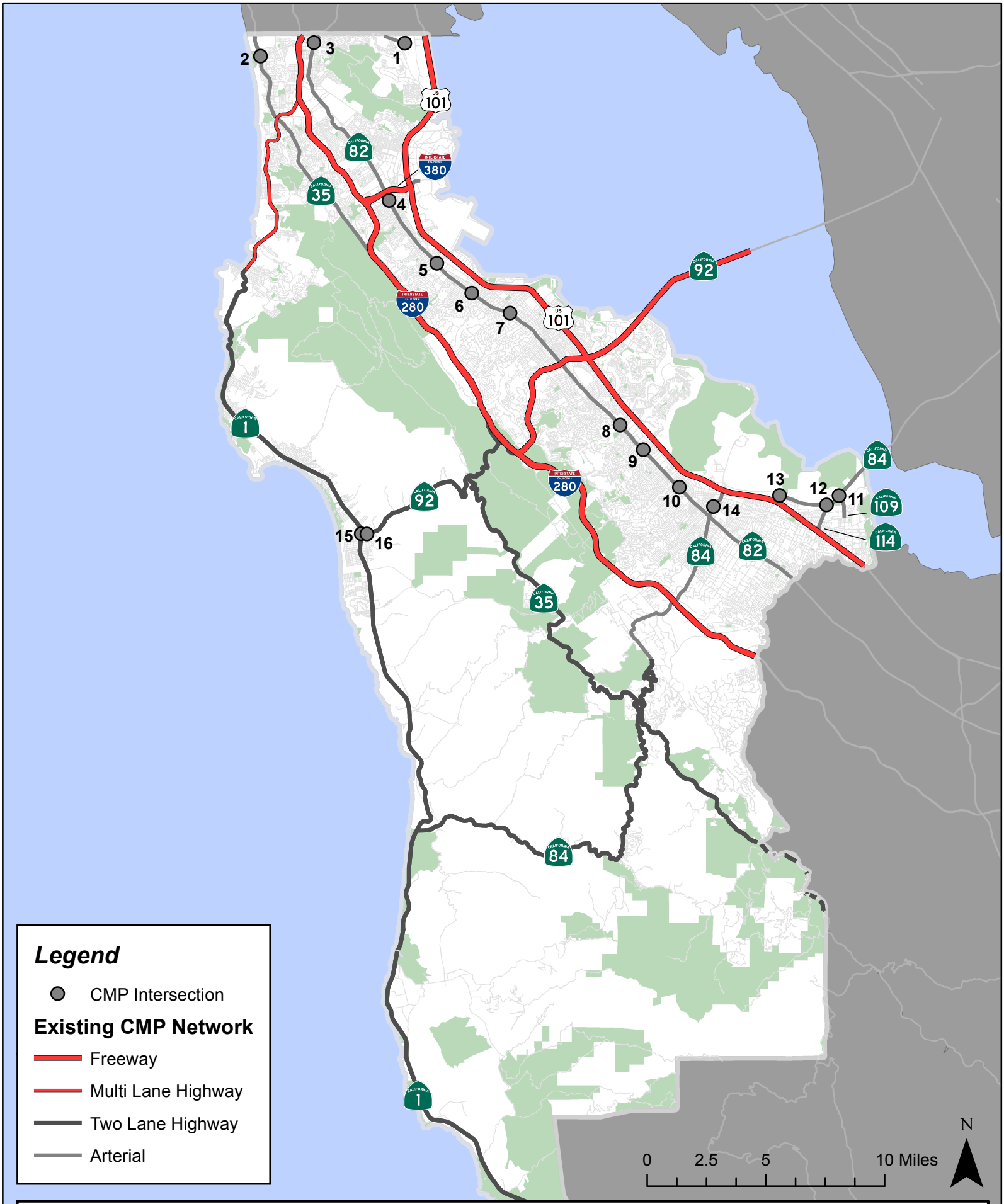


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FIGURE 1

EXISTING CMP NETWORK

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## 1.2: Companion Network

For the 2021 CMP Update, C/CAG staff desired to develop a new Companion Network alongside the CMP network, including ten roadway segments and 17 intersections. The purpose of this network was to monitor congestion in other areas of the county that may not be on the CMP network, such as local arterial roadways. The Companion Network includes roadway segments other than freeways and state routes (as these are already in the CMP network), however, intersections with state routes as the major street may be included as part of the Companion Network so long as they are not an existing CMP intersection. These locations will be monitored for informational purposes.

*John Daly Boulevard in Daly City looking west from SR-82; one of the Companion Network segments*

To identify the network, TJKM developed a set of criteria by which the network would be selected. The criteria focused on roadway classification/function, past collision history, bicycle Level of Traffic Stress, facilities that were identified in local city/county plans, and locations that connected to existing CMP segments that had a failing LOS in 2019. Based on this criteria, TJKM developed a draft Companion Network that was presented to C/CAG's CMP Technical Advisory Committee (CMP TAC) on April 15, 2021 and to the Congestion Mitigation and Environmental Quality (CMEQ) Committee on April 26, 2021. Based on comments from the committees, adjustments were made to the network, including the desire from CMEQ members to see weekend monitoring at Coastside locations.

The Companion Network is detailed in **Tables 4** and **5**, and mapped in **Figure 2**.

**Table 4: CMP Companion Network Intersections**

| # | Jurisdiction | Intersection |
|---|---|---|
| 17 | San Mateo | SR-82/3rd Ave |
| 18 | Unincorporated San Mateo County | Skyline Blvd (SR-35)/SR-92 |
| 19 | San Carlos | Holly St/Industrial Rd |
| 20 | Redwood City | Whipple Ave/Veterans Blvd |
| 21 | Atherton | Middlefield Rd/Marsh Rd |
| 22 | Menlo Park | Sand Hill Rd/Santa Cruz Ave |
| 23 | East Palo Alto | Bay Rd/University Ave |
| 24 | Woodside/Redwood City | SR-84/Alameda de las Pulgas |
| 25 | Portola Valley | Alpine Rd/Portola Rd |
| 26 | Unincorporated San Mateo County | SR-35/SR-92 |
| 27 | Colma | El Camino Real (SR-82)/Mission Rd |
| 28 | Half Moon Bay | SR-1/Main St |
| 29 | South San Francisco | El Camino Real (SR-82)/Westborough Blvd |
| 30 | Unincorporated San Mateo County (El Granada/Coastside) | SR-1/Capistrano Blvd |
| 31 | Unincorporated San Mateo County (SFO Airport) | S. Airport Blvd/San Bruno Ave |
| 32 | Pacifica | SR-1/Reina del Mar Ave |
| 33 | Unincorporated San Mateo County (Moss Beach/Coastside) | SR-1/Cypress Ave |

**Table 5: CMP Companion Network Roadway Segments**

| ID | Jurisdiction | Name | Extent |
|---|---|---|---|
| R1 | Belmont | Ralston Avenue | US-101 to Alameda de las Pulgas |
| R2 | Unincorporated San Mateo County (North Fair Oaks), Atherton, Redwood City | Middlefield Road | SR-84 to Marsh Rd |
| R3 | Burlingame | California Drive | Broadway to Peninsula Ave |
| R4 | Brisbane | Bayshore Boulevard | Geneva Ave to US-101 NB Off-Ramp |
| R5 | Daly City | John Daly Boulevard | SR-35 to Mission St |
| R6 | Foster City | Foster City Boulevard | E. 3rd Ave to Beach Park Blvd |
| R7 | Hillsborough | Chateau Drive/Ralston Avenue | I-280 to El Camino Real |
| R8 | Millbrae | Millbrae Avenue | SR-82 to Old Bayshore Hwy |
| R9 | Pacifica | Sharp Park Boulevard | SR-1 to SR-35 |
| R10 | San Bruno | Sneath Lane | SR-35 to Huntington Ave |

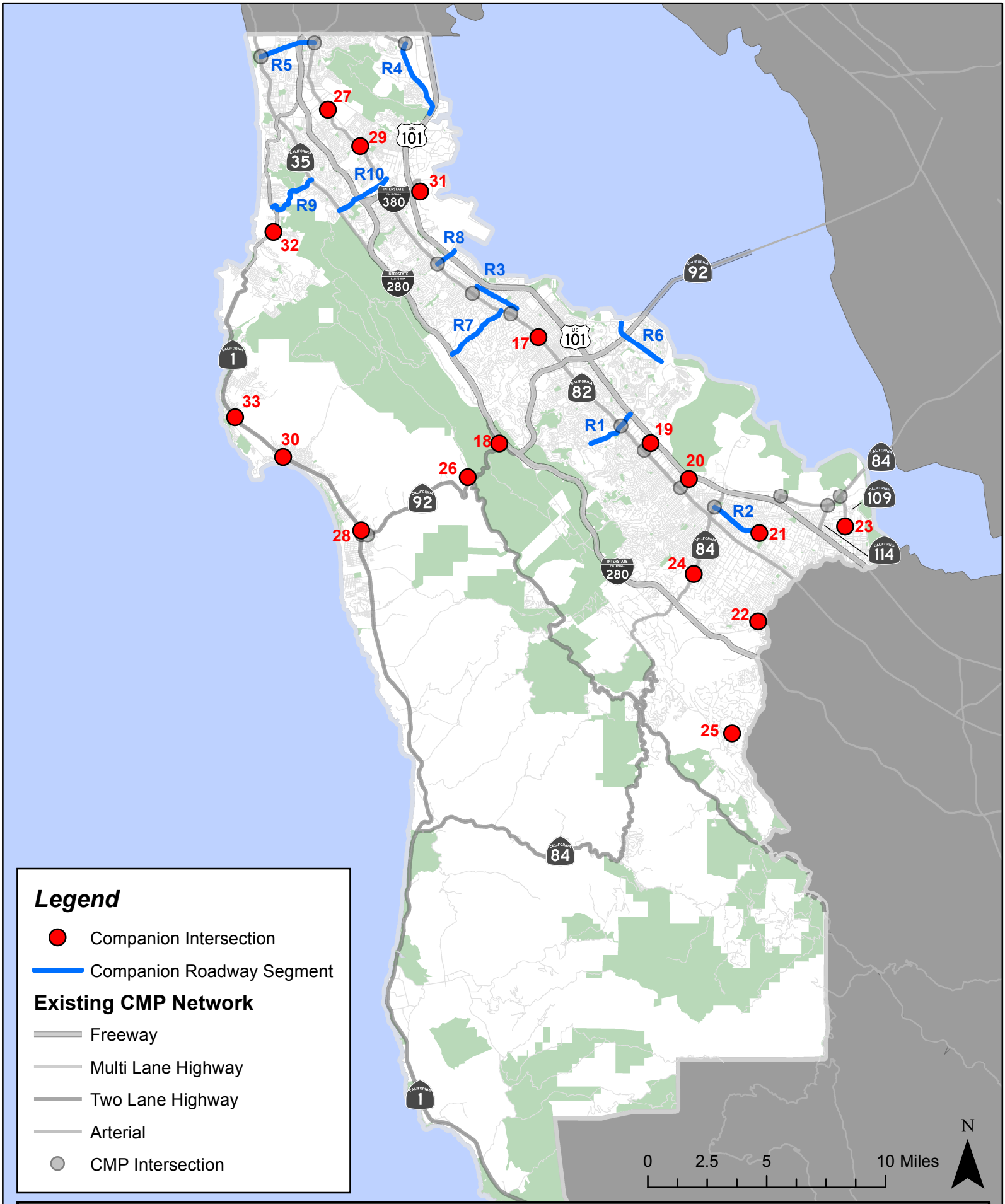


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FIGURE 2

COMPANION MONITORING NETWORK

C/CAG City/County Association of Governments of San Mateo County

## 1.3: Level of Service Standards

*Level of service* (LOS) is a qualitative term used to describe a roadway's operating condition. The LOS of a road or street is designated by a letter grade ranging from A to F, with LOS A representing free-flow conditions with little or no delay and LOS F representing forced flow with excessive delays. California Government Code Sections 65089.1 (A) and (B) requires that LOS standards be established by, in this case, C/CAG for the roadways and intersections designated to be in the CMP Roadway System. Furthermore, roadway levels of service (LOS) are to be measured by methods described in one of the following documents: The Transportation Research Board's *Circular 212,* the latest version of the HCM, or a uniform methodology adopted by the CMA that is consistent with the HCM. An explanation of the various levels of service is shown below in **Table 6.**

**Table 6: LOS Definitions**

| LOS Level | Description |
|---|---|
| A | Free-flow conditions with unimpeded maneuverability. |
| B | Reasonably unimpeded operations with slightly restricted maneuverability. |
| C | Stable operations with somewhat more restrictions. Motorists will experience appreciable tension while driving. |
| D | Approaching unstable operations where small increases in volume produce substantial increases in delay and decreases in speed. |
| E | Unstable flow at or near capacity levels with poor levels of comfort and convenience. |
| F | Forced traffic flow in which the amount of traffic approaching a point exceeds the amount that can be served. Characterized by stop-and-go waves and poor travel times. |

Sources: San Mateo CCAG Traffic LOS Calculation Methods, HCM, and Virginia DOT

The CMP legislation stipulates that the CMP's LOS standards can be set at any LOS - A through F. However, only roadway segments or intersections operating at LOS F when the CMP network was established may have a LOS F standard set for them. The LOS standards established for San Mateo County vary by roadway segment. By adopting LOS standards based on geographic differences, C/CAG signaled that it intends to use the CMP process to prevent future congestion levels in San Mateo County from getting worse than currently anticipated. At the same time, the variations in LOS standards by geographic area conform to current land use plans and development differences between the Coastside and Bayside, between older downtowns near Caltrain stations and other areas of San Mateo County. Based on data collected during the 1991 CMP monitoring process, the following LOS standards were selected for the roadway segments:

- If the existing (1990/91) LOS was F, then the standard was set to be LOS F.
- If the existing or future LOS was or will be E, then the standard was set to be LOS E.
- The standard for roadway segments near the San Francisco, Santa Clara, and Alameda County borders, with one exception,[1] was set to be LOS E to be consistent with the recommendations in those counties' 1991 CMPs. (This standard would apply unless those roadway segments were already operating at LOS F.)
- On SR-82 (El Camino Real), the standard was set to be LOS E.
- For the remaining roadway segments, the standard was set to be one letter designation worse than the LOS projected for the year 2000.

Intersection LOS standards were selected based on the following considerations:

- If the existing (1990/91) LOS is F, then the standard is set to be LOS F.
- If the existing or future LOS is or will be E, then the standard is also set to be E.
- The standard of the intersections near the San Francisco, Santa Clara, and Alameda Counties will be LOS E to be consistent with the LOS standards adopted in those counties.
- On SR-82 (El Camino Real), the standard is set to be LOS E to be consistent with the roadway segment standards.
- For the remaining intersections, the standard is set to be LOS E to correspond to the standard established for the adjacent roadway segment. (All the segments on which these intersections are located have standards set to LOS E).
- Note that as the Companion Network is not part of the CMP network, it does not have an established LOS standard and is monitored for informational purposes only. CMP and Companion Network locations monitored on weekends similarly have no adopted LOS standard and are also monitored for informational purposes only.
- The LOS standards for roadway segments and intersections is mapped below in **Figure 3**.

[1]For I-280 south of SR 84, the adopted standard is LOS D.

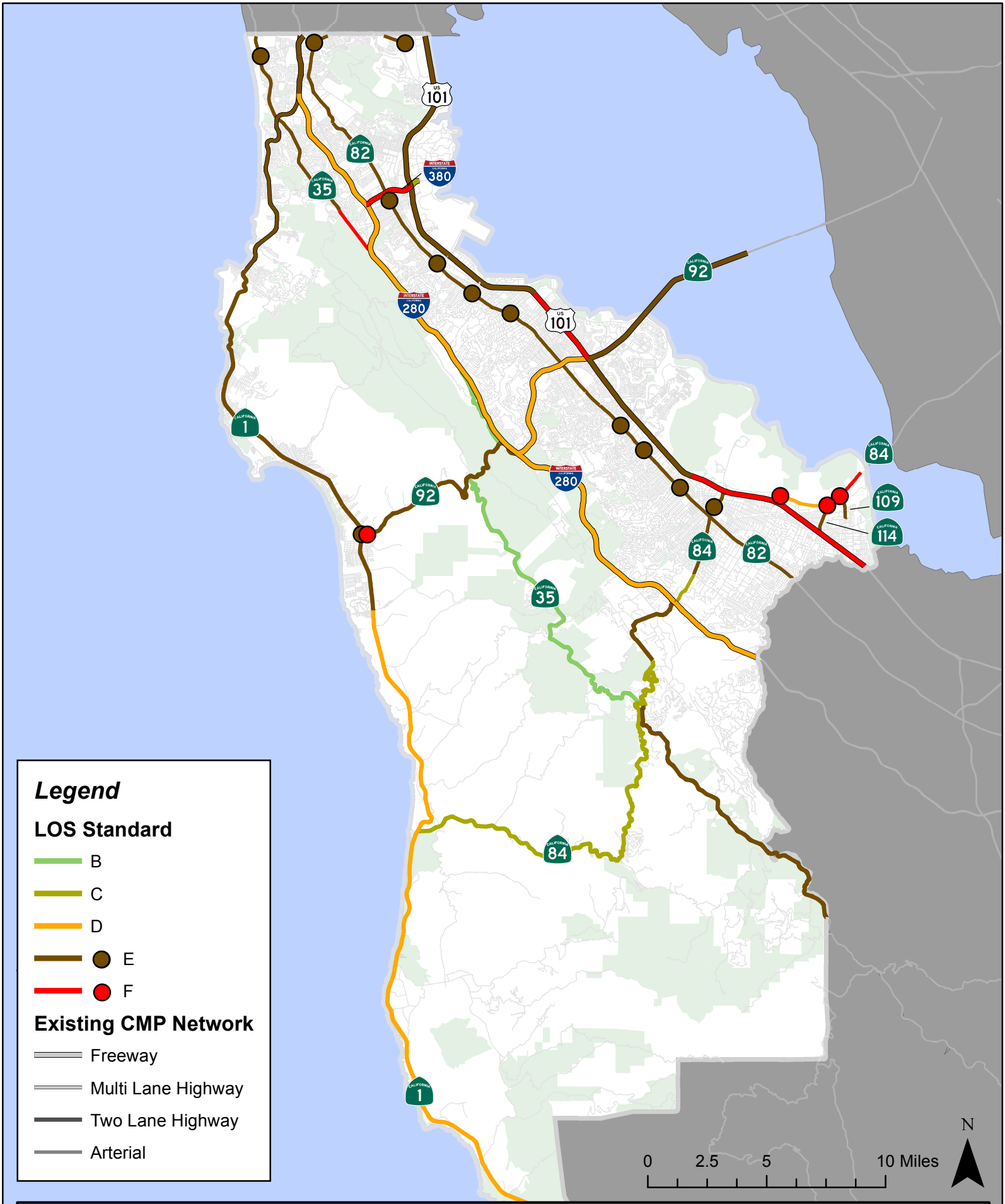


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FIGURE 3

LEVEL OF SERVICE STANDARDS

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# CHAPTER 2: STUDY METHODOLOGY

*CMP Intersection of SR-92 and Main Street in Half Moon Bay*

This section discusses the methodology utilized for measuring LOS on freeways, multi-lane highways, two-lane highways, arterials, and intersections throughout San Mateo County. The process begins with screening days within the monitoring period to ensure that only those expected to result in normal commuter traffic conditions are retained. Days that could produce lighter or heavier than usual traffic conditions, such as public holidays or special event days, were identified for later removal.

## 2.1: Data Collection

This year's monitoring study was conducted in April-May 2021 on mid-week days (Tuesday-Thursday) during the AM (7am-9am) and PM (4pm-6pm) peak periods. Note that in past monitoring efforts, the PM peak period was listed as 4pm-7pm; however, in practice the actual peak period used varied across locations. In order to ensure uniformity, the PM peak period was set to 4pm-6pm across all locations and methodologies.

The COVID-19 pandemic has caused reductions in traffic countywide as a result of stay-at-home orders, increased telecommuting, and virtual school. The decision was made to conduct the CMP under COVID pandemic traffic conditions because the CMP, by its very nature, is a monitoring document. The purpose of the CMP, among other things, is to measure and report freeway, highway, and intersection LOS for the specific monitoring year and to compare it over time. While the CMP data collection ideally takes place under normal traffic conditions, it is unknown when or even if traffic conditions/patterns will return to pre-pandemic levels. Therefore, it is prudent that C/CAG conduct the CMP under COVID conditions not only to understand how traffic has changed compared to pre-pandemic levels during the last update in 2019, but it will also give C/CAG a tool to measure how traffic recovers post-pandemic in future CMP updates.

This section describes the type of data used and their collection methods.

### Travel Speed Data

MTC has contracted with INRIX to obtain region-wide commercial speed data, and has made the data available for planning and monitoring purposes. This LOS Monitoring Study used the commercial speed data from INRIX through MTC's contract. INRIX "aggregates traffic data from GPS-enabled vehicles and mobile devices, traditional road sensors and hundreds of other sources."

Traffic data is reported by INRIX using discrete roadway links termed as XD (eXtreme Definition). Each XD link is associated with a unique ID represented by a nine-digit code, where each individual number in the XD ID describes a portion of the geography including country, direction of travel, and roadway segment. INRIX data contains speeds aggregated at multiple time intervals for each XD ID in the network. For the current monitoring period, data at five minute granularity was accessed for the selected monitoring times across all identified freeway and multilane highway CMP segments in San Mateo County.

### 72-Hour Traffic Counts

Two-lane highways and arterial segments are primarily monitored using data from 72-hour traffic counts, which are performed using pneumatic tubes that are laid in the road. The tubes record volumes, speeds, and vehicle classifications in each direction during the specified count period. These counts were conducted by TJKM and IDAX Data Solutions at 25 CMP locations and 10 Companion Network locations countywide. At four CMP locations on the Coastside (three on SR-1 and one on SR-92), these counts were also conducted on a Saturday and Sunday to provide weekend monitoring of tourist traffic.

### Intersection Turning Movement Counts

Turning movement counts (TMCs) record the total volume of vehicles, bicycles, and pedestrians that pass through an intersection during the specified monitoring period. Typically, the data is recorded showing how many cars make each possible movement (left turn, proceed straight, right turn, etc.) as they approach the intersection from each cardinal direction. Bicycles are recorded in a similar manner, while pedestrians are recorded by how many use the crosswalk on each leg of the intersection. TMCs were conducted at 16 CMP intersections and 17 Companion Network intersections during the AM and PM peak period. At eight of the locations on the Coastside (two CMP and six Companion Network), TMCs were conducted on a Saturday during the AM, Mid-Day (11am-1pm), and PM peak periods.

### HOV Lane Floating Car Survey

Floating car surveys are a method by which average speed and travel time can be measured along a defined roadway segment. As INRIX does not separate out High Occupancy Vehicle (HOV) lanes in their data, floating car surveys were conducted in the US-101 HOV lane from the Santa Clara County Line to Whipple Avenue. The surveys were completed using GPS technology to determine the travel time between the start and end of the segment. A minimum of four surveys were completed for each peak period and in each direction of travel.

