

redesign:
fremont/newark

bus network existing conditions

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Overview

Fremont and Newark were historically designed to put automobiles first, with low housing and commercial density, fast arterials, and a lack of pedestrian amenities. This translated into low demand for transit. In response, the transit network was chiefly designed to provide coverage and minimize walk distances in widely dispersed neighborhoods. Many bus lines crisscross the area at the cost of frequent service, creating fewer opportunities for riders to travel when and where they need to go. In the face of low gas prices and a diverse landscape of new shared mobility options, ridership on AC Transit's South County lines has declined substantially. This indicates that the current network inadequately serves area mobility needs and underscores the urgent need to reevaluate how the District provides service in this area.

This study is an initiative to re-envision the transit network to best serve the travel needs of those who live, work, and play in Fremont and Newark. Although these cities have historically emphasized low-density development, Fremont and Newark have charted a more compact and transit-oriented course for the future. Both cities' planning efforts have already produced mixed-use residential and commercial developments with an urban character. This growth has been concentrated around existing BART stations and along several main arterials. Denser growth and the forthcoming BART extension to Santa Clara County will help support a broader variety of choices for work and leisure travel. The study follows the Goals & Guiding Principles set forth in the AC Transit Comprehensive Operational Analysis (COA), approved by the AC Transit Board of Directors in xx, xxxx, and will build on that foundation, finding ways to improve transit service by increasing frequent service, making the service simpler and easier to use, and identifying opportunities to increase service hours of operation.

This analysis and subsequent community engagement efforts will help ensure that the plan properly balances traditional and new, more flexible transit services in line with today's transportation demands while setting the stage for the cities' less auto-centric vision of the future.

The existing conditions analysis consists of two parts – the Market Analysis and the Service Assessment.

The **Market Analysis** breaks down the underlying factors that drive transit ridership and is divided into the following components:

- A demographic profile analyzes demographic information from the US Census associated with strong transit performance, including people of color, low-income communities, people with disabilities, seniors, and youth.
- A land use profile examines existing residential and employment uses and densities, as well as new developments under construction or in the planning stages.

The **Service Assessment** draws upon data sampled from the District's automatic passenger counter (APC) and automatic vehicle location (AVL) systems to evaluate AC Transit service performance in the following areas:

- The ridership analysis identifies where and when existing transit serves the most and fewest passengers.
- An analysis of transit efficiency breaks down how much service is provided relative to the resources expended using industry-standard service productivity metrics.
- The transit effectiveness analysis provides an understanding of for whom and how well the transit network provides mobility throughout Fremont and Newark, based on data from the 2017-2018 AC Transit customer survey.
- An analysis of speed and reliability uses AC Transit automatic vehicle location system data to identify on-time performance successes and challenges.

Service Area Profile

AC Transit operates transit service within the cities of Fremont and Newark, depicted below in Figure 1.

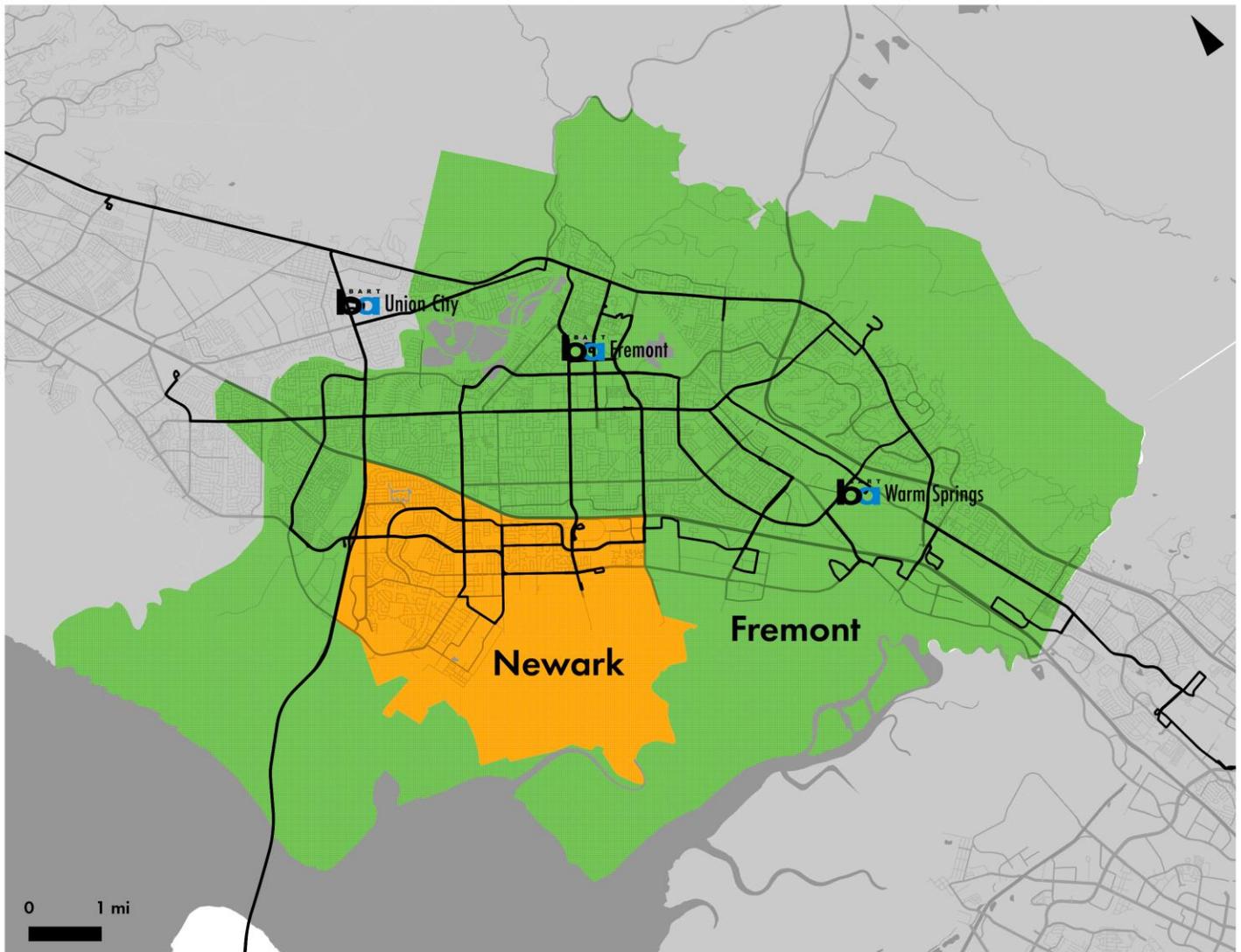


Figure 1 –Fremont and Newark Municipal Boundaries, overlaid with AC Transit network

As of this writing, AC Transit directly operates ten local lines (99, 200, 210, 212, 215, 216, 217, 232, 239, and 251), two Transbay express lines, one Flex service, and is the administrator of the Dumbarton Express consortium, which operates two contracted Transbay express lines. AC Transit also directly operates several limited-service lines focused around school-related passenger demand.

Market Analysis

Fremont and Newark's demographic make-up provides the basis for developing and prioritizing improvements within the existing transit network and helps identify opportunity areas for successful transit services. While improving our understanding of the communities we serve certainly reflects transit industry best practices, it is also of paramount importance to proactively meet the District's federal Title VI and environmental justice obligations.

Nationally, regionally, and locally, markets with strong transit ridership share many of the same characteristics. They tend to have higher population and employment densities – where people and jobs are concentrated near transit, transit can effectively provide convenient access to the places people want to go, increasing ridership. Less dense areas have significant mobility needs as well, but the relative scattering of their trip origins and destinations makes delivering efficient, high-quality transit service in these environments a continuing challenge.

In addition to robust density, the strongest transit markets tend to have more low-income households, larger communities of color, more seniors, youths, and college-aged, and larger shares of those with disabilities and zero-vehicle households.

The balance of area densities and demographics touches on the fundamental questions of transit network design; how much service should a transit agency concentrate on providing more frequent service in dense corridors, and how much service should be spread out to provide network coverage in more dispersed areas? This section illuminates these different demographic markers to help inform the District's response to these questions within Fremont and Newark.

Existing Area Demographics

The neighborhood-level geographic analysis depends heavily upon the Census Bureau's American Community Survey (ACS). The subset of the 2013-2017 ACS 5-Year dataset contains fine-grained information at a neighborhood-level geography, but the wide 5-year sampling timeframe means that they alone cannot fully capture the large scale of development currently unfolding in the area. To provide a full picture of underlying transit ridership drivers, the analysis also integrates data as appropriate from the California Employment Development Department, the cities of Fremont and Newark, MTC, and from the 2017-2018 AC Transit On-Board Survey.

Population and Employment

The populations of Fremont and Newark are large and growing. Estimates from the Census' Population Estimates Program show that in 2018, 286,005 people lived in Fremont and Newark, which reflects growth of 11.2% since 2010. Percentagewise, employment growth outstrips the growth in population, indicating that Fremont and Newark are disproportionately addressing the region's housing crisis relative to other Bay Area municipalities.

Estimated Population by Year	2010	2011	2012	2013	2014	2015	2016	2017	2018
Fremont	214,561	217,400	221,479	224,888	228,397	231,697	233,378	234,237	237,807
Newark	42,629	43,021	43,544	44,098	44,663	45,241	45,857	47,379	48,198
Total	257,190	260,421	265,023	268,986	273,060	276,938	279,235	281,616	286,005
Growth since 2010		3,231	7,833	11,796	15,870	19,748	22,045	24,426	28,815
% Growth since 2010		1.3%	3.0%	4.6%	6.2%	7.7%	8.6%	9.5%	11.2%

Figure 2 – Population by Year (Census Population Estimates Program, 2019)

Estimated Employment by Year	2010	2011	2012	2013	2014	2015	2016	2017	2018
Fremont	99,500	101,100	104,500	106,700	108,700	111,400	113,400	115,000	116,900
Newark	20,400	20,600	21,200	21,600	21,900	22,400	23,000	24,000	24,400
Total	119,900	121,700	125,700	128,300	130,600	133,800	136,400	139,000	141,300
Growth since 2010		1,800	5,800	8,400	10,700	13,900	16,500	19,100	21,400
% Growth since 2010		1.5%	4.8%	7.0%	8.9%	11.6%	13.8%	15.9%	17.8%

Figure 3 – Employment by Year (Labor Force and Unemployment Rate for Cities and Census Designated Places, California EDD, 2019)

While the cities have seen substantial residential and employment growth, for transit service, the density, type, and geography of this growth is just as important as its overall magnitude. Higher density development and a mix of residential and commercial land uses typically can support more frequent transit service, especially when spread along linear corridors. In contrast, dispersed areas with limited densities and segregated land uses are more difficult to serve with high-quality frequent transit that serves many people cost-effectively.

The map below, which depicts population and employment densities, helps provide some important geographic context. As the map shows, the highest residential and employment densities within Fremont and Newark are concentrated in a node near the Fremont BART station. Fremont Blvd stands apart as the largest continuous corridor with higher-density mixed-use development. In addition, the Fremont Blvd corridor and the Mission Blvd/East 14th St corridors have been identified by AC Transit's Major Corridors Study as priorities for major capital investment. Decoto Road and Fremont Blvd have also been identified by the Alameda County Transportation Authority (ACTC).

Other less prominent corridors with individual nodes of increased density include the Paseo Padre corridor, as well as the Ardenwood, Mowry, Stevenson, and Grimmer corridors. These corridors boast less contiguous density than their other peers, suggesting that they may be less conducive to strong transit ridership and performance.

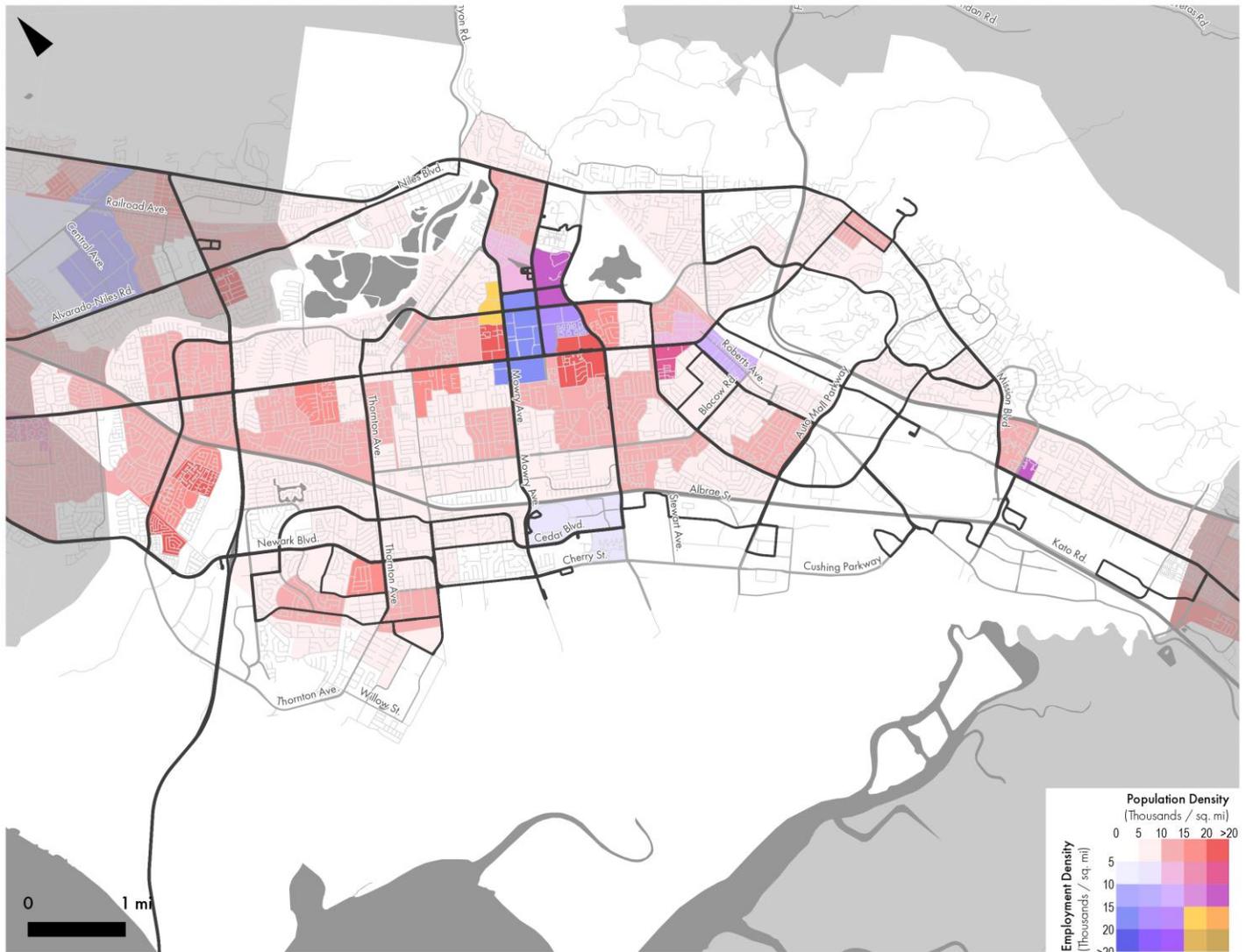


Figure 4 – Population and Employment Density (U.S. Census 2013-2017 5-Year American Community Survey)

Populations of Color

Fremont and Newark's are primarily non-white; ethnic diversity is one of these communities' strengths. Fremont and Newark boast large communities of South Asians, East Asians, and Southeast Asians, with scores of different languages spoken. This holds true relative to the rest of the Bay Area, which itself is a particularly diverse region. Serving communities of color is a key part of AC Transit's mission, but also extremely important from a federal compliance perspective. In addition, from a transit market perspective, it is important to note that people of color tend to ride transit in greater numbers than white people.

