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Technical Memorandum

July 3, 2023

Project# 21385

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From: Lilian Wu, Elliot Cobb, and Mike Aronson, Kittelison & Associates

RE: **AC Transit Realign: Origin-Destination Analysis**

INTRODUCTION

AC Transit connects the East Bay communities to each other and to regional destinations. As part of the on-going network realignment effort, this memorandum summarizes the data exploration Kittelison & Associates (Kittelison) conducted to identify important origin-destination patterns for AC Transit transportation planning.

The purpose of this analysis is to provide data-oriented support on how trips are distributed within the AC Transit service area and between the AC Transit service area and other parts of the Bay Area. The analysis considers:

- **Geography:**
 - The AC Transit service area
 - Four Planning Areas within the service area
 - Detailed origin-destination zones (406) and zone groups (28)
 - Equity Priority Communities
- **Time Periods:**
 - COVID-19 impacts
 - Pre-COVID period: 2019 September & October
 - During-COVID period: 2021 September & October
 - After-COVID period: 2022 March & April
 - Time of day:
 - Early AM (12:00 AM – 6:00 AM)
 - AM peak (6:00 AM – 10:00 AM)
 - Mid-day (10:00 AM – 3:00 PM)
 - PM peak (3:00 PM – 7:00 PM)
 - Late PM (7:00 PM – 12:00 AM)
- **Trip Attributes:**
 - Trip purposes
 - Travel modes
 - All-vehicle: all motor vehicles including automobiles, buses and trucks.
 - Rail index and bus index: a measure to assess relative transit passenger activity.

METHODOLOGY

This Origin-Destination analysis is based on StreetLight Data (StreetLight). StreetLight is a San Francisco based company that collects, aggregates, and analyzes anonymous Location Based Services (LBS) data to inform evaluation of trip patterns. StreetLight uses a set of algorithms to identify which trip movements are most likely to be using autos, rail transit, bus transit, bicycling or walking. The attributes used include speed, route, types of stops and starts, and characteristics of the transportation system (for example, walk trips would not follow a freeway) and land uses such as rail stations.

The StreetLight data set represents a sample of total travel, as it only includes devices (GPS units, mobile phones, etc.) that are actively transmitting coordinates. To represent total travel amounts, the sampled data must be factored up to total travel. For total vehicle travel, the adjustment factors were calibrated based on a large collection of traffic counts throughout the United States. For bus and rail trips, the factors were calibrated based on reported ridership by route on several major transit services. Because these are estimated total trips from a sample rather than actual counted trips, StreetLight refers to the transit results as "rail index" and "bus index" quantities, as they can be used for relative comparison of travel patterns but may not precisely report actual bus or transit ridership.

The StreetLight data for the AC Transit service area were compiled for typical weekday conditions, represented by Tuesday to Thursday.

AC Transit specified boundaries for 406 StreetLight analysis zones. The analysis zones are smaller and more detailed within the AC Transit service area, and larger for other parts of the Bay Area.

GEOGRAPHY

The StreetLight data were provided for trips beginning in or ending in 406 StreetLight analysis zones covering most of the San Francisco Bay Area. To help fully understand these origin/destination patterns, the analysis zones have been aggregated at three geographic scales:

1. Service Area: Entire AC Transit service area
2. Planning Areas: Four subareas AC Transit typically uses for planning purposes within its service area
3. Zone Groups: Within the AC Transit service area, cities or city subareas, and adjacent counties outside the AC Transit service area

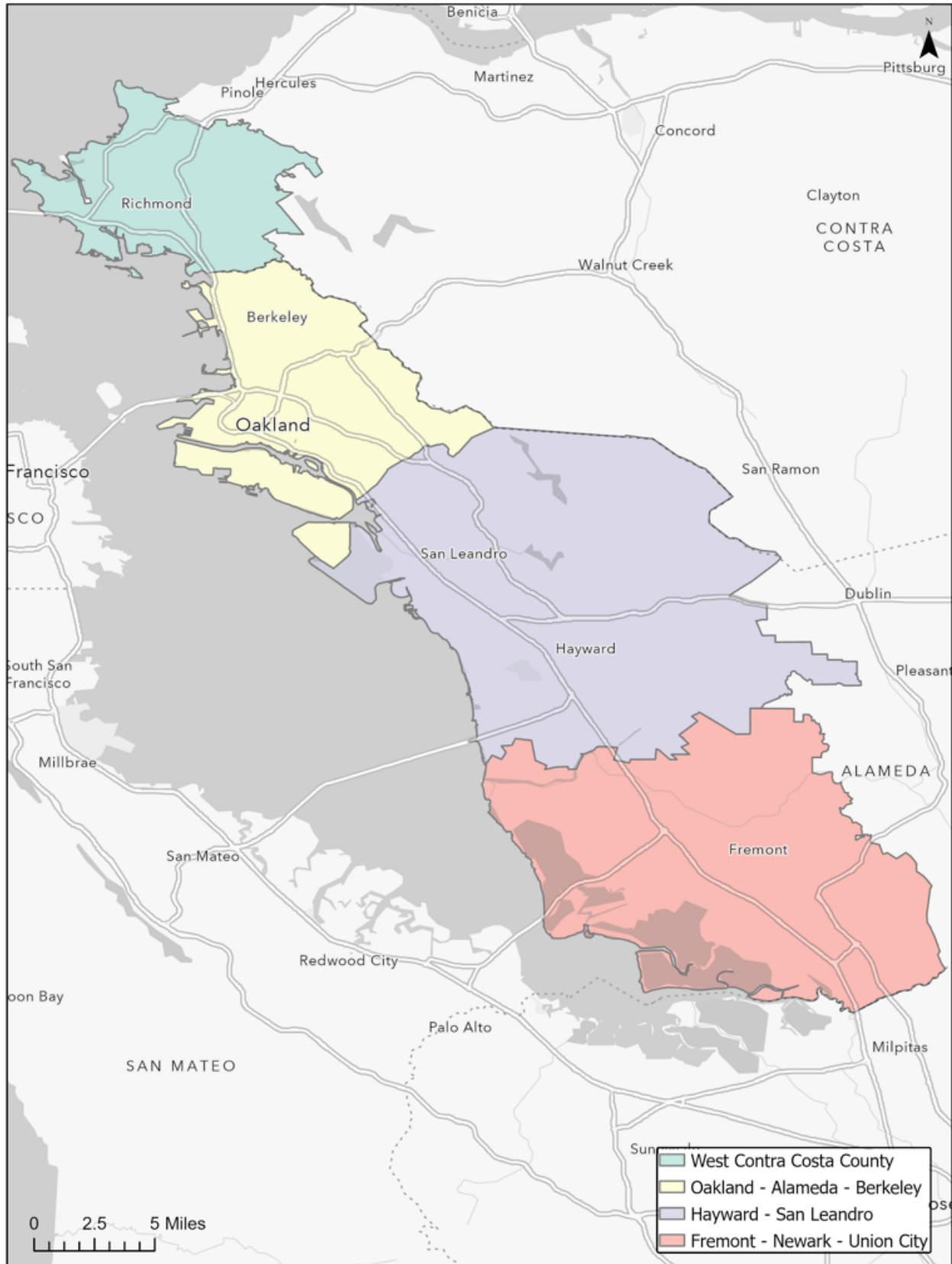
The origin-destination patterns are also reported separately for Equity Priority Communities, as defined by the Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG) for Plan Bay Area 2050, the current Bay Area Regional Transportation Plan (RTP).

AC Transit Service Area and Planning Areas

The entire AC Transit service area includes four Planning Areas as shown in Figure 1. They are:

1. West Contra Costa County
2. Oakland-Alameda-Berkeley
3. Hayward-San Leandro
4. Fremont-Newark-Union City

Figure 1 AC Transit Service Area and Planning Areas



Zone Groups

Figure 2 illustrates the 406 Streetlight analysis zones covering the AC Transit service area and additional major destinations in the Bay Area. In addition, the zones have been further grouped into 28 zone groups established for this analysis. The zone groups generally correspond with city boundaries within the AC Transit service area, and with county boundaries outside the AC Transit service area, with the following exceptions:

- Areas within AC Transit Service Area where cities were further subdivided:
 - Oakland-Downtown
 - Oakland-Airport
 - Oakland-Other
 - Berkeley-Downtown: including downtown and UC Berkeley Campus
 - Berkeley-Other
 - Fremont-South: including Warm Springs district and Tesla
 - Fremont-Other
- Areas outside the AC Transit Service Area where counties were further subdivided:
 - San Francisco-Downtown
 - San Francisco-Other

Equity Priority Communities

Figure 3 highlights the equity priority communities within the origin-destination study area. Equity Priority Communities are census tracts that have a significant concentration of underserved populations, such as households with low incomes and people of color. A combination of additional factors helps define these areas. The current classifications are based on the United States Census American Community Survey 2014-2018.