### Transit Ridership and Schedule Data

As part of the multi-modal performance element, transit ridership for all three major transit agencies serving San Mateo County (BART, Caltrain, and SamTrans) was collected for FY 21. Total ridership and average weekday ridership was reported. Transit schedules for Caltrain and SamTrans applicable during the monitoring period (April-May 2021), were obtained to calculate multi-modal travel times along the US-101 corridor.

### Caltrans PeMS Data

To conduct an assessment of travel time reliability along San Mateo County freeway corridors, travel time index data was obtained from Caltrans Performance Monitoring System (PeMS).

## 2.2: LOS Methodology

All freeway segments in the network were monitored using the INRIX travel time data, which allows for determination of LOS on the basis of average operating speed. C/CAG primarily uses the 1994 and 2010 HCM methodology to monitor LOS on the CMP network. The specific methodologies used for monitoring freeway and arterial segments are listed below per HCM definitions:

**Freeway and Multilane Highway Segments (HCM 1994 - Chapter 3)** – All freeway and multilane highway segments were evaluated using the "basic freeway sections" and "multilane highways" methodology of HCM 1994 where the LOS for each freeway segment was determined using its average travel speed. Travel speed data was pulled from INRIX for April-May 2021, discussed above in Section 2.1.

The routes that fall into this classification include:

- SR-1 from San Francisco County Line to Linda Mar Avenue
- SR-92 from I-280 to Alameda County Line
- US-101
- I-280

- I-380[2]

**Two-Lane and Arterial Segments (HCM 1994 – Chapters 7, 8, and 11)** – All non-freeway surface street segments were evaluated based on the volume to capacity ratio (V/C) dependent on the local free-flow speed, cross-section, number of lanes, % no-passing zones, and functional class.

Two-lane highways and arterials were evaluated primarily based on the current volumes as measured through 72-hour traffic counts at 35 CMP and Companion Network locations and turning movement counts at 10 locations throughout the county. These counts and resulting V/C were then compared to the applicable criteria in the HCM 1994 to determine the respective LOS. Companion Network segments were monitored using the same methodology as the CMP network.

The routes that fall into this classification include:

- SR-1 (south of Linda Mar Avenue)
- SR-35
- SR-82
- SR-84
- SR-92 (from SR-1 to I-280)
- SR-109
- SR-114
- Mission Street
- Geneva Avenue
- Bayshore Boulevard

**Intersections –** Turning movement counts were conducted at each CMP and Companion Network intersection during the AM and PM peak periods (for intersections that were analyzed on Saturday, mid-day peak period was also collected). These were modeled in Synchro and used the HCM 2010 methodology. Where intersection parameters did not allow the use of HCM 2010 in Synchro (one example is split signal phasing), HCM 2000 was used. The applicable methodology used is noted in the LOS results tables for intersections.

**Figure 4** maps the CMP network with the applicable LOS methodology used. Detailed explanations of the LOS methodologies used is included in **Appendix B**.

[2] Although travel speed data is used to determine LOS on all segments of I-380, one segment (US-101 to Airport Access Road) is classified as an Arterial and as such the "Arterial" criteria in HCM 1994 is used.

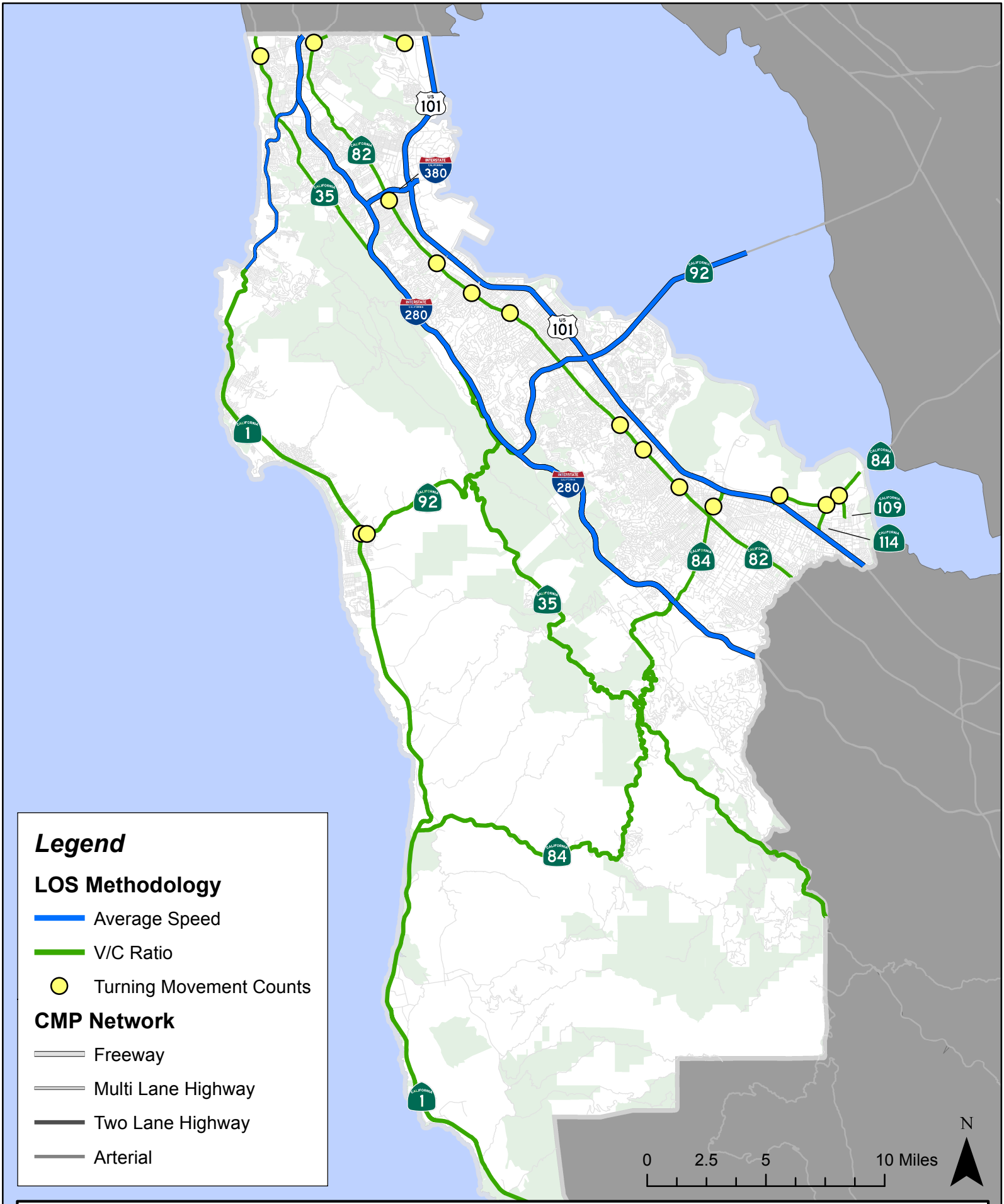


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FIGURE 4

LEVEL OF SERVICE METHODOLOGY

C/CAG City/County Association of Governments of San Mateo County

## 2.3: Data Analysis

As has been previously mentioned, C/CAG uses three methodologies for monitoring the CMP and Companion Network in San Mateo County: Average Speed, V/C Ratio, and Turning Movement Counts. The methodology to analyze each is described below.

**Average Speed – Commercial Speed Data (INRIX)**

Once collected from the INRIX database, the commercial speed data points filtered to ensure a high quality data sample. Three grades (10, 20, or 30) are associated with INRIX data, with a grade of 10 representing low quality, historical speed data, 30 representing high-quality probe data, and 20 representing a mixture of the two. The collected datasets were graded and then filtered to ensure only grade 30 INRIX data was used in the analysis. The data was then associated with the appropriate CMP segment. Once reduced, the travel time data was extracted for each segment in seconds. This was then converted to an hour metric, and divided by the length of the INRIX segment, producing an average speed for the segment. This average speed was then compared against HCM 1994 methodologies to report the appropriate LOS. This methodology is consistent with past monitoring efforts. LOS is reported for both directions, however, only the worst case direction is listed. The official result is the worst case LOS between the AM and PM peak period.

**Volume/Capacity Ratio**

V/C ratios are used to calculate LOS on two-lane highway and arterial CMP and Companion Network segments. These ratios are calculated based on 72-hour traffic counts taken at 25 CMP locations and 10 Companion Network locations. Once the data had been received and quality checks had been performed on the data collected, the highest one hour traffic volume was calculated for each peak period in each direction across all three days. Consistent with past monitoring efforts, the highest one hour in each peak period and each direction across these three hours was selected as the official volume per hour to calculate the V/C ratio. On 10 segments, 72-hour counts were not conducted instead turning movement counts from intersections on that applicable segment were used. To extract the volumes, all movements approaching to moving away from the intersection in a certain direction during the intersection's peak one hour of traffic, were combined to form the official volume. For example, if volumes from north of an intersection were used, then the SBL, SBT, and SBR movements were used for southbound volumes, while NBT, WBL, and EBR movements were used for northbound movements. For arterials, LOS is reported for both directions, however, only the worst case

direction is listed. Two-lane highways are reported as bi-directional LOS. The official result is the worst case LOS between the AM and PM peak period.

Consistent with past monitoring efforts and HCM methodology, the capacity of each segment was assumed to be 1,100 vehicles per lane, per hour; with the exception of two-lane highways, where the capacity was assumed to be 2,800 vehicles per hour in both directions combined. For arterials, the subsequent V/C was compared to the "Arterials" criteria under HCM 1994 to assign the appropriate LOS. For two-lane highways, two additional inputs are required: terrain (level, rolling, or mountainous), and percent no passing. These are used to find the correct criteria under HCM 1994 and assign the correct LOS.

**Intersections**

16 CMP intersections and 17 Companion Network intersections were analyzed as part of the 2021 LOS Monitoring. The performance measure for intersections is LOS, but different from freeways and highways, the HCM 2010 was used to determine the LOS (Note: where signal timing parameters prevented Synchro from using HCM 2010, HCM 2000 was used). Turning movement counts were collected for each intersection on a weekday during the AM and PM peak periods and modeled in Synchro. For eight Coastside intersections, counts were also conducted on a Saturday in the AM, Mid-Day (11am-1pm) and PM peak periods. In addition to turning movement counts, pedestrian and bike counts were collected. The intersections were analyzed as if they were isolated (not coordinated or part of a signal system) and optimized given the current geometry. The modeled results provide an estimate of the optimized LOS and may not represent the actual conditions if the intersection is either using less than optimal phasing, splits or cycle length. TJKM updated the Synchro file from past CMP monitoring years to more accurately reflect current signal parameters and intersection controls observed out in field (for one example, changing a Permissive + Protected left turn to a Protected left turn if it was observed in current conditions). This modification in signal control changes the operation of the intersection in field and hence to reflect the current conditions this change was also modeled in Synchro. As such, the LOS at some intersections may be higher or lower than in previous years due to these changes.

# CHAPTER 3: LOS MONITORING RESULTS

## 3.1: 2021 LOS Monitoring Results

This chapter discusses the 2021 LOS monitoring results for roadway segments and intersections based on the data collected for the project during April/May 2021. The COVID-19 pandemic has caused reductions in traffic across San Mateo County. This is evidenced by the fact that only five roadway segments were failing before interregional exemptions (all of which improved to an acceptable LOS after interregional exemptions), compared to 19 pre-exemption failing segments in 2019. It should be noted, however, that one intersection (SR-84/Middlefield Road) was failing in the PM peak period, but it improved to an acceptable LOS after interregional reductions. While this is not an improvement over last year where there were no failing intersections before reductions, the intersection was close to failing in 2019 (LOS E), and additional traffic to critical movements in the intersection could cause it to downgrade to LOS F.

Volumes from 72-hour traffic counts fell by an average of 23% when compared to available data from 2017. Intersection turning movement count volumes similarly fell by an average of 21% when compared to 2019 data. Reductions in traffic can be attributed to stay-at-home orders, increased telecommuting, and virtual school. As a monitoring document, the CMP provides C/CAG an opportunity to not only measure traffic reductions pre-COVID to during the pandemic, but also measure its recovery as traffic returns to pre-pandemic conditions.

New to the 2021 CMP Monitoring Report are two items: the Companion Network (which includes 10 roadway segments and 17 intersections beyond the CMP network countywide), and weekend LOS monitoring at select locations on the Coastside. The Companion Network was designated out of a desire to see additional locations monitored countywide which are not included in the CMP network. Weekend monitoring is done at select Coastside locations due to the high amounts of weekend tourist traffic experienced at these locations (causing traffic levels oftentimes greater than experienced on weekdays). These are presented alongside the CMP LOS monitoring results for informational purposes only.

**Tables 7 and 8** list out the reported worst case direction LOS for each roadway segment on the CMP and Companion Networks. The CMP segments are then mapped in **Figure 5** (AM Peak Period) and **Figure 6** (PM Peak Period), while the Companion Network segments are mapped in **Figure 7** (AM Peak Period) and **Figure 8** (PM Peak Period). CMP and Companion Network intersection LOS is reported in **Tables 8** and **9**, and mapped in **Figure 9** (CMP AM), **Figure 10** (CMP PM), **Figure 11** (Companion Network AM), and **Figure 12** (Companion Network PM). Weekend LOS is reported in **Tables 10** and **11**, and mapped in **Figure 13** (AM), **Figure 14** (Mid-Day)**, and Figure 15** (PM). Lastly, roadway segments and intersections that are failing before interregional travel exemptions is mapped in **Figure 16**.

**Table 7: 2021 CMP Roadway Segment LOS**

| Route | Roadway Segment | LOS Standard | 2021 LOS | | With Interregional Reduction - AM | With Interregional Reduction - PM |
|---|---|---|---|---|---|---|
| | | | AM Peak Period | PM Peak Period | | |
| SR-1 | San Francisco County Line to Linda Mar Blvd | E | A | C | - | - |
| SR-1 | Linda Mar Blvd to Frenchmans Creek Rd | E | D | D | - | - |
| SR-1 | Frenchmans Creek Road to Miramontes Rd | E | E | E | - | - |
| SR-1 | Miramontes Rd to Santa Cruz County Line | D | B | C | - | - |
| SR-35 | San Francisco Co Line to Sneath Ln | E | A | A | - | - |
| SR-35 | Sneath Ln to I-280 | F | B | C | - | - |
| SR-35 | I-280 to SR-92 | B | B | B | - | - |
| SR-35 | SR-92 to SR-84 | B | B | B | - | - |
| SR-35 | SR-84 to Santa Clara County Line | E | B | B | - | - |
| SR-82 | San Francisco County Line to John Daly Blvd | E | A | A | - | - |
| SR-82 | John Daly Blvd to Hickey Blvd | E | A | A | - | - |
| SR-82 | Hickey Blvd to I-380 | E | A | A | - | - |
| SR-82 | I-380 to Trousdale Dr | E | A | A | - | - |
| SR-82 | Trousdale Dr to 3rd Ave | E | A | A | - | - |
| SR-82 | 3rd Ave to SR-92 | E | A | A | - | - |
| SR-82 | SR-92 to Hillsdale Ave | E | A | A | - | - |
| SR-82 | Hillsdale Ave to 42nd Ave | E | A | A | - | - |
| SR-82 | 42nd Ave to Holly St | E | A | A | - | - |
| SR-82 | Holly St to Whipple Ave | E | A | A | - | - |
| SR-82 | Whipple Ave to SR-84 | E | A | B | - | - |
| SR-82 | SR-84 to Glenwood Ave | E | A | A | - | - |
| SR-82 | Glenwood Ave to Santa Cruz Ave | E | A | A | - | - |

| Route | Roadway Segment | LOS Standard | 2021 LOS | | With Interregional Reduction - AM | With Interregional Reduction - PM |
|---|---|---|---|---|---|---|
| | | | AM Peak Period | PM Peak Period | | |
| SR-82 | Santa Cruz Ave to Santa Clara County Line | E | A | A | - | - |
| SR-84 | SR-1 to Portola Rd | C | C | C | - | - |
| SR-84 | Portola Rd to I-280 | E | C | B | - | - |
| SR-84 | I-280 to Alameda de las Pulgas | C | D | C | C | - |
| SR-84 | Alameda de las Pulgas to US-101 | E | B | C | - | - |
| SR-84 | US-101 to Willow Rd | D | A | A | - | - |
| SR-84 | Willow Rd to University Ave | E | B | C | - | - |
| SR-84 | University Ave to Alameda County Line | F | D | D | - | - |
| SR-92 | SR-1 to I-280 | E | E | E | - | - |
| SR-92 | I-280 to US-101 | D | D | D | - | - |
| SR-92 | US-101 to Alameda County Line | E | E | E | - | - |
| US-101 | San Francisco County Line to I-380 | E | A | D | - | - |
| US-101 | I-380 to Millbrae Ave* | E | A | F | - | D |
| US-101 | Millbrae Ave to Broadway* | E | D | F | - | D |
| US-101 | Broadway to Peninsula Ave* | E | D | F | - | D |
| US-101 | Peninsula Ave to SR-92* | F | F | E | - | - |
| US-101 | SR-92 to Whipple Ave* | E | D | F | - | D |
| US-101 | Whipple Ave to Santa Clara County Line | F | D | D | - | - |
| SR-109 | Kavanaugh Dr to SR-84 (Bayfront Expwy.) | E | A | A | - | - |
| SR-114 | US-101 to SR-84 (Bayfront Expressway) | E | A | A | - | - |
| I-280 | San Francisco County Line to SR-1 (north) | E | A | D | - | - |
| I-280 | SR-1 (north) to SR-1 (south) | E | A | E | - | - |
| I-280 | SR-1 (south) to San Bruno Ave | D | A | A | - | - |

| Route | Roadway Segment | LOS Standard | 2021 LOS | | With Interregional Reduction - AM | With Interregional Reduction - PM |
|---|---|---|---|---|---|---|
| | | | AM Peak Period | PM Peak Period | | |
| I-280 | San Bruno Ave to SR-92 | D | A | A | - | - |
| I-280 | SR-92 to SR-84 | D | A | A | - | - |
| I-280 | SR-84 to Santa Clara County Line | D | A | A | - | - |
| I-380 | I-280 to US-101 | F | E | E | - | - |
| I-380 | US-101 to Airport Access Road | C | A | A | - | - |
| Mission St | San Francisco County Line to SR-82 | E | A | A | - | - |
| Geneva Ave | San Francisco County Line to Bayshore Blvd | E | A | A | - | - |
| Bayshore Blvd | San Francisco County Line to Geneva Ave | E | A | A | - | - |

*Note: Construction of the US-101 Express Lanes between I-380 and Whipple Avenue was ongoing at the time of monitoring, and could potentially have an impact on traffic in the area.

**Table 8: 2021 Companion Network Roadway Segment LOS**

| Route | Roadway Segment | LOS Standard | 2021 LOS | |
|---|---|---|---|---|
| | | | AM Peak Period | PM Peak Period |
| Ralston Ave | US-101 to Alameda de las Pulgas | N/A | A | A |
| Middlefield Rd | SR-84 to Marsh Rd | N/A | A | A |
| California Dr | Broadway to Peninsula Ave | N/A | A | A |
| Bayshore Blvd | Geneva Ave to US-101 NB Off Ramp | N/A | A | A |
| John Daly Blvd | SR-35 to Mission St | N/A | A | A |
| Foster City Blvd | E. 3rd Ave to Beach Park Dr | N/A | A | A |
| Chateau Dr/Ralston Ave | I-280 to El Camino Real | N/A | C | C |
| Millbrae Ave | SR-82 to Old Bayshore Hwy | N/A | A | B |
| Sharp Park Blvd | SR-1 to SR-35 | N/A | A | A |
| Sneath Ln | SR-35 to Huntington Ave | N/A | A | A |