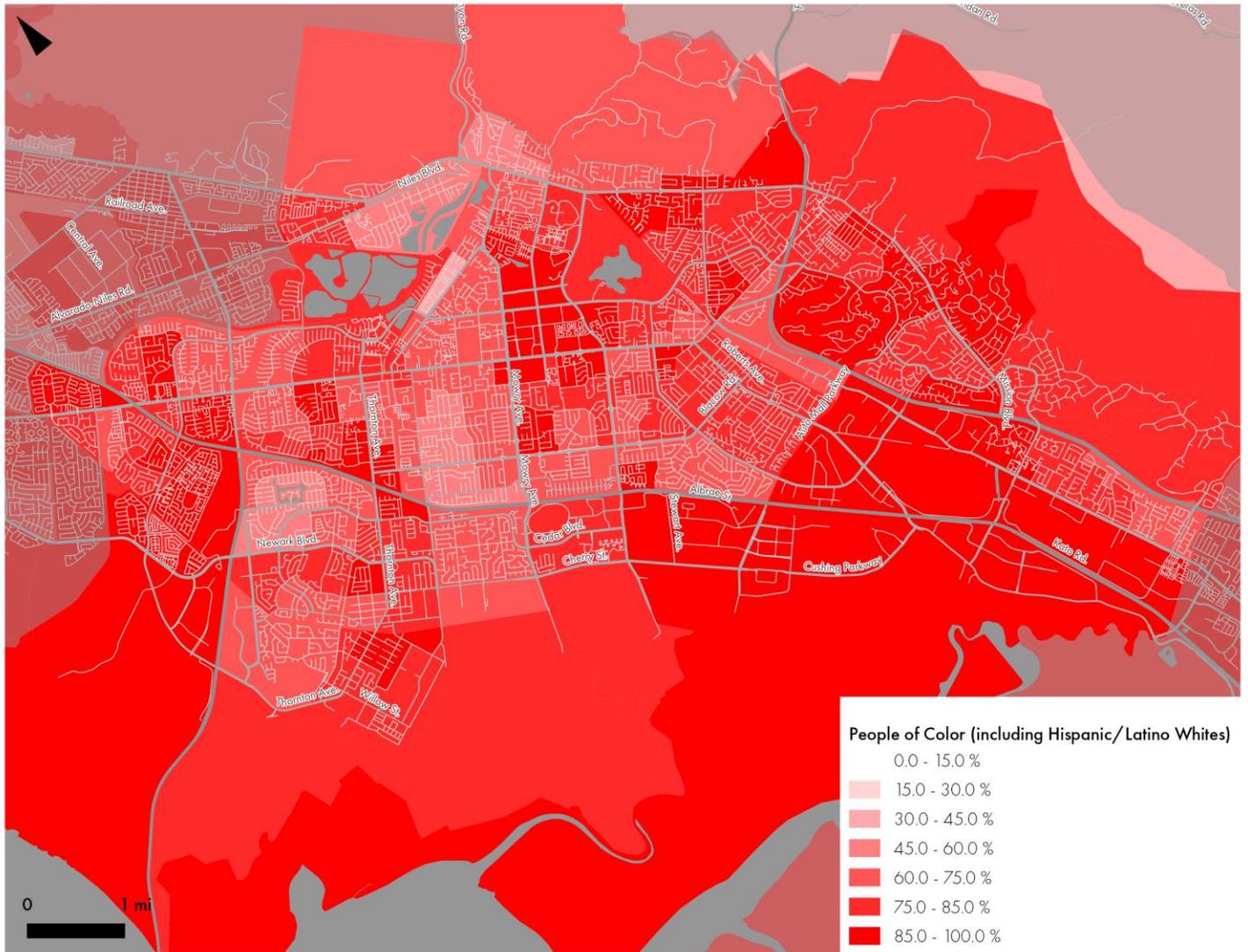


Figure 5 – Populations of Color, as percent of Total Population (U.S. Census 2013-2017 5-Year American Community Survey)

Youth Population

In general, the youth population (ages 10-17) is well dispersed across Fremont, with a few areas like the Niles District standing out as having higher proportions of this age demographic.

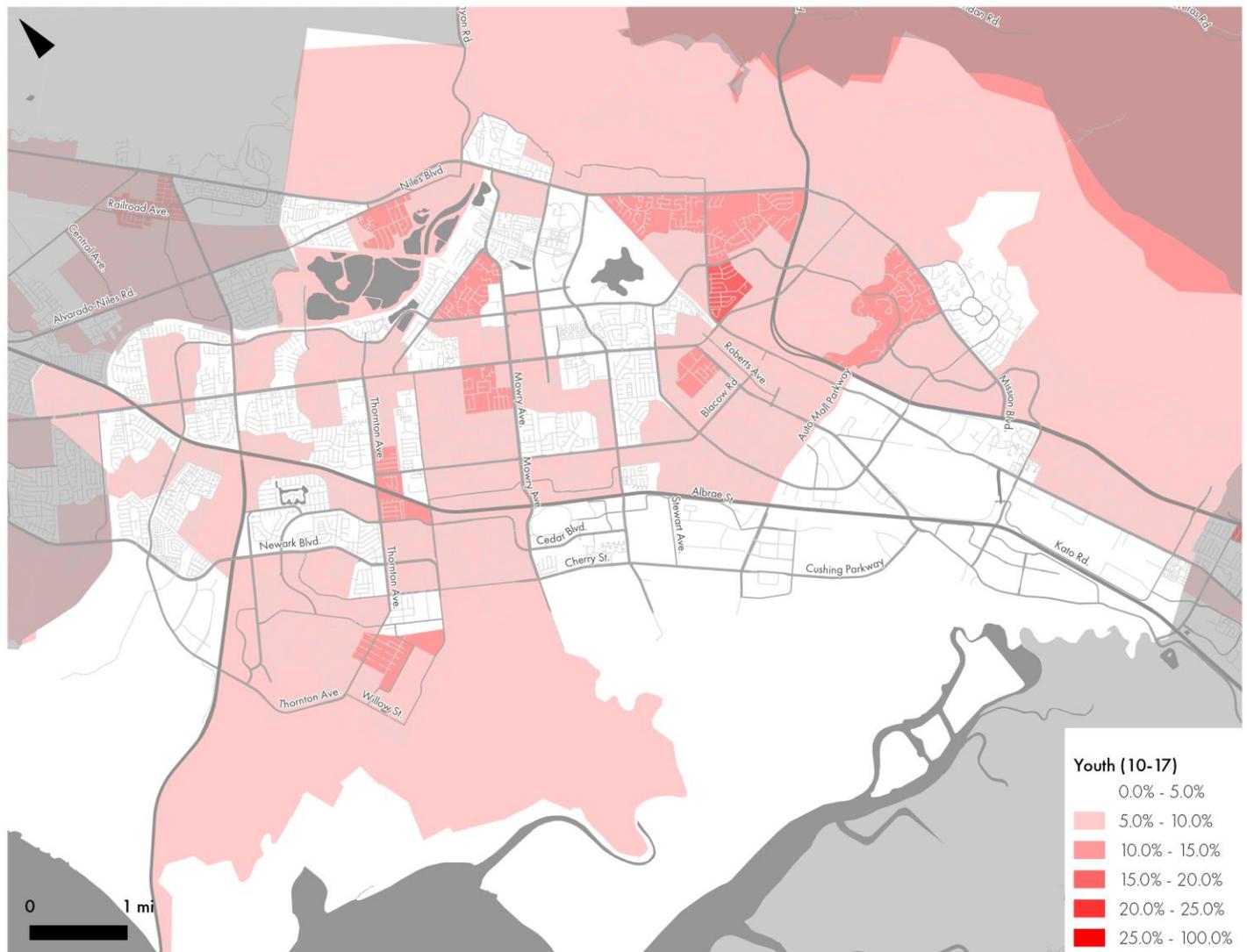


Figure 6 – Youth, Age 10-17, as Percent of Total Population, (U.S. Census 2013-2017 5-Year American Community Survey)

Senior Population

Seniors ages 65 and above make up a much higher proportion of residents in Fremont and Newark as compared to other age demographics. Nationwide and regionally, seniors tend to ride transit in greater numbers as compared the general population, though locally, increased senior ridership relative to the general population is not corroborated by District rider survey data.

Some block groups with high percentages of seniors are located in the area bordered by State Route 84, Cedar Blvd, and Newark Blvd., which includes the Newark Gardens senior housing, the eastern part of the Niles district near the former Vallejo Flour Mill site, the Blacow neighborhood, and in the Mission San Jose area.

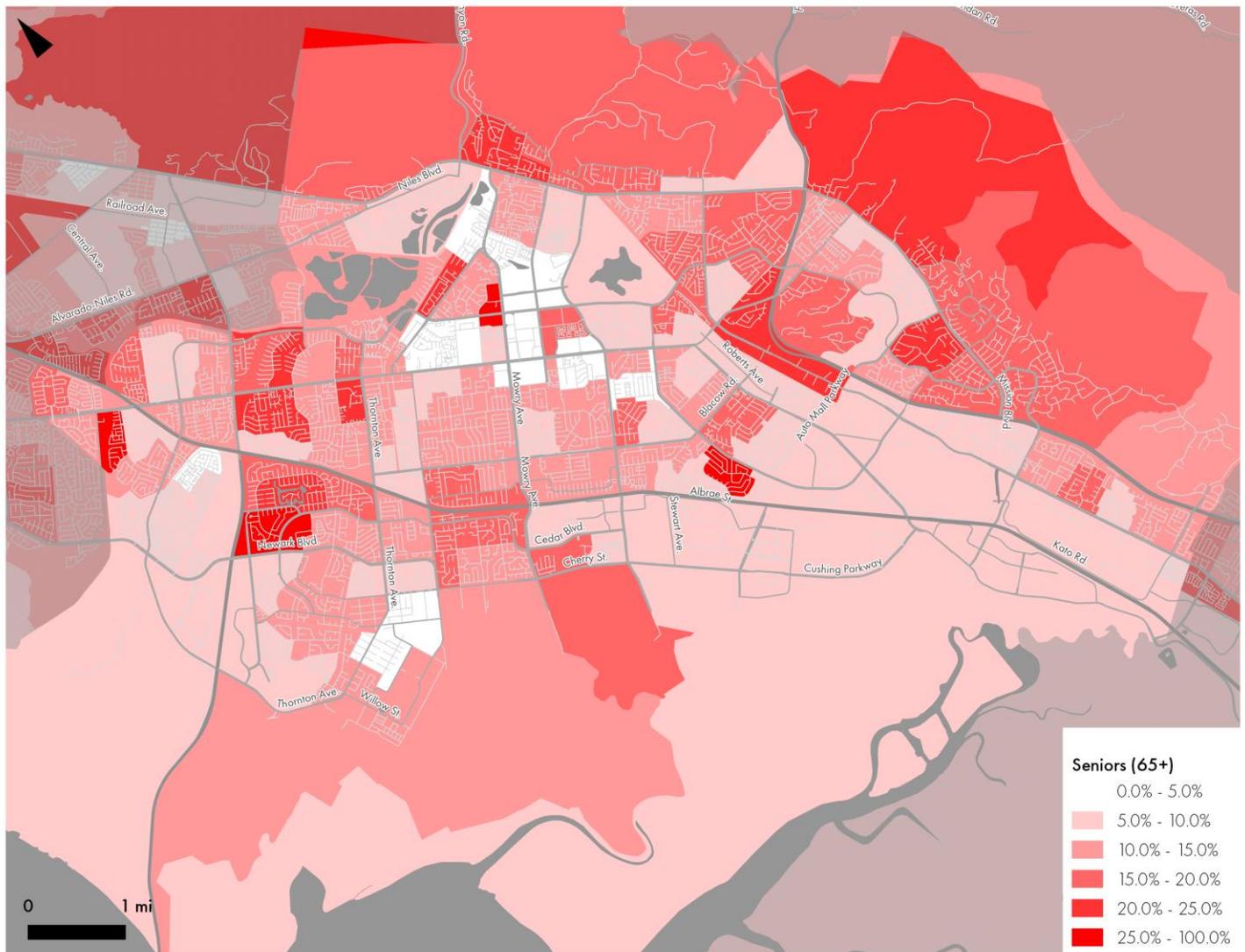


Figure 8 – Senior population, Age 65+, as Percent of Total Population (U.S. Census 2013-2017 5-Year American Community Survey)

Low-Income Populations

Fremont and Newark's population is largely high-income. However, there are pockets of these communities where there are larger concentrations of low-income residents. AC Transit considers those whose household income is less than 200% of the federal poverty level to be low-income. Serving those with low-income is another key part of AC Transit's mission that is also important from a federal compliance perspective. In addition, from a transit market perspective, it is important to note that those with lower incomes tend to ride transit in greater numbers than those in wealthier households. The block groups with the highest percentages of low-income households are in Old Town Newark and along the Fremont Blvd corridor. However, the geography of many of these low-income populations is not contiguous.

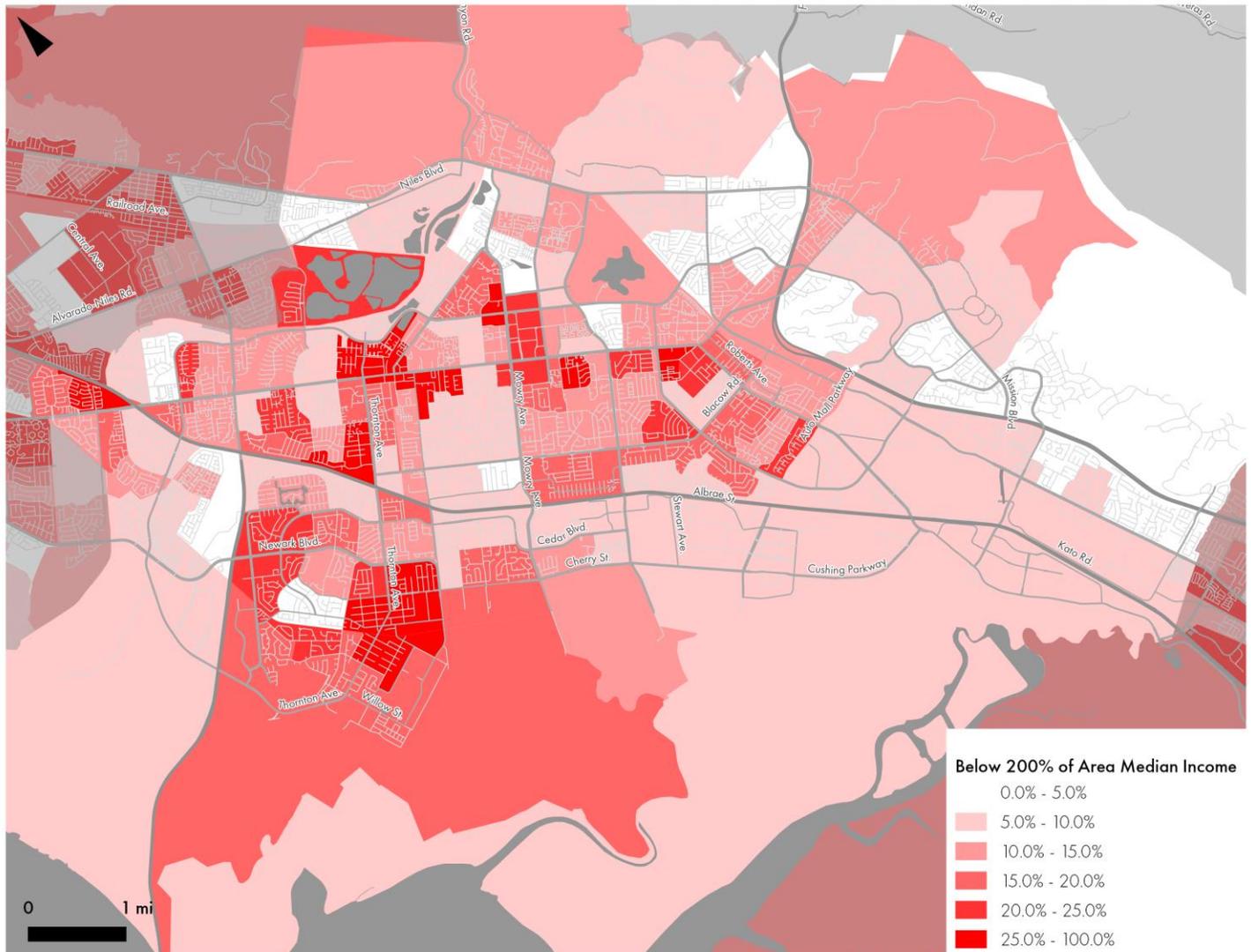


Figure 9 – Household Income Relative to Federal Poverty Level (U.S. Census 2013-2017 5-Year American Community Survey)

Disability Status, Age 18+

The block groups with the highest percentages of those with disabilities are concentrated near Alvarado and Lowry Road, which includes the Besaro Mobile Home Community and near Paseo Padre and Mowry. Other areas with higher percentages of individuals with disabilities overlap with there are higher percentages of seniors, like near Newark Gardens, and near Fremont Blvd and Blacow Rd.

