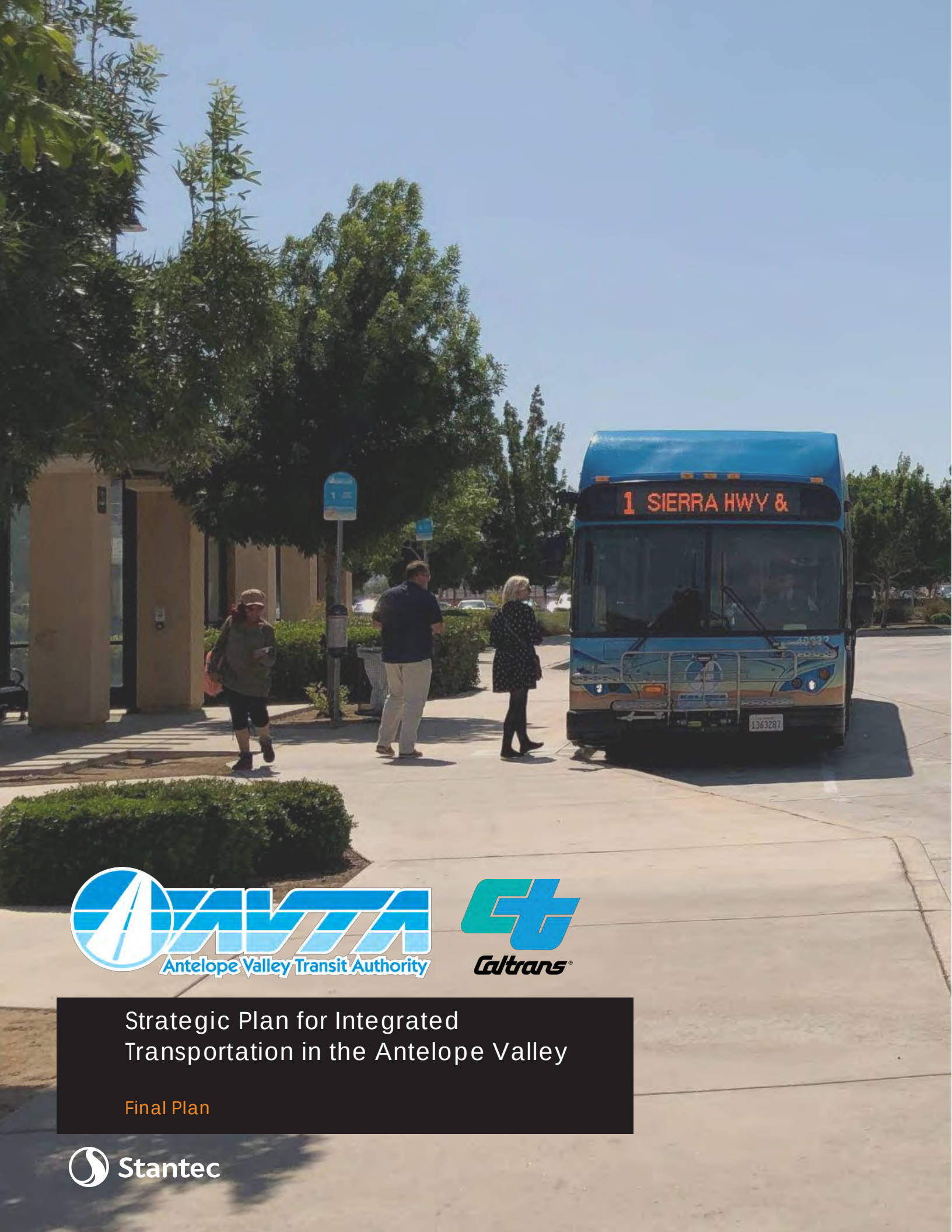

Antelope Valley Transit Authority

Caltrans

Strategic Plan for Integrated Transportation in the Antelope Valley

Final Plan

Stantec

ACKNOWLEDGMENTS

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We like to thank all the current and past riders of AVTA services who provided valuable input into crafting this plan, as well as staff of AVTA who provided valuable comments, feedback, and time. Finally, we like to thank all community members of the Antelope Valley.

Strategic Plan for Integrated Transportation in the Antelope Valley

Prepared for:

Antelope Valley Transit Authority
Caltrans

Prepared by:

Stantec Consulting Services Inc.

Background Review

A Review of Background Documents and Best Practices in Transit-Oriented Development and Transit Service Provision

Prepared for:

Antelope Valley Transit Authority

Prepared by:

Stantec
Transit Advisory Services

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OVERVIEW

The strategic integrated mobility plan for the Antelope Valley (AV) is intended to position the AV as a sustainable, attractive, and forward-looking community by shifting land use and transportation planning away from single occupancy vehicle (SOV) use and sprawling developments. Across the globe, communities are learning, sometimes the hard way, that planning for people—developing walkable communities, attractive and inviting landscapes, coordinating transportation and land uses to encourage walking, cycling, and public transit use—results in better health outcomes, better quality of life outcomes, and better economic outcomes.

The overarching goal of this study is to develop a roadmap for the AVTA, to develop recommendations and strategies to improve service delivery and develop attractive and useful public transportation service, while also leveraging shifts in transportation technologies and land use planning policies and approaches. Particularly in Southern California, where auto congestion represents a substantial drain on the public coffers, public health, and quality life, ameliorating options for transportation other than SOV, which includes improvements to the public realm, incentivizing transit use, while right-pricing auto use, is important for reducing reliance on SOVs.

In order to better understand the relationship between mobility, place, and quality of life, we review key research and policy documents that pertain to the Valley and will inform the overall direction and goals of this project, followed by a review of best and current practices in the field to help inform strategic directions for this mobility plan.

1.0 INTRODUCTION

1.1 HISTORICAL CONTEXT AND CURRENT SITUATION

During the early days, many cities started to introduce street cars and railroad services which resulted in transportation and land use development patterns to form. In today's century, many cities are trying to redevelop strong links between transportation and land use. This is being made possible by promoting more mixed-use and transit-oriented developments (TOD).

The Antelope Valley is a low-density place that includes unincorporated Los Angeles County and has two principle cities, Lancaster and Palmdale that lie within the Antelope Valley region. For many years the population of Antelope Valley has been very diverse. Originally, Antelope Valley was a main hub for trade routes. Several developments were also responsible of Antelope Valley's growth during the mid-1800's such as gold mining, cattle ranching, and the construction of the Railroad line.

Today, Lancaster and Palmdale need to improve local and regional connectivity through transit-oriented developments in order to develop land sustainably and preserve their natural resources. Also, most of the housing and land prices are very low in Antelope Valley compared to what one may find in adjacent areas nearby such as San Fernando Valley and Santa Clarita, where the housing prices are much higher. This suggests that it has allowed more people to move into the area to purchase property, which has become the primary reason Antelope Valley is experiencing a shift in demographics today. As Antelope Valley's population is growing steadily due to factors like affordable housing available in the area, it has led many people to travel further for work, recreational, leisure and even school related purposes. Therefore, it is important to understand that improving local and regional connectivity through transit-oriented developments is key to facilitating economic growth and improving quality of life for residents. In 1992, the cities of Lancaster and Palmdale along with the County of Los Angeles joined together to form the Antelope Valley Transit Authority (AVTA) to meet the growing need for public transportation in the Antelope Valley.

1.2 ABOUT ANTELOPE VALLEY AND AVTA

The Antelope Valley has approximately 486,000 residents who are primarily located in the City of Lancaster and the City of Palmdale, spread out over a vast, and low-density area at the edge of the Mojave Desert. Primary employers in the AV are mainly defense contractors and from the aviation industry, located at Plant 42, Edwards AFB, and the Mojave Spaceport (in Kern County). AVTA operates local and commuter public transportation services that helps improve mobility and economic growth in an area. AVTA is recognized nationally as a leader in adopting clean bus technologies through conversion of its fleet to 100% electric.

AVTA is funded primarily through local, state, and federal funding sources. Essentially, AVTA provides fixed-route, on-demand, and commuter bus services. Fixed-route local service operates seven days a week. The network includes eleven local service routes, three supplemental (school-day) routes that operate at peak time and three commuter routes. AVTA has around 45 local transit buses. Transit vehicles can seat around 38-40 passengers and operating hours are usually between 5:00 am to 12:45 am. Lastly, the main transfer centers are located at Sgt. Steve Owen Memorial Park and at the Palmdale Transportation Center.

One of the issues that Antelope Valley is facing today is that the service area is too dispersed so AVTA is trying to look at alternatives to fixed route service that will help improve the mobility of the community. It is important to provide strong transportation connectivity throughout a region. Doing so can help attract residents back into the area and allow for economic opportunities to be developed. When it comes to the demographics of Antelope Valley around 48% of population are non-Hispanic white with a growing Latino population, where significant number of residents live in poverty and consists of a large senior population.

In 2008, AVTA's board of directors approved bus service changes that were intended to increase access to healthcare, education and community resources. The aim for AVTA recently has been to improve its commuter service by keeping communities connected and reducing greenhouse gas emissions. A new local route (as of 2018), route 8, was introduced to accommodate the growing population of students in the region. The route is designed to offer service from Antelope Valley College's Lancaster campus to the Palmdale Center. Furthermore, route 786 was also recently added at Los Angeles Veteran's Administration Medical Center to provide Veterans better access to healthcare facilities.

It is also important to note that currently, in Palmdale a multi-modal transportation hub exists that offers connections between Antelope Valley, Lancaster, and Los Angeles County. This hub is known as Palmdale's transportation center that opened in 2005. The Transportation Center is intended to work within public private partnerships and provide local and regional alternative modes of mobility services to users. The Metrolink commuter service is also located at Lancaster and Palmdale that operates to and from Antelope Valley.

2.0 BACKGROUND LITERATURE REVIEW

The current planning process relies on an understanding of previous planning efforts, successes, and challenges. This section provides overviews of some important planning documents and plans relevant to transit.

2.1 SCAG 2016-2040 RTP/SCS FOR CITY OF LANCASTER AND CITY OF PALMDALE

The Regional Transportation Plan and Sustainable Communities Strategy for both the City of Lancaster and City of Palmdale encourages smarter growth using integrated transportation and land use strategies such as developing "Complete Communities," locating strategic areas for infill development and investment, and planning for housing and jobs near transit, in other words moving towards more transit-oriented developments.

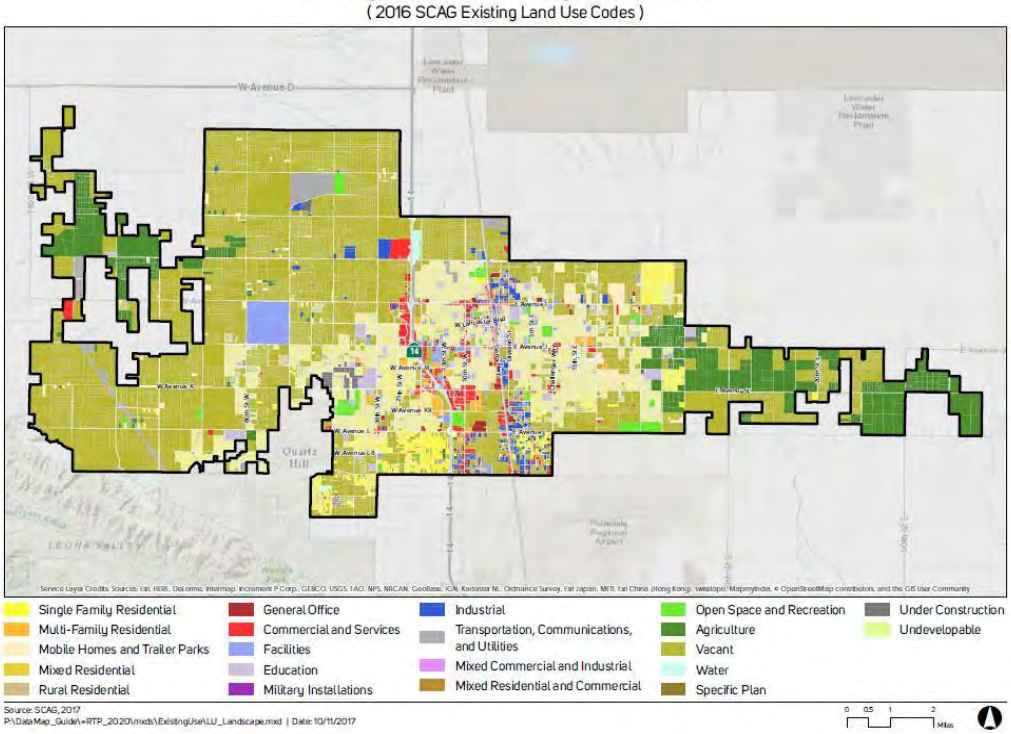
In the City of Lancaster, the land use is mainly low density residential. Most of the land use in the City of Lancaster consists of vacant, agriculture, commercial and single-family residential dwellings. The City of Lancaster's downtown area is centered around the Southern Pacific Railroad and comprised of a mix of single residential uses, commercial services, public and institutional uses as well. There is great opportunity for the City of Lancaster to develop more mixed used and single-family residential developments as illustrated in the General Plan Land Use Map for Lancaster for 2040 (Figure 1). However, due to the historic character of Lancaster it has had significant influence on the city's land use patterns that has led to issues regarding incompatible land uses. Since the current land use in Lancaster is low density the issue it poses for transit is that transit services cannot have frequent services and operate in all areas of Lancaster. Therefore, a tradeoff is necessary—does AVTA continue to spread its resources throughout the service area, or does AVTA develop higher frequency service along major corridors focused on ridership? Of course, many elements are required to move towards more successful collective public transport beyond what a transit agency has jurisdiction over, such as improving the pedestrian realm, prioritizing transit vehicles and so on.

Moreover, in the City of Palmdale land use is mainly vacant low density residential like the City of Lancaster. In the future Palmdale is expected to become more developed where land use patterns mainly consist of single-family, industrial, and commercial uses (Figure 2Figure *1*). Since the existing land use in Palmdale is low density residential and commercial it poses issues for transit services to operate efficiently in the area as well.

Overall, these plans are made with the intent to help present comprehensive strategies and bring regional principles of sustainable design and transit-oriented development for regions like Antelope Valley. The following images illustrated below are maps displaying the General Plan Land Use and Existing Land Uses in Lancaster and Palmdale along with a map highlighting potential transit stops and corridors for the City of Lancaster in 2040 (Figure 1).

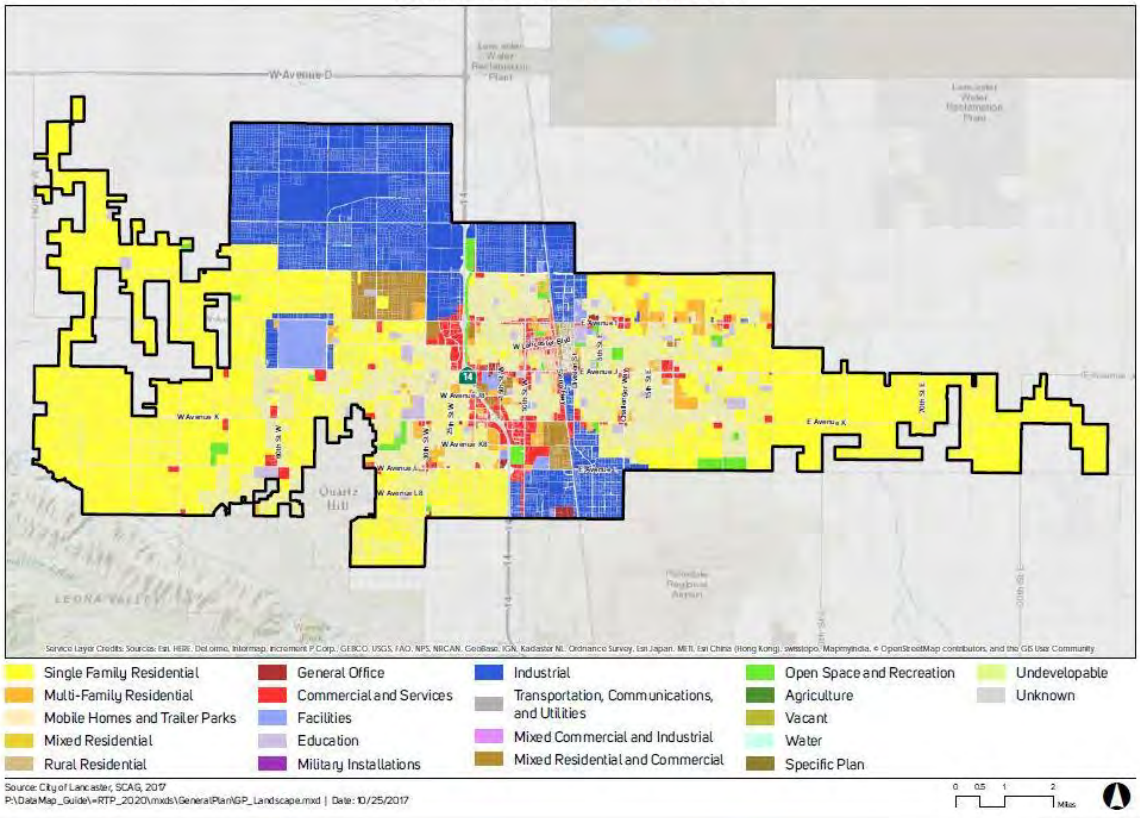
Existing Land Use in City of Lancaster

(2016 SCAG Existing Land Use Codes)



General Plan Land Use in City of Lancaster

(2016 SCAG General Plan Land Use Codes)



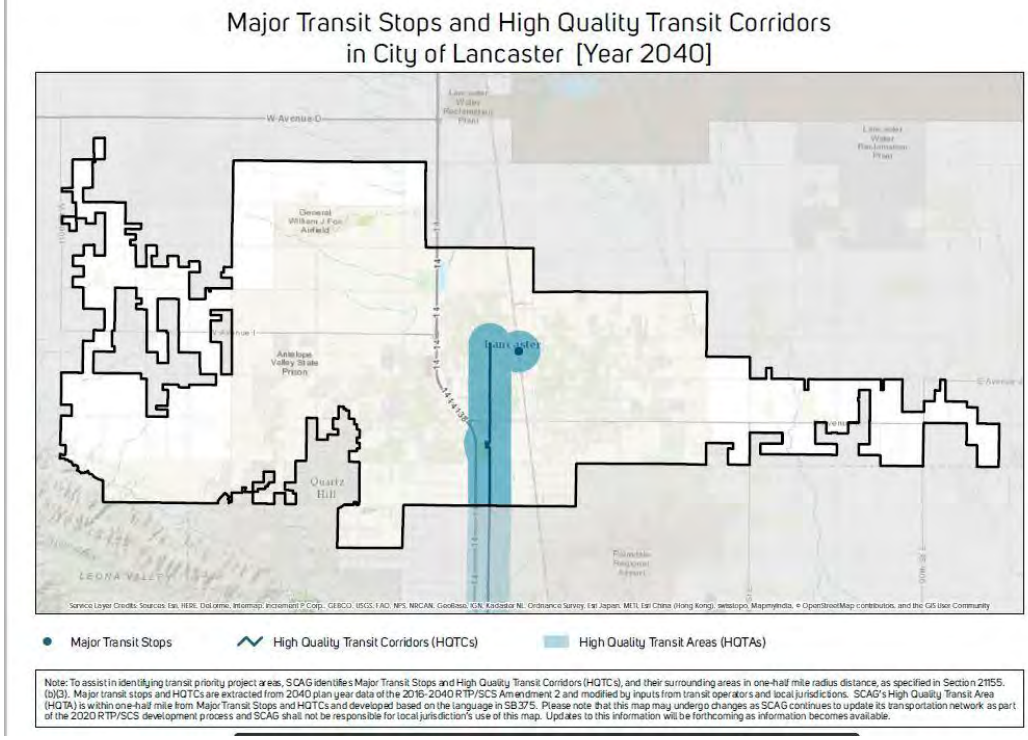
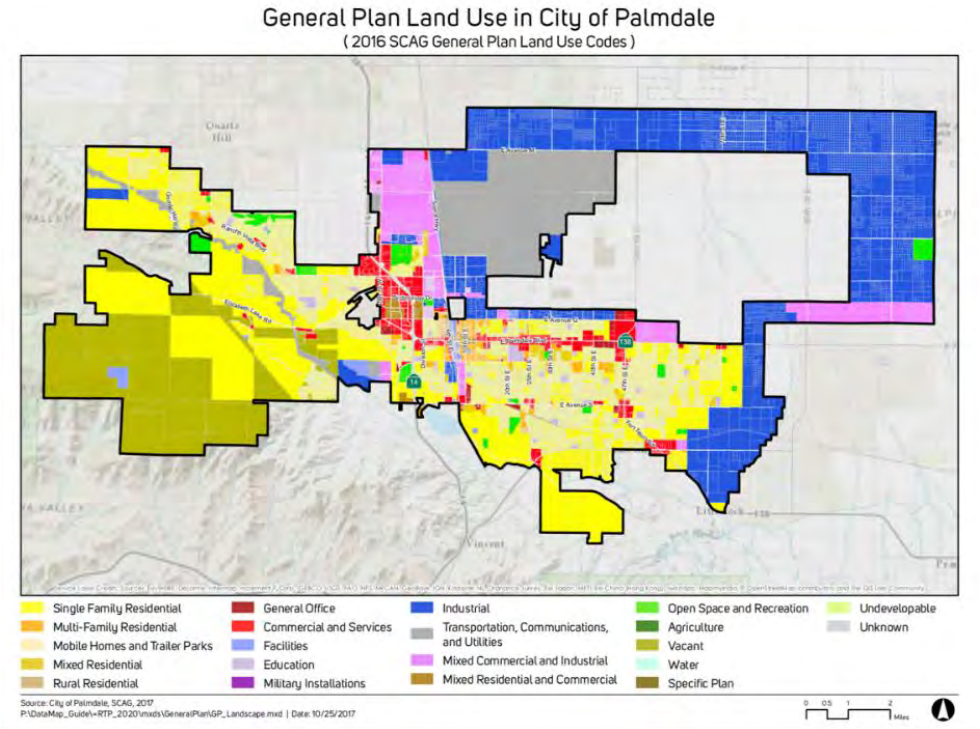


Figure 1: City of Lancaster Existing and General Plan Land Use Maps and Map of Major Transit Corridors and Transit Stops in Lancaster for 2040 (Source: SCAG 2016-2040 RTP/SCS City of Lancaster)



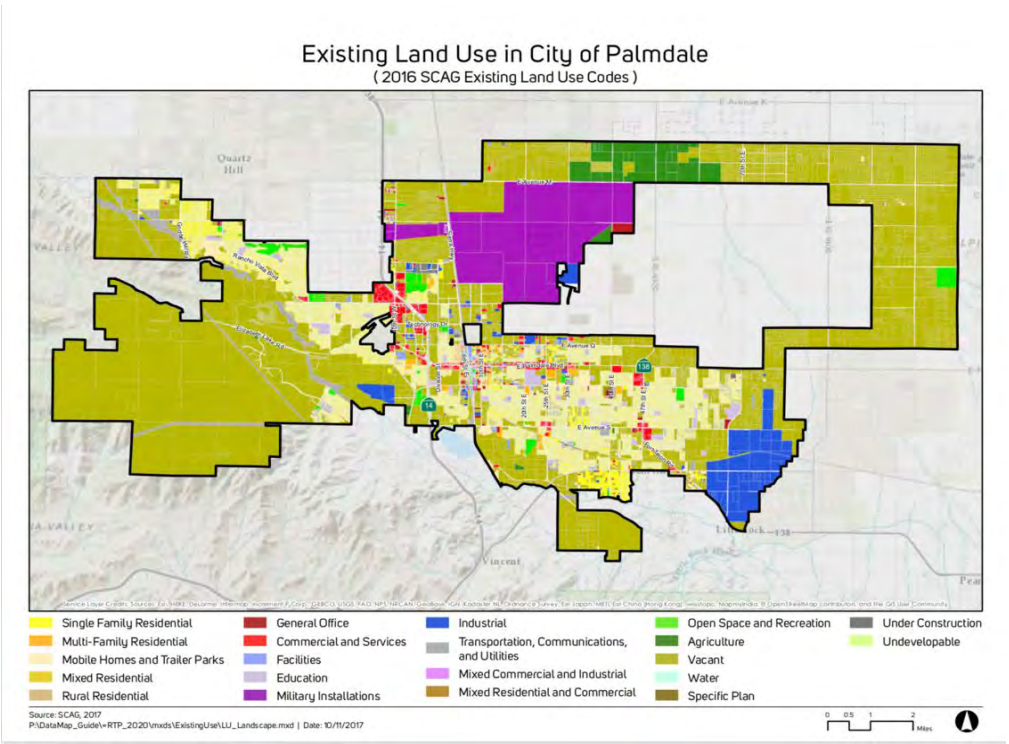


Figure 2: City of Palmdale Existing and General Plan Land Use Maps (Source: SCAG 2016-2040 RTP/SCS City of Palmdale)

This plan also identifies the Antelope Valley as an area that is expected to see a High-Quality Transit Area (HQTA) being developed by the year 2040, which means that it would be more common to see fixed-route services operating at 15-minute frequencies and to see employment growth to dramatically increase in the next couple of years. The High-Quality Transit Area (HQTA) is a type of corridor that provides fixed-route bus services during peak hours. In this plan Lancaster and Palmdale are expected to see a HQTA corridor that will be about one-half a mile from major transit stops. HQTA corridors are also known as 'Transit Priority Areas'.

The 2040 HQTA corridor will exist along 10th St W, Sierra Hwy and Avenue S (Figure 3). These corridors are currently served by AVTA's local routes (Route 1 – Palmdale/Lancaster and Route 3 – East/West Palmdale via Avenue S), which operate every 30 minutes at peak weekday frequency, and Metrolink's Antelope Valley Line, which also operates every 30 to 60 minutes during peak hours in peak direction. This plan envisions that the frequency along these corridors in Lancaster and Palmdale will increase to 15 minutes during peak hours by 2040.

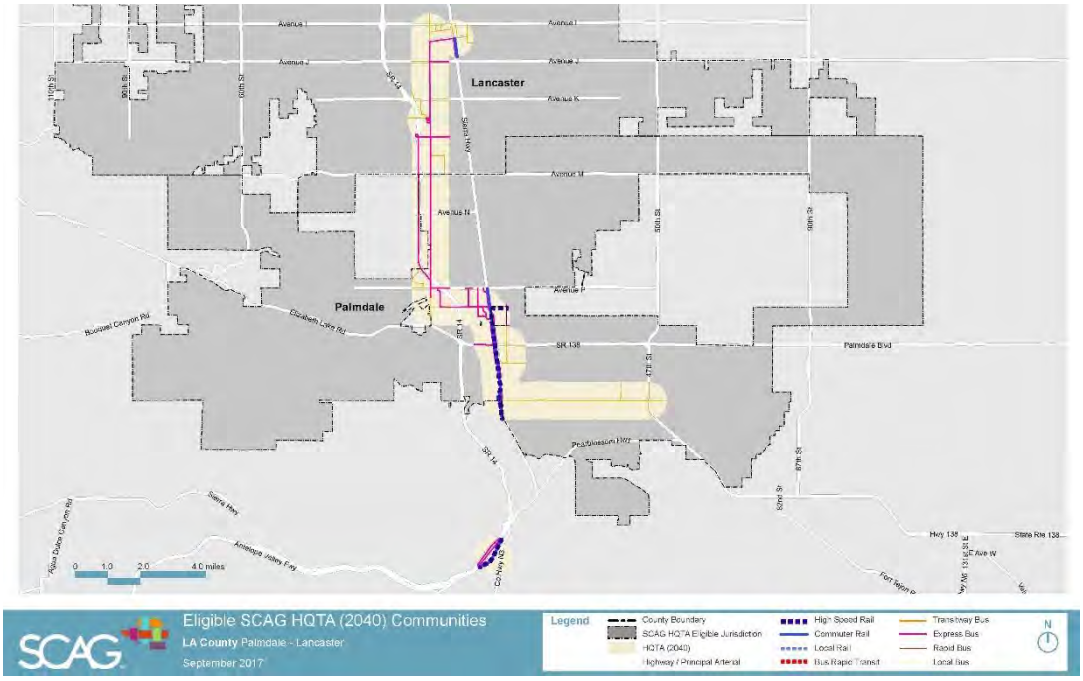


Figure 3: Eligible SCAG HQTA (2040) Communities in Palmdale and Lancaster (Source: SCAG Sustainability Program)

2.2 AVTA MOBILITY MANAGEMENT PLAN

The Mobility Management Plan seeks to identify challenges and service gaps that exist within Antelope Valley and recognizes mobility needs of residents living in the region. Furthermore, it consists of comprehensive strategies that can be used for improving transportation delivery services in Antelope Valley. The plan also highlights different approaches that can be used to improve coordination between transportation providers in the area. This plan stresses the importance of identifying gaps in regional communication, striving for better coordination of transportation services, being aware of mobility needs of citizens, and managing available resources efficiently. These are some of the factors addressed in the plan that are explained to be primary goals AVTA seeks to achieve. Moreover, the Mobility Management plan highlights seven key transportation challenges that Antelope Valley is facing, which includes the following areas of issues:

- **Large service area**: Antelope Valley is dispersed and vast, making the efficient operation of transit challenging. The plan proposes to have transportation services that will be able to meet the needs of ride-dependent populations.
- **Accessibility:** Due to the large service area, providing easily accessible transit service in Antelope Valley is challenging. The plan proposes to improve amenities, to have AVTA serve large employers and to provide more frequent headways for the fixed route services that currently operate in Antelope Valley.
- **Trip scheduling and dispatching:** This process has become a challenge between AVTA, Access Services and the Private Transportation Providers. The plan proposes to have the trip scheduling and dispatching process to reflect the travel demand that is currently exhibited by customers.
- **Lack of coordination amongst private and public operators:** Very few people in the Antelope Valley use services provided by private transportation providers. The plan proposes to increase awareness of the services to the residents of Antelope Valley.
- **Not enough capacity in its Dial-A-Ride services:** Travel time and wait times have been a primary concern for residents who rely on public transit services in Antelope Valley. The plan proposes to improve its coordination amongst various transportation providers and increase capacity onboard the Dial-A-Ride vehicles.
- **Training:** The challenges that exist pertain to formal training with private transportation providers and driver sensitivity training. The plan proposes to improve its training guidelines to better serve clients and the ride-dependent populations.
- **Funding:** Having enough funding is a constant challenge for both public and private transportation providers. The plan proposes coordinated funding strategies and having better coordination amongst the transportation providers could help solve concerns related to funding. Doing so, can also lead to better use of existing limited resources.

These seven challenges facing Antelope Valley need to be addressed in order to provide better transit services in the region. The plan discusses these challenges and provides recommendations that can be applied in Antelope Valley with the intent to work towards fostering strong collaboration amongst transportation providers. The overall focus of the Mobility Management plan is on cooperation, education and coordination instead of focusing on resources to produce unsustainable services.

It is more common to find public transit providers today wanting to collaborate with private transportation providers to improve transportation services for disadvantaged populations compared to in the past. Especially, as Antelope Valley continues to see population growth in the coming years, being prepared to improve public and private partnerships in order to offer transportation services that are well connected, reliable and affordable is the key to facilitating strong economic growth in a region. This is explained to be achievable in the Mobility Management plan by maximizing the use of limited transportation resources in order to improve service delivery. The plan also mentions how the federal government has recognized the important role that local collaboration plays in enhancing mobility services for disadvantaged populations. For most mobility management efforts to move forward, funding plays a big role in achieving that. The availability of funding in the plan is identified to be provided through federal funding programs such as, Job Access and Reverse Commute (JARC) and New Freedom.
Antelope Valley is a relatively low-density area which makes it difficult for commuters getting to places such as, school, hospitals, and workplaces when trying to access public transit services through non-motorized methods. As part of the Dial-A-Ride survey, the findings in the plan regarding the transit services revealed the following:

- Many customers who use the Dial-A-Ride service do not find the existing fixed route service to meet their mobility needs, especially for transit dependent populations that includes, low-income individuals, seniors and persons with disabilities.

- Around 66% of commuters who use the Dial-A-Ride service reported that their main reason for using the service is because they do not drive or do not have access to vehicles.

- Many fixed route services are not well connected, lack proper amenities and experience infrequent headways that often-become barriers in offering efficient and reliable service to the residents of Antelope Valley.

Essentially, this plan depicts that providing more efficient transit operations can lead to reductions in cost on a per-trip, per-mile, and per-hour basis and improve quality of public transportation services, as well as the quality of life for residents living in Antelope Valley. Figure *4* is taken from AVTA's Mobility Management Plan that displays mobility challenges faced by certain populations.

Exhibit E.1 Mobility Challenges by Client/Customer Group

Target Population	Special Needs or Mobility Gaps	Type of Transportation Mode	Potential Solutions
Able-Bodied Seniors	• Lack of knowledge about resources • Concerns about safety and comfort • Potential to lose driver license	• AVTA fixed-route transit • AVTA Dial-A-Ride • Special purpose shuttles	• Better outreach regarding transportation options • Travel training programs • Reduced fare programs
Frail Seniors and Chronically Ill Persons	• Assistance to and through the door • On-time performance and reliability of service • Trip planning assistance	• AVTA Dial-A-Ride • Access Services Paratransit • Emergency and non-emergency medical transportation • Special purpose shuttles	• Door-through-door assistance; outside-the-vehicle assistance • Increased coordination between providers • Joint call center and brokerage system • Driver sensitivity training
Low-income and Homeless Individuals	• Sensitivity to increased transportation costs • Access to trip planning • Inability of public transit to meet mobility needs	• AVTA fixed-route transit • Special purpose shuttles • Rail (i.e., Metrolink) • Commuter bus service	• Travel training programs • Coordinate fare subsidies with social service organizations • Improve access to bus passes • Special purpose shuttles oriented around specific trip purposes • Improve public transit service where feasible
Persons with Sensory Impairments	• Difficulty accessing visual or auditory information	• AVTA Dial-A-Ride • Access Services Paratransit • Emergency and non-emergency medical transportation • Special purpose shuttles	• Information in accessible formats • Travel training programs • Driver sensitivity training
Employees	• Lack of knowledge regarding transportation benefits programs • Lack of awareness regarding available transportation services • Perception transit does not meet their mobility needs	• Personal automobile • Vanpool • Carpool • AVTA fixed-route transit • Bicycle • Walking	• Improve marketing and outreach efforts • Establish employer-run rideshare program • Improve AVTA fixed-route service where feasible • Improve bicycle and pedestrian infrastructure

Figure 4: Mobility Challenges by Client/Customer Group (Source: AVTA's Mobility Management Plan)

2.3 CITY OF LANCASTER CLIMATE CHANGE ACTION PLAN (JUNE 2016)

The City of Lancaster's Climate Change Action Plan seeks to guide municipalities and private authorities to move towards sustainable practices, in order to help reduce greenhouse gas (GHG) emissions and become more environmentally conscious when completing projects. Doing so, will help enhance the quality of life for residents. It is important for operating authorities like AVTA to take into consideration different strategies they can utilize to make their services align with goals and guidelines that are addressed in this plan. Especially when it comes to transportation projects, improving commuter services in regions while keeping sustainability in mind is key to creating resilient communities. Being able to apply methods that can help reduce greenhouse gas emissions through the

introduction of either electric fleet cars or BRT systems for instance has been described in the plan to be a great way to make improvements in transit systems.
In the next few years, California is expected to experience five key threats from climate change that can have high economic, environmental, and social impacts in communities if ignored:

- Droughts and wildfires;
- Coastal danger;
- Degradation of Air Quality;
- Spreading disease; and
- Loss of native fish

Furthermore, this plan also addresses the importance of developing partnerships with local and national organizations. The plan acknowledges that AVTA should introduce a BRT system, which would be integrated with other transportation services such as, walking and cycling. The City of Lancaster is hoping to partner with AVTA to take advantage of this transportation opportunity. This is because it has been proven that having efficient BRT systems can potentially reduce vehicle miles travelled and GHG by almost 3%. Even having a local shuttle service is recommended as another potential solution in the plan that can provide residents service to transit centers and contribute in reducing emissions, and congestion too. Many accomplishments that the city has achieved such as, AVTA introducing its first electric busses in 2014 have been highlighted in the plan as well:

- 'In 2014, BYD unveiled their first two North American-made electric busses at their manufacturing facility in Lancaster. These buses were built for AVTA, the local public transportation agency serving Lancaster, Palmdale, and northern Los Angeles County.'
- In 2016 AVTA was voted to introduce the first 100% electric public transportation fleet.

2.4 CITY OF LANCASTER GENERAL PLAN 2030

The City of Lancaster's General Plan for 2030 addresses the community's vision and goals for the future and identifies specific policies and guidelines that highlight how its lands should be dealt with. The plan explains the different types of development that will take place and provides in depth context regarding the city's land use, zoning, and the general pattern of the city's development in the coming years. The General Plan for Lancaster is not just a guide outlining the community's vision but also highlights how the visons and goals stated in the plan can be achieved using sustainable practices.

In the plan it states that according to the Southern California Association of Governments (SCAG) for the 2004 Regional Transportation Plan, Lancaster's population is expected to increase to 259,696 by the year 2030. Most of the population in Lancaster commute outside of the city for employment purposes. This has led to limited amount of jobs and housing that is available in the City of Lancaster.

Within this plan the residents have also expressed their vision for the city and many residents desire complete, connected, safe and healthy communities. They desire a place where they can live, work and play. Part of accomplishing this means that the city needs to do more to improve local and regional connectivity, attract employment in the city and work to develop balanced and efficient transportation systems through transit-oriented developments, which encourages mixed use developments to be developed near transit centers. Most residents would also like the transportation network to be accessible, reliable and safe. Some of the major transportation issues that have been brought to attention through this plan is how Lancaster is facing challenges on sustaining its growing population. Congestion levels are relatively low in the City of Lancaster compared to larger cities, but at the same time many residents felt like more transit options need to be available in the city, in order accommodate its growing population and their needs.

This General plan also recognized Antelope Valley's growing issues with commuter congestion on the freeway. The importance of introducing more alternative modes of transportation and ease of access to transportation systems is

needed in the region. Even more focus in the plan is placed on the fact that the Lancaster needs to have better integration of connected systems of paths, trails and transit services that would allow residents to bike, walk and use public transit to reach their desired destinations conveniently.

The following are the key priorities and visions highlighted in the plan that are desired for the City of Lancaster for 2030:

- Balancing Growth
- Ensuring Economic Well-being
- Strengthening Community Identity
- Improving Public Safety
- Promoting Active Living
- Focusing on Education and Youth
- Supporting Environmental Conservation
- Ensuring a Balanced and Efficient Transportation System

It is important to understand that the Lancaster General Plan study area is looking at areas outside the city's boundary and not just focusing on areas of interest that lie within the city limits. The purpose of the study area is that it recognizes issues regarding land use and transit services affecting Lancaster and its surrounding areas. Overall, the plan is a great resource to keep ongoing communications between the City of Lancaster and other agencies like AVTA open, whose support can benefit future economic, social and environmental conditions of communities in Lancaster and its surrounding lands.

2.5 CITY OF PALMDALE GENERAL PLAN

The City of Palmdale's General Plan addresses its community's vision and goals and identifies policies and guidelines on how lands should be organized and dealt with. The plan is a great resource that is used to help make land use and transportation related decisions. Additionally, the main purpose of this plan is providing a comprehensive, long-range policy guideline for City of Palmdale's future developments.

The population of City of Palmdale in 2017 was reported to be 157,519 and largely driven by immigration and economic growth in Southern California region. As population grows this creates challenges in a city regarding how the city can meet the needs of its residents. As the population of Palmdale is expected to grow in coming years there is more demand of having connected and efficient transit services along with mixed use developments. Growth patterns in this city are increasing, which is why AVTA must take advantage of this opportunity and introduce alternative modes of transportation that will keep communities connected and allow residents to travel through the region more conveniently. An issue that has been a concern for most residents is regarding increase in traffic volume in coming years as population is expected to grow. The general plan also explains that approximately 34% of residents commute outside Antelope Valley in order to reach their workplaces. This suggests that cities like Palmdale need to invest in employment centres and be aware of their development and growth patterns. Essentially, transit-oriented developments along with adopting the complete streets strategy is a great way to address many of the issues that Palmdale is experiencing. The plan also mentions that most bus services operating in the City of Palmdale is provided by AVTA.

2.6 2016-2021 LOS ANGELES: PEOPLE, INDUSTRY AND JOBS

Since 1990, the population of Los Angeles County has experienced significant growth by almost 16%. Los Angles has a rich and diverse population, and in 2016 the population of Los Angeles County was reported to be 10.1 million. In the future, Los Angeles County's population is expected to increase to 10.4 million by 2020 and 10.7 million by 2025, according to the California Department of Finance forecasts.

Furthermore, the document provides a lot of analysis regarding the County's employment conditions too. Employment is a major factor that determines the standard of living in an area and dictates the way transit services are planned, which can influence how well communities are connected to local and regional areas. In this report, it identified that

the largest private sector industry in Los Angeles county in 2015 was food services, followed by professional and technical services and administrative jobs. These employment industries are an important part of the Los Angeles County that help facilitate economic growth. Interestingly, this report mentions that between 2016 and 2021, Los Angeles County is expected to add over 206,700 new jobs. Thus, as population continues to grow and more jobs are expected to appear in the County, the County's transit service area needs to be expanded. Not only will this make it convenient, efficient and cost-effective for those wanting to head to Los Angeles downtown or to major centers but will also allow transit services in low density cities to have facilities in place for people of all kinds to have easy access to, resulting in enhanced quality of life for residents.

2.7 PALMDALE TOD FRAMEWORK PLAN ENVIRONMENTAL IMPACT REPORT

The Palmdale Transit Oriented Development (TOD) Framework Plan Environmental Impact report seeks to identify different strategies to help improve the City of Palmdale's transit hub. The report explains the importance of creating a vision to guide future transit-oriented development and improve Palmdale's transit hub. The overall concept of Palmdale's TOD plan consists of incorporating the following elements:

- Mixed-used adjacent to future station (i.e.: offices, hotels, retail, and new transit-oriented neighborhoods)
- Avenue Q will act as a transit spine that links the station area to entertainment and residential areas
- Existing neighborhood around school would be preserved and enhanced
- Parks, landscaped streets and open spaces link recreation areas, neighborhoods

The plan also briefly identified the key principles for streets and open space it intends to use which includes:

- Pedestrian-Friendly Street Design
- Network of Open Space Corridors
- Vibrant Parks
- Using the "Complete streets" approach
- Engaging Public Spaces, including shade trees or structures, lighting, seating, signage, activities
- Water-efficient landscaping suited to the environment

The following images below provide a visual representation of the conceptual circulation and concept plan for Palmdale's TOD Framework (Figure 5).

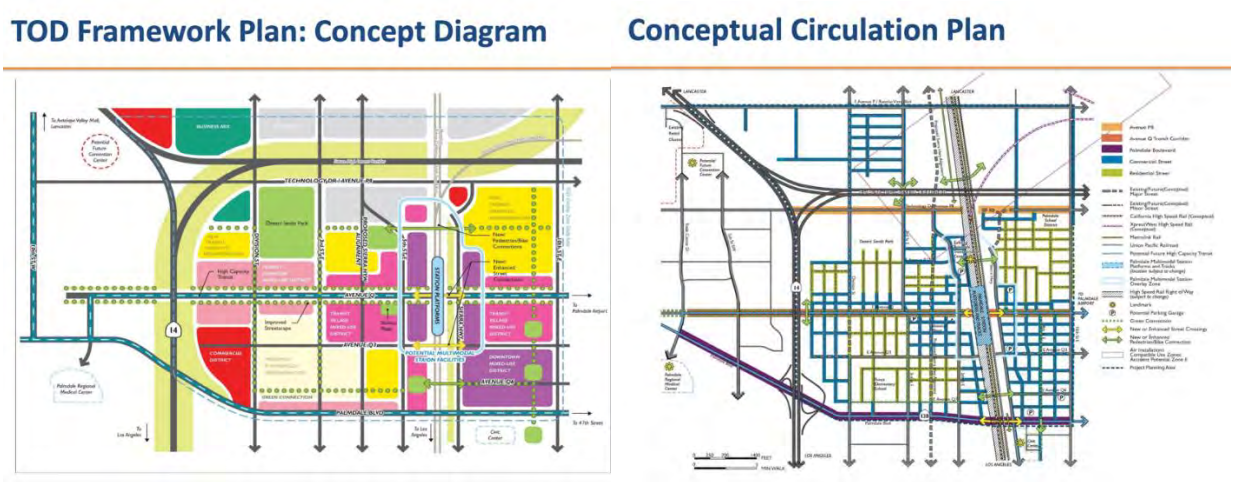


Figure 5: Palmdale's TOD Framework Plan Concepts[1]

2.8 LIVABILITY AUDIT REPORT

The Livability Audit report highlights ways City of Palmdale is working towards making its communities more enjoyable and convenient places for citizens to live, work and get to places in. Currently, the city is creating a TOD overlay zone that is expected to bring TOD around Palmdale's transit hub center. The project is in its initial phase and the research collected from this phase will provide more information about the final TOD Overlay Zone for the City of Palmdale. The TOD Overlay Zone project is trying to increase livability in the area that is around the Palmdale Transportation center. Livability is the idea of how safe, healthy and comfortable a place feels. A place can be considered "livable" if people feel comfortable travelling and have easy access to services, they need to reach their desired destinations. Thus, to promote livability around public transportation centers, this report identifies the need for vibrant areas to have a sense of place where people can live, work and play.

2.9 CITY OF PALMDALE ENERGY ACTION PLAN

In 2011, the City of Palmdale released their Energy Action Plan to act as a framework to guide the city in achieving higher levels of energy efficiency and independence and decreasing GHG emissions consistent with state legislation by 2035. The Plan outlines strategies and implementation measures in areas such as waste, transportation, residential, and commercial/industrial. Ultimately, achieving a higher level of energy efficiency, reducing energy demand and consumption, and reducing GHG emissions will help to enhance the environmental, economic, and physical health of the community and ensure that Palmdale and those who call the city home are resilient and healthy for generations to come.

Based on a 2005 GHG emissions inventory, the transportation sector contributed 40% of total city emissions; the largest of any sector. This shows that creating a more sustainable transportation system is an important component of reach climate and energy goals within Palmdale. Palmdale's plan is centered around seven main goals, two of which are relevant to this study: reduce transportation emissions through alternative vehicles, trip reduction and consolidation, and efficient flow; and implement smart land uses to reduce vehicular trips. Within each of these goals are specific emissions reduction targets and implementation measures to achieve these.

1 http://www.cityofpalmdale.org/Portals/0/Documents/TOD/EnvironmentalImpactReport/Palmdale%20TOD%20Framework%20Plan_Public%20Review%20Meeting_101117.pdf)

Specific implementation measures within the first goal of reducing transportation emissions include enhancing the efficiency of vehicle flow, implementing a complete streets approach to achieve mobility, on-road vehicle emissions reductions, reducing transportation emissions through requiring transit amenities for all transit destination-related new developments, and encouraging participation in commuter programs. Implementation measures within this goal that directly relate to AVTA include promoting upgrades to the regional transit fleet and support the expansion of transit options within the Antelope Valley. Specifically, the city committed to collaborating with AVTA to identify gaps in local service and facilitate solutions, maintain park-and-ride lots, continuing to support regional transit programs and promote these to the public, and collaborate with other local agencies to implement relevant portions of the SCAG RTP/SCS.

Specifically, Palmdale wishes to continue to implement their Bicycle and Pedestrian Master Plan as funding becomes available. Not only does this help to provide for the first and last mile connections of trips taken through AVTA, but it touches on multiple best practices outlined below, including complete streets and challenges in the first and last mile.

It is encouraging that Palmdale acknowledges the important links between transportation and land use, as seen in the action items for the next transportation-related goal to implement smart land uses to reduce vehicular trips. Understanding that reducing transportation emissions can also be achieved through the creation of integrated land uses that promote walkable neighborhoods and forms of transportation other than private vehicle use, implementation items include promoting accessible housing near transit and services through higher-density mixed-use housing near employment centers and existing AVTA routes, infill development, housing targeted towards the local workforce, exploring increased densities in transit-rich areas to expand the city's stock of transit-oriented development, and improve the jobs-housing balance in the city.

3.0 BEST PRACTICES

The following section provides insights to case studies and highlights industry best practices that will help guide AVTA to improve its commuter service throughout Antelope Valley.

3.1 TRANSIT-ORIENTED DEVELOPMENT AND TRANSIT SERVICES

Worldwide, TOD is being used as a tool to promote smart growth in communities and to help solve issues related to commuter service, connectivity, congestion, and vehicles mile traveled, in order to improve quality of life for residents.

In the Transit Cooperative Research Program (TCRP) 102 report about Transit-Oriented Development in the United States, and in the TCRP 128 report about the effects of Transit-Oriented Development on housing, parking and travel it identifies how transit-oriented development (TOD), is a tool used to encourage smart growth and promote economic development in areas that are facing local and regional connectivity challenges. TOD is a type of urban development that focuses on creating lively, mixed-use and vibrant communities that are located close to transportation centers. The main goal for TOD is to create mixed-used communities near transit centers, in order to have compact, walkable and healthy communities. In recent years, having access to high quality transit services is becoming increasingly important. Therefore, focusing on transit-oriented development is an effective strategy that operating transit authorities like AVTA can use to improve accessibility, transit services and create livable communities. However, it is important to be aware that transit-oriented developments may not always be the best solution to utilize in all situations.

The TCRP report 128 also seeks to explain that encouraging more transit-oriented developments in areas like Antelope Valley that is relatively low density can help reduce auto-dependency in communities and help lead to reducing parking. Parking is a key factor in determining the success of communities, development projects and sustainable transportation. However, if there is excess parking this can result in more people relying on automobiles, increase vehicle miles traveled, contribute to congestion and housing costs.

According to findings explained in the TCRP 102 report, residents who tend to live closer to transportation centers are more likely to commute by transit and typically rely less on automobiles compared to residents who are not near TOD corridors. Transit-oriented developments will continue to grow and in the United states there have been over 100 projects that are developed near transit centers.

A few examples of places where TOD corridors in the United States exist include:

- Western district in Los Angeles's Hollywood area; and
- Rosslyn-Ballston in Arlington County

In addition, transit services that are most successful are usually found to be operating near Central Business Districts (CBD). The TCRP report 102 describes, that TOD ridership is likely to be increased if transit-oriented developments are being placed near express bus corridors that are linked to healthy CBD or located near corridors that provide efficient connecting bus services.

Many successful examples of TOD in the United States is provided in the TCRP report 102. For instance, Boston is a very good example of TOD planning that focused on revitalizing declining areas and providing more safe and reliable public transit services in the area through transit-oriented developments. Boston's history of growth and development has led Boston to primarily be successful due to its development of mass transit. For example, in areas like Northeast New Jersey's TOD, due to railway improvements, it allowed commuters to have more fast and efficient rail transit services that connect to major centers like Manhattan as a result of the TOD corridor.

Major factors that have led to the success of TOD in these areas are coordination amongst public and private providers and having strong policy guidelines that focus on concentrating development, encouraging mixed use, providing alternatives to driving, improving streetscape design and having frequent transit services. Overall, the primary benefits associated with TOD from both a public and private perspective is that it helps increase ridership, revitalize declining neighborhoods, and facilitates economic growth according to TCRP report 102. Florida is also another city mentioned in the plan that has more 'smart growth developments than anywhere else in United States and its comprehensive plan is focused on urban and downtown revitalization that encourages mass transit services and TOD.

Overall, TOD are mixed use developments near transit facilities that promote compact, walkable and healthy communities that can influence economic growth and sustainable practices in a region. Furthermore, for TOD's to be successful it is recommended that private and public partnerships work together to create strategic frameworks to help improve communities. Also, by encouraging more transit-oriented developments it will benefit communities economically, socially and environmentally for many years. The most known benefit of TOD is the fact that it increases ridership and increases profit for public and private agencies as well.

3.2 COMPLETE STREETS

Smaller communities face unique transportation challenges. Major roads that bring traffic through town can pose significant safety barriers for residents on foot or on bike. These major roads are not only key transportation routes but are also important to the economic vitality of a community. With a Complete Streets approach, cities are more likely to be empowered to coordinate with outside agencies on new project designs to ensure that it will serve residents as well as visitors for many years.

Streets are vital places within the region of Antelope Valley and are determining factors that can either improve quality of life or decline conditions in communities. The definition of complete streets can be explained to be as streets that are designed to enable safe access for all users so that pedestrians, bicyclists, motorists, and transit riders of all ages and abilities are able to safely use the streets. Understanding how our transportation network can equitably be shared between different road users is imperative to promoting a multi-modal transportation network that provides a range of attractive choices for mobility by integrating all modes into a seamless network. Moreover, the

link between complete streets and public health is also well documented as it enhances human and environmental health by providing an environment that enables and encourages active transportation. Since 2003, Complete Streets has seen over 1,400 policies adopted (as of January 2019) in the United States.

Additionally, the importance of integrating transportation and land use planning using the complete streets approach is also identified in the Transit Cooperative Research Program (TCRP) 182 report about Linking Transit Agencies and Land Use Decision Making. Recently, the move towards the complete streets approach has allowed transit and land use related developments to be integrated more efficiently. On the other hand, in the Smart Mobility Framework (2010) report it stresses the importance of redesigning streets to move people more efficiently, as well as identifies the purpose of Right of Way and the opportunities that exist to create streetscapes and lively neighbourhoods using the complete streets strategy. This plan essentially identifies the importance of complete streets and how that contributes to improving local transit systems, since complete streets can increase the attractiveness of transit. For instance, the City of Lancaster used the complete streets approach to redesign Lancaster Boulevard that helped make the commercial area's streets vibrant and safer for pedestrians and cyclists. As a result, the project led to an increase in job growth and helped facilitate economic stability in the area.

The smart mobility plan outlined the following ways to enhance communities:

- A transportation system with facilities and services should offer highly-connected multi-modal networks with complete streets.
- Diversifying travel choices in all locations with an emphasis on serving all users through Complete Streets and the supportive land use and urban design features of community design supportive of location efficiency.
- Promote travel by walking, bicycling, and transit to reap benefits to individual health as well as to offer reliable travel options.

3.3 HEALTHCARE AND MOBILITY REPORTS IN THE INDUSTRY

Public transportation brings many benefits to communities, individuals and to the local economy. According to the American Public Transportation Association after exploring the health impacts of transit they found six benefits of integrating public transportation systems which included the following:

- Public transit users are more active
- Buses are safer than individual vehicles.
- Public transportation reduces stress
- Public buses keep air cleaner
- Riding public transportation saves money
- Public transportation provides access to essential needs later in life

Having public transportation services available for people to use will not only promote economic growth, but also leads people to adopt healthy lifestyles. Research findings reveal that individuals who typically use public transit are more likely to be active compared to people who regularly use motorized vehicles to travel in and out of cities. It is also important that transit agencies know when improving their transit services to integrate their services in a way that will allow convenient access to healthcare and healthy foods, along with reducing reliance on ADA services. These are some factors transit agencies must focus their resources on. A lack of access to healthcare in low density environments can pose great challenges for diverse range of populations, especially those who are impaired or suffer from disabilities. Furthermore, numerous research study findings reveal that users who use public transit are more active and typically less likely to suffer from the following diseases:

- Heart and vascular diseases,
- strokes,
- diabetes,
- hypertensive diseases,

- osteoporosis,
- joint and back problems,
- colon and breast cancers
- depression.

In addition, many jurisdictions around the world recognize that improving transit services to easily access education and employment centers is a factor that can reduce stress amongst individuals and overall improve Levels of service (LOS) for transit services in a region as well. Not only does improving transit allow for better integration of education and employment centers, but it also leads to better long-term economic opportunities. It is a given fact that public transit helps reduce pollutions and promotes better use of land. As well as, buses produce less pollution than cars and AVTA is leading the way with the adoption of a zero-emission fleet.

3.4 CHALLENGES IN FIRST AND LAST MILE

Due to the dispersed nature of the Antelope Valley, auto-oriented retail and major streets, AVTA riders experience challenges in first and last mile. Essentially people living in low density environments have a hard time commuting using transit services such as, rail and bus services. This is mainly because most transit stops are not placed nearby for residents to easily access. AVTA needs to focus on addressing these challenges and come up with ways it can implement transit stops smartly, in order encourage people to use transit and overall improve its commuter service in the region.

According to the Transit Cooperative Research Program (TCRP) J-11 TASK 26 report about Collaborations and Partnerships between Public Transportation and Transportation Network Companies (TNCs), this report identifies solutions to addressing the first and last mile challenge by integrating TNC in the transit system to offer more flexible, convenient modes of options for people that are wanting to commute throughout regions like Antelope Valley. Many places around the world are implementing public private partnerships to introduce TNC's with the intention to evaluate how the services can help solve transportation gaps in low density environments.

For example, in Dallas, Texas the Dallas Area Rapid Transit (DART) introduced a new Go Pass app that commuters can use to book a ride with Uber or Lyft. DART began its micro transit program in October 2017 which is a service that allows riders the ability to decide what type of PTP, at what cost and time or distance they would like to use. In order to make transit use easier, DART has enhanced its mobile apps to incorporate trip-planning as a new feature. When using the Go Pass, riders can simply select "Connect 2 Car," and they will be connected with the Lyft app. The city also has a contract with Lyft for a pilot program for paratransit riders that was introduced in October 2015 and is still on-going today. Overall, Dallas has come up with innovative strategies to make transit more user friendly, reliable, and stress-free for its customers, and this approach to implementing service models to enhance transit systems should be taken into consideration by other cities too.

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Existing Conditions

A Review of Market Conditions, Transit Services, and Opprotunities

Prepared for:

Antelope Valley Transit Authority

Prepared by:

Stantec
Transit Advisory Services

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Executive Summary

AVTA, like most agencies in Southern California, is experiencing steep ridership losses. While many factors are beyond AVTA's control, such as fuel prices, cheap land at the periphery and growth strategies, and pedestrian infrastructure, the overall quality and quantity of transit service are the main levers that AVTA can adjust to attract more riders.

Some of the issues raised throughout this report can provide clues as to necessary corrective actions:

- **Inconsistent schedules and headways**. AVTA operates inconsistent headways on many routes based generally on the cycle time of a route, rather than on clockface headways or headways that are more customer-friendly. For example, while route 11 operates generally every 30 minutes, route 1 operates with headways that are 24 minutes, 25 minutes, 26 minutes, and so on. Operating these types of schedules can discourage causal customers and confuse others. Having consistent headways throughout clearly defined service periods (morning peak, midday, etc.) can encourage ridership because schedules are simple to remember and easy to understand.

- **Low frequency across all routes.** AVTA does not operate any routes at headways of 15 minutes over less. To grow ridership, key corridors should be identified based on passenger demand and supportive transit land uses and urban design; service levels should then be improved to define a high-frequency network.

- **Low frequency on weekends.** AVTA operates routes very infrequently on weekends, particularly on Sundays. While weekend ridership is lower than weekdays and providing more service is costly, weekend travel is important for a number of reasons including for employees to reach jobs, and shoppers to reach retail, etc. Improving weekend frequency, particularly during the midday, could help grow some ridership.

- **Long routes that have low ridership segments or detours.** It's natural for bus routes to have segments that see high passenger activity, and segments that see low passenger activity. The key is to design routes that minimize the segments with low activity or break up long routes that contain parts with low activity that don't serve as connecting routes. Route 1 is a good example that sees high passenger activity along its alignment in Palmdale and Lancaster, but little activity between them along 10 St. W. While analyzing travel patterns will occur later in this project, at first glance, this pattern of route usage suggests that it may be beneficial to customers and bus operations to split up the route to focus service along the heavily used segments, or redesigning service along 10 St. W. to contain fewer stops to speed up route 1.

- **Network design focused on one-seat rides cause long and indirect routes and lengthen travel times**. Some routes provide direct and easy trips, like route 1 which is general north-south, but routes like 9 and 7 are designed to serve many destinations, but are indirect and likely

discourage ridership though long travel times. Instead, now that AVTA provides free transfers, new network design opportunities are enabled, such as one that is more gridded or that requires transfers, but can result in shorter travel times. Other fare policies, such as unlimited travel during a 2 hour time window of a first trip can facilitate multipurpose trips, ease some financial burden for low-income customers, and potentially increase trip-making. Of course, this comes at the expense of some fare revenue but has benefits too.

- **Mismatch between service provided and demand.** Traditionally, peak demand for transit mimic 9-to-5 work works. Now, in many communities across North America, peak demand grows throughout the day when demand was traditionally lowest during the midday. Route-level analyses reveal different demand profiles relative to its service provision. However, the general trend is higher demand during the midday, with a mismatch is service provision. Together with consistent headways and specifying dayparts or time periods, AVTA can develop customer-friendly schedules as well as design a service plan to deploy resources that meet actual passenger demand and usage.

- **Slowing service and unreliable service.** Overall, local buses operate on-time 77% of the time, but on-time performance varies by route and day of the week. Some routes with the lowest on-time performance are also routes that operate at the lowest frequencies. This means that riders may miss connections to other low-frequency routes, resulting in long wait times until the next arrival. AVTA must build enough recovery time into the schedules to account for delays related to traffic, heavy passenger activity, frequent stopping, and long dwell times while passengers with mobility devices board/alight. As a community grows, schedules must change to account for changing traffic and passenger conditions. This issue can also be observed on the commuter routes, which have poor on-time performance with a large percentage of buses arriving late. To keep up with slowing traffic conditions, commuter schedules must reflect realistic travel times, particularly to southern LA County.

- **Service that generates low ridership in low transit propensity areas.** Lake Los Angeles, Littlerock, and Pearblossom are poor transit markets—their low density, long distances between points of interest and lack of pedestrian amenities results in low productivity fixed-route scheduled services. This is not to say that residents of these communities don't need or use transit—instead, the residents of these communities are low-income and have low car ownership, suggesting that they do indeed need mobility options. Alternative service delivery models, leveraging new technology and smaller vehicles could help provide more effective and attractive service in these communities and provide connectivity with Lancaster-Palmdale.

- **Facilities that could be improved to improve customer comfort.** The major bus hubs could benefit from upgrades for passenger waiting, including real-time bus arrivals, better security to improve the perception of safety, and more information. In addition, providing real-time GTFS feeds to third-parties could expand the ability for customers to trip plan and track their bus.

- **School (supplemental) routes that are not successfully serving their intended markets.** The three routes operated as supplemental routes see low ridership, and while they perform well on a

per revenue hour basis, discussions with AVTA staff and school representatives indicate that services for students could serve substantial latent demand. Yellow school bus service is only provided to students living beyond 3 miles of any school, providing an excellent opportunity for AVTA to capture student ridership (from the population within 3 miles) for school trips, but also for other trips if an appropriate fare were developed. In addition, redesigning current routes to be more flexible to serve schools can allow AVTA to redeploy current resources from the supplemental routes into more productive services.

- **Commuter services that potentially don't reflect current demand.** As we found in our analyses, many trips on the commuter routes are largely empty. As a general trend, all routes have lost ridership since 2013/2014, despite increased service hours. These findings suggest a few things. First, they suggest that the currently deployed resources could be redeployed elsewhere to serve new potential markets, like reverse commuting into the Valley or not operated altogether to save on operating costs. Second, these findings suggest that commuter routes that were once attractive are no longer as attractive. The reasons could be diverse, including changes in job locations, commuting patterns, competiting services offering lower fares and so one. Another key reason could be dissatisfaction with the travel time for commuting routes including the unreliability of the service. Essentially, growing traffic and no priority measures for commuter buses, either on SR-14 or in the Valley or in Los Angeles negates any benefit to transit. If priority was given to commuter buses, if routes connected to rapid transit sooner rather than navigating congested local streets, some ridership may return. This is reflected in the poor on-time performance of the commuter routes, as well as complex route patterns such as route 786, which operates five different patterns. Providing reliable and easy to use service, along with convenient parking is important for building commuter ridership.

- **Growing demand for DAR services which are costly to provide.** While the cost per service hour for DAR service has decreased since 2013, ridership has grown and the passenger per hour have decreased, indicating the service has grown less productive. Reasons for this could include growing traffic, inefficient routing schemes, poor trip grouping, and so on. AVTA needs to mitigate the demand for DAR service by improving the accessibility of fixed-route transit, focusing on a family of services delivery model that leverages both DAR and fixed-route, while implementing broad travel training to give persons reliant on DAR the skills and confidence needed to ride fixed-route services. Microtransit pilots that leverage new technology and delivery models could help improve the efficiency of DAR, while providing service substitution in areas with low fixed-route productivity.

- **Fare policy and fare evasion.** AVTA provides a relatively straightforward fare table for reduced and regular fares. However, some opportunities become apparent such as rationalizing the commuter route fares that align with the distance traveled, providing student discounts, and developing employee pass schemes with major employers in the Antelope Valley. Based on discussions with operators, fare evasions seems to be a pervasive issue that requires addressing. Transit enforcement officials, anti-fare evasion advertising campaigns, and public outreach could all help to address the root causes and results of fare evasion.

Abbreviations

AVTA	Antelope Valley Transit Authority
NTD	National Transit Database
SCAG	Southern California Association of Governments
DAR	Dial-a-Ride
AFB	Air Force Base

1.0 BACKGROUND

The Antelope Valley Transit Authority (AVTA) was established in 1992 by a Joint Powers Agreement between the cities of Lancaster, Palmdale, and Los Angeles County and provides various transit services for the mobility of residents of the Antelope Valley. The broader purpose of this study is to develop strategies to improve the mobility of residents of the Antelope Valley, not only through traditional public transit, but also through novel ways like microtransit, partnerships with other mobility providers, and to generally improve the usefulness of AVTA services and thus grow ridership.

Nevertheless, challenges abound. The main challenge for the AVTA is to attract ridership from a broader market in a low-density, auto-centric environment. First-mile/last-mile challenges are plentiful—accessing bus stops is sometimes challenge without adequate pedestrian infrastructure, hostile environments to walking, and oceans of parking that surround key destinations, like hospitals and retail stores. However, opportunities are also apparent. Ridership from students in high schools and colleges is growing; innovative and disruptive transportation technologies are enabling new mobility methods that improve efficiency while lowering costs; and finally, municipal and county partners are recognizing the need to develop transit-friendly environments that can expand transportation options beyond driving, helping mitigate negative health impacts and improve quality of life.

This report evaluates existing conditions of AVTA at the system level and route level to understand how well AVTA service compares its peers, as well as how well each route in the system compares to the system average. Findings are separated by type of service, including weekday and weekend local routes, supplemental routes, commuter routes, and Dial-a-Ride service. Demographic information and transit market conditions in the Antelope Valley (AV) were also analyzed as part of this report to ground the transit service findings in the local context of the AV.

2.0 ABOUT AVTA

The AVTA carried approximately 2.5 million unlinked passenger trips across all operated modes in 2018. AVTA operates (via contracted third-party services) three different modes across a large and diverse service area which includes urban, suburban, and rural elements.

For regular fixed-route services (aka local transit services), AVTA operates 13 regular routes as well as three supplemental routes that operate during peak times to accommodate students before and after school hours. In addition, AVTA operates long-distance commuter services to destinations outside of the Antelope Valley, including downtown LA, West LA, and more recently, into Edwards Air Force Base, a large employment zone roughly 30 miles northeast of Lancaster. Finally, AVTA also operates a demand-response service known as dial-a-ride (DAR) which caters to persons with disabilities as well as residents outside of the 'urban zone'. Access paratransit services operated throughout Los Angeles County also provides curb-to-curb service in the Valley as an overlay with DAR—AVTA notes that Access demand in the Valley is strongly outpacing supply.

Overall, AVTA has lost nearly a third of its ridership since 2014, despite providing about 14% more service hours since 2014.[1] While some routes have been altered over time, removed, or added, the overall trend at the route-level has been downward, indicating a sustained and generalized loss of transit ridership. As a mode split of boardings (in 2018), local fixed-route service constitutes 87% of total boardings, while commuter services constitute about 11% and dial-a-ride the final 2%.

[1] Based on NTD reports and data provided by AVTA.

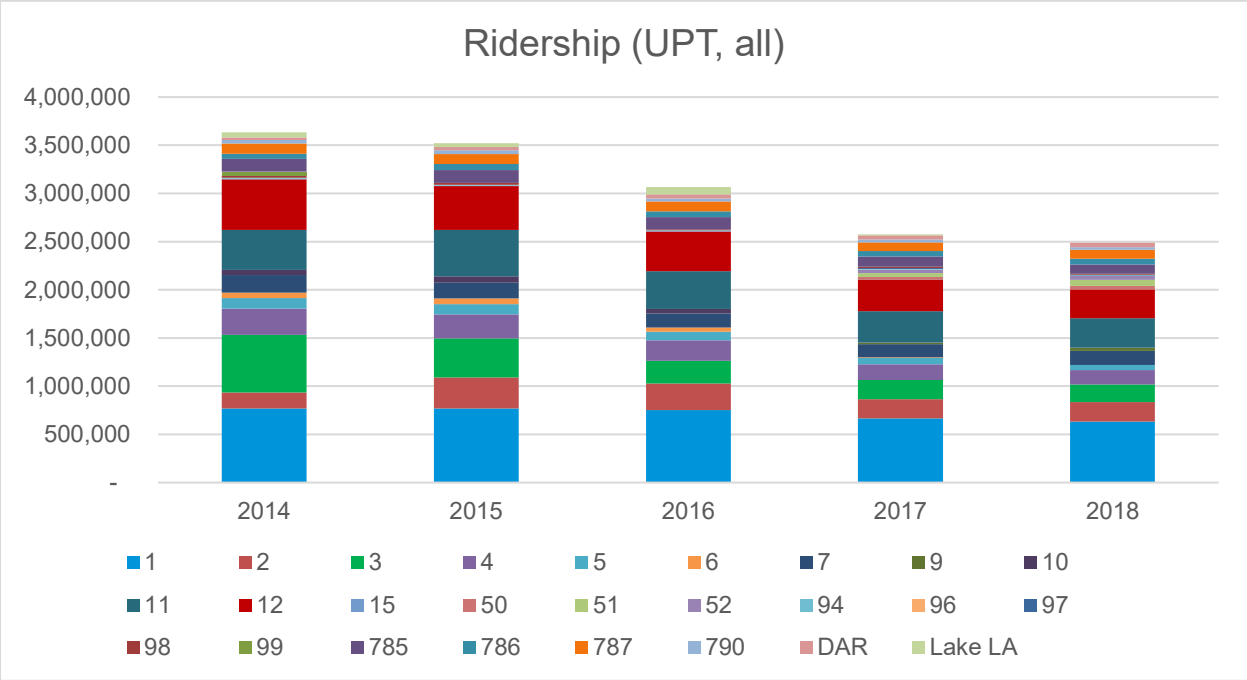

Figure 1: Unlinked passenger trips from 2014-2018 for all routes and modes of AVTA.

Note, 99 in the above graph represents ridership from unknown routes and was not an actual bus route.

This downward trend in ridership is noticeable across all three of AVTA's modes and is likely a result of general trends of falling transit ridership in Southern California. Indeed, a recent study[2] examining the **root causes of declining bus ridership across Southern California pointed to the rise of discounted loans and the easy access to credit to lease automobiles, particularly for the populations that traditionally tend to ride transit (recent immigrants and low-income households)**. As such, riders who are able to afford a car are quicker to ditch transit and drive. Moreover, the study also recognized the **growing dissatisfaction with the quality of transit service as another disincentive to transit use.** Finally, this study strongly suggested that **transit agencies work to improve service quality—namely, improved service frequency, reliability, and travel times**—to attract occasional transit riders while winning the loyalty of current riders in order to offset the loss in ridership.

While the loss in ridership seen by AVTA probably stems from some of the same causes as those from other Southern California bus agencies, AVTA has some unique attributes that it can capitalize on to reverse ridership hemorrhaging. First, AVTA can move to improve service frequency along key routes, harmonizing schedules across more of the service day to improve the legibility of schedules and hopefully spur more spontaneous travel, as well as better accommodate current travel patterns. For commuter services, our study will look to uncover pain points, opportunities to improve route alignments, and

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[2] Manville, M., Taylor, B.D. & Blumenberg, E. *Falling Transit Ridership: California and Southern California* (2018). Prepared for SCAG. UCLA-ITS.
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currently unaccommodated travel patterns in the hope of capturing more ridership while redeploying resources where they are more impactful. Third, Plant 42 represents an important employee base and market that, while challenging, currently sees no transit service. Finally, new technology can help deploy a more attractive and effective service to the transit-hostile service area in the east, in communities like Lake Los Angeles, Pearblossom, and Littlerock.

3.0 PEER ANALYSIS

Peer agencies were identified based on a number of considerations including:

- service area population;
- agency size (vehicles operated);
- transit modes offered;
- ridership; and
- location (warmer states were considered to account for climate)

Additionally, previous transit-related reports completed in the Antelope Valley were referenced to identify consistent peer agencies. A peer review was completed in the AVTA Fare Study dated November 2014, therefore these agencies were included into the peer group. The peer agencies considered in the peer group are listed in Table 1.

Table 1: Peer group

Name	State	Population	Service Area Population	Service Area (sq miles)	Modes Operated	# Peak Vehicles (VOMS)	Ridership (UPT)
Antelope Valley Transit Authority	***CA***	***341,219***	***349,050***	***1,200***	***CB,DR,MB***	***82***	***2,576,521***
Lakeland Area Mass Transit District (LAMT) [1]	FL	262,596	312,388	77	DR,MB	68	1,346,484
Laredo Transit Management, Inc.(El Metro) [1]	TX	235,730	236,091	59	DR, MB	52	3,037,511
Sunline Transit[2]	CA	345,580	432,416	1,120	DR,MB	93	4,316,269
Santa Clarita Transit[2]	CA	258,653	252,271	78	CB,DR,MB	90	2,864,351
San Joaquin Regional Transit District[2]	CA	370,583	735,764	1,426	CB,DT,MB	104	3,566,367
Gold Coast Transit[3]	CA	367,260	367,260	84	DR,MB	70	3,718,811
The Eastern Contra Costa Transit Authority (Tri Delta Transit)[3]	CA	277,634	306,000	225	DR,MB	78	2,478,391

[1] Selected based on service area population, peak vehicles operated and location

[2] Considered in AVTA Fare Study Peer Review

[3] Found in both 1 and 2

All peer agencies serve populations within 100,000 of AVTA, operate between 50-100 vehicles during peak times, contain ridership above 1 million but below 5 million and operate a mix of conventional fixed-route buses, commuter buses, and demand-response or paratransit services. Additionally, all agencies are located within southern states that have comparable climates to Antelope Valley.

3.1 PERFORMANCE METRICS

Key performance metrics were evaluated among the peer agencies and can be grouped into the following categories:

- **Ridership**: Being a primary performance measure, the ridership change between 2013 and 2017 was plotted with the change in service area population. This may illustrate whether a change in ridership is reflective of a change in the population served or other factors. Higher values are favorable for both metrics. To examine the popularity or attractiveness of transit, the ridership on a per capita basis was measured, which also account for population changes. A higher boarding per capita would indicate greater transit usage.

- **Service provided**: The revenue hours on a per capita basis were considered to measure the level of service provided based on the population served. This may help to understand why or why not individuals choose to use transit as service hours play an important role. The higher the revenue hours per capita, the more service offered.

- **Service productivity:** An industry measure of the productivity of a public transit system results from the amount of service provided (revenue hours) and its utilization in the form of ridership or boardings. As such, boardings per unit of service hour (revenue hours) provides a good understanding of the level of use of a transit system, with higher values translating to greater service productivity.

- **Financial performance**: A number of metrics may be considered to evaluate the financial investment and financial efficiency of a public transit agency. One measure of this is the operating cost on a per hour and per boarding basis. A lower operating cost per hour and operating cost per boarding would indicate greater cost efficiencies in operating transit service. Additionally, a lower change over time in these values would be favorable, while noting that certain operating costs are bound to increase over time.

3.2 FIXED-ROUTE

3.2.1 Ridership

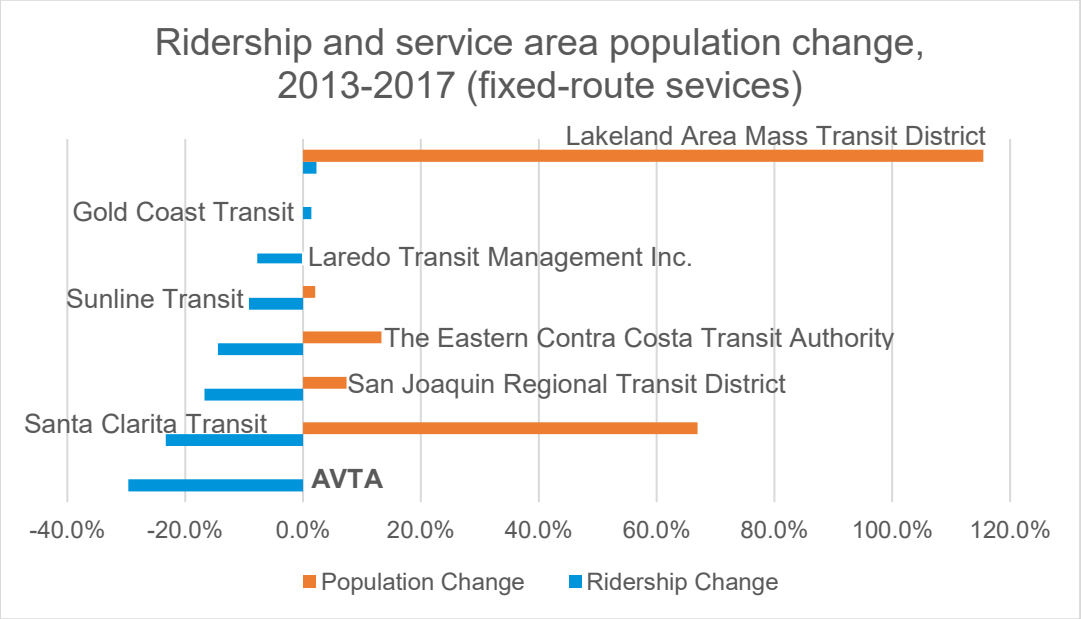


Figure 2: Ridership and service area population change (fixed-route), 2013 to 2017

- **Most peer agencies had little to no service area population changes**, apart from Sunline Transit and Lakeland Area Transit which had changes of approximately 67% and 115% respectively. Lakeland Area Transit saw this growth due a consolidation of three systems. **Antelope Valley did not experience any changes to the service area population.** Excluding the two anomalies noted above, the average change in service area population is 3.8%.
- **Most peer agencies experience some ridership decrease**, with an average ridership change of -12%. Gold Coast Transit and Lakeland Area Mass Transit both experienced marginal growth in ridership of 1% to 2%.
- **AVTA experienced the largest ridership decrease among its peers with a change of -30%** or just below one million riders.

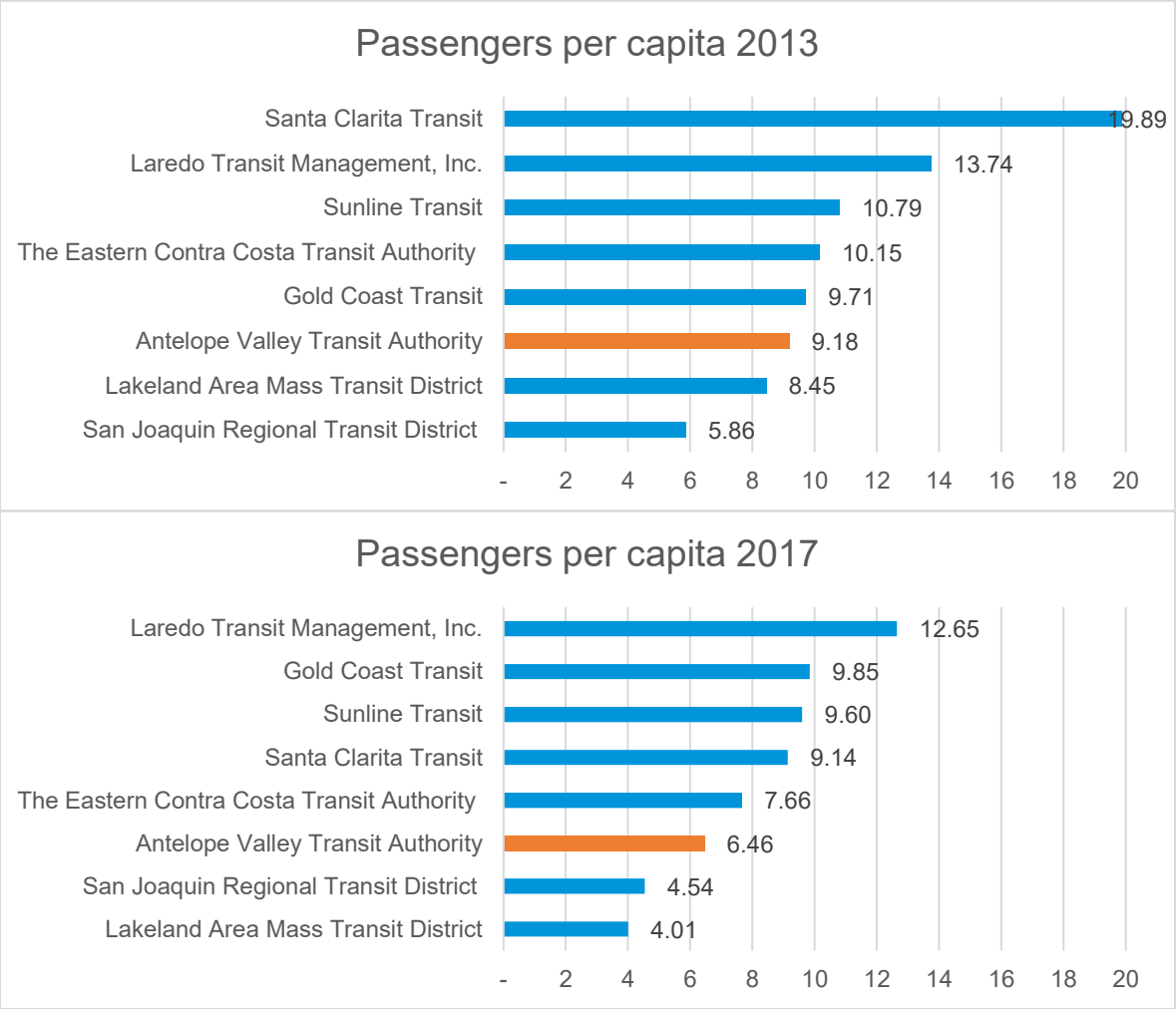


Figure 3: Passengers per capita (fixed-route), 2013 to 2017

- **AVTA experienced a 30% reduction in passengers per capita** from 9.18 in 2013 to 6.46 in 2017 which suggests transit has become a less attractive transportation mode in the Valley. AVTA remains below the peer averages of 10.97 in 2013 and 7.99 in 2017.

3.2.2 Service Provided

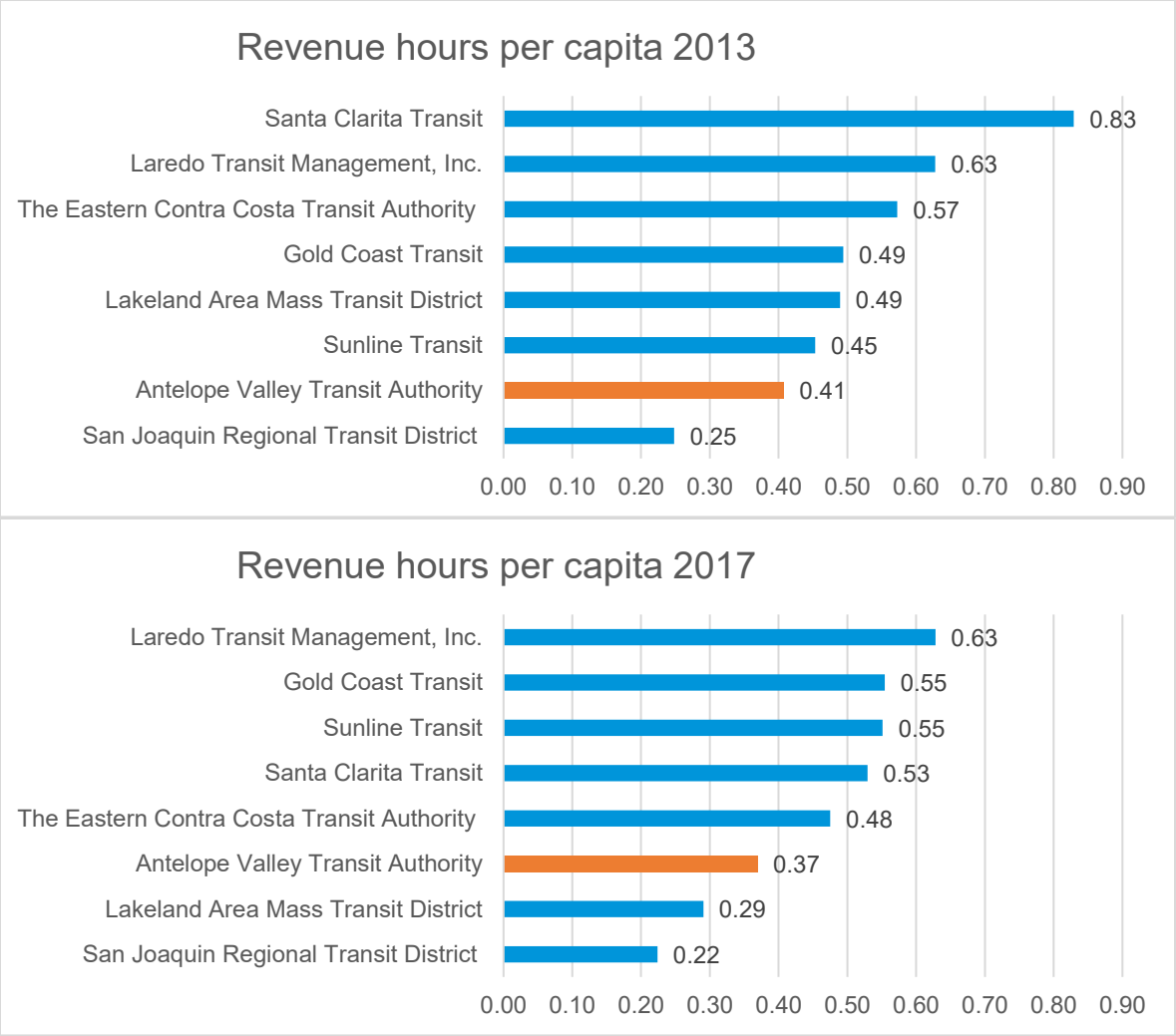


Figure 4: Revenue hours per capita (fixed-route), 2013 to 2017

- **AVTA remains below the peer average** of 0.52 in 2013 and 0.45 in 2013. AVTA experienced a 9% reduction in revenue hours per capita, with the largest reduction in revenue hours. **A decline was found among peer agencies with an average change of -12%.**
- Unlike the majority of the peer group, Gold Coast Transit and Sunline Transit experienced an increase in revenue hours per capita. Notably, Gold Coast Transit was one of two peer agencies that saw marginal growth in ridership over the last 5 years despite a declining trend.

3.2.3 Service Productivity

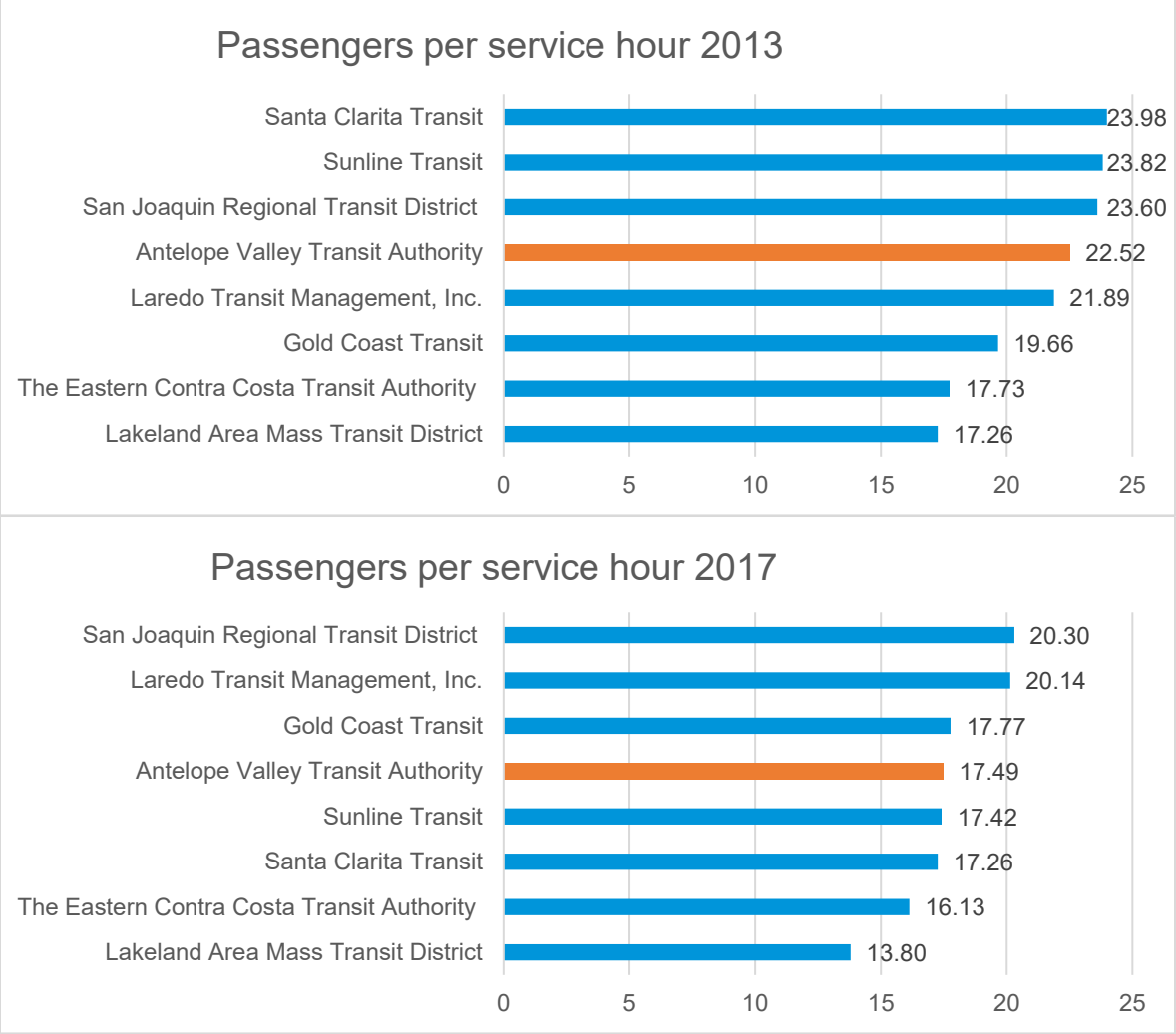


Figure 5: Passengers per service hour (fixed-route), 2013 to 2017

- **A decline in service productivity is seen among all peer agencies,** with AVTA experiencing a change of -22%. Despite the decline, AVTA remains consistent with the peer average of 17.54 in 2017.

3.2.4 Financial Performance

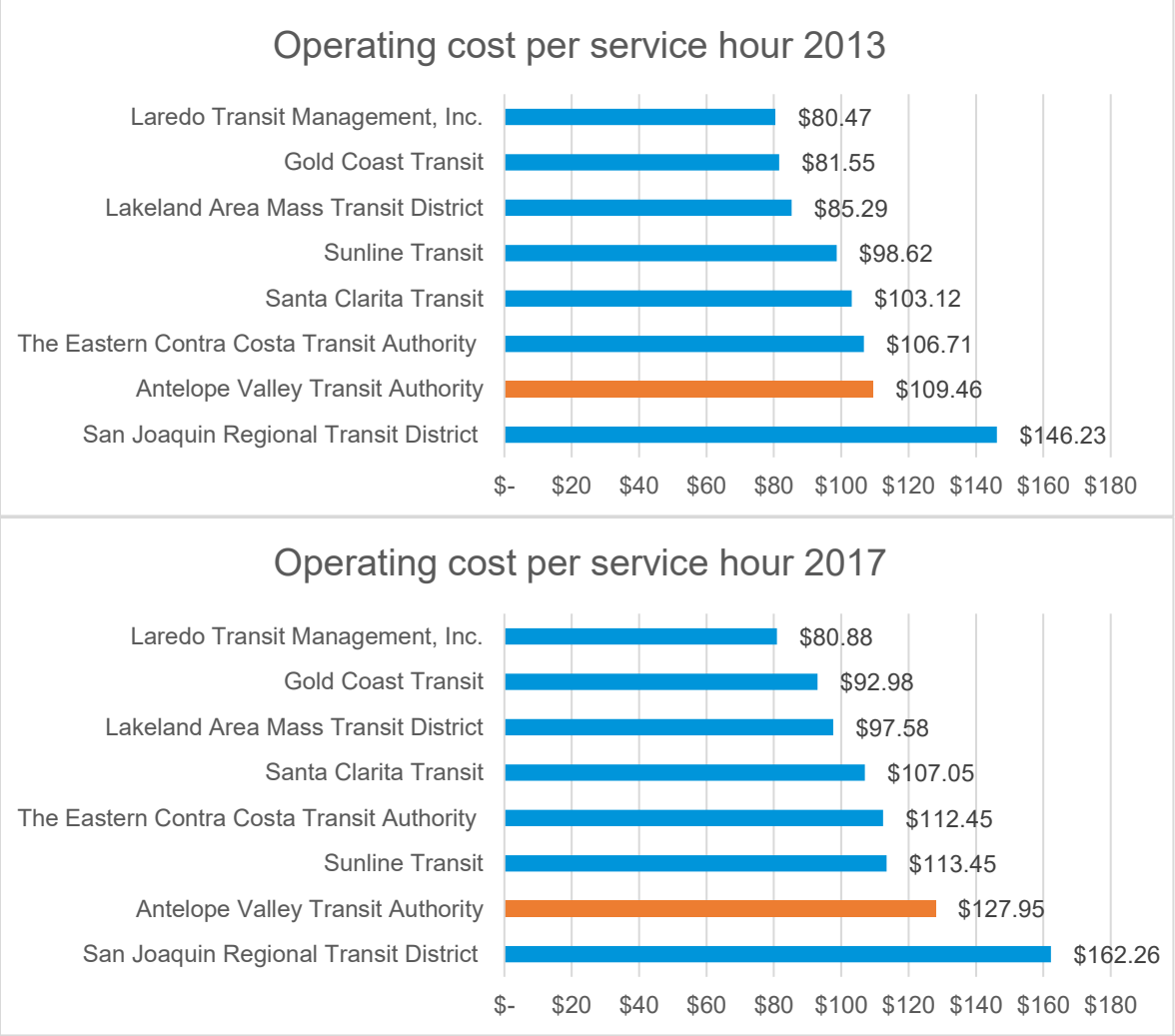


Figure 6: Operating cost per service hour (fixed-route), 2013 to 2017

- **AVTA has a relatively high operating cost per service hour in comparison to its' peers**, with the second highest operating cost per hour.
- **AVTA's operating cost has increased by 17% or $18.5 per service hour, between 2013 and 2017**, which is larger than the peer average increase of 10%.

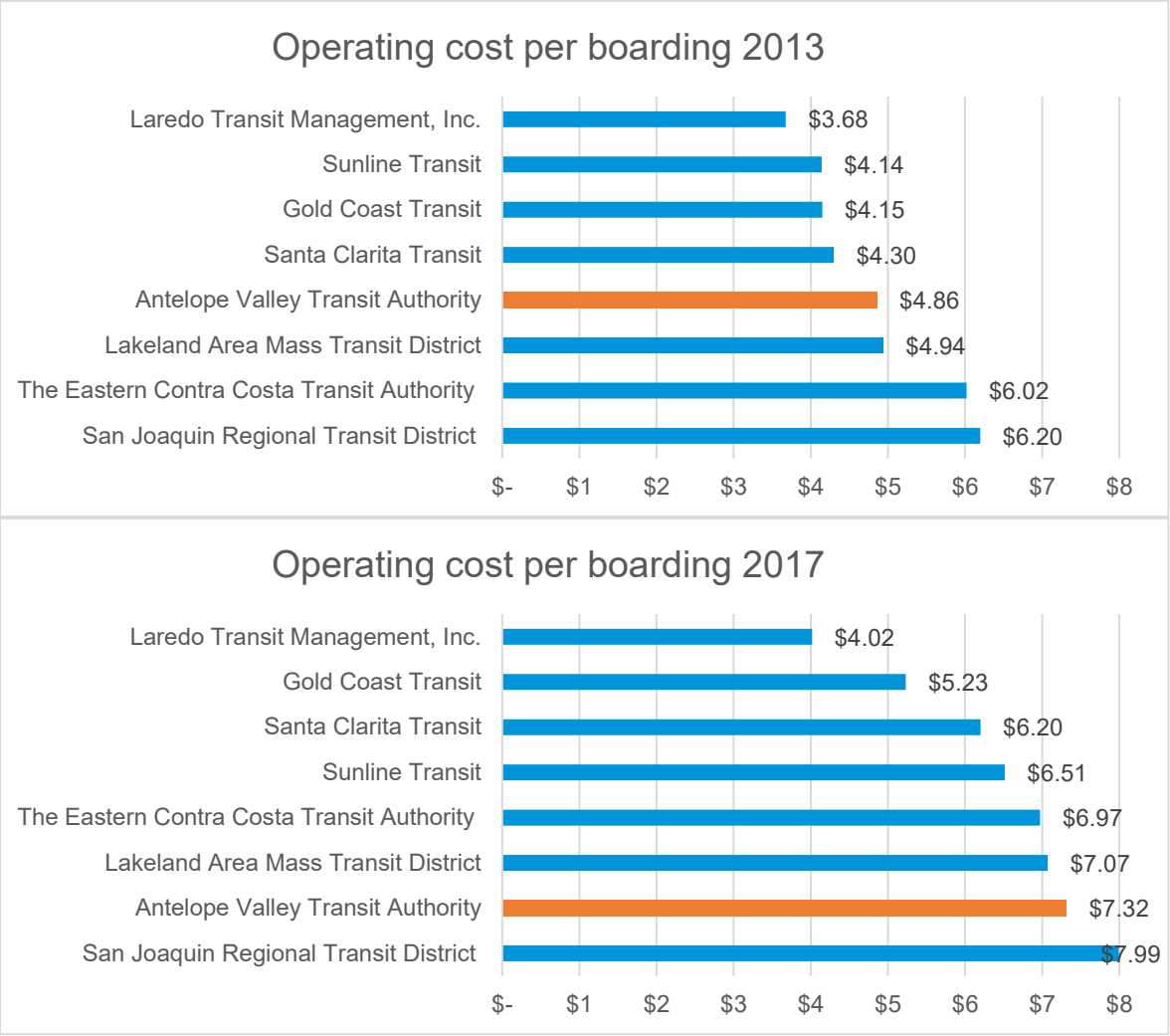


Figure 7: Operating cost per boarding (fixed-route), 2013 to 2017

- **The operating cost per boarding for AVTA has increased by 50%** between 2013 and 2017, which is greater than the 34% increase among peer agencies. This can be attributed to the increase in operating expenses and a decrease in boardings at AVTA.
- **AVTA had the second highest operating cost of fixed route service in 2017**, with San Joaquin Regional Transit Authority having the highest cost of $7.99. AVTA was previously closer to the peer average of $4.79 in 2013.
- Sunline Transit and LAMTD also experienced large increases in operating cost per boarding, with an increase of 57% and 43% respectively.

Figure 8: Fare revenue per boarding (fixed-route), 2013 to 2017

- **An overall increase in fare revenue per boarding can be seen among the peer group,** with an average increase of 10%.
- **The fare revenue per boarding for AVTA has increased significantly by 61%, with one of the highest in the peer group in 2017**. This is due to the increase in farebox revenue despite the declining ridership. This can be a result of fare changes made during this time.

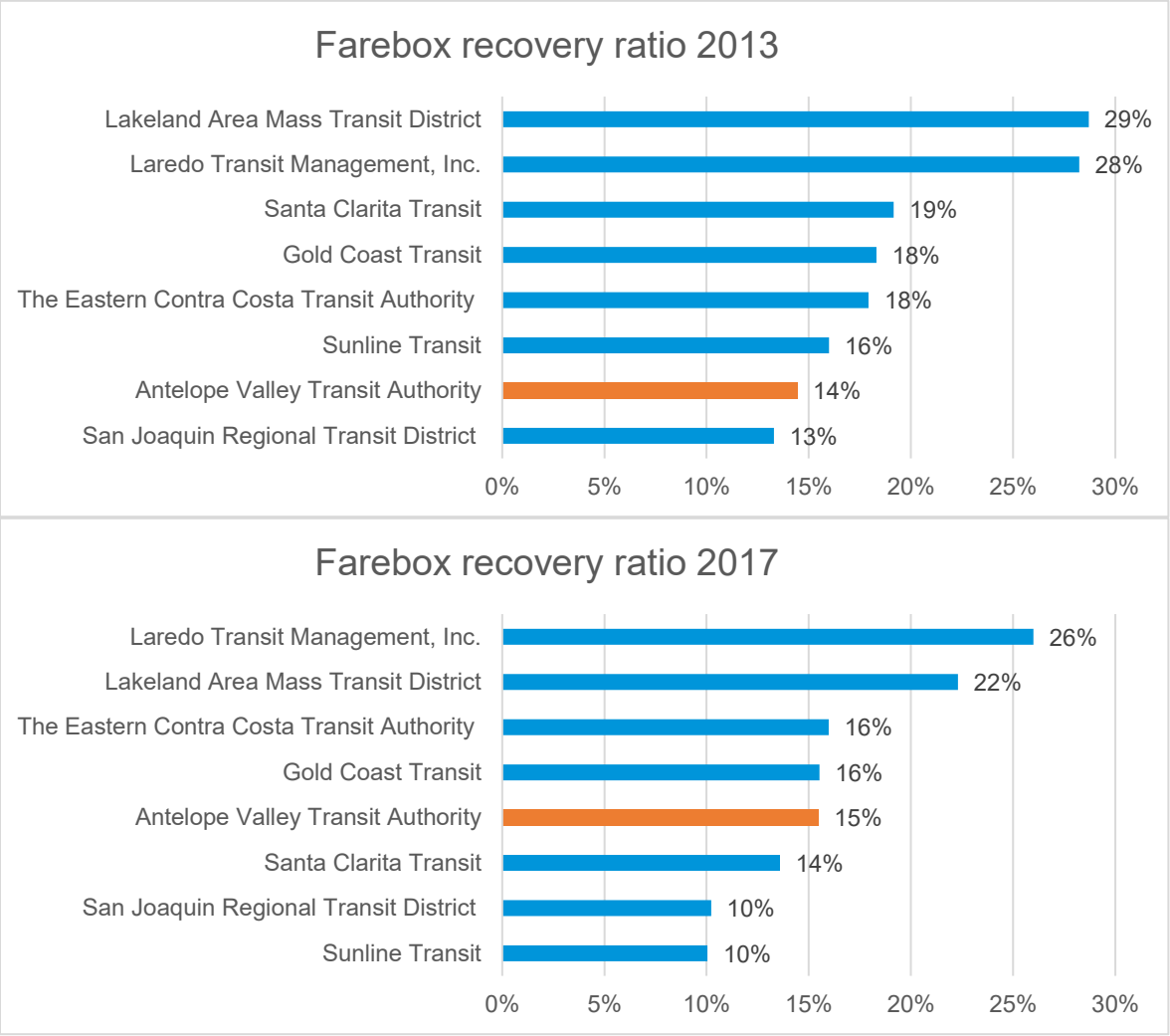


Figure 9: Farebox recovery (fixed-route), 2013 to 2017

- **A decrease in farebox recovery can be seen among the peer group,** with an average decrease of 17%. However, **AVTA experiences a minor increase in farebox recovery of 7%,** due to increasing farebox revenues. The increase in farebox revenue despite a decrease in ridership suggests a fare increase was made between 2013 and 2017.

3.3 DEMAND RESPONSE OR DIAL-A-RIDE

3.3.1 Ridership

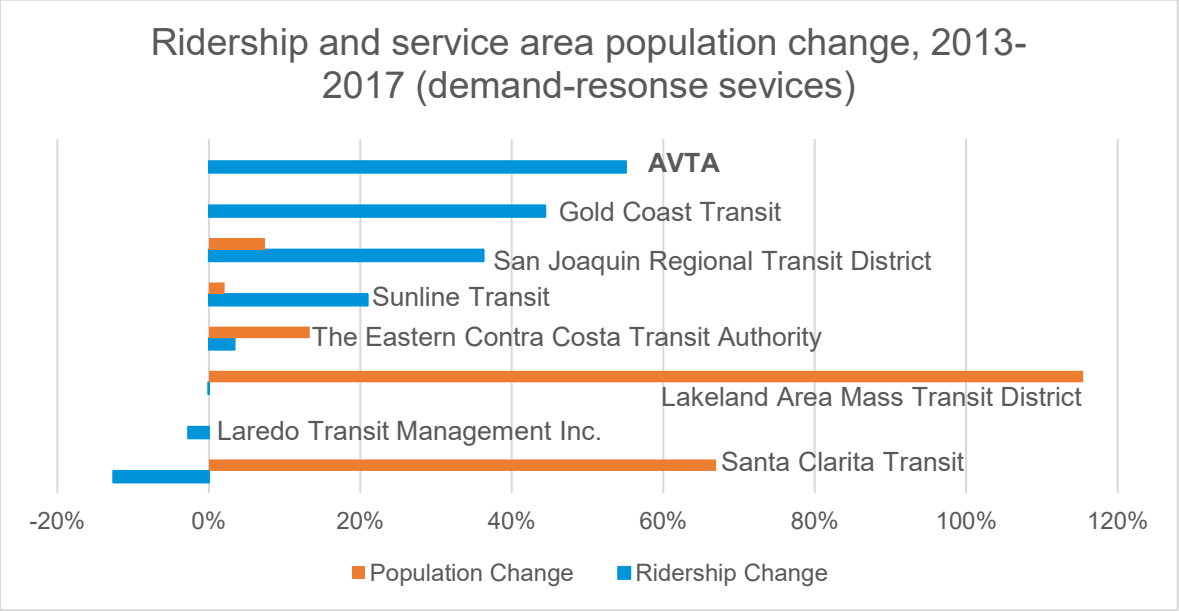


Figure 10: Ridership and service area population change (demand-response), 2013 to 2017

- **AVTA experienced the largest growth in demand-response (dial-a-ride) service ridership**, with an increase of 55% with no change to the service area population.
- **Most peer agencies saw growth in demand-response ridership**, with an average increase of 18%. Santa Clarita saw the largest decline in ridership of -13%.

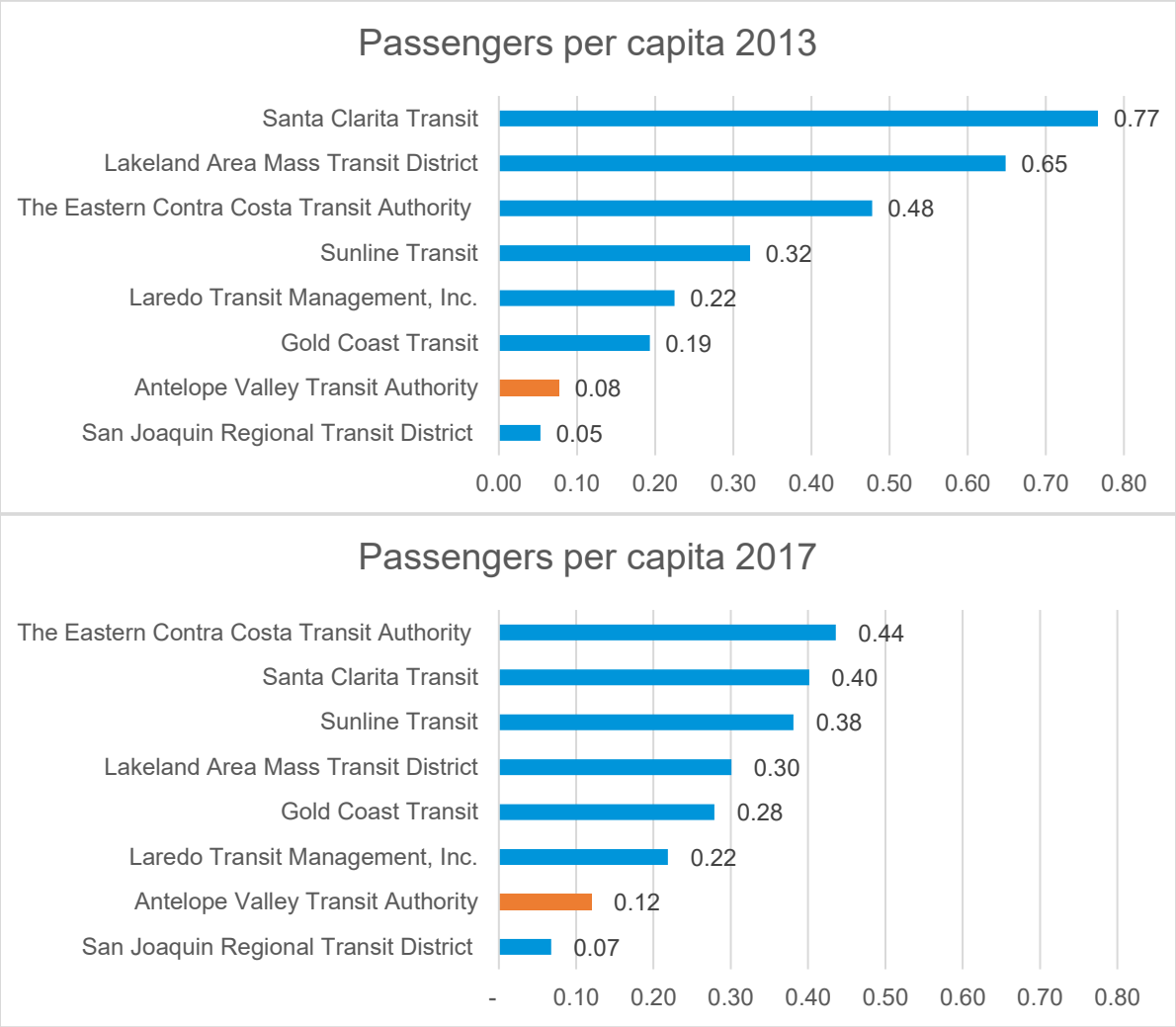


Figure 11: Passengers per capita (demand-response), 2013 to 2017

- **AVTA has the second lowest passengers per capita, however saw an increase between 2013 and 2017**. The change in passengers per capita among the peer group varies, with Santa Clarita Transit experiencing the largest decrease of almost 50%.

3.3.2 Service Provided

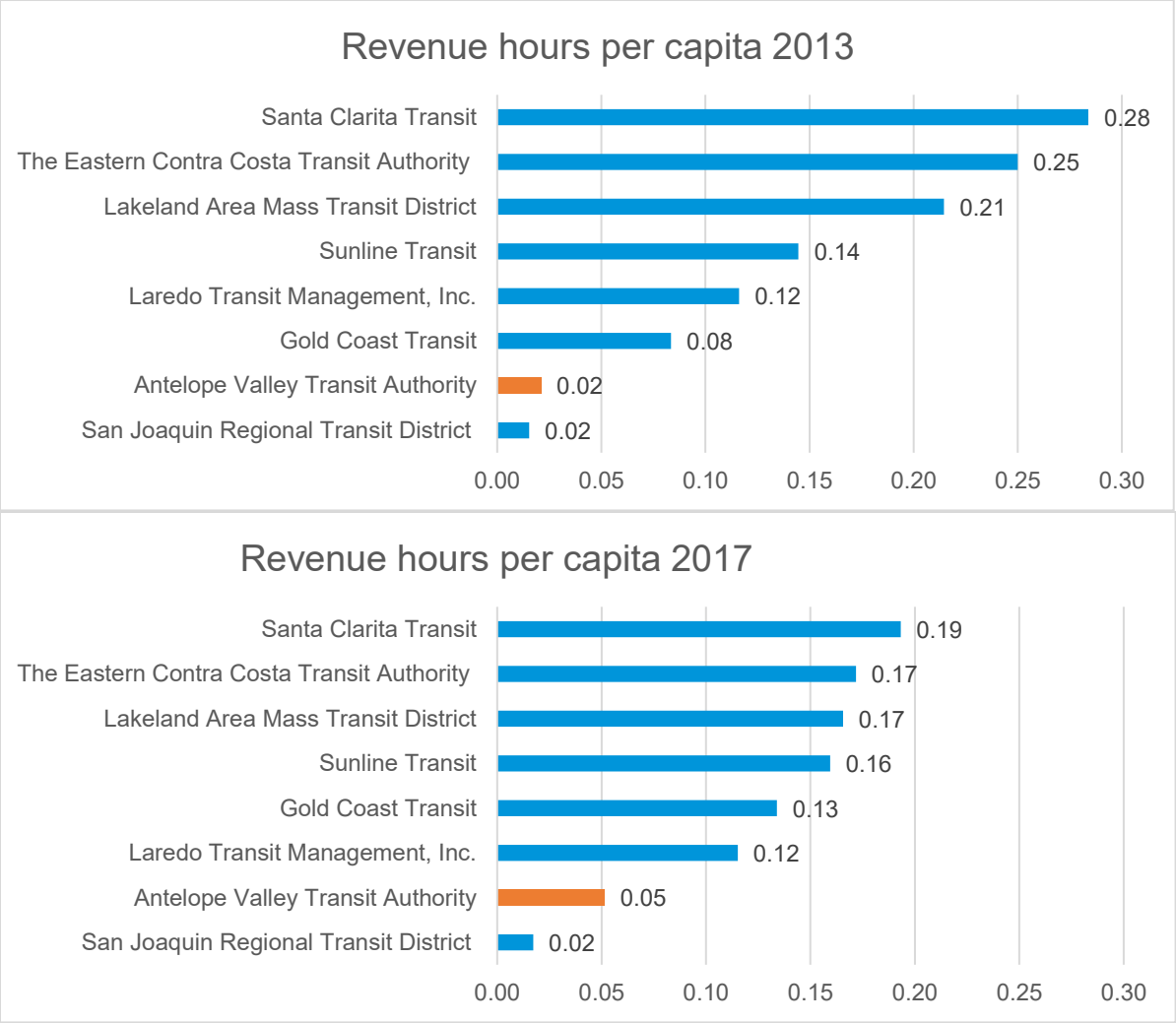


Figure 12: Revenue hours per capita (demand-response), 2013 to 2017

- **AVTA provided in more service (revenue hours per capita) in 2017,** despite a declining trend among peer agencies.
- **AVTA has one of the lowest revenue hours per capita,** less than half the peer average of 0.13 in 2017.

3.3.3 Service Productivity

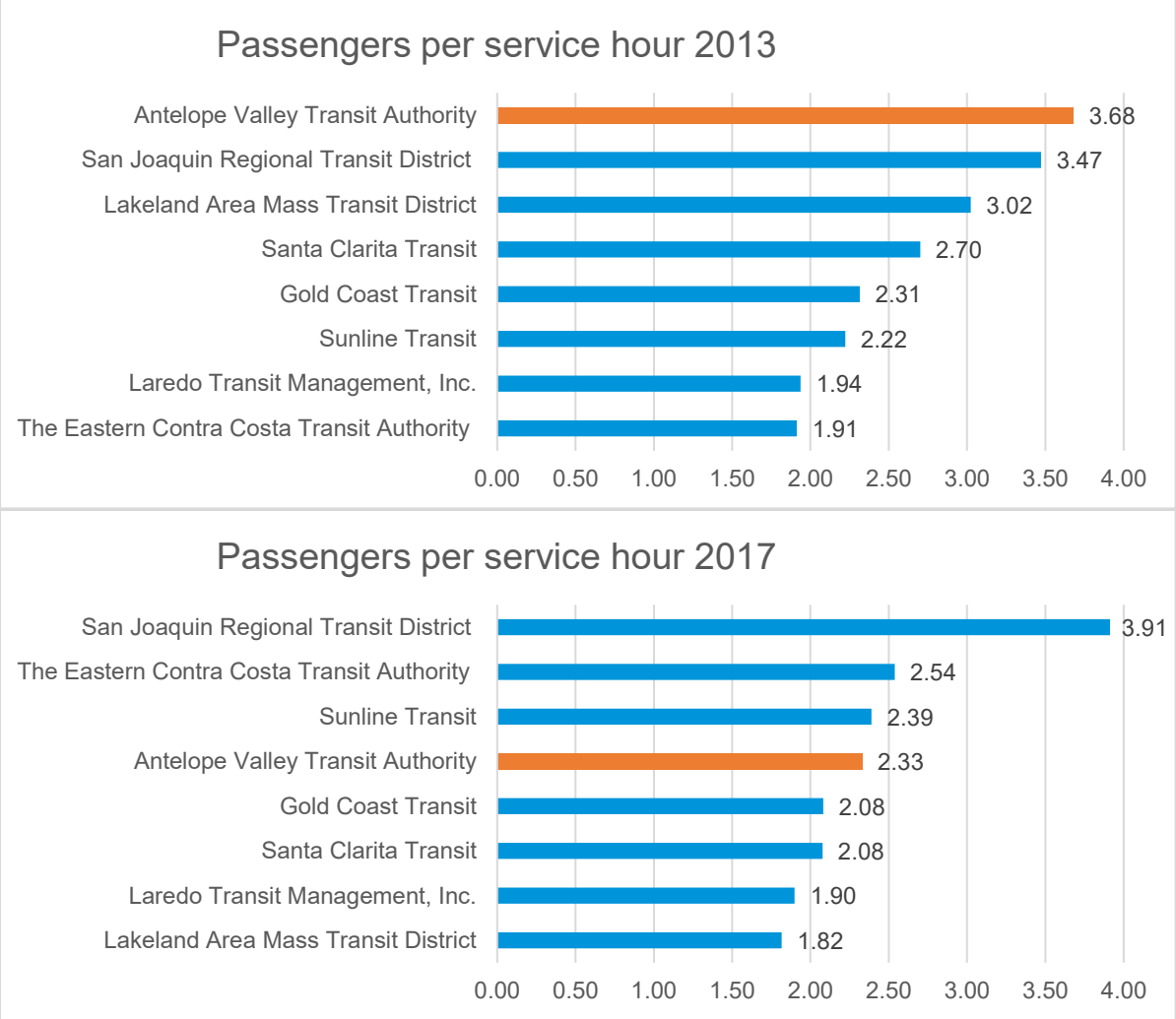


Figure 13: Passengers per vehicle hour (demand-response), 2013 to 2017

- **An overall decline in service utilization or productivity of 10% is seen among all peer agencies**.
- **AVTA experienced a larger than average decline of 37%.** While the ridership has increased between 2013 and 2017 (55%), the service hours have increased almost three times that (145%), resulting in a lower service utilization.
- **AVTA had the highest passengers per service hour in 2013** which has declined to just below the average of 2.38 in 2017.

