2020 Multimodal Monitoring Report

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Alameda County Transportation Commission
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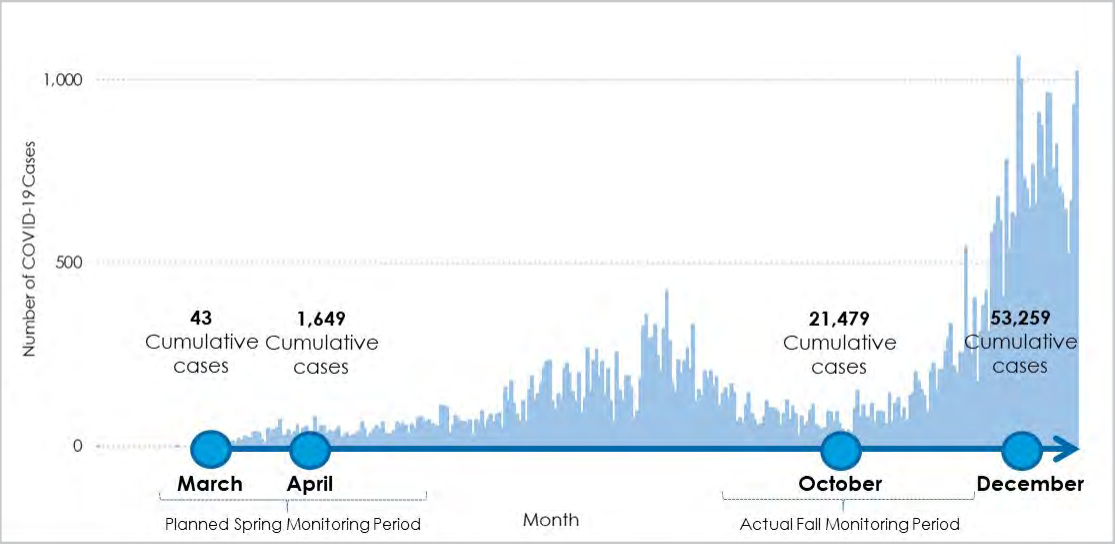
EXECUTIVE SUMMARY

Alameda CTC monitors and documents multimodal performance on major roads throughout Alameda County every two years. For the 2020 cycle, the COVID-19 pandemic and shelter-in-place orders substantially changed travel demand and the economy in Alameda County. Immediately after shelter-in-place orders were issued in March, total auto travel[1] fell 30% while traffic delay[2] fell 94% compared to just a month earlier. Because of the acute impacts of the COVID-19 pandemic, Alameda CTC moved the data collection period from the spring (March – May) to the fall (September – November). By the fall of 2020, traffic delay was still down about 70%, however total travel was down just 8% from before the pandemic.

COVID-19 Cases in Alameda County in 2020



THE COVID-19 PANDEMIC

Shelter-in-Place orders were issued throughout Alameda County and the Bay Area on March 16, 2020 and had an immediate effect on transportation:

- **Social Distancing:** Telecommuting is believed to have increased significantly during the COVID-19 pandemic, about 300,000 workers (about 40% of all workers) may have telecommuted through the pandemic. Just 10% telecommuted in 2019.
- **The Economy:** In April 2020, the unemployment rate climbed to 14% and put about 125,000 Alameda County residents out of work. By October, unemployment had returned to 7.6%, but was still down substantially from 3% unemployment in 2019. This alone would have substantially changed demand during peak hours.

1 Total travel refers to Vehicle Miles Traveled (VMT).

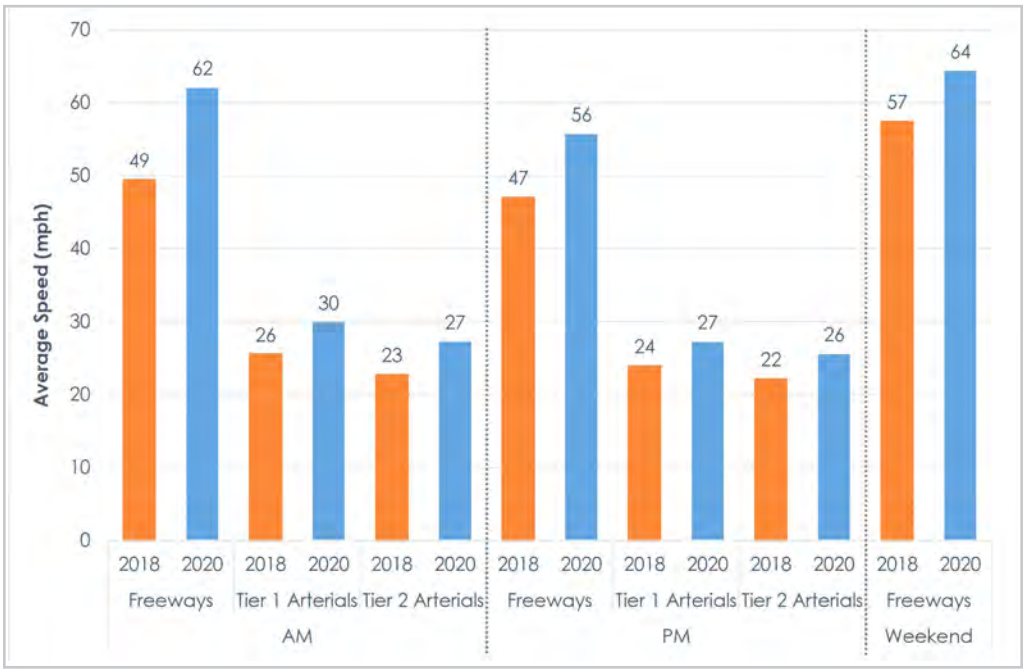
2 Vehicle Hours of Delay, or the time each vehicle spends in traffic on freeways below 35 mph.

2020 MONITORING CYCLE AT A GLANCE

Average speeds on both freeways and arterials increased. Many roads that were fully congested before the pandemic moved at near free-flow speeds.

- Freeway speeds increased 26%, 19%, and 12% in the AM, PM, and weekend peak periods, respectively.
- Surface highway and principal arterial speeds increased 17% and 14% in the AM and PM peak periods, respectively.
- Major arterial speeds increased 20% and 15% in the AM and PM peak periods, respectively.
- Pedestrian activity was down significantly – 56% during the PM period, 62% during the mid-day, and 80% after school.
- Bicycle activity dropped only modestly – 6% during the PM period, 5% during the mid-day, and 10% after school, despite distanced learning.

Average Speeds on CMP Network – 2018 vs. 2020



BEYOND 2020

Alameda CTC will resume normal roadway monitoring in the spring of 2022 with transit performance monitoring, and subsequently, active transportation counts in the fall of 2022. In the interim, Alameda CTC will continue to monitor the long-term impacts from the pandemic on roadways to better understand how peak commuter flows and other travel demand may permanently change after the COVID-19 pandemic. A mix of infrastructure and policy changes may be needed to meet new demands as long-term trends emerge.

CHAPTER 1: INTRODUCTION

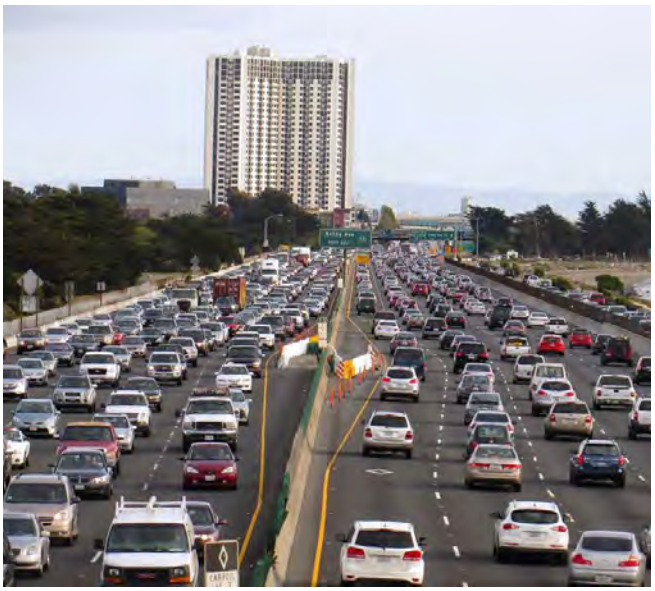
Since 1991, the Alameda County Transportation Commission (Alameda CTC) monitors the performance of 553 miles of major roads throughout Alameda County, every two years pursuant to state legislation. As new data sources have become available, Alameda CTC has expanded its monitoring program to include new times of day and more roads to develop a better understanding of how the county's transportation system functions. This information is used throughout the agency and drives project and policy decisions. The main objectives of the monitoring effort are to:

- Collect information on the performance of individual roadways throughout Alameda County,
- Identify congested segments,
- Compare the performance of different modes,
- Identify systemwide trends.

CONGESTION MANAGEMENT

The Congestion Management Program (CMP) network includes five types of facilities: freeways, highways, principal arterials, major arterials, and major roads. Data are less available on minor local roads which are not included in the CMP network. The CMP network has historically been divided into Tier 1 and Tier 2 networks and is shown in **Figure 1-1**:

- **Tier 1**: Tier 1 roadways are part of the CMP network, initially adopted in 1991 and updated in 1992. The Tier 1 network encompasses all ten freeways (six interstates (i.e., I-80, I-580, I-680, I-880, I-980, and I-238) and four state routes (i.e., SR 13, SR 24, SR 84, and SR 92)), all 11 state highways, 23 special segments (including tunnels and ramps), and 12 principal arterials. The Tier 1 network is subject to state CMP conformity requirements, and only during the afternoon peak-period. Data collected in the morning peak-period and weekends (for freeways only) is for informational purposes only.



- **Tier 2**: Tier 2 roadways were added during an update to the CMP network in 2011 and expanded in 2018. The Tier 2 network includes major arterials and major roads. All Tier 2 roadways are monitored for informational purposes only.

In addition, Alameda CTC monitors the performance of ten High Occupancy Vehicle (HOV) and Express Lanes covering 98 directional miles, shown in **Figure 1-2**. Each direction of the HOV/express route is considered separately since start and end points are often different. I-880 HOV data was collected in September 2020, right before the I-880 HOV lanes were converted to Express Lanes on October 2, 2020. Alameda CTC also monitors congestion on three bridges connecting Alameda County to San Francisco and San Mateo County: the San Francisco-Oakland Bay Bridge, the San Mateo-Hayward Bridge, and the Dumbarton Bridge. The bridges themselves are primarily outside of Alameda County and are monitored for informational purposes and to better understand travel to and from Alameda County to San Francisco and the Peninsula.

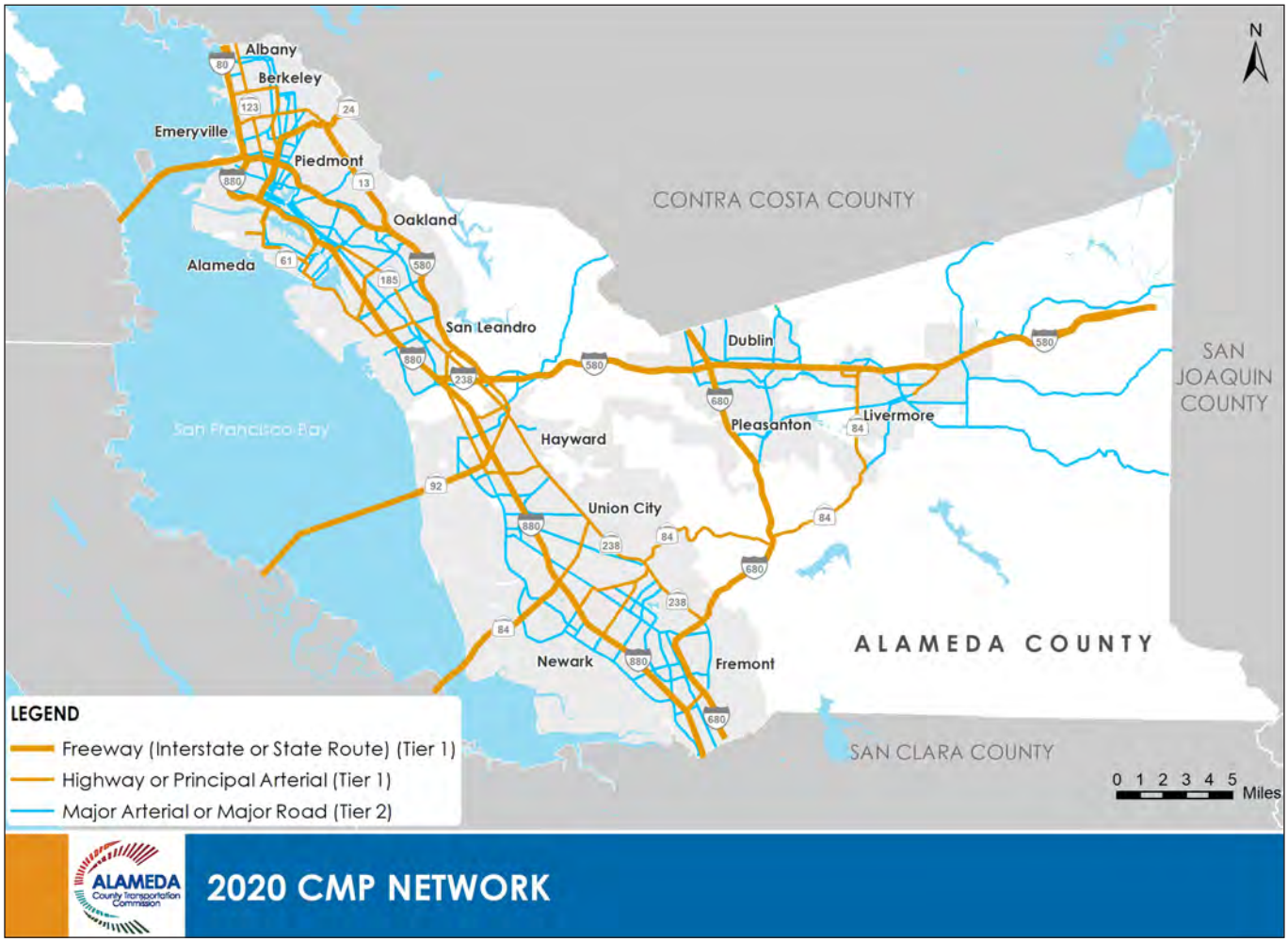


Figure 1-1. 2020 CMP Network

Table 1-1. Alameda CTC CMP Network - By Facility Type

CMP Facility Type	Distance Monitored (Centerline Miles)
Freeways	140 miles
Highways	70 miles
Principal Arterials	29 miles
Major Arterials	184 miles
Major Roads	130 miles
Total	**553 miles**

Table 1-2. Alameda CTC CMP Network - By Network Category

CMP Facility Type	Distance Monitored
Tier 1 Network	239 centerline miles
Tier 2 Network	314 centerline miles
Special Segments	13 directional miles (23 connections)
HOV / Express Lanes	98 directional miles
Bridges	19 directional miles (three bridges)

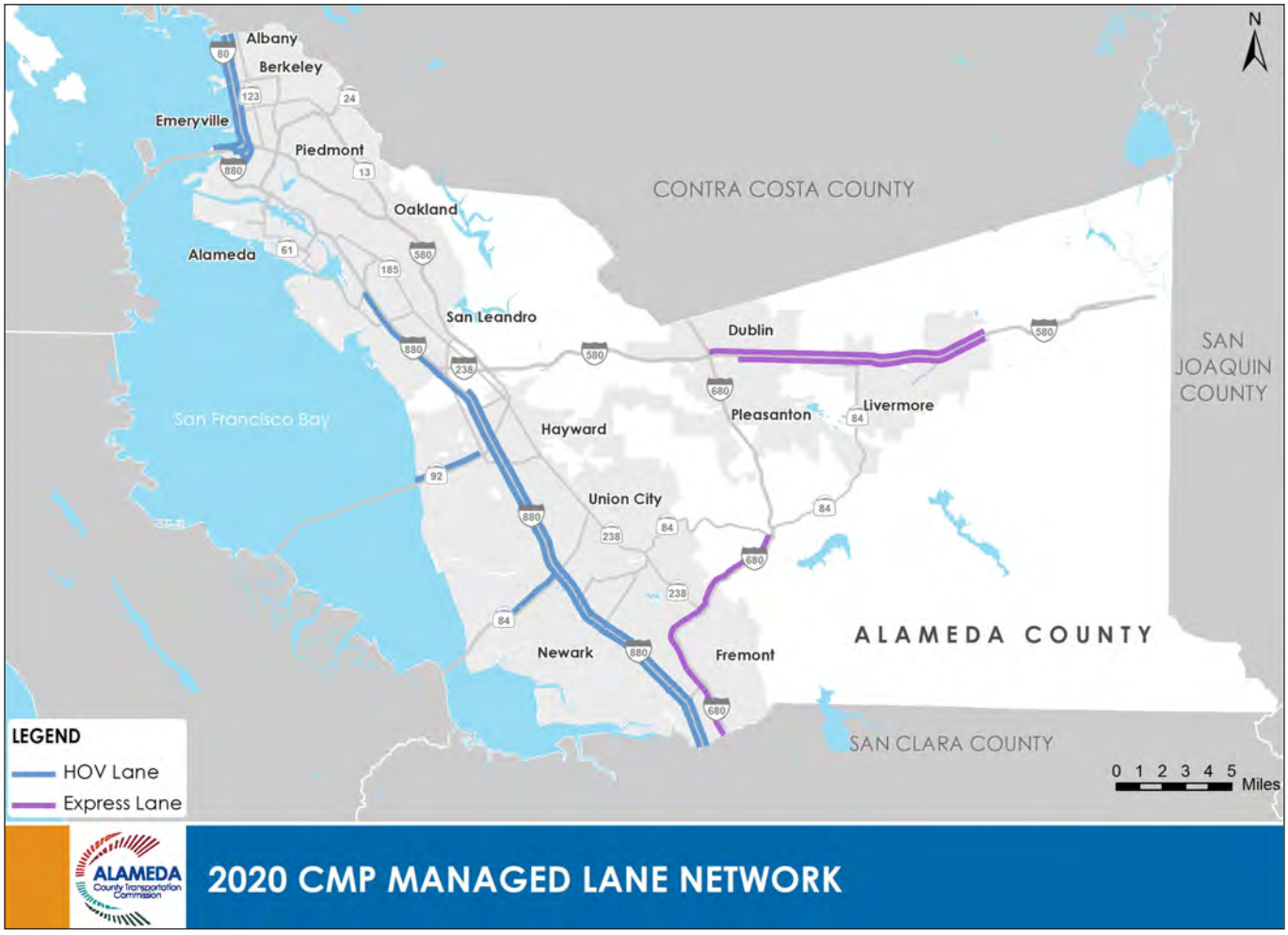


Figure 1-2. 2020 CMP Managed Lane Network

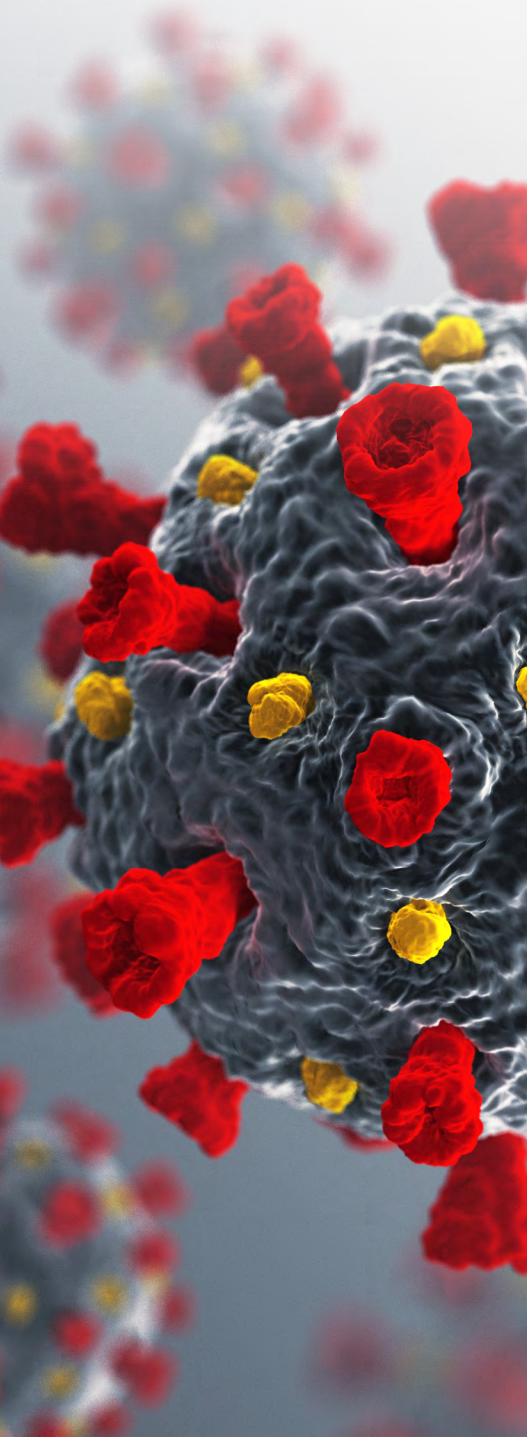
For the purposes of consistent data collection and analysis, the CMP network has been broken up into shorter segments, which collectively make up the CMP network.