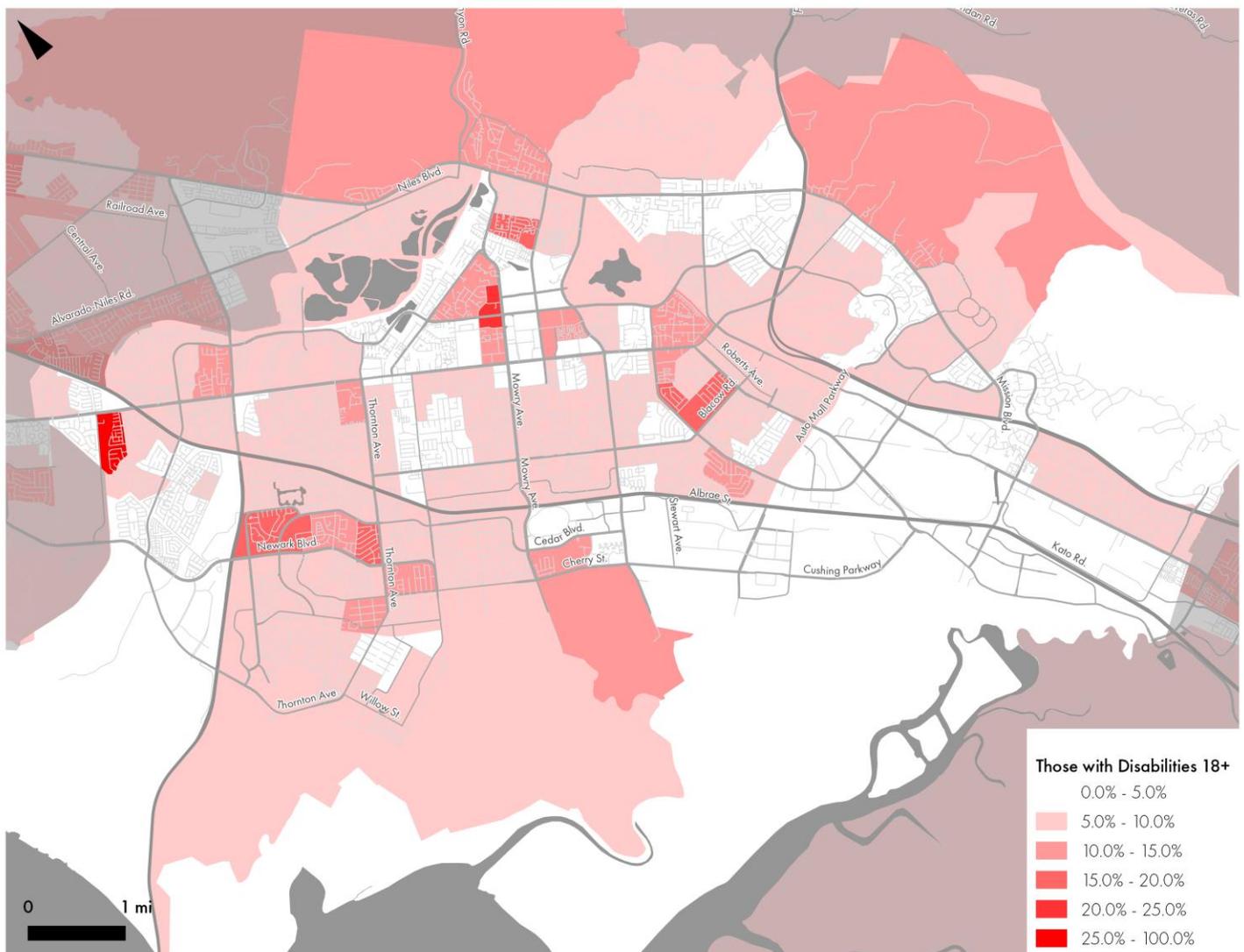


Figure 10 – People with Disabilities, Age 18+ (U.S. Census 2013-2017 5-Year American Community Survey)

Zero-Vehicle Households

In general, zero-vehicle households in Fremont and Newark are largely concentrated around BART stations and in the Irvington District. Many of these areas are already served by some of the best service in the area, including Lines 99, 200, and 210. In addition, the pocket of zero-vehicle households adjacent in the Newark Gardens area is well served by Line 200. Many pockets with high percentages of zero-vehicle households overlap with areas with high percentages of seniors, especially within Central Fremont.

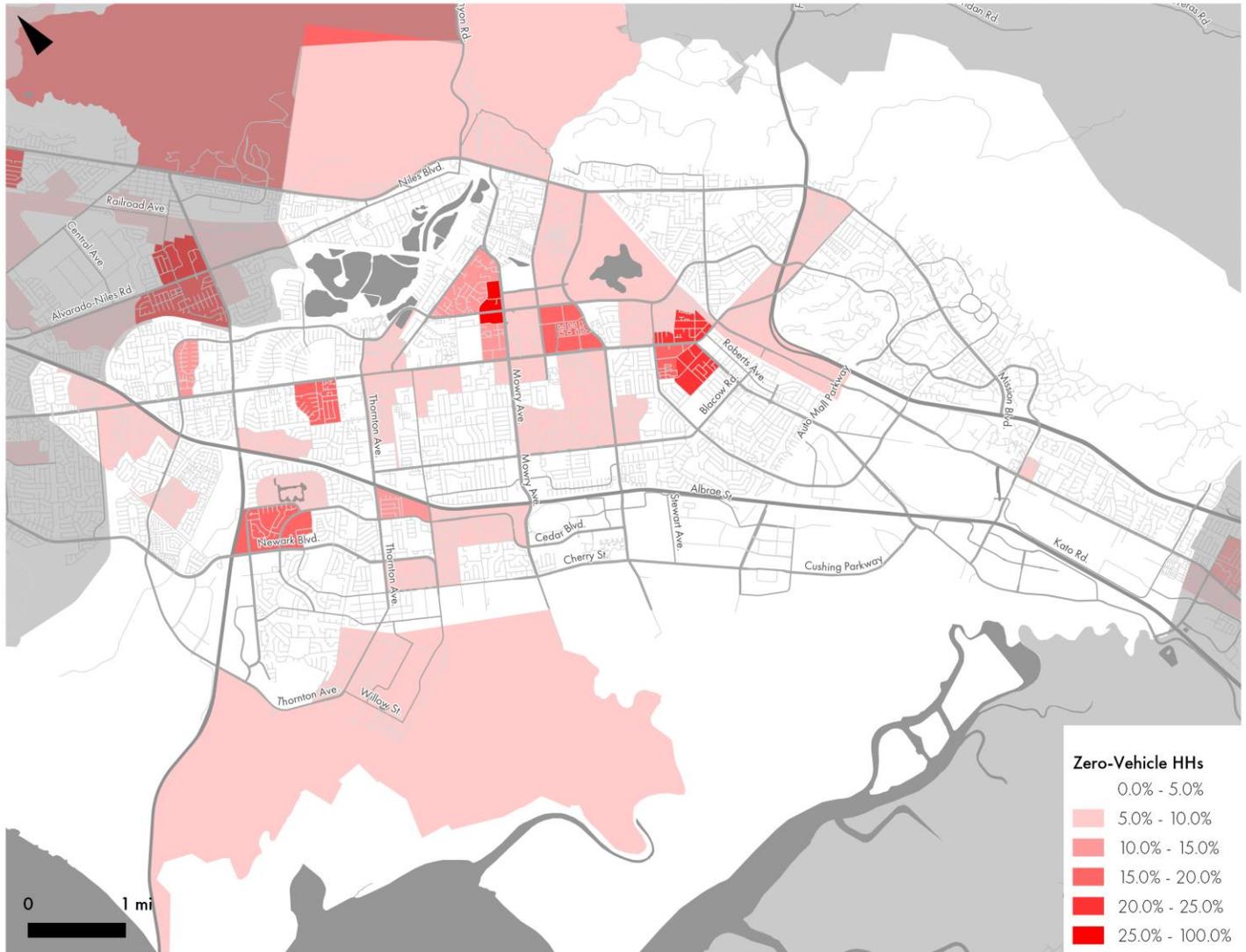


Figure 11 – Zero Vehicle Households as Percent of All Households (U.S. 2013-2017 5-Year American Community Survey)

Street Topologies, Walkability, and Transit Access Challenges

Transit generally thrives in settings with higher population and employment densities along linear corridors. However, density, employment, and transit-favorable demographics are not the only factors associated with increased transit ridership. AC Transit's 2004 design manual for transit-supportive infrastructure, *Designing with Transit*, details how crucial safe, walkable, and transit-supportive pedestrian environments are in supporting the transit customer experience. A lack of appropriate supporting infrastructure makes transit less appealing and more difficult for potential riders to use. Unfortunately, the existing infrastructure in many parts of Fremont and Newark makes transit ridership more challenging. These issues are detailed below.

Incomplete and/or Inaccessible Sidewalks throughout Communities

Throughout Fremont and Newark, sidewalks and pedestrian pathways generally provide access to most of both communities. However, areas on the fringes of the cities, particularly industrial areas and hillsides, often lack a sidewalk, or if one is present, it is likely to not meet ADA standards. At best, these situations decrease the safety and convenience of one's walk to the nearest bus stop, and at worst, they make it impossible for an individual with disabilities to access AC Transit service. These areas should be connected to the community's pedestrian network to facilitate walk access to bus stops and be sufficiently wide for full accessibility.

Prohibitively Long Walk Distances to Transit

Walk distances to streets with transit can often be long in Fremont and Newark due to neighborhood and street design. Walk distances to transit are increased in any neighborhoods with long block lengths and disconnected street grids. Figure 12 depicts one representative scenario where the lack of connectivity of area streets can increase door-to-door transit travel times substantially. In the map depicted on the left side of Figure 12, the left side details a street grid that facilitates shorter walks to and from transit and other locations away from the corridor. The right side of the visual depicts a grid that provides significantly less convenient walk access.



Figure 12 – Walk Distances and Transit Access

Long walk distances to transit are further increased where development patterns incorporate long, unbroken walls around subdivisions, shopping centers, or other land uses. Residents may be able to walk around the wall on the nearest street. However, overly long block lengths may mean that the nearest street is a discouraging 800 or 1,000 feet away. Some housing developments situated next to a shopping center have pedestrian gates (often key-accessed) permitting only residents of such developments to walk from housing to shopping.

While building a road would be the most disruptive and expensive remedy for these situations, other ways can also improve access to transit for pedestrians, like constructing midblock pedestrian connectors (walkways). These are particularly useful for pedestrian-friendly commercial areas and as connectors to transit.

As a special district tasked with operating transit service rather than administering planning codes or operating and maintaining streets and sidewalk infrastructure, AC Transit relies on the cities of Fremont and Newark to make improvements to the infrastructure that supports the delivery of quality transit service. Our constituent cities are important partners in our shared mission to bolster sustainable mobility options and mitigate congestion both locally and regionally.

Rider Demographic Profile

While Fremont and Newark's demographics and land-use patterns help explain some of the area's specific mobility challenges, the cities' overall demographics differ substantially from those of transit riders. It is important to understand the characteristics of existing riders to understand what types of markets AC Transit currently serves as compared to the overall population. This context is pivotal for the District to establish priorities for potential new markets and provide context for how transit network changes could shape experiences for existing riders and new riders alike.

Who are Fremont and Newark's AC Transit riders?

The 2017-18 On-Board Survey identifies some key characteristics for those riding AC Transit in and around Fremont and Newark, which are depicted below:

Fremont and Newark's transit riders are substantially lower-income than the overall population. 60% of Fremont and Newark AC Transit riders have household incomes below \$50,000. By comparison, the 60th percentile income for Fremont residents is above \$100,000, and between \$75,000 and \$100,000 for Newark residents.

Compared to Fremont and Newark's population, Fremont and Newark AC Transit riders are more likely to be Hispanic or African-American and less likely to be Asian. When compared to the populations of Fremont and Newark as a whole, AC Transit riders tend to be much more Hispanic and African-American than Fremont and Newark residents overall. Fremont and Newark also have disproportionately more Asian residents as compared to AC Transit's ridership in the area. In terms of individual cities, Newark's demographics more closely match those of AC Transit's ridership in the area than Fremont's.

School-aged riders make up a substantial percentage of Fremont and Newark AC Transit ridership.

Based on the available survey data, those of middle school, high-school, and college age ride in disproportionately higher numbers than the general population.

Middle-aged individuals and seniors are underrepresented in AC Transit's ridership relative to the general population. Those 45 and older make up nearly a third of the general population, but are just under 20% of AC Transit riders. Trends are similar for riders above the age of 65, who are underrepresented in AC Transit's ridership. Those of middle school, high-school, and college age ride in disproportionate numbers from the general population.

Fremont and Newark AC Transit riders are less likely to use the Disabled fare relative than the population of Fremont and Newark disabled residents. This could be a reflection of the the barriers to accessing fare discount programs or suggest that those with disabilities take advantage of other ways to get around Fremont and Newark rather than fixed-route transit service.

Rider Household Incomes

Household incomes among AC Transit riders are skewed towards the low end, while household incomes among Fremont and Newark residents are skewed towards the high end. AC Transit riders tend to be substantially lower-income than the general population of Fremont and Newark residents.

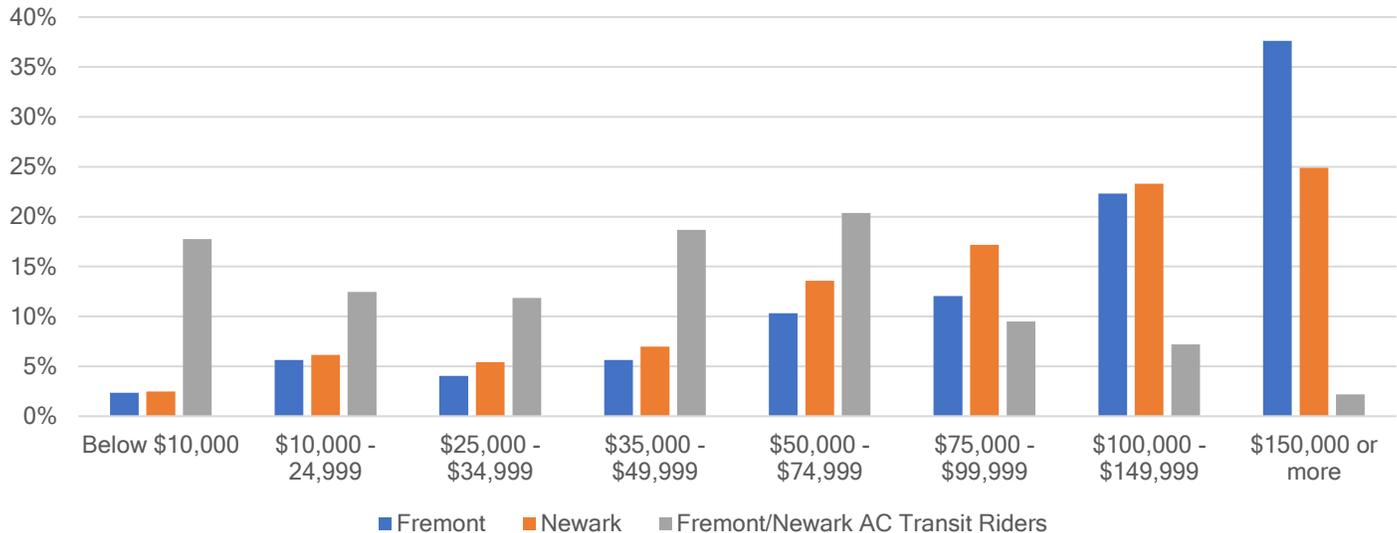


Figure 13 – Household Incomes by City and Transit Ridership (ACS 2013-17, AC Transit 2017-18 On-Board Survey)

Rider Ethnicity

Fremont and Newark boast a substantial Asian population and the percentage of AC Transit riders who identify as Asian is larger than in other parts of the AC Transit service area, however Asian riders in Fremont ride AC Transit in a lower proportion than their population. In addition, people who identify as Latino/Hispanic ride AC Transit disproportionately more relative to their representation among Fremont residents, and African-American residents ride the bus more than their representation in the population as a whole in both cities.