- **San Joaquin Regional Transit District has maintained a relatively high service utilization,** and despite an overall decrease among peer agencies has seen an increase of 13% in passengers per service hour between 2013 and 2017.

3.3.4 Financial Performance

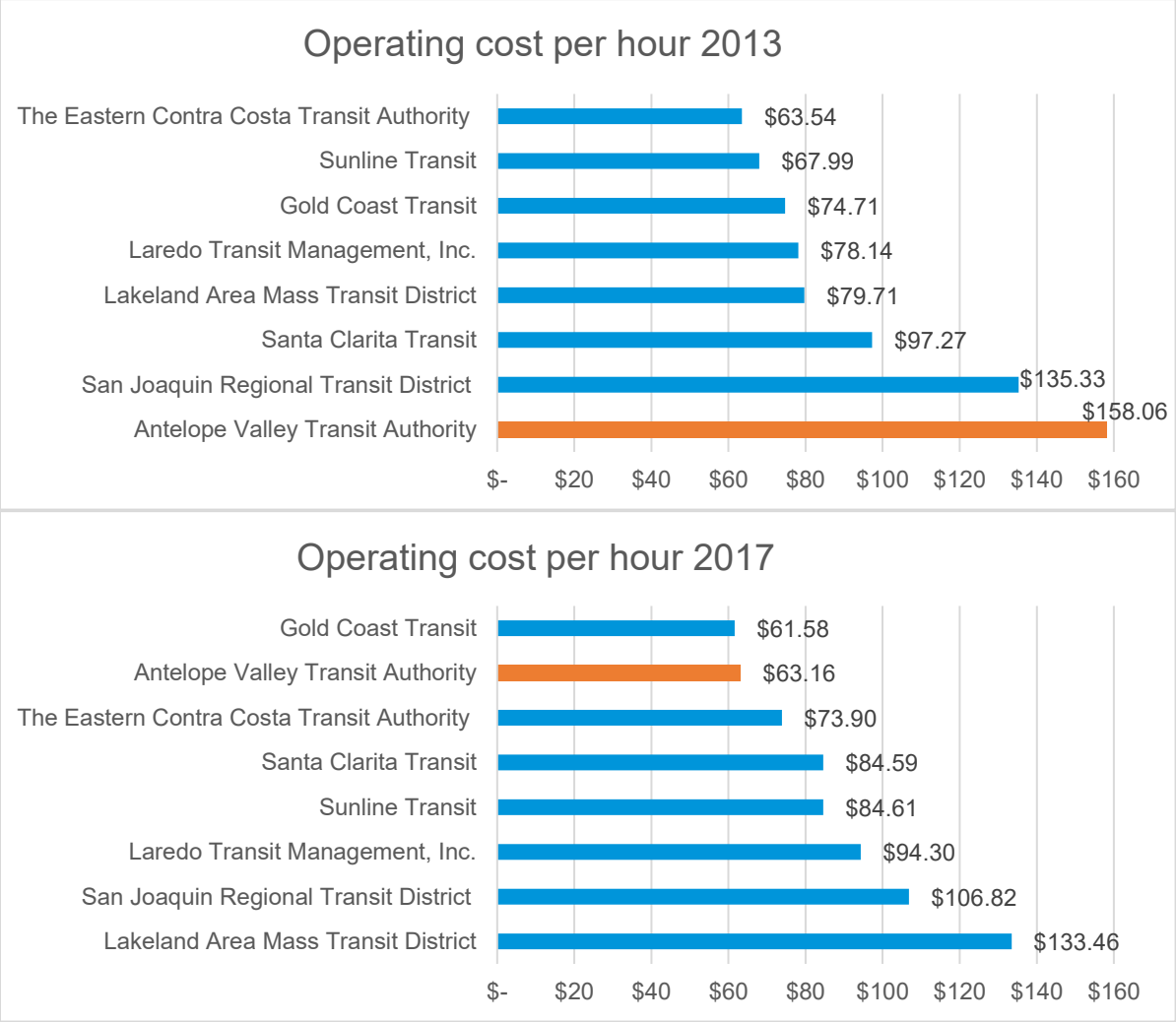


Figure 14: Operating cost per hour (demand-response), 2013 to 2017

- **A reduction in operating cost per hour is seen among all peer agencies,** with an average reduction of 8%.
- **AVTA experienced a substantial reduction in operating cost per hour**, moving from the highest operating costs per hour in the peer group to one of the lowest by 2017. A reduction of 60% or $94 is seen between 2013 and 2017.

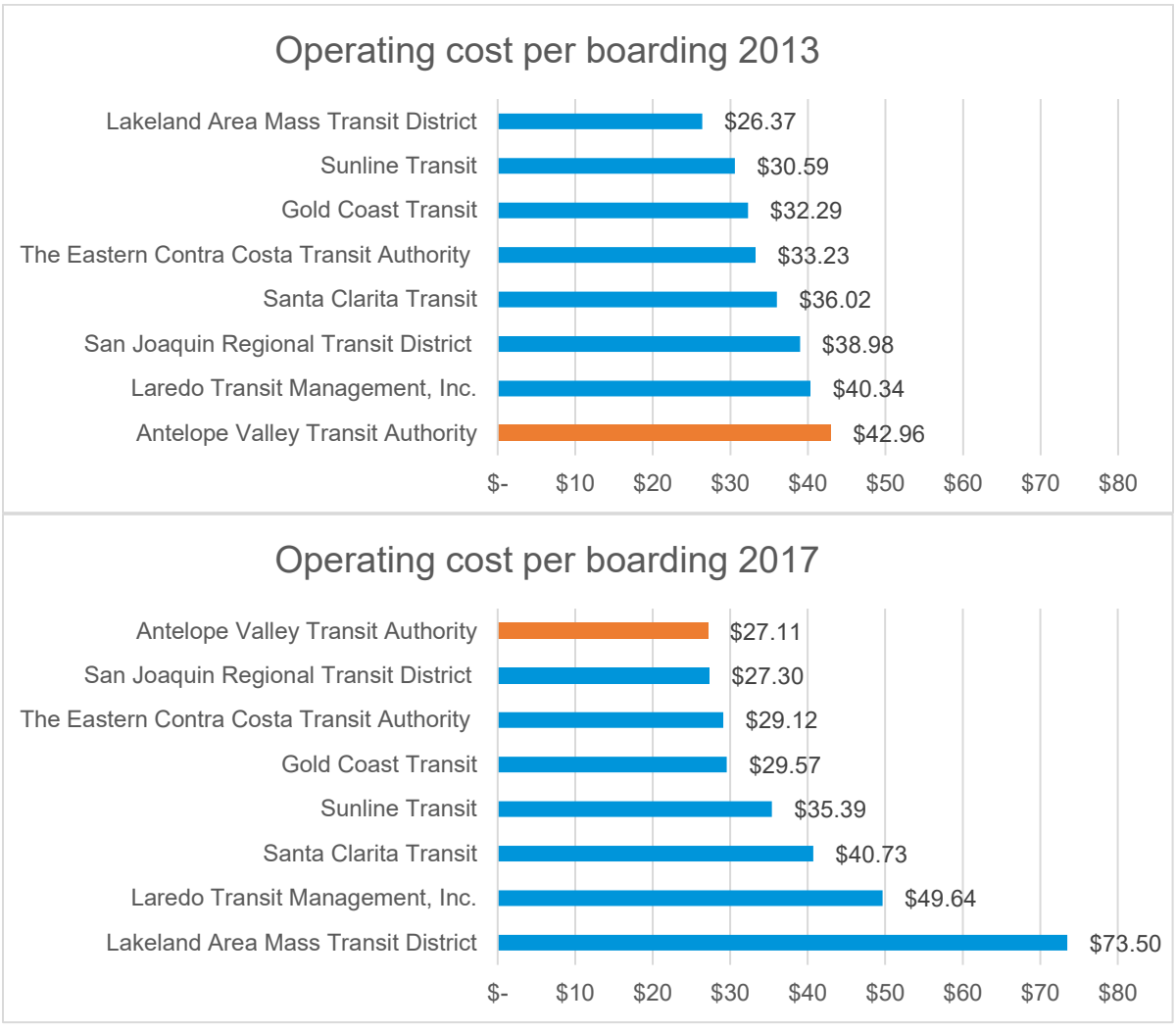


Figure 15: Operating cost per boarding (demand-response), 2013 to 2017

- **Overall, an increase in operating cost per boarding is seen among all peer agencies,** with an average increase of 11%.
- Despite the increasing trend, **AVTA experienced a significant reduction in operating cost per boarding**, moving from the highest operating costs per passenger in the peer group to the lowest by 2017. A reduction of 37% or $15.85 is seen between 2013 and 2017. This is likely due to a combination of increased ridership and decreased operating costs.

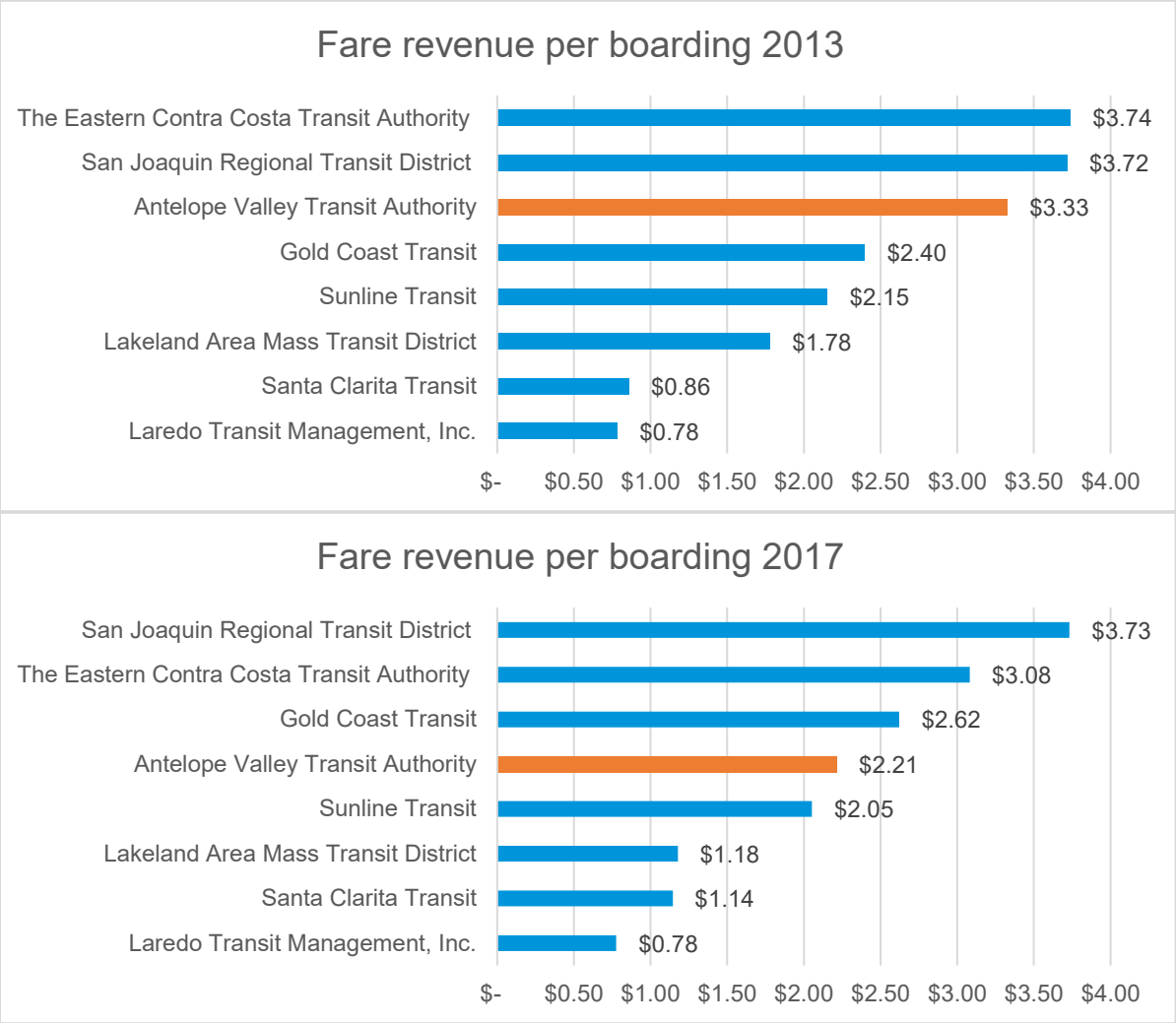


Figure 16: Fare revenue per boarding (demand-response), 2013 to 2017

- **Overall, a decrease in fare revenue per boarding is seen among all peer agencies,** with an average reduction of 10%.
- **AVTA experienced a greater than average reduction in fare revenue per boarding**, with a reduction of 33%. This is due to the relatively stagnant fare revenue (3% increase) despite the growth in ridership of 55% between 2013 and 2017.

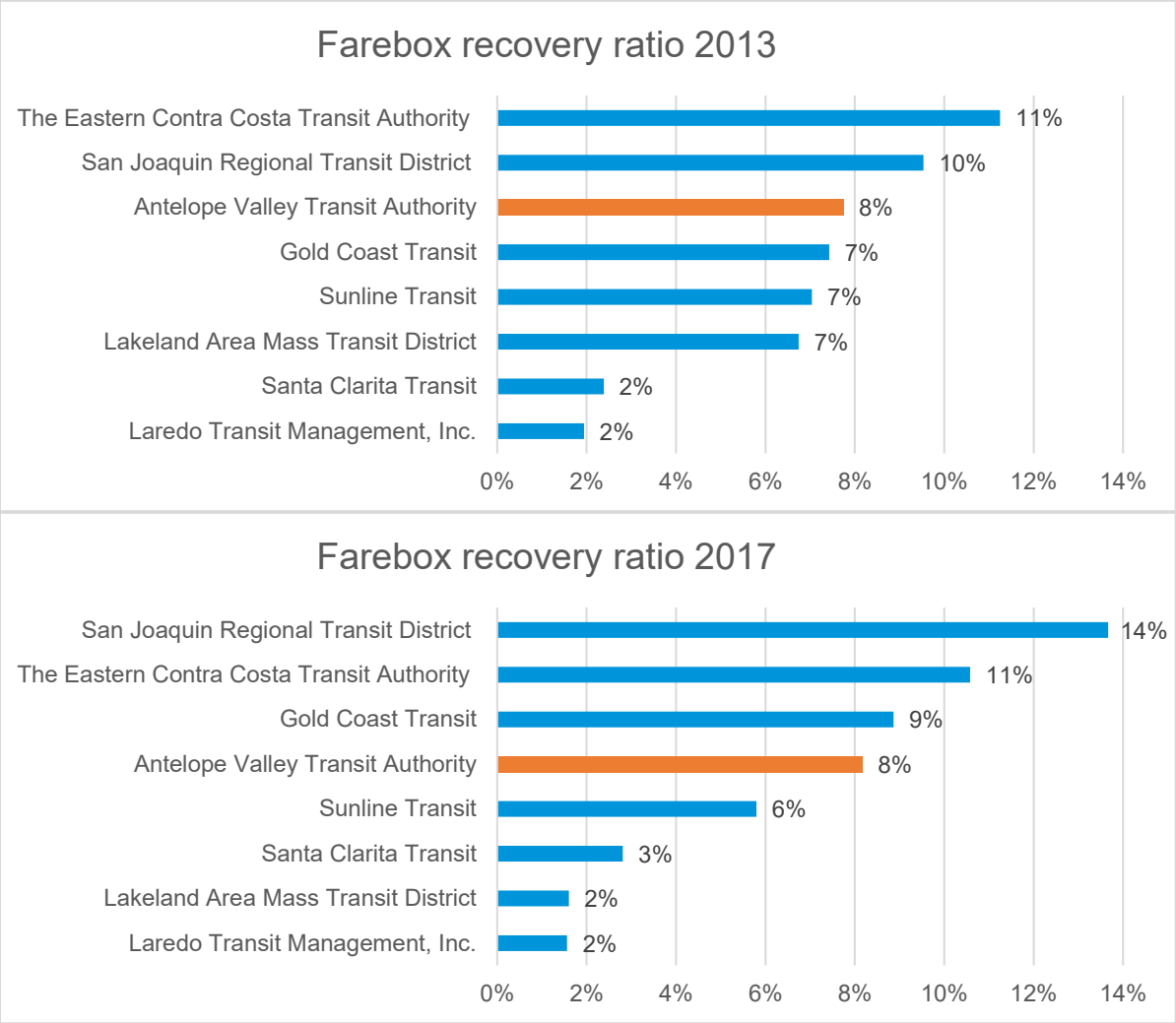


Figure 17: Farebox recovery ratio (demand-response), 2013 to 2017

- **Overall, the farebox recovery ratio has remained constant among all peer agencies,** with an average of 7%.
- **Similar to the peer group AVTA maintains a consistent farebox recovery ratio of 8%,** which is just above the peer group average.

3.4 COMMUTER SERVICE

3.4.1 Ridership

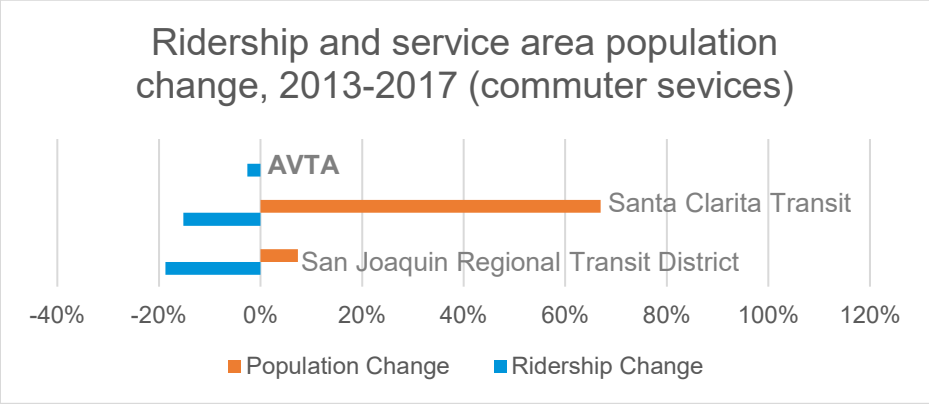


Figure 18: Ridership and service area population change (commuter), 2013 to 2017

- **A reduction in ridership can be seen among peer agencies, despite the increase in service area population.**
- **AVTA largely maintains commuter ridership,** with a marginal reduction of 3%, despite no changes to the service area population.

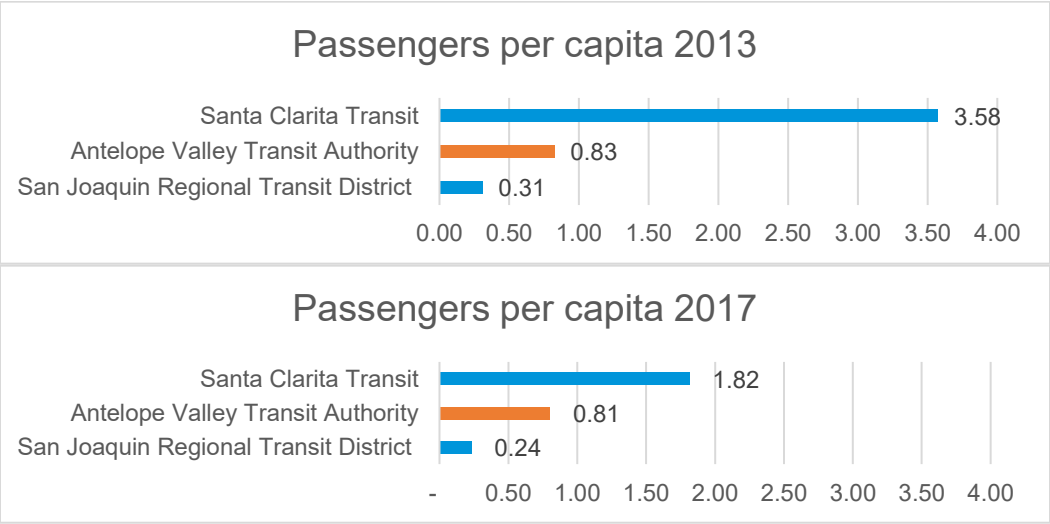


Figure 19: Passenger per capita (commuter), 2013 to 2017

- **A reduction in passengers per capita is observed among all peer agencies,** with an average decrease of 39%.

- **AVTA maintains relatively constant passengers per capita,** with a decrease of 3% which is much lower than its peers.
- **Notably, Santa Clarita Transit, a neighboring agency which operates some overlapping services into southern LA County has more than double the ridership of AVTA in 2017.** While the agency has seen a greater decrease in commuter ridership between 2013 and 2017, it remains significantly higher than AVTA.

3.4.2 Service Provided

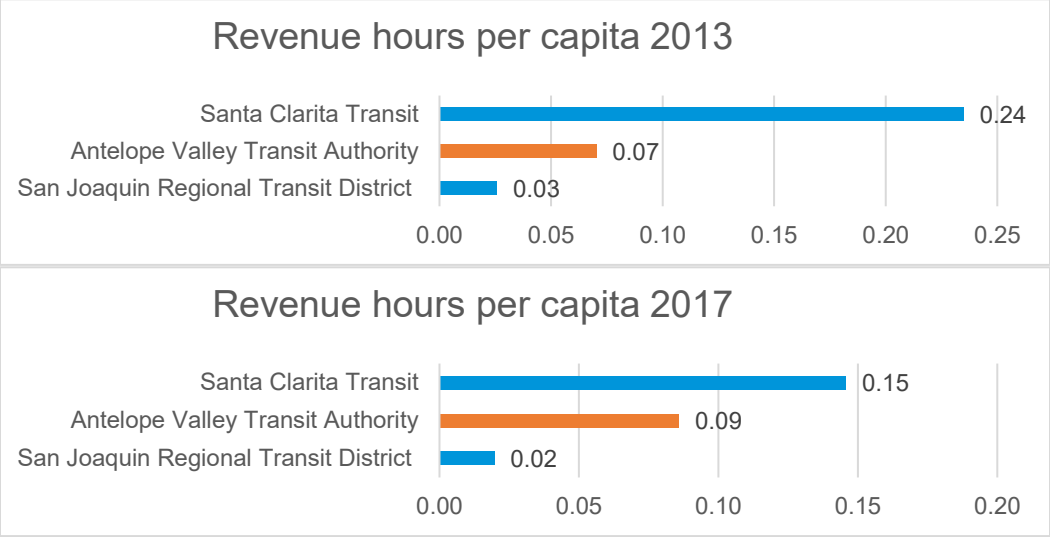


Figure 20: Revenue hours per capita (commuter), 2013 to 2017

- **A decrease in revenue hours per capita is observed among peer agencies,** with an average reduction of 24%.
- **Contrastingly, AVTA experienced an increase in revenue hours per capita of 22%.** AVTA remains close to the peer average of 0.08 in 2017.

3.4.3 Service Productivity

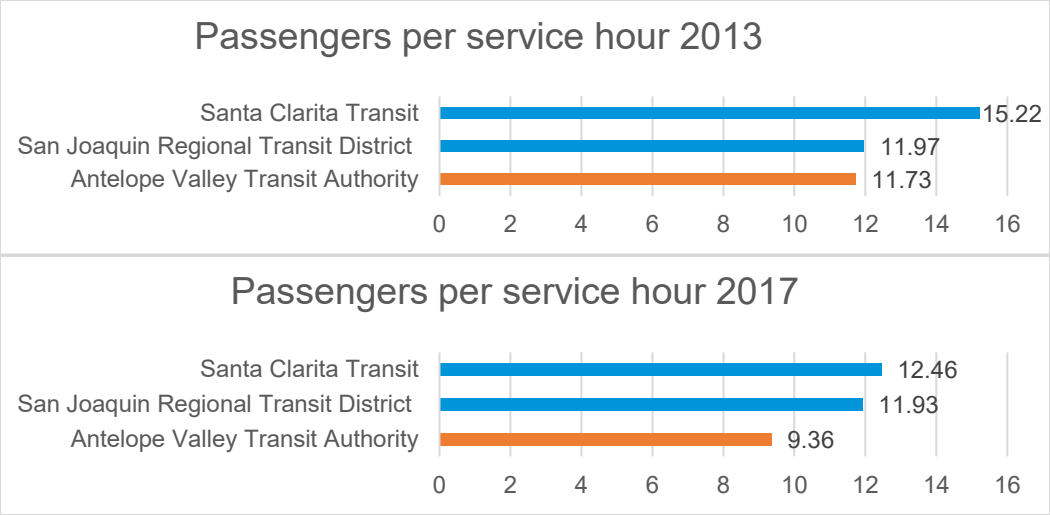


Figure 21: Passengers per service hour (commuter), 2013 to 2017

- **A decrease in passengers per service hour is observed among peer agencies,** with an average reduction of 13%.
- **AVTA experiences the largest decrease in passengers per service hours,** with a reduction of -20%. While the revenue hours have increased between 2013 and 2017, the ridership has largely stayed the same, with a minor reduction of 3%. **AVTA remains below its peers in terms of service productivity.**

3.4.4 Financial Performance

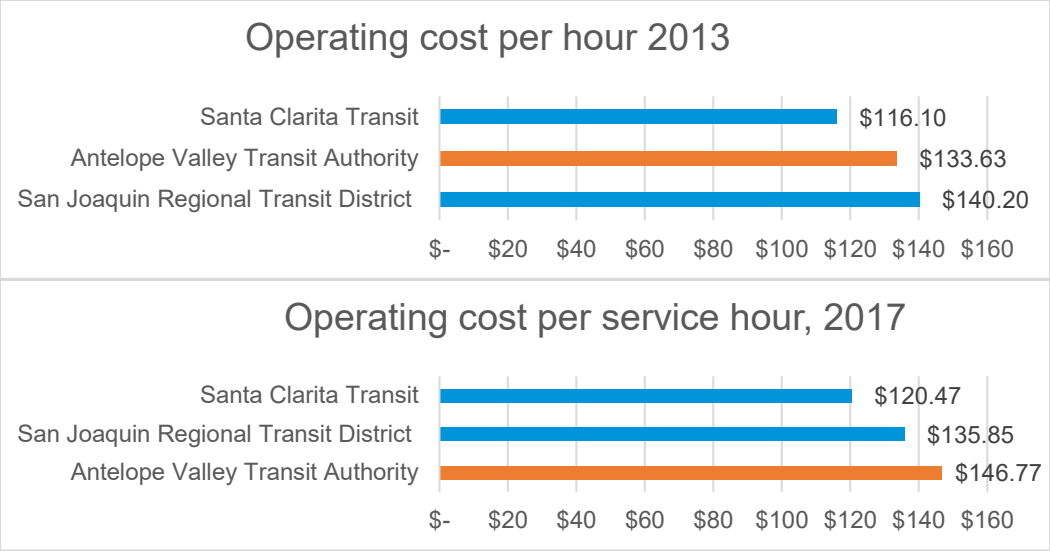


Figure 22: Operating cost per hour (commuter), 2013 to 2017

- **An increase in operating cost per service hour is observed among peer agencies,** with an average increase of 3%.
- **AVTA has the largest operating cost per service hour in 2017 of its peers.** An increase of 10% is observed between 2013 and 2017. The AVTA commuter service had a significant increase of 34% in operational expenses between 2013 and 2017.

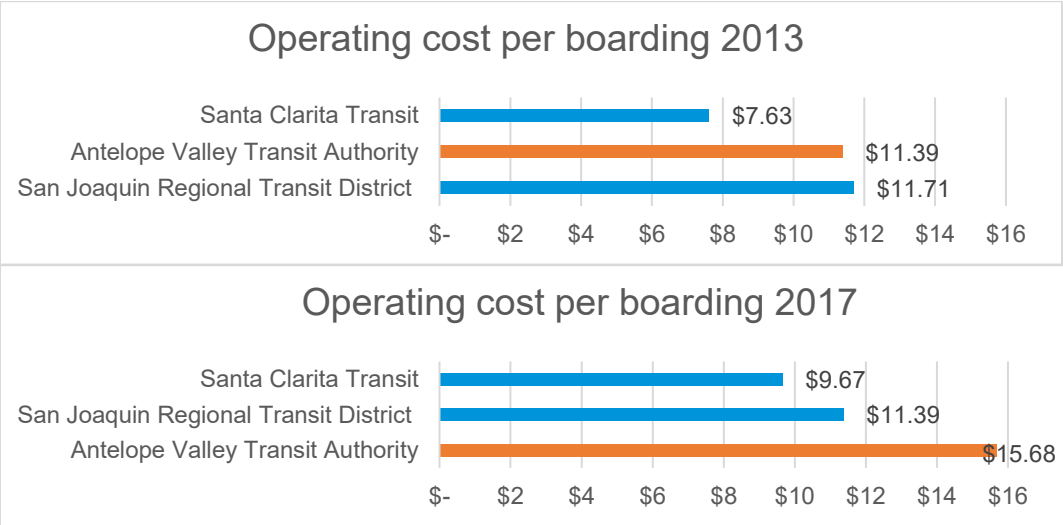


Figure 23: Operating cost per boarding (commuter), 2013 to 2017

- **AVTA experiences a significant increase in operating cost per boarding,** with an average increase of 38%, which is larger than the peer average increase of 20%.

- In comparison, **San Joaquin experienced a decrease in operating cost per** boarding. While they have seen a decrease in operational costs, a similar reduction in ridership is also observed. **Santa Clarita Transit maintains the lowest operating cost per boarding of the peer group**, despite an increase between 2013 and 2017. While both agencies had similar operational costs, **Santa Clarita had more than double the commuter ridership of AVTA in 2017**.

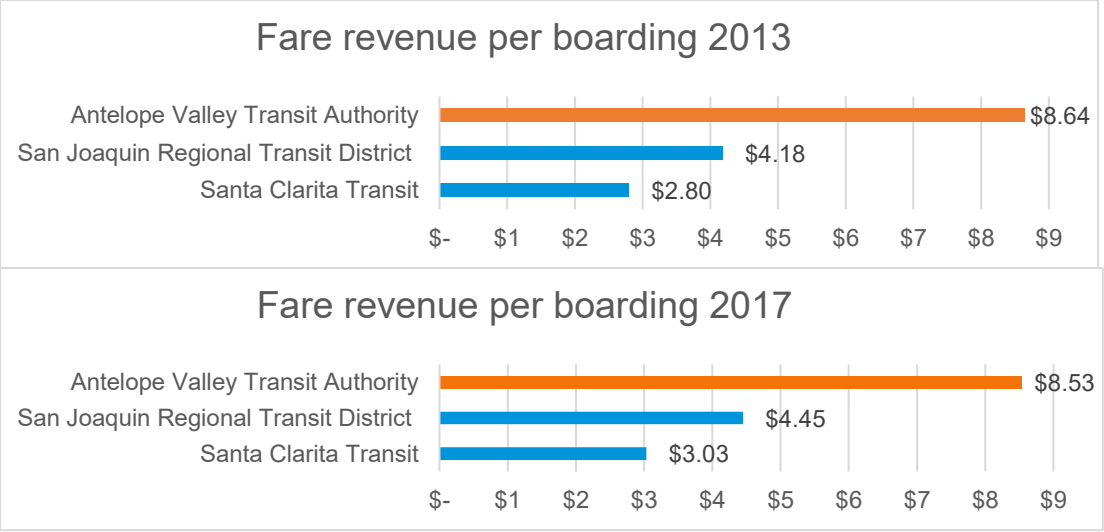


Figure 24: Fare revenue per boarding (commuter), 2013 to 2017

- **AVTA has the highest fare revenue per boarding of the peer group,** between 2013 and 2017. This is more than double San Joaquin Regional Transit District and three times that of Santa Clarita Transit, despite a decrease between 2013 and 2017.

- While this shows a financially efficient service, this also illustrates higher fares than its peers and can be linked to decreasing and lower ridership compared to peers. **Notably, Santa Clarita Transit offers service into downtown LA for half the price of AVTA.**

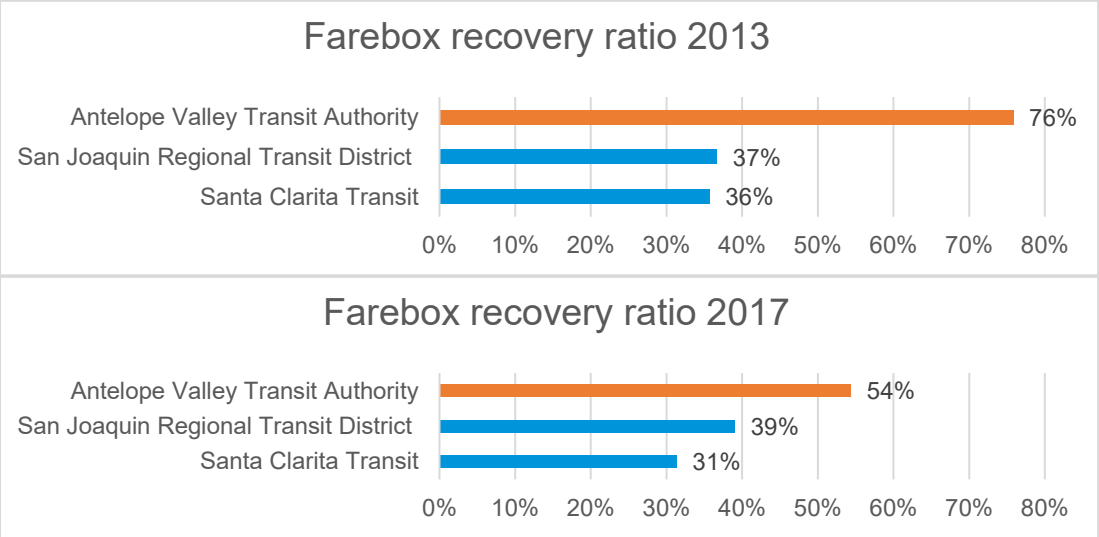


Figure 25: Farebox recovery ratio (commuter), 2013 to 2017

- **AVTA maintained the largest farebox recovery ratio of the peer group, however also experienced the largest reduction between 2013 and 2017** due to a significant increase in operating expenses compared to its peers.

3.5 PEER ANALYSIS SUMMARY

3.5.1 Fixed Route Service

- **General ridership decrease of fixed-route services is seen among peers, with AVTA having the largest decrease of 30%.** AVTA had the greatest decline in revenue hours (compared to 2013) which likely contributed to lower ridership. **However, we note that since 2014, AVTA has provided more revenue hours on fixed-route services.**
- **A decline in service productivity is seen in the peer group,** due to a decrease in ridership despite an increase in revenue hours. AVTA remains consistent with its peers.
- **AVTA has one of the highest operating cost per service hour and per boarding within the peer group.** The fare revenue per boarding has increased significantly at AVTA, suggesting fare changes were made between this period.

3.5.2 Demand-Response Service

- **A large growth in ridership for demand-response services is observed for the entire peer group.** AVTA saw the largest growth, but still has fewer riders relative to the population compared to the peer group. Additionally, AVTA provides a lower amount of service than its peers.

- **A decline in service productivity is seen among all peers. AVTA experiences the largest decline** as ridership has increased between 2013 and 2017 (55%) however the service hours have increased almost three times (145%).
- **A reduction in operating cost per hour is seen among all peer agencies likely due to ridership increases**. AVTA experienced a significant reduction of 60%.

3.5.3 Commuter Service

- **AVTA experiences a smaller decline in ridership than its peers,** although AVTA commuter ridership is significantly lower than neighboring agency Santa Clarita Transit.
- **A trend among peers of decreasing commuter service is seen, however AVTA has increased revenue hours**. This may contribute to the more stable ridership maintained compared to its peers. **AVTA has the lowest service productivity, with comparable service hours to Santa Clarita but almost half the ridership**
- **Compared to peers, AVTA has the largest operating cost per service hour and boarding**, with a greater increase in operating cost than its peers. **The farebox recovery of AVTA's commuter service is greater than its peers**. While this is beneficial, it also indicates that AVTA's commuter service is more expensive than its peers. **Specifically, Santa Clarita Transit offers overlapping services into southern LA county for half the price**. High commuter fares may present a barrier to use, particularly compared to affordable gas and little advantage to using commuter services over a personal vehicle.

4.0 MARKET CONDITIONS

Public transit is both a business and a public service—transit needs to be financially sustainable and responsible to the taxpayers who may or may not ride transit, while also ensuring that it can provide vital mobility to residents without other means of traveling, as well as who choose to ride transit. Typically, these conflicting goals result in difficult decisions to remove service, to serve certain neighborhoods over others, or to design routes that intend to provide coverage at the expense of ridership or productivity. Service design decisions which underlie routes and finally a network are informed by the market transit needs to serve, as well as by the goals and objectives of the broader community.

To understand the ingredients for successful and productive transit services we need to understand the market for transit. In other words, we need to understand the demographics of a city (or cities), its layout, and where people are going. Transit normally works best when it can provide fast and frequent service to a large number of people traveling for different purposes. Nevertheless, sometimes transit must also provide access to residents who are elderly or low-income; for example, residents unable to drive or get a lift, but who must still travel.

4.1 RECIPE FOR RIDERSHIP

The recipe for transit ridership can be boiled down to a few key ingredients:

- **Population density**, that is, having more people to serve, particularly in close proximity, is one of the strongest predictors of transit use.
- **Employment density**, meaning that customers can use transit to get to and from work, is also one of the strongest predictors of transit use—nevertheless some job types are more favorable to transit use than others, and with the rise of non-traditional work hours, transit is finding it difficult to serve these markets. In the Valley, the main employment sector is military and defense contracting, particularly at Plant 42, Edwards AFB, and the Mojave Space Port (technically in Kern County). While local routes should serve key local destinations, commuter routes can attempt to capture ridership to and from these more far-flung employment centers, as well as those further south in LA County. Another interesting possibility is capturing reverse commuters, that is, individuals who live elsewhere but commute to the Valley for work.
- **Land use** mix and the urban environment are important for inducing people to choose transit because they enable multipurpose transit trips, and they can enable a favorable pedestrian environment to access bus stops. Indeed most transit trips begin and end with a walk.
- **Socioeconomic characteristics**, like age, income and household vehicle access are some of the strongest predictors of transit use because traditionally, households without vehicles were heavily reliant on transit. While this is still the case, this varies by region due to new services like Uber and Lyft. In the Valley, while some neighborhoods have access to Uber and Lyft, others do

not and therefore are still likely reliant on alternatives like transit, cycling, and lifts from friends and/or family.

- **Activity centers** or major destinations and **travel flows**. Places where many different people travel to and from, like a hospital or school, for different purposes (employment, services, studying, etc.), are trip generators, attracting large amounts of people and can sustain transit service. Of course, the success of transit at individual destinations in an activity center varies, particularly given its pedestrian access, times of use and so on. And travel flows between key activity centers and locations and residences should be designed to serve corridors and flows of high volume of travel. Matching travel patterns with transit service, providing competitive (with personal vehicles) travel times, and simple and useful bus routes can build ridership, particularly along key corridors in the Valley.

4.2 ABOUT THE ANTELOPE VALLEY

The Antelope Valley is located in northern Los Angeles County, situated between the San Gabriel and Tehachapi Mountains. The cities of Lancaster and Palmdale are the largest cities in the Antelope Valley, and this urban area comprises 77.7% of the total population. The entirety of the Antelope Valley comprises a region spanning approximately 2,200 square miles, and lies approximately 70 miles north of Downtown Los Angeles.

Aside from the main cities of Lancaster and Palmdale, the Antelope Valley is largely comprised of unincorporated areas of Los Angeles County, including Lake Los Angeles, Sun Village, Littlerock, Desert View Highlands, Acton, Northwest Palmdale, Quartz Hill, Pearblossom, and Leona Valley. The North Antelope Valley consists of a southern border of Lancaster and Lake Los Angeles, northward to the Los Angeles County line. South Antelope Valley consists of the remainder of the valley area, including Palmdale.

To understand the demand for transit, it's important to understand the current and potential ridership base, the geography and spatial design of the area transit serves or intends to serve, as well as other mobility options of its targeted audience. The following section provides an overview of the different areas of the Antelope Valley, including the Palmdale/Lancaster Urban Area and North and South Antelope Valley, as compared to Los Angeles County.

Table 2: Comparison of Palmdale/Lancaster, North and South Antelope Valley, and Los Angeles County.

	Palmdale/ Lancaster Urban Area	North Antelope Valley	South Antelope Valley	Los Angeles County
Total population (2017)	351,282	192,636	215,973	10,105,722
Total population (2012)	339,087	188,625	206,920	9,840,024
Population change (2012 - 2017)	3.6%	2.1%	4.4%	2.7%
Number of households	86,937	52,581	54,470	3,178,266

	Palmdale/ Lancaster Urban Area	North Antelope Valley	South Antelope Valley	Los Angeles County
Average household size	3.39	3.22	3.52	3.02
Median household income (2017)	$55,738	$55,928	$63,388	$60,879
Unemployment rate (2017)	12.4%	8.2%	9.8%	7.8%
Spanish spoken at home	30.3%	18.4%	32.5%	39.3%
Hispanic	44.5%	38.2%	53.2%	48.4%
Non-Hispanic White	30.1%	35.8%	29.4%	26.5%
Non-Hispanic Asian	4.0%	3.8%	4.3%	14.5%
Non-Hispanic Black	15.5%	18.9%	10.2%	7.9%
Non-Hispanic American Indian	0.4%	0.3%	0.5%	0.2%
All other Non-Hispanic	5.6%	3.0%	2.4%	2.5%
14 and younger	25.7%	22.9%	24.0%	18.6%
15-34	29.4%	28.8%	28.1%	29.9%
35-64	37.1%	37.6%	38.2%	39.0%
65 and older	7.8%	10.7%	9.7%	12.5%
Less than high school	22.7%	17.0%	23.0%	20.7%
High school only	29.9%	30.8%	26.0%	21.6%
Some college, no degree	27.1%	30.2%	29.2%	23.2%
Post-secondary degree or higher	19.7%	21.9%	21.7%	34.5%
Owned	65.1%	56.3%	68.4%	45.9%
Rented	34.9%	43.7%	31.6%	54.1%
Single detached home	73.1%	72.9%	82.1%	49.3%
Single attached home	2.0%	1.5%	1.7%	6.5%
Apartment (2 to 4 units)	5.1%	4.8%	2.6%	8.2%
Apartment (>5 units)	14.3%	13.6%	8.9%	34.4%
Mobile home	4.5%	7.0%	4.7%	1.6%
Drove alone	79.4%	84.5%	76.9%	74.0%

	Palmdale/ Lancaster Urban Area	North Antelope Valley	South Antelope Valley	Los Angeles County
Carpooled	14.0%	8.8%	14.1%	9.6%
Public transit	2.0%	1.2%	1.7%	6.3%
Walked, bicycle	0.9%	0.8%	0.7%	2.5%
Other	3.7%	4.7%	6.7%	7.6%
Households with one or no vehicles	18.6%	21.5%	14.7%	26.3%
Households with two or more vehicles	81.4%	78.5%	85.3%	73.7%
Average commuting time (min.)	35.8	33.3	42.6	30.9

Sources: ACS 2017 5-year estimates; ACS 2012 5-year estimates

This table provides a comparative overview of different areas of the Antelope Valley in relation to countywide characteristics, to gain a better understanding of the unique characteristics of the area. The entire Antelope Valley has a population of 408,609, most of which is located in the Lancaster/Palmdale Urban Area. Though the Antelope Valley population comprises approximately 4% of the total county population, it makes up 46.3% of the total land area.

Overall, **all areas of the Antelope Valley are experiencing population growth higher than or similar to the county average. Both the Palmdale/Lancaster Urban Area and South Antelope Valley are experiencing population growth rates above the county average.**

With the exception of the South Antelope Valley, median incomes are below the county average. Typically, a lower income population is more likely to take public transit since they are less likely to own a personal vehicle. **However, Antelope Valley's public transit use (for commuting trips) is below the county average, and all areas of the Antelope Valley display higher than county average vehicle ownership at all levels, reinforcing the high levels of driving alone to work.** It is also interesting to point out that the Palmdale/Lancaster Urban Area and Southern Antelope Valley display much higher rates of carpooling than the countywide average.

Overall, the Antelope Valley has a higher population of young people (14 and under) than the county average, especially in the Palmdale/Lancaster Urban Area. This presents an opportunity to capture more young riders through supplemental school routes and local service. The Antelope Valley is also much lower density than the county overall, with a much higher percentage of single-family detached houses than the county average and a much lower percentage of apartment buildings with five or more units. Population density along with vehicle ownership are two of the strongest indicators of transit use in a community. While the Antelope Valley has higher-density areas such as Lancaster and Palmdale, these cities are still lower density than the county average, and far-reaching rural communities (such as Lake Los Angeles) pose unique challenges to transit use in the Antelope Valley.

4.3 POPULATION DENSITY

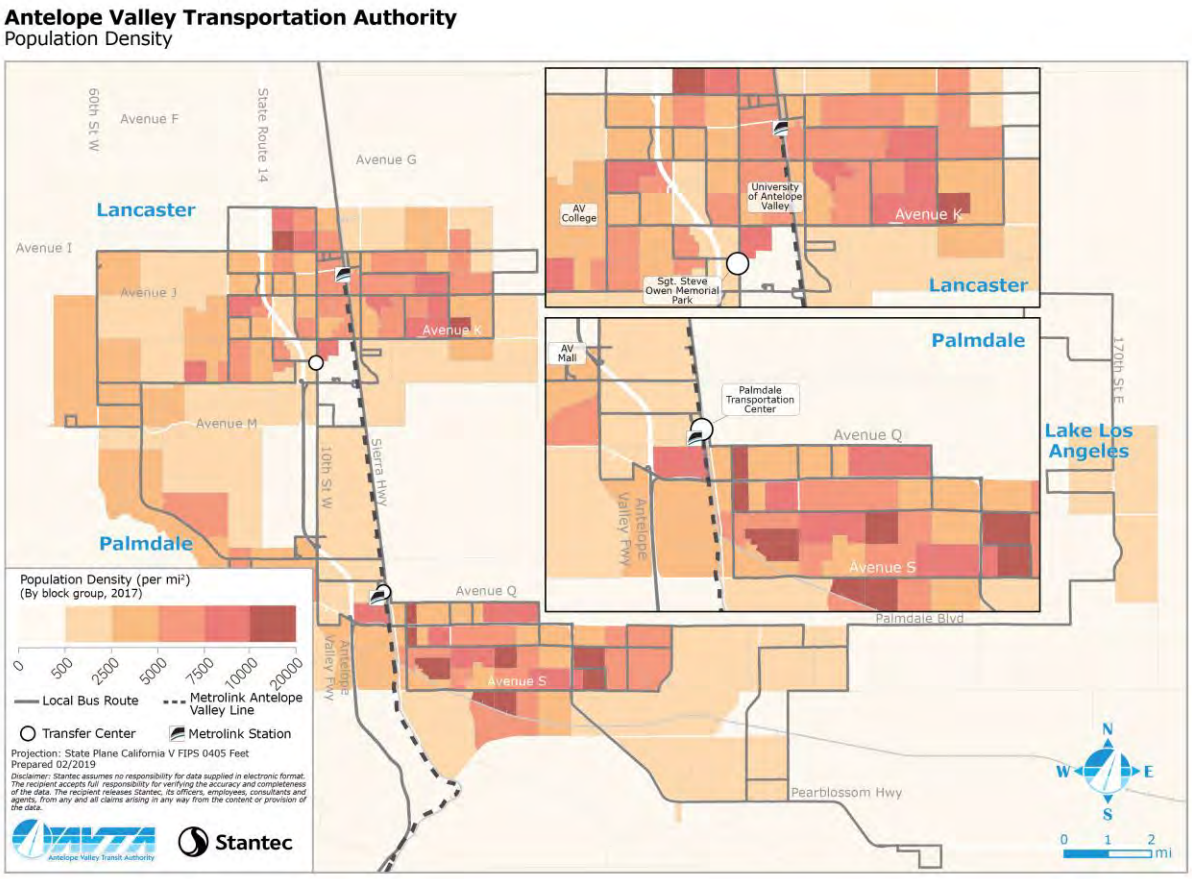


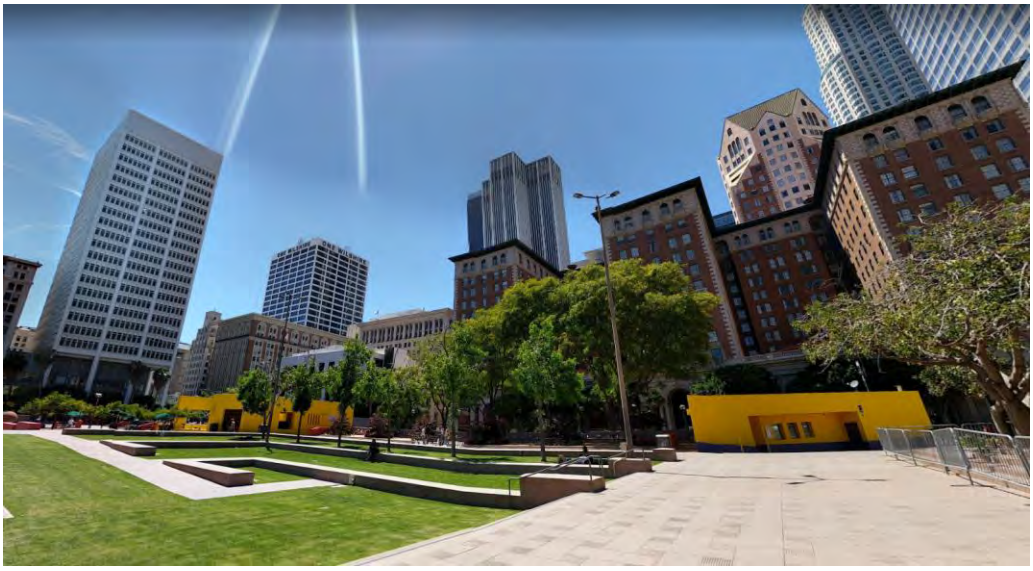
Figure 26: Antelope Valley Population Density.

- Regular **fixed-route services (including supplemental routes) are accessible within a ¼ mile (5-minute walk) to about 172,000 people or about 36% of the Antelope Valley's population**. Within a ½ mile (10-minute walk), that number increases to about 270,000 people or about 57% of the population.

- The densest areas of the Antelope Valley are Lancaster and Palmdale. Additional high-density areas include the Desert View Highlands neighborhood northwest of Palmdale, the area around Antelope Valley College, Rancho Vista, and the Pearland neighborhood in east Palmdale.

- Unincorporated areas outside of Lancaster and Palmdale are much lower density. These communities include Lake Los Angeles, Littlerock, Pearblossom, Sun Village, Leona Valley, and Acron.

- While there are variances in density throughout the Valley, population density overall is still very low compared to truly urban areas such as downtown Los Angeles, as seen in the comparison images below. Low population density and sprawling, auto-centric land use patterns seen in the Antelope Valley provide a significant barrier to building transit ridership. In addition to the density in urbanized areas, land use mixes where housing and employment and services are located within close proximity can encourage walking, cycling, and transit trips.



Downtown LA from Pershing Square (Source: Google Maps)

Downtown Lancaster (Source: Google Maps)

4.4 EMPLOYMENT DENSITY

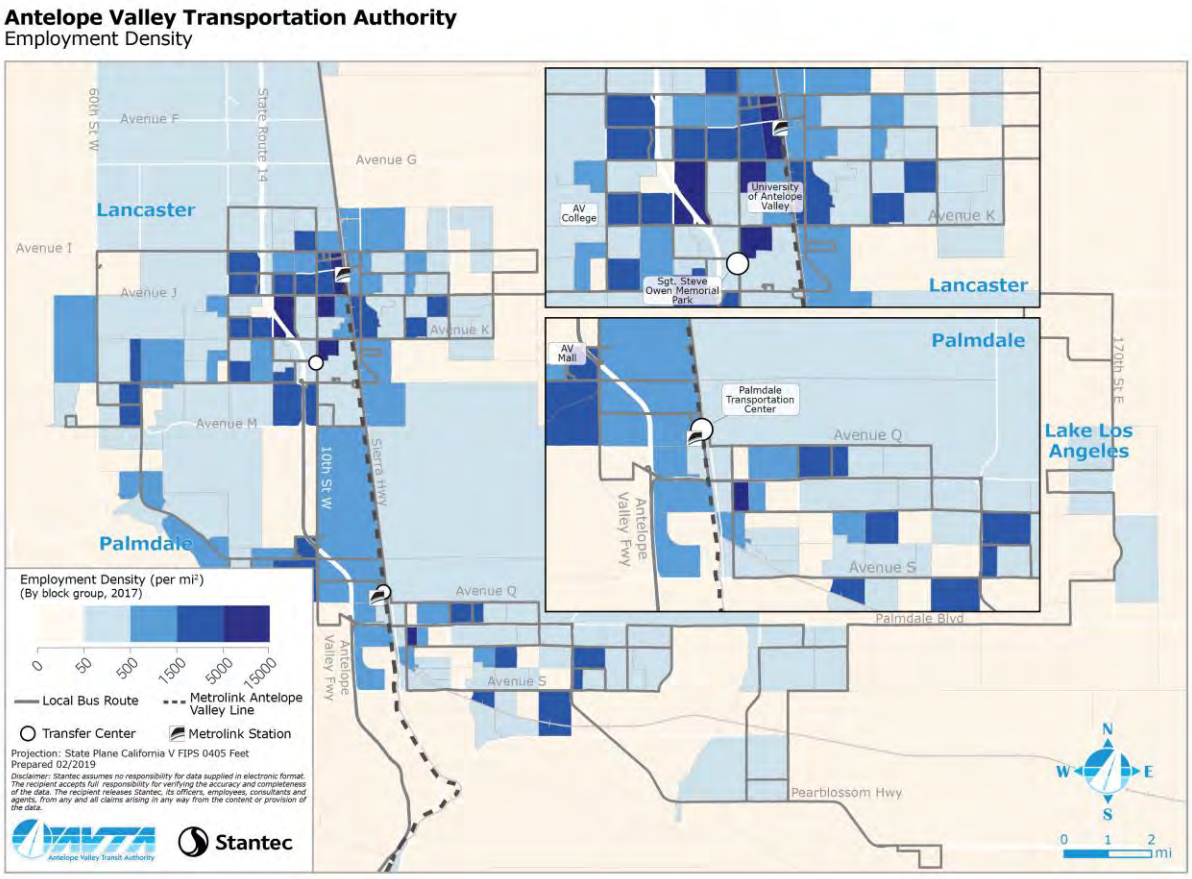


Figure 27: Antelope Valley Employment Density.

- Similar to population density, employment density is centered in Lancaster and Palmdale. **About 38,000 jobs are within a ¼ mile of transit, and 54,000 jobs within a ½ mile of transit.**
- Plant 42, located in Palmdale, is the second-largest employer in the Antelope Valley. However, due to its large size (3.2 million square feet of industrial space), the area does not appear to have a high employment density on the map. The vastness of the footprint and other specifics make serving Plant 42 a particular challenge.
- The largest employment sectors in the Antelope Valley include health care and social assistance (21% of the workforce), retail (16% of the workforce), educational services (13% of the workforce), manufacturing (10% of the workforce), and food service (10% of the workforce).
- With an average of 80.7% of workers commuting alone in a private vehicle to and from work, it is also interesting to note that 69% of workers living in Antelope Valley commute outside of the area

for work, with only 31% living and working in the local area. An additional 32,000 workers are employed in the Antelope Valley but live outside of the area and commute in for work.[3]

4.5 MINORITY POPULATIONS

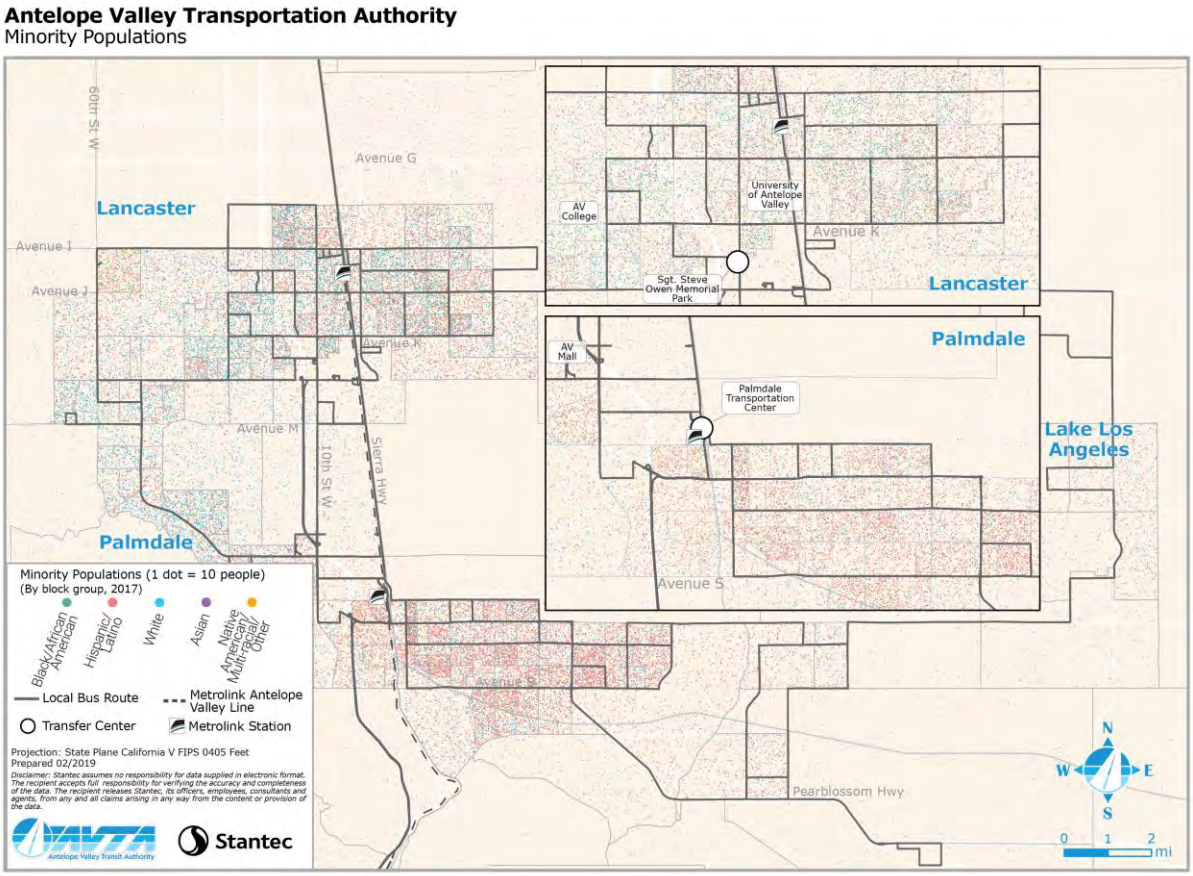


Figure 28: Antelope Valley Minority Populations.

- The largest concentrations of minority populations are located in Lancaster, Palmdale, Desert View Highlands, and the unincorporated area northwest of Palmdale. The Antelope Valley contains a higher portion of white residents than the county average, especially in the northern portion of the valley.

[3] From LEHD: https://onthemap.ces.census.gov/

- The Palmdale area represents the largest non-white Hispanic population, which is higher than the county average, and the non-Hispanic black population is most prevalent in the North Antelope Valley.
- The non-Hispanic Asian population for the entire valley is far below the county average, and the non-Hispanic American Indian population is slightly higher than the county average.
- Currently, **73% of the area's minority populations are located within a ¼ mile of a bus stop**.

4.6 HOUSEHOLD INCOME

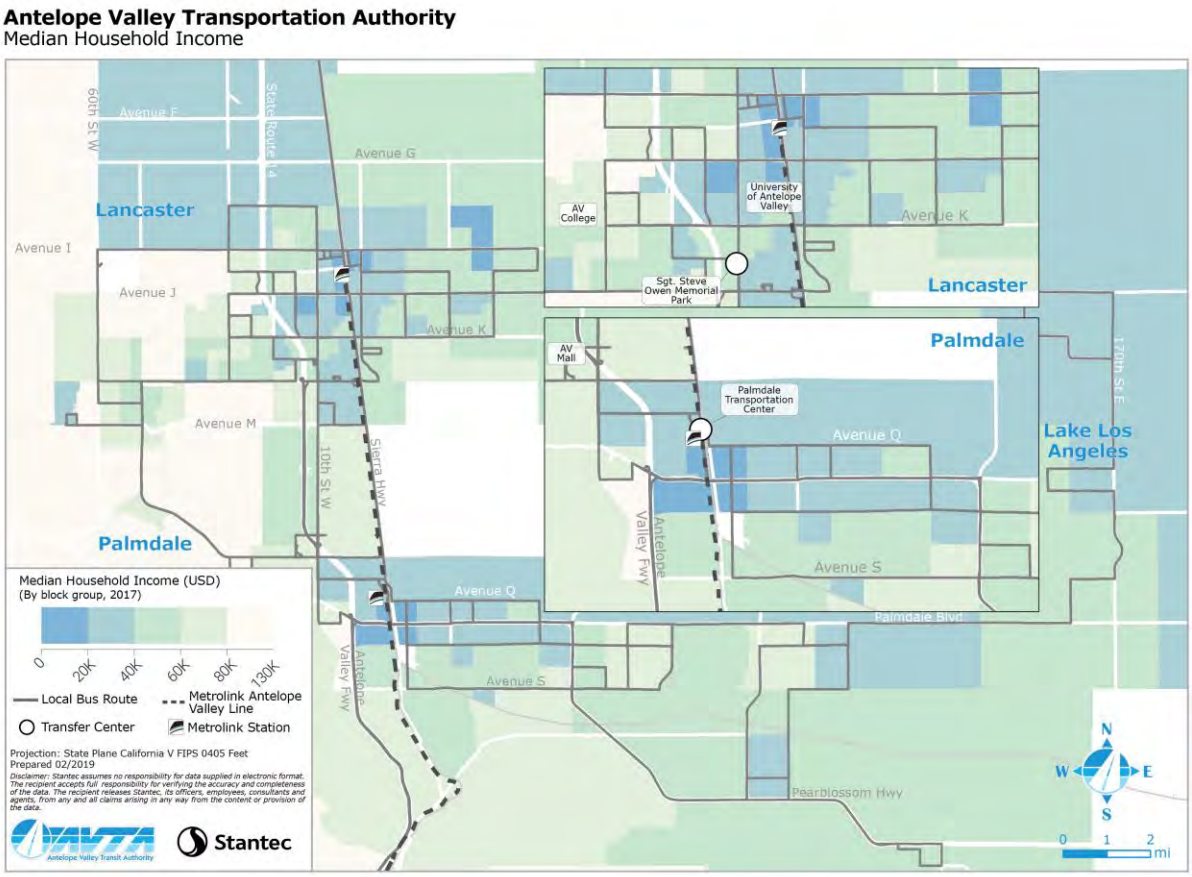


Figure 29: Antelope Valley Median Household Income.

- Overall, the median income for the Antelope Valley is slightly below the county average. Additionally, Palmdale has a higher median income ($56,699) than Lancaster ($49,314) and Lake Los Angeles ($42,803). Higher average incomes are concentrated in rural, unincorporated communities around Lancaster and Palmdale.

- Following the trends displayed by median income, the highest concentrations of people living below the national poverty level are located in Lancaster, Palmdale, and Lake Los Angeles.
- About **26% of the Antelope Valley's low-income population (those whose incomes are below the national poverty level) are within a ¼ mile of a bus stop**.

4.7 SENIOR POPULATIONS

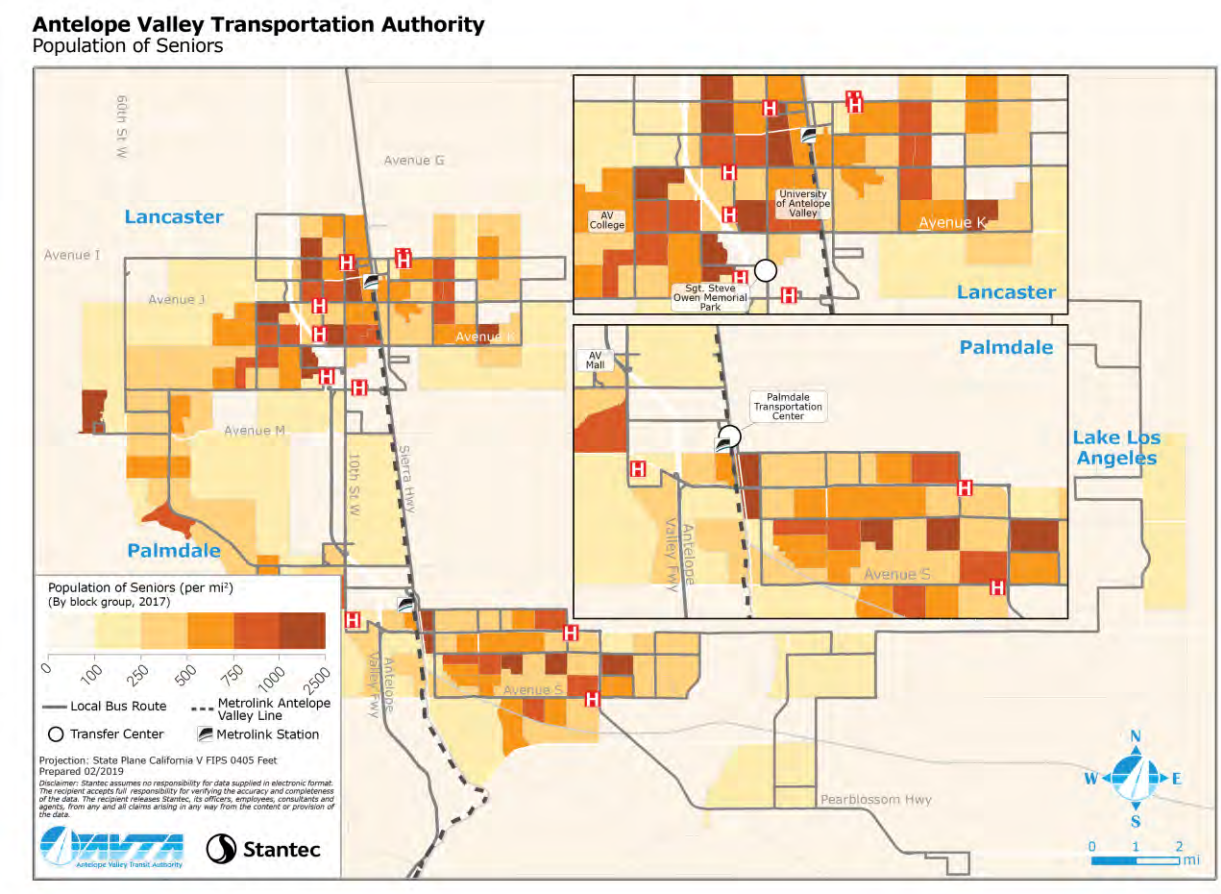


Figure 30: Antelope Valley Population of Seniors.

- The largest concentration of seniors is located in pockets throughout Palmdale, Lancaster, Desert View Highlands, Rancho Vista, and Quartz Hill. There is not a large presence of seniors in other unincorporated areas of the Antelope Valley, including Lake Los Angeles.
- Higher concentrations of senior populations are clustered around hospitals and medical facilities. Additionally, the areas with the most seniors are the areas where the most senior housing complexes are located.

- While the North Antelope Valley displays the highest proportion of seniors, it is still below the county average for those 65 and older.
- Overall, **only 9.5% of the senior population is located within a ¼ mile of a bus stop.**

4.8 ZERO-VEHICLE HOUSEHOLDS

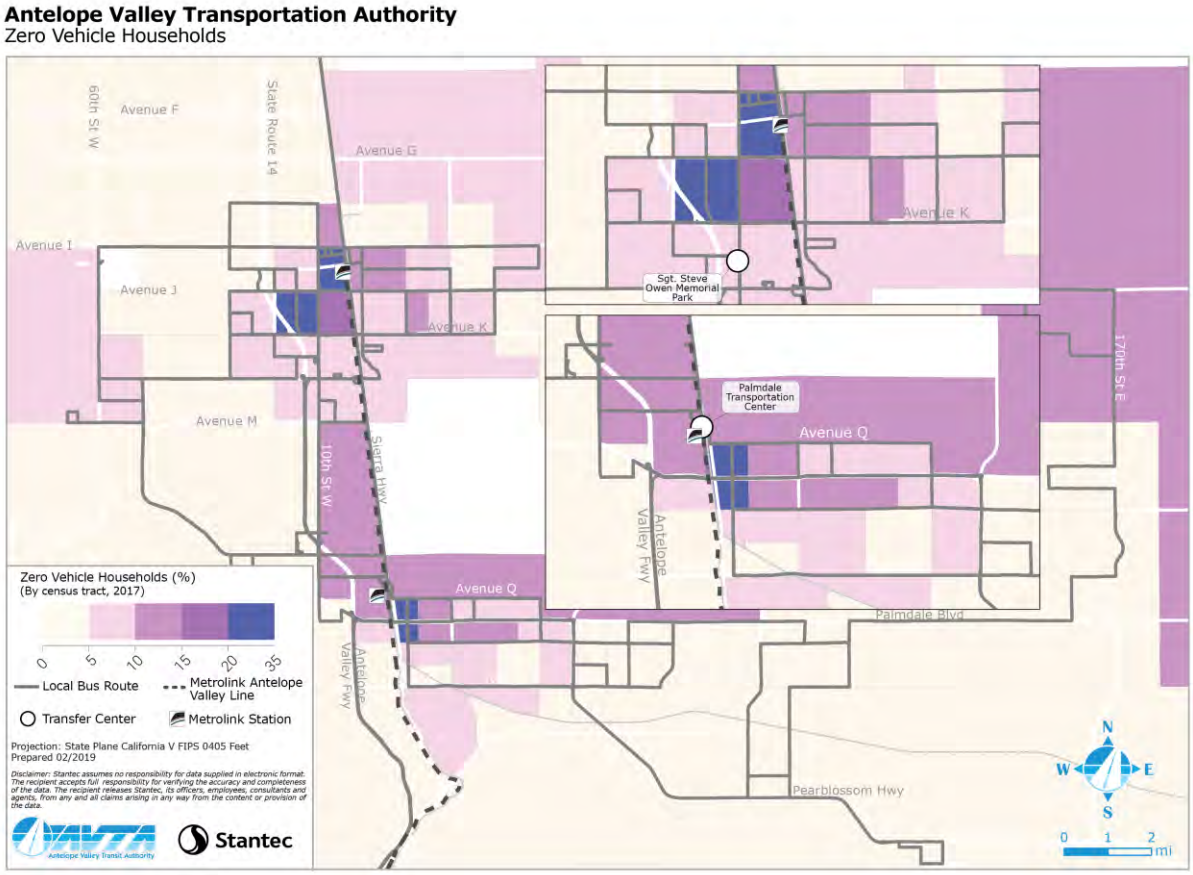


Figure 31: Antelope Valley Zero-Vehicle Households.

- Overall, Antelope Valley households are much more likely to own at least one vehicle than the county average, especially in rural areas such as Lake Los Angeles, where only 1.63% of households do not own any vehicles.
- On average, 6.15% of Antelope Valley households are zero-vehicle, lower than the county average of 9.2%. The northern valley has a slightly higher portion of car-free households at 7.22% when compared to the southern valley (5.07% zero-vehicle households).

- Mirroring this trend, Palmdale has a lower percentage of car-free households (5.82%) than Lancaster (7.75%).
- It is interesting to note that the areas with highest concentrations of zero-vehicle households are centered around or near transit centers and Metrolink stations, though **only 9.2% of zero-vehicle households are within a ¼ mile of a bus stop.**

4.9 TRANSIT MODE SHARE FOR COMMUTING

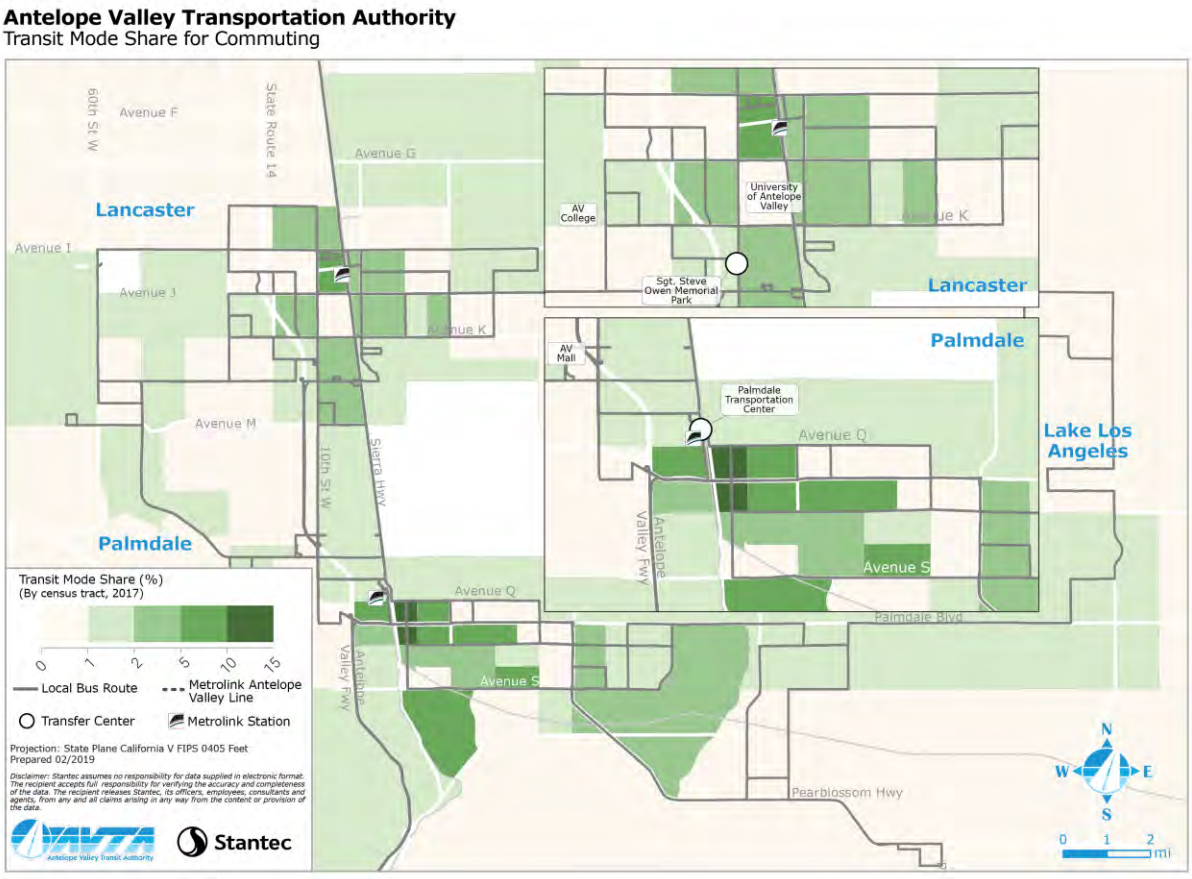


Figure 32: Antelope Valley Transit Mode Share for Commuting.

- While Los Angeles County and Southern California, in general, are not known for its high transit usage, the Antelope Valley's transit mode share for commuting is very low, at 1.5%. While the South Antelope Valley displays a slightly higher proportion of transit mode share at 1.7% (compared with 1.2% for North Antelope Valley), it is still lower than the county average of 6.3%.

- Palmdale and Lancaster show similar mode share trends, at 1.9% and 1.4% respectively. Rural areas of the Antelope Valley show an even smaller portion of transit commuters, at 1.1%
- Its important to note that the map in Figure 32 only considers travel mode for work trips (e.g., commuting). To grow transit ridership, it's important that transit fulfill multple trip purposes, such as for shopping, healthcare, and recreational purposes. To help facilitate these travel purposes, AVTA needs to focus on growing ridership beyond the typical 9-to-5 commuter.

4.10 SUMMARY

- Overall, both Palmdale and Lancaster have the highest transit propensity in the service area compared to rural areas of the Antelope Valley such as Lake LA, Littlerock, and Pearblossom. These areas have low population and employment densities and land uses that are not supportive of fixed-route transit service.
- Palmdale has the greatest transit propensity due to its **high population density**, concentration of **minority populations**, and presence of **low-income neighborhoods**; however, Lancaster has high **employment density.** This illustrates that while more origins (i.e., households) are in Palmdale, there are more destinations (i.e., jobs) in Lancaster.
- It's critically to provide transit service to the area's disadvantaged populations to ensure challenges faced by these populations are not further compounded by reduced mobility. Minority populations are generally well-served by transit, with **73% of the minority population located within a ¼ mile (5-minute walk) of transit service**. Other populations, however, have limited access, with only **9% of the senior population, 26% of low-income residents,** and **9.2% of zero-vehicle households located within a ¼ mile of transit.**

5.0 AVTA LOCAL SERVICE DELIVERY

AVTA operates local fixed-route transit service seven days a week across 13 main routes (Route 8 was added in late 2018) and three supplemental routes (Figure 33); AVTA does not offer service on major holidays (six holidays).

Below we discuss **three major elements of transit service that are critically important to customers**, and as such, for growing and retaining ridership. These elements also dictate, to a large extent, the cost of operating transit service. Ensuring that resources are allocated in a rational and efficient manner requires tradeoffs to ensure that service can meet demands across a challenging terrain like the Antelope Valley.

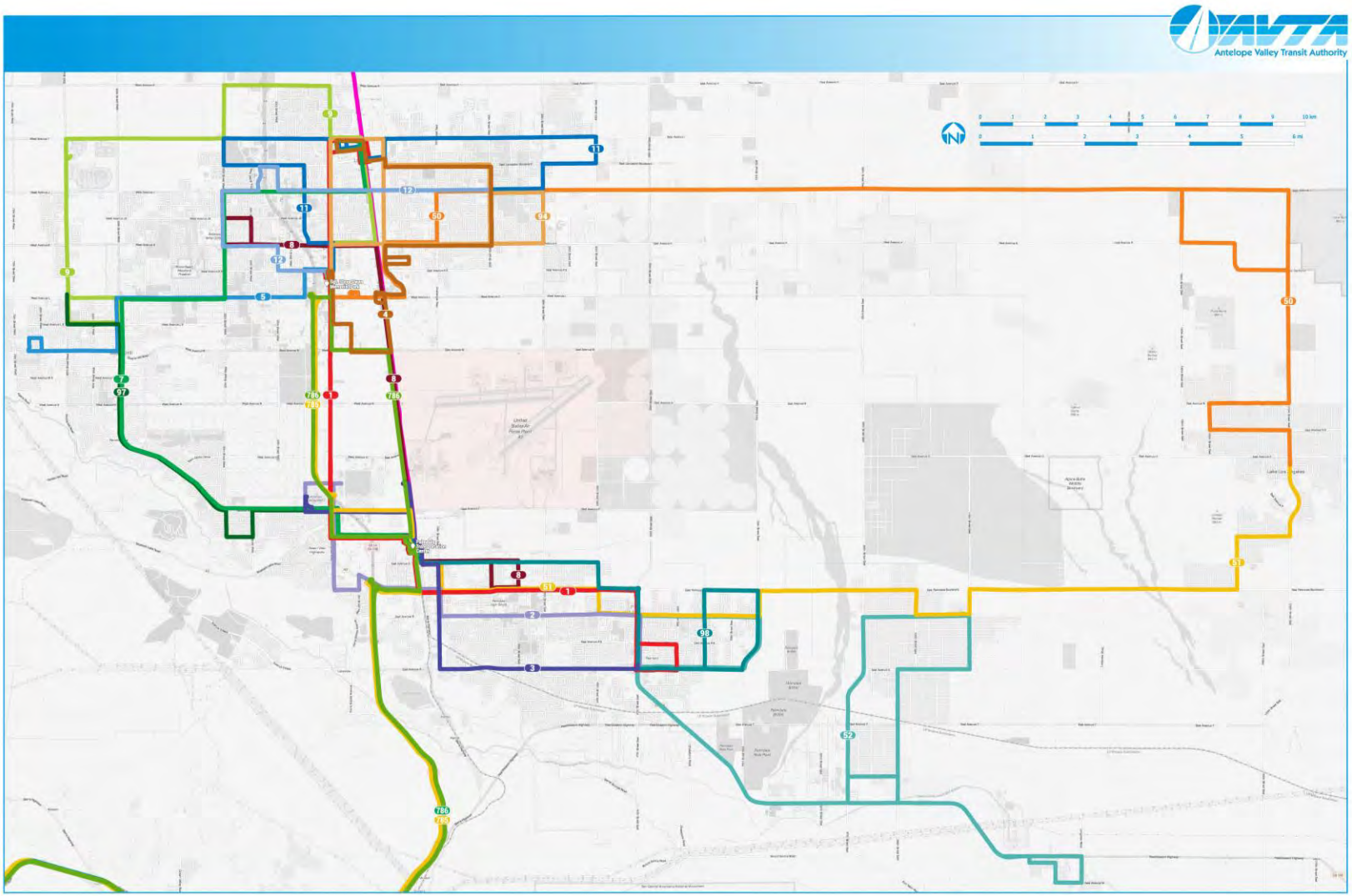


Figure 33: AVTA service area and local bus routes.

Service Frequency

Service frequency (and its inverse, headway between buses or transit vehicles) is perhaps the **most important attribute for choosing or forgoing transit** as a mode choice, particularly for people with other modes at their disposal. Frequent service, which in North America is understood as headways of 15 minutes or less, allows people in a community to travel with great freedom on transit – they can pick up and go. The best part of a personal vehicle is the ability to leave whenever one wishes, rather than relying on a scheduled bus. Headways of 15 minutes or better can help transit approach that level of convenience.

Nevertheless, **increasing service frequency directly increases operating costs**. While costly, analyses of route productivity (described further below in Section 5.1.1) and frequency from agencies across North America reveal a strong and positive relationship between the two—the greater the **service frequency, the greater the route productivity**. We caution that frequent or **ridership routes** be designed with a purpose, that is, used to connect high-density activity centers (a lot of people and jobs, with mixed land uses) along a relatively straight line. Route 1 for example, would be a good candidate for a frequent route because of the markets it serves and its relatively high ridership. On the other hand, routes into Lake LA and routes that serve peak demand locations like schools, are not good candidates for frequent service and can be classified as **coverage routes** that serve a specific purpose, operated at a lower frequency, and can be circuitous in alignment. Low productivity for coverage routes is acceptable because they serve another goal.

Overall, AVTA's fixed routes operate at highly variable service headways, with the most frequent routes operating at **30-minute headways**—this **not frequent enough to build ridership and entice occasional or non-riders to use transit**. Furthermore, the variability of frequency, that is, non-consistent headways are huge detractors to trying transit service, as it makes transit service difficult to understand and thus use.

Service Span

Transit service needs to be available when people travel. **Service span** tells customers between what hours transit service operates. AVTA generally operates between 5 am and midnight on weekdays, but that varies by route; weekends see shorter service spans which generally matches decreased transit demand.

However, with the increase in non-traditional work hours, **typical service spans generally no longer reflect current travel patterns**.

Ensuring transit is available when people need it is important but costly. **Like service frequency, lengthening the service span will increase operating costs (more buses and more operators)**. Adjusting the service span by pruning early morning hours can help re-coup costs to invest in later service hours, or longer weekend hours, although this needs to be done with caution.

Finally, service span is also important in the notion of dayparts or times of day and the frequency operated at different times of the day. This is most easily understood by discussing morning and

afternoon peaks—typically, from 6-9 am, and from 4-7 pm, transit agencies increase service frequency to match peak demand. This span is important for meeting a particular need (commuting). However, in many communities like the Antelope Valley, these peaked trends are giving way to more sustained all-day demand when transit agencies, like AVTA, tended to reduce service during the midday. In this case, the service frequency during the midday span may need to increase to match this demand.

Reliability

Knowing your bus will arrive as published in a schedule is an important attribute for customer satisfaction and ridership. If the bus is constantly late or early, coupled with long headways, a missed trip can lengthen travel which is a key attribute to choosing transit over other modes.

Reliability is typically measured as on-time performance at key time points, and whether the departure of the bus at the time point is within an acceptable window (this is known as **schedule adherence**). AVTA measures on-time performance as a bus departure from a time point within 0 minutes of scheduled time (no early departures) and 5 minutes after scheduled time. On-time performance is all the more important for infrequent bus routes and transfers or connections because if a bus connection is missed, waiting for the next one can be painfully long, derailing a rider's plan.

Overall, AVTA's weekday fixed-route on-time performance is 77% on-time, which is below typical industry targets of 80-90% on-time. While 77% is generally close to the acceptable on-time performance range, on-time performance varies by route from 46% to 93%. This indicates that schedules may not reflect the realities of operating service along some routes, which is a particular issue on routes like Route 50 and 51 that operate at 1.5 to 2-hour frequencies. **Service reliability is a necessary ingredient for a successful transit system**; an unreliable system negatively impacts customers by causing them to arrive late to work/school, miss major transit connections, or miss daily activities and appointments.

With the prevalence of technology, many transit agencies including AVTA have onboard technology allowing real-time bus tracking. AVTA's system allows customers to track buses via the interface of Track-It, which shows real-time bus positions. This system can help customers better plan for trips and actual bus arrivals. However, we note that this interface is difficult to navigate (particularly on a mobile device) and dated. AVTA could publish its real-time GTFS to be picked up by third-party transit and trip planning apps like Transit and Citymapper to provide customers with real-time arrival information, multimodal trip planning, all with simple and intuitive interfaces. **Real-time information is crucial to winning ridership today because of the expectations of riders to provide current and reliable information.**

5.1 SYSTEM-LEVEL ANALYSIS

5.1.1 Overall Trends and Network Performance

In 2018, boardings on fixed-routes continued their general decline since 2014, shedding roughly 3.6% of 2017 ridership in spite of a substantial increase in revenue service hours and miles (Figure 34).[4]

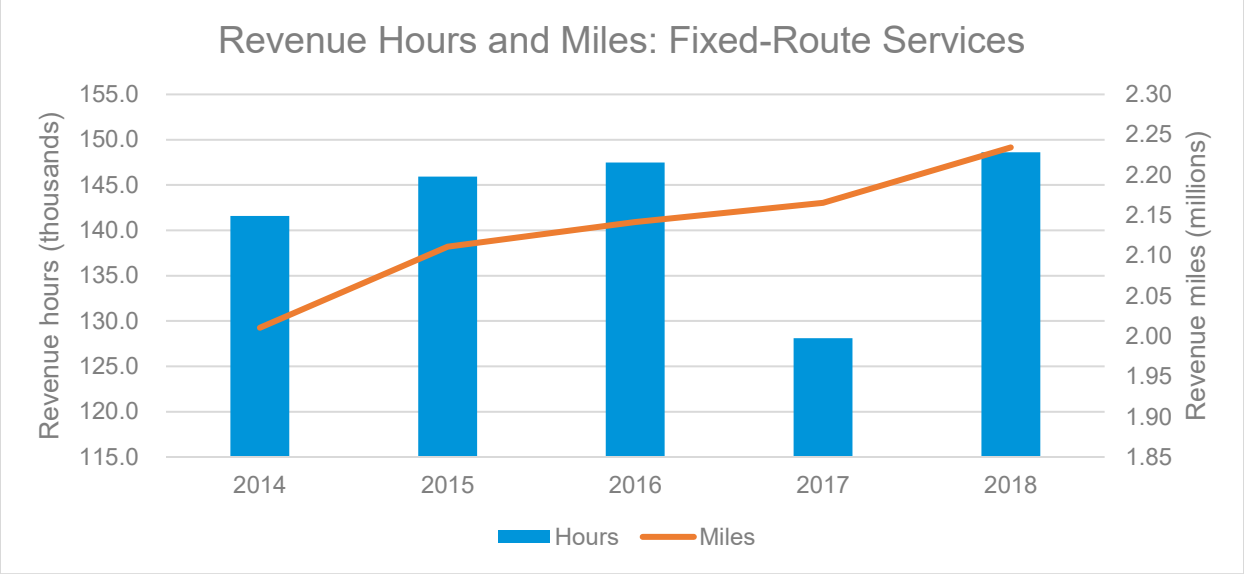


Figure 34: Annual revenue hours and miles for fixed-route service, 2014-2018.

The generalized and sustained loss of ridership has been experienced by most routes, but varies greatly.

- Route 1, the route with the greatest ridership, experienced nearly a 20% loss in ridership from 2014 to 2018, suggesting that while it's still the workhorse, it has not been immune to the loss of ridership.
- Route 2 is one of the only routes that experienced a gain in ridership, up 22% from 2014. Route 2 is interlined with Route 3. While Route 2 has experienced an increase in ridership, Route 3 has lost substantial ridership due to a redesign whereby it no longer operates along Palmdale Blvd (now along Ave. S). Interestingly, service levels have remained the same on Route 3 despite substantial decreases in demand, so much so that Route 3 sees similar ridership to Route 4 that operates with half as many vehicles as Route 3.

[4] Route 8 is not included because it only began operation in late 2018??

- Routes 11 and 12 (which are interlined) lost 26% and 43% of ridership, respectively, but only about 6-8% from 2017.
- Route 8 was introduced in August 2018 to directly connect Antelope Valley College (Lancaster campus) to Palmdale Transportation Center. Despite offering free service through a student discount program, the services saw only roughly 115 boardings on an average weekday during Fall 2018.
- While the **nine routes that service Lancaster and Palmdale carry over 90% of boardings**, the remaining **10% comes from the three routes (50, 51, and 52)** that service the eastern part of the Valley which includes Lake Los Angeles, Littlerock, Pearblossom, Sun Village and incorporated parts of Los Angeles County.
- While the actual number of average daily boardings on Route 50, 51 and 52 is low (~450 combined boardings across the three routes), these routes have seen an increase of over 30% of annual boardings from 2017, suggesting that demand in these communities is growing.
- However, servicing more remote communities is challenging to do in an efficient manner with fixed-route scheduled transit service. Our plan will look for ways to delivery mobility in new ways, leveraging technological advances and mobility partners.
- AVTA's network design is more radial than gridded, despite operating on a gridded street network. As such, **radial designs force circuitous route alignments that cause customers to sometimes backtrack to a transfer terminal to switch buses**. Moreover, routes are designed to cover off as many destinations as possible, further making routes complex, slowed, and indirect. This design favors one-seat rides over transfers, particularly on-street that occur at the intersections of two routes, facilitating an "L"-like travel pattern. The simple reason for this network design principle was that AVTA, until recently, charged passengers for a bus transfer. Today, transfers are free for a two-bus trip. Therefore, this change in fare policy can open up new opportunities to design more direct, less convoluted routes that will require transfers, but if scheduled correctly, can actually reduce passenger travel time.
- Overall, despite service adjustments, route modifications and investment in transit service, AVTA's fixed-route ridership has declined, in line with the general trend of declining ridership in Southern California. The challenge then is to understand the successful elements of routes, their weaknesses, and how to design services that match the needs of the transit market, the demand, and in an effective manner.
- Farebox recovery ratio is a measure of how well the fare for service covers the costs of operating the service. By analyzing the amount of operating costs covered by fare revenue, we can consider how reliant an agency is on the regional or municipal tax base. Indeed, **a substantial amount of operating cost should be recovered through transit fares**, which is reflective of both service quality and usage.

- **The average farebox recovery ratio for AVTA local routes is 17%, which is a respectable recovery ratio; however, farebox recovery ranges from 6.8% to 50.6%** (Figure 35). It should be noted that while Routes 97 and 98 have high farebox recovery ratios, these two routes only represent a small portion of the system's operating costs due to the limited trips they provide. AVTA's farebox recovery ratio is high on routes with the greatest operating costs, such as Route 1, which shows that the investment into these specific routes (i.e. providing a high number of service hours where demand is greatest) is resulting in more financially efficient service.

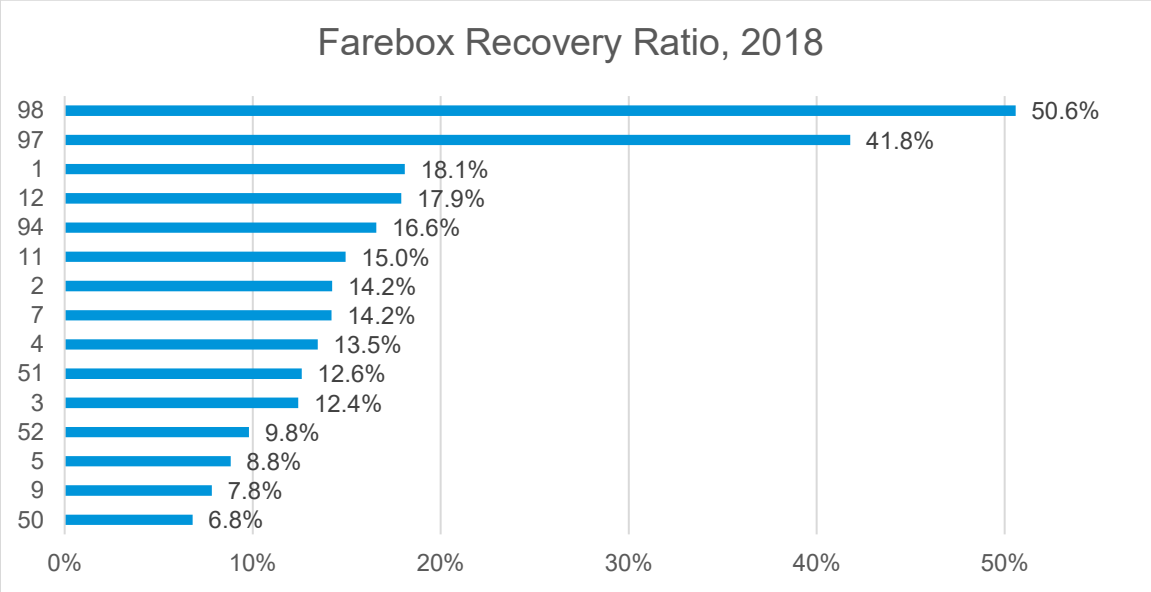


Figure 35: Route-level farebox recovery ratio, 2018.

- A measure of cost effectiveness is the cost per rider, where a lower cost per ride is preferable (Figure 36). The **average cost per boarding for an AVTA route is $10.61**, which appears high due to a few routes that have significantly higher costs per boarding (Route 9, 50 and 52).

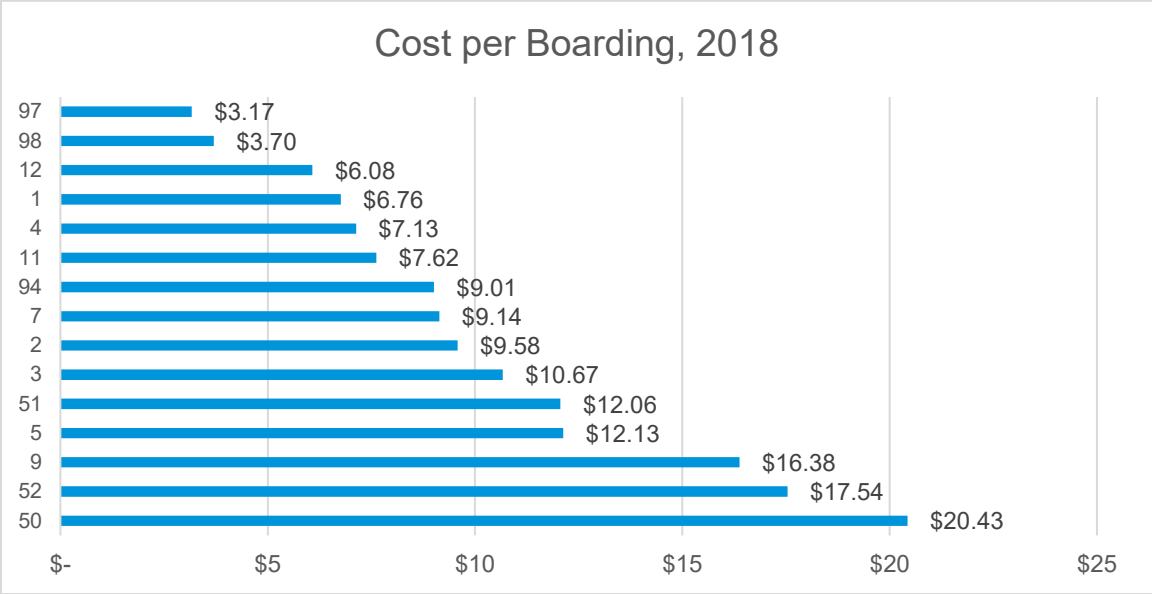


Figure 36: Route-level cost per boarding, 2018.

5.1.2 Weekday Analysis

On a typical weekday (in 2018), AVTA carries nearly 8,700 passenger trips, the bulk of which (7,400 or 85%) are on the local fixed routes, including school trippers or supplemental routes (90 series routes; these routes combined carry roughly 92 passenger trips, about 1% of fixed-route ridership). **Route 1 represents nearly a third of all weekday ridership (over 2,000 passenger trips), and together with routes 11 and 12, represent nearly 60% of AVTA's fixed-route ridership (over 4,000 passenger trips).** These characteristics are typical of many transit agencies, where the bulk of ridership is carried by a few routes, while the remaining routes play a supporting role. These findings also provide clues as to where AVTA could strengthen service to potentially gain new ridership or more trips from current riders, such as by improving frequency and on-time performance to make service more attractive, convenient and reliable.

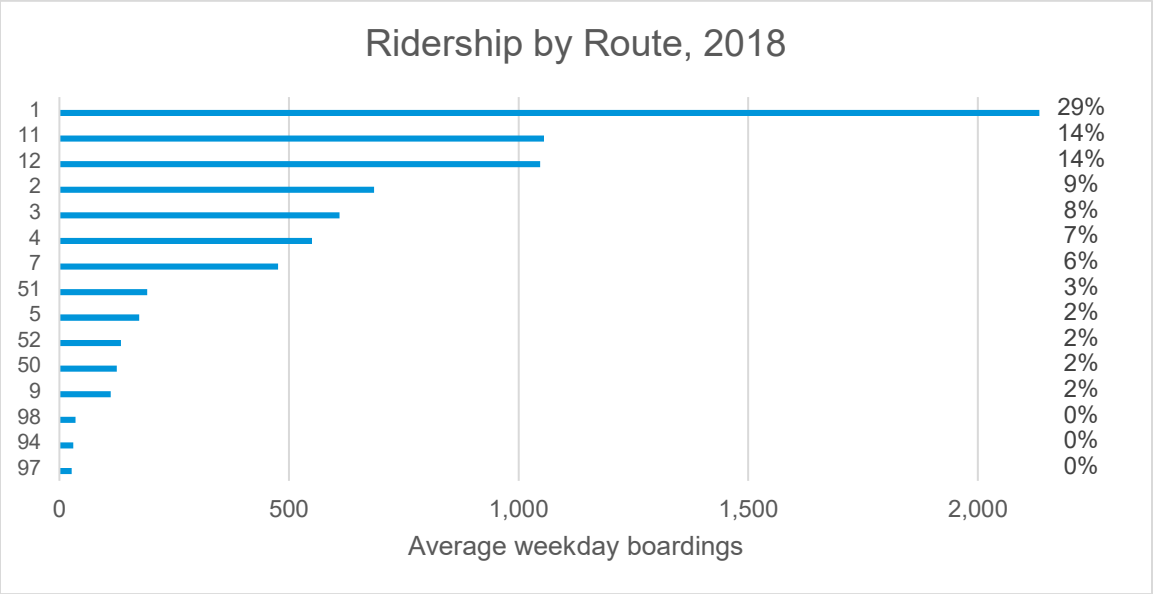


Figure 37: Average weekday boardings by route and as a percent of all fixed-routes, 2018.

One of the best measures of the productivity of a bus route is the turnover of passengers or boardings per revenue hour. Essentially, this measure can provide an indication of utilization per hour of service. Service or revenue hours depends on the length of the route, average operating speed, frequency of service, and the service span. Altering any of these factors will impact revenue hours and thus the amount of service provided. And since an hour of service represents the major cost of providing or operating service, boardings per revenue hour provides a clear indication of **ridership relative to operating costs**. We note that productivity is used when measuring the goals of maximizing **ridership**, that is, not worrying about servicing all areas of a community where some routes may see little ridership, but instead provide a vital service—for AVTA, routes like 50, 51, and 52 are examples of **coverage** routes that are not expected to see large volumes of ridership.

The table below (Table 3) lists regular fixed routes ordered by most to least productive, based on boardings per revenue hour. **Routes 12 and 1 are the most productive at nearly 20 boardings per revenue hour**. At the lower end of the spectrum are the Lake LA routes, with well below 10 boardings per revenue hour. These productivity measures will be useful when rationalizing the service design of AVTA's local service, including service spans, frequencies, delivery options, and service types (frequent or local or coverage, etc.).

Similar to the above trends of ridership loss, AVTA's routes have also experienced a decrease in productivity. For example, in 2014 and 2015, route 1 operated with ~31 boardings per revenue hour on average but now operates with 19 boardings per revenue hour. Overall, route productivity has dropped across the network.

Table 3: Route-level average weekday boardings and productivity, 2018.

Route	Avg. weekday boardings	Avg. weekday boardings per rev. hr.
12	1,047	19.6
1	2,134	19.3
4	550	18.3
11	1,055	15.8
7	476	14.4
2	685	12.2
3	610	10.9
51	191	10.8
5	174	10.5
9	112	8.4
52	134	7.6
50	125	6.9

One way to determine if the existing service meets the demands of the population is by looking at how well passenger activity throughout the day aligns with the number of vehicles in service. Figure 38 illustrates the relationship between transit supply and demand for local routes only (including supplemental routes) and provides insight into the peak weekday service hours across the network. While the level of service provided stays relatively consistent from approximately 6 am to 7 pm in terms of number of vehicles in service, the passenger demand data reveals a midday peak from approximately 10 am to 3 pm. This midday peak is observed at the system level, but differs by route depending on key destinations served; for example, routes serving major employment areas or commuter transfer hubs will experience greater peaks in the am and pm periods (see 5.2 Route Profiles). For routes that experience a strong midday peak, it would be beneficial to dedicate greater resources during the midday peak than during morning and afternoon periods. It is important that service frequency matches with the level of demand on each route to ensure that the agency's limited resources are being deployed in the most effective and efficient way.

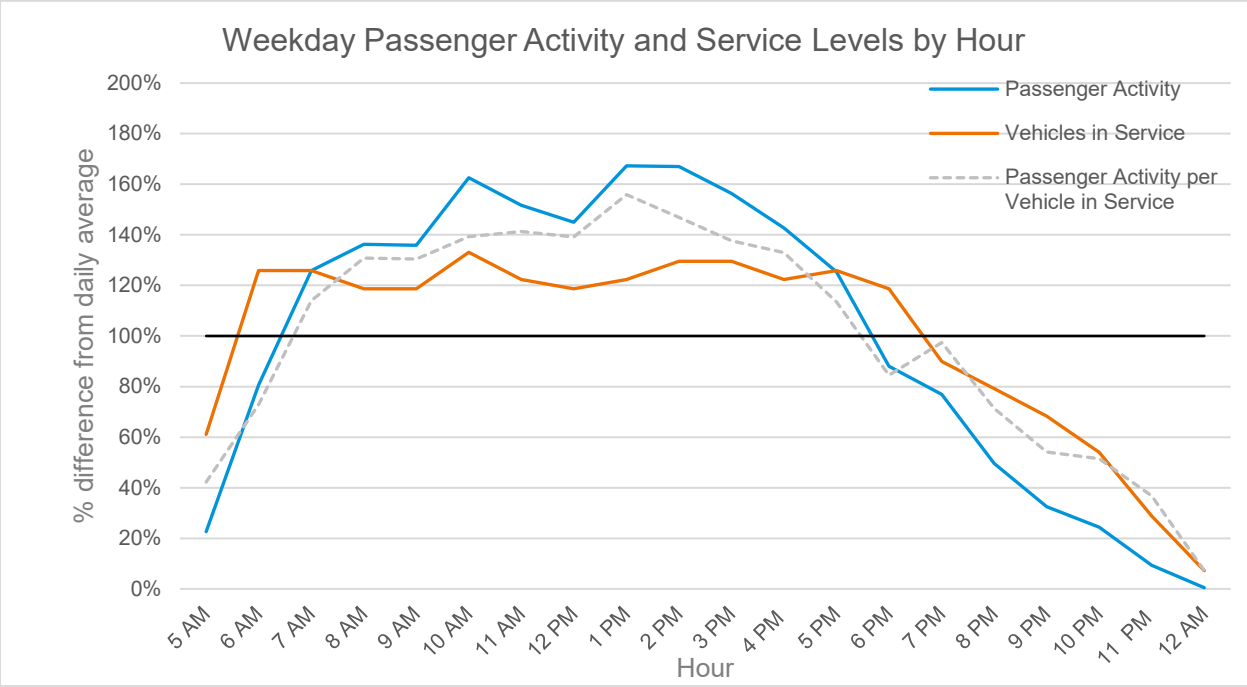


Figure 38: Transit supply and demand as a function of daily average across a typical weekday.

Service reliability is a necessary ingredient for a successful transit system; an unreliable system negatively impacts customers by causing them to arrive late to work/school, miss major transit connections, or miss daily activities and appointments. **Reliability during weekdays is particularly important for building customers' confidence that they can depend on transit for consistent daily use**.

As shown in Figure 39, on-time performance of local AVTA routes ranges from 46% to 93% on time, with a system average of 77%. In most cases, buses run late rather than early, which reveals that the running times do not adequately account for operational realities, such as traffic conditions or ramp deployment for wheelchair passengers. The two routes with the highest percentage of late departures are Route 9 and Route 50. Passengers wishing to transfer in Lake LA from Route 50 to Route 51 are likely to miss this connection due to unreliable service, which can cause significant travel time delays since these routes only operate every two hours.

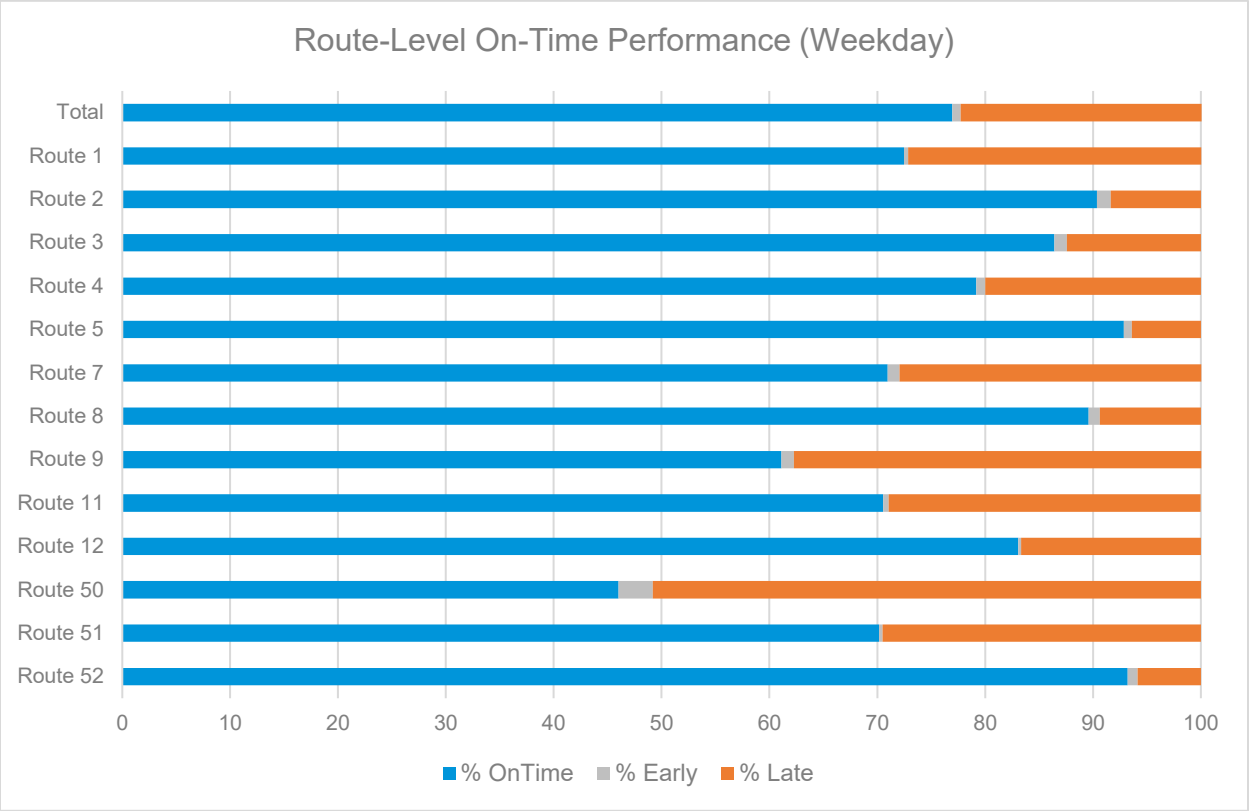


Figure 39: Route-level on-time performance on a typical weekday.

5.1.2.1 Weekday Stop-Level Passenger Activity

Next, we leveraged passenger counter data to understand passenger activity at the stop-level which provides clues as to stops with high and low demand. Viewing passenger activity along a route and at the network level (Figure 40) can help uncover patterns of use and provide clues of how to design or redesign route alignments.

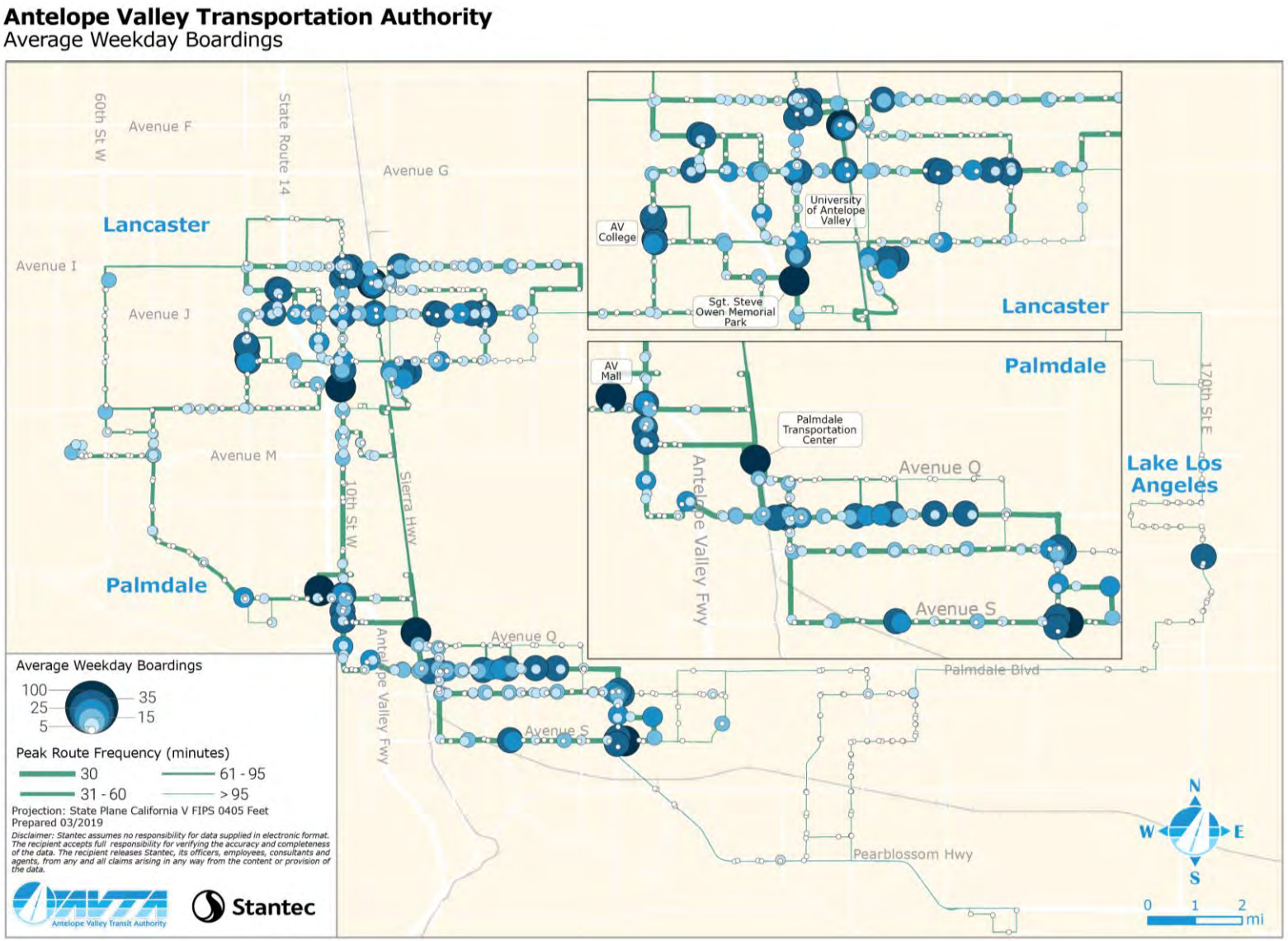


Figure 40: Average weekday boardings for fixed-route services, 2018.

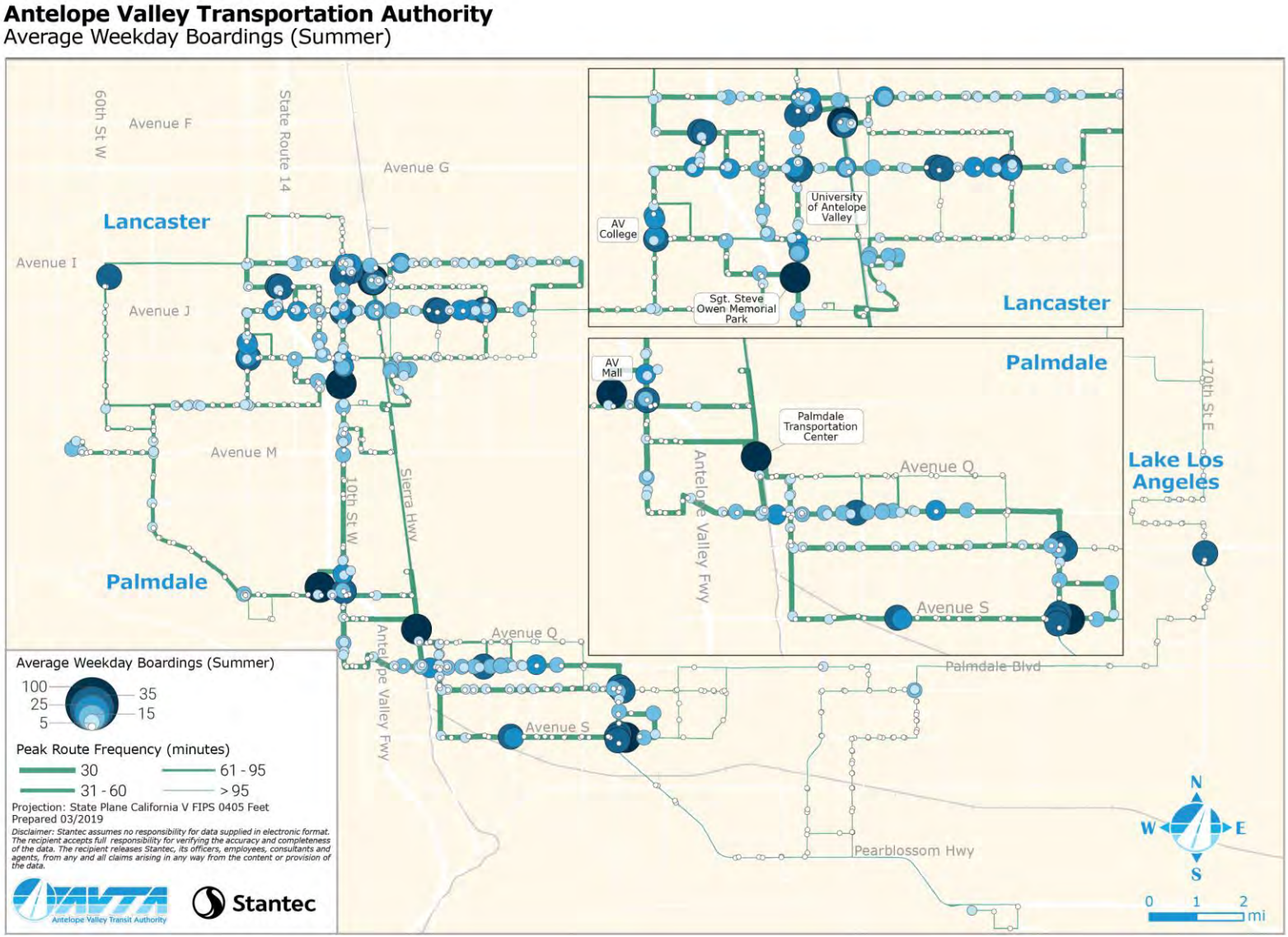


Figure 41: Average weekday boardings (summer) for fixed-route services, 2018.