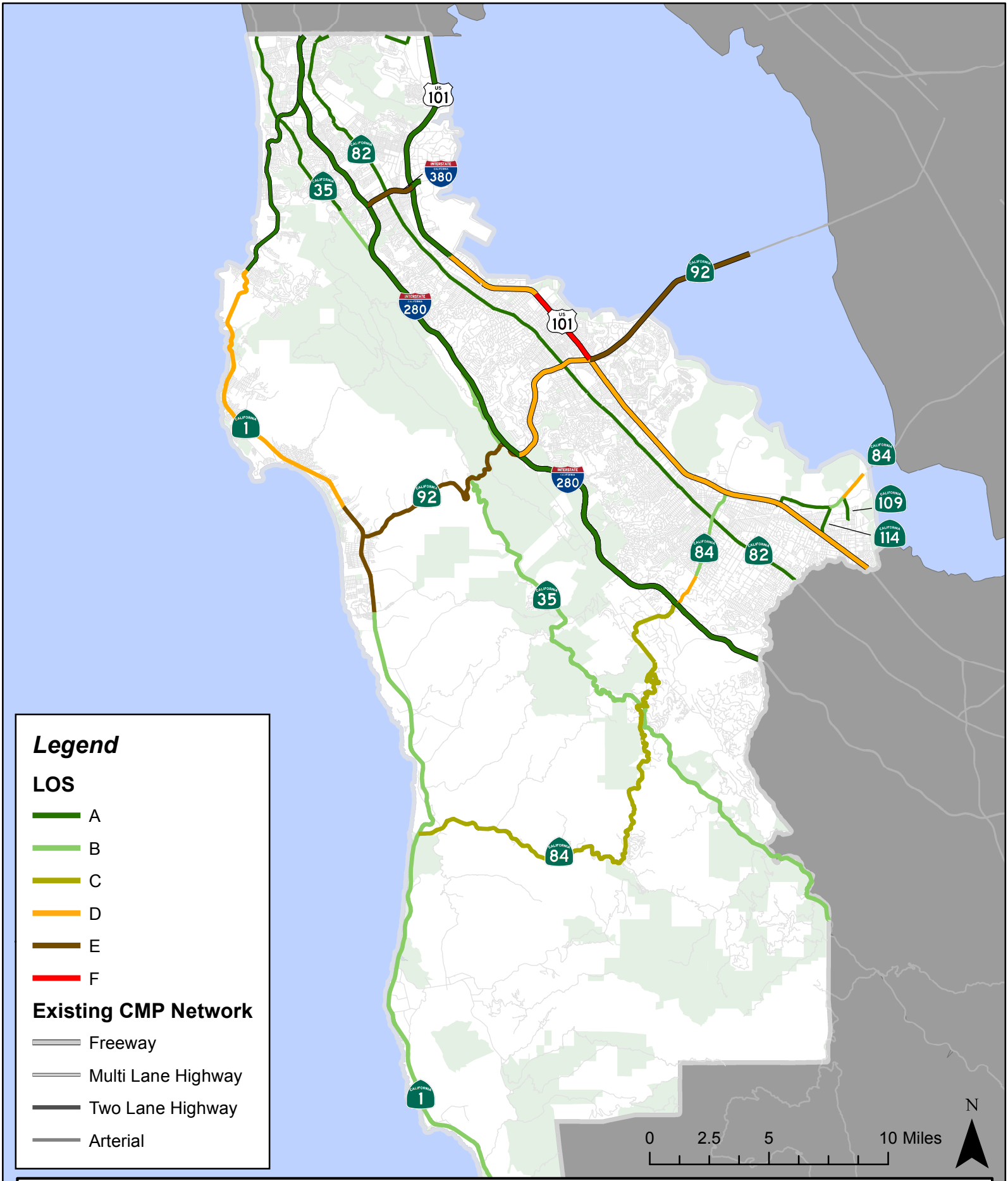


FIGURE 5

TJKM

# CMP ROADWAY SEGMENT LOS - AM PEAK PERIOD

## (WITHOUT INTERREGIONAL EXEMPTION)

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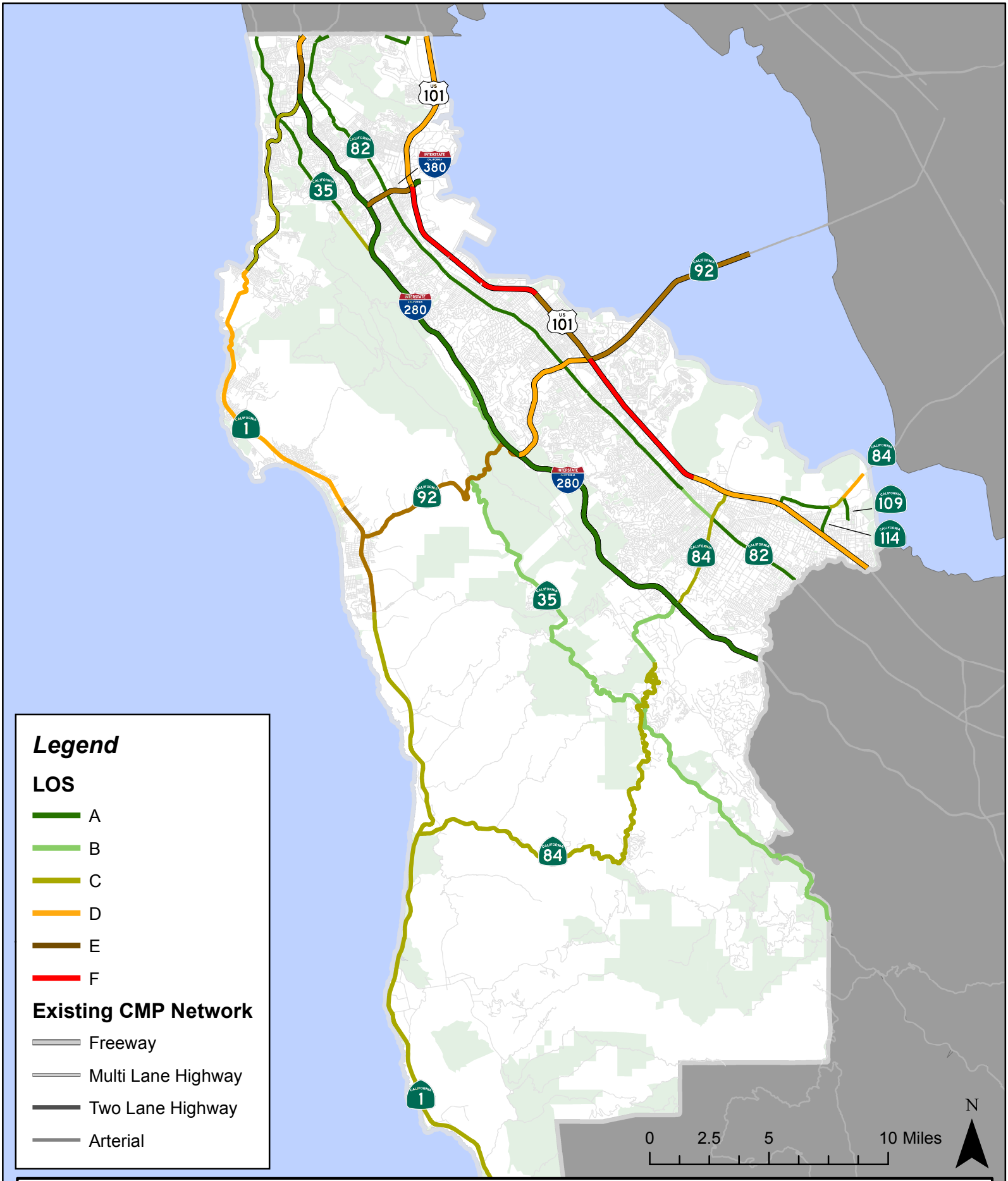


FIGURE 6

TJKM

CMP ROADWAY SEGMENT LOS - PM PEAK PERIOD

(WITHOUT INTERREGIONAL EXEMPTION)

C/CAG City/County Association of Governments of San Mateo County

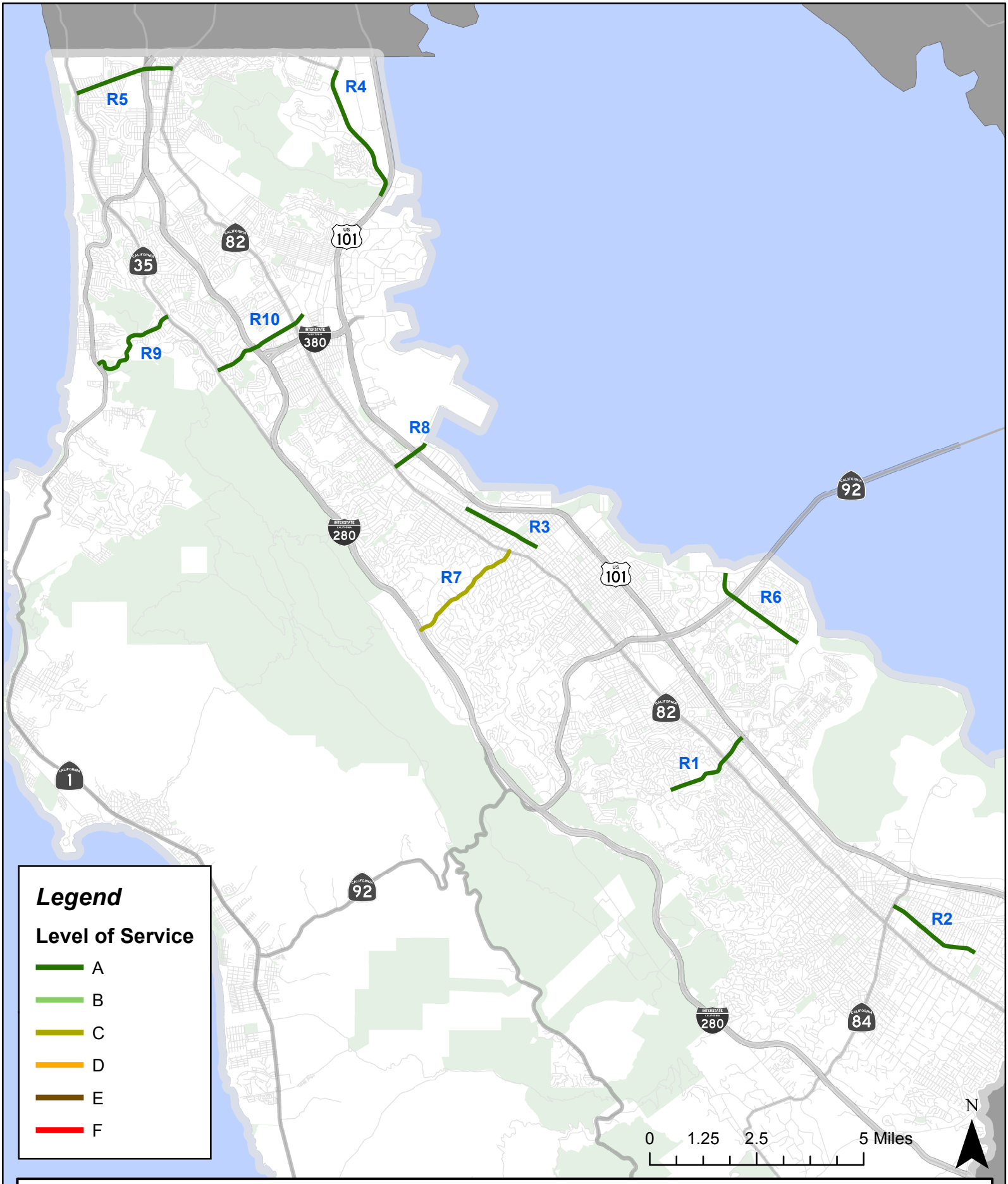


FIGURE 7

# COMPANION ROADWAY SEGMENT LOS AM PEAK PERIOD

TJKM

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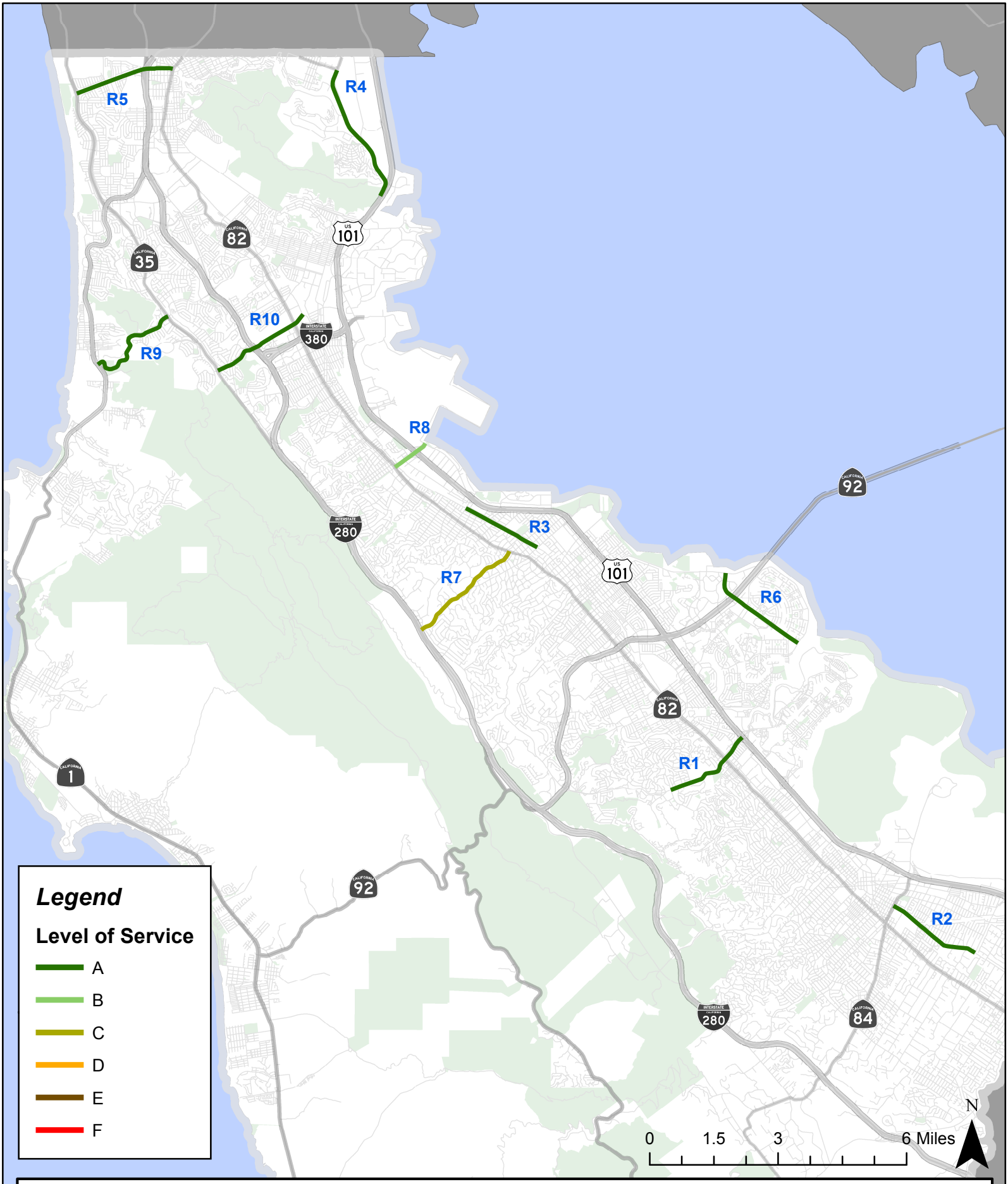


FIGURE 8

COMPANION ROADWAY SEGMENT LOS
PM PEAK PERIOD

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of San Mateo County

**Table 9: 2021 CMP Intersection LOS**

| ID | Intersection | Methodology | LOS Standard | AM Peak | | With Interregional Reduction AM | | PM Peak | | With Interregional Reduction PM | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Delay (sec) | LOS | Delay (sec) | LOS | Delay (sec) | LOS | Delay (sec) | LOS |
| 1 | Bayshore Blvd/Geneva Ave | HCM 2000 | E | 15.6 | B | - | - | 19.9 | B | - | - |
| 2 | SR-35/John Daly Blvd | HCM 2000 | E | 17.3 | B | - | - | 19.6 | B | - | - |
| 3 | SR-82/John Daly Blvd/Hillside Ave | HCM 2010 | E | 28.8 | C | - | - | 33.1 | C | - | - |
| 4 | SR-82/San Bruno Ave | HCM 2010 | E | 23.9 | C | - | - | 29.3 | C | - | - |
| 5 | SR-82/Millbrae Ave | HCM 2010 | E | 33.9 | C | - | - | 39.0 | D | - | - |
| 6 | SR-82/Broadway | HCM 2010 | E | 12.2 | B | - | - | 12.4 | B | - | - |
| 7 | SR-82/Park Rd/Peninsula Ave | HCM 2000 | E | 24.5 | C | - | - | 34.1 | C | - | - |
| 8 | SR-82/Ralston Ave | HCM 2000 | E | 41.6 | D | - | - | 40.4 | D | - | - |
| 9 | SR-82/Holly St | HCM 2010 | E | 27.5 | C | - | - | 33.9 | C | - | - |
| 10 | SR-82/Whipple Ave | HCM 2010 | E | 35.1 | D | - | - | 43.0 | D | - | - |
| 11 | University Ave/SR-84 | HCM 2000 | F | 16.6 | B | - | - | 45.7 | D | - | - |
| 12 | Willow Rd/SR-84 | HCM 2010 | F | 23.7 | C | - | - | 35.7 | D | - | - |
| 13 | SR-84/Marsh | HCM 2000 | F | 63.1 | E | - | - | 62.6 | E | - | - |
| 14 | SR-84/Middlefield Rd | HCM 2010 | E | 59.1 | E | - | - | 96.2 | F | 74.4 | E |
| 15 | SR-1/SR-92 | HCM 2000 | E | 29.1 | C | - | - | 36.5 | D | - | - |
| 16 | Main St/SR-92 | HCM 2010 | F | 51.3 | D | - | - | 48.1 | D | - | - |

**Table 10: 2021 Companion Network Intersection LOS**

| ID | Intersection | Methodology | AM Peak | | PM Peak | | LOS Standard |
|---|---|---|---|---|---|---|---|
| | | | Delay | LOS | Delay | LOS | |
| 17 | El Camino Real/3rd Ave | HCM 2010 | 23.9 | C | 24.8 | C | N/A |
| 18 | SR-92/Skyline Blvd (SR-35) | HCM 2000 | 16.5 | B | 22.2 | C | N/A |
| 19 | Industrial Rd/Holly St | HCM 2010 | 38.0 | D | 62.7 | E | N/A |
| 20 | Veterans Blvd/Whipple Ave | HCM 2010 | 28.8 | C | 46.2 | D | N/A |
| 21 | Middlefield Rd/Marsh Rd | HCM 2010 | 29.7 | C | 91.4 | F | N/A |
| 22 | Santa Cruz Ave/Sand Hill Rd | HCM 2010 | 41.8 | D | 29.7 | C | N/A |
| 23 | University Ave/Bay Rd | HCM 2000 | 47.5 | D | 78.3 | E | N/A |
| 24 | SR-84/Alameda de las Pulgas | HCM 2010 | 33.4 | C | 39.4 | D | N/A |
| 25 | Alpine Rd/Portola Rd | HCM 2010 | 9.0 | A | 10.6 | B | N/A |
| 26 | SR-92/SR-35 | HCM 2010 | 18.8 | C | 23.2 | C | N/A |
| 27 | El Camino Real/Mission Rd | HCM 2010 | 10.2 | B | 16.3 | C | N/A |
| 28 | SR-1/Main St | HCM 2000 | 34.5 | C | 45.1 | D | N/A |
| 29 | El Camino Real/Westborough Blvd | HCM 2010 | 96.2 | F | 54.0 | D | N/A |
| 30 | SR 1/Capistrano Rd | HCM 2010 | 16.6 | B | 17.8 | B | N/A |
| 31 | S Airport Blvd/San Bruno Ave | HCM 2000 | 14.8 | B | 14.4 | B | N/A |
| 32 | SR-1/Reina del Mar Ave | HCM 2000 | 43.5 | D | 45.5 | D | N/A |
| 33 | SR-1/Cypress Ave | HCM 2010 | 34.4 | D | 83.4 | F | N/A |

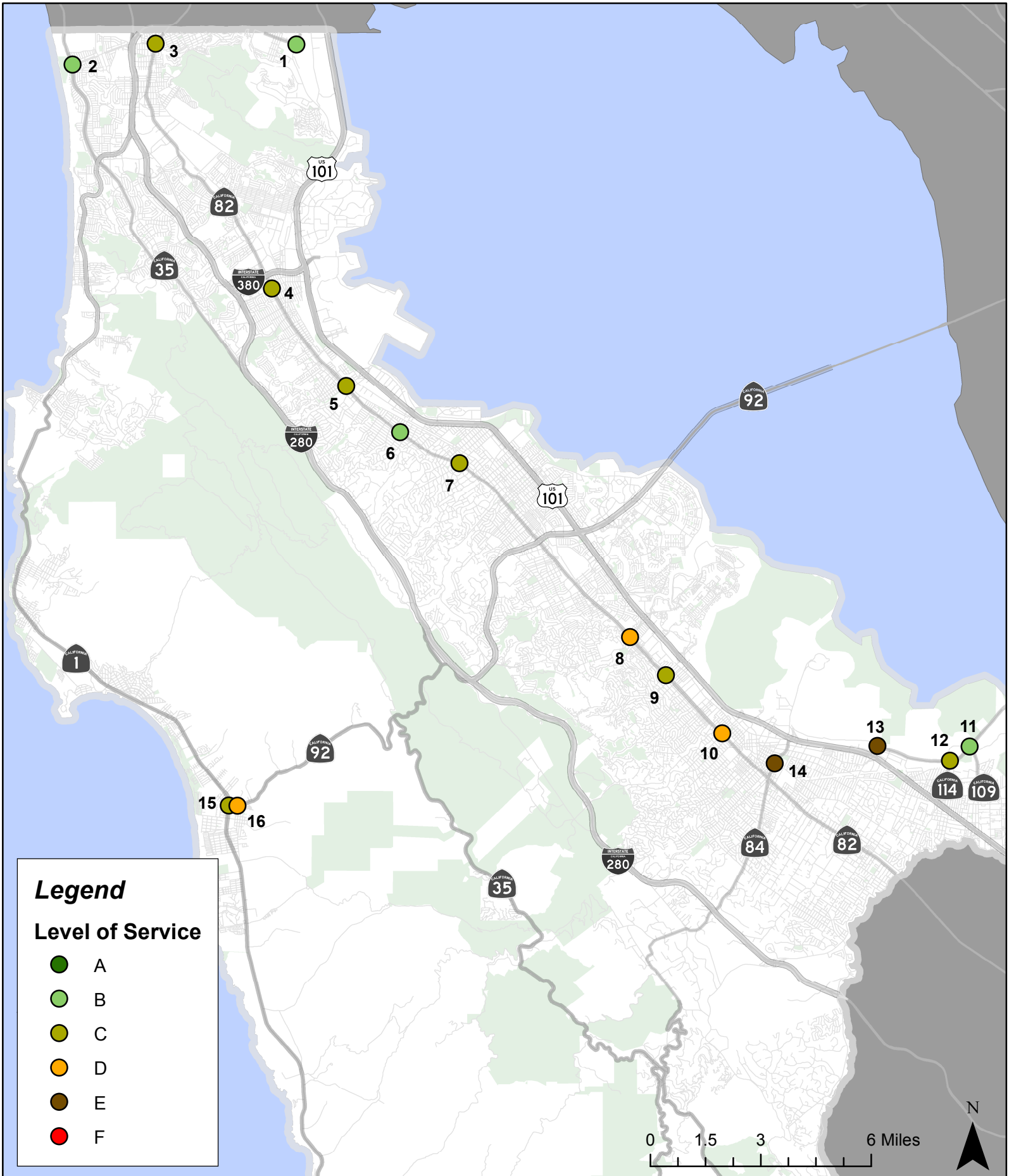


FIGURE 9

# CMP INTERSECTION LOS - AM PEAK PERIOD

## (WITHOUT INTERREGIONAL EXEMPTION)

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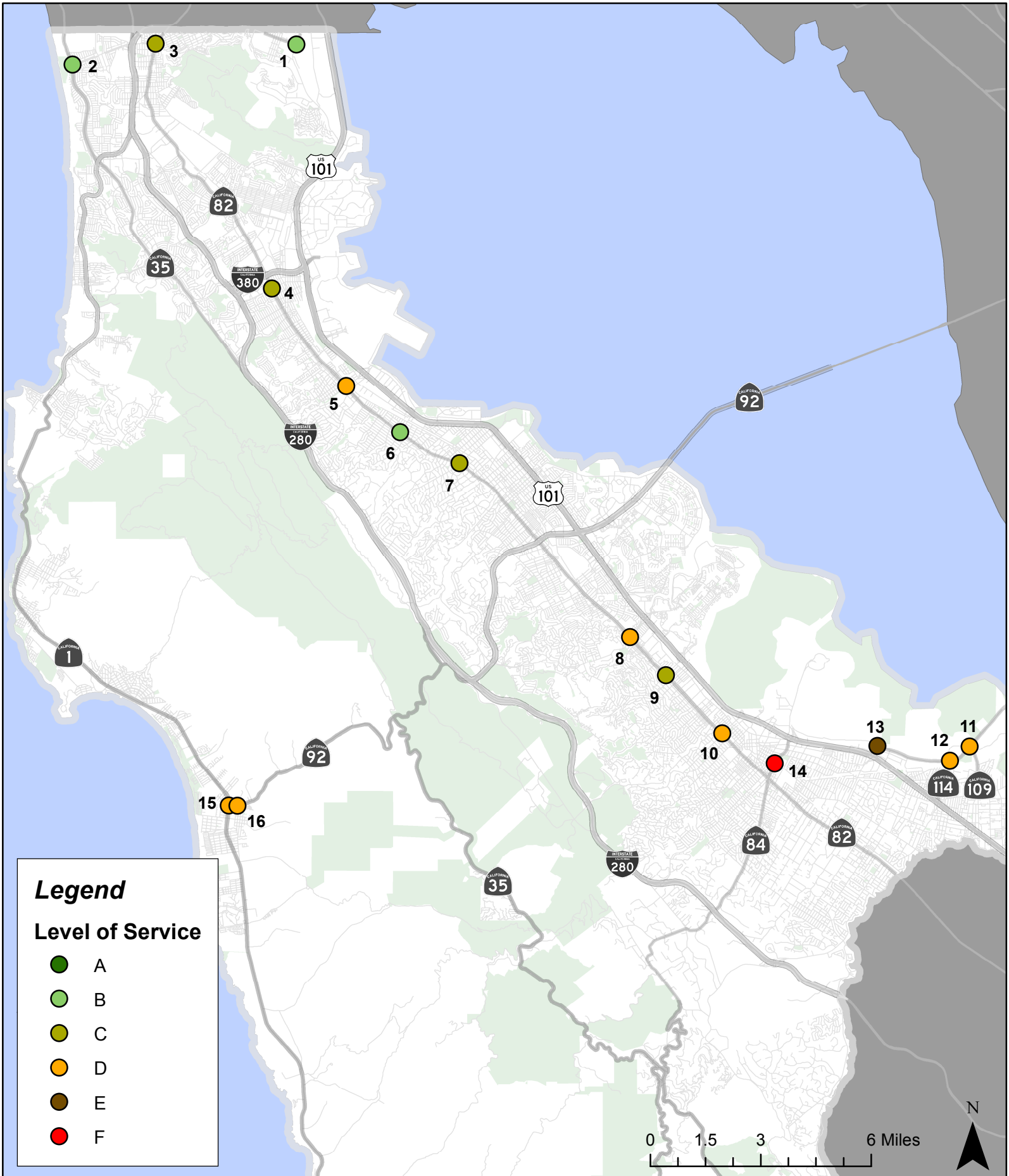