Figure 2 StreetLight Analysis Zones and Zone Groups for Origin-Destination Analysis

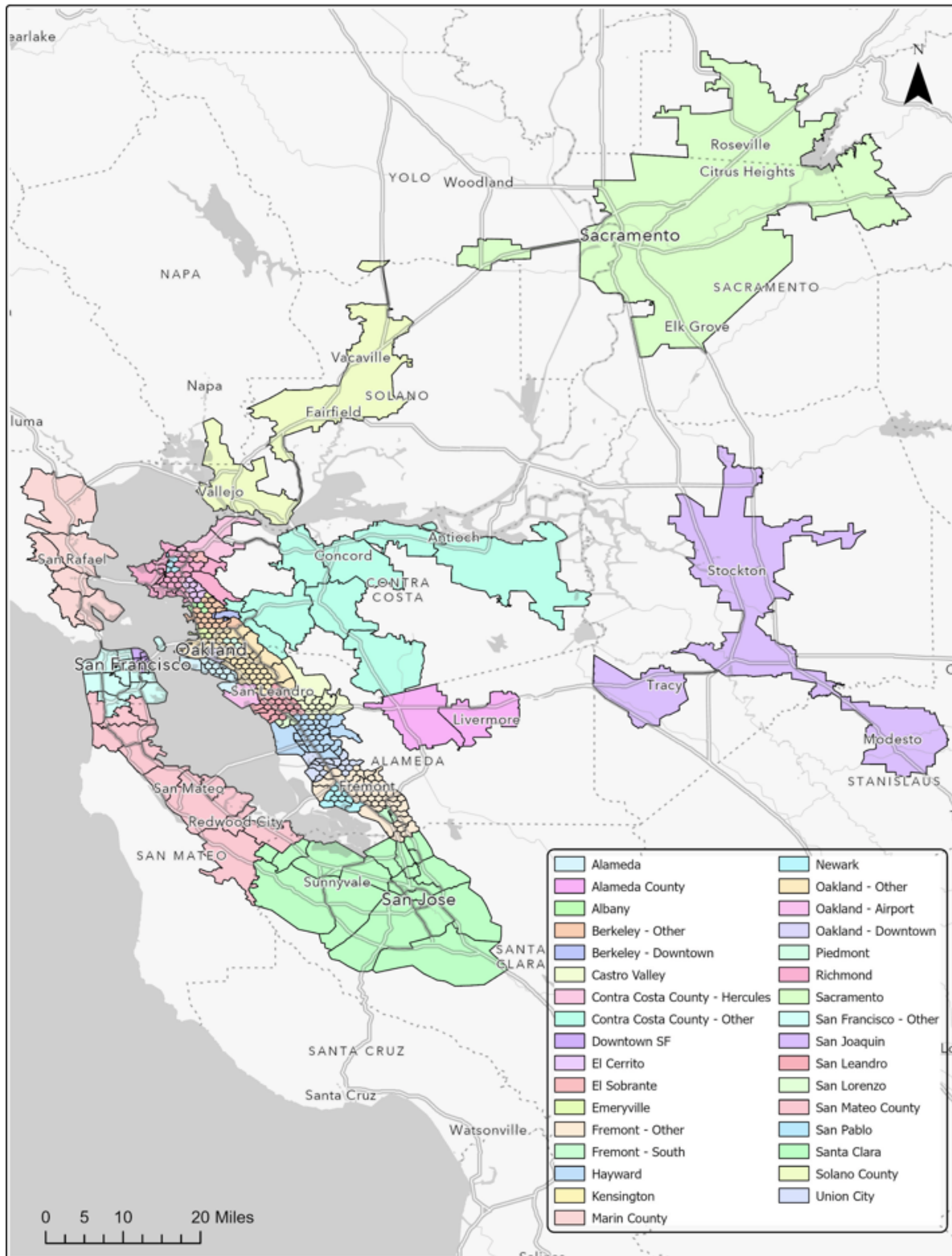
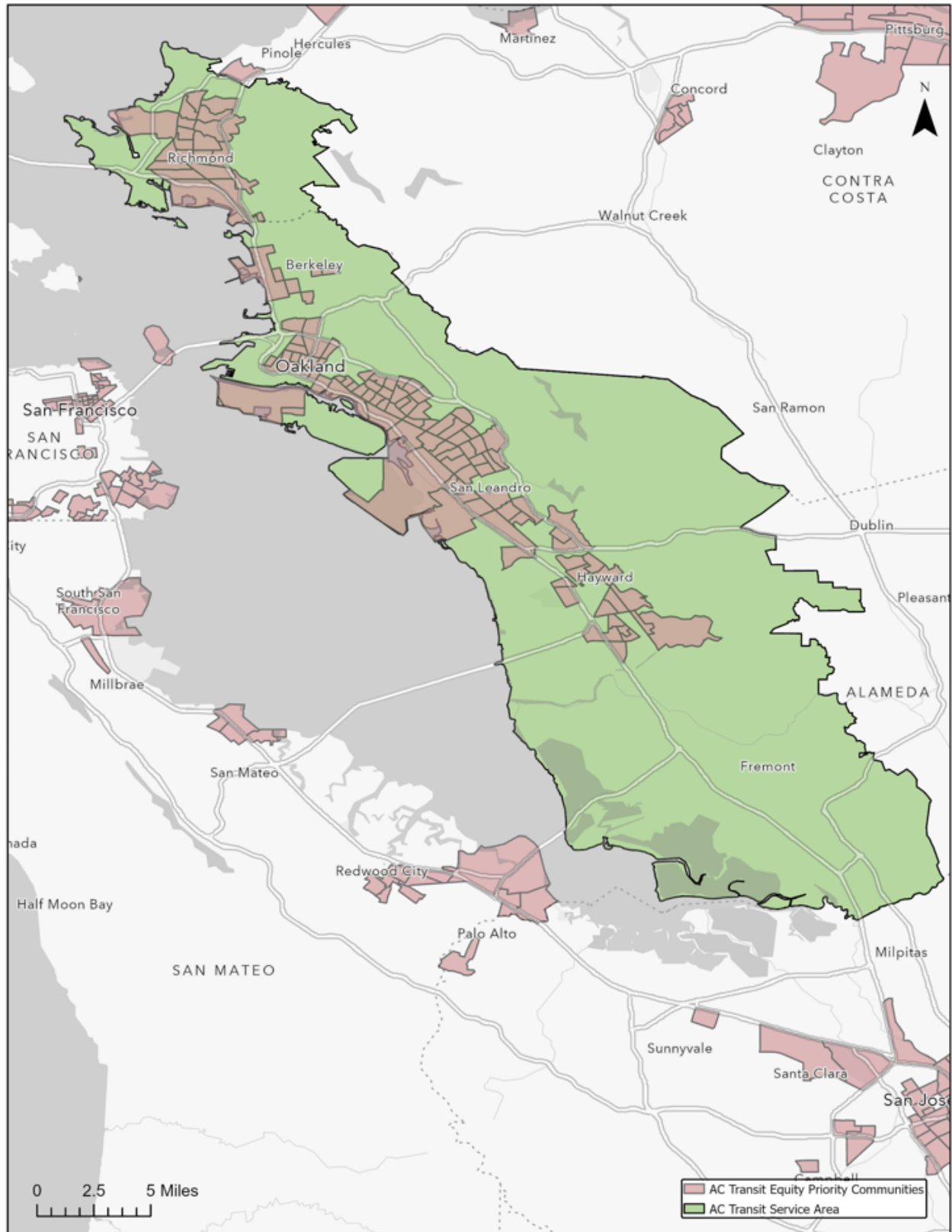


Figure 3 Equity Priority Communities



Source: MTC (<https://mtc.ca.gov/planning/transportation/access-equity-mobility/equity-priority-communities>)

TIME PERIOD ANALYSIS

The COVID-19 pandemic had significant impacts on overall travel, and particular impacts on transit ridership. Three periods were selected to evaluate the impact of COVID-19:

- Pre-COVID period: September & October 2019
- During-COVID period: September & October 2021
- After-COVID period: March & April 2022

The pre-COVID period (September and October of 2019) is the period before the holiday season and COVID shutdown. Streetlight changed its data processing algorithm in May 2022 to include connected vehicle data. As a result, Streetlight data sets from after May 2022 use a mix of Location-Based Service and connected vehicle data, while data sets developed prior use only Location-Based Service data. Therefore, the after-COVID period was selected as March and April 2022 so the before and after comparison is based on data collected and processed with a consistent methodology.