- **Freeway Segments**: Freeway corridors are typically divided at major interchanges and ramps. Some low volume entrances and exit ramps have been aggregated into, longer segments. Periodically, Alameda CTC reviews the segment limits and, if needed, divides the segments further. For example, the I-580 corridor in the east county was re-segmented in 2007 reflecting the land use changes since 1991.
- **Arterial Segments**: Arterial corridors are typically segmented at major intersections, jurisdiction boundaries, or locations where road characteristics change significantly (ex. Posted speed limit, number of lanes, intensity of land uses, channelization schemes). Most segment boundaries are identical for both directions and the distances are generally the same. In a limited number of locations, the distances for each direction of the same segment may differ slightly in cases of very wide intersections or when the street crossings are staggered.

MONITORING METHODOLOGY

Alameda CTC uses similar monitoring methodologies for each cycle, with minor modifications. State legislation requires Alameda CTC to measure level of service (LOS) which is calculated from average speed on each CMP segment. This process involves four steps. The detailed methodology used for data collection, data analysis, and LOS assignment is available in **Appendix A**.

1. Collect disaggregated speed data on roadways using probe-vehicle based commercial speed data (e.g., INRIX data), freeway express lanes Electronic Toll System (ETS) data, or floating car survey data. Monitoring relied exclusively on floating car surveys until 2014.
2. Filter automatically collected data for days that result in abnormal commuter traffic conditions. Public holidays and school breaks typically produce lighter than usual traffic conditions while special events typically produce heavier than usual conditions.
3. Aggregate speed data into CMP segments. This is done separately for commercial speed, ETS, and floating car survey data.
4. Assign LOS based on the average speeds calculated for each CMP segment based on Highway Capacity Manual (HCM) methodologies.



METHODOLOGY CHANGES AND COVID-19

For the 2020 monitoring cycle, Alameda CTC made two notable changes to the monitoring methodology:

1. In 2019, INRIX switched from Traffic Message Channels (TMC)-based data, which was used in the last several monitoring cycles, to extreme definition (XD)-based data for the region. INRIX XD offers more granular data, which is more contiguous, and has greater geographic coverage. On arterial roadways, XD segments typically begin and end with roadway intersections and align more cleanly with CMP segmentation. This has allowed the 2020 monitoring include data from more Tier 2 segments. Out of 414 Tier 2 segments, 312 segments (75%) had data in 2018, while this increased to 373 (90%) in 2020.

2. Because of the acute impacts of the COVID-19 pandemic, Alameda CTC moved the data collection period from the spring (March – May) to the fall (September – November). The shelter-in-place order issued on March 16, 2020 created an immediate and unprecedented change in travel behavior. Both travel demand and congestion fell dramatically throughout the County in the initial days after the shelter-in-place order. Compared with the pre-COVID condition, in the week of March 16, 2020 for instance, daily Vehicle Miles Traveled, or VMT, which measures the amount of travel for all vehicles in a geographic region during a certain period, dropped by approximately 30%, and Vehicle Hours of Delay, or VHD, which are computed by subtracting the estimated vehicle-hours traveled if all travel demand were at free-flow speed, dropped by approximately 94%. Therefore, Alameda CTC postponed data collection to September 1 to November 6, 2020 time period instead. The narrower data collection window was possible because of more robust INRIX XD data. Aggregate speed data into CMP segments. This is done separately for commercial speed, ETS, and floating car survey data.

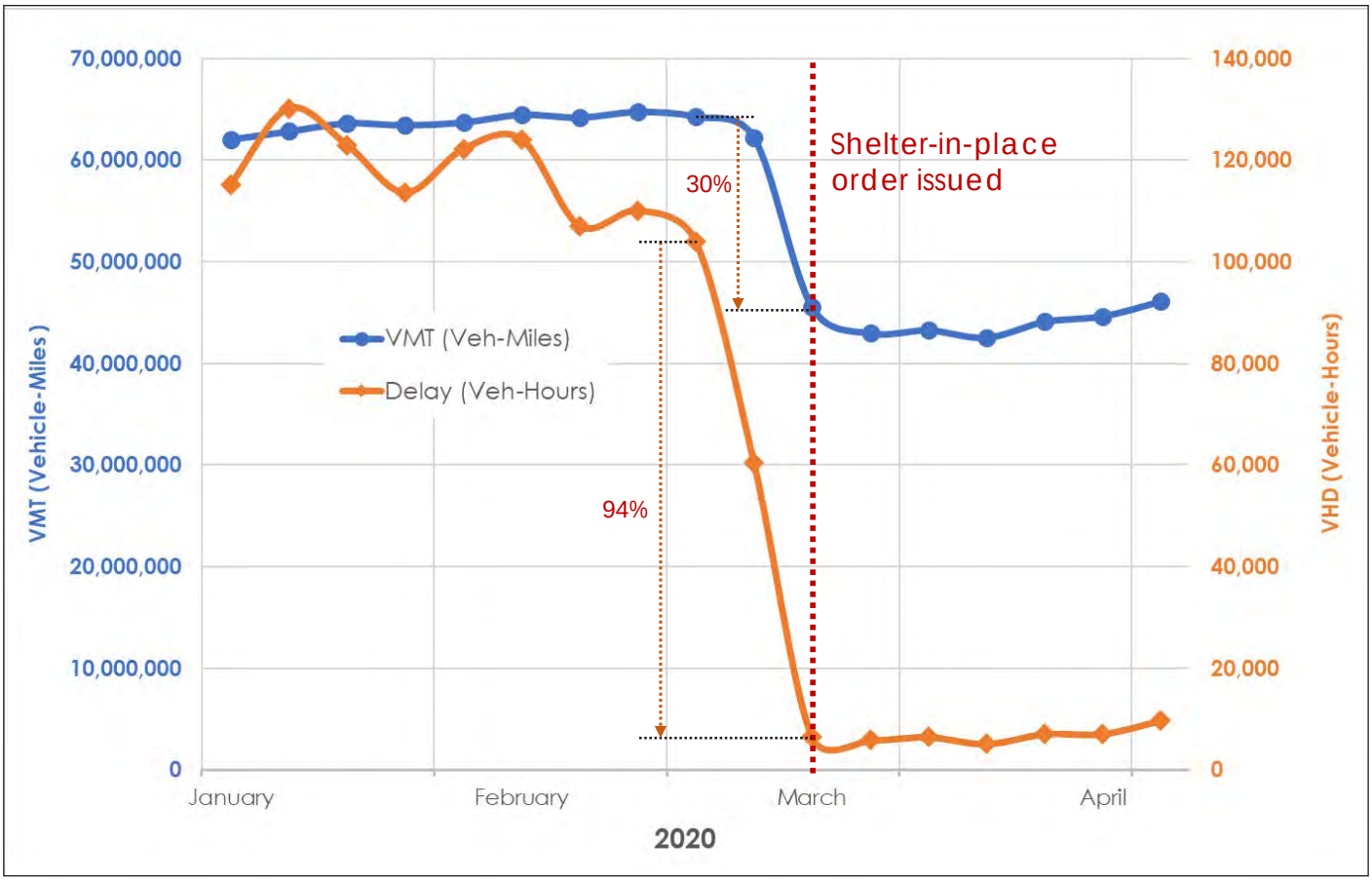


Figure 1-3. Countywide Daily VMT and VHD

The 2018 CMP reporting cycle was the first time Alameda CTC monitored transit performance on major bus transit corridors. However, due to the sustained impact of the COVID-19 pandemic on transit routes and ridership, Alameda CTC did not monitor transit performance for the 2020 monitoring cycle. Ridership for most transit operators was still down 70 to 90% by Fall, 2020.

Active transportation counts, including bicycles and pedestrians, were collected using video cameras at 150 locations, consistent with the methodologies of previous monitoring cycles.

ORGANIZATION OF THIS REPORT

This report is organized into six chapters. Chapter 1 introduces the CMP network and provides context for this LOS Monitoring Report. Chapter 2 summarizes transportation demand changes due to COVID-19. Chapters 3 and 4 present the LOS monitoring results for freeways and arterials, respectively, while Chapter 5 summarizes bicycle and pedestrian counts. Lastly, Chapter 6 provides a summary of key findings. The Appendices contain the detailed methodology for data and LOS analysis used in this report, maps and tables of the LOS monitoring results, and CMP conformity summary.

CHAPTER 2: TRANSPORTATION DEMAND AND COVID-19

BACKGROUND: HISTORIC DEMAND FACTORS

Myriad factors have historically shaped transportation demand, chief among them, economic factors including job and population growth. For the last decade, a booming regional economy and consistent local population and job growth fueled a steady increase in travel demand on roadways throughout the county and lead to increased congestion almost every year since the end of the recession. Between 2010 and 2018 the unemployment rate fell from over 11 percent to three percent[1]. During that time, average freeway speeds during the PM period dropped nine percent from 52 mph to 47 mph, as illustrated in **Figure 2-1.**

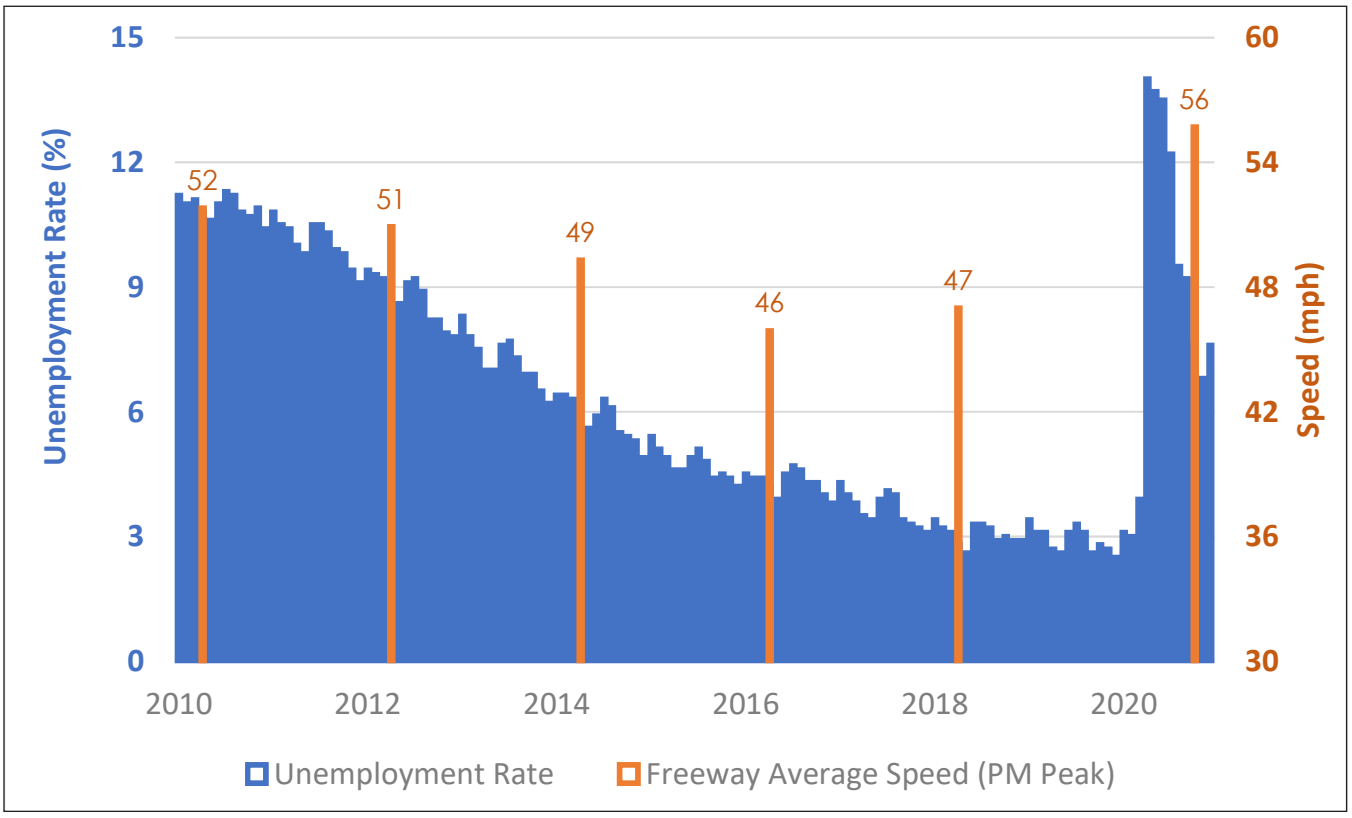


Figure 2-1. Alameda County Unemployment Rate and Freeway Average Speed (PM)

1 Bureau of Labor Statistics, Local Area Unemployment Statistics. Alameda County January 2010 – December 2020. Not Seasonally Adjusted.

2020 AND THE COVID-19 PANDEMIC

Typically, both economic indicators and average travel speeds shift gradually, however, 2020 was a year unlike any other and the COVID-19 pandemic radically changes transportation almost overnight. On March 16, 2020, with hundreds of confirmed COVID-19 cases in the San Francisco Bay Area, the Alameda County and Berkeley Public Health Departments issued shelter in place orders covering all of Alameda County and required residents to stay at home. Several days later, on March 19, 2020, the State of California issued an Executive Order and Public Health Order which directed all Californians to stay home except to go to an essential job or to shop for essential needs. Initially set to expire in early April, these orders persisted through the end of 2020 and into 2021. As a consequence of the COVID-19 pandemic, and the subsequent shelter-in-place orders, the economy stalled and the unemployment rate climbed from three percent in February 2020 to 14 percent by April (**Figure 2-1**), putting about 125,000 Alameda County residents out of work. This, combined with telecommuting (as discussed below), resulted in significant reduction in transportation demand and much less congestion after late-March in 2020.

UNEMPLOYMENT

The COVID-19 pandemic had an enormous impact on the local economy. More than 125,000 people, or almost 14% of the total workforce, lost their jobs by April, the month immediately after the shelter in place orders were issued. Over the summer and into the fall of 2020, the unemployment rate did recover quickly as well, by October it has reached 7.6%, comparable to the years after the recession.

TELECOMMUTING

To support social distancing, remote work and telecommuting likely increased significantly during the COVID-19 pandemic. Telecommuting, or working from home, is a work arrangement in which employees do not travel to a central place of work, often an office building, warehouse, or store located in a major commercial hub. While telecommuters may still make work and personal trips, they are often not during the traditional morning and afternoon peak commuter windows that the monitoring report captures data on.

Prior to the pandemic, about 44% of jobs in Alameda County[2] could potentially be performed from home, compared to about 45% throughout the rest of the San Francisco Bay Area[3] .

2 Ability to work from home: evidence from two surveys and implications for the labor market in the COVID-19 pandemic, Monthly Labor Review, Bureau of Labor Statistics, June 2020. https://www.bls.gov/opub/mlr/2020/article/ability-to-work-from-home.htm

3 Remote Work in the Bay Area, An Initial Evaluation of the Data and Implications for Public Policy, December 2020, Bay Area Council Economic Institute.

However, only about 23% of those workers, or about 9 to 10% of all workers[4], actually did perform work from home regularly. No local survey of workers was available at the time this report was published, however a national study[5] conducted after the start of the pandemic found that, with 25,000 survey samples, almost half (50%) of the workforce was telecommuting after the start of the pandemic. If the pandemic had a similar effect on Alameda County workers, about 300,000 workers, or 40% of all workers in Alameda County may have telecommuted through the pandemic.

While many workers were able to shift to remote work during the pandemic, California State Public Health Officer has designated a list of essential workers to protect communities while ensuring continuity of functions critical to public health and safety and economic and national security[6]. Many of these essential workers were unable to perform their jobs remotely and continued to commute and travel similarly to before the pandemic. Essential workers made up 61% of the workforce before the start of the pandemic, and 62% after. Employment for essential workers, by sector, is shown in **Table 2-1**. Only the health care and public health sector saw employment growth, compared to before the pandemic.

4 The average take-up rate - that is, the percentage of workers who were in occupations in which telecommuting is technologically feasible and who actually worked at home – was only 23.2 percent prior to COVID-19 based on the two BLS surveys. The percentage of those who were both in occupation in which telecommuting was feasible and who did telecommute was about 10.2 percent (i.e., 44.2% × 23.2% = 10.2%). This is consistent with the findings that about nine percent of workers in Alameda County primarily worked from home before COVID-19 based on the American Community Survey, US Census Bureau.

5 Erik Brynjolfsson, John J. Horton, Adam Ozimek, Daniel Rock, Garima Sharma, and Hong Yi Tu Ye, "COVID-19 and remote work: an early look at US data," Working Paper 27344 (Cambridge, MA: National Bureau of Economic Research, June 2020), https://www.nber.org/papers/w27344.

6 California Essential Workforce. https://covid19.ca.gov/essential-workforce/#:~:text=Workers%20such%20as%20plumbers%2C%20electricians,any%20facility%20supporting%20COVID%2D19

Table 2-1. Alameda County Essential Workforce – Before vs. After COVID-19 [7]

No.	Essential Workforce Sector	Before COVID-19 (February 2020)	After COVID-19 (June 2020)	% Change
1	Health Care/Public Health/ Emergency Services	90,072	91,963	+2.1%
2	Food and Agriculture	74,401	51,501	-30.8%
3	Energy	3,318	3,172	-4.4%
4	Water and Wastewater	3,735	3,728	-0.2%
5	Transportation and Logistics	57,154	55,207	-3.4%
6	Communications and Information Technology	21,541	20,125	-6.6%
7	Government Operations and Other Community-based Essential Functions	96,547	84,428	-12.6%
8	Critical Manufacturing	30,277	29,871	-1.3%
9	Financial Services	17,423	17,025	-2.3%
10	Chemical and Hazardous Materials	4,474	4,508	0.8%
11	Defense Industrial Base	126	96	-23.8%
12	Industrial, Commercial, Residential, and Sheltering Facilities and Services	88,036	75,828	-13.9%
		487,104	**437,452**	**-10.2%**

7 Based on Quarterly Census of Employment and Wages (QCEW), U.S. Bureau of Labor Statistics (BLS).

AVERAGE TRAVEL SPEEDS

Rising unemployment and increased telecommuting caused by the pandemic resulted in less congestion and an increase in travel speeds on roads in Alameda County in 2020. Many roads moved at near free-flow speeds, even by the fall. Many of these roadways were fully congested before the pandemic. Average travel speeds on freeways and arterials are shown in **Figure 2-2** and **Figure 2-3,** respectively.

Freeways:

- During the AM peak period, average speeds on nearly all freeways were near free-flow conditions, with an average speed of 62 mph, up 26% from 2018.
- During the PM peak period, average freeway speeds were lower, about 56 mph, but still up 19%.
- Weekend average freeway speeds were also up 12% to 64 mph, close to free-flow conditions.

Surface Highways and Principal Arterials (Tier 1):

- Surface highways and principal arterial speeds also increased significantly, though not as high as freeways (e.g., 7% vs. 26% during the AM peak period and 14% vs. 9% during the PM peak period when comparing speed increases between surface highways/ principal arterials and freeways).
- During the AM peak period, average speeds increased from less than 26 mph to about 30 mph, about a 17% increase.
- During the PM peak period, average speeds increased from less than 24 mph to more than 27 mph, about a 14% increase.

Major Arterials (Tier 2):

- During the AM peak period, average speeds increased from less than 23 mph to more than 27 mph, about a 20% increase.
- During the PM peak period, average speeds increased from about 22 mph to more than 25 mph, about a 15% increase.