FIGURE 10

# CMP INTERSECTION LOS - PM PEAK PERIOD

## (WITHOUT INTERREGIONAL EXEMPTION)

TJKM

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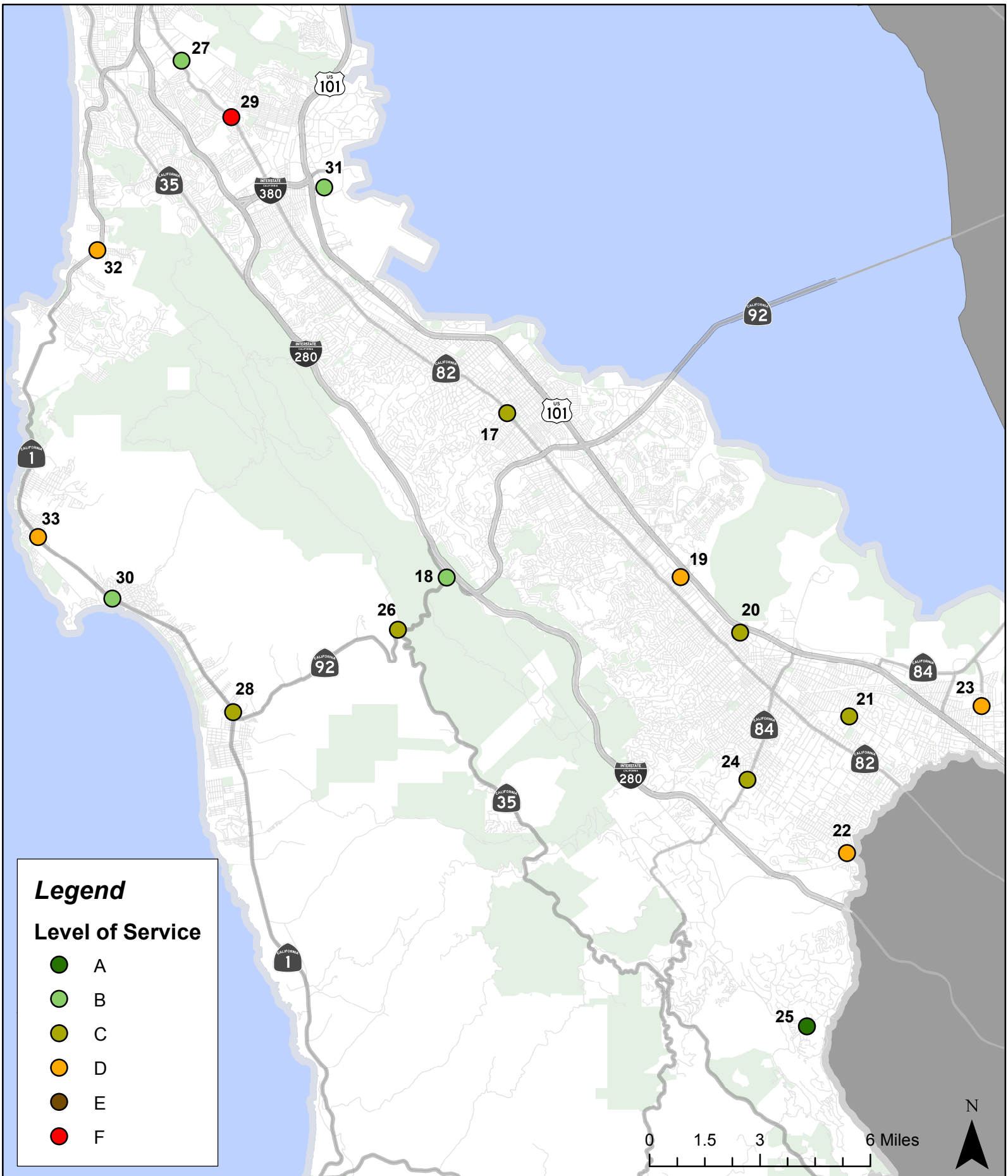


FIGURE 11

COMPANION INTERSECTION LOS
AM PEAK PERIOD

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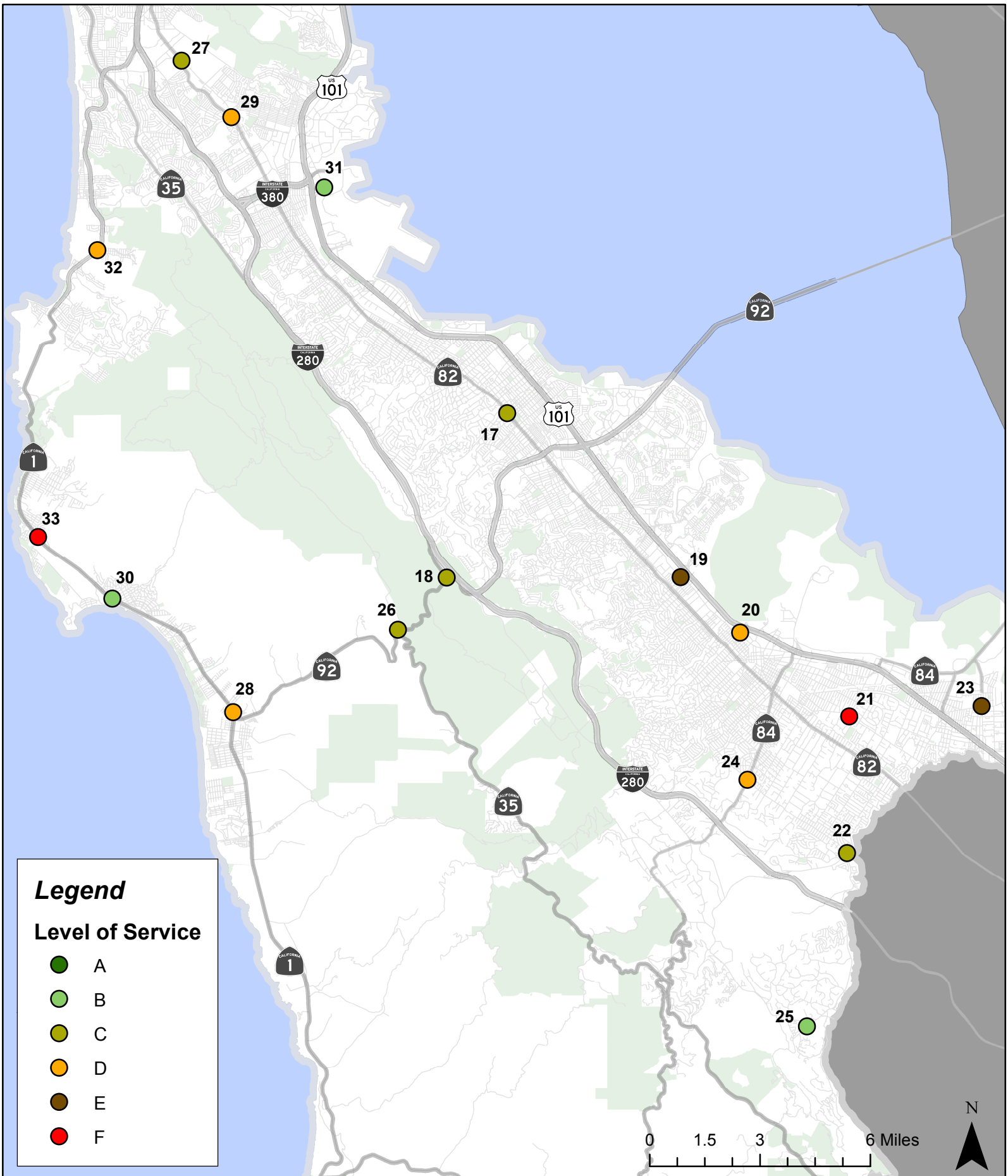


FIGURE 12

COMPANION INTERSECTION LOS
PM PEAK PERIOD

TJKM

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of San Mateo County

**Table 11: 2021 Roadway Segment Weekend LOS**

| Route | Roadway Segment | LOS Standard | 2021 LOS | | |
|---|---|---|---|---|---|
| | | | AM Peak Period | Mid-Day Peak Period | PM Peak Period |
| SR-1 | Linda Mar Blvd to Frenchmans Creek Rd | N/A | C | D | D |
| SR-1 | Frenchmans Creek Rd to Miramontes Rd | N/A | D | E | E |
| SR-1 | Miramontes Rd to Santa Cruz County Line | N/A | B | C | C |
| SR-92 | SR-1 to I-280 | N/A | E | E | E |

**Table 12: 2021 Intersection Weekend LOS**

| ID | Intersection | Methodology | AM Peak | | Mid-Day Peak | | PM Peak | | LOS Standard |
|---|---|---|---|---|---|---|---|---|---|
| | | | Delay (sec) | LOS | Delay (sec) | LOS | Delay (sec) | LOS | |
| 15 | SR-1/SR-92 | HCM 2000 | 29.7 | C | 38.9 | D | 37.5 | D | N/A |
| 16 | Main St/SR-92 | HCM 2010 | 28.0 | C | 41.2 | D | 36.5 | D | N/A |
| 18 | SR-92/Skyline Blvd (SR-35) | HCM 2000 | 64.1 | E | 130.9 | F | 55.8 | E | N/A |
| 26 | SR-35/SR-92 | HCM 2010 | 23.2 | C | 135.8 | F | 46.5 | E | N/A |
| 28 | SR-1/Main St | HCM 2000 | 41.1 | D | 45.9 | D | 41.9 | D | N/A |
| 30 | SR-1/Capistrano Rd | HCM 2010 | 15.4 | B | 20.7 | C | 18.7 | B | N/A |
| 32 | SR-1/Reina Del Mar Ave | HCM 2000 | 26.5 | C | 59.0 | E | 44.6 | D | N/A |
| 33 | SR-1/Cypress Ave | HCM 2010 | 23.0 | C | 230.1 | F | 122.7 | F | N/A |

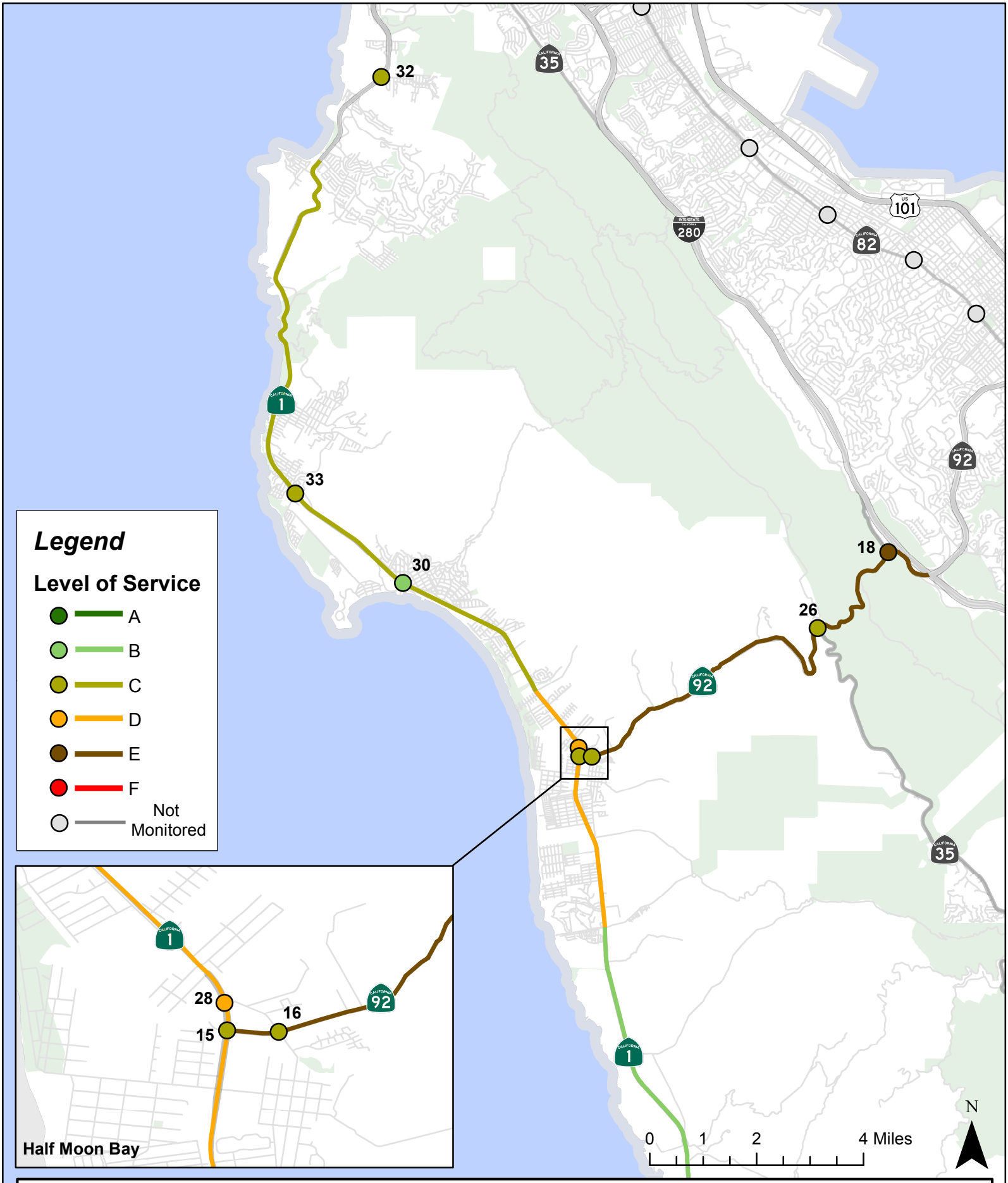


FIGURE 13

WEEKEND SEGMENT & INTERSECTION LOS
AM PEAK PERIOD

TJKM

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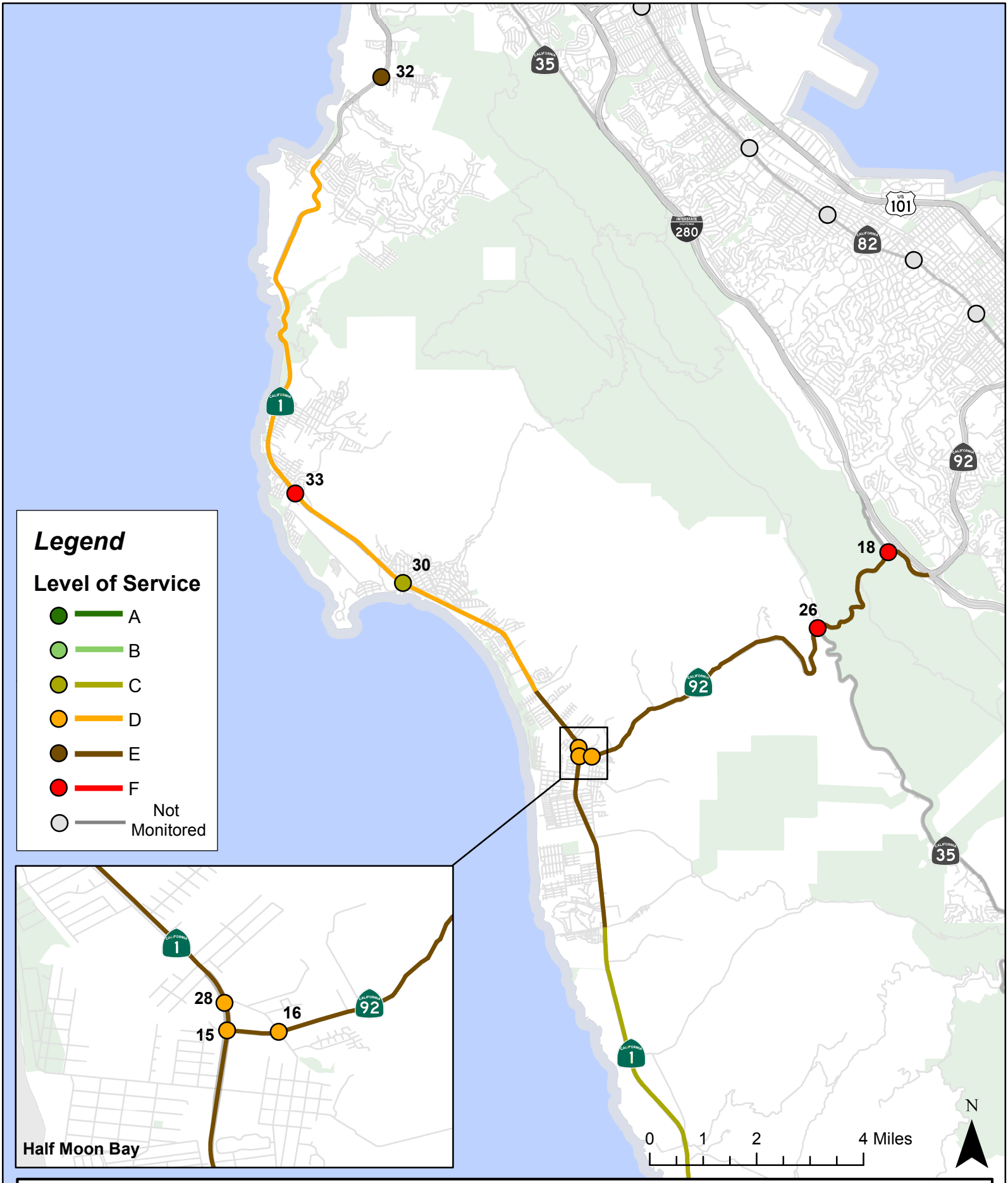