Key findings of the typical weekday stop-level analysis (Figure 40) include:

- In Palmdale, the highest boardings are observed along Palmdale Blvd, which is served by Route 1 and consists primarily of commercial and service land uses.
- Major stops in Palmdale include:
  - Palmdale Transportation Center, where riders can transfer to Metrolink trains;
  - Stops at 47th St E and Avenue S, which provide access to Walmart Superstore, Walgreens, and other commercial destinations; and
  - AV Mall, a large shopping center.
- 10th St W acts as the main transit corridor that connects Palmdale and Lancaster. While passenger activity is observed at major destinations on 10th St W (Figure 42) within Palmdale and Lancaster, stop-level demand along 10th St W is low between W Avenue O 8 and Avenue M, where lands are largely vacant (Figure 43).

Figure 42: 10th St W at Commerce Center Dr

Figure 43: 10th St W at W Avenue N

- Major stops in Lancaster include:
    - Sgt. Steve Owen Memorial Park, where riders can transfer to local bus routes;
    - Lancaster Station, which provides access to Metrolink trains as well as local bus transfers;
    - Stops near Antelope Valley College and the University of Antelope Valley; and
    - Avenue J corridor, including key commercial destinations, schools, and healthcare facilities like Antelope Valley Hospital

- The service provided is largely in line with demand, as low ridership corridors are served by low-frequency routes (e.g. 7, 9, 50, 51, 52).

- The high-activity stops of Sgt. Steve Owen Memorial Park, Lancaster Station, and Palmdale Transportation Center reveal that passengers rely on these stops as transfers and a large percentage of transfers occur at a small number of locations. AVTA could establish additional transfer points by redesigning some routes to be more direct and focusing service along key connecting corridors.

Key findings of the summer weekday stop-level analysis (Figure 41) include:

- Overall, stop-level passenger activity is lower across the AVTA service area during summer months when schools are no longer in session, which is consistent with North American trends. It should be noted that the supplemental routes (94, 97 and 98) continue to operate during the summer months, despite their main purpose being school transportation.

- While most of the stop activity decreases during the summer, some destinations emerge as more popular during the summer than a typical weekday, including Palmdale Dog Park and surrounding area, shopping destinations, and Challenger Memorial Youth Center, a youth correctional facility.

- Corridors with the highest ridership are Avenue J, 10th Street W, and Palmdale Blvd, which are consistent with the typical weekday ridership observed during other times of the year.

5.1.3 Weekend Analysis

It's typical for most transit agencies to see a reduction in demand on weekends, and to provide less service as compared to weekdays. Nevertheless, providing decent service on weekends is still vital for the community for access to services, events, and importantly, for employees to reach jobs on weekends.

Weekend service, like later evening weekday service, is expensive to provide (more buses and more operators) and typically experiences lower ridership. For AVTA, **Saturday** ridership on fixed-routes (only the core 12 routes operate on weekends) is about **42% of weekday ridership (3,500 passenger trips)** and **Sunday** ridership is only about **30% of weekday ridership (2,600 passenger trips)**.

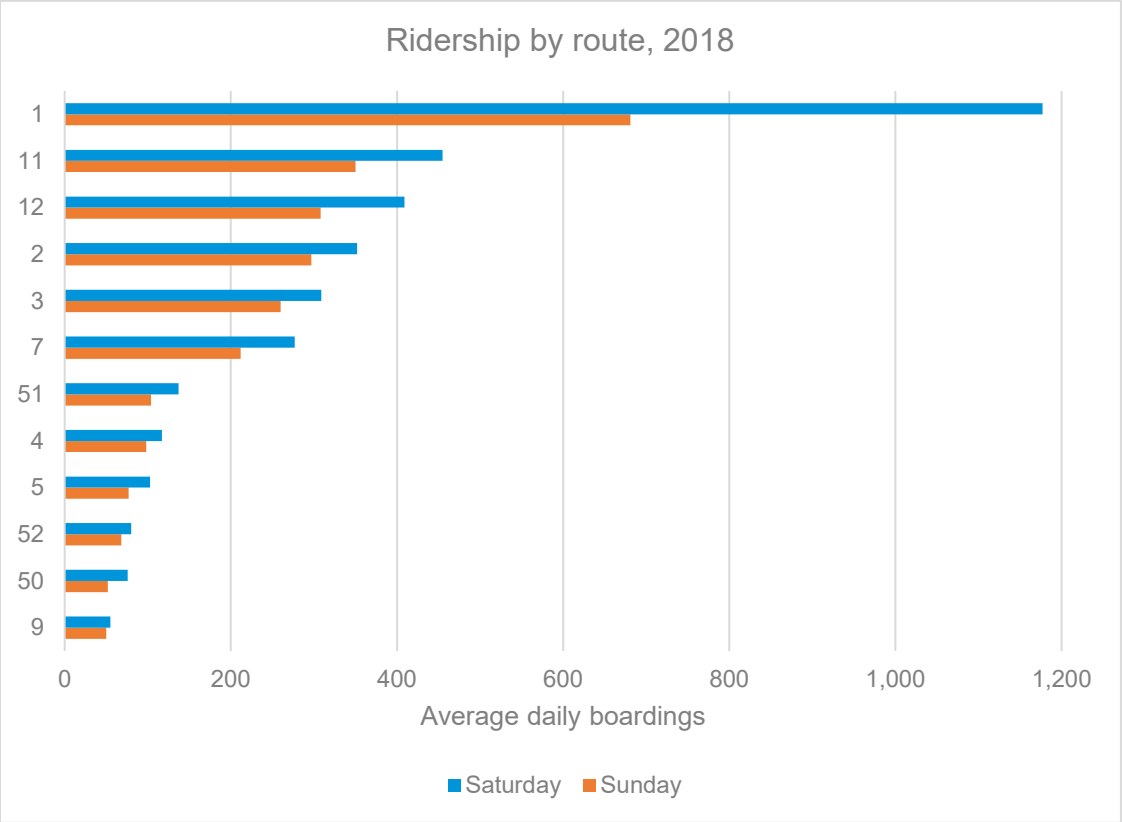


Figure 44: Average weekend boardings, 2018.

For the most part, the demand across routes is stable across weekdays and weekends, i.e., routes 1, 11, and 12 experience the largest ridership (Figure 44). Table 4 presents productivity ratios between average weekday values, and average Saturday and Sunday values, respectively—the closer the value is to one, the more the route performs consistently throughout the week, while numbers larger than one indicate better weekday performance, and numbers smaller than one indicate between weekend performance.

Two routes that stand out as exceptions that see substantial differences in route productivity during the weekend compared to weekdays are routes 4 and 9. The major reason for this weekend vs. weekday discrepancy is a mismatch in demand and service provision—key destinations along route 9, such as the homeless shelter have check-ins around 8 pm, but weekend service ends at 5:30 pm, while Quartz Hill High School is closed on weekends. Route 4, while generally unproductive on weekdays, is so infrequent on weekends (every two hours) that it is inconvenient for most trip purposes—and so is route 9 for that matter. Destinations along route 4 are also typically closed for business on the weekends (such as the courthouse and county office building). These findings suggest that service should match demand on weekends, that low productivity routes be deleted entirely, or that alternative service delivery operate in certain zones on weekends to better match rider demand.

Table 4: Route-level average weekend boardings and productivity, 2018.

Route	Avg. Saturday boardings	Avg. Sunday boardings	Avg. Sat. board. / rev. hr.	Avg. Sun. board. / rev. hr.	Weekday:Sat. ratio	Weekday:Sun. ratio
12	409	308	18.2	15.0	1.08	1.31
1	1,177	681	16.7	18.5	1.16	1.04
11	455	350	16.1	13.6	0.98	1.16
2	352	297	13.3	12.0	0.92	1.02
3	309	260	11.7	10.6	0.93	1.03
7	277	212	10.3	9.3	1.40	1.54
51	137	104	10.1	8.7	1.06	1.23
4	117	98	8.9	7.4	2.06	2.46
5	103	77	8.8	6.6	1.19	1.59
52	80	68	6.9	5.8	1.10	1.30
50	76	52	5.5	4.3	1.25	1.61
9	55	50	5.3	4.9	1.59	1.73

Agencies typically experience different demand periods on weekends than weekdays because trip purposes tend to shift from work and school travel during weekdays to discretionary travel during the weekend. As shown in Figure 45 and Figure 46, the weekend peak occurs midday but appears to end earlier on Sunday (10 am to 2 pm) than Saturday (10 am to 4 pm). Similar to the findings for weekdays, the number of vehicles in service on the weekend does not match the peak demand periods.

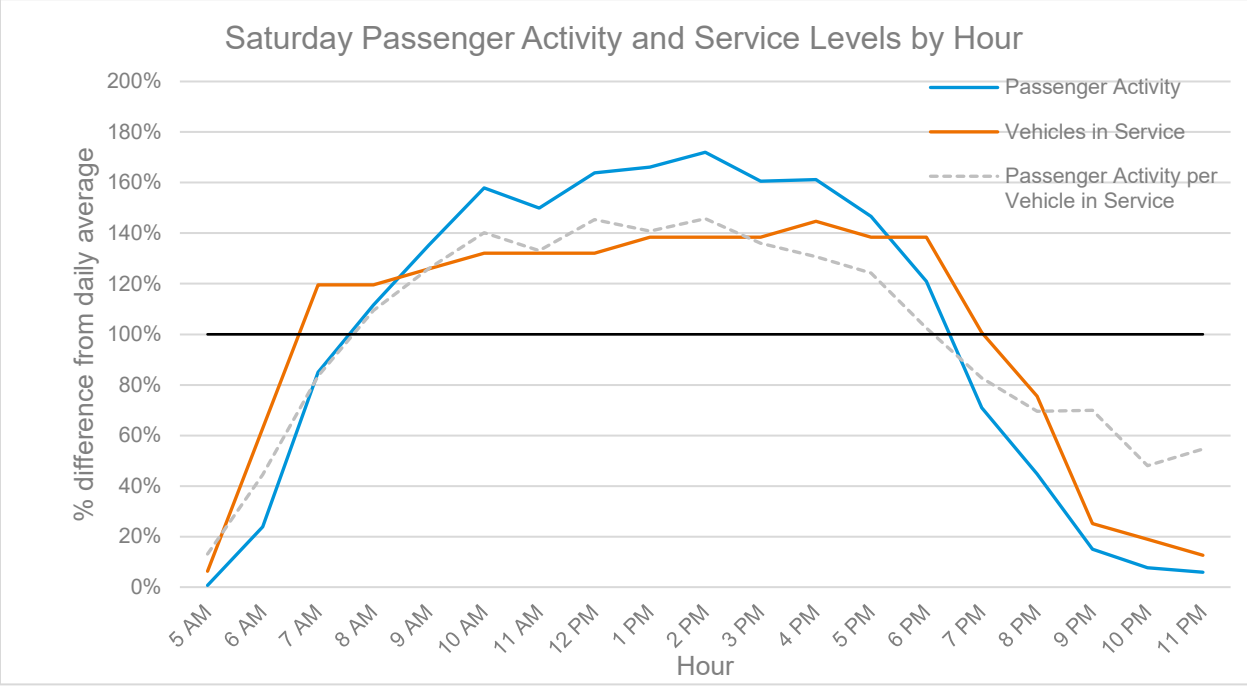


Figure 45: Transit supply and demand as a function of daily average across a typical Saturday.

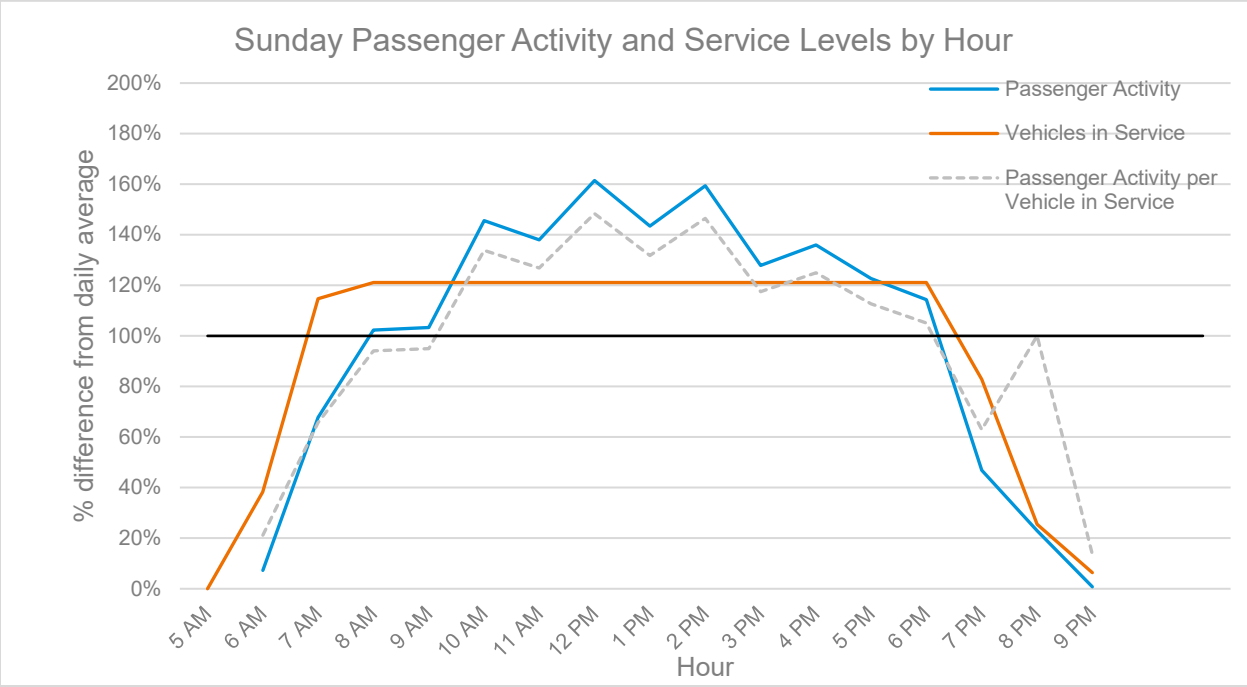


Figure 46: Transit supply and demand as a function of daily average across a typical Saturday.

On-time performance on weekends becomes critical due to the decrease in service frequency on Saturday and Sunday compared to weekdays. A missed trip or connection on a weekend can result in a rider waiting two hours for the next bus, which significantly inconveniences riders. As shown in Figure 47 and Figure 48, the percentage of on-time buses across the whole system is similar on both Saturday (84%) and Sunday (86%). Both weekend days have higher on-time performance than weekdays (77%), which is unsurprising since weekends typically experience fewer delays because of reduced traffic conditions and fewer boardings.

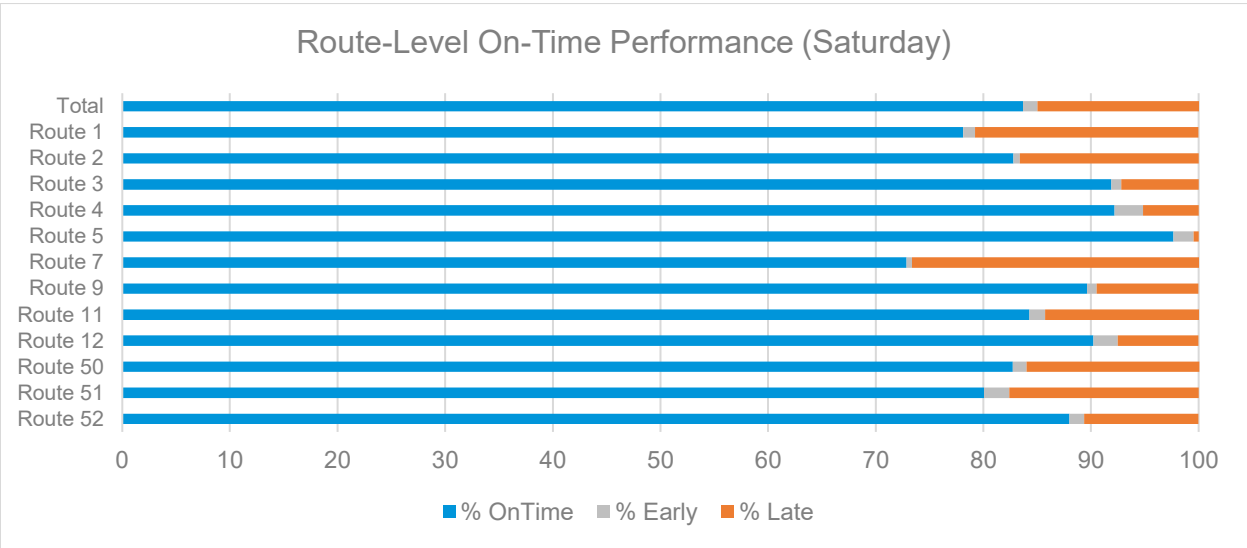


Figure 47: Route-level on-time performance on a typical Saturday.

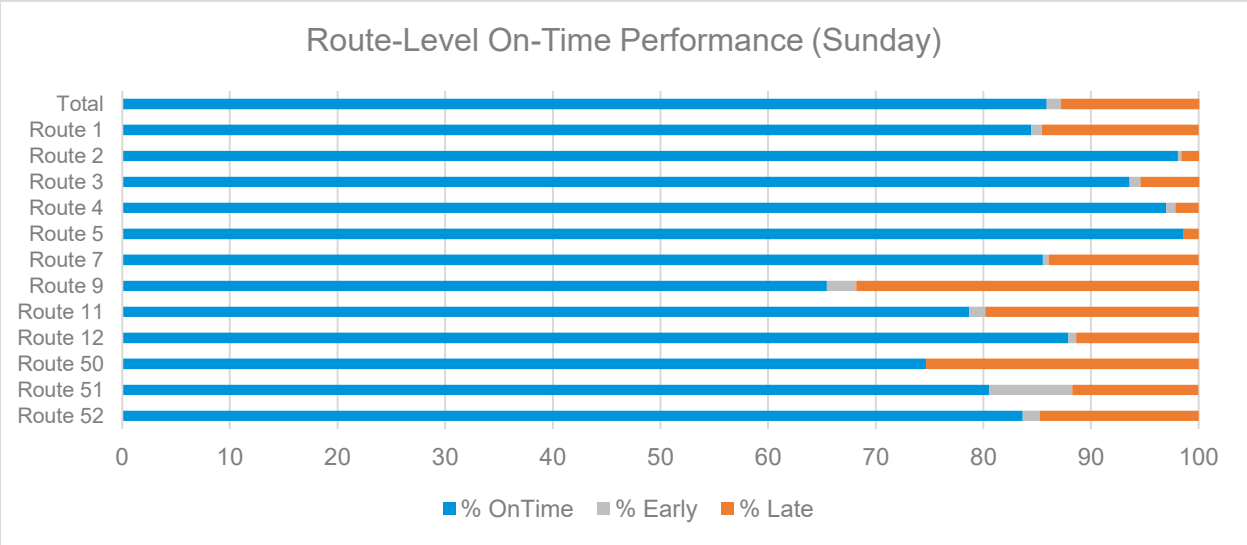


Figure 48: Route-level on-time performance on a typical Sunday.

5.1.3.1 Weekend Stop-Level Passenger Activity

Passenger counter data for the weekend was used to determine average weekday boardings at the stop level on Saturday and Sunday (Figure 49 and Figure 50). It is important to review weekend activity separately from weekday activity to determine patterns of use and identify destinations or corridors of high activity and ensure weekend schedules reflect demand.

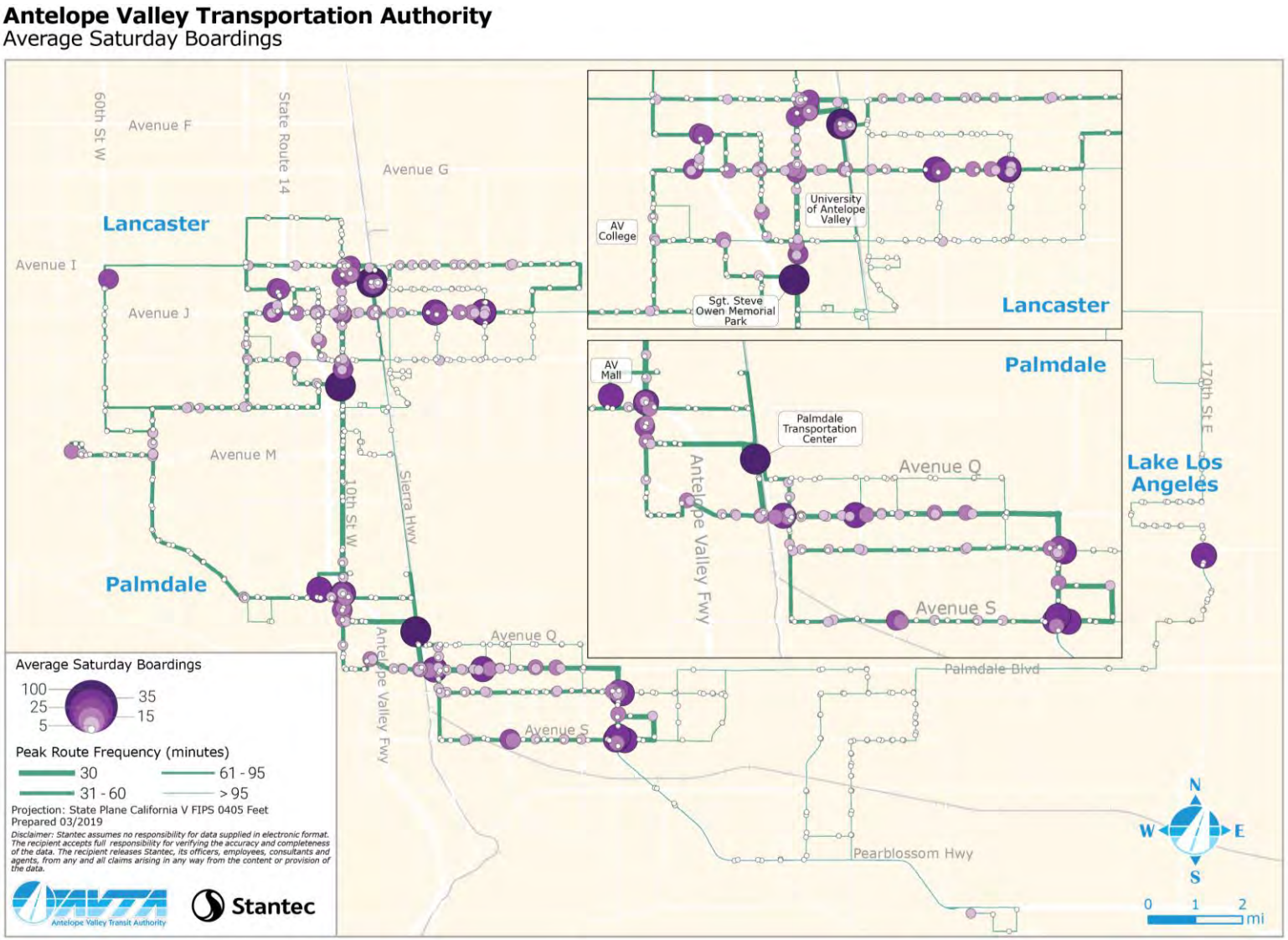


Figure 49: Average Saturday boardings at the stop-level, 2018.

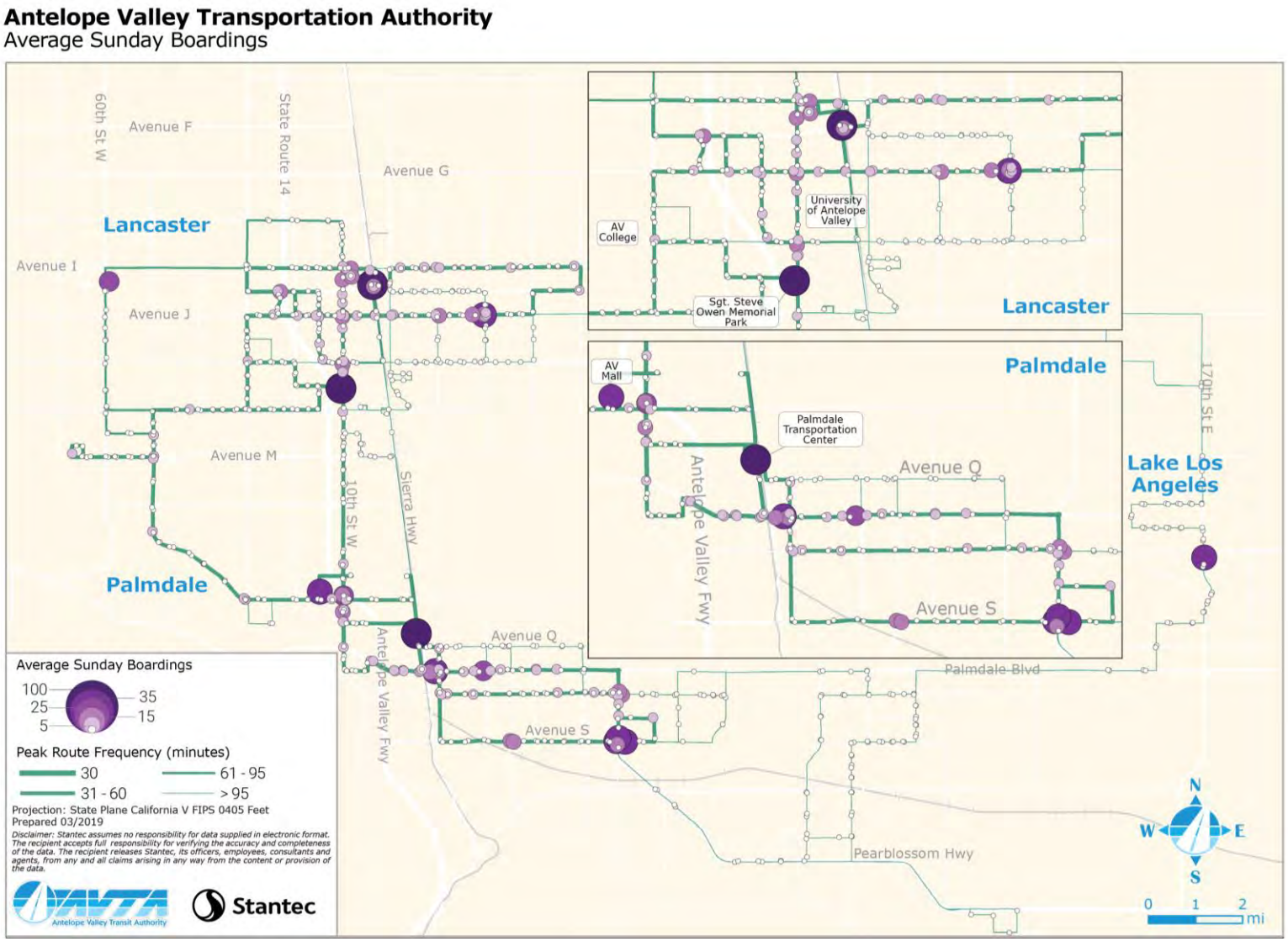


Figure 50: Average Sunday boardings at the stop-level, 2018.

Key findings from weekend stop-level data include:

- **Passenger activity is higher on Saturday than on Sunday, but the high-activity stops are largely the same on both days.** The busiest stops on both days include Sgt. Steve Owen Memorial Park, Palmdale Transportation Center, Antelope Valley Mall, Lancaster Station, and 47th St E and Avenue S. These high-activity stops are also consistent with the high-activity stops on weekdays.

- **The routes with the lowest frequencies (Routes 4, 50, 51 and 52) experience the lowest ridership, illustrating that the level of service provided is generally consistent with the demand. That being said, it is likely that the lower ridership is not only due to decreased demand but is caused by the low frequency on the route.** For example, Route 3 and Route 4 carry a similar number of riders during the weekday, but Route 4 experiences much lower ridership on the weekend. This may be as a result of 60-minute weekend headways on Route 3 and 120-minute weekend headways on Route 4.

- Some destinations typically experience higher ridership on Sundays than on weekdays or Saturdays, such as churches. However, church locations do not emerge as popular destinations on Sundays in the AV. This may be due to the fact that the **frequency of service is too low and/or the schedule does not align with start and end times of service.**

5.2 ROUTE PROFILES

AVTA operates thirteen (13) local bus routes. The majority of the local routes provide service seven days a week, with differing hours on weekdays and weekends. The only local route that does not provide weekend service is Route 8, an express route to and from Antelope Valley College.

AVTA operates service between 5:00 am and 12:45 am, 6:00 am-11:45 pm on Saturdays, and 6:30 am-8:45 pm on Sundays, with variation between specific routes. Local routes do not operate on six major holidays throughout the year.

AVTA's local routes provide service locally throughout the Antelope Valley. Predominately serving the cities of Lancaster and Palmdale and surrounding areas, local routes also serve more remote and rural areas of the Antelope Valley, including Lake Los Angeles, Pearblossom, and Littlerock.

A summary of local routes is outlined below.

Table 5: Route-level service spans and headways, 2018.

Route	Weekday Service Span	Weekday Headway	Saturday Service Span	Saturday Headway	Sunday Service Span	Sunday Headway
Route 1	5:00am-8:00pm 8:00pm-12:00am	24-26 minutes 60 minutes	6:00am-9:00am 9:00am-6:00pm 6:00pm-11:30pm	60 minutes 29-30 minutes 60 minutes	7:00am-8:30pm	60 minutes
Route 2	5:55am-6:45pm 6:55pm-10:43pm	30 minutes 60 minutes	6:30am-8:14pm	60 minutes	6:30am-7:18pm	60 minutes
Route 3	5:55am-6:49pm 6:55pm-10:44pm	30 minutes 60 minutes	6:30am-8:14pm	60 minutes	6:30am-7:18pm	60 minutes
Route 4	5:35am-9:20pm	60 minutes	7:40am-9:17pm	120 minutes	7:40am-9:17pm	120 minutes
Route 5	6:05am-9:23pm	60 minutes	7:05am-7:03pm	60 minutes	7:05am-7:03pm	60 minutes
Route 7	5:00am-10:29pm	55-68 minutes	6:55am-8:56pm	50-70 minutes	6:55am-6:53pm	50-70 minutes
Route 8	6:35am-6:05pm	80-100 minutes	N/A	N/A	N/A	N/A
Route 9	6:15am-8:05pm	95-105 minutes	7:20am-6:19pm	95 minutes	7:20am-6:19pm	95 minutes
Route 11	5:15am-7:45pm 7:45pm-11:55pm	30 minutes 60 minutes	5:45am-7:57pm	60 minutes	6:45am-6:57pm	60 minutes
Route 12	5:00am-7:00pm 7:00pm-11:38pm	30 minutes 60 minutes	6:02am-7:44pm	60 minutes	7:00am-6:44pm	60 minutes
Route 50	5:20am-11:12pm	120-150 minutes	7:20am-8:29pm	120-150 minutes	7:20am-8:06pm	120-150 minutes
Route 51	5:30am-10:33pm	120 minutes	7:25am-8:16pm	120 minutes	7:25am-7:48pm	120 minutes
Route 52	5:30am-11:24pm	120 minutes	7:30am-7:26pm	120 minutes	7:30am-7:26pm	120 minutes

5.2.1 Route 1: Lancaster/Palmdale

- Route 1 operates between the Antelope Valley cities of Lancaster and Palmdale, with the southern terminus at the Walmart located at 47th St. and Ave. S in Palmdale, and the northern terminus at the LA County Sheriff's Department at Lancaster Blvd. and Sierra Hwy in Lancaster.
- Route 1 largely follows California State Route 14 (SR 14) south from Lancaster and east along State Route 138 (SR 138/Palmdale Blvd.) to Palmdale.
- Major transfer points include the Palmdale Transportation Center and Metrolink Station and Sgt. Steve Owen Memorial Park, with access to the Kaiser Permanente Medical Offices for Antelope Valley. Sgt. Steve Owen Memorial Park Station also offers access to Commuter Routes 785, 786, and 787.
- Route 1 displays the highest overall ridership in the system, with 631,166 total riders in 2018 comprising 29% of total local fixed route ridership.
- At 681 average Sunday boardings, Route 1 displays the largest amount of Sunday passenger trips in the local system, along with the highest Sunday boardings/hour.
- Route 1 has experienced an 18% decrease in ridership between 2014 and 2018, despite an increase in revenue hours of 34% during the same time period.
- While generally operating at 30-minute headways during weekday peak periods, Route 1's schedule displays small inconsistencies in arrival times, varying between 24 and 26 minutes. Saturday peak headways also vary between 29 and 30 minutes.

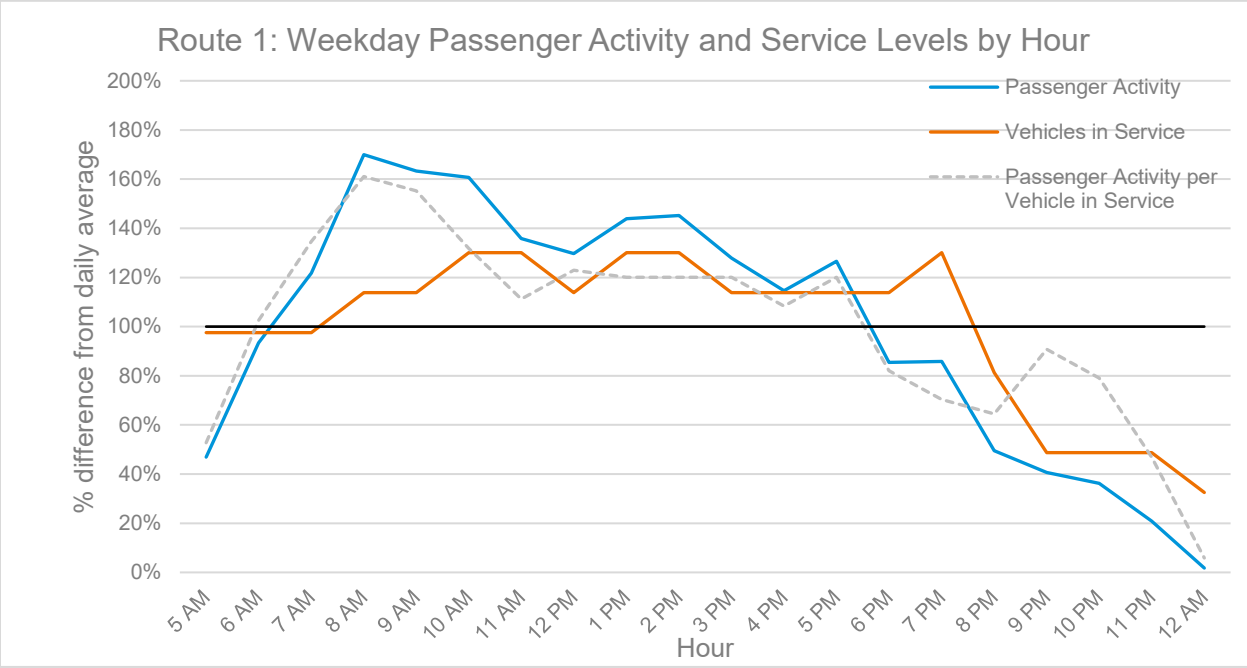


Figure 51: Route 1 transit supply and demand as a function of daily average across a typical weekday

- Route 1 sees variation in both passenger activity and service levels throughout operating hours. The largest peak in passenger activity occurs in the morning, and from 8 am-11 am passenger activity is far above the supply of vehicles in service. A peak in vehicle supply is seen at 7 pm, which is much higher than passenger activity at that time. After 7 pm, both vehicle supply and passenger activity begin to decline until the end of service hours.

Table 6: Route 1 key performance metrics.

	Route	Avg. daily boardings	Revenue hours (scheduled)	Boardings per revenue hour	Early time points (%)	Late time points (%)
Weekday	Route 1	2,134	110.4	19.3	0.4	27.2
	All routes (avg)	608	40.8	12.9	0.8	22.3
Saturday	Route 1	1,177	70.6	16.7	1.1	20.7
	All routes (avg)	296	22.9	11.0	1.3	15.0
Sunday	Route 1	681	36.8	18.5	1.0	14.6
	All routes (avg)	213	18.8	9.7	1.3	12.9

5.2.2 Route 2: East/West Palmdale via Avenue R and Route 3: East/West Palmdale via Avenue S

- Routes 2 and 3 provide east-west service to Palmdale and the southern portion of the Antelope Valley. Route 3 provides access to the Palmdale Transportation Center, with available transfers to other local routes, supplemental routes, commuter routes, and Metrolink.

- Routes 2 and 3 offer access to the Antelope Valley Mall, the Palmdale Regional Medical Center, Palmdale High School, AV Academy High School, and DryTown Water Park, as well as multiple grocery stores and shopping centers.
- Combined, Routes 2 and 3 account for 19% of total local fixed route ridership, with Route 2 providing slightly more annual passenger trips (205,259) than Route 3 (182,421).
- Routes 2 and 3, which are interlined, have shown varied ridership trends over the past four years. While ridership has increased 22% on Route 2 since 2014, Route 3 has seen a decrease of 69% over the same time period.
- Most of the ridership growth seen on Route 2 came between 2014 and 2015, when there was a 91% increase in ridership. This was followed by two consecutive years of significant decreases in ridership, followed by a slight ridership increase of 3% between 2017 and 2018.
- It is interesting to note that revenue hours on Route 2 stayed virtually the same (0.1% increase) between 2014 and 2015, the time period which saw a large increase in ridership. Revenue hours on Route 2 have decreased by 9% between 2014 and 2018, but increased by 25% between 2017 and 2018.
- Route 3 has seen the largest decrease in ridership out of all routes in the system, with a decrease of over 400,000 annual riders between 2014 and 2018. Decreases in ridership happened steadily from year to year during this time, with the largest yearly decrease (41%) happening between 2015 and 2016 and smallest annual decrease (85%) between 2017 and 2018.
- Between 2014 and 2018, Route 3 has seen relatively little change in revenue hours (total decrease of 3%). The largest changes have taken place between 2016 and 2017 (23% decrease), followed by a 24% increase from 2017 to 2018.

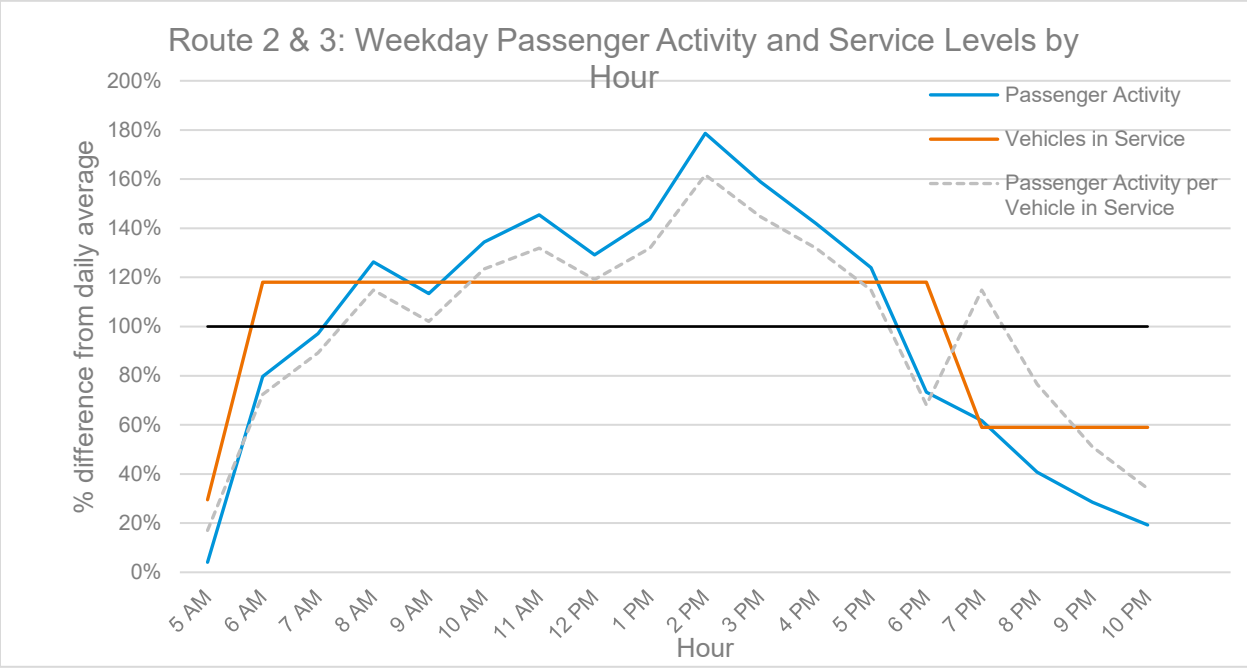


Figure 52: Route 2 and 3 transit supply and demand as a function of daily average across a typical weekday

- On average, service vehicle levels stay steady throughout the day until 6 pm, where a decrease is seen that follows passenger activity trends. However, the mid-afternoon peak in passenger activity (2 pm) is not reflected in service levels, as with the other small peak in passenger activity that occurs around 11 am.

Table 7: Route 2 key performance metrics.

	Route	Avg. daily boardings	Revenue hours (scheduled)	Boardings per revenue hour	Early time points (%)	Late time points (%)
Weekday	Route 2	685	56.1	12.2	1.3	8.4
	All routes (avg)	608	40.8	12.9	0.8	22.3
Saturday	Route 2	352	26.5	13.3	0.6	16.6
	All routes (avg)	296	22.9	11.0	1.3	15.0
Sunday	Route 2	297	24.7	12.0	0.3	1.6
	All routes (avg)	213	18.8	9.7	1.3	12.9

Table 8: Route 3 key performance metrics.

	Route	Avg. daily boardings	Revenue hours (scheduled)	Boardings per revenue hour	Early time points (%)	Late time points (%)
Weekday	Route 3	610	55.8	10.9	1.1	12.4
	All routes (avg)	608	40.8	12.9	0.8	22.3
Saturday	Route 3	309	26.4	11.7	0.9	7.2
	All routes (avg)	296	22.9	11.0	1.3	15.0
Sunday	Route 3	260	24.5	10.6	1.0	5.5
	All routes (avg)	213	18.8	9.7	1.3	12.9

5.2.3 Route 4: Eastside Lancaster

- With the exception of Supplemental Route 94, Route 4 serves a portion of eastern Lancaster not provided by other routes. Route 4 provides service between the LA County Sheriff's Department at Lancaster Blvd. and Sierra Hwy and Sgt. Steve Owen Memorial Park.
- These stops provide transfers to many other local routes; Lancaster Blvd. and Sierra Hwy offers transfers to Routes 1, 7, 9, and 11, and passengers can transfer to Routes 1, 5, 9, 11, 12, 50, and Supplemental Route 94 at Sgt. Steve Owen Memorial Park. In addition to these transfer points, Route 4 also offers service to the AVTA Office, Antelope Valley High School, and Antelope Valley Senior Center.
- Route 4 comprises 7% of total local route passenger trips, but has fallen 46% since 2014.
- The largest annual decrease in ridership occurred between 2016 and 2017 (22% decrease in ridership), but has shown steady decreases (at least 9%) for all other years.
- Revenue hours on Route 4 have fluctuated but overall has decreased by 10% since 2014. Marginal changes in revenue service are seen between 2014 and 2016 (total decrease of 0.2%), with a large decrease (26%) between 2016 and 2017. Revenue hours then increased by 21% between 2017 and 2018.

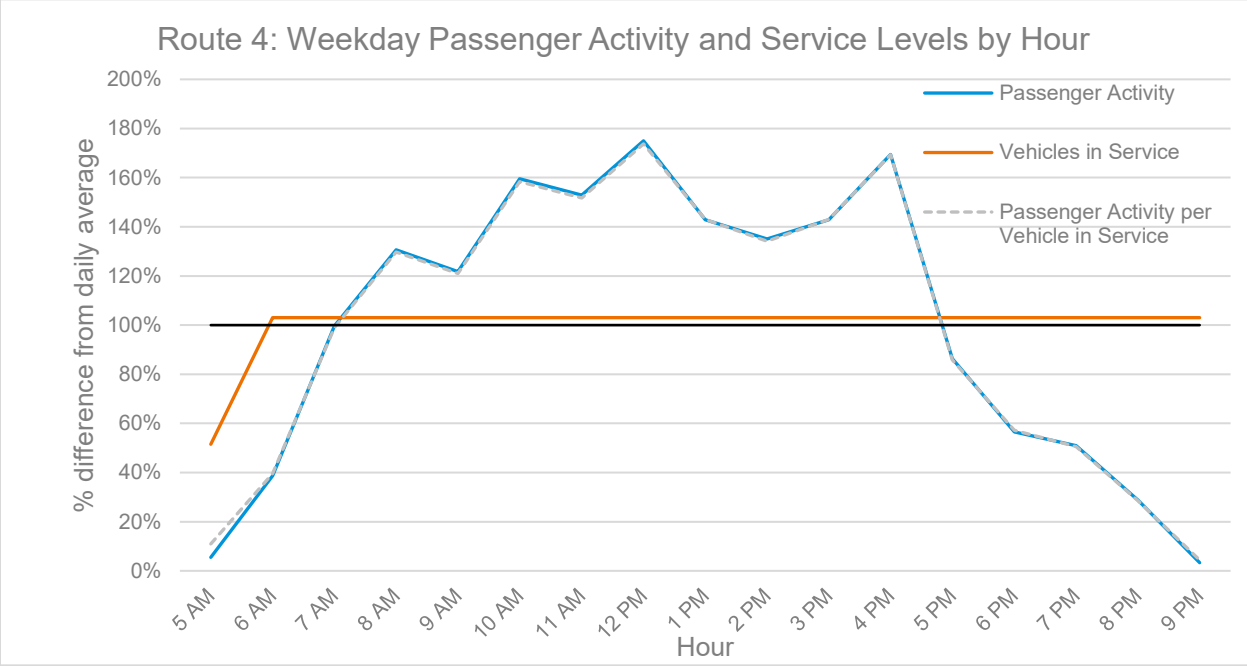


Figure 53: Route 4 transit supply and demand as a function of daily average across a typical weekday

- Overall, vehicle activity for Route 4 stays steady during service hours, and passenger activity per vehicle in service is nearly identical to overall passenger activity. However, vehicle service activity stays constant despite variations in passenger activity throughout the day. The largest variations

are seen during passenger peaks at 12 pm and 4 pm. After 4 pm, passenger activity dramatically decreases, and after 5 pm an oversupply of vehicles is seen in relation to passenger activity.

Table 9: Route 4 performance metrics.

	Route	Avg. daily boardings	Revenue hours (scheduled)	Boardings per revenue hour	Early time points (%)	Late time points (%)
Weekday	Route 4	550	30.1	18.3	0.8	20.0
	All routes (avg)	608	40.8	12.9	0.8	22.3
Saturday	Route 4	117	13.2	8.9	2.6	5.2
	All routes (avg)	296	22.9	11.0	1.3	15.0
Sunday	Route 4	98	13.2	7.4	0.9	2.2
	All routes (avg)	213	18.8	9.7	1.3	12.9

5.2.4 Route 5: Quartz Hill via Avenue L

- Route 5 operates between Sgt. Steve Owen Memorial Park in Lancaster and Mayflower Gardens Convalescent Hospital and Residential Living Center at 67th St. and Ave. L-15, west of Quartz Hill.
- Route 5 predominately runs along Avenue M, 50th St., and Avenue L, with the only major transfer center on the route located at Sgt. Steve Owen Memorial Park.
- Route 5 has seen decreased ridership since 2014. Between 2014 and 2015, ridership saw a slight decrease of 3%, followed by a larger ridership decrease between 2015 and 2016 of 14%. Between 2016 and 2017, ridership saw a large decrease of 25%, followed by a slightly smaller decrease of 23% between 2017 and 2018.
- Overall, ridership has fallen by 52% since 2014, and currently comprises 2% of the total local fixed route ridership.
- Since 2014, revenue hours on Route 5 have fluctuated. Overall, revenue hours have increased by 12% between 2014 and 2018.
- Between 2014 and 2015, revenue hours increased slightly by 0.2%, followed by another slight increase of 2% between 2015 and 2016. Between 2016 and 2017, revenue hours increased significantly (36%), but was then followed by a large decrease of 20% between 2017 and 2018.

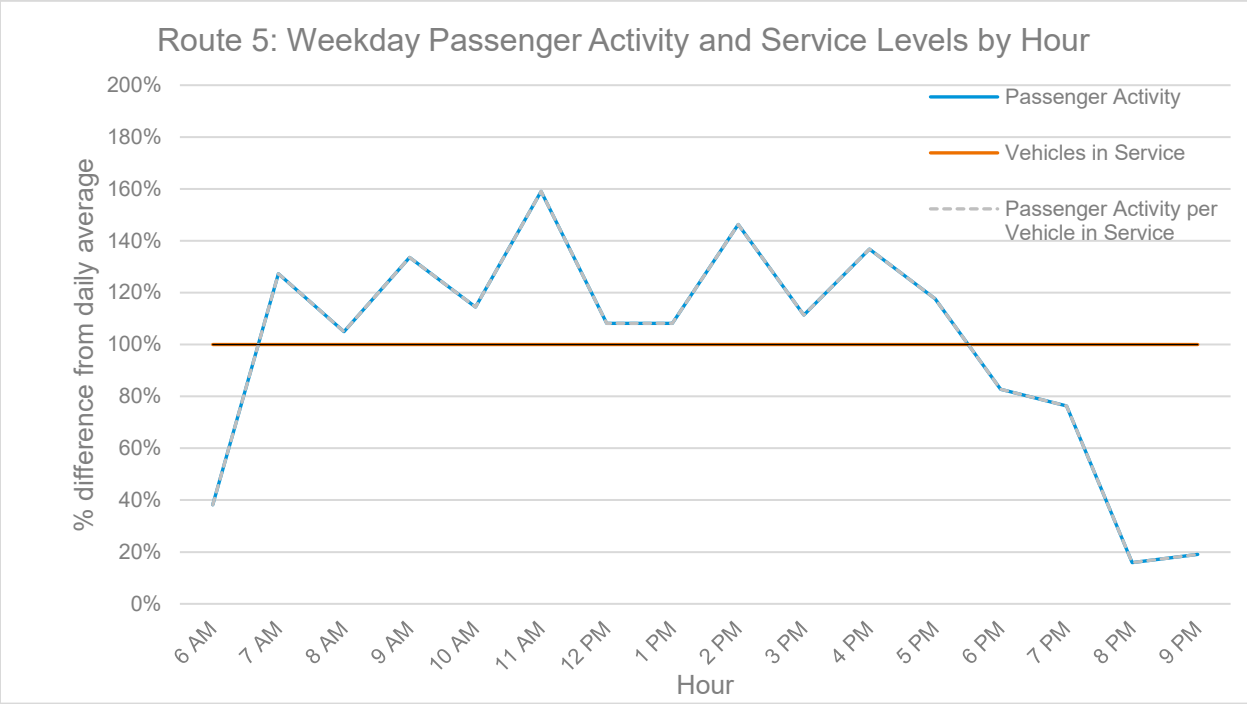


Figure 54: Route 5 transit supply and demand as a function of daily average across a typical weekday

- Route 5 sees many variations in passenger activity throughout the average weekday, with the largest peaks occurring at 11 am and 2 pm. Passenger activity begins to decrease at 5 pm and continues to decrease until service hours end and they supply of vehicles surpasses passenger demand. Service levels remain constant during operating hours despite these sharp variations in passenger activity.

Table 10: Route 5 performance metrics.

	Route	Avg. daily boardings	Revenue hours (scheduled)	Boardings per revenue hour	Early time points (%)	Late time points (%)
Weekday	Route 5	174	16.6	10.5	0.7	6.4
	All routes (avg)	608	40.8	12.9	0.8	22.3
Saturday	Route 5	103	11.7	8.8	1.9	0.5
	All routes (avg)	296	22.9	11.0	1.3	15.0
Sunday	Route 5	77	11.7	6.6	0.0	1.4
	All routes (avg)	213	18.8	9.7	1.3	12.9

5.2.5 Route 7: Rancho Vista/Lancaster

- Route 7 runs between the LA County Sheriff's Office at Sierra Hwy and Lancaster Blvd. in Lancaster and the Palmdale Transportation Center in Palmdale, with access to the Palmdale Metrolink Station.

- Route 7 also provides access to Antelope Valley College at 30th St. and Ave. K, Quartz Hill Elementary School and Library at 50th St. and Ave. M, and Antelope Valley Mall at 10th St. and Marketplace.
- Route 7 provides access to the Quartz Hill and Rancho Vista neighborhoods, and the southern portion of the route is duplicated by Supplemental Route 97.
- Route 7 comprises 7% of total ridership on the local fixed route service. Overall, Route 7 has displayed a 20% decrease in ridership between 2014 and 2018.
- While Route 7 displays a net decrease in ridership with decreases every year from 2014 to 2017, ridership increased by 6% between 2017 and 2018, a departure from the pattern displayed by a majority of routes.
- Unlike other routes, which have seen large changes in revenue hours, Route 7 has experienced a relatively small change in revenue hours between 2014 and 2018 (2% increase). However, large changes in revenue service hours are seen year-to-year, with the most significant being a 22% decrease in revenue hours from 2016 to 2017 followed by a 15% increase between 2017 and 2018.
- As with Route 1, Route 7 displays inconsistent headways during weekday and weekend service. Weekday frequencies fluctuate between 55 and 68 minutes, whereas weekend service varies between 50 and 70 minutes.

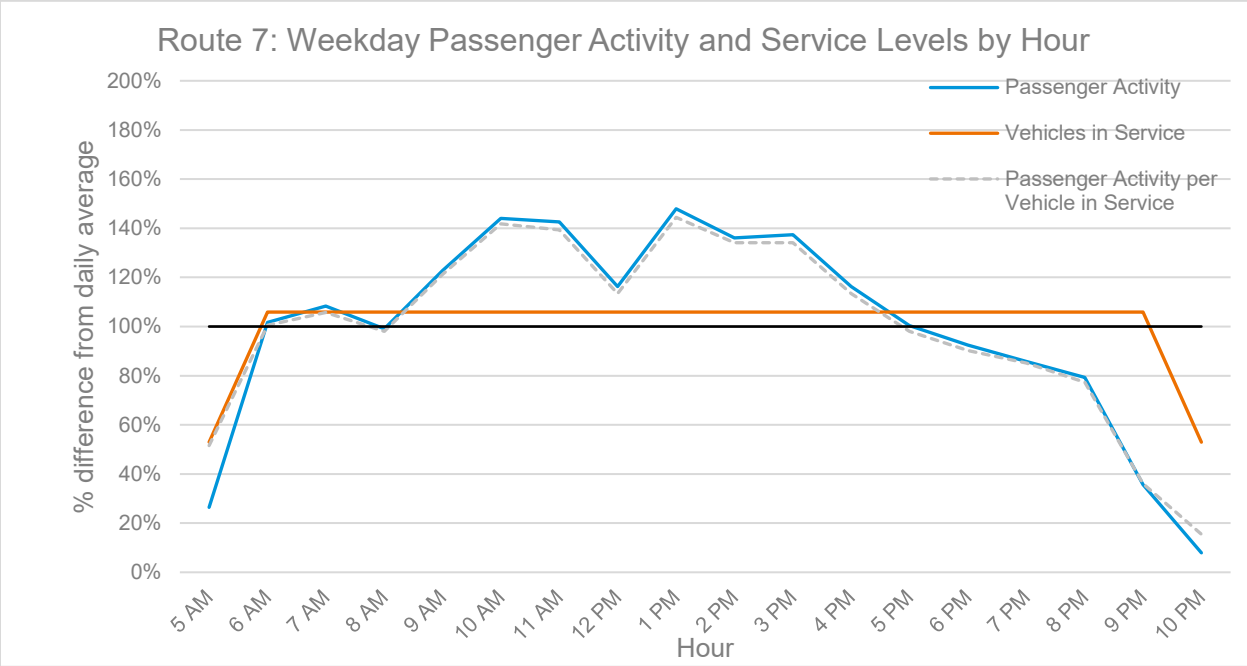


Figure 55: Route 7 transit supply and demand as a function of daily average across a typical weekday

- Average weekday passenger activity on Route 7 has dual midday peaks, from 10-11am and at 1 pm, while service activity remains constant from 6am-9pm. Vehicle service levels closely match passenger activity in the morning hours from 6am-8am, but once passenger activity begins to increase at 9 am, it surpasses vehicle supply until passenger activity dips below vehicle service at 5 pm.

Table 11: Route 7 performance metrics.

	Route	Avg. daily boardings	Revenue hours (scheduled)	Boardings per revenue hour	Early time points (%)	Late time points (%)
Weekday	Route 7	476	33.0	14.4	1.1	28.0
	All routes (avg)	608	40.8	12.9	0.8	22.3
Saturday	Route 7	277	26.9	10.3	0.5	26.7
	All routes (avg)	296	22.9	11.0	1.3	15.0
Sunday	Route 7	212	22.7	9.3	0.5	13.9
	All routes (avg)	213	18.8	9.7	1.3	12.9

5.2.6 Route 8: Antelope Valley College

- Route 8 provides service between Antelope Valley College, the Palmdale Transportation Center, and the AVC Palmdale Center in effort to develop a strong student population base, as student populations often compose a significant portion of transit ridership across North America.
- Also known as the AVC Shuttle, Route 8 provides express service with few stops between destinations, with the only other stop at Palmdale Blvd. and 25th St., with access to Palmdale High School and offers transfers to Routes 1 and 51.
- As the purpose of this route is to provide express service to and from Antelope Valley College, the small number of stops aligns with the attempt to provide fast travel times. However, the small number of stops may discourage students living along the line but far from stops from using the service.
- In the Fall of 2018, its first semester of operation, the service experienced approximately 115 average weekday riders (4.1 passengers per revenue hour). Since the students were given student discounts that resulted in free fares during this time, the ridership observed is lower than expected.
- The service operates at 80-minute frequencies and the last southbound trip departing from AV College leaves at 4:55pm. Therefore, although the travel times may be faster on this express service, the low frequency of operation paired with limited service span mean that other routes likely provide greater convenience for students.
- AVTA demonstrated that they wanted to make a service dedicated to students to provide a convenient service tailored to getting students quickly between AV College and PTC. While this

service aims to provide riders with a one-seat-ride between a major transit hub and the college, ridership shows that this service in its current form needs improvement. Instead of providing a designated service for the college that operates at low frequencies and has a limited service span, there is opportunity to redesign existing services, such as Routes 5, 7 and 12 to provide a better level of service. Students could use these routes, which operate at higher frequencies than Route 8, to connect to Route 1 for access to Palmdale Transportation Center. In general, AVTA could benefit from developing a grid-like system that focuses service on major corridors that intersect instead of providing services that focus on one specific need or trip purpose.

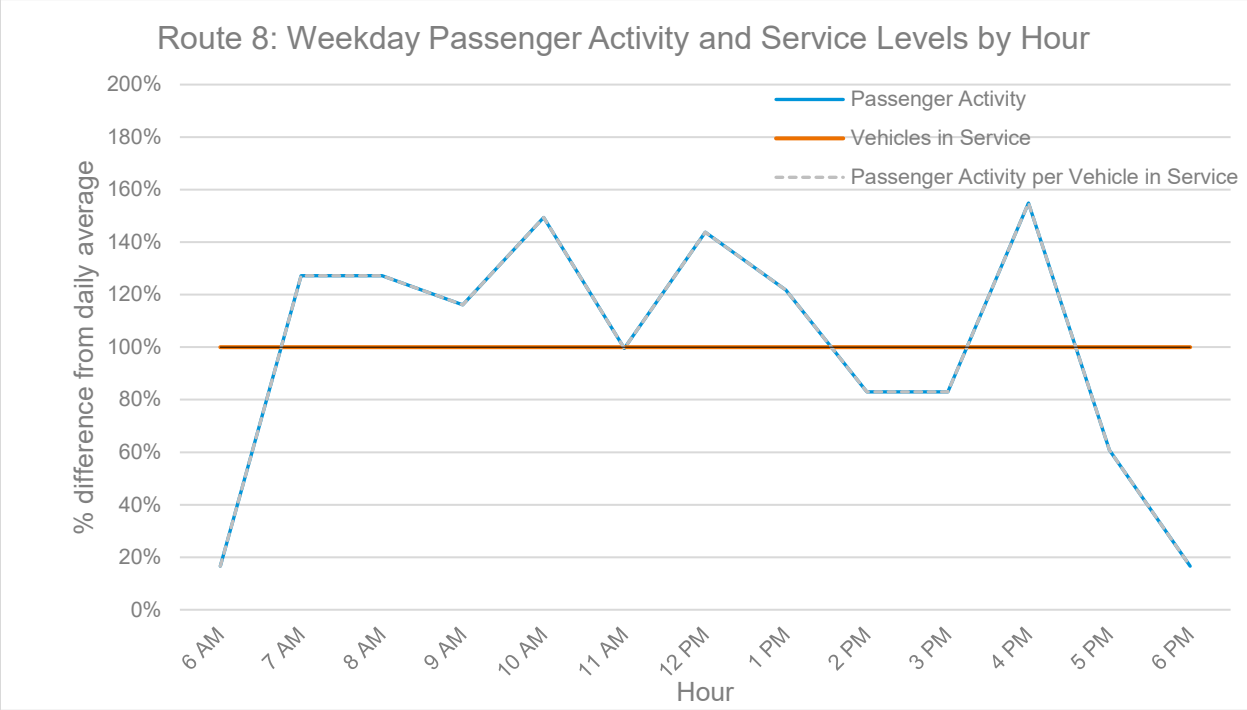


Figure 56: Route 8 transit supply and demand as a function of daily average across a typical weekday

- Passenger activity on Route 8 varies widely throughout service hours, most likely as a result of student and class schedules, while vehicle service levels remain constant. Because there are no major peaks and passenger activity fluctuates throughout the day, it is logical to provide a consistent number of vehicles in service throughout the day. After 5 pm, service levels remain constant despite a sharp decline in passenger activity that begins after 4 pm, which is approximately the time when the final trips are departing from AV College.

	Route	Avg. daily boardings	Revenue hours (scheduled)	Boardings per revenue hour	Early time points (%)	Late time points (%)
Weekday	Route 8	115	10.3	4.1	1.0	9.4
	All routes (avg)	608	40.8	12.9	0.8	22.3

5.2.7 Route 9: Quartz Hill via Avenue H

- Route 9 provides service to the northwestern portion of the Antelope Valley, between Quartz Hill and Lancaster. Route 9 is the only route to offer service to the University of Antelope Valley, the Mira Loma Detention Center, and Antelope Valley State Prison.
- Offers major transfer points in Lancaster at Sgt. Steve Owen Memorial Park at Sierra Hwy. and Lancaster Blvd., where transfers to routes 1, 4, 7, 11, and 747 are available. Route 9 also provides service to Quartz Hill High School at its western terminus.
- Route 9 provides access to the western portion of Lancaster, which is not duplicated by any other existing routes while still providing important connections at other stops, but only makes up 2% of total local route boardings.
- Route 9 began service in 2017, and has seen a ridership increase of 187% between 2017 and 2018 (11,694 in 2017 to 33,551 in 2018), the largest ridership increase in the system.
- Route 9 revenue hours also increased by 56% between 2017 (2,832 revenue hours) and 2018 (4,409 revenue hours).

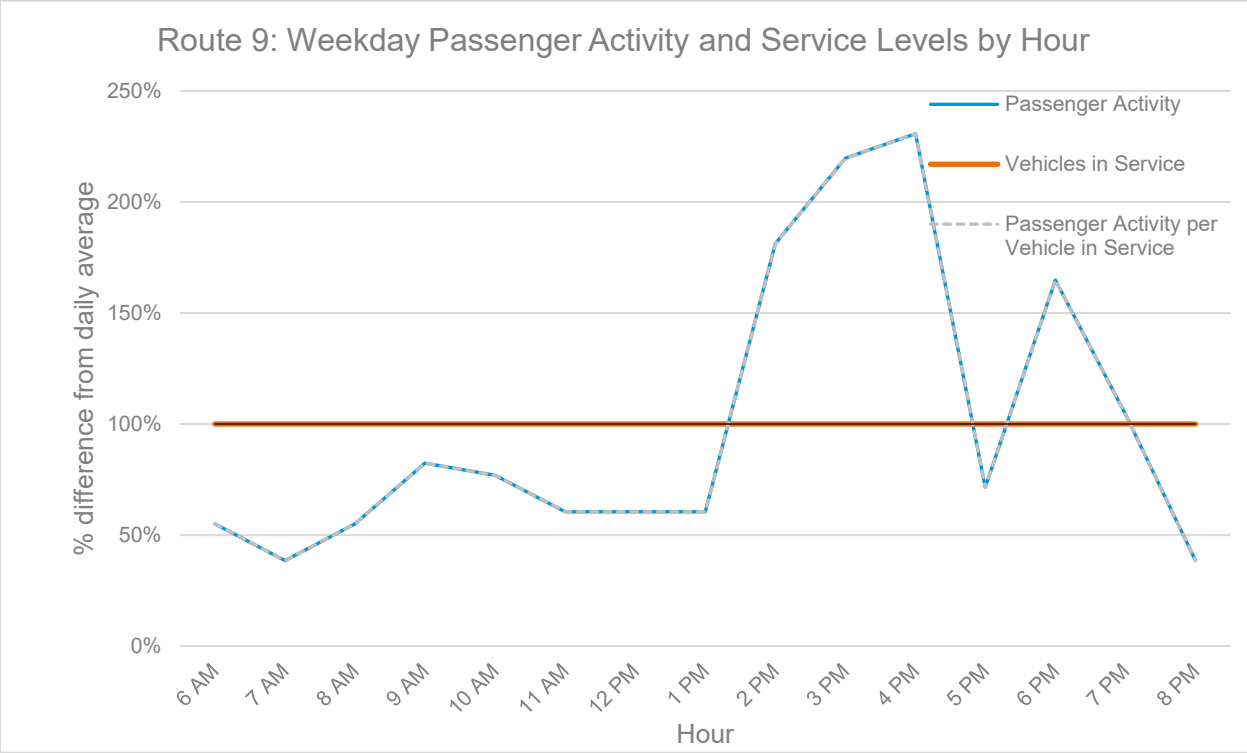


Figure 57: Route 9 transit supply and demand as a function of daily average across a typical weekday

- Route 9 sees wide variances in passenger activity throughout the day, which is not reflected by the vehicle service levels, which stay constant throughout weekday service hours. According to average weekday passenger trends, vehicles in service are oversupplied in the first half of the

day, after which a significant jump in ridership causes vehicle shortages throughout the latter half of the day, aside from a sharp dip in passenger activity seen at 5 pm.

Table 12: Route 9 key performance metrics.

	Route	Avg. daily boardings	Revenue hours (scheduled)	Boardings per revenue hour	Early time points (%)	Late time points (%)
Weekday	Route 9	112	13.3	8.4	1.2	37.8
	All routes (avg)	608	40.8	12.9	0.8	22.3
Saturday	Route 9	55	10.4	5.3	0.9	9.4
	All routes (avg)	296	22.9	11.0	1.3	15.0
Sunday	Route 9	50	10.3	4.9	2.7	31.8
	All routes (avg)	213	18.8	9.7	1.3	12.9

5.2.8 Route 11: East/West Lancaster via Avenue I and Route 12: East/West Lancaster via Avenue J

- Routes 11 and 12 provide east-west service to Lancaster between Antelope Valley College to the west and 40th St. to the east.
- Both routes provide access to the Sgt. Steve Owen Memorial Park station, with available transfers to local routes, supplemental routes, and commuter routes. At Sierra Hwy and Lancaster Blvd., Route 11 also provides transfers to the Lancaster Metrolink Station.
- Routes 11 and 12 provide access to many schools in the Lancaster area: Tierra Bonita Elementary School and Park, Miller Elementary School, Linda Verde Elementary School, El Dorado Elementary School, Amargosa Creek Middle School, Desert Winds High School, Antelope Valley High School, and Antelope Valley College.
- Routes 11 and 12 also provide access to Lancaster City Hall, Lancaster Marketplace, Antelope Valley Hospital, Kaiser Permanente Lancaster Medical Offices, grocery stores, and several mobile home parks.
- Combined, Routes 11 and 12 account for 28% of total local fixed route ridership, but have experienced significant ridership losses (26% and 43%, respectively) between 2014 and 2018.
- Both routes have seen decreases in ridership every year since 2014. The smallest ridership decrease for both routes was seen between 2017 and 2018, where Route 11 saw a 6% decrease and an 8% decrease for Route 12.
- Revenue hours on both routes have varied between 2014 and 2018. Overall, Route 11 has experienced a 3% increase in revenue hours, while Route 12's revenue hours decreased by 8%.

- Overall, Route 11 has more revenue hours and passengers than Route 12, though Route 12 has more boardings/revenue hour than Route 11.

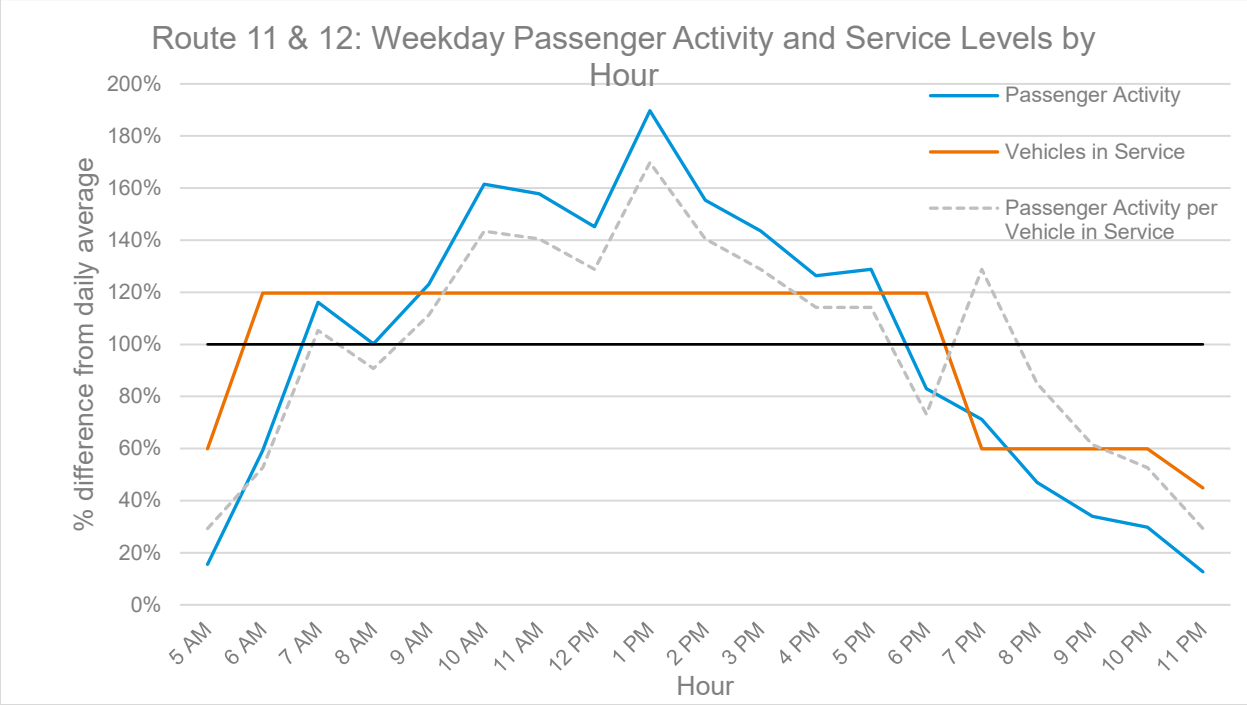


Figure 58: Route 11 and 12 transit supply and demand as a function of daily average across a typical weekday

- Routes 11 and 12 show high levels of variation in passenger activity throughout the day. Service activity remains constant between 6 am and 6 pm, after which it declines, following the passenger activity pattern. Passenger peaks, occurring at 10 am and 1 pm, experience a shortage of vehicle supply during this time.

Table 13: Route 11 key performance metrics.

	Route	Avg. daily boardings	Revenue hours (scheduled)	Boardings per revenue hour	Early time points (%)	Late time points (%)
Weekday	Route 11	1,055	66.8	15.8	0.5	28.9
	All routes (avg)	608	40.8	12.9	0.8	22.3
Saturday	Route 11	455	28.2	16.1	1.5	14.3
	All routes (avg)	296	22.9	11.0	1.3	15.0
Sunday	Route 11	350	28.2	13.6	1.5	19.8
	All routes (avg)	213	18.8	9.7	1.3	12.9

Table 14: Route 12 key performance metrics.

	Route	Avg. daily boardings	Revenue hours (scheduled)	Boardings per revenue hour	Early time points (%)	Late time points (%)
Weekday	Route 12	1,047	53.3	19.6	0.3	16.7
	All routes (avg)	608	40.8	12.9	0.8	22.3
Saturday	Route 12	409	22.5	18.2	2.3	7.5
	All routes (avg)	296	22.9	11.0	1.3	15.0
Sunday	Route 12	308	20.6	15.0	0.7	11.4
	All routes (avg)	213	18.8	9.7	1.3	12.9

5.2.9 Route 50: Lake LA/Lancaster

- Route 50 is one of two routes providing service, largely along Avenue J, to Lake Los Angeles, from Sgt. Steve Owen Memorial Park in Lancaster to Town Center Plaza in Lake Los Angeles.
- Route 50 provides multiple intermediary stops between Owen Memorial Park and Town Center Plaza along Avenue J, Avenue L, Avenue K-8, and Avenue N-4, which provides access to grocery stores and shopping centers.
- As Route 50 provides service to the more rural areas of the Antelope Valley, service frequency is adequate due to the low population and employment density of the Lake Los Angeles area. However, this route is important as it is the only fixed-route public transit service between Lake Los Angeles and Lancaster, especially as a portion of Lake Los Angeles displays a fairly high rate of zero-vehicle households who may rely on this service.
- Unlike many routes in the system, Route 50 experienced a ridership increase of 35% between 2017 and 2018.
- This increase in ridership was coupled with an increase in revenue hours of 49% between 2017 and 2018.
- Despite the large increase in ridership, Route 50 comprises 2% of total local fixed route ridership, the second-lowest ridership of all routes in the system.

Table 15: Route 50 key performance metrics.

	Route	Avg. daily boardings	Revenue hours (scheduled)	Boardings per revenue hour	Early time points (%)	Late time points (%)
Weekday	Route 50	125	18.2	6.9	3.2	50.8
	All routes (avg)	608	40.8	12.9	0.8	22.3
Saturday	Route 50	76	13.8	5.5	1.3	16.1
	All routes (avg)	296	22.9	11.0	1.3	15.0
Sunday	Route 50	52	12.2	4.3	0.0	25.3
	All routes (avg)	213	18.8	9.7	1.3	12.9

5.2.10 Route 51: Lake LA/Palmdale

- Much like Route 50, Route 51 provides service to Lake Los Angeles from Palmdale. Starting at the Palmdale Transportation Center, the route travels east, predominately along Palmdale Blvd., to the Town Center Plaza in Lake Los Angeles.
- Unlike Route 50, Route 51 provides more stops along its route, predominately in the southeastern area of Palmdale, where stops provide access to shopping centers, grocery stores, Littlerock High School, and Lake Los Angeles School.
- Between 2017 and 2018, Route 51 experienced a ridership increase of 51% and comprised 3% of total ridership in 2018.
- It is not surprising that this route has higher ridership than Route 50, as its connection to the Palmdale Transportation Center connects to a myriad of other AVTA local routes and the Palmdale Metrolink Station with access to the Antelope Valley line, which provides access to the larger region outside the Antelope Valley. Additionally, the presence of stops with more activity centers and amenities reinforces this observation.
- Between 2017 and 2018, Route 51's revenue hours increased by 45%.

Table 16: Route 51 key performance metrics.

	Route	Avg. daily boardings	Revenue hours (scheduled)	Boardings per revenue hour	Early time points (%)	Late time points (%)
Weekday	Route 51	191	17.7	10.8	0.3	29.5
	All routes (avg)	608	40.8	12.9	0.8	22.3
Saturday	Route 51	137	13.5	10.1	2.3	17.6
	All routes (avg)	296	22.9	11.0	1.3	15.0
Sunday	Route 51	104	11.9	8.7	7.7	11.7
	All routes (avg)	213	18.8	9.7	1.3	12.9

5.2.11 Route 52: Littlerock/Pearblossom

- Route 52 provides service to the communities of Littlerock and Pearblossom in the southeastern portion of the Antelope Valley.
- While predominately a local line serving Littlerock, Pearblossom, and Sun Village, Route 52 also provides connections to Routes 1, 2, and 3 at 47th St. and Avenue S. Route 52 provides seven stops with access to multiple shopping centers, grocery stores, Keppel Academy, Pearblossom Elementary School, Antelope Elementary School, and Littlerock High School.

- Pearblossom and Littlerock are rural, unincorporated communities south of Lake Los Angeles and north of the Angeles National Forest. As with routes 50 and 51, this service is important to provide despite the fairly low population density and low proportion of zero-vehicle households.
- As with Route 50 and 51, Route 52 increased revenue hours significantly (46%) between 2017 and 2018.
- Unlike Routes 50 and 51, which saw large ridership increases between 2017 and 2018, ridership on Route 52 increased by 6% in the same span of time.

Table 17: Route 52 key performance metrics.

	Route	Avg. daily boardings	Revenue hours (scheduled)	Boardings per revenue hour	Early time points (%)	Late time points (%)
Weekday	Route 52	134	17.7	7.6	0.9	5.9
	All routes (avg)	608	40.8	12.9	0.8	22.3
Saturday	Route 52	80	11.6	6.9	1.4	10.6
	All routes (avg)	296	22.9	11.0	1.3	15.0
Sunday	Route 52	68	11.7	5.8	1.6	14.7
	All routes (avg)	213	18.8	9.7	1.3	12.9

5.2.12 Supplemental routes 94, 97, and 98

In addition to its local routes, AVTA operates three (3) supplemental bus routes during peak periods to accommodate the increased demand for those traveling to and from school and alleviate overcrowding on local routes during peak hours. These three routes, Routes 94, 97, and 98, operating predominately in Lancaster and Palmdale, also providing service to Quartz Hill in the western Antelope Valley.

These routes operate Monday-Friday and do not provide weekend service. Monday, Tuesday, Thursday, and Friday, each route operates one AM and one PM run to and from the high schools and major destinations. Wednesday schedules operate differently, providing one PM run either westbound or eastbound and no AM runs to coincide with school schedules. As with local routes, supplemental routes do not operate on major holidays.

A summary of supplemental routes is outlined below.

Table 18: Service characteristics of supplemental routes.

Route	Westbound Destination	Westbound Service Span	# of Runs	Eastbound Destination	Eastbound Service Span	# of Runs
Route 94	Owen Memorial Park	2:27-3:55pm M-T, Th-F 1:12-2:12pm W	1, PM 1, PM	Antelope Valley High School/Eastside High School	6:40-7:27am M-F	1, AM

Route	Westbound Destination	Westbound Service Span	# of Runs	Eastbound Destination	Eastbound Service Span	# of Runs
Route 97	Quartz Hill High School	6:35-7:10am M-F	1, AM	Palmdale Transportation Center	3:15-3:45pm M-T, Th-F 1:20-1:50pm W	1, PM 1, PM
Route 98	Palmdale Transportation Center	2:52-3:22pm M-T, Th-F 1:04-1:39pm W	1, PM 1, PM	Pete Knight High School	6:40-7:15am M-F	1, AM

Table 19: Supplemental routes key performance metrics.

	Route	Avg. daily boardings	Revenue hours (scheduled)	Boardings per revenue hour	Early time points (%)	Late time points (%)	Cost per boarding	Farebox recovery ratio
Weekday	Route 94	30	2.2	13.6	NA	NA	$9.01	16.57%
Weekday	Route 97	27	0.6	45.0	NA	NA	$3.17	41.79%
Weekday	Route 98	35	1.0	35.0	NA	NA	$3.70	50.58%
	All routes (avg)	31	1.3	31.2	0.8	22.3	$10.09	17%

- The supplemental routes have some of the highest farebox recovery ratios and lowest costs per boarding. This is due to the way service is tailored to a specific demand population and time of day. Route 98, which has the highest farebox recovery ratio, operates three daily trips during peak school hours. A small number of vehicles are used to carry a large daily student population, which results in more efficient and productive service. This is not expected to be the case for other routes that provide service throughout the entire service day.

5.2.12.1 Supplemental Route 94

- Supplemental Route 94 operates in Lancaster, providing service to Antelope Valley and Eastside High Schools. This route provides service to supplement local Routes 4 and 11, which also provide access to Antelope Valley High School, as well as to Eastside High School, a stop not provided by any other existing local routes.
- In addition to Antelope Valley and Eastside High Schools, Route 94 also provides access to Sgt. Steve Owen Memorial Park, which provides transfers to local, supplemental, and commuter routes.
- Weekday service (excluding Wednesdays) provides one AM run eastbound from Sgt. Steve Owen Memorial Park first to Antelope Valley High School and terminating at Eastside High School, then making one PM run westbound from Antelope Valley High School terminating at Sgt. Steve Owen Memorial Park. On Wednesdays, Route 94 provides one PM westbound run from Antelope Valley High School to Sgt. Steve Owen Memorial Park.
- Between 2014 and 2018, Route 94 has experienced a net ridership loss of 33%, though ridership fluctuates year-to-year during this time.

- Route 94 experienced its most significant ridership losses between 2014 and 2016. Between 2014 and 2015, ridership decreased by 24%, followed by a decrease of 30% the following year.
- However, ridership has steadily increased starting in 2016. Between 2016 and 2017, ridership increased by 14%, followed by a ridership increase of 10% between 2017 and 2018.
- In 2018, Route 94 comprised 32% of total Supplemental Route service.
- Revenue hours have experienced a net decrease of 6% between 2014 and 2018. While revenue hours remained constant between 2014 and 2015, hours significantly decreased 2015-2017. Revenue hours then increased by 50% between 2017 and 2018.
- Interesting to note that between 2016 and 2017, revenue hours decreased by 31%, but ridership increased by 14%.
- Route 94's bus stop at Eastside High School is about 10-minute walk from the actual school across a desert patch and an athletic field, presenting a pedestrian barrier with the school and transit service.

5.2.12.2 Supplemental Route 97

- Supplemental Route 97 provides service to Quartz Hill and Highland High Schools in Quartz Hill and Palmdale. This route helps to supplement service to Quartz Hill High School provided by local Route 9, and is the only route to provide service to Highland High School. Route 97 also provides service to the Palmdale Transportation Center, with available transfers to local routes, supplemental routes, commuter routes, and Metrolink.
- Service (excluding Wednesdays) provides one AM run westbound from the Palmdale Transportation Center to Quartz Hill High School, with a stop at Highland High School. PM service provides one run Eastbound from Quartz Hill High School to the Palmdale Transportation Center. Wednesday service provides one PM trip eastbound from Quartz Hill High School to the Palmdale Transportation Center.
- Overall, Route 97 has experienced a 44% increase in ridership, though ridership decreased 7% between 2017 and 2018.
- Route 97 represents 29% of total supplemental route ridership.
- Between 2017 and 2018, Route 97 decreased its revenue hours by 22%, but has experienced a 33% increase between 2014 and 2018.

5.2.12.3 Supplemental Route 98

- Supplemental Route 98 provides service from the Palmdale Transportation Center to Pete Knight High School in Palmdale. Route 98 is the only route to provide service to Pete Knight High School, but helps to supplement local routes 1, 2, 3, and 52 which operate in the same areas of Palmdale. Service to the Palmdale Transportation Center also offers access to local routes, supplemental routes, commuter routes, and Metrolink.
- Route 98 operates one AM run eastbound from the Palmdale Transportation Center to Pete Knight High School and one PM run westbound to the Palmdale Transportation Center on all weekdays excluding Wednesdays. Wednesday service provides one PM run westbound.
- Though ridership has experienced a significant decrease (51%) between 2014 and 2018, it still comprises 38% of all supplemental service ridership, the highest ridership of any supplemental route.
- Annual ridership has fluctuated greatly during this time. While a small increase in ridership (6%) was seen between 2014 and 2015, this was followed by a significant decrease (42%) between 2015 and 2016. An increase of 47% was seen the following year, which was followed by a 46% decrease between 2017 and 2018.
- As with ridership, revenue hours have fluctuated between 2014 and 2018. Revenue hours have decreased 24% since 2014, but have experienced changes annually. A small increase (4%) was seen between 2014 and 2015, followed by a significant decrease of 25% between 2015 and 2016. While hours again decreased 15% between 2016 and 2017, a 15% the following year returned revenue hours to virtually the same as 2016 levels.
- Based on discussions with various stakeholders, the current schedule of route 98 is poorly aligned with Pete Knight’s bell times, which could be negatively impacting ridership.

6.0 AVTA COMMUTER SERVICE DELIVERY

Currently, AVTA operates five commuter routes that intend to connect residents in the Antelope Valley with major employment, institiutional and commercial zones outside of the valley, such as Santa Clarita and Downtown Los Angeles. Recently, AVTA added a new service to Edwards Air Force Base (January 2019). Due to lack of data for this new service, the discussion below focuses on the four commuter routes currently in operation (Figure 59).

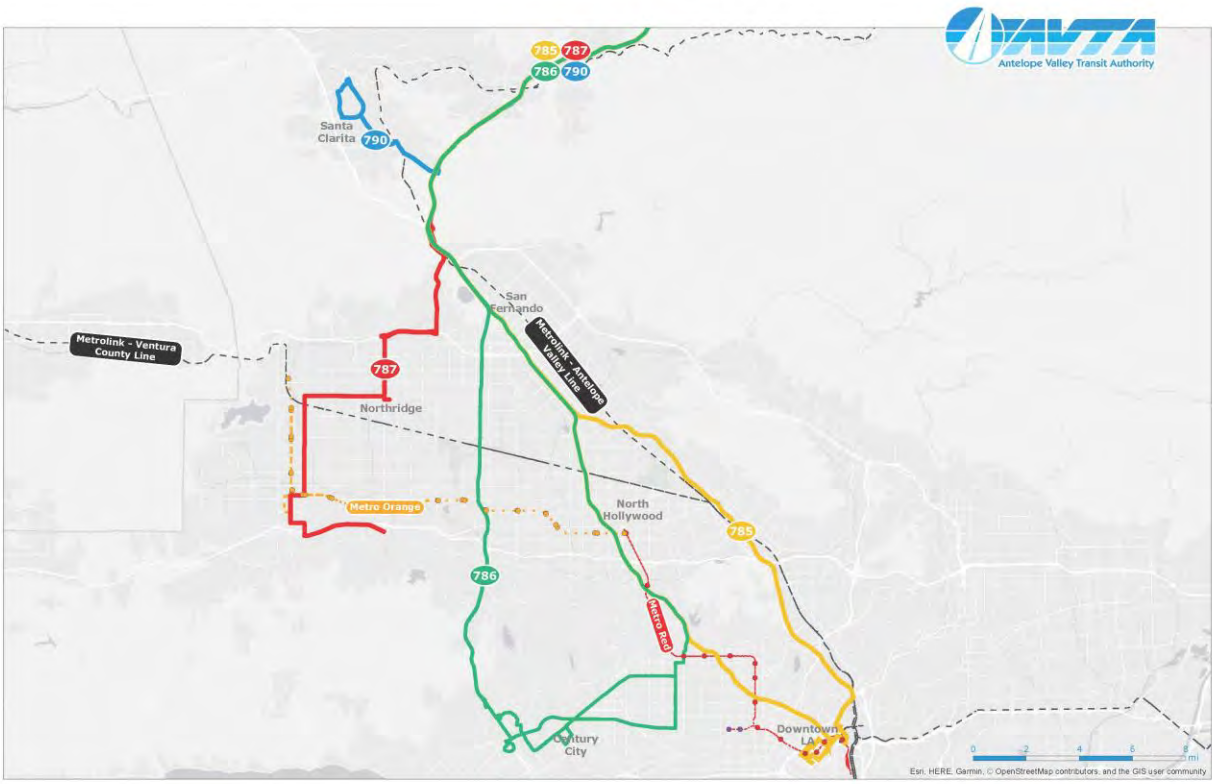


Figure 59: Commuter service routes to Santa Clarita, the San Fernando Valley, and Los Angeles.

6.1 BUILDING COMMUTER RIDERSHIP

Building commuter ridership, while similar to local service ridership, can be predicated on a number of key factors, including:

- **Travel time** along a commuter route is important as this corresponds to the favourability of one mode over another. Travel time is directly related to the transit infrastructure available along the route, including reserved bus lanes, convenient stop facilities, and priority signals. Notably, there is no priority infrastructure along the AVTA commuter routes. Additionally, the distance of a route

will influence the travel time, meaning more complex routes or serving areas located further away will have greater travel times. For example, Route 785 travels approximately 150 miles south of the Valley to downtown LA with travel times upwards of two hours, compounded by the several stops in heavy LA traffic which further increases the travel time. While commuter routes are intended to travel further distances than local routes, minimizing the length of the route to only travel to critical points and leveraging connections to transit modes with greater dedicate transit infrastructure (BRTs, LRTs,or rail) where possible can reduce travel times to final destinations.

- **Reliability**, meaning the on-time performance of a route is important to gain and maintain ridership. This is especially critical on commuter routes as many passengers are required to arrive at work, school, or other scheduled activities by a fixed time. Route distance will greatly influence the reliability of commuter routes traveling into urban areas during peak periods due to traffic congestion. Traveling into areas further south in LA County have route distances of approximately 150 miles with heavy congestion closer to the destinations, which increases the potential for schedule delays. All commuter routes into LA County have a very poor on-time performance with average late times over 40%. Minimizing the length of travel within these congested areas will improve the reliability of the service.

- **Park and ride facilities** are an important component of commuter service, including the location, size, and convenience of these facilities. Currently, the commuter service operates from Owen Memorial Park and the Palmdale Transportation Center in the Valley. The location of these facilities should be convenient for riders to access and minimize the route deviation required to access these facilities. Multi-modal travel to and from these facilities is also a critical component to managing congestion in and around the station including integration of local transit, pedestrian and cycling connections to support non-auto trips to these facilities. Further, this can help to address first and last mile challenges for riders with no access to a vehicle. Additionally, appropriate drop-off and parking facilities with supporting wayfinding will help to guide traffic flow and parking. Increasing non-auto travel modes to access these facilities will support sustainable ridership growth.

- **Route directness** is an important factor in designing commuter routes. The number of turns and stops should be minimized where possible to reduce travel time and remain on schedule. When possible, it is beneficial to minimize the mileage in congested areas, including the travel within southern LA County. A key measure of route directness is the number of turns at intersections per route, with fewer turns resulting in more direct routing.

- **The number of and distance between stops** should be carefully considered, noting that important destinations need to be served while limiting the number of stops that slow down routes. The average distance between drop-off locations can be considered, where stop distances which are unnecessarily small should be revised.

- **Schedule and route consistency** contribute to the ease of use of commuter routes. When schedules do not follow a pattern or several route variants exist it becomes more challenging for riders to understand the service. For example, the two route variations on Route 786 where the

stop order changes in west LA can be confusing and should consider being revised. Additionally, a standard frequency should be considered on all routes, for example, Route 785 operates with frequencies between 15 and 30 minutes.

6.2 OVERVIEW

AVTA operates five (5) commuter bus routes. These routes provide service during peak AM and PM hours when the majority of commuters are expected to use the service. Additionally, Route 790 serves as a daytime commuter route between Antelope Valley and Santa Clarita, intended to fill a gap in Metrolink service to Antelope Valley during this time. The commuter routes do not provide service within Antelope Valley, with runs operating primarily south-west towards downtown Los Angeles, San Fernando Valley, and Santa Clarita. A recent route was introduced in early 2019 which travels north to the Edwards Air Force Base.

These routes operate as express service where passengers travel between Antelope Valley and the final destination with limited stops. Currently, the revenue service is not bidirectional, apart from Route 790, meaning buses depart with passengers from Antelope Valley in the morning and return trips are made with passengers back to Antelope Valley in the evening.

A summary of commuter routes is outlined below.

Table 20: Commuter service overview

Route	Route destination	Weekday Service Span	Weekday Headway	# of Runs
Route 785	Downtown Los Angeles	3:50AM-8:55AM; 2:50PM-7:47PM	15-30 minutes	9 in the AM; 9 in the PM
Route 786	Century City/West Los Angeles	4:00AM-7:19AM; 2:50PM-7:28PM	20-30 minutes	5 in the AM; 5 in the PM
Route 787	West San Fernando Valley	4:00AM-8:58AM; 2:50PM-7:54PM	10-30 minutes	9 in the AM; 9 in the PM
Route 790*	Santa Clarita	7:50AM-5:50PM	10-120 minutes	5 (two-way service)
Route 747**	Rosamond/Edwards Air Force Base	5:15-9:29AM; 2:25-6:45PM	60 minutes	2 in the AM; 2 in the PM

** operates as a mid-day connector service, not during AM or PM peaks*
***began operation in January 2019, excluded from analysis due to limited data*

To understand the performance of commuter routes a number of metrics are provided in Table 21 below.

Table 21: Commuter service performance metrics

Routes	Avg. daily boardings	Revenue hours (scheduled)	Boardings per revenue hour	Early time points (%)	Late time points (%)	Cost per boarding	Farebox recovery ratio
Route 785	375	36.8	10.2	7.9%	42%	$14.30	42%
Route 786	230	24.4	9.4	10.4%	61.5%	$15.11	63%
Route 787	355	38.3	9.3	4.7%	53.9%	$15.09	68%

Routes	Avg. daily boardings	Revenue hours (scheduled)	Boardings per revenue hour	Early time points (%)	Late time points (%)	Cost per boarding	Farebox recovery ratio
Route 790	100	12.1	8.3	7.2%	10.8%	$17.09	27%
Commuter Average	**265**	**27.9**	**9.3**	**7.5%**	**42.1%**	**$15.40**	**50%**

- **Route 785** operates from Palmdale and Lancaster to Union Station with several stops in downtown LA. Route 785 has 9 runs per peak period with the **highest average daily boardings translating to the lowest cost per boarding of $14.30**. **The on-time performance of this route is poor, with 42% of service operating late and 8% of service operating early**. This is due to the heavy traffic in and around LA, worsened by a number of construction projects.

- **Route 786** providing service to Century City and the University of California, Los Angeles campus (UCLA). Route 786 provides less service than 785 with 5 runs per peak period, however, has the second highest boardings per revenue hour. **Route 786 has the poorest on-time performance with 62% of service operating late an 10% operating early**, resulting in very low reliability. Similar to Route 785, this is due to the traffic and construction in LA and results in low reliability. **Route 786 has a very high farebox recovery ratio, likely a result from the highest commuter fare** with a single trip costing $10.75.

- **Route 787** operates to West San Fernando Valley, with a stop at the California State University Northridge campus (CSUN). Route 787 operates 9 runs during each period with the **greatest number of revenue hours and second highest boardings**. Similar to the other two commuter routes operating to LA, the on-time performance is poor, with 54% of service operating late and 5% operating early. **Route 787 has the highest farebox recovery ratio.**

- **Route 790** was created to provide service between Palmdale and the Newhall Metrolink station to compensate for a lack of train service, therefore Metrolink riders are able to board the 790 with their Metrolink ticket. Route 790 operates two-way service (5 runs per direction) during the day. **Route 790 has the lowest number of revenue hours and daily ridership**. The trip distance is considerably shorter than other routes, with trip times of approximately 50 minutes between Santa Clarita and Antelope Valley. **Route 790 has the lowest farebox recovery, which is half the commuter average and has the highest cost per boarding.**

- **Route 747** is the newest commuter route, beginning in January 2019 from Palmdale and Lancaster to the Edwards Air Force Base. Two-way service operates with two runs during each peak period (4 runs in total). As the route just began operations, there is limited data, therefore this route is not included in the commuter analysis.

6.3 SYSTEM-LEVEL ANALYSIS

The service operations of all commuter routes were considered to understand how the service has been operating over the last five years. The annual ridership, service hours and revenue vehicle miles are shown below as these metrics provide a strong understanding of system performance.

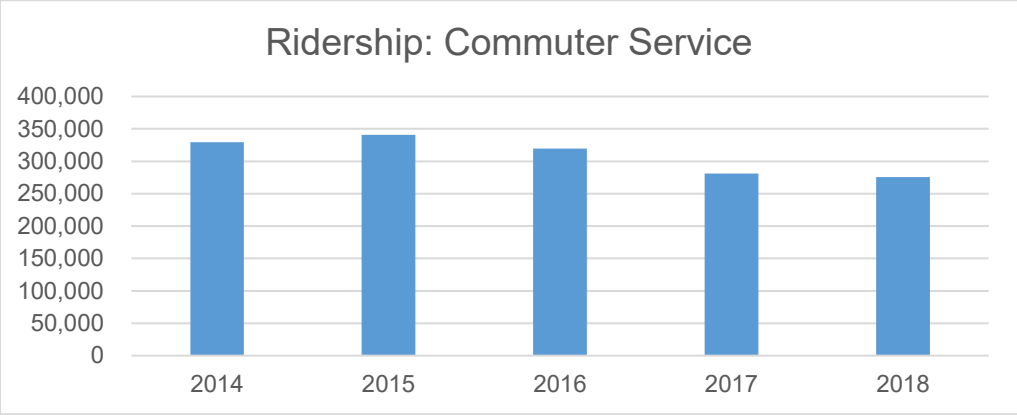


Figure 60: Commuter service ridership since 2014.

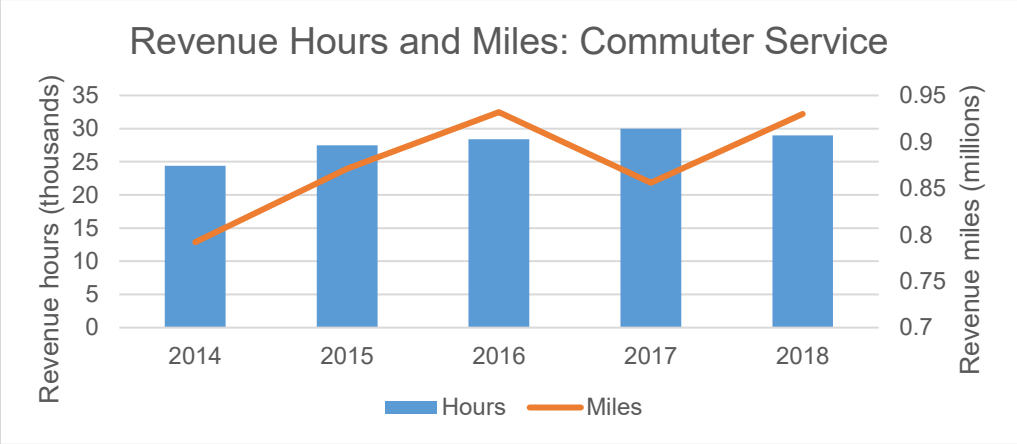


Figure 61: Commuter service revenue hours and miles since 2014.

- **AVTA commuter routes experienced an average loss in ridership of 4% since 2014**, with the exception of an increase between 2014 and 2015 likely attributed to service additions. The largest decrease was seen between 2016 and 2017, with a change in ridership of -12%.
- **Annual revenue hours have continued to increase for the commuter service,** with the largest increase observed between 2014 and 2015 corresponding with additional runs added to the commuter service.

- A large increase in revenue hours is seen in 2017 alongside a large decline in revenue miles. This suggests that in recent years **commuter routes were traveling shorter distances, but trips were taking longer due to traffic and construction**. This correlates with the largest decrease in ridership.

- Despite the increase in revenue vehicle hours and revenue vehicle miles, the ridership along commuter routes continues to decrease. **The increase in revenue miles indicates additional stops or areas being serviced, however this may add additional trip times onto the commuter routes, potentially disincentivizing riders**. Further exploration into commuter service performance will be done in the route-level analysis.

6.4 ROUTE-LEVEL ANALYSIS

To better understand the existing performance of the commuter service, the annual ridership, service hours and revenue miles for each commuter route are shown below.

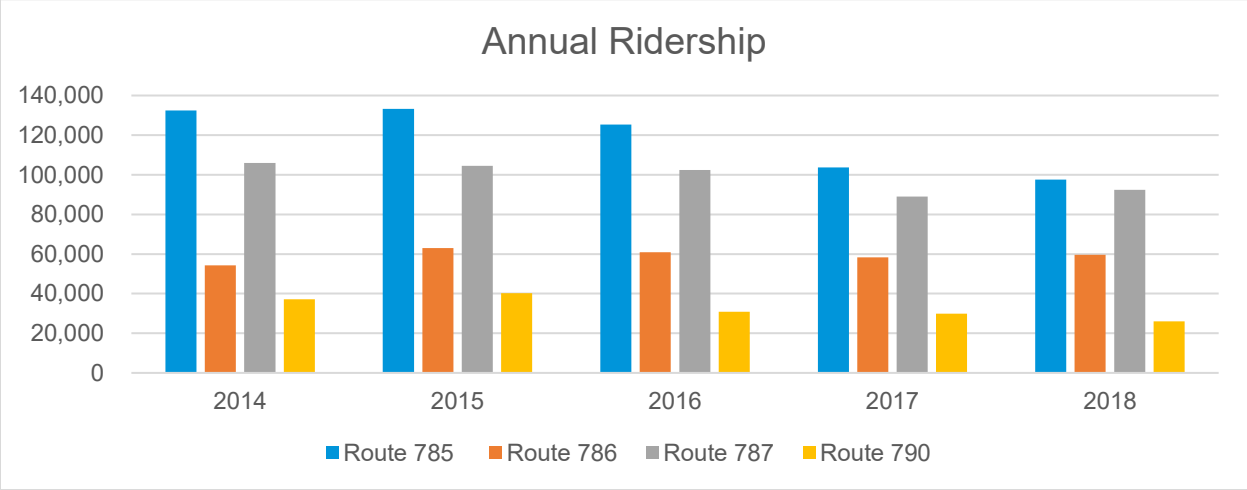


Figure 62: Annual ridership by route by year, commuter service.

- **All routes experienced a large ridership decrease between 2016 and 2017, especially Route 785 (-17%) and Route 790 (-23%).**

- **Ridership along Route 785 experiences an overall decrease,** with an average change in ridership of -7% over the last five years. A marginal increase between 2014 and 2015 (0.7%), coinciding with additional runs added. Between 2015 and 2018, ridership has continued to decrease. The largest change in ridership was between 2016 and 2017, with a change of -13%.

- **Ridership on Route 786 has increased approximately 2% over the last five years.** However, when looking more closely a significant increase is seen between 2014 and 2015 (16%), followed by a continued decrease.

- **Ridership on Route 787 experienced a decrease in ridership between 2014 and 2017**, with the most significant decrease of 13% occurring between 2016 and 2017. **An increase of 4% is seen between 2017 and 2018**.
- **Ridership along Route 790 experiences the largest decrease in ridership of 8%**. The most significant ridership decreases were seen between 2015 and 2016 (-23%).

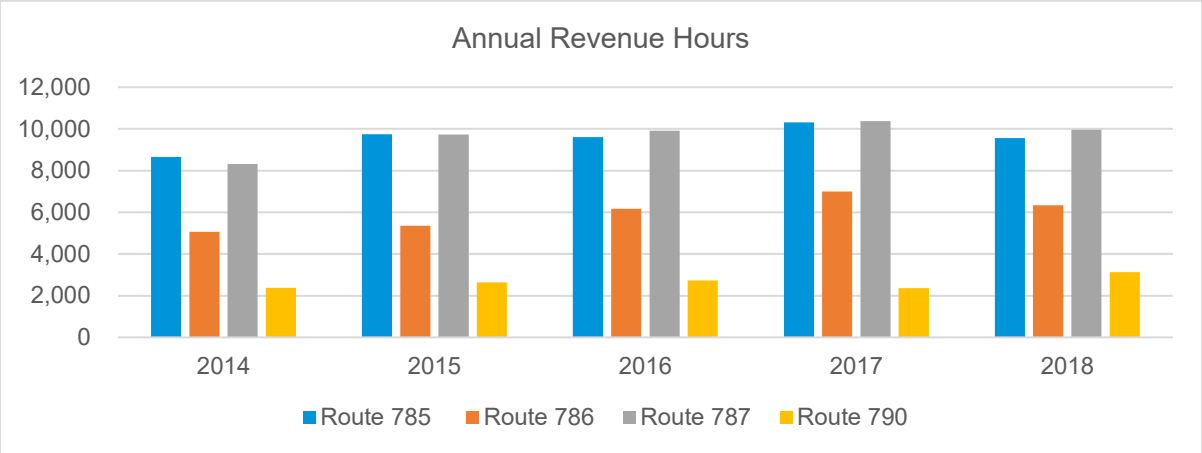


Figure 63: Annual revenue hours by route by year, commuter service.

- **Routes 785, 786 and 787 follow a similar pattern of a continual increase in revenue hours** up until 2017 where a decrease is seen between 2017 and 2018. The largest increase in service hours among the AM/PM peak period service is seen on Route 786 to West Los Angeles with a growth of 6% since 2014.
- **Route 790 has a varied change in revenue hours.** An increase is observed between 2014 and 2016 with a large decrease (-13%) between 2016-2017, followed by a large increase (33%) between 2017-2018. **This route experiences the largest growth overall of 8%, which does not match the declining ridership.**

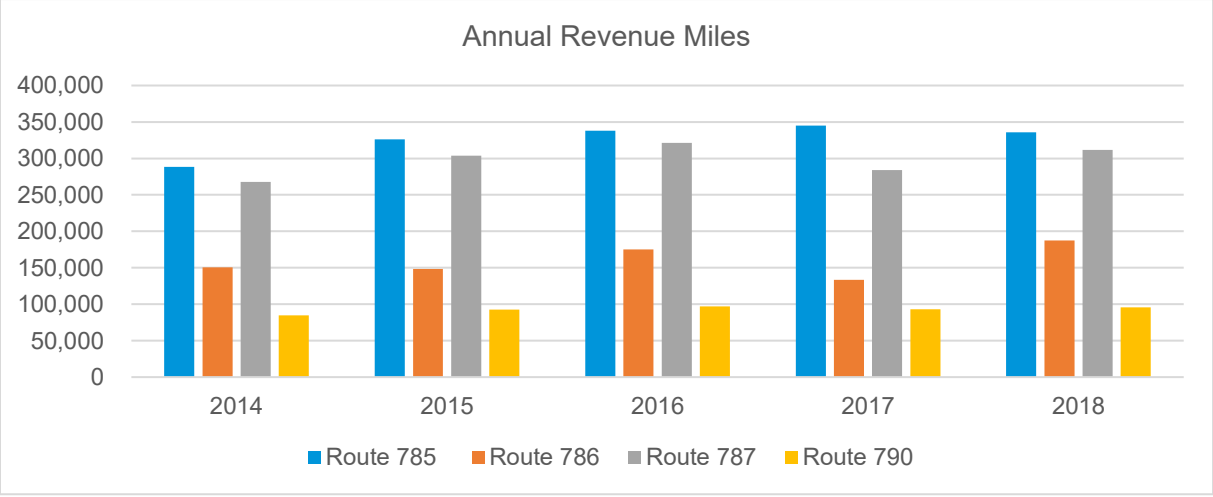


Figure 64: Annual revenue miles by route by year, commuter service.

- From the system-level review, **an overall increase in revenue miles occurred since 2014**.
- Looking at specific routes, a significant reduction in revenue vehicle miles is observed between 2016-2017 on Routes 786 (-23%) and 787(-12%) to West Los Angeles and West San Fernando Valley, respectively. This was followed by an increase in revenue miles on both routes between 2017 and 2018, **Route 786 experienced the largest growth in revenue miles of 8% since 2014**.

6.5 CAPACITY UTILIZATION

To further understand the usage of all commuter routes, the bus occupancy was considered by run and time of day. This was compared to a seated capacity of 53 seats to determine the level of occupancy. The occupancy for each run was determined by taking the 85th percentile and median (50th percentile) of ridership data for the most recent full operating year, 2018. The median (50th percentile) demonstrates typical occupancy, while the 85th percentile aims to reveal top performing runs.

Notably, given the limitations in the data available, Route 785, 786 and 787 PM ridership back into Antelope Valley is not fully captured, with only terminal boardings measured. Therefore, greater occupancy in the PM service is anticipated. The occupancy measured during the AM, PM and midday commuter service is detailed below.

6.5.1 AM Peak Period

The three commuter routes operate during the AM peak hour: Route 785, Route 786 and Route 787. The occupancy is illustrated in the graph below.

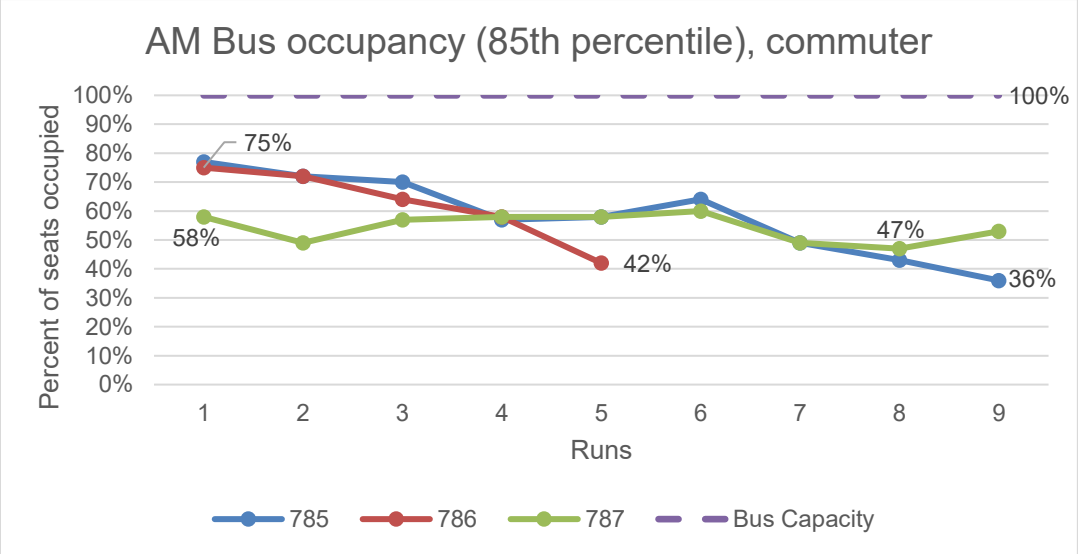


Figure 65: Commuter bus occupancy (85th percentile), AM peak

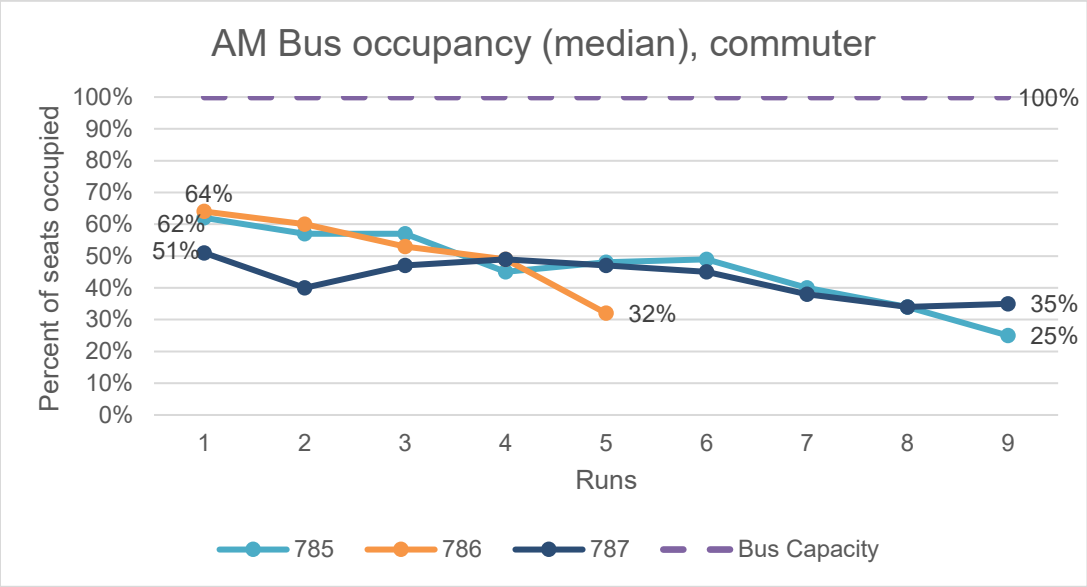


Figure 66: Commuter bus occupancy (median), AM peak

- **Routes traveling into LA (785 and 786) illustrate higher occupancy is highest during earlier runs** (4-5 am), with run 1 containing the highest occupancy along all routes. Given the heavy traffic into LA, worsened by construction, it is likely that service after a certain time will not arrive in LA on time for commuters. Route 787 maintains a more consistent occupancy over all 9 runs, although most buses operate at half the capacity.
- **Routes 786 experiences the sharpest decline** of approximately 8% across the 5 runs (85th percentile). The first run operates with an 85th percentile occupancy of 75% which decreases to 42% by the last run. Notably, the variance in rote alignment, where stops in LA are serviced in the opposite direction along runs 4 and 5 may potentially be adding complexities which result in decreased ridership.
- **Route 787 operates with a more consistent occupancy of around 50% across all 9 runs.** However, this indicates that all buses are traveling have empty between Antelope Valley and West San Fernando Valley.
- Similar to Route 786, **Route 785 sees a decline in occupancy over the 9 runs,** with run 1 operating with an 85th percentile occupancy of 75% which decreases to 36% by run 9.

6.5.2 PM Peak Period

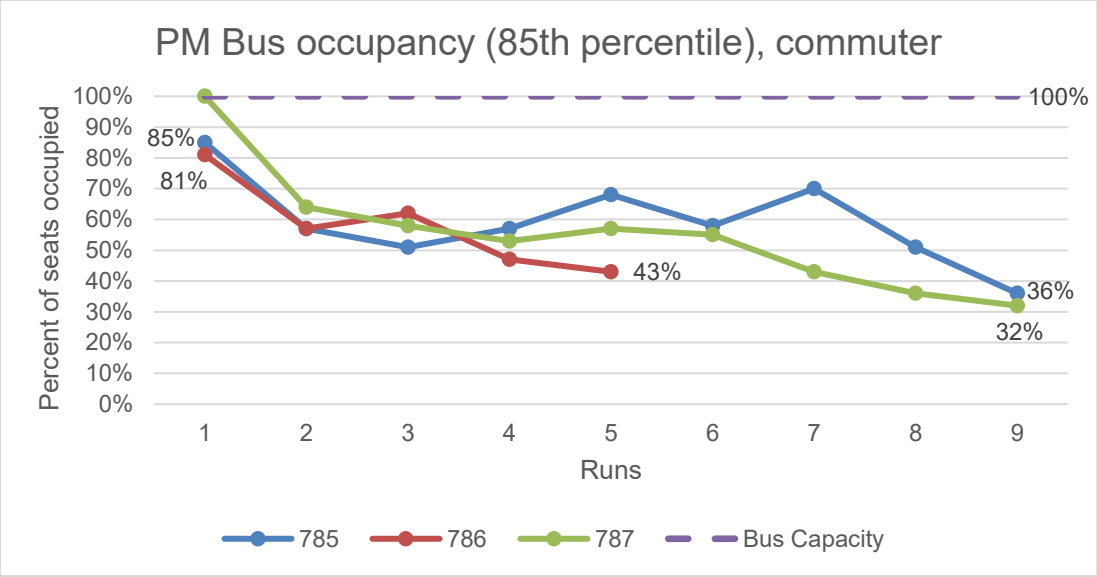


Figure 67: Commuter bus occupancy (85th percentile), PM peak

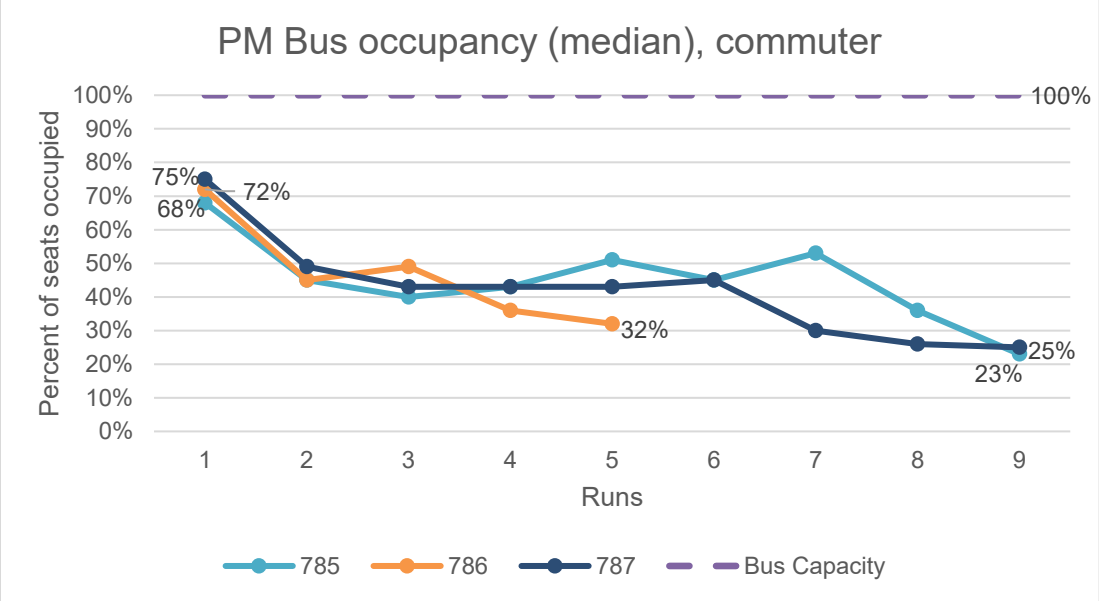


Figure 68: Commuter bus occupancy (median), PM peak

- **Similar to the AM peak period, the highest bus occupancy occurs during run 1** (around 3:30 pm), with an 85th percentile and median occupancy of over 80% and 70% respectively along all three routes. This is likely influenced by congestion, based on google maps travel times continually worsen from downtown LA, UCLA and west San Fernando Valley from 3 pm onwards, only beginning to improve after 6 pm. It is expected that the same commuters who travel from

Antelope Valley early in the morning would likely return earlier. Although, the PM occupancy is greater than the AM, suggesting that additional riders are commuting to Antelope Valley in the afternoon. Notably, this ridership data does not capture a number of boardings, meaning these values may be higher.