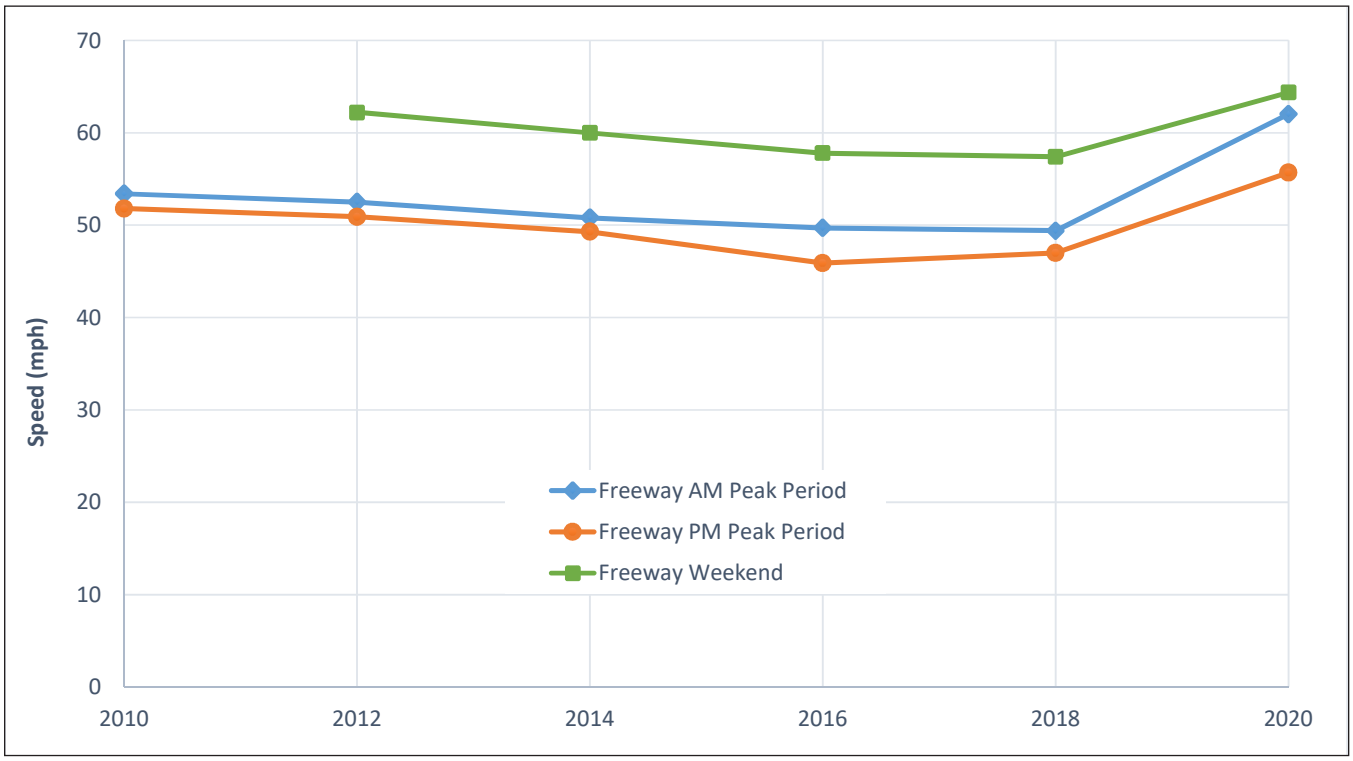


Figure 2-2. Countywide Average Speeds – Freeways

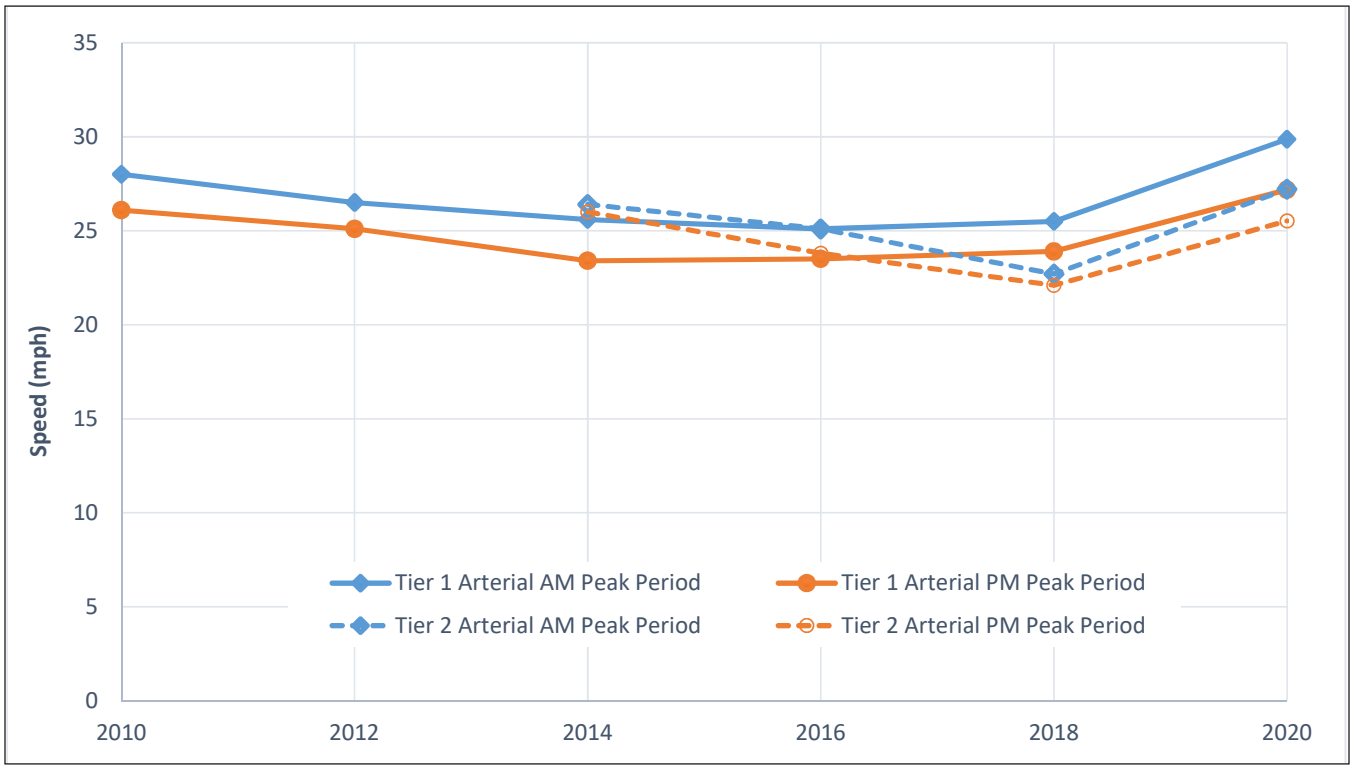


Figure 2-3. Countywide Average Speeds – Arterials

VEHICLE MILES TRAVELED (VMT) AND VOLUMES

Although traditional commuter travel demand may have fallen significantly, overall travel demand remained high. The number of vehicle miles traveled (VMT) in Alameda County, which measures total travel for all vehicles in the county, fell about 30% immediately after the shelter-in-place order was issued in March 2020. However, in the subsequent months VMT steadily increased, down about 12% year-to-date by June and just 8% by October.

Volumes at key gateways also remained high. Westbound traffic volumes on the San Francisco-Oakland Bay Bridge, the largest commuter gateway in the region, fell about 50% immediately after the shelter-in-place order was issued, and had returned to almost 90% of 2019 volumes by October, as shown in Figure 2-4. Morning peak period bridge volumes returned to about 99%, near the pre-pandemic level, by October 2020.

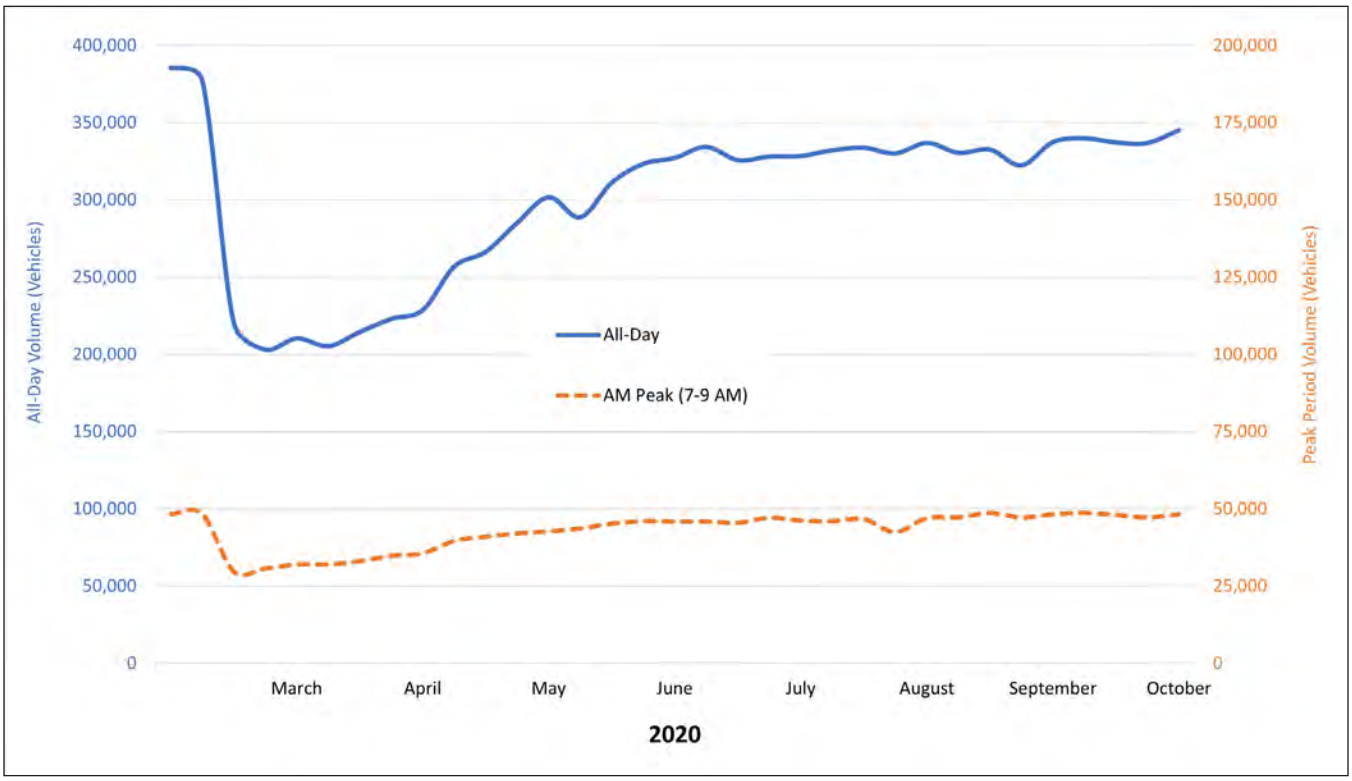


Figure 2-4. San Francisco-Oakland Bay Bridge Traffic Volumes (Westbound)

CONGESTION AND VEHICLE DELAY

Congestion decreased considerably throughout the county as travel times became more flexible. Vehicle hours of delay (VHD) in Alameda County, which are computed by subtracting the vehicle-hours traveled if all travel demand were at free-flow speed from the estimated vehicle-hours traveled, fell about 94% immediately after the shelter-in-place order was issued, as illustrated in Figure 2-5. VHD went up somewhat through the summer, but was still down about 70% by October 2020.

While total travel (VMT) declined slightly by the fall, delay (VHD) was still down 70%. This can be explained by the nonlinearity between traffic demand and congestion. After reaching capacity of the facility, delay increases exponentially when additional cars compete for road space at the same time, on the same road. This is because, once a queue has formed and an additional vehicle joins at the back of the queue, not only is that vehicle delayed, it also adds extra delay to any other vehicles that join after, with the now longer queue. As a result, smaller changes in transportation demand (e.g., reduced VMT), especially during the peak commuter periods, can have exponential reductions in congestion (e.g., reduced delay/VHD, increased speed).

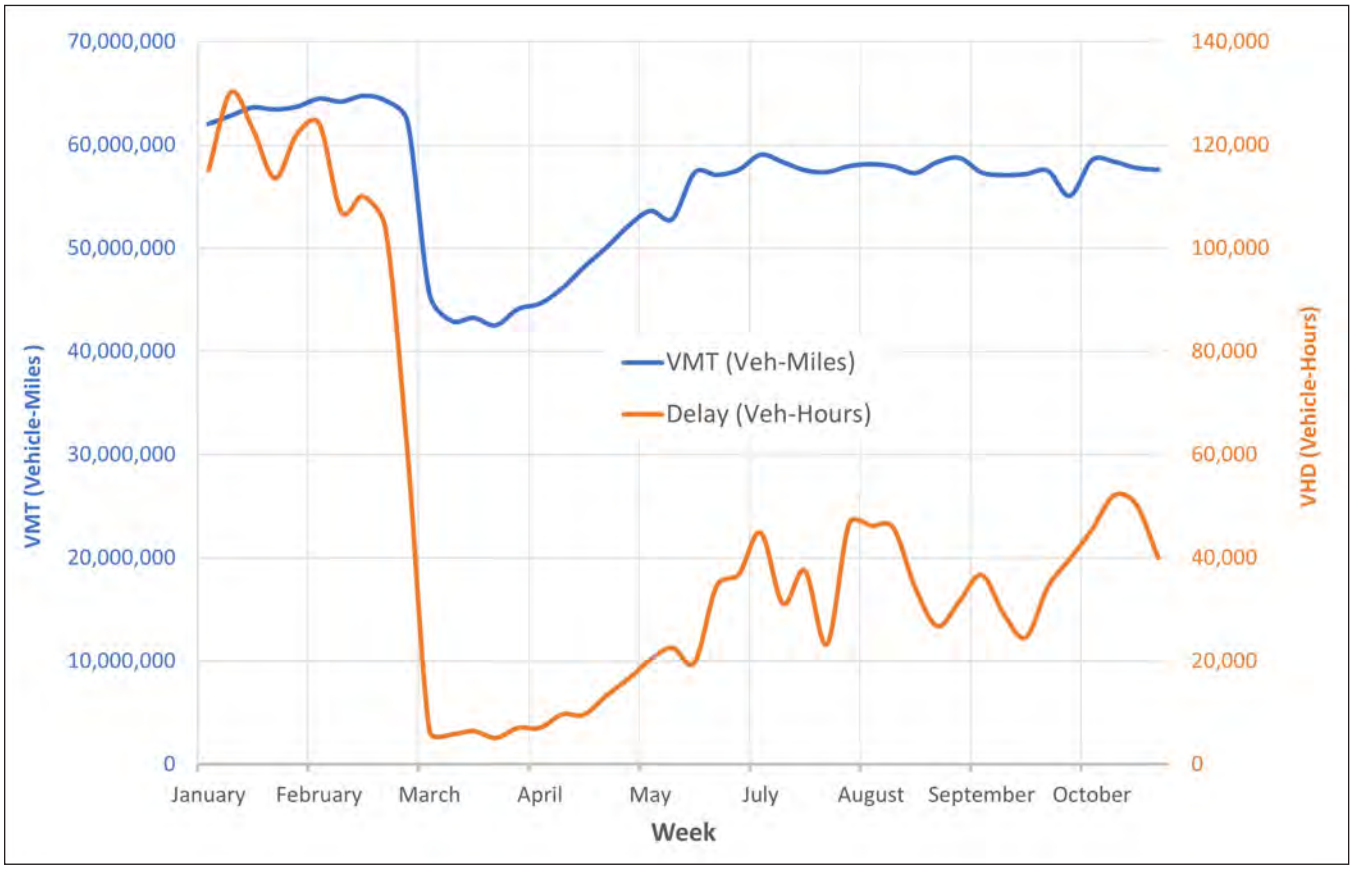
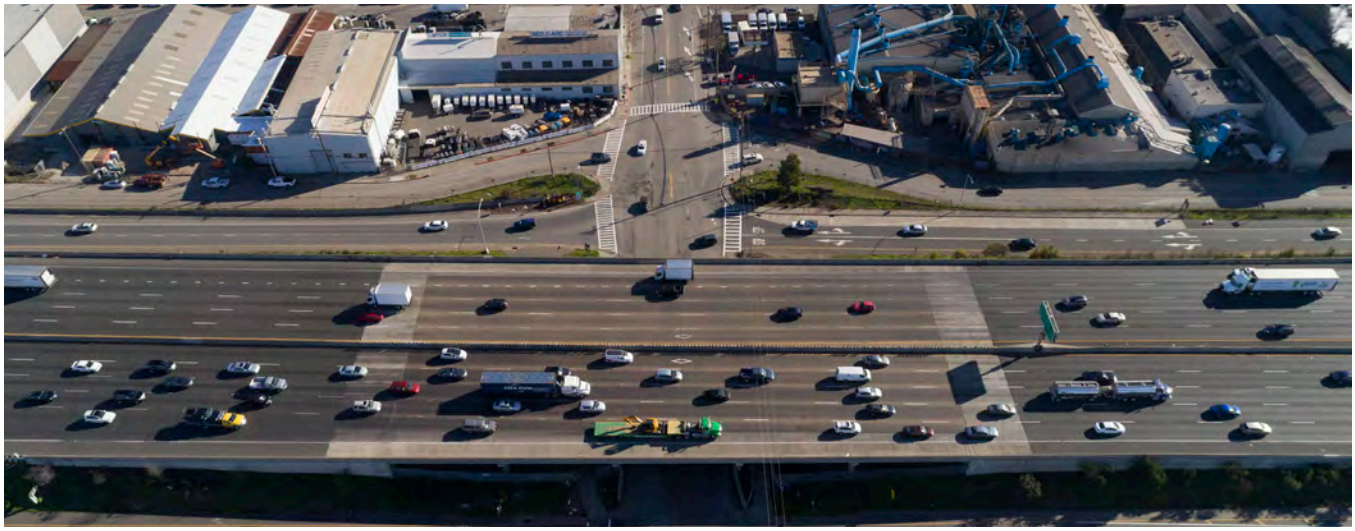


Figure 2-5. Countywide Daily VMT and VHD

ROUTING APPS

The precise impact of routing apps is difficult to measure. However, the steady proliferation of trip routing apps and vehicle navigation systems may have shifted travel behavior in 2018. Average speeds on freeways during the PM peak period remained essentially flat (+1 mph), despite strong economic growth, while average speeds on major arterial roadways (Tier 2 arterials) decreased by seven percent (-2 mph). The heavier use of arterials may be a response to heavily congested freeway segments throughout the county. Because the COVID-19 pandemic had such a strong effect on travel in 2020, there is no specific evidence routing apps had an effect on travel demand.



TRAVEL DEMAND BEYOND 2020

The sustained nature of COVID-19 social distancing guidelines may permanently change individual behaviors and attitudes, even as restrictions are eased. Alameda CTC will continue to monitor the impact of COVID-19 on travel behaviors. A mix of infrastructure and policy changes may be needed to meet new demands as longer-term trends emerge.

CHAPTER 3: FREEWAY SYSTEM

Alameda County connects the region with an extensive network of 140 centerline-miles of freeways on six interstates and four state routes. These freeways provide critical mobility for millions of commuters each day and also carry more goods than any other county in the Bay Area.

Alameda CTC's monitoring program includes all 140 centerline-miles of freeways, as well as ramps, bridges, and 98 directional miles of managed lanes (carpool and express lanes), throughout Alameda County. All facilities are monitored on weekday mornings (7-9 AM) and afternoons (4-6 PM), and mainline freeway segments are also monitored on weekend afternoons (1-3 PM). State CMP legislation only requires monitoring on weekday afternoons, however Alameda CTC also collects performance data during other periods for informational purposes. **Appendix B** contains detailed Level of Service maps for each monitoring period for the entire CMP network. This chapter discusses trends and key findings observed during the fall 2020 (September – November) monitoring cycle.

CONGESTION

Alameda County is located in the geographic center of the Bay Area, home to one of the most productive economies in the country. Freeways carry many of the longest trips, including commutes. Typically, the network has been heavily congested with five of the ten most congested corridors in the region in Alameda County[1].

During the 2020, as a result of the COVID-19 pandemic, shelter-in-place orders, and economic turbulence, congestion declined significantly during all monitoring periods. Weekday afternoons remains the most heavily congested period, but congestion also declined significantly during the afternoon commute.

What is Congestion?

This report considers the causes and impacts of systemic congestion which occurs on freeways when demand exceeds the vehicle capacity of the roadway. Each additional vehicle then has an exponential impact on travel speeds. This is why even small changes in demand can have a significant impact on congestion. This report does not investigate ephemeral causes of congestion like special events, weather, and incidents.