FIGURE 14

WEEKEND SEGMENT & INTERSECTION LOS
MID-DAY PEAK PERIOD

TJKM

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of San Mateo County

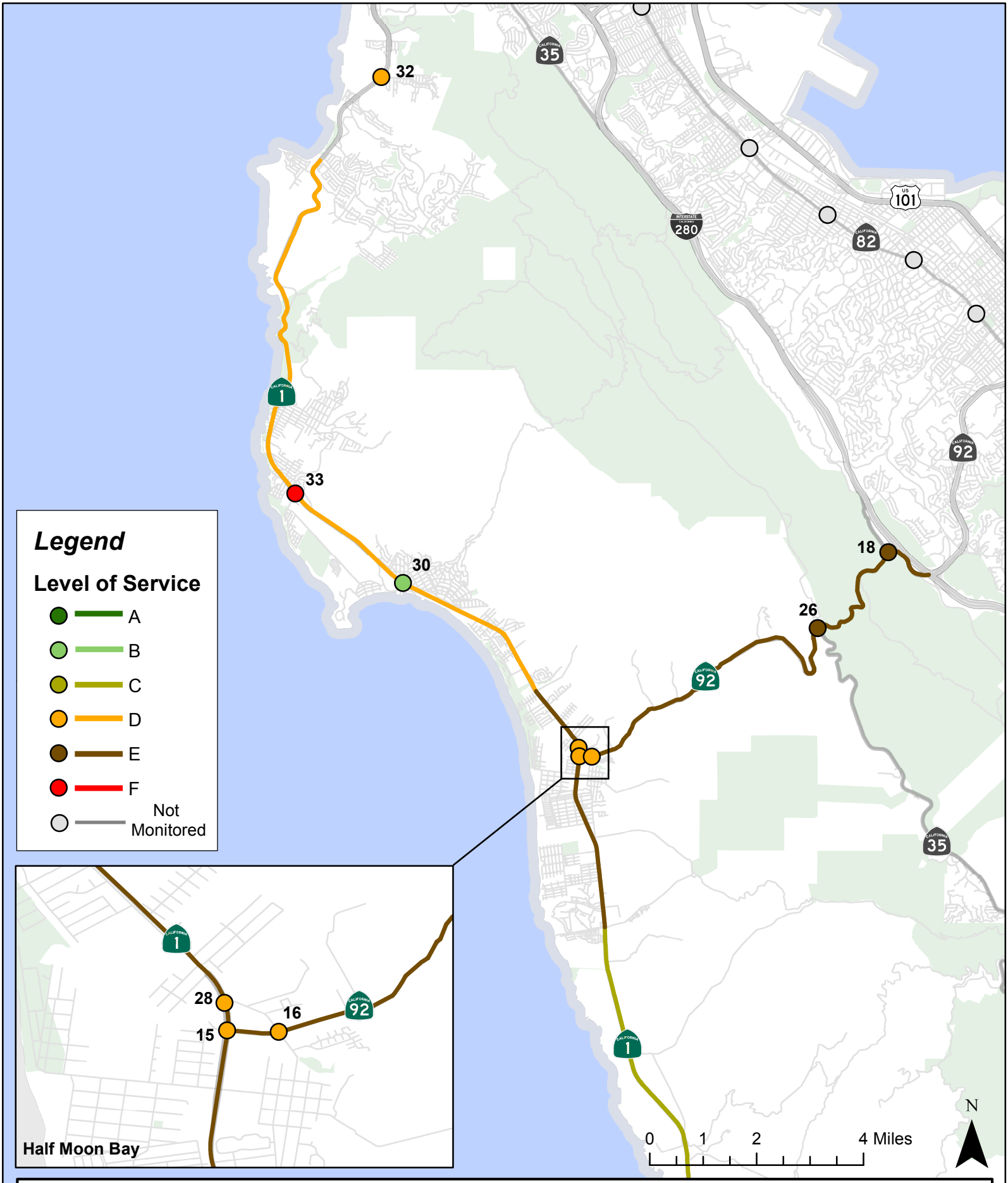


FIGURE 15

WEEKEND SEGMENT & INTERSECTION LOS
PM PEAK PERIOD

TJKM

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of San Mateo County

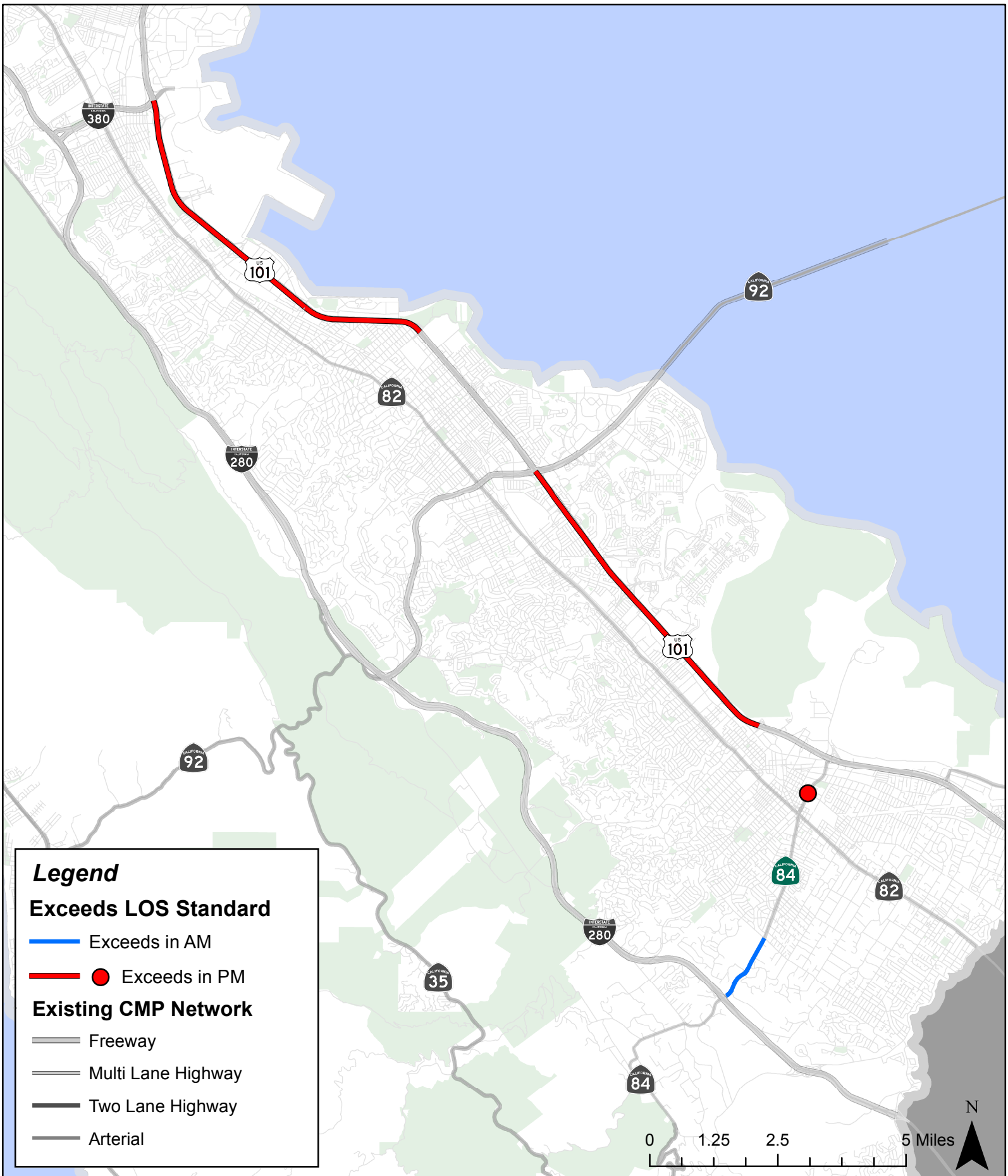


FIGURE 16

FAILING ROADWAY SEGMENTS/INTERSECTIONS

(WITHOUT INTERREGIONAL EXEMPTION)

TJKM

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## 3.2: Reduction in Volumes Due to Interregional Trips

The CMP legislation allows for the reduction in volume for those trips that are interregional. In this case, "interregional" are those trips that originate from outside the county (either traversing the county or ending within the county). For those CMP segments found with a LOS below the standard, the county travel demand model (C/CAG-VTA Model) is used to determine the proportion of the volume estimated to be from interregional travel. As shown in **Tables 4** and **6**, there were five segments and one intersection that had at least one direction in either the AM or PM peak period that had a lower LOS than the established standard. **Table 13** includes the resulting percentage of traffic from the C/CAG-VTA Model that is estimated to be interregional by segment.

**Table 13: Interregional Trips by Failing Segment**

| Segment | Direction | AM Peak % | PM Peak % |
|---|---|---|---|
| US-101 from I-380 to Millbrae Ave | SB | - | 26.8% |
| US-101 from Millbrae Ave to Broadway | SB | - | 25.8% |
| US-101 from Broadway to Peninsula Ave | SB | - | 26.9% |
| US-101 from SR-92 to Whipple Ave | NB | - | 38.2% |
| Intersection of SR-84 and Middlefield Rd | All | - | 10.0% |
| SR-84 from I-280 to Alameda de las Pulgas | WB | 19.2% | - |

When applying reductions, they can be deducted directly for those where V/C is the performance measure used, but for those segments that use INRIX travel speed, a few extra steps are required to reflect the exemption. Historically, the LOS Monitoring Study has made use of the LOS tables as included in the HCM 1994 that include reference speeds for given free-flow speeds and LOS. In order to reflect the reduction, the V/C must first be estimated from the same tables. This adds a level of error given that density is the preferred performance measure and the methodology is to use a secondary measure to estimate another secondary measure, take the reduction, and then reverse the calculation using the V/C and determine the adjusted LOS with the exemption.

After incorporating the reduction in volumes for segments and intersections found to have an LOS lower than the standard, all raised to an acceptable LOS. Therefore, for the 2021 CMP monitoring cycle, ***there are no deficient segments or intersections after interregional reductions***. Failing segments and intersections after their respective interregional reductions are mapped in **Figures 17** and **18.**

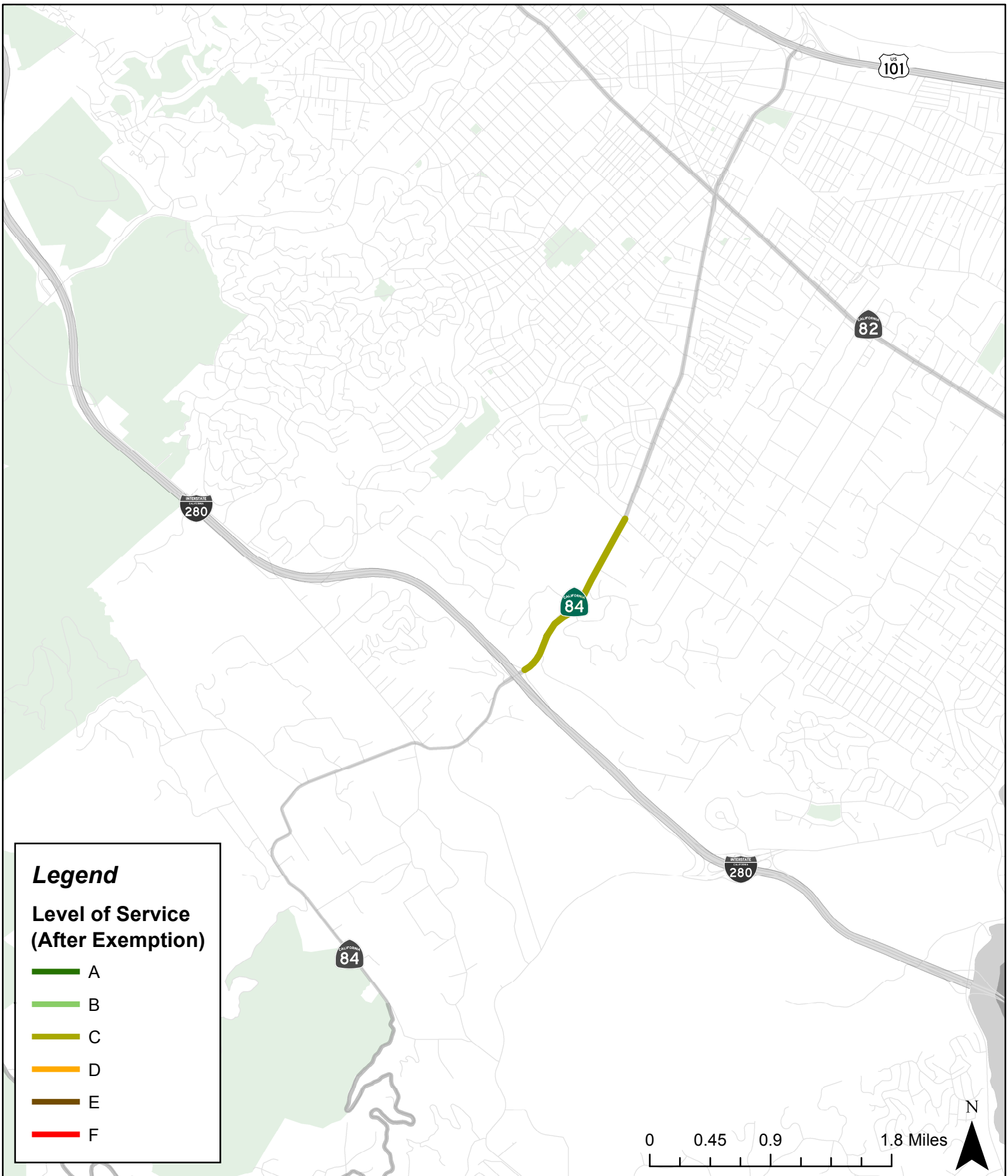



FIGURE 17

TJKM

DEFICIENT ROADWAY SEGMENTS/INTERSECTIONS
AM PEAK PERIOD (AFTER EXEMPTION)

C/CAG
City/County Association of Governments
of San Mateo County

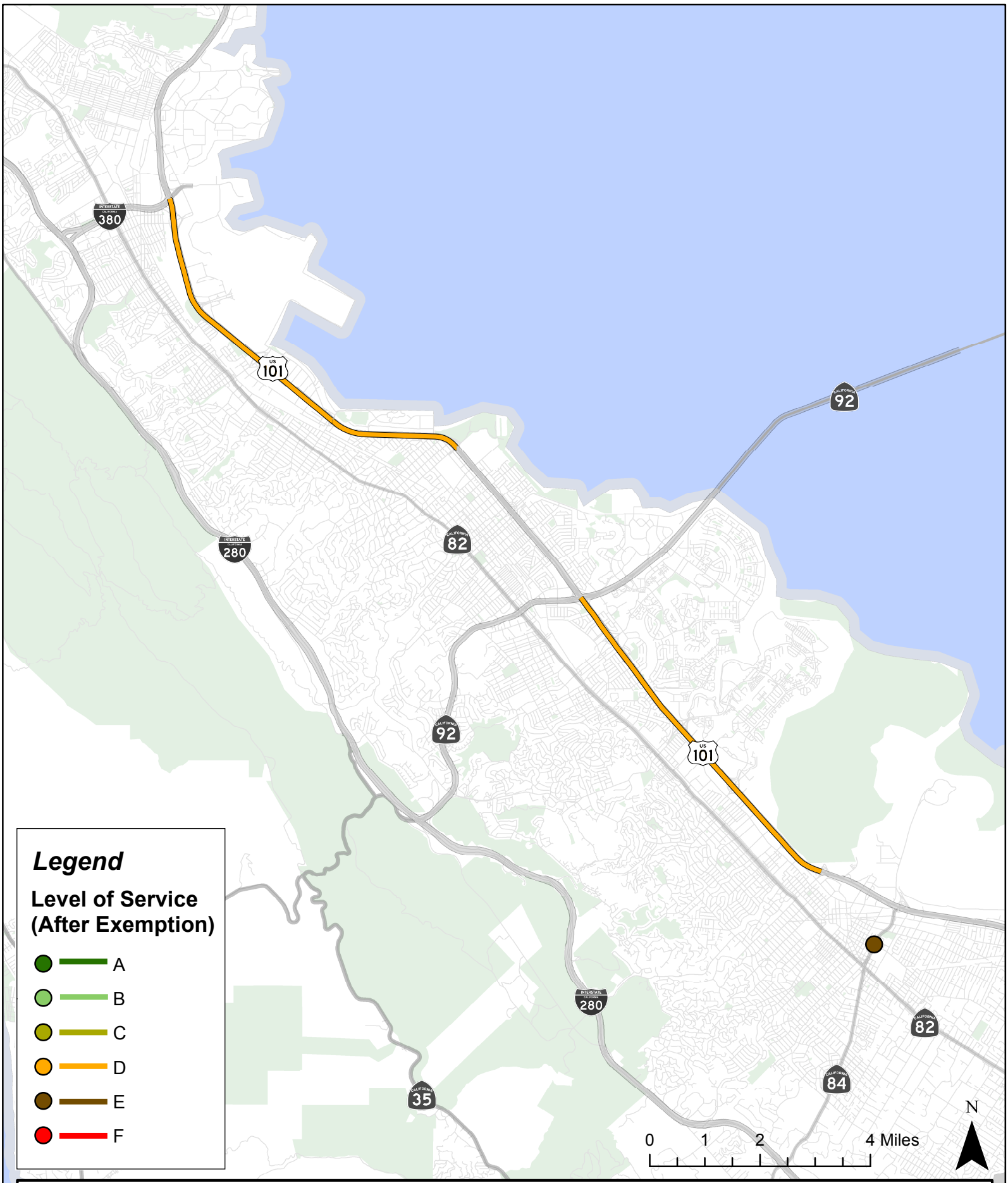



FIGURE 18

DEFICIENT ROADWAY SEGMENTS/INTERSECTIONS
PM PEAK PERIOD (AFTER EXEMPTION)

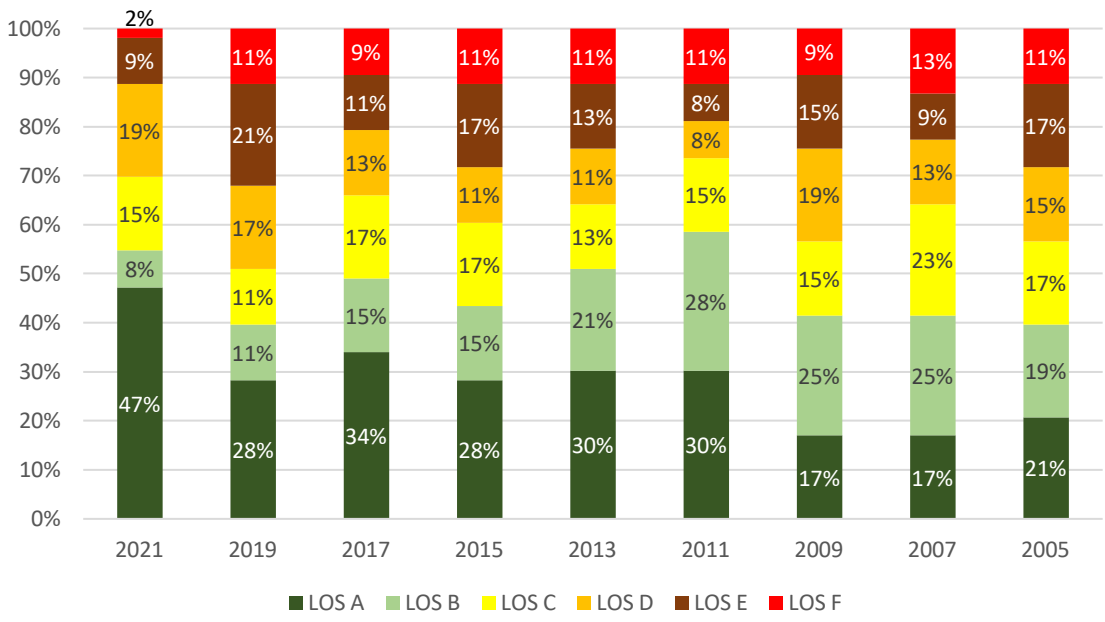
TJKM

C/CAG
City/County Association of Governments
of San Mateo County

## 3.3: Historical Comparisons

C/CAG has continuously conducted monitoring of the CMP network every two years since the CMP was established in 1991. As such, it presents the opportunity to examine the historical trends along each segment and at each intersection. **Figure 19** below illustrates the percentage of each LOS grade for roadway segments across the last nine monitoring cycles. From this, it can be seen that 2021 had the highest percentage of LOS A grades, and lowest percentage of LOS F grades. This can be attributed to the reduction in traffic from the COVID-19 pandemic.

**Figure 19: Historical LOS Comparison for Roadway Segments**




For intersections, the trend is similar. 2021 in both the AM and PM peak periods saw the fewest intersections with LOS D, E, or F since 2011. As intersection LOS has traditionally been reported for both the AM and PM peak period, we have the opportunity to examine historical trends for each individually. **Figure 20** shows the historical trends of intersection LOS in the AM peak period, while **Figure 21** illustrates the PM peak period.

Tables showing the historical LOS for all roadway segments and intersections are presented below in **Tables 14 and 15**. All historical LOS is presented after interregional exemptions. Note that TJKM updated the Synchro file from past CMP monitoring years to more accurately reflect current signal parameters and intersection controls observed out in field (for one example, changing a Permissive + Protected left turn to a Protected left turn if it was observed in current conditions). This modification in signal control changes the operation of the

intersection in field and hence to reflect the current conditions this change was also modeled in Synchro. As such, the LOS at some intersections may be higher or lower than in previous years due to these changes.

**Figure 20: Historical LOS Comparison for Intersections – AM Peak Period**

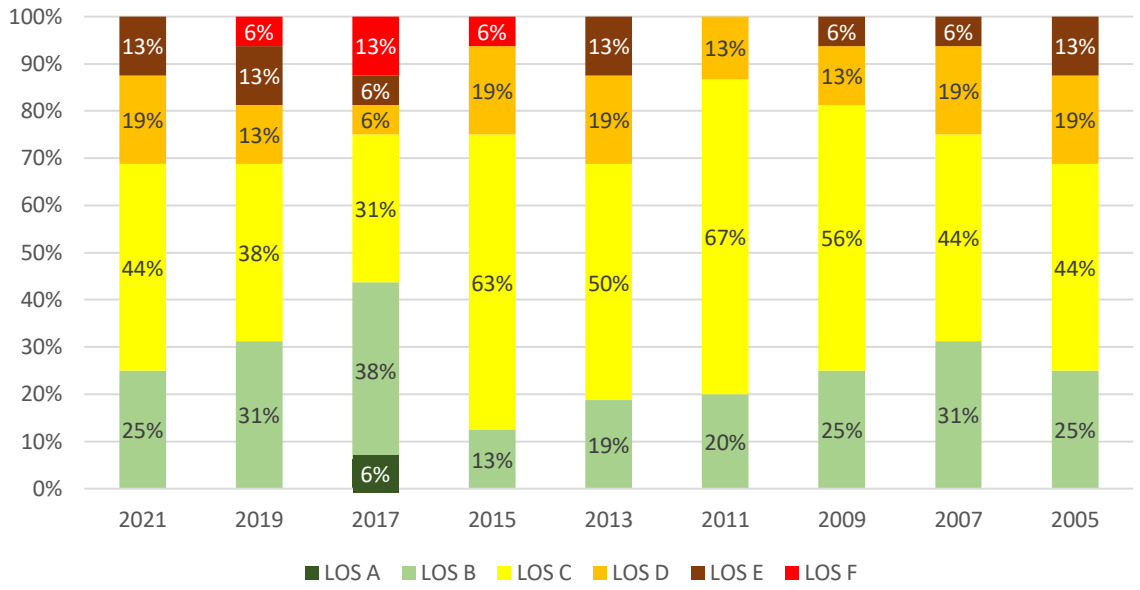



**Figure 21: Historical LOS Comparison for Intersections – PM Peak Period**

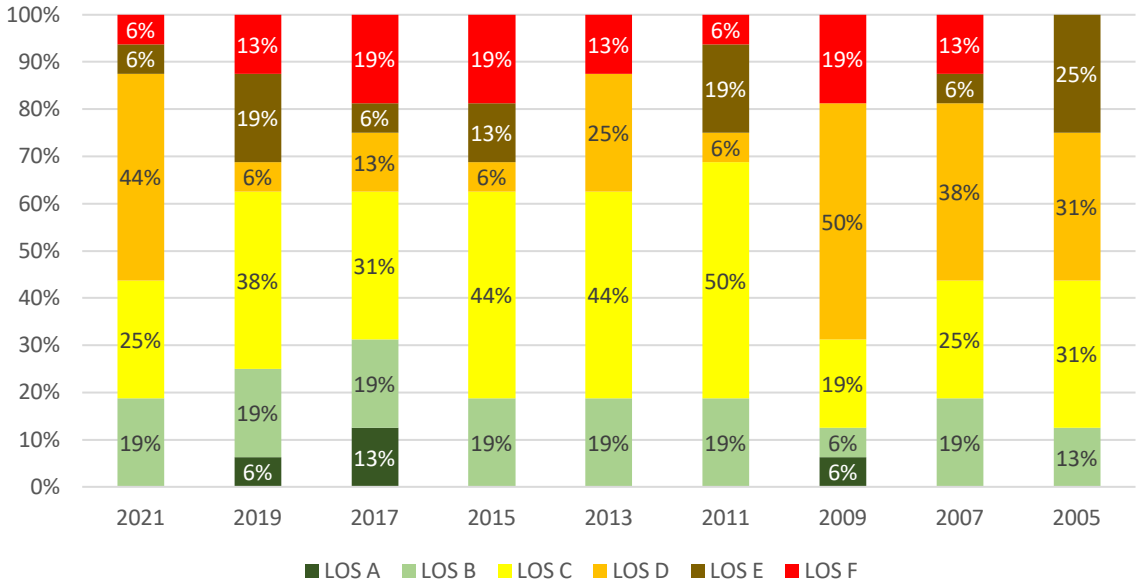


**Table 14: Historical LOS for Roadway Segments**

| Route | Roadway Segment | 2021 | 2019 | 2017 | 2015 | 2013 | 2011 | 2009 | 2007 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|
| SR-1 | San Francisco County Line to Linda Mar Blvd | C | C | A | A | F | B | F | F | F |
| SR-1 | Linda Mar Blvd to Frenchmans Creek Rd | D | D | D | D | D | D | D | D | D |
| SR-1 | Frenchmans Creek Road to Miramontes Rd | E | E | E | E | E | E | E | E | E |
| SR-1 | Miramontes Rd to Santa Cruz County Line | C | C | C | C | B | B | B | B | C |
| SR-35 | San Francisco Co Line to Sneath Ln | A | D | C | D | B | A | C | C | C |
| SR-35 | Sneath Ln to I-280 | C | F | F | F | F | F | E | F | F |
| SR-35 | I-280 to SR-92 | B | C | B | A | B | B | B | B | C |
| SR-35 | SR-92 to SR-84 | B | B | B | B | B | B | B | B | B |
| SR-35 | SR-84 to Santa Clara County Line | B | B | B | B | B | B | B | B | B |
| SR-82 | San Francisco County Line to John Daly Blvd | A | A | A | A | A | A | A | A | A |
| SR-82 | John Daly Blvd to Hickey Blvd | A | A | A | A | A | A | A | A | A |
| SR-82 | Hickey Blvd to I-380 | A | A | A | A | A | A | A | C | A |
| SR-82 | I-380 to Trousdale Dr | A | A | A | A | A | A | A | B | A |
| SR-82 | Trousdale Dr to 3rd Ave | A | A | A | A | A | B | A | A | A |
| SR-82 | 3rd Ave to SR-92 | A | A | A | A | A | A | A | A | A |
| SR-82 | SR-92 to Hillsdale Ave | A | A | A | A | A | A | B | B | B |
| SR-82 | Hillsdale Ave to 42nd Ave | A | B | C | C | B | B | B | B | B |
| SR-82 | 42nd Ave to Holly St | A | A | B | B | A | A | B | B | A |
| SR-82 | Holly St to Whipple Ave | A | A | A | B | B | C | C | D | D |
| SR-82 | Whipple Ave to SR-84 | B | A | A | A | A | B | C | C | C |
| SR-82 | SR-84 to Glenwood Ave | A | A | A | B | A | B | B | B | B |