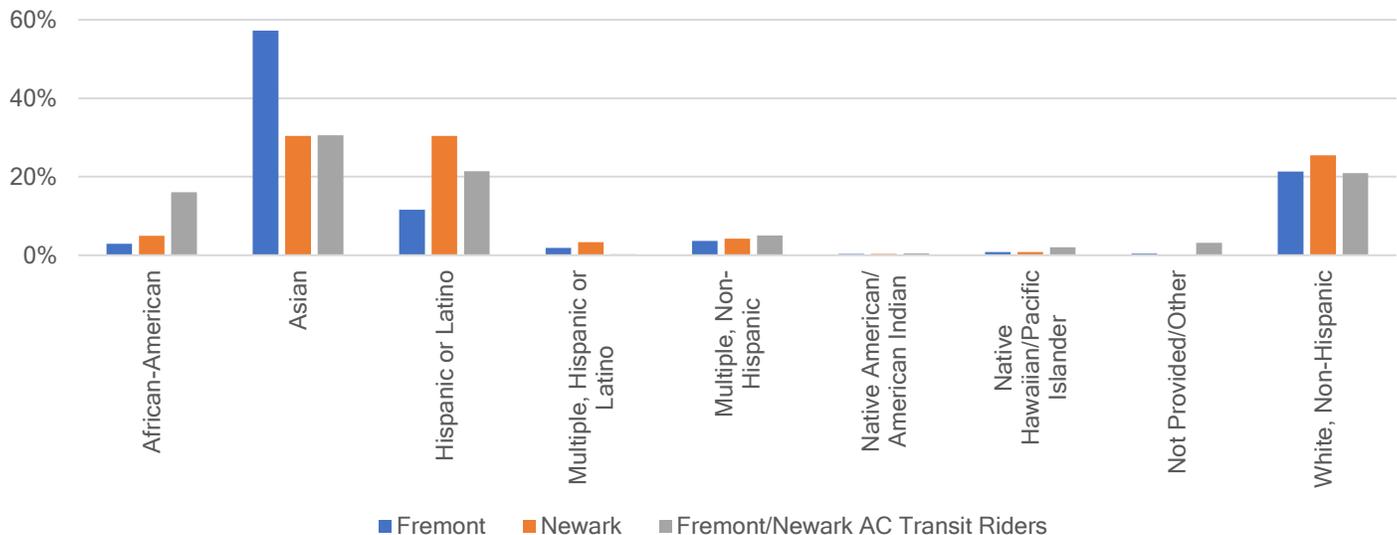


Figure 14 – Race/Ethnicity by City and Transit Ridership (ACS 2013-17, AC Transit 2017-18 On-Board Survey)

Rider Age

The data show that school-aged individuals (middle school through high school) ride substantially more than their representation in the general population. Because the AC Transit on-board survey excluded school-demand-focused limited service lines in its sampling plan, the number of middle-school- and high-school-aged individuals are likely underrepresented in the dataset. This is corroborated in automatic passenger count data and qualitative data.

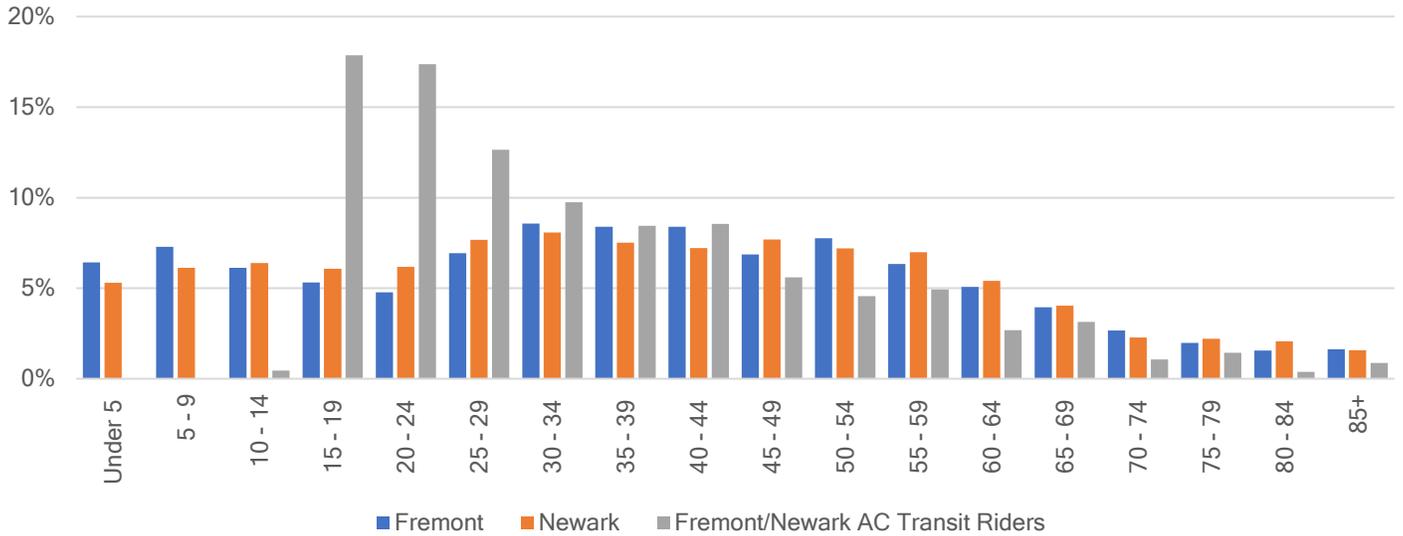


Figure 15 – Age Breakdowns by City and Transit Ridership (ACS 2013-17, AC Transit 2017-18 On-Board Survey)

Household Vehicle Availability by Rider

Fremont and Newark’s AC Transit riders tend to have substantially fewer cars in their households – roughly 65% of Fremont and Newark AC Transit riders have fewer than two cars in their household, as compared to less than 30% of Fremont and Newark residents.

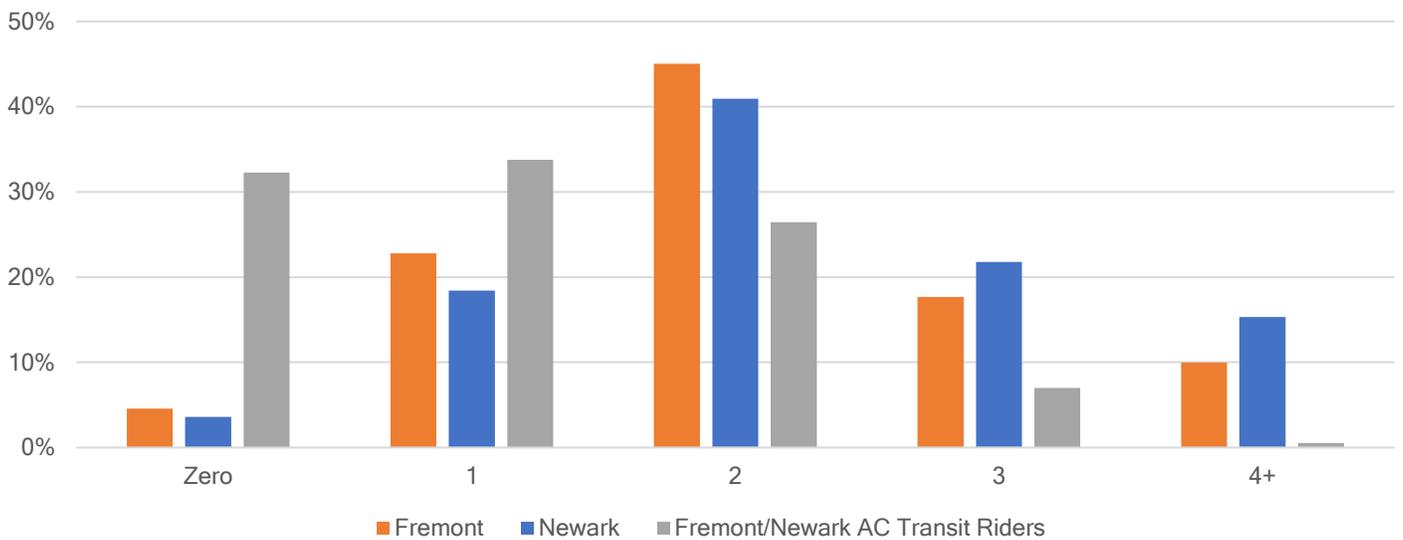


Figure 16 – Available Household Vehicles by City and Transit Ridership (ACS 2013-17, AC Transit 2017-18 On-Board Survey)

Disability Status

Just over 7% of Fremont residents and 8% of Newark residents have a disability, which is substantially more than the under 3% of AC Transit riders paying the discounted fare for those with disabilities. This suggests that fewer people with disabilities ride AC Transit fixed-route service than the overall population of residents living with disabilities, or that people with disabilities do not know how to qualify for or use the discounted disabled fare program. It should be noted that the rider data do not include AC Transit riders who qualify for and use complementary paratransit service.

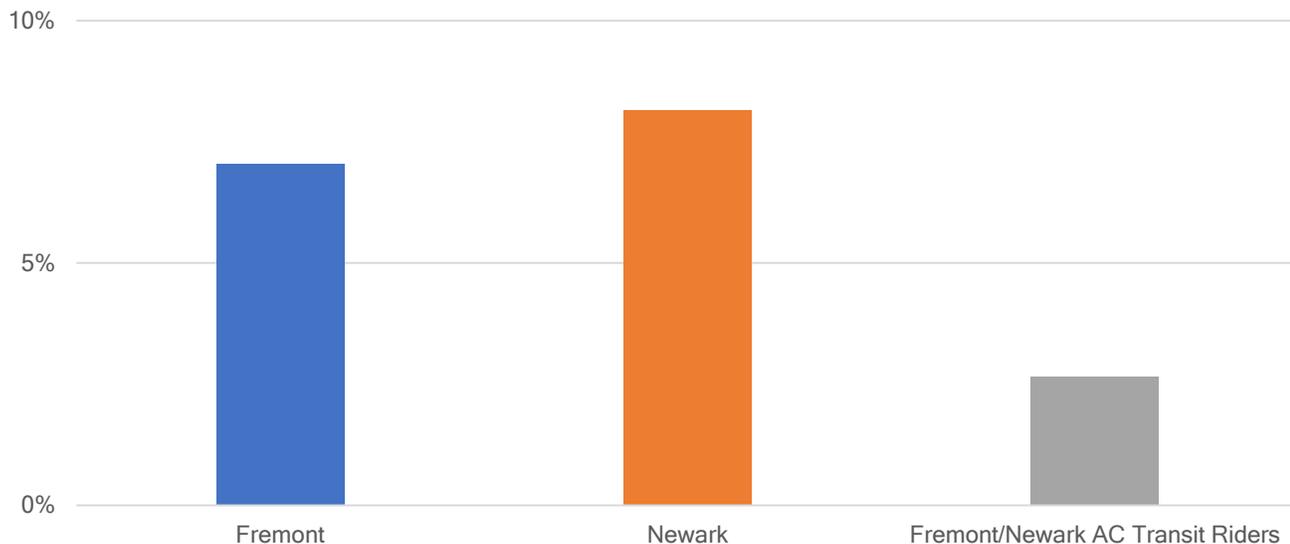


Figure 17 – Disability Status by City and Transit Ridership (2013-17 ACS, AC Transit 2017-18 On-Board Survey)

Student Status

Survey data for AC Transit riders within Fremont and Newark indicate that students make up a large minority of the riding population. As with the sample for the distribution of ages, the percentage of K-12 students should be taken with a large caveat, given that the dataset excludes data from AC Transit’s limited service lines, which carry many middle- and high-school individuals, and which are very well-subscribed. Also of note, a significant portion of college and university students attend classes on a part-time basis, meaning that they may also use AC Transit buses for other trip purposes like part-time work.

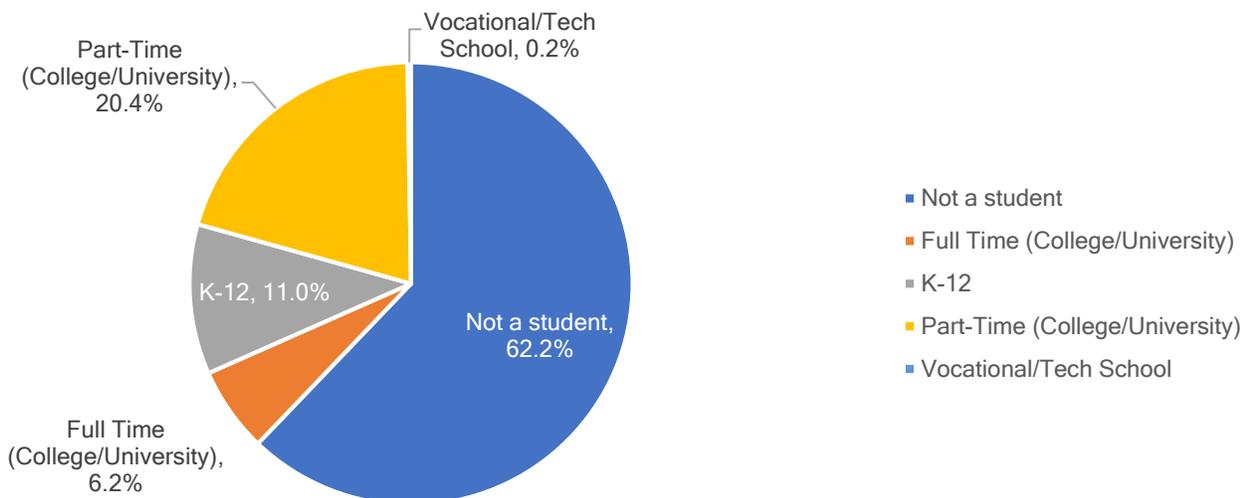


Figure 18 – Transit Rider Student Status (AC Transit 2017-18 On-Board Survey)

Trip Purpose

Riders use transit for a variety of different trip types; home-based trips of all different types make up the largest individual share of trips by far, with home-based work trips exceeding 40%. Of note, few AC Transit trips taken in Fremont and Newark tend to be non-home-based, which may be related to the infrequency of AC Transit service.