- **Route 787 operates with an 85th percentile occupancy of 100%, suggesting full bus on run 1.** This drops to between 50% and 60% between runs 2 and 6. Following this, after 6 pm, the bus operates close to a third or quarter full. Route 787 sees higher ridership during the PM than the AM period.
- **Route 785 has varying peaks in occupancy across all runs.** Occupancy peaks during run 1 (85%), 5 (68%) and 7 (70%).
- **Route 786 has the highest occupancy during run 1** and continues to decrease along the remaining runs, suggesting that demand for the route at UCLA decreases after 4 pm or 5 pm.

6.5.3 Midday

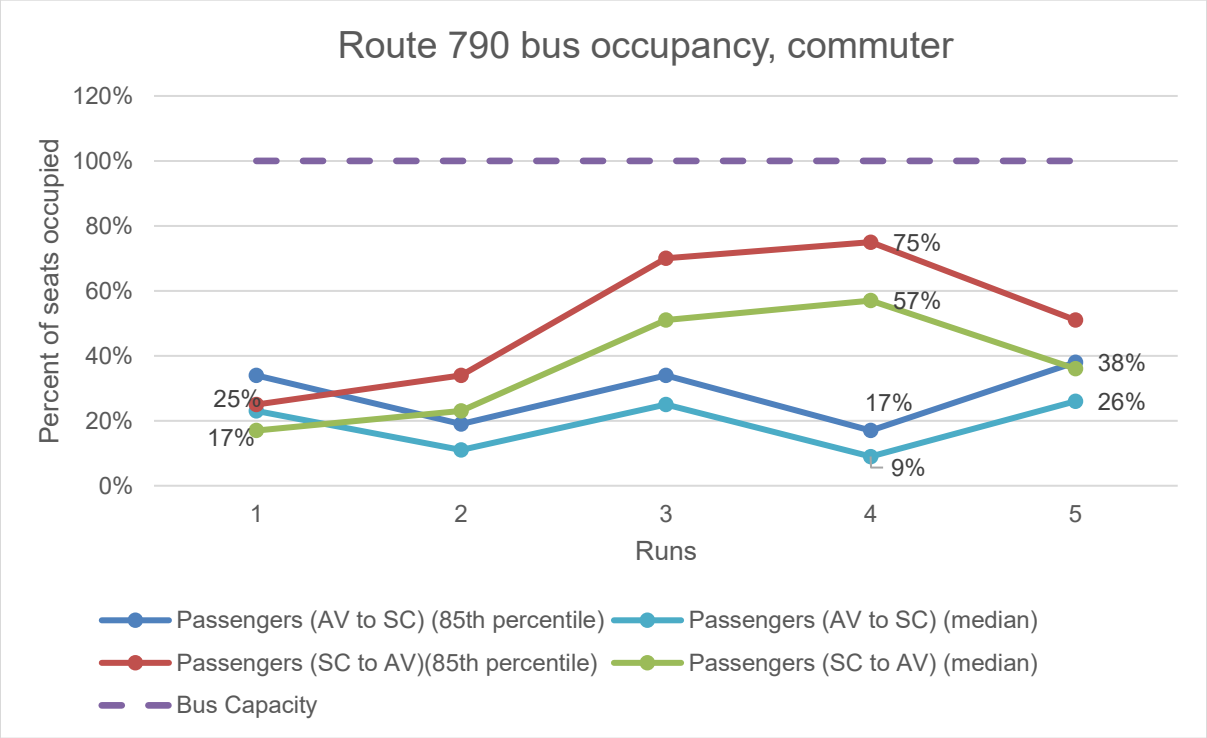


Figure 69: Commuter bus occupancy, midday

- **Route 790 appears to be more popular traveling from Santa Clarita to Antelope Valley**. Higher occupancies are observed along runs 3 and 4. Run 3 makes additional stops in Santa Clarita at a regional transit center, Henry Mayo Newhall Memorial Hospital and a local community college (College of the Canyons). Run 4 leaving Newhall Metrolink station at 3 pm and arriving in

Palmdale just before 4 pm and has the greatest occupancy with a median and 85th percentile of 57% and 75%, respectively.

- **Between Antelope Valley to Santa Clarita Route 790 operates with low occupancies** across all 5 runs, remaining within an 85th percentile occupancy of 10-40%. The median occupancies do not exceed 25% full.

6.6 COMMUTER SERVICE CHALLENGES AND OPPORTUNITIES

- **Annual revenue hours and revenue miles continue to increase despite ridership losses.**
- **The reliability (OTPs) on all commuter routes is very poor**, with an average of 50% late/early trips. Given that traffic around southern LA County varies greatly and is further affected by on-going construction.
- **The commuter service has a high farebox recovery ratio**, with an average of 50% and recovery ratios up to 70%. While this benefits the financial performance of the service, it may also suggest that fares are currently too high and do not match competitors such as Santa Clarita transit or Metrolink.
- **During the AM runs greater occupancy is seen in the early runs, with a continual decline in usage**. This is likely due to delays in travel time, as the later runs into southern LA County would arrive too late for commuters traveling to work or school. **The PM service appears to have a greater utilization**. **Similar to the AM, higher bus occupancy is seen in the early runs, however a more consistent usage is seen**. This may be related to the varying reliability of the service which would make it difficult to use to arrive at fixed times during the morning peak period.
- **Route 790 is one of the poorest performing commuter routes**. **Over the last five years, Route 790 experienced the largest growth in revenue hours and the largest decline in ridership**. Route 790 has the lowest farebox recovery, which is half the commuter average and has the highest cost per boarding.
- **Given the noted challenges with the commuter service the following opportunities have been identified to be further explored:**
    - Consider reducing mileage in congested areas in southern LA County, including a reduction of stops within the area to avoid continual stopping and increased travel time;
    - Evaluate the feasibility of shortening commuter service north of LA County to connect to rail or rapid transit services such as Metrolink or LA Metro rapid transit lines;
    - Evaluate and improve the ease of use of each route by creating more consistent and standard schedules. Avoid multiple route deviations, such as Route 786 and consider standardizing the frequencies such as every 20-30 mins.

- Consider removing or shortening to connect with higher order transit the later AM runs into LA county as they often run with low capacities and arrive too late in LA to be useful for many commuter riders.

7.0 DIAL-A-RIDE

In addition to fixed route and commuter services, AVTA also offers Dial-A-Ride Service (DAR) in the Antelope Valley to those who qualify based on age, disability, or residency location. DAR provides curb to curb transportation services to Antelope Valley residents in the Los Angeles County area. Additionally, DAR is available to the general public living in Rural Zone 2 (see map) who may not have access to the local fixed route system, though at an increased rate than in the other service areas not open to the general public.

As seen in the map below, DAR operates in three different zones with distinct fares for each: the Urban Zone which comprises Lancaster, Palmdale, Lake Los Angeles, and Littlerock, Rural Zone 1, and Rural Zone 2. The entirety of the Antelope Valley is served by DAR.

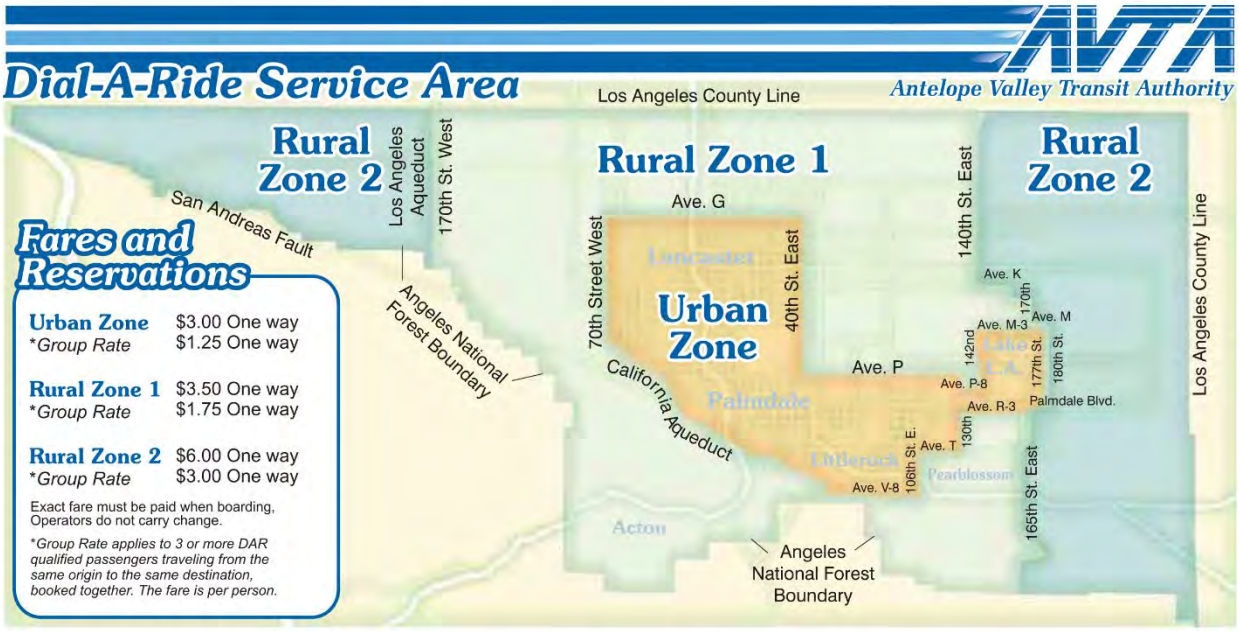


Figure 70: DAR service area and fare rates.

DAR operates from 6:00 am-7:30 pm on weekdays and 8:00 am-6:00 pm on weekends. Rides can be reserved on the same day, or up to two days in advance. Riders are limited to three rides per day, and clients can call or text any day between 8:00 am and 5:00 pm to reserve a ride. It should be noted that there is a 30-minute window incorporated into pick-up and drop-off times. A ride can arrive up to ten minutes early or twenty minutes late and still be within the reservation window. Certified riders can also bring a Personal Care Assistant (PCA) on their trip at no additional charge.

7.1 SYSTEM-LEVEL ANALYSIS

DAR service operations were considered to understand how the service has been operating over the last five years. Boardings per revenue hour, annual passenger trips and annual revenue hours, and cost per

revenue hour and passenger trip are shown below to provide a comprehensive understanding of DAR performance.

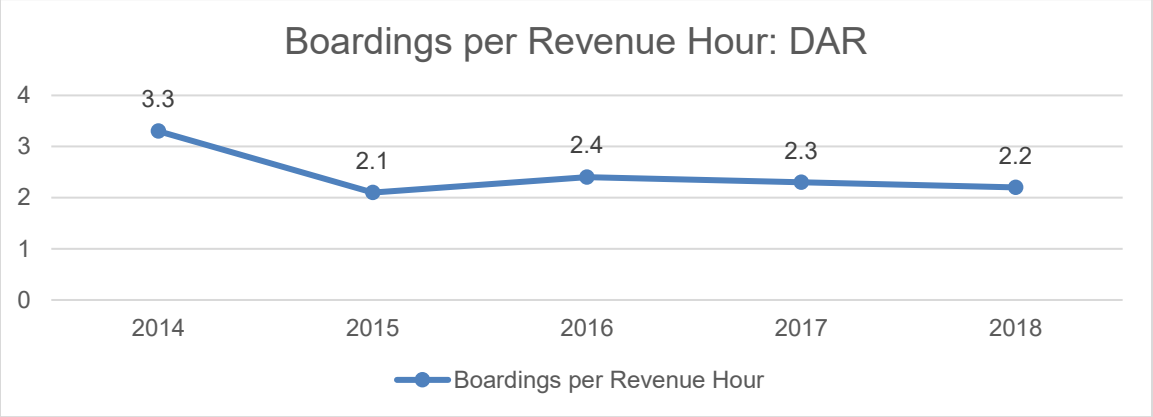


Figure 71: Boardings per revenue hour, DAR.

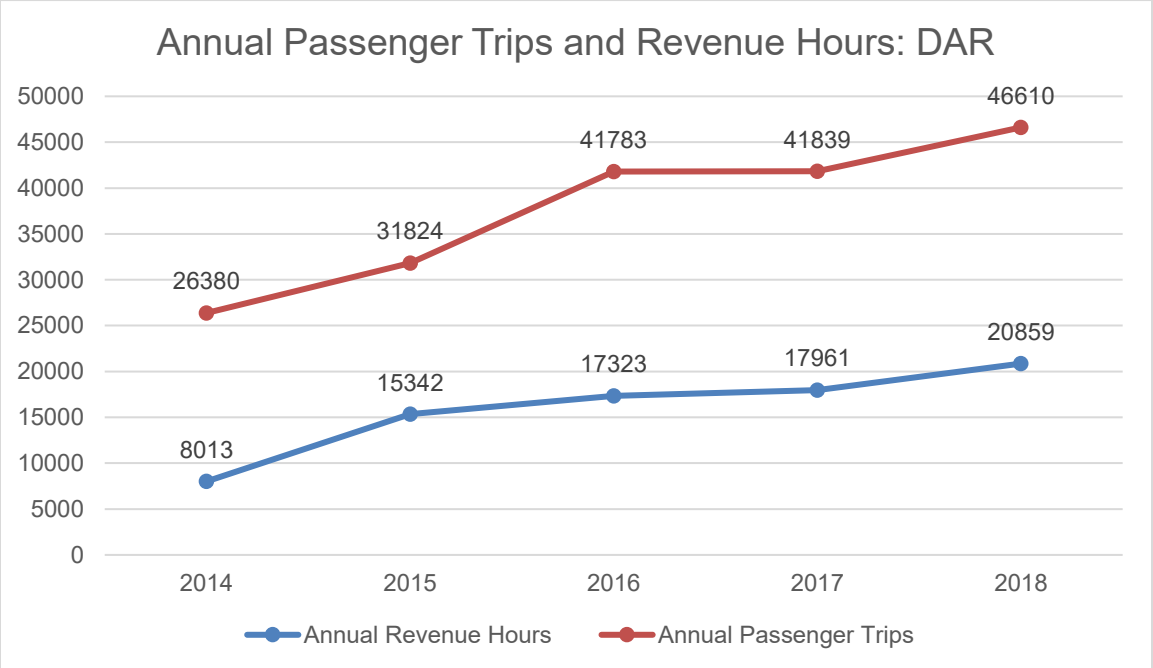


Figure 72: Annual passenger trips and revenue hours, DAR.

- While overall annual passenger trips have increased since 2014, boardings per revenue hour have shown a 32% decrease in the same time period. **Boardings per revenue hour showed the sharpest decrease between 2014 and 2015, with a decrease of 37%. During this time, both annual passenger trips and revenue hours displayed increases**.

- Between 2014 and 2018, revenue hours increased by 160%, whereas passenger trips increased by 77%. Both revenue hours and passenger trips for AVTA DAR service increased every year in the time period. Between 2014 and 2015, revenue hours saw a significant increase of 91%, accompanied by a passenger trip increase of 21%. Revenue hours and passenger trips both increased every year between 2014 and 2018.
- Between 2014 and 2015, boardings per revenue hour saw a significant decrease of 37%, followed by an increase of 16% the following year. 2017 and 2018 saw smaller decreases of 3 and 4%, respectively.
- Overall, revenue hours have increased an average of 31% a year over the time period, while passenger trips increased an average of 16% annually. Boardings per revenue hour decreased an average of 7% each year during this time. **Even though passenger trips increased during this time, the far more drastic increase in revenue hours may be causing the subsequent decrease in boardings per revenue hour.**

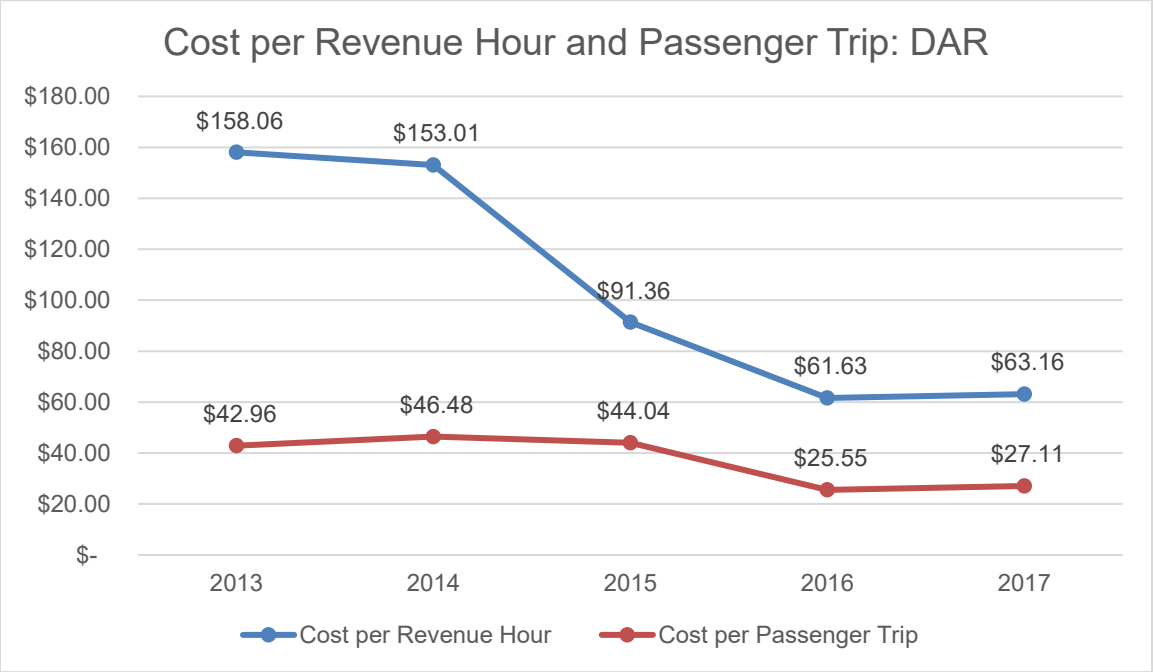


Figure 73: Costs per revenue hour and passenger trip, DAR.

- While boardings per revenue hour have decreased despite increases in overall passenger trips, **costs per revenue hour and passenger trips have both decreased significantly,** as displayed above. However, this may be unrelated to passenger trips or revenue hours and may be the result of decreased operating costs. It should also be noted that the sample years are slightly different.
- Between 2013 and 2014, cost per revenue hour showed a slight decrease of 3%, while cost per passenger trip increased slightly, by 8%. While cost per passenger trip showed a small decrease

of 5% in 2015, cost per revenue hour decreased significantly, by 40%. The subsequent year, both saw significant decreases of over 30%, followed in 2017 by slight increases (2% for cost per revenue hour and 6% for cost per passenger trip).

- Despite yearly variances, cost per revenue hour for DAR service has decreased an average of 18% annually, and cost per passenger trip has decreased by 8% each year between 2013 and 2017.

7.2 CHALLENGES AND OPPORTUNITIES FOR DAR

DAR-type services are costly to operate on a per-trip basis. Nevertheless, AVTA offers a service to the rural areas of the Antelope Valley where fixed-route service would perform very poorly. A mounting challenge for both AVTA and Access Paratransit services, the paratransit providers for Los Angeles County, is the relentlessly growing demand for curb-to-curb trips from an increasingly elderly and disabled population.

Other transit agencies are expanding the universal accessibility of their fixed-route infrastructure, such as accessible bus stops and shelters, which can facilitate the use of fixed-route services by persons with disabilities. Furthermore, **travel training for customers of DAR and Access can help shift some demand, at least for certain trips, to fixed-route transit**.

Increasingly across North America, transit agencies are implementing a **family of services** approach that leverages **fixed-route services together with curb-to-curb services, enabling greater travel flexibility by delivering the right service, whether fixed-route or curb-to-curb or in combination, on a trip-by-trip basis based on passenger ability.** For instance, on nice weather days, a trip could be completed entirely on fixed-route services, while on a rainy or cold day, the same trip could be provided through DAR. In addition, **providing DAR service to major transit hubs, such as Owen Memorial Park or Palmdale Transportation Center, could provide a 'home to hub' strategy that lowers the demand and burden on DAR**.

Finally, DAR can benefit from new technology that helps group trips efficiently, and substituting routes with low productivity, either entirely or at certain times of the day, with DAR or other microtransit solutions can help provide lower cost mobility.

8.0 OTHER MOBILITY SERVICES AND CONNECTIONS

8.1 KERN COUNTY

Kern Transit provides fixed-route bus service between and in the rural communities of Kern County. In addition to this, they provide two lines to the Antelope Valley: Bakersfield to Lancaster and California City to Lancaster. Cross-county fare is $5.00, and local intercommunity fare is $3.00.

Route 100, providing service from Bakersfield to Lancaster, operates seven days a week and provides access to the Kern County communities of Bakersfield, Keene, Tehachapi, Mojave, and Rosamond in addition to Lancaster. This route provides transfers to other transit systems, including Metrolink (at the Sierra Hwy stop in Lancaster), AVTA, and the Eastern Sierra Transit Authority (ESTA), which serves Inyo and Mono Counties.

Route 250 provides service Monday-Saturday between California City (located northeast of Mojave in Kern County) and Lancaster. It provides transfers to AVTA and ESTA, in addition to reaching the communities of California City, Mojave, Rosamond, and Lancaster.

8.2 TNCS

Both Lyft and Uber operate in the Antelope Valley. Lyft vehicles are concentrated in Palmdale, Lancaster, and Quartz Hill, and Lyft Line does not appear to operate in the Antelope Valley. Uber operates predominately in similar areas, providing both traditional and Uber Pool services. It has been noted by Antelope Valley College representative that there has been an influx of TNC activity in and around main areas of the college during peak times, which may cause circulation and congestion issues for the area in the future if this trend continues.

8.3 CYCLING AND ACTIVE TRANSPORT

Some bike lanes do exist in the Antelope Valley, both in the urban centers of Palmdale and Lancaster and unincorporated areas. The County's 2012 Bicycle Master Plan states that in the unincorporated areas of the Antelope Valley, there are 7.2 miles of maintained bikeways.[5] The report states that bicycling as a transportation mode in this area can be challenging "due to substantial distances to access employment and commercial centers." These existing bike lanes are located in Lake Los Angeles and Quartz Hill. The future bikeway network proposed in the report would increase this network to 230.7 miles of maintained bikeways in unincorporated areas of the County, to be implemented by 2032. This would significantly increase the bikeway network into other unincorporated areas of the Antelope Valley.

[5] https://dpw.lacounty.gov/pdd/bike/docs/bmp/BMP%20CHP%203.pdf

Palmdale contains a mixture of Class I, II, and III bikeways. While a Class II bikeway exists around Palmdale High School, the majority of bike lanes in Palmdale are Class III. A Class I bike path connects Palmdale and Lancaster.

Overall, Lancaster has a more robust bikeway network than Palmdale, with most of the existing network classified as Class II bike lanes. In 2012, Lancaster released a Master Plan of Trails and Bikeways to guide the planning of pedestrian and bicycle facilities in a comprehensive manner throughout the city. The plan calls for the addition of 40 miles of Class I bike paths, 138 miles of Class II bike lanes, and 37 miles of Class III bike routes, as well as numerous pedestrian improvements to encourage more active transportation. Additionally, all AVTA transit buses have bicycle racks on them and their website offers a how-to page and instructional video on how to properly use the bike racks.

While dockless scooters have not yet made their way to the Antelope Valley, their appearance in other unincorporated areas of LA County (East Pasadena and Altadena) in late 2018 prompted the Los Angeles County Board of Supervisors to approve an electric scooter pilot program for unincorporated areas of the County in January 2019, which developed a regulatory framework for safe operation and storage of the scooters in unincorporated areas.

8.4 METRO

Metro bus service has its northern boundary in Sylmar, a San Fernando Valley neighborhood approximately 10 miles south of Santa Clarita and does not serve the Antelope Valley.

8.5 METROLINK

The Antelope Valley is served by the Antelope Valley Metrolink Line, with stations in Lancaster and Palmdale. The Antelope Valley line's northern terminus is Lancaster, with additional stops in Palmdale, Vincent Grade/Acton, Via Princessa, Santa Clarita, Newhall, Sylmar/San Fernando, Sun Valley, Burbank Airport, Downtown Burbank, Glendale, and Union Station in Downtown Los Angeles. The Antelope Valley line operates seven days a week, with differing weekday and weekend hours. The 76.6-mile long line is the third-busiest line in the system, with an average of 7,000 daily weekday boardings.

The Lancaster Metrolink Station is located at Sierra Hwy and Lancaster Blvd., with transfers to local AVTA routes 1, 4, 7, 9, and 11, in addition to commuter route 747. The Lancaster Metrolink Station also provides access to Amtrak ThruWay Bus, ESTA, and Kern Regional Transit.

The Palmdale Metrolink Station is located at the Palmdale Transportation Center and offers transfers to local AVTA routes 1, 3, 7, and 8, supplemental routes 97 and 98, and all commuter routes (785, 786, 787, 747 and 790). It also provides access to Amtrak ThruWay Bus, Greyhound, and LA County Beach Bus (Tuesday, Thursday, and Saturday May-September only).

In 2018, Metro partnered with Metrolink to complete the Antelope Valley Line Study, an infrastructure improvement plan for the Metrolink Antelope Valley line which includes increasing the frequency of the Antelope Valley Metrolink service and developing a phased approach for capital improvements based on costs, benefits, and impacts. The study has many alternatives under consideration, including a regular

and consistent clock-facing schedule, more frequent peak period service, and identifying and improving existing infrastructure constraints that can reduce travel time and increase reliability. The study should be completed by Summer 2019. This is important to note and consider going forward, as more agencies like AVTA are redesigning commuter routes to serve and provide connections higher-order transit systems as opposed to providing duplicative services with slower average travel times. An improved Antelope Valley Line to Union Station in Downtown LA with more frequent service might provide an opportunity to rethink AVTA's current commuter routes.

8.6 ACCESS PARATRANSIT

Access Services (Los Angeles County Consolidated Transportation Services Agency) is a local public entity in charge of administering the Los Angeles County Coordinated Paratransit Plan on behalf of the County's 45 fixed-route transit operators. Access operates seven days a week, 24 hours a day in most areas of Los Angeles County as a curb-to-curb shared ride service available to those who qualify based on age or disability. To qualify for Access, individuals must prove they have a disability that prevents them from being able to take traditional fixed-route transit service and complete an in-person evaluation.

Access provides complimentary transportation to any location within ¾ of a mile of any fixed route bus stop or ¾ mile around any LA Metro rail station during the hours that those systems are operational. Fares are distance-based; trips up to 20 miles cost $2.75, and trips over 20 miles are $3.50. However, special fares are enacted for those traveling to or from and within the Antelope Valley and Santa Clarita areas. Customers can pay for their fare with cash (exact change), by credit/debit card, or through Access coupons (available for order online, by mail, or in-person at local transit agency offices throughout the County).

Access provides 1,000 vehicles in service on an average weekday, covering an area that spans roughly 4,060 square miles and completing approximately 10,000 daily trips. Access riders can schedule a ride by phone between 6am and 10pm, and rides can be reserved between two weeks to one day in advance. Access provides a one-hour reservation window within the requested reservation timeframe. On the day and time of the reserved ride, drivers have a 20-minute window to arrive within the reserved time, and drivers will wait for up to 5 minutes at pick-up locations.

Access customers ride for free on most local County fixed-route transit systems, as well as Metrolink service within the County. Because of this, and to incentivize fixed route usage by Access customers when possible, Access offers free travel training in preparation of taking these regular routes.

8.6.1 Antelope Valley Service

Access operates slightly differently in Santa Clarita and the Antelope Valley, including different service hours, reservation hours, service days, fares, and transfer trips.

- Antelope Valley reservation hours operate every day from 8am-5pm.

- Antelope Valley service hours operate on weekdays from 5am-12:30am and weekends from 6:30am-8:30pm. Antelope Valley service does not operate during some holidays (New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day).
- Trips within the Antelope Valley are a flat rate of $2.00 regardless of trip length. Trips between the Antelope Valley and Santa Clarita are $7.00, and transfers between the Antelope Valley and LA Basin are $7.00.
- To transfer between the Antelope Valley and the rest of the County, customers must transfer at the Olive View Medical Center in Sylmar. This service is only available on weekdays and not on weekends. Transfer times happen daily at 7:30am, 1:00pm, and 6:00pm, and these must be taken into consideration when reserving a ride.

Though AVTA's DAR program has seen annual passenger trips increase 77% since 2014, demand for Access is growing in the Antelope Valley. This could be for many reasons related to the service area, fare rates, and other program incentives. To help stem some of the growing demand for Access service in the Antelope Valley, AVTA can look more closely at the following special features of Access to find ways to make its fixed-route service more accessible to stem some of this Antelope Valley demand for Access services.

- Larger service area: Access provides trips to Antelope Valley customers throughout the entire County, both within the Antelope Valley, to and from Santa Clarita, and to and from the LA Basin. AVTA DAR's service area is currently constrained to only within the local Antelope Valley area.
- Cheaper local trips: Access provides local trips within the Antelope Valley at a flat rate of $2.00 regardless of trip length, while DAR trips range from $3.00-6.00 for individual rides. While this does not apply to DAR users living in Rural Zone 2 who qualify for DAR based on residency and would not qualify for Access, those who qualify for both would spend less on an Access ride in all zones at the individual rate.
- Other incentives:
    - Access riders can utilize ADA paratransit services outside of LA County, including Orange, San Bernardino, Ventura, Riverside, and San Diego Counties. Access customers are entitled to 21 days of visitor-riding privileges outside of LA County in a 12-month period.
    - Access customers ride for free on most LA County local fixed route service, including LA Metro bus and rail, AVTA, Culver City Bus, Long Beach Transit, Santa Monica Big Blue Bus, and more. AVTA's DAR customers are only eligible for reduced fare on the AVTA system.
    - Additionally, Access riders ride Metrolink for free on rides and lines within the County. As the Antelope Valley Metrolink line operates totally within the County, this may be an incentive for Antelope Valley residents to use Access over DAR.

8.7 TAXIS AND OTHER

Multiple taxi companies operate in the Antelope Valley, all based out of Palmdale. These companies include Antelope Valley Taxi Service, AV Independent Taxi Cab, and Antelope Valley Cab Service. The company Antelope Logistics and Transportation, based in Lancaster, offers non-emergency transportation services throughout the Antelope Valley and to and from a number of LA-area airports. Additional mobility services operating in the Antelope Valley include the Amtrak ThruWay Bus (Lancaster and Palmdale), ESTA (Lancaster and Palmdale), Greyhound (Palmdale only), and the LA County Beach Bus to Santa Monica (Palmdale only).

9.0 FARES

Fare policy is important to manage demand for transit services, while recouping a reasonable amount of operating costs from fare revenues. A difficulty arises when fares are set too low to sustain service improvements or develop an attractive and useful bus service, as well when they are set too high that the system loses riders, particularly riders who switch to driving since the bus provides no added incentive, such as not needing to pay for parking or using priority lanes, cutting travel times. Inappropriate fare structures can also add to instances of fare evasion unintentionally if fare tables are overly complicated but also deliberately from perceived low value for money and poor service quality.

AVTA provides different fare structures for fixed route and commuter service. Local fixed-route service fare offers options from one-way trips to monthly (31-day) passes, with different rates for regular and reduced fare (available to seniors and those with disabilities). Additionally, through the use of the TAP card, low-income riders have access to the LIFE program, provided by LA Metro, which can reduce 7-day and monthly passes. LIFE only applies to local AVTA routes.

Commuter fares differ based on route, but maintain the same structure of regular and reduced fare. Riders can choose from one-way, 10-ride, and monthly passes, as well as the EZ Transit Pass, a monthly pass provided by LA Metro administered via TAP card good for regional transportation providers throughout the county. AVTA also offers special discounts for seniors, veterans and active military, and students, discussed in greater detail below.

9.1 EXISTING FARE STRUCTURE AND POLICY

AVTA offers different fare options for its different modes, including local routes, commuter routes, and DAR service. While cash is still accepted as payment, AVTA is also integrated with LA Metro's TAP card, which allows customers to load fare payment onto the card and also access other Los Angeles County transit services, such as Metro, Culver City Bus, and Santa Monica Big Blue Bus. The tables below show detailed fare information for each transit type, including regular and reduced fare.

9.1.1 Local Fixed-Route Services

Table 22: Local route fares.

Local Routes	Regular Fare	Senior/Disabled Reduced Fare	LIFE Regular	LIFE Senior/Disabled
One-Way Trip	$1.50	$0.75	N/A	N/A
4-Hour Pass	$2.00	$1.00	N/A	N/A
Day Pass	$5.00	$2.50	N/A	N/A
Weekly Pass	$15.00	$7.50	$9.00	$7.00
31-Day Pass	$50.00	$25.00	$26.00	$17.00

- Fares for local fixed-route service area offered for one-way trips, 4-hour passes, day passes, weekly passes, and monthly (31-day) passes at both regular and reduced fare. Reduced fare is available to seniors, those with disabilities, and veterans. Further, additional discounts are offered through the LIFE program, administered by LA Metro. LIFE provides discounts to weekly and monthly passes to low-income individuals and can only be utilized through the TAP card. LIFE discounts for seniors and those with disabilities are compounded on top of their already discounted fare, resulting in a monthly pass of $17, a 66% discount from the regular full-fare price.
- Incentivizing the use and sale of monthly passes can be an effective means of increasing ridership and rewarding loyal customers when the number of trips taken with the monthly pass creates discounts in the per-trip price that is less than what one would have paid for a single ride. Unlimited monthly passes of this nature can encourage users to use the system more often than they would if they were buying an individual pass every time they took a trip with AVTA, which has the potential to become even more effective after the increased Route 1 frequencies during peak periods are implemented in June 2019.
- Assuming the average person who purchases a monthly pass for $50.00 from AVTA makes 40 trips in the 31-day period, the unit price drops to $1.25, a discount of only 16.7% on the regular per-trip price of $1.50. To encourage the uptake of the 31-day passes, the per-trip discount should be more significant to make this a truly attractive option, either by increasing single fares or decreasing monthly fares.

9.1.2 Fixed-Route Fare Comparison with Peers

Using the same peer agencies examined earlier in this report, the table below shows the list of peers, including their populations and ridership, as well as farebox recovery ratios and the amount of transit service they provide per capita. Local routes and regular, one-way fares were included due to data availability. As not all riders pay the full fare, it is important to acknowledge this when moving forward with analysis.

Table 23: Peer agency fare comparison.

Agency	Service Area Population	Annual Ridership	Revenue hours per capita	Regular fare amount (one-way trip)	Regular fare amount (monthly pass)	Farebox recovery ratio
AVTA	***349,050***	***2,576,521***	***0.37***	***$1.50***	***$50.00***	***15.5%***
LAMT	312,388	1,346,484	0.29	$1.50	$47.00	22.1%
El Metro	236,091	3,037,511	0.63	$2.00	N/A	26.0%
Sunline Transit	432,416	4,316,269	0.55	$1.00	$34.00	10.0%
Santa Clarita Transit	252,271	2,864,351	0.53	$1.00	$34.00	13.6%
San Joaquin Regional Transit District	735,764	3,566,367	0.22	$1.50	$65.00	10.2%
Gold Coast Transit	367,260	3,718,811	0.55	$1.50	$50.00	15.5%

Agency	Service Area Population	Annual Ridership	Revenue hours per capita	Regular fare amount (one-way trip)	Regular fare amount (monthly pass)	Farebox recovery ratio
Tri Delta Transit	306,000	2,478,391	0.48	$2.00	$57.00	16.0%

Sources: FTA NTD 2017 Transit Agency Profiles

- At 15.5%, AVTA's farebox recovery ratio for its local fixed route system is slightly below the peer agency average of 16.1%, with the same ratio as Gold Coast Transit and below the highest recovery ratio of 26% by El Metro. This farebox recovery rate is also below the state-mandated minimum of 20%; however, none of the California peer agencies analyzed above are meeting this state goal either. In fact, AVTA has a recovery ratio equal to or greater than all California peer agencies with the exception of Tri Delta Transit.
- Looking at AVTA's farebox recovery across all services (local, commuter, and DAR) and over a 5-year span shows small yearly fluctuations in recovery ratios. Between 2013 and 2017, overall farebox recovery ranges between 23% and 26%, with local route recovery between 13% and 16%, and DAR recovery between 6% and 9%. Commuter service, however, shows an average recovery rate of 50%, markedly higher than other AVTA services.
- Peer agency and AVTA regular-priced fares for a one-way trip range between $1.00-$2.00, and the AVTA price of $1.50 is also the median price for this fare category across sampled agencies. This suggests that AVTA is in the correct ballpark as far as this specific fare structure goes when compared to peer groups. Additionally, peer agencies have comparable fare prices and programs for special populations including seniors, students, low-income individuals, and individuals with disabilities.
- AVTA's revenue hours per capita is also on the low end when compared to peer agencies. Transit service quality of availability is approximated by this measure, and it is intrinsically linked to fares; if the service does not meet your needs, you are less likely to take transit, and less likely to feel that taking transit is worth the fare paid. Out of the seven total peer agencies, AVTA only has higher revenue hours per capita than two agencies, the Lakeland Area Mass Transit District and San Joaquin Region Transit District.
- Peer agencies show similar discount programs for seniors and those with disabilities as AVTA. Peer agencies also show consistency with classifying reduced rates as eligible to seniors and those with disabilities. Discounted single-ticket fare for peer agencies ranges between $0.85 (Tri Delta Transit) and free (Santa Clarita Transit). Including AVTA, 75% of peer agencies have a reduced fare price that is 50% of their regular price, which shows that AVTA's discounted fare prices are on par with other agencies.
- There is much higher variability in terms of special fares for students. Only El Metro and LAMT offer student fares for one-way trips, while San Joaquin offers discounted monthly student passes. However, this could be a result of the area that these transit agencies operate in and not having a large student population
- Monthly passes range from $34.00-65.00, with El Metro being the only agency that does not offer monthly passes for local fixed-route service. At an average of $48.00, AVTA's monthly pass amount of $50.00 is slightly higher than average, but still consistent with peer agencies. The three other agencies that offer the same regular one-way fare as AVTA (Gold Coast Transit, LAMT, and San Joaquin) have monthly passes between $47.00 and $65.00, for an average amount of $54.00. From this perspective, AVTA is providing a lower than average monthly pass amount,

though, as discussed above, still does not provide a significant enough discount to incentivize use.

9.1.3 DAR Services

Table 24: DAR fares.

DAR Service (all one-way)	Individual Rate	Group Rate*
Urban Zone	$3.00	$1.50
Rural Zone 1	$3.50	$1.75
Rural Zone 2	$6.00	$3.00

**Applies to three or more eligible passengers, rate is per individual*

- AVTA DAR offers different rates for their different service areas. Those who qualify based on age or disability living in the Urban Zone or Rural Zone 1 pay $3.00 or $3.50 for an individual one-way ride, or groups of three or more eligible riders each pay $1.50 or $1.75. Rural Zone 2 provides individual rides for anyone living within the service area for $6.00 or a group rate of $3.00.
- Both AVTA DAR and Access LA operate in the Antelope Valley. However, Access provides rides for qualifying individuals anywhere within the Antelope Valley service area for a flat rate of $2.00, regardless of trip length. For someone who qualifies for both DAR and Access, they have a larger incentive to use Access over DAR based on price. Despite this, demand for both Access and DAR have been increasing in the past and show no signs of slowing down as the population continues to age.

9.1.4 Commuter Services

Table 25: Commuter route fares.

Commuter Routes	Regular Fare	Senior/Disabled Reduced Fare
Route 747 – Rosamond/Edwards Air Force Base		
One-Way Trip	$5.00	$2.50
10-Ride Pass	$45.00	$22.50
Monthly Pass	$175.00	$87.50
EZ Transit Pass	N/A	N/A
Route 785 – Downtown Los Angeles		
One-Way Trip	$9.25	$4.50
10-Ride Pass	$85.00	$42.50
Monthly Pass	$296.00	$148.00
EZ Transit Pass	$330.00 Zone 10	$165.50 Zone 13
Route 786 – Century City/West Los Angeles		
One-Way Trip	$10.75	$5.25
10-Ride Pass	$99.00	$49.50
Monthly Pass	$344.00	$172.00

Commuter Routes	Regular Fare	Senior/Disabled Reduced Fare
EZ Transit Pass	$352.00 Zone 11	$175.00 Zone 14
Route 787 – West San Fernando Valley		
One-Way Trip	$8.75	$4.25
10-Ride Pass	$80.00	$40.00
Monthly Pass	$280.00	$140.00
EZ Transit Pass	$308.00 Zone 9	$156.00 Zone 12
Route 790 – Santa Clarita		
One-Way Trip	$5.00	$2.50
Monthly Pass	$150.00	$75.00
EZ Transit Pass	$286.00 Zone 8	$118.00 Zone 8

- As with other services, AVTA offers both regular and reduced fare for commuter routes, as well as a variety of different pass types, including one-way trips, 10-ride passes, monthly passes, and EZ transit passes administered by LA Metro and can be used for different commuter service providers throughout the county. However, it is difficult to discern the logic behind this pricing system. For example, Route 785 travels a longer distance than Route 787, but fares are cheaper for Route 785 despite this.

- Additionally, the commuter fare structure may not be competitive with other commuting options in the area. Santa Clarita Transit offers a full fare single ride to Downtown LA or Century City for $4.50 (though it should be noted that Santa Clarita's service to Downtown LA stops at 7th and Spring and does not terminate at Union Station) while also offering free parking at their Metrolink Station, where the commuter buses depart from. Someone living in the Antelope Valley who commutes to the Downtown or Century City area can easily drive to Santa Clarita, take advantage of the free parking, and utilize Santa Clarita commuter service at its cheaper price.

- While Metrolink is overall more expensive than AVTA's commuter service, the additional incentives of a fixed-guideway transit alternative that avoids Los Angeles traffic and congestion may be attractive enough that choice riders opt for this more expensive option. Additional incentives include that both the Lancaster and Palmdale Metrolink stations provide free parking, and Metrolink tickets include free transfers to connecting buses and trains at one's destination. Additionally, LA Metro is permanently subsidizing the Antelope Valley Line with a 25% fare discount, which makes regular monthly passes from Lancaster to Union Station $322.00, slightly less expensive than the EZ Transit Pass for AVTA Route 785.

9.1.5 Special Fare Programs

AVTA offers several types of special fare programs for those who qualify. These include special discounts for seniors, veterans, students, and low-income individuals.

- Senior Annual Pass: AVTA offers a senior annual pass for riders 62 and older, which allows seniors to ride the local fixed route system free of charge to encourage increased transit ridership among Antelope Valley seniors. Seniors with the annual pass are also eligible for DAR services

at normal cost depending on their zone of residence. Additionally, the senior pass allows for reduced commuter service rates, which are outlined in the table above.

- Veteran Services: all U.S. active military and veterans ride for free on local fixed route service with proper identification. Veterans and active military also receive reduced fare for commuter service.

- College Student Pass Program: started in 2016, the Campus Connect program is open to current Antelope Valley College students enrolled in six or more units per semester. The pass is valid for sixteen weeks and provides free service on all local fixed routes. While currently only available for Antelope Valley College students, AVTA is hoping to expand the program to all Antelope Valley local college students in the future.

- LIFE (Low Income Fare is Easy): previously known as the Rider Relief Transportation Program (RRTP), LIFE is funded by LA Metro and available to eligible individuals with TAP cards. Antelope Valley residents can obtain a monthly discount—$24 discounted from the monthly pass amount for full-fare passengers and $8 for reduced fare passengers. Thus, LIFE participates in the Antelope Valley would pay $26 for a monthly pass and reduced fare passengers would pay $17. Thus, LIFE participates in the Antelope Valley would pay Eligibility is determined by monthly income and household size. After providing proof of income, eligibility is valid for one year.

9.2 CHALLENGES AND OPPORTUNITIES

Fare evasion is a universal, pervasive problem for transit agencies nationwide. Understanding the complex and nuanced reasons for fare evasion is not easy, and specific reasons why fare evasion is happening is highly contextual and dependent on the specific context of the transit agency and population in which it operates. During the operator workshops and customer service sessions held at the AVTA offices in Lancaster, one phrase was repeated by operators and customer service representatives alike: “quote the fare and let them ride.” This was created to maintain operator safety, and has no official policy or enforcement behind it, but it has seeped into the culture of some AVTA riders. **Simple measures, such as signage reminding riders to pay their fare or information about the reduced fare LIFE program for low-income riders, can help to shift the cultural perception away from this notion while also helping AVTA to reach the state-mandated 20% farebox recovery goal.**

Additional opportunities make themselves evident in AVTA’s integration with the TAP card and new transfer policy. As of January 2019, AVTA offers two hours of free transfers on local routes when paying with a pre-loaded TAP card. By providing free transfers for two hours on local service when using the TAP card, this encourages transit use, streamlines the bus riding experience, and encourages the use of the TAP card as opposed to other forms of payment. To capitalize on this development, AVTA should emphasize transfers that get customers to their destinations quickly and conveniently. This allows AVTA to de-emphasize one-seat rides that are often long and create slow, convoluted routes. However, the overall low frequency of service makes this opportunity difficult to utilize. To make this service more effective, AVTA can improve frequency, or expand the free transfer window to a larger time frame.

Additional fare opportunities lie in exploring partnerships with major Antelope Valley employers to create incentive programs and discounts to encourage transit use among employees, along with working towards expanding the Campus Connect program to be available to any rider with a valid student ID. Partnering with local businesses to offer discounts with valid proof of a transit pass is another way to incentivize transit use. LA Metro's Destination Discounts program provides exclusive discounts at restaurants, retail stores, museums, local events, and more to transit riders with a TAP card. Currently, there are no Destination Discount locations in the Antelope Valley. Reaching out to LA Metro to expand this program to the AVTA service area could create opportunities to increase ridership.

Overall, transit agencies should charge fares that are appropriate—fares that people are able to and comfortable with paying, where people feel the quality of the transit service matched the fare they paid, as well as taking equity into account. A balanced approach to fare policy that takes all of the aforementioned into consideration, as well as the local demographic context is the best approach, and will also help AVTA achieve the state-mandated 20% farebox recovery.

10.0 TRANSIT FACILITIES

AVTA has invested in transit facilities across the service area aimed at improving customer convenience, comfort and satisfaction. In addition, some transit facilities also improve service operations and reliability.

10.1 BUS SHELTERS AND HUBS

AVTA has 328 bus shelters across its service area and in the hot dessert, provides much-needed relief and shade from the sun. Bus shelters represent only 37% of all bus stops. As shown below in Figure 74, the existing bus shelters are generally located at stops with the highest passenger activity; however, other high use bus stops could benefit from shelters. At a minimum, all stops that have 30 average daily boardings should have a shelter. Of the 63 stops that have 30 daily boardings or more, only 50 (79%) have shelters. Additional opportunities could exist for AVTA to generate revenue from advertising on shelters.

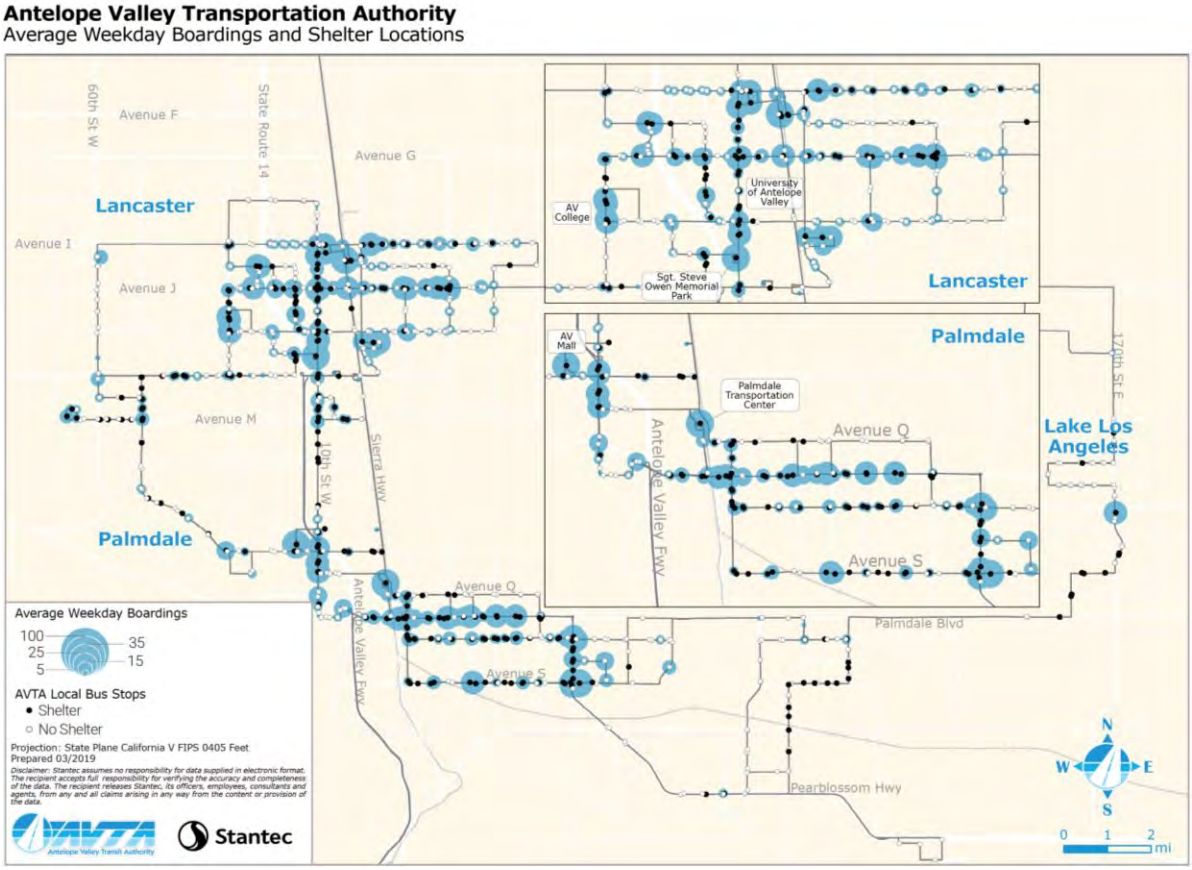


Figure 74: Bus stop shelters and average boardings on a typical weekday.

AVTA operates two main transit hubs, one in Lancaster near Owen Memorial Park, and one in Palmdale, the Palmdale Transportation Center that is connected with Metrolink's Palmdale station on the Antelope

Valley Line. Both centers provide parking for customers. However, both centers could benefit from additional and improved customer amenities, such as:

- Real-time bus arrivals.
- More seating.
- Improved security to improve the perception of safety.

10.2 DEDICATED FACILITIES

Currently, AVTA does not have any dedicated facilities for transit, such as dedicated or reserved bus lanes, queue jump lanes, or transit signal priority (TSP). All or any of these three treatments can help improve the speed of bus operations, shortening passenger trips, while reducing cycle time for a bus and in theory, allowing for shorter headways with fewer buses.

Reserved lanes and queue jump lanes help mitigate the negative impacts of congestion on transit vehicles. Reserved lanes provide a separate lane for buses and could improve on-time performance on routes with lots of traffic and or passenger activity, such as along route 1 on 10 St. W. Queue jump lanes provides transit vehicles with the ability to get ahead of traffic at signalized intersections.

Finally, **transit signal priority can save between 5-20% of bus running times,** depending on the treatment and investment. In general, TSP provides transit vehicles with prioritized or lengthened green signals at intersections, minimizing stops at red signals. Together with far-side bus stop placement, TSP can greatly benefit bus operations, speed up travel times, and improve reliability.

11.0 UNIQUE AVTA OPPORTUNITIES

The AV is home to a substantial manufacturing, industrial, and military workforce—large employers as discussed previously include Edwards Air Force Base (AFB) located in Kern County about 30 miles northwest of Lancaster, the Mojave Air and Space Port about 26 miles north of Lancaster, and Air Force Plant 42 (Plant 42) located within Lancaster-Palmdale. Each of these three locations has considerable workforces that provide an interesting opportunity for AVTA to gain ridership through commuter-type services, contributing to the overall goals of the communities to reduce auto-dependence.

11.1 EDWARDS AFB AND PLANT 42

This large AFB has roughly 22,000 people (about 2,000 residents according to the 2010 US Census) on its footprint, ranging from military personnel, researchers, pilots, as well as residents who live on the AFB, including servicemen and women who live with families. Given the substantial number of people, coupled with mobility needs for those without cars, as well as for retention and quality of life, representatives from Edwards (and Plant 42) negotiated with AVTA for commuter service from Lancaster-Palmdale and Edwards AFB.

The result is a new route 747 designed after stakeholder consultation, marketing, and surveys of personnel at the base. A chief concern of the personnel included safety and security at park and ride locations for the commuter service. Additional important features included the price of the service and the ability to leave later (or earlier) than the scheduled service of the shuttle.

The current route 747 operates between Palmdale Transportation Center and Boeing Plaza along Sierra Hwy to the ARB with multiple stops through the base; two morning and two afternoon trips are operated (Figure 75). Based on discussions with AVTA and representatives from Edwards, the launch of the service in January 2019 was very successful as initial service was provided free of charge. However, soon afterward, ridership dropped to about 50% of the initial week based on a few factors, likely the introduction of the fare as well as the lack of a ‘safe ride’ home.

Many transit agencies with commuter services operate safe or guaranteed rides home which accommodates customers who may need to leave earlier than the afternoon return trips, or later than the afternoon return trips. If AVTA wishes to build ridership at Edwards or for other services, then consideration for emergency travel beyond the scheduled trips is necessary. Additional incentives include education about employee bus passes and federal tax credits for public transportation. AVTA could also support vanpooling initiatives, such as TBARTA in Florida.[6]

[6] http://www.tbarta.com/files/pdfs/TBARTA_Regional_Vanpool_Program_Fact_Sheet.pdf

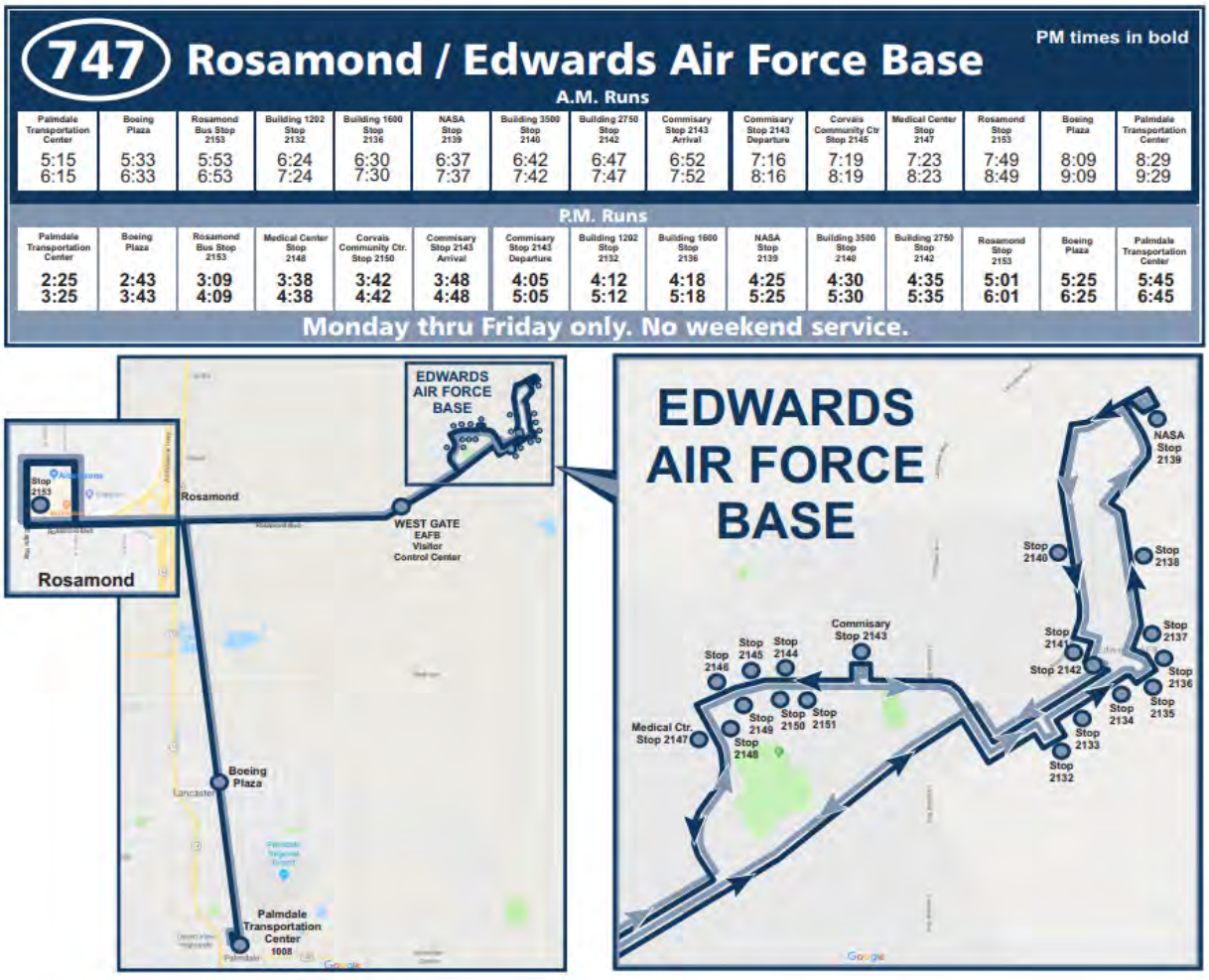


Figure 75: Alignment and schedule of route 747.

Plant 42 has roughly 10,000 people on a very large footprint and represents a great opportunity for AVTA to capture some commuters. However, some main obstacles to designing and implementing transit service include:

- Security and access to the site are difficult due to security clearances required. As such, passengers on a vehicle will require security clearances that may add time to the vehicle's running time.
- Once the security clearance is passed, the site is large and dispersed, so dropping off riders at one location is not practical—some circulator or shuttle service would also be required (Figure 76).

Figure 76: Aerial view of Plant 42.

(Source: Google Maps)

Nevertheless, there are some merits to providing some form of transit or vanpooling type service since discussions with representatives from Plant 42 indicated heavy traffic along Ave M and Ave P, key access roads to the Plant 42 site. This traffic is particularly heavy in the afternoon when many people are leaving the site at the same time. Some infrastructural considerations for any potential transit service include queue jump or reserved lanes—speeding up transit vehicles would be essential to generating interest in a commuter-type service for Plant 42.

11.2 MOJAVE AIR AND SPACE PORT

With about 2,500 employees, the Space Port has expressed interest in a commuter service and is working with AVTA to implement route 748 which is designed to connect Lancaster, Palmdale and the Space Port (Figure 77). Similar to route 747, route 748 will serve park-and-rides in Lancaster-Palmdale before making various stops in the Space Port.

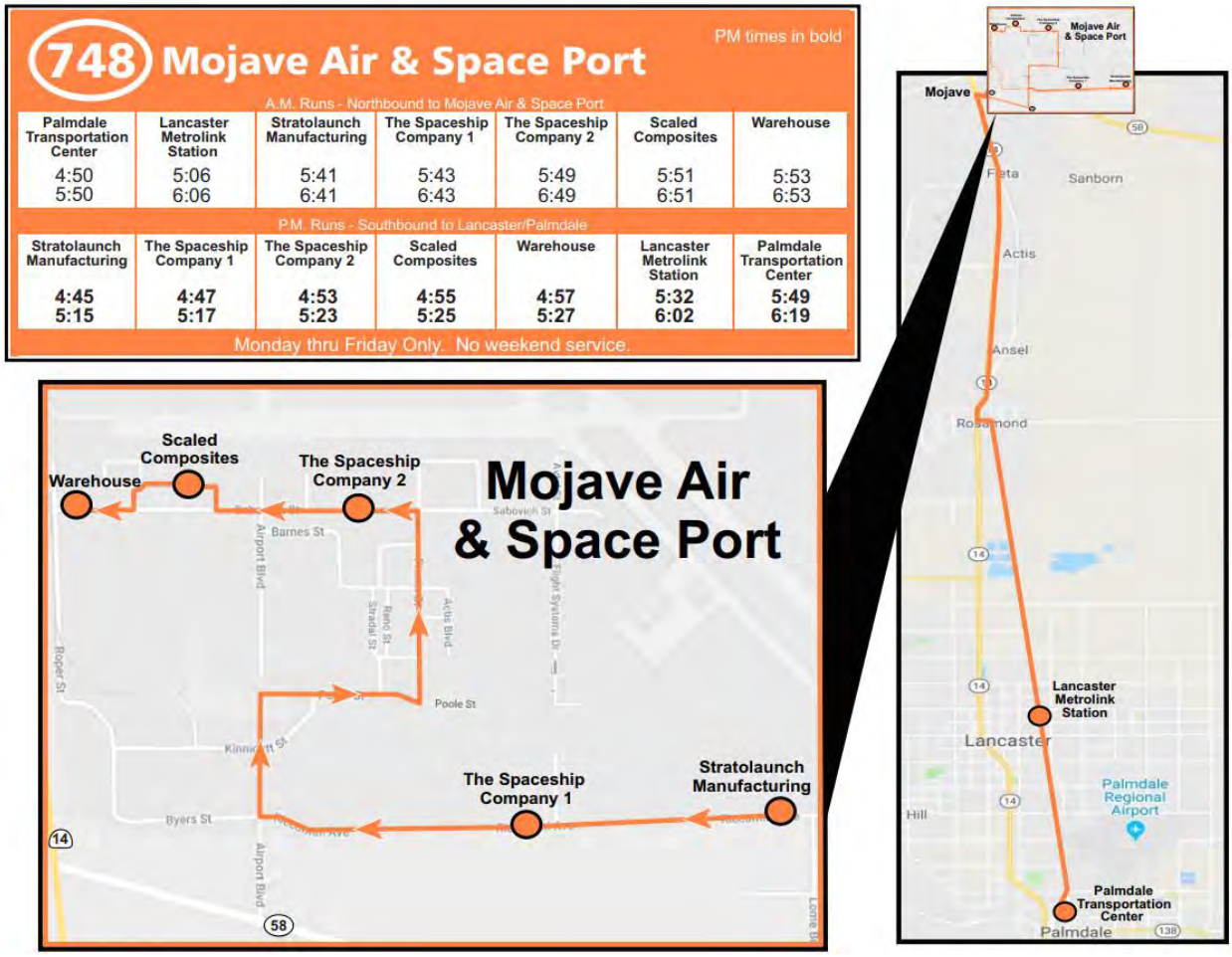


Figure 77: Proposed alignment and schedule of route 748.

In discussions with stakeholders at Mojave, some key issues emerged:

- Parking constraints are not an issue.
- The proposed stop at the Lancaster Metrolink Station was raised as a safety concern given the perceived and actual elements of homelessness, crime, and other unsafe behaviors.
- While about 50% of the workforce hails from Lancaster-Palmdale, the remainder hails from Tehachapi. As such, the potential ridership base from Lancaster-Palmdale is roughly 1,250 people.
- Similar concerns regarding the safe or emergency ride home as at Plant 42 and Edwards were raise.
- Kern County currently provides service to Mojave (100 Bakersfield-Lancaster) so some form of collaboration could be mutually beneficial.

- While the cost a fare is still being negotiated, employee discounts and other forms of financial incentives should be explored to encourage transit use.

12.0 SERVICE ISSUES

AVTA, like most agencies in Southern California, is experiencing steep ridership losses. While many factors are beyond AVTA's control, such as fuel prices, cheap land at the periphery and growth strategies, and pedestrian infrastructure, the overall quality and quantity of transit service are the main levers that AVTA can adjust to attract more riders.

Some of the issues raised throughout this report can provide clues as to necessary corrective actions:

- **Inconsistent schedules and headways**. AVTA operates inconsistent headways on many routes based generally on the cycle time of a route, rather than on clockface headways or headways that are more customer-friendly. For example, while route 11 operates generally every 30 minutes, route 1 operates with headways that are 24 minutes, 25 minutes, 26 minutes, and so on. Operating these types of schedules can discourage causal customers and confuse others. Having consistent headways throughout clearly defined service periods (morning peak, midday, etc.) can encourage ridership because schedules are simple to remember and easy to understand.

- **Low frequency across all routes.** AVTA does not operate any routes at headways of 15 minutes over less. To grow ridership, key corridors should be identified based on passenger demand and supportive transit land uses and urban design; service levels should then be improved to define a high-frequency network.

- **Low frequency on weekends.** AVTA operates routes very infrequently on weekends, particularly on Sundays. While weekend ridership is lower than weekdays and providing more service is costly, weekend travel is important for a number of reasons including for employees to reach jobs, and shoppers to reach retail, etc. Improving weekend frequency, particularly during the midday, could help grow some ridership.

- **Long routes that have low ridership segments or detours.** It's natural for bus routes to have segments that see high passenger activity, and segments that see low passenger activity. The key is to design routes that minimize the segments with low activity or break up long routes that contain parts with low activity that don't serve as connecting routes. Route 1 is a good example that sees high passenger activity along its alignment in Palmdale and Lancaster, but little activity between them along 10 St. W. While analyzing travel patterns will occur later in this project, at first glance, this pattern of route usage suggests that it may be beneficial to customers and bus operations to split up the route to focus service along the heavily used segments, or redesigning service along 10 St. W. to contain fewer stops to speed up route 1.

- **Network design focused on one-seat rides cause long and indirect routes and lengthen travel times**. Some routes provide direct and easy trips, like route 1 which is general north-south, but routes like 9 and 7 are designed to serve many destinations, but are indirect and likely discourage ridership though long travel times. Instead, now that AVTA provides free transfers,

new network design opportunities are enabled, such as one that is more gridded or that requires transfers, but can result in shorter travel times. Other fare policies, such as unlimited travel during a 2 hour time window of a first trip can facilitate multipurpose trips, ease some financial burden for low-income customers, and potentially increase trip-making. Of course, this comes at the expense of some fare revenue but has benefits too.

- **Mismatch between service provided and demand.** Traditionally, peak demand for transit mimic 9-to-5 work works. Now, in many communities across North America, peak demand grows throughout the day when demand was traditionally lowest during the midday. Route-level analyses reveal different demand profiles relative to its service provision. However, the general trend is higher demand during the midday, with a mismatch is service provision. Together with consistent headways and specifying dayparts or time periods, AVTA can develop customer-friendly schedules as well as design a service plan to deploy resources that meet actual passenger demand and usage.

- **Slowing service and unreliable service.** Overall, local buses operate on-time 77% of the time, but on-time performance varies by route and day of the week. Some routes with the lowest on-time performance are also routes that operate at the lowest frequencies. This means that riders may miss connections to other low-frequency routes, resulting in long wait times until the next arrival. AVTA must build enough recovery time into the schedules to account for delays related to traffic, heavy passenger activity, frequent stopping, and long dwell times while passengers with mobility devices board/alight. As a community grows, schedules must change to account for changing traffic and passenger conditions. This issue can also be observed on the commuter routes, which have poor on-time performance with a large percentage of buses arriving late. To keep up with slowing traffic conditions, commuter schedules must reflect realistic travel times, particularly to southern LA County.

- **Service that generates low ridership in low transit propensity areas.** Lake Los Angeles, Littlerock, and Pearblossom are poor transit markets—their low density, long distances between points of interest and lack of pedestrian amenities results in low productivity fixed-route scheduled services. This is not to say that residents of these communities don't need or use transit—instead, the residents of these communities are low-income and have low car ownership, suggesting that they do indeed need mobility options. Alternative service delivery models, leveraging new technology and smaller vehicles could help provide more effective and attractive service in these communities and provide connectivity with Lancaster-Palmdale.

- **Facilities that could be improved to improve customer comfort.** The major bus hubs could benefit from upgrades for passenger waiting, including real-time bus arrivals, better security to improve the perception of safety, and more information. In addition, providing real-time GTFS feeds to third-parties could expand the ability for customers to trip plan and track their bus.

- **School (supplemental) routes that are not successfully serving their intended markets.** The three routes operated as supplemental routes see low ridership, and while they perform well on a per revenue hour basis, discussions with AVTA staff and school representatives indicate that

services for students could serve substantial latent demand. Yellow school bus service is only provided to students living beyond 3 miles of any school, providing an excellent opportunity for AVTA to capture student ridership (from the population within 3 miles) for school trips, but also for other trips if an appropriate fare were developed. In addition, redesigning current routes to be more flexible to serve schools can allow AVTA to redeploy current resources from the supplemental routes into more productive services.

- **Commuter services that potentially don't reflect current demand.** As we found in our analyses, many trips on the commuter routes are largely empty. As a general trend, all routes have lost ridership since 2013/2014, despite increased service hours. These findings suggest a few things. First, they suggest that the currently deployed resources could be redeployed elsewhere to serve new potential markets, like reverse commuting into the Valley or not operated altogether to save on operating costs. Second, these findings suggest that commuter routes that were once attractive are no longer as attractive. The reasons could be diverse, including changes in job locations, commuting patterns, competiting services offering lower fares and so one. Another key reason could be dissatisfaction with the travel time for commuting routes including the unreliability of the service. Essentially, growing traffic and no priority measures for commuter buses, either on SR-14 or in the Valley or in Los Angeles negates any benefit to transit. If priority was given to commuter buses, if routes connected to rapid transit sooner rather than navigating congested local streets, some ridership may return. This is reflected in the poor on-time performance of the commuter routes, as well as complex route patterns such as route 786, which operates five different patterns. Providing reliable and easy to use service, along with convenient parking is important for building commuter ridership.

- **Growing demand for DAR services which are costly to provide.** While the cost per service hour for DAR service has decreased since 2013, ridership has grown and the passenger per hour have decreased, indicating the service has grown less productive. Reasons for this could include growing traffic, inefficient routing schemes, poor trip grouping, and so on. AVTA needs to mitigate the demand for DAR service by improving the accessibility of fixed-route transit, focusing on a family of services delivery model that leverages both DAR and fixed-route, while implementing broad travel training to give persons reliant on DAR the skills and confidence needed to ride fixed-route services. Microtransit pilots that leverage new technology and delivery models could help improve the efficiency of DAR, while providing service substitution in areas with low fixed-route productivity.

- **Fare policy and fare evasion.** AVTA provides a relatively straightforward fare table for reduced and regular fares. However, some opportunities become apparent such as rationalizing the commuter route fares that align with the distance traveled, providing student discounts, and developing employee pass schemes with major employers in the Antelope Valley. Based on discussions with operators, fare evasions seems to be a pervasive issue that requires addressing. Transit enforcement officials, anti-fare evasion advertising campaigns, and public outreach could all help to address the root causes and results of fare evasion.

13.0 SUMMARY AND NEXT STEPS

This document provides the building blocks of the Antelope Valley Strategic Mobility Plan by developing an understanding of the market for transit, the current service provided by AVTA, how the service is performing over time and compared to peer agencies, and delving into challenges and opportunities that are unique to AVTA (such as large employment zones like Mojave and Edwards AFB), as well as those common to many agencies, including ridership losses and service issues.

The following steps will include an analysis of current travel patterns of residents of the Antelope Valley, as well as commuters who live elsewhere but work in the Valley to uncover potential unmet travel patterns. In addition, we'll look at our findings here relative to local and regional plans for mobility to understand how future growth and development should align with plans for AVTA. Finally, concurrent stakeholder and public outreach will help inform the needs assessment to ensure that recommendations reflect the larger goals and desires of the community.

Public and Stakeholder Engagement

A Review and Analysis of Stakeholder and Public Engagement and Outreach

Prepared for:

Antelope Valley Transit Authority

Prepared by:

Stantec
Transit Advisory Services

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Abbreviations

AVTA	Antelope Valley Transit Authority
DAR	Dial-A-Ride

EXECUTIVE SUMMARY

Community and stakeholder engagement and outreach is a critical component of assessing public transit service, including strengths, areas of opportunity, challenges, and barriers to increased ridership. An area as large and diverse as the Antelope Valley requires a multifaceted approach to outreach to accurately collect a comprehensive understanding of the breadth and variety of viewpoints and opinions. During the week of June 17, 2019, the Stantec team engaged with both riders and non-riders across the Antelope Valley, including in Lancaster, Palmdale, Lake Los Angeles, Littlerock, Quartz Hill, and Pearblossom. The team also engaged with commuters in Downtown Los Angeles and Century City/West Los Angeles. Specific events hosted by the Stantec team included a public meeting and rider and non-rider focus groups to delve deeper into some of the issues regarding AVTA service. Finally, an online survey open to both riders and non-riders was advertised, the results of which are discussed later in the report.

However, stakeholder outreach has been ongoing throughout the entire project process. Stakeholders that the Stantec team has met with include AVTA bus operators and customer service representatives, Santa Clarita Transit, healthcare providers, and representatives from Mojave Air and Space Port, Plant 42, and Edwards Air Force Base. Stantec has also been holding ongoing meetings with the Community Advisory Group, made up of stakeholders representing the cities of Lancaster and Palmdale, Los Angeles County, Antelope Valley College, local nonprofits such as First 5 LA, and other important community stakeholders.

Despite the range and variety of where engagement took place, who the team spoke with, or what the engagement event was, some common themes were consistently heard. These are summarized below, and detailed discussions are presented in the body of the report. These recurring themes and findings from the Antelope Valley community will be used by the Stantec team to inform future tasks and service recommendations.

- **There is a general lack of awareness and knowledge about AVTA.** A topic of discussion during the non-riders focus group was that there was very little knowledge about what AVTA is and how to use the system. Additionally, no non-rider focus group attendees had ever visited the AVTA website or were aware of the Track-It app. This lack of awareness was echoed at different events attended by Stantec team members during outreach week. At many of the community events attended, such as Monday Bitez and the Lancaster BLVD Farmers Market, community members had to be educated about what AVTA is. This issue was also echoed at the stakeholder meeting with healthcare providers, where providers noted that promotion and widespread awareness of AVTA services are lacking. Through social media and distinct bus shelter branding, AVTA can continue to spread awareness on what AVTA is and the services it provides.
- **AVTA riders are largely captive riders with no other means of transportation.** This means that many riders are reliant on AVTA as their main source of transportation and depend on AVTA to get to where they need to go. As there is a perception among riders that service has worsened over recent years, AVTA should focus on strengthening its core services and providing high-quality service to the regular riders who depend on the system. This will translate to increased rider satisfaction and loyalty, creating a community of AVTA riders who are supportive and act as ambassadors for the system.

- **For people who have a transportation alternative, AVTA is not viewed as a realistic option.** When compared to private vehicle use, AVTA is not viewed as convenient or an attractive option for multiple reasons. The land uses and development patterns in the Antelope Valley present an obvious challenge: land uses are low density, sprawling, and spread out. Most residential developments in more urban areas are single-family neighborhoods that are inward-facing and do not provide good access to transit services, and rural areas lack decent pedestrian infrastructure (such as sidewalks and crosswalks) that enable easy access to bus stops. Additionally, because so many of AVTA's local routes operate at 60-minute headways or less frequently, it takes considerably more time to reach a destination via transit than using one's personal vehicle.
- **The Antelope Valley has long-term goals of smart growth, sustainable development, and creating transit-oriented developments along major corridors.** Municipal stakeholders attending different outreach events stress that future developments will be much denser and supportive of transit (as significant population growth is projected for parts of the Antelope Valley), and it is important that AVTA continues to collaborate with cities during the planning of such initiatives so that future developments and transit work together to support one another. However, it should be noted that these land use changes should be viewed as long-term developments and not taken into consideration for short-term planning.
- **Commuter service is not a competitive alternative.** When compared to other options such as Metrolink or personal vehicle use, commuter service to Downtown Los Angeles, Century City/West Los Angeles, and the West San Fernando Valley is not an attractive commuter option. Other more recent commuter initiatives such as service to Edwards Air Force Base and the Mojave Air and Space Port have not materialized into high-ridership routes, though these employment centers present their own unique challenges.
- **Major service challenges.** Summarized below are several common themes heard from riders during outreach events at bus stops and major transit centers, the public meeting, rider focus group, and the First 5 LA community meeting
    - **Operator behavior and attitude.** Reports of bus operators displaying behavior perceived as rude and inappropriate were common during outreach. Additional common operator issues include reports of operators passing by people with mobility devices, making unscheduled stops, and a lack of commitment to the job. While AVTA is aware of these issues and is taking steps to improve the situation, it is important to remember that bus operators are the people riders see representing AVTA on a daily basis, and their behavior and attitude can make a significant difference in a passenger's overall impression of the ride. Ideally, bus operators should be viewed as assets who represent the agency well and encourage more people to ride.
    - **Quality of service – reliability and convenience.** One of the most common complaints heard from riders during outreach was related to on-time performance, with many riders voicing frustration regarding schedule adherence and buses arriving on time. This can also result in missed transfers, further impacting the rider experience. Another revelation discovered during outreach is a community perception that AVTA service is unreliable. Attendees of the non-riders

focus group noted that they expressed interest with their employers regarding the creation of employee transit passes, but employers declined, stating that AVTA service is not reliable enough to use for commuting purposes.

- **Bus shelters and bus stop amenities.** One of the most easily evident current shortcomings with AVTA service is a lack of bus shelters and other bus stop amenities at high-volume stops. Over 20% of stops that see 30 or more daily boardings do not have shelters, while over 40% of low-use stops (stops with an average of less than two boardings per day) have shelters. In total, only 37% of all AVTA bus stops have a shelter. As the Antelope Valley's climate can be harsh and there can be long wait times for buses, it is important to develop guidelines and standards for bus stops and shelters to ensure they are benefitting the largest number of people possible. Indeed, many riders have **"waited under the hot sun and in the rain as well"** because many stops lack shelter and protection from the elements. Additionally, basic amenities such as lighting, shade, signage, and wayfinding, and arrival time information should be considered for high-volume bus shelters outside of major transit centers.
- **Much of the Antelope Valley lacks adequate pedestrian infrastructure.** Robust first and last-mile connections are integral to making transit trips that are seamless and convenient. However, in an area like the Antelope Valley that lacks adequate pedestrian infrastructure, a lack of first and last-mile connections can provide a hurdle to increased transit use. Riders and non-riders alike mentioned long walking distances to stops and destinations, with some areas (especially in more rural parts of the Valley) lacking basic pedestrian features such as sidewalks and crosswalks. This was mentioned as an issue especially by riders with mobility devices, where a lack of pedestrian infrastructure makes accessing bus stops and destinations around bus stops increasingly difficult. Additionally, healthcare providers noted that patients who use AVTA to get to and from medical appointments face difficulties getting from the bus stop to the facility itself, which can be especially challenging to those with mobility devices.
- **Electric bus operations and maintenance issues.** One issue seen firsthand by the Stantec team was the operational issues in regards to AVTA's electric bus fleet. Growing pains of this type are to be expected with fleet electrification, but issues such as slow bus speeds, breakdowns, range issues, and forced change-offs are negatively affecting customer experience and rider satisfaction.

1.0 INTRODUCTION

Community outreach and engagement is an integral component of any project, especially when changes are involved, community buy-in (especially from community leaders and those who use the service), is critically important. Thus, the successful implementation of the outcomes of the strategic mobility plan requires thorough, firsthand knowledge and understanding of the needs and desires of riders, non-riders, frontline employees, stakeholders, and community leaders from across the Antelope Valley. If service changes are going to be significant and truly improve the rider experience, as well as encouraging non-riders to use the system, understanding the challenges and opportunities facing AVTA from a community viewpoint is absolutely necessary. This is why, as described in detail below, the Stantec team engaged with a diverse range of Antelope Valley stakeholders and AVTA riders across the Antelope Valley. The opinions and accounts from different stakeholders are used to create a holistic understanding of strengths and opportunities for AVTA service, as well as inform service concepts and recommendations.

Over the week of June 17, 2019 and ongoing throughout the project process, Stantec has been engaging in public outreach and stakeholder engagement to discuss major findings thus far and initial service recommendations. The team has conducted multiple engagement events and activities, including a public meeting, rider and community focus groups, meetings with community stakeholders (including major employment centers, healthcare providers, and Santa Clarita Transit), and workshops with AVTA bus operators and customer service representatives, as well as engaging with riders and non-riders at various pop-up events throughout the Antelope Valley and dissemination of an online survey.

Presented below is a summary of activities, major prevalent themes, and discussion points that emerged from the various engagement activities.

2.0 COMMUNITY ENGAGEMENT

During the week of June 17, 2019, the Stantec team facilitated a number of rider and community engagement events throughout the Antelope Valley. In addition to the public meeting and rider and non-rider focus groups, the team participated in pop-up events and engaged with community members at major transit centers and key locations during community events, as well as participating in ride-alongs on key local routes and engaging with commuter service users at their destinations in Downtown LA and Century City/West Los Angeles.

During this outreach, team members handed out 1,000 flyers advertising the online survey and spoke to over 100 people at major transit centers (Palmdale Transportation Center and Sgt. Steve Owen Memorial Park) and community locations such as the Antelope Valley Mall, Oso Meat Market in Lake Los Angeles, Littlerock Family Dollar (pictured below), Quartz Hill Public Library, Littlerock Library, and DryTown Water Park. Outreach was also conducted at community events including the Lancaster BLVD Farmers Market and Monday Bitez in Lancaster.

2.1 RIDER OUTREACH

2.1.1 Local

To gain a deeper understanding of AVTA service challenges, strengths, and opportunities from the rider perspective, the Stantec team spent over twenty hours engaging with riders at major transit centers throughout the Antelope Valley, promoting the project and the online survey. Below is a summary of major themes uncovered from conversations with riders, as well as firsthand observations from the Stantec team.

- **Focus on core services.** While new programs such as the JetHawks Shuttle are a good way to increase brand visibility, this is not where sustained, long-term ridership will come from. By focusing on core services and providing a better experience for the system's captive users, riders are more likely to become loyal, use the system more, and promote it within the community. Based on rider feedback received thus far, this can be achieved through providing more reliable service, enhanced bus stop amenities, bus operator sensitivity training, better ADA accessibility for bus stops, better information and

trip planning, providing additional midday connections to Santa Clarita (due to lack of midday Metrolink service to Los Angeles), and providing a system that provides more coverage and less frequency, which seemed the priority from riders that the Stantec team spoke to.

- **Operational and maintenance issues are affecting performance and rider satisfaction.** Electric buses are slow and take a long time to reach destinations, as well as being unreliable in terms of maintenance. The Stantec team observed multiple issues including bus breakdowns and range issues, which results in forced change-offs. Not all riders noticed the change-off and missed the bus, which causes longer waits and travel times, as well as frustration among customers.
- **Fare policy considerations.** Many riders expressed a desire for special fare programs that, if implemented, could aid in increasing ridership, such as a special fare for college students, an expanded age/height range for child fare, and free transfers to other systems for commuters. Because many of AVTA's riders are very disadvantaged, eliminating the 4-Hour Pass and using that fare amount for a day pass makes it easier for low-income riders to use the system more, which can also increase ridership.
- **Service does not match demand.** Most buses observed during the week were largely empty. While this could be due to summer, service should be reduced to reflect actual demand. This was especially evident on the supplemental routes. While one bus operator mentioned that these are usually full during the school year, they are mostly empty during the summer.
- **Bus stop improvements.** Because of long headways, missed connections, and harsh climate, better stop amenities are needed, including more shelters, benches, lighting, signage, and wayfinding. Many riders (especially elderly riders or those with mobility devices) also feel that bus stops are too far to walk to. This could partially be due to the fact that much of the Antelope Valley lacks sufficient pedestrian infrastructure (such as sidewalks), making it more difficult to reach the bus stop.
- **Schedule adjustments to accurately reflect dwell and running times.** Due to the increase in ridership from people with mobility devices and those who take a long time to board and alight, dwell times and thus running times need to be adjusted. This will either result in longer headways or more buses to maintain current headways, but ultimately result in higher customer satisfaction because schedules will be realistic and more reliable. This need for longer dwell times which are currently not accommodated results in buses and schedules that are unrealistic and unreliable, bus operators being rude to riders (likely because they are frustrated because their on-time performance will suffer), and a cycle of unreliable service, with poor customer service from operators, and dissatisfied riders who will leave the system when they have the chance.

2.1.2 Commuter

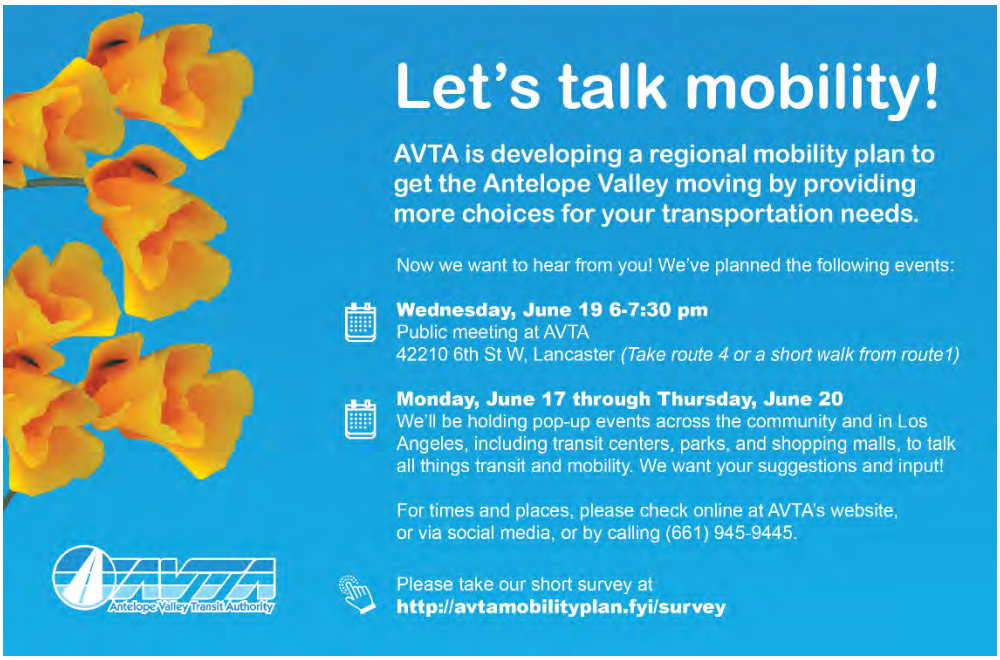
As congestion and traffic continue to worsen in Southern California, providing reliable service (in regards to arrival times and on-time performance) on AVTA's commuter routes becomes increasingly difficult. This was experienced firsthand by the Stantec team during commuter rider engagement. Stantec team members were stationed at high-activity stops in Downtown LA and Century City/West Los Angeles during the morning of June 18, 2019. Major observations are detailed below.

- **Unreliable arrival times.** Team members, equipped with a schedule and the Track-It app, noticed that buses arrived both very early and very late. Specifically, buses arriving in the Century City/West Los Angeles area were, on the same day, both up to one hour early and one hour late. If riders are utilizing commuter routes for their intended purpose (to commute to and from work), this high variability in arrival times is likely a determent to more people using the service as compared to Metrolink or other services that are more reliable.

- **Bunching in traffic or congested areas.** Team members also observed significant bunching of buses, regardless of scheduled departure and arrival times. It is not difficult to imagine that, as a rider, one would be frustrated that a bus that left an hour later than the one they are currently on arrived at the destination at the same time.
- **Commuter service is not a competitive alternative.** Due to congestion, bunching, unreliable schedules, and ticket costs, commuter service is currently not a competitive alternative when compared to other options such as Metrolink or personal vehicle use. Streamlining service to remove redundancies with other commuter services and providing connections to Metro rail and Santa Clarita Transit buses can be a more efficient use of resources and help to speed up travel times, along with providing more reliable service and a better customer experience.

2.2 PUBLIC MEETING

Stantec collaborated with AVTA to publicize and host a public meeting on Wednesday, June 19, 2019 (see poster below) at AVTA Headquarters in Lancaster from 6-7:30 pm. Five attendees were present, along with several AVTA staff members.



Stantec presented the purpose of the meeting, the current study, and the project process. Stantec also presented initial findings from analysis done thus far and major themes heard from ongoing engagement. The meeting involved a robust discussion related to findings thus far, initial service concepts, and important considerations moving forward, such as trade-offs between coverage and frequency, simple and complex routes, and more vs. fewer stops.

Below is a table (Table 1) describing major feedback and input from meeting participants.

Table 1 Feedback from the general public open house.

Service Requests	Commuter Service Feedback	Common Complaints	Major Themes
Longer weekend hours	Commuter buses are not comfortable (no leg room)	Long wait times	Value coverage over frequency
Service requests to: Magic Mountain, the beach, more service to Santa Clarita, Leona Valley, popular churches	Commuter service would be a more attractive option if all tickets could be used to transfer onto the LA Metro system like Metrolink tickets	Inhospitable bus shelters exacerbated by the harsh natural environment (hot summers, cold winters, windy)	Seem to favor more coverage because of walk distances, heat, and ridership from persons with disabilities, mobility devices, seniors, people with children, etc.
Work with major employers in the Antelope Valley to subsidize bus passes and encourage transit use		Reports of rude bus operators, especially to those with mobility devices (buses passing those with mobility devices)	
Implementation of a rider reward program		Operational issues with electric buses (slow, breaking down)	

Overall, there were many requests for service to specific locations that likely do not warrant fixed-route service as they are all very low-density, as well as longer hours of service. Riders did note that they have appreciated increased frequencies on Route 1. Additionally, echoing what was heard from other riders during outreach, meeting attendees tended to favor coverage over frequency. Understanding that these trade-offs are an inherent aspect of transit service planning, due to the unique nature of the Antelope Valley and the population that AVTA serves, service coverage is a bigger priority for riders than frequency.

2.3 SURVEY

Between June and August 2019, an online survey was open to both riders and non-riders as an additional way to receive feedback from the Antelope Valley community regarding AVTA and travel behavior in the Antelope Valley. The survey was advertised on AVTA's website and social media as well as through bilingual flyers distributed during the week of outreach and engagement. A total of 103 surveys were collected during this time. 46 surveys (45%) were from Antelope Valley community members who do not use AVTA, and 57 surveys (55%) were from current AVTA riders, including local, DAR, and commuter users. 92% of responses were English, with the remaining 8% of responses in Spanish.

Despite extensive outreach through various different means, the survey yielded a low response rate, reflective of the general feeling and attitude of apathy among AVTA riders. This low response rate and low levels of engagement are seen in other areas of outreach, such as the low turnout at the public meeting despite extensive outreach. While AVTA is actively trying to engage its riders and become a more visible presence in the Antelope Valley community, this should be acknowledged as another challenge faced by AVTA. This is also seen in the responses below. Questions regarding satisfaction with services yielded a significant portion of respondents who reported "no opinion" or "neither satisfied nor dissatisfied." Regardless of the low number of responses, the survey results provide some important information and insights regarding strengths and areas of opportunity to improve AVTA service, how people travel around the Antelope Valley, and why people make the decisions to travel in the ways that they do.

2.3.1 Respondent Profile

An overview of the demographics of survey respondents is shown below (Table 2). Overall, non-riders are much more likely than riders to own a car, with 92.7% of non-riders reporting owning at least one vehicle, compared with only 34.5% of riders. Specifically, non-rider households are most likely to own two vehicles (56.4% of non-riders). One-quarter of non-rider households own one vehicle, and 18.2% of non-rider households own three or more vehicles. Of the riders who own vehicles, the majority (63.2%) own two vehicles per household, and no riders reported owning more than three vehicles.

The vast majority of respondents (both riders and non-riders alike) own smartphones, though slightly fewer riders are in possession of smartphones than non-riders. This presents an opportunity to expand the use of targeted advertising on mobile platforms, such as through social media accounts, but it should be acknowledged that these results are likely sweked somewhat because the survey was available exclusively online, and the proportion of service users with smartphones does not necessarily reflect these survey results. Overall, survey respondents were more likely to identify as female, though it is interesting to note that riders tended to be male, while the majority of non-riders were female. While respondent ages spanned from 16 to 83, average ages of respondents across all categories are higher than the county average of 36[1]. This above-average age aligns with the high proportion of respondents who reported their employment status as “retired”. Because of these traits, it should be understood that survey results may not be reflective of the Antelope Valley community.

The most common employment status among non-riders was clerical/professional, while the largest portion of riders reported as students. A number of respondents reported two or more different employment categories (such as “student” and “employed casually or part-time”). These responses are reflected in the “other (two or more)” category.

Table 2: Demographic overview of respondents.

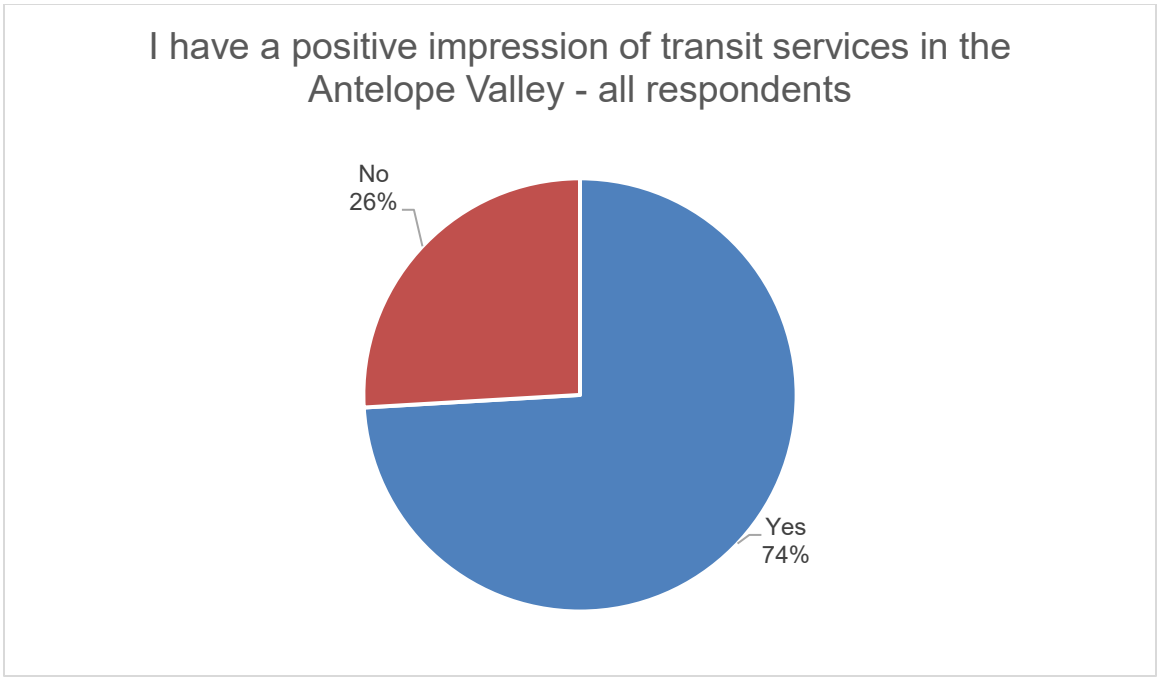
Variable		All Respondents	Riders	Non-Riders
Car Access	Yes	59.4%	34.5%	92.7%
	No	40.6%	65.5%	7.3%
Mobile/Smartphone Access	Yes	96.0%	92.7%	98.2%
	No	4.0%	7.3%	1.8%
Average Age		44.3	40.1	50.0
Gender	Female	55.7%	41.8%	73.8%
	Male	42.3%	56.4%	23.8%
	Prefer not to say	2.1%	1.8%	2.4%
Ethnicity	Asian/Pacific Islander	4.2%	3.6%	4.9%
	Black/African American	11.5%	14.5%	7.3%
	Latino	30.2%	29.1%	31.7%
	White	37.5%	38.2%	36.6%
	Other	9.4%	9.1%	9.8%
	Prefer not to say	7.3%	5.5%	9.8%

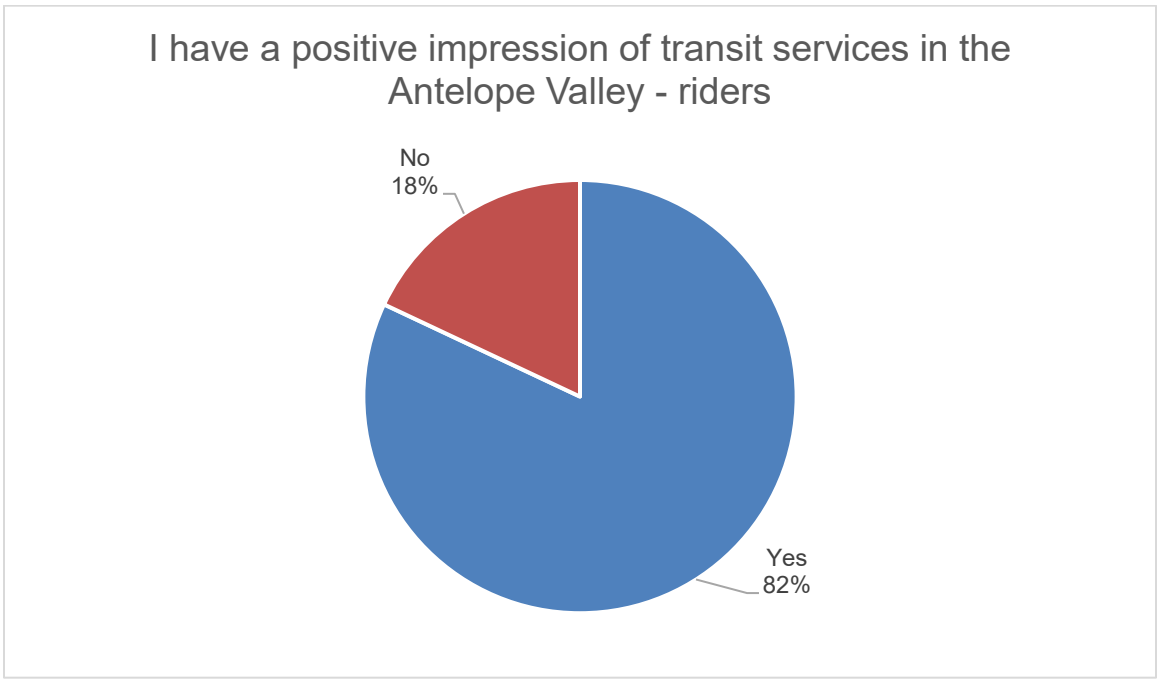
[1] 2013-2017 American Community Survey 5-Year Estimates

Household Income	Less than $20,000	17.7%	25.5%	7.1%
	$20,000-40,000	17.7%	23.6%	11.9%
	$40,001-60,000	14.6%	10.9%	19.0%
	$60,001-80,000	11.5%	9.1%	14.3%
	$80,001-100,000	5.2%	0.0%	11.9%
	More than $100,000	8.3%	3.6%	14.3%
	Don't know	25.0%	27.3%	21.4%
Employment	Clerical/Professional	31.6%	20.4%	46.3%
	In School	15.8%	24.1%	4.9%
	Manual Labor	6.3%	11.1%	0.0%
	Self-Employed	5.3%	7.4%	2.4%
	Employed casually or part-time	7.4%	11.1%	2.4%
	Unemployed/not working	10.5%	13.0%	7.3%
	Retired	14.7%	7.4%	24.4%
	Other (two or more)	8.4%	5.6%	12.2%

All respondents were asked whether they have a positive impression of AVTA, with 89 responses (50 rider and 39 non-rider), and full results are shown in Figure 1. Overall, 67.4% of respondents have a positive impression of transit services in the Antelope Valley, but results are more variable between riders and non-riders. Riders were much more likely to have a positive impression of transit in the Antelope Valley (82% of respondents), compared with non-riders, who were less likely to feel the same way (66.7% of respondents reporting a positive impression of AVTA). Non-rider comments detailing why they do not have a positive impression include "it takes a long time to reach the destinations," "service is not convenient and a hassle when you do reach the bus," **"takes a long time to get to bus stops with nowhere to sit or shelter from the hot sun and wind,"** "not frequent," "not safe," and "word of mouth complaints from friends and coworkers."

While fewer riders reported a negative impression of AVTA, those that did provided comments including "at most of the bus stops there is nowhere to sit and not a lot of connecting buses around the city," **"long walk to the bus from my house,"** "**bus drivers are not friendly,"** "service is not reliable, no direct service, and no late service on weekends," and the "bus is not safe when belligerent people ride."


I have a positive impression of transit services in the Antelope Valley - all respondents
No
26%
Yes
74%


I have a positive impression of transit services in the Antelope Valley - riders
No
18%
Yes
82%

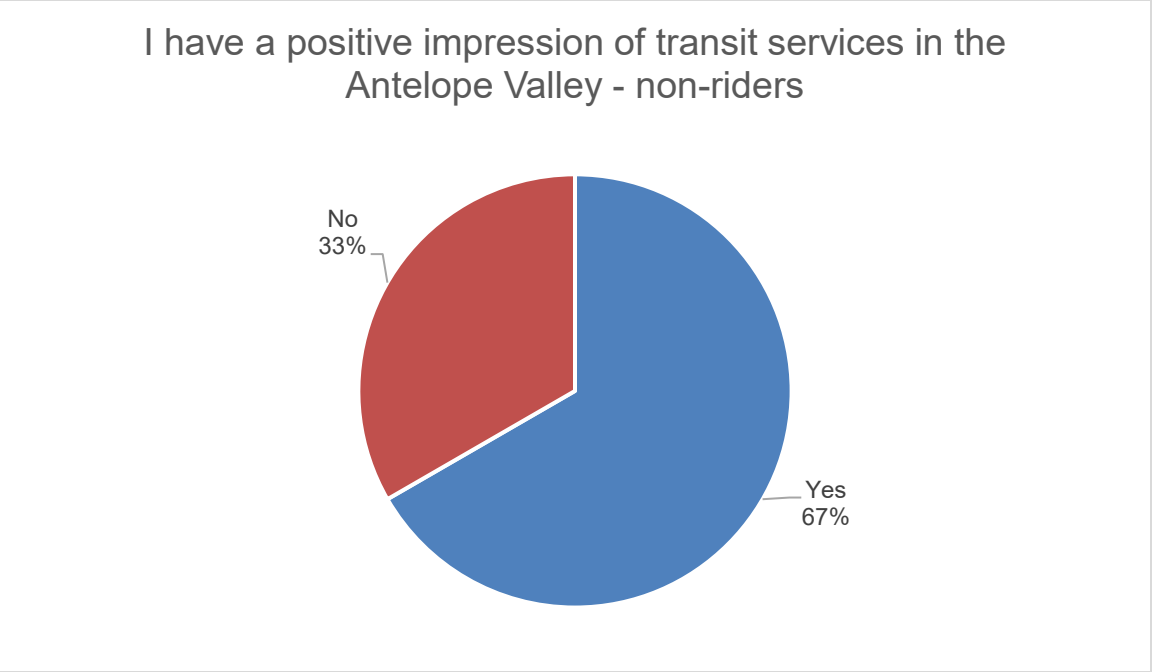


Figure 1: Impression of transit services in the Antelope Valley.

The following sections provide an overview of responses in specific categories, including DAR, commuter service, and insights regarding why non-riders choose other ways to get around the Antelope Valley.

2.3.2 Rider Overview

Respondents who reported using AVTA service in the last three months represent local, commuter, and paratransit riders. Specifically, 63.2% of respondents exclusively use local service, 10.5% only use commuter services, and 1.8% only use DAR. About 25% use a combination of two or more service types, with the most common being both local and commuter services (15.8%).

As shown in Figure 2 below, almost half (44.7%) of respondents use the service at least five days a week, and Figure 3 shows that nearly 60% of respondents have been riders for three or more years. This suggests that AVTA's riders both use the service frequently and have been using the service for a long time, suggesting that riders are dependent on the system and AVTA is providing a lifeline service for these individuals.

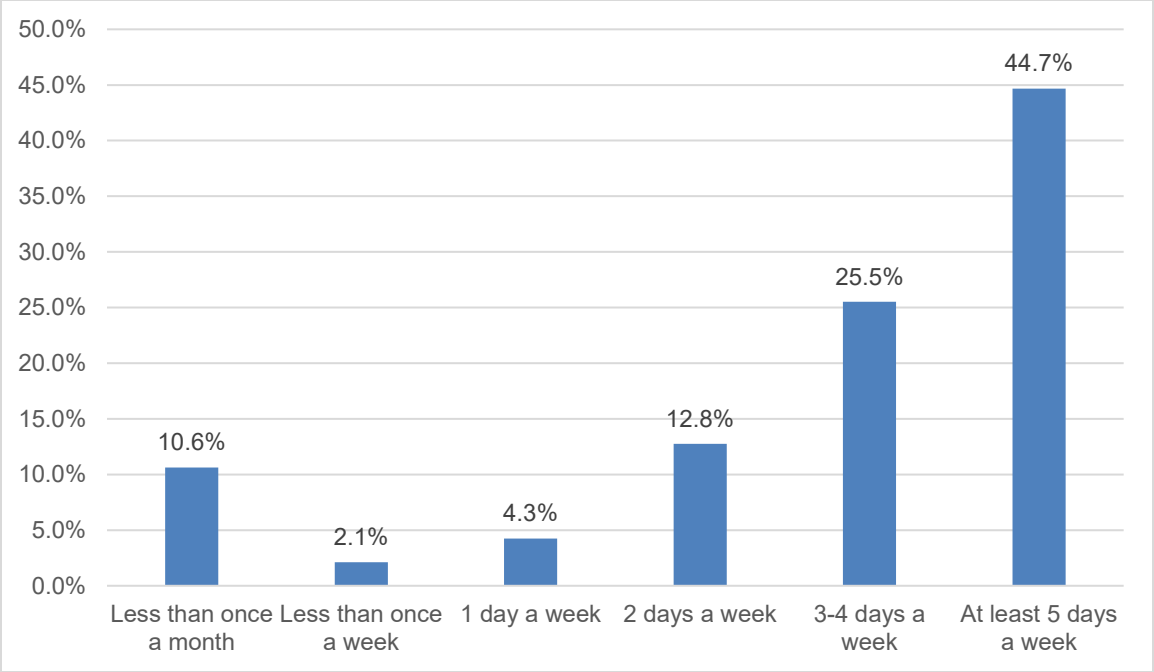


Figure 2: Frequency of AVTA use.

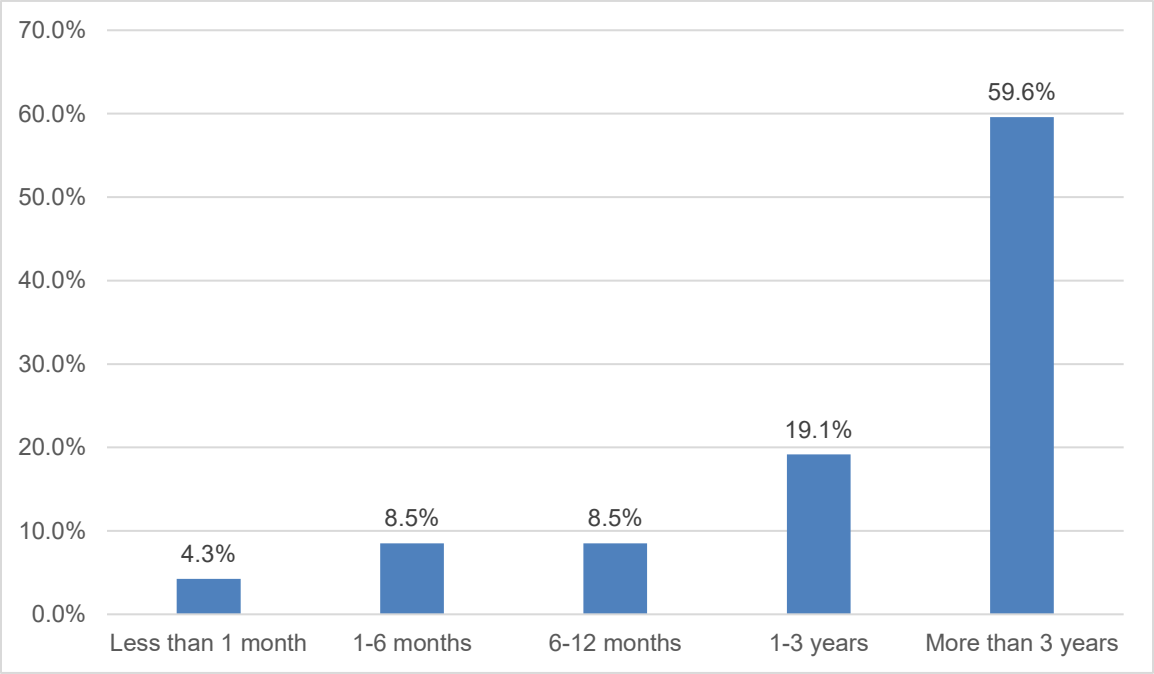


Figure 3: Length of time using AVTA.

Riders were also asked about which routes they use to complete their typical transit trip. As there was no cap on the number of routes a respondent could choose, there was a possibility of gaining insight to how many transfers are required to complete an average transit trip. However, 33% of respondents chose more than three routes

(with one respondent selecting eight routes), which likely indicates that respondents were confused about what the question was asking, or that the question wording was unclear. Thirty-three percent of respondents chose one route, 15% chose two routes (indicating one transfer), and the remaining 19% chose three routes (two transfers).

As respondents were able to select as many routes as they wanted, a total of 136 selections were made by the 48 respondents. Unsurprisingly, Route 1 was the most popular route choice, at 25% of total responses (see Figure 4). Other commonly selected routes include routes 2, 3, 4, 12, 11, and 7. Route 8, the express route to Antelope Valley College, shows a low number of responses likely due to the timing of the survey and outreach and may show higher numbers if outreach took place while school was in session. Usage of supplemental routes is very low likely for a similar reason, as the survey was open during summer when school was not in session. Routes to rural areas including Lake Los Angeles, Pearblossom, Littlerock, and Quartz Hill outside of Lancaster and Palmdale also show very low usage by survey respondents. Overall, these findings largely mirror actual ridership of local routes.

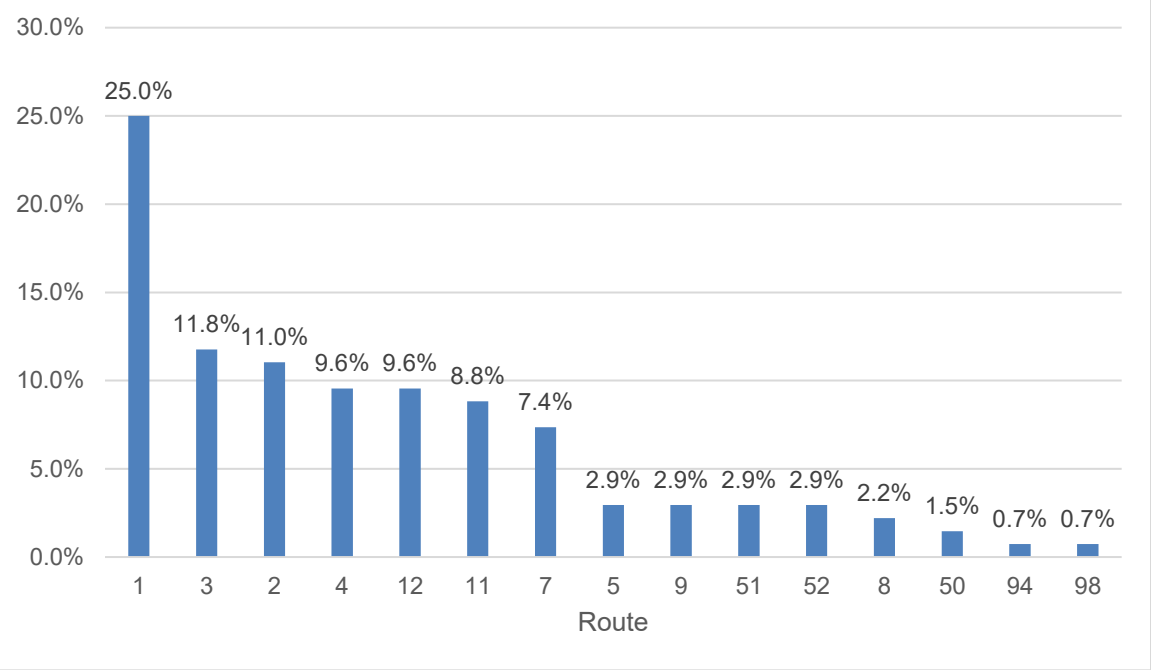


Figure 4: Route usage.

When asked how they would travel today if AVTA fixed-route services were not available, the most popular responses included driving their own vehicle (18.8% of respondents), getting a lift from a friend or family member (18.8%), or Uber/Lyft (16.7%). Other responses included walking (14.6%), cycling (6.3%), or Access Paratransit (6.3%). About 15% of respondents would not make the trip without AVTA.

A variety of trip purposes were reported when respondents were asked what the primary purpose of their most common trip using AVTA is, the full results of which are shown below in Figure 5. The most common trip purpose was commuting to and from work (31.3% of respondents). Other popular trip purposes include commuting to and from school, shopping, running errands, and healthcare.

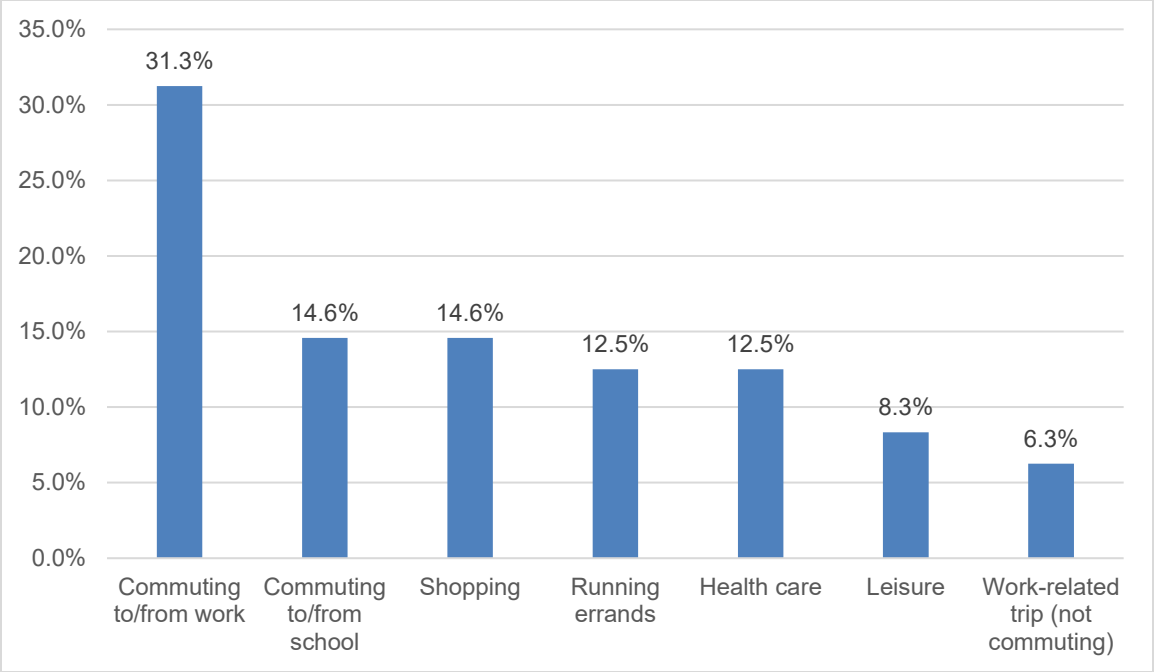


Figure 5: Main trip purpose.

Regarding fares, 70.8% of respondents reported paying via the TAP card, with 29.2% paying through other means. Sixty percent of respondents reported paying the full fare, with 39.6% reporting reduced fare. The monthly pass and one-way fare were the most popular fare payment types, with 36.6% of respondents using each. About 20% of respondents use day passes, 4.9% reported using 4-hour passes, and 2.4% of respondents use weekly passes.

Two important issues regarding accessibility and mobility in the Antelope Valley identified through other outreach activities relates to how riders get to bus stops and whether riders need to transfer to reach their final destination. The majority of respondents (56.5%) reported that they need to complete at least one transfer between bus routes to get to their final destination, compared to 43.5% of those that do not. Additionally, the vast majority (89.6%) of riders walk to the bus stop, underscoring the importance of addressing the pedestrian infrastructure and land use challenges associated with first and last-mile connections in the Antelope Valley.

The question of how satisfied riders are with the overall quality of AVTA bus services based on their typical experiences yielded mixed results, as seen in Figure 6. While a majority (56.3%) of respondents are either satisfied or extremely satisfied with the service, nearly a third of respondents are neither satisfied nor dissatisfied with service, and 12.5% are not satisfied. Various different comments from riders were provided on this point, including feedback such as **“buses need to come more often so that people don’t have to leave home an hour or two early to get to where they’re going,”** and **“more frequent bus times…a one-way trip takes three hours.”** This shows that there is room for improvement regarding the overall rider experience, and if AVTA can enact changes that improve this, it can increase loyalty among its ridership base.