| Route | Roadway Segment | 2021 | 2019 | 2017 | 2015 | 2013 | 2011 | 2009 | 2007 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|
| SR-82 | Glenwood Ave to Santa Cruz Ave | A | C | C | C | C | B | B | C | D |
| SR-82 | Santa Cruz Ave to Santa Clara County Line | A | D | B | B | B | A | B | B | C |
| SR-84 | SR-1 to Portola Rd | C | D | B | B | C | C | C | C | C |
| SR-84 | Portola Rd to I-280 | C | B | C | C | B | B | B | B | B |
| SR-84 | I-280 to Alameda de las Pulgas | C | E | D | D | D | C | C | A | C |
| SR-84 | Alameda de las Pulgas to US-101 | C | E | D | D | D | E | E | E | E |
| SR-84 | US-101 to Willow Rd | A | B | B | C | C | B | E | C | B |
| SR-84 | Willow Rd to University Ave | C | E | B | B | B | C | E | F | F |
| SR-84 | University Ave to Alameda County Line | D | F | F | F | F | F | F | F | F |
| SR-92 | SR-1 to I-280 | E | E | E | E | E | E | E | E | E |
| SR-92 | I-280 to US-101 | D | E | E | E | E | F | D | D | E |
| SR-92 | US-101 to Alameda County Line | E | F | C | F | E | A | B | B | B |
| US-101 | San Francisco County Line to I-380 | D | D | E | E | E | A | D | E | D |
| US-101 | I-380 to Millbrae Ave | D | E | D | D | C | C | D | C | D |
| US-101 | Millbrae Ave to Broadway | D | E | C | E | C | C | C | C | D |
| US-101 | Broadway to Peninsula Ave | D | D | D | E | C | C | D | C | D |
| US-101 | Peninsula Ave to SR-92 | F | F | F | F | F | F | F | F | F |
| US-101 | SR-92 to Whipple Ave | D | E | E | E | D | D | E | D | E |
| US-101 | Whipple Ave to Santa Clara County Line | D | F | F | F | F | F | F | F | F |
| SR-109 | Kavanaugh Dr to SR-84 (Bayfront Expwy.) | A | C | C | D | D | C | D | D | C |
| SR-114 | US-101 to SR-84 (Bayfront Expressway) | A | C | C | C | A | B | C | C | B |
| I-280 | San Francisco County Line to SR-1 (north) | D | E | E | E | E | E | D | A | E |

| Route | Roadway Segment | 2021 | 2019 | 2017 | 2015 | 2013 | 2011 | 2009 | 2007 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|
| I-280 | SR-1 (north) to SR-1 (south) | E | E | D | E | E | B | E | E | E |
| I-280 | SR-1 (south) to San Bruno Ave | A | D | D | C | D | D | D | C | E |
| I-280 | San Bruno Ave to SR-92 | A | D | A | C | B | D | C | B | B |
| I-280 | SR-92 to SR-84 | A | B | A | C | C | B | D | D | D |
| I-280 | SR-84 to Santa Clara County Line | A | D | A | A | A | A | D | D | C |
| I-380 | I-280 to US-101 | E | F | F | F | F | F | F | F | E |
| I-380 | US-101 to Airport Access Road | A | A | A | A | A | A | B | C | A |
| Mission St | San Francisco County Line to SR-82 | A | A | A | A | A | A | A | A | A |
| Geneva Ave. | San Francisco County Line to Bayshore Blvd | A | A | A | A | A | A | A | A | A |
| Bayshore Blvd. | San Francisco County Line to Geneva Ave | A | A | A | A | A | A | A | A | A |

**Table 15: Historical LOS for Intersections**

| ID | Intersection | Peak Period | 2021 | 2019 | 2017 | 2015 | 2013 | 2011 | 2009 | 2007 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Bayshore Blvd/Geneva Ave | AM | B | E | B | B | B | B | C | B | C |
| | | PM | B | B | A | B | B | B | C | C | C |
| 2 | SR-35/John Daly Blvd | AM | B | B | C | D | C | C | B | B | B |
| | | PM | B | B | B | E | C | C | C | B | C |
| 3 | SR-82/John Daly Blvd/Hillside Ave | AM | C | B | B | C | C | B | C | C | C |
| | | PM | C | C | C | C | C | C | D | C | D |
| 4 | SR-82/San Bruno Ave | AM | C | C | B | C | C | C | C | C | C |
| | | PM | C | C | C | C | C | C | D | D | D |
| 5 | SR-82/Millbrae Ave | AM | C | E | D | D | E | D | E | E | E |
| | | PM | D | E | D | E | D | E | D | E | E |

| ID | Intersection | Peak Period | 2021 | 2019 | 2017 | 2015 | 2013 | 2011 | 2009 | 2007 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | SR-82/Broadway | AM | B | B | A | B | B | B | B | B | B |
| | | PM | B | A | A | B | B | B | A | B | B |
| 7 | SR-82/Park Rd/Peninsula Ave | AM | C | C | B | C | C | C | B | B | B |
| | | PM | C | C | B | C | C | C | B | B | B |
| 8 | SR-82/Ralston Ave | AM | D | C | C | C | C | C | D | D | E |
| | | PM | D | C | C | C | D | C | D | D | E |
| 9 | SR-82/Holly St | AM | C | C | C | C | C | C | C | C | C |
| | | PM | C | C | C | C | C | C | D | C | C |
| 10 | SR-82/Whipple Ave | AM | D | C | C | C | C | C | C | C | D |
| | | PM | D | D | D | C | C | C | D | D | D |
| 11 | University Ave/SR-84 | AM | B | C | F | C | E | C | B | B | B |
| | | PM | D | F | F | F | F | F | F | F | E |
| 12 | Willow Rd/SR-84 | AM | C | D | C | D | D | C | C | C | C |
| | | PM | D | E | F | F | F | E | F | F | E |
| 13 | SR-84/Marsh Rd | AM | E | F | F | F | D | D | C | C | C |
| | | PM | E | F | F | F | D | E | F | D | C |
| 14 | SR-84/Middlefield Rd | AM | E | D | E | C | D | C | D | D | D |
| | | PM | E | E | E | D | D | D | D | D | D |
| 15 | SR-1/SR-92 | AM | C | B | B | C | C | D | C | D | D |
| | | PM | D | C | C | C | C | C | D | D | D |
| 16 | Main St/SR-92 | AM | D | B | B | C | B | C | C | C | C |
| | | PM | D | B | B | B | B | B | C | C | C |

# CHAPTER 4: MULTI-MODAL PERFORMANCE MEASURES

Beginning in 1995, the Transit LOS Standard element of the San Mateo County CMP was replaced with the Performance Measure element. Four Performance Measures were selected and incorporated in the 1997 CMP Update and used each update cycle through 2009. The four measures are used to measure the performance of the overall multi-modal transportation system, including non-automotive modes. They are:


*BART at South San Francisco station (Source: BART.gov)*

- LOS;
- Travel times from single-occupant automobiles, carpools, and transit;
- Pedestrian and bicycle improvements; and
- Ridership/person throughput for transit.

This section presents the 2021 measurements of these performance measures and includes the historic results for context.

## 4.1: LOS

The levels of service of the CMP corridors and segments are included in the previous sections of this monitoring report. The results show that no roadway segments or intersections exceeded their respective LOS standard following reflection of the interregional trips.

## 4.2: Travel Times for Single-Occupant Automobiles, Carpools, and Transit

This multi-modal performance measure compares the travel time of the various modes available in the US 101 corridor from the Santa Clara County line to the San Francisco County line. Those include using the general purpose lanes, using the carpool lane for the limits available, or using transit via SamTrans or Caltrain.

The general-purpose travel times previously presented early in this report were the result of a two-month average between April and May 2021. Those included in **Table 16** for the single occupant vehicle represent the calculated INRIX travel time using the average speed over each TMC segment for each five-minute interval during each respective AM and PM peak period. The HOV travel times are based on five runs in the field for the limits of the HOV between the Santa Clara County line and Whipple Avenue summed with the INRIX results for the balance of the route to the San Francisco County line on the north. Therefore, the HOV portion represents a far smaller sample size than an average for the peak period over two months.

The current limits of the carpool lane in San Mateo County are from the Santa Clara County line to Whipple Avenue. For those that are able to use this lane during the peak hours, the remainder of the run will take place in the general purpose lane.

Travel times for those using transit include the option to access SamTrans Route 398 along the US-101 corridor or Caltrain. The travel times for the transit options are represented based on the published schedules during the April-May 2021 monitoring period. Actual data collection for these routes was not performed but is shown consistent with methods used in previous LOS monitoring studies.

The travel times for the various mode options are included in **Table 16** below. The table includes the respective travel times, listed by direction and peak periods, for the current reporting period as well as previous years back to 2011.

The results will show that travel times have greatly improved in the general purpose and HOV lane along US-101 from 2019 to 2021, in some cases improving by as much as 12 minutes (PM southbound). This is primarily due to the COVID-19 reduction in traffic that has caused travel times and speeds to improve on freeways across San Mateo County (according to the LOS monitoring results in Chapter 3). Travel time savings using the HOV lane are minimal compared to the general purpose lanes, with the HOV lane travel time actually exceeding single occupancy travel time in the AM northbound direction. This can again be attributed to the reduced congestion during the pandemic.

Caltrain operated reduced service during the pandemic and at the time of monitoring was not running the Baby Bullet express. As such, the travel time on Caltrain increased slightly in both directions in both the AM and PM peak periods, but not significantly. The greatest increase was six minutes in the AM northbound direction.

Established in August 2019, SamTrans Route 398 provides service from the Redwood City Transit City to San Francisco via El Camino Real and US-101 in the AM and PM peak periods, with small detours to the San Bruno BART Station and San Francisco International Airport. The route will run hourly from 5:07 a.m. to just after midnight on weekdays, and 5:50 a.m. to 11:10 p.m. on weekends. Travel times in the northbound direction either stayed close to the same or increased slightly. Southbound travel times improved slightly from 2019.

C/CAG has also been exploring the integration of observed travel time data on SamTrans based on automatic vehicle locator (AVL) data. Buses can get stuck in traffic or otherwise be delayed and as such observed travel times may differ from the published schedule. A table comparing available travel time data on Route 398 is compared with the published schedule below in **Table 17** below. Note that the scheduled travel times in this table are based on a start/end point at Drumm/Clay in San Francisco, as opposed to Mission/7$^{th}$ as has been used in past years. Mission/7$^{th}$ is not a time point in the NB direction and as such could not be used to compare with actual travel time data. Therefore, the scheduled travel times between the two tables may differ slightly.

**Table 16: Multi-Modal Travel Times Along US-101 Corridor (in minutes)**

| Mode | AM Peak Period | | | | | | | | | | | | PM Peak Period | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Northbound | | | | | | Southbound | | | | | | Northbound | | | | | | Southbound | | | | | |
| | 21 | 19 | 17 | 15 | 13 | 11 | 21 | 19 | 17 | 15 | 13 | 11 | 21 | 19 | 17 | 15 | 13 | 11 | 21 | 19 | 17 | 15 | 13 | 11 |
| Single Occupancy Auto | 23 | 28 | 32 | 32 | 28 | 29 | 22 | 40 | 35 | 36 | 41 | 34 | 24 | 40 | 36 | 39 | 30 | 32 | 26 | 32 | 32 | 32 | 33 | 40 |
| Carpool – HOV Lane | 24 | 26 | 32 | 32 | 32 | 28 | 22 | 38 | 34 | 35 | 37 | 30 | 24 | 40 | 36 | 42 | 37 | 30 | 26 | 31 | 32 | 32 | 32 | 35 |
| Caltrain (Palo Alto to approx. SF County Line near Bayshore Station) | 46 | 40 | 40 | 39 | 23 | 35 | 46 | 43 | 44 | 43 | 27 | 31 | 44 | 40 | 40 | 38 | 24 | 34 | 44 | 39 | 36 | 38 | 23 | 35 |
| SamTrans Route 398 (Redwood City Station to SF) | 65 | 57 | 80 | 80 | 68 | 76 | 67 | 74 | - | - | 73 | 81 | 84 | 83 | - | - | 72 | 81 | 63 | 74 | 91 | 91 | 74 | 78 |

**Table 17: SamTrans Travel Times on Route 398 (in minutes): Scheduled vs. Actual (2021)**

| | AM NB | AM SB | PM NB | PM SB |
|---|---|---|---|---|
| Scheduled Travel Time | 68 | 65 | 87 | 78 |
| Actual Travel Time | 63 | 64 | 80 | 77 |

## 4.3: Pedestrian and Bicycle Improvements

The purpose of this performance measure is to maintain a focus on non-vehicular alternatives. This should be reflected in connectivity to transit and other modes to not only make connections convenient, but safe and attractive. During the CMP update process, seven-year Capital Improvement Program (CIP) projects are identified and evaluated. The top-ranked projects are forwarded to MTC to be evaluated in the regional process for State and Federal funding.

C/CAG developed the San Mateo County Comprehensive Bicycle and Pedestrian Plan in 2011 to address the planning, design, funding, and implementation of bicycle and pedestrian projects of countywide significance. The Plan includes a policy framework to guide and evaluate implementation of projects identified by the local implementing cities/towns and the County. To maximize funding available for bikeway projects, the Plan emphasizes projects that improves safety, promote access to jobs, and located within high population as well as employment densities. The Plan also establishes geographical focus areas for countywide investment in pedestrian infrastructure.

The San Mateo County Comprehensive Bicycle and Pedestrian Plan was subsequently updated in 2021 and adopted by the C/CAG Board at their June 2021 meeting. The updated plan proposes 250 miles of bicycle projects and pedestrian projects that address gaps to transit, between jurisdictions, or are within pedestrian priority areas. In addition to the C/CAG plan, many cities and towns in San Mateo County have their own bicycle/pedestrian plans. At the time of writing, 13 of the 20 cities/towns in San Mateo County have an adopted bicycle, pedestrian, or active transportation plan, plus the unincorporated County. Three more are under development.

Bicycle and pedestrian counts were conducted at all 16 CMP intersections and 17 Companion Network intersections during the AM and PM peak period, as well as at eight Coastside intersections during the Saturday AM, Mid-Day, and PM peak periods. **Tables 18-20** detail the results of these counts.

**Table 18: CMP Intersection Bicycle and Pedestrian Counts**

| ID | Intersection | Peak Period | Total Bikes | Total Pedestrians |
|---|---|---|---|---|
| 1 | Bayshore Blvd/Geneva Ave | AM | 18 | 16 |
| | | PM | 8 | 12 |
| 2 | SR-35/John Daly Blvd | AM | 7 | 6 |
| | | PM | 2 | 3 |
| 3 | SR 82/John Daly Blvd/Hillside Ave | AM | 4 | 116 |
| | | PM | 11 | 198 |
| 4 | SR-82/San Bruno Ave | AM | 1 | 40 |
| | | PM | 3 | 70 |
| 5 | SR-82/Millbrae Ave | AM | 2 | 51 |
| | | PM | 2 | 48 |
| 6 | SR-82/Broadway | AM | 12 | 112 |
| | | PM | 2 | 104 |
| 7 | SR-82/Peninsula Ave | AM | 0 | 26 |
| | | PM | 4 | 35 |
| 8 | SR-82/Ralston Ave | AM | 6 | 64 |
| | | PM | 8 | 94 |
| 9 | SR-82/Holly St | AM | 10 | 46 |
| | | PM | 8 | 58 |
| 10 | SR-82/Whipple Ave | AM | 26 | 67 |
| | | PM | 22 | 63 |
| 11 | University Ave/SR-84 | AM | 6 | 8 |
| | | PM | 10 | 12 |
| 12 | Willow Rd/SR-84 | AM | 4 | 6 |
| | | PM | 11 | 11 |

| ID | Intersection | Peak Period | Total Bikes | Total Pedestrians |
|---|---|---|---|---|
| 13 | Marsh Rd/SR-84 | AM | 5 | 16 |
| | | PM | 20 | 36 |
| 14 | SR-84/Middlefield Rd | AM | 23 | 80 |
| | | PM | 32 | 102 |
| 15 | SR-1/SR-92 | AM | 6 | 26 |
| | | PM | 6 | 50 |
| 16 | Main St/SR-92 | AM | 5 | 27 |
| | | PM | 5 | 77 |

**Table 19: Companion Network Intersection Bicycle and Pedestrian Counts**

| ID | Intersection | Peak Period | Total Bikes | Total Pedestrians |
|---|---|---|---|---|
| 17 | SR-82/3rd Ave | AM | 10 | 165 |
| | | PM | 8 | 141 |
| 18 | Skyline Blvd/SR-92 | AM | 9 | 4 |
| | | PM | 7 | 6 |
| 19 | Holly St/Industrial St | AM | 8 | 14 |
| | | PM | 9 | 11 |
| 20 | Whipple Ave/Veterans Blvd | AM | 2 | 22 |
| | | PM | 5 | 30 |
| 21 | Marsh Rd/Middlefield Rd | AM | 40 | 21 |
| | | PM | 37 | 11 |
| 22 | Sand Hill Rd/Santa Cruz Ave | AM | 101 | 47 |
| | | PM | 125 | 43 |
| 23 | University Ave/Bay Rd | AM | 12 | 89 |
| | | PM | 23 | 99 |

| ID | Intersection | Peak Period | Total Bikes | Total Pedestrians |
|---|---|---|---|---|
| 24 | SR-84/Alamedas de las Pulgas | AM | 39 | 13 |
| | | PM | 70 | 16 |
| 25 | Portola Rd/Alpine Rd | AM | 47 | 13 |
| | | PM | 71 | 36 |
| 26 | SR-35/SR-92 | AM | 5 | 0 |
| | | PM | 1 | 0 |
| 27 | El Camino Real/Mission Rd | AM | 1 | 0 |
| | | PM | 5 | 1 |
| 28 | SR-1/Main St | AM | 0 | 18 |
| | | PM | 2 | 42 |
| 29 | El Camino Real/Westborough Rd | AM | 3 | 39 |
| | | PM | 0 | 26 |
| 30 | Capistrano Rd/SR-1 | AM | 4 | 41 |
| | | PM | 9 | 33 |
| 31 | S. Airport Blvd/San Bruno Ave | AM | 5 | 1 |
| | | PM | 3 | 1 |
| 32 | SR-1/Reina Del Mar Ave | AM | 0 | 13 |
| | | PM | 4 | 24 |
| 33 | SR-1/Cypress Ave | AM | 3 | 2 |
| | | PM | 13 | 4 |

**Table 20: Weekend Intersection Bicycle and Pedestrian Counts**

| ID | Intersection | Peak Period | Total Bikes | Total Pedestrians |
|---|---|---|---|---|
| 15 | SR-1/SR-92 | AM | 11 | 39 |
| | | Mid-Day | 33 | 49 |
| | | PM | 6 | 47 |
| 16 | Main Street/SR-92 | AM | 18 | 34 |
| | | Mid-Day | 17 | 130 |
| | | PM | 8 | 61 |
| 18 | Skyline Blvd/SR-92 | AM | 29 | 18 |
| | | Mid-Day | 147 | 43 |
| | | PM | 63 | 19 |
| 26 | SR-35/SR-92 | AM | 2 | 0 |
| | | Mid-Day | 28 | 0 |
| | | PM | 14 | 1 |
| 28 | SR-1/Main St | AM | 7 | 11 |
| | | Mid-Day | 26 | 62 |
| | | PM | 4 | 34 |
| 30 | Capistrano Rd/SR-1 | AM | 8 | 54 |
| | | Mid-Day | 37 | 87 |
| | | PM | 14 | 89 |
| 31 | SR-1/Reina Del Mar Ave | AM | 15 | 31 |
| | | Mid-Day | 30 | 157 |
| | | PM | 7 | 76 |
| 33 | SR-1/Cypress Ave | AM | 9 | 0 |
| | | Mid-Day | 21 | 8 |
| | | PM | 7 | 0 |

The results of the counts show that bicycle and pedestrian activity varies across the peak periods and across the county. For the CMP intersections, the intersection with the highest bike activity in the AM peak period was SR-82/Whipple Avenue with 26 bikes, while in the PM peak period it was SR-84/Middlefield Road with 32 bikes. SR-82/John Daly Boulevard had the highest number of pedestrians in both the AM and PM peak periods with 116 and 198 pedestrians respectively. For the Companion Network intersections, Sand Hill Road/Santa Cruz Avenue had the highest amount of bike activity in the AM and PM peak periods with 101 and 125 bikes respectively. SR-82/3rd Avenue had the highest pedestrian activity in both peak periods with 165 and 141 pedestrians respectively. On the weekend, Skyline Boulevard/SR-92 had the highest amount of bike activity in all peak periods, with 29 bikes in the AM, 147 bikes in the Mid-Day, and 63 bikes in the PM peak periods. Capistrano Road/SR-1 had the highest pedestrian activity in the AM and PM peak periods (54 and 89 pedestrians respectively), while SR-1/Reina del Mar had the highest pedestrian activity in the Mid-Day peak period with 157 pedestrians.

The project team also compared the number of bikes and pedestrians during the peak hour of each intersection between 2019 and 2021, to better understand pandemic effects on active transportation. Note that only CMP intersections are included as the Companion intersections and weekend monitoring is new to the 2021 cycle. Historical comparisons of the CMP intersections are presented below in **Table 21** and **Figures 22** and **23** for bicycles, and **Table 22** and **Figures 24** and **25** for pedestrians.