Table 1 and Figure 4 summarize total trips by all vehicles (not just transit trips) made within the AC Transit service area (i.e., both origin and destination of a trip falls within the AC Transit service area), by time of day.

Key findings:

- Compared to the pre-COVID period, total vehicle trips dropped by 10% during COVID and then increased by 1% by spring 2022 during the after-COVID period.
- The highest number of trips happened during the four-hour PM Peak (3:00 PM – 7:00 PM), followed by mid-day (10:00 AM – 3:00 PM) and AM Peak (6:00 AM – 10:00 AM).
- Early AM and Late PM trips were more affected by COVID than trips during the day. This may indicate greater decreases in activities such as very long distance commuting and going out for entertainment.
- Mid-day trips were the least affected by COVID. This may indicate that activities such as shopping, errands and medical visits decreased less than commuting.
- AM Peak trips dropped further after the peak of COVID, from an 8% drop from pre-COVID levels during COVID to a 12% drop from pre-COVID levels after COVID, while PM peak trips increased by 1% after COVID compared to during COVID. This may indicate time shifts in commute patterns as more employers standardized remote or hybrid work schedules.

Table 1 COVID Impact on Number of Total Vehicle Trips within AC Transit Service Area

Time Period	Early AM	AM peak	Mid-day	PM peak	Late PM	Daily
Total Vehicle Trips						
Pre-COVID	82,731	570,294	796,151	816,946	394,267	2,660,389
During COVID	68,227	525,721	760,368	743,992	303,991	2,402,299
After COVID	70,488	503,923	754,761	748,190	333,678	2,411,040
Changes from Pre-COVID in %						
During COVID	-18%	-8%	-4%	-9%	-23%	-10%
After COVID	-15%	-12%	-5%	-8%	-15%	-9%

Source: Streetlight Data, Kittelson & Associates (2023)

Figure 4 Time-of-day Variation for Total Vehicle Trips within AC Transit Service Area

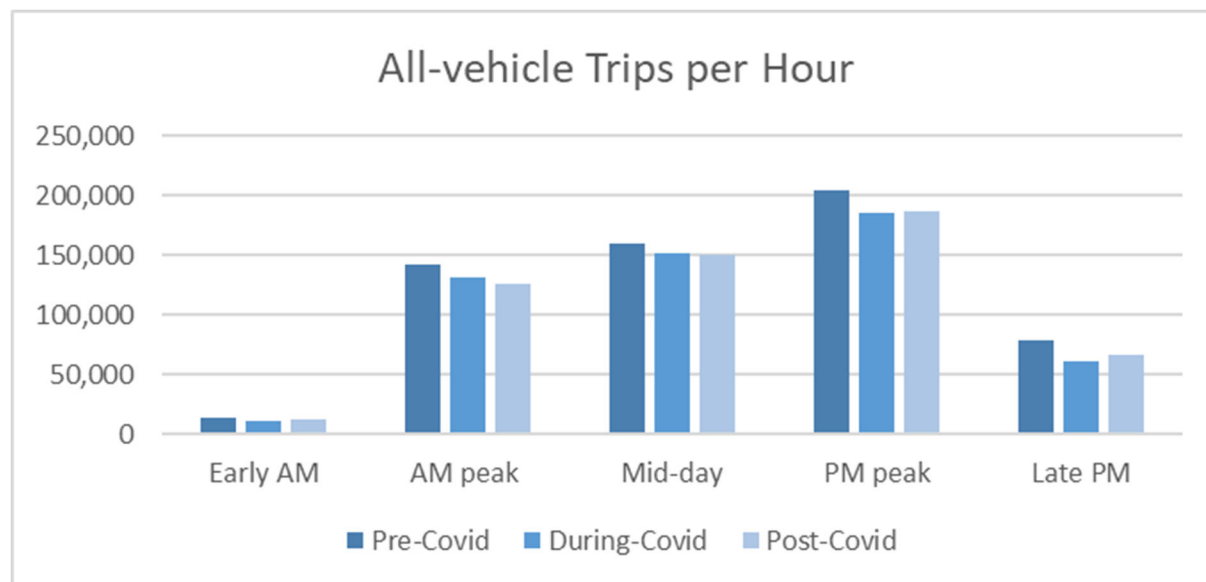


Table 2 summarizes how travel patterns have changed for the 28 zone groups between the 2019 pre-COVID and 2022 post-COVID periods, in terms of the total trips from and to the zone group areas.

Key Findings:

- Downtown Oakland had the largest proportional decrease in total vehicle travel, with those trips dropping by around 40%.
- Other significant decreases were to/from Downtown San Francisco, Downtown Berkeley, Berkeley, Piedmont, and Emeryville, where total vehicle trips dropped by more than 23%.
- The highest numbers (as opposed to percentages) of total vehicle trip decreases were to/from Oakland, San Francisco, Downtown San Francisco, Fremont, and the surrounding counties where total vehicle trips dropped by more than 80,000.
- Hayward, San Leandro and Union City had more modest decreases in total vehicle trips.
- Richmond had more total vehicle trips in 2022 than in 2019.

Figure 5 illustrates the travel patterns change of the total trips for the San Francisco Bay Area while Figure 6 focuses on the AC Transit Service Area. Within the AC Transit Service Area, more detailed travel pattern changes for a finer Streetlight analysis zone level are shown in Figure 7 through Figure 10 for the four planning areas, respectively.

Key Findings:

- Within the West Contra Costa planning area, there were trip increases in Richmond and San Pablo, while trip decreases occurred in higher income residential areas such as Point Richmond and the El Cerrito hills.
- Within the Oakland-Alameda-Berkeley planning area, there were trip increases along the International Boulevard corridor in East Oakland, while trips decreased in the Oakland hills along with downtown Oakland.
- Within the Hayward-San Leandro planning area, there were trip increases in parts of Hayward outside the downtown area, while there were areas with both increases and decreases in San Leandro.
- Within the Fremont-Newark-Union City planning area, the largest trip decreases were in the southern part of Union City and the southeast area of Fremont.

Table 2: Changes for Total Vehicle Trips 2019 to 2022 in Zone Groups

Zone Group	As Origin		As Destination		Total
	Change in Vehicle Trips	Percentage of Total Origin	Change in Vehicle Trips	Percentage of Total Destination	Change in Percentage
San Francisco	-110,919	-9%	-114,185	-9%	-9%
Alameda	-13,653	-8%	-12,914	-8%	-8%
Oakland	-93,952	-15%	-96,394	-16%	-15%
San Leandro	-18,670	-7%	-18,229	-7%	-7%
Hayward	-19,227	-5%	-20,554	-5%	-5%
San Lorenzo	379	1%	-180	0%	0%
Emeryville	-17,836	-33%	-17,333	-32%	-32%
Berkeley	-41,949	-24%	-40,643	-23%	-24%
Albany	-5,064	-20%	-4,981	-20%	-20%
Castro Valley	-9,505	-8%	-9,003	-7%	-8%
Union City	-13,674	-8%	-13,444	-8%	-8%
Fremont	-89,589	-17%	-91,328	-17%	-17%
El Sobrante	-410	-2%	-460	-2%	-2%
Newark	-11,186	-11%	-10,583	-10%	-10%
Oakland-Downtown	-37,571	-40%	-35,750	-39%	-39%
Fremont-South	-14	0%	356	1%	0%
Richmond	857	0%	478	0%	-43%
El Cerrito	-11,432	-17%	-11,860	-17%	0%
San Mateo County	-297,445	-16%	-297,549	-16%	16%
Contra Costa County - Other	-148,105	-7%	-147,034	-7%	-3%
Santa Clara County	-756,137	-18%	-753,354	-18%	-17%
Downtown San Francisco	-99,463	-28%	-96,029	-28%	-16%
Alameda County	-150,023	-21%	-149,375	-21%	-7%
Solano County	-19,453	-2%	-20,478	-2%	-18%
Sacramento	-292,498	-6%	-292,040	-6%	-28%
Berkeley-Downtown	-15,201	-25%	-15,574	-26%	-11%
Piedmont	-4,342	-29%	-4,056	-28%	-21%
Oakland-Airport	-17,465	-22%	-18,547	-24%	-2%

Note: Data is for Total Vehicle trips, all times of day, Tuesdays through Thursdays.