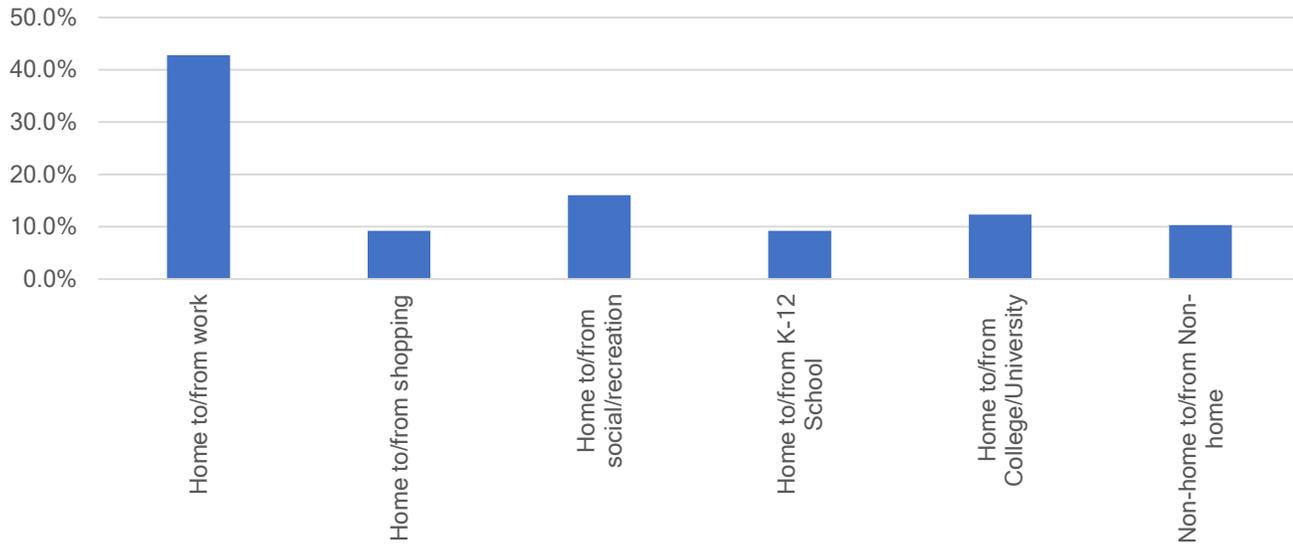
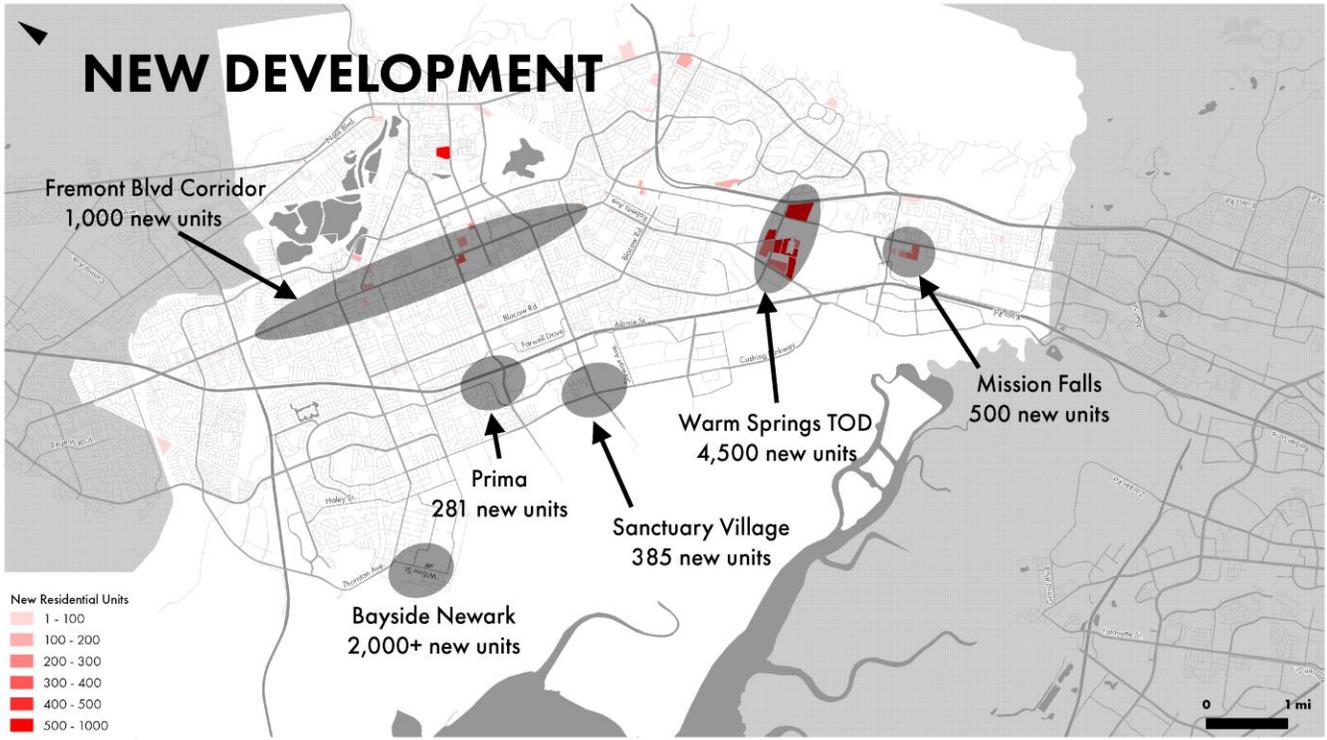


Figure 19 – Transit Trip Purposes (AC Transit 2017-18 On-Board Survey)

Future Population and Employment

Substantial additional development is ongoing in the Warm Springs District next to the Warm Springs/South Fremont BART station, with 4,500 new units and thousands of square feet of accompanying retail and office space being added. Other notable development is taking place along the Fremont Blvd. corridor: as of June 2019, along Fremont Blvd., over 3,200 units are planned or under construction, along with over 130,000 square feet of new commercial space. Additional development is underway in Newark, with over 2,000 residential units at Bayside Newark (formerly known as the Dumbarton TOD) already built or under construction.

Other employment centers have seen dramatic growth, including in the Dumbarton Circle area, where thousands of jobs have been created by Tesla, Facebook, and other area employers. The City of Newark also anticipates substantial development at the Morton Salt site, where Facebook will open a large scale commercial food preparation operation to support its corporate cafeterias throughout the Bay Area.



Market Analysis - Key Findings

Fremont and Newark are suburban communities with one particularly dense and growing corridor in Fremont Blvd, and individual nodes of denser development scattered throughout the region.

Fremont and Newark's prevailing low levels of residential density make it challenging to serve these communities with public transit that is convenient for most area residents and commuters. Multifamily residential developments increasingly make up a large percentage of the cities' new housing units, however, and are increasingly being concentrated along corridors like Fremont Blvd. Moreover, Fremont and Newark far outstrip their peers relative to other Bay Area municipalities when it comes to the pace of new development. Still, the majority of Fremont and Newark's land area remains untouched by new development more conducive towards transit ridership. Although Fremont and Newark are indeed making good progress to facilitate more transit-oriented lifestyles, altering land uses and behaviors takes time and continued effort.

As of today, most of Fremont and Newark's built environment still looks like the Fremont and Newark of yesterday. Most of the cities' land area is still occupied by single-family homes and residential development that encourage driving at the expense of walk access, making transit less compelling for many trips. Curvilinear cul-de-sacs, privacy walls, and fenced-in developments form physical barriers that keep pedestrians from easy access to the major streets and straight streets where traditional fixed-route transit can operate most safely and effectively.

Moreover, though employment is growing substantially in the area, much of it is being situated in low-density locations that make the provision of quality transit service difficult. For example, Facebook and Tesla have brought thousands of jobs to the Dumbarton Circle area, which is a prototypical corporate campus with lots of free parking. Like with much of Fremont and Newark's current residential development, jobs located in suburban-style commercial settings make it challenging for transit to succeed without increasing incentives to encourage the use of the transit service already on the street.

Moreover, both communities lack a targeted transportation demand management (TDM) strategy with strong incentives for AC Transit utilization. The city of Fremont is increasingly exploring new TDM measures, but as of today, transit incentives could be substantially stronger. The AC Transit EasyPass program, which provides low-cost unlimited transit passes paid for by employers, colleges and universities, and residential communities, has seen limited uptake in Fremont and Newark. Other communities in Alameda County have seen great success in directly encouraging transit use, and Fremont and Newark could follow the examples set by other municipalities with robust TDM programs like the City of Alameda, which incentivizes transit use for all new development through the Alameda Transportation Management Association.

Fremont and Newark's AC Transit ridership is ethnically diverse, substantially lower-income, younger, and with fewer vehicles available than the communities' general population. Data show that older individuals and those with disabilities are significantly underrepresented in the population of AC Transit riders, suggesting that those with means and with options tend to use other modes to get around both locally and regionally. Low ridership among seniors and those with disabilities is a particularly striking finding; nationally and regionally, both demographic groups typically ride transit with greater frequency than the general public. Overall, land use changes, service improvements, and better incentives for transit use could make AC Transit service useful for more people in these communities, and substantially increase mobility options both for existing riders and potential future riders.

Service Assessment

The Service Assessment forms an important part of the project's existing conditions analysis. This section builds on the Market Analysis to provide AC Transit staff, key stakeholders, and community members with a comprehensive understanding of how existing service within Fremont and Newark performs by measuring ridership, efficiency, and effectiveness.

The District's vehicle fleet is equipped with automatic passenger counters (APCs), which provide reliable boarding and alighting counts, and an automatic vehicle location (AVL) system that records location data to provide a wealth of quantitative data.

Proper context for these data is essential – the experiences of District planning and operations staff, together with activities to engage riders and non-riders in our discourse, will enable the District to develop a new transit network that balances the clear need for better mobility options in Fremont and Newark within the District's fiscal limitations.

Service Overview

AC Transit directly operates ten local lines (99, 200, 210, 212, 215, 216, 217, 232, 239, and 251), two Transbay express lines (SB and U), and one Flex service in Fremont and Newark. AC Transit also administers two contracted Dumbarton Express lines on behalf of the Dumbarton Bridge Regional Operations Consortium, which aside from AC Transit is made up of BART, SamTrans, VTA, Caltrain, and Union City Transit. AC Transit also directly operates several limited-service lines tailored to serve passenger demand around school bell times.

All of AC Transit's current local services in Fremont and Newark operate between every 20 and 60 minutes, with just a handful of lines operating past 9:00 pm, and many only operating until 8:00 pm.

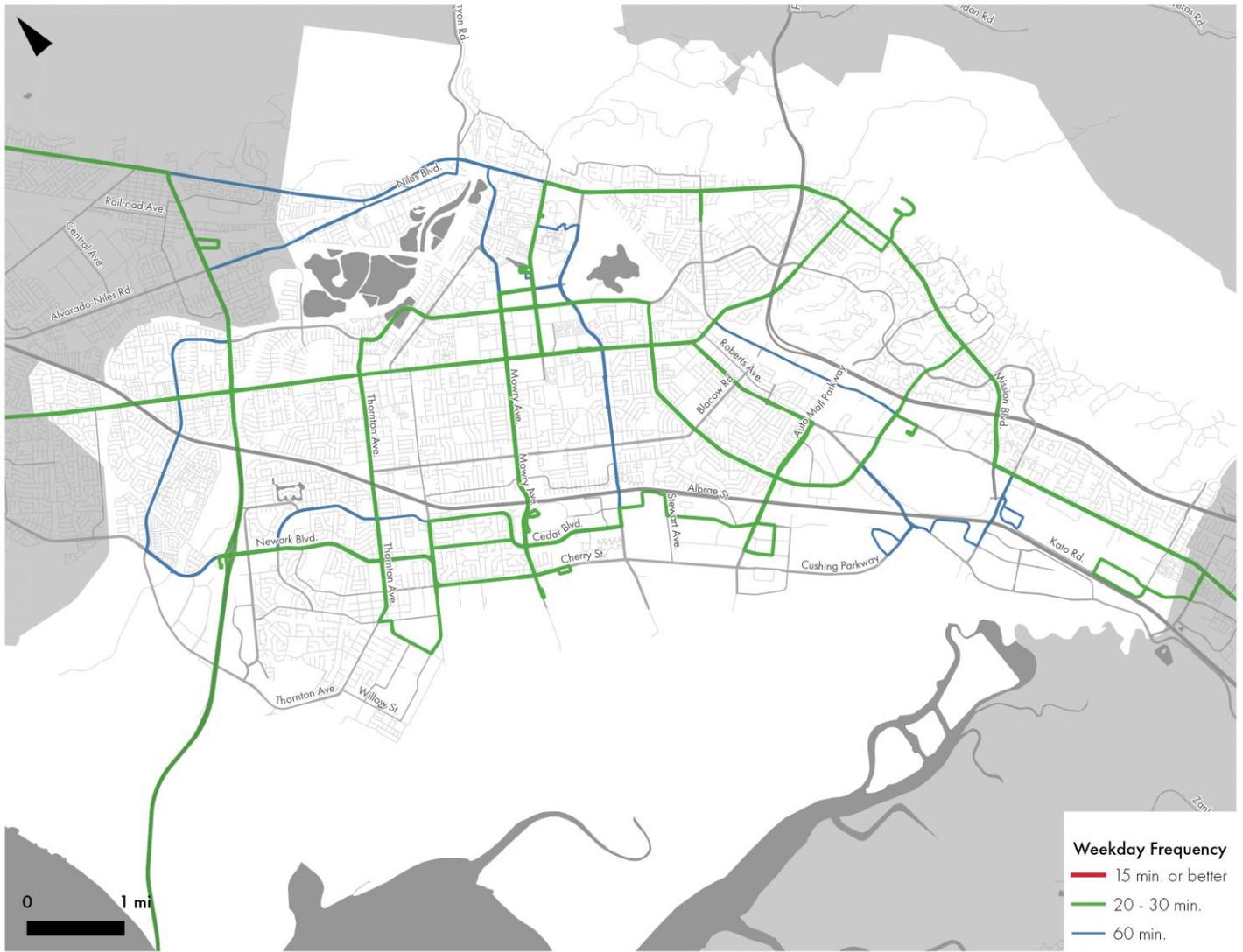


Figure 20 – Existing Weekday Frequency in Newark and Fremont

The key characteristics of these services are listed in the table below:

Line	Line Description	Frequency	Weekday Span	Weekend Span
99	7 Days a Week: Fremont BART to Hayward BART via Fremont Blvd., Union City BART, Mission Blvd., and South Hayward BART.	Weekdays: every 20 min. Weekends: every 25 min.	5:00a to 12:00a	6:00a to 12:00a
200	Weekdays: Fremont BART to Union City BART via Mowry Ave., NewPark Mall, Central Ave., Newark Blvd., and Decoto Rd. Weekends: Additional service to Silliman Recreation Center, Newark	7 Days a Week: every 30 min.	6:30a to 12:00a	7:30a to 12:00a
210	7 Days a Week: Ohlone College to Union Landing Shopping Center via Washington Blvd., Fremont Blvd., and Alvarado Blvd.	7 Days a Week: every 30 min.	5:30a to 9:30p	7:00a to 7:00p
212	Weekdays: NewPark Mall to Fremont BART via Cedar Blvd., Pacific Commons, Auto Mall Pkwy., and Fremont Blvd. Weekends: Pacific Commons to Fremont BART via Auto Mall Pkwy., Fremont Blvd., and Walnut Ave.	7 Days a Week: every 30 min.	6:30a to 11:30p	7:00a to 12:00a
215	Weekdays only: Warm Springs District to Fremont BART via Warm Springs BART, Osgood Rd., and Paseo Padre Pkwy.	Weekdays: every 60 min.	7:30a to 8:00p	no service
216	Weekdays: Ohlone College Newark Campus to Union City BART via Stevenson Blvd., Fremont BART, and Niles Blvd. Weekends: Silliman Recreation Center to Union City BART via Stevenson Blvd., Fremont BART, and Niles Blvd.	7 Days a Week: every 60 min.	6:15a to 7:15p	7:00a to 7:00p
217	7 Days a Week: Great Mall Transit Center to Fremont BART via Milpitas Blvd., Warm Springs Blvd., and Mission Blvd.	7 Days a Week: Every 30 min.	5:30a to 10:00p	7:15a to 9:30p
232	7 Days a Week: NewPark Mall to Fremont BART via Cedar Blvd., Paseo Padre Pkwy., Union City BART, and Mission Blvd.	7 Days a Week: Every 60 min.	5:00a to 7:00p	8:30a to 7:30p
239	Weekdays only:	Weekdays: every 30 min.	6:20a	no

Line	Line Description	Frequency	Weekday Span	Weekend Span
	Milmont Dr. and Kato Rd. to Fremont BART via Warm Springs Blvd., Grimmer Blvd., and Paseo Padre Pkwy.		to 10:00p	service
251	Weekdays: Ohlone College Newark Campus to Fremont BART via Cherry St., Thornton Ave., and Paseo Padre Pkwy. Weekends: Silliman Recreation Center to Fremont BART via Cherry St., Thornton Ave., and Paseo Padre Pkwy.	7 Days a Week: every 60 minutes	6:40a to 7:20p	7:10a to 6:40p
Flex	Weekday-only: On-Demand Service to Central Newark from Union City BART, hailed by telephone, smartphone, or computer.	Weekdays: On-demand, with walk-ons accepted every half-hour at Union City BART	6:00a to 8:00p	no service
U	Weekday peak-direction only Transbay service: Fremont BART to Stanford via Centerville Amtrak, Ardenwood Park & Ride, and the Dumbarton Bridge.	Weekdays: every 20 to 40 minutes	6:00a to 8:20a 2:45p to 5:55p	no service
SB	Weekday peak-direction only Transbay service: Cedar Blvd. & Stevenson Blvd., Newark, to San Francisco via Newark Blvd., Union City Blvd. and Hesperian Blvd.	Weekdays: every 20 to 30 minutes	5:30a to 8:00a 3:30p to 6:55p	no service

Figure 21 – Route Descriptions, Service Frequencies, and by Day Type (Spring 2019)

Key Transit Performance Indicators

Ridership

Ridership analysis is crucially important and facilitates understanding of how many passengers use transit lines, but also the geography of this usage. How the service is being used by riders reveals information about the kinds of key trip generators along a line.