**Table 21: CMP Intersection Bicycle Counts – Historical Comparison**

| | | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| ID | Intersection | 2021 | 2019 | % Change | 2021 | 2019 | % Change |
| 1 | Bayshore Blvd/Geneva Ave | 9 | 0 | 900% | 3 | 4 | -25% |
| 2 | SR-35/John Daly Blvd | 5 | 4 | 25% | 1 | 0 | 100% |
| 3 | SR 82/John Daly Blvd/Hillside Ave | 2 | 2 | 0% | 5 | 4 | 25% |
| 4 | SR-82/San Bruno Ave | 0 | 2 | -100% | 3 | 4 | -25% |
| 5 | SR-82/Millbrae Ave | 1 | 6 | -83% | 1 | 1 | 0% |
| 6 | SR-82/Broadway | 9 | 6 | 50% | 2 | 8 | -75% |
| 7 | SR-82/Peninsula Ave | 0 | 8 | -100% | 1 | 4 | -75% |
| 8 | SR-82/Ralston Ave | 4 | 5 | -20% | 3 | 11 | -73% |

| | | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| ID | Intersection | 2021 | 2019 | % Change | 2021 | 2019 | % Change |
| 9 | SR-82/Holly St | 5 | 6 | -17% | 4 | 8 | -50% |
| 10 | SR-82/Whipple Ave | 17 | 11 | 55% | 10 | 6 | 67% |
| 11 | University Ave/SR-84 | 4 | 20 | -80% | 3 | 26 | -88% |
| 12 | Willow Rd/SR-84 | 1 | 29 | -97% | 7 | 7 | 0% |
| 13 | Marsh Rd/SR-84 | 3 | 7 | -57% | 10 | 23 | -57% |
| 14 | SR-84/Middlefield Rd | 6 | 24 | -75% | 17 | 12 | 42% |
| 15 | SR-1/SR-92 | 3 | 20 | -85% | 4 | 5 | -20% |
| 16 | Main St/SR-92 | 2 | 7 | -71% | 1 | 11 | -91% |
| | **TOTAL** | **71** | **157** | **-55%** | **75** | **134** | **-44%** |

**Figure 22: Historical Bicycle Counts Comparison – AM Peak Hour**

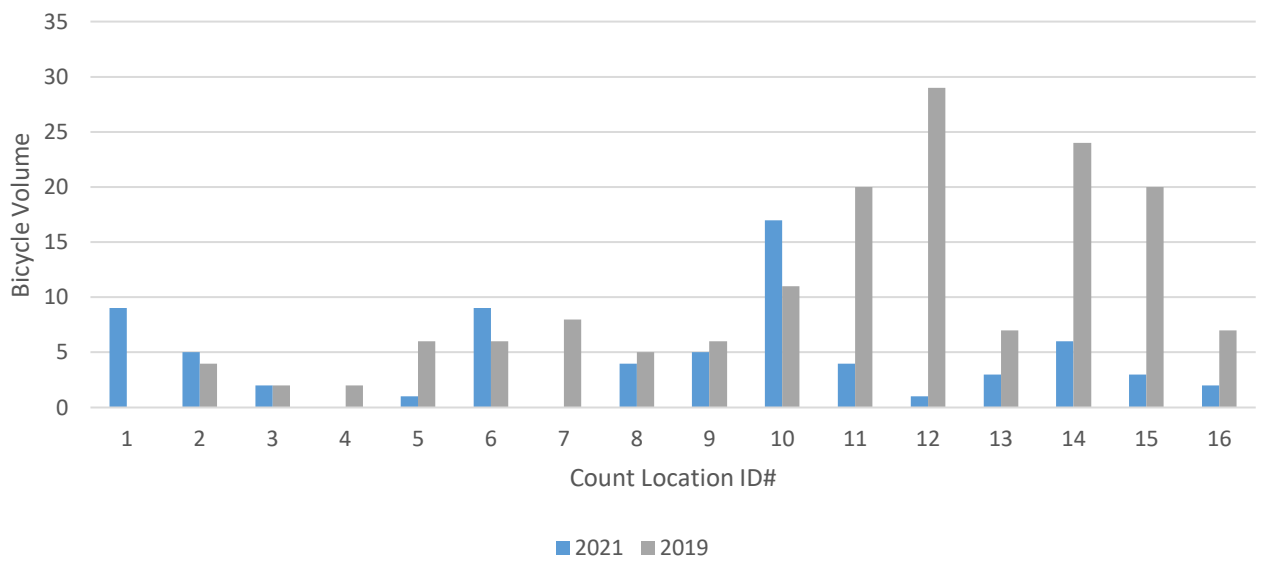


**Figure 23: Historical Bicycle Counts Comparison – PM Peak Hour**

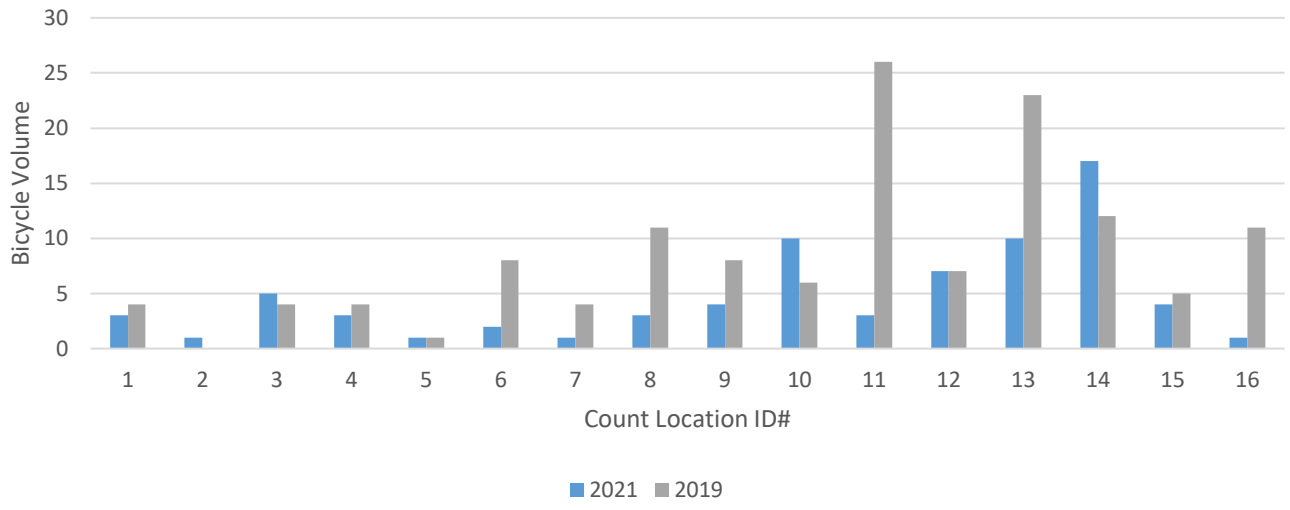



**Table 22: CMP Intersection Pedestrian Counts – Historical Comparison**

| | | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| ID | Intersection | 2021 | 2019 | % Change | 2021 | 2019 | % Change |
| 1 | Bayshore Blvd/Geneva Ave | 9 | 20 | -55% | 5 | 15 | -67% |
| 2 | SR-35/John Daly Blvd | 5 | 2 | 150% | 2 | 1 | 100% |
| 3 | SR 82/John Daly Blvd/Hillside Ave | 67 | 173 | -61% | 107 | 292 | -63% |
| 4 | SR-82/San Bruno Ave | 18 | 49 | -63% | 41 | 63 | -35% |
| 5 | SR-82/Millbrae Ave | 29 | 244 | -88% | 13 | 224 | -94% |
| 6 | SR-82/Broadway | 63 | 63 | 0% | 49 | 64 | -23% |
| 7 | SR-82/Peninsula Ave | 17 | 16 | 6% | 12 | 30 | -60% |
| 8 | SR-82/Ralston Ave | 29 | 92 | -68% | 42 | 120 | -65% |
| 9 | SR-82/Holly St | 28 | 40 | -30% | 29 | 49 | -41% |
| 10 | SR-82/Whipple Ave | 46 | 32 | 44% | 31 | 57 | -46% |
| 11 | University Ave/SR-84 | 4 | 12 | -67% | 3 | 9 | -67% |
| 12 | Willow Rd/SR-84 | 4 | 22 | -82% | 7 | 52 | -87% |
| 13 | Marsh Rd/SR-84 | 8 | 11 | -27% | 19 | 6 | 217% |

| | | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| ID | Intersection | 2021 | 2019 | % Change | 2021 | 2019 | % Change |
| 14 | SR-84/Middlefield Rd | 38 | 22 | 73% | 49 | 23 | 113% |
| 15 | SR-1/SR-92 | 14 | 21 | -33% | 25 | 23 | 9% |
| 16 | Main St/SR-92 | 18 | 50 | -64% | 47 | 50 | -6% |
| | **TOTAL** | **397** | **869** | **-54%** | **481** | **1078** | **-55%** |

**Figure 24: Historical Pedestrian Counts Comparison – AM Peak Hour**

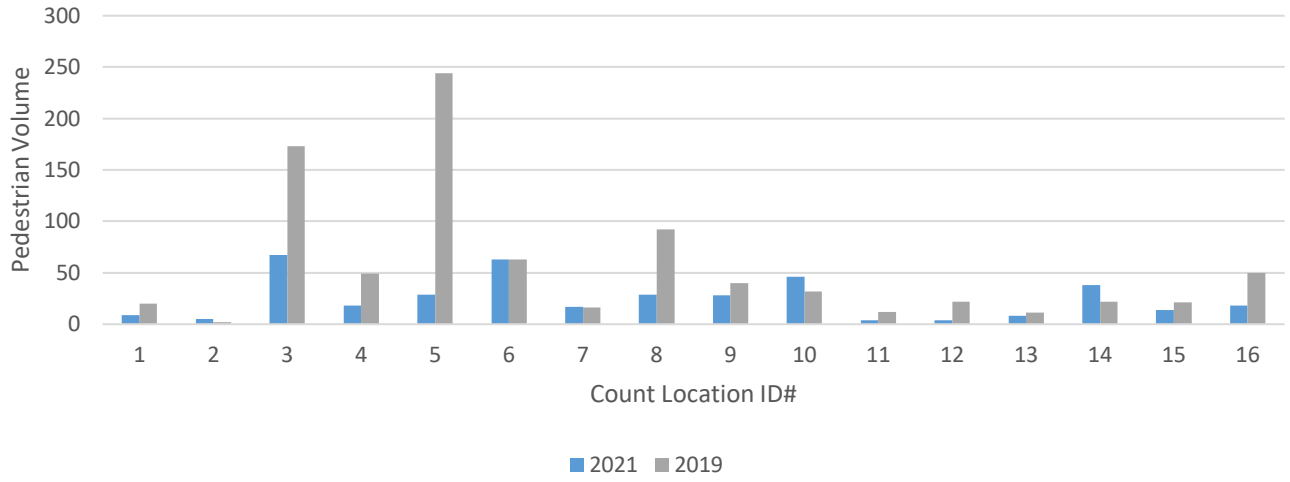
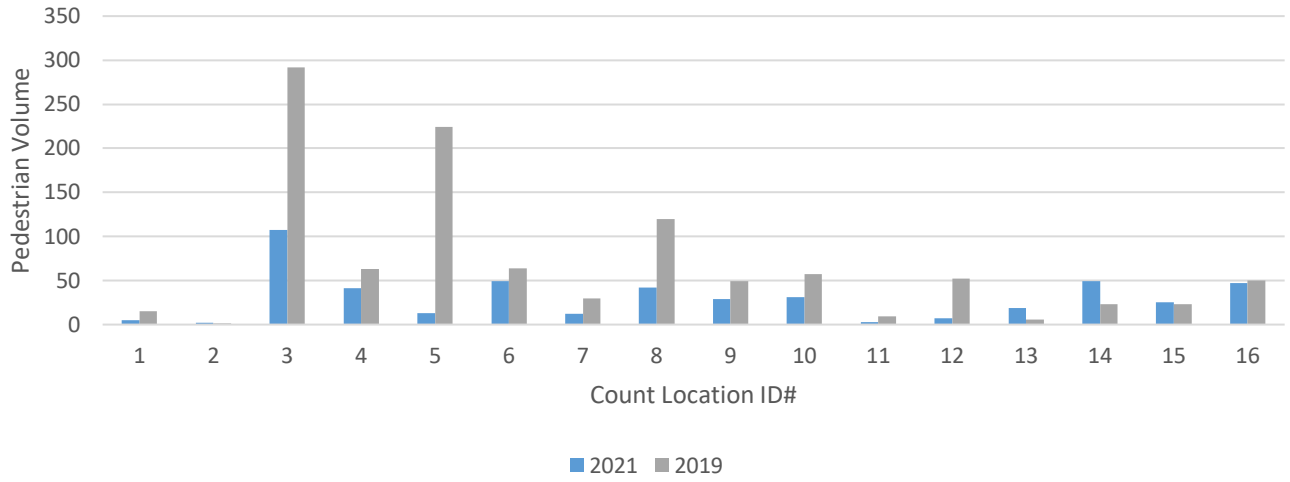



**Figure 25: Historical Pedestrian Counts Comparison – PM Peak Hour**



As is shown in the tables and charts above, between 2019 and 2021, bicycle activity dropped on average by 55% in the AM peak hour and 44% in the PM peak hour. Pedestrian activity dropped by 54% in the AM peak hour and 55% in the PM peak hour. As with the reduction in vehicle volumes and congestion seen countywide, this can likely be attributed to the COVID-19 pandemic. It should be noted, however, that active modes of travel can also be sensitive to moderate changes in weather, temperature, or other field conditions.

## 4.4: Ridership/Person Throughput for Transit

The purpose of this performance measure is to document the number of patrons using the available transit options. Within San Mateo County, there are three options, including SamTrans, Caltrain, and BART. BART has six stations within San Mateo County: Daly City, Colma, South San Francisco, San Francisco International Airport, San Bruno, and Millbrae.

The COVID-19 pandemic caused a drastic decrease in ridership for transit agencies across San Mateo County. When comparing FY 19 with FY 21, SamTrans total ridership decreased by 58%, while Caltrain and BART saw more drastic decreases. Caltrain's ridership decreased by 92% between FY 19 and FY 21, while BART decreased by 87%. FY 21 was the first full fiscal year within the pandemic and as such the ridership losses can be more clearly seen here when compared with FY 19.

Annual ridership and average weekday ridership for FY 21 is presented in **Table 23** alongside historical data back to FY 17.

**Table 23: Transit Ridership by Agency**

| Transit Agency | Annual Total | | | | Average Weekday | | | |
|---|---|---|---|---|---|---|---|---|
| | FY 2021 | FY 2019 | FY2017 | FY 2015 | FY 2021 | FY 2019 | FY 2017 | FY 2015 |
| SamTrans | 4,503,358 | 10,670,850 | 11,816,760 | 13,158,703 | 13,620 | 35,150 | 38,700 | 42,981 |
| Caltrain | 1,295,656 | 17,662,773 | 18,648,850 | 18,995,161 | 4,099 | 63,597 | 62,190 | 58,245 |
| BART (Colma and Daly City) | 1,211,716 | 7,741,549 | 7,818,023 | 8,155,340 | 3,934 | 26,483 | 25,269 | 28,050 |
| BART (South San Francisco, San Bruno, SFO, and Millbrae) | 1,312,774 | 11,261,768 | 12,102,872 | 12,614,731 | 4,236 | 37,687 | 39,989 | 40,741 |
| Combined Transit | 8,323,504 | 47,336,940 | 50,386,505 | 52,923,935 | 25,889 | 162,917 | 166,148 | 170,017 |

Sources: SamTrans staff, Caltrain staff, BART website

# CHAPTER 5: OTHER PERFORMANCE METRICS

*Ralston Avenue in Belmont, one of the Companion Network segments*

In addition to the LOS monitoring and multi-modal performance metrics presented above, two additional metrics are offered to measure the status of the CMP network in San Mateo County: volume comparisons before and during the COVID-19 pandemic, and travel time reliability. Each is described below.

## 5.1: COVID-19 Pandemic Volume Comparisons

The COVID-19 pandemic has caused reductions in traffic across San Mateo County, which can be evidenced in the improved LOS on most of the roadway segments countywide (described in Chapter 3). During the process to collect traffic counts and analyze INRIX data, TJKM prepared charts comparing previously available data (either from 2017 or 2019) to current 2021 data to understand the precise change in traffic levels/travel speeds on San Mateo County's CMP network. These are presented below in **Tables 24-27**. Overall, roadway segment counts decreased by an average of 23% between 2017 and 2021, while intersection turning movement volumes decreased by an average of 21% between 2019 and 2021. Travel speeds increased by an average of 24% in the AM peak period and 20% in the PM peak period between 2017 and 2021. Note that 10 roadway segments in the CMP network utilize turning movement counts to derive their peak hour volume for V/C calculations. As there is more recent turning movement count data from 2019 than there is 72-hour count data from 2017 to compare, and these are presented in a separate table.

**Table 24: Freeway Average Speed Comparisons – 2017 to 2021**

| | | | | AM Peak Period | | | PM Peak Period | | |
|---|---|---|---|---|---|---|---|---|---|
| Segment | Limits | Direction | Free Flow Speed | 2021 Avg. Speed | 2017 Avg. Speed | % Difference | 2021 Avg. Speed | 2017 Avg. Speed | % Difference |
| SR-1 | SF County Line to Linda Mar Blvd | NB | 55 | 55 | 56 | -1% | 54 | 59 | -8% |
| | | SB | 55 | 55 | 64 | -15% | 54 | 55 | -1% |
| SR-92 | I-280 to US-101 | EB | 60 | 63 | 47 | 34% | 59 | 37 | 59% |
| | | WB | 60 | 59 | 46 | 29% | 60 | 50 | 20% |
| SR-92 | US-101 to Alameda County Line | EB | 60 | 64 | 65 | -2% | 56 | 29 | 95% |
| | | WB | 60 | 54 | 42 | 30% | 65 | 63 | 4% |
| US-101 | SF County Line to I-380 | NB | 65 | 66 | 43 | 52% | 66 | 47 | 42% |
| | | SB | 65 | 66 | 54 | 23% | 64 | 53 | 20% |
| US-101 | I-380 to Millbrae Ave | NB | 65 | 65 | 57 | 13% | 63 | 55 | 15% |
| | | SB | 65 | 67 | 63 | 6% | 44 | 47 | -7% |
| US-101 | Millbrae Ave to Broadway | NB | 65 | 62 | 54 | 16% | 61 | 54 | 13% |
| | | SB | 65 | 65 | 59 | 9% | 52 | 51 | 1% |
| US-101 | Broadway to Peninsula Ave | NB | 65 | 61 | 50 | 23% | 64 | 52 | 21% |
| | | SB | 65 | 62 | 50 | 26% | 52 | 46 | 13% |
| US-101 | Peninsula Ave to SR-92 | NB | 65 | 51 | 27 | 91% | 63 | 41 | 55% |

| | | | | AM Peak Period | | | PM Peak Period | | |
|---|---|---|---|---|---|---|---|---|---|
| Segment | Limits | Direction | Free Flow Speed | 2021 Avg. Speed | 2017 Avg. Speed | % Difference | 2021 Avg. Speed | 2017 Avg. Speed | % Difference |
| | | SB | 65 | 65 | 23 | 176% | 57 | 39 | 45% |
| US-101 | SR-92 to Whipple Ave | NB | 65 | 63 | 53 | 19% | 47 | 24 | 96% |
| | | SB | 65 | 65 | 44 | 48% | 62 | 59 | 6% |
| US-101 | Whipple Ave to Santa Clara County Line | NB | 65 | 64 | 52 | 22% | 65 | 53 | 24% |
| | | SB | 65 | 66 | 40 | 67% | 62 | 43 | 45% |
| I-280 | SF County Line to SR-1 (North) | EB | 65 | 69 | 57 | 21% | 61 | 61 | 0% |
| | | WB | 65 | 67 | 70 | -5% | 65 | 68 | -4% |
| I-280 | SR-1 (North) to SR-1 (South) | EB | 65 | 68 | 62 | 11% | 59 | 59 | -1% |
| | | WB | 65 | 68 | 63 | 9% | 67 | 66 | 1% |
| I-280 | SR-1 (South) to San Bruno Ave | EB | 65 | 68 | 68 | 0% | 67 | 60 | 13% |
| | | WB | 65 | 67 | 41 | 66% | 65 | 68 | -4% |
| I-280 | San Bruno Ave to SR-92 | EB | 65 | 70 | 69 | 1% | 71 | 62 | 15% |
| | | WB | 65 | 70 | 68 | 2% | 70 | 71 | -1% |
| I-280 | SR-92 to SR-84 | EB | 65 | 70 | 70 | -1% | 71 | 61 | 15% |
| | | WB | 65 | 70 | 58 | 21% | 70 | 66 | 6% |
| I-280 | SR-84 to Santa Clara County Line | EB | 65 | 69 | 72 | -4% | 70 | 44 | 59% |

| | | | | AM Peak Period | | | PM Peak Period | | |
|---|---|---|---|---|---|---|---|---|---|
| Segment | Limits | Direction | Free Flow Speed | 2021 Avg. Speed | 2017 Avg. Speed | % Difference | 2021 Avg. Speed | 2017 Avg. Speed | % Difference |
| | | WB | 65 | 69 | 68 | 2% | 69 | 69 | 0% |
| I-380 | I-280 to US-101 | NB | 65 | 63 | 38 | 65% | 63 | 43 | 47% |
| | | SB | 65 | 60 | 58 | 3% | 59 | 45 | 31% |
| I-380 | US-101 to Airport Access Rd | NB | 65 | 46 | 39 | 17% | 44 | 39 | 12% |
| | | SB | 65 | 38 | 50 | -24% | 39 | 46 | -17% |