Figure 5 Changes in Total Vehicle Trips 2019 to 2022 in Zone Groups – San Francisco Bay Area

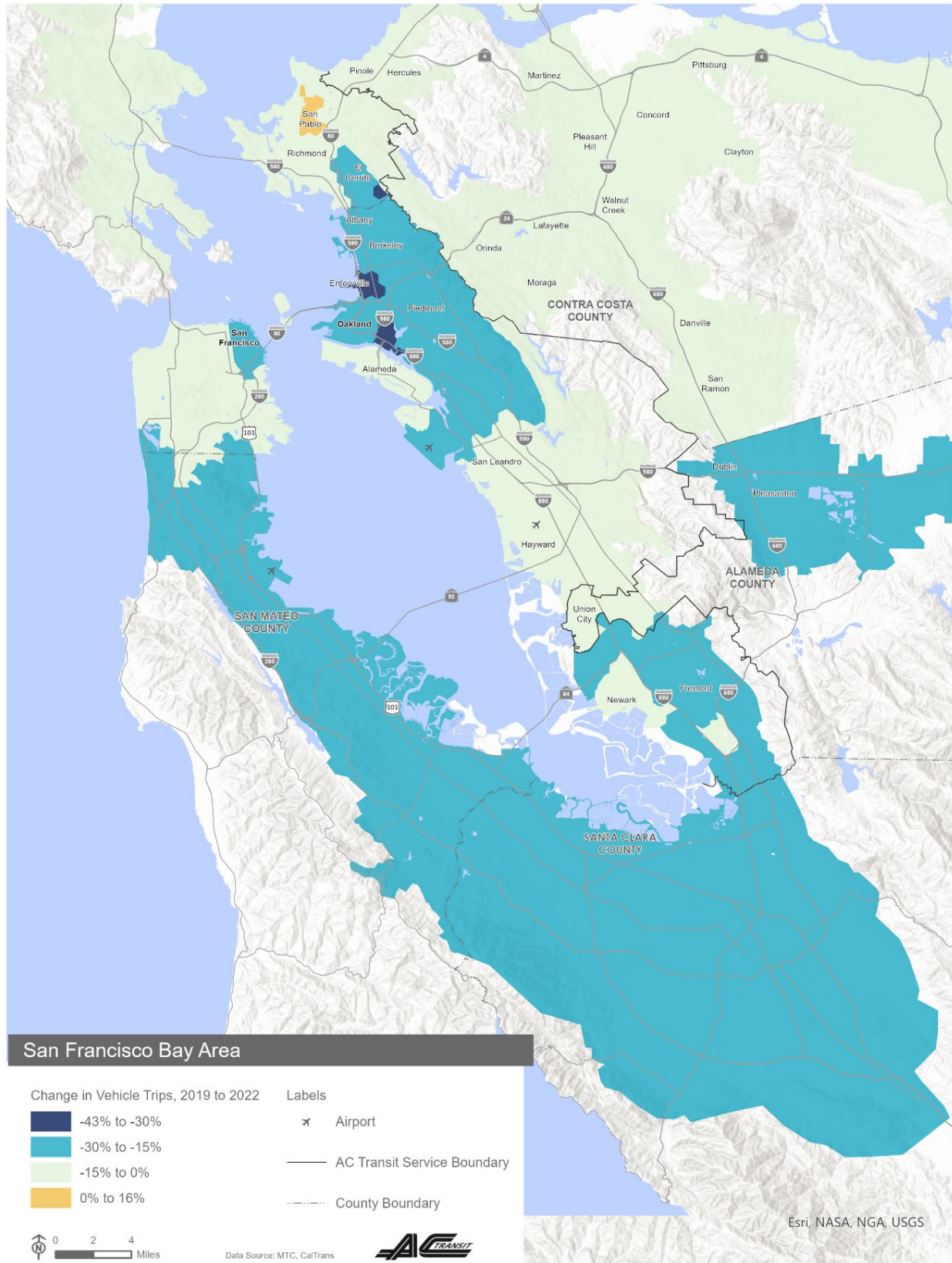


Figure 6 Changes in Total Vehicle Trips 2019 to 2022 in Zone Groups – AC Transit Service Area

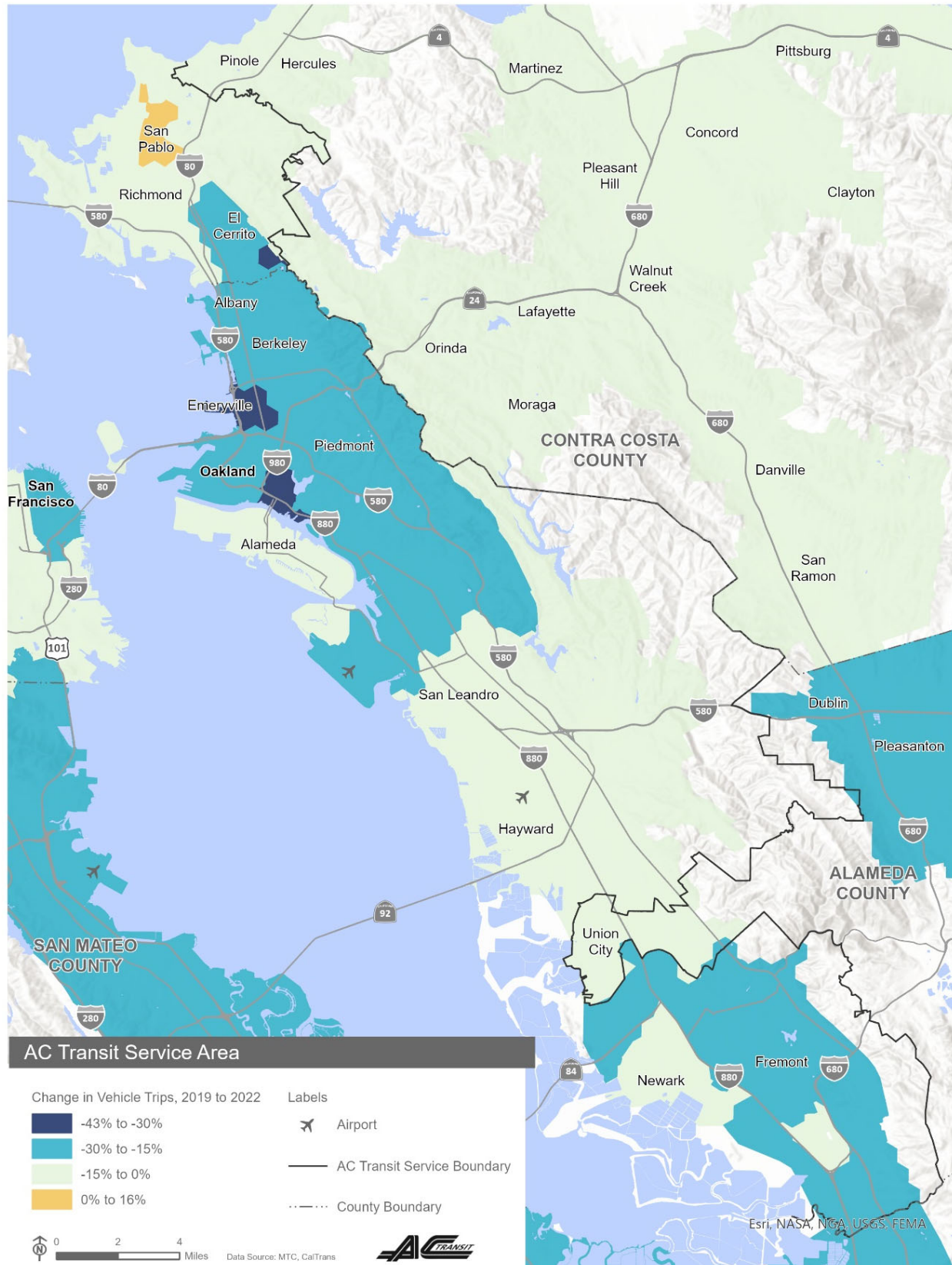


Figure 7 Changes in Total Vehicle Trips 2019 to 2022 in Streetlight Analysis Zones – West Contra Costa County Planning Area