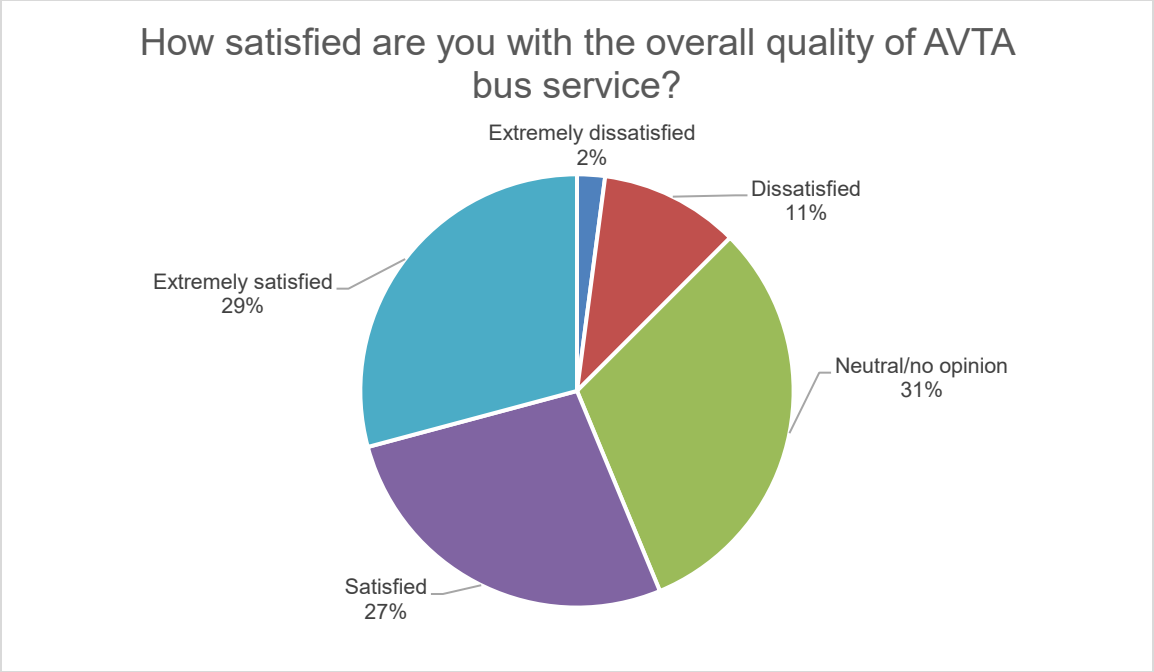


Figure 6: Overall satisfaction with AVTA bus service.

Riders were then asked about satisfaction with specific aspects of AVTA service during their typical trip, which reveals additional strengths and areas of opportunity within AVTA's service and the trip experience that is provided to riders. Riders were asked to rate their satisfaction on many different service areas, including transfer ability, fare, bus cleanliness, route directness, operator behavior and attitude, hours of operation, safety, waiting time, availability of information, and one's comfort and ability to get a seat while onboard. Respondents were asked to rate their satisfaction on a scale from one to five, with one representing extremely dissatisfied and five extremely satisfied. The numbers presented below (Figure 7) display the average rating for each service area; higher numbers represent higher levels of satisfaction and lower numbers indicate respondents are less satisfied in these areas.

Overall, riders are most satisfied with the fare they paid, and least satisfied with the amount of time they spent waiting for the bus, closely followed by hours of operation. However, it is interesting to see that rates of satisfaction across all service areas are relatively similar and do not show that much variation, indicating that there is not one aspect of current service that is either significantly stronger or weaker than others. In fact, many service ratings are either the same as, or very close to, the overall average satisfaction of 3.5. While 3.5 is above-average, it shows that there is room for AVTA to improve its services and provide a more pleasant rider experience.

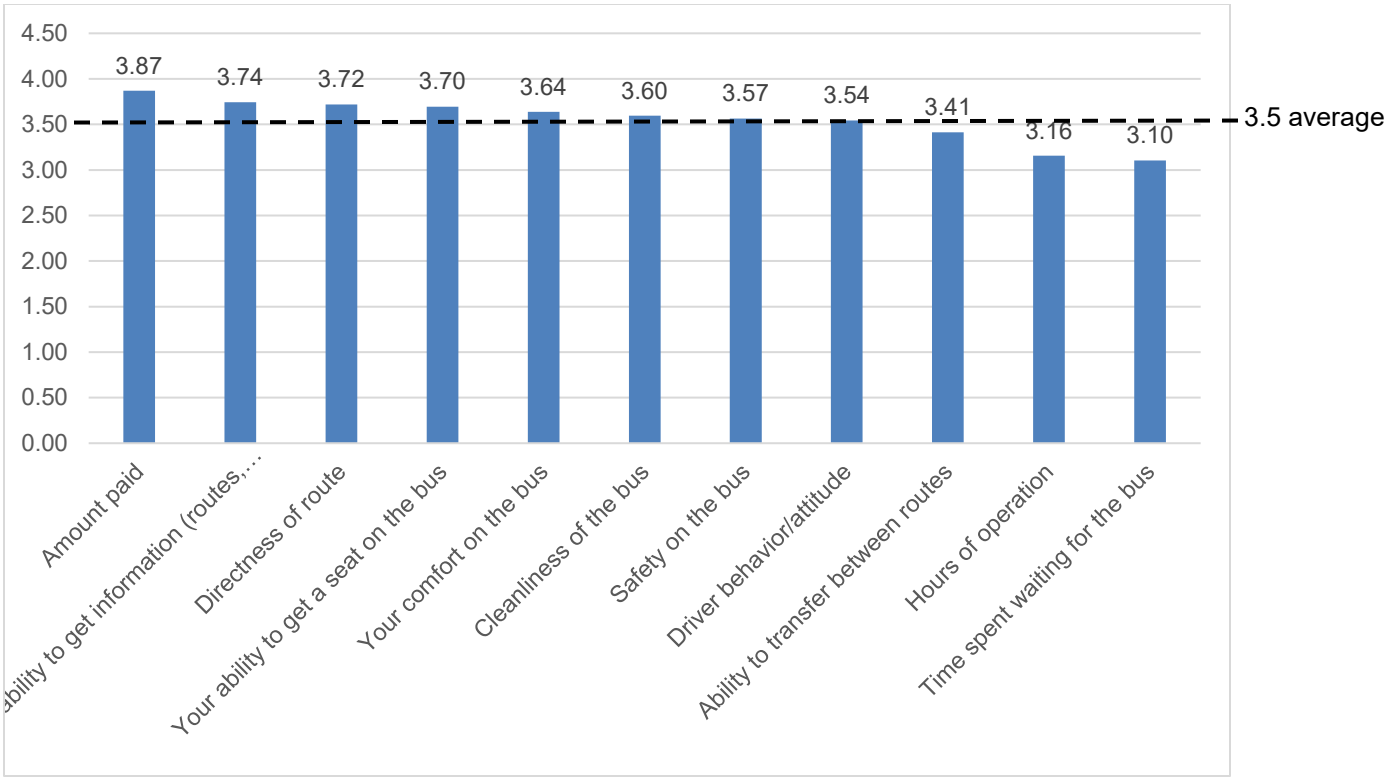


Figure 7: Detailed satisfaction with AVTA service areas.

An important consideration for any transit agency is the trade-offs between different aspects of service, and communicating the necessity of prioritizing what is most important to riders helps to deliver a better service with limited resources, as well as clarifies overall agency direction or goals. Using the same rating scale as the previous question, respondents were asked to rate how important various tradeoffs are to them. Trade-offs include longer service hours and decreased frequency, frequent service with longer walking distances, shorter travel times with more transfers, and one-seat rides with indirect routes. Respondents were also asked if they agree with the following statement: transit should get priority over vehicle traffic where it is feasible. Results are presented in Figure 8 below.

While results are fairly similar across the board, it appears as though survey respondents most value shorter travel times, even if that means more transfers in their trip, and least value longer service hours with lower frequencies. It is interesting to see a relatively low level of support for transit and transit priority over vehicle traffic, especially because non-riders showed a higher level of support (4.0) when asked the same question (see Figure 25).

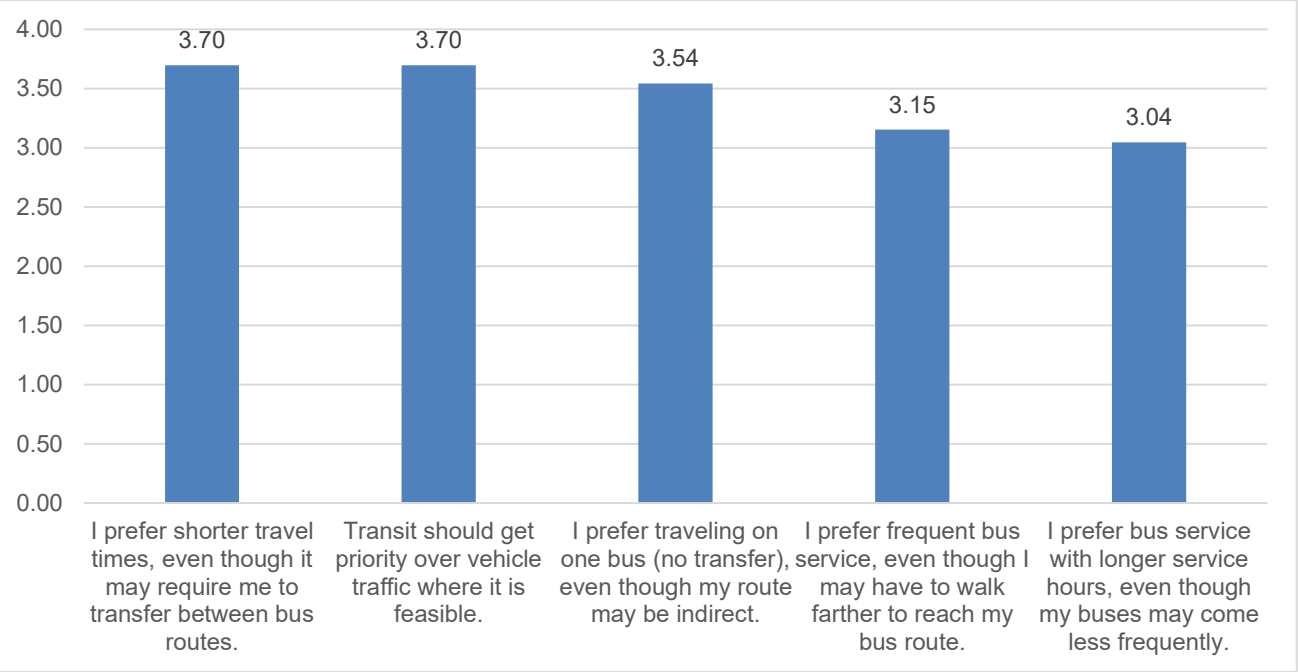


Figure 8: Transit tradeoff priorities.

2.3.3 Dial-a-Ride Service

A special subset of questions requested information on the rider experience for DAR users. Of the fifty rider survey responses, six identified as DAR users and provided responses to this set of questions (though one was incomplete, only providing responses to the questions regarding fixed-route service). The majority of respondents (60%) reported using AVTA's DAR services once a week, with a smaller proportion of respondents using the service more frequently (20% 3-4 days a week, and the remaining 20% use the service at least five days a week). Reflecting the pattern seen in responses from riders of the fixed-route service, the majority of DAR respondents (60%) have been using the service for more than three years.

The vast majority (80%, or four out of five respondents) reported that their primary purpose for using DAR is for healthcare purposes. The remaining respondent reported that they use the service to commute to and from work. As seen in Figure 9, responses were much more varied regarding how respondents would travel if DAR was not available, but the most popular alternative was to utilize Uber or Lyft (40% of respondents).

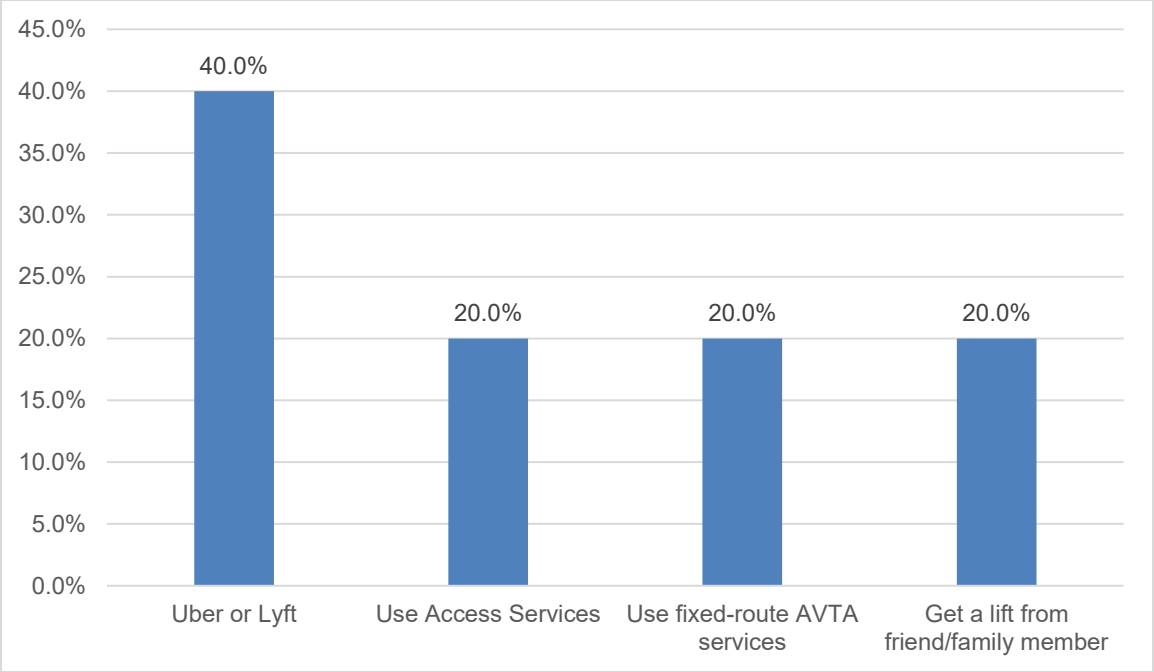


Figure 9: Travel alternatives to DAR services.

Overall, respondents reported very high satisfaction of DAR services, with 80% of respondents stating that they were extremely satisfied with the service. The remaining 20% reported that they were neither satisfied nor dissatisfied with the service. While the high level of satisfaction is encouraging, it should be understood that the small sample size may not be representative of the overall population of AVTA DAR users. For example, additional DAR feedback received at the First 5 LA meeting revealed dissatisfaction with aspects of DAR service (such as the reservation process and pick-up window) not reflected in these survey results. However, these positive results are typically seen during these types of surveys, as DAR users tend to be very grateful that the service is provided and have a perception that if they complain or provide too much negative feedback, the service will no longer be provided.

DAR participants were also asked about their satisfaction regarding the program eligibility process, ride reservation process, and overall ride experience. Results are presented in Figure 10 below, using the same one to five rating scale to represent satisfaction.

Overall, DAR respondents appear to be satisfied with many aspects of the eligibility assessment process, feeling especially satisfied in the manner in which all their questions were answered as well as the ease of scheduling an appointment. It is also encouraging that no respondents provided a rating of one (extremely dissatisfied) for any aspect of the eligibility assessment process. However, respondents show a lower degree of satisfaction when asked if they were treated fairly. This is an issue that AVTA can look into to improve the overall eligibility assessment experience.

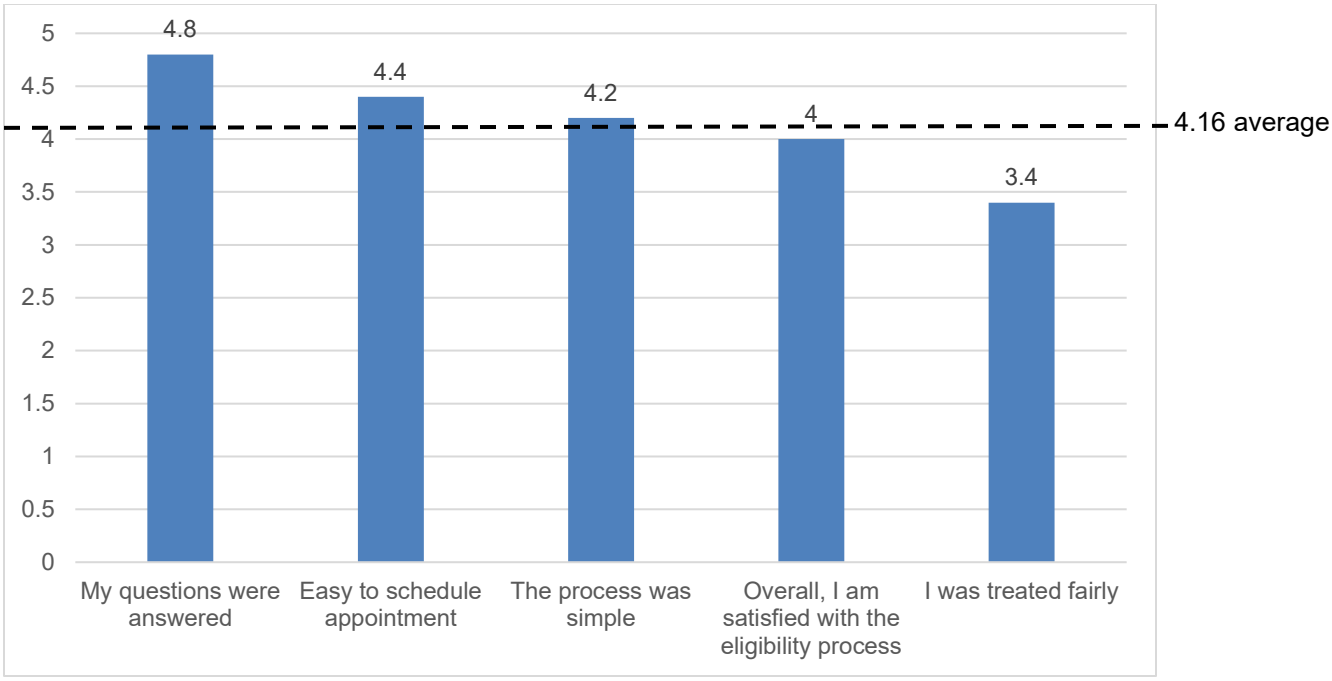


Figure 10: DAR eligibility assessment process satisfaction.

DAR riders were also asked to rate their satisfaction regarding the ride reservation process, using the same one-to-five rating used in previous questions. DAR customers provided satisfaction ratings for different aspects of the ride reservation process, including their ability to reach a customer service representative when they call, how polite and friendly the representative is, the ease and simplicity of the reservation process, and whether or not they are generally able to get their desired travel times. As seen in Figure 11, DAR respondents tend to be satisfied with the ride reservation process, the average satisfaction with the ride reservation process (4.15) is very close to that of the eligibility assessment process (4.16), and there is less variation among responses. Respondents are more satisfied with their ability to get desired travel times and the ease and simplicity of the overall process, and least satisfied with their ability to reach a customer representative when they call. DAR respondents are also less likely to own a smartphone (80% as opposed to 92.7% of all riders).

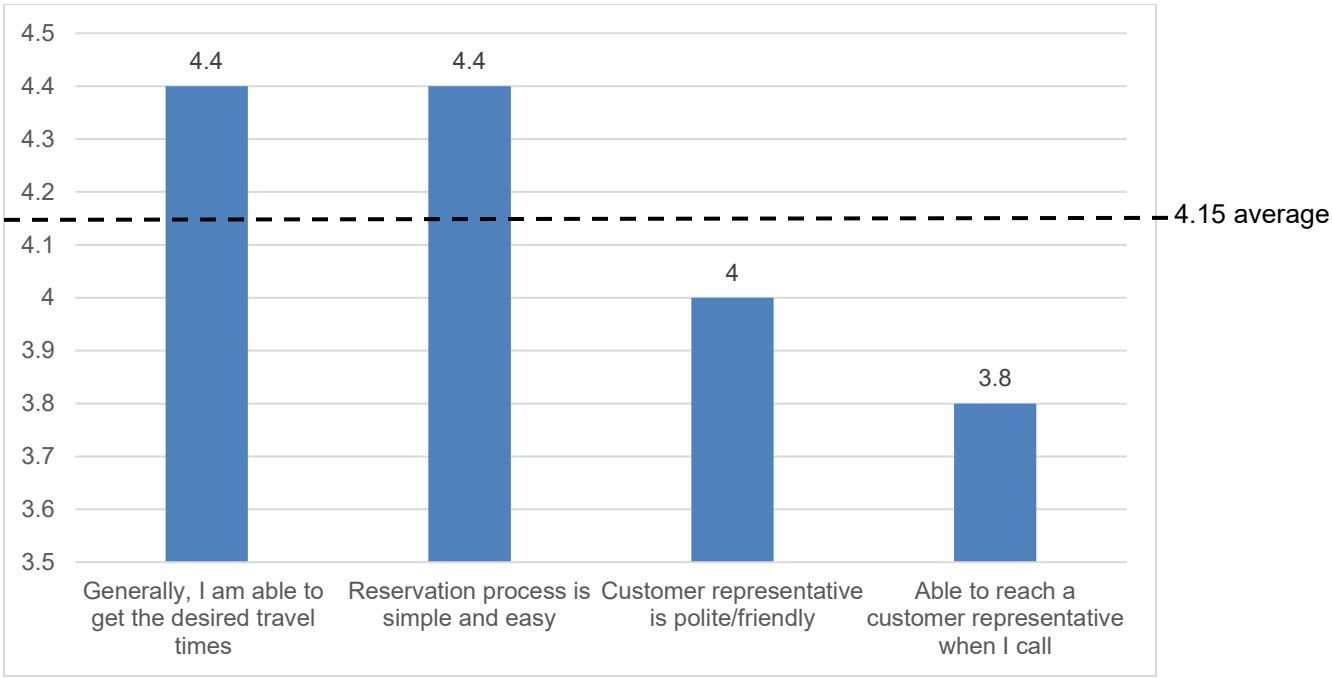


Figure 11: DAR reservation process satisfaction.

DAR users were then asked to rate their satisfaction of various factors related to the actual ride itself, including how safe they feel onboard, how courteous and helpful van operators are, cleanliness of van interiors, on-time performance, and overall ride satisfaction (Figure 12). Average satisfaction for the ride itself (3.96) is lower than other aspects of DAR service, and satisfaction among different categories tends to be lower. Additionally, two respondents reported that they were extremely dissatisfied with the cleanliness of the van interiors, and this received the lowest satisfaction rating in this category. As no other service aspect received this low rating, this is something that should be looked into, as maintaining clean vans are an important part of the rider experience and can influence one's overall impression of DAR services. Despite this, riders still reported a high level of overall satisfaction with the ride, at 4.4 out of 5.

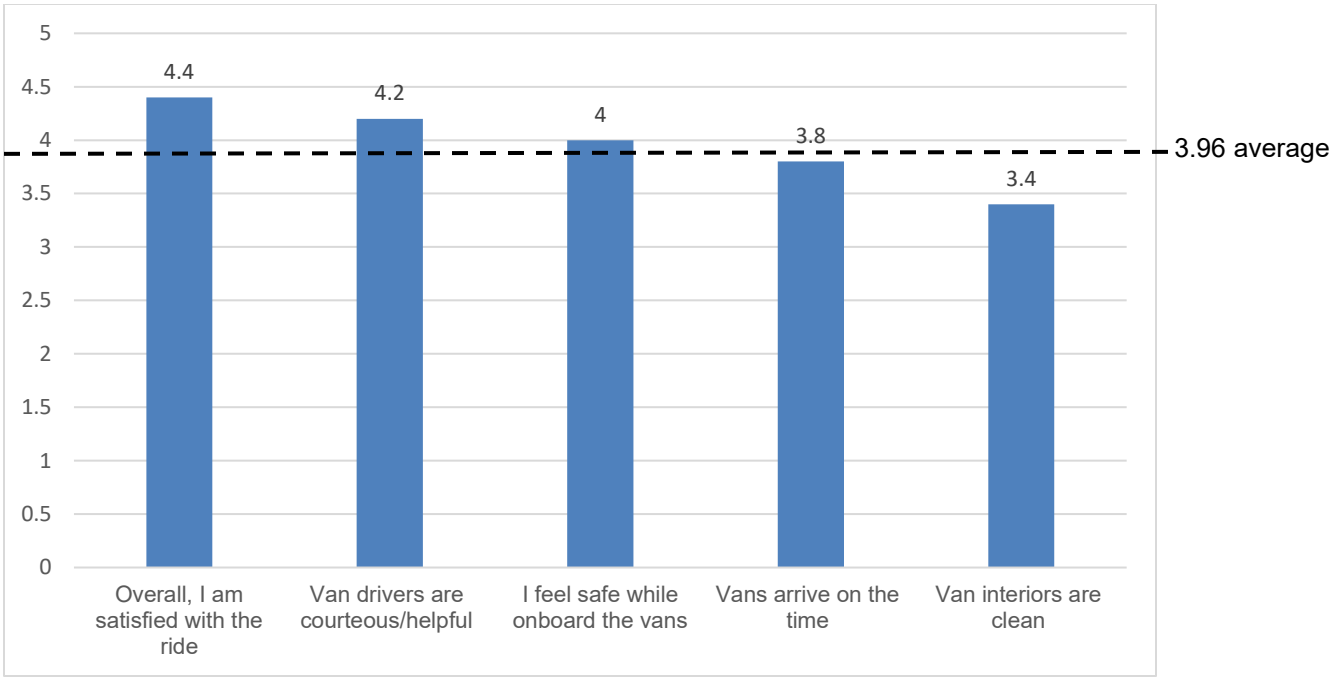


Figure 12: DAR ride satisfaction.

Overall, DAR respondents were the most satisfied with how their questions were answered during the eligibility assessment process, ease of scheduling an eligibility assessment appointment, ability to get their desired travel times, simplicity and ease of reserving rides, and the overall ride experience. Respondents were least satisfied with the cleanliness of the vans, van on-time performance, ability to reach a customer service representative when they call to schedule an appointment, and fair treatment during the eligibility assessment process. While these aspects of service are areas that AVTA can look into to improve the overall DAR experience, additional data should be collected before drawing definitive conclusions and taking action due to the low number of survey respondents. For example, DAR users at the First 5 LA meeting expressed frustration and low satisfaction with their ability to get their desired travel times, but 80% of survey respondents were either satisfied or extremely satisfied with this service area. Consensus on areas of DAR service that need the most improvement should be ascertained before moving forward with program changes or adjustments.

Respondents were evenly split on whether they had previously used fixed-route service, with half reporting that they have used fixed-route AVTA services in the past. The respondents who reported that they have not used fixed-route service provided reasons including **"I'm unsure about where or how to travel by local bus service**," "I am unable to travel by local bus service because of my disability," or simply being uninterested in using fixed-route services. When asked how likely they would be to replace DAR trips with trips using fixed-route service if travel training was provided, responses were more varied, as seen below in Figure 13 (as no respondents reported that they would be "very unlikely" to replace DAR trips after travel training, this choice is not shown in the figure below). While the majority of respondents were neutral on the issue, the fact that some respondents reported being somewhat or very likely to replace DAR trips with fixed-route service after travel training is encouraging, and better-promoting travel training programs for this purpose should be considered.

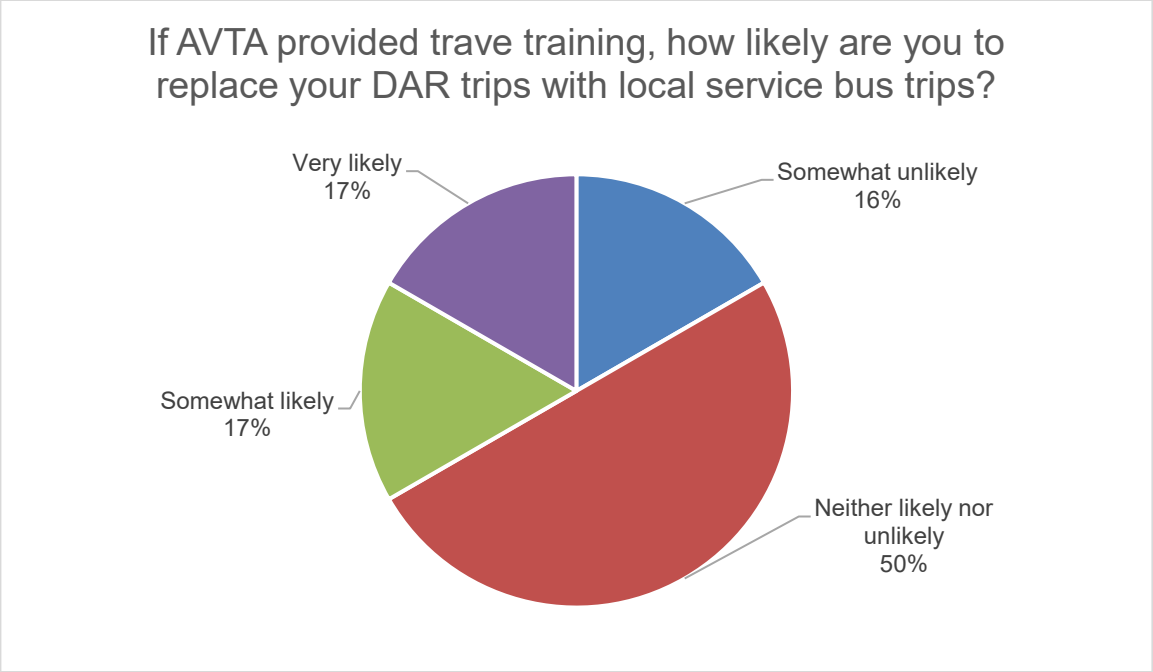


Figure 13: DAR user likelihood of using fixed-route service after travel training.

2.3.4 Commuter Service

As with DAR-specific questions, a section of the survey specifically asked about AVTA's commuter services. More respondents identified as users of the commuter service compared to DAR service, with sixteen responses for commuter service questions.

As seen in Figure 14, most commuters have been using AVTA for a long amount of time. This trend is reflected in DAR users and riders of local fixed-route services, reinforcing the fact that AVTA's riders are longtime riders who likely have few, if any, transportation alternatives. As seen in Figure 15, there is a large amount of variation in how frequently respondents take each commuter route. As most respondents reported only taking one route, the majority of responses for each route was "never." The number of respondents for each route is provided in parenthesis next to the route number. For example, three people reported using Route 747. One uses the route less than once a month, one uses 3-4 days a week, and one uses it 2 days a week. The high amount of variation in how often respondents use each route suggests that these routes may be used less for traditional weekday commuting and more for less traditional commutes. Route 786 (to Century City/West Los Angeles) has the highest proportion of riders reporting using it five days a week.

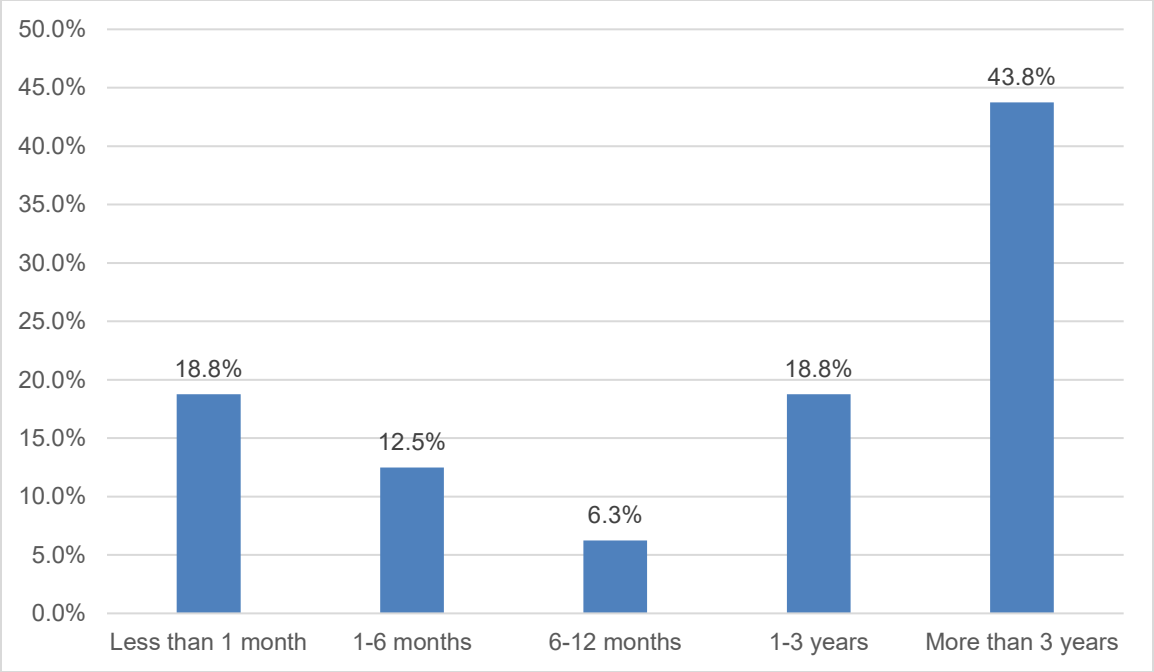


Figure 14: Length of time using commuter services.

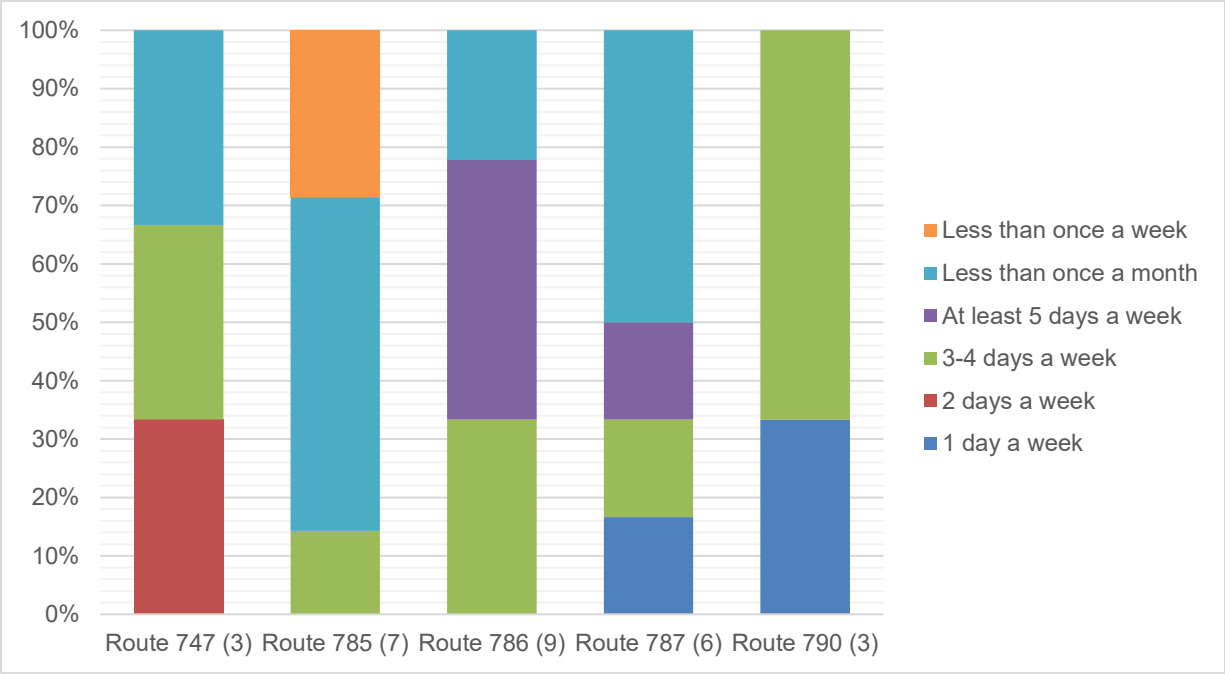


Figure 15: Commuter route frequency.

Regarding fares, the majority of commuter riders (81.3%) pay full fares, while 18.8% of commuters pay either the senior or disabled fare. There was more variation among responses regarding the type of fare typically purchased

for commuter services, as seen below in Figure 16, but the most popular choices are one-way and monthly tickets, with each representing almost one-third of overall survey responses.

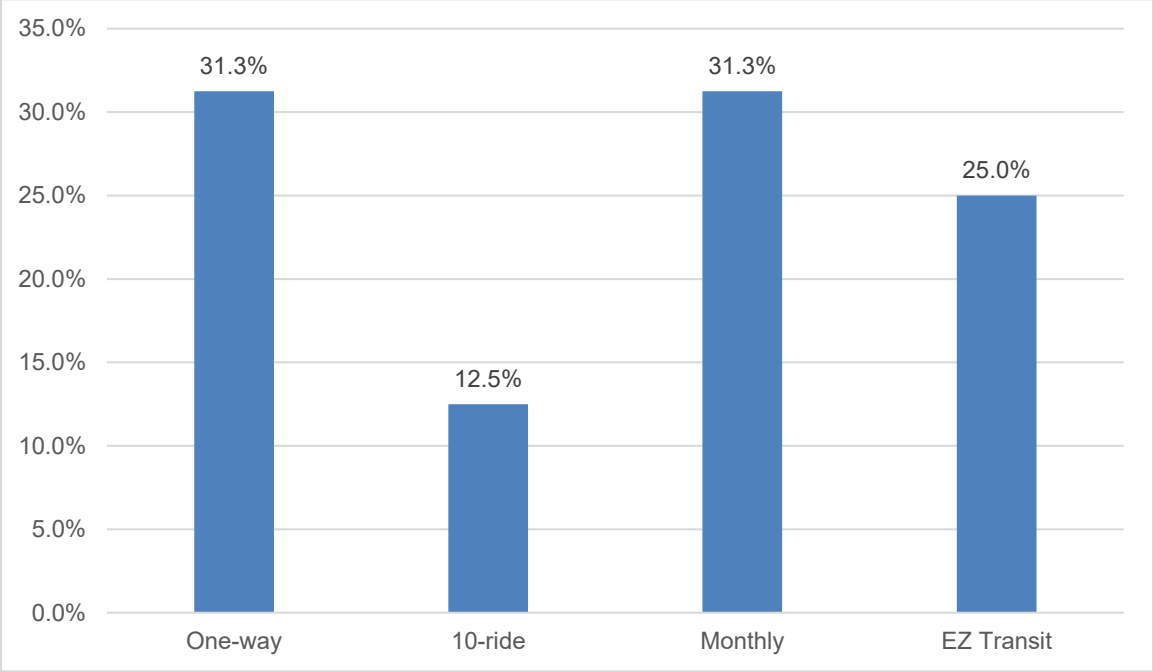


Figure 16: Fare typically purchased for AVTA commuter services.

Unsurprisingly, the most common trip purpose for commuter trips was commuting to and from work, at 40% of total respondents. Other responses include commuting to and from school (13% of respondents) and leisure (also 13% of respondents). Full results can be seen in Figure 17 below. Specific responses for the “other” category include “court” and “going to LA.”

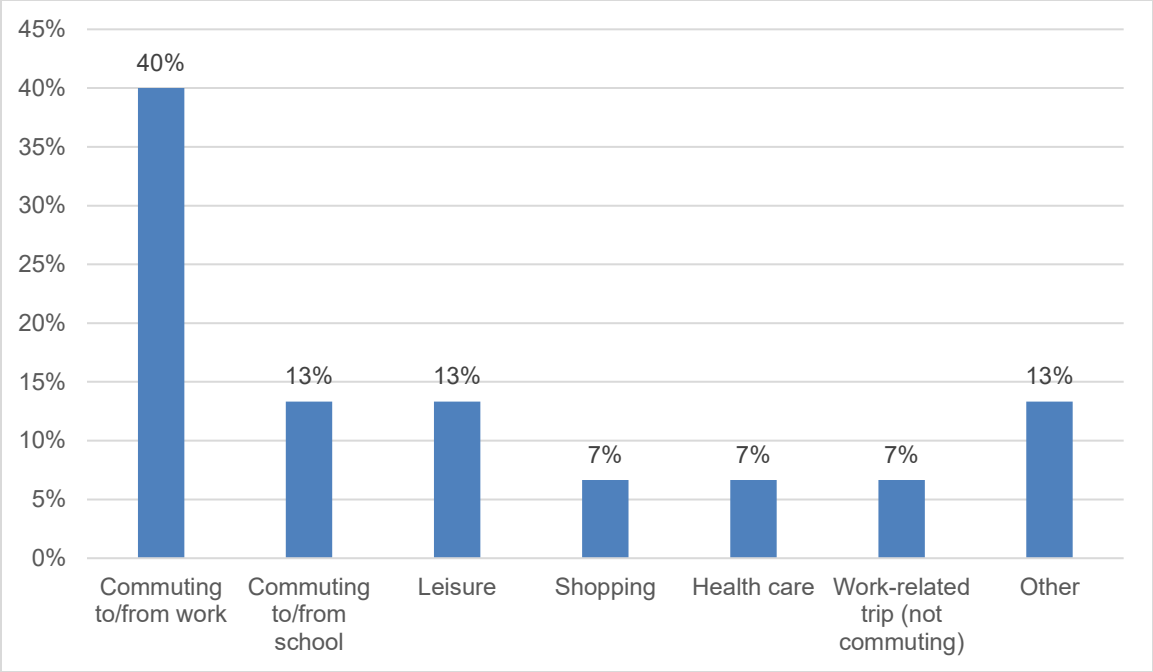


Figure 17: Main trip purpose for commuter services.

Respondents also provided information on how they access commuter services and their final destination after alighting AVTA commuter buses. While the largest proportion of respondents note that they reach AVTA's commuter service through driving their personal vehicle (35.7% of respondents), the second most popular option was through utilizing local AVTA or other transit (21.4%). Other responses included getting a lift from a friend or family member, Uber/Lyft, or walking (Figure 18). The high proportion of respondents who use local service to reach commuter services highlights the importance of ensuring that schedules are aligned to provide for easy and convenient transfers.

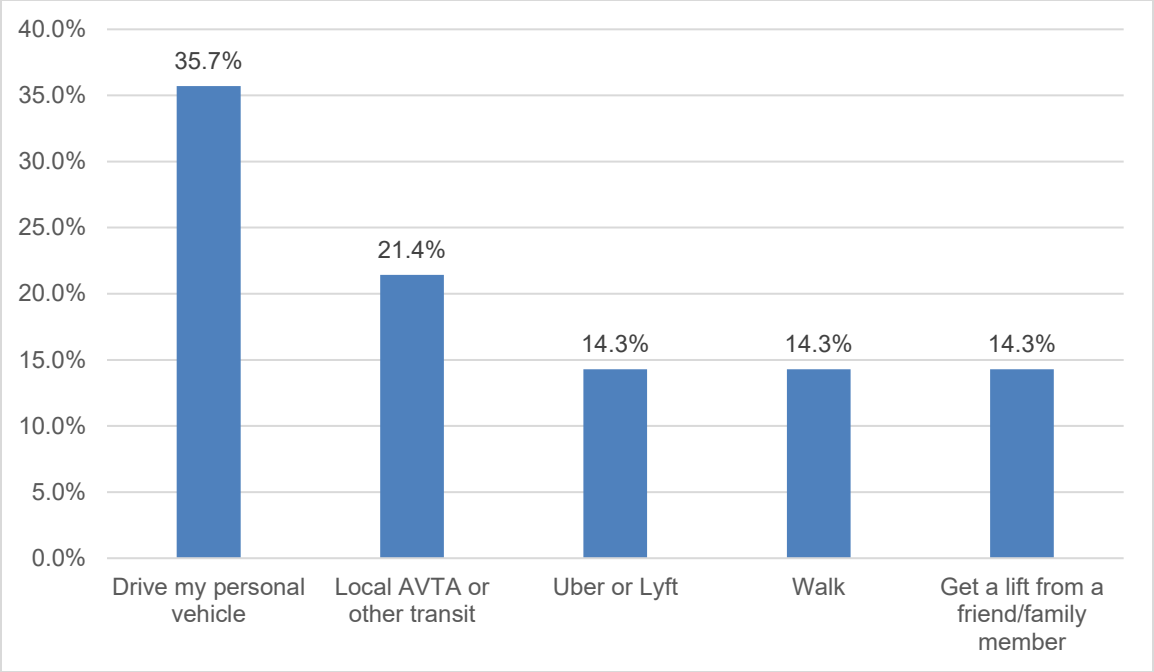


Figure 18: Mode used to reach commuter services.

Unsurprisingly, most commuter respondents (42.9%) walk to their final destination after their trip on AVTA's commuter services. However, a large portion of commuters (35.7%) transfer to another transit service to reach their final destination, suggesting that for a considerable portion of commuters, AVTA's commuter services are only a portion of their overall daily transit trip. Other responses include an Uber/Lyft ride (14.3%) and driving their own vehicle (7.1%).

While it would be assumed that most commuters make daily round trips via AVTA's commuter services (meaning that morning and afternoon journeys are on the same AVTA commuter route), it was interesting to see that **nearly a third of respondents (31.3%) do not typically make round trips, and utilize other means to complete their daily journeys.** Coincidentally, this is the same number of respondents who reported purchasing one-way tickets for their journeys on AVTA commuter buses. The remaining 68.8% of respondents make round trips using the same AVTA commuter bus route.

A number of different responses were provided when respondents were asked how they would travel today if commuter services were not available, but a majority (56.3%) of respondents said they would use Metrolink services instead, while a number of respondents (31.3%) said they would drive their personal vehicle. Less popular responses include getting a lift from a friend or family member (6.3%) or an Uber/Lyft ride (also 6.3%).

Overall, survey respondents tend to be satisfied with AVTA's commuter services, as seen in Figure 19 (as no respondents reported "extremely dissatisfied," this is not shown in the figure). However, the significant portion of those who are neither satisfied nor dissatisfied and those that are dissatisfied shows that there is room for improvement regarding the rider experience and AVTA's commuter services overall. This aligns with feedback heard regarding commuter service during other outreach and engagement activities, such as at the public

meeting, where users of the commuter service complained of uncomfortable buses and expressed dissatisfaction that all AVTA fares cannot be used to transfer onto other transit services.

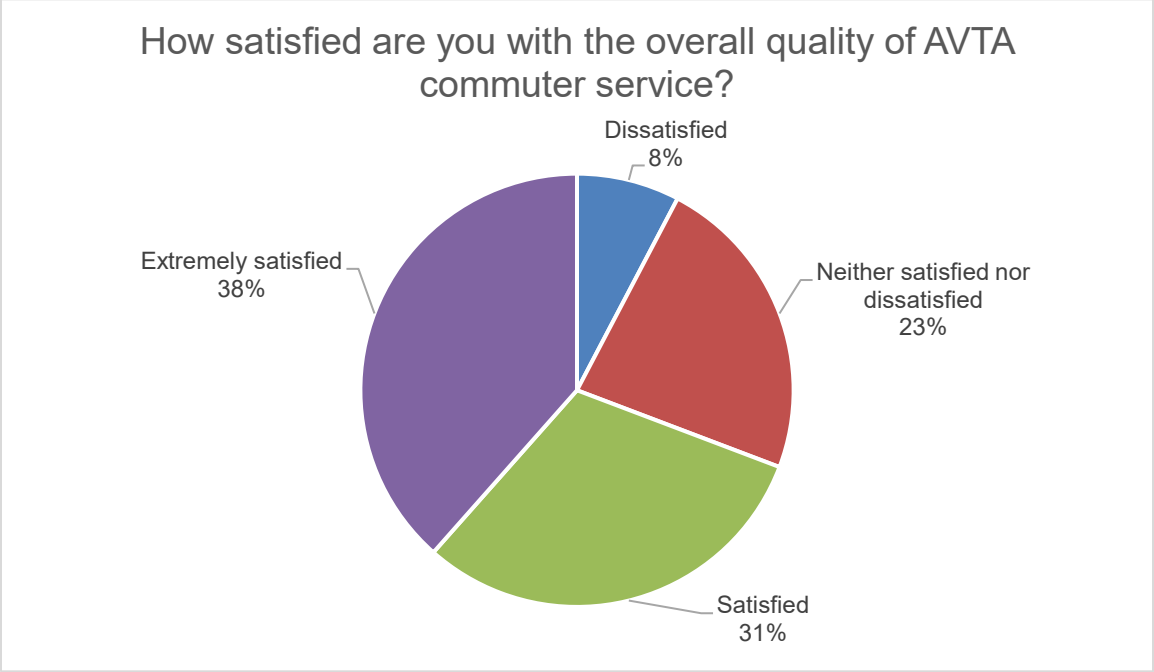


Figure 19: Satisfaction with AVTA commuter services.

Along with providing their overall satisfaction with commuter services, respondents were also asked to rate their satisfaction across many different specific aspects of service, using the same one to five ranking system to represent their satisfaction. These service areas include their ability to transfer between routes, amount paid, bus cleanliness, route directness, operator behavior and attitude, hours of operation, safety and comfort onboard the bus, time spent waiting for the bus, ability to get a seat on the bus, and ability to get information (such as route maps and schedules). Respondent rankings for these service areas are shown in Figure 20 below.

Overall, commuter respondents are fairly satisfied with current services, though variation exists. Respondents are least satisfied with hours of operation, fares, and time spent waiting for the bus, while they are most satisfied with bus cleanliness and their safety onboard the bus. As commuters are on these buses for a long amount of time, these service aspects can significantly influence a rider's overall commuting experience, so the high level of satisfaction in these areas is encouraging. It is also interesting to see such high levels of satisfaction with commuter bus cleanliness compared to lower satisfaction levels of vehicle cleanliness for DAR and local service. Applying the same cleanliness standards and methods used on commuter buses to other service areas may help to raise these satisfaction levels to that of commuters.

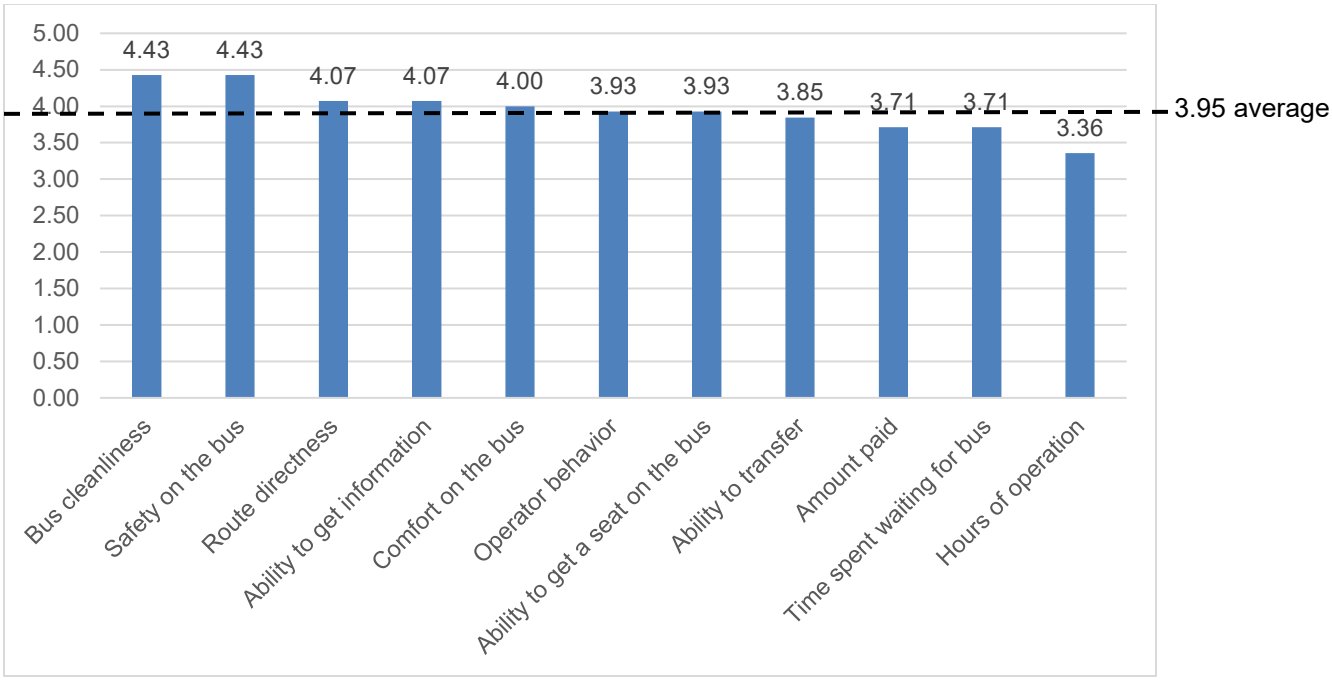


Figure 20: Detailed satisfaction with AVTA commuter service areas.

In the same way that riders were asked to rank which aspects of transit service are most important to them (Figure 8), commuters were asked to decide between shorter travel times with more transfers or one-seat rides with indirect routes that may take longer. As with other questions of this nature, respondents rated their preference on a one-to-five scale. Results are shown in Figure 21.

While respondent preferences are fairly similar, it seems as though respondents have a slight preference for one-seat rides and longer travel times over shorter travel times that may require more transfers. This contradicts commuter complaints heard during outreach regarding long travel times amid worsening traffic and congestion conditions, and should be investigated in greater detail to obtain a clear consensus. Further research to determine whether or not this preference varies by route may also be worthwhile.

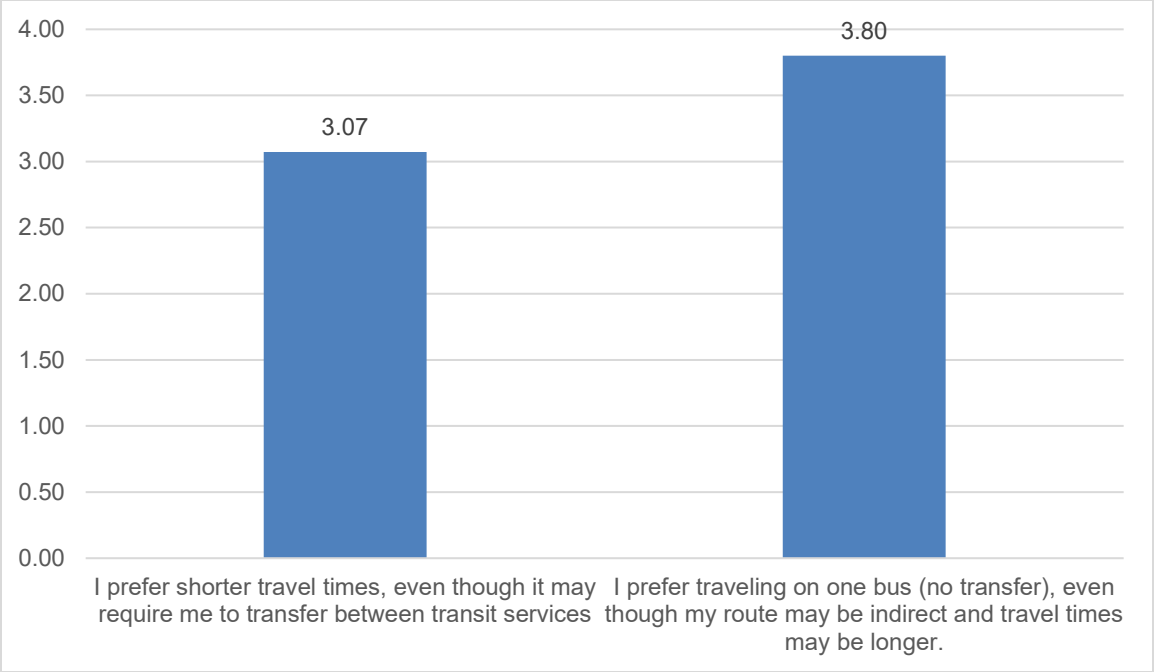


Figure 21: Commuter service trade-off priorities.

2.3.5 Non-Rider Overview

Surveys of this nature are beneficial when open to the general public who are not transit riders to better understand why they do not use transit, and what could potentially convince them to change their travel behavior and try public transit services. Overall, 46 survey respondents identified as non-riders, meaning that they have not used AVTA in the past three months, or have never used AVTA's services.

Unsurprisingly, the vast majority of non-riders (88.9%) typically get around the Antelope Valley in their personal vehicles, though they use a range of different transportation options, as seen below in Figure 22. Less popular responses included getting a lift from a friend or family member (4.4%), Los Angeles County Access paratransit services (2.2%), cycling (2.2%), and taxi (2.2%). Acknowledging the auto-centric land use and development patterns of the Antelope Valley, the overwhelming popularity of driving one's personal vehicle is understandable, but long-term commitments to future developments and land use decisions that take transit accessibility into account can help to decrease people's dependency on personal vehicles, which provides benefits such as helping to reach regional and state climate goals and creating more sustainable communities as the Antelope Valley continues to grow and develop.

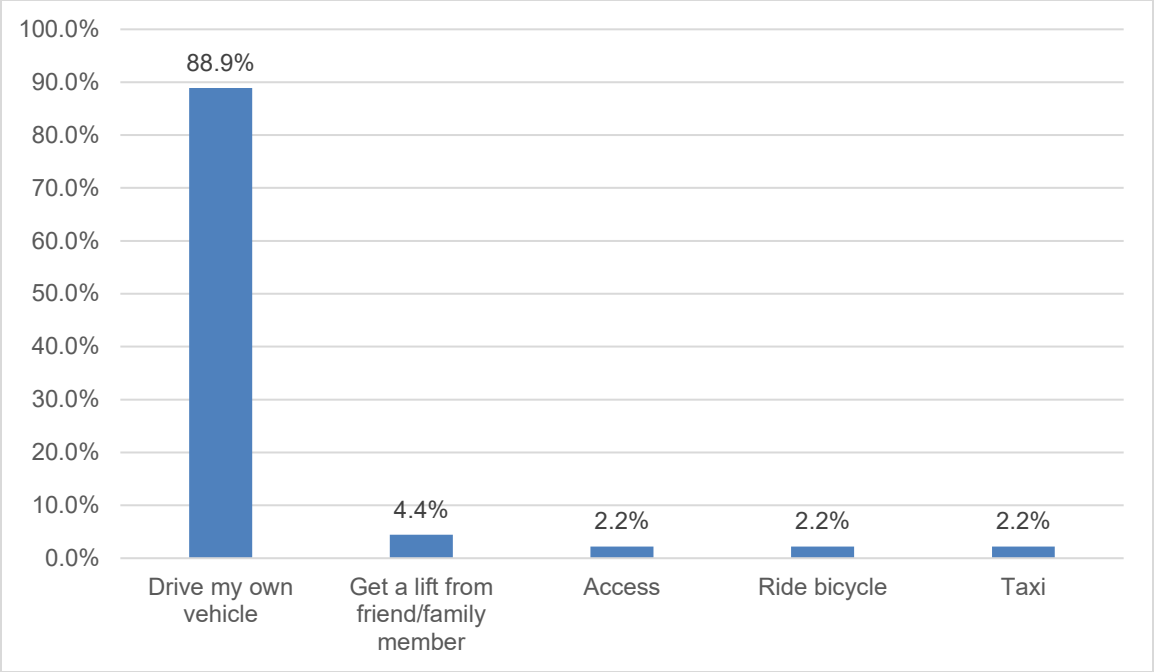


Figure 22: Non-rider mode choices.

While driving one's own personal vehicle is currently the most popular choice for the majority of Antelope Valley residents and non-rider survey respondents, when asked how likely they would be to use transit if it was convenient (meaning frequent, affordable, and reliable), the majority (52.4%) of respondents reported being somewhat or very likely to use it (see Figure 23). It is encouraging that a relatively small portion (19%) of respondents would be either very or somewhat unlikely to use transit, regardless of how convenient it is. The 29% of respondents who are neutral and have no opinion presents an opportunity to provide additional community outreach; if these people had a positive impression of AVTA, they could become somewhat or very likely to use transit if it becomes convenient for them.

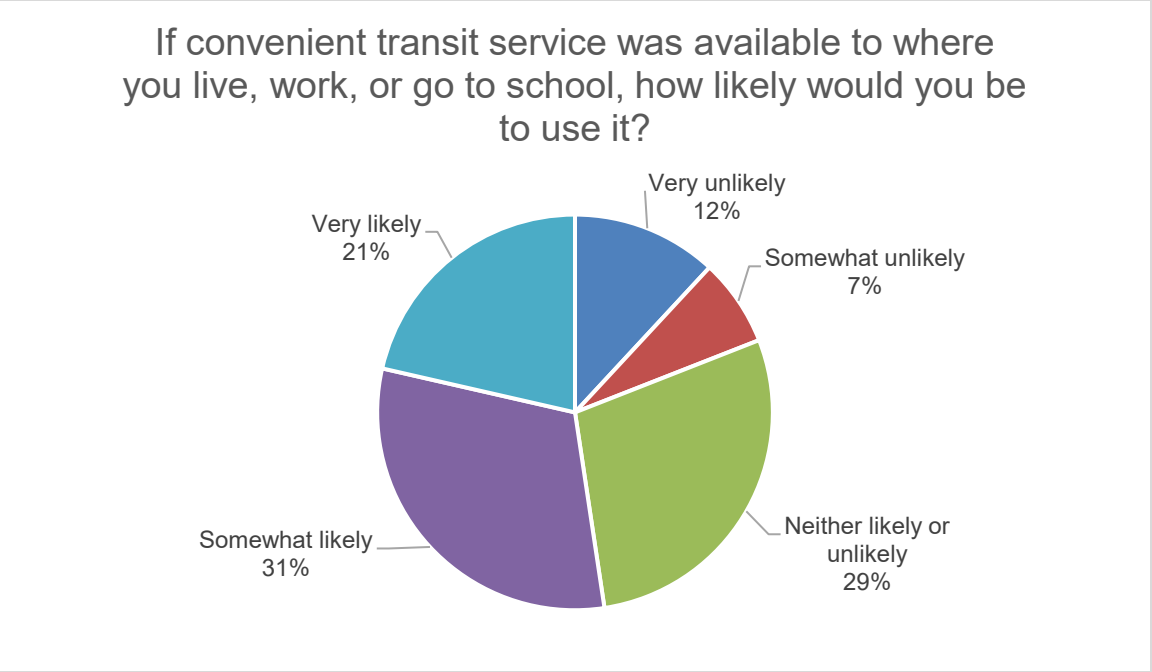


Figure 23: Non-rider likelihood of using transit.

Non-riders were also asked to provide detailed information on the major reasons why they do not use AVTA. Respondents were asked how much they agree or disagree with the following statements: routes and schedules do not cover my needs, service is not frequent enough, the trip would take too long by bus, no routes near where I live, it is not convenient, and it is too expensive. Respondents rated their opinion on the same one (strongly disagree) to five (strongly agree) rating scale. As seen in Figure 24, the most popular reason among respondents for not using AVTA is related to trip length, with 50% of respondents giving this reason a rating of five. Other major reasons for not using AVTA include that AVTA is not convenient and inadequate service frequency. According to respondents, amount paid, service reliability, and a general dislike of public transit are not major determining factors.

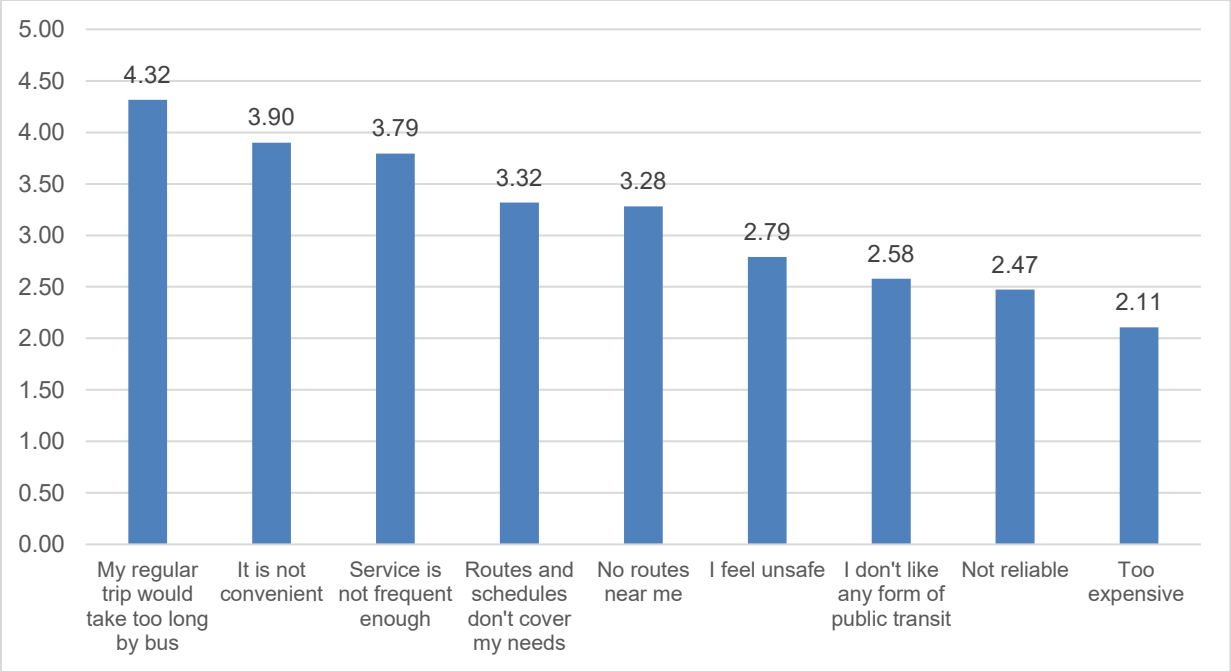


Figure 24: Non-rider reasons for not using AVTA.

Non-riders were also asked to provide their opinion regarding how much they agree or disagree with some broad, general statements about AVTA and public transit, using the same one to five rating scale to represent how much they disagree (one) or agree (five) with a given statement. Statements included: there is no AVTA bus route near my home, I know which AVTA bus route is closest to my home, I am familiar with the service provided by AVTA, I do not use AVTA because I prefer to travel by car, I believe public transit reduces traffic congestion, and public transit is a necessary service that should be given priority over vehicle traffic where possible. Full results are shown in Figure 25. It is encouraging that respondents agreed with the last two statements, showing that there is general support for public transit among those living in the Antelope Valley, even though the respondents themselves are not riders. Specifically, 56% of respondents strongly agree that public transit reduces traffic congestion, and the same percentage of respondents strongly agree that public transit service is necessary and should be given priority over vehicle traffic where possible. These results show that support for and ridership of transit in the Antelope Valley may increase as traffic and congestion continues to worsen. Non-riders also tended to agree or strongly agree that a preference for using one's own personal vehicle is a more attractive option over AVTA, as reflected in other non-rider responses that show a propensity for private vehicle use.

The remaining three statements are in regard to public knowledge of AVTA. A low rating in response to the statement "there is no AVTA bus route near my home" shows that respondents were less likely to agree with this statement, and 35% of respondents strongly disagree with the statement, meaning that there is a bus route near their home. Responses are fairly split regarding familiarity with the services AVTA provides and knowledge of which bus route is closest to one's home.

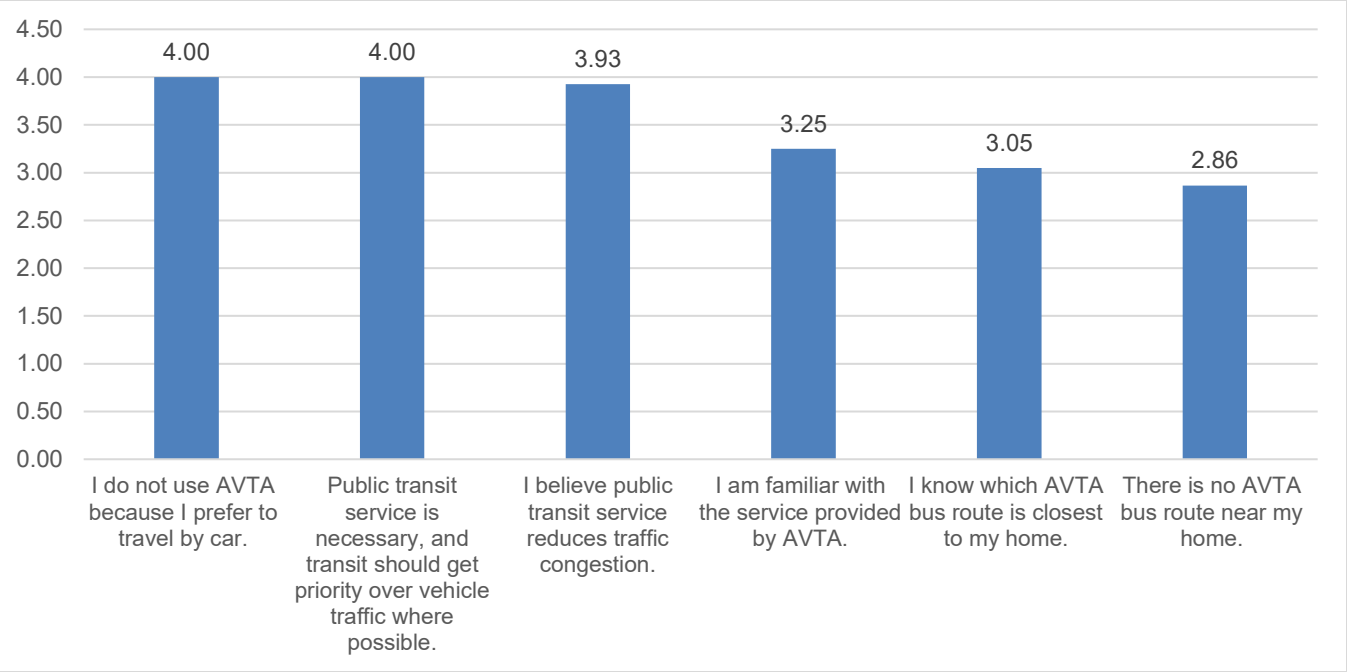


Figure 25: Non-rider opinions of public transit.

2.3.6 Summary of Survey Results

Despite the small sample size, survey results were largely representative of feedback heard through other outlets during the community engagement and outreach process, such as at the First 5 LA meeting, focus groups, and conversations had with riders at bus stops. Across all service types, riders tend to be those who have been using the system for a long period of time (three or more years) and use the system frequently (at least five times a week), though this is less likely among DAR respondents, who are more likely to use DAR services once a week. Additionally, riders are more likely to be captive or transit-dependent, as 65.5% of rider respondents do not own a car.

Riders make trips for a variety of purposes that differ based on service type: DAR riders are more likely to use the service to get to and from healthcare, and commuters are most likely to use AVTA to commute to and from work. Those using the local fixed-route system are also most likely to use the system to get to and from work, though school and shopping are also common trip purposes among respondents.

Overall, respondents tended to have a positive impression of AVTA, though nearly 25% of respondents do not, for reasons including perceptions of safety and security, long waiting times for buses, rude bus operators, infrequent service, and a lack of bus shelters. Riders tend to be most satisfied with DAR service, and least satisfied with the overall quality of AVTA bus service. However, satisfaction levels across all aspects of service show large proportions of respondents having neither a positive nor negative opinion. This suggests that AVTA can work to become more visible and recognizable throughout the Antelope Valley, informing riders and non-riders alike about what the agency is and the services provided. Continuing to engage in outreach and becoming more visible in the community can help to foster positive perceptions and impressions of the agency, and focusing on improving the quality of service can lead to a better rider experience and increase satisfaction and loyalty among riders.

3.0 FOCUS GROUPS

Focus groups provide participants with a venue to explore attitudes, beliefs, perceptions, and experiences. Focus groups are not staged to be projectable across an entire population, but they do reveal experiences, attitudes, and perceptions that are present in the community as well as provide an opportunity to have an in-depth discussion of important issues. We used focus groups for this exact purpose: to dive deeper into the issues that the team has been hearing throughout the entire community outreach and stakeholder engagement process.

3.1 PURPOSE

Using the qualitative research method of focus groups, the Stantec team and its subcontractor, Gobis & Co., sought to understand why riders use AVTA services and why other residents of the agency's service area choose to travel by other means. Two focus group sessions were staged, one with riders and another with residents of the service area that do not ride AVTA service or formerly rode AVTA but are not current transit users.

The sessions gathered firsthand accounts and opinions on aspects spanning AVTA service as well as overall transportation challenges in the Antelope Valley, including rider and non-rider perceptions of AVTA and its services, those characteristics of transit service most important to riders and non-riders, where riders get the information they need to ride AVTA and where non-riders would go if they wanted information about the service, and why riders made their choice to use AVTA and the reasons why non-riders don't ride. The research revealed both groups' overall assessment of the need for public transit service in the Antelope Valley.

3.2 METHODOLOGY

Focus groups were used as a research format that would allow riders and non-riders to openly and frankly offer their opinions on AVTA service without the time and cost constraints associated with region-wide qualitative research often executed by phone. As a qualitative research methodology, focus groups results cannot be projected across the Antelope Valley population. As the Antelope Valley is a large area, spanning 2,200 square miles, with low population density (253 people per square mile), Stantec believed that projection of the results across such as broad geographic area with low population density that does not support fixed-route transit service would not be valid or useful. However, focus groups are an important aspect of the overall outreach and engagement process, as these in-depth conversations provide an additional means of receiving rider and community feedback.

The focus group participants were recruited from the current 'catchment' areas for existing AVTA services as defined by the boundaries of the AVTA service area and the levels of service those areas receive, proportionately. Recruitment was accomplished using the demographic profile of the AVTA service area using 2010 U.S. Census and 2015 American Community Survey data.

Riders were defined as being frequent users of the service for at least one year. As discussed in greater detail below, many of the rider focus group participants exceeded minimum requirements; two participants reported using public transit in the Antelope Valley before the formation of AVTA. Conversely, non-riders were defined as

those who have never used AVTA services, or former riders who have not used AVTA services over the past year. The decision to include former riders was helpful in analyzing why AVTA has been seeing ridership decline over the past several years.

Multiple strategies were implemented in the recruitment of focus group participants, including advertising on social media and engaging AVTA frontline personnel (bus operators and customer service representatives) in the recruitment of both riders and non-riders.

Those interested in participating called Stantec and underwent a screening to determine their eligibility for the two groups. Every effort was made to replicate AVTA current rider profile for the rider focus group, which was achieved with a mix of ages, genders, ethnicities, and income profiles. The non-rider focus group was more challenging to fill, as awareness of AVTA and its services was found to be very low.

The focus groups were staged at the AVTA headquarters in Lancaster, as the facility is accessible by bus for riders and centrally located for non-riders and former riders. The groups were recorded so the opinions and comments of the participants can be used by AVTA in other planning exercises. The participants were paid a stipend for participating in the sessions, and refreshments and light snacks were provided at each session.

Separate discussion guides were developed by John Gobis of Gobis & Co., who moderated the two focus groups. Gobis reviewed AVTA operating data, customer complaints, and compliments and conducted intercept interviews with riders and non-riders prior to the focus groups to inform the discussion guides. The guides were crafted for the specific groups to elicit responses that would yield answers that would assist AVTA with the design and delivery of its services. For riders, the guide contained questions that identified those characteristics of service most important to current system users, such as service frequency, on-time performance, and fares. Non-rider questions were intended to determine awareness of AVTA services, how non-riders made their travel choices and what factors would make them consider riding AVTA service.

3.3 RIDER FOCUS GROUP

On Monday, June 17, 2019, a focus group consisting of ten current AVTA system users was held to better understand AVTA service challenges and opportunities from the rider perspective. A profile of participants is outlined below.

- **Vehicle availability:** the overwhelming majority of riders in the focus group session did not have a vehicle available to them for their travel. Some had disabilities that did not allow them to drive, although a few of the participants had cars but chose to ride AVTA. Several of the riders also maintain Uber or Lyft accounts for emergency travel but do not use these on a regular basis, relying on AVTA as their main mode of transportation.

- **Trip purpose:** according to focus group attendees, healthcare is the greatest trip purpose for travel on AVTA. Some of the focus group participants had jobs, utilizing AVTA for commuting purposes, while others were students who rode to school. Shopping was also identified as another important trip purpose for those riding AVTA.

- **Frequency of use:** some of the focus group participants noted that they have been using public transit in the Antelope Valley prior to the formation of AVTA. In terms of length of use, all participants have been

transit users for at least two years, with the majority falling between two and eight years of ridership. One participant noted using transit in the Antelope Valley for over 25 years. Along with being long-term users, the majority of riders use the service at least five days a week, with some using AVTA every day.

The focus group conversations spanned many areas of AVTA service. Discussion is summarized by topic below.

- **Fares and fare payment:** rider focus group participants were aware of the benefits of the TAP card and the majority of them used TAP. Participants did not express concerns about AVTA's fare structure, and consider the service to be a good value despite their issues related to service quality. However, it was noted that AVTA may lose riders if fares are raised and service quality stays consistent poor.

- **Bus operator training:** riders believe that bus operators are no longer in control of their buses which results in poor service and safety issue onboard buses. They perceive that newer bus operators do not have the same commitment to the agency as operators who have been with AVTA for longer periods of time. Riders attribute this deterioration of service to the lack of operator training. Further, the riders said that the training of the newer operators also impacts service quality as those driving less than five years have the worst on-time performance because they are not familiar with the routes and do not know how to navigate the increasing traffic volumes in the Antelope Valley.

- **Transfers/transfer policy:** AVTA riders expressed concerns with the lack of directness of AVTA routes that results in riders making multiple transfers to get to their final destinations. In addition to the lack of directness of the current route structure, making transfers is near to impossible for riders as the lack of on-time performance results in missed timed transfers and long waits for the next buses. Riders expressed a desire for AVTA to establish an official policy to hold buses at major transfer points so that missed connections are minimized.

- **New service opportunities**: as it is clear that AVTA's local routes have not been updated to reflect development and land use changes in the Antelope Valley, participants were eager to offer opinions regarding new service opportunities. Of all the opportunities suggested by the riders, providing more localized service that would bring riders closer to AVTA's line haul services was the most-mentioned new service request. Riders suggested that AVTA reevaluate its existing bus stops, as many bus stops are no longer used and serve merely to slow down services. Riders also mentioned the JetHawks Express bus service as an opportunity to lure more riders to AVTA service.

- **Electric bus fleet**: while riders approve of the agency's commitment to electric, zero-emission buses, they expressed concerns regarding the current fleet, specifically stating that the current batteries are "not strong enough," resulting in frequently forced change-offs, which are understandable inconvenient for riders.

- **Awareness and understanding of AVTA:** despite the loyalty of AVTA riders and their daily use of the agency's services, they knew little about the agency. Half of the riders were aware of the AVTA mobile application which enables them to track the arrival of their service in real-time. However, a few who had downloaded the app reported that it has many issues, such as not providing accurate real-time arrival information and that it often lags behind the actual time of day. Most of the focus group participants thought that AVTA was a privately owned and operated company. Riders were unanimous in the belief

that AVTA has not grown its services in response to the growth of the Antelope Valley, and agree that AVTA does not do enough marketing or communicating with them as frequent riders.

- **Overall satisfaction:** despite their dependence on AVTA, riders expressed serious concerns about AVTA service. When asked if they think service has improved, worsened, or stayed the same over time. all participants expressed frustration, stating that AVTA service had deteriorated over the past five years. They attributed the poor service quality to the lack of driver training, citing observations that the routes driven by older, more experienced bus operators performed better than those routes driven by newer operators. Participants said that newer operators do not have the same commitment to their riders as long-term operators, and could benefit greatly from additional operator training.

In addition to open discussion following the discussion guide, focus group participants were asked to list and prioritize characteristics of service that are most important to them and have the greatest impact on their experiences as riders. Provided below is the list of service characteristics that were most important to this sample of AVTA riders.

- **On-time performance:** riders said that on-time performance was less than 50%. This affects many other aspects of service, such as the ability to transfer easily. Low on-time performance, combined with missed transfers and service that is in many cases already infrequent, can result in very long trips for AVTA riders and negatively impact overall rider experience.

- **Transfers:** the majority of riders are required to make at least one transfer (and often two or more) to reach their final destination. While inconveniences that can arise due to transfers can be minimized (such as through transfers that are well-timed and pleasant waiting conditions), participants stated that they often wait up to an hour between buses because of the lack of on-time performance. Riders expressed a desire for AVTA to hold buses at transfer points so that long wait times and missed transfers can be minimized.

- **Pass-bys:** riders said that they were **"frequently passed by while waiting at stops,"** resulting in even longer waits and total travel times. When speaking to riders during other outreach events, it appears that this is a common issue, often due to the rider waiting near the bus stop in the shade as the bus stop itself does not provide shade or protection from the elements. This is an issue that can be addressed through additional operator training, which is already warranted based on other feedback from focus group participants and riders at large.

- **Distance to the bus stop:** focus group participants often need to walk long distances to access AVTA service, a common issue raised at other outreach activities. Participants raised a need for better first and last-mile service connections as well as better bus stop amenities. Specifically, more robust pedestrian infrastructure that better connects bus stops to surrounding destinations would aid in easing difficulties with accessing transit and connecting transit to destinations, which can be achieved through working with the cities and unincorporated areas of the Antelope Valley.

- **Safety at bus stops:** riders reported feeling unsafe while waiting at bus stops and onboard buses, noting that this issue is exacerbated in areas where there is a large homeless presence. Especially when riders often have long wait times at buses, ensuring that patrons feel safe is a very important aspect of the

overall rider experience. Additional bus operator training that stresses a need for operators to take ownership of their buses can also aid in ensuring that riders feel safe onboard buses as well.

- **Connectivity:** many focus group participants utilize AVTA to connect to Metrolink service. Participants noted that making transfers between AVTA and Metrolink service is challenging and stressful, highlighting gaps in regional connectivity that AVTA can address by ensuring that their schedules align with current Metrolink schedules. This issue was echoed by other riders who use AVTA to connect to Metrolink services, with one survey respondent requesting **"better-timed connections with Metrolink trains and TRANSPorter buses out of the Palmdale Station."**

Overall, rider focus group participants are heavily dependent on the service, and use it at a high frequency, showing that AVTA riders depend on the service for their main source of transportation. Additionally, many participants are loyal riders, as shown through the length of time they have been using the service for (over twenty years, in some cases). While participants use AVTA for many reasons, the most common trip purpose was to travel to and from healthcare. This reinforces the need to ensure that AVTA provides service to Antelope Valley healthcare providers, and that the pedestrian infrastructure connecting bus stops to the actual facilities provides for easy access to and from, especially for those with mobility devices or other mobility challenges.

Many of the focus group participants believe that service has worsened over the years due to operator issues. Issues such as operators passing by passengers with mobility devices, making unscheduled stops, or displaying rude behavior has been noted in other areas of outreach and engagement, and AVTA is aware of this issue and is taking steps to address operator behavior. Dependable operators who treat riders with respect and show a clear commitment to providing public transit to the Antelope Valley can aid in winning back rider loyalty and attracting new riders to the system.

Other than operator behavior, the main issues with AVTA service in the eyes of focus group participants include on-time performance, transfer policy, overall trip length, first-last mile connections, and bus stop amenities. Overall, the views and opinions of AVTA service strengths and opportunities voiced in the focus group largely echo the feedback heard while interacting with riders during other outreach activities.

3.4 NON-RIDER FOCUS GROUP

The focus group comprised of non-riders was held at AVTA Headquarters on the evening of Wednesday, June 19, 2019. Four Antelope Valley community members were in attendance, providing an overview of opinions and perceptions of AVTA service and public transit in the Antelope Valley. As with the rider focus groups, participants were recruited using a screener to ensure the group was both demographically and geographically representative of the Antelope Valley. A participant profile is outlined below.

- **Vehicle availability:** the primary means of travel for non-riders participating in the focus group was by private vehicle, and all participants had reliable access to a personal vehicle. All of the non-riders had both Uber and Lyft accounts, although most use those services predominately for out of town travel and use their private vehicles for transportation around the Antelope Valley.

- **Average commute times:** non-riders had average workday commutes of between 10-20 miles, with one participant traveling 45-miles round trip. One non-AVTA rider commuted each weekday to the Palmdale Metrolink station to travel to Los Angeles, though does not use AVTA to reach the station in Palmdale. Another participant said that they were interested in using AVTA to commute to and from work, but when they approached their employed about the possibility of a subsidized pass for commuting, the employer refused, stating that “transit is not reliable” and the employee should not take the bus to work. While participants unanimously agreed that traffic and congestion have gotten worse in the Antelope Valley, it is not severe enough to influence their travel mode decisions. Participants also noted that the price of gasoline would not influence their choice of travel or how they commute.

- **Use of public transit:** while all of the non-riders used public transit while traveling in other cities and all have used Metrolink service, they noted a perception that AVTA service is not as viable as transit in other cities, specifically citing long waits between buses, unreliable service, and concerns regarding safety and security while waiting for buses (especially at bus stops lacking shelters). One participant noted that “people waiting at bus stops have looks of frustration on their faces,” stating that this adds to the perception that using AVTA is not a pleasant experience.

  Conversely, participants had an alternative view of the newly-instated JetHawks service. A majority of participants had used and had a pleasant experience with the service, stating that AVTA service for special events is convenient and a good strategy for luring more non-riders to try the service. However, one rider recalled a negative experience using the system, stating that the bus did not arrive on time and dropped the rider off a considerable distance away from the stadium.

Discussion with non-riders focused on perceptions of AVTA and reasons for their travel choices, as well as reasons why they do not use AVTA. Discussion of these topics is presented below.

- **Awareness of AVTA:** while non-riders had some awareness of AVTA services, they stated that walking to a bus stops would be an inconvenience. However, most participants did not know if there was a bus stop close to their home.

- **Perceptions of AVTA:** non-riders had many opinions and of perceptions of AVTA, but few knew much about the agency or its services. For example, none of the participants knew that AVTA had a mobile application that provided real-time information, and none had ever visited the AVTA website or follow AVTA on social media. One non-rider stated that she would "love to ride the bus" but she didn't know enough about the service to try AVTA nor how to access the information. This signals a potential need for travel training and more promotion of AVTA's online trip planning services and information portals, so that non-riders can feel more confident about using the service to replace some trips they would normally take in their private vehicles.

- **Current service issues:** service reliability was cited as the most important service characteristic by participants. If reliable, convenient service could be ensured, more non-riders would be willing to try AVTA. However, they noted that due to their unfamiliarity with transit systems, they would also depend on their bus operator to help navigate them as they grow accustomed to how transit works. While this could be achieved through additional bus operator training, this also signals a potential need for better advertisement of existing travel training and trip-planning services provided through AVTA.

  Participants also noted the importance of safety and security when using transit, noting that many stops seem unsafe and they would not feel comfortable waiting at these locations, especially stops with a large homeless presence, such as the Lancaster Metrolink station. In order for these non-riders to use AVTA on a regular basis, they noted that AVTA would have to demonstrate that it manages these issues while also providing adequate shelter at stops where riders could wait protected from the harsh weather.

- **Barriers to transit use:** when discussing reasons for their travel choices, non-riders cited many barriers to transit use that would have to be overcome before they would consider using AVTA. In addition to the service reliability and safety concerns mentioned above, it still stands that for a majority of Antelope Valley residents, private vehicle use is a much more convenient option than transit. Specifically, participants spoke of long walking distances to bus stops with poor pedestrian infrastructure and a lack of bus stops with amenities such as shade and lighting. One participant mentioned a "lack of control" that makes transit use unattractive, while others said that an inability to trip chain using AVTA makes private vehicle use the more convenient option, with one participant stating that dropping off their children at daycare before going to work would "make riding AVTA impossible."

In the same way that riders were asked to list and prioritize the service characteristics that are most important to them, non-riders were asked to rank the characteristics of transit service that would be most important to luring them onto AVTA service, which is provided below.

- Buses that are on-time and reliable
- Routes that are direct and travel times that are comparable to if that trip was taken in a private vehicle
- Courteous and helpful bus operators

- Buses and shelters that are clean
- Bus stops that are closer to destinations, as well as enhanced pedestrian infrastructure to facilitate easy travel to and from the stop
- Feeling of safety and security at stops and onboard buses

The non-riders present at the focus group are largely representative of the Antelope Valley community, with all those present possessing personal vehicles and choosing to commute to work via car (or car and commuter rail). All focus group participants also have active Uber/Lyft accounts, showing that even if they did not have personal vehicle access, they would likely utilize these services over AVTA. This is in contrast to the rider focus group, where participants were reliant on AVTA as their main source of transportation and did not have another way to get around. However, all non-rider focus group participants reported using public transit while visiting other places and using Metrolink service. This shows that, for many, AVTA is not an attractive, convenient, or competitive choice when other transportation modes are available.

Indeed, non-riders indicated that there is little that could be done to influence a change in their transportation choices: neither worsening traffic nor increased gasoline prices would entice focus group participants to use AVTA service. When probed further, the underlying reasons for this seemed to lie in perceptions of public transit and a lack of knowledge about public transit, coupled with a lack of confidence in the ability to navigate the system.

Specifically, non-riders stated a low interest in using AVTA services for several reasons, including concerns regarding safety and security, a lack of bus shelter and bus stop amenities, long walking distances to bus stops and unhospitable pedestrian infrastructure to access these stops, and concerns about service reliability.

It is interesting to note that the barriers preventing non-riders from trying AVTA largely reflect the main issues riders have with the service. This shows that, if these issues are fixed, AVTA might succeed in both increasing loyalty and satisfaction among current riders and getting non-riders to use the system on a regular basis and not just for “special” services, such as the JetHawks shuttle.

3.5 MAIN SERVICE ISSUES

Responding to the major issues raised during the focus groups would retain the loyalty of existing riders while addressing the challenges that non-riders identified as keeping them from using AVTA. Based on the feedback heard during both the rider and non-rider focus groups, main service issues have been identified and detailed below, along with potential ideas for recommendations. These major themes and concepts act to inform final recommendations when taken together with findings from other engagement activities.

- **Bus operator training review:** bus operators are the face of the agency for AVTA’s customers. More than any one group of employees, bus operators come into contact with more riders and the public on a daily basis than any other part of the AVTA organization. In addition to their role as ‘gatekeepers’ of information about the agency and its services, bus operators make the largest contribution to shaping the AVTA brand and public perception.

The apprehensions about newer drivers raised during the rider focus group should be of concern to AVTA and its service contractor, TransDev. The wide difference in opinions about the quality of newer drivers in relation to the more experienced older drivers may be a sign of deficiencies in TransDev training programs and policies. Are drivers being provided with enough in-class and behind-the-wheel training? Are older, more experienced drivers being used as mentors for younger bus operators? Are customer complaints as well as commendations being used to evaluate bus operator performance? Rarely in focus groups with riders are bus operators called out for criticism to the extent seen during the AVTA session. AVTA can identify the shortcomings of TransDev's training and require the service contractor to take steps to strengthen its training before new bus operators are released into service.

- **First and last-mile solutions:** a significant number of existing AVTA riders have no vehicle available for their travel. With its low-density development patterns, housing is spread out and block lengths are long, which requires those without vehicles to walk or bicycle a considerable distance to access mainline transit services. The distance to a bus stop in the AVTA service area is a major barrier to riders and non-riders alike. During the focus group, riders spoke about walking more than one mile to get to an AVTA bus stop.

  Traditional fixed-route transit service is not always the right response to a service area like the Antelope Valley that lacks density. This is evidenced by AVTA unlinked passenger trips per vehicle revenue mile, which is one, according to the agency's National Transit Database report for 2017. Providing first and last-mile solutions would unlock ridership for AVTA similar to how regional airlines feed passengers into major airlines at hubs. Microtransit or on-demand solutions may be more appropriate for less dense areas of AVTA's service area that are currently experiencing low ridership. Microtransit/on-demand programs will not only facilitate a more efficient means of providing service to these areas but also improve customer experience as they will not have to walk long distances in harsh conditions to reach bus stops.

  Working with municipalities and the county to improve pedestrian conditions throughout the Antelope Valley can also help to make the first and last miles of trips easier for AVTA riders.

- **Timed transfer policy/on-time performance:** riders spoke to the all too frequent dilemma of missing a transfer connection on AVTA service. Because of the frequency of service and on-time performance challenges, AVTA riders have extraordinarily long waits if they miss connections. Riders expressed frustration with AVTA as they claimed the agency has no policy for handling timed transfers, even at its major hubs. Riders stated that some bus operators will call ahead to attempt to hold a connecting bus at transfer points and some will not. This inconsistency adds to rider apprehension about AVTA. Establishing an official timed transfer policy that is consistent and easy for customers to understand can help to alleviate these issues and improve the rider experience.

- **Courtesy is contagious:** participants of the rider focus group recounted anecdotes of rude and disrespectful behavior by passengers onboard buses, such as riders not giving up their seats to seniors and disabled passengers, loud and obnoxious riders, and unruly teenagers bothering other passengers. Some participants noted that this is due in part to bus operators who do not feel "in control" and who are not taking ownership of their buses like older operators, who command respect from their passengers. Apart from additional operator training, an easy solution to this is a courtesy campaign, in which courteous behavior and respect for fellow passengers are advertised through AVTA's social media and advertisements onboard buses.

- **Awareness, understanding and support:** AVTA needs to market its services if the agency is to increase its ridership however AVTA needs to also speak to those who do not ride the agency's service but support the service with their tax dollars. Both the rider and especially the non-rider focus groups revealed that residents of the Antelope Valley know every little about their public transit agency. Even for those who do not use the system, having knowledge of and a positive perception of AVTA is advantageous as they can recommend the service to others.

  By communicating and being open, AVTA shows respect for those who ride its services and the communities it serves, and a sense of trust can be established between AVTA and the Antelope Valley Community. An easy way to begin this process is to manage AVTA's social media platforms in real-time to demonstrate that the agency is alert and responding to service issues. If AVTA takes the initiative to communicate and recognizes its shortcomings, the agency can earn the support it needs to face the future.

4.0 STAKEHOLDER MEETINGS

As a component of public and stakeholder engagement, the team met with multiple important community stakeholders such as major employment centers, AVTA bus operators and customer service representatives, healthcare providers, and Santa Clarita Transit. A summary of each meeting is provided below.

4.1 MOJAVE AIR AND SPACE PORT

Stantec team members met with representatives from the Mojave Air and Space Port to understand transportation challenges and opportunities for AVTA in preparation for the new AVTA commuter line providing service to the Air and Space Port.

Mojave Air and Space Port employs about 2,500 employees, approximately half of which live in the Antelope Valley. Kern County already provides commuter service for employees living there. There is employee interest in commuter service out of a desire to be environmentally conscious, but the fact remains that parking at Mojave is free and plentiful. Other concerns with commuter service are related to safety and security, (particularly at the Lancaster Metrolink Station, which is perceived to be unsafe), concerns with emergency rides home (the fear of being stranded if one needs to leave or return to work when commuter service is not operating), and ensuring that the service is sufficiently advertised.

However, since the service June 2019, ridership has been low with an average of 5 daily riders.

4.2 PLANT 42 AND EDWARDS AIR FORCE BASE

Stantec team members also met with stakeholders at Plant 42 and Edwards Air Force Base to understand transportation challenges and opportunities for AVTA and how initial service is proceeding to Edwards AFB (Route 747).

When the service to Edwards was launched (747) in January 2019, ridership was high for the first week when the service was offered for free. However, service plummeted afterward and has continued to be low (15 average

daily boardings on weekdays excluding Fridays), which stakeholders suspect may be due to the cost of the fare as well as concerns with emergency rides home. Specifically, **stakeholders noted that employees do not feel comfortable using the service due to a feeling of being "stranded" with no way to get home or leave the base in the case of an emergency**. Despite a large potential transit market (many people do not have access to personal vehicles), the physical layout of Edwards AFB also presents challenges to efficient commuter service: the campus is very large, remote, and spread out. AFB stakeholders mentioned that providing a service for emergency rides home, coupled with more advertising to promote the service, could help in regaining some ridership.

Like Edwards AFB, Plant 42 is a massive footprint located between Palmdale and Lancaster. Stakeholders mentioned that some factors that could encourage or support commuter service include creation of a park-and-ride facility to accommodate those commuting from outside of the Palmdale/Lancaster area and implementation of a bus-only lane along Avenues M and P. Barriers to successful implementation include logistical issues related to the main entrance security checkpoint (potentially problematic depending on how long it takes to search each person), and the Plant's large footprint would render a "one-stop" solution unfeasible; instead, a circulator between main buildings would have to be developed as opposed to dropping all passengers off at the main entry point. However, stakeholders were still open to collaborating to develop a commuter service to Plant 42.

4.3 HEALTHCARE PROVIDERS

The Stantec team met with representatives from hospitals and healthcare providers in the Antelope Valley to understand mobility challenges for patients, and how mobility services are currently provided.

Healthcare providers communicated that health indicators for large parts of the Antelope Valley are very low, some of the most important needs are for patients to reach appointments, and providing transportation services is essential for health. Patients may miss appointments or choose not to travel to healthcare providers because they do not have access to transportation, which creates a cycle of worsening health conditions and indicators.

While AVTA services the majority of hospitals and health care providers, a few issues emerged from the discussions and other observations:

- Promotion and awareness of AVTA services, particularly fixed-route buses, are lacking. Providing schedules and other services (such as TAP card information) would be helpful for informing patients of options.
- While most hospitals, clinics, and healthcare providers have bus stops nearby, the vast amounts of parking and very large parking lots surrounding the main buildings are discouraging and daunting to able-bodied individuals and for persons who may have a disability or illness.
- To help ensure that everyone in the Antelope Valley has access to medical care, AVTA can reevaluate where stops are located in relation to the actual facility itself, being especially cognizant of those experiencing medical issues and those with mobility challenges.

4.4 SANTA CLARITA TRANSIT

Stantec met with representatives from Santa Clarita Transit to learn more about their current commuter services and discuss potential opportunities for partnership to minimize duplication of service on commuter routes.

Santa Clarita Transit staff informed team members that their commuter service routes are nearing capacity, and do not have additional capacity to absorb additional ridership. Because their commuter routes are much nearer capacity, there is an opportunity for AVTA commuter buses to make an additional stop in Santa Clarita (potentially at the Newhall Ave./Sierra Highway park and ride lot) to absorb commuters from Santa Clarita. It was also mentioned that many Santa Clarita riders have expressed a desire for off-peak service to CSUN to accommodate student schedules, which could be another opportunity to grow commuter ridership.

Representatives from Santa Clarita Transit also informed team members that they are experiencing many of the same challenges with commuter service as AVTA; specifically, difficulties with on-time performance especially in areas with heavy TNC use and road construction, and little-to-no notice regarding road closures for construction or special events.

While Santa Clarita Transit is experiencing higher ridership on their commuter routes and do not see major changes to them in the near future, they expressed openness to coordinating with AVTA to minimize service duplication and potentially serve new markets. It is also interesting to note that they are looking to implement a microtransit/mobility on-demand program in newly annexed areas of the city. If this comes to fruition, AVTA can look to this as an example to understand challenges and best practices to implementing something similar in an area with similar geographic challenges.

4.5 CUSTOMER SERVICE REPRESENTATIVE SESSIONS

The Stantec team also held sessions with AVTA customer service representatives to understand common complaints, issues, and areas of opportunity coming from system users.

Overall common system comments include desires for longer weekend hours, increased frequencies, and issues with on-time performance (across local, supplemental, and commuter routes). Representatives also feel that the service area population is growing, and transit is not meeting the needs of these new populations.

- **Supplemental service:** bus schedules do not align with school start and dismissal times, rendering the service less useful than it could be.
- **Fares:** representatives hear many suggestions for a college student fare program (discounted fare with student ID), which was a common request heard from riders and non-riders during outreach (**"I would like to see student bus passes implemented,"** said one non-rider survey respondent). It was also mentioned that many people would like to be able to pay with their credit card. Representatives also informed the team of issues with fare evasion, especially among students on supplemental routes, and the policy of "quote the fare and let them ride." There was support for the idea of implementing an enforcement program.
- **Track-It:** while representatives are trying to encourage use of the application among riders, and it is generally well-received, it does not always communicate accurate information, and it is not necessarily

intuitive or exceedingly user-friendly. The biggest issue appears to be with that of “ghost buses:” buses that sometimes disappear from the app because operators get logged out of the system and are unable to log back in while they are driving, resulting in riders believing that their bus is not coming because they cannot see it in the app.

Representatives also noted a high volume of service requests for bus shelters at stops where long wait times and unhospitable conditions make waiting for the bus especially arduous, with one request stating that the customer has **“been taking the bus at this location for years and has waited under the hot sun and in the rain…She thinks a shelter would be beneficial for the community.”** This, combined with the high amount of requests for service to specific areas reiterates the theme that AVTA customers value coverage over frequency and more versus fewer stops. Customer service representatives echoed this thought, stating that providing coverage is more important here due to the long length of blocks, severe weather, and the high number of people who are elderly or travel with mobility devices.

4.6 BUS OPERATOR WORKSHOPS

The Stantec team also met with AVTA bus operators to understand current system opportunities and challenges from the operator perspective. Major themes raised by operators during the workshop are summarized below.

- **Route Planning:** many operators see the need for more direct routes, and also noted service duplication among local routes while large areas of the Antelope Valley does not have service coverage, specifically where populations are growing. Operators noted that this service duplication can be confusing for customers, citing examples of customers boarding the wrong bus, as buses on different routes can display the same destination.

- **Schedule Adherence:** as has been observed firsthand during outreach, it is difficult to adhere to the published schedule due to a large number of customers boarding with mobility devices, which inherently increases boarding times and makes it more difficult for operators to maintain on-time performance and results in customer complaints to operators. Multiple operators also noted that run times are insufficient, leaving little to no time for operators to take breaks. They noted that these are worst on routes to more rural areas, such as routes to Lake Los Angeles, Pearblossom, and Littlerock.

- **Fares:** operators universally cited the fare evasion issue, and acknowledged that fares are not enforced due to safety concerns. As with customer service representatives, operators expressed a desire for some sort of enforcement program to help mitigate this issue.

- **Commuter Service:** operators acknowledge issues with on-time performance, but issues such as congestion, construction, and road closures are out of their control. Operators endorsed the notion of terminating commuter service at Metro Rail lines or coordination with other commuter services (such as Santa Clarita Transit) to minimize service duplication.

- **Local Routes:** operators support increased frequency on Route 1, and a majority believe that service to Lake Los Angeles should be terminated, citing that this is not the best use of AVTA resources as ridership is so low. Operators would like to see local service coverage servicing those who need it most, and getting them where they need to go quickly and conveniently. One challenge raised is that many streets

with bus stops do not have sufficient pedestrian infrastructure (sidewalks, lighting, etc.), making them difficult to access.

- **Electric buses:** operators acknowledge the issues associated with electric buses, and understand riders' frustrations when service and maintenance issues arise. Route configuration should take into account the time it takes to charge the buses, and it is more difficult to maintain schedules when operating electric buses because of the time associated with charging and observed speed decreases.

Overall, operators seem to be aware of the many challenges already identified by AVTA and others, and are supportive of system changes that will address these problems and make the ride smoother for everyone involved, passengers and operators alike.

4.7 COMMUNITY ADVISORY GROUP (CAG) MEETINGS

An important component of developing the strategic mobility plan for AVTA is receiving input on progress made thus far and initial findings and service concepts from a group representing the many diverse communities of the Antelope Valley. The Community Advisory Group (CAG), comprised of city and county representatives, nonprofits, educational institutions, and major employers, was formed early on in the project process to act as a "sounding board" and to provide candid insights about community thoughts and opinions, and to make sure all the different voices of the Antelope Valley are being heard. CAG members are especially important as they are often community leaders who can help be our champions of resulting recommendations. CAG meetings have been held periodically throughout the project process to assess progress and provide feedback on initial findings and potential recommendations and service concepts.

The first CAG meeting was held on Monday, February 11, 2019 at AVTA Headquarters. Attendees included representatives from the City of Palmdale, City of Lancaster, Los Angeles County 5th District Supervisor, Plant 42, and community advocates, as well as AVTA and Stantec personnel. As this meeting was held early on in the project process, the Stantec team saw this as an opportunity to provide CAG members with an overview of the project goals, tasks, and overall project timeline.

The meeting also included a discussion of the existing conditions review to be completed by Stantec, which provides an overview of current systems, including local fixed-route, commuter, paratransit, and supplemental service. Discussion included an evaluation of new service changes (such as the newly-implemented Route 8 and service to Edwards Air Force Base) and analysis on where people are commuting to and from in the Antelope Valley. A strong pillar of conversation throughout the meeting was the belief that public transit helps to both alleviate congestion and addresses safety concerns associated with driving. Attendees also stressed the fact that it is important to understand the barriers to transit use in the Antelope Valley, and there was a large amount of interest in focusing future service improvements around new technologies in transit, such as microtransit/mobility-on-demand with transportation network companies and AV technology.

Further, the Stantec team facilitated a discussion on the community engagement and outreach process, asking stakeholders to provide feedback about how their patrons travel, opinions on current AVTA service, challenges and opportunities for AVTA, and what their vision is for the Antelope Valley is in the short-term (1-5 year) future.

The first CAG meeting provided important insight on the Antelope Valley and its many diverse communities, opportunities, and challenges from a variety of viewpoints, which in turn helped to inform the rest of the community engagement and outreach process.

The second CAG meeting was held on Thursday, July 25, 2019, again at AVTA headquarters. Representatives from Lancaster and Palmdale were in attendance, along with the President of Antelope Valley College, representatives from the nonprofits First 5 LA and Coffee 4 Vets, and AVTA and Stantec personnel.

The Stantec team provided an overview of the work done so far, highlighting major themes and findings that have informed early recommendations and service concepts, which included a robust discussion of major barriers and obstacles facing AVTA. Major points of discussion include the Antelope Valley's geographical challenges to supporting successful fixed-route transit (most of the Antelope Valley lack the population and job density to support frequent and productive fixed-route transit), service issues (service along major corridors is infrequent, schedules are complex, and service is spread too thinly to generate major ridership), DAR service demand continues to increase, and operational challenges related to fleet electrification and bus operator issues.

Major themes heard during community engagement was echoed by meeting attendees. Specifically, the poor pedestrian infrastructure present in much of the Antelope Valley makes it difficult for many to access bus stops, and when taken in conjunction with a lack of bus stop amenities and long wait times for buses, can create a poor transit experience for riders. Other discussion topics included bus operator attitude and behavior issues and bus reliability and on-time performance.

The Stantec team also presented identified needs and opportunities. Discussion points included changing travel patterns in the Antelope Valley (existing travel service does not match observed travel demand), commuter service duplication with other services (such as Metro rail), and bus stop locations and associated amenities. It was pointed out that while it is encouraging that AVTA is working with the cities and county to regain control over bus stops and shelters, it is important to have service guidelines in place moving forward to ensure all bus stops meet minimum service standards. Meeting attendees were supportive of opportunities to accommodate DAR passengers on existing potential routes or new community circulators to help curb growing DAR demand, as well as synching supplemental route schedules with bell times to attract more student riders.

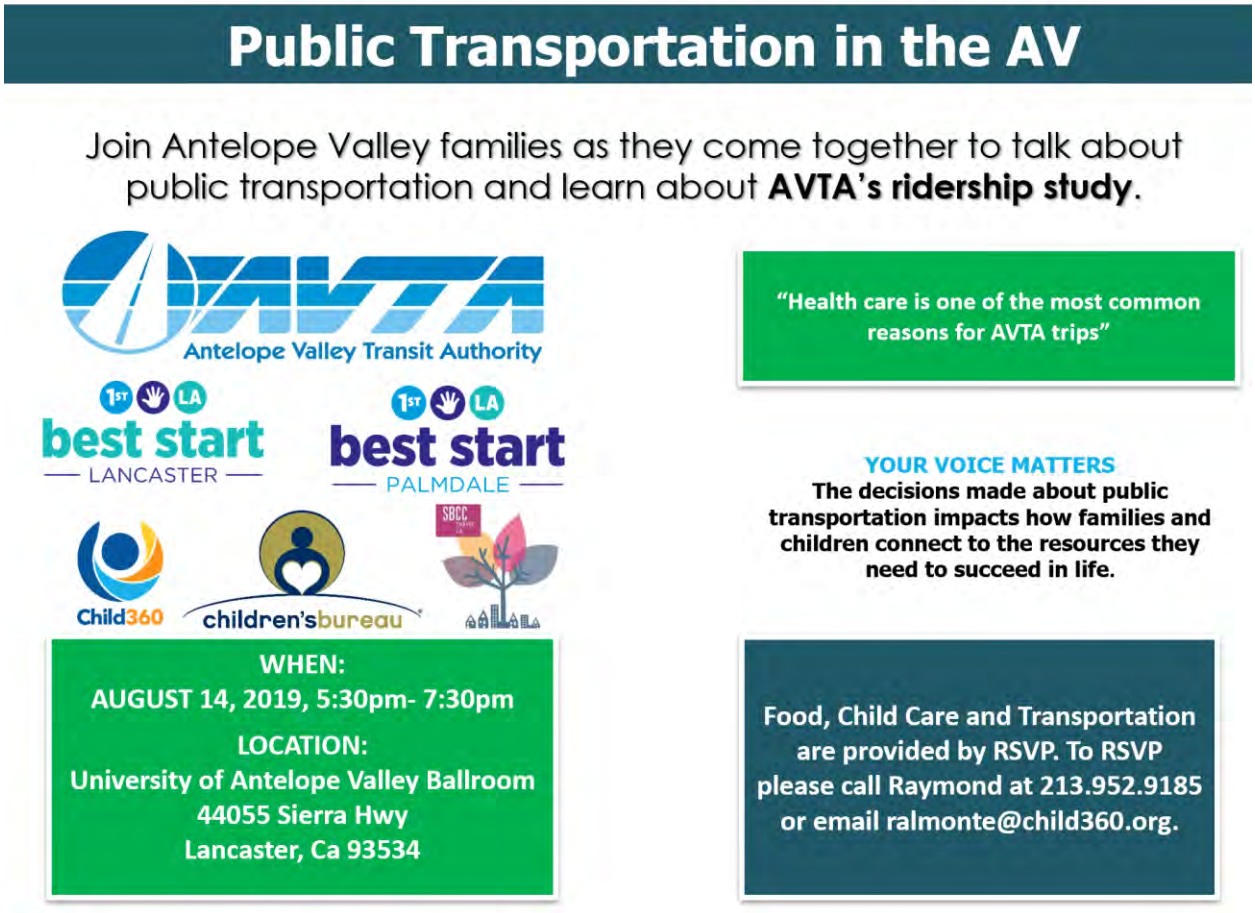
When the discussion turned to the long-term regional outlook of the Antelope Valley, Lancaster representatives informed attendees that Lancaster is focusing its future growth to create an infrastructure supportive of land use densification, active transportation, and transit use. This reinforces the importance of AVTA working with municipalities and unincorporated areas to ensure future growth works with, rather than against, transit to the extent possible.

All meeting attendees were aware of and pleased by the increased ridership associated with the increased frequencies along Route 1, and while they have all heard anecdotal praise for the new JetHawks service and commuter services, were surprised to see how low ridership numbers were. This led to a discussion on who AVTA's market is and where it should be focusing its efforts. The Stantec suggestion to focus service locally (specifically within and between Palmdale and Lancaster) to match supply with actual demand was not opposed to by any CAG members in attendance, and attendees also supported a microtransit/mobility-on-demand solution to more remote, rural areas (such as Lake Los Angeles, Littlerock, and Pearblossom) as opposed to conventional fixed-route service.

Additional meetings will be held in the future to update members on recommendations and findings from the final report.

4.8 FIRST 5 LA COMMUNITY MEETING

On the evening of Wednesday, August 14, 2019, a community meeting was held at the University of Antelope Valley in Lancaster (see outreach flyer below). First 5 LA, a nonprofit organization that focuses on ensuring all children in Los Angeles County 5 years old and younger are healthy and set up for long-term success, represents many people who currently use AVTA or are past AVTA riders. The organization also stresses that transportation options and access to jobs, education, and healthcare providers are closely tied to a community's health and quality of life. For these reasons, and due to the fact that this organization represents those who have historically been disadvantaged and "left out" from a seat at the decision-making table, it was important to hold an additional meeting where they could provide feedback on AVTA services during the community engagement process.



The meeting opened with welcome and introductions before the Stantec team gave a comprehensive presentation providing context on the project purpose and process and presenting initial findings and service concepts. A short discussion followed the presentation, where Stantec provided clarification on some potential recommendations and heard feedback from attendees. Two meeting attendees then gave testimonials, providing

personal, firsthand accounts of the challenges associated with transportation and relying on AVTA in the Antelope Valley. Each table then broke out into discussions led by a moderator, focusing on four main topics posed by First 5 LA: main purposes for using AVTA, transportation challenges in the Antelope Valley, desired changes to AVTA and transportation in the Antelope Valley, and best strategies for reaching out to the community for feedback and engagement.

In total, over thirty community members were in attendance, representing a diverse range of ages and ethnicities as well as different areas of the Antelope Valley, including the more urbanized Lancaster-Palmdale area as well as more rural communities such as Lake Los Angeles, Littlerock, and Pearblossom. Meeting attendees included non-riders or former riders, and users of AVTA's local, commuter, and DAR services. Translation services were provided in Spanish and American Sign Language.

Major points of discussion immediately following the presentation included the possibility of on-demand services for rural areas with low ridership and technology services, such as an integrated app, that could make using AVTA easier and more accessible to those unfamiliar with transit. Overall, attendees were in favor of an on-demand option as long as these populations would still be provided a sufficient level of service. It was stressed that, **while there are not many riders in the rural communities like Pearblossom and Lake Los Angeles, "these riders are very dependent on AVTA's services, so the on-demand option would need to provide service at the same level or exceeding current fixed-route services".** There were logistical questions regarding service cost and payment options (with many attendees in favor of special and discounted fares for on-demand services), and a few attendees noted a need to ensure the connection between on-demand and fixed-route services will be seamless and convenient, and that real-time arrival information should be improved to assist with this.

While AVTA has an app, some attendees did not know about it, and others shared that Track-It does not always work and is not easy to use. Additionally, while Google Maps hosts information on AVTA bus stops and routes, it is not always accurate or convenient. Attendees unanimously voiced support for an app that is integrated with other transit providers and helpful for trip planning (such as the Transit app). Attendees stated they would be willing to use AVTA more if there was an app that was easy to use and showed information for multiple transit providers in the region, not just AVTA.

Overall, very nuanced and insightful feedback was provided by attendees that span across many areas of AVTA's service, much of which reiterated what the Stantec team has already heard from previous engagement activities. Comments and feedback have been consolidated and grouped into categories, as presented below.

- **Paratransit services:** meeting attendees preferred to use Los Angeles County Access services over AVTA DAR, because it is difficult and inconvenient to schedule trips days in advance through DAR, where rides can be scheduled only one day in advance with Access. DAR users stated that they only use DAR when going to or from areas Access does not provide service to, and users complained about the large pick-up window for DAR, stating that DAR reservations had a two-hour pick-up window. As DAR's pick-up window is actually 30 minutes, a lack of knowledge and accurate information regarding AVTA's DAR services is likely the issue. Focusing on outreach to DAR customers and ensuring users know accurate information about the service can increase customer satisfaction and help to curb the dissemination of inaccurate information.

- **Bus stops and pedestrian infrastructure:** echoing feedback heard during other rider outreach activities, meeting attendees voiced a need for the improvement of both bus stops and pedestrian

infrastructure throughout the Antelope Valley. Many shared personal anecdotes recounting struggles accessing bus stops in harsh conditions including lack of sidewalks, long walking distances, and a lack of lighting. Attendees noted that the bus stops themselves are lacking in shade and adequate lighting, as well as cleanliness issues with existing bus shelters.

- **Bus operators:** many non-riders noted unsafe driving practices by AVTA bus operators and would like to see additional "safe driver training" for bus operators.

- **Safety and security:** riders noted unsafe conditions both onboard buses and at bus stops and shelters. Riders stated that "rowdy teenagers" on buses make other riders feel uncomfortable, and altercations and fights among passengers have been known to break out onboard buses. Riders requested additional bus operator training so that they are better equipped to handle these situations. Riders also mentioned feeling unsafe using certain stops at night, noting that they plan their trips around avoiding these stops, but providing adequate lighting at these stops would help alleviate this issue. Many Metrolink commuters noted a preference for the Palmdale Transportation Center over the Lancaster Metrolink Station due to the large homeless presence at the Lancaster Metrolink Station. Issues related to safety and security are important because a widespread public perception that AVTA is safe can help in encouraging more people to try the service.

- **Fares:** meeting attendees reiterated a desire for expanded special fare programs, suggesting a special "family pass" to encourage families to use AVTA for social, recreational, or shopping purposes. Attendees also suggested special fare programs and services to special destinations, such as summer buses to the beach, Magic Mountain, or the Lancaster Poppy Reserve. There was also a desire to coordinate these efforts with special travel training for those with disabilities.

- **Schedule and frequency:** there were many requests and suggestions related to schedules and service frequency. Those heard most frequently include a desire for earlier start times to align with new Metrolink schedule changes and more frequent service during peak hours and on weekends. While riders were pleased with Route 1's increased frequencies, they were overall unsatisfied with on-time performance, citing late buses and unreliable arrival times. Riders and non-riders both agreed that they would like to see AVTA service that is more competitive with travel times of personal vehicles, with one rider providing the real-life example that her journey from Lake Los Angeles to Palmdale takes two hours via bus, but only thirty minutes by car.

- **Providing services that match demand:** many attendees noted buses are often "half empty" and suggested using smaller buses for these routes. Longtime riders have also noted that AVTA service has not adjusted to reflect land use and development changes in the Antelope Valley, with one rider stating that fifteen years ago, the buses took you "anywhere you needed to go" in the Antelope Valley. Now, they don't take you to many important destinations because of how the Antelope Valley has developed.