For the purposes of this report, a freeway segment is considered congested if the average speed drops below 30 mph (LOS-F). These congested segments are further classified into three sub-categories, as listed below which describe the intensity of congestion:

LOS F(30) – Average Travel Speed < 30 mph

LOS F(20) – Average Travel Speed < 20 mph

LOS F(10) – Average Travel Speed < 10 mph

1 Bay Area Vital Signs: Freeway Congestion Levels Off, But Delays Are Still at Record Highs. https://mtc.ca.gov/whats-happening/news/bay-area-vital-signs-freeway-congestion-levels-delays-are-still-record-highs

Afternoon Congestion

Only 16 freeway segments, or 22 directional miles (7 percent of the freeway network) were congested during the afternoon peak period, as illustrated in **Figure 3-1** – compared to 39 segments, or 66 directional miles (22 percent of the freeway network) in 2018.

Congestion (PM Peak Period)	2018	2020	Change (2020 vs. 2018)
Congested Segments	39 segments	16 segments	-23 segments
Congested Directional Miles	66 miles	22 miles	-44 miles
Percent of Freeway Network	22%	7%	-15%

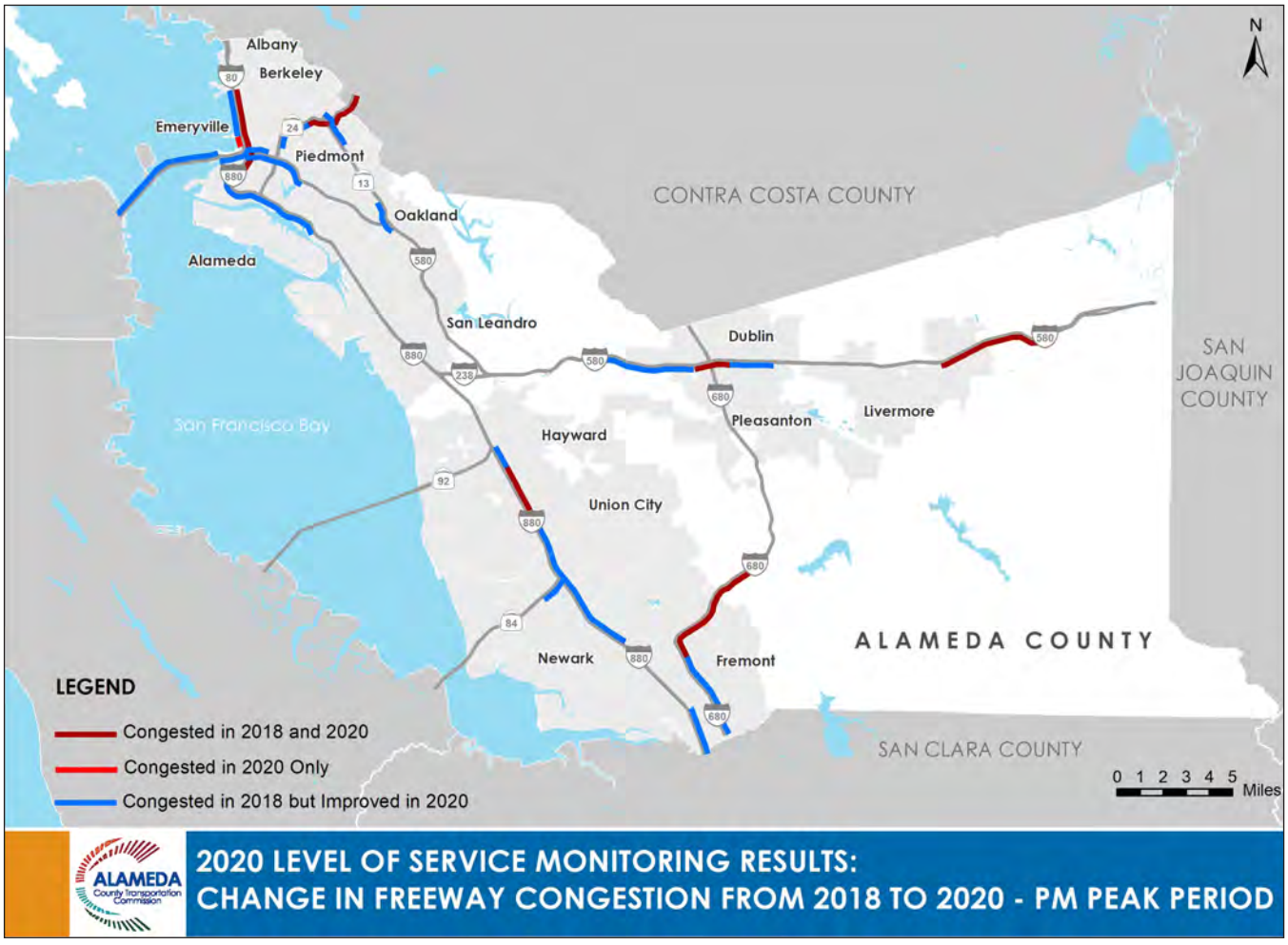


Figure 3-1. Change in Freeway Congestion from 2018 to 2020 - PM Peak Period

Although the afternoon peak period remains the most congested time of day, congestion dropped by two-thirds, significantly as average travel speeds picked up. The largest single-year improvement since monitoring began in 1991. Consequently, the remaining congestion, shown in **Figure 3-1**, is more isolated. Only one new congested segment appeared in 2020 on Westbound I-80, between Powell Street and the I-80//I-580 split the remaining 15 congested segments listed in **Table 3-1** were also congested in 2018. Only two congested segments had lower average travel speeds in 2020, the remaining segment travel speeds improved. The longest continuous congested segment was Northbound I-580 between Durham Road and Andrade Road, for a total of approximately six miles. The slowest congested segment was Eastbound I-80 between I-80/I-580 Merge and Powell Street, with an average speed of 15 mph.

Table 3-1. Congested Freeway Segments - PM Peak Period

		Segment Limits		Jurisdiction	Length	Plan Area	# Lanes	Speed (mph)	
CMP ID	CMP Route	From	To		(mi)			2018	2020
F3	I-80 - EB	I-80 / I-580 (Merge)	Powell	Emery	0.54	North	6	11	15
F4	I-80 - EB	Powell	Ashby	Emery - Berk	0.72	North	6	13	17
F5	I-80 - EB	Ashby	University	Berk	1.3	North	5	21	23
F12	I-80 - WB	Powell	I-80/I-580 (Split)	Emery	0.47	North	6	31	27
F20	I-580 - EB	San Ramon/ Foothill	I-680	Plea	0.71	East	4	15	26
F21	I-580 - EB	I-680	Hopyard	Plea	0.87	East	6	15	26
F27	I-580 - EB	1st St	Greenville	Liv	2.13	East	6	23	27
F28	I-580 - EB	Greenville	N.Flynn	Uninc	2.73	East	4	21	19
F61	I-680 - NB	Durham Rd	Washington Blvd	Fre	1.3	South	3	12	24
F62	I-680 - NB	Washington Blvd	Rt 238/ Mission	Fre	1.14	South	3	21	30
F63	I-680 - NB	SR 238/ Mission	Vargas Rd	Fre	1.1	South	4	22	28
F64	I-680 - NB	Vargas Rd	Andrade Rd	Uninc	2.21	South	4	20	25
F91	I-880 - NB	Alv-Niles	Tennyson	Uni City - Hay	2.6	South	4	19	27
F102	I-880 - NB	I-880/I-80 (split)	I-880/I-80 (merge)	Oak	1.44	North	4	14	24
F132	SR 24 - EB	Broadway/ SR 13	Caldecott (enter)	Oak	1.65	North	4	13	21
F133	SR 24 - EB	Caldecott (enter)	Fish Ranch Road	Oak	1.04	North	4	27	22

Morning Congestion

Freeway congestion during the morning peak period all but disappeared. Morning trips are more likely work-related while afternoon and weekend trips are more diverse, the significant rise in telecommuting during the COVID-19 pandemic may have also contributed to this significant shift.

Of the 28 congested segments (48 directional miles), representing 16 percent of the freeway network in 2018, just one segment (0.7-mile) representing 0.2 percent of the network was congested in 2020.

Congestion (AM Peak Period)	2018	2020	Change (2020 vs. 2018)
Number of Congested Segments	28	1	-27
Directional Miles of Congested Segments	48	0.7	-47.3
Percent of Freeway Network	16%	0.2%	-15.8%

The lone remaining congested segment was on I-580 Westbound between I-205 and Grant Line Road. No new segments became congested in 2020. Average speeds on some of the most congested segments in 2018 increased significantly. The approach to the Bay Bridge toll plaza, formerly one of the most congested segments in the network, increased from 11 mph in 2018 to 34 mph in 2020.

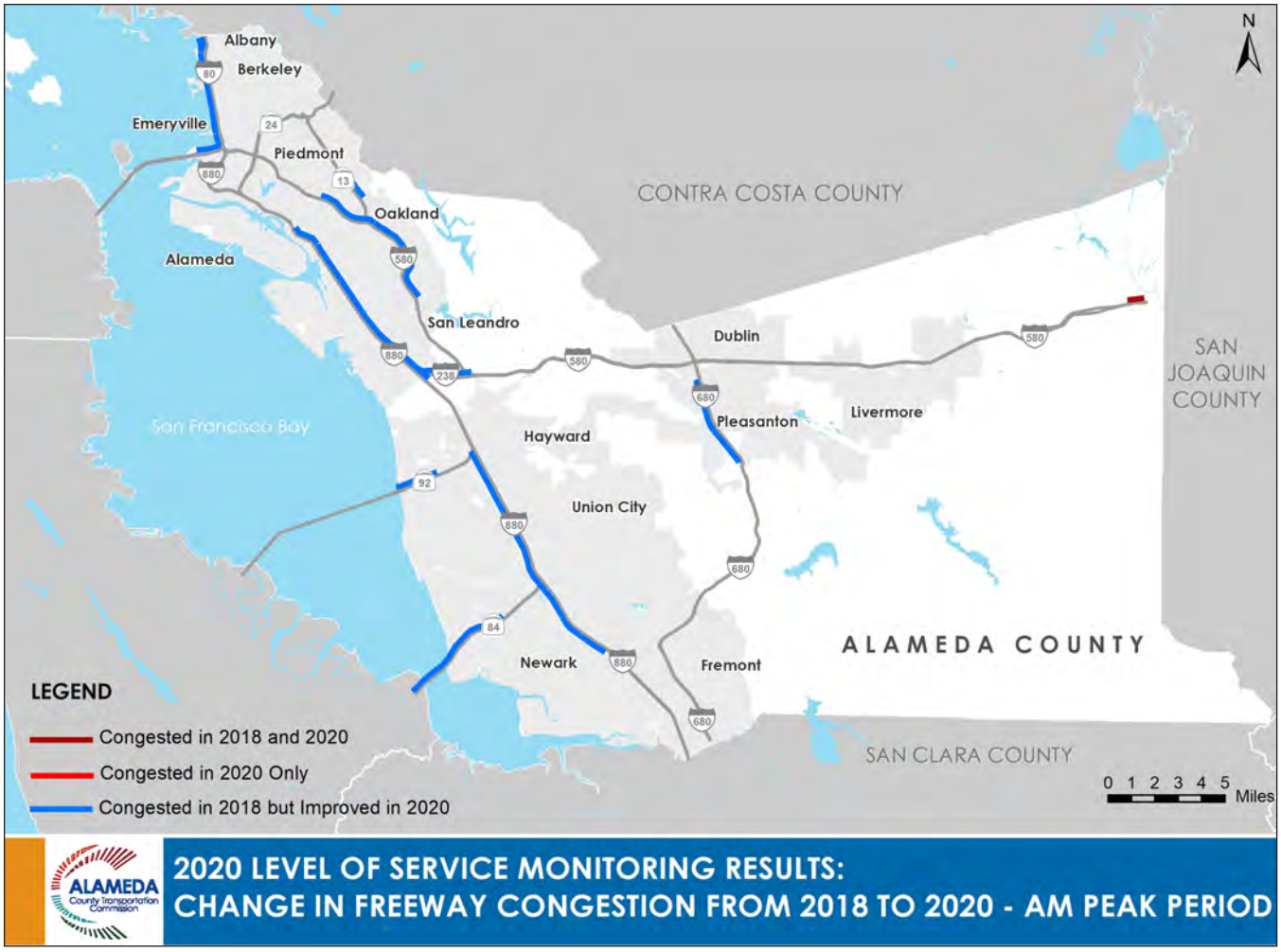


Figure 3-2. Change in Freeway Congestion from 2018 to 2020 - AM Peak Period

Weekends

Freeway congestion also declined on weekends in 2020; however, the westbound approach to the Bay Bridge remained more congested than weekday mornings. Although the COVID-19 pandemic appears to have dramatically impacted daily commuter behavior, its impact on non-work travel, including weekend travel to San Francisco, appears to be less significant. Only four freeway segments, or five directional miles (2 percent of the freeway network) were congested on weekends – compared to nine segments, or nine directional miles (three percent of the freeway network) in 2018.

Congestion (Weekend)	2018	2020	Change (2020 vs. 2018)
Number of Congested Segments	9	4	-5
Directional Miles of Congested Segments	9	5	-4
Percent of Freeway Network	3%	2%	-1%

Of the four congested segments on weekends, listed in Table 3-2, three were already congested in 2018, and only one, I-80 WB the SFOBB toll plaza and the San Francisco County, was a new congested segment. Speeds increased on most of congested segments in 2020. For example, speed increased from 22 mph in 2018 to 28 mph in 2020 on I-80 WB between the I-580 junction and University Avenue. I-80 WB from Toll Plaza to San Francisco County performed at LOS F in 2020, but not in 2018. However, this segment performed at LOS F previously in 2010, 2012, and 2016.

Table 3-2. Congested Freeway Segments - Weekend

		Segment Limits		Jurisdiction	Length	Plan Area	# Lanes	Speed (mph)	
CMP ID	CMP Route	From	To		(mi)			2018	2020
F9	I-80 - WB	Jct - I-580	University	Berk - Alb	1.51	North	6	21.7	28.2
F10	I-80 - WB	University	Ashby	Berk	1.31	North	5	26.0	29.9
F12	I-80 - WB	Powell	I-80/I-580 (Split)	Emery	0.47	North	6	25.2	30.0
F14	I-80 - WB	Toll Plaza	SF County	Oak	2.01	North	4	32.9	29.0

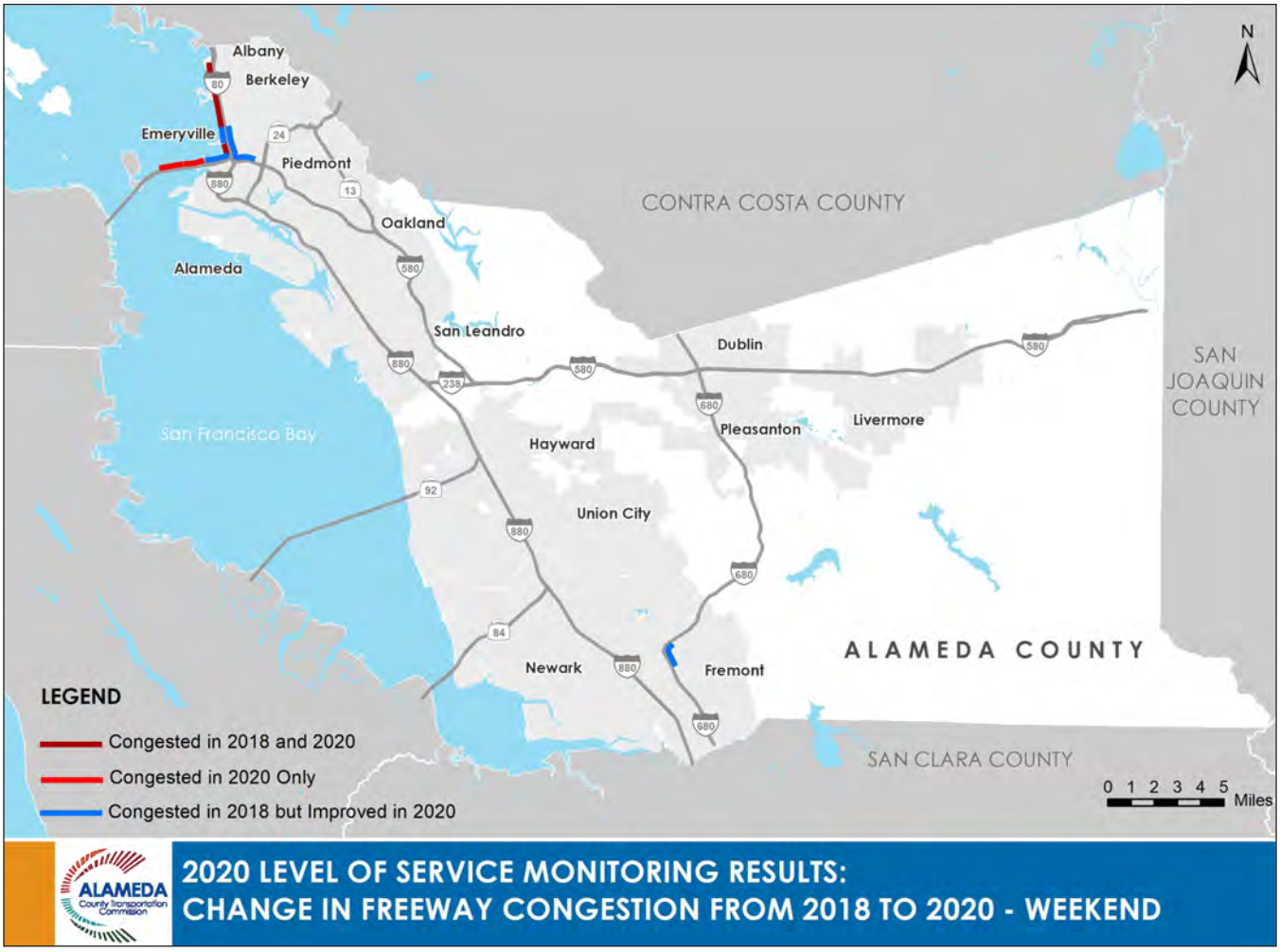


Figure 3-3. Change in Freeway Congestion From 2018 to 2020 - Weekend

AVERAGE TRAVEL SPEED

Countywide Travel Speed

Freeway speeds primarily decreased over the last decade as the regional economy grew and travel demand increased. In 2018, average speed increased by about one mph on freeways, while average speed decreased slightly on arterials. The heavier use of arterial roadways may be the result of vehicle routing applications that are built into many newer automobiles and the wide availability and popularity of trip routing apps which may have influenced travel behavior. Major capital improvement projects completed in that year, including the I-80 Smart Corridor Project and the I-580 Express Lanes Project may have also affected travel speeds. However, this overall shift towards incrementally faster freeway speeds, even as arterial speeds declined was seen throughout the Bay Area, suggesting different vehicle routing patterns may have had more of an affect than capital projects.