Service Productivity

The most common measurement of transit service productivity is passengers per hour (the number of boardings divided by the number of hours a route is operated). Service productivity is an important effectiveness metric that helps communicate how many rides are being delivered relative to the District's investments in service.

Transit Network Design Fundamentals

Transit network elements must be carefully considered to maximize the transit rider experiences and to ensure that service appropriately meets travel needs.

Frequency

Frequency of service refers to how regularly a transit line operates, which shapes average wait times. Data from academic literature on wait times show that transit customers perceive wait times at transit stops as at least 30% longer than their actual length. In addition, when wait times at stops are compared to in-vehicle travel times, the literature shows that individuals perceive out-of-vehicle wait times up to twice as acutely as compared to in-vehicle travel times, underscoring the power of frequency in improving transit service quality.

Transit industry best practices reinforce that service should operate at least every 15 minutes so that riders feel confident enough to use the service without having to consult a schedule. Unfortunately, frequent transit comes with significant operating costs; operating a bus every 15 minutes is roughly twice as expensive as service every 30 minutes and four times as expensive as operating hourly service.

Coverage

Network coverage, or providing at least some service to all residents in an area, generally stands in opposition to network frequency. Discussions of how to balance coverage and frequency are pivotal in transit planning. With a limited number of resources, a transit operator must choose a balance between frequent service and coverage service.

For example, let's say that in a hypothetical scenario, a transit agency has four buses, and four major corridors of the same length. This agency could choose to direct its four buses and operators to operate on one corridor, which, for ease of discussion, would provide 15-minute service on one corridor and no service on the three other corridors.

In another scenario, this same transit operator could operate those same 4 buses on four different corridors of equal length to provide these four corridors with service. In that situation, with the same number of buses and operators, each corridor would only be able to operate hourly.

This illustrates the challenges associated with this balance; other combinations could include putting 30-minute service on only two corridors, or operating 20-minute service on one corridor and 60-minute service on a second corridor. Each option would have trade-offs.

Span of Service

Span of service refers to the operating hours of a service. Service that begins operating earlier in the morning and later in the evening allows transit riders more flexibility to travel where and when they want to go. Extending spans of service is often an acute concern for people who work non-traditional work hours and others who face ever-lengthening regional commutes and punishing congestion on area roadways.

Reliability

Reliability is a core part of a quality transit experience. A transit rider should be able to count on transit getting them to their destination. A 2013 UC Berkeley study of current and former San Francisco Muni users underscores the importance of maintaining reliable service; a large percentages of former transit riders cited unreliability as a key reason for them abandoning the service. Moreover, service reliability is often correlated with increased service frequency; more frequent service provides an insurance of sorts for any individual reliability issues that may occur. As mentioned above, however, frequency is extremely expensive.

Simplicity

In order to make a service easy to use, it should be simple and understandable. By its very nature, transit serves a variety of demographics across all ages, ability levels, and language proficiencies, so designing a simple, intelligible network facilitates increased ridership. Public engagement activities conducted as part of the AC Transit Comprehensive Operational Analysis validated how important simple network design is to riders. Riders surveyed overwhelmingly expressed support for straighter, simpler, transit lines with fewer confusing loops.

Overall Fremont and Newark Ridership

Ridership for the local network in Fremont and Newark has declined substantially over last few years.

Figure 22 shows one example: the ridership trends for AC Transit’s 200-series routes over the last five years, charted against the level of service (hours and miles). (Note that the dramatic increase, peaking in December 2015, was associated with participation of Northwest Polytechnic University, an institution in Fremont’s Warm Springs District, in AC Transit’s EasyPass program. Their student body, which was heavily transit riders, steadily and precipitously declined after the institution lost their accreditation.)

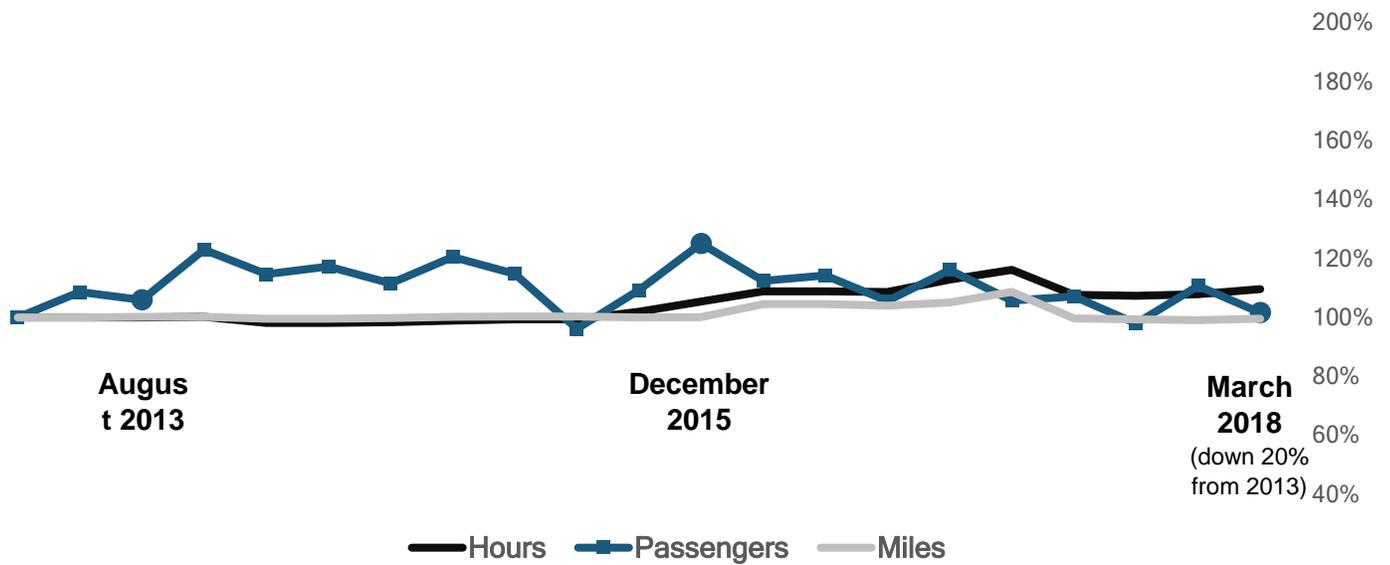


Figure 22 – AC Transit Ridership, Passengers, and Miles (2013 through 2018).

When comparing recent ridership against 2013 and 2014, AC Transit shows overall declines in Fremont and Newark, which suggests that service isn’t meeting peoples’ needs. Declining ridership amid largely constant service levels means that cost-effectiveness and productivity are steadily decreasing as well.

Line-Level Ridership Analysis

As mentioned above, the District’s vehicle fleet is equipped with automatic passenger counters (APCs), which provide reliable boarding and alighting counts, and an automatic vehicle location (AVL) system that records location data to provide a wealth of quantitative data. These data form the

Weekday Ridership by Line

Figure 23 shows that Line 99 carries the most riders of any lines traveling through Fremont and Newark. The highest frequency lines carry the most overall ridership, with Line 99 operating every 20 minutes on weekdays; lines 200, 217, 212, and 239 operate every 30 minutes on weekdays. Fremont and Newark’s lower-frequency services carry substantially less ridership.

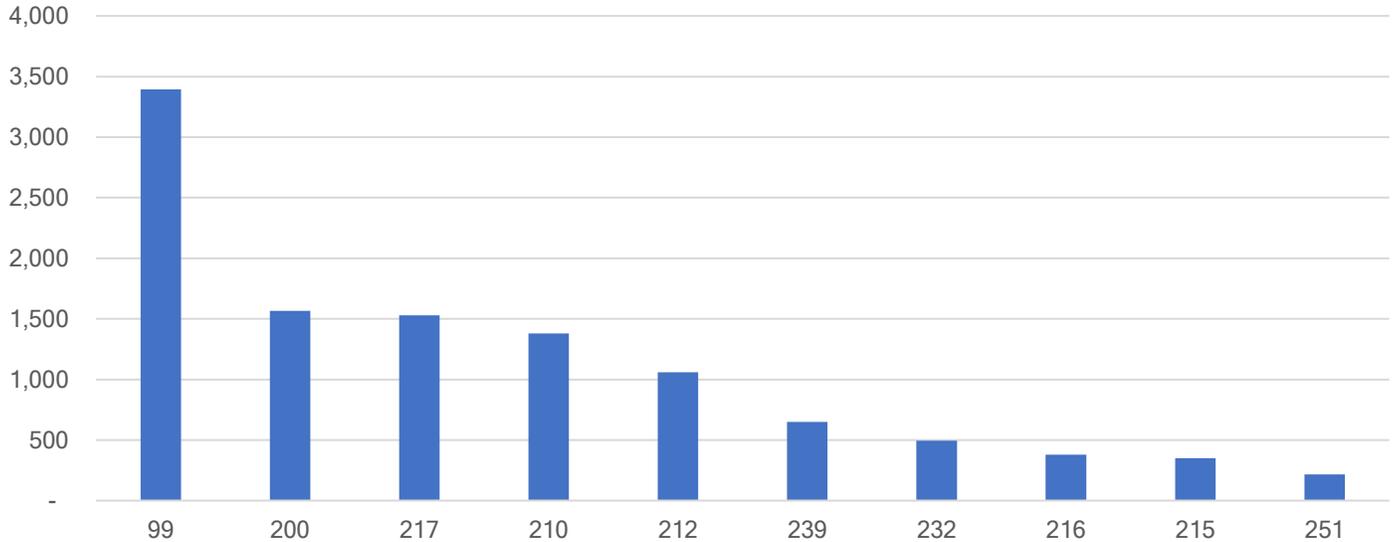


Figure 23 – Weekday Ridership, Local Lines (Automatic Passenger Count Data, Winter 2017-18).

Figure 24 shows that on weekends, ridership trends largely mirror those occurring on weekdays, though the overall ridership magnitude is substantially lower across all lines.

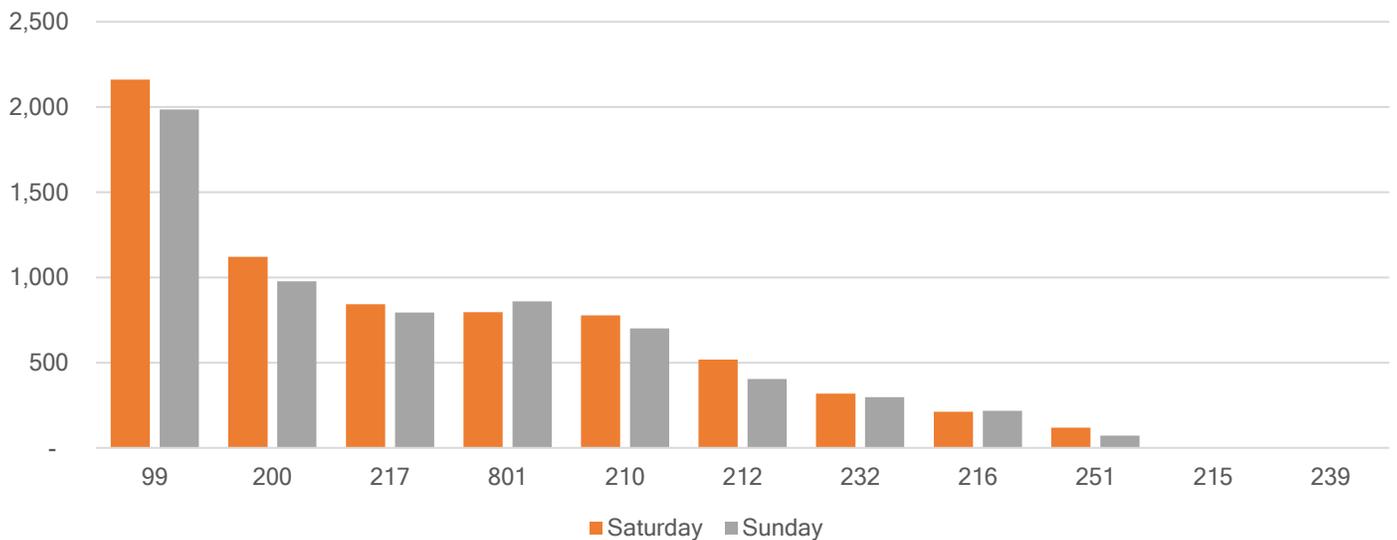


Figure 24 – Weekend Ridership, Local Lines (Automatic Passenger Count Data, Winter 2017-18).

Weekday Ridership by Line and Peak Period

Understanding how ridership trends differ by time period helps planners understand the times of day when ridership is strongest and weakest. Different types of routes exhibit different characteristics – the strongest transit markets have transit ridership through the midday and typically are more cost-effective to serve. Adding service when demand is much more peak-oriented, conversely, proves more of a challenge when it comes identifying available buses and operators.

The time periods for the ridership figures depicted by peak period in Figure 25 and Figure 26 are depicted on the right.

Midday and pm peak ridership are stronger than ridership in the mornings across most lines save for the 215, which although overall ridership is low, exhibits a relatively stronger morning ridership.

Period	Timeframe
AM Peak/AM	6:00a – 8:59a
Midday	9:00a – 2:59p
PM Peak/PM	3:00p – 6:59p
Evening	7:00p – 9:59p
Owl	10:00p – 5:59a

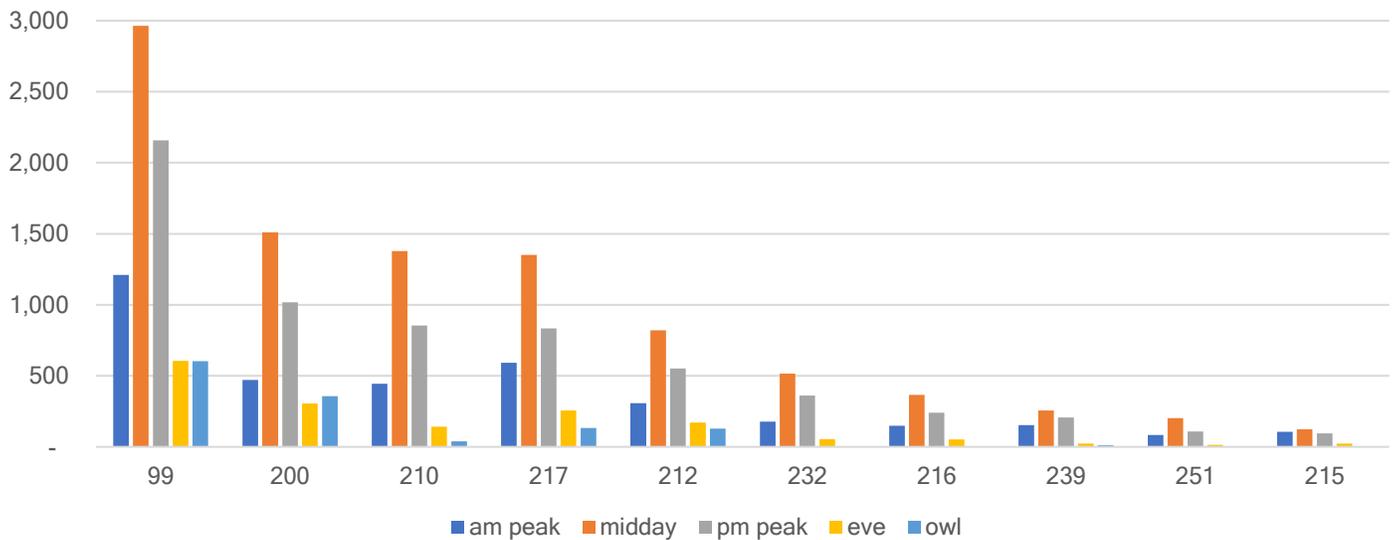


Figure 25 – Weekday Ridership by Peak Period (Automatic Passenger Count Data, Winter 2017-18).