- **Resources and signage:** an important consideration in ensuring that transit services are accessible to all is providing resources that are also accessible, regardless of one's preferred language or ability status. It was mentioned by several attendees that a lack of Spanish resources and materials available onboard buses serves as a barrier to transit use for Spanish-speakers. One attendee commented **"it would be easier to navigate the system if resources were available in Spanish,"** and consideration

should be given to other languages commonly spoken in the Antelope Valley as well as to those with visual impairments for whom reading the maps and schedule is difficult. Attendees noted this should be extended to AVTA's customer service representatives, as one Spanish-speaking attendee stated that she has been hung up on for requesting a Spanish speaker.

The round-table breakout discussions focused on four main discussion questions, and the major points brought up by each table are discussed below. The breakout sessions also included discussions on the trade-offs involved in transit. Attendees were mixed on whether coverage or frequency was more important for AVTA, but agreed that more stops are preferred over fewer stops because of both the service population and challenging geography of the service area. Out of a desire to provide service that suits the needs of everyone, attendees stressed that providing both frequency and coverage is of equal importance. When reminded that transit agencies work with limited resources and that this may not be realistic, attendees decided that frequency is more important than coverage, stating that a lack of frequency is more isolating because if service is infrequent, people will not use it regardless of the coverage provided. However, it is important to note that multiple attendees suggested providing layers of coverage through frequent "express" routes with fewer stops and local community routes with more stops and coverage.

- **What is your main purpose for using public transportation?** The most common responses included work/commuting purposes, school, healthcare, shopping, to connect to Metrolink, lack of a car, and to save money on gas.
- **What are the challenges you and your family have faced in the Antelope Valley around transportation?** Many responses were provided, the most common of which include a lack of shade during the day and lack of light at night at bus stops, long walking distances to stops, buses passing people at stops and not waiting for people running to stops, lack of safety at stops and onboard buses,

long wait times, late or early buses, lack of service coverage, lack of service frequency, dispatch and driver miscommunications, buses that do not show up, lack of bus shelters, and lack of equity in language translation services.

- **How would you like to see the transportation system improve in the near future?** Increased access to bus stops, bus stops with shelters, shade, seating, and lighting, transportation hubs in areas other than Lancaster and Palmdale (such as Sun Village and Lake Los Angeles), more direct routes, more frequent cleaning of shelters and buses, more weekend, evening, early morning, and holiday service, bus operator training (especially to handle rowdy or rude riders and better treatment of those with mobility devices), more frequent (15-minute) service, enhanced video surveillance to combat delinquency, same-day paratransit service, on-demand/rideshare services (that are affordable and accessible to those without a smartphone), and better connections between AVTA and Metrolink service.
- **How can we reach out to the community to get feedback on the ridership plan in the future?** Many suggestions for community outreach were proposed, which include utilizing social media, holding public meetings at schools, being present at community events and outside popular Antelope Valley destinations, mass mailers, and advertising on billboards, local television, and radio.

Overall, many of the comments, ideas, and requests, heard during the First 5 LA meeting aligns with the major themes heard from riders during other community outreach events. Moreover, the many firsthand accounts of the transportation-related struggles and challenges faced by those in the Antelope Valley reinforce the importance of providing ways to address mobility and accessibility limitations across the service area. A major theme stressed by meeting attendees was that the shortcomings of current public transit options in the Antelope Valley limit the mobility of those who depend on it the most, which translates to consequences regarding access to opportunity, health indicators, and quality of life. Helping to provide an easier and more convenient transit trip for those that rely on AVTA's services should be a focus of new service improvements to increase rider loyalty and satisfaction.

5.0 SUMMARY OF ENGAGEMENT AND OUTREACH

Despite the range and variety of where engagement took place, who the team spoke with, or what the engagement event was, some common themes were consistently heard. These are summarized below, and detailed discussions are presented in the body of the report. These recurring themes and findings from the Antelope Valley community will be used by the Stantec team to inform future tasks and service recommendations.

- **There is a general lack of awareness and knowledge about AVTA.** A topic of discussion during the non-riders focus group was that there was very little knowledge about what AVTA is and how to use the system. Additionally, no non-rider focus group attendees had ever visited the AVTA website or were aware of the Track-It app. This lack of awareness was echoed at different events attended by Stantec team members during outreach week. At many of the community events attended, such as Monday Bitez and the Lancaster BLVD Farmers Market, community members had to be educated about what AVTA is. This issue was also echoed at the stakeholder meeting with healthcare providers, where providers noted that promotion and widespread awareness of AVTA services are lacking. Through social media and

distinct bus shelter branding, AVTA can continue to spread awareness on what AVTA is and the services it provides.

- **AVTA riders are largely captive riders with no other means of transportation.** This means that many riders are reliant on AVTA as their main source of transportation and depend on AVTA to get to where they need to go. As there is a perception among riders that service has worsened over recent years, AVTA should focus on strengthening its core services and providing high-quality service to the regular riders who depend on the system. This will translate to increased rider satisfaction and loyalty, creating a community of AVTA riders who are supportive and act as ambassadors for the system.
- **For people who have a transportation alternative, AVTA is not viewed as a realistic option.** When compared to private vehicle use, AVTA is not viewed as convenient or an attractive option for multiple reasons. The land uses and development patterns in the Antelope Valley present an obvious challenge: land uses are low density, sprawling, and spread out. Most residential developments in more urban areas are single-family neighborhoods that are inward-facing and do not provide good access to transit services, and rural areas lack decent pedestrian infrastructure (such as sidewalks and crosswalks) that enable easy access to bus stops. Additionally, because so many of AVTA's local routes operate at 60-minute headways or less frequently, it takes considerably more time to reach a destination via transit than using one's personal vehicle.
- **The Antelope Valley has long-term goals of smart growth, sustainable development, and creating transit-oriented developments along major corridors.** Municipal stakeholders attending different outreach events stress that future developments will be much denser and supportive of transit (as significant population growth is projected for parts of the Antelope Valley), and it is important that AVTA continues to collaborate with cities during the planning of such initiatives so that future developments and transit work together to support one another. However, it should be noted that these land use changes should be viewed as long-term developments and not taken into consideration for short-term planning.
- **Commuter service is not a competitive alternative.** When compared to other options such as Metrolink or personal vehicle use, commuter service to Downtown Los Angeles, Century City/West Los Angeles, and the West San Fernando Valley is not an attractive commuter option. Other more recent commuter initiatives such as service to Edwards Air Force Base and the Mojave Air and Space Port have not materialized into high-ridership routes, though these employment centers present their own unique challenges.
- **Major service challenges.** Summarized below are several common themes heard from riders during outreach events at bus stops and major transit centers, the public meeting, rider focus group, and the First 5 LA community meeting
    - **Operator behavior and attitude.** Reports of bus operators displaying behavior perceived as rude and inappropriate were common during outreach. Additional common operator issues

include reports of operators passing by people with mobility devices, making unscheduled stops, and a lack of commitment to the job. While AVTA is aware of these issues and is taking steps to improve the situation, it is important to remember that bus operators are the people riders see representing AVTA on a daily basis, and their behavior and attitude can make a significant difference in a passenger's overall impression of the ride. Ideally, bus operators should be viewed as assets who represent the agency well and encourage more people to ride.

- **Quality of service – reliability and convenience.** One of the most common complaints heard from riders during outreach was related to on-time performance, with many riders voicing frustration regarding schedule adherence and buses arriving on time. This can also result in missed transfers, further impacting the rider experience. Another revelation discovered during outreach is a community perception that AVTA service is unreliable. Attendees of the non-riders focus group noted that they expressed interest with their employers regarding the creation of employee transit passes, but employers declined, stating that AVTA service is not reliable enough to use for commuting purposes.
- **Bus shelters and bus stop amenities.** One of the most easily evident current shortcomings with AVTA service is a lack of bus shelters and other bus stop amenities at high-volume stops. Over 20% of stops that see 30 or more daily boardings do not have shelters, while over 40% of low-use stops (stops with an average of less than two boardings per day) have shelters. In total, only 37% of all AVTA bus stops have a shelter. As the Antelope Valley's climate can be harsh and there can be long wait times for buses, it is important to develop guidelines and standards for bus stops and shelters to ensure they are benefitting the largest number of people possible. Indeed, many riders have **"waited under the hot sun and in the rain as well"** because many stops lack shelter and protection from the elements. Additionally, basic amenities such as lighting, shade, signage, and wayfinding, and arrival time information should be considered for high-volume bus shelters outside of major transit centers.
- **Much of the Antelope Valley lacks adequate pedestrian infrastructure.** Robust first and last-mile connections are integral to making transit trips that are seamless and convenient. However, in an area like the Antelope Valley that lacks adequate pedestrian infrastructure, a lack of first and last-mile connections can provide a hurdle to increased transit use. Riders and non-riders alike mentioned long walking distances to stops and destinations, with some areas (especially in more rural parts of the Valley) lacking basic pedestrian features such as sidewalks and crosswalks. This was mentioned as an issue especially by riders with mobility devices, where a lack of pedestrian infrastructure makes accessing bus stops and destinations around bus stops increasingly difficult. Additionally, healthcare providers noted that patients who use AVTA to get to and from medical appointments face difficulties getting from the bus stop to the facility itself, which can be especially challenging to those with mobility devices.

- **Electric bus operations and maintenance issues.** One issue seen firsthand by the Stantec team was the operational issues in regards to AVTA's electric bus fleet. Growing pains of this type are to be expected with fleet electrification, but issues such as slow bus speeds, breakdowns, range issues, and forced change-offs are negatively affecting customer experience and rider satisfaction.

Needs and Opportunities

A Review of Travel Patterns, Unmet Demand, Future Growth and Opportunities

Prepared for:

Antelope Valley Transit Authority

Prepared by:

Stantec
Transit Advisory Services

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Abbreviations

AFB	Air Force Base
AV	Antelope Valley
AVTA	Antelope Valley Transit Authority
DAR	Dial-a-Ride
HQTA	High-Quality Transit Area
LEHD	Longitudinal Employer-Household Dynamics
NHTS	National Household Travel Survey
PMD	Palmdale Regional Airport
SCAG	Southern California Association of Governments

EXECUTIVE SUMMARY

Previous tasks examined AVTA's existing services, ridership, performance compared to peers, and began identifying challenges that may be contributing to ridership loss, service issues, or inefficiencies in service delivery. This task looks deeper at these challenges and opportunities, identifying how well AVTA's service delivery meets the needs of its residents, and what it needs to do in the future to better accommodate the demand of the AV population and improve the customer experience. Using a combination of data sources, this report explores the existing transit markets as well as projected transit markets in the future. A summary of findings is provided below, which will be used to develop recommendations for service improvements.

- **Existing service does not always match observed travel demand.** Most trips are short (under 3 miles) within Lancaster and Palmdale but are not well-served by existing local service. Despite the fact that most points of interest are located in Lancaster and Palmdale, bus stops are disproportionately located in areas such as Lake LA, Pearblossom, and Littlerock. There is a need to serve short east-west trips within Lancaster by an east-west continuous and frequent transit corridor, as well as a north-south corridor between Lancaster and Palmdale. Trips outside of Palmdale and Lancaster (e.g. in Lake LA, Pearblossom, and Littlerock) that do not have enough demand to support fixed-route transit could be more efficiently served by a microtransit or on-demand alternative.

- **Improvements to active transportation infrastructure are required to create a safe and attractive environment for accessing bus stops.** Nearly 80% of NHTS origins and destinations are located within a 10-minute walk of existing transit stops, showing that AVTA provides great coverage to desired locations. However, the pedestrian environment around many bus stops does not provide convenient or safe access to these destinations. An active transportation network that includes amenities such as pedestrian crossings, sidewalks, shelters, multi-use paths, and bike facilities, would all contribute to the overall appeal and accessibility of transit in the AV.

- **AVTA's commuter services duplicate existing LA Metro service.** Instead of providing one-seat rides from the AV to destinations in the City of Los Angeles, commuter services should provide express service that feeds into Metro stations to facilitate regional transfers and more efficient service. The traffic in Downtown LA creates unreliable service and prevents riders from depending on this service for their daily commute. Connecting commuter services with higher-order transit services with a dedicated right-of-way at Metro stations, namely along the Orange and Red Lines, can improve the efficiency, reliability, and productivity of commuter service. In addition, bringing riders to Metro Stations, such as North Hollywood Station, would also facilitate transfer opportunities to new destinations including Burbank (where many AV residents are employed).

- **There are opportunities to accommodate DAR passengers on existing conventional routes or new community circulators.** Many DAR trip origins and destinations are located near AVTA's local bus stops. A Travel Training program that teaches individuals with a disability how to take conventional transit and empowers them to travel independently should be more widely advertised and implemented to help shift demand from DAR to conventional transit. This would also require improvements to the accessibility of fixed-route stops as well as operator sensitivity training to improve the experience for persons with a disability.

- **There is a potential to attract more students to transit with concession fares and schedules that match bell times**. Nearly 15,000 high-school students living within 3 miles of service are not provided

school buses, which represents a large potential transit market. Without a reduced student fare, student ridership is lower than it could be, and the high fare contributes to fare evasion observed across the system. Supplemental routes are designed for school, but schedules do not reflect students' schedules and continue to operate during summer months when school is not in session.

- **The AV is expected to experience tremendous population and employment growth by 2035 and beyond.** Major employment growth is expected at Plant 42, Fox Field Industrial Corridor, and in many areas across the AV. Given the long-range nature of land development, there is a need for establishing a standing relationship between AVTA staff and local officials to ensure residential and employment developments are planned with transit at the forefront. The relationship between transit and land use is imperative for creating a future centered around active and sustainable modes of transportation.

- **SCAG identified an HQTA for 2040 spanning between Lancaster and Palmdale as a result of population and employment growth.** An HQTA is defined as a walkable area served by frequent transit (15 minutes or less) within a half-mile. Route 1 will become increasingly important as a transit corridor in the AV, connecting Lancaster and Palmdale and it is expected that ridership will grow on this route in the coming decades. AVTA has already begun improving this route through an increase in service frequency to 15-minute headways, which shows their commitment to the region's goals. Additional suggestions include reducing the number of stops and providing priority for transit vehicles to speed up travel times for transit riders. Weekend improvements in frequency can also help attract new ridership.

- **Planned transit projects reveal an increasing need to improve regional connections.** The Antelope Valley Line Study seeks to increase the frequency of Metrolink service on the Antelope Valley Line. These improvements would increase the number of commuting trips, reverse commuting opportunities, and may reduce the need for AVTA to provide commuter service to Santa Clarita and Downtown LA. As these projects come to fruition, AVTA should adjust service to ensure regional investments are complemented instead of duplicated by AVTA services. Other major projects that may shape the AV's landscape include the High Desert Corridor Highway, Rail, and Bikeway project (XpressWest) between Palmdale and Las Vegas.

1.0 INTRODUCTION

Based on stakeholder engagement activities and community outreach, together with a thorough analysis of existing conditions, datasets, field visits and discussions with AVTA staff, Stantec identified needs and opportunities that will help inform recommendations and strategies for mobility in the Antelope Valley (AV). This report outlines these key needs and opportunities, illustrating where we are today and where we need to be in the future.

First, we examine unmet transit demand using data from the National Household Travel Survey (NHTS) to identify local and regional travel patterns for all modes of travel. This data helps reveal desired destinations that are not currently served by AVTA's local and commuter services. It is important to uncover neighborhoods in the AV that may benefit from transit provision but are not currently provided service. We also used Dial-a-Ride (DAR) origin and destination data to see if there are DAR locations that could be better served by fixed-route transit to encourage DAR riders to take conventional transit; DAR service at AVTA, similar to other properties, is more costly to provide on a per-passenger basis than fixed-route services. Unmet transit demand was also identified by evaluating access to key destinations such as healthcare facilities, schools, and employment centers.

Second, we examine future demand by reviewing planning documents and SCAG employment and population projections. The AV is expected to see tremendous population and employment growth, which makes it a prime candidate to become a High-Quality Transit Area (HQTA) according to SCAG. An HQTA is defined as a walkable area served by frequent transit (15 minutes or less) within a half-mile. Other regional transit projects, such as the Antelope Valley Metrolink Line and High Desert Corridor Rail also illustrate the region's need for high-quality transit to support a shift in travel patterns from private vehicles to active and sustainable modes of transportation. Through the region's transit and land use plans, we begin to envision a walkable and transit-oriented future in which AVTA plays a crucial role in delivering mobility services to residents, employees, and visitors of the AV.

2.0 NEEDS

2.1 UNMET TRANSIT DEMAND

2.1.1 Local Service

We analyzed origin-destination data from the 2017 National Household Travel Survey (NHTS)[1], using all trips that begin or end in the Antelope Valley. We extracted origin-destination pairs to include only trips that are internal to the local service area, meaning both the origin and the destination were in either Lancaster or Palmdale. The focus was on Lancaster and Palmdale as the survey sample size in Lake LA and unincorporated LA County was too low to derive general travel patterns to and from those areas. The goal of this analysis is to determine how well the local AVTA service aligns with general trip patterns by all modes of transportation and uncover gaps and

[1] Federal Highway Administration. (2017). 2017 National Household Travel Survey, U.S. Department of Transportation, Washington, DC. Available online: https://nhts.ornl.gov/.
The NHTS is a national survey that collects travel data across the United States, including trips by all transportation modes and for all travel purposes. Survey data can be used to understand trends in travel behavior as well as demographic trends, which contribute to transportation planning and policy development. This survey uses a sample of approximately 2.5% of all trips and is therefore not used to examine trips at a granular level, but instead is used in this report to explore general trends and travel patterns.

opportunities for AVTA local service. Regional travel patterns outside of the AV are explored as part of the commuter service analysis below.

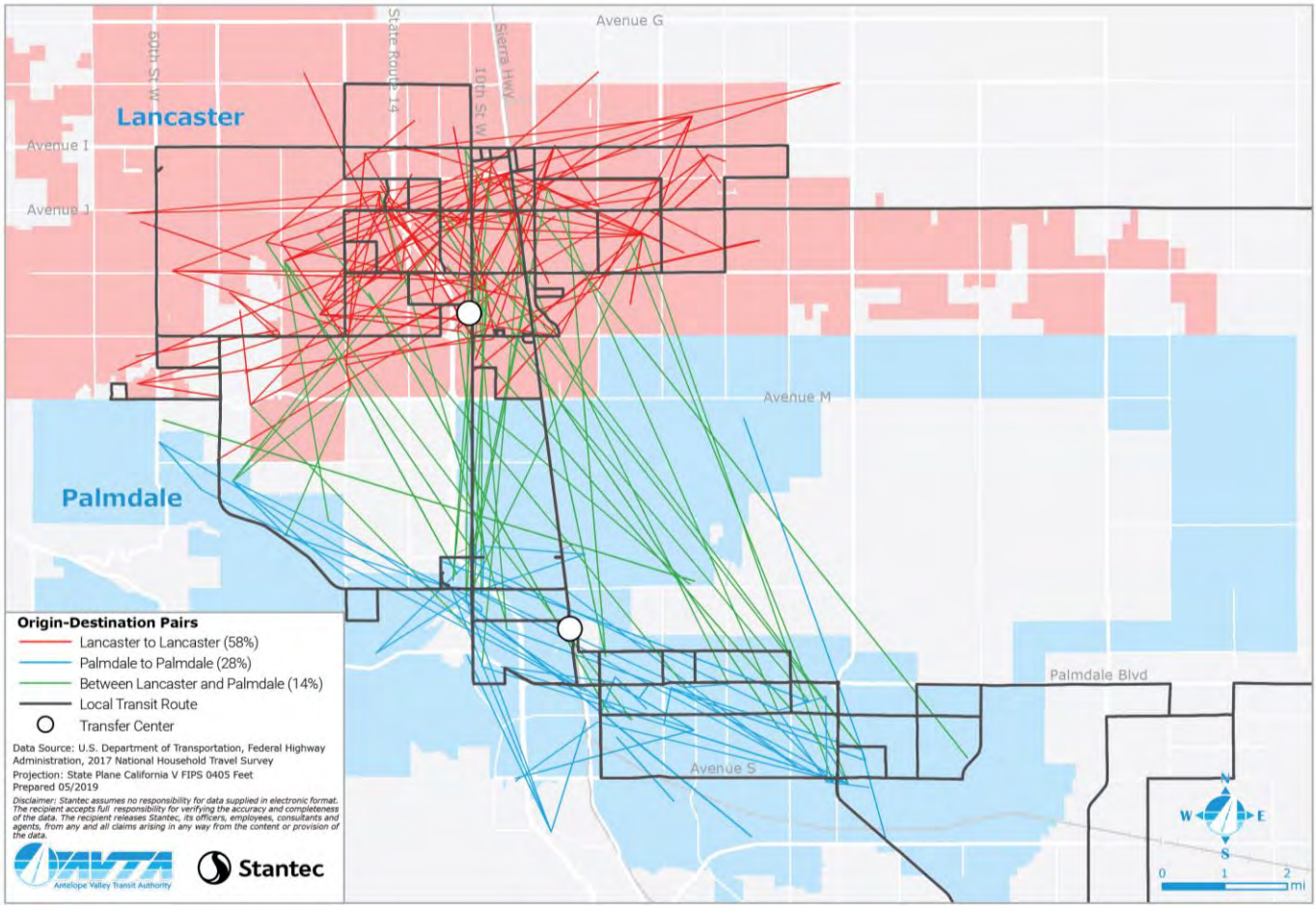

Figure 1: NHTS Origin-Destination Pairs (Lancaster and Palmdale only)

Key findings from the NHTS origin-destination analysis in the local AVTA service area include:

- Considering all modes of transportation on all days of the week, more intracity trips occur within Lancaster (58%) than Palmdale (28%).

- While trips occur in a variety of directions, there are many trips internal to Lancaster that occur in the east-west direction. This is consistent with findings from the stop-level APC data analysis, where strong ridership was observed along Avenue J. **Since Avenue J is a corridor of high-activity stops, it is likely a good candidate for a single high-frequency route to operate.** Today, service along Avenue J is fragmented as different segments are served by different routes, including routes 7, 11, 12, 50 and 94. The high passenger activity at the intersection of 10th St W and Avenue J alludes to a high number of transfers between route 1 and routes operating on Avenue J. Simplifying or untangling routes along a grid network of connecting high-activity corridors allows transit agencies to increase frequency, which is the key factor that attracts riders to transit.

- Internal Palmdale trips occur in the northwest to southeast direction. This pattern demonstrates that Palmdale Transportation Center is not only a key transfer location for providing connections to the Metrolink, but it also facilitates local transfers within Palmdale as riders travel from south Palmdale to the northwest.

- The NHTS also revealed a relatively high proportion of intercity trips between Lancaster and Palmdale (14%). With only a limited number of north-south streets that connect the two cities, the routes that connect these cities are integral to movement in the AV. **The strong ridership on route 1 is a clear reflection of the need to travel north-south between cities.** Increasing the frequency along route 1 should result in great ridership benefits for AVTA because making the best routes of a system better typically increases ridership throughout the entire system, including on weaker-performing routes. Additional frequent routes connecting with route 1 could also boost ridership.

- As shown in Figure 2, the greatest frequency of trips is observed over short distances (less than 4 miles) internally within Lancaster, followed by short trips internally within Palmdale. The most common local trip (24% of trips) is made from Lancaster to Lancaster at distances of 0-2 miles. As expected, trips between Lancaster and Palmdale are longer than intracity trips. The average trip length for origin-destination pairs within Lancaster is 3.2 miles, within Palmdale is 3.7 miles, and between Lancaster and Palmdale is 9.1 miles.

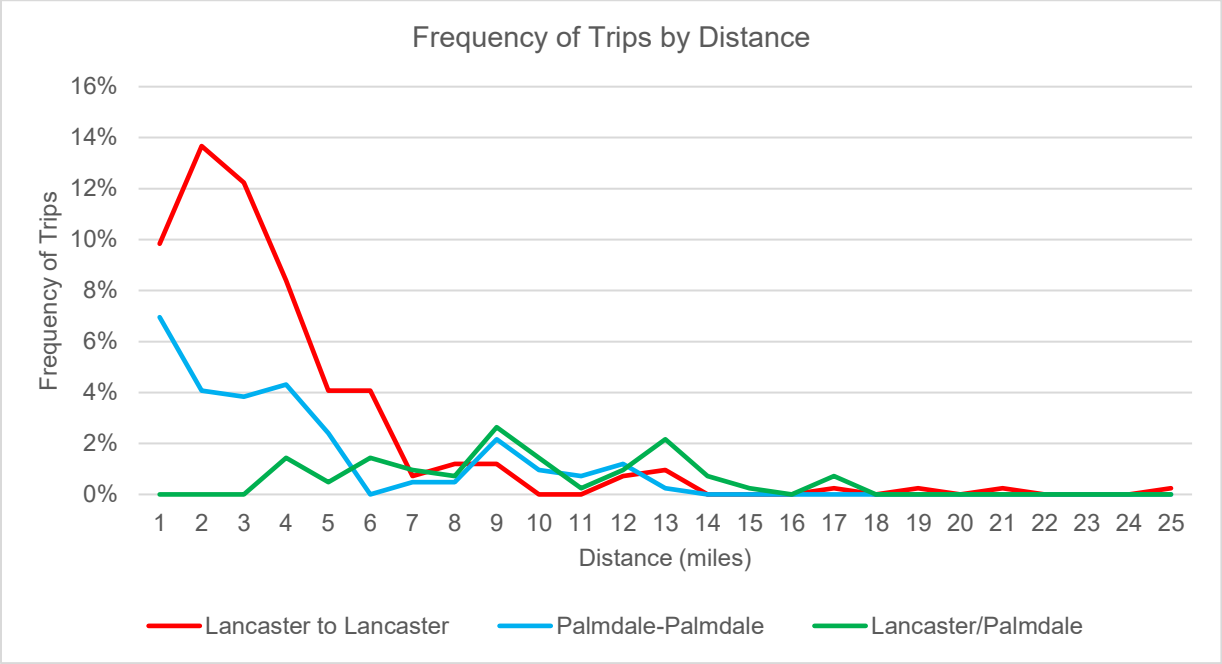

Figure 2: Frequency of trips by distance using NHTS origin-destination pairs (Lancaster and Palmdale only)

- The existing travel times on transit for both long and short trips are not attractive to potential or current riders. For mid to long distances (e.g., from Lancaster to Palmdale), there needs to be higher frequency service with greater stop spacing and transit priority wherever possible to speed up service. Local services with shorter stop spacing should then feed into these services, creating the opportunity to transfer to a frequent service with shorter wait times.

We then compared existing weekday locations to weekday stop locations and boardings in order to understand how well the existing system meets existing travel patterns. Section 3.0 Opportunities looks at future patterns and opportunities to serve new destinations.

- When considering unpaired weekday origins and destinations (Monday to Friday), the survey revealed 185 unique origins/destinations. There were 107 (58%) located in Lancaster, 70 (38%) in Palmdale, and 8 (4%) in Unincorporated LA (within the AV). While approximately 58% of origins/destinations in the Antelope Valley are located in Lancaster, Table 1 shows that only 47% of AVTA bus stops are located in Lancaster. The distribution of weekday AVTA boardings also confirms that there are more points of interest in Lancaster and that existing stops in Lancaster are better used than in Palmdale or

Unincorporated LA. There is likely latent demand in Lancaster that could be better served by stronger east-west and north-south routes, paired with additional stops at key destinations that are not currently served.

- Areas such as Lake LA and Sun Village show little to no demand, particularly during the weekday. It should be noted that a handful of destinations were observed in Lake LA when including weekend trips. This further shows the difficulty of serving these areas by fixed-route transit. Microtransit pilots are currently being explored for these areas and recent simulation results suggest that on-demand transit could serve these populations more efficiently.

Table 1: NHTS Weekday Origin/Destination Locations and AVTA Service

Origin/Destination City	Number of NHTS Weekday Origins/Destinations	Number of AVTA Local Bus Stops	Number of Weekday Average Daily Boardings
Lancaster	107 (58%)	349 (47%)	4,887 (55%)
Palmdale	70 (38%)	249 (33%)	3,629 (40%)
Unincorporated LA County (within the AV)	8 (4%)	151 (20%)	449 (5%)
Total	185 (100%)	749 (100%)	8,965 (100%)

- It should also be noted that the majority of local origins and destinations are within walking distance of an existing AVTA transit stop. Looking at local weekday trips within the Antelope Valley only, Figure 3 shows the unique origins and destinations located within walking distance of an existing bus stop.

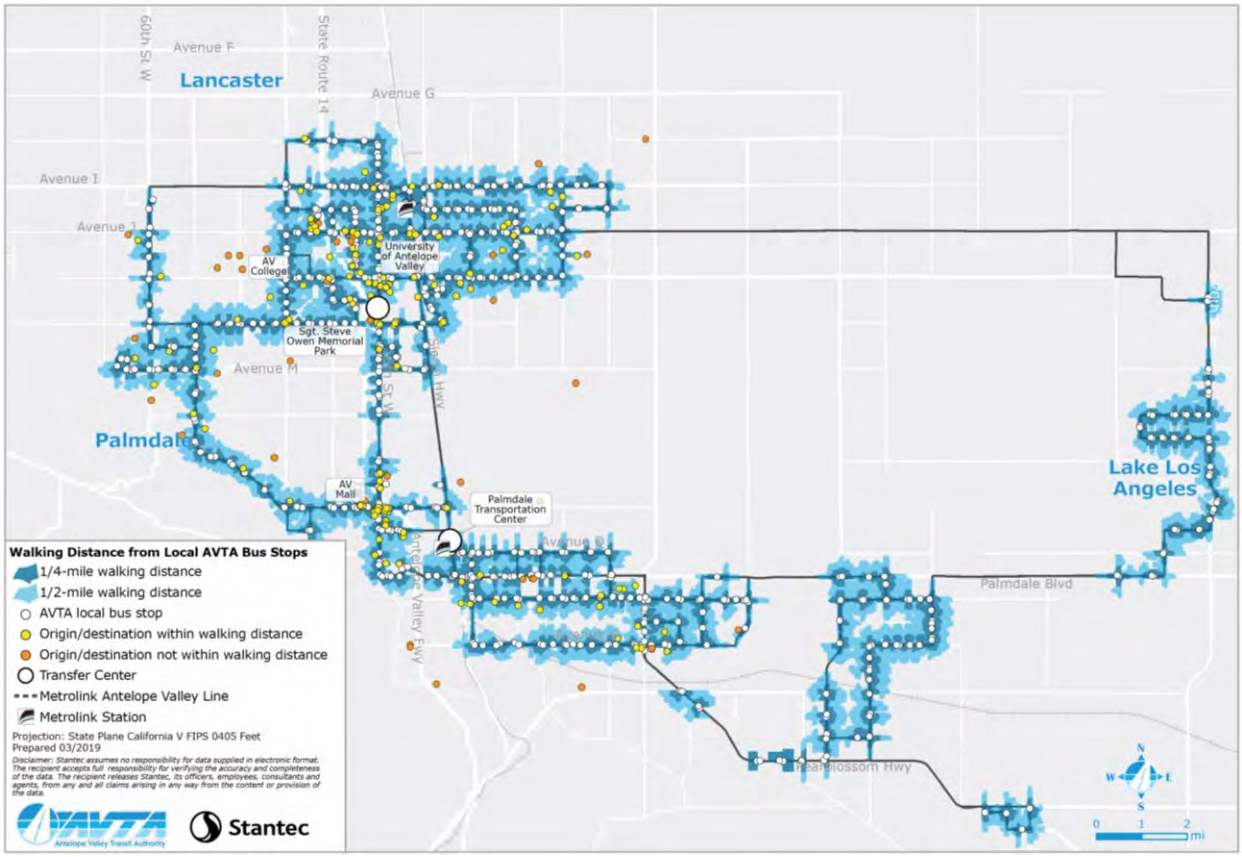

Figure 3: Walking distance from local AVTA bus stops to NHTS origins and destinations

- A total of 146 of 185 unique NHTS locations (79%) are within a ½ mile (10-minute) walking distance of a bus stop, which suggests that AVTA provides good coverage to common destinations in the service area.

- **Even though some destinations are in close proximity to bus stops, they are not located within walking distance due to the lack of pedestrian amenities for accessing these destinations. Improvements to the active transportation network, such as construction of sidewalks, multi-use paths, pedestrian crossings and bike facilities could drastically improve the connections between the front door of popular locations to AVTA's bus stops.**

- Some destinations located outside the 5- and 10-minute walkshed of bus stops are more challenging to serve with conventional fixed-route transit. Microtransit or on-demand solutions that bring customers to a transportation hub, such as Palmdale Transportation Center or Sgt. Steve Owen Memorial Park, could be implemented to help solve the first-mile/last-mile barrier for accessing transit.

Trip start times also provide insight into how well AVTA services match demand. Figure 4 below shows the NHTS trip start time for all trips within the Antelope Valley. There is a clear peak in travel demand during the midday, which is consistent with AVTA ridership data that showed higher midday ridership compared to AM or PM peak periods. Instead of focusing services during the weekday AM and PM peak periods, there is a need to supply strong transit service during the midday period to accommodate this high off-peak demand.

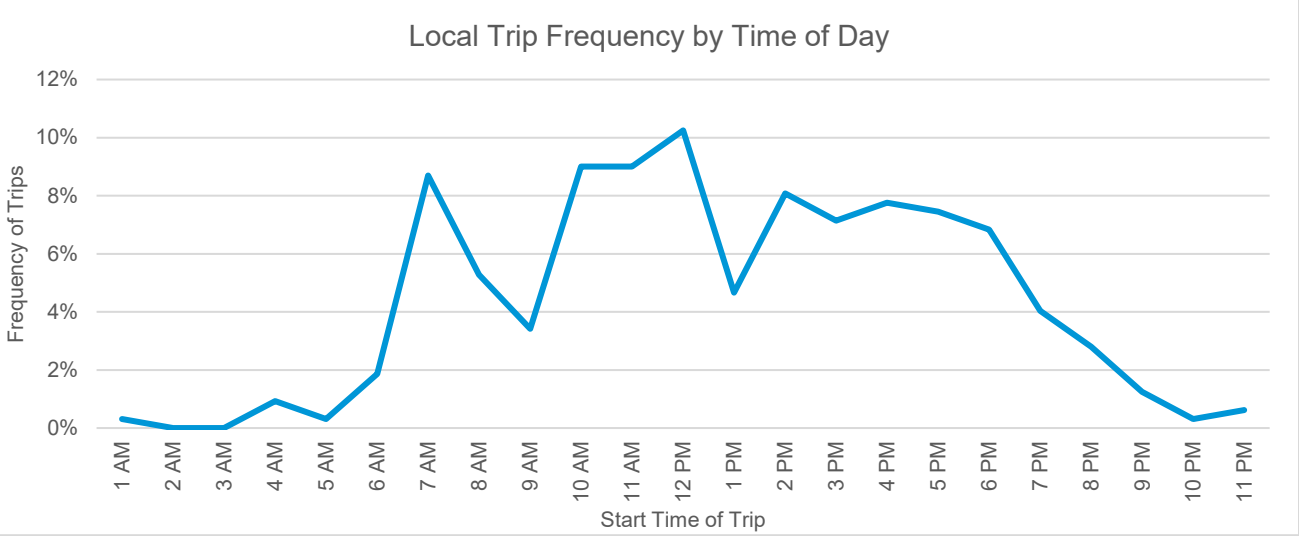

Figure 4: Frequency of trips within the Antelope Valley by time of day using NHTS origin-destination pairs

2.1.1 Commuter Service

We explored NHTS origin-destination data to explore regional travel trends and identify any locations that are not currently served by AVTA's commuter services. This dataset is only a sample of trips originating in or destined for the AV but can reveal general trends.

- Looking at destinations in Santa Clarita, San Fernando, and the City of Los Angeles confirms that AVTA's commuters can reach desired destinations from the AV using transit. Century City, Santa Clarita and Downtown Los Angeles show the most trip activity, and are **covered by existing commuter services that provide transfer opportunities to other transit agencies.** While it is possible to get to these destinations using AVTA's commuter service, **the long travel times and inefficient operation can make these services unattractive.**

- One destination in the AV that is not served by AVTA is the Antelope Valley California Poppy Reserve. **There may be an opportunity to provide seasonal service from Lancaster Metrolink Station to the Poppy Reserve, only while poppies are in bloom.**

- Pasadena was also included in this review because Santa Clarita identified a need to provide service to Pasadena. If a similar desire is found in the AV, it may be possible for a partnership between Santa Clarita Transit and AVTA to deliver service to Pasadena. Based on the NHTS dataset, there is not presently a need for commuter service between the AV and Pasadena.

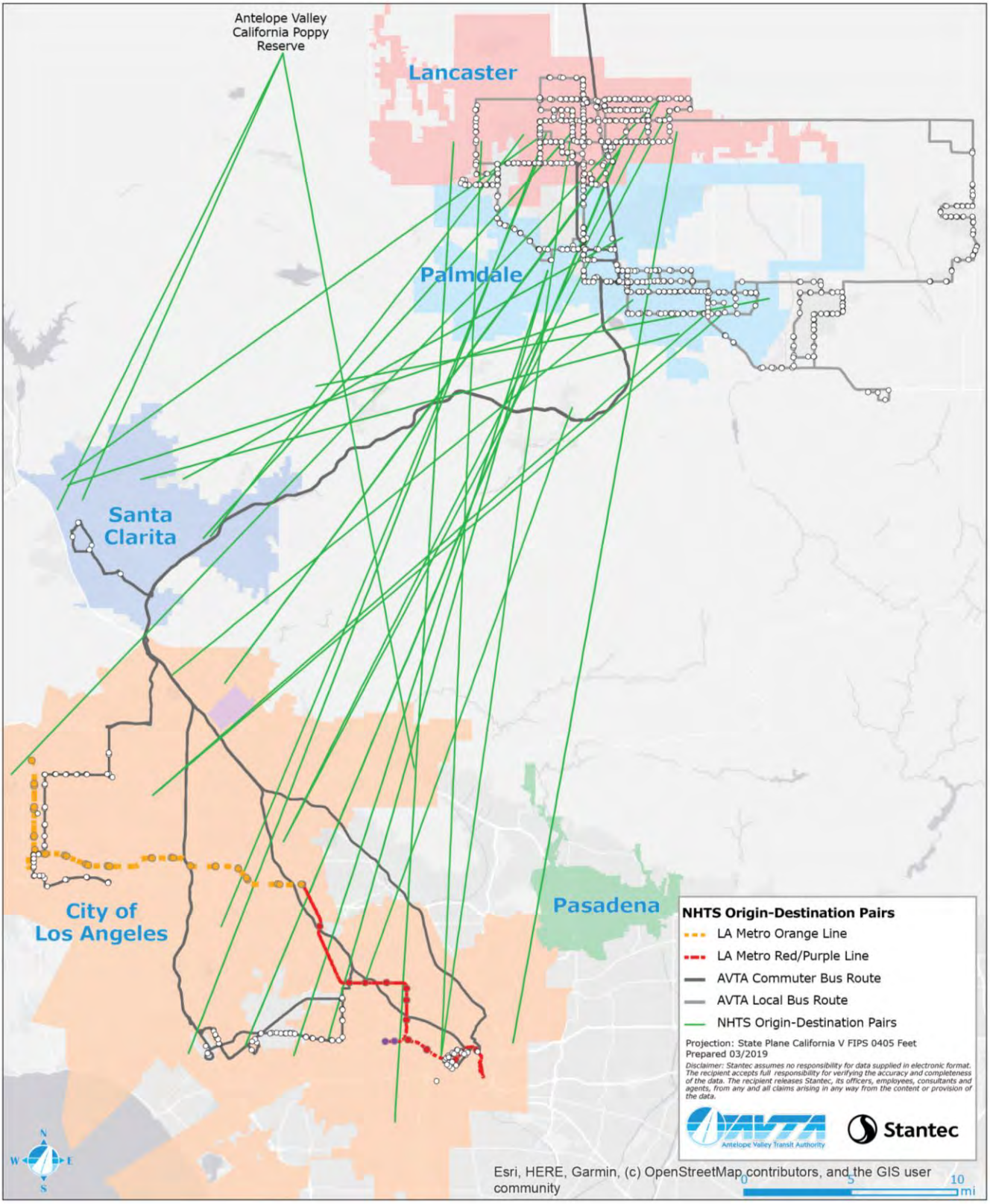

Figure 5: NHTS Origin-Destination Pairs (between the Antelope Valley and commuter cities)

The existing AVTA commuter services (Routes 785, 786, 787) are offered during weekday AM and PM peak periods and in peak direction only. We used the NHTS origin-destination data to determine if there are

opportunities for AVTA to offer reverse commuting service (i.e. service from Downtown LA to the AV during the morning and from the AV to Downtown LA during the afternoon), as well as explore the potential to provide off-peak services to these destinations. Trips between the City of Los Angeles and the Antelope Valley by trip start time are shown below in Figure 6.

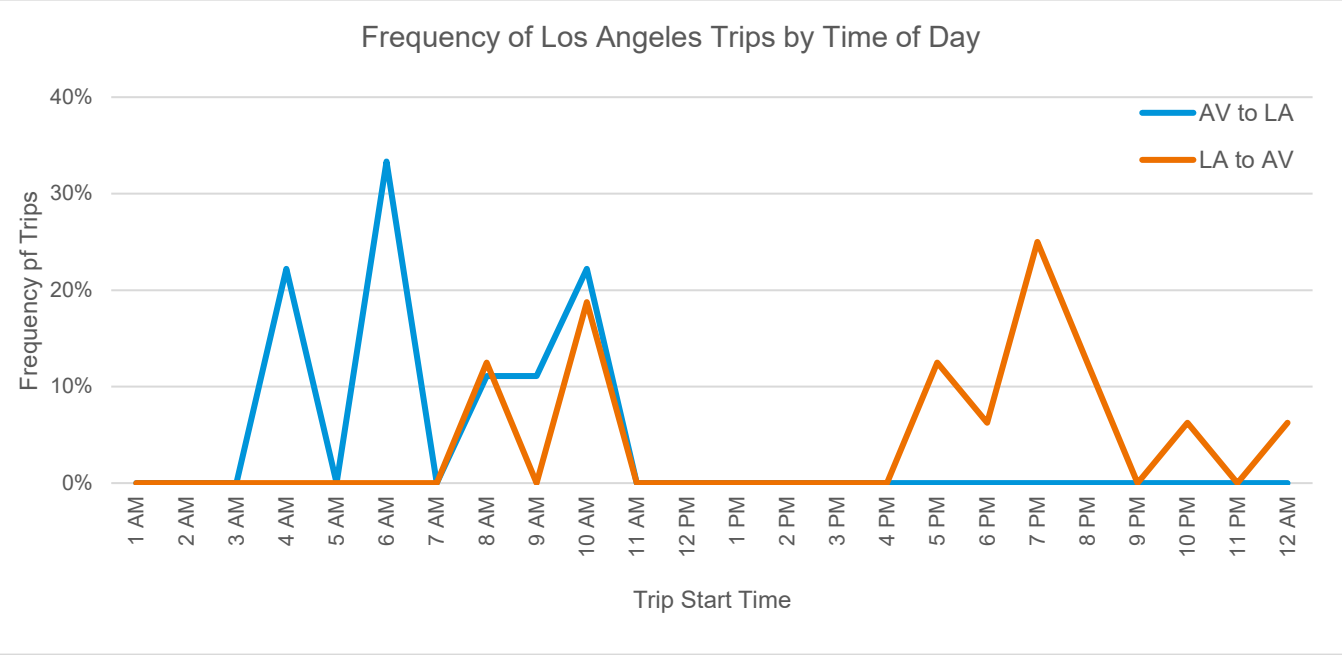

Figure 6: Frequency of trips between Antelope Valley and the City of Los Angeles by time of day using NHTS origin-destination pairs

- Trips between LA and the Antelope Valley are highest during the peak periods, with more trips from the AV to LA in the AM and more trips from LA to the AV in the PM. AVTA's existing commuter service generally reflects these trends, with trips to LA starting in the early AM.
- **There may be opportunities to provide reverse commuting trips**, particularly during the AM from LA to the AV. Given existing ridership on commuter routes and resource limitations, additional trips can only be introduced if commuter services improve their efficiency.
- As shown in Figure 7, **destinations along Route 785 in Downtown LA are all located within a 5 or 10-minute (1/4 or 1/2-mile) walking distance of LA Metro Red Line**. The Downtown segment of Route 785 results in unreliable commuter service for AVTA because of the time spent in traffic. There is a need to simplify Route 785 in the Downtown to improve efficiency, increase reliability, improve customer service (i.e. reduce travel time) and free up resources for more productive service. One possible solution is to terminate Route 785 at North Hollywood station for service into Downtown LA on the Red Line. Additional routes at this station, such as Metro Orange Line, local Metro buses, LADOT Commuter Express, Burbank buses and more, would also improve regional connectivity by facilitating additional transfer opportunities. By eliminating the unreliable segments of Route 785 in Downtown LA, AVTA could explore the idea of providing reverse commute or off-peak trips from North Hollywood station.

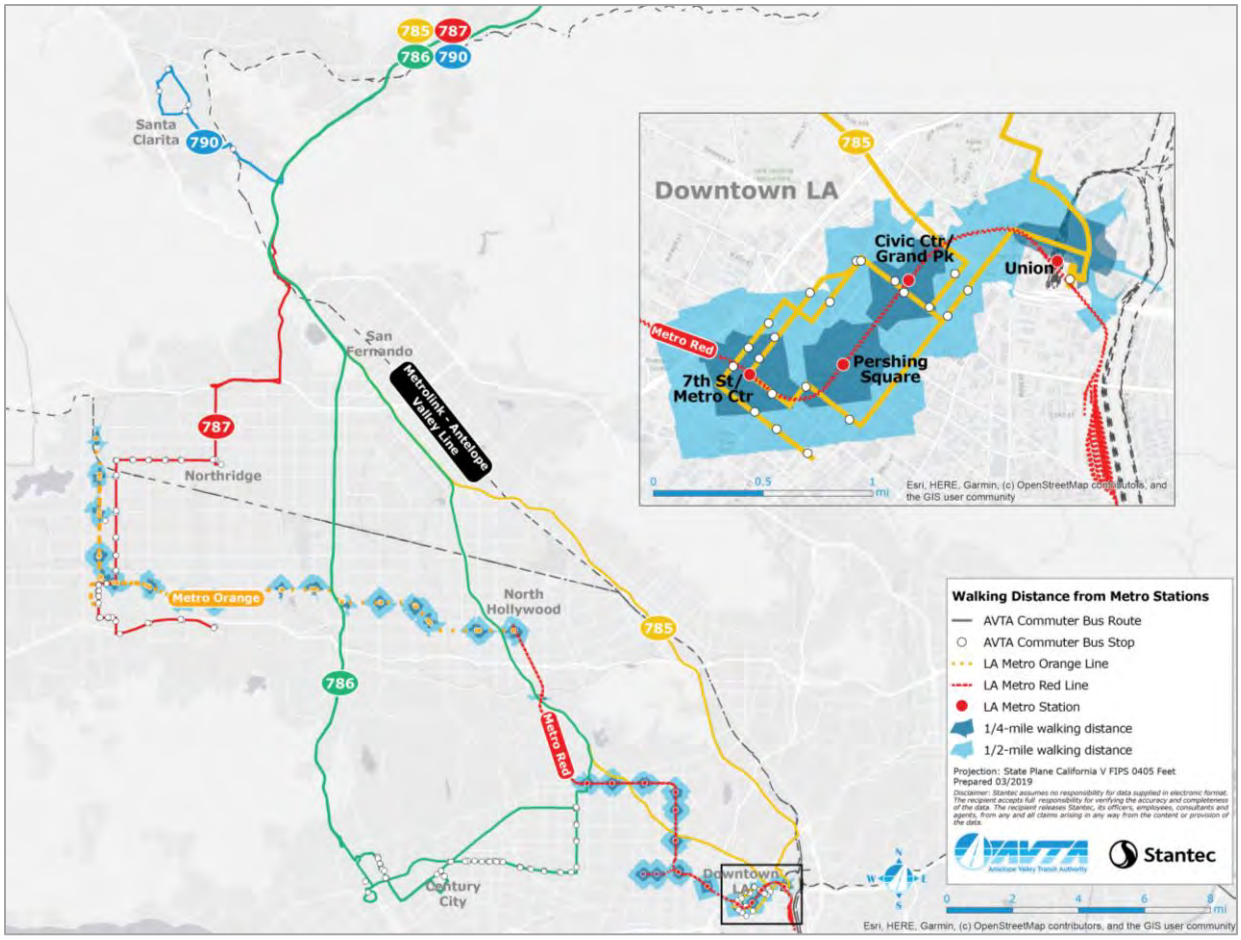

Figure 7: Walking Distance from LA Metro Rapid Transit Stations

- **Ridership on Route 786 to Century City is low**, resulting in the second highest cost per boarding following Route 790. According to Santa Clarita Transit, which also provides commuter service to Century City on Route 792 and 797, the high demand for service between SC and Century City is difficult to accommodate with their existing service. **AVTA should consider serving Newhall Station in SC to pick up overflow riders heading from SC to Century City**. In addition, this suggestion was also made by Santa Clarita Transit as they do not have additional resources to provide more service.

- The destination with the highest demand on Route 787 is California State University, Northridge (CSUN). However, **the schedule for Route 787 does not align with the needs of a student population** as many students do not travel during the typical AM and PM peak periods. There is a need to provide mid-day and late-evening trips to and from CSUN to accommodate flexible student schedules. To accommodate this need, AVTA should consider a pilot project with a Transportation Network Company (TNC), such as Uber or Lyft, where students could be picked up from a train station and brought to CSUN, or dropped off at a train station for return trips to the AV, when AVTA commuter buses are not running. In addition, Santa Clarita Transit indicated an interest in working with AVTA on a joint CSUN solution as they do not have the resources to provide service. We believe this is something that should be further explored.

- A large segment of Route 787 duplicates Metro Orange Line and shows low ridership. AVTA should consider stopping at Nordhoff Station to facilitate transfers to the Orange Line instead of duplicating service. Some passenger activity on Route 787 is observed at Warner Center stop, which is not located

within a reasonable walking distance from the Orange Line. However, Warner Center is served by the Metro Shuttle service which operates every 10 minutes from Canoga Station (Orange Line).

We also compared the results from the NHTS to the 2015 Longitudinal Employer-Household Dynamics (LEHD) survey, which collects information specifically on employment and household locations and information at various geographies. The 10 most common workplace locations of AV residents are shown below in Table 2.

Table 2: Top 10 employment locations of Antelope Valley residents (LEHD)

Employment Location	Count	Percentage
City of Los Angeles	23,018	20.5%
Lancaster	20,710	18.5%
Palmdale	12,785	11.4%
Santa Clarita	4,397	3.9%
Burbank	1,678	1.5%
Quartz Hill	1,126	1.0%
San Diego	1,111	1.0%
Pasadena	1,017	0.9%
Glendale	993	0.9%
El Segundo	887	0.8%
All Places	**112,096**	**100%**

- The demand for work travel in the City of LA, Lancaster, Palmdale, and Santa Clarita match the supply provided by AVTA through local and commuter services.
- **Route 790 fills an existing gap in Metrolink service**, providing a necessary link between the AV and Santa Clarita during off-peak hours when the Metrolink is not running.
- There is employment demand in Burbank from AV residents, but it is not recommended to provide a commuter service to Burbank as 1,678 jobs are unlikely to sustain a dedicated transit service. Providing a commuter service on Route 785 to North Hollywood Station, as recommended above, would provide transfer opportunities for workers traveling to Burbank.
- Overall, there is a need for AVTA commuter service to feed into Metro services. This would help create a regional network of transfer opportunities instead of duplicating service that is already delivered by other transit providers, as well as leverage services operating in a dedicated right-of-way that can improve customer experience by reducing overall trip travel time.

Nearly 65,000 jobs are located in the Antelope Valley, attracting workers from within and outside of the Antelope Valley. Home locations of employees who work in the AV can provide insight into reverse commuting opportunities and potentially uncover new transit markets. The top 10 home locations of Antelope Valley workers are shown below in Table 3.

Table 3: Top 10 home locations of Antelope Valley workers (LEHD)

Home Location	Count	Percentage
Lancaster	18,494	28.6%
Palmdale	13,503	20.9%
City of Los Angeles	4,089	6.3%

Quartz Hill	1,590	2.5%
Santa Clarita	1,353	2.1%
Rosamond	1,271	2.0%
Lake Los Angeles	864	1.3%
Sun Village	723	1.1%
Bakersfield	537	0.8%
San Diego	392	0.6%
All Places	**64,667**	**100%**

- The most common home locations of AV workers are Lancaster and Palmdale, which illustrates the need for strong local service within the AV to connect residents to employment.
- The City of Los Angeles also emerges as a common home location for workers in the AV, with over 4,000 LA residents traveling to the AV for work. However, this is much lower than the number of AV residents travelling to LA for work (over 23,000). Reverse commuting opportunities from LA to the AV on AVTA services may therefore be limited.

Overall, Stantec believes there is an opportunity to reinvent AVTA's commuter services to better serve its customers. To note, in tandem with redesigning commuter services, AVTA will need to revise fares to reflect shorter travel distances. Proactive discussions with peer transit agencies such as Santa Clarita and LA Metro on fare reciprocity will need to occur since some customers transferring to another service will have to pay another fare under the current regime which may be a detractor to regional collaboration.

2.1.2 Dial-a-Ride

AVTA provides Dial-a-Ride (DAR) services in the Antelope Valley to those who qualify based on age, disability, or residence location. DAR is also available to the general public living in rural areas who may not have access to the local fixed route system, though at a higher fare than in the other service areas not open to the general public.

Home locations of DAR registrants can be used to understand where residents are concentrated or dispersed across the AVTA service area. Examining patterns in DAR home locations can assist in designing new local fixed route services or community circulators in areas that are currently underserved by conventional transit service. Some DAR customers may be willing to take conventional transit if it is conveniently located, particularly for those who take short local trips around their communities. Additionally, services that are designed based on popular DAR origins and destinations, but are available to everyone, can be used in areas with low conventional transit productivity. Operating a community circulator to replace a low frequency fixed route can improve accessibility for both DAR registrants as well as the general AVTA ridership.

Figure 8 below illustrates the home locations of individuals who have access to DAR services (eligible as of January 2019). In total, there were 1,786 eligible registrants (as of January 2019) in the service, who took approximately 44,468 trips in 2018, or about 25 trips per registrant. An additional 1,496 trips (0.8 trips per customer) were scheduled but were not completed due to no-shows.

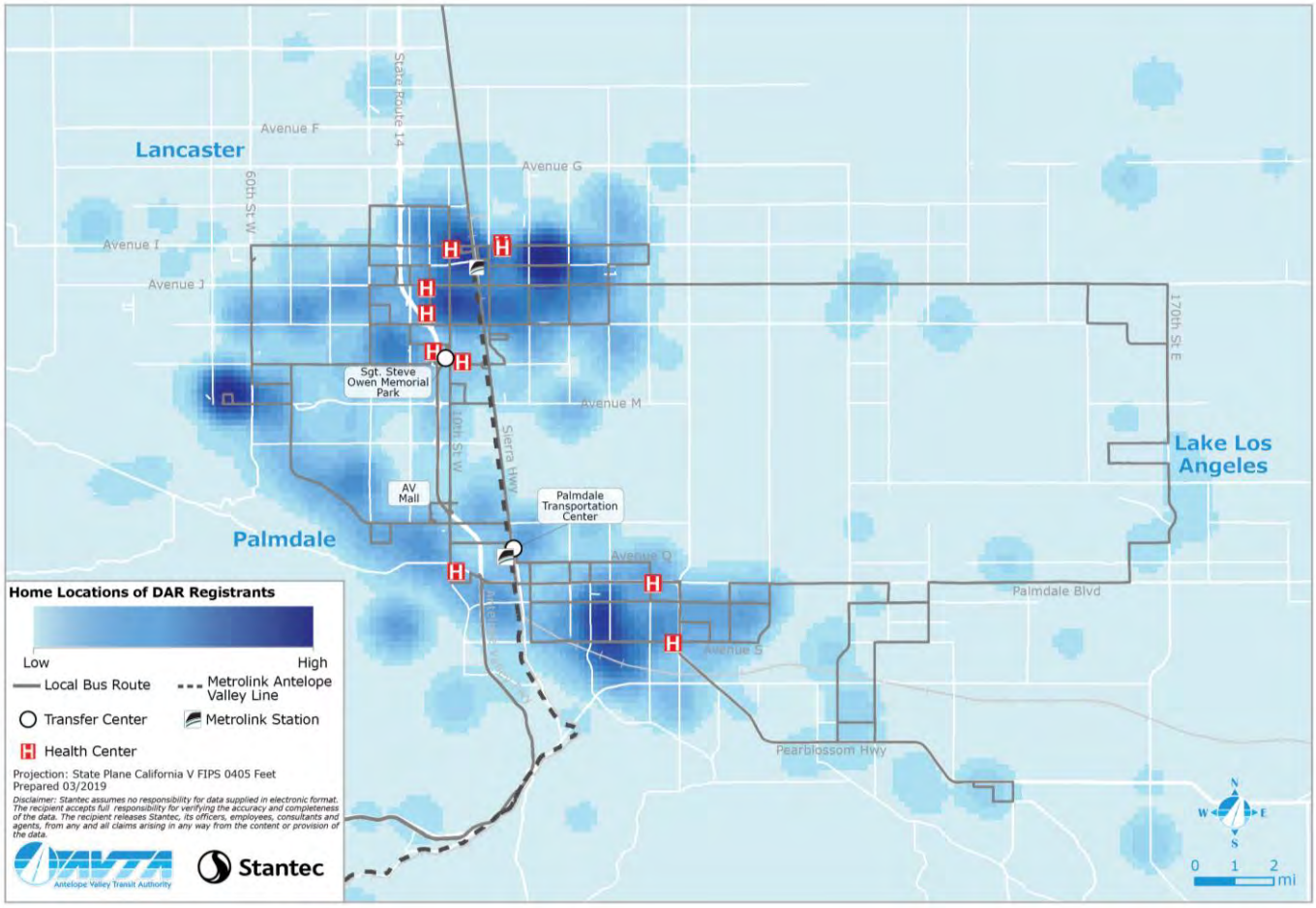

Figure 8: Home locations of eligible (2019) DAR registrants and health centers

- Common residences of DAR registrants include Mayflower Gardens Retirement Community (Quartz Hill), Lancaster Village Senior Apartments, Lancaster Homes Apartments and Arbor Grove Apartments (W Jackman St), neighborhoods near Avenue I and J in Lancaster, and between Avenue R and S in Palmdale.

- An area of relatively high DAR residents with low fixed-route access is in the west of Lancaster, bounded by Avenue I, 70th St W, Avenue K, and 30th St W (see Figure 9). Walking distances to the nearest route (Route 9, 7, or 12) can be 20 to 30 minutes. There may be an opportunity to fill this gap in transit service with an accessible community circulator. This service would reduce walking distances for many DAR registrants, while providing transit service in an area that is not currently served. This may also eliminate the need for Route 9, as a circulator could more effectively cover this area.

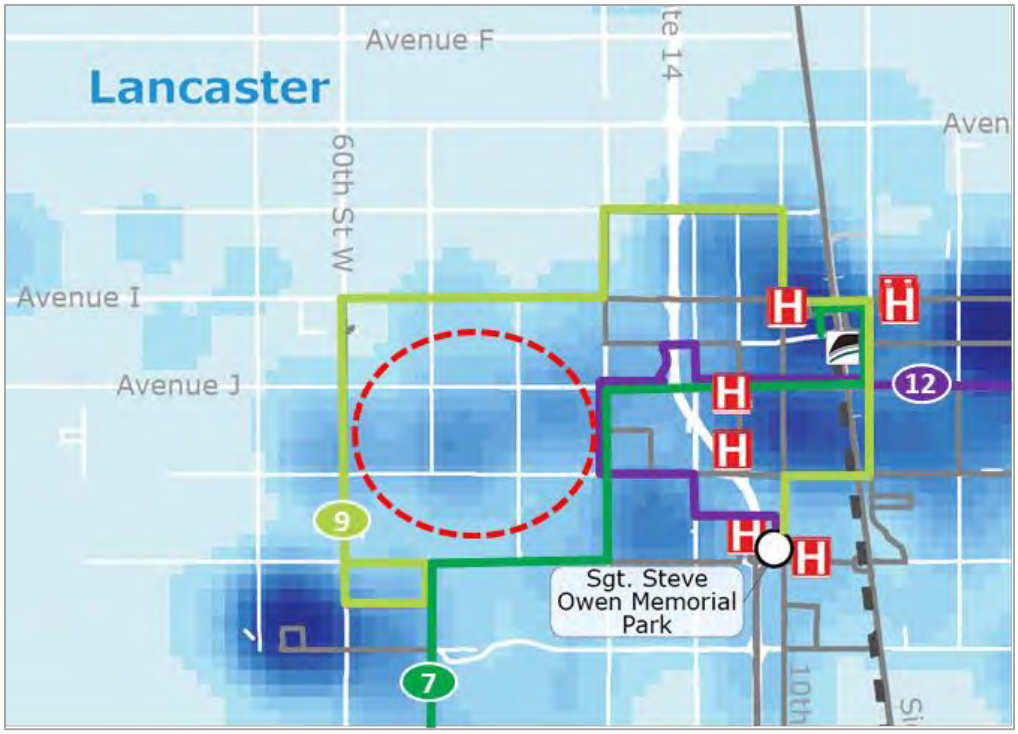

Figure 9: Potential community circulator location

- The top origins and destinations (over 5,000 annual trips) include:
    - 585 West Jackman Street (23,948 trips; 7% of total DAR trips) – This drop-off location serves the Antelope Valley Adult Day Health Care Center, along with nearby destinations such as Lancaster City Hall and a Senior Center.
    - Hermandad Mexicana Nacional - Palmdale Office (8,436 trips; 3% of total DAR trips)
    - Los Angeles County Office of Education (LACOE) Greater Avenues for Independence (GAIN) Job Services (6,250 trips; 2% of total DAR trips)
    - Palmdale GAIN Office (5,508; 2% of total DAR trips)

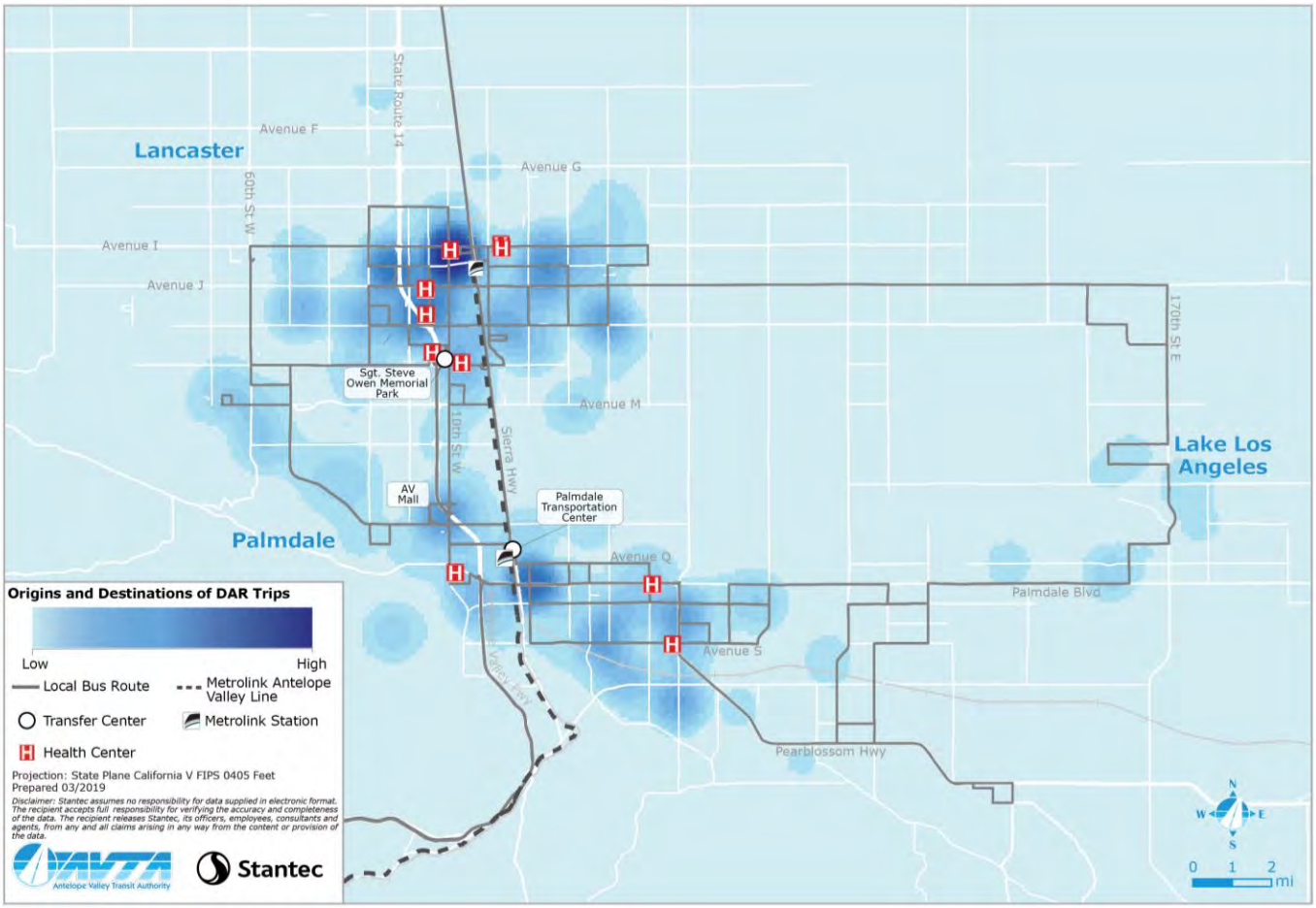

Figure 10: Origins and destinations of annual DAR trips (2018) and health centers

- As part of the Greater Avenues for Independence (GAIN) program, AVTA offers DAR trips for employment interviews and to predetermined places of work. The second, third, and fourth most popular DAR destinations, with a combined annual 20,194 trips, are all located within walking distance of a conventional fixed-route transit stop. One example of a common trip taken on DAR is from 1233 W Rancho Vista Blvd to the Palmdale GAIN office.

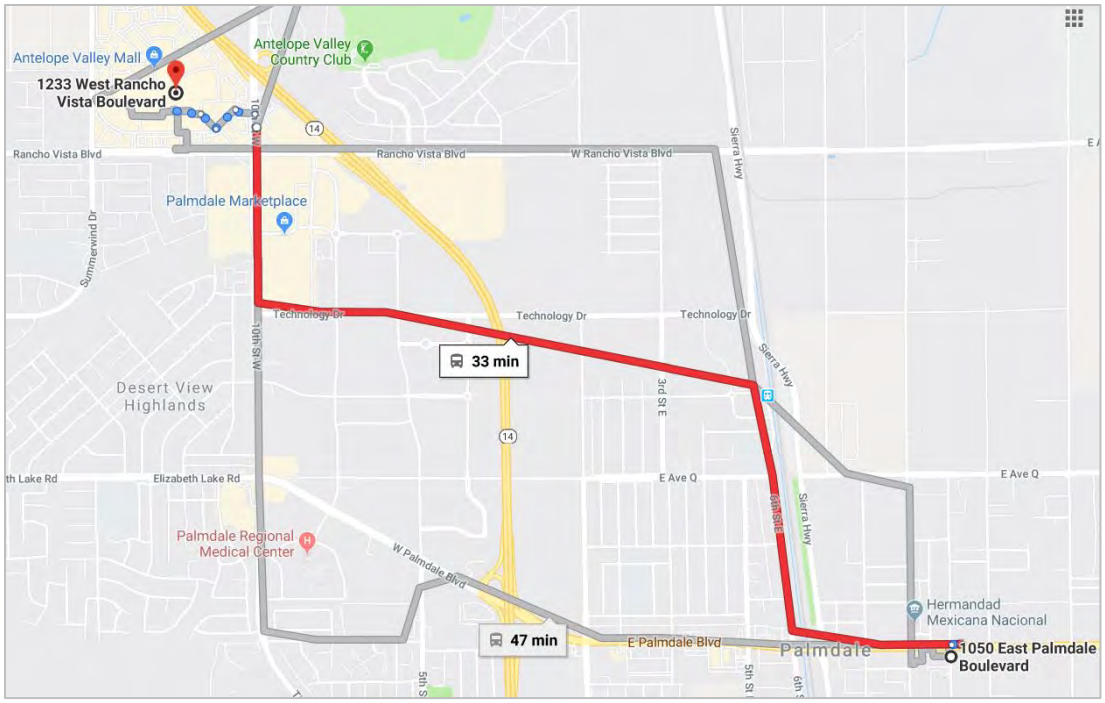

Figure 11: Sample conventional transit trip between a common DAR origin and destination (Source: Google Maps)

- The most common trip distance in 2018 (10% of total trips) was between 3 and 4 miles, and 18% of trips were less than 3 miles. As shown in Figure 12, over half the DAR trips (54%) were between 4 and 13 miles, which are trips that can typically be served by conventional transit, depending on the availability of nearby stops. These findings may suggest that conventional fixed-route options do not provide the desired convenience, accessibility, or travel time compared to DAR.

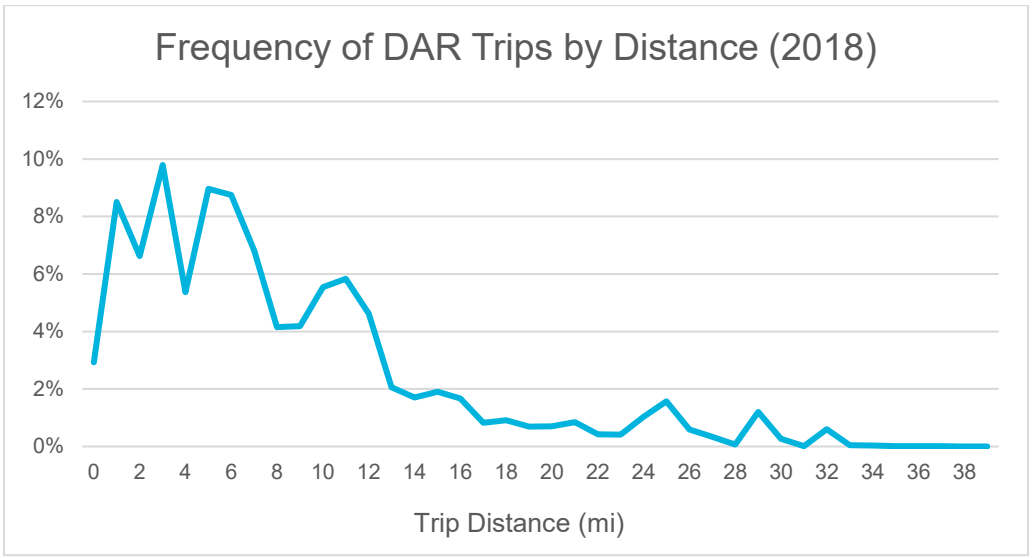

Figure 12: Frequency of DAR trips by trip distance in 2018

- DAR is a necessary service for riders who are unable to travel using conventional transit due to their age or disability, as well as for those who live in rural areas that lack conventional transit options. However, there are DAR trips with origins and destinations that are located near AVTA's local bus stops. A Travel Training program that teaches individuals with a disability how to take conventional transit and empowers

them to travel independently could be implemented to help shift the demand for DAR to conventional transit. This would also require improvements to the accessibility of fixed-route stops as well as driver sensitivity training to improve the experience for persons with a disability.

2.2 ACCESS TO HEALTH CARE

One aspect important to the AV community is access to healthcare services, such as hospitals and clinics. During our meetings with stakeholders who work at various institutions throughout the area, it became clear that the ability to travel to healthcare appointments, particularly preventative appointments, is important to curb later negative health outcomes related to morbidity. Indeed, for patients, the healthcare community, and local governments, the cost of providing emergency services far outweighs the cost of providing preventative treatments, so the ability to travel easily to hospitals and healthcare clinics is essential.

We used the Jane tool in Remix to measure the number of residents who live within different travel times from nine key health care locations. This tool provides an evaluation of the traversable distance with walking and transit at different travel time thresholds. The numbers presented below show how many residents live within a 15-minute, 30-minute, 45-minute, and 60-minute trip to the various locations (see Table 4 and Figure 13). We also repeated the analysis during morning peak, when transit service tends to be greatest, as well as at midday when transit services are typically reduced.

Table 4: Access of residents to major healthcare Centers in the AV by Transit

	Morning (9:00 AM)				Midday (12:00 PM)			
	15 mins	30 mins	45 mins	60 mins	15 mins	30 mins	45 mins	60 mins
AV Hospital	2%	14%	42%	75%	2%	13%	41%	72%
Antelope Valley Community Clinic Palmdale	3%	22%	50%	71%	3%	16%	42%	62%
Antelope Valley Community Clinic Lancaster	4%	19%	41%	70%	4%	17%	36%	61%
South Valley Health Care	3%	23%	44%	67%	2%	15%	38%	60%
Kaiser Permanente Palmdale	3%	19%	52%	66%	3%	18%	49%	64%
Kaiser Permanente Lancaster	1%	8%	30%	65%	1%	7%	26%	53%
High Desert Medical Palmdale	2%	14%	40%	63%	2%	11%	36%	60%
VA Clinic	2%	12%	37%	59%	2%	12%	34%	56%
Palmdale Regional Medical Center	1%	6%	24%	55%	1%	6%	21%	48%

Data represent the percentage of residents (as a total of the number of residents who live within 0.5-mile of an AVTA bus stop) with access to each healthcare facility by public transit at various travel time thresholds.

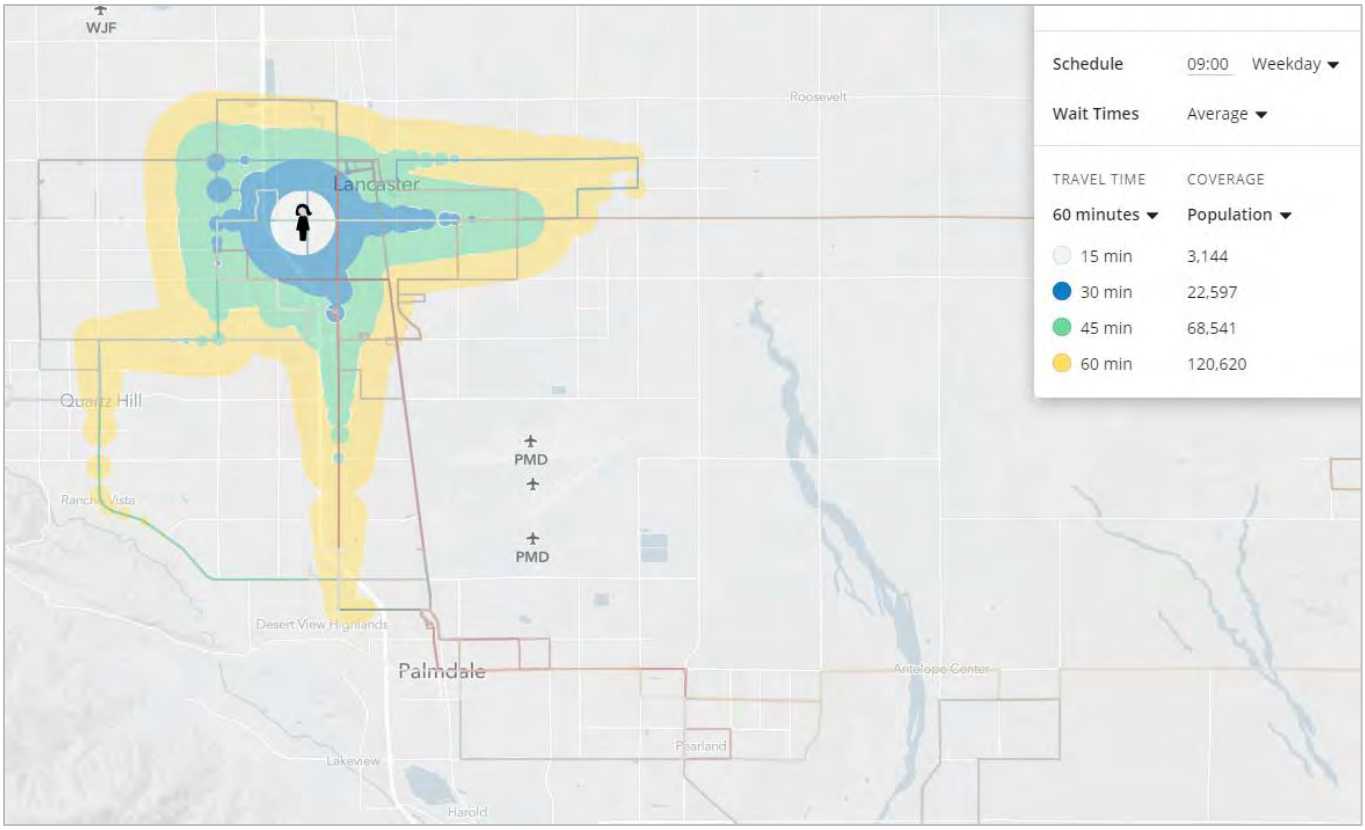

Figure 13: Jane tool in Remix demonstrating population served by transit within 15, 30, 45, and 60 minutes

Of course, with longer travel times, more healthcare providers are accessible to more people, but we note the following observations:

- On average, the **population able to access health care opportunities (within a 30-minute travel time) drops by about 15% at midday compared to 9 am**, suggesting that **midday service should be strengthened, particularly to health care to accommodate trips outside of traditional rush hours**.
- While no location is 100% accessible by the entire population, which is expected due to zoning, development, and other factors impacting urban settlement, at an hour travel time, **the most accessible location is the Antelope Valley Hospital, by about 75% of the population.**
- The **least accessible hospital is the Palmdale Regional Medical Center**, served by route 2, which is accessible by 55% of the population (at 9 am) with an hour of travel time.

Many strategies discussed here and elsewhere can improve access to not only healthcare facilities, but to other opportunities too (like jobs, retail locations, places of worship, etc.). Overlapping concepts include:

- More frequent routes, which reduces wait times and thus total travel times
- More direct route alignments, reducing turns and detours that prolong travel times

Another strategy that will improve access to healthcare facilities is improving bus stop siting and pedestrian access to the building entrances. One example is the Antelope Valley Hospital (Figure 14), showing the nearest bus stop from route 11 (operating every 30 minutes) and the building entrance. The existing stop in blue is not near the main entrance but could be moved to where the orange dot is located (if turning movements are deemed safe) to provide more direct and convenient pedestrian access to the hospital. While the intent of the stop

placement at the blue dot is to provide far-side placement, other considerations need to be taken into account for bus stop placement guidelines; in this case, the land use (hospital) could justify a near-side stop before the intersection, and then another stop closer to the pedestrian access to the hospital entrance.

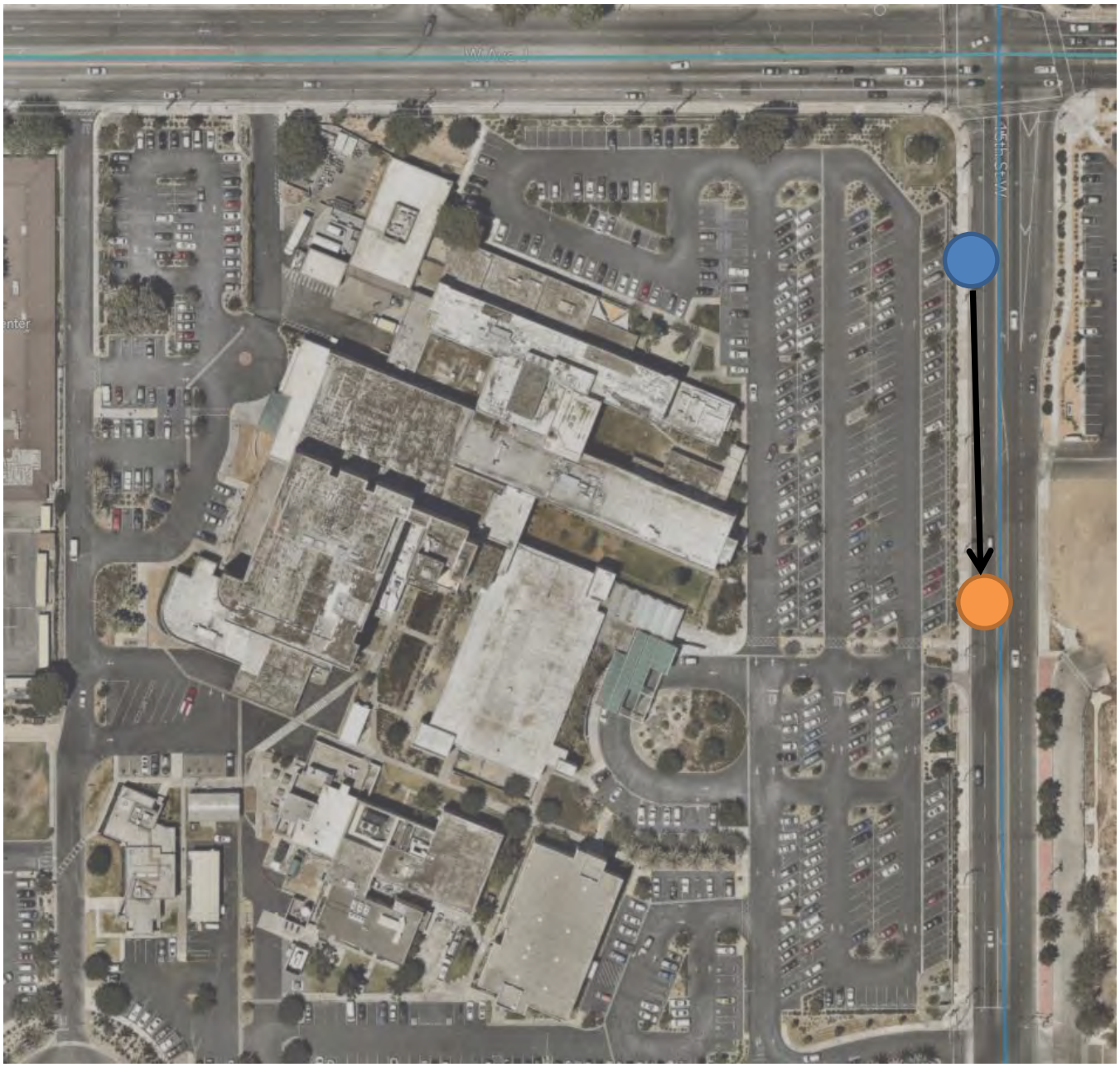

Figure 14: Preferred location (top); actual location (bottom) – distance is ~300 ft. (Google Maps)

2.3 ACCESS TO SCHOOLS

There are an estimated 14,450 high school students living within a 3-mile radius of their school who are not eligible for school bus service from the Antelope Valley Schools Transportation Agency (AVSTA). Those living within one mile of school are likely able to walk to school; however, the students living between 1 and 3 miles from school could potentially take transit. There are 10,313 students who live 1 to 3 miles from school, which represents a hypothetical upper range of approximately 20,000 daily weekday trips that could be taken using AVTA's fixed-route service by these students. This does not include middle school students who could take transit when school buses are unavailable, such as on their way home from an extra-curricular activity. Today, less than 100 daily weekday boardings[2] are observed on the three supplemental routes combined.

The home locations of high school students are shown below in Figure 15.

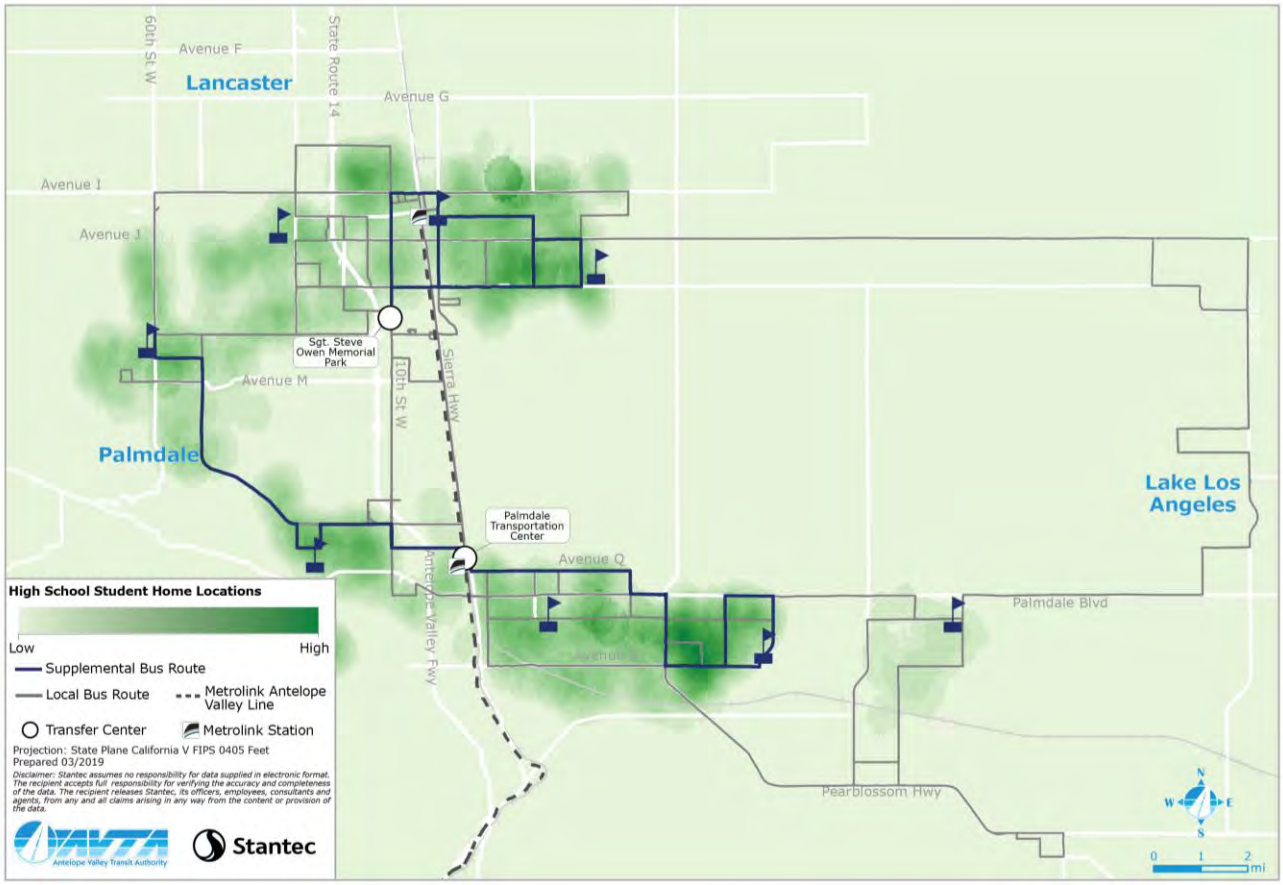

Figure 15: High schools and student home locations within 3 miles of school

- Supplemental routes are currently deployed to serve school students, offering trips in the AM and PM peaks only. However, the supplemental routes do not accurately match school bell times or schedules, or do not provide enough time for students to get to the bus after the dismissal bell. Supplemental routes that are intended for school students continue to operate during summer months when school is no longer in session. While some riders on these supplemental routes are from the non-student population, **ridership is too low to justify providing these services during the summer months**. Non-student riders who currently take this service during the summer months could be accommodated on existing

[2] Ridership data is limited due unreliable APC data or buses not equipped with APC counters (on supplemental routes).

conventional transit routes. For example, riders of Route 97 could take Route 7 instead, which operates along a very similar alignment.

- Overall, high schools in the AV are well-served by AVTA's local transit service (including supplemental routes). Lancaster High School is one school where the surrounding neighborhoods do not have strong transit service to school (between Avenue J and Avenue K).

- There is an opportunity to **attract more students to transit by providing concession fares for high school students**. The benefits of reducing fares for students is threefold: students will be more likely to take transit to/from school if it is more affordable; a lower fare can help reduce fare evasion; and the lower fare is likely to result in an overall increase in transit use by young riders including discretionary trips during the evenings and weekends (such as to the mall, visit friends, etc.).

- Students who live farther than three miles from school receive transportation to and from school, but a reduced fare for all students would increase the likelihood these students would take transit to other destinations.

2.4 ACCESS TO EMPLOYMENT

- Transit to employment destinations must be reliable so employees can depend on AVTA for daily commuting. On-time performance has been identified as an ongoing concern by AVTA riders who have been late to work because of late buses or buses that never showed up. **Adjusting running time[3] and creating realistic schedules that operators can adhere to could improve on-time performance and reliability of the service.**

- AVTA provides commuter service to many regional employment centers including Edwards Air Force Base, and Mojave Air and Space Port. Since introducing these services, AVTA has experienced much lower ridership than anticipated, with only 15 average daily boardings to Edwards AFB and 5 average daily boardings to Mojave in June 2019. **From speaking to riders and operators, the biggest concern riders have with the service is that they are unable to quickly get home in case of an emergency.** In addition, leaving work early or late to come home is not an option with only two trips offered in the morning and two trips in the afternoon. This service **does not allow the flexibility of working hours**, which appears to be a concern for many riders.

- Plant 42 was identified as a major employer that does not currently have transit service. While there are a lot of potential riders and an opportunity to reduce congestion at this location, it is not recommended that transit service is provided to Plant 42 in the short term. The pilots to other major employment destinations such as Edwards and Mojave have not been successful, and the security at Plant 42 acts as a barrier to seamless transit service. To ensure successful deployment of a service at Plant 42, transit priority is required. With roadway upgrades such as a dedicated bus lane, it may be possible to explore transit to Plant 42 and/or an internal shuttle service within the plant. We recommend reviewing servicing Plant 42 in 2-3 years time.

[3] Likely increasing running time during times of the day with heavier traffic and ridership from persons with mobility disabilities that lengthen dwell times will be necessary. Layover time could also require adjustment to account for bus battery charging on-route.

3.0 OPPORTUNITIES

Using population and employment projections from the SCAG 2016 RTP/SCS, we explore the short and long-term growth of people and jobs in the Antelope Valley. The short-term growth from 2016 to 2020 includes changes that have already begun to take shape in the region and will be used when developing short-term recommendations for service changes. Long-term growth is used to understand the trends and patterns in the region and to begin the conversation about creating future developments and neighborhoods that are transit-supportive.

3.1 EMPLOYMENT GROWTH

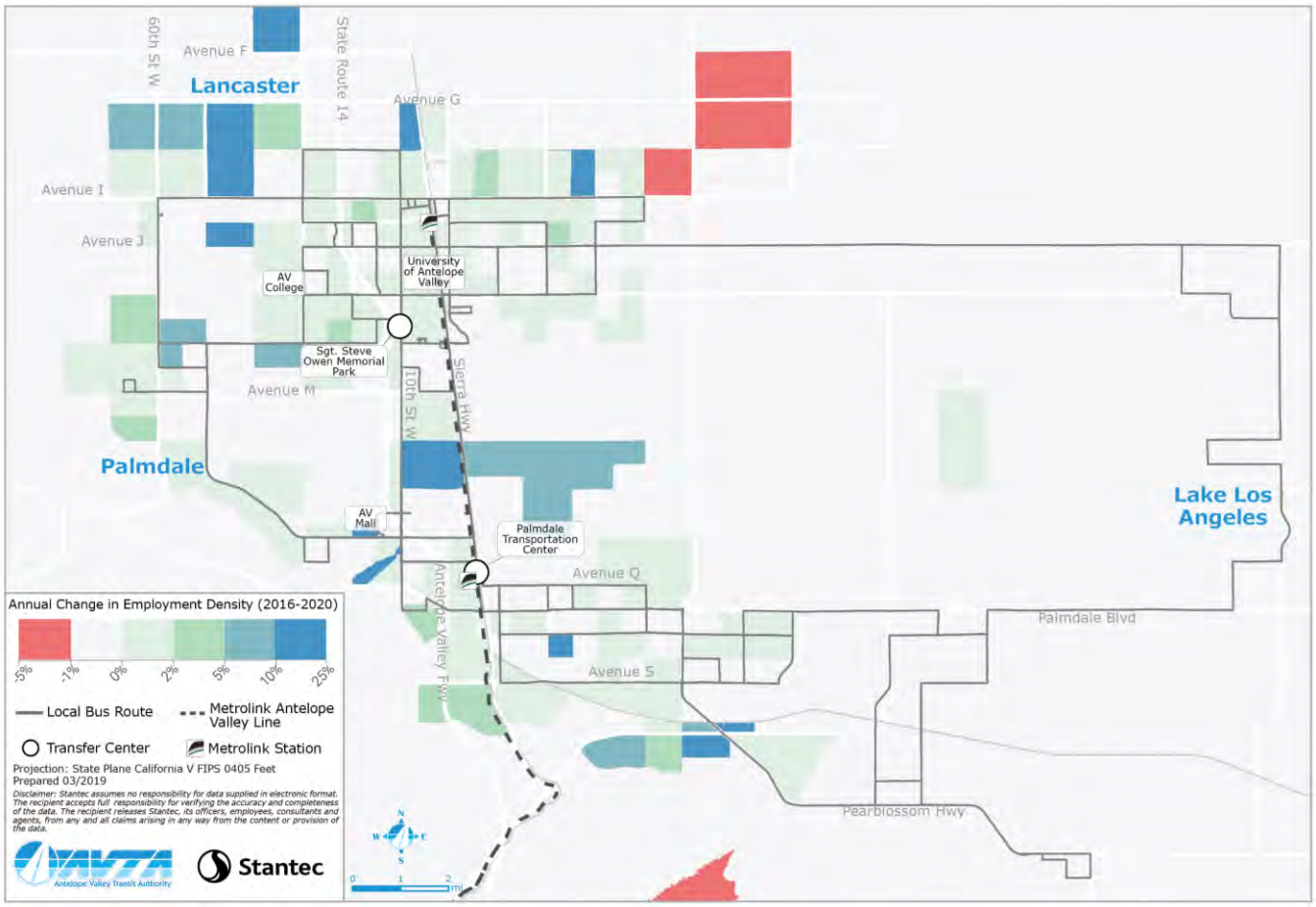

Figure 16: Annual Percent Change in Employment Density (2016-2020)

Short-term changes in employment density (2016-2020):

- Job growth is expected at Plant 42 in the short-term. While there is not an immediate need to provide transit service to/within the plant, there may be an opportunity in the future to provide service to this employment area.
- Northwest Lancaster is also anticipated to see employment growth in the near future, which is not currently well-served by AVTA local service. Route 9 operates along nearby Avenue I but currently has very low ridership. These employment opportunities may help grow ridership on route 9, creating a need

for more frequent service. As development proceeds in this area, AVTA should explore alternative route alignments that bring riders quickly from Lancaster Station to major employers.

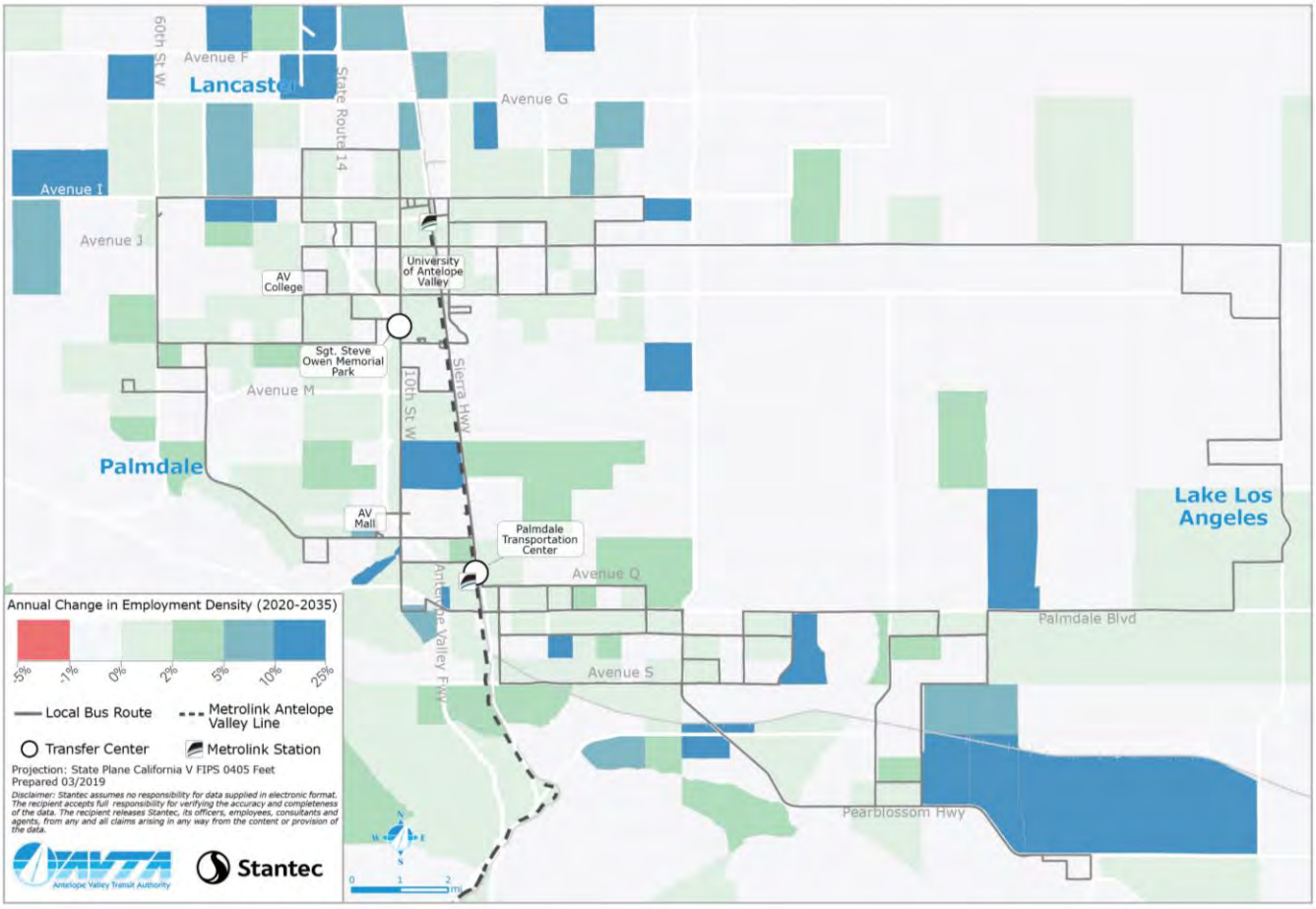

Figure 17: Annual Percent Change in Employment Density (2020-2035)

Long-term changes in employment density (2020-2035):

- Some areas of the Antelope Valley are expected to experience tremendous employment growth over the next couple decades (to 2035 and beyond), such as the Fox Field Industrial Corridor and Pearblossom.
- The Fox Field Industrial Corridor is an 8,000-acre master-planned industrial park adjacent to the existing William J. Fox Airfield in the northwest of Lancaster (Figure 18). The plan for this area consists of a projected 90 million square feet of building area, with office, industrial, research and development, commercial and institutional land uses. The existing Apollo Park will also be complemented by additional green and open space to promote an active lifestyle and sense of community.

  Looking to the future, it is expected that Avenue G and 30th St W will become key transit corridors for this area that is not currently served by transit. **AVTA should consider providing a commuter service that runs north on 30th St W and west on Avenue G, leaving from Sgt. Steve Owen Memorial Park and/or Palmdale Transportation Center, to provide access to jobs for Antelope Valley residents as well as regional LA County residents.** It will also be important to work with the City of Lancaster to ensure new developments do not prioritize surface parking and instead provide active frontages along complete streets corridors that are pedestrian-friendly. An on-demand internal circulator between key

businesses could also improve internal circulation within the park and be an innovative mobility solution to complement the high-tech businesses that are expected to locate here.

Figure 18: Fox Field Industrial Corridor Concept
Source: www.langdonwilson.com/projects/masterplan/foxfield

3.2 POPULATION GROWTH

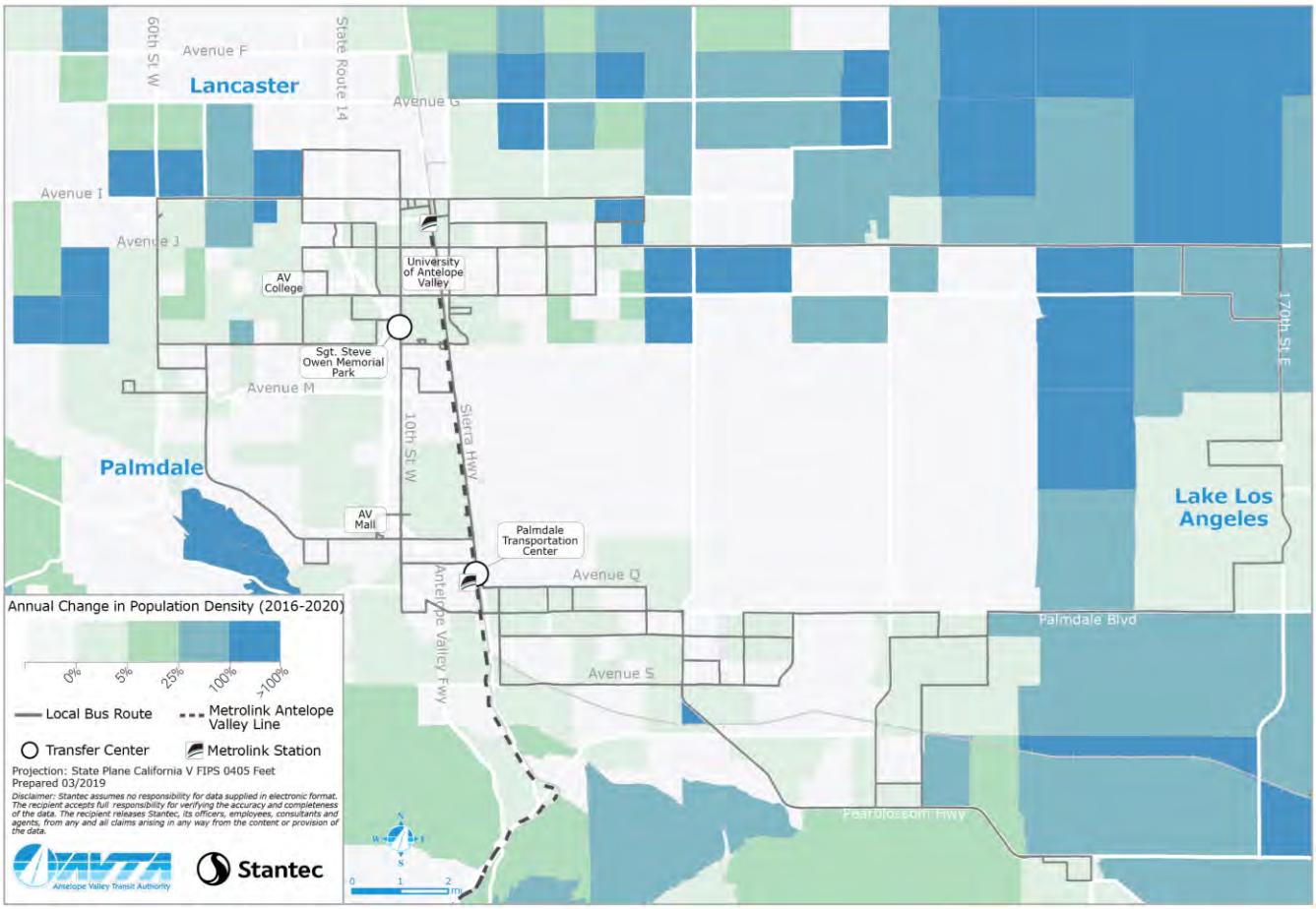

Figure 19: Annual Percent Change in Population Density (2016-2020)

Short-term changes in population density (2016-2020):

- The most population growth in the short-term is observed in today's very low-density areas. While their population density may double in size soon, the total population is still unlikely to warrant transit service as the distance between land uses is not supportive of transit service.
- Population growth in Northwest and West Lancaster should be monitored to determine if new transit service is required in these neighborhoods. Similar to employment growth mentioned above, population growth may require changes to route 9 or other nearby routes such as route 5.

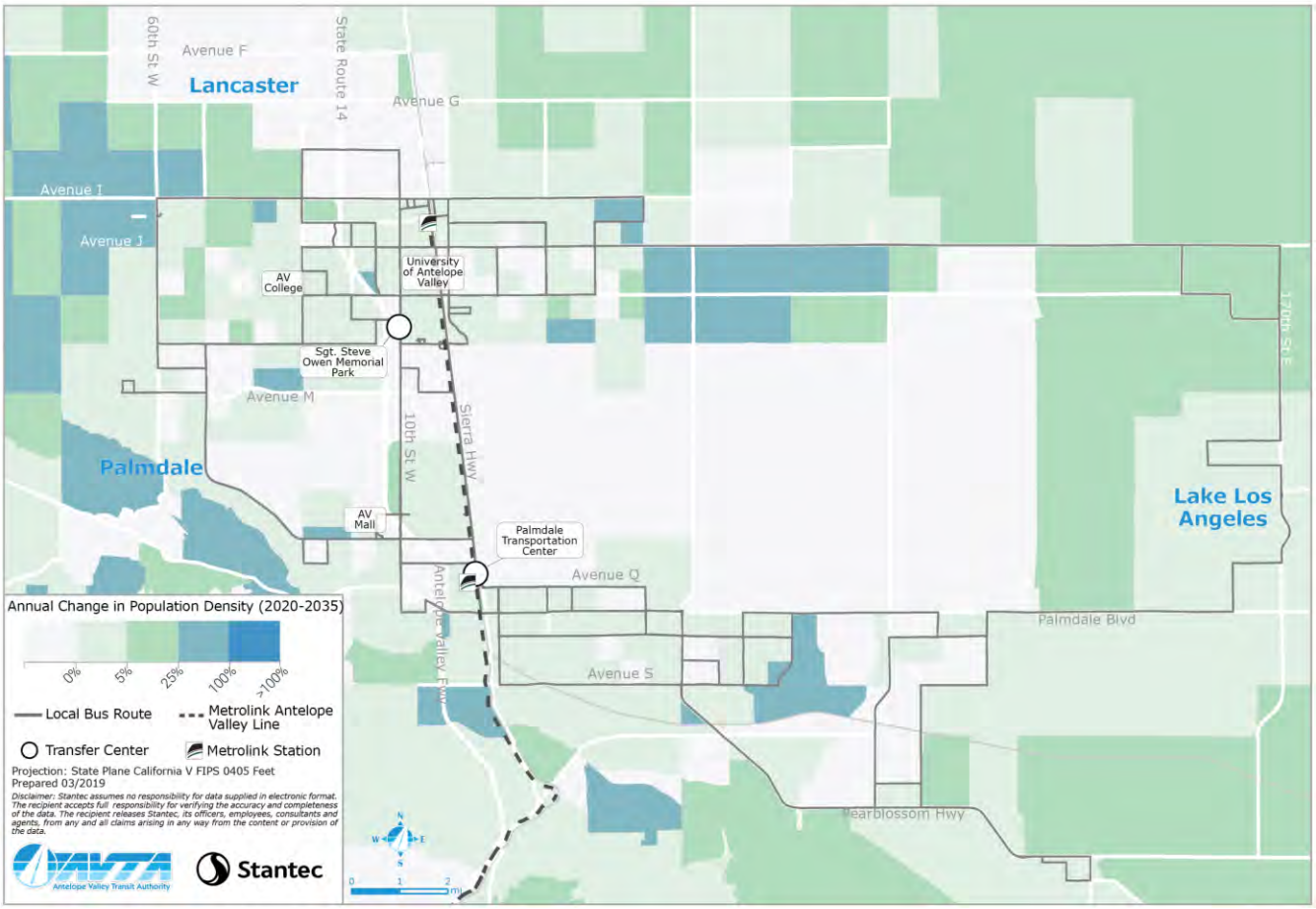

Figure 20: Annual Percent Change in Population Density (2020-2035)

Long-term changes in population density (2020-2035):

- To 2035 and beyond, the greatest population growth is expected in West Lancaster and along Avenue J in the east, which may warrant new transit services.
- While these long-term developments are still in the planning and design stage, it is important that AVTA works together with local officials to ensure new residential and employment developments are planned with transit in mind. For example, large parking lots in front of building entrances act as a barrier for transit use and reduce the walkability of neighborhoods.

3.3 ANTELOPE VALLEY AND REGIONAL TRANSPORTATION PROJECTS

An area as large and diverse as Los Angeles County inherently requires multiple transit agencies of differing scales to provide transit options throughout the County. However, this requires extensive collaboration between agencies. An analysis of transit agencies providing service to the region uncovers a number of projects, studies, and plans that will affect future demand on the Antelope Valley's local transit system.

Additionally, the local municipalities of Lancaster and Palmdale have outlined numerous plans, policies, and goals related to land use, transportation, and future development that foster increased transit use and more sustainable communities. Understanding what these are, along with when, where, and how they are taking place, are important so that AVTA can capitalize on these developments and ensure that their service is serving these new developments as effectively as possible.

3.3.1 SCAG-defined transit priority areas and AVTA service

Some major goals of the SCAG RTP/SCS are to decrease vehicle miles traveled (VMT) and to shift the proportion of short-distance trips (under three miles) to predominately active transport and transit modes. To accomplish these goals, as well as to tackle poor air quality in Los Angeles County, the RTP recognizes the crucial link between land use and transportation planning to support sustainability goals and realize meaningful greenhouse gas emissions reductions, such as through locating new housing and employment near transit infrastructure and land use intensification where warranted by population density and growth. As such, SCAG has designated transit priority areas along with high-quality transit lines to identify areas where new growth should go, as well as where zoning and land use changes would be prioritized. We discuss these below in conjunction with transit infrastructure projects that will shape where and how AVTA needs to provide transit service.

As defined in the 2016 SCAG RTP/SCS, a High-Quality Transit Area (HQTA) is defined as a walkable area within a half-mile of a well-serviced transit stop or transit corridor with 15-minute or less service frequency during peak commute hours. This definition is consistent with SB 375, wherein regions in California are tasked with the creation of Sustainable Communities Strategies (SCS) with goals including decreasing greenhouse gas emissions through land use and transportation planning strategies. SB 375 further defines a major transit stop as a site containing an existing rail station, ferry terminal served by either bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during morning and afternoon peak commute periods, and a High-Quality Transit Corridor (HQTC) as a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak hours. Further, Transit Priority Areas (TPA) are identified for 2040 by the 2016 RTP/SCS, which highlight areas within one half-mile of a major transit stop. Taken together, these areas and corridors are important components of the existing transportation network, and when combined with appropriate sustainable land use planning strategies, can help to create truly sustainable communities as laid out in the SCAG RTP/SCS. Specifically, frequent transit service can provide attractive and viable alternatives to driving, particularly for shorter trips.

At present (based on the 2016 RTP/SCS), **there is one HQTA identified for 2040 spanning between Lancaster and Palmdale** (see Figure 21). This implies that this area of the Antelope Valley will see population and employment growth, coupled with more fixed-route service operating at 15-minute intervals to accommodate the growing population. In **this plan, the areas of Lancaster and Palmdale encompassed by the HQTA largely represent AVTA's current local route 1, which travels between the two cities.**

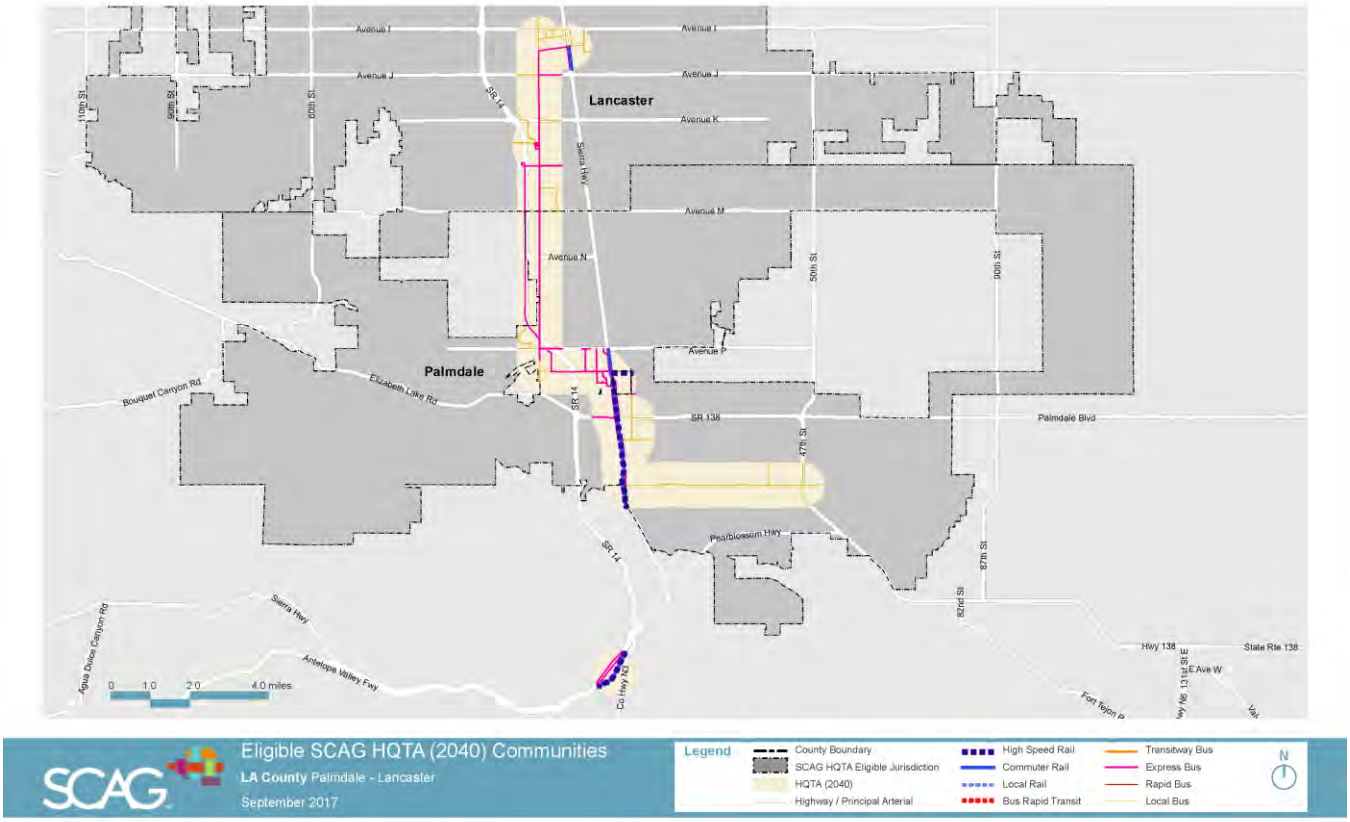

Figure 21: SCAG 2016 RTP/SCS Palmdale-Lancaster HQTA
Source: http://sustain.scag.ca.gov/Documents/HQTA/Maps/LA_PalmdaleLancasterscagHQTAeligible.pdf

Further, two transit priority areas are identified within the HQTA, one in Lancaster and one in Palmdale, as seen in Figure 22. Specifically, **the Palmdale transit priority area encompasses the area that currently contains the Palmdale Transportation Center, which provides access to local routes (1, 3, 7, and 8), commuter routes (785, 786, and 787), and the Antelope Valley Metrolink line.** The **Lancaster transit priority area, encompassing the half-mile area around the intersection of Lancaster Blvd. and Sierra Hwy adjacent to Antelope Valley High School provides access to AVTA local routes (1, 4, 7, 9, 11) and the Antelope Valley Metrolink line.** Improving service quality and frequency of routes in these areas will be essential for supporting growth and increasing transit mode share, as well as aligning with other relevant plans.

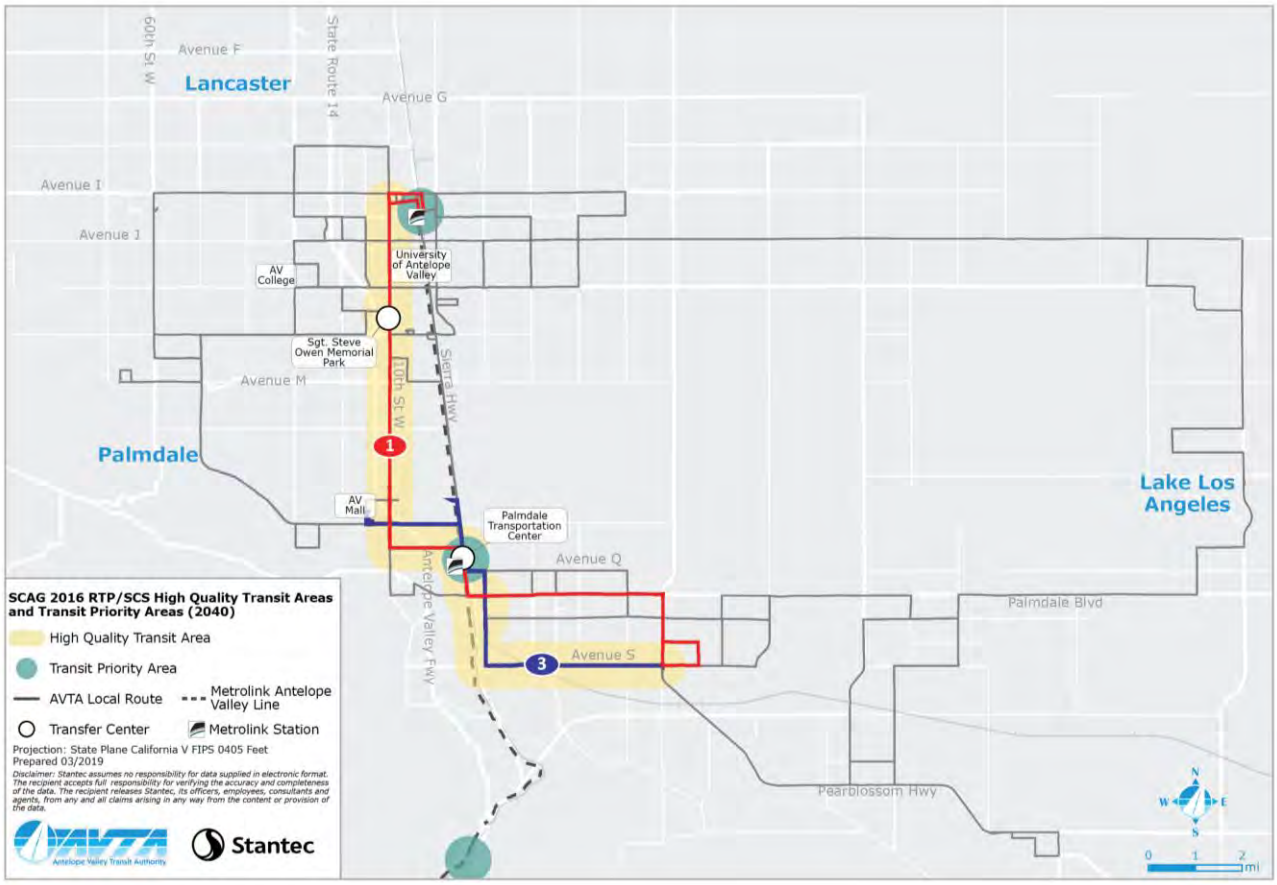

Figure 22: SCAG 2016 RTP/SCS Palmdale-Lancaster High-Quality Transit Areas and Transit Priority Areas (2040)

As noted in Task 1, the 2040 HQTA will exist along 10th St. W, Sierra Hwy, and Avenue S, corridors currently served by Routes 1 and 3 which operate at 30-minute frequencies during weekday peak periods. It should be noted that Route 1 operated along Avenue S when the SCAG RTP/SCS was drafted, but now operates on Palmdale Blvd. This alignment has proven to increase ridership and is, therefore, more suitable as part of the HQTA.