In 2020, however, due to the COVID-19 pandemic, average speeds on freeways increased substantially during every monitoring period. Speeds increased 26% (+13 mph) during the morning peak period, 19% (+9 mph) during the afternoon peak period, and 12% (+7 mph) on weekends. Average speeds on freeways between 2010 and 2020 are shown in **Figure 3-4.**

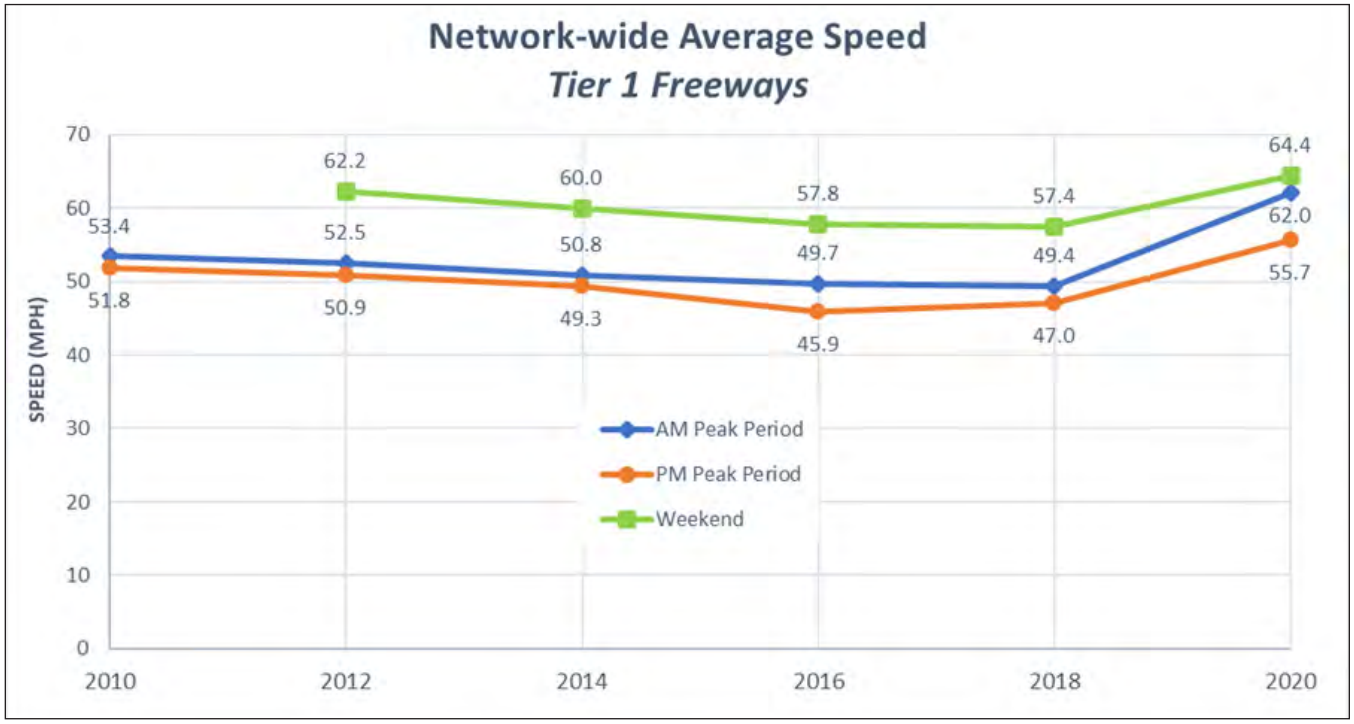


Figure 3-4. Freeways - Countywide Average Speed (2010 - 2020)

Peak-and-Off-Peak Speed

Most freeways have clear distinction between the peak and non-peak directions as commuters flow from more residential communities to office and commercial centers in the morning, then back in the afternoon. During the morning peak period commuter traffic typically flows westbound and southbound towards Downtown Oakland, San Francisco, and Silicon Valley. That dynamic reverses in the afternoon as commuters head back eastbound and northbound. Average speeds are definitionally slower in the peak direction. Consequently, nearly all congestion tracks with peak direction commute flows.

In 2020, average speeds increased significantly for both the peak and off-peak directions during both the morning and afternoon peak periods. However, the peak direction for each period did run slower than the off-peak direction. The afternoon peak period was always more congested than the morning peak period. Also, the morning was hardly directionally peaked (off-peak to peak speed ratio = 1.06), while the afternoon was more peaked (off-peak to peak speed ratio = 1.15). In the morning, the peak direction ran faster than the off-peak direction did before 2020. For instance, during the morning peak period, the average speed in the peak direction in 2020 was 59 mph which was higher than the average speed of 55 mph in the off-peak direction in 2018.

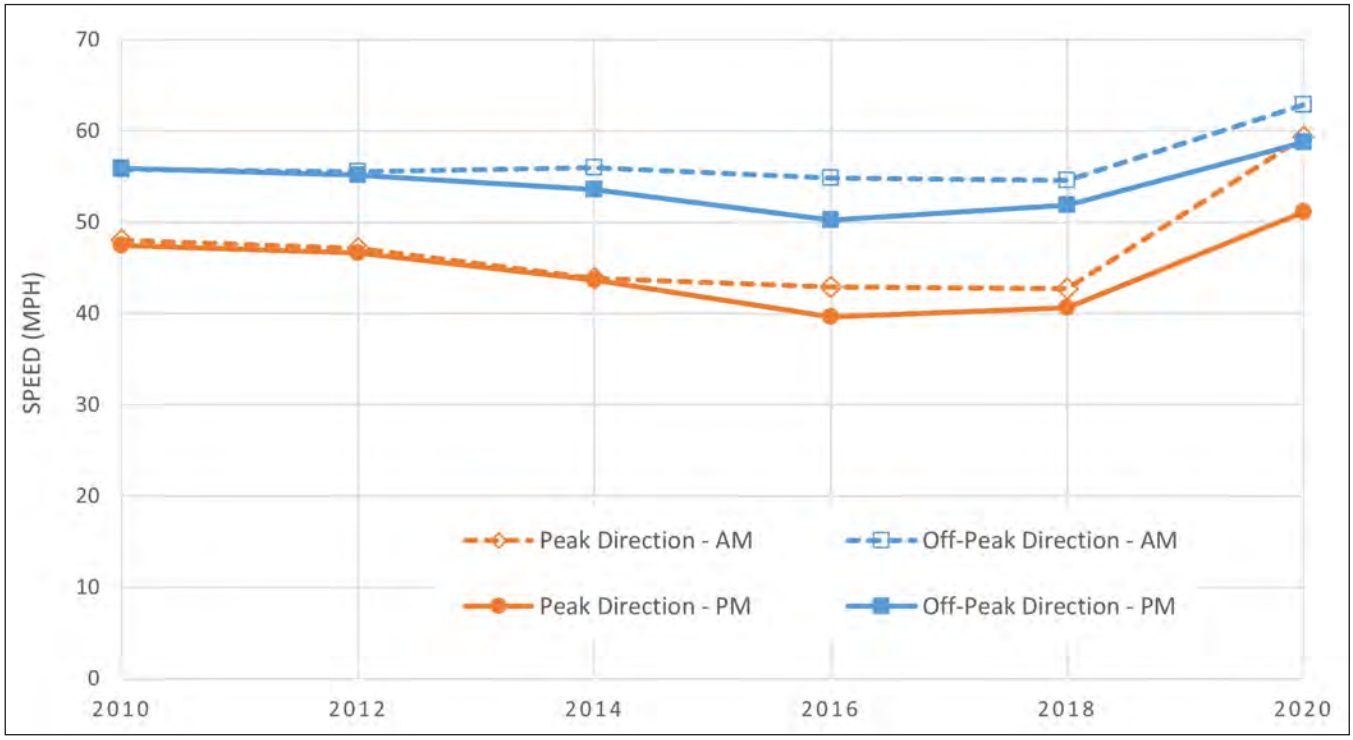


Figure 3-5. Freeway Average Speed: Peak vs. Off-Peak Directions

Speed changes from 2018 to 2020 were also analyzed for each segment of the entire freeway network, as illustrated in **Figure 3-6** (afternoon peak period) and **Figure 3-7** (morning peak period). Due to the COVID-19 pandemic, even though there were still some freeway segments experienced slower speeds (i.e., changes <0%), speeds on majority of the freeway segments increased in 2020. Speeds on many freeway segments improved by even more than 50 percent – 24% and 19% during the AM and PM peak periods, respectively. Overall, the north planning area improved more than other areas. Speeds on I-580 east segment (between SR 238 and I-205) and I-680 increased less than on other freeways.

Speed Change (2020 vs. 2018)	AM Peak Period	PM Peak Period
<0%	17%	20%
0% - 25%	44%	46%
25% - 50%	15%	15%
>50%	24%	19%
Total	**100%**	**100%**

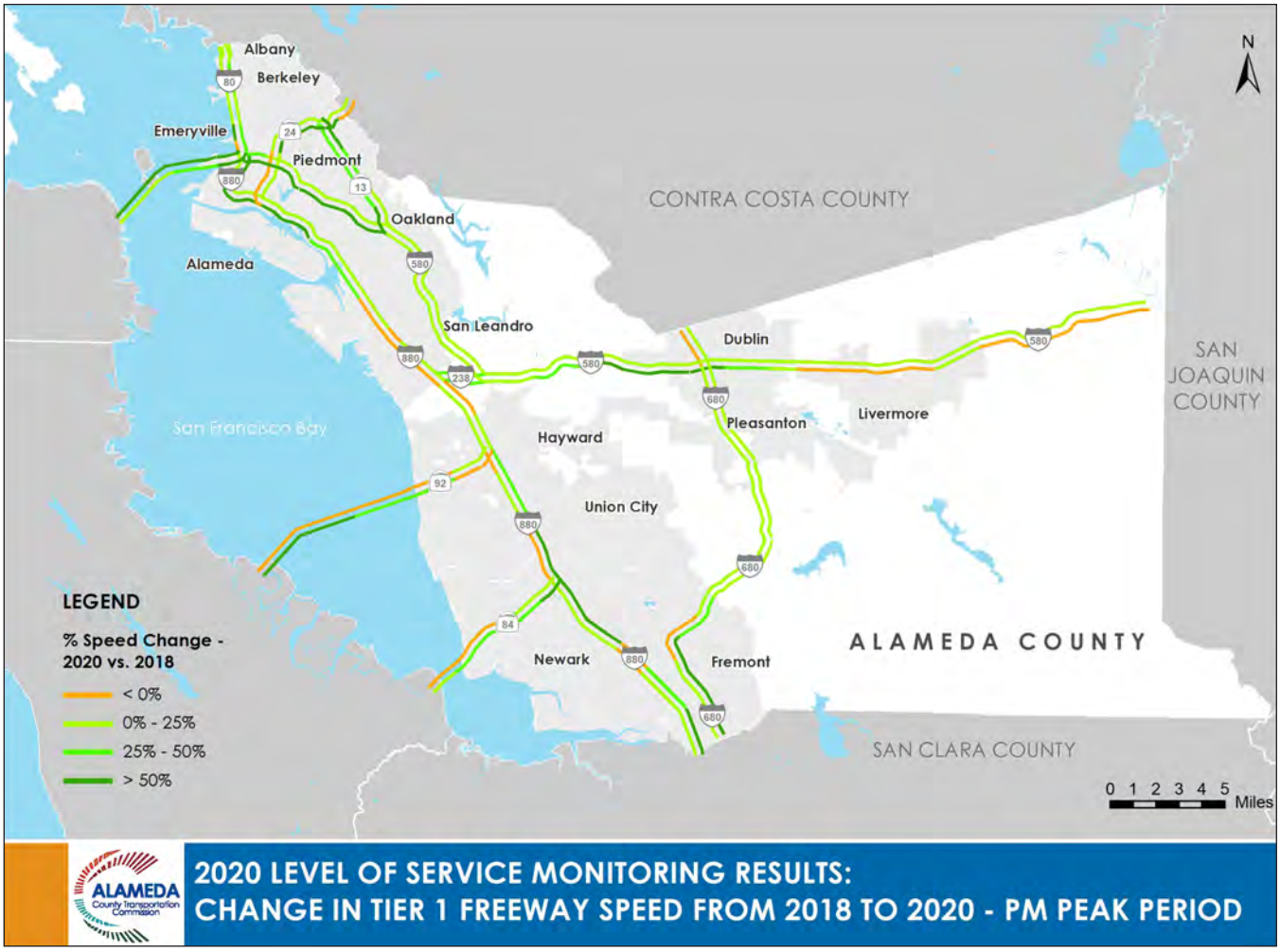


Figure 3-6. Change in Tier 1 Freeway Speed From 2018 to 2020 - PM Peak Period

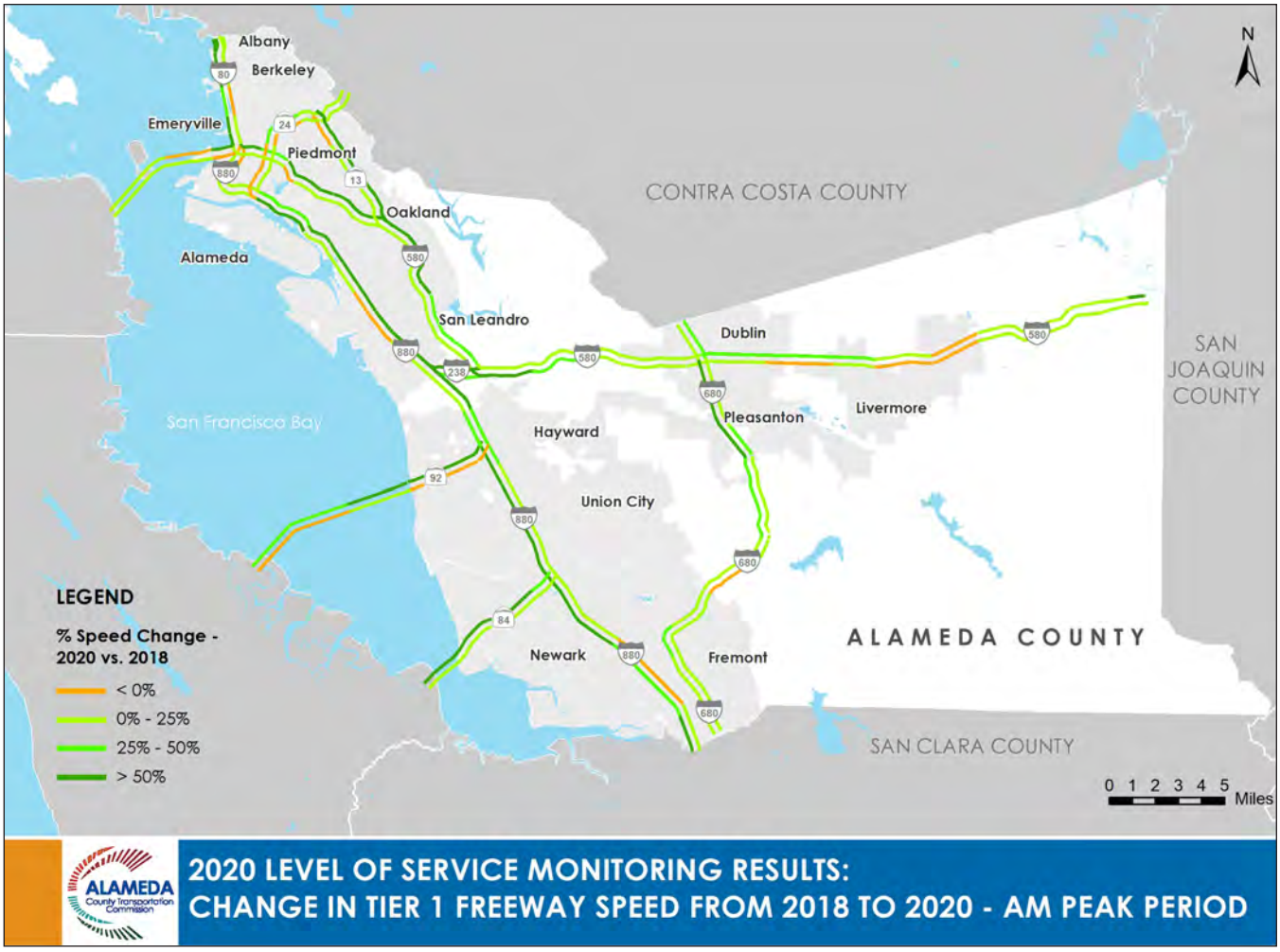


Figure 3-7. Change in Tier 1 Freeway Speed From 2018 to 2020 - AM Peak Period

HIGH OCCUPANCY VEHICLE AND EXPRESS LANES

Starting 2014, Alameda CTC began monitoring managed lanes: High Occupancy Vehicle (HOV) and Express Lanes. Managed lanes encourage carpooling, provide additional travel choices, and improve travel time reliabilities. Alameda CTC separately evaluates LOS on ten HOV/express lane routes covering 98 directional miles. Unlike mainline freeway segments, each direction of the HOV or express lane is considered separately since start and end points are often different. HOV/express lanes were monitored mainly using floating car surveys and/or toll gate data because the available INRIX data does not currently separate managed lanes from general purpose lanes.

In the 2020 monitoring cycle, no HOV or express lane segment was congested during either the morning or afternoon peak period. Average speeds on HOV and express lanes increased in both the morning and afternoon peak periods between 2018 and 2020. As illustrated in **Figure 3-8**, average speeds in HOV lanes increased by 30% (+15 mph) and 26% (+13 mph) in the morning and afternoon peak periods, respectively. Average speeds in Express Lanes, on the other hand, increased by 9% (+6 mph) in the morning peak period and 3% (+2 mph) in the afternoon peak period. **Appendix C** presents detailed data on managed lane performance.

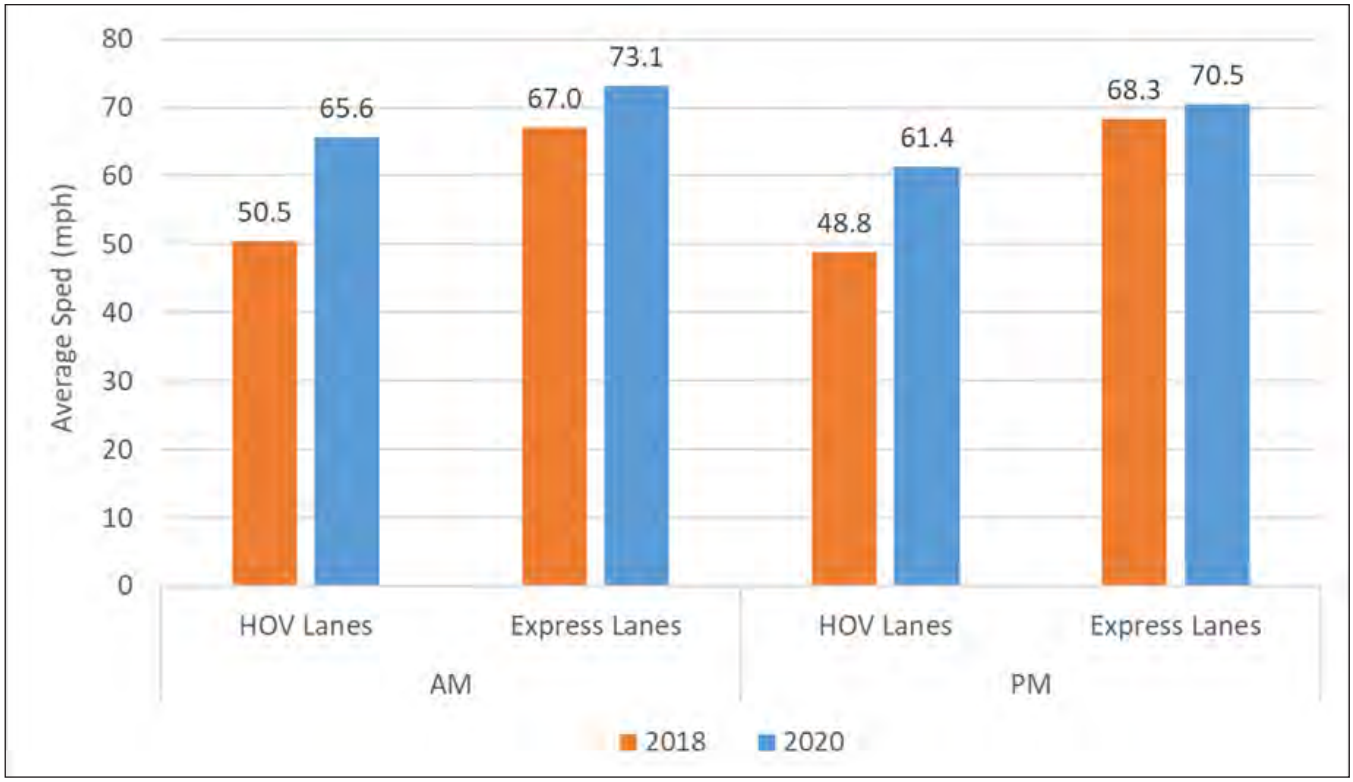


Figure 3-8. 2018 - 2020 Average Speed of Managed Lanes (mph)

The managed lane performance was also compared to freeway performance across all lanes. The plots shown in **Figure 3-9** and **Figure 3-10** provide comparisons of the average speeds along the freeway (all lanes) and managed lanes for the afternoon and morning peak periods. Each graph contains a diagonal line which represents parity between the average speeds along freeways and HOV/express lanes. In 2020, average speeds were higher on most of the managed lane segments than on the corresponding freeway segments. Only a handful of HOV segments experienced lower speeds than the average speeds across all lanes on the corresponding freeway segments (below the diagonal lines on **Figure 3-9** and **Figure 3-10**). All Express Lanes performed better than the general-purpose lanes. The HOV lane on I-80-WB from Powell Street (Overhead Bridge) to I-80/I-580 (GP Lanes Split) had the greatest speed differential during the afternoon peak period. In the morning peak period, the HOV lane on I-880 SB from SR 238 WB (Merge) to A St (Overhead Bridge) offered the greatest travel time saving.