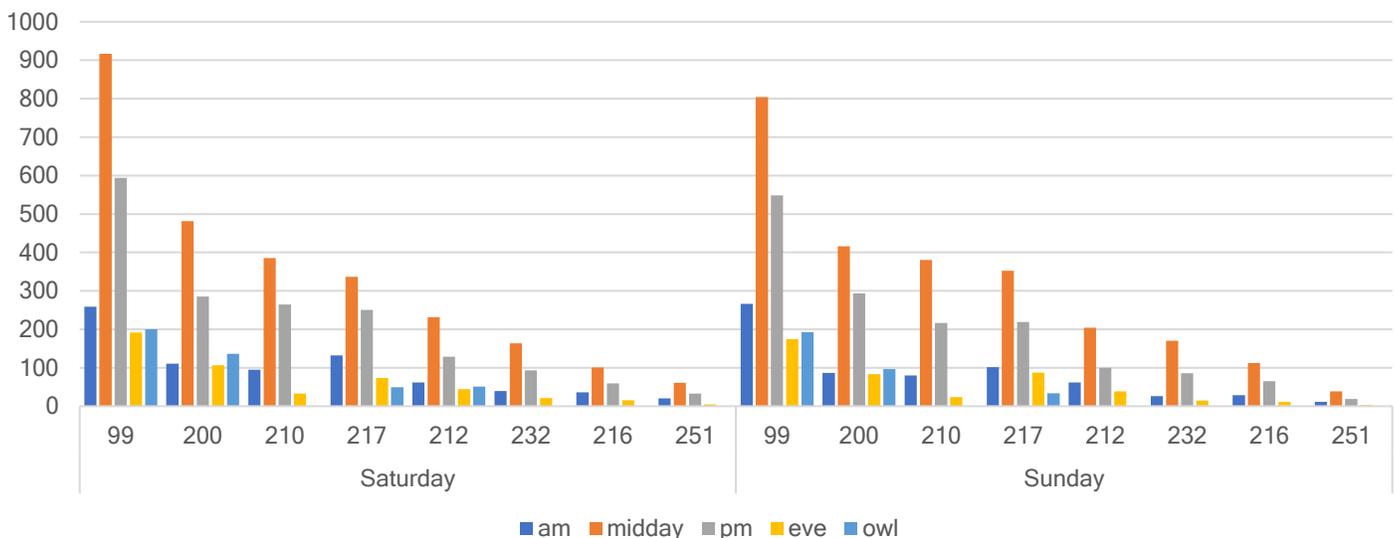


Figure 26 – Weekend Ridership by Period (Automatic Passenger Count Data, Winter 2017-18).

Productivity by Line and Time Period

Figure 27 and Figure 28 depict how productive fixed-route service is on weekdays and on weekends. This metric is expressed in terms of passengers per revenue hour, and shows how many riders are carried relative to the amount of service put out on the street. The most productive lines across all day types are lines 99, 210, and 200, which operate along Fremont and Newark’s key transit spines, even though they operate more frequently than most of the rest of the area’s transit services.

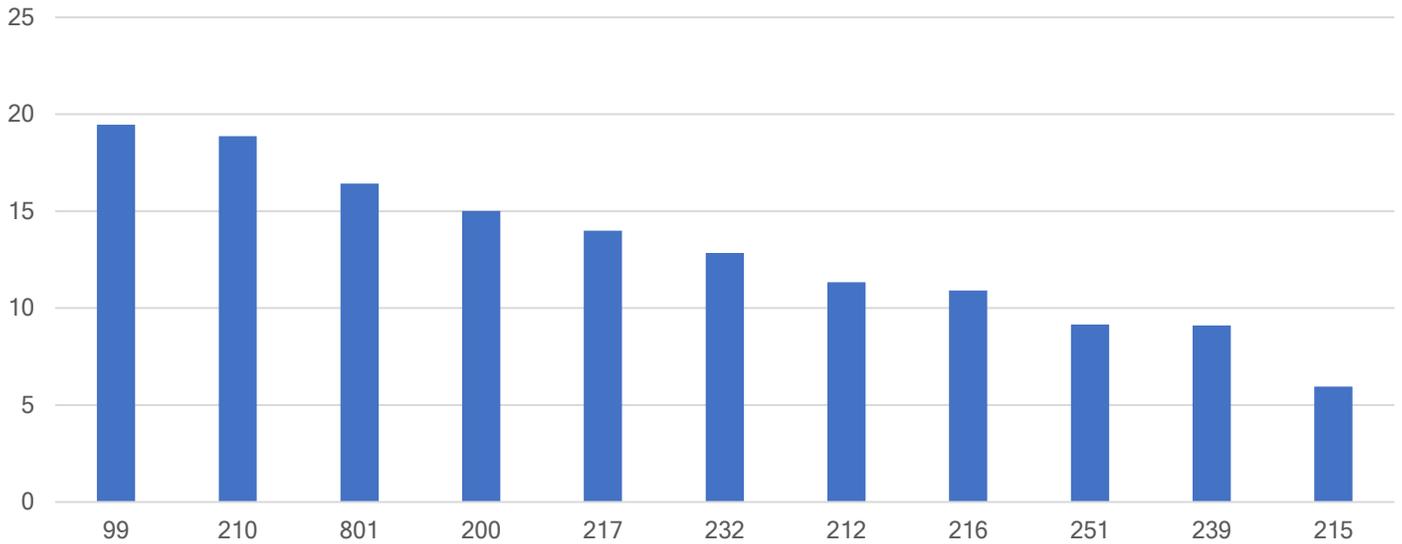


Figure 27 – Weekday Productivity (Passengers per Revenue Hour) by Line (Automatic Passenger Count Data, Winter 2017-18).

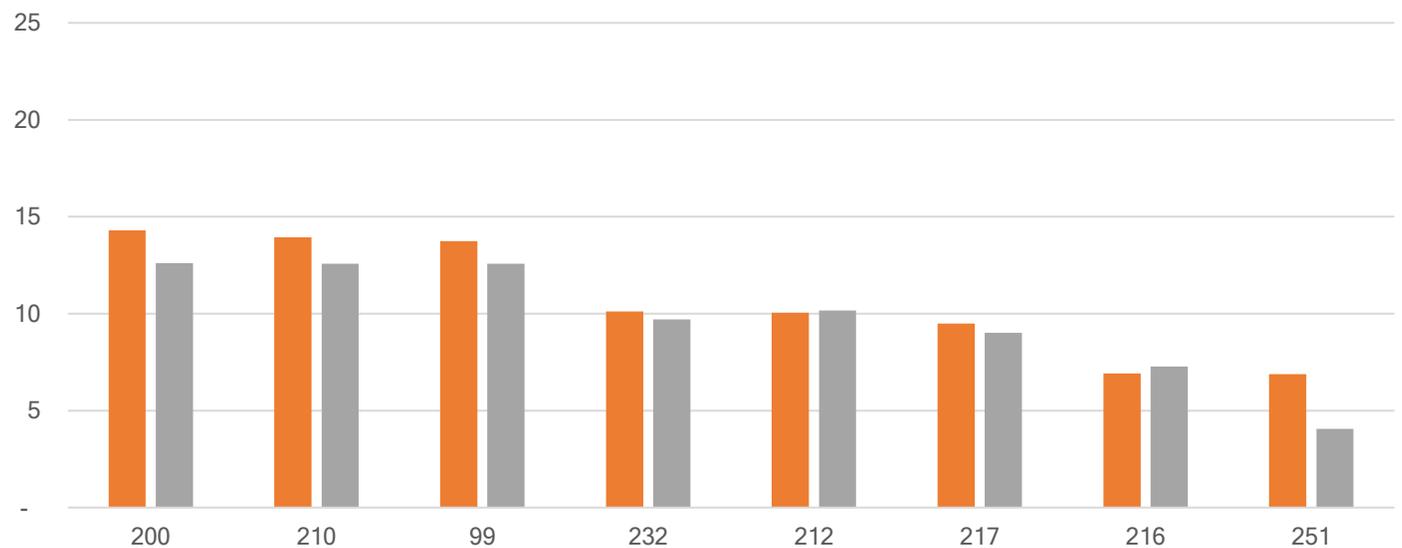


Figure 28 – Weekend Productivity (Passengers per Revenue Hour), Local Lines (Automatic Passenger Count Data, Winter 2017-18).

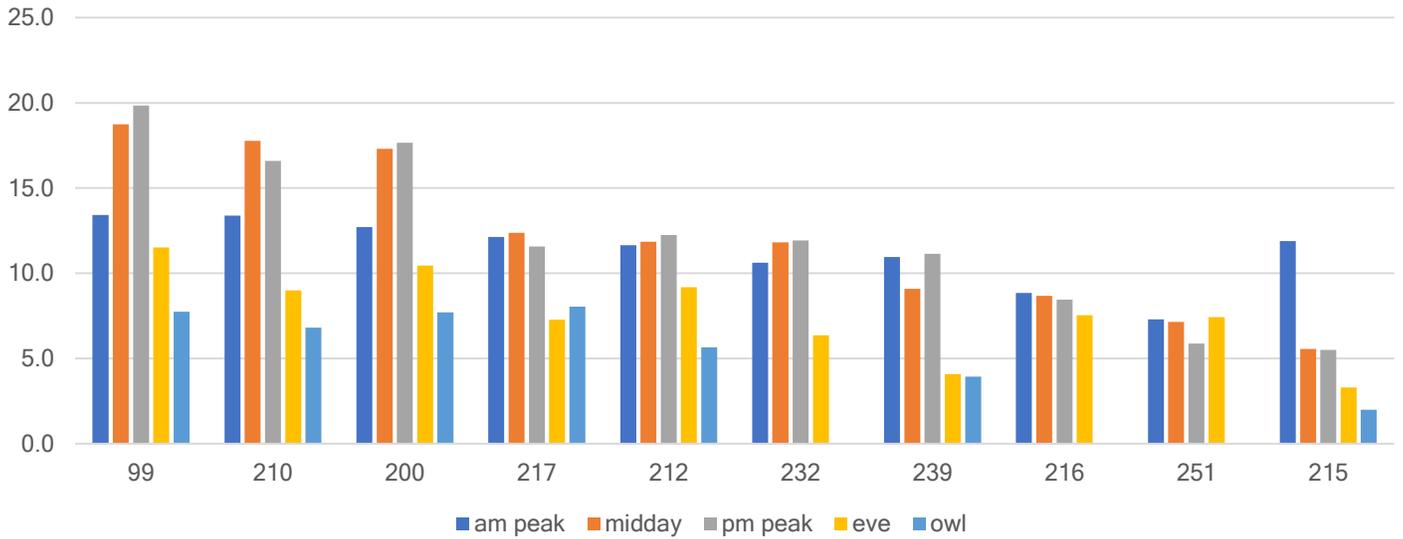


Figure 29 and Figure 30 depict how productive fixed-route service is across time periods. On weekdays, midday and PM service on most lines is equally productive or more productive than service in the AM. This is especially true on lines 99, 200, and 210. Service productivities across the day for other lines tend to be more consistent. For line 215, service on weekday mornings is particularly productive due to particular peak period deviations to Lam Research. On weekends, these time of day trends are mirrored on lines 200 and 210, though other lines see higher service productivities occurring in the morning rather than in the rest of the day.

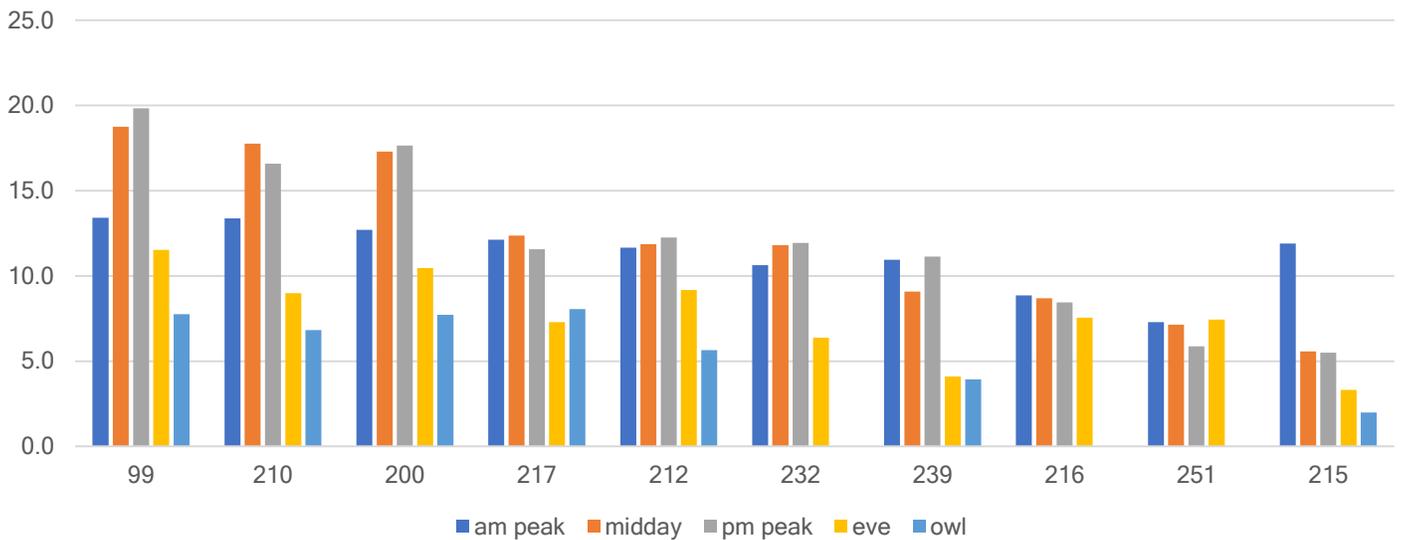


Figure 29 – Weekday Productivity by Peak Period (Automatic Passenger Count Data, Winter 2017-18).

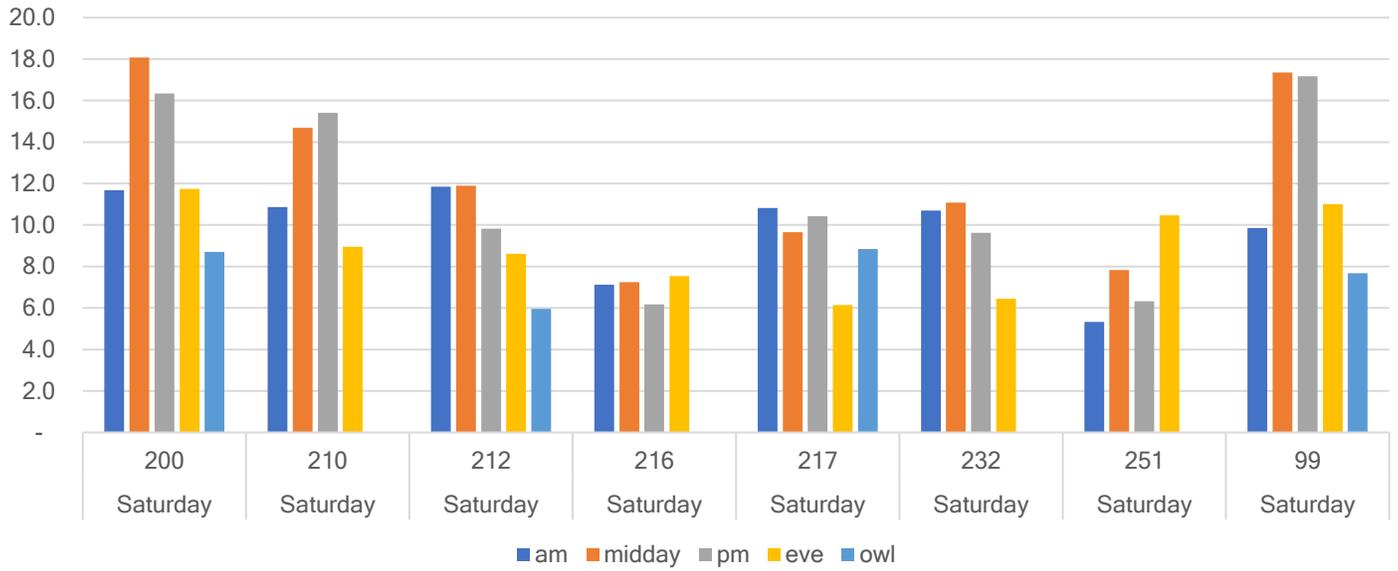


Figure 30 – Weekend Productivity by Period (Automatic Passenger Count Data, Winter 2017-18).