The **HQTA also provides access to the Antelope Valley Metrolink line**, currently operating at 30 to 60-minute frequencies during the same time periods. The 2040 RTP/SCS envisions this corridor's transit operating at 15-minute frequencies to accommodate the growing population and smart land use choices that encourage transit use. This has been achieved by the implementation of AVTA's early action plan on Route 1, which now operates at 15-minute frequencies during peak hours. On a long-term scale, as the AV continues to develop and densify, more transit priority areas and HQTAs may be identified by SCAG if municipalities embrace land uses and development patterns that encourage transit and support ridership.

3.3.2 Antelope Valley Metrolink line

While LA Metro does not operate any service in the Antelope Valley, according to Metro's 2014 Short Range Transportation Plan (SRTP), the Los Angeles/Palmdale Corridor has been identified for enhanced Metrolink service beginning in 2019. As a member agency of the Southern California Regional Rail Authority (SCRRA, also known as Metrolink), Metro's Regional Rail unit works closely with Metrolink, in part acting as a leader in the planning and coordination of Metrolink projects in the Los Angeles County area.

As such, Metro recently completed the Antelope Valley Line Study and released recommendations in July 2019 with the final study report being released in October 2019. The study analyzed current service on the Antelope Valley Line with the intent to look at increasing frequency of Metrolink service while developing a phased, prioritized approach to implementing capital improvements based on impacts, costs, and benefits. As both the Lancaster and Palmdale Metrolink stations are located within SCAG transit priority areas, this plan to increase frequency is consistent with SCAG SCS 2040 goals.

Specifically, the plan examined the various service challenges the line is currently facing due to aging infrastructure and mountainous terrain. The study focuses on the eight northernmost stations on the Line, including both Lancaster and Palmdale (see Figure 9). **The study considered a number of alternatives for improved service, including more frequent peak period commuter service, more frequent reverse-peak and off-peak service, regular and consistent clock-facing scheduling in both directions of travel, and the introduction of peak express service between Los Angeles Union Station and the Lancaster and Palmdale stations.**

Major findings from the study reveal strong ridership and mode share growth potential, with daily trips on the line projected to increase by 9% each year through 2042. The study identified a phased incremental plan for improving service, if funding is identified, and presented six different service scenario plans requiring fourteen capital projects. The report recommends moving forward with three scenarios, which include $27.3 million in improvements to the Lancaster Metrolink station to accommodate additional service. The report recommends phased improvements over the next twenty years, including one additional late evening train, two additional off-peak round trips to provide hourly mid-day service, and improved peak service and semi-hourly off-peak service. Staff members are working with state and local partners to identify funding. These findings will guide the implementation of the enhanced Metrolink service identified in the SRTP.

As these stations are transfer centers to AVTA local, commuter, and supplemental routes, it is likely that the Antelope Valley Line improvements will impact AVTA service, specifically more frequent service between Union Station and the Antelope Valley. Thus, it is important to enhance connectivity between Metrolink and AVTA service to strengthen the regional transit system and provide for seamless transfers between services.

Figure 23: Antelope Valley Line Study Area

Source: https://media.metro.net/projects_studies/regionalrail/map_regionalrail_antelopevalley.pdf

3.3.3 City of Lancaster General Plan 2030

Lancaster's General Plan, adopted in 2009, outlines the city's vision and goals for the future, identifying the types of development that will be allowed to accommodate the city's future, and how development should take place, taking into consideration specific policies, practices, and actions to achieve the community's goals in a sustainable manner. Many of the sustainable land use practices outlined in the plan (compact, walkable neighborhoods, mixed-use land uses, infill development, transit-oriented development) can work with transit systems in a complementary manner to encourage transit use, especially locally within Lancaster. The plan includes land use and zoning designations for the city, as well as specific topics such as housing, natural environment, public health and safety, active living, physical mobility, economic development, and physical development.

As noted in Task 1, the General Plan uncovered that the Lancaster community wants complete, connected, safe, and healthy communities. Specifically, the plan's physical mobility section outlines Lancaster's visions and goals for future transportation use in the city, which includes a discussion on alternative transportation modes. The plan

states that Lancaster wishes to explore strategies for enhancing existing transit and developing additional transit services, including local bus service, to accommodate future population growth. Specific goals include:

- **Prioritizing high-frequency fixed-route bus service within the urbanizing area where demand will be greatest and service provision will be most effective while deemphasizing fixed-route service in lower-density areas**. Essentially, providing high-quality fixed-route bus service to the areas of highest need.
- **Establishment of a major multimodal transportation** hub to provide for connectivity between local and regional transit services.
- **Urban design and development that encourages transit use, bicycling, and walking** over private vehicle use through the promotion of **transit-oriented development** in the downtown area of Lancaster with increased density, the intensity of land uses and improved local fixed-route transit service through the implementation of a Transit Village District overlay zone.
- **Examining alternatives to fixed-route transit services within rural areas**, such as demand response services.

Lancaster's vision and goals for the future of their city see increased density and population growth within the urbanized area of Lancaster, and the City understands the need for local transit options to serve this population, as well as providing for land uses and future development patterns that encourage transit use. Working to ensure AVTA's service aligns with these goals and serves these populations will be important as the city continues to grow.

3.3.4 Lancaster Complete Streets Master Plan

Lancaster's Complete Streets Master Plan provides a roadmap for designing streets, sidewalks, and public rights-of-way that are designed to enable safe access for all users and foster a robust multimodal transportation system. Specifically, the Plan promotes a re-imagining of the current road classification system and right-of-way design to promote transit and active transportation use and allow the City to add complete streets design elements to existing and future streets. Further, the plan dedicates an entire section to bus stop locations, and the plan notes that coordination with the regional transit agency (AVTA) should occur when determining the appropriate location of bus stops that will be most conducive to enhanced transit use. **Design guidance laid out in the plan includes giving priority to the location that will best serve passengers, bus signal priority at traffic lights, bus stop bulbs, and other strategies to enhance the effectiveness of the bus stop**.

3.3.5 City of Palmdale General Plan

While Palmdale is currently in the process of updating its general plan, their current general plan was adopted in 1993. The plan's circulation element contains an objective dedicated to increasing public transit opportunities available to Palmdale residents in order to reduce traffic impacts on streets and highways and provide travel alternatives. As with Lancaster, AVTA can focus on providing future service to the densest areas of Palmdale. Additionally, the circulation element of the updated general plan should be reviewed once it is released, or the feasibility of collaborating with Palmdale on the update to ensure transit goals are consistent for the City and AVTA could be explored.

3.3.6 Palmdale Transit-Oriented Development Framework Plan Environmental Impact Report

Released in 2017 in partnership with Metro, Palmdale's Transit-Oriented Development (TOD) Framework Plan established a vision to guide future TOD and public realm improvements around Palmdale's transit hub (see Figure 24). Specifically, the plan calls for:

- High-intensity mixed-use directly adjacent to the future station (such as office space, hotels, retail, and multi-family housing)
- **Reconfiguring Avenue Q to act as a transit spine linking the station area to entertainment and residential uses**
- Preserving and enhancing the existing neighborhood around Yucca Elementary School
- Linking recreational areas and residential neighborhoods through a combination of parks, landscaped streets, and open spaces
- Addition of streets over time to create pedestrian-friendly (shorter) urban blocks, especially near the future station
- Complete streets design features that accommodate driving, walking, biking, and transit

All of these concepts work together to encourage more sustainable land use and transportation practices, of which local fixed-route bus service provided by AVTA is a vital component. Currently scheduled for completion in 2035, this provides another area of increased density, land uses that encourage transit use, and a population of potential transit riders for AVTA.

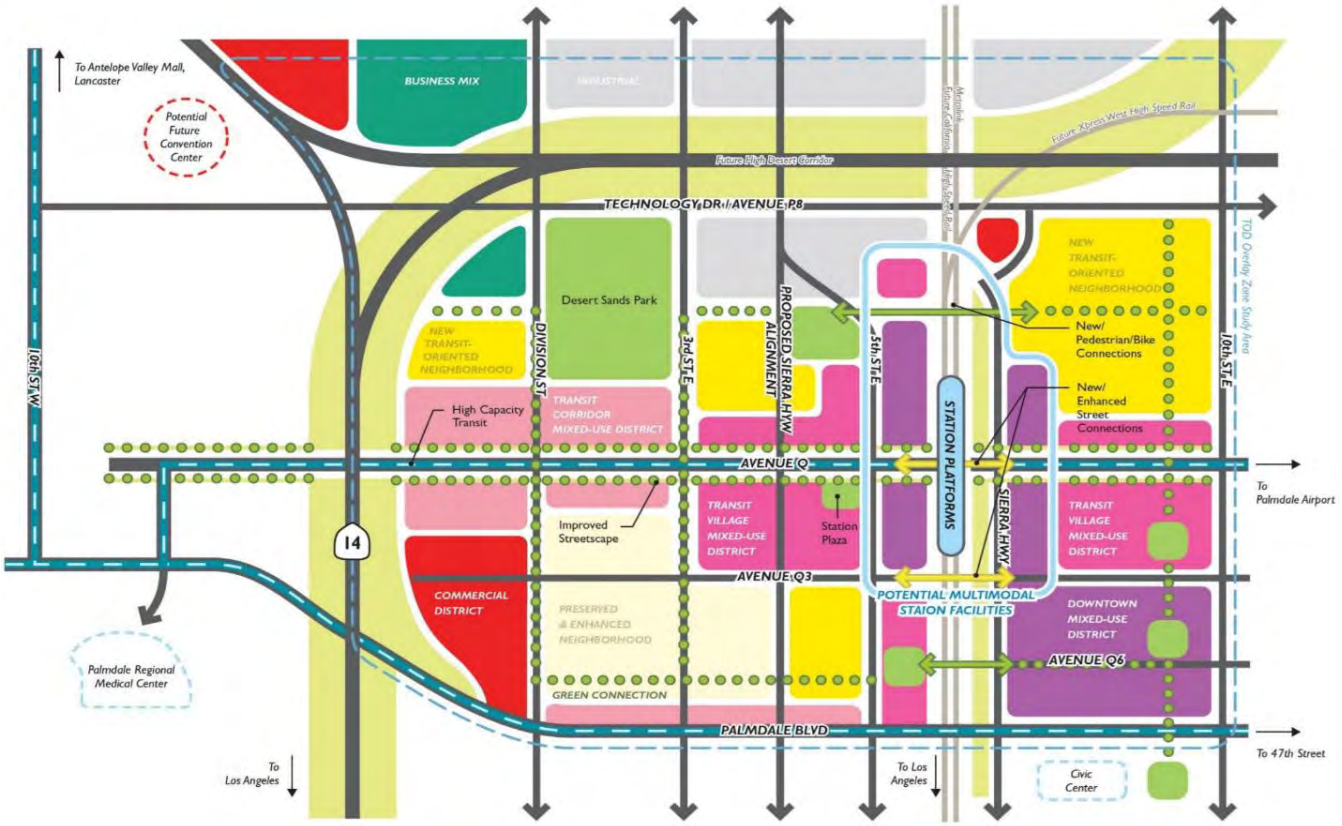

Figure 24: Palmdale TOD Framework Plan Concept

Source:
http://www.cityofpalmdale.org/Portals/0/Documents/TOD/EnvironmentalImpactReport/Palmdale%20TOD%20Framework%20Plan_Public%20Review%20Meeting_101117.pdf

3.3.7 Palmdale Avenue Q Feasibility Study

Released in 2016 and primarily funded by SCAG, the Avenue Q Feasibility Study evaluates the viability of extending the TOD planned for the area around the transit hub outlined in the previous section, ultimately to develop Avenue Q as an active, mixed-use, multimodal transportation corridor that links major destinations and employment areas with the Palmdale Station. Specifically, the study area focuses on the corridor surrounding West Avenue Q, generally located between Auto Center Drive, Palmdale Blvd, Avenue Q, and Division Street, the eastern boundary of which is located a quarter-mile from the Palmdale Transportation Center (see Figure 25).

Along with a TOD land use framework and specific TOD design guidance, the study also identifies strategies for creating an integrated transit network encompassing high-capacity transit corridors, local fixed-route bus service, commuter, and regional rail. Specifically, these include ensuring transit vehicles have priority over other vehicles along Avenue Q and Palmdale Blvd and prioritizing bus speed and schedule reliability. Along with the other TOD initiatives ongoing in Lancaster and Palmdale, it is important for AVTA to be aware of these and adjust service accordingly to capture more potential riders and help achieve the sustainability goals TODs aim to address.

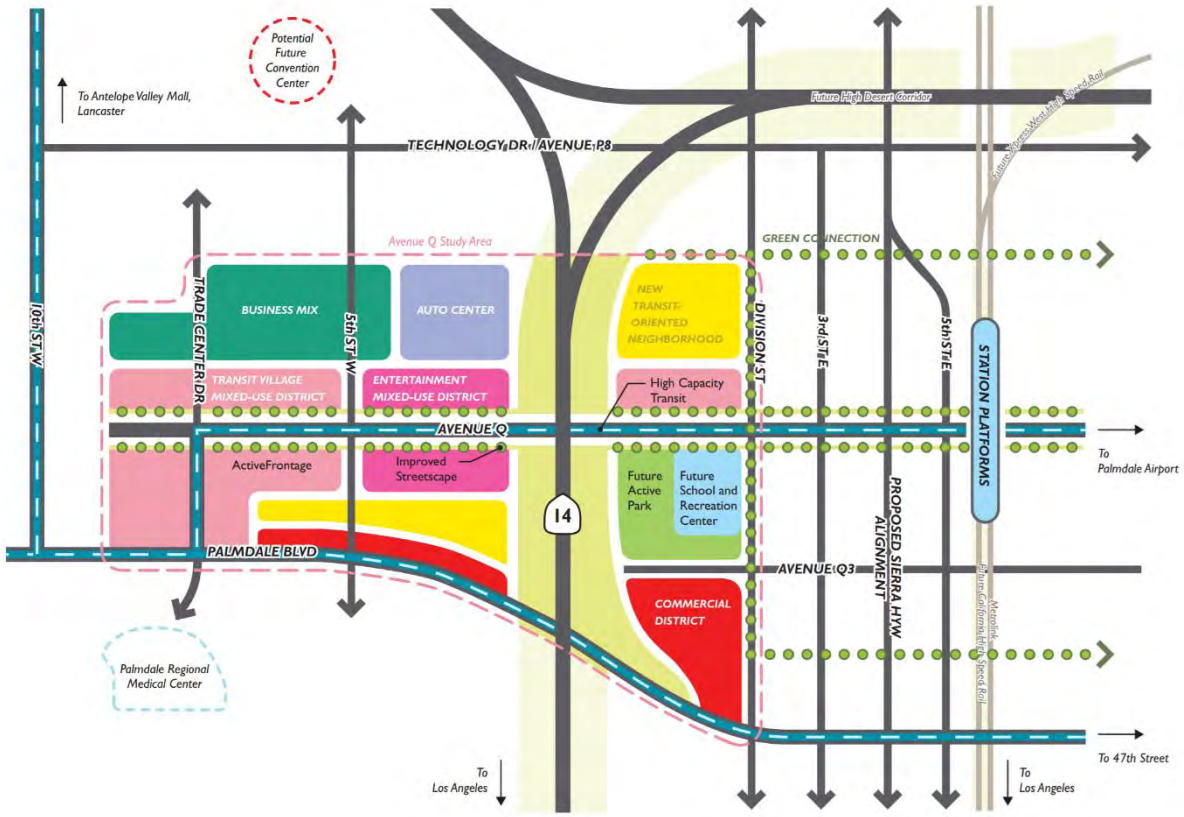

Figure 25: Palmdale Avenue Q TOD Concept

Source:
https://www.cityofpalmdale.org/Portals/0/Documents/TOD/AveQ%20Feasibility%20Study%20Compiled%20101216.compressed.pdf?ver=2016-12-21-133456-947

3.3.8 Virgin Trains USA (XpressWest) and the High Desert Corridor

XpressWest is a private venture proposal to build a privately funded high-speed rail passenger train connecting Victorville to Las Vegas, with future plans to extend the service to Phoenix, Salt Lake City, and Denver by rail operator Virgin Trains USA. XpressWest is expected to connect to Palmdale via the High Desert Corridor (see Figure 26 and Figure 27). Construction is slated to begin in 2020 with revenue service to begin in 2022. The Palmdale stop is scheduled to connect to the Palmdale Transit Center, allowing for easy access to Metrolink service to the rest of the Los Angeles area. For the first full year of revenue service, ridership estimates have been as high as five million passengers. While the project has been in flux for almost a decade, if it does come to fruition, the increased traffic likely to be seen at the Palmdale transit hub (especially in conjunction with the TOD enhancements proposed for around the hub), signals a need for AVTA to take all this into consideration, including strategies allowing for connectivity between local and regional transit services.

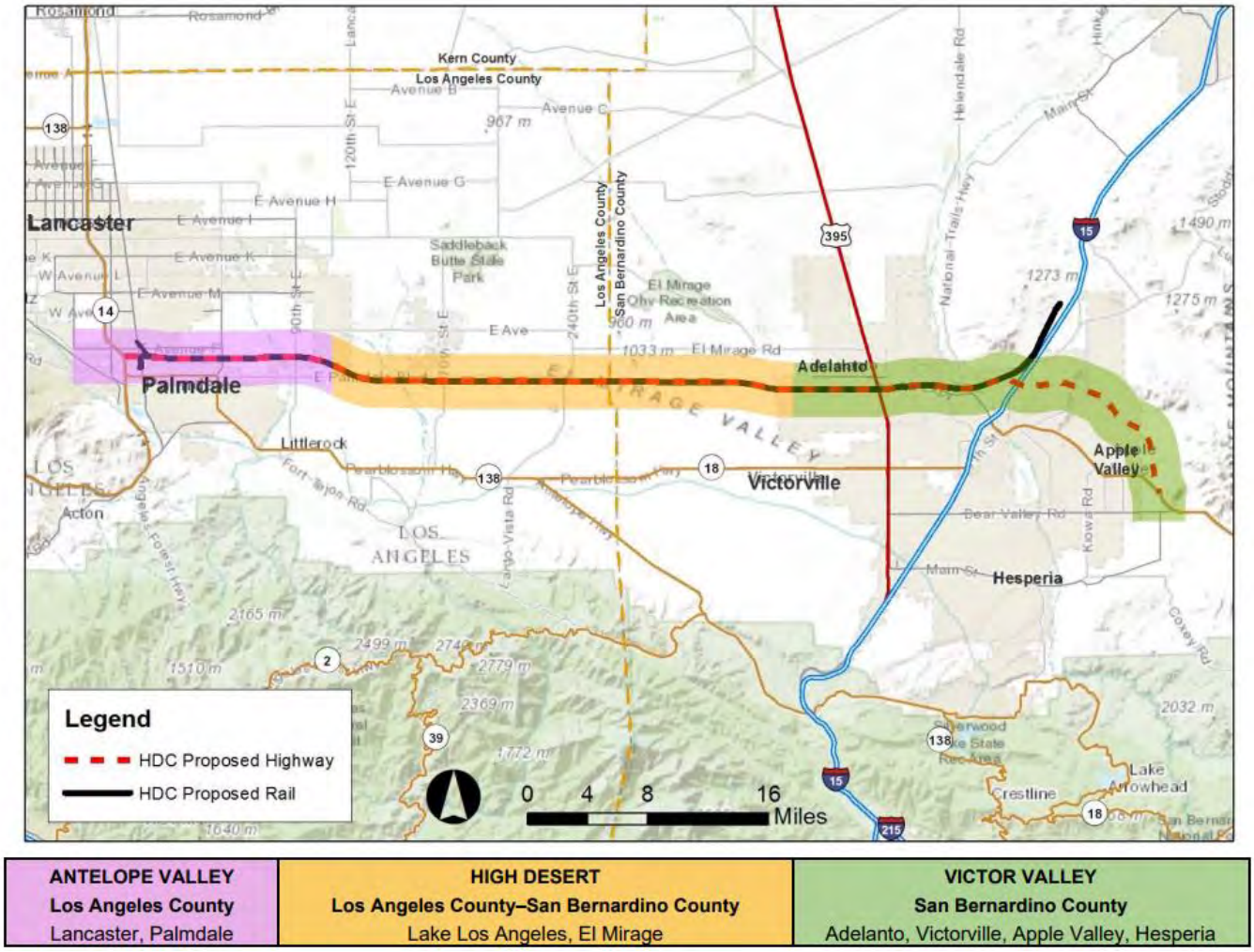

Figure 26: High Desert Corridor (HDC) proposed highway and rail
Source: http://www.dot.ca.gov/d7/env-docs/docs/hdc/

A typical cross-section for the High Desert Corridor is shown below in Figure 27, illustrating center rails, medians, 4 lanes of traffic in each direction, and a bi-directional bike path.

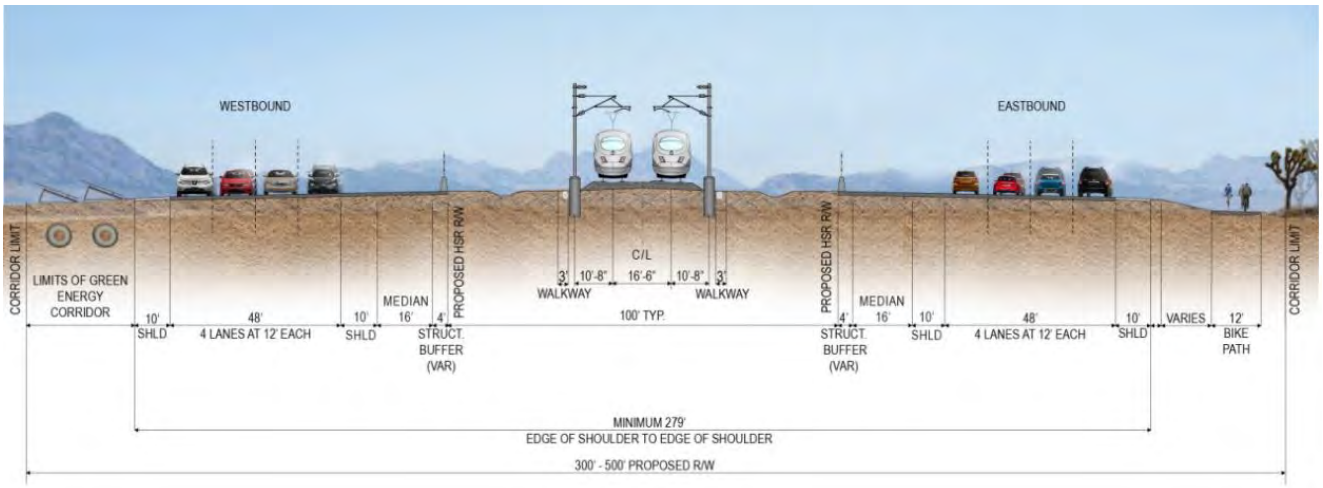

Figure 27: Conceptual cross-section for HDC
Source: http://www.dot.ca.gov/d7/env-docs/docs/hdc/

3.3.9 Palmdale Regional Airport Specific Plan

While commercial service operated by Los Angeles World Airports at Palmdale Regional Airport (PMD) was discontinued in 2008 and the City of Palmdale took control over the terminal in 2013, PMD has yet to see a return to commercial service. Amid a growing Antelope Valley population and economy, the City of Palmdale is currently exploring options for financing, developing, and managing the terminal facility and terminal operations, to be managed by Plant 42 personnel under a Joint Use Agreement with the City of Palmdale. Specifically, this includes two runways and the terminal facility.

Citing the Antelope Valley's sizable population and employment base and research from the Antelope Valley Economic Alliance stating that there is expected long-term growth in biotechnology and other leading industries such as aviation and aerospace, research, defense, and technology in the Los Angeles basin looking to expand operations, a return to commercial service is now viable and warranted. Specifically, the PMD is expected to have reasonable and sustainable service upon initial startup, and the service area is comparable in terms of population size and bases to other metropolitan areas throughout the US that sustain successful commercial air service, such as Corpus Christi, TX, Bristol, TN, and Pensacola, FL.

The Commercial Terminal Feasibility Study completed in 2019 by Jviation forecasts that, due to pent-up demand that currently exists in the region, activity is expected to begin with regional jets that can hold between 50 and 80 passengers and quickly ramp up to a mix of larger airliners that can hold 130-160 passengers. Once current demand is alleviated, growth will adopt industry trends reflecting the FAA's projection for passenger growth. This roughly translates to just over 40,000 annual enplaned passengers in the base year to just under 180,000 annual enplaned passengers by year 20 of commercial operations.

While still in the early planning phases, the reintroduction of commercial airline services to PMD could increase overall demand for transportation services throughout the Antelope Valley, within Palmdale specifically, and throughout the entire region. As plans for PMD progress, AVTA should proactively engage with the City of Palmdale to ensure transit is considered in the initial planning phases and that transit connections are considered early on in the process so that transit-supportive infrastructure as well as convenient connections to the AVTA system are incorporated in the PMD plan.

4.0 SUMMARY OF NEEDS AND OPPORTUNITIES

- **Existing service does not always match observed travel demand.** Most trips are short (under 3 miles) within Lancaster and Palmdale but are not well-served by existing local service. Despite the fact that most points of interest are located in Lancaster and Palmdale, bus stops are disproportionately located in areas such as Lake LA, Pearblossom, and Littlerock. There is a need to serve short east-west trips within Lancaster by an east-west continuous and frequent transit corridor, as well as a north-south corridor between Lancaster and Palmdale. Trips outside of Palmdale and Lancaster (e.g. in Lake LA, Pearblossom, and Littlerock) that do not have enough demand to support fixed-route transit could be more efficiently served by a microtransit or on-demand alternative.
- **Improvements to active transportation infrastructure are required to create a safe and attractive environment for accessing bus stops.** Nearly 80% of NHTS origins and destinations are located within a 10-minute walk of existing transit stops, showing that AVTA provides great coverage to desired locations. However, the pedestrian environment around many bus stops does not provide convenient or safe access to these destinations. An active transportation network that includes amenities such as

pedestrian crossings, sidewalks, shelters, multi-use paths, and bike facilities, would all contribute to the overall appeal and accessibility of transit in the AV.

- **AVTA's commuter services duplicate existing LA Metro service.** Instead of providing one-seat rides from the AV to destinations in the City of Los Angeles, commuter services should provide express service that feeds into Metro stations to facilitate regional transfers and more efficient service. The traffic in Downtown LA creates unreliable service and prevents riders from depending on this service for their daily commute. Connecting commuter services with higher-order transit services with a dedicated right-of-way at Metro stations, namely along the Orange and Red Lines, can improve the efficiency, reliability, and productivity of commuter service. In addition, bringing riders to Metro Stations, such as North Hollywood Station, would also facilitate transfer opportunities to new destinations including Burbank (where many AV residents are employed).

- **There are opportunities to accommodate DAR passengers on existing conventional routes or new community circulators.** Many DAR trip origins and destinations are located near AVTA's local bus stops. A Travel Training program that teaches individuals with a disability how to take conventional transit and empowers them to travel independently should be more widely advertised and implemented to help shift demand from DAR to conventional transit. This would also require improvements to the accessibility of fixed-route stops as well as operator sensitivity training to improve the experience for persons with a disability.

- **There is a potential to attract more students to transit with concession fares and schedules that match bell times**. Nearly 15,000 high-school students living within 3 miles of service are not provided school buses, which represents a large potential transit market. Without a reduced student fare, student ridership is lower than it could be, and the high fare contributes to fare evasion observed across the system. Supplemental routes are designed for school, but schedules do not reflect students' schedules and continue to operate during summer months when school is not in session.

- **The AV is expected to experience tremendous population and employment growth by 2035 and beyond.** Major employment growth is expected at Plant 42, Fox Field Industrial Corridor, and in many areas across the AV. Given the long-range nature of land development, there is a need for establishing a standing relationship between AVTA staff and local officials to ensure residential and employment developments are planned with transit at the forefront. The relationship between transit and land use is imperative for creating a future centered around active and sustainable modes of transportation.

- **SCAG identified an HQTA for 2040 spanning between Lancaster and Palmdale as a result of population and employment growth.** An HQTA is defined as a walkable area served by frequent transit (15 minutes or less) within a half-mile. Route 1 will become increasingly important as a transit corridor in the AV, connecting Lancaster and Palmdale and it is expected that ridership will grow on this route in the coming decades. AVTA has already begun improving this route through an increase in service frequency to 15-minute headways, which shows their commitment to the region's goals. Additional suggestions include reducing the number of stops and providing priority for transit vehicles to speed up travel times for transit riders. Weekend improvements in frequency can also help attract new ridership.

- **Planned transit projects reveal an increasing need to improve regional connections.** The Antelope Valley Line Study seeks to increase the frequency of Metrolink service on the Antelope Valley Line. These improvements would increase the number of commuting trips, reverse commuting opportunities, and may reduce the need for AVTA to provide commuter service to Santa Clarita and Downtown LA. As these projects come to fruition, AVTA should adjust service to ensure regional investments are

complemented instead of duplicated by AVTA services. Other major projects that may shape the AV's landscape include the High Desert Corridor Highway, Rail, and Bikeway project (XpressWest) between Palmdale and Las Vegas.

Service Concepts, Strategies, and Performance Measures

Prepared for:

Antelope Valley Transit Authority

Prepared by:

Stantec
Transit Advisory Services

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Abbreviations

AVTA	Antelope Valley Transit Authority
DAR	Dial-a-ride
TOD	Transit-Oriented Development
VMT	Vehicle miles traveled

EXECUTIVE SUMMARY

Based on the analysis, feedback, and needs and opportunities assessment, we developed a series of service concepts and strategies aimed at achieving the objectives of the regional mobility plan for the Antelope Valley.

The overall goal is to **help AVTA play a more substantial role in the mobility of the Antelope Valley and to provide useful transit service that can be the foundation of multimodalism, that can include cycling, walking, car-sharing, ride-sharing, and other non-single occupancy vehicle trips. By advancing these goals, AVTA plays a bigger part in developing a sustainable and equitable community.**

The table below summarizes the service concepts and how they aim to address the various objectives of the plan:

Service concepts and strategies **Objectives**	Service layers	Transit infrastructure (hubs, stops, etc.) and universal accessibility	Alternative service delivery (on-request service)	Revised schedules	Operator training	Emergency ride home (and car/vanpooling)	Travel training	Fare policy	Transit-first developments	Information and outreach (bilingual and accessible)	Collaborations and partnerships
Faster service	■	■		■							
More frequent service	■		■			■			■		
Shorter walks	■	■	■						■		■
More reliable service	■	■	■	■	■	■				■	
Better integration of land use and transportation	■	■	■						■		■
Better customer experience	■	■	■	■	■	■	■	■	■	■	■
Better bus stop access or access to transit	■	■	■			■	■		■		■
Better regional connectivity	■		■	■		■		■	■	■	■
Better access to destinations (jobs, healthcare, etc.)			■	■		■	■		■		■
More inclusive ridership base	■	■	■		■	■	■	■		■	■
Safer and more secure		■	■		■	■			■	■	■
More cost-effective service	■	■	■	■		■	■	■			■

The 11 service concepts include strategies for addressing discrepancies in transit demand and service provision throughout AVTA's vast service area, focusing on service layers or tiers that aim to match service levels and design to the level of transit demand. Simply put, more frequent service should be devoted to areas that are

dense, walkable, and mixed-use, while flexible on-request service, similar to dial-a-ride service in principle but premised on user-friendly technology, should be provided to lower density or hard to serve communities.

The other strategies aim to support a more successful and useful transit network to enable broader mobility beyond single-occupancy vehicles, including:

- Redeveloping route schedules and operator training to improve service delivery and reliability of service as well as customer service
- Providing transit infrastructure to improve operations and reliability, as well as leveraging a multimodal approach to mobility by exploring car-sharing opportunities and encouraging walking and cycling in conjunction with public transportation
- Being more inclusive through accessible infrastructure and travel training to reduced reliance, when possible, on dial-a-ride
- Providing more accessible information to current customers as well as potential customers to improve trip planning and awareness of AVTA services to lower the barrier to transit use
- Collaborating with local decision-makers and developing partnerships to encourage a transit- and person-centric approach to developments in the Antelope Valley, particularly housing and commercial development that recognizes and considers the pedestrian and transit user.

Finally, we also provide performance measures that aim to track the progress of implementing the resultant mobility plan, as well as measures to track the success of AVTA's network. These measures are inspired by AVTA's mission statement and current reporting metrics endorsed by the Board of Directors.

Overall, the strategies and concepts developed here will be further elaborated in developing the plan document that provides a phased approach to meeting the community's objectives for a more balanced approach to mobility in the Antelope Valley.

1.0 BACKGROUND

The goal of this mobility plan is to ensure that the types, levels, and quality of the transportation services provided by the Antelope Valley Transit Authority (AVTA) can maintain the loyalty of existing riders and are an attractive alternative to using a car for non-riders.

The majority of the recommendations developed here are aimed at AVTA and transit service—the major focus of this study—but is also inclusive of other mobility modes and the context (land use, community planning, etc.) that can either nurture or discourage multimodal transportation options in the region.

The service design and delivery strategies proposed by Stantec will make AVTA service more sustainable while making it easier for the residents of the Antelope Valley to use all forms of shared-ride transportation. By making AVTA services more effective and efficient, AVTA as an agency becomes more valuable to the residents of the Antelope Valley.

This document discusses and expands upon the concepts developed throughout this project that emanated from the analyses of existing conditions, feedback from robust stakeholder engagement, and attempts to provide concrete strategies and objectives based on the values of the broader community.

2.0 APPROACH OVERVIEW AND PLAN OBJECTIVES

2.1 APPROACH OVERVIEW

Understanding the markets in the Antelope Valley and the needs of the different markets, as well as the gaps and challenges in providing attractive transit service, led us to pose specific questions when engaging the public, such as:

- What kind of service is more attractive, frequent service that requires more walking or rolling, or less frequent service that requires less walking or rolling?
- More direct service that involves a long walk or roll, or more complex (longer) routing that brings one closer to their destination?
- Is information sufficiently simple and useful to easily plan a transit trip?
- What are barriers to accessing and using transit service on a regular basis?

The in-depth stakeholder engagement, combined with the research, analysis and best practices have led us to develop 11 service concepts and strategies that aim to achieve the different objectives of this plan—the objectives that focus mainly on transit service and the network of routes operated by AVTA, but as well as associated policies and objectives that can enable more successful transit service and other mobility options. The 11 service concepts and strategies we developed include:

Service layers	Travel Training
Transit infrastructure	Fare policy
Alternative Service Delivery Strategies	Transit-first developments
Revised schedules	Information and outreach
Operator training	Collaborations and partnerships
Emergency ride home	

The overall goal is, then, to **help AVTA play a more substantial role in the mobility of the Antelope Valley and to provide useful transit service that can be the foundation of multimodalism, that can include cycling, walking, carsharing, ridesharing, and other non-single occupancy vehicle trips. By advancing these goals, AVTA plays a bigger part in developing a sustainable and equitable community.**

The table below provides an overview of the objectives of the mobility plan (rows) and the service concepts and strategies aimed at addressing them (Table 1).

Table 1: Service concepts and plan objectives.

Service concepts and strategies **Objectives**	Service layers	Transit infrastructure (hubs, stops, etc.) and universal accessibility	Alternative service delivery (on-request transit services)	Revised schedules	Operator training	Emergency ride home (and car/vanpooling)	Travel training	Fare policy	Transit-first developments	Information and outreach (bilingual and accessible)	Collaborations and partnerships
Faster service											
More frequent service											
Shorter walks											
More reliable service											
Better integration of land use and transportation											
Better customer experience											
Better bus stop access or access to transit											
Better regional connectivity											
Better access to destinations (jobs, healthcare, etc.)											
More inclusive ridership base											
Safer and more secure											
More cost-effective service											

2.2 PLAN OBJECTIVES

The outcomes of this plan will position AVTA to play a more substantial role in mobility in the Antelope Valley that extends beyond single-use vehicles, to include walking and cycling, transit service of different service types, and shared mobility. **The cornerstone or overarching vision of this plan is to encourage equity and sustainability.**

The objectives and the service concepts intended to address them are strongly informed by stakeholder and public outreach and feedback**. Recurring themes and gaps identified in earlier work informed the guiding objectives that are listed here**.

- **Faster service –** a key motivator for public transit use is quick travel times, as much as possible, competitive with driving. Of course, this may not always be possible, but travel times should be somewhat comparable to driving times for trips in urban areas. Different tools exist to speed up bus service, from infrastructural changes to policy guidelines and design strategies.

- **More frequent service –** frequent service is expensive to provide, requiring vehicles, operators and more revenue service hours. However, across North America, agencies providing frequent service throughout the day have seen ridership growth owing to the flexibility and freedom that frequent transit provides. Feedback from customers and the early action plan boosting frequencies on route 1 during weekdays confirms the need for AVTA to deploy more frequent service along key corridors, on weekdays and on weekends. AVTA has seen the results of its investment in frequent service materialize on route 1. In the month of September 2019, AVTA saw a 10% ridership increase on route 1, year-over-year, which is likely attributable to the frequency increase. The trade-offs are discussed in subsequent sections, and the need to provide frequent service where it will be useful and used must be balanced with lower frequency coverage routes. Moreover, experimenting with services like on-request or flexible transit services can help address the needs of residents in low-density communities where infrequent fixed-route service is currently provided. Importantly, more frequent service means shorter wait times, potentially reducing overall travel times.

- **Shorter walk or roll distances –** typical walk distances to transit service are a five-minute walk or roll (about ¼ mile) to most transit service and a 10-minute walk (about ½ mile) or roll distance to frequent services (15 minutes or better). However, the service environment in most of the Antelope Valley is not favorable to walking or rolling to access transit services, and are not transit-oriented. While AVTA can locate bus stops closer to major trip generators, residences, etc., other issues influencing the transit orientation of the streets require intervention and collaboration with municipal departments and private actors (developers). We heard that walking to and from transit in the Antelope Valley is difficult due to the heat and lack of sidewalks. Stop spacing, which impacts operations, should be rationalized to balance operating speeds and bus stop access based on land uses and trip generators.

- **More reliable service –** unreliable service can be transit's death knell. If customers can't rely on transit, then they will abandon it, given the opportunity. Particularly with infrequent routes, missed connections due to early or late buses can destroy someone's plans, like meeting a friend or making a critical job interview. AVTA's services vary in terms of reliability, but overall, schedules must be redesigned to reflect actual operating conditions that will benefit both passengers and operators. This includes building sufficient running and recovery times into schedules as well as accounting for sufficient charging or bus

switch-off time as AVTA completes its transition to a 100% all-electric bus fleet. In addition, further effort is needed to build a case for transit priority infrastructures like reserved bus lanes.

- **Better integration of land use and transportation** – a key feature that emerged from the analysis was the poor coordination between land use and transportation in the Antelope Valley which results in unproductive transit, and difficult trade-offs. By initiating a task force with municipal partners, AVTA can play a larger role in development decisions, street redesigns, and other important land-use choices that strongly impact how successful transit can actually be in the Antelope Valley. Transit-favorable developments, like Lancaster Bl., are conducive to transit; placing childcare services in areas that are light industrial beyond a convenient walk from a major street with transit is not.

- **Better customer experience –** improving the experience during the entire journey is what counts—customers value their time and ensuring that AVTA respects each customer means that AVTA respects the value of their time. This involves AVTA designing service that matches travel patterns, reflects the service environment, and provides comfortable and safe journeys and waiting areas. Facilitating trip planning and trip making substantially lowers the barrier to transit use and can help AVTA win new customers.

- **Better bus stop access (access to transit) –** most transit trips, at least locally, involve a walk or roll between a bus stop and a destination or origin. The lack of sidewalks in particular acts as a barrier to transit use and is unsafe and unattractive. Furthermore, supporting cycling as well can help AVTA attract multimodal customers to the system. Moreover, new opportunities can be leveraged to combine dial-a-ride services and fixed-route for certain journeys, as well as other future opportunities like vanpooling, ride-sharing, and car-sharing. Advocating for pedestrian infrastructure can benefit AVTA and the broader Antelope Valley community, but requires proactively working with municipal partners and developers who may decide to place oceans of free parking in front of their buildings, rather than behind them.

- **Better regional connectivity–** enabling regional connectivity in the Antelope Valley requires that AVTA better schedule routes to meet Metrolink train services, connecting with potential riders in Santa Clarita, as well as facilitate choices that include cycling, walking, vanpooling or carpooling. Working with partners like Metro as well as local and regional employers can help AVTA develop mobility services that are successful at reducing single-occupancy vehicles, even if that means another type of vehicle than a bus.

- **Better access to destinations –** ultimately, the goal of AVTA is to provide mobility so that customers can safely and efficiently access AVTA services and their final destinations and the opportunities at these destinations. This plan, in particular, seeks to improve access to jobs both locally and regionally, as well as with healthcare opportunities. Healthcare indicators in the Valley are some of the poorest in the County. Transit is a sustainable way to move and connect people; healthcare facilities are important destinations and require service, even though that service may be unproductive at times and these locations may be currently unfriendly to transit.

- **Wider, more inclusive ridership base –** ensuring that AVTA reaches more potential customers in a responsible manner can help grow ridership and support higher quality transit service. A potentially larger market includes students in high school, as well as commuters who may be unaware of services, and ridership from occasional customers. Providing bilingual as well as accessible information is important for being inclusive and equitable.

- **Safer and more secure –** fundamentally, AVTA strives to provide safe and reliable transit service. Safety is paramount for riders when attempting to access a bus stop without a sidewalk or shelter, as well as when riders onboard a bus may feel threatened, or when a bus breakdown and riders are stranded. Perceptions exist, right or wrong, that AVTA is not a safe or secure service. More must be done to alleviate these concerns such as partnering with the local police departments in Lancaster and Palmdale to increase visual security presence.

- **More cost-effective service –** being financially responsible is important for customers who pay for service, non-riders who fund the service via tax dollars, and for AVTA and the broader community to ensure that resources are allocated rationally and optimally. Developing service layers that match demand and tactics to improve operations are ways to address cost-effectiveness. Revising some fare policies, such as four-hour passes and day passes and broadening fare products can also impact cost-effectiveness.

The next section describes the service concepts and strategies that act as guidelines to address these plan objectives or goals. Importantly, the guidelines will inform the route designs, policies, and recommendations in task 6.

3.0 SERVICE CONCEPTS AND STRATEGIES

The proposed concepts and strategies from Table 1 are expanded upon in the following sections. The graphic below demonstrates how these concepts and strategies are informed by and respond to service requests and stakeholder feedback from the several engagement activities throughout this project.

Service Concepts	Key
Service layers	
Transit infrastructure and universal accessibility	
Alternative service delivery	
Revised schedules	
Operator training	
Emergency ride home	
Travel training	
Fare policy	
Transit-first developments	
Information and outreach	
Collaborations and partnerships	

Customer Requests	Service Concepts
“Buses need to come more often so that people don’t have to leave home an hour or two early to get to where they’re going”	
“More frequent bus times…a one-way trip takes three hours”	
It “takes a long time to get to bus stops with nowhere to sit or shelter from the hot sun and wind”	
“These riders are very dependent on AVTA’s services, so the on-demand option would need to provide service at the same level or exceeding current fixed-route services”	
"Please have better-timed connections with Metrolink trains and TRANSPorter buses out of Palmdale Station"	
“Frequently passed by while waiting at stops”	
Employees do not feel comfortable using the service due to a feeling of being “stranded” with no way to get home or leave the base in the case of an emergency	
“I’m unsure about where or how to travel by local bus service”	
“I would like to see student bus passes implemented”	
“Long walk to the bus from my house”	
“It would be easier to navigate the system if resources were available in Spanish”	
“She is requesting a shelter be added...She has been taking the bus at this location for years and has waited under the hot sun and in the rain as well”	
“Bus drivers are not friendly”	

3.1 SERVICE LAYERS

To meet AVTA's objectives, we used an approach that defines route types based on coverage or ridership goals. Route types are then grouped into specific network layers, which tell the agency and its customers the purpose of each route, and thus what is expected from each route in terms of service levels and performance.

3.1.1 Coverage vs. Ridership

Every transit system has a bias towards either ridership or coverage. The degree of bias depends upon the value placed on transit, the desired outcomes and, oftentimes, policy decisions outside of the control of the agency. If the desire is simply to provide access to a service – regardless of quality or directionality, then the system tends towards coverage. On the other hand, if a strict business approach is taken and the value is on only providing service where there is a minimum standard of ridership then the system moves towards a ridership bias.

The **coverage model** maximizes access to transit services regardless of the quality or frequency of service. As a result of prioritizing transit access over productivity, finite resources are spread thin across greater geographic areas and communities. Coverage networks provide transit stops in close proximity to riders' origins and destinations with minimal walking distances, but the frequency and travel times are longer due to circuitous routing. These networks are beneficial in areas with a high population of seniors or people with mobility challenges who require short distances to access transit. Coverage networks are also attractive to riders living in cities/regions with extreme hot or cold weather. Route 4 is an example of a relatively productive coverage route that aims to connect different points of interest through a circuitous route.

Typical characteristics include:

- Circuitous and indirect routing
- Lower frequency
- Providing basic access to the transit network
- One-seat rides to everywhere to avoid a transfer
- Timed transfers between buses due to low service levels
- Serving lower-density areas where private vehicles are prevalent
- Limited trip generators along the route
- Customer travel time is a lower priority

Figure 1: Schematic of coverage network model (fleet of 10 buses)

The **ridership model** maximizes ridership and productivity. It connects key destinations with services to encourage use of the system. Once routes operate at least every fifteen minutes, they tend to generate new

ridership because wait times are reduced, and spontaneous travel without the need to reference a timetable can occur. A ridership network is typically adopted in areas with higher population density that can support a high level of frequency. Riders are typically willing to walk or roll longer distances to reach transit if wait times are low, services are direct, and a higher level of service is provided. However, distances to transit that are too long to travel by foot or by assistive mobility device can also create a first-mile last-mile problem, where passengers cannot easily get between transit stops and their origins and destinations. Route 1, in particular, is an example of a ridership route—it operates on 15-minute headways, sees high bidirectional ridership, and is relatively straight and direct between Palmdale and Lancaster.

Typical characteristics include:

- Simple, direct routing
- High frequency (15 minutes or less all day, every day)
- Prioritizing service to areas of strong demand
- Passenger transfers are a key component of travel to reach destinations
- Routes have key destinations along the route and at each end that act as anchors
- The service is designed to move people quickly and efficiently

Figure 2: Schematic of coverage network model (fleet of 10 buses)

Typically, there is a balance between coverage and ridership, where some areas of the city are afforded coverage services and other major corridors are given ridership services (higher frequencies and more direct routes). Based on feedback from the public and stakeholders, residents of the Antelope Valley are generally willing to ride more circuitous routes with longer travel times instead of taking more direct routes that may require greater walking or roll distances or a transfer. AVTA will likely continue to provide more coverage routes given that most of the region consists of low-density development and lacks walkable neighborhoods. As the population continues to grow and become denser in the long-term, ridership routes that provide greater frequency and more direct travel may become more valued by AVTA residents.

3.1.2 Layer Types

Layer types help agencies prioritize and allocate resources across a transit system in order to serve many purposes and populations. Four main service types are applicable to AVTA:

- **Frequent** transit service aims to move towards an ultimate service frequency of 15 minutes (or better if warranted) all day but may operate at this higher frequency for the majority of the day (e.g. 6 am to 6 pm) or during peak periods only. Frequent services are typically deployed along major corridors with mixed-use development and density of key destinations and transit trip generators.

- **Local** transit operates along corridors where there is a high level of usage but the density (both jobs and people) is not sufficient to warrant a frequent level of service. The goal of this service is to offer 30-minute service throughout the day. The goal of all local routes is to operate on a clock face headway but there may be some exceptions depending on the length of routes and the cost of maintaining the discipline of such a schedule. Local routes also bring people to frequent corridors and mobility hubs to promote transfers.

- **Community** service is primarily designed to provide access within residential areas and provide coverage to lower-density communities. This service connects to the local and frequent transit networks to provide transit access to the entire community. The goal of this service is to operate every 60 minutes on weekdays.

- **On-request or flexible** transit typically operates as curb-to-curb or stop-to-stop service, where users are able to request rides as needed instead of following a fixed schedule. Routes are created dynamically and can fluctuate throughout the day. On-request transit solutions are often implemented using app-based technology that allows riders to request rides using a smartphone or computer and are commonly deployed in low-density areas that do not have enough demand to support fixed-route transit.

- **Commuter** services operate during peak hours in peak directions, connecting local riders to regional employment or activity centers. Commuter routes typically involve a long segment of non-stop service to provide fast service during the busy AM and PM peaks. Depending on the level of demand, trips may span many hours during the peak period (e.g. 5 am to 9 am), operating at consistent headways.

- **Supplemental/school** routes carry riders who share a common destination, such as an employment center or school. Schedules are coordinated with school or work start and end times, typically providing one or two trips in the morning and one or two trips in the afternoon.

3.1.3 Stop Spacing by Layer

The distance between stops impacts the speed of operation, as frequent stopping results in slower service. Layers of service that operate in different environments will have different stop spacing, where direct and frequent **ridership routes will have greater distances between stops to speed up service** and **coverage routes will have shorter distances between stops to reduce walking distances.**

There is no clear industry standard on stop spacing due to the variability in land use, density, and services offered by different properties; however, recent trends have shown an increase in distances between stops over time as agencies have tried to speed up services and operate more efficiently. For example, San Francisco proposed increasing stop distance between stops on five routes in 2010 (Figure 3). Consolidating stops to increase space between stops was estimated to result in time savings of 4-19% depending on the line.

Line	Current stops	Proposed stops	Moved stops	Existing feet between stops	Proposed feet between stops	Estimated time savings{+1}
9-San Bruno	129	112	3	750	875	4-13%
14-Mission	107	88	3	800	975	5-14
28-19th Ave.	79	63	11	975	1,250	7-19
30-Stockton	89	69	5	650	825	6-11
71-Haight/Noriega	115	96	6	750	925	4

{+1} Depending on time of day and location

Figure 3: San Francisco Muni lines under consideration for stop spacing changes (2010)[1]

Today, San Francisco's Stop Spacing Standard indicates that bus stop spacing should be 800 to 1,360 feet on grades less than or equal to 10% and a minimum of 500 feet on grades over 10%.[2] This standard is similar to many other agencies such as Los Angeles Metro (1,320 feet for local service, 3,168 feet for limited-stop service[3]), AC Transit (800 to 1,300 feet for local service), and Seattle/King County Transit (minimum of 660 feet, typically 880 to 1,320 feet).[4] Santa Clarita specifies stop spacing of 500 to 1,000 feet, in locations where pedestrian access is provided to a nearby development.

Guidelines for stop spacing for each layer are as follows:

- **Frequent:** typical stop spacing of 1/4 to 1/2 mile (1,320 to 2,640 feet).
- **Local:** typical stop spacing of 1/6 to 1/4 mile (880 to 1,320 feet).
- **Community:** typical stop spacing of 1/8 to 1/6 mile (660 to 880 feet).
- **On-demand:** stop spacing of 1/8 to 1/6 mile (660 to 880 feet) for stop-to-stop on-demand services, if applicable. Door-to-door on-demand services do not require stop spacing standards.

The values above represent typical stop spacing for each layer, however, there are a number of considerations in addition to distance that must be considered when siting bus stops:

- **Locate stops on the farside** whenever possible to improve bus operations. Farside bus stops offer many advantages including minimizing conflicts at intersections with other motor vehicles and pedestrians, safer pedestrian crossings behind buses and re-entering traffic using gaps created by traffic lights.
- **Locate stops near building entrances, pedestrian crossings, and walkways.** Many retail, institutional, office, health, and industrial developments in the Antelope Valley are automobile-oriented and include expansive parking lots. These parking lots are often situated between the road and the building façade, acting as a barrier for transit and active mode users. AVTA must consider the walking paths to major destinations when locating bus stops to ensure stop location does not further impede access. Stopping near pedestrian amenities, such as crossings and walkways, improves accessibility and

[1] https://www.sfgate.com/bayarea/article/Muni-may-reduce-stops-to-increase-speed-save-cash-3168017.php
[2] https://www.sfmta.com/sites/default/files/reports/2017/FY2017-2030%20SFMTA%20SRTP-Accessible_0.pdf
[3] https://media.metro.net/images/service_changes_transit_service_policy.pdf
[4] https://nacto.org/wp-content/uploads/2016/05/1-7_Tanner-Transit-Stop-Spacing-Location-and-Infrastructure_2015.pdf

safety. On streets with unsafe pedestrian amenities and/or grades above 10%, AVTA can consider locating stops closer than the recommended minimum stop spacing.

- **Locate stops near major trip generators, such as seniors residences, health care facilities, schools, and commercial centers.** AVTA should consider land use when siting bus stops, ensuring bus stops serve locations that transit riders are interested in traveling to. Bus stops surrounded by vacant lands should be avoided. It is better to have uneven stop spacing to serve specific land uses than to maintain consistent stop spacing that serves nothing.
- **Locate stops near connecting bus routes and stops to facilitate transfers between routes.**

3.1.4 Summary

Table 2 provides a high-level summary of the service features for the layers we propose for AVTA.

Table 2: Service features for proposed network layers.

Layer	Purpose	Service span	Desired headways	Stop spacing	Desired infrastructure	Notes
Frequent	• High ridership • Corridor-focused • Mixed-use and mid to high-density developments	5 am -12 am	15 minutes	1/4 to 1/2 mile (1,320 to 2,640 feet)	• Reserved lanes • Multimodal transfer locations • Safe pedestrian crossings	
Local	• Medium ridership • Serves local and community destinations such as malls and health centers	5 am -10 pm, on-demand replacement from 10 pm to 12 am	30 minutes	1/6 to 1/4 mile (880 to 1,320 feet)	• Primarily regular stops • Some transfer stops and enhanced stops at community destinations • Pedestrian crossings	Pilot to replace late-night local services with on-demand
Community	• Coverage service • Low-density residential with few community destinations	6 am -10 pm, on-demand replacement from 10 pm to 12 am	60 minutes	1/8 to 1/6 mile (660 to 880 feet)	• Primarily regular stops • Enhanced stops at community destinations	Pilot to replace late-night community services with on-demand
On-Request	• Maximum coverage • Low-density residential	6 am -12 am	TBD	1/8 to 1/6 mile (660 to 880 feet) or door-to-door	• Regular stops or curb-to-curb service	Average wait times to be defined through pilot
Commuter	• Peak-hour service to employment destinations	3 am – 9 am, 2 pm – 6 pm (approximately)	15-30 minutes during peaks	Non-stop segments, 1/6 to 1/4 mile within local area	• Terminus at mobility hub • HOV lanes	

Layer	Purpose	Service span	Desired headways	Stop spacing	Desired infrastructure	Notes
Supplemental/ school	• Specific trips to/from a common location (school/work) • Residential and institutional (i.e. schools) land uses	N/A (specific trips with school/work start and end)	N/A (specific trips with school/work start and end)	1/8 to 1/6 mile (660 to 880 feet)	• Enhanced stops at schools and supplemental route destinations	

3.2 TRANSIT INFRASTRUCTURE

To enable fast and effective service, as well as to provide customer-centric service, a variety of infrastructural treatments and interventions are needed and recommended.

3.2.1 Waiting environments (stops and hubs)

For customers who need to wait or transfer at bus stops, we heard repeatedly that shade and bus shelters were critical to waiting in the hot climate; in fact, it was common to hear about customers missing a bus due to waiting in shady spots that may have been somewhat removed from the bus stop.

AVTA should develop a rollout strategy for prioritizing bus shelters and benches at bus stops based on:

- Passenger boardings – stops with the greatest boardings should be prioritized for shelters and benches, particularly if these stops facilitate route transfers (either at the same stop or across the street).
- Land use or customer market – at stops located near senior facilities or other locations with more vulnerable populations, bus shelters, and benches are warranted even if boarding activity may be low.

Other passenger amenities should be deployed at major transfer or mobility hubs (tiers 1 and 2), which we identify as:

- Sgt. Steve Owen Park
- Lancaster Metrolink/Sierra Hwy and Lancaster Blvd
- Fern Ave and Jackman St
- Palmdale Transportation Center
- 47th St E and E Ave S

These hubs, given their role in the network and volumes of passengers, should provide benches and shelters, as well as next-arrival screens, maps, and other trip-planning information. At the busiest hubs, particularly those with regional significance (Lancaster Station, Sgt. Steve Owen Park, and Palmdale Transportation Center), bicycle racks should be provided, and if AVTA decides to partner with car-sharing services like Getaround, parking for shared cars. Car-sharing services can reduce car ownership while enabling mobility when transit isn't viable. Car-sharing is described in Box 1 (below).

We propose the following guidelines (all stops should have a hard landing pad and other accessibility-facilitating infrastructure):

Table 3: Stop guidelines.

Stop type	Purpose	Number of daily passengers (boardings)	Amenities
Mobility hub – tier 1	• Multimobility center or hub that combines more than two modes • Provides the greatest level amenities due to the level of service and the volume of customers/travelers	More than 300: • Lancaster Blvd and Sierra Hwy • Palmdale Transportation Center • Sgt. Steve Owen Memorial Park	• Shelters • Benches • ADA-compliant landing pads • Real-time arrival information, maps and other info • Secure bicycle parking • On-demand ridesharing or car-sharing • Electric vehicle charging • Package delivery lockers • Protected bicycle facilities • Pedestrian facilities • Mixed-use and dense developments
Mobility hub – tier 2	• Location with multiple bus routes serving particularly substantial trip generators, like shopping centers • Bus stop with large passenger demand served by one bus route	More than 90 and/or located at a major attractor: • AV Mall • 47th and S • Palmdale and 20th	• Shelters • Benches • ADA-compliant landing pads • Real-time arrival information, maps and other info • Trash bins
Transfer stop	• For stops at intersections that see two or more intersecting (perpendicular) routes • For stops served by multiple routes • To facilitate transfers and waiting	More than 25 (up to 90) and/or located near a school, senior facility, healthcare center, etc. (land use dependent)	• Bus stop pole and stop flag • Schedule • Bench • ADA-compliant landing pad • Shelter • Trash bin • Pedestrian crossing infrastructure (at intersections and mid-block) • Bicycle parking
Enhanced stop	• For a stop with greater boardings or with a specific land use • Served by a single route	More than 25 (up to 90) and/or located near a school, senior facility, healthcare center, etc. (land use dependent)	• Bus stop pole and stop flag • Schedule • Bench • ADA-compliant landing pad • Shelter • Trash bin • Bicycle parking
Regular stop	• Bus stop typically served by a single route	Up to 25	• Bus stop pole and stop flag • ADA-compliant landing pad • Bench if possible

BOX 1. Car-sharing, benefits, and potential use

The Antelope Valley is dominated by cars, and cars are needed for a variety of purposes, likes going to places **transit doesn't reach or at times transit doesn't operate, or if one needs to carry many items. While this plan recognizes that cars won't be goi**ng anywhere soon in the Antelope Valley, a major goal is to make travel more multimodal, and that means enabling people to drive when needed. Moreover, the burden of owning a car may severely limit low-**income households' opportunities to attain work, visit** healthcare facilities, etc.

We propose that AVTA work to enable car-sharing services at its two main hubs, Palmdale Transportation Center, and at Sgt. Steve Owen Memorial Park. Car-sharing can take a variety of forms:

- More traditional service that provides a fleet owned by a company, like Enterprise or ZipCar
- Newer, peer-to-peer models that enable customers to rent a privately-**owned vehicle when it's not** in use.

Car-sharing is differentiated from conventional car rentals in that cars can be reserved and rented automatically and immediately through a technology platform and that the rental period can be on the order of minutes or hours as opposed to days. Preference should be given to electric vehicles **given AVTA's mandate of** going green with its own fleet.

Nearby Victor Valley Transit Authority has partnered with Enterprise CarShare to provide car sharing services in the low-demand areas of the service area. Membership fees are waved, and hourly rentals are $5 an hour, and daily rates are capped at $40 (fuel included). VVTA contributed approximately $20,000 to the program in 2017/18.

More recently, LA Metro partnered with Getaround, a peer-to-peer service that allows commuters to rent out their cars at Metro park-and-ride lots throughout the County. Getaround is licensed to occupy 110 parking spaces across 27 Metro transit station lots. Rental fees are approximately $5 per hour. Metro provides customers $25 off their first booking. This innovative strategy can facilitate travel when a car is required and reduces overall car ownership.

An example of how ride sharing could particularly be useful in the Antelope Valley is for a customer to use AVTA local bus service to get to the Palmdale Transportation Center, then rent a car through Getaround to travel to an appointment during the day, to finally return the vehicle for the owner to then make their return trip home after alighting from an AVTA commuter service or the Metrolink train. Similar to LA Metro, AVTA could provide an initial discount on first-time users.

3.2.2 Transit-supportive infrastructure facilities

In more congested areas, to improve bus operations, reserved lanes can speed up travel time and improve reliability.

For reserved (bus only) lanes, **one potential corridor for deployment can be 10th St W or Palmdale Blvd during morning and afternoon rush hours to improve the reliability of route 1.** Such a treatment would require working city officials and getting buy-in from stakeholders along the corridors (and enforcement as well).

Future considerations for other infrastructure that requires multi-stakeholder engagement concerns bus turnout lanes, such as the ones below (Figure 4).

Figure 4: Example of a newly constructed bus turn-out on 10th St W.

While this arrangement may improve traffic for vehicles behind the bus, these schemes may slow overall bus speeds because of the maneuvering into and out of the bus stop, particularly if vehicles are not obligated to yield to buses. Traditional in-lane bus stops are preferable to speed up buses, and AVTA should advocate for such designs unless stops are designated as time-points or require longer dwell times. If AVTA intends to implement more pull-in stops, then transit vehicles must be given priority when exiting a stop (vehicles must yield to buses).

Finally, while having bidirectional pairs of bus stops is ideal for bidirectional access to destinations, sometimes, these can provide safety issues for customers/pedestrians as shown in Figure 5.

Figure 5: Example of an in-lane bus stops on 10th St W, but the northbound bus stop lacks a landing pad and safe pedestrian crossing.

To facilitate bus stop and transit access, AVTA needs to work with jurisdictions to ensure that safe pedestrian crossings are provided, particularly at mid-block stops like the one above. A great example of a street treatment to facilitate mid-block crossings is on 15th St between W Ave K-8 and W Ave L (Figure 6).

Figure 6: Example of a safe pedestrian crossing.

Used appropriately, these street treatments can enable pedestrian safety and facilitate public transit usage. More discussion is presented in Section 3.9 regarding the urban design aspects that can encourage public transit usage.

3.3 ALTERNATIVE SERVICE DELIVERY (ON-REQUEST AND FLEXIBLE TRANSIT SERVICES)

It's clear that certain communities of the service area are difficult to serve effectively with fixed-route scheduled transit due to dispersed low-density destinations, single land uses, narrow streets, and poor street connectivity. In particular, areas like Lake Los Angeles, Pearblossom, Littlerock, and Quartz Hill generate very low transit demand which makes attractive transit costly to provide—as such, service frequencies on routes 50, 51, and 52 are greater than hourly, further discouraging ridership. Approximately 500 passenger trips are made on these three routes on a typical weekday, or about 5% of weekday passenger trips. Serving these distant areas is difficult on a fixed schedule, and we've heard that while these routes are unproductive, they provide a lifeline to many residents who live in these communities. Other instances of low demand include certain times of the day, such as evenings after 10 pm when ridership is only ~2% of daily ridership, or on certain days of the week.

BOX 2. Microtransit Simulation Results

AVTA recently developed simulations of on-request in Sun Village and Lake Los Angeles to understand the potential fleet requirements and journey characteristics using this scheme.

- Ridership modeling used three different ridership demands (50, 100, and 250 rides) across different locations (origins and destinations) in the study areas
- Time of day trip distribution peaks slightly before noon and in the early evening/late afternoon
- Modeled 2-6 vehicles (capacity of 14 passengers each)
- Service span specified as 6 am to 9 pm
- Results demonstrated that vehicle utilization ranges from 1.7 to 5.3 rides per vehicle hour, depending on ride request volumes and the number of vehicles
- As vehicle utilization increases, so does average wait time and ride duration
- This simulation provides a good overview of the productivity and ride quality expected depending on ridership and resources
- Overall, starting modestly with a few vehicles (2-3) would be sufficient to meet smaller demands, whereas more vehicles (4 or more) are needed to provide a good level of service when demand is higher.

To address mobility needs in these communities, we propose on-request or flexible transit services, which are alternative service delivery options being adopted by places throughout North America to address similar issues. While alternative service delivery comes in different flavors summarized in Table 4, based on the ridership patterns, we recommend two strategies for AVTA:

- For areas currently served by routes 50, 51, and 52 (but supplemental routes), fixed-route service would be removed and replaced by the on-request layer. On-request service would be provided through AVTA but delivered through a partnership with a transportation network company (TNC), like Via, Lyft, or Uber. These services can be hailed through a mobile app, or by calling AVTA to schedule a ride.

  If the customer requests a ride from within the service area to a destination in Palmdale or Lancaster, the customer will be dropped off at a hub with frequent transit service. This **home-to-hub** service has been used successfully in other low-density communities, as well as in Los Angeles to complete first-last-mile challenges around stations like North Hollywood and El Monte. Importantly, these rides are shared and dynamically routed, so it is not a taxi service, but a shared service to a transit hub. From there, customers can complete their journey with a free transfer to an AVTA vehicle, or walk, bicycle or use carsharing.

  The return trip would be similar in that the customer would be picked up from the hub after requesting a ride, and then delivered to their home or the nearest intersection.

  If the customer requires access to a destination within the service zone, then the shared-ride would be provided curb-to-curb.

  Fares would be similar to fixed-route, currently, $1.50 for a one-way fare and transfers would be free.

Depending on the service provider and delivery concept, existing AVTA bus stops could be used as **pick-up points if the stops are connected to pedestrian infrastructure and include certain amenities**, like a bench and/or shelter, and if the walk distance is less than 5-10 minutes between the request's location and the nearest stop. Using designated stops in an on-demand scheme reduces overall vehicle travel time, reducing impacts of detours to passengers already on-board the vehicle.

- For nighttime service, stop-to-stop on-demand service is suggested for routes with low productivity after 10 pm. Routes 1 and 12 should continue to operate beyond 10 pm acting as the backbone of the system, while other local routes can be replaced with on-demand service. Instead of providing 60-minute headways on all local routes, better service can be provided where the greatest late-night demand takes place. Similar to on-demand service replacing routes 50, 51, and 52, this service could be delivered in partnership with a TNC, where riders can book trips through the app or by calling AVTA to book a trip.

  We propose that existing bus stops be used instead of providing door-to-door service, as long as lighting is present at stops and people perceive the stops as safe to wait at. It could operate in two main zones, one for Lancaster and one for Palmdale. For intercity trips between Palmdale and Lancaster, on-request service can bring customers to Palmdale Transportation Center or Sgt. Steve Owen Memorial Park to transfer to route 1 where service will be operating late at night. Riders can also transfer to route 12 at Sgt. Steve Owen Memorial Park, which will also continue to provide late-night service past 10 pm until midnight (Figure 7).

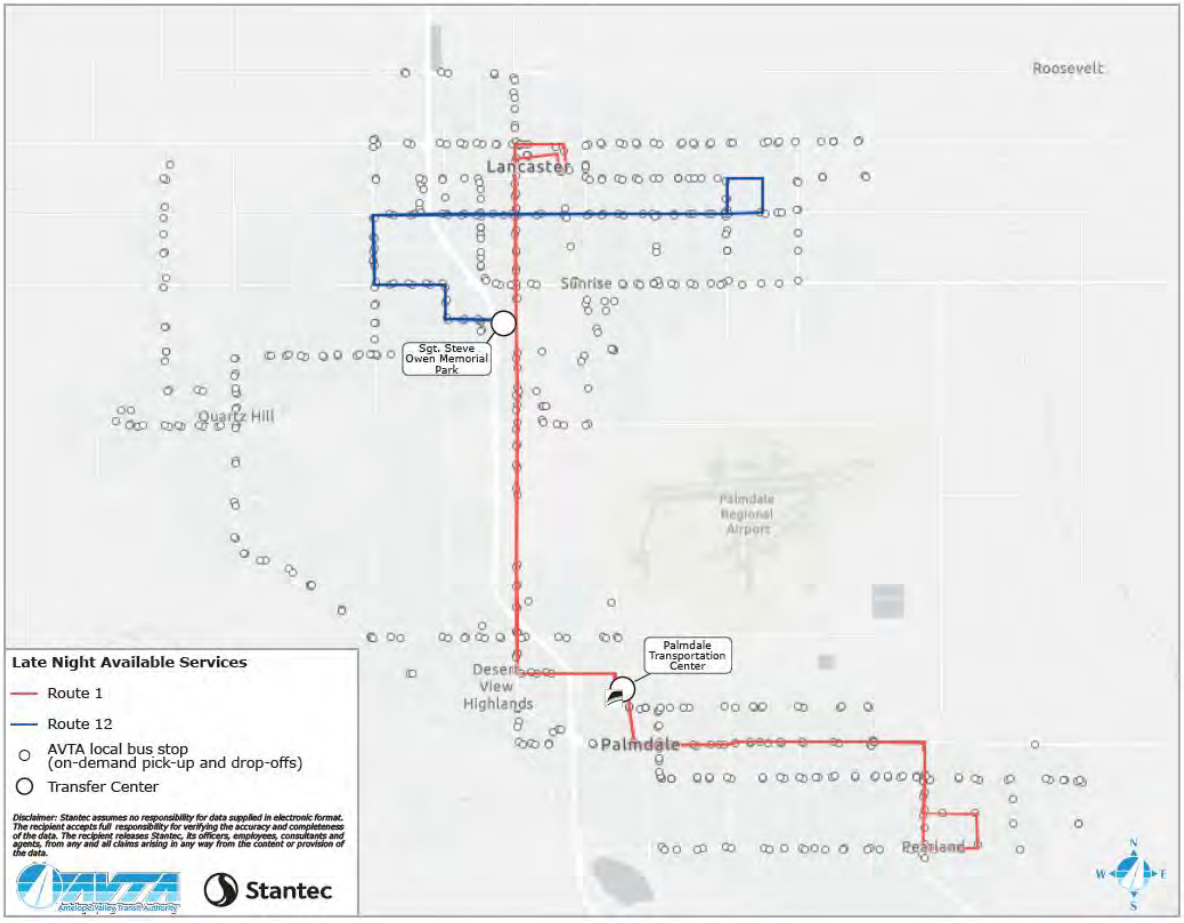


Figure 7: Late night service concept with fixed-route and on-request services.

To increase the level of spontaneity of this on-request service, AVTA could consider adopting a strategy similar to AC Transit Flex[5], where an AC Transit bus leaves a major transfer center (BART station) every 30 minutes and riders tell the driver their destination stop when they enter the vehicle. The driver then enters the passengers' destinations into an on-board tablet and the trip matching software, DemandTrans, creates the best route. Trips from any trip origin other than the Transit Center require advanced booking, at least 30 minutes before departure.

Two AC Transit Flex services replaced two fixed routes with on-request service between existing stops, carrying passengers to and from BART stations or between stops within the zone of operation (see Castro Valley example to/from Castro Valley BART in Figure 8).

If AVTA were to adopt a similar strategy, it would provide customers with a flexible option for getting home. Riders could take route 12 or route 1 to Palmdale Transportation Center or Sgt. Steve Owen Memorial Park, where they could finish the last leg of their trip using the on-request service. Having consistent headways leaving transfer centers would reduce the need to book trips in advance and subsequently eliminate the fear of missing a booked trip. This option also benefits riders who do not have a smartphone to quickly book a trip. Riders wishing to travel between other fixed stops in the late-night on-demand zone would be required to request trips in advance.

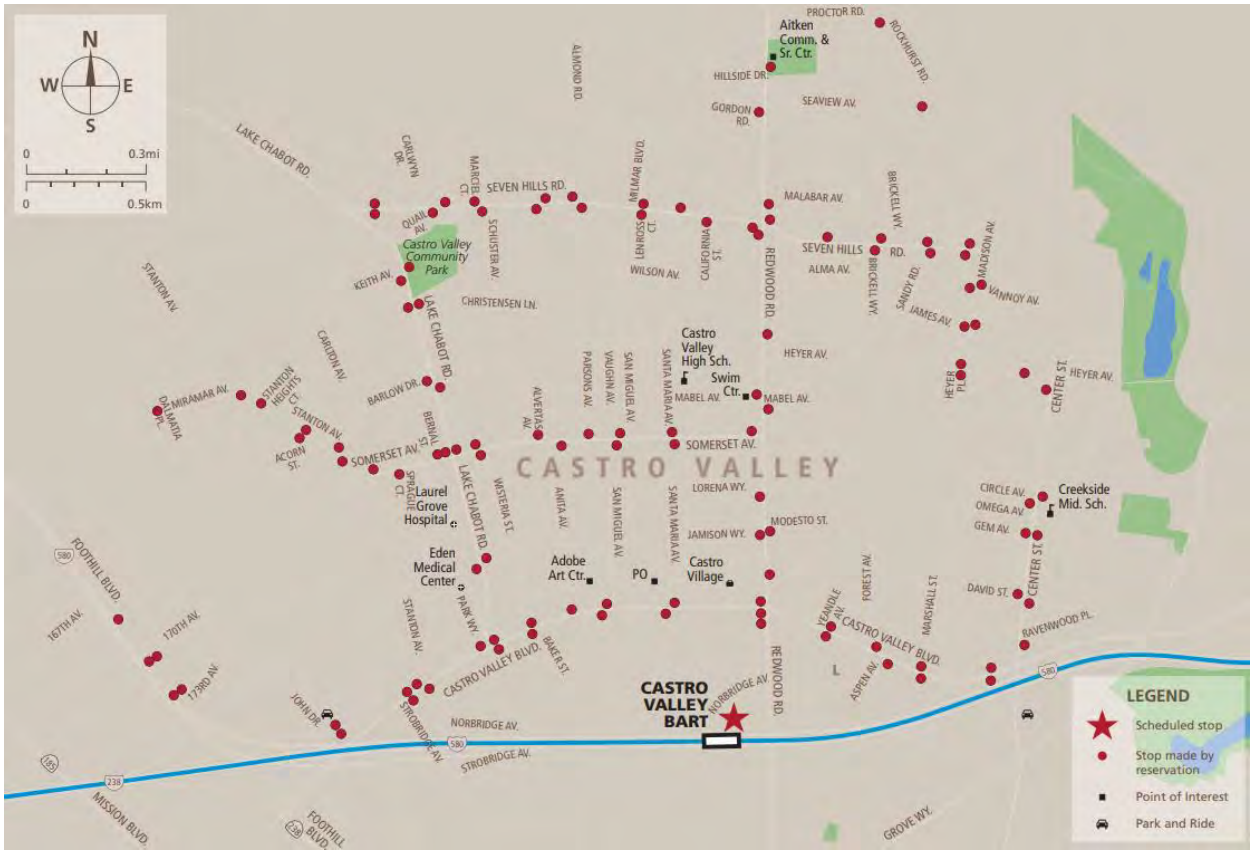


Figure 8: Fixed-stop on-request service in Castro Valley, California as part of AC Transit Flex pilot
Source: AC Transit – Alameda-Contra Costa Transit District

[5] http://www.actransit.org/flex/

One important lesson learned from this pilot is that trip reservations may act as a barrier for riders. There were 40% more trips beginning at BART stations (where riders did not have to reserve a trip) compared to other pick-up locations (see boardings and alightings in Figure 9).

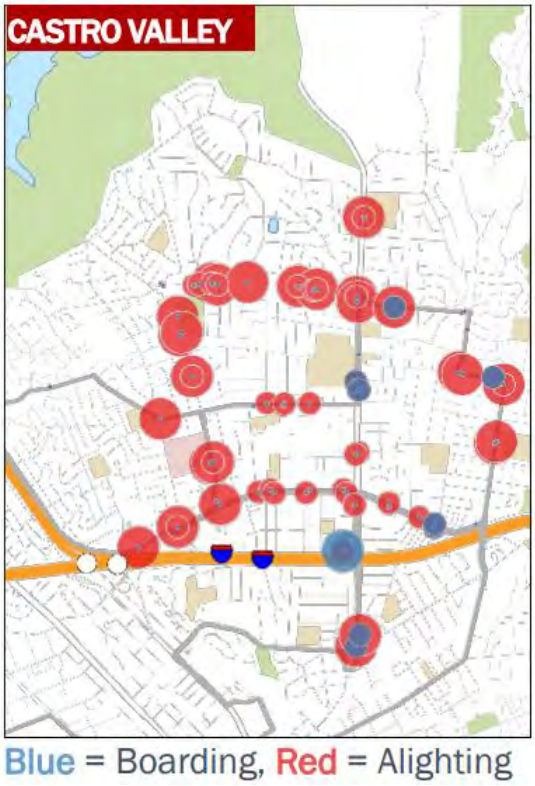


Figure 9: Castro Valley boardings and alightings from AC Transit Flex pilot[6]

- Currently, Dial-A-Ride (DAR) service operates in the traditional manner whereby requests are taken by phone and scheduled into a manifest for service delivery. Many transit agencies throughout the country and locally too are piloting DAR or paratransit services operated and delivered in a TNC-like fashion. For example, Santa Monica's MODE service is delivered through Lyft, where customers use the Lyft app to schedule trips or can call in if they are unfamiliar with app-based booking. Similarly, Monrovia Transit is using Lyft-contracted services to provide on-request solutions for its DAR ADA service. Rides can be booked through the app (or via phone call) with a fixed fare of $0.50. Monrovia is also piloting a similar service delivery with GoMonrovia for non-ADA trips, where passengers can use a promo code within the service area to request a trip with a fixed fare. This model could be an interesting delivery model for AVTA to consider. Other models leverage scheduling and service delivery from Via, such as in Michigan and Texas.

  The major advantage for customers is the ability to summon trips in a more instantaneous fashion than DAR or paratransit services have typically provided—AVTA's DAR accommodates same-day requests, but may be unable to provide them due to capacity, however. Another advantage is the offloading of the responsibility of scheduling and developing trip manifests to dynamically routed services; however, these

[6] https://www.apta.com/wp-content/uploads/Conferences_Meetings_Events/Presentations/2018-Sustainability/Urgo-John.pdf

contracts and service delivery still require agency oversight to ensure that service quality and standards are met. Finally, if AVTA develops service substitution for some routes, additional efficiencies may result from providing a similar strategy for DAR service. This on-request solution may even help address non-emergency medical transportation needs and could involve collaboration with healthcare providers.

BOX 3. Example of home-to-hub in nearby Bakersfield.

In Bakersfield, we recently completed a feasibility assessment of different type of on-request solutions for different neighborhoods in the city that experience low transit ridership. One solution we recommended included a shared-ride dynamically routed service in a zone of the city that would leverage existing resources (vehicles and operators from their paratransit service, called GET-A-Lift) and require new technology for scheduling and routing. GET entered into a partnership with TransLoc to develop the app and tools necessary to pilot the RYDE Bakersfield service in April 2019. The service zone is overlaid with fixed-route transit that may eventually be deleted altogether. If destinations are within the zone, passengers receive a curb-to-curb trip; if destination are outside the zone, RYDE brings passengers to the nearest transit hub to connect to fixed-route services. GET is reporting steady ridership growth on the RYDE service and is currently offering loyalty-type promotions, like punch cards for a free trip after 10 paid trips. More information can be found here: https://rydebakersfield.com/.

Table 4: Alternative service delivery concepts.

Alternative Service Delivery Model	Service Description	Advantages	Disadvantages
On-Request/ Flexible Route	Base operational hours remain unchanged. Vehicle deviates from its route within a short walking distance from the requester.	- Operates in similarity to successful ASD models from peer agencies - Service provided based on rider demand - Implements costs control measures by limiting idling - Improved public perception - Van can coordinate to aid DAR service based on customer ability	- Additional training required - If using a third party the contracting, and bidding process can be expensive
On-Request/ Dynamic Route	Base operational hours remain unchanged. Consistent route re-sequencing required to ensure an optimal journey.	- Offers a more personalized service which is similar to a Transportation Network Company (TNC) - Responsive to traffic conditions - Responsive to demand - Can comingle with DAR riders and other customers depending on request locations	- Technological investment required to provide this service - If using a third party the contracting, and bidding process can be expensive
Flex Route/ Fixed Schedule	Arrival and departure times are fixed. The route is adjusted by requester demand and changes over-time, route deviation is often a predetermined distance, e.g. 1 mi.	- Route is based on rider needs - Fixed schedule is easier for bus operators	- Bus/van could still be empty - Additional training required for bus operators and deviation parameters outlined - Although schedule is fixed, arrival times may vary depending on route deviations
Fixed Route/ Fixed Schedule	Arrival and departure times are fixed. The route is predetermined, closely resembles traditional service. This can operate as a feeder service.	- Can utilize existing bus stops as pick up points. - No additional training required for bus operator. - Largest difference is equipment based as service is provided by a van	- Any cost savings is based on equipment only - During low/no ridership times the van is still empty

Some of the benefits of on-demand or microtransit solutions include:

- Shorter wait times for customers
- Potentially lower costs for AVTA, allowing redistribution of resources (40-ft. buses and operators) to more productive routes

However, extensive outreach and education are needed, particularly for populations who may lack access to mobile phones.[7] Bilingual and accessible outreach and information are imperative, including clear website materials, printed materials, and in-person demonstrations, like at the Lake LA library.

Metro is currently providing free service on Via to entice riders to try the on-demand service that provides connections to certain Metro stations. This home-to-hub approach could work in the Antelope Valley, leveraging connections at Lancaster Station or Sgt. Steve Owen hub (in Lancaster) and Palmdale Transportation Center.

3.3.1 Volunteer Transportation Programs

There are multiple volunteer transportation programs across the United States in which neighbors transport neighbors to the doctor's office, to the grocery store or to a family member's house. Volunteer transportation is a program that is operated by a not-for-profit or sponsoring transportation agency that fosters volunteer drivers and escorts to provide transportation using their own vehicles for which they receive a per trip stipend. In some situations, the vehicles are provided by an agency like AVTA or Kaiser Permanente.

Previously, we have encountered dozens of volunteer programs that are delivering essential transportation services at a much lower cost per trip than transit agencies can provide. In the State of California alone there are 58 volunteer programs provided thousands of rides each year.

There is a very common thread to many of the volunteer programs which is why we included in the on-request service options for AVTA—volunteer programs are most successful when they are operated in rural, less densely populated areas like the Antelope Valley.

Volunteer transportation options, similar to the vanpool program managed by Metro, should be explored by AVTA because they are a community-based response to unmet transportation needs and one that can be delivered at very low cost to present DAR service costs.

3.4 REVISED SCHEDULES

We heard from many customers that buses are unreliable, meaning that buses are late or early, prolonging travel times due to waiting for the next (infrequent) bus. Our analysis revealed that the actual on-time performance[8] of local AVTA routes ranges from 46% to 93% on-time, with a system average of 77%. This is well below the industry's best practice average of 90% or better. In most cases, buses run late rather than early, which reveals that the running times do not adequately account for operational realities, such as traffic conditions or ramp deployment for passengers using a wheelchair or for individuals to load bicycles. Moreover, worsening traffic conditions at certain times of the day may cause customers to miss connections with services like Metrolink trains, or cause overly long travel times on commuter services.

While many strategies can be used to speed up buses and improve reliability, like priority treatments, farside bus stop placement, connecting with higher-order transit (like subways and trains in their own right-of-way), one major

[7] Based on survey responses, 97 of 101 responded as having a smartphone (51 of 55 riders have a smartphone), indicating penetration of over 90% for smartphone ownership for respondents (note the survey was hosted exclusively online).
[8] Buses departing a time-point stop 0 minutes before to five minutes past the scheduled departure time are considered "on time".

way for AVTA to improve reliability is to revise schedules and adjust bus or trip running times to reflect actual operating conditions.

For local fixed-route services, we propose:

- Based on the revised network concept proposed in Task 6, AVTA must account for longer dwell times due to wheelchair use and longer passenger boardings and alightings, as well as accounting for layovers to charge or switch-off electric buses.
- Typically, 10-15% of running times should be allocated for layover or recovery (or 6 to 9 minutes per hour). This is a general rule of thumb, but AVTA should use its actual trip-level travel time data to conduct statistical analyses of historical run times and dwell times (analyzing mode and medians of running and layover times across the service day), conduct field observations, and recut schedules. This may require headway adjustments as discussed in the service layers section, as well as additional transit vehicles to respond to actual route cycle times and provide desired headways.
- Observing operators and using segment speeds would help AVTA design more realistic schedules.
- Deleting bus stops that have low passenger activity and rebalancing stops to ensure consistent stop spacing where possible, but also accommodating land uses and points of interest that may require closer stop spacing.

The benefits are clear for customers who could rely more comfortably on AVTA. For operators, being less concerned about making time-points and being on-time because of more realistic schedules can reduce stress and improve driving behavior and attitudes towards customers, particularly when helping persons requiring mobility devices or answering customer questions.

For commuter routes, we propose:

- Reducing route alignments to connect with Metro stations where possible to get passengers onto faster, dedicated right-of-way transit (such as the Metro Red Line)
- Minimizing turns and route patterns to improve speeds and make services more legible
- Adjusting schedules, including shifting runs to depart the Antelope Valley early for points south due to worsening traffic and deleting later runs which are typically less than half full.

3.5 OPERATOR TRAINING

Operators are the frontline and the face of the agency—ensuring that operators provide courteous and professional service to customers is one of the surest ways to win satisfaction, loyalty, and potentially new customers. In fact, a recent study of customer satisfaction from the United Kingdom found that operator behavior, attitude, and performance were significant drivers of customer satisfaction.[9]

Not surprisingly, we heard from customers that some operators are great and helpful, and others are rude or discourteous. Reviewing customer feedback revealed similar sentiments, including recurring themes like:

[9] https://www.intelligenttransport.com/transport-news/85760/bus-satisfaction-driver-new-report/

- Operators who don't help persons with disabilities
- Erratic or unsafe driving
- Bus operators who pass-up passengers waiting at bus stops (even though the bus is not at capacity)
- Impatient or discourteous operators

As ambassadors of AVTA, good bus operators should be rewarded and featured in advertising campaigns celebrating the hard work they do. Bus operator shortages across Los Angeles County are hampering agencies' abilities to provide and meet service. Recruitment goes hand-in-hand with acknowledging and celebrating good bus operators.

We recommend that AVTA work with TransDev, the third-party operator of service, to develop operator training focused on two key aspects:

- Customer service – Operators need to understand their public-facing role as information providers so that answering rider questions shouldn't be treated as an annoyance. We heard also that customers would like to be reassured that operators are authority figures onboard buses, ensuring that customers feel safe in case of emergency. Providing advertising campaigns to highlight operator training regarding emergency responses could help build trust from passengers.
- Operations and driving – Ensuring that operators drive safely, minimizing hard braking, rapid acceleration and such, impacts safety, customer satisfaction, and importantly for AVTA, operating ranges for electric buses. Minimizing change offs and other vehicle issues require operator training for successfully operating electric buses and maximizing the range of these vehicles.

Overall, together with 'true-to-the-street' schedules that can minimize operator stress related to meeting time-point and with on-street supervision as visible support to operators and to mitigate on-street issues, operator training can result in better customer satisfaction and operational outcomes for AVTA.

3.6 EMERGENCY RIDE HOME (AND CAR/VANPOOLING)

Ridership on the Route 747 (Edwards AFB) and Route 748 (Mojave) has not materialized to the extent originally anticipated. Rider feedback has indicated that the 747 and 748 schedules do not account for last-minute plan changes or emergency situations. If a commuter takes an AVTA bus to work in the morning and needs to leave work early unexpectedly, they have no way of getting back home. This creates a feeling of being "stranded" and may prevent people from taking the AVTA bus on a regular basis. Loss of ridership on the other commuter routes to points south (785, 786, and 787) may in part be due to a similar sentiment of potential riders.

A possible solution to concerns about not getting home in case of emergency is to implement an Emergency Ride Home policy. Emergency Ride Home or Guaranteed Ride Home programs have been implemented across the country as part of the growing effort to encourage active and sustainable modes of commuting. Typically, these programs are offered through the employer as part of a wider program that aims to reduce the use of single-occupancy vehicles. Emergencies commonly include reasons such as personal illness/emergency, illness/emergency of a family member, or unscheduled overtime.

Some examples of Emergency Ride Home programs are provided below:

- **Los Angeles:** Emergency rides are offered to employees who take a sustainable mode of transportation to work (e.g. walk, bicycle, transit, carpool, etc.) as part of the Regional Guaranteed Ride Home Program (GRH). Employers must be signed up for the program and employees must be enrolled in their company's Shared Mobility Program to be eligible to receive up to two emergency rides per year. Sponsors of this program include LA Metro, Orange County Transportation Authority (OCTA), and San Bernardino County Transportation Authority (SBCTA).

- **Sacramento:** Administered by the Sacramento Transportation Management Association (TMA), taxi or rental car vouchers are given in an emergency to commuters who take modes other than driving alone. Any employee of a TMA-member employer can use this program up to five times per year.

- **Tampa Bay:** An Emergency Ride Home (ERH) program is available to individuals who take sustainable modes at least twice a week. Taxi fares are paid for an emergency ride up to $100 and up to four times per year. The participant is required to pay the excess fare above $100. This program is also available to students of colleges, universities, or technical schools who commute using carpool, bus, bicycle or walk at least twice a week. The ERH program can only be used to get from campus to home, and not the reverse from home to campus.

AVTA could offer emergency rides home to riders of their commuter services. Eligibility should be restricted to monthly pass holders only and not available to occasional riders. Employees would need to submit a claim and indicate why the emergency ride was needed (e.g. illness, family emergency, etc.). Alternatively, AVTA could partner with individual employers served by routes 747 and 748 to deliver this program and offer vouchers to commuters who use the AVTA bus in the morning and require an emergency ride home. For routes 747 and 748, on-request solutions could also be explored for ERH service delivery using the same restrictions.

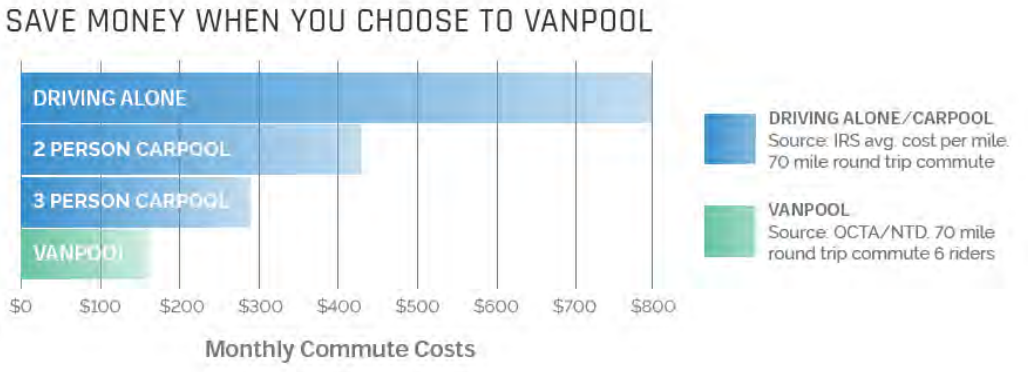
An alternative to fixed-route service to Edwards AFB and Mojave is the implementation and promotion of carpooling or vanpooling programs to these locations and other major employment destinations. Carpool and

vanpool programs are attractive alternatives to those with long commutes for whom fixed-route transit service may not be convenient or feasible. Vanpooling and carpooling programs help commuters with similar schedules and destinations get to and from work easily, aid in removing single-occupancy vehicle trips, reduces per-person emissions and improves air quality. It is also estimated that van and carpoolers in Southern California reduce their commute trips by 20 minutes in each direction, and those in participating programs can reduce their commuting costs by 70% when switching from driving alone[10].

The main difference between car and vanpooling is vehicle size and number of occupants. Carpools tend to be smaller and completed using a participant's personal vehicle. Vanpooling services are often sponsored by transit agencies and involve the use of a van, minivan, or SUV. Agencies can provide these vehicles (such as through Enterprise Rideshare vehicles), or allow participants to use their own vehicles. When sponsored by transit agencies, those enrolled in the program often gain the added bonus of automatic enrollment in an emergency ride home program, providing additional flexibility and freedom in the case of an emergency.

Some local examples of transit agency-sponsored vanpool programs are detailed below.

- **OCTA OC Vanpool:** OC Vanpool requires a minimum of five riders with similar work destinations and schedules and a designated pickup location (often a park and ride lot). All vehicles are leased through Enterprise Rideshare on a monthly basis, and provides vehicle insurance, maintenance, and car features such as Wi-Fi. OCTA subsidizes 30-40% of the monthly costs as well as providing the GRH Program, which provides reimbursement for travel costs for unexpected emergencies twice a year. OCTA estimates monthly savings of at least $200 a month compared to carpool programs, and over $600 a month compared to driving alone[11].



- **LA Metro Vanpool Program:** the LA Metro vanpool program is one of the largest publicly funded vanpool programs in the country, with nearly 1,300 vanpools in operation, which equates to removing 6,000 vehicles from LA roads every weekday. A countywide program, Metro vanpool is already in operation in parts of the Antelope Valley, helping those who commute from the Antelope Valley to Santa Clarita or the LA basin save on commuting costs, reduce the stress associated with driving alone, and reduce commute times. Like the OC Vanpool program, participants can lease vehicles that are partially-

[10] https://www.metro.net/riding/vanpool/
[11] https://octa.net/pdf/Vanpool_FactSheet.pdf

subsidized by Metro, or use their own vehicles if they fit certain size and mileage requirements. As mentioned above, participants are automatically eligible for the GRH program.

- **Waze Carpool:** the GPS navigation software app, Waze, provides another carpooling option that can help mitigate congestion and facilitate sustainable commuting choices. Users of the Waze app can simply download the Waze Carpool app, choose to either ride or drive, and be matched with people based on route and time of day. As a rider, after entering your origin and destination locations and time of day wishing to travel, Waze will automatically match you with a list of drivers that fit the parameters and includes information on walking distance to the pickup location and estimated arrival time. From there, riders communicate with the drivers by sending messages through the app to finalize carpooling details. Drivers can also offer rides to riders along the same route. Drivers can drive up to four riders, and are reimbursed for gas and other related costs. Prices vary based on distance traveled and the number of people in the carpool. Waze also offers free marketing materials and other resources to employers who partner with Waze to encourage carpooling among employees, as well as offering partnerships with cities or transit agencies to start citywide or service area-wide carpooling programs, such as Waze's current carpooling partnership with the San Diego Association of Governments (SANDAG)[12].

Employers can play a major role in the success of van and carpooling programs. Vanpool commuting can help employers save and resources by reducing parking demand and improving the ability to recruit and retain qualified employees[13]. Employers can also benefit by participating in Commuter Benefits, a program outlined in the federal tax code that offers employer tax breaks for subsidizing vanpools for employees. Because the Antelope Valley is in the service area of the LA Metro Vanpool Program, AVTA could reach out to local employers (or employers elsewhere in the county that employ those who live in the Antelope Valley) and provide information on the benefits of the vanpool program, which they can then, in turn, pass on to their employees. AVTA can also do more to raise awareness of the vanpool program throughout the Antelope Valley to encourage sustainable transportation choices among commuters.

Similarly, Edwards AFB already operates a vanpool program offering a $125 monthly subsidy to participants as an alternative to driving alone. AVTA can work with Edwards AFB to help implement an emergency ride home program as an additional program component and can explore the feasibility of implementing a vanpool program to Mojave as an alternative to fixed-route service. For example, Kern Council of Governments partners with the public vanpooling agency CalVans to encourage vanpooling to Mojave for Kern County-based employees[14].

3.7 TRAVEL TRAINING

AVTA works with local community organizations to deliver travel training sessions that teach groups how to use AVTA's conventional transit services. Curriculum topics include local and commuter services, onboard bus features, how to read schedules, and how to plan a trip. Travel training occurs in a classroom setting, as well as on-board a bus where participants receive hands-on experience with the bus features. A question and answer

[12] https://www.waze.com/carpool/companies?city=Mountain%20View
[13] https://www.metro.net/riding/vanpool/employers/
[14] https://calvans.org/employers

period follow, where participants can ask for clarification on anything that is unclear or was not covered. This program is excellent for encouraging non-transit riders to try taking public transit for the first time.

Despite having a travel training program, our public engagement responses have illustrated that there is a lack of information and understanding of AVTA's conventional transit services. One barrier that may be preventing customers from taking advantage of the services available to them is a lack of Spanish-language resources and materials available. People with low vision have also had difficulty finding accessible materials, making it difficult to navigate the AVTA system. In addition to distributing materials that accommodate non-English speakers and people with low vision, travel training should be more widely promoted to community organizations that work with these populations.

AVTA should also develop partnerships with local organizations, such as First 5 LA, to recruit participants in the travel training program and disseminate travel training materials to promote the bus services that AVTA provides. To help educate the public, AVTA could also host workshops with service providers or community organization leaders to give them the information needed to travel train their members. This format is also called "train the trainer" and is a great tool to spread information and education to a wider audience through training a few key members of the community.

Travel training can also be used to encourage Dial-a-Ride users to try conventional transit. When asked how they would travel if DAR didn't exist, many customers indicated that they would take Uber or Lyft, while few said they would use fixed-route services. This response may be due to a lack of understanding about fixed-route services offered, as some non-riders said they are unsure about where or how to travel by local bus service. There are likely a number of factors that influence DAR riders' interest in taking local services beyond lack of knowledge, such as accessibility barriers at stops and past negative experiences on public transit (AVTA or other agency). While travel training may not be able to directly solve these issues, travel training can help riders overcome barriers by showing them how to plan trips that will work for them. Together with infrastructural improvements, encouraging the use of conventional transit by DAR customers through travel training provides benefits to the rider by giving them the option to travel more spontaneously and independently, and benefits AVTA by reducing pressures on existing DAR resources.

3.8 FARE POLICY

A few common themes about AVTA's existing fare structure emerged during the previous tasks, including recommendations from the public to reduce fares for students and/or families, address fare evasion, and reduce the cost of commuter services. Some recommendations for AVTA to consider are as follows:

- **Eliminate the 4-hour pass.** Based on survey responses about fare products, the 4-hour pass is not widely used throughout the system. This is likely because it is difficult for riders to make a two-way trip to a destination within the allotted 4-hour window. Since free transfers are provided between AVTA services, the 4-hour fare does not provide a significant benefit to AVTA riders. Instead, AVTA should consider eliminating the 4-hour pass, and focus on marketing the day and monthly pass, as well as offering reduced day pass fares to make it easier for people with lower incomes to travel more often and conduct many activities within a day using transit (essentially LIFE-type fares but for non-monthly products).
- **Provide concession fares to students to attract more riders and combat fare evasion.** We've heard from riders and non-riders alike that greater differentiation is needed between fares, namely reduced fares for students. The benefits of reducing fares for students is threefold: students will be more likely to

take transit to/from school if it is more affordable; a lower fare can help reduce fare evasion; and the lower fare is likely to result in an overall increase in transit use by young riders including discretionary trips during the evenings and weekends (such as to the mall, visit friends, etc.). Reducing fares for school students also makes transit more accessible for low-income populations, particularly for families with multiple school-aged children.

- **Promote existing passes that provide reduced fares to improve access for low-income populations.** The LIFE (Low-Income Fare is Easy) program offers 7-day and 31-day passes for local trips on AVTA based on household size and annual income. Information about this program should be available in multiple languages to assist non-English speakers with applying to this program. Providing information to local community leaders would also help spread awareness of this option to people who typically have difficulty accessing or understanding the available online materials (e.g. non-English speakers, seniors, people who are blind or have low vision, people with a cognitive disability, etc.). AVTA should also improve access to information about the EZ pass for people who make regional trips.

- **Create new partnerships with local employers to distribute employee passes.** EcoPasses are transit passes that are subsidized by employers and distributed to their employees for a reduced fare. These passes provide benefits for all parties involved:

    - Employees have an incentive to take transit to work and leave their car at home, reducing traffic congestion and increasing the transit mode share.
    - Employers who do not have enough parking spots to accommodate workers can provide an alternative travel option, and work towards their goals of creating a more sustainable workplace.
    - Transit agencies receive a consistent revenue stream from participating employers and improve productivity by carrying more riders.

- **Give transit passes to health care centers for patients requiring transportation home after appointments.** To assist patients with their ride home from medical centers, facilities should be given TAP cards with a one-way fare or day pass pre-loaded onto it for purchase at a reduced price. For example, a TAP card with a day pass can be sold for $5 instead of $7 ($5 for day pass plus $2 fee for the card). Offering a day pass at health care centers makes it more convenient for riders since day passes cannot be purchased when boarding a bus. This strategy also helps promote the use of TAP cards and will hopefully result in riders continuing to use their TAP cards to board AVTA services to and from medical appointments.

- **Reduce the price of commuter services alongside commuter service changes.** We have proposed changes to AVTA's commuter services that would reduce the distance traveled. For example, Route 785 is proposed to terminate at NoHo Station to provide connections to Metro services instead of proceeding to Union Station. If the commuter route no longer serves downtown LA destinations, riders will expect a reduction in fares accordingly. AVTA should explore the fare structure of all commuter routes, as members of the public have expressed that commuter fares are too expensive. It should be noted that Santa Clarita Transit charges $2-$2.25 for commuter services compared to AVTA's fare of $8.75-10.75 for single rides to similar destinations (of course, Santa Clarita's trips are shorter than AVTA's because SC is located closer to LA). It was also mentioned that the large discrepancy between commuter route fares (785, 786, 787, 790) and supplemental routes fares (747, 748) is not justified, which would also be rectified by reducing commuter fares to better align with the services provided.

- **Work with neighboring agencies like Santa Clarita to reduce transfer fares.** We recommend that more of AVTA's commuter services stop in Santa Clarita to pick up additional riders on the way to LA destinations, as well as provide AVTA riders with more opportunities to transfer to Santa Clarita services. Santa Clarita riders will not be interested in taking AVTA's commuter services and vice versa if it is cost-prohibitive to do so.

3.9 TRANSIT-FIRST DEVELOPMENTS

As discussed in Section 3.2, sufficient transit infrastructure, including dedicated bus lanes, pedestrian infrastructure and street treatments, and bus stops and mobility hubs, are integral components of an effective transit system. However, land use and development decisions also play a major role in how convenient and attractive transit is as a transportation option. As has already been seen through stakeholder and community engagement, the auto-centric land use and development patterns that currently exist throughout much of the Antelope Valley provide a barrier to transit use, and can often make it difficult for transit users to reach their final destination (such as having to cross a sea of parking that exists between the bus stop and their desired destination). Adopting a set of transit-supportive land use and development principles for the Antelope Valley can help prioritize transit use and accessibility in future development decisions, ultimately helping the Antelope Valley to become a community whose land use and development patterns work with transit to reduce automobile reliance and increase transit use. Obtaining support from municipal stakeholders and developers and working with these groups to achieve a common vision for transit-supportive development is also key.

Examples of auto-centric developments are not difficult to come by in the Antelope Valley, such as the Walmart Neighborhood Market at Rancho Vista Blvd and Town Center Dr. While the development has a bus stop with shelter amenities located in front of the store, transit users still have to cross a large parking lot with no pedestrian infrastructure to reach the storefront (see Figure 10).

Not only is the primary street frontage dominated by parking, but a lack of sidewalks makes it difficult to reach the Walmart from the stop located on the other side of the street. A mix of land uses within one development that encourages transit use and reduces automobile reliance is absent from this standalone commercial development. While residential uses surround the Walmart, their closed-off, insular nature makes it difficult to access surrounding uses by means other than private vehicle use. By placing the building frontage at the right-of-way, placing parking behind the building, and providing easier pedestrian access from the bus stop to the building entrance, this development could become much more transit-supportive.

Figure 10: Walmart with front-facing parking on Rancho Vista. Google Maps.

The surrounding residential neighborhood of Rancho Vista was also not developed in a way conducive to transit use. In the same way that the standalone Walmart encourages private vehicle use, closed-off, low-density residential neighborhoods are difficult to serve effectively through transit because buses have to complete long, meandering routes to reach residences. It is difficult to locate bus stops at central locations that are accessible to a large number of people because walking distances are long as routes are indirect.

In Figure 11 below, a physical wall between the neighborhood and closest major street presents an additional challenge to residents accessing transit from this neighborhood. Street and network connectivity enhance transit access by bringing destinations closer together, reducing travel times, and improving pedestrian access. Strategies that open neighborhoods through the provision of through-block pedestrian and bicycle passages can help to create easy, direct access to bus stops and is a small change that can be made to make these areas more supportive of transit.

Figure 11: Rancho Vista neighborhood. Google Maps.

Figure 12: AVTA bus stop located outside Rancho Vista neighborhood. Google Maps.

3.9.1 Transit-Supportive Guidelines

While Los Angeles County and the cities of Palmdale and Lancaster have goals of sustainable development (as outlined in the cities' general plans and the County's Antelope Valley Area Plan) that consider transit and support multimodal transportation infrastructure, AVTA needs to play a more active role in working with local governments, developers, and communities to promote and maximize public transit in land use developments. One of the key ways transit agencies can play a meaningful role in this regard is through extensive collaboration and work with municipalities and developers to prioritize land use and development decisions that facilitate transit use and take a multimodal planning perspective. An effective way for this to take place is through the creation of a task force that meets on a regular basis to discuss development and land use strategies and opportunities that can support and encourage transit ridership. AVTA can develop its own transit-supportive guidelines, or draw from the many existing examples outlined below.

As seen in the example below from Ontario's Transit-Supportive Guidelines, a development that works with transit does not have to result in drastic differences to the Antelope Valley development landscape. Small but impactful differences, such as building orientation that places active uses and building entrances at the right-of-way (Figure 12), creates a more attractive pedestrian environment that, when combined with strategic bus stop placement, makes destinations much more accessible for transit users.

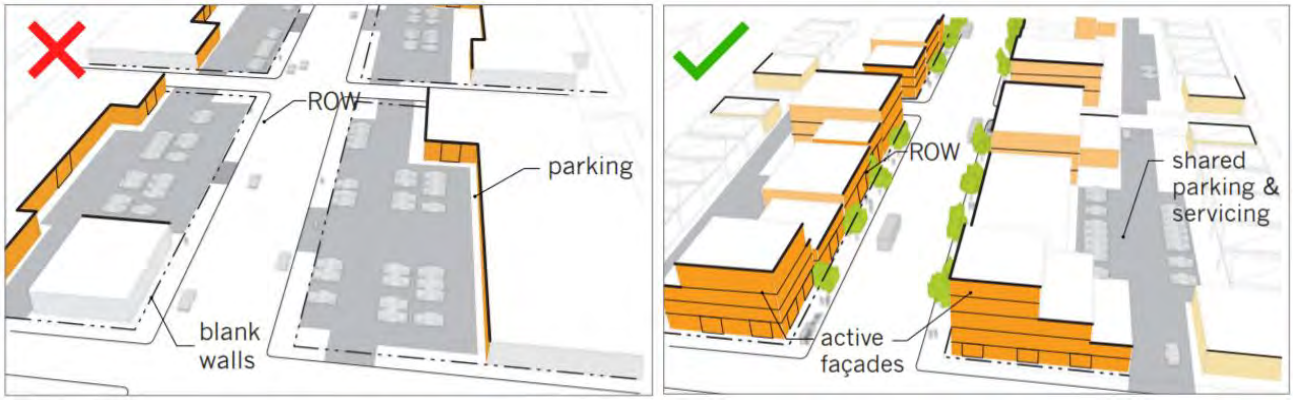


Figure 13: Example of transit-oriented design for retail.

The Bay Area Rapid Transit agency (BART) has also developed extensive guidelines for municipalities, elected officials, developers, and community members on TODs in the Bay Area. In 2016, BART decided to take an active role in transit-supportive planning and development when its Board adopted an official agency TOD Policy and Performance Targets and Land Use Strategy (see below) to help guide future development in the service area. AVTA can also consider creating an official transit-supportive policy for its Board to adopt to create a unified, cohesive vision of what AVTA considers to be transit-supportive development practices.

BART's TOD guidelines provide a framework for how BART approaches TOD planning, design, and development and connects transit-supportive development to the agency's overall strategic plan. The guidelines also include detailed best practices for urban design and a checklist that can be helpful for developers to ensure they are maintaining consistency with TOD goals and guidelines, spanning categories including site and building design, equity and sustainability, and street patterns and circulation. This is another tool that can be utilized by AVTA to promote transit-supportive development throughout the Antelope Valley.

The guidelines also include examples of implemented TOD projects in the Bay Area, such as the San Leandro Downtown TOD shown below (Figure 14). The project, completed in 2014, resulted in the construction of a retail center, office complex, 115 units of affordable housing, enhanced pedestrian and multimodal amenities, and zoning changes to allow for increased density to guide future developments. The after-photo shown below shows affordable family housing located across the street from the BART station. Providing real-life examples of this nature are helpful in obtaining buy-in from municipalities, developers, and other stakeholders.

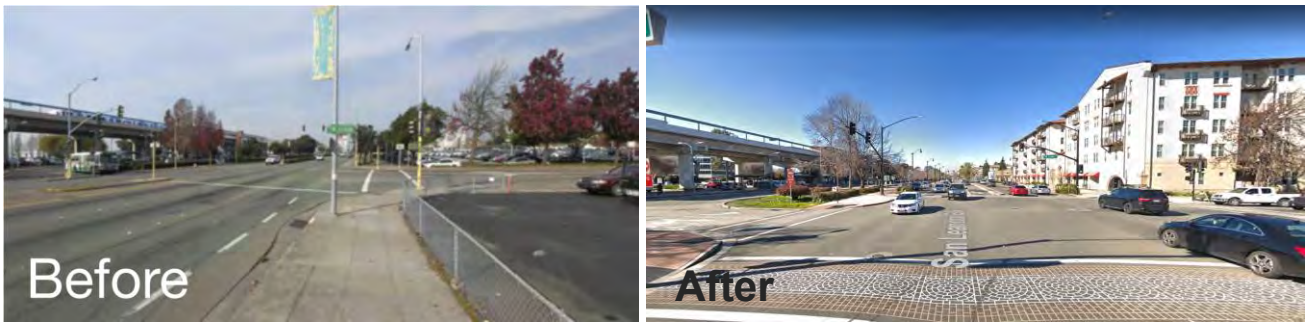


Figure 14: Example of a TOD project in the Bay Area.

LA Metro has also developed a TOD Planning Toolkit in the form of online tools. LA Metro's toolkit is based on ten characteristics the agency considers to be best practices that promote the creation of transit-supportive places, based on foundational tenants of a diversity of land uses, compact design, greater transportation mode choice, safe and walkable streets, and destination accessibility. Characteristics include compact design, complete neighborhoods, street, and network connectivity, affordable housing, parking management, transit prioritization, commercial stabilization, site layout and building design, transportation demand management, and pedestrian and bicycle circulation.

Each characteristic is expanded upon to include specific strategies that support the given characteristic and detailed discussion on its measure of effectiveness (typically shown as the elasticity of VMT in relation to the characteristic; for example, complete neighborhood effectiveness is measured in terms of vehicle miles traveled with respect to land use mix[15].) The toolkit also includes over 90 case studies providing specific examples of how these guidelines have been implemented in various neighborhoods across Los Angeles County. AVTA, in conjunction with Antelope Valley municipalities, can adopt this toolkit to use as a guide for future developments around major mobility hubs to set development and design standards and guidelines to ensure that future developments are working with transit, and sets the Antelope Valley up for success as it continues to grow and develop.

While the Antelope Valley is not known for its transit-supportive land use choices, there are some examples of existing developments that contain transit-supportive characteristics, such as along Lancaster Boulevard. The

[15] https://www.metro.net/projects/tod-toolkit/complete-neighborhoods/

stretch of Lancaster Boulevard between Sierra Hwy and 10th St. West displays active storefronts that encourage pedestrian interaction, decorative pedestrian infrastructure, trees, benches, bicycle amenities, adequate lighting, and outdoor dining. Retail centers have parking behind the buildings to create a continuous street wall not broken up by large parking lots. While still auto-oriented with a proliferation of on-street and median parking, these design features are important in creating a sense of “place” where people want to spend their time and is considered a community destination. Indeed, despite high temperatures during the summer months, pedestrians can still be seen along Lancaster Boulevard. While good foundational elements exist along this corridor, much can be done to make it more supportive of transit and modes of active transportation and less dominated by cars.

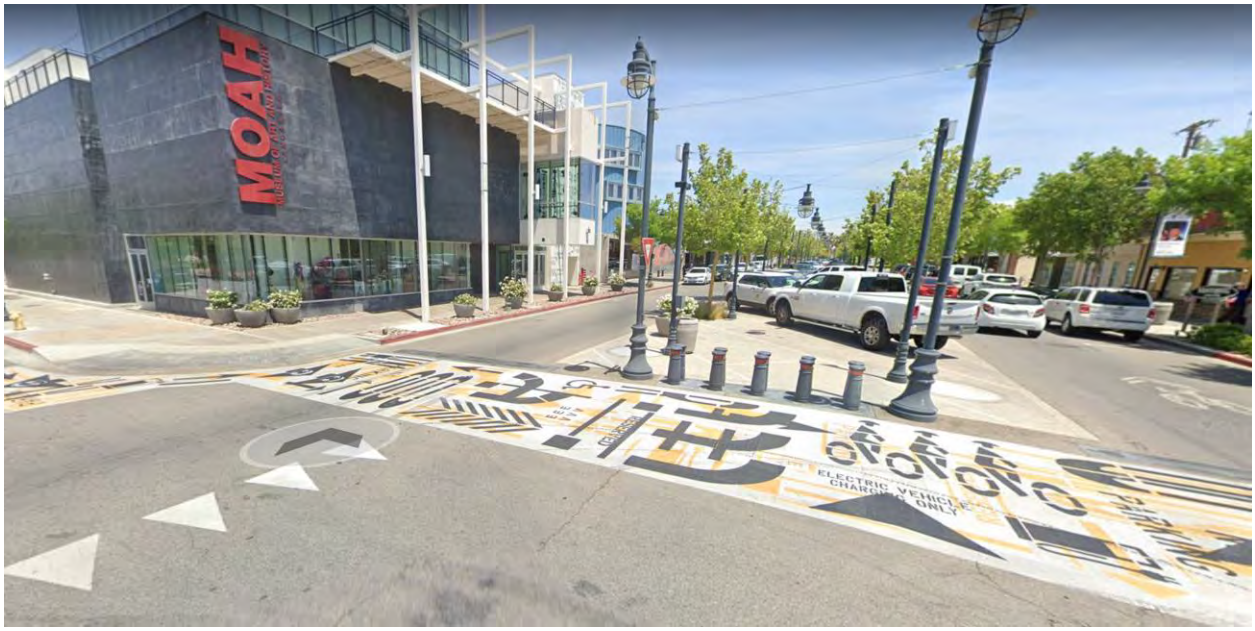


Figure 15: Lancaster Bl is a good example of person-centric design.

Development that is supportive of transit is also seen at the intersection of 10th St. West and Jackman St (Figure 16). The apartment complex displays mixed-use development with ground-floor retail. Mixed-use development brings land uses and amenities closer together, allowing for reduced travel distances, more non-automobile trips, and can overall reduce VMT. This specific development also displays active uses at grade level and front door access close to a high-frequency bus stop (Route 1), further reducing the need for automobile trips. According to Metro’s TOD Planning Toolkit, locating parking areas away from the primary street frontage and placing buildings towards the edges of streets and public spaces helps to create walkable urban environments by providing a sense of definition to streets and emphasizing pedestrian access. Parking is not located in front of the building, acting as a barrier to those accessing the building via transit. Instead, parking is located behind the development, creating a continuous wall of active storefronts and making the retail and residential destinations more accessible to transit users. Applying these principles of mixed-use development to create compact neighborhoods with a mix of uses supporting multimodal transportation systems can support and encourage transit use.