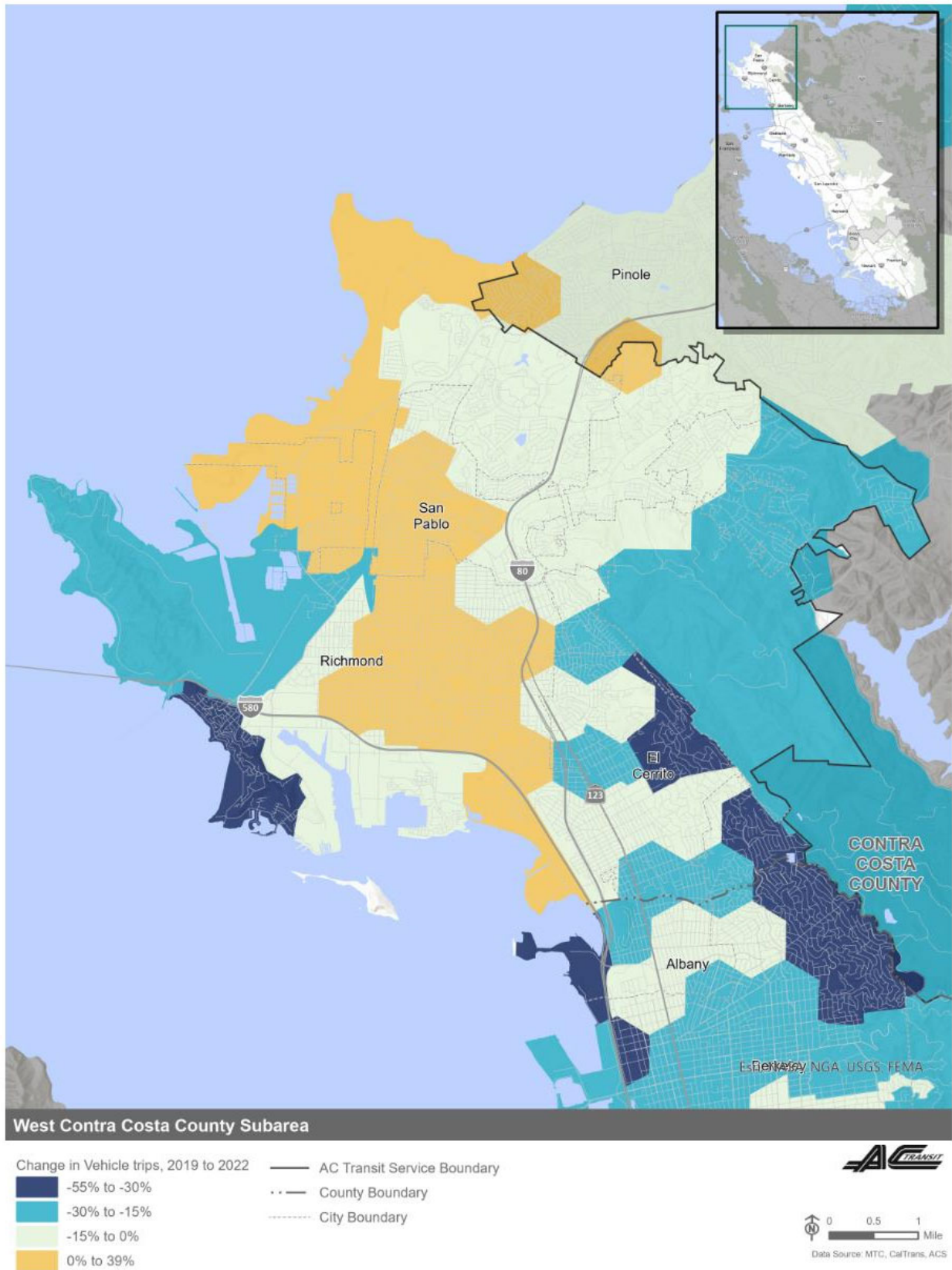
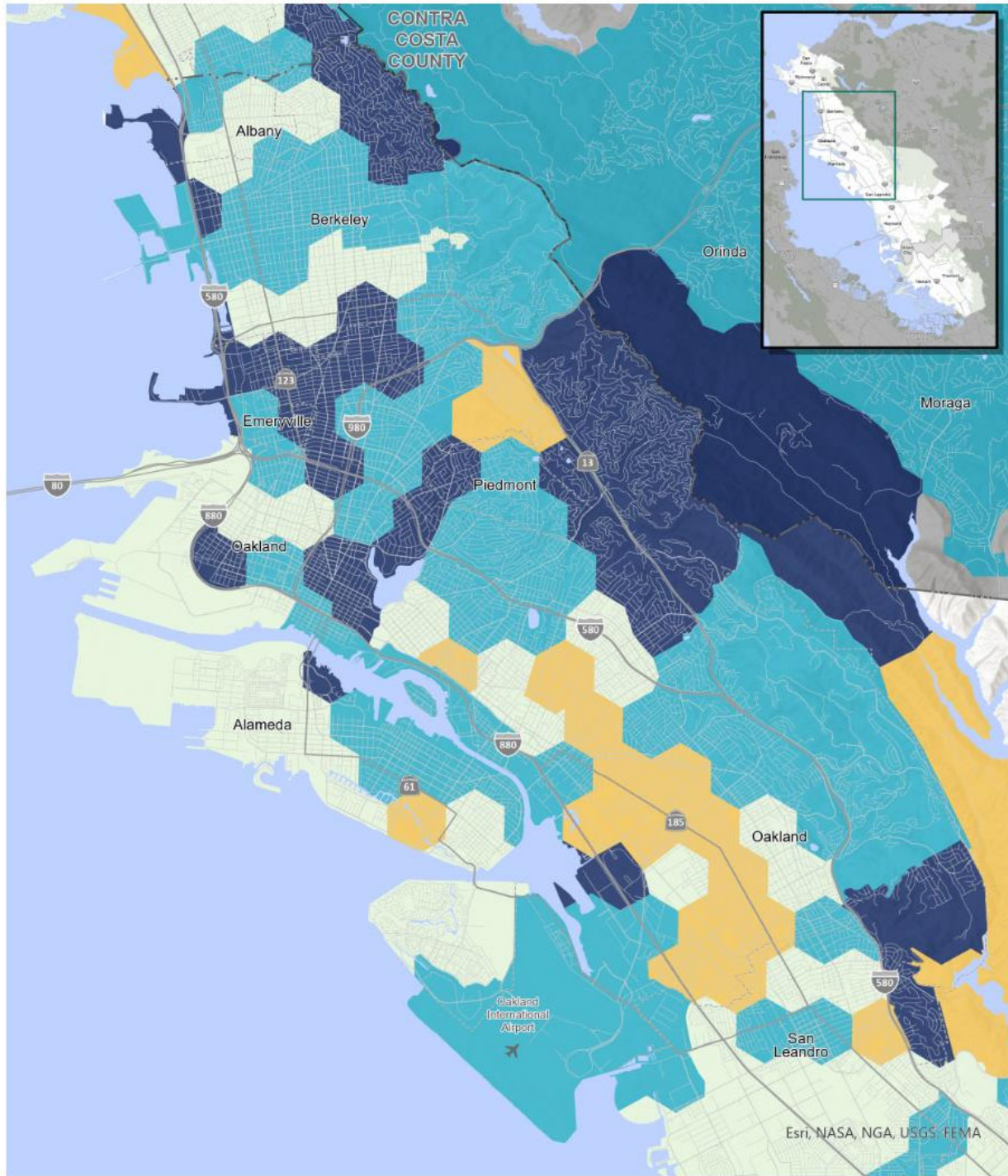


Figure 8 Changes in Total Vehicle Trips 2019 to 2022 in Streetlight Analysis Zones – Oakland-Alameda-Berkeley Planning Area



Oakland-Alameda-Berkeley Subarea

- | | |
|---------------------------------------|-------------------------------|
| Change in Vehicle trips, 2019 to 2022 | — AC Transit Service Boundary |
| ■ -55% to -30% | ···· County Boundary |
| ■ -30% to -15% | ----- City Boundary |
| ■ -15% to 0% | |
| ■ 0% to 39% | |



Data Source: MTC, CalTrans, ACS

Figure 9 Changes in Total Vehicle Trips 2019 to 2022 in Streetlight Analysis Zones – Hayward-San Leandro Planning Area