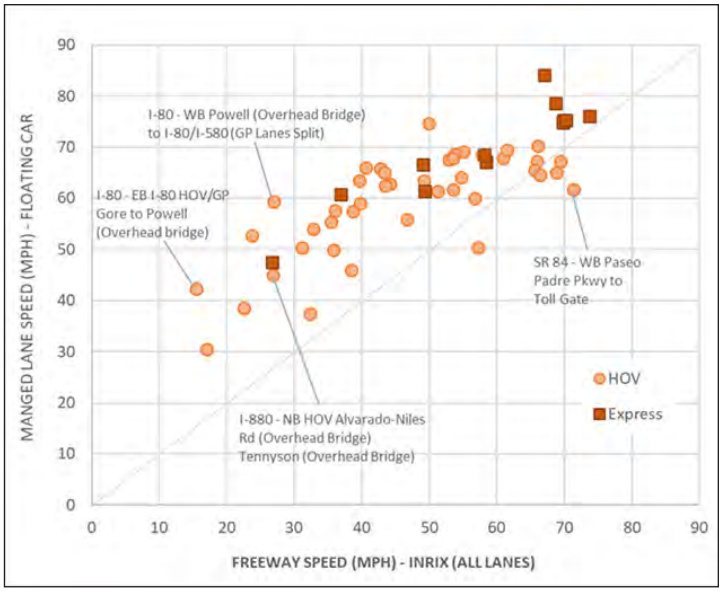


Figure 3-9. Freeway (Tier 1) to HOV/EL Speed Comparison - PM Peak Period

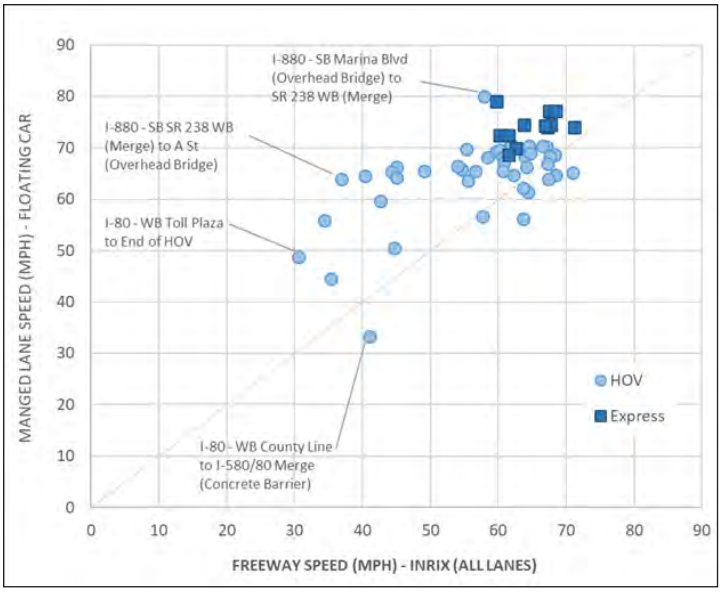


Figure 3-10. Freeway (Tier 1) to HOV/EL Speed Comparison - AM Peak Period

SPECIAL SEGMENTS

In addition to mainline freeways and managed lanes, Alameda CTC monitors 23 special segments mainly ramp connectors. Only two special segments (as shown in **Table 3-3**), or 1.4 directional miles (11 percent of the total special segment network) were congested during the afternoon peak period – compared to five segments, or 2.9 directional miles (22 percent of the total special segment network) in 2018. Both segments were also congested in the 2018 monitoring cycle. Speeds increased on most special segments in 2020 during the afternoon peak period. For example, speed increased from 13 mph in 2018 to 24 mph in 2020 at the SR 13/SR 24 interchange (from SR 13 NB to SR 24 EB).

In the morning peak period, only one special segment (as shown in **Table 3-3**), or 1.0 directional miles (7 percent of the total special segment network) were congested – compared to four segments, or 2.6 directional miles (19 percent of the total special segment network) in 2018. This segment was also congested in the 2018 monitoring cycle. Speeds increased on most special segments in 2020 during the morning peak period. For example, speed increased from 11 mph in 2018 to 40 mph in 2020 at the I-880/I-238 interchange (from I-238 WB to I-880 NB).

Table 3-3. Congested Special Segment

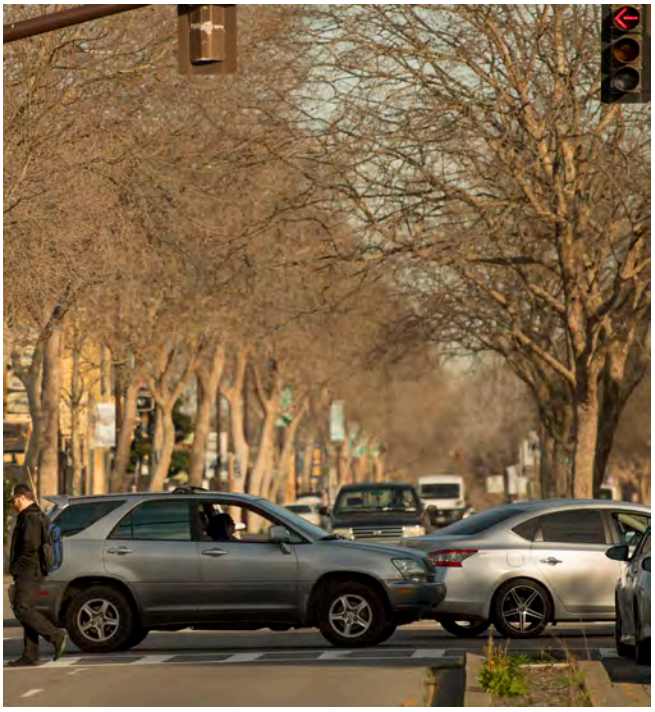
Peak Period			Segment Limits		Jurisdiction	Length	Plan Area	# Lanes	Speed (mph)	
	CMP ID	CMP Route	From	To		(mi)			2018	2020
PM	R2	I-80/I-580 Interchange	I-580 WB	I-80 N	Oak	0.45	North	2	18.2	17.3
PM	R22	I-880/SR 260 Connection	I-880 SB	SR-260 WB	Oak	0.99	North	Varies	10.0	11.7
AM	R22	I-880/SR 260 Connection	I-880 SB	SR-260 WB	Oak	0.99	North	Varies	15.4	15.9

CHAPTER 4: SURFACE HIGHWAYS AND ARTERIALS

In addition to freeways, Alameda CTC monitors the performance of major surface roads throughout the county. These include surface highways, principal arterials, and major arterials. The initial CMP network adopted in 1991 included 72 miles of highways and 27 miles of selected principal arterials (99 total miles) in addition to the 140 freeways and special segments discussed in the previous chapter. As commercial probe data has become available Alameda CTC has expanded the CMP network to include another 314 miles of major arterials and monitors these roads for informational purposes.

CONGESTION ON SURFACE HIGHWAYS AND ARTERIALS

Although drivers regularly encounter delay on surface roads, the nature of that delay is very different from freeways. Highways and arterials are seldom fully congested, even during the PM peak period. Drivers commonly experience delay from turning queues and at high volume intersections. These locations are carefully managed by cities to prevent sustained congestion. Drivers may also reroute on to less congested routes in the event of an incident. Similar to freeways, any CMP arterial segments that perform at LOS F is considered congested. Arterial LOS is determined based on both arterial class and speed, as detailed in the methodology included **Appendix A. Appendix B** contains the LOS maps for the entire CMP network as well as for each of the planning areas.



Surface Highways and Principal Arterials (Tier 1)

Congestion on surface highways and principal arterials declined during both the afternoon and morning peak periods in 2020. In the afternoon, only two surface highway segments (as shown in Table 4-1) covering 2.2 directional miles (1.1 percent of the Tier 1 arterial network) were congested. In 2018, three segments, or 2.4 directional miles (1.2 percent of the Tier 1 arterial network) were congested. One of the congested segments, SR 84 EB between Vallecitos Lane and Vallecitos Nuclear Center, was a new congested segment in 2020. This segment was also congested in 2016. Speeds increased on most Tier 1 arterials in 2020. For example, speed increased from 9 mph in 2018 to 25 mph in 2020 on SR 84 EB between Sunol Road and Pleasant-Sunol Road.

Table 4-1. Congested Tier 1 Arterial Segments - PM Peak Period

		Segment Limits		Jurisdiction	Length	Plan Area	# Lanes	Speed (mph)	
CMP ID	CMP Route	From	To		(mi)			2018	2020
A127	SR 84-EB	SR 84 (Off) / I-680	Vallecitos Ln	Uninc	1.05	East	1	13.4	22.9
A128	SR 84-EB	Vallecitos Ln	Vallecitos Nuc.Cntr	Uninc	1.13	East	1	29.6	22.5

No highways or principal arterial segments were congested during the morning peak period in 2020. The segment on SR-84 EB from Sunol Road to Plea-Sunol Road was congested in 2018 but improved in 2020. Similar to the afternoon peak period, speeds increased in the morning peak period on most Tier 1 arterials in 2020. For instance, speed increased from 13 mph in 2018 to 38 mph in 2020 on SR 84 EB between Sunol Road and Pleasant-Sunol Road.

Major Arterials (Tier 2)

No major arterials were congested in 2020 during either the afternoon or morning peak period. Four major arterial segments that were congested in 2018 but not congested in 2020, during the afternoon peak period, are listed below:

- Hesperian Boulevard-Union City Boulevard NB: Between Union City/Alvarado Boulevard and Whipple Road
- Hesperian Boulevard-Union City Boulevard NB: Between Whipple Road and Hesperian/Union City Boulevard/Over-Bridge
- Vasco Road NB: Between WB I-580 Off Ramp and Scenic Avenue
- Vasco Road NB: Between Scenic Avenue and Dalton Avenue/City-County Line

AVERAGE TRAVEL SPEED

Average speeds on highways and arterial roads decreased over the few monitoring cycles. However, due to the reduced travel demand caused by the COVID-19 pandemic, the average speeds on both Tier 1 and Tier 2 arterials in 2020 increased, as shown in Figure 4-1 and Figure 4-2.

- Highways and Principal Arterials:
  - During the morning peak period, the average speeds increased by 17% (+4.4 mph).
  - During the afternoon peak period, the average speeds increased by 14% (+3.3 mph).

- Major Arterials:
  - During the morning peak period, the average speeds increased by 20% (+4.5 mph).
  - During the afternoon peak period, the average speeds increased by 15% (+3.4 mph).

Type	Peak Period	Average Speed (mph)		Change (2020 vs. 2018)
		2018	2020	
Highways / Principal Arterials	AM	25.5	29.9	+17%
	PM	23.9	27.2	+14%
Major Arterials	AM	22.7	27.2	+20%
	PM	22.1	25.5	+15%

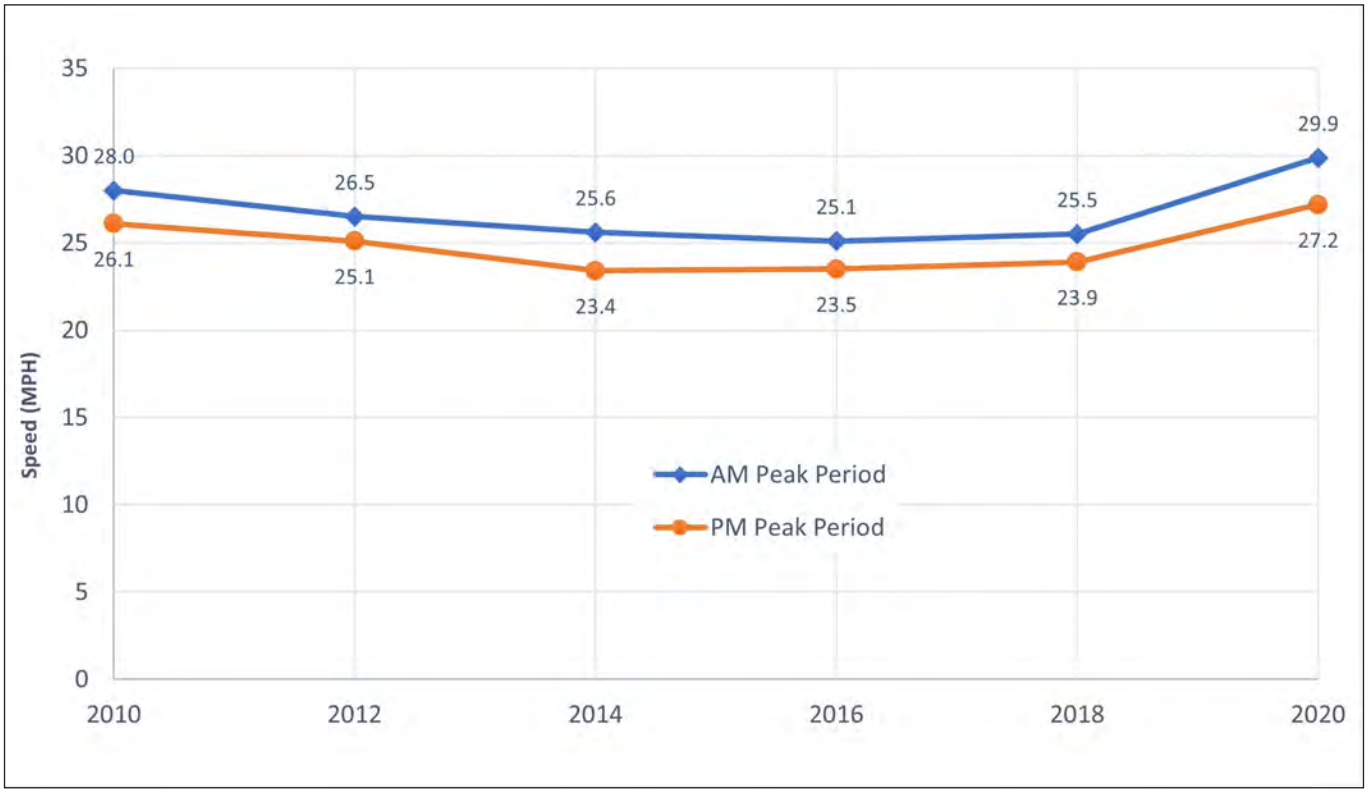


Figure 4-1. Surface Highways/Principal Arterials (Tier 1) – Countywide Average Speed (2010 – 2020)

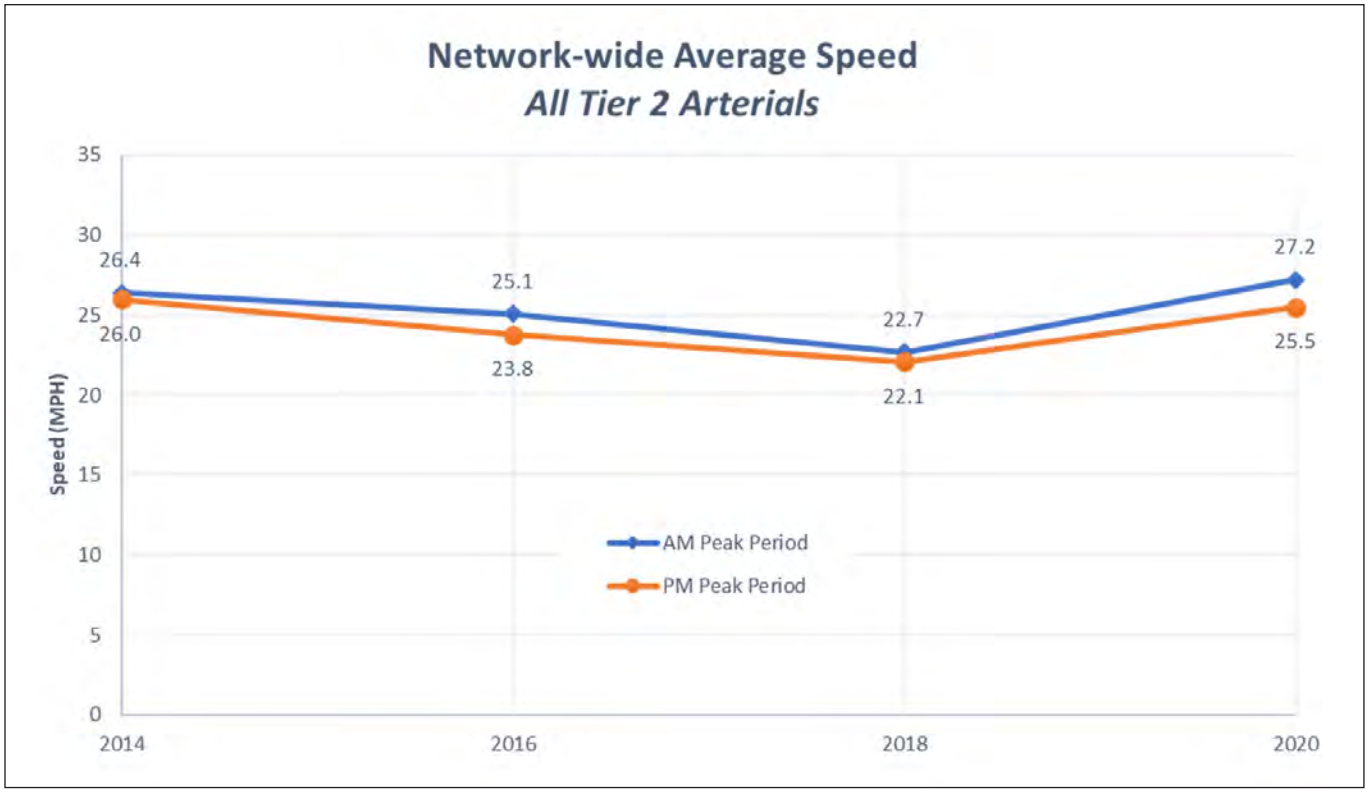


Figure 4-2. Major Arterials (Tier 2) – Countywide Average Speed (2014 – 2020)

Surface Highways (Tier 1)

In Alameda County, there are approximately 70 centerline-miles of surface highways which are under the jurisdiction of the California Department of Transportation, as listed in **Table 4-2**.

Table 4-1. Congested surface highway/principal arterial segments (Tier 1) - PM Peak Period

State Route	Highways	Cities	Direction	Centerline Miles
SR 13	Ashby Ave	Berkeley	E/W	3.8
SR 61	Doolittle Dr, Otis Dr, Broadway, Encinal Ave, Central Ave, Webster St	Alameda	N/S	7.6
SR 77	42nd Ave	Oakland	E/W	0.4
SR 84	Niles Canyon, Thornton Ave, Fremont Ave, Peralta Ave, Mowry Ave	Fremont/ Pleasanton Livermore/ Unincorporated County	E/W	22.6
SR 92	Jackson St	Hayward	E/W	1.7
SR 112	Davis St	San Leandro	E/W	0.6
SR 123	San Pablo Ave	Albany/Berkeley Emeryville/ Oakland	N/S	5.2
SR 185	International Blvd/ East 14th	Oakland/ San Leandro/ Hayward	N/S	10.5
SR 238	Mission Blvd/Foothill Blvd	Hayward/Union City/ Fremont	N/S	14.7
SR 260	Webster/Posey Tubes	Alameda/ Oakland	N/S	1.4
SR 262	Mission Blvd	Fremont	E/W	1.6

The speed changes from 2018 to 2020 on all Tier 1 arterials are illustrated in **Figure 4-3** and **Figure 4-4** for the afternoon and morning peak periods, respectively. Although speeds declined on 29 segments (19% of the highway network) during the afternoon peak period and 21 segments (14% of the highway network) during the morning peak period, due to the COVID-19 pandemic, average speeds increased on the majority of the highway segments in 2020. Average speeds increased by even more than 50 percent on 12 segments (8% of the network) during both the afternoon and morning peak periods. Overall, average speeds on highways increased by 13% (+3 mph) during the afternoon peak period, and 16% (+4 mph) during the morning peak period.