**Table 25: Roadway Segment 72-Hour Volume Comparisons – 2017 to 2021**

| Route | Roadway Segment | Direction | AM Peak Period | | | PM Peak Period | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2017 Peak Hour Volume | 2021 Peak Hour Volume | % Difference | 2017 Peak Hour Volume | 2021 Peak Hour Volume | % Difference |
| SR-1 | Linda Mar Blvd to Frenchmans Creek Rd | NB | 591 | 497 | -16% | 742 | 534 | -28% |
| | | SB | 564 | 429 | -24% | 746 | 611 | -18% |
| SR-1 | Frenchmans Creek Rd to Miramontes Rd | NB | 914 | 815 | -11% | 1402 | 1239 | -12% |
| | | SB | 1346 | 1080 | -20% | 1052 | 1107 | 5% |
| SR-1 | Miramontes Rd to Santa Cruz County Line | NB | 188 | 116 | -38% | 274 | 230 | -16% |
| | | SB | 135 | 137 | 1% | 368 | 262 | -29% |
| SR-35 | San Francisco County Line to Sneath Ln | NB | 2127 | 857 | -60% | 1616 | 833 | -48% |
| | | SB | 1327 | 544 | -59% | 1690 | 916 | -46% |
| SR-35 | Sneath Ln to I-280 | NB | 716 | 463 | -35% | 1276 | 785 | -38% |
| | | SB | 1534 | 744 | -51% | 718 | 451 | -37% |
| SR-35 | I-280 to SR 92 | NB | 306 | 173 | -43% | 392 | 160 | -59% |
| | | SB | 365 | 152 | -58% | 306 | 213 | -30% |
| SR-35 | SR-92 to SR-84 | NB | 116 | 74 | -36% | 132 | 98 | -26% |
| | | SB | 92 | 78 | -15% | 136 | 101 | -26% |

| Route | Roadway Segment | Direction | AM Peak Period | | | PM Peak Period | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2017 Peak Hour Volume | 2021 Peak Hour Volume | % Difference | 2017 Peak Hour Volume | 2021 Peak Hour Volume | % Difference |
| SR-35 | SR-84 to Santa Clara County Line | NB | 103 | 100 | -3% | 77 | 87 | 13% |
| | | SB | 32 | 46 | 44% | 163 | 96 | -41% |
| SR-82 | 3rd Ave to SR-92 | NB | 1502 | 1323 | -12% | 1677 | 1317 | -21% |
| | | SB | 1715 | 993 | -42% | 1700 | 1418 | -17% |
| SR-82 | SR-92 to Hillsdale Ave | NB | 967 | 1164 | 20% | 1227 | 1735 | 41% |
| | | SB | 937 | 967 | 3% | 1019 | 1470 | 44% |
| SR-82 | Hillsdale Ave to 42nd Ave* | NB | N/A | 625 | N/A | N/A | 1052 | N/A |
| | | SB | N/A | 646 | N/A | N/A | 872 | N/A |
| SR-82 | SR-84 to Glenwood Ave | NB | 925 | 1094 | 18% | 1905 | 1630 | -14% |
| | | SB | 2111 | 1546 | -27% | 1433 | 1712 | 19% |
| SR-82 | Glenwood Ave to Santa Cruz Avenue | NB | 910 | 594 | -35% | 1721 | 1139 | -34% |
| | | SB | 1528 | 853 | -44% | 1535 | 899 | -41% |
| SR-82 | Santa Cruz Ave to Santa Clara County Line | NB | 898 | 651 | -28% | 1606 | 1028 | -36% |
| | | SB | 1615 | 769 | -52% | 1605 | 855 | -47% |
| SR-84 | SR-1 to Portola Rd | EB | 294 | 205 | -30% | 122 | 156 | 28% |

| Route | Roadway Segment | Direction | AM Peak Period | | | PM Peak Period | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2017 Peak Hour Volume | 2021 Peak Hour Volume | % Difference | 2017 Peak Hour Volume | 2021 Peak Hour Volume | % Difference |
| | | WB | 88 | 108 | 23% | 319 | 210 | -34% |
| SR-84 | Portola Rd to I-280 | EB | 338 | 319 | -6% | 308 | 197 | -36% |
| | | WB | 262 | 212 | -19% | 309 | 178 | -42% |
| SR-84 | I-280 to Alameda de las Pulgas | EB | 1629 | 1288 | -21% | 1721 | 1266 | -26% |
| | | WB | 1978 | 1948 | -2% | 1895 | 1630 | -14% |
| SR-84 | Alameda de las Pulgas to US-101 | EB | 1959 | 1423 | -27% | 1609 | 1457 | -9% |
| | | WB | 1632 | 1407 | -14% | 1858 | 1555 | -16% |
| SR-84 | US-101 to Willow Rd | EB | 1698 | 712 | -58% | 2210 | 1530 | -31% |
| | | WB | 2370 | 1565 | -34% | 1691 | 909 | -46% |
| SR-84 | Willow Rd to University Ave | EB | 1347 | 994 | -26% | 3547 | 2482 | -30% |
| | | WB | 3402 | 2169 | -36% | 1221 | 936 | -23% |
| SR-84 | University Ave to Alameda County Line | EB | 1459 | 1021 | -30% | 5261 | 2790 | -47% |
| | | WB | 4638 | 2831 | -39% | 1458 | 1163 | -20% |
| SR-92 | SR-1 to I-280 | EB | 1435 | 921 | -36% | 780 | 766 | -2% |
| | | WB | 597 | 653 | 9% | 1338 | 1067 | -20% |

| Route | Roadway Segment | Direction | AM Peak Period | | | PM Peak Period | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2017 Peak Hour Volume | 2021 Peak Hour Volume | % Difference | 2017 Peak Hour Volume | 2021 Peak Hour Volume | % Difference |
| SR-109 | Kavanaugh Drive to SR-84 (Bayfront Expwy.) | NB | 637 | 485 | -24% | 1682 | 978 | -42% |
| | | SB | 1716 | 739 | -57% | 490 | 406 | -17% |
| SR-114 | US101 to SR-84 (Bayfront Expressway) | NB | 1088 | 485 | -55% | 1617 | 1213 | -25% |
| | | SB | 1169 | 1040 | -11% | 1018 | 467 | -54% |
| Mission St | San Francisco County Line to SR-82 | NB | 425 | 233 | -45% | 542 | 373 | -31% |
| | | SB | 357 | 263 | -26% | 483 | 357 | -26% |

*New count location

**Table 26: Roadway Segment Turning Movement Count Volume Comparisons – 2019 to 2021**

| Route | Roadway Segment | Direction | AM Peak Period | | | PM Peak Period | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2019 Peak Hour Volume | 2021 Peak Hour Volume | % Difference | 2019 Peak Hour Volume | 2021 Peak Hour Volume | % Difference |
| SR-82 | San Francisco County Line to John Daly Blvd | NB | 846 | 517 | -39% | 1048 | 836 | -20% |
| | | SB | 804 | 512 | -36% | 1030 | 788 | -23% |
| SR-82 | John Daly Blvd to Hickey Blvd | NB | 672 | 369 | -45% | 1003 | 774 | -23% |
| | | SB | 704 | 448 | -36% | 913 | 695 | -24% |
| SR-82 | Hickey Blvd to I-380 | NB | 1536 | 890 | -42% | 1651 | 1257 | -24% |
| | | SB | 974 | 767 | -21% | 1553 | 1310 | -16% |
| SR-82 | I-380 to Trousdale Dr | NB | 1177 | 736 | -37% | 1313 | 1147 | -13% |
| | | SB | 1189 | 971 | -18% | 1318 | 1080 | -18% |
| SR-82 | Trousdale Dr to 3rd Ave | NB | 952 | 733 | -23% | 1061 | 828 | -22% |
| | | SB | 950 | 723 | -24% | 893 | 751 | -16% |
| SR-82 | 42nd Ave to Holly St | NB | 715 | 525 | -27% | 1151 | 1006 | -13% |
| | | SB | 964 | 642 | -33% | 953 | 961 | 1% |
| SR-82 | Holly St to Whipple Ave | NB | 732 | 625 | -15% | 1062 | 1061 | 0% |
| | | SB | 966 | 751 | -22% | 1140 | 1139 | 0% |

| Route | Roadway Segment | Direction | AM Peak Period | | | PM Peak Period | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2019 Peak Hour Volume | 2021 Peak Hour Volume | % Difference | 2019 Peak Hour Volume | 2021 Peak Hour Volume | % Difference |
| SR-82 | Whipple Ave to SR-84 | NB | 1245 | 963 | -23% | 1493 | 1407 | -6% |
| | | SB | 1185 | 838 | -29% | 1276 | 1212 | -5% |
| Geneva Ave | San Francisco County Line to Bayshore Blvd | EB | 1068 | 722 | -32% | 532 | 496 | -7% |
| | | WB | 488 | 424 | -13% | 1090 | 848 | -22% |
| Bayshore Blvd | San Francisco County Line to Geneva Ave | NB | 744 | 438 | -41% | 800 | 926 | 16% |
| | | SB | 782 | 639 | -18% | 825 | 524 | -36% |

Note: These roadway segments use TMCs to derive their volumes. It includes all volumes approaching or moving away from the side of the intersection indicated in the 2017 Monitoring Report LOS calculation spreadsheets.

**Table 27: Intersection Turning Movement Count Volume Comparisons – 2019 to 2021**

| ID | Roadway Segment | Peak Period | 2019 Peak Hour Volume | 2021 Peak Hour Volume | % Difference |
|---|---|---|---|---|---|
| 1 | Bayshore Blvd/Geneva Ave | AM | 2485 | 1762 | -29% |
| | | PM | 2546 | 2178 | -14% |
| 2 | SR-35/John Daly Blvd | AM | 3314 | 1796 | -46% |
| | | PM | 3072 | 2264 | -26% |
| 3 | SR-82/John Daly Blvd/Hillside Dr | AM | 2413 | 1622 | -33% |
| | | PM | 3195 | 2535 | -21% |
| 4 | SR-82/San Bruno Ave | AM | 4093 | 2420 | -41% |
| | | PM | 4796 | 3617 | -25% |
| 5 | SR-82/Millbrae Ave | AM | 5007 | 3456 | -31% |
| | | PM | 5490 | 4336 | -21% |
| 6 | SR-82/Broadway | AM | 2425 | 1862 | -23% |
| | | PM | 2383 | 2012 | -16% |
| 7 | SR-82/Peninsula Ave/Park Rd | AM | 2563 | 1693 | -34% |
| | | PM | 2395 | 2004 | -16% |
| 8 | SR-82/Ralston Ave | AM | 3575 | 2866 | -20% |
| | | PM | 4251 | 3884 | -9% |

| ID | Roadway Segment | Peak Period | 2019 Peak Hour Volume | 2021 Peak Hour Volume | % Difference |
|---|---|---|---|---|---|
| 9 | SR-82/Holly St | AM | 2836 | 1969 | -31% |
| | | PM | 3333 | 3037 | -9% |
| 10 | SR-82/Whipple Ave | AM | 3890 | 2958 | -24% |
| | | PM | 4190 | 3925 | -6% |
| 11 | University Ave/SR-84 | AM | 6162 | 4398 | -29% |
| | | PM | 6581 | 4861 | -26% |
| 12 | Willow Rd/SR-84 | AM | 4835 | 3550 | -27% |
| | | PM | 5825 | 3853 | -34% |
| 13 | Marsh Rd/SR-84 | AM | 4112 | 2695 | -34% |
| | | PM | 3834 | 3110 | -19% |
| 14 | Middlefield Rd/SR-84 | AM | 4944 | 4038 | -18% |
| | | PM | 5113 | 5024 | -2% |
| 15 | SR-1/SR-92 | AM | 1969 | 1921 | -2% |
| | | PM | 2711 | 2627 | -3% |
| 16 | SR-92/Main St | AM | 1835 | 1794 | -2% |
| | | PM | 2478 | 2279 | -8% |

## 5.2: Travel Time Reliability

Travel time reliability is the consistency or dependability in travel times, as measured from day-to-day and/or across different times of the day. Travel time reliability is significant to many transportation users. Driver's value reliability as it allows them to make better use of their time. Many transportation planners and decision makers have started to consider travel time reliability as a performance measure throughout the United States. A more extensive discussion of these measures can be found in the Federal Highway Administration (FHWA) publication *Travel Time Reliability*, including guidance on the calculation methodology and application of travel time reliability measures.

Travel time reliability measures are relatively new, but a few have proven effective. Most measures compare high-delay days to those with an average delay. The most effective methods of measuring travel time reliability are 90th or 95th percentile travel times, buffer index, and planning time index, explained in the following sections. Related measurements include average travel time and free flow travel time.

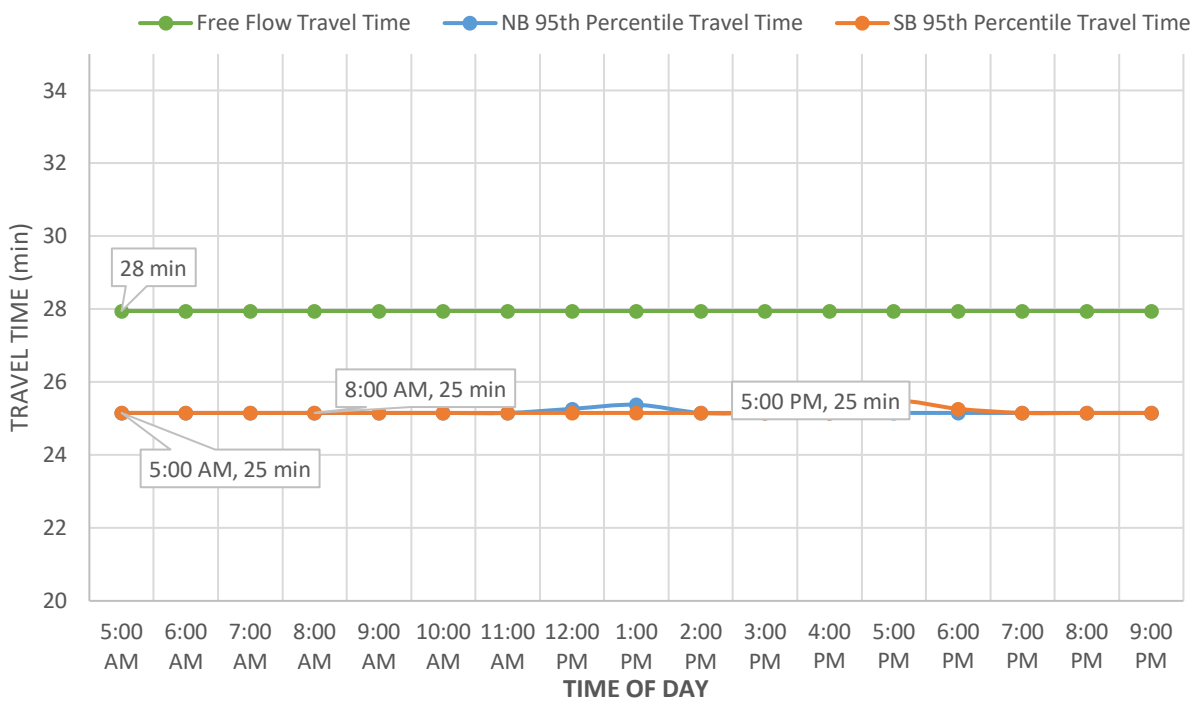
This method, the *90th or 95th percentile travel times*, is perhaps the simplest method to measure travel time reliability. It estimates how bad delay will be on specific routes during the heaviest traffic days. The one or two bad days each month mark the 95th or 90th percentile, respectively. Users familiar with a route (such as commuters) can see how bad traffic is during those few bad days and plan their trips accordingly. This measure is reported in minutes.

The *buffer index* represents the extra time (or time cushion) that travelers must add to their average travel time when planning trips to ensure on-time arrival. For example, a buffer index of 40% means that for a trip that usually takes 20 minutes a traveler should budget an additional eight minutes to ensure on-time arrival. The additional eight minutes is called the buffer time. Therefore, the traveler should allow 28 minutes for the trip in order to ensure on-time arrival 95% of the time.

The *planning time index* represents how much total time a traveler should allow to ensure on-time arrival. While the buffer index shows the *additional* travel time that is necessary, the planning time index shows the *total* travel time that is necessary. The Planning Time Index is the ratio of the 95th percentile travel time to the free-flow travel time. For example, a planning time index of 1.60 means that for a trip that takes 15 minutes in light traffic a traveler should budget a total of 24 minutes to ensure on-time arrival 95% of the time.

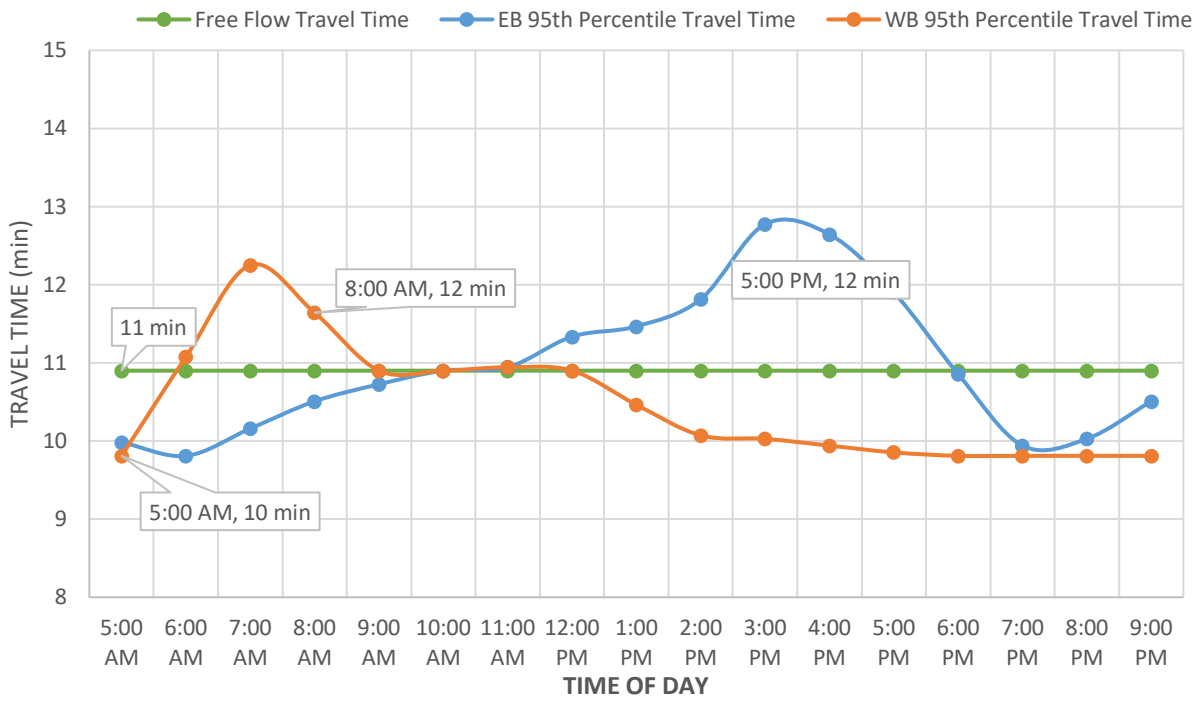
As an added value task, TJKM prepared travel time reliability charts for all freeways in San Mateo County where the data was available. This included I-280, SR-92 (I-280 to Alameda County Line), and US-101. Charts were prepared for the entire freeway from one end of the county to the other (with the exception of SR-92 as noted above). Each graph compares the travel time along the corridor under free flow conditions to the northbound/eastbound and southbound/westbound 95th percentile travel times between 5am-9pm. Planning time index data was collected by TJKM from the Caltrans Performance Measurement System (PeMS) for midweek days during April/May 2021, excluding holidays and any days with adverse weather. Caltrans assumes a free flow speed of 60 miles per hour (mph) for calculating free flow travel time. As this speed is below the posted speed limit of 65 mph, speeds increase during off peak times and result in actual 95th percentile travel times below the calculated free flow travel time.

**Figure 26: Travel Time Reliability Chart – I-280**



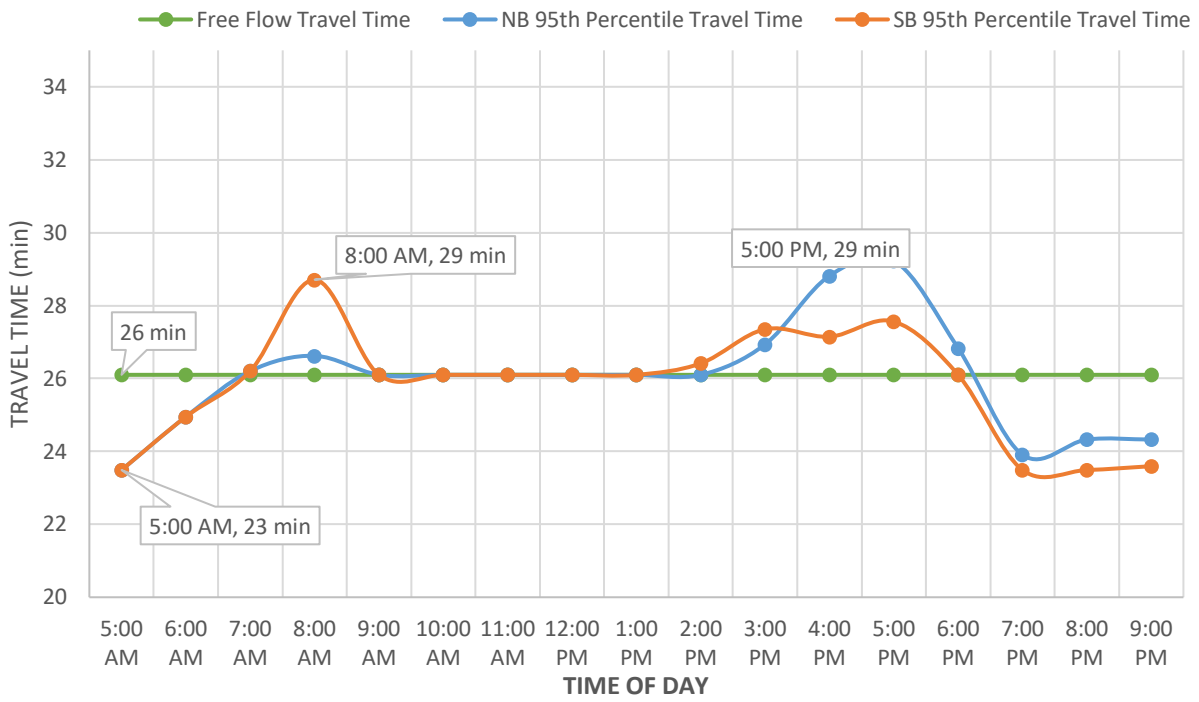

On I-280, travel times remained steady throughout the day with little congestion causing them to increase. The maximum travel time was 25 minutes in both the AM and PM peak, compared to the free flow travel time of 28 minutes assuming a speed of 60 mph. Neither the AM or PM peak period experienced any significant delays Travel times have been greatly reduced on the I-280 corridor as a result of the COVID-19 pandemic reduction in traffic.

**Figure 27: Travel Time Reliability Chart – SR-92**




On SR-92, WB travel times are highest in the AM peak period with a maximum travel time of just over 12 minutes at 7am. EB travel times are highest just before the PM peak period, with the peak occurring at just under 13 minutes around 4pm. In both directions, travel times reduced below the free flow travel time of 11 minutes, reducing to as low as 10 minutes in the early morning and late evening as congestion dissipated. The trends in this chart follow the typical commute patterns on SR-92, as commuters travel from the East Bay to San Mateo County for work in the morning, then the reverse in the afternoon.

**Figure 28: Travel Time Reliability Chart – US-101**




On US-101, SB travel times increased in both the AM and PM peak period, reaching as high as 29 minutes near 8am. NB travel times were highest in the PM peak period, also peaking at 29 minutes around 5pm. Both directions reduced below the free flow travel time of 26 minutes in off-peak hours. The COVID-19 pandemic has caused traffic reductions on US-101, causing more favorable travel times that are overall close to the free flow speed despite some peak period variance.

# CHAPTER 6: NEXT STEPS

## 6.1: 2021 CMP Conformance


*Pedestrian approaching El Camino Real (SR-82) in Colma*

As discussed earlier, no roadway segments or intersections were found to be outside the established LOS standards after interregional reductions. The C/CAG Board approved the Countywide Congestion Relief Plan (CRP), which is a countywide deficiency plan to address these and future deficiencies. This Plan will relieve all San Mateo County jurisdictions - 20 cities/towns and the County - from having to develop and implement individual deficiency plans for current LOS changes and any that may be detected in future years. No actions or corrective measures are required and all jurisdictions are considered in conformance.

## 6.2: CMP Update

The next step in the CMP process is to complete the 2021 CMP Update. TJKM is preparing the document on behalf of C/CAG. This Monitoring Report will be included as an appendix to the CMP Report.