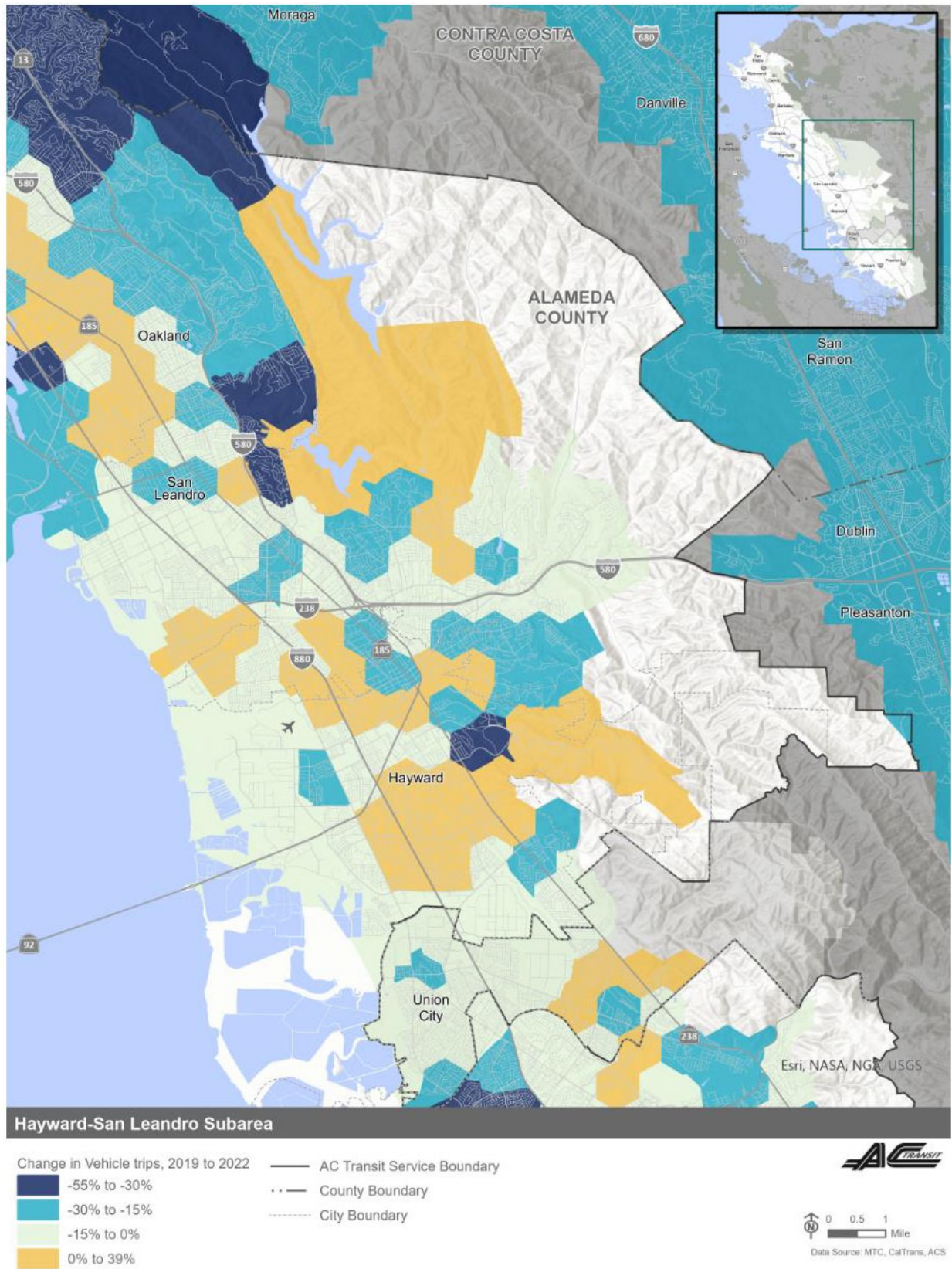
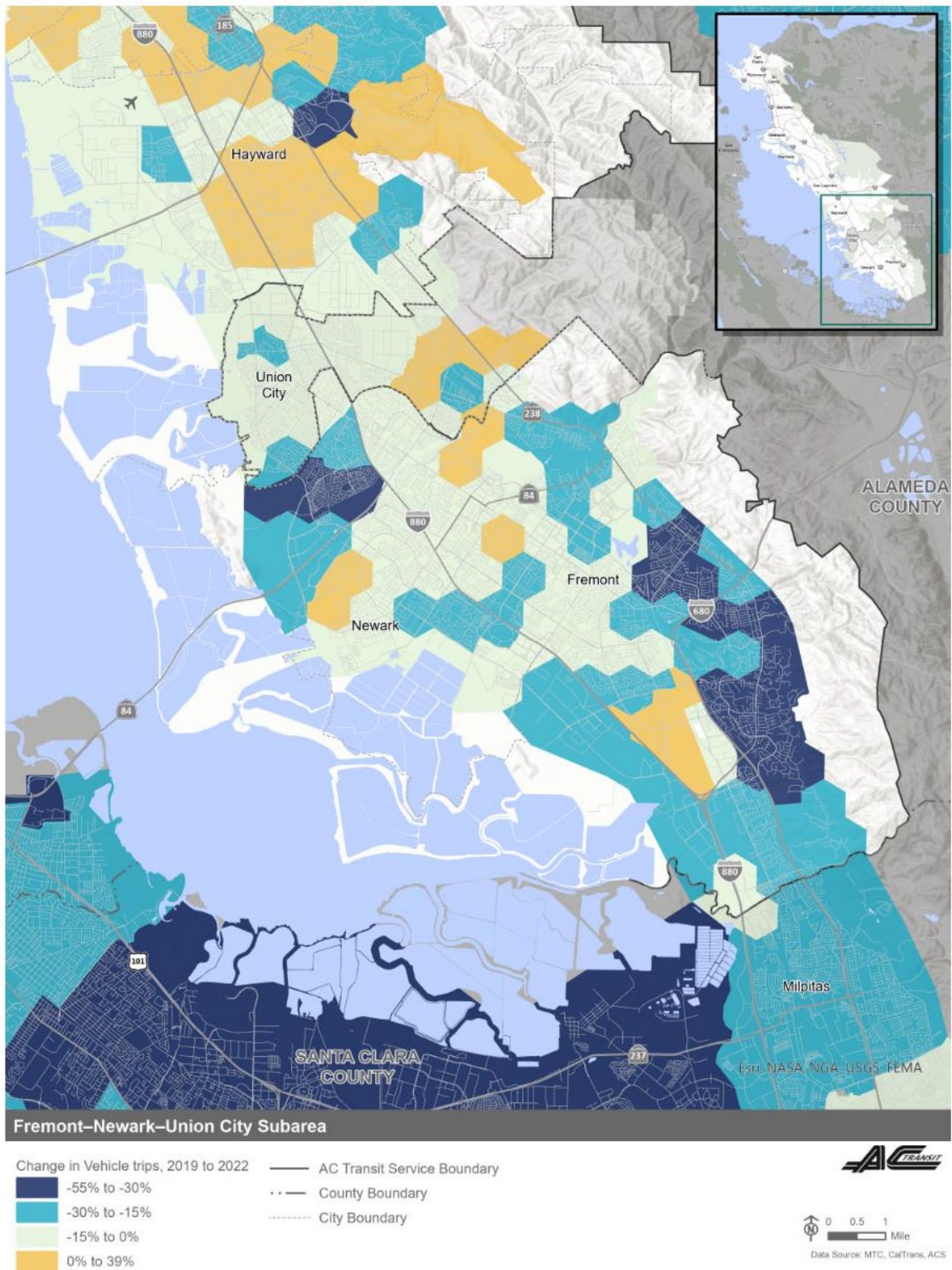


Figure 10 Changes in Total Vehicle Trips 2019 to 2022 in Streetlight Analysis Zones– Fremont-Newark-Union City Planning Area



ORIGIN-DESTINATION PATTERNS

This section summarizes the Origin-Destination analysis by planning area and by zone group.

AC Transit Service Area Trips

Table 3 summarizes the total number of trips during the after COVID period (spring 2022) within the Bay Area study area as shown in Figure 2, categorized into within and outside the AC Transit service area. It shows that 14% of total Bay Area study area trips start from the AC Transit service area, 85% of which travel to a destination within the AC Transit service area. The remaining 86% of trips start from outside the AC Transit service area, 2% of which traveled to points within the AC Transit service area.