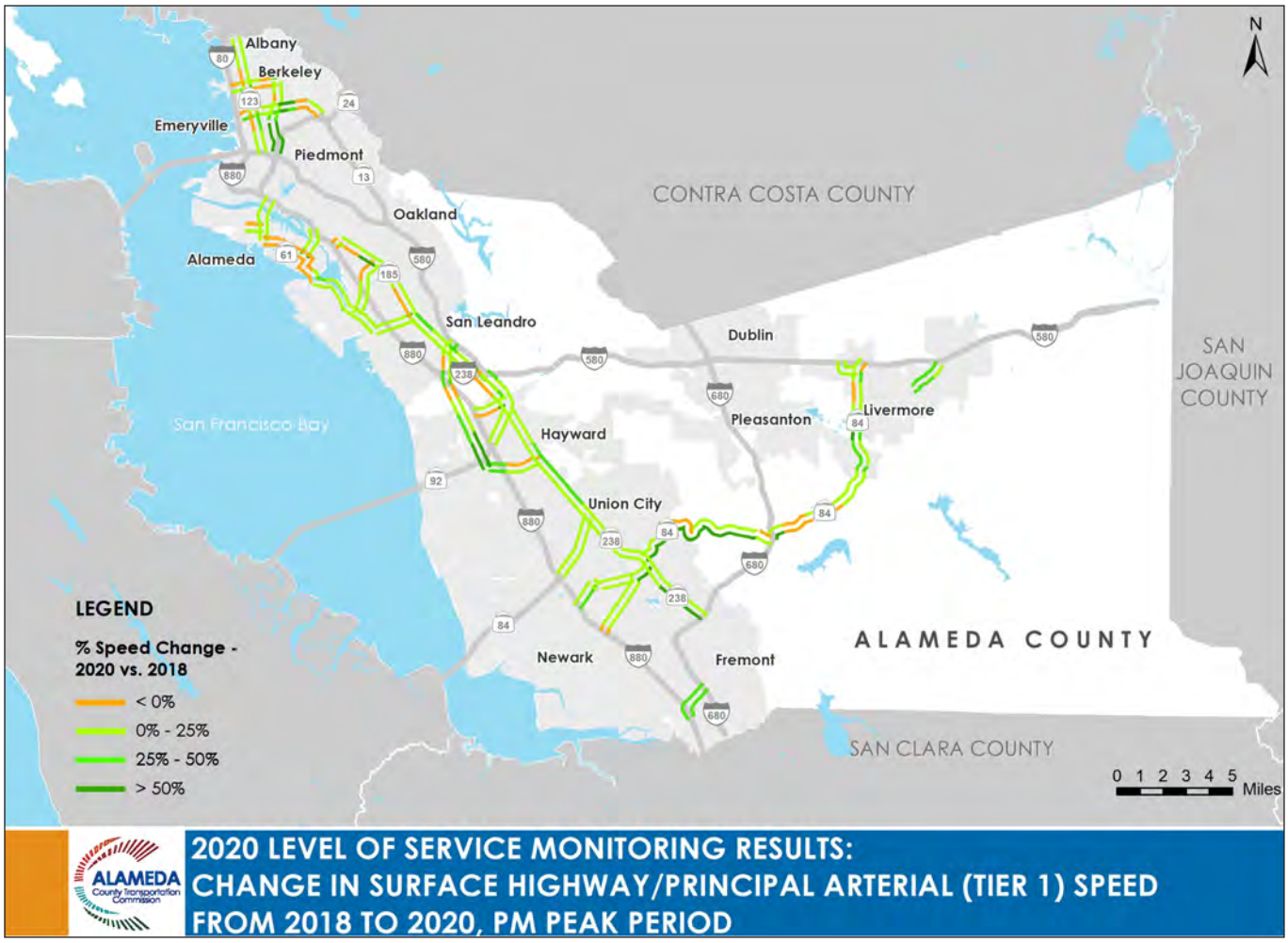


Figure 4-3. Change in Surface Highway / Principal Arterial (Tier 1) Speed from 2018 to 2020 - PM Peak Period

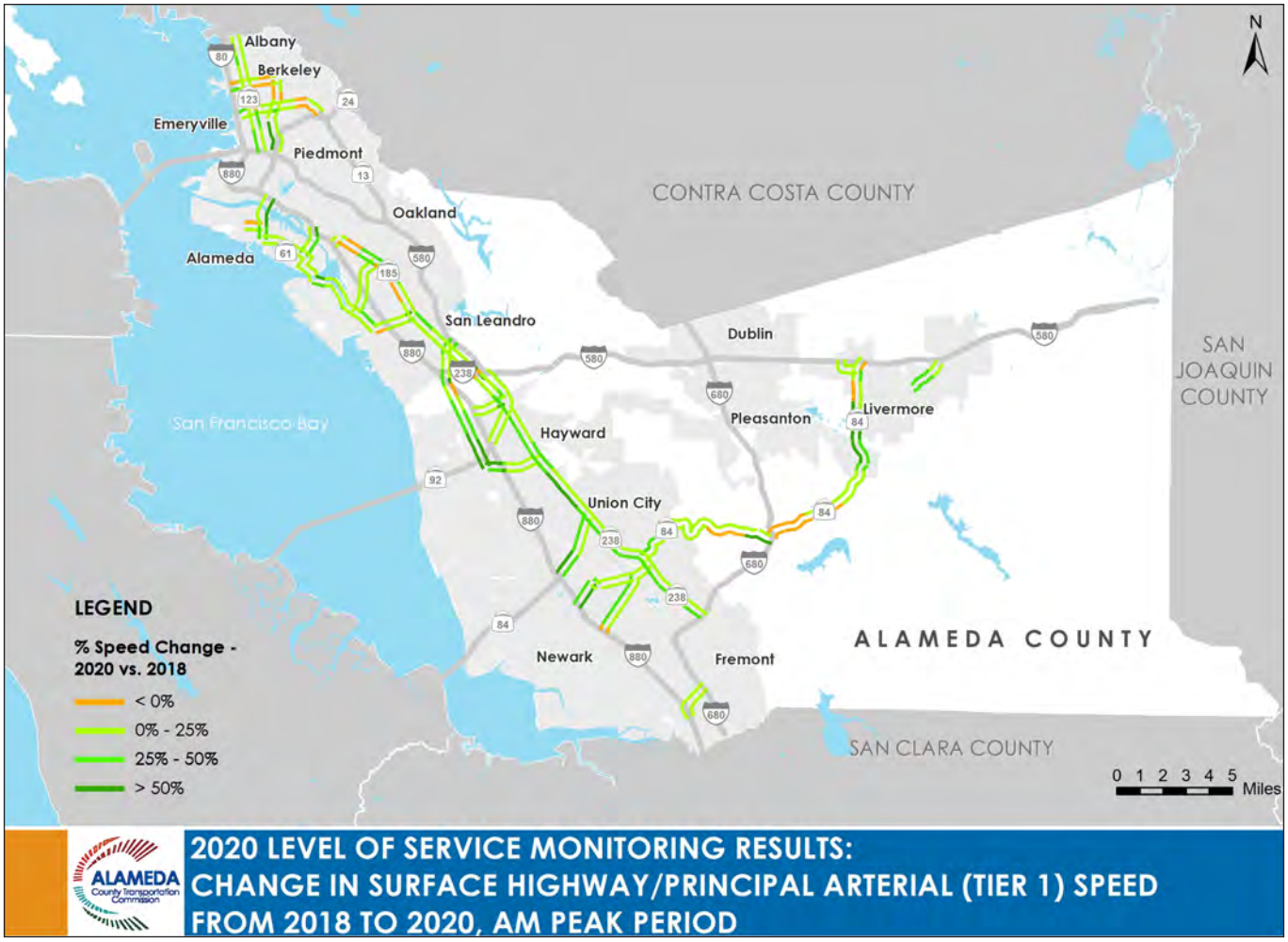


Figure 4-4. Change in Surface Highway / Principal Arterial (Tier 1) Speed from 2018 to 2020 - AM Peak Period

Principal Arterials (Tier 1)

Principal arterials extend approximately 29 centerline miles within the Alameda County. Alameda CTC has monitored these roads since the monitoring program's inception in the 1990s. Principal arterials, unlike highways, are managed by local jurisdictions.

The speed changes from 2018 to 2020 on principal arterials are also illustrated in **Figure 4-3** and **Figure 4-4** for the afternoon and morning peak periods, respectively. Although speeds declined on 14 segments (17% of the principal arterial network) during the afternoon peak period and 11 segments (13% of the principal arterial network) during the morning peak period, due to the COVID-19 pandemic, average speeds increased on the majority of the principal arterial segments in 2020. Average speeds increased by even more than 50 percent on nine segments (11% of the network) and 11 segments (13% of the network) during the afternoon and morning peak periods, respectively. Overall, Average speeds on principal arterials increased by 17% (+3 mph) during the afternoon peak period, and 21% (+4 mph) during the morning peak period.

Major Arterials (Tier 2)

Tier 2 arterials network consists of 414 CMP segments covering a total of 314 miles. INRIX data was not available on some of the segments in 2018 and/or 2020. Out of 414 Tier 2 segments, 312 segments (75%) had data in 2018, while this increased to 373 (90%) in 2020. Comparisons of speed changes were made only for the segments with speed data available for both years, as illustrated in Figure 4-5 and Figure 4-6 for the afternoon and morning peak periods, respectively.

Although speeds declined on 53 segments (18% of the major arterial network) during the afternoon peak period and 32 segments (11% of the major arterial network) during the morning peak period, due to the COVID-19 pandemic, average speeds increased on the majority of the major arterial segments in 2020. Average speeds increased by even more than 50 percent on 15 segments (5% of the network) and 13 segments (4% of the network) during the afternoon and morning peak periods, respectively. Overall, average speeds on major arterials increased by 15% (+3 mph) during the afternoon peak period, and 20% (+5 mph) during the morning peak period.

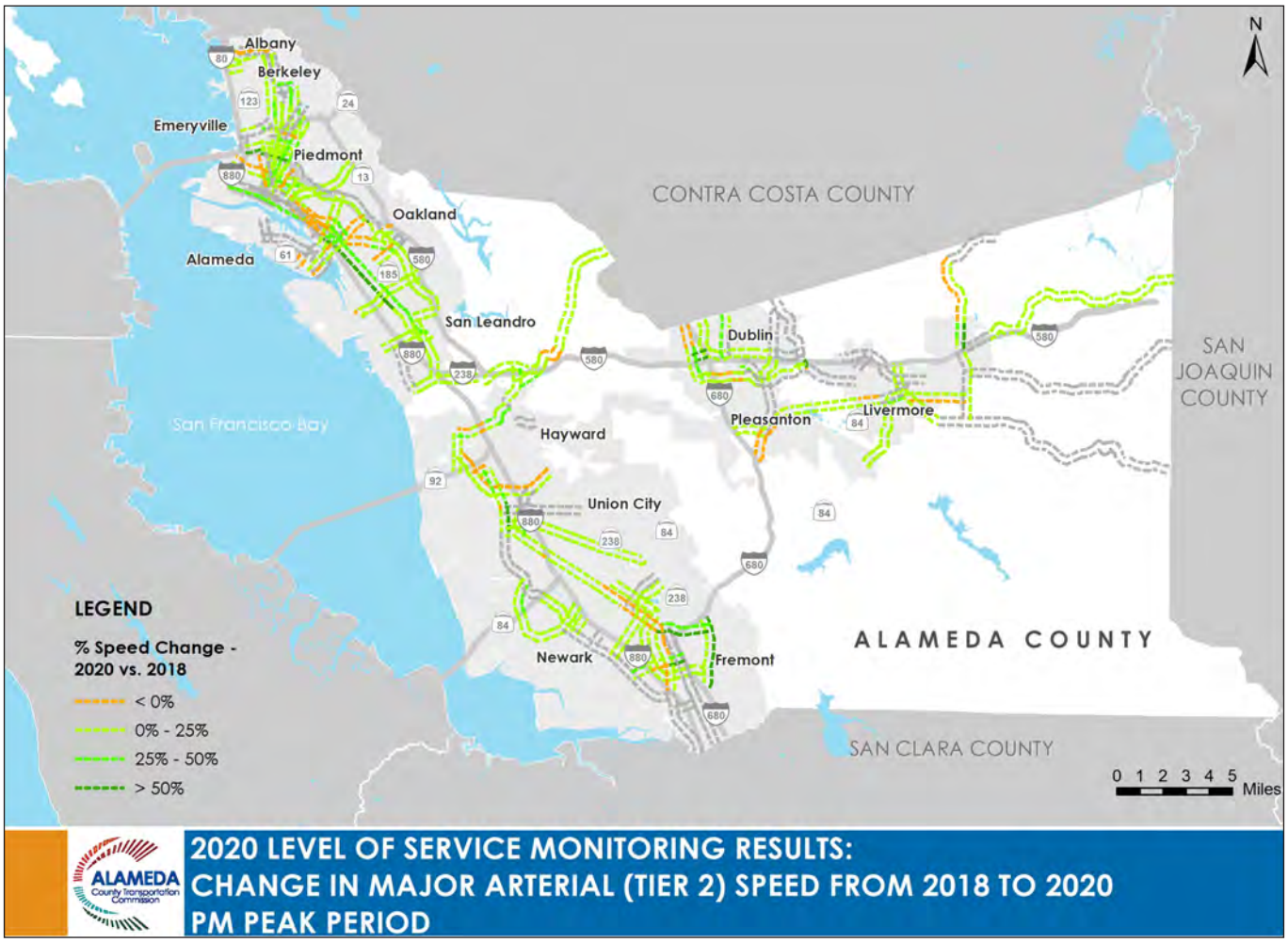


Figure 4-5. Change in Major Arterial (Tier 2) Speed from 2018 to 2020 - PM Peak Period

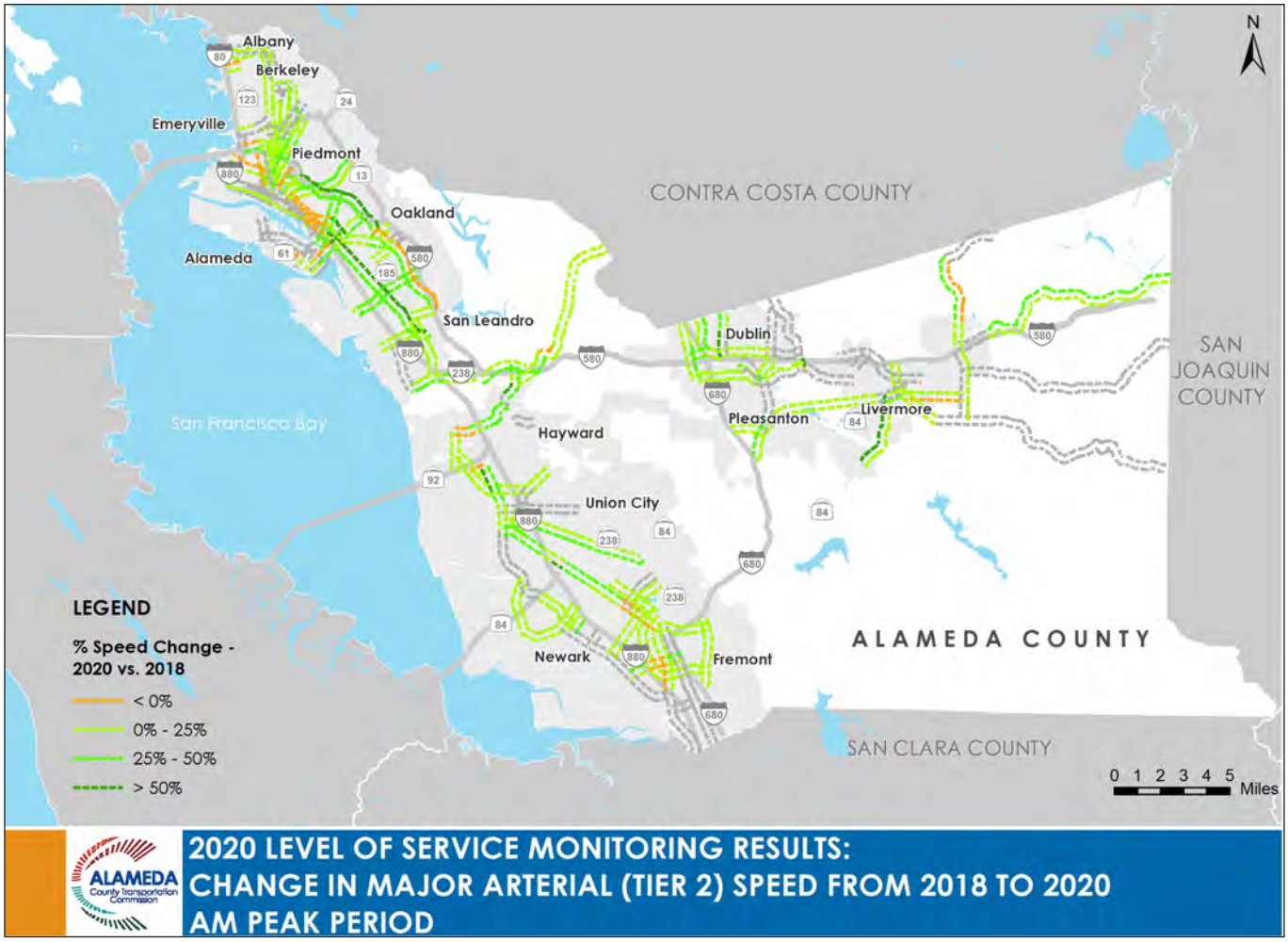


Figure 4-6. Change in Major Arterial (Tier 2) Speed from 2018 to 2020 - AM Peak Period

CHAPTER 5: ACTIVE TRANSPORTATION

Since 2010, Alameda CTC has conducted biennial manual bicycle, pedestrian, and scooter counts at 150 intersections throughout Alameda County to monitor active transportation activity and better understand emerging trends. The program was overhauled in 2016, and 2020 is the third cycle data are available for the current selection of locations. This chapter presents a brief analysis of the last three cycles with a focus on the 2018 and 2020 cycles.

Active Transportation counts for each cycle are conducted by paid professionals who are instructed to use the National Pedestrian and Bicycle Documentation Project methodology. Counts were collected during the afternoon peak period (4-6pm) for all locations, similarly to the rest of the monitoring report. Additionally, some locations have data collected midday (12-2 p.m.) or after school (2-4 p.m.), on weekdays. All counts are scheduled to take place between September and October. This is true even when other multimodal performance data are collected in the spring, thus 2020 was the first cycle to have auto and active transportation data collected during the same window. Due to large regional wildfires which occurred during the count window during the last three cycles, no counts are conducted on days where the local Air Quality Index exceeds 80.

SUMMARY

Similar to the trends observed for motorized modes, the current active transportation data reflects drastic changes in travel compared to previous years, likely due to the COVID-19 pandemic. Pedestrian activity in particular was down significantly. Additionally, the 2020 active transportation counts may have been uniquely affected by a series of historically large wildfires in August and September. While the count methodology does account for acute impacts from poor air quality, the 2020 fire season was so large it may have had longer term impacts.

It should also be noted that the bicycle and pedestrian counts are not as comprehensive as the roadway monitoring. The 150 intersections in

the count program do not offer similarly comprehensive geographic coverage and since bicycle and pedestrian trips typically cover shorter distances, activity is less likely to be captured, especially within neighborhoods. Anecdotal accounts during the 2020 cycle of greatly increased recreational activity by remote workers is especially unlikely to be captured by the Alameda CTC count program which focuses on major activity centers.

A summary of the pedestrian and bicyclist counts is provided below.

- There was a large decline in pedestrian counts in 2020 compared to 2018. Pedestrian counts were down 56% in the afternoon, 62% mid-day, and almost 80% after school.
- Bike counts dropped only modestly, six percent during the afternoon, five percent mid-day, and 10% after school.
- Limited data is available for scooters, as scooter counts were added to the Count Program in 2018 for the first time. Scooter counts during the PM Peak showed a 65% decline from 2020.