Productivity by Geography

As part of this analysis, each line was divided into segments to assess how the geography of ridership breaks down among the different lines operated. Figure 31 shows where lower-productivity transit route segments are concentrated. Moderately productive transit segments tend to run along corridors like Mission Blvd south of Decoto, Paseo Padre Ave, Newark Blvd, and Stevenson Blvd, while poorer productivity tends to be concentrated in the south end of Fremont (the Irvington and Warm Springs Districts).

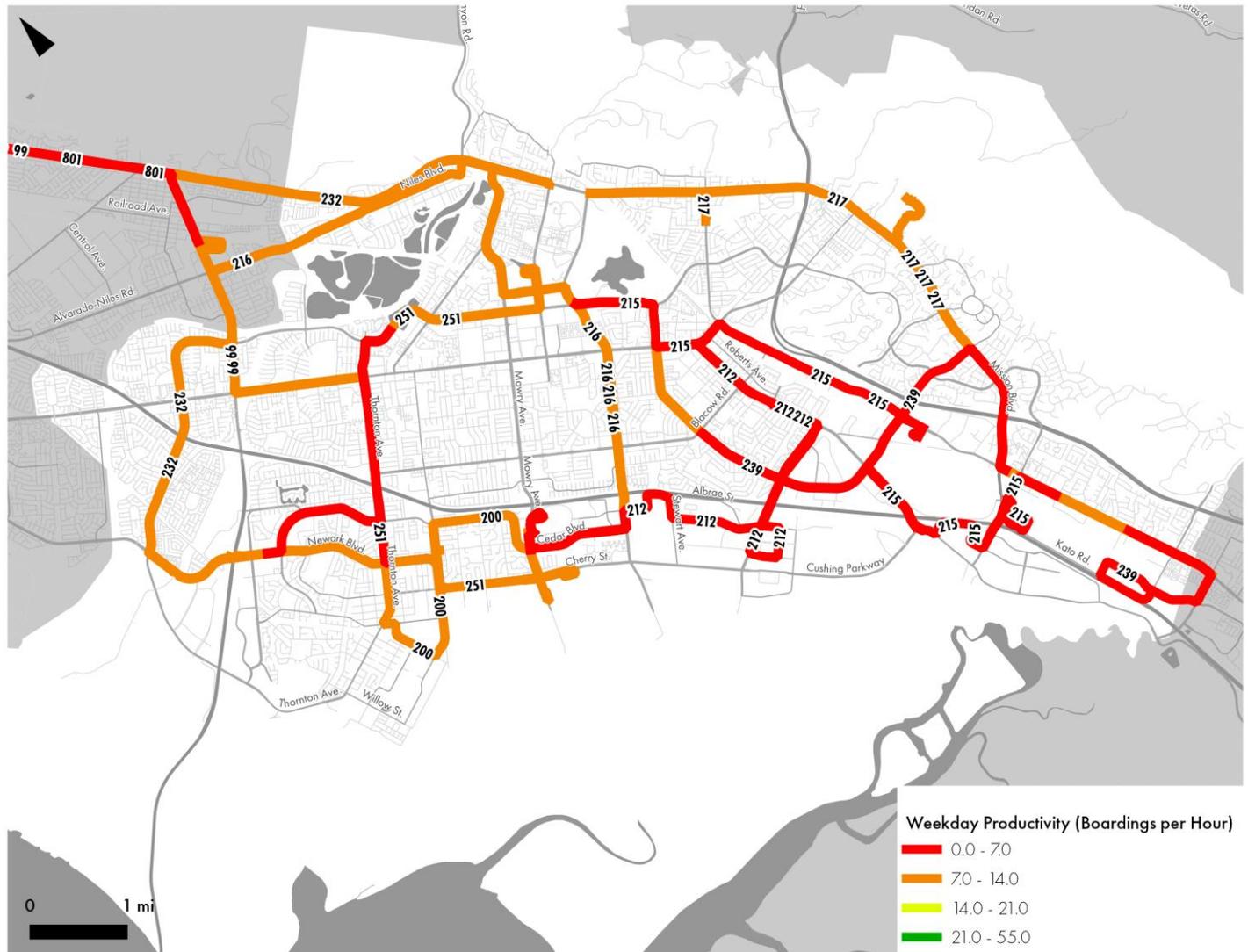


Figure 31 – Weekday Lower Productivity Route Segments (Automatic Passenger Count Data, Winter 2017-18).

Transit segments with higher productivities depicted in Figure 32 tend to be concentrated in Central Fremont, which has to do in part with the importance of BART as a key transit hub; Fremont BART attracts a significant number of boardings. Other key corridors with substantially high productivity for this area include the Fremont Blvd corridor, the Decoto Road corridor, and the Mowry corridor.

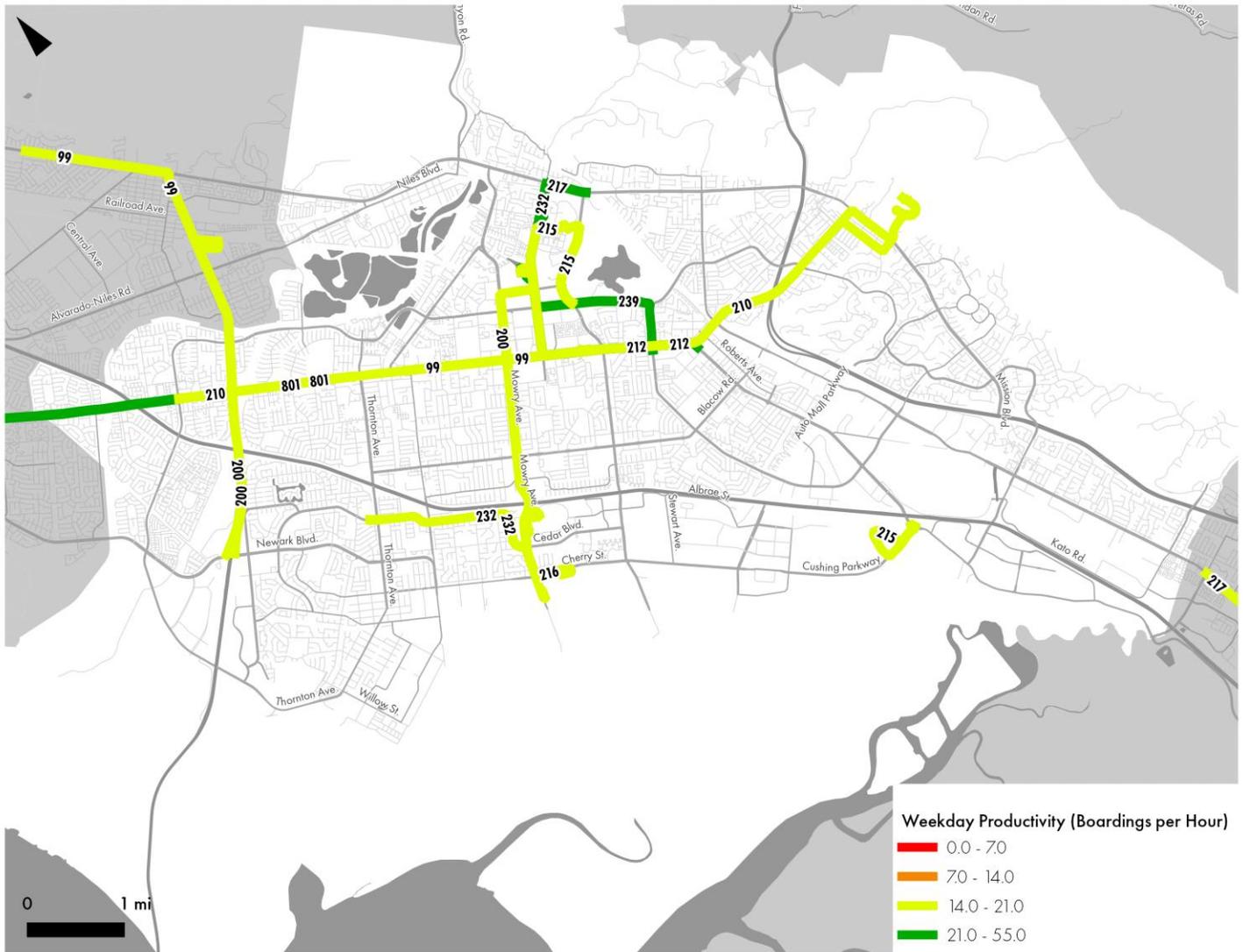


Figure 32 – Weekday Higher Productivity Route Segments (Automatic Passenger Count Data, Winter 2017-18).

On-Time Performance by Line and Day Type

Like other transit operators nation-wide and regionally, AC Transit has seen the impacts of increasing congestion. AC Transit’s scheduling department strives to improve reliability, but adding time to schedules is not the only factor that can have positive impacts on reliability. Proactive line supervision and line management are fundamental strategies that form the bedrock of reliable transit service. With the implementation of AC Transit’s new Clever Devices automatic vehicle location (AVL) system, the District has new technological tools with which to manage transit service in real-time, allowing the District to monitor and adjust service at a seconds-level timeframe.

Aside from operational strategies to maximize service reliability, AC Transit’s municipal partners play an important role in planning and implementing new infrastructure that supports good transit. AC Transit’s recently-adopted *Multimodal Design Guidelines*, together with earlier design manuals like *Designing with Transit*, provide ample guidance for ensuring that streets, neighborhoods, and capital infrastructure support access to safe, reliable, and speedy transit that integrates well with other transportation modes.

AC Transit’s Short Range Transit Plan identified a goal of all trips performing at or above 72% on-time performance. At present, many of AC Transit’s services fall below this benchmark.

Line	Weekday	Saturday	Sunday
99	72.7%	80.5%	77.7%
200	67.0%	62.3%	69.0%
210	59.5%	61.6%	63.6%
212	71.6%	70.4%	70.1%
215	65.7%	No Service	No Service
216	64.2%	61.3%	73.3%
217	65.2%	59.7%	57.8%
232	72.5%	78.5%	80.5%
239	71.6%	No Service	No Service
251	70.9%	74.9%	69.6%

Figure 33 – On-Time Performance by Line, numbers from automatic vehicle location system, Winter 2017-18 sign-up

Average Passenger Trip Lengths

Average passenger trip lengths on AC Transit local lines in South County reflect Fremont and Newark's geography. Lower densities bring with them longer average trips lengths; things are far apart from other things. Line 217, at an average passenger trip length of 5.9 miles, carries the area's longest average passenger trip length among local services. At Line 217's average operating speed, that distance is traversed in approximately 25 minutes, suggesting that door-to-door one-way trip lengths for riders are similarly long. For geographic context, 5.9 miles is roughly equivalent to the distance between the Great Mall in Milpitas and the Warm Springs BART station. Suffice it to say, typical users of AC Transit's service take long bus rides; even the shortest average trip length among local lines, which belongs to Line 212, is 3.6 miles.

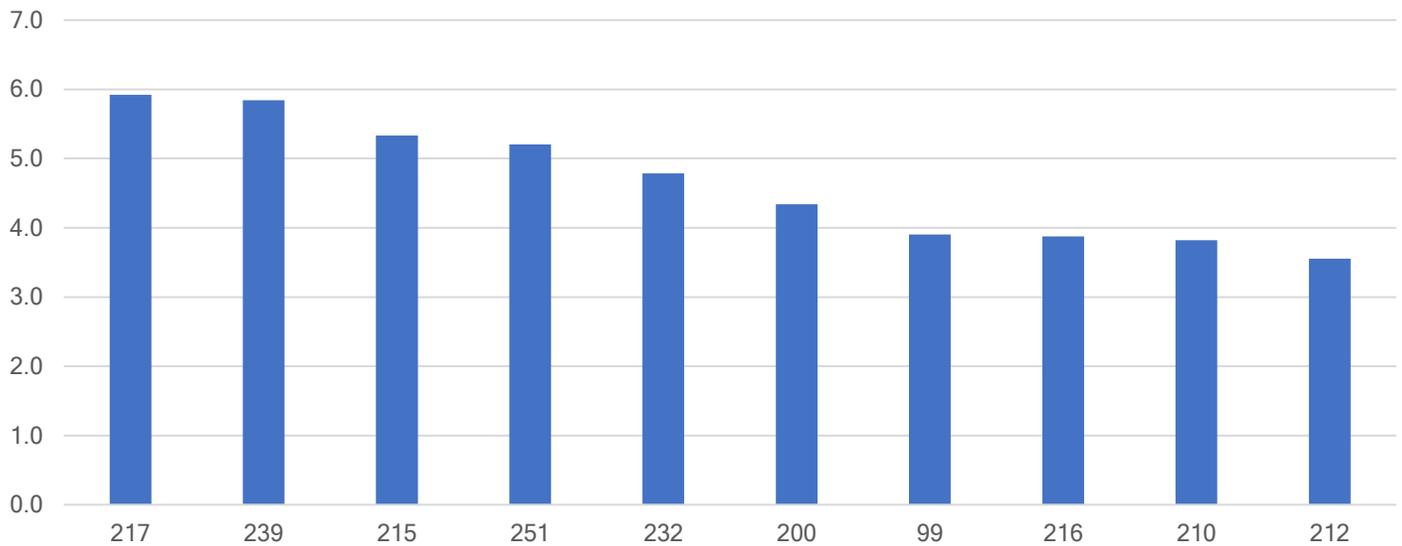


Figure 34 – Weekday Average Trip Lengths (miles) by Route (Automatic Passenger Count Data, Winter 2017-18).

Service Assessment - Key Findings

Bus service in Fremont and Newark is infrequent – none of the cities' AC Transit lines run more often than every 20 minutes on weekdays, with most service operating every hour or half-hour. In addition, not all transit lines run 7 days a week, and most of AC Transit's network stops running after about 8 p.m. This lack of transit supply means that often transit is not convenient enough for those traveling in the area to use. This is reflected in the market assessment's breakdown of AC Transit's current users and their key characteristics: those who can afford to avoid using AC Transit tend to do so, including people of color, seniors, and the disabled. People in these demographics typically tend to ride transit more as compared to the general public.

In general, the highest-performing transit service tends to be found around the densest centers of demand along the area's biggest corridors, including Fremont Blvd, Mowry, Decoto Road, and Walnut Ave. Lower performing corridors tend to be found in areas with fewer multi-family residences and more spread out, homogenous land uses.

AC Transit's key fixed-route network spines (lines 99, 200, and 210) exhibit strong productivities through the middle of the day and into the afternoon, meaning that they serve travel markets outside of a traditional peak-oriented commute market. The mixed-use corridors they serve likely generate increased ridership; increased ridership logically follows when more destinations are easily reached within walking distance of a major bus line. Other services serving areas outside of Fremont and Newark's main mixed-use corridors tend to perform more poorly and have flatter demand over the course of the day both on weekdays and on weekends.

Much of AC Transit's services in the area does not meet reliability expectations. AC Transit can and should do more to ensure that service reliability stays high even in the face of increasingly punishing congestion throughout Fremont and Newark. Although AC Transit's service in Fremont and Newark operates in mixed-flow traffic, there are substantial improvements that could be made both on the operations side and by deploying improved transit-friendly capital infrastructure in tandem with the cities of Fremont and Newark.