Table 3 AC Transit Service Area Total Vehicle Trip Summary (After COVID Period)

From \ To	Within AC Transit Service Area	Outside AC Transit Service Area ¹	Origin Total	% of Total
AC Transit Service Area	2,411,040	430,973	2,842,013	14%
% of Origin Total	85%	15%		
Outside AC Transit Service Area	428,968	17,723,331	18,152,299	86%
% of Origin Total	2%	98%		
Destination Total	2,840,009	18,154,304	20,994,312	

■ ¹ – Outside AC Transit Service Area refers to the spatial limits off the analysis area as shown in Figure 2.

Planning Area Trips

Table 4 to Table 6 show the distribution of total vehicle trips, bus index, and rail index among the four planning areas and outside the AC Transit service area, based on Streetlight data from March and April 2022.

Total Vehicle Trips by Planning Area

Key findings:

- The Oakland-Alameda-Berkeley planning area generates the highest number of trips as an origin and destination within the AC Transit service area.
- The Fremont-Newark-Union City planning area generates the highest number of trips to/from outside the AC Transit service area.
- Two-thirds or more of trips originating in each planning area have destinations within the same planning area.
- The highest trip flows between planning areas occurs between the Oakland-Alameda-Berkeley planning area and the Hayward-San Leandro planning area.
- There were relatively few total vehicle trips reported between the West Contra Costa planning area and the Hayward and Fremont planning area.

Table 4 Total Vehicle Trip Distribution among Planning Areas (After COVID Period)

From \ To	West Contra Costa County	Oakland-Alameda-Berkeley	Hayward-San Leandro	Fremont-Newark-Union City	Outside AC Transit Service Area	Subarea Origin Total
Total Vehicle Trips						
West Contra Costa County	238,347	40,343	4,821	997	75,646	360,154
Oakland-Alameda-Berkeley	41,557	682,644	93,393	9,921	119,362	946,877
Hayward-San Leandro	4,821	94,967	548,839	65,955	107,082	821,664
Fremont-Newark-Union City	967	9,831	65,975	507,662	128,883	713,318
Outside AC Transit Service Area	73,391	119,478	106,776	129,323	17,723,331	18,152,299
Subarea Destination Total	359,083	947,263	819,804	713,858	18,154,304	20,994,312
Total Vehicle Trips as % of Origin Totals						
West Contra Costa County	66%	11%	1%	<1%	21%	100%
Oakland-Alameda-Berkeley	4%	72%	10%	1%	13%	100%
Hayward-San Leandro	<1%	12%	67%	8%	13%	100%
Fremont-Newark-Union City	<1%	1%	9%	71%	18%	100%
Outside AC Transit Service Area	<1%	<1%	<1%	<1%	98%	100%

Table 5 Bus Index Distribution among Planning Areas (After COVID Period)

From \ To	West Contra Costa County	Oakland-Alameda-Berkeley	Hayward-San Leandro	Fremont-Newark-Union City	Outside AC Transit Service Area	Subarea Origin Total
Bus Index % of Origin Totals						
West Contra Costa County	87%	7%	<1%	<1%	6%	100%
Oakland-Alameda-Berkeley	2%	95%	3%	<1%	<1%	100%
Hayward-San Leandro	<1%	8%	85%	7%	<1%	100%
Fremont-Newark-Union City	<1%	<1%	9%	89%	1%	100%
Outside AC Transit Service Area	<1%	<1%	<1%	<1%	99%	100%

Note: Bus index - a measure that can be used to assess relative bus passenger activity.

Table 6 Rail Index Distribution among Planning Areas (After COVID Period)

From \ To	West Contra Costa County	Oakland-Alameda-Berkeley	Hayward-San Leandro	Fremont-Newark-Union City	Outside AC Transit Service Area	Subarea Origin Total
Rail Index % of Origin Totals						
West Contra Costa County	9%	36%	4%	<1%	51%	100%
Oakland-Alameda-Berkeley	9%	34%	10%	2%	44%	100%
Hayward-San Leandro	1%	26%	11%	5%	56%	100%
Fremont-Newark-Union City	<1%	21%	19%	5%	54%	100%
Outside AC Transit Service Area	1%	6%	2%	<1%	90%	100%

Note: Rail index - a measure that can be used to assess relative rail passenger activity.

Bus Index by Planning Area

Key findings:

- Most bus trips (85 to 95 percent) stay within their own planning area.
- Origin-destination combinations with more than 5 percent of trips include West Contra Costa to Oakland-Alameda-Berkeley, Hayward-San Leandro to Oakland-Alameda-Berkeley, and both directions between Hayward-San Leandro and Fremont-Newark-Union City.

Rail Index by Planning Area

Key findings:

- For rail trips originating in most of the AC Transit service area, over half have destinations outside the service area (typically San Francisco).
- Significant percentages of rail trips (21 to 36 percent) have destinations in the Oakland-Alameda-Berkeley planning area.
- Few rail trips stay within the West Contra Costa, Hayward-San Leandro or Fremont-Newark-Union City planning areas.

Zone Groups Analysis

The more detailed zone groups analysis is based on cities and city subareas within the AC Transit service area, and counties outside the service area. Selected detailed zone groups for Origin-Destination analysis include:

- Berkeley Downtown
- San Francisco Downtown
- Fremont-South
- Oakland Airport
- Oakland Downtown
- San Mateo County
- Santa Clara County

Table 7 compares the total vehicle trips traveling to the selected zone groups for pre-, during-, and after-COVID periods.

Key Findings:

- Overall, the after COVID totals were lower than the pre-COVID period for these selected zone groups.
- There was an increasing trend for after COVID compared to during-COVID except for Berkeley Downtown.

Table 7 Total Vehicle Trips Going to Selected Zone Groups

To Selected Zone Groups	Pre-COVID	During COVID	After COVID
Berkeley-Downtown	58,102	51,094	43,207
San Francisco Downtown	342,919	210,707	250,289
Fremont-South	41,756	40,569	42,440
Oakland-Airport	77,879	57,672	59,568
Oakland-Downtown	90,881	50,961	55,910
San Mateo County	1,882,607	1,613,170	1,590,708
Santa Clara County	4,196,121	3,452,759	3,450,955

Table 8 to Table 10 show the daily trip distribution from the four planning areas and outside the AC Transit service area to the selected zone groups for pre-, during-, after-COVID periods, respectively.

Table 8 Pre-COVID Total Vehicle Trips to Selected Zone Groups from Planning Areas

To Selected Zone Groups	West Contra Costa County	Oakland-Alameda-Berkeley	Hayward-San Leandro	Fremont-Newark-Union City	Outside Service Area	Total
Total Vehicle Trips						
Berkeley-Downtown	2,797	47,321	1,280	167	6,537	58,102
San Francisco Downtown	3,690	18,251	5,316	1,612	314,050	342,919
Fremont-South	46	408	1,845	23,872	15,585	41,756
Oakland-Airport	1,534	23,192	31,530	2,297	19,326	77,879
Oakland-Downtown	2,619	57,089	9,530	1,319	20,324	90,881
San Mateo County	2,941	13,559	24,295	25,040	1,816,772	1,882,607
Santa Clara County	853	7,897	20,713	102,970	4,063,688	4,196,121
Total Vehicle Trips % to Destinations						
Berkeley-Downtown	5%	81%	2%	<1%	11%	100%
San Francisco Downtown	1%	5%	2%	<1%	92%	100%
Fremont-South	<1%	<1%	4%	57%	37%	100%
Oakland-Airport	2%	30%	40%	3%	25%	100%
Oakland-Downtown	3%	63%	10%	1%	22%	100%
San Mateo County	<1%	<1%	1%	1%	97%	100%
Santa Clara County	<1%	<1%	<1%	2%	97%	100%

Key Findings:

- About 80 percent of trips to downtown Berkeley/UC Berkeley come from the Oakland-Alameda-Berkeley planning area.
- Trips from the AC Transit service area account for less than ten percent of total vehicle trips to downtown San Francisco.
- Over one third of trips to the south Fremont area come from outside the AC Transit service area, primarily Santa Clara County.
- About one-quarter of trips to the Oakland Airport or downtown Oakland areas come from outside the AC Transit service area.