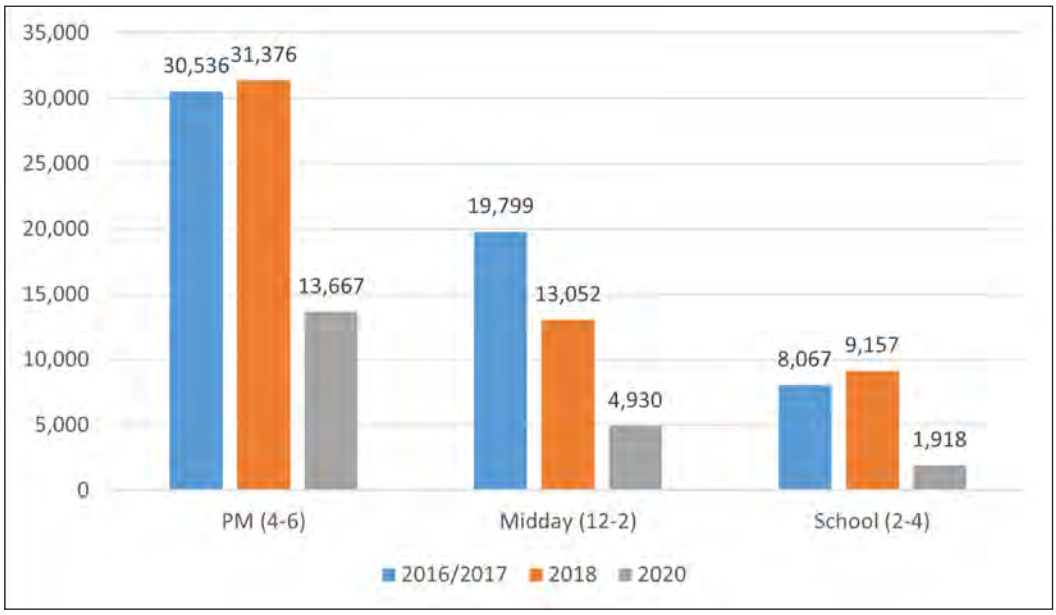


Figure 5-1. Pedestrian Counts, 2016-2020

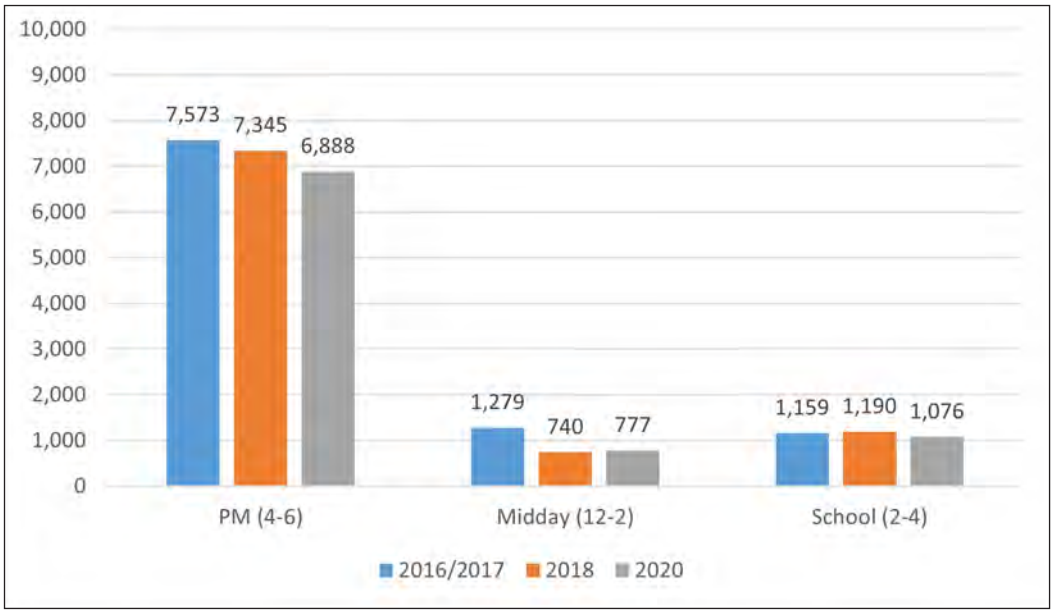


Figure 5-2. Bicyclist Counts, 2016-2020

HIGH VOLUME LOCATIONS

Bicycle and pedestrian activity at count locations is geographically concentrated in Alameda County. The 37 high count locations[1] , which represent 64% of all bicycles or pedestrians counted and hereafter referred to as high-volume locations are mostly located in northern Alameda County, and about one third of them are near either the UC Berkeley campus or downtown Oakland. Total bicyclist activity was more evenly distributed across all count locations, and they are also located where there are existing bicycle paths near residential neighborhoods.

The high pedestrian volume locations account for almost 65% of all afternoon pedestrian activity and 90% of mid-day activity. These high-volume locations generally saw the largest reductions in activity, with an average 61% drop in the PM period and a 64% drop in the mid-day period. These numbers not only reflected the significant shift in travel behavior due to shifts to work-from-home and diminished mid-day (lunch hour) travel activity, but also reflected the drop in pedestrian activity around the UC Berkeley campus due to the university's COVID-19 protocols. UC Berkeley conducted the fall semester with fully remote instruction. On the other hand, as shown in Figure 5-3, pedestrian traffic at medium- and low-volume locations did not see as large a decline in traffic between 2020 and 2018 compared to the highest traffic locations. There was a 44% fall in PM peak pedestrian traffic (compared to 61% at highest traffic locations) and 45% fall in mid-day pedestrian traffic (compared to 64% at highest traffic locations) in 2020 compared to 2018. These results suggest a larger share of pedestrian activity at these locations was not work-related.

1 High count locations based on 2018 cycle counts.

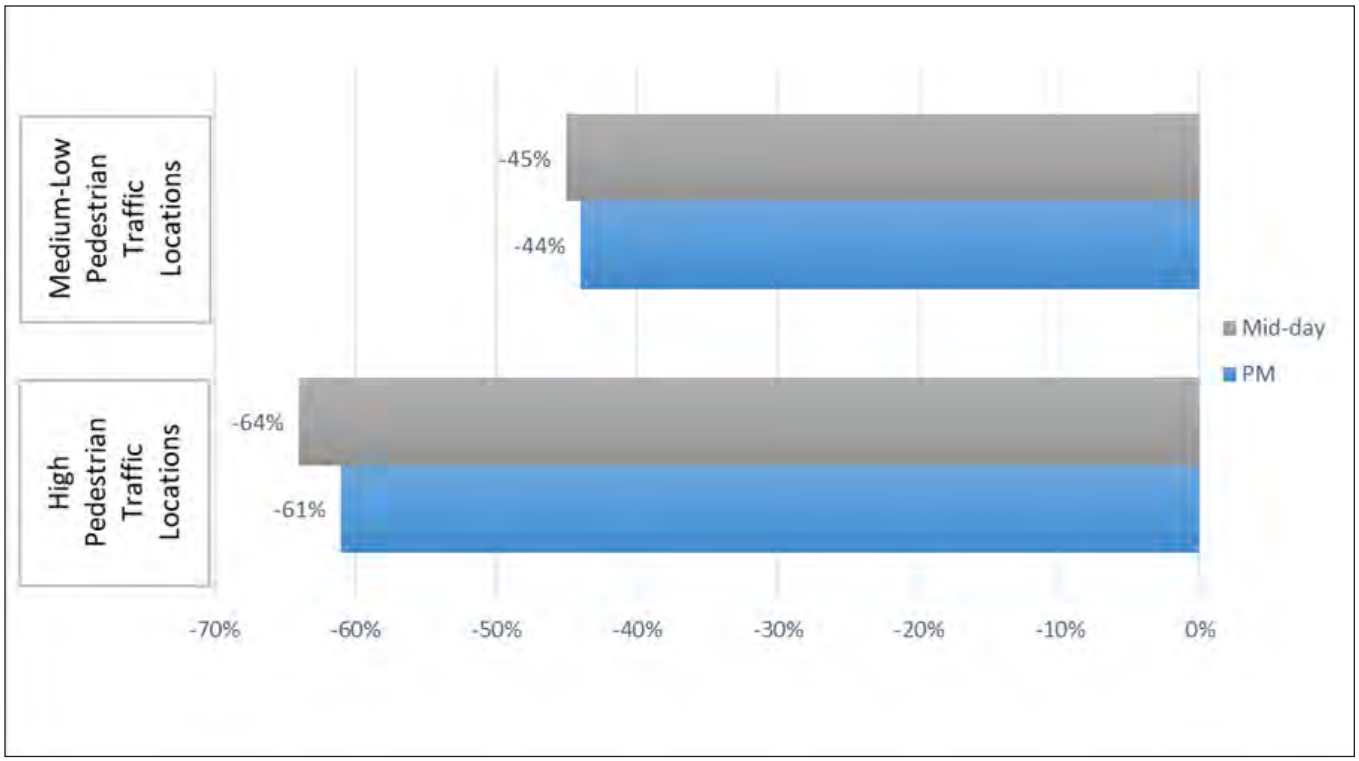


Figure 5-3. Changes in High Pedestrian Traffic and Medium-Low Traffic Locations

Bike counts at the high bicyclist volume locations went down 13% in the PM period but increased by 6% in the mid-day period, as shown in Figure 5-4 below. However, the reserve pattern was observed at the low volume locations. The increase in bicycle activity could be due to more bicyclists who continued to work from home and turned to their local neighborhood streets for bike activity. For example, bicyclist counts at Christie Ave and Powell Street in Emeryville (location #41), which is one of key intersections connecting to Bay Trail, went up 1.5 times (from 26 to 65) in the PM period and went up 2.6 times (from 11 to 40) in the mid-day period. Similar trend was observed at locations near parks or downtown areas. In Fremont near the Mission Peak Park, bicyclist counts increased from eight to 36 in the PM and five to 22 in the mid-day at Mission Blvd and Washington Blvd (location #55). In Hayward, for example, bicyclist counts increased from 21 to 62 in the PM at Main St and B St (location #63). Industry sales data also confirmed the trend that nationwide bike sales in June 2020 saw a 63% year-over-year growth,[2] indicating generally increased interest in bicycling.

2 The NPD Group (https://www.npd.com/wps/portal/npd/us/news/press-releases/2020/plot-twist-us-performance-bike-sales-rise-in-june-reports-the-npd-group/)

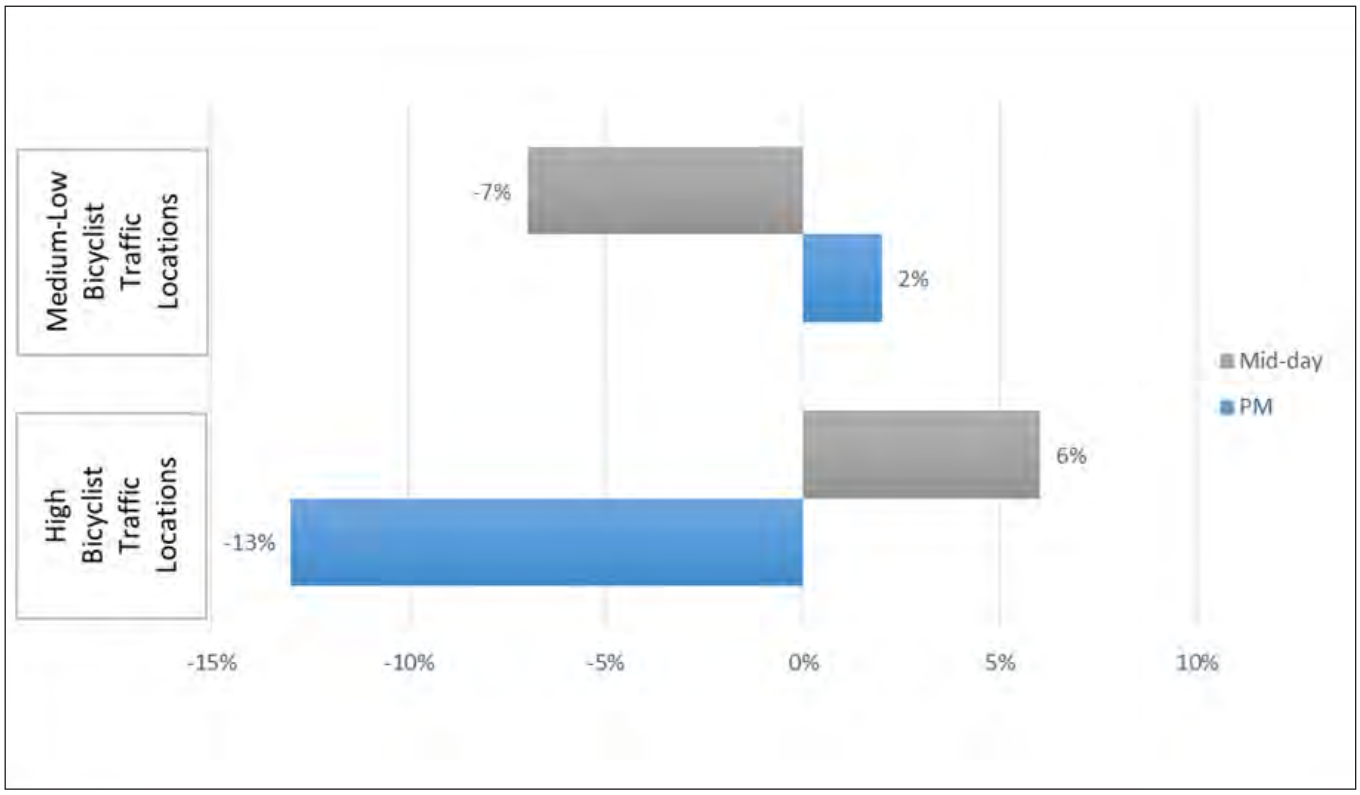


Figure 5-4. Changes in High Bicyclist Traffic Locations vs. Medium-Low Traffic Locations

BIKE HELMET USE, WRONG-WAY TRAVEL, AND RIDING AND SIDEWALK

Trends in bicycle helmet use have been consistent through the last three monitoring cycles. Around one-third of bicyclists observed did not wear a helmet. There was a 13% increase in riding on sidewalks for bicyclists in 2020 compared to 2018. There were 640 bicyclists riding the wrong way compared to 207 in 2018 and 534 in 2016/2017. Locations where bicyclists ride on sidewalks or ride the wrong way may indicate areas where there are low-quality bike facilities and/or a locations with inexperienced or uncomfortable bicycle riders. There was 24% of bicyclists rode on sidewalks in 2020 compared to 20% the previous year, and 9% of bicyclist traveled the wrong way in 2020 compared to 3% the previous year.

SCOOTER

Scooter counts from 2018 were highly concentrated in downtown Oakland (88% of total PM counts). In 2018, there were 147 of locations (97% out of total) where less than 10 scooters were counted. There was 80% decrease in the scooter counts collected in downtown Oakland, and a similar trend was observed in Berkeley, Emeryville, and Pleasanton. In Fremont, however there were 58 scooters counted during the PM in 2020, a significant increase compared to just three in 2018.

CHAPTER 6: SUMMARY

2020 was a year unlike any other and the COVID-19 pandemic radically changed transportation and the economy almost overnight after countywide shelter-in-place orders were issued on March 16, 2020. The unemployment rate climbed from three percent to 14 percent over just two months, putting about 125,000 Alameda County residents out of work. At the same time, remote work and telecommuting increased significantly during the COVID-19 pandemic to support social distancing. As many as 300,000 workers, or 40% of all workers in Alameda County may have telecommuted through the pandemic.

These combined factors had a radical and immediate impact on transportation demand and congestion. In Alameda County, vehicle hours of delay (VHD), one measure of congestion, fell about 94% immediately after the shelter-in-place order was issued. Vehicle Miles Traveled fell about 30% during at the same time.

Over the subsequent summer and into the fall, VMT recovered to something close to pre-pandemic levels and was down eight percent year-to-date by October 2020. VHD on the other hand was still down about 70% by the fall. At the same time average speeds on both freeways and arterials increased, as shown in **Figure 6-1**. Many roads that were fully congested before the pandemic moved at near free-flow speeds especially during the mornings:

FREEWAYS:

- During the AM peak period, average speeds on nearly all freeways were near free-flow conditions, with an average speed of 62 mph, up 26% from 2018.
- During the PM peak period, average freeway speeds were lower, about 56 mph, but still up 19%.
- Weekend average freeway speeds were also up 12% to over 64 mph, close to free-flow conditions.

SURFACE HIGHWAYS AND PRINCIPAL ARTERIALS (TIER 1):

- During the AM peak period, average speeds increased from less than 26 mph to about 30 mph, about a 17% increase.
- During the PM peak period, average speeds increased from less than 24 mph to more than 27 mph, about a 14% increase.

MAJOR ARTERIALS (TIER 2):

- During the AM peak period, average speeds increased from less than 23 mph to about 27 mph, about a 20% increase.
- During the PM peak period, average speeds increased from about 22 mph to more than 25 mph, about a 15% increase.

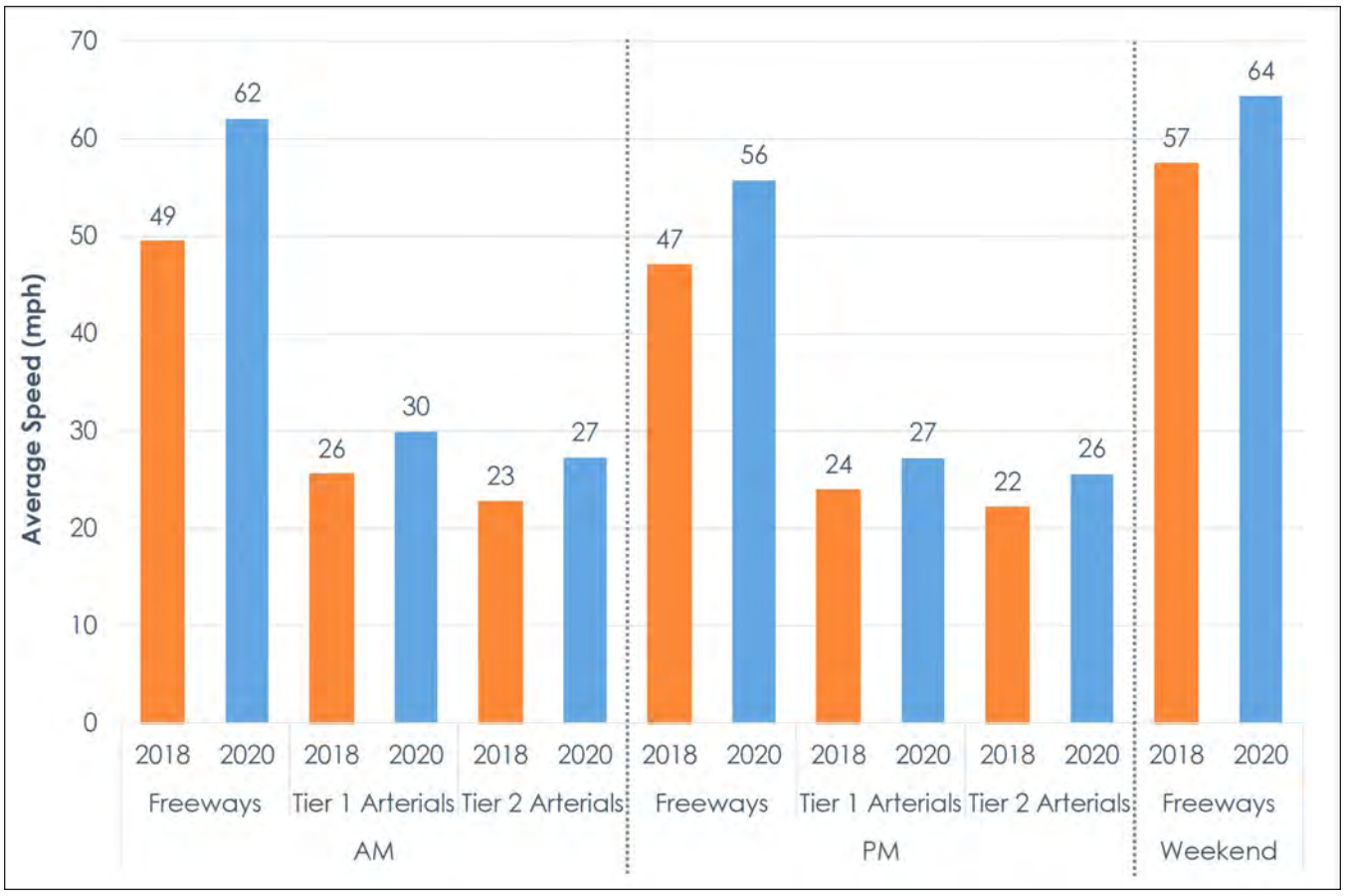


Figure 6-1. Average Speeds on CMP Network – 2018 vs. 2020

Bicycle and pedestrian count data, also collected in the fall, revealed that pedestrian activity, especially near major commercial districts, was down significantly—56 percent during the PM period, 62 percent during the mid-day, and 80 percent after school. Bike counts on the other hand dropped only modestly—six percent during the afternoon commute, five percent during the mid-day, and ten percent after school despite distance learning throughout Alameda County. There are multiple potential explanations for this: (1) activity may be more geographically diffuse and has shifted away from the limited number of count locations,

(2) a historic wildfire season may have had a seasonal effect on active transportation, (3) activity at historically very high-volume locations like downtown Oakland and around UC Berkeley dropped most significantly and may have had an outsized effect on total volumes. If residents are more likely to use their local neighborhood streets for recreation as they continue to work from home, either in hybrid work patterns or full time. It will be worth exploring the possibility of expanding the count sites to better capture recreational bicycling and walking in the future.

Data collected for both active transportation and on roadways reflects very different travel behavior than the 2018 monitoring cycle and the COVID-19 pandemic may permanently change individual behaviors and attitudes, even as social distancing restrictions are eased. Alameda CTC will continue to monitor the impact of COVID-19 on travel behaviors. A mix of infrastructure and policy changes may be needed to meet new demands as longer-term trends emerge.