Table 9 During COVID Total Vehicle Trips to Selected Zone Groups from Planning Areas

To Selected Zone Groups	West Contra Costa County	Oakland-Alameda-Berkeley	Hayward-San Leandro	Fremont-Newark-Union City	Outside Service Area	Total
Total Vehicle Trips						
Berkeley-Downtown	1,835	42,459	991	264	5,545	51,094
San Francisco Downtown	2,116	7,877	3,445	977	196,292	210,707
Fremont-South	91	561	1,862	24,338	13,717	40,569
Oakland-Airport	1,243	17,265	22,722	2,036	14,406	57,672
Oakland-Downtown	1,519	32,930	5,380	778	10,354	50,961
San Mateo County	2,838	9,785	18,182	15,486	1,566,879	1,613,170
Santa Clara County	1,107	7,178	17,492	74,776	3,352,206	3,452,759
Total Vehicle Trips % to Destinations						
Berkeley-Downtown	4%	83%	2%	<1%	11%	100%
San Francisco Downtown	1%	4%	2%	<1%	93%	100%
Fremont-South	<1%	1%	5%	60%	34%	100%
Oakland-Airport	2%	30%	39%	4%	25%	100%
Oakland-Downtown	3%	65%	11%	2%	20%	100%
San Mateo County	<1%	<1%	1%	<1%	97%	100%
Santa Clara County	<1%	<1%	<1%	2%	97%	100%

Table 10 After COVID Total Vehicle Trips to Selected Zone Groups from Planning Areas

To Selected Zone Groups	West Contra Costa County	Oakland-Alameda-Berkeley	Hayward-San Leandro	Fremont-Newark-Union City	Outside Service Area	Total
Total Vehicle Trips						
Berkeley-Downtown	2,178	33,512	982	322	6,213	43,207
San Francisco Downtown	2,547	8,918	3,653	1,010	234,161	250,289
Fremont-South	97	663	2,145	24,473	15,062	42,440
Oakland-Airport	1,432	18,559	22,848	1,845	14,884	59,568
Oakland-Downtown	1,584	35,979	5,875	860	11,612	55,910
San Mateo County	2,787	10,522	19,344	16,432	1,541,623	1,590,708
Santa Clara County	1,272	7,123	18,015	77,024	3,347,521	3,450,955
Total Vehicle Trips % to Destinations						
Berkeley-Downtown	5%	78%	2%	<1%	14%	100%
San Francisco Downtown	1%	4%	1%	<1%	94%	100%
Fremont-South	<1%	2%	5%	58%	35%	100%
Oakland-Airport	2%	31%	38%	3%	25%	100%
Oakland-Downtown	3%	64%	11%	2%	21%	100%
San Mateo County	<1%	<1%	1%	1%	97%	100%
Santa Clara County	<1%	<1%	<1%	2%	97%	100%

TRIP PURPOSES

This section analyzes the trip purposes for trips within the AC Transit service area (i.e., both trip ends are in AC Transit service area). The results are summarized for total vehicle trips, bus index, and rail index in Table 11 through Table 12, respectively.

Table 11: Total Vehicle Trip Purposes within AC Transit Service Area

Time Periods	Home-to-Work	Home-to-Other	Non-Home	Total Trips	Percent Change from Pre-COVID
Pre-COVID					
AM Peak	39%	37%	24%	570,294	-
PM Peak	21%	47%	32%	816,946	-
All Day	24%	43%	33%	2,660,389	-
After COVID					
AM Peak	39%	35%	26%	503,923	-12%
PM Peak	22%	48%	31%	748,190	-8%
All Day	25%	42%	32%	2,411,040	-9%

Table 12: Bus Index Trip Purposes within AC Transit Service Area

Time Periods	Home-to-Work	Home-to-Other	Non-Home	Total Index	Percent Change from Pre-COVID
Pre-COVID					
AM Peak	14%	36%	50%	111,230	
PM Peak	7%	38%	54%	187,421	
All Day	9%	37%	54%	570,877	
After COVID					
AM Peak	13%	31%	56%	58,482	-47%
PM Peak	7%	38%	55%	103,803	-45%
All Day	8%	36%	56%	319,365	-44%

Note: Bus index - a measure that can be used to assess relative bus passenger activity.

Table 13: Rail Index Trip Purposes within AC Transit Service Area

Time Periods	Home-to-Work	Home-to-Other	Non-Home	Total Index	Percent Change from Pre-COVID
Pre-COVID					
AM Peak	2%	8%	90%	34,403	
PM Peak	1%	6%	93%	39,806	
All Day	1%	8%	91%	108,861	
After COVID					
AM Peak	1%	8%	91%	12,218	-64%
PM Peak	1%	8%	92%	16,105	-60%
All Day	1%	9%	90%	47,015	-57%

Note: Rail index - a measure that can be used to assess relative rail passenger activity.

Key Findings:

- For total vehicle trips, the total number of trips dropped by 8% to 12% for different time periods. The greatest decrease in total vehicle trips was for the Peak AM period, which is the most affected by work commutes. The proportions of trip purposes did not change significantly during any time period.
- The bus index decreased by 44 to 47 percent between the 2019 pre-COVID and 2022 post-COVID periods. The greatest decrease was during the AM peak period.
- The trip purposes for the bus index did not change significantly. In particular, the percentages of home-work trips stayed relatively constant. There was a shift of about five percent from home-other to Non-Home during the AM peak period, possibly indicating changes in bus use for school or errands.
- The rail index shows greater decreases after COVID than for buses. However, the StreetLight data interpretation of trip purposes identifies very few Home-Work trips on rail transit within the AC Transit service area. This may indicate that the algorithms used to estimate trip purposes (mostly based on land uses at the origins and destinations) may not be fully calibrated for rail trips. This may be due to the locations of most rail stations in non-residential areas. However, the overall index quantities for all trip purposes combined should still represent changes in rail passengers.

Equity Priority Communities

Equity-priority community trips are defined as either end of a trip falls in an equity-priority community as shown in Figure 3. This analysis focuses on trips within the AC Transit service area.

Table 14: Total Vehicle Trip Purposes in Equity Priority Communities

Time Periods	Home-to-Work	Home-to-Other	Non-Home	Total Equity-Priority Trips	Percent Change from Pre-COVID	Total AC Transit Service Area Trips	Equity-Priority Trips%
Pre-COVID							
Peak AM	37%	38%	25%	272,987	-	570,294	48%
Peak PM	20%	46%	34%	384,091	-	816,946	47%
All-day	23%	43%	34%	1,265,115	-	2,660,389	48%
After COVID							
Peak AM	37%	36%	27%	243,026	-11%	503,923	48%
Peak PM	21%	48%	32%	357,467	-7%	748,190	48%
All-day	24%	43%	33%	1,165,000	-8%	2,411,040	48%

Table 15: Bus Index Trip Purposes in Equity Priority Communities

Time Periods	Home-to-Work	Home-to-Other	Non-Home	Total Equity-Priority Index	Percent Change from Pre-COVID
Pre-COVID					
Peak AM	14%	36%	50%	63,913	
Peak PM	8%	37%	55%	102,789	
All-day	9%	37%	54%	312,972	
After COVID					
Peak AM	13%	31%	56%	35,020	-45%
Peak PM	7%	38%	55%	57,558	-44%
All-day	9%	36%	56%	179,949	-43%

Note: Bus index - a measure that can be used to assess relative bus passenger activity.

Table 16: Rail Index Trip Purposes in Equity Priority Communities

Time Periods	Home-to-Work	Home-to-Other	Non-Home	Total Equity-Priority Index	Percent Change from Pre-COVID
Pre-COVID					
Peak AM	2%	8%	90%	30,813	
Peak PM	1%	6%	93%	34,721	
All-day	1%	7%	91%	95,221	
After COVID					
Peak AM	1%	8%	91%	10,634	-65%
Peak PM	1%	8%	92%	13,998	-60%
All-day	1%	9%	90%	40,376	-58%

Note: Rail index - a measure that can be used to assess relative rail passenger activity.

Key Findings:

- Trips to and from analysis zones representing Equity Priority Communities account for nearly half of all travel within the AC Transit service area.
- There are few differences between the proportions of trip purposes to and from Equity Priority Communities and the trip purpose proportions for the entire service area. In both areas, home-work trips comprise nearly 40 percent of AM peak period travel and about 20 to 25 percent of PM peak and all-day travel.
- The decreases in bus index and rail index for Equity Priority Communities were very similar to the overall changes in the AC Transit service area, indicating that COVID impacts on overall transit ridership were not significantly different for Equity Priority Communities than general trends.