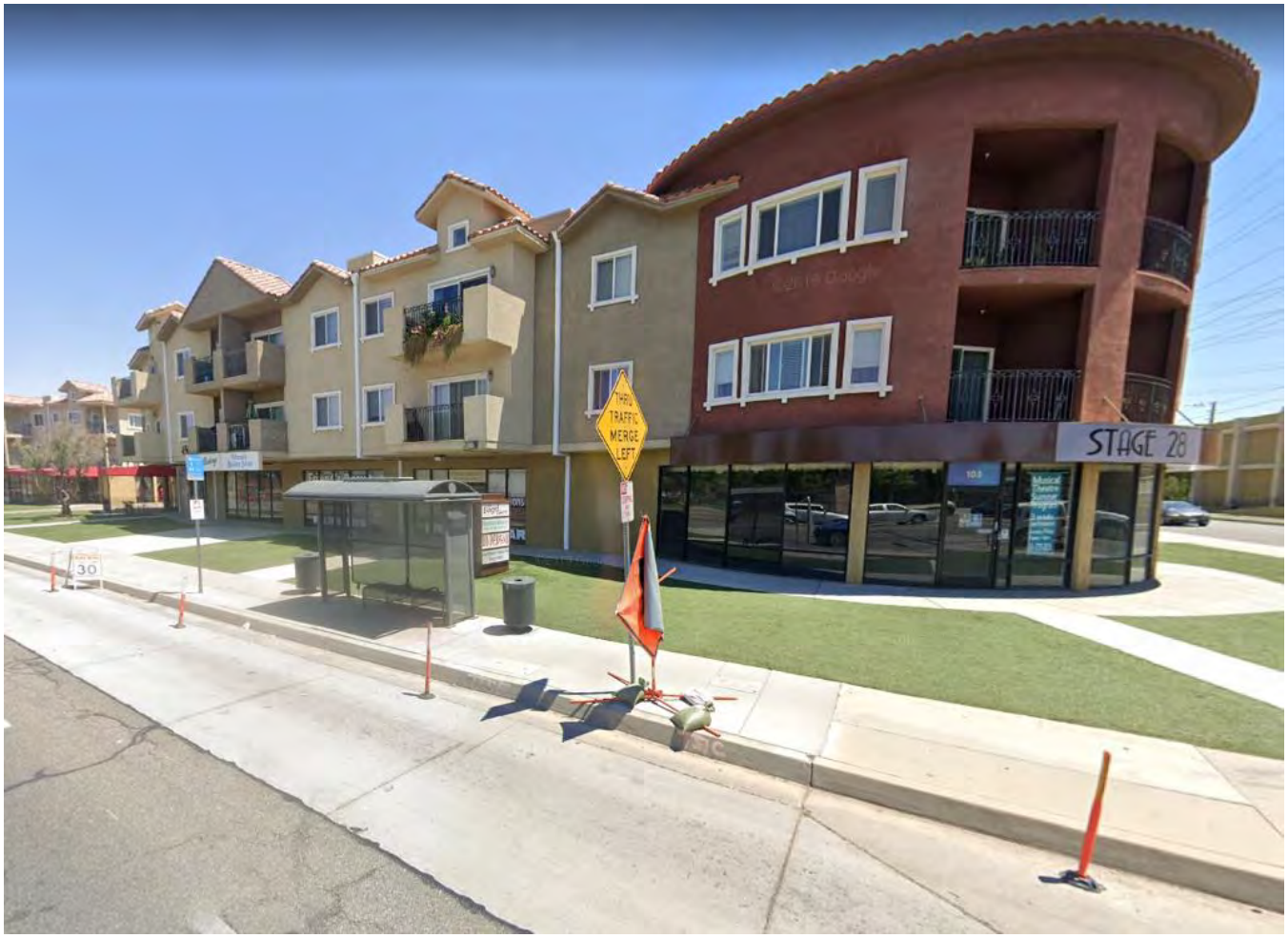


Figure 16: Transit-supportive mixed-use at 10th St W and Jackman St.

While truly transit-supportive land use and development changes will likely be seen implemented over a longer period of time, there are small changes to existing developments that can make them more accessible to transit use. For example, enhancing the pedestrian infrastructure at the Antelope Valley Mall by providing a safe, direct means for getting from the bus stop to the actual mall can increase accessibility, and creating active storefronts that are pedestrian-scaled for businesses in the area supports many transit-oriented development policies.

Similarly, the Valley Central shopping center can become more supportive of transit by providing the necessary pedestrian infrastructure to access destinations safely and easily from the bus stops, and through-block passages for pedestrians can be established to the adjacent residential neighborhood located behind 25th St. West to create more direct ways to access bus stops and destinations. It is important for AVTA to make a sustained effort to work with municipalities and developers to establish transit-supportive development goals that can create vibrant, sustainable communities that work with and encourage transit use as opposed to private vehicle usage.

BOX 4. Transit-supportive big box retail

Big-box commercial retail centers are traditionally known to be auto-centric developments, catering to those with personal vehicles. However, the Keele-Finch Walmart commercial center in suburban Toronto shows that this does not have to be the case, and big-box developments can be economically successful when they cater to both transit and car users. Instead of providing front parking, no street entrance, and no right-of-way pedestrian-scaled frontage, the project added active street elements, front door access close to transit stops, streetscape improvements, rear parking, pedestrian facilities, and cycling amenities. A travel and parking survey revealed that roughly 45% of total trips to the Walmart happened via transit, and that only half of the parking spaces are occupied during the peak/busiest period. This example shows that by proactively planning for multimodal transportation options and placing transit access as a priority in the development process, more people will access the development by using transit. In addition, developments of this type help to enhance the accessibility and mobility of those who are transit-dependent by making it easier to access destinations from transit stops.

3.10 INFORMATION AND OUTREACH (BILINGUAL AND ACCESSIBLE)

Simply put, outreach and informational materials are two main ways that a community can learn about and engage with a transit agency. It is important that agencies use effective outreach strategies that maximize their reach and sphere of influence while engaging new potential riders and maintaining rider loyalty by providing timely service updates and responding to customer comments. There are many ways that outreach can take place, including through social media, text/email message blasts, targeted campaigns, and participation at popular community events. AVTA is already doing many of these things; continuing to use strategic outreach to become easily recognizable in the Antelope Valley and utilizing best practices can help to make outreach more effective. Likewise, providing information resources (including system maps, schedules, and timetables) that are effective and accessible to the entire service population is necessary as well.

3.10.1 Information

As over 30% of the Lancaster/Palmdale urban area is comprised of households where Spanish is spoken at home[16], AVTA needs to ensure that bilingual information is readily and conveniently available to riders with limited English proficiency (LEP). While AVTA may already provide these resources and has identified reasonable steps for providing language assistance to persons with LEP under their FY 2018 LEP Plan, feedback from riders heard during community outreach reveals that bilingual information resources are not always available onboard buses and at transit centers, and bilingual customers have had negative experiences when contacting customer service representatives. Because of the large Spanish-speaking population that uses AVTA serves, it is important to maintain up-to-date schedules, maps, and information in Spanish onboard buses.

Example of a bilingual ad for LIFE TAP fares from Metro.

It is also important to provide information in ways that are accessible to those with various impairments that can act as barriers and make transit use more challenging. For example, navigating transit systems and accessing

[16] American Community Survey 2017 5-year estimates

information can be difficult for those with visual impairments. Various strategies, such as sensory substitution (verbal communication is substituted for visual communication) and tactile cues (such as tactile paving that informs a visually impaired person that they have reached the location to wait to board the bus at, or accessible audio or tactile system maps (such as those used by San Joaquin RTD[17]) can help to make fixed-route use easier and potentially encourage DAR users to use fixed-route services[18]. AVTA can also consider the creation of an Accessibility Advisory Committee (AAC) that can meet on a regular basis to provide insights and recommendations regarding accessible information services.

One of the most important information sources provided by a transit agency is its system map. Transit system maps are distinct from other topological maps in that they are schematic diagrams used to illustrate the various routes and stations within a public transit system. Elements are simplified, graphic symbols are used to represent realistic images, and diagrammatic representation of lines (straight lines and fixed angles) that may not be geographically accurate are used to help users efficiently use the system that the map is displaying. Unnecessary details are omitted and most effective designs are streamlined and simple to maximize effectiveness. In essence, all details included in the map should be related to displaying the lines in a clear, straightforward manner. Additionally, transit maps are especially important because they are part of the service area's overall image, and if the design is effective and powerful, it can positively influence both the city and the transit agency in a positive way, helping to create the brand and identity of the service area[19]. To fully reap the benefits of an effective system map, AVTA should revisit its current system map with these best practices and design guidelines in mind, and can gain inspiration from other local bus agency maps, such as that of the Culver City Bus system, Santa Monica Big Blue Bus, Burbank Bus, and Long Beach Transit. Eliminating the 3D point-of-view and extraneous details like Joshua Trees and focusing on the transit network is essential for enabling effective and clutter-free wayfinding.

3.10.2 Outreach

Social media is one of the most powerful ways to connect with a large number of people using relatively few resources. Transit agencies can utilize effective social media to connect with their customers and personalize what can otherwise appear to be a "faceless bureaucracy." Transit agencies utilize social media for many reasons, which can broadly be grouped into the categories of timely updates, public information, citizen engagement, employee recognition, and entertainment[20].

Transit agency social media accounts can be powerful tools for providing a "personal touch" by responding to comments, questions, and requests in a genuine and meaningful way. If sincerity is conveyed in responses to customer input and inquiries, it can help to create a more positive impression of the agency. From a quick glance at AVTA's Facebook page, it is clear that AVTA is already doing this. For example, a customer commented on a post requesting a bus shelter be installed at a bus stop in Sun Village, and AVTA's response was informative, personal, and sincere. Responding to every valid customer comment in a timely manner is one way to enhance the effectiveness of AVTA's social media accounts.

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[17] http://lighthouse-sf.org/2017/12/06/san-joaquin-rtd-introduces-accessible-transit-maps-in-collaboration-with-lighthouses-mad-lab-and-ccbvi/
[18] https://www.citylab.com/transportation/2019/07/visually-impaired-app-technology-tag-sign-assessible-transit/594190/
[19] https://www.planetizen.com/node/81397/how-design-better-bus-transit-map
[20] TCRP: Uses of Social Media in Public Transportation (2012)

Service alerts and announcements are not the only types of service changes that warrant posting on social media. In fact, the posts that receive the most traction on AVTA's social media accounts are those detailing service improvements in real-time, such as the installation of bus shelters (see below). As additional bus shelters are one of the most commonly-requested service improvements, highlighting these successes can help to boost the public perception of AVTA and spread awareness about these new features to those who otherwise may not know about it. AVTA should also continue to use social media to promote its services and to let the community know when it is at events, such as the Instagram posts below advertising their "Cooling Buses" at the Antelope Valley Fair and Grace Fest, as these receive positive feedback from the community and continue to promote awareness and a positive public impression of the agency.

avta_1 • Follow

avta_1 The "Coolest" all-Electric Bus in town is at @gracefestav, keeping people cool while they have fun! #empoweringmobility #gracefestav #cleanair #zeroemissions #avtaleadingtheway

1d

This is AWESOME!

1d Reply

Thank-You. AVTA

1d 1 like Reply

Liked by and 34 others

1 DAY AGO

Add a comment... Post

avta_1 • Follow

avta_1 It's Senior Day at the @avfairgrounds, and the "Coolest" buses in town are providing shelter and relief from the heat!

2w

avfairgrounds 😍 ❄

2w 1 like Reply

Nicely Done!! 👏😎😎

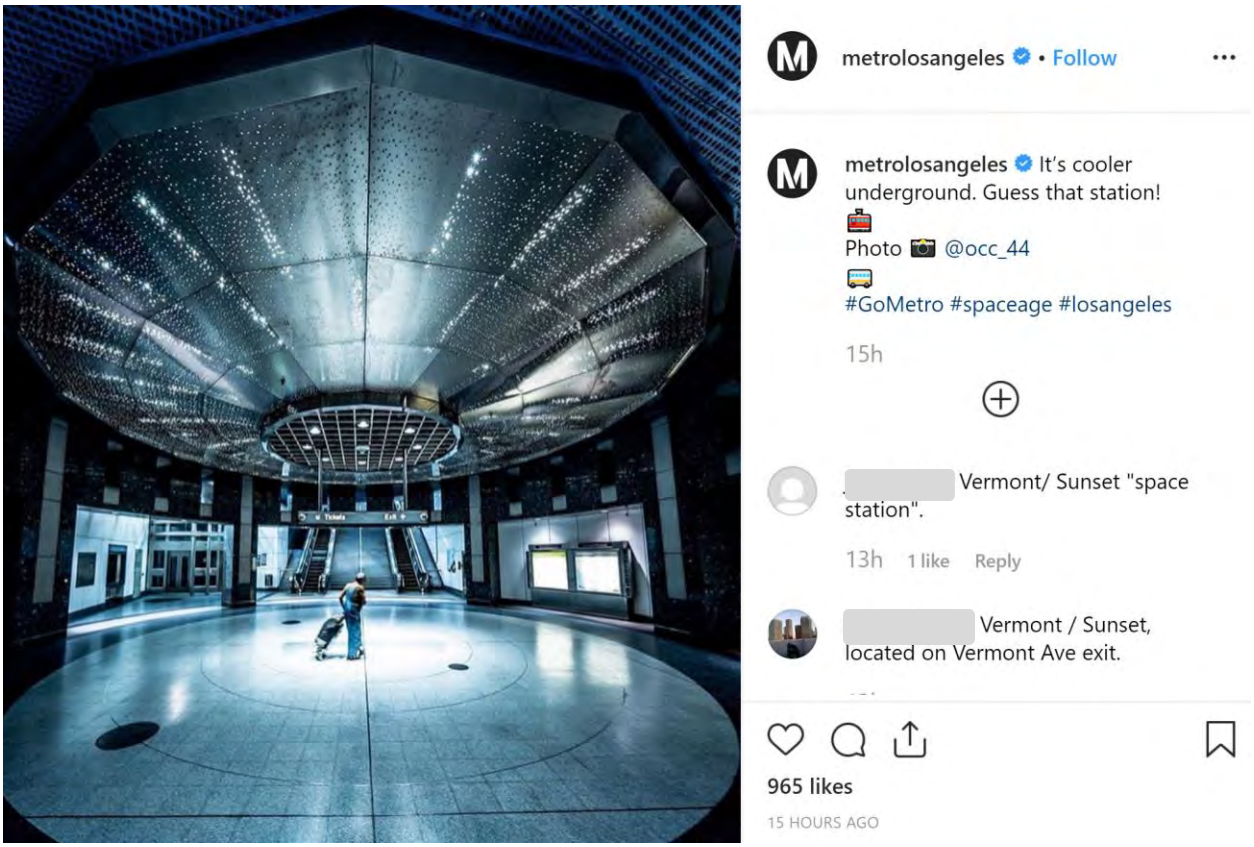
2w 1 like Reply

Liked by

AUGUST 19

Add a comment... Post

Social media posts do not have to be limited to service announcements and promotions. Many transit agencies are using social media to engage followers with trivia or other activities that encourage public participation. For example, LA Metro's Instagram account will post "guess that station" images, which encourages followers to engage with and participate in the post, while GTrans in Gardena offers old bus stop signs as trivia rewards. Small actions like this can help to actively engage AVTA's social media followers and help attract new followers, which can encourage ridership and foster a positive perception of AVTA as an agency.



It is important to acknowledge that despite the growing popularity of social media, it is not realistic to totally rely on social media platforms to reach the service area population, as some people who are tech-savvy do not have social media. In addition to providing information about service changes, promotions, and special events via social media, AVTA should also engage in sending these updates to riders through email and text message blasts. As with other outreach forms, equity and accessibility considerations should be given for those who do not speak English and those with disabilities for whom reading print may be difficult.

For example, one can receive LA Metro text/SMS service alerts automatically to their cell phone, which are forwarded messages from the LA Metro Rider Alerts Twitter account. By linking text service alerts to the already active AVTA Twitter, riders who do not have or do not regularly check social media can be kept up-to-date on service alerts and new promotional events. Metro also offers email alerts and updates, allowing users to choose which topics they would like to receive emails and alerts about[21]. While AVTA offers an E-News signup, topics are

[21] https://www.metro.net/riding/mobile-resources/email-mobile-alert/

limited to board meetings, TAC meetings, and press releases. Expanding this to include service alerts and promotional events can help AVTA to reach and engage with a larger portion of the Antelope Valley.

Campaigns at schools and senior facilities are another worthwhile outreach approach as students and seniors are traditional populations of transit riders. Engaging with Antelope Valley College and the University of the Antelope Valley about how taking AVTA to and from school can be a convenient, easy, and cost-effective option (especially highlighting the new route 8 for AVC students) may help to boost student ridership. This can also be done at the public high schools served by supplemental routes 94, 97, and 98, with campaigns focused on the importance of paying your fare and proper behavior and etiquette to display while onboard the bus. Campaigns at senior facilities can focus on how AVTA can increase one's mobility, and provide travel training and trip-planning assistance.

It is also important that AVTA continue to participate in public events that can increase their visibility in the community. We acknowledge that AVTA is making a concerted effort to do this, such as their presence at JetHawks games, the Antelope Valley Fair, and Lancaster National Night Out. Expanding this to more events, such as Monday Bitez in Lancaster and the Lancaster BLVD Farmers' Market can help to expand their visibility further. It is also recommended that the focus of AVTA's presence at these events is to educate community members on what AVTA is and the services the agency provides; our focus group meetings with non-riders showed little brand familiarity with AVTA. This can also be an opportunity to highlight new service improvements (such as the recently-increased frequencies on route 1 or newly-installed bus shelters) and solicit feedback from the community. Becoming a regular, consistent participant in these events can also help to foster relationships with community organizations, local businesses, and stakeholders who have similar goals to AVTA, which can grow into opportunities for collaboration and partnerships.

3.10.3 Branding

A transit agency's brand is communication tool. It is the image a transit agency projects about itself and can be used to support the underlying service and customer service commitments. In its current existence, AVTA's brand is not overly memorable or striking. The dedicated brand has been used since the agency was created in 1992 and has an "old feel" to it.

While it is commendable that AVTA has a dedicated brand, the visual language of the logo is antiquated and in need of an overhaul. The depiction of a road within the AVTA logo is confusing and does not necessarily speak to public transportation. Distinct, catchy brands with modern visual and verbal language that speaks to its intended audience are increasingly becoming norm in the transit industry. A good local example of a strong brand is Santa Monica's Big Blue Bus. Its brand is strong, visual identity modern, and well known to even non-transit riders.

Stantec encourages AVTA to invest into a refreshed branding strategy that raises the profile of transit and mobility in the community and creates desire in potential customers. In fact, other peer agencies such as MiWay (Mississauga Transit) in Ontario Canada, that have recently invested in a rebrand have seen ridership increase from 5-8% from the new excitement that is created. Branding particular service layers, such as the frequent network, is also industry best-practice. We believe AVTA should retain a marketing consultant to assist in the development of a new brand strategy to modernize the agency's public identity. It would be ideal to implement a new brand in tandem with service changes contemplated throughout this Strategic Mobility Plan.

3.11 COLLABORATIONS AND PARTNERSHIPS

Collaborating with local businesses and municipal decisionmakers will be essential for implementing many of the recommendations from this mobility plan. Being creative with and open to advertising and marketing opportunities can help AVTA grow into an important contributor to daily life in the Antelope Valley.

3.11.1 Municipal, county, and other governmental partnerships

- A major part of this plan requires building communities that physically encourage and foster public transit usage. This requires that the built environment be walkable, dense, and convenient to transit, even if that means some inconvenience for drivers. While we recognize that this is typically beyond a transit agency's jurisdiction, we strongly recommend that AVTA advocate for a bigger role in decisions occurring within its service area, particularly when it relates to land development and street redesigns. AVTA should be playing a proactive role to help city staff and developers understand the impacts of their decisions regarding transit ridership. If guiding plans talk about density and less sprawl, but actual development occurs with back-fenced communities and no sidewalks, transit will be unproductive and shouldn't be supplied to these areas.

  AVTA should work to be part of decision-making bodies in the cities/areas it serves, as well as form a task force that meets every two months to discuss development and street design issues that can encourage transit ridership.

  If AVTA has a seat in land use and transportation planning bodies, AVTA can provide input into processes that shape how communities are built and whether they work for transit.

BOX 5. Transit supportive developments and urban planning.

Urban planning, development regulations, and urban design play substantial roles in the outcome of the success of public transit—sometimes more than is appreciated. However, these elements are typically outside of the control of a transit agency. Metro provides an excellent toolkit for transit-supportive planning (https://www.metro.net/projects/tod-toolkit/) that outlines specific policies and programs that can be used to promote development in a transit-oriented manner. This useful tool provides ways that local agencies and developers can better integrate land use and transportation planning strategies to encourage travel by non-single occupancy vehicles, for instance, using strategies to improve street connectivity like prohibiting cul-de-sacs and providing through-block pedestrian and bicyclist passages.

AC Transit in the Bay Area has a page on their website called "Urban Planning" that provides an overview of the impact of planning on transit outcomes. AC Transit also developed a manual (Designing with Transit; http://www.actransit.org/wp-content/uploads/designing_with_transit2.pdf) that provides an easy-to-read overview of the basics of transit service and planning, and policies geared toward policymakers, councilors, and interested members of the community to use and advocate for better transit-oriented developments, including:

- Develop dense, mixed uses in locations with good transit access
- Plan bus corridors to maximize their potential for transit-oriented development
- Manage parking as part of an overall transportation and land use strategy

The key to all this is engaging the public, decisionmakers, and developers so that they have a good understanding of the outcomes of the choices they make regarding transportation; transit **can't be successful if places aren't designed and developed with people in mind.**

Transportation demand management is crucial, and AVTA should work to develop a task force whereby developments in the service area need to address a minimum set of transportation elements, such as sidewalks, street connectivity, and parking siting.

- Related to outreach, AVTA should advocate together with other local active transportation players, such as the High Desert Cyclists, and other advocacy groups like the Antelope Valley Partners for Health who advocate for safe routes to schools and pedestrian safety. Co-organizing or co-sponsoring events like walkable streets such as CicLAvia in Los Angeles where streets are closed to traffic and opened to walking and cycling may help build a broader coalition for more inclusive mobility. Working to advocate for

local bike-to-work day or bike week, and hosting bicycle repair clinics at transit hubs are some ideas that can improve the bicycle/transit transportation cocktail.

3.11.2 Neighborhood associations

- Back-fenced suburban subdivisions create substantial barriers to walking or rolling and transit use—a walk or roll that could be direct is forced to be longer due to dead ends, cul-de-sacs and walled communities.

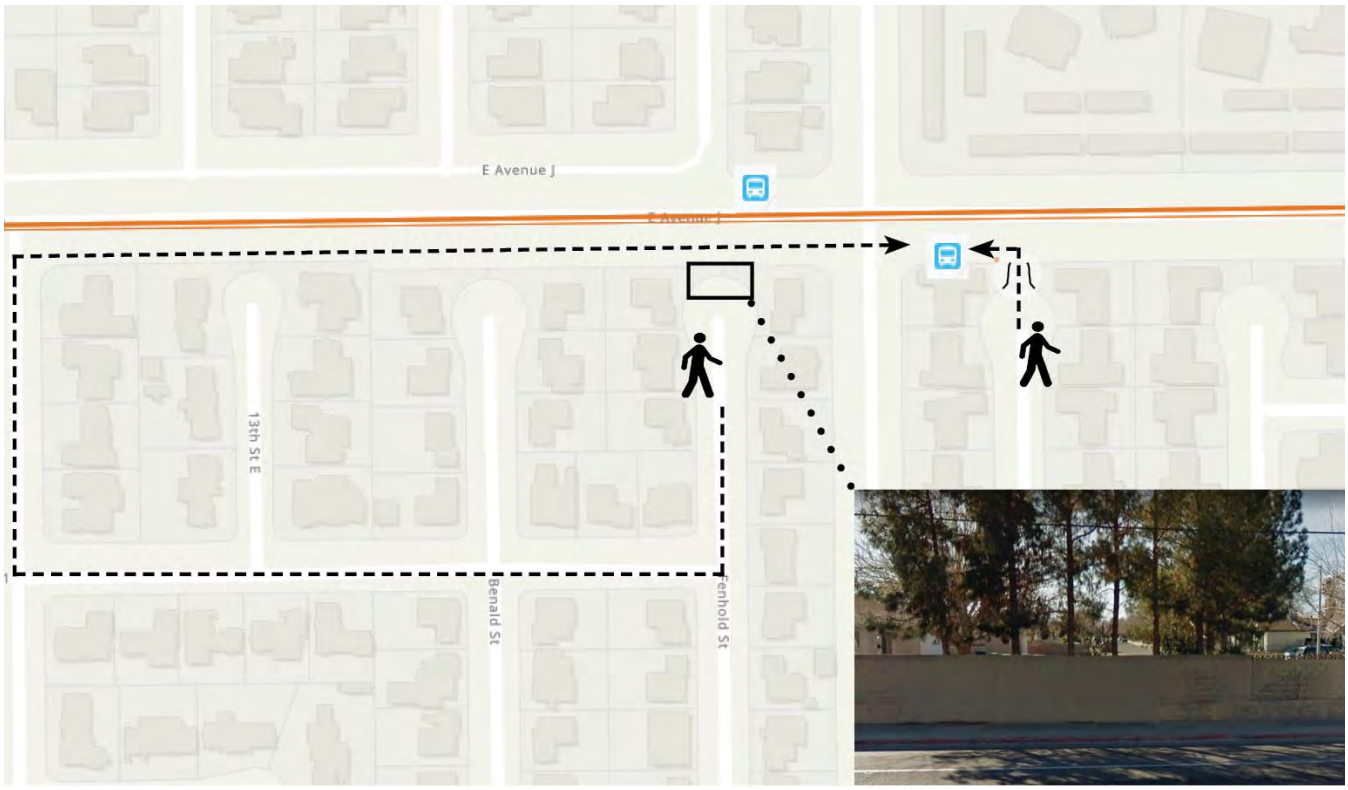


Figure 17: Poking a ped-bike link (*right*) through the wall of a cul-de-sac can substantially reduce the walking distance to bus stops compared to walled-off cul-de-sacs (*left*).

For example, Figure 17 shows that walled-off cul-de-sacs along Ave J. where we propose a frequent route could require a 10-minute walk to reach the nearest bus stop for the person on the left. By poking or piercing a pedestrian or bike-only path or link through the wall (inset) could provide a much shorter walk, as schematized for the person on the right. Working with neighborhood associations or residents, AVTA can help advocate for creating pedestrian shortcuts that can minimize walk distances to bus stops, where possible.

3.11.3 Local businesses/employers

- AVTA has collaborations with Edwards and Mojave providing commuter services and discounted fares—large employers are interesting potential partners, but so are smaller businesses that may benefit from having employee-discounted transit passes. Partnerships with hospitals and healthcare providers can also ensure that AVTA provides transit information at these locations. Finally, AVTA could develop partnerships with local businesses to provide an incentive or reward benefit program of transit riders with

valid TAP cards. Metro operates a “Destination Discounts” program[22] that offers customers small discounts at events, museums, restaurants, and retail stores to encourage both transit and local businesses. AVTA should investigate potential partnerships that provide similar incentives.

3.11.4 Schools and educational institutions

- AVTA has existing relationships with schools, such as Antelope Valley College, providing service via route 8 and discounted fares for students. Moreover, AVTA provides school service via supplemental routes. However, AVTA should try to reach a larger student market by providing discounted fares for all students enrolled at secondary and post-secondary schools; depending on the successful uptake of the pass and usage (beyond trips for school), AVTA may wish to expand this to primary school students too.

  Similar to Metro’s TAP card programs, reduced fares can be provided for qualified students, including discounted one-way and monthly passes. Robust outreach and engagement with school administrators are necessary to build support for such a program, and other opportunities can be leveraged too, including demonstrations about riding the bus at various schools. Research has shown that people who try and use public transit at a young age tend to use it more often as they reach adulthood compared to people who do not use public transit. As such, AVTA should work with schools to cultivate a positive transit image for students.

[22] See https://www.metro.net/places/destination-discounts/ for examples.

BOX 6. Transit service guidelines and standards.

Throughout this **study and more specifically discussed in this report, it's clear that AVTA** should develop and adopt objective and transparent service standards or guidelines. Transit service guidelines help a transit agency define what service should be provided where, when and why, how design decisions are made, and provide a rational approach to service design and delivery. Moreover, these guidelines can inform customers about the decision-making process. So for instance, if the design guideline for commuter routes states that trips must be at least half full, and that any trips not meeting the guideline should be targeted for corrective action and if no improvements occur, then the trip is deleted, AVTA can clearly point to a defensible standard that informed the decision to remove a commuter trip. Finally, service guidelines define the thresholds or minimums expected by third-party operators. AVTA currently provides some guidelines in its Title VI report (Chapter 3), but we recommend that AVTA develop standalone standards informed by actual performance and desired outcomes, similar to examples from Santa Monica, Metro, and TransLink:
https://www.bigbluebus.com/uploadedFiles/Content/Newsroom/News/BBB_Service%20Design%20Performance%20and%20Evaliation%20Guidelines_%202015.pdf;
https://media.metro.net/images/service_changes_transit_service_policy.pdf;
https://www.translink.ca/~/media/documents/plans_and_projects/transit_service_guideline/transit%20services%20guidelines%20public%20summary.ashx

4.0 PERFORMANCE MEASURES

Performance measures help transit agencies understand performance at various levels of different functions. For the purposes of the discussion here, we explore performance measures at both a network or system level, as well as at the route level.

AVTA must report certain metrics to the FTA for NTD reporting, and these aggregate annual statistics can be used, as we did in earlier tasks, to compare overall performance against peer systems to check how AVTA compares on a performance range on metrics like ridership per capita, operating cost per revenue hour, and farebox recovery ratio.

The overall desire of this study and the mobility plan is to provide more mobility options for travel in the Antelope Valley while making AVTA more effective and efficient. To evaluate the outcomes of this plan, which argues for a multimodal approach to mobility, we developed measures that are traditional transit industry measures, customer-centric, and informed by AVTA's mission statement:

*AVTA Empowers Mobility—Getting People Where They Need to Be **Safely, Timely,** and **Cost-Effectively**.*

The measures proposed here are in line with the industry state of the practice and build upon existing performance measures reported by AVTA at monthly board meetings.

4.1 SAFELY

Safety and security were common themes that emerged throughout public consultation. Many members of the public mention lack of safety while waiting at bus stops, including poor lighting or visibility, sense of endangerment when walking to bus stops that lack adequate pedestrian facilities, as well as some perceived safety issues while riding transit.

AVTA needs to do more to ensure a sense of security, real and perceived, to encourage more people to try and rely on public transportation. Working to advertise safety policies and actions, working with public works to identify and prioritize pedestrian infrastructure, and responding quickly and professionally to customer complaints can help AVTA address safety concerns. Ensuring vehicles and bus stops are clean can reduce the perception of danger that's typically correlated with physical disorder—cleanliness also is a strong predictor of customer satisfaction and passenger comfort. Verifying and enforcing fare payment can also contribute to an improved sense of safety. Finally, ensuring that vehicles are well-maintained and in good working order is critical for passenger and operator safety, as well as vehicle reliability.

Table 5: Proposed safety performance measures.

Measure	Rationale	Description	Notes
Customer injury incidents	Measuring incidents, both preventable and non-preventable, per 100,000 boardings provides an indication of the safety of overall transit service. Incidents include slips, trips, collisions and	Injury incidents per 100,000 boardings	Incidents will be reported quarterly and be compared to previous quarters and the target.

Measure	Rationale	Description	Notes
	other events on AVTA property (bus stops and vehicles).		
Offenses against customers and staff	Enforcement at transit facilities and onboard vehicles will reduce offenses against customers and staff, making everyone's journey on AVTA more safe, comfortable and enjoyable.	• Offenses against customers will be measured per 100,000 boardings • Offenses against staff will be measured per 10 employees	Reported quarterly and compared to previous quarters and the target. Offenses include, but aren't limited to mischief, harassment, sexual assault, robbery/theft, and indecent exposure. Identifying trends and high-risk areas can help develop mitigation plans.
Fare inspection and evasion	Minimizing fare evasion, whether a complete fare evasion or purposefully paying the incorrect fare for the trip, is in AVTA's and the community's best interest. AVTA requires fare revenue to invest in consistent and quality service. Fare evasion can also contribute to a sense of disorder and lack of safety.	• Transit enforcement should strive to inspect a set target of fares reported as a percentage of boardings. • Fare evasion rate should be reported as a percentage of inspected fares.	Reported quarterly and compared to previous quarters and the target.
Bus stops with shelters and lighting	Proper lighting is important for a sense of safety, and shelters can provide protection from weather.	Percent of bus stops with shelters and lighting.	
Bus stops with sidewalk infrastructure/accessibility	Sidewalks, curb cuts, and other important infrastructure are necessary for a walkable and accessible transit network—safe access includes crossing signals and pedestrian markings.	Percent of bus stops connected to sidewalk/pedestrian network.	
Road calls and change offs	Road calls and change offs indicate vehicle issues that can	Average daily number of vehicle-equipment failures requiring road calls	

Measure	Rationale	Description	Notes
	impact safety perception, as well as timely journeys	(repairs) or vehicle change offs (replacement)	
Vehicle reliability (mean distance between failures, MDBF)	Large distances between failures indicate good maintenance practices the ensures passenger and operator safety and ensures vehicle and service reliability	Total miles accumulated for the entire fleet compared to the total number of chargeable mechanical road calls.	
Safety perception on customer satisfaction surveys	Biennial customer satisfaction surveys can help AVTA track factors that influence safety perception	Average satisfaction with safety onboard vehicles and waiting at stops	AVTA should conduct biennial customer satisfaction surveys
Customer Complaints and Compliments	Customer complaints and compliments from different sources, including 311 and social media channels will be tracked and reported monthly.	Complaints per 100,000 boardings	

4.2 TIMELY

Valuing a customer's time is one of the most important things a transit agency can do—travel time (which includes access to a bus stop, waiting, in-vehicle time, transfer time, and final walking time) is one of the strongest predictors of customer satisfaction with a transit trip.

Ultimately, transit agencies would be able to match travel times with personal vehicles, but the reality of transit requires tradeoffs—route alignments that are informed by land use patterns, urban development, and the location of destinations and transit markets. Bus stop placement and density, together with any priority treatments will greatly impact bus travel speeds and travel times. Externalities like traffic, construction, and inclement weather can all take a toll on travel times and speeds.

We also argue that timely involves reliability—that is, how reliable and consistent is transit service? Reliable service and information enable timely trips while building customer satisfaction and loyalty.

Table 6: Proposed timeliness performance measures.

Measure	Rationale	Description	Notes
Door-to-door travel times	Journey travel times are strong predictors of satisfaction and the	The median of door-to-door travel times derived from biennial	AVTA should conduct biennial customer satisfaction surveys

Measure	Rationale	Description	Notes
	attractiveness of public transportation	customer surveys querying specific (last) journey on transit	
Destinations accessible within a 30-minute and 45-minute travel time	Transit provides access to opportunities, and ensuring that key destinations are reachable within a reasonable travel time is an important goal for AVTA	The median number of destinations (jobs, healthcare, etc.) accessible by transit within 30 and 45 minutes of travel time (from key locations)	AVTA can use the Jane tool in Remix to evaluate access to/from key destinations
Route miles with all-day frequent service	Frequent service provides flexibility when using transit, enabling spontaneity and attracting more ridership	Revenue miles operated at 15-minute or fewer headways as a percentage of total revenue miles	Frequent service is a strong predictor of route productivity but is expensive to provide and needs to be deployed where the market is supportive
Population within ½-mile of frequent service	Frequent service provides flexibility when using transit, enabling spontaneity and attracting more ridership	The total population living within ½-mile (10-minute walk) of a bus stop with frequent (15 minutes or better) service as a percent of total population living with ½-mile of any AVTA bus stop	
Reliably – headway regularity on frequent routes	Reliable service is timely service—ensuring that customers can complete journeys consistently plays a major role in transit attractiveness	For service with 15-minute (or better) headways, headways should be measured and headway variability should be measured: • Gapping – actual headways should operate at no more than 120% of scheduled headways 80% of the time • Bunching – actual headways should operate at no less than 25% of scheduled headways 95% of the time	

Measure	Rationale	Description	Notes
Reliably – on-time performance (punctuality) for non-frequent routes	Punctual service, schedule adherence, is important for consistent journey times and customer satisfaction. Delayed buses can make a passenger late, while a missed bus (early departure from a stop) may mean an extra-long wait for the next vehicle	Departure from time points that are early (0 minutes early than scheduled time) and late (more than 5 minutes late than scheduled time) as percentages of all recorded time point stops	
Reliably – Short lines/turns	Unscheduled short turns or lines, where a vehicle does not complete its scheduled trip, can reduce reliability and customer satisfaction	Total short turns or lines per month (as well as a percentage of total trips per route)	Eliminate or minimize short turns to the extent possible.

4.3 COST-EFFECTIVELY

Cost-effective results from ridership, efficient use of resources (right-sizing service for demand), and the right-pricing of transit services. The measures provided in the table below (Table 7) aim to capture the performance of a range of services, particularly since the industry measure of productivity, boardings per hour, is truly geared towards routes that are frequent and provide useful service throughout the day, like route 1.

Table 7: Proposed cost-effective performance measures.

Measure	Rationale	Description	Notes
Average fare	The use of different fare concessions can be tailored to income levels, etc., and the average fare paid can provide a general sense of the fare revenue recouped by AVTA at the system and route levels	Total fare revenue divided by total boardings (per route, and network-wide)	
Farebox recovery ratio	AVTA should maintain at least a 20% farebox recovery ratio (network-wide)	Total farebox revenue divided by total operating cost (per routes, and network-wide)	As per TDA requirements and to demonstrate fiscal viability
Productivity (boardings per revenue hour)	Boardings per revenue hour provides a good indication of the utility of transit service—that is, ridership relative to the cost	Passenger boardings divided by revenue service hours (per route, and network-wide)	

Measure	Rationale	Description	Notes
Productivity (boardings per revenue mile)	Boardings per revenue mile provides a good indication of transit utility particularly if travel speeds are low	Passenger boardings divided by revenue service miles (per route, and network-wide)	
Boardings by time of day and day of week	Useful transit service can help riders travel at all times of the day for different trip purposes, beyond commuting. Peak service, due to scheduling and split shifts can be costly compared to providing all-day consistent service.	Average passenger boardings by hour of day, and day of week	
Cost per passenger boarding	Tracking the cost per boarded passenger can help AVTA measure cost-efficiency	Net cost (operating cost less fare revenue) divided by total passenger boardings	
Cost per revenue hour	Tracking the cost per revenue hour can help AVTA measure cost-efficiency	Net cost (operating cost less fare revenue) divided by total revenue hours	
Cost per revenue mile	Tracking the cost per revenue mile can help AVTA measure cost-efficiency	Net cost (operating cost less fare revenue) divided by total revenue miles	
Subjective 'value for money' for paid fare	Customer-centric measure of cost-effectiveness	Satisfaction with fair paid or 'value for money' based on biennial customer surveys	AVTA should conduct biennial customer satisfaction surveys

5.0 SUMMARY AND NEXT STEPS

Based on the analysis, feedback, and needs and opportunities assessment, we developed a series of service concepts and strategies aimed at achieving the objectives of the regional mobility plan for the Antelope Valley.

The overall goal is to **help AVTA play a more substantial role in the mobility of the Antelope Valley and to provide useful transit service that can be the foundation of multimodalism, that can include cycling, walking, car-sharing, ride-sharing, and other non-single occupancy vehicle trips. By advancing these goals, AVTA plays a bigger part in developing a sustainable and equitable community.**

The table below (Table 8) summarizes the 11 service concepts and how they aim to address the various objectives of the plan.

Table 8: Summary table of plan objectives and service concepts and strategies.

Service concepts and strategies / **Objectives**	Service layers	Transit infrastructure (hubs, stops, etc.) and universal accessibility	Alternative service delivery (on-request service)	Revised schedules	Operator training	Emergency ride home (and car/vanpooling)	Travel training	Fare policy	Transit-first developments	Information and outreach (bilingual and accessible)	Collaborations and partnerships
Faster service	■	■		■							
More frequent service	■		■			■			■		
Shorter walks	■	■	■						■		■
More reliable service	■	■	■	■	■	■				■	
Better integration of land use and transportation	■	■	■						■		■
Better customer experience	■	■	■	■	■	■	■	■	■	■	■
Better bus stop access or access to transit	■	■	■			■	■		■		■
Better regional connectivity	■		■	■		■		■	■	■	■
Better access to destinations (jobs, healthcare, etc.)			■	■		■	■		■		■
More inclusive ridership base	■	■	■		■	■	■	■		■	■
Safer and more secure		■	■		■	■			■	■	■
More cost-effective service	■	■	■	■		■	■	■			■

The 11 service concepts include strategies for addressing discrepancies in transit demand and service provision throughout AVTA's vast service area, focusing on service layers or tiers that aim to match service levels and design to the level of transit demand. Simply put, more frequent service should be devoted to areas that are dense, walkable, and mixed-use, while flexible on-request service, similar to dial-a-ride service in principle, should be provided to lower density communities.

The other strategies aim to support a more successful and useful transit network to enable broader mobility beyond single-occupancy vehicles, including:

- Redeveloping route schedules and operator training to improve service delivery and reliability of service as well as customer service
- Providing transit infrastructure to improve operations and reliability, as well as leveraging a multimodal approach to mobility by exploring car-sharing opportunities and encouraging walking and cycling in conjunction with public transportation
- Being more inclusive through accessible infrastructure and travel training to reduced reliance, when possible, on dial-a-ride
- Providing more accessible information to current customers as well as potential customers to improve trip planning and awareness of AVTA services to lower the barrier to transit use
- Collaborating with local decision-makers and developing partnerships to encourage a transit- and person-centric approach to developments in the Antelope Valley, particularly housing and commercial development that recognizes and considers the pedestrian.

Finally, we also provide performance measures that aim to track the progress of implementing the resultant mobility plan, as well as measures to track the success of AVTA's network. These measures are inspired by AVTA's mission statement and current reporting metrics.

Overall, the strategies and concepts developed here will be further elaborated in developing the plan document that provides a phased approach to meeting the community's objectives for a more balanced approach to mobility in the Antelope Valley.

Strategic Plan for Integrated Transportation in the Antelope Valley

Prepared for:

Antelope Valley Transit Authority
Caltrans

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Abbreviations

AFB	Air Force Base
ADA	Americans with Disabilities Act
AV	Antelope Valley
AVTA	Antelope Valley Transit Authority
DAR	Dial-a-ride
GRH	Guaranteed Ride Home
HQTA	High-Quality Transit Area
NEMT	Non-emergency medical transportation
SCAG	Southern California Association of Governments
SOV	Single occupancy vehicle
TOD	Transit-Oriented Development
VMT	Vehicle miles traveled

EXECUTIVE SUMMARY

AVTA provides public transportation services to the Antelope Valley, a sprawling area of nearly 400,000 residents. AVTA operates fixed-route services, regional commuter services, and dial-a-ride (DAR) services for seniors, persons with a disability and residents in the rural areas of Antelope Valley. Despite providing more transit service in recent years, AVTA, like most peers in Southern California and throughout the nation, has been experiencing declining ridership.

The challenge for AVTA is to reorganize its service to better deliver journeys in the Antelope Valley that do not involve single-occupancy vehicles—as such, **we propose that AVTA strengthen its core services and focus on where ridership is strongest while exploring different service delivery models in areas where ridership is the lowest**.

The goal of this mobility plan is to ensure that the types, levels, and quality of the transportation services provided by AVTA can maintain the loyalty of existing riders, connect those in need of vital healthcare services, and are an attractive alternative to using a car for non-riders. Table 1 illustrates the service concepts and strategies that we are proposing in order to meet the objectives of the plan, which were developed throughout the first five tasks of this study.

Table 1: Service concepts and plan objectives.

Service concepts and strategies **Objectives**	Service layers	Transit infrastructure (hubs, stops, etc.) and universal accessibility	Alternative service delivery (microtransit and on-request)	Revised schedules	Operator training	Emergency ride home (and car/vanpooling)	Travel training	Fare policy	Transit-first developments	Information and outreach (bilingual and accessible)	Collaborations and partnerships
Faster service	■	■		■							
More frequent service	■		■			■			■		
Shorter walks	■	■	■						■		■
More reliable service	■	■	■	■	■	■				■	
Better integration of land use and transportation	■	■	■						■		■
Better customer experience	■	■	■	■	■	■	■	■	■	■	■
Better bus stop access or access to transit	■	■	■			■	■		■		■
Better regional connectivity	■		■	■		■		■	■	■	■
Better access to destinations (jobs, healthcare, etc.)			■	■		■	■		■		■
More inclusive ridership base	■	■	■		■	■	■	■		■	■
Safer and more secure		■	■		■	■			■	■	■
More cost-effective service	■	■	■	■		■	■	■			■

What We've Seen

Through a review of important documents that have shaped and will continue to shape the Antelope Valley, along with a review of current service performance and transit markets, the following major themes were identified:

- The more urbanized areas of the Antelope Valley (Lancaster and Palmdale) have long-term objectives of transit-oriented development and are supportive of land use and development decisions that encourage transit use and help to reduce VMT. However, the current state of the Antelope Valley is dispersed, low-density development in a large service area that makes it difficult to provide productive, frequent transit services.
- SCAG's 2016-2040 RTP/SCS outlines plans that encourage integrated land use and transportation strategies that create complete communities and transit-oriented development. In particular, the RTP/SCS identifies a High-Quality Transit Area (HQTA) corridor running along 10th St. W, Sierra Hwy, and Avenue S between Lancaster and Palmdale (currently served by AVTA's Routes 1 and 3).
- The relatively greater population and employment densities of Lancaster and Palmdale better support fixed-route transit compared to the rural areas of Lake LA and unincorporated communities including Quartz Hill, Littlerock, and Pearblossom.
- It is critical to provide transportation services to the disadvantaged communities of the Antelope Valley, including minority populations, low-income residents, car-free households, and seniors.

What We've Heard

Throughout the stakeholder engagement process, common themes emerged that were largely in line with findings uncovered through our analysis of existing conditions, as well as new service issues and opportunities for improvement. Major themes uncovered through stakeholder engagement are summarized below.

- AVTA's current riders are largely dependent riders with no other means of transportation, meaning that many riders are reliant on AVTA as their main source of transportation and AVTA is providing a lifeline service to these individuals. However, among non-riders and the general Antelope Valley community, there is an overall lack of awareness and knowledge about AVTA. While AVTA is actively working to become more visible, it will take time, effort and resources to become easily recognizable in the community.
- Feedback from riders suggests major service issues with operator behavior and attitude, overall quality of service (reliability and convenience), a lack of bus shelters and bus stop amenities, battery electric bus 'growing pains' that are affecting rider experience, and a lack of adequate pedestrian infrastructure. Moreover, many long-time riders expressed the opinion that service quality has declined in recent years despite the agency adding more revenue service hours.
- Commuters feel that commuter service is not a competitive alternative when compared with other options such as Metrolink or personal vehicle use, and new pilot commuter services to Edwards Air Force Base and Mojave Air and Space Port have not materialized into high-ridership routes.
- Municipal stakeholders stressed that the Antelope Valley has long-term goals of smart growth, sustainable development, and creating transit-oriented development along major corridors. While these

are goals that will materialize only in the long-term, it is imperative for AVTA to proactively work with Antelope Valley cities and the county to integrate land use and transportation planning decisions to see these goals become a reality.

- Survey results revealed most rider respondents use AVTA frequently (at least five days a week) and have been using the service for a long time (more than three years). While results were mixed, there was consensus that riders tend to value coverage over frequency due to the dispersed, spread-out development patterns seen in the service area.

- While survey results show 67% of non-riders and 82% of riders have a positive impression of transit services in the Antelope Valley, overall, people who have a transportation alternative do not view AVTA as an attractive or convenient alternative to private vehicle use. Long wait times, a lack of pedestrian infrastructure and bus shelter amenities, and long travel times were frequently cited by non-riders as reasons for not riding AVTA.

What's Needed

We then synthesized all the information gathered to identify needs regarding transit and mobility that may be preventing AVTA from providing attractive and effective transit service, while acknowledging the barriers and challenges to providing this in an area like the Antelope Valley. The following gaps and needs were identified:

- AVTA's services have not changed to accommodate new developments and destinations where riders want service to, and bus stops are disproportionately located in rural areas with low ridership that would be better served through an alternative delivery strategy, such as microtransit or an on-request, shared-ride mobility service.

- Better active transportation and pedestrian infrastructure are needed throughout much of the Antelope Valley to make transit stops more accessible, and to make it easier to reach final destinations after alighting, especially for those individuals requiring mobility devices. A robust multimodal network with active transportation and pedestrian amenities would contribute to the overall appeal and accessibility of transit in the Antelope Valley.

- AVTA's commuter services are duplicative of existing LA Metro services that operate on dedicated rights-of-way. Terminating AVTA's commuter services at higher-order LA Metro transit services (such as the Red Line and Orange Line) will help to improve the efficiency, reliability, and productivity of commuter services, as well as open up transfer opportunities to new destinations (such as Burbank, where many Antelope Valley residents are employed).

- Other needs identified that can potentially improve AVTA's services include schedule changes to match school bell times, paired with fare concessions for students to increase ridership on supplemental routes. AVTA should also take steps, including robust travel training, to accommodate DAR passengers in the Urban Zone on redesigned, accessible conventional routes.

- Again, land use and development decisions were highlighted as a major factor affecting the quality and service of AVTA routes. Because the Antelope Valley is expected to see tremendous growth in the coming decades, it is imperative that AVTA establish a meaningful, working relationship with local officials and developers to ensure new developments are planned with a "transit first" mindset.

- Recommendations were based on the objectives of faster service, more frequent service, shorter traversing opportunities, more reliable service, growing ridership, better integration of land use and transportation, better customer experience, better access to stops and destinations, better regional connectivity, a more inclusive ridership base, more cost-effective service, and enhanced safety and security.

- Performance measures were developed based on AVTA's mission statement of empowering mobility: Getting People Where They Need to Be Safely, Timely, and Cost-Effectively. Recommended performance measures are in line with industry state of the practice, build upon existing performance measures reposted at monthly board meetings, and are broken down into three major categories of *Safely, Timely*, and *Cost-Effectively.*

Action Plan Overview

The recommendations and strategies support the following three main goals of the strategic mobility plan:

1. **Enhance AVTA's core services—Improve the transit network and mobility services.** The recommendations are divided by service category and rely on the fact that services should complement each other, and resources should be deployed prudently and reflect actual demand.

2. **Improve the customer experience.** Building customer satisfaction has been demonstrated to retain riders, expand the ridership base, and get people to use transit more often. This strategy involves improving communications and customer information for better trip planning and improving customer amenities at bus stops.

3. **Build and support an inclusive, multimodal network.** Transit can't do it all—AVTA needs to offer and cooperate with different transportation modes, particularly walking and cycling. Working with elected officials and advocates from across the Antelope Valley will be crucial for ensuring that the community develops in a manner that supports transit use and offers balance for mobility options.

Enhance AVTA's Core Services

Recommendations are provided for the following categories of AVTA's core services:

- **Local services:** Fixed-route transit service that provides relatively short-distance trips in and between the cities of Palmdale and Lancaster. The local service offering is divided into layers—frequent, local, and community—which dictate the service frequency and span.

- **On-request microtransit and dial-a-ride:** All services that require riders to book trips in advance, accessible transit (currently dial-a-ride) for seniors or riders with a disability, on-request microtransit service substitution for existing fixed routes (50, 51, and 52), on-request transit in rural areas lacking fixed route transit, late-night on-request service, and non-emergency medical transportation (NEMT). AVTA is currently in the process of staring up its new On-Request Shared Mobility service.

- **Commuter services:** Longer distance fixed-route transit that connects riders from the AV to regional employment areas. Commuter services typically include long segments of non-stop service, such as on freeways, to move people quickly across long distances.

- **Supplemental services:** Routes that carry riders who share a common destination, such as an employment center or school. Schedules are coordinated with school or work start and end times, typically providing one or two trips in the morning and one or two trips in the afternoon.

Local Services

Agencies use service layer types or tiers to help prioritize and allocate resources across a transit system in order to serve many purposes and populations. They establish service standards which act as a communication tool to stakeholders of the parameters and criteria that define each layer and how/where they are to be used, including triggers for change. Each layer of service—frequent, local, and community—has route-level recommendations that are in line with the goals and targets of the layer. The layers and associate route-level changes are described below.

- **Frequent layer**
    - This layer aims to move towards an ultimate service frequency of 15 minutes all day but may operate at this higher frequency for the majority of the day (e.g. 6AM to 6PM) or during peak periods only. Frequent services are typically deployed along major corridors with mixed-use development and density of key destinations and transit trip generators.
    - Route 1 and Route 12 are proposed to form the frequent layer of service, providing 15-minute headways (or better) for the majority of the weekday and 30-minute headways on Saturday. AVTA should monitor the success of 30-minute service on Saturdays before Sundays are considered for more frequent service.
    - The alignment of Route 1 is proposed to stay the same, and only a minor change is suggested for Route 12. We recommend that Route 12 stays on Avenue J instead of detouring into Valley Central Shopping Center in order to create a straight, east-west corridor for frequent service in Lancaster.
- **Local layer**
    - Local transit operates along corridors where there is a high level of usage but the density (both jobs and people) is not sufficient to warrant a frequent level of service. The goal of this service is to offer 30-minute service throughout the day. The goal of all local routes is to operate on a clockface headway, but there may be some exceptions depending on the length of routes and the cost of maintaining the discipline of such a schedule. Local routes also bring people to frequent corridors and mobility hubs to promote transfers.
    - Routes 2, 3, 4, 6, and 11 compose the local layer in the proposed network. Each route will operate at 30-minute service on weekdays and feed into the frequent network at key transfer locations such as Palmdale Transportation Center and Sgt. Steve Owen Memorial Park.
    - We proposed terminating Route 11 at Valley Central Shopping Center, where Route 12 will no longer operate. The goal of Route 11 is to provide strong east-west service on Avenue I to help AVTA develop a grid of north-south and east-west routes that increases the number of route options riders have. Importantly, Route 11 will be supported operationally by new on-route charging infrastructure slated for Sierra Hwy just north of Lancaster Blvd.

- Two new routes, Routes 4 and 6, are proposed to operate in Lancaster to provide greater access to key destinations and facilitate north-south travel. These routes will be interlined to operate as a bi-directional loop but will be marketed as separate routes since the directionality of loops can be confusing for riders to understand. This 30-minute service is an important piece in improving access to medical centers as well as other community destinations, directly from key transfer locations such as Sgt. Steve Owen Memorial Park and Lancaster Metrolink Station.

- **Community Layer**
  - Community service is primarily designed to provide access within residential areas and provide coverage to lower-density communities. This service connects to the local and frequent transit networks to provide transit access to the entire community. The goal of this service is to operate every 60 minutes on weekdays. Community routes that fall below 10 boardings per revenue hour should be investigated to be replaced with on-request microtransit solutions.
  - The proposed community layer includes Routes 5, 7 and 9, which will operate at no worse than 60-minute headways on weekdays or on the weekend. Operating at worse than 60-minute headways means that riders do not have the flexibility to travel where they want, when they want to. Some of AVTA's routes currently operate every 90-120 minutes, which means that passengers must plan their day around the transit schedule. If it is not financially viable for a route operate at 60-minute headways, we recommend that those routes be considered for service substitution via on-request microtransit.

- **Route 747 – Edwards AFB and Route 748 – Mojave**
  - As services to Edwards AFB and Mojave are still new, it is important to continue to monitor ridership. If ridership does not grow, it is recommended to eliminate these routes and instead redeploy these resources on key services. Strategies for reducing single-occupancy vehicle use for commuters traveling to and from these destinations should continue to be explored, such as through partnering with Edwards AFB and Mojave to advertise and expand the use of carpooling and vanpooling services.
  - Implementing an emergency ride home program could help to assuage worries that those using the commuter services will be "stranded" or will not have any alternative ways to get home in the case of an emergency. This could be implemented using an existing emergency ride home service (such as the Regional Guaranteed Ride Home Program) or potentially implemented using forthcoming on-request infrastructure and resources.

- **On-request layer**
  - On-request transit typically operates as curb-to-curb or stop-to-stop service, where customers request rides as needed instead of following a fixed schedule. Routes are created dynamically and can fluctuate throughout the day. On-request transit solutions are nowadays implemented using app-based technology that allows riders to request rides using a smartphone or computer and are commonly deployed in low-density areas that do not have enough demand to support fixed-route transit. Rides can also be booked, traditionally, by calling a booking center as well.

- Routes 50, 51 and 52 are proposed to operate only on-request. The public had previously expressed concerns about these routes, indicating that if they miss their bus, they have no alternative but to wait 90-120 minutes for the next bus. In some cases, this has impacted their employment due to late arrivals at work or resulted in missed medical appointments.
- The substitution of these routes with on-request microtransit will be offered through a shared-ride delivery service that includes late-night, NEMT, and accessible transit services (currently dial-a-ride). More details about the proposed on-request microtransit and dial-a-ride services are provided in the next section.

Figure 1 illustrates the proposed local transit network, which has been adjusted to meet unmet transit needs identified in previous tasks (note, Routes 747 and 748 are not presented on this map). This network aims to provide simplified transit service along key corridors where the greatest demand for transit was observed. For example, providing stronger east-west local transit routes to facilitate short local trips in Lancaster was achieved by increasing the frequency of service along Avenue J (Route 12), providing continuous service on Avenue K (Route 5), and maintaining a local service along Avenue I (Route 11). The redesigned network also provides greater transfer opportunities by feeding local and community routes into major transfer centers including Sgt. Steve Owen and Palmdale Transportation Center or facilitating on-street transfer opportunities at major intersections.

Figure 2 shows the network and the routes colored by layer of transit service.

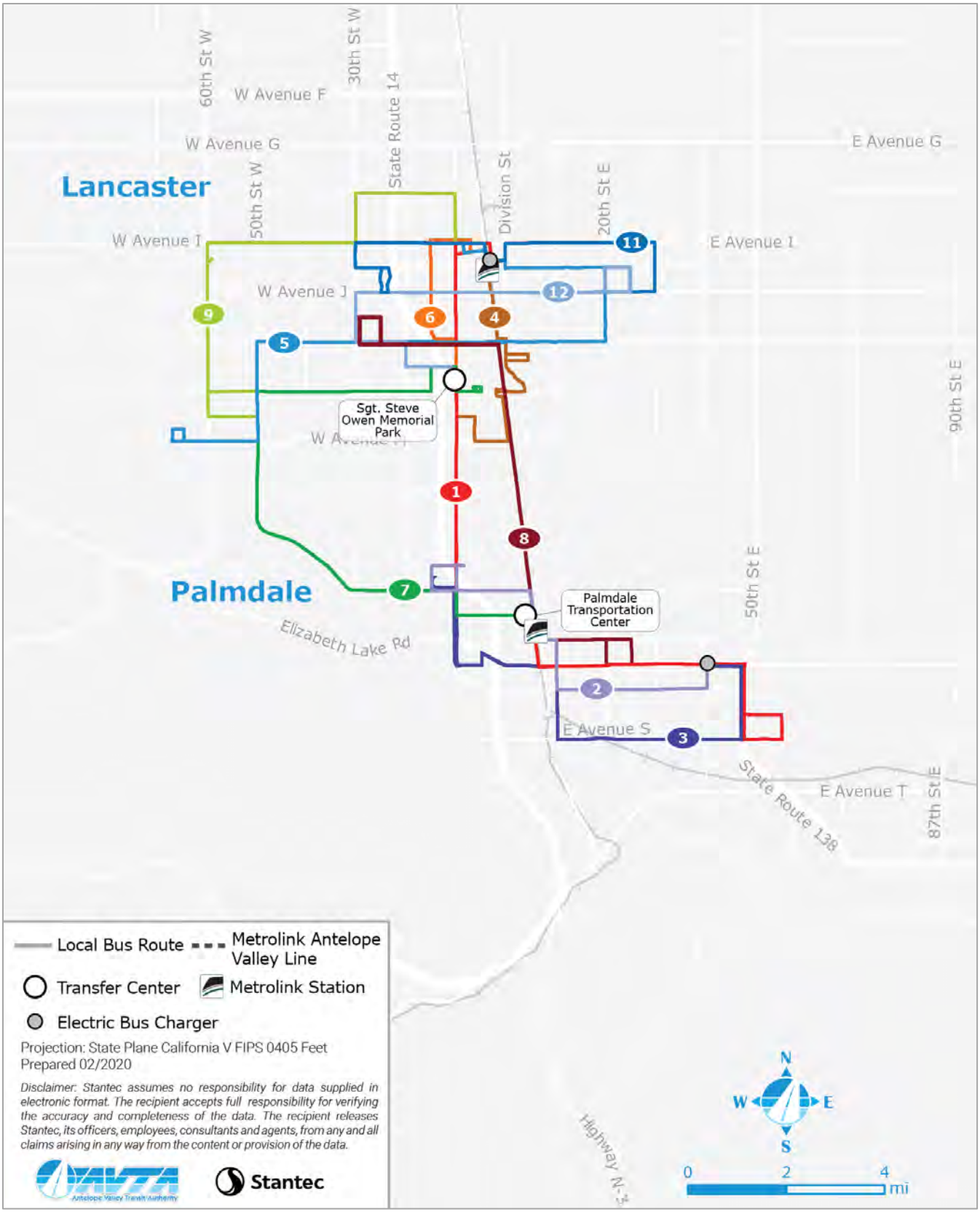


Figure 1: Proposed local transit network

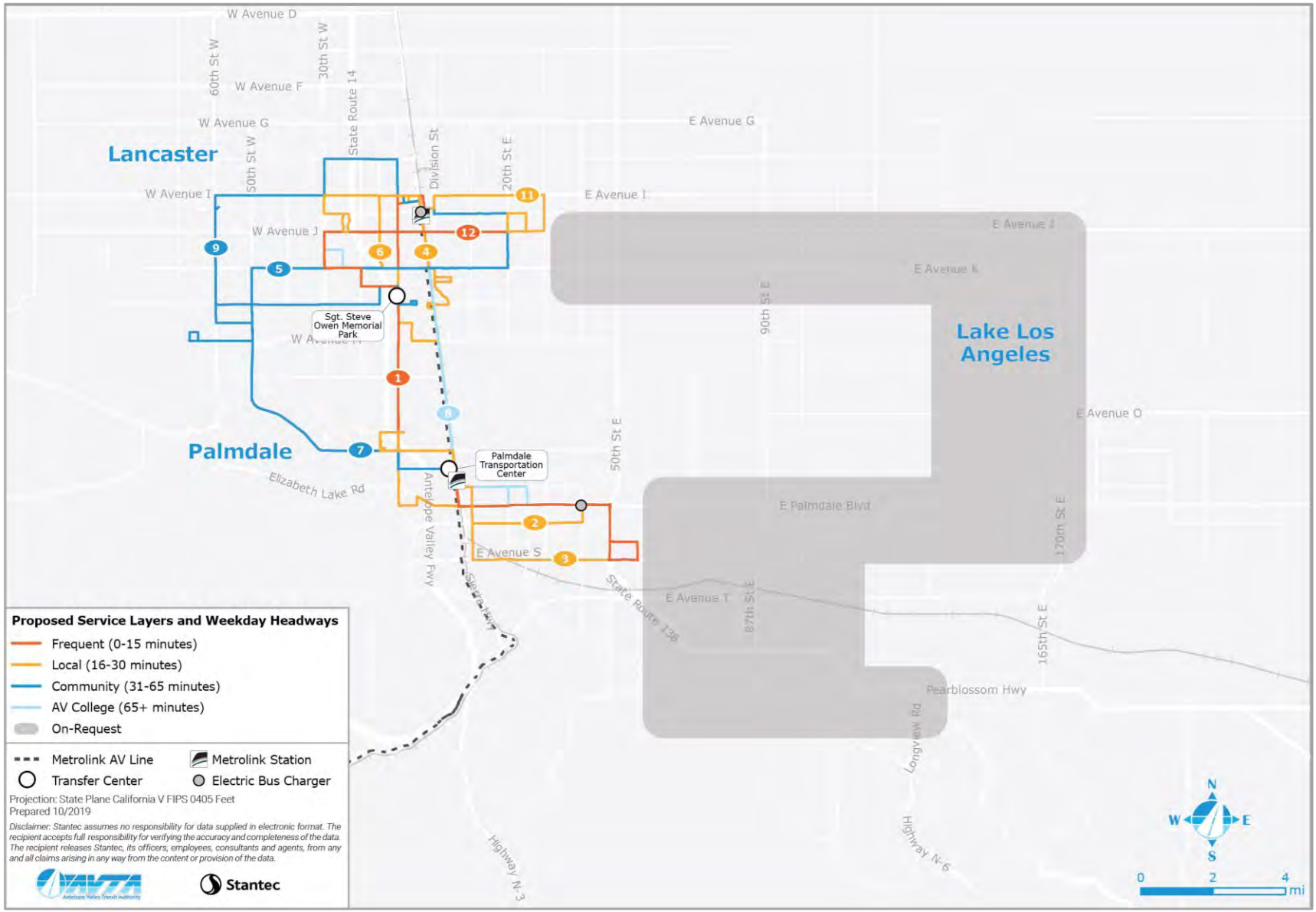


Figure 2: Proposed local service layers and weekday headways

Of course, increasing the frequency on multiple routes in the proposed network will result in greater operating costs. It is anticipated that the changes proposed above will result in an increase in operating costs of approximately $1.9 million, not including on-request service delivery—service hours will remain unchanged for 747 and 748, with minor changes for supplemental school routes. The increase in operating costs is largely due to the increase in frequency on routes such as Route 12 (from 30 minutes to 15 minutes on weekdays), Route 9 (to 60 minutes on weekdays and weekends) and Route 5 (extended alignment). The cost estimates presented below were developed using Remix's transit planning software and represent high-level estimates based on an average cost of $90 per revenue hour and assuming average speeds comparable to today's routes to estimate revenue hours. Efficiencies may be found once AVTA develops their vehicle and crew schedules, including interlining routes where appropriate and developing schedules that reflect actual operating conditions.

Forecasted costs for local services are expected to grow by ~13%, while ridership is estimated, conservatively, to grow by ~15-20%. Additional outreach, marketing, and travel training would help boost these ridership numbers, also acknowledging the fact that, as some other agencies have experienced, a large-scale overnight network change may decrease ridership in the short-term as riders learn to use the new network and more riders are attracted. AVTA needs to make the transition as painless as possible with communication and trip planning assistance.

Table 2: Existing and Proposed Annual Service Hours and Cost (Local Service)

	Local service[1]
Existing Hours (est.)	165,600
Proposed Hours	186,620
Difference	21,020
Existing Ridership (est.)	2,075,500
Forecasted Ridership	2,420,600
Difference	345,100
Existing Operating Costs	$14,903,000
Forecasted Operating Costs	$16,793,500
Difference	$1,890,500
Existing Farebox Recovery (est.)	17%
Forecasted Farebox Recovery	18%

These changes in the local network are expected to be accommodated within the existing conventional transit fleet, with potentially a need for 2-4 additional vehicles during peak service. The number of vehicles required will be confirmed as more detailed route schedules are cut.

The investment into improved transit service is expected to result in ridership increases that can recover some of service delivery costs. Removing routes such as Route 50, 51, and 52 (approximately 17,000 annual revenue hours) that have a high cost per boarding can result in a more efficient and cost-effective local transit system.

[1] Does not include Routes 747 and 748, which would be unchanged (estimated annual cost of $406,900), but includes the elimination of Routes 50, 51, and 52 in the proposed service. Does not include estimates for on-request services. Farebox recovery includes only estimated farebox revenue.

Changes to the commuter network, such as terminating Route 785 at North Hollywood Station and eliminating later commuter runs, can also help to offset the cost to provide local service.

On-Request Microtransit and Dial-a-Ride

Several opportunities exist within AVTA's service area for a new, flexible, dynamic, and innovative way(s) to provide transportation services, particularly in areas of Antelope Valley like Lake Los Angeles with low population densities that are difficult to serve with conventional fixed transit. As described in the section above, routes such as 50, 51 and 52 are unproductive due to low-density development. We recommend substituting these unproductive fixed-route services with on-request transit given the prevalence of on-request technology. With the current DAR contract up for renewal at the end of the year, we recommend that a new on-request, shared mobility service be combined with the DAR program into one on-request service for optimal effectiveness and efficiency.

We propose the following the following services to be included in the on-request program:

- **On-request, shared-ride service for DAR-eligible customers.** Transition the current DAR system into an 'on-request' system, merging the on-request service delivery (service substitution for Routes 50, 51 and 52) into a service whereby customers can request a journey through a mobile phone app or by calling a phone number. DAR-eligible customers (seniors and persons with a disability who are unable to take conventional transit) will still qualify for door-to-door accessible transit in any zone (Urban Zone or Rural Zones 1-3).

- **On-request curb-to-curb or home-to-hub service in rural areas lacking fixed-route transit.** For customers living in existing DAR Rural Zone 1 or 2 who do not have access to fixed-route transit, on-request service will be provided to the nearest transit hub or will be delivered curb-to-curb below a certain distance. Rural Zone 4 will be added as service substitution for Routes 50, 51, and 52, which will also operate as curb-to-curb or home-to-hub for non-DAR eligible customers.

- **On-request, late-night service substitution.** Use of on-request transit services to replace conventional fixed routes in evening hours. Primarily app-based, but in the case of AVTA, call center services are envisioned to complement the app since not all customers have access to smart phones. Route 1 and Route 12 will continue to operate until midnight, while other local and community routes will be substituted with on-request service for short local trips or to feed customers into Route 1 and 12 after 10PM on weekdays, and potentially, after 8PM on Saturdays and 7PM on Sundays. This service is a low-cost way of extending the service span to midnight across the entire system. Riders could have the option of being connected with the fixed route which AVTA would pay for, or for an additional fee, have the on-request provider drive them their entire journey which they would then pay the difference.

- **On-request non-emergency medical transportation.** AVTA has secured a grant to provide non-medical emergency transportation (NEMT) as a pilot and will be bundled within the future on-request, shared mobility project. The NEMT service will allow riders and caregivers to book rides in advance of appointments as well as on-request. Riders will also be able to request recurring trips for repeating appointments, such as weekly or monthly appointments. This NEMT pilot will provide mobility as a "last resort" to individuals without any other funding coverage for service (Private Insurance, Medicaid, etc.) and does not intend to compete with other NEMT providers in the AV.

The existing zones of the DAR program should be rebranded into AVTA Mobility Zones according to the map shown below:

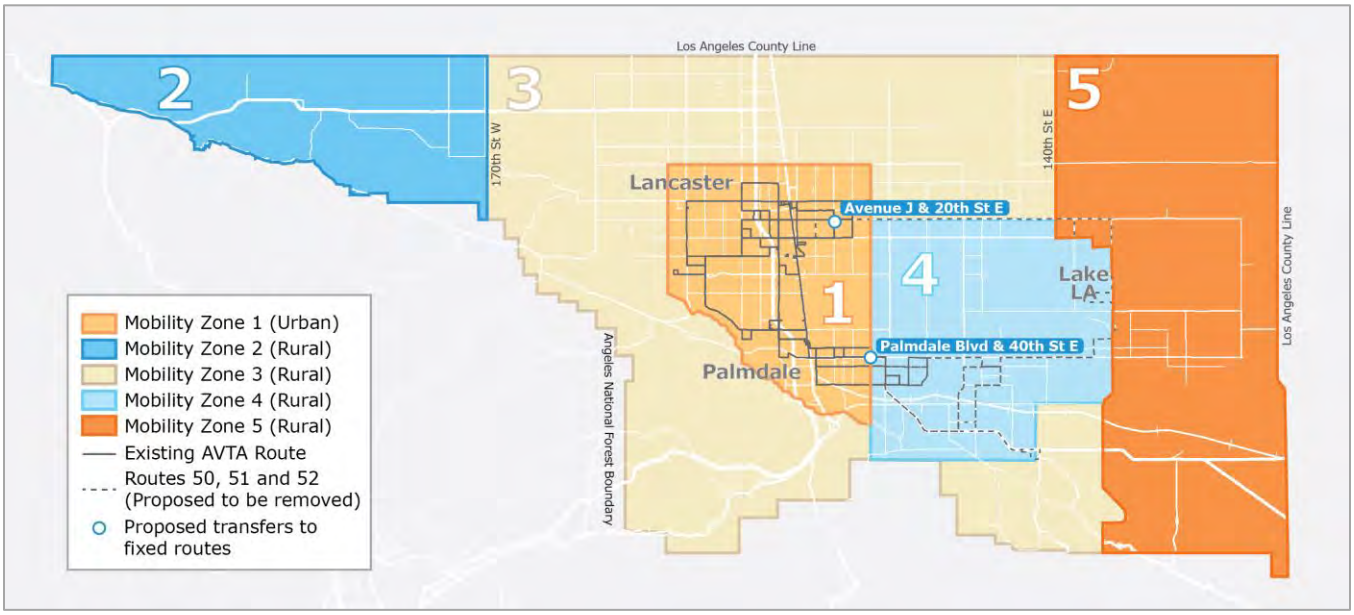


Figure 3: Concept map including a proposed Urban and Rural Mobility Zones

The intent of the rebranding is to indicate that the service is new and improved compared to the legacy DAR program. Initial cost estimates of on-request services, which include service substitution for routes 50-52, DAR, NMET, and late-night service hover around ~$2.6 annually.

Commuter Services

It's clear that while AVTA's commuter services have shed ridership in recent years, the commuter routes provide important connections to job markets in the region that are oftentimes not well-connected by other transit services. However, our analyses reveal that beyond decreasing ridership, many of the trips on most routes are typically operating with loads of less than 50% occupancy. We recommend the following route-level changes, which are expanded upon in the body of the report:

- **Route 785 – Los Angeles**
    - Realign the route to terminate at the LA Metro North Hollywood Red Line station, so that customers can transfer to the subway which provides a quick travel time to downtown (about 25 minutes travel time to Union Station), as well as offer other connections to the Orange Line and destinations in the San Fernando Valley.
    - With the realignment, AVTA will need to redesign the schedule and should provide earlier departures and eliminate two of the final runs for morning and afternoon services, resulting in 14 total trips rather than 18. AVTA will also need to reduce fares to reflect the shorter distance and the need for customers to transfer. Even though travel time will likely be shorter and more reliable, it may be perceived as less convenient. Providing information to longtime riders highlighting the benefits of shorter travel times and increased reliability of arrival times may also

be an important component to ensure no riders are lost when transitioning services. This is an important consideration for 786 recommendations as well.

- **Route 786 – Century City/West Los Angeles**
    - Route 786's multiple variants can be confusing to customers as well as reduce the number of available travel times to certain destinations. AVTA should simplify the alignment to service Westwood and Century City and terminate at Santa Monica Blvd. and Wilshire Blvd., and no longer provide the variant beginning at Santa Monica Blvd. and La Brea Ave.; more passenger activity is seen in Westwood and Century City than east of Century City, and both the morning and afternoon runs of the Santa Monica and La Brea variant see median occupancies below 50%. The new terminus at Santa Monica Blvd. and Wilshire Blvd. offer connections to frequent LA Metro bus service along Wilshire Blvd. which remaining passengers can use to complete their trip.
    - In addition to consistent routing, we propose eliminating one trip from the morning and afternoon service due to low passenger loads, which reduces the total daily trips from 10 to 8.
    - Meetings with Santa Clarita Transit revealed that Santa Clarita is having difficulties accommodating the high demand between Santa Clarita and Century City with their commuter lines 792 and 797. AVTA should consider adding a stop to serve the Newhall station in Santa Clarita to accommodate these travelers.
- **Route 787 – West San Fernando Valley**
    - As with Route 786, there is an opportunity for AVTA to provide an additional stop at the Newhall station in Santa Clarita to pick up commuters that could not be accommodated by Santa Clarita's current commuter services.
    - AVTA should explore the demand for off-peak service to CSUN, as it is the largest trip generator along the route. Exploring the feasibility of serving other West San Fernando Valley destinations (such as the VA Medical Center in North Hills) or other transit connections (such as the LA Metro Orange Line or Ventura County Metrolink stations) in the area are other considerations. Due to low passenger activity, it is recommended to terminate service at the Warner Center.
    - In addition to this alignment change, we propose eliminating two morning and afternoon trips due to low passenger loads, which reduces the total daily trips from 18 to 14.
- **TRANSporter 790 – Metrolink Connections**
    - Revise schedules for 790 to account for new Metrolink departure times and to improve on-time performance (currently approximately 70%). On-time performance should be at 85% since missing a train results in waits in the order of hours, not minutes. AVTA should also examine the feasibility of adding two runs during the day that currently do not have a bus bridge at the Newhall Station.
    - Explore collaboration with Santa Clarita Transit. During stakeholder engagement, it became clear that opportunities exist to share ridership by having certain commuter routes stop through Santa

Clarita, as mentioned above. AVTA should form a working group to define objectives and action items for collaboration.

Taken together, the proposed changes for commuter services aim at making better use of finite resources, while focusing on connections to other transit services over one-seat rides. In combination with alignment changes and fewer trips, we estimate that these recommendations can result in cost savings of ~$1.2 million.

Supplemental Services

AVTA's supplemental routes provide important service to and from local public high schools in different areas of the Antelope Valley. While these services are open to the general public, the main purpose of these routes is to transport students to school in the morning and return trips in the afternoon Because these routes serve a specific purpose and are currently very productive, no route changes are recommended. However, there are opportunities to improve supplemental routes:

- **Adjust supplemental route schedules to accurately reflect school beginning and end times.** Current supplemental route schedules either do not accurately reflect bell times or do not give students enough time to reach the bus after the dismissal bell. Improving schedules can help increase ridership and improve rider satisfaction. Supplemental routes to and from school should not operate when school is not in session due to the low demand.

- **Partner with schools to create a reduced student fare to boost ridership on supplemental routes as well as encourage students to use the fixed route system for other purposes**. The student population is traditionally one of the largest potential markets for transit agencies. The launch of a reduced fare program presents an opportunity to launch an educational outreach and training campaign to student riders of supplemental routes regarding the importance of paying your fare, which can help reduce fare evasion.

Overall, the high-level costs of the proposed service are presented in Table 3 below. These estimates are based on assumptions that do not account for runcutting, interlining, and scheduling techniques that can optimize service hours, nor do they account for business rules that AVTA can implement to control costs for on-request services.

Table 3: Existing and Proposed Estimated Annual Service Costs

	Existing	Proposed (est.)	Difference
Local & supplemental (excluding 50, 51, 52)	$13,373,000	$16,793,500	$3,420,500
Dial-a-Ride	$1,648,010	$1,210,920	$(437,090)
50, 51, 52	$1,530,000	$986,000	$(544,000)
Commuters (785, 786, 787, 790)	$4,134,590	$2,944,130	$(1,190,460)
747, 748	$406,910	$406,910	$-
Late-night on-request	$-	$232,000	$232,000
NEMT	$-	$130,500	$130,500
Total	**$21,092,510**	**$22,703,970**	**$1,611,460**

Improve the Customer Experience

- **Improve customer and community awareness of AVTA services.** Continue to leverage social media channels to not only improve awareness and marketing of AVTA, but also provide service information and other information related to riding the bus. AVTA should also improve materials by creating a new map with a clean, clear, and modern aesthetic that does away with the 3D perspective of the current map, as well as ensuring all materials are bilingual. The service changes recommended throughout the plan provide an opportunity for the new information to be improved and for AVTA to undergo a brand refresh.

- **Retrain operators.** Proactively work with AVTA's service contractor to develop operator training and retraining programs and hold service contractors responsible for insufficient performance.

- **Emergency or guaranteed ride home.** We recommend that AVTA explore implementing an emergency ride home service, which many peer agencies offer to customers who may need to return home for an emergency during the midday when commuter services are not operating. An initial step is to survey customers onboard AVTA services to determine home and work locations, interest in the emergency ride home and other pertinent information. AVTA should also inform customers about the Regional Guaranteed Ride Home (GRH) supported by LA Metro in Los Angeles County.

- **Improve bus stop amenities.** Establish a committee to develop bus stop guidelines and an improvement plan and install new bus shelters, benches, and other amenities as outlined in the improvement plan.

- **Collaborate with officials and the community to implement transit-supportive design and development.** Establish a working group of staff from municipalities, the county, community organizations, and AVTA to develop transit-supportive guidelines and implement/monitor developments and their transit supportiveness. These guidelines, in conjunction with transit service guidelines, should provide a workable framework for developments and land uses in the Antelope Valley that are supportive of transit ridership, including provisions for pedestrian infrastructure, set-backs, parking guidelines and so on.

Build and Support an Inclusive, Multimodal Network

- **Improve sidewalk and bicycle access to AVTA services.** AVTA should establish a pedestrian and cyclist access working group and action plan. This group should include staff from municipal departments as well as advocacy groups. The group should develop an action plan detailing critical steps for improving pedestrian paths and cycling access to transit.

- **Improve the universal accessibility of AVTA infrastructure.** Working together with the accessibility advisory group and local officials, AVTA needs to develop an action plan for improving the universal (ADA) accessibility of its infrastructure. While AVTA has taken the initiative to improve stop accessibility by ensuring new stops have shelters and benches and meet universal accessibility standards, not all stops are fully compliant with ADA standards, particularly legacy stops that have not been recently upgraded. Steps could also be taken to improve information at stops for people who are blind or have low vision, in addition to providing bilingual information at AVTA's stops and stations. AVTA should assess the level of accessibility of its bus stops, identify low-hanging fruit, and prioritize investments based on stop usage.

- **Support car-sharing schemes and other modes in the Antelope Valley.** AVTA should do more to promote and foster multimobility in the Antelope Valley, support active transportation and help reduce reliance on SOV. As a leader in zero-emission technology, AVTA could look to explore other GHG-reducing initiatives, such as carpooling, vanpooling, volunteer transportation programs, ridesharing and carsharing. AVTA should also provide priority parking for electric and hybrid vehicles at its main terminals.
- **Develop a marketing plan and implement a brand refresh.** AVTA should develop a marketing plan that includes messaging and strategies for a variety of audiences including customers and non-riders. In addition, the plan should detail strategies for educating and obtaining feedback throughout the implementation of this strategic mobility plan. AVTA should also launch a brand refresh study and engage with the community to evaluate ideas and concepts for a different brand. Branding can also extend to the frequent network and bus stops and the new AVTA On-Request, Shared Mobility Service.
- **Develop and internal communication strategy.** AVTA should organize internal working meetings where this plan is presented and discussed and establish an advisory group of internal champions of this plan from across AVTA departments. AVTA should implement and monitor the actions of this plan and develop a detailed funding action plan that builds upon the funding opportunities outlined in this report.

Phasing, Funding and Actions

To implement the action items and recommendations detailed above, a phased approach is proposed and detailed in the table below. The phasing plan recommends implementation over a five-year period and identifies potential funding opportunities and parties responsible for implementation. Action items are broken down into the three major goals our recommendations are built on: enhance AVTA's core services, improve the customer experience, and build and support an inclusive, multimodal network.

	Action	Year 1	Year 2	Year 3	Year 4	Year 5	Potential Funding	Responsible Actor(s)
Goal 1 - Enhance AVTA's core services - transit network and mobility services								
	Fixed-route							
1	Layers and network design	Refine network and route concepts and launch new local network (launch in 2020)					5307; CMAQ; Measure R; Props A and C	AVTA
2	Improve schedules	Redevelop schedules to more accurately reflect on-street operating conditions	Expand street supervision to monitor reliability				5307; CMAQ; Measure R; Props A and C	AVTA
3	Explore transit-dedicated infrastructure	Establish working group for studying transit-dedicated infrastructure	Pilot peak hour reserved lanes on Palmdale Blvd. Pilot peak hour reserved lanes on Ave. J	Pilot peak hour reserved lanes on 10th St.			5307; CMAQ; Measure R; Props A and C; SB-1; BUILD	AVTA; City of Lancaster; City of Palmdale; Los Angeles County
	DAR							
4	Launch on-request service	Implement on-request shared mobility services	Monitor and adjust services as program evolves				5310 (already procured for NEMT); CMAQ; 5312; Integrated Mobility Innovation	AVTA
5	Rationalize service area and eligibility	Study whether service area requires reduction and if eligibility should be modified	Modify service area and eligibility as necessary					AVTA; community partners
6	Expand travel training	Refocus program on travel training DAR customers and new fixed-route customers					5310	AVTA; community partners
7	Explore volunteer transportation programs		Establish working group to examine volunteer transportation programs and non-transit services				5310	AVTA; LA Metro; community partners
8	Establish accessibility advisory committee	Develop framework for establishing advisory committee on accessibility & establish committee						AVTA; community partners
	Commuter							
9	Redesign routes	Refine network and route concepts and launch new local network						AVTA
10	Improve schedules	Redevelop schedules to more accurately reflect on-street operating conditions						AVTA
11	Explore collaboration with Santa Clarita	Work with SC Transit to understand opportunities to minimize duplication and best use resources					TIRCP; Props A and C; Measure R	AVTA; Santa Clarita Transit
	Fare policy							
12	Launch a fare study	Implement short-term changes to fares and fare policy	Launch study to rationalize fares due to route and service changes					AVTA
13	Expand student fares to all students in the AV	Create new fare category for any enrolled-student to obtain a discounted fare					AVAQMD	AVTA; AVUSD; University of Antelope Valley; other schools
Goal 2 - Improve the customer experience								
14	Improve customer and community awareness of AVTA services	Work with local groups to understand disability needs for information Ensure all marketing and informational material is bilingual and up-to-date	Implement new community outreach program to inform about AVTA at different locations across AV	Work with accessible advisory group to develop accessible information				AVTA; community partners
15	Retrain operators		Retrain operators for customer service and safe operations					AVTA
16	Leverage Metro's Guaranteed Ride Home program and educate customers	Dedicate a customer rep to working with employers and employees to educate about GRH	Hold internal working meetings to track plan implementation and success				Measure R and M; Props A and C	AVTA; LA Metro; employers
17	Improve bus stop amenities	Establish committee to develop bus stop guidelines & an improvement plan	Install new bus shelters and benches				5307; CMAQ; Measure R; Props A and C; SB-1; BUILD	AVTA; City of Lancaster; City of Palmdale; Los Angeles County
18	Collaborate with officials and community to implement transit supportive design and development	Establish working group of staff from cities, community organizations and AVTA to develop transit-supportive guidelines	Implement and monitor developments and their transit-supportiveness				Measure M; Sustainable Communities Program (SCAG)	AVTA; City of Lancaster; City of Palmdale; Los Angeles County
Goal 3 - Build and support an inclusive, multimodal network								
19	Improve sidewalk and bicycle access to AVTA services	Establish pedestrian and cyclist access working group & action plan	Implement pedestrian and cyclist access and integration program				Measure M; Sustainable Communities Program (SCAG)	AVTA; City of Lancaster; City of Palmdale; Los Angeles County
20	Improve the accessibility of AVTA infrastructure	Work with accessibility advisory committee and local officials to prioritize accessibility improvements					Measure M; Sustainable Communities Program (SCAG)	AVTA; City of Lancaster; City of Palmdale; Los Angeles County
21	Support a car-sharing scheme in the AV	Study potential for car-sharing schemes centered at multimodal hubs					Measure M; 5312	AVTA; LA Metro; car-sharing companies
22	Develop a marketing plan and implement a brand refresh	Develop marketing plan to provide public outreach for the plan	Launch a brand refresh study	Implement brand refresh				AVTA
23	Develop an internal communication strategy	Establish internal advisory group to support implementation of this plan & identify funding priorities	Implement and monitor the actions of this plan & develop a funding action plan					AVTA

1.0 THE CHALLENGE

AVTA provides public transportation services to the Antelope Valley, a sprawling area of nearly 400,000 residents. Despite providing more transit service in recent years, AVTA, like most peers in Southern California and throughout the nation, has been experiencing declining ridership (Figure 4).

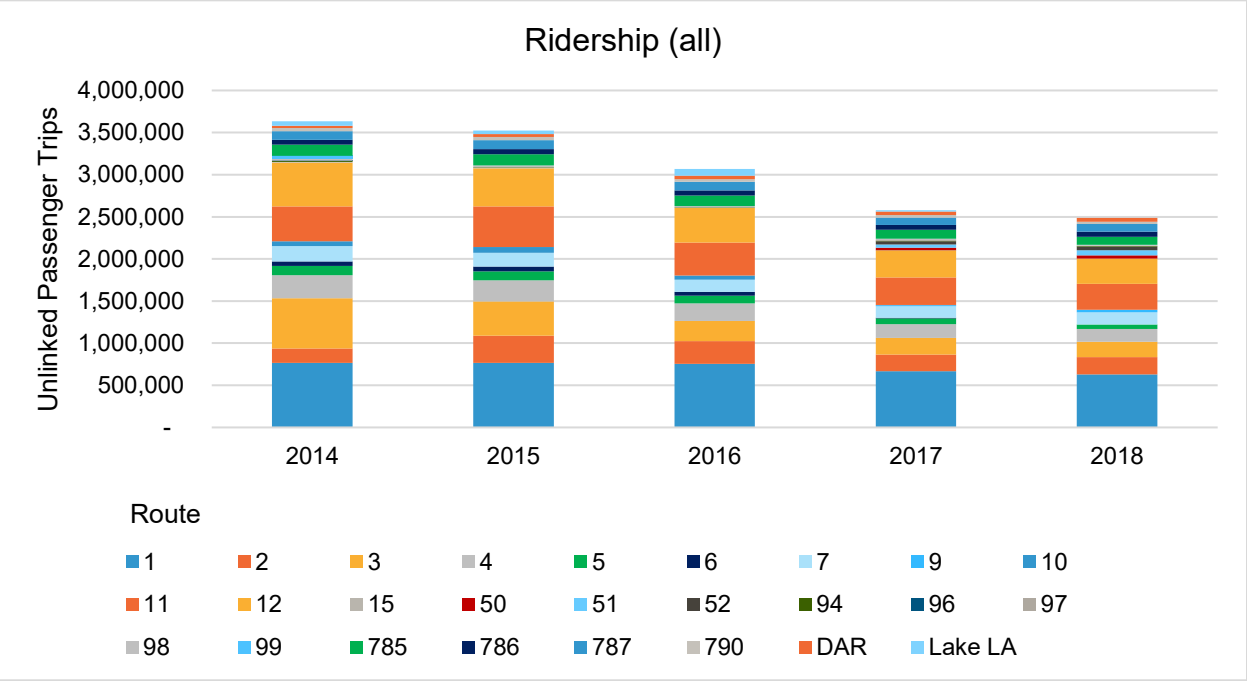


Figure 4: Declining ridership on AVTA services.

A recent report[2] concluded that while it is difficult to pin the loss of bus ridership on any one factor, a major contributing factor to the decline in bus ridership is the motorization of traditionally transit-dependent populations. In other words, populations who would use transit and use it frequently, such as minorities, low-income residents, and recent immigrants, are acquiring vehicles and reducing their transit use. Southern California is a car-loving culture. In fact, most Southern Californians have never tried public transit. Taken together, this study advises agencies that in order to regain some ridership, efforts should be placed on attracting discretionary riders for occasional trips mainly by improving service quality—frequency, reliability, reducing travel times, and making transit comfortable, convenient, and direct. Note that improving service quality has the important outcome of not only attracting discretionary riders but improving the experience of transit-dependent riders too.

AVTA has additional challenges that make providing efficient and effective transit service particularly difficult—the rural nature of most of its service area, paired with dispersed and segregated land uses and general lack of pedestrian infrastructure. As such, AVTA needs to better tailor service delivery to the market it's trying to serve. In addition, working to educate customers and stakeholders throughout the service area will be essential for helping the Antelope Valley to become more transit-supportive in the future.

[2] https://www.scag.ca.gov/Documents/ITS_SCAG_Transit_Ridership.pdf

The goal of this mobility plan is to ensure that the types, levels, and quality of the transportation services provided by AVTA can maintain the loyalty of existing riders, connect those in need of vital healthcare through mobility and are an attractive alternative to using a car for non-riders.

AVTA operates fixed-route services, dial-a-ride services as a complementary non-ADA service for seniors and persons with disabilities unable to ride fixed-route services and residents in the rural Antelope Valley, and commuter services focused on connecting the Antelope Valley with Los Angeles.

The challenge for AVTA is to reorganize its service to better deliver journeys that do not involve SOVs—as such, **we propose that AVTA strengthen its core services and focus on where ridership is strongest while exploring different service delivery models** but also potentially leveraging other transportation modes, such as ride and car-sharing.

Based on feedback from customers and non-customers, engagement with key stakeholders across the Antelope Valley, our analysis of data, and best practices from across the industry, we developed service concepts and strategies to meet the objectives in Table 4. These concepts aim to move transit into the forefront of planning in the region to facilitate sustainable mobility options for residents and visitors.

Table 4: Service concepts and plan objectives.

Service concepts and strategies **Objectives**	Service layers	Transit infrastructure (hubs, stops, etc.) and universal accessibility	Alternative service delivery (microtransit and on-request)	Revised schedules	Operator training	Emergency ride home (and car/vanpooling)	Travel training	Fare policy	Transit-first developments	Information and outreach (bilingual and accessible)	Collaborations and partnerships
Faster service	■	■		■							
More frequent service	■		■			■			■		
Shorter walks	■	■	■						■		■
More reliable service	■	■	■	■	■	■				■	
Better integration of land use and transportation	■	■	■						■		■
Better customer experience	■	■	■	■	■	■	■	■	■	■	■
Better bus stop access or access to transit	■	■	■			■	■		■		■
Better regional connectivity	■		■	■		■		■	■	■	■
Better access to destinations (jobs, healthcare, etc.)			■	■		■	■		■		■
More inclusive ridership base	■	■	■		■	■	■	■		■	■
Safer and more secure		■	■		■	■			■	■	■
More cost-effective service	■	■	■	■		■	■	■			■

Figure 5 illustrates how these service concepts and plan objectives respond directly to customer feedback received throughout the project, using quotes from our engagement exercises.

Customer Requests	Service Concepts
“Buses need to come more often so that people don’t have to leave home an hour or two early to get to where they’re going”	
“More frequent bus times…a one-way trip takes three hours”	
It “takes a long time to get to bus stops with nowhere to sit or shelter from the hot sun and wind”	
“These riders are very dependent on AVTA’s services, so the on-demand option would need to provide service at the same level or exceeding current fixed-route services”	
"Please have better-timed connections with Metrolink trains and TRANSPorter buses out of Palmdale Station"	
“Frequently passed by while waiting at stops”	
Employees do not feel comfortable using the service due to a feeling of being “stranded” with no way to get home or leave the base in the case of an emergency	
“I’m unsure about where or how to travel by local bus service”	
“I would like to see student bus passes implemented”	
“Long walk to the bus from my house”	
“It would be easier to navigate the system if resources were available in Spanish”	
“She is requesting a shelter be added...She has been taking the bus at this location for years and has waited under the hot sun and in the rain as well”	
“Bus drivers are not friendly”	

Service Concepts	Key
Service layers	
Transit infrastructure and universal accessibility	
Alternative service delivery	
Revised schedules	
Operator training	
Emergency ride home	
Travel training	
Fare policy	
Transit-first developments	
Information and outreach	
Collaborations and partnerships	

Figure 5: Service concepts addressing customer requests

2.0 WHAT WE'VE SEEN

Our strategic planning process began with a review of pertinent documents and existing conditions that helped to drive stakeholder and community engagement, identify service gaps and needs, and develop initial service concepts and recommendations. Through a review of important documents that have and will continue to shape the Antelope Valley and AVTA and a review of current service performance and transit markets, the following major themes were identified:

- A review of municipal planning documents (including the Lancaster General Plan, Palmdale General Plan, Lancaster Climate Action Plan, and Palmdale Livability Audit Report) reveal that the more urbanized areas of the Antelope Valley (Lancaster and Palmdale) have long-term objectives of transit-oriented development and are supportive of land use and development decisions that encourage transit use and help to reduce VMT. However, the current state of the Antelope Valley is dispersed, low-density development in a large service area that makes it difficult to provide productive, frequent transit services.

- SCAG's 2016-2040 RTP/SCS outlines plans for the more urbanized areas of Palmdale and Lancaster that encourage integrated land use and transportation strategies that create complete communities and transit-oriented development. Such strategies include locating homes and jobs near transit, infill development, and integrating a mix of land uses in a compact area to create walkable neighborhoods with strong connections to transit. **In particular, the RTP/SCS identifies a High-Quality Transit Area (HQTA) corridor running along 10th St. W, Sierra Hwy, and Avenue S between Lancaster and Palmdale (currently served by AVTA's Routes 1 and 3).**

- Palmdale and Lancaster are the areas of the Antelope Valley with the highest transit propensity, compared to the rural areas of Lake LA and unincorporated communities including Quartz Hill, Littlerock, and Pearblossom. The relatively higher population and employment densities of Lancaster and Palmdale are more supportive of fixed-route transit.

- It is critical to provide transportation services to the disadvantaged communities of the Antelope Valley, including minority populations, low-income residents, car-free households, and seniors. Under its current service network, 73% of minority populations, 9% of seniors, 26% of low-income residents, and 9.2% of zero-vehicle households are located within a ¼ mile (5-minute walk) of AVTA transit services.

- A detailed analysis of current services reveals areas of opportunity through which AVTA can improve its service and attract more customers:
    - inconsistent schedules and headways
    - low frequencies across all routes (prior to the recent changes to Route 1's schedule)
    - low weekend frequencies
    - long routes with low ridership segments or detours
    - long travel times and indirect routes
    - service that does not match demand
    - unreliable arrival times
    - service that generates low ridership in low transit propensity areas
    - transit facilities with inadequate amenities for customer comfort
    - poorly-performing commuter routes
    - growing demand for DAR services
    - fare policy considerations and fare evasion.

3.0 WHAT WE'VE HEARD

While our own analysis of existing conditions and important planning documents identified opportunities for improvement in many areas of AVTA's current service, interfacing with important stakeholders, current AVTA riders, and the larger Antelope Valley community was an imperative next step in developing recommendations to help enhance the accessibility and mobility of those who use AVTA's services as well as attracting non-riders to try the service. Throughout the stakeholder engagement process, common themes emerged that were largely in line with findings uncovered through our analysis of existing conditions, as well as new service issues and opportunities for improvement. Major themes uncovered through stakeholder engagement are summarized below.

- AVTA's current riders are largely captive riders with no other means of transportation, meaning that many riders are reliant on AVTA as their main source of transportation and AVTA is providing a lifeline service to these individuals. However, among non-riders and the general Antelope Valley community, there is an overall lack of awareness and knowledge about AVTA. While AVTA is actively working to become more visible, it will take time and effort to become easily recognizable in the community.

- Feedback from riders suggests major service issues with operator behavior and attitude, overall quality of service (reliability and convenience), a lack of bus shelters and bus stop amenities, battery electric bus 'growing pains' that are affecting rider experience, and a lack of adequate pedestrian infrastructure. Moreover, many long-time riders expressed the opinion that service quality has declined in recent years despite the agency adding more revenue service hours.

- Commuters feel that commuter service is not a competitive alternative when compared with other options such as Metrolink or personal vehicle use, and new pilot commuter services to Edwards Air Force Base and Mojave Air and Space Port have not yet materialized into high-ridership routes, though it should be acknowledged that these employment centers present their own unique challenges.

- Municipal stakeholders stressed that the Antelope Valley has long-term goals of smart growth, sustainable development, and creating transit-oriented development along major corridors. While these are goals that will materialize only in the long-term, it is imperative for AVTA to proactively work with Antelope Valley cities and the county to integrate land use and transportation planning decisions to see these goals become a reality.

- Survey results revealed that the majority of rider respondents use AVTA frequently (at least five days a week) and have been using the service for a long time (more than three years). Riders are most satisfied with amount paid in fare for the service they are receiving, and least satisfied with time spent waiting for the bus. While results were mixed, there was consensus that riders tend to value coverage over frequency due to the dispersed, spread-out development patterns seen in the service area.

- While survey results show 67% of non-riders and 82% of riders have a positive impression of transit services in the Antelope Valley, overall, people who have a transportation alternative do not view AVTA as an attractive or convenient alternative to private vehicle use. Long wait times, a lack of pedestrian infrastructure and bus shelter amenities, and long travel times were frequently cited by non-riders as reasons for not riding AVTA.

4.0 WHAT'S NEEDED

Taking all of the information learned from a review of important documents, analysis of existing conditions, and firsthand feedback from current riders and stakeholders, we then synthesized all of this information to identify gaps or needs regarding transit and mobility that may be preventing AVTA from providing attractive and effective transit service while acknowledging the barriers and challenges to providing this in an area like the Antelope Valley. These helped to shape the recommended strategies and performance measures laid out in Task 5, as well as informing the final strategic plan for integrated transportation outlined in the body of this report.

- Examining how well AVTA's service delivery meets the needs of Antelope Valley residents and what it needs to do in the future to better accommodate demand and improve the customer experience, we uncovered the challenges and opportunities for AVTA. A major theme that emerged during our analysis and echoed during rider outreach was that service on the street does not always match observed travel demand. Specifically, AVTA's services have not changed to accommodate new developments and destinations where riders want service to, and bus stops are disproportionately located in rural areas with low ridership that would be better served through an alternative delivery strategy, such as microtransit or an on-request, shared ride service.

- Better active transportation and pedestrian infrastructure are needed throughout much of the Antelope Valley to make transit stops more accessible to get to, and to make it easier to reach final destinations after alighting, especially for those individuals requiring mobility devices. A robust multimodal network with active transportation and pedestrian amenities would contribute to the overall appeal and accessibility of transit in the Antelope Valley.

- AVTA's commuter services are duplicative of existing LA Metro services that operate on dedicated rights-of-way, and terminating existing commuter services at higher-order LA Metro transit services (such as the Red Line and Orange Line) will help to improve the efficiency, reliability, and productivity of commuter services, as well as opening up transfer opportunities to new destinations (such as Burbank, where many Antelope Valley residents are employed).

- Other needs identified that can potentially improve AVTA's services include schedule changes to match bell times and fare concessions for students to increase ridership on supplemental routes and taking steps to accommodate DAR passengers on redesigned, accessible conventional routes as well as introducing new community circulators.

- Again, land use and development decisions were highlighted as a major factor affecting the quality and service of AVTA routes. Because the Antelope Valley is expected to see tremendous growth in the coming decades, it is imperative that the AVTA establish a meaningful, working relationship with local officials and developers to ensure new developments are planned with transit in mind.

- The series of service concepts and strategies aimed at achieving the objectives of AVTA's regional mobility plan focus on the goal of helping AVTA play a more substantial role in the mobility of the Antelope Valley and provide useful transit service that can be the foundation of a multimodal, equitable, and sustainable community.

- Recommendations were based on the objectives of faster service, more frequent service, shorter traversing opportunities, more reliable service, better integration of land use and transportation, a better customer experience, better access to stops and destinations, better regional connectivity, a more inclusive ridership base, more cost-effective service, and enhanced safety and security.
- The above objectives will be achieved through the following set of service concepts and strategies: service layers (including frequent, local, community, on-demand, supplemental/school, and commuter), transit infrastructure and universal accessibility, alternative service delivery models, revised schedules, operator training, emergency ride home programs, travel training, fare policy, transit-first developments, accessible and bilingual information and outreach, and collaborations and partnerships.
- Performance measures were developed based on AVTA's mission statement of empowering mobility: *Getting People Where They Need to Be Safely, Timely, and Cost-Effectively*. Recommended performance measures are in line with industry state of the practice, build upon existing performance measures reported at monthly board meetings, and are broken down into three major categories of Safely, Timely, and Cost-Effectively.

5.0 ACTION PLAN OVERVIEW

The following section describes the recommendations and strategies to support the three main goals or pillars of the strategic mobility plan:

1. **Enhance AVTA's core services—Improve the transit network and mobility services.** The recommendations are divided by service category and rely on the fact that services should complement each other and resources should be deployed prudently and reflect actual demand.

2. **Improve the customer experience.** Building customer satisfaction has been demonstrated to retain riders, expand the ridership base, and get people to use transit more often. This strategy involves improving communications and customer information for better trip planning and improving customer amenities at bus stops.

3. **Build and support an inclusive, multimodal network.** Transit can't do it all—AVTA needs to offer and cooperate with different transportation modes, particularly walking and cycling. Working with elected officials and advocates from across the Antelope Valley will be crucial for ensuring that the community develops in a manner that supports transit use and offers balance for mobility options.

The recommendations that follow were built upon the foundations in Task 5 that explored strategies and service concepts.

6.0 ENHANCE AVTA'S CORE SERVICES

6.1 LOCAL SERVICES

6.1.1 Existing Local Service Performance

Our analysis revealed that Route 1 carries the most riders (29% of all daily weekday boardings), while routes 11 and 12 also capture a sizeable amount of ridership (14% each). Figure 6 shows the average weekday daily boardings for AVTA local routes using APC data from 2018.

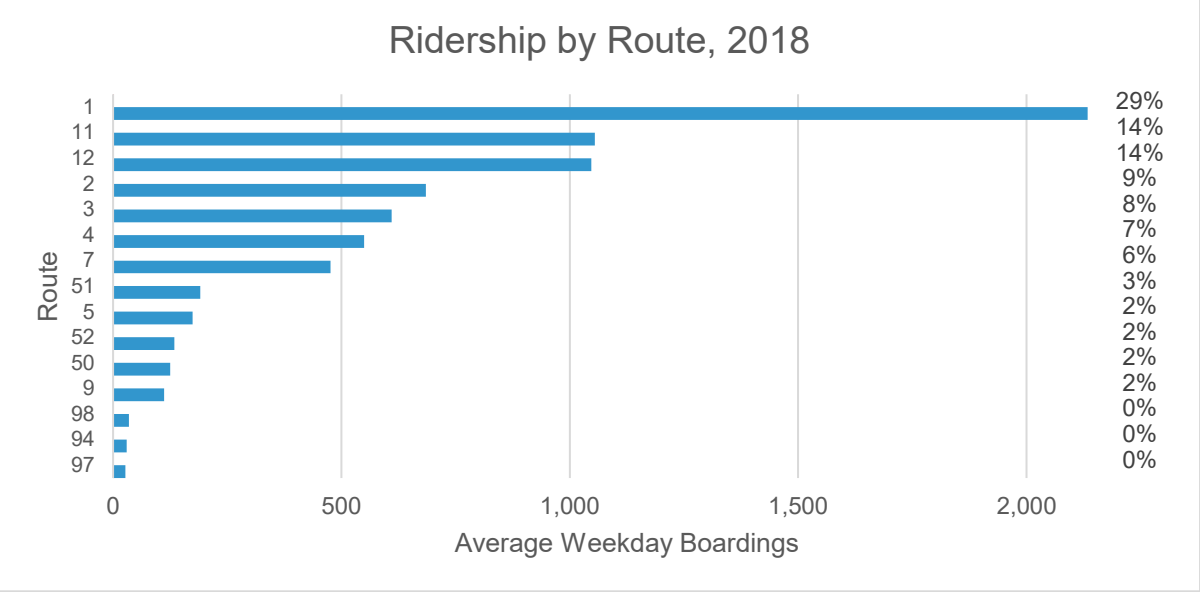


Figure 6: Average weekday boardings by route and as a percent of all fixed-routes, 2018.

Furthermore, as a measure of productivity, boardings per revenue hour provides another perspective showing that beyond Routes 12, 1, and 11, Route 4 is also relatively productive.

Our analysis extended into the stop level to understand corridors, strong routes, or portions of routes that could be combined into stronger routes. We looked to design routes with defined purposes, such as a focus on ridership with frequent service, connecting individuals to strong anchor locations across the network area and coverage services. Furthermore, acknowledging the opportunity to replace low productivity services like Routes 50, 51, and 52 with new microtransit services opens new possibilities to do something new, and redeploy those fixed route resources to where they are more productive, like on Routes 1 and 12.

Route	Avg. weekday boardings	Avg. weekday boardings per rev. hr.
12	1,047	19.6
1	2,134	19.3
4	550	18.3
11	1,055	15.8
7	476	14.4
2	685	12.2
3	610	10.9
51	191	10.8
5	174	10.5
9	112	8.4
52	134	7.6
50	125	6.9

Table 5: Route-level average weekday boardings and productivity, 2018.

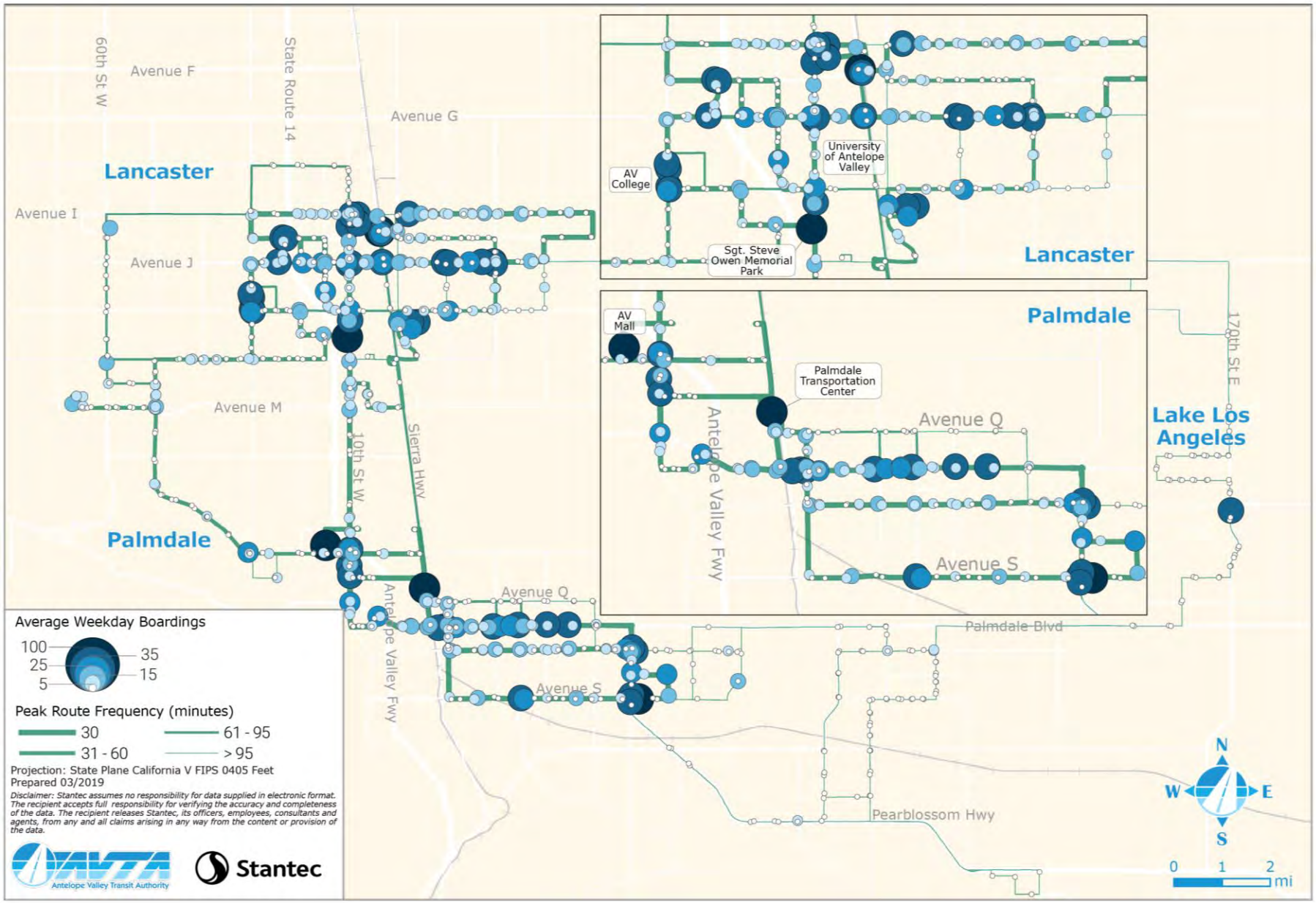


Figure 7: Average weekday boardings for fixed-route services, 2018.

Key findings of the typical weekday stop-level analysis (Figure 7) include:

- In Palmdale, the highest boardings are observed along Palmdale Blvd, which is served by Route 1 and consists primarily of commercial and service land uses.

- Major stops in Palmdale include:
    - Palmdale Transportation Center, where riders can transfer to Metrolink trains and AVTA's Transporter to Santa Clarita;
    - Stops at 47th St E and Avenue S, which provide access to Walmart Superstore, Walgreens, and other commercial destinations; and
    - AV Mall, a large shopping center.

- 10th St W acts as the main transit corridor that connects Palmdale and Lancaster. While passenger activity is observed at major destinations on 10th St W (Figure 8) within Palmdale and Lancaster, stop-level demand along 10th St W is low between W Avenue O 8 and Avenue M, where lands are largely vacant (Figure 9).

Figure 8: 10th St W at Commerce Center Dr

Figure 9: 10th St W at W Avenue N

- Major stops in Lancaster include:
    - Sgt. Steve Owen Memorial Park, where riders can transfer to local bus routes;
    - Lancaster Station, which provides access to Metrolink trains as well as local bus transfers;
    - Stops near Antelope Valley College and the University of Antelope Valley; and
    - Avenue J corridor, including key commercial destinations, schools, and healthcare facilities like Antelope Valley Hospital

- The service provided is largely in line with demand, as low ridership corridors are served by low-frequency routes (e.g. 7, 9, 50, 51, 52).

- The high activity stops of Sgt. Steve Owen Memorial Park, Lancaster Station, and Palmdale Transportation Center reveal that passengers rely on these stops as transfers and a large percentage of transfers occur at a small number of locations. AVTA should establish additional transfer points by redesigning some routes to be more direct and focusing service along key connecting corridors.

6.1.2 Network Reimagining

Through the analysis of origin-destination data, ridership data, stakeholder meetings, and public engagement, it was determined that existing local transit services do not adequately respond to demand in many places. Although most transit trip demand occurs locally within Lancaster, between Palmdale and Lancaster, and within Palmdale, substantial resources are spent providing fixed-route transit service in low-demand areas such as Lake LA, Pearblossom, and Sun Village, where ridership is scant. We acknowledge that providing transit service in these low-demand areas is absolutely necessary to provide mobility options for people who lack alternative travel options; however, fixed-route service that operates every 1.5 to 2 hours does not allow riders the flexibility to travel where they want, when they want. In addition, these existing fixed-route services (i.e. Routes 50, 51 and 52) are costly to provide and have relatively low ridership and productivity. Alternatives to fixed-route transit, such as on-request microtransit, can improve the cost efficiency of providing transit, while also giving riders better service with shorter waiting times. This section redesigns transit services by replacing unproductive services with on-request transit and redeploying resources into more productive routes that serve the greatest number of people and destinations.

Service Layers

Agencies use layer types to help prioritize and allocate resources across a transit system in order to serve many purposes and populations. They establish service standards which act as a communication tool to stakeholders of the parameters and criteria that define each layer and how/where they are to be used, including triggers for change. The following four service types compose the local network and aim to match the highest-demand areas with the greatest amount of service:

- **Frequent** transit service aims to move towards an ultimate service frequency of 15 minutes all day but may operate at this higher frequency for the majority of the day (e.g. 6AM to 6PM) or during peak periods only. Frequent services are typically deployed along major corridors with mixed-use development and density of key destinations and transit trip generators. The target for ridership on frequent routes is 20 boardings per revenue hour or higher. If a route on the local layer reaches this target, it should be investigated and considered for frequent service.

- **Local** transit operates along corridors where there is a high level of usage but the density (both jobs and people) is not enough to warrant a frequent level of service. The goal of this service is to offer 30-minute service throughout the day. The goal of all local routes is to operate on a clock face headway, but there may be some exceptions depending on the length of routes and the cost of maintaining the discipline of such a schedule. Local routes also bring people to frequent corridors and mobility hubs to promote transfers. The target performance of a local route is 15 boardings per revenue hour, which is currently only met by two routes on the local layer (Route 4 and Route 11).
- **Community** service is primarily designed to provide access within residential areas and provide coverage to lower-density communities. This service connects to the local and frequent transit networks to provide transit access to the entire community. The goal of this service is to operate every 60 minutes on weekdays. Community routes that fall below 10 boardings per revenue hour should be investigated to be replaced with on-request microtransit solutions.
- **On-request** transit typically operates as curb-to-curb or stop-to-stop service, where users are able to request rides as needed instead of following a fixed schedule. Routes are created dynamically and can fluctuate throughout the day. On-demand transit solutions are often implemented using app-based technology that allows riders to request rides using a smartphone or computer and are commonly deployed in low-density areas that do not have enough demand to support fixed-route transit.

Additional service layers include **commuter** and **supplemental** services, which are discussed in the subsequent sections. Commuter and supplemental routes provide a limited number of trips per day to serve a specific purpose, such as school travel or travel to employment centers. A decrease in supplemental revenue hours is proposed based on the elimination of supplemental routes to school during the summer months when school is not in session and demand is low.

The local network described below focuses on the core services that operate during the majority of the day on weekdays and weekends.

Figure 10 illustrates the proposed local transit network, which has been adjusted to meet unmet transit needs identified in previous tasks. This network aims to **provide simplified transit service along key corridors where the greatest demand for transit was observed**. For example, providing stronger east-west local transit routes to facilitate short local trips in Lancaster was achieved by increasing the frequency of service along Avenue J (Route 12), providing continuous service on Avenue K (Route 5), and maintaining a local service along Avenue I (Route 11). The redesigned network also provides greater transfer opportunities by feeding local and community routes into major Transfer Centers including Sgt. Steve Owen and Palmdale Transportation Center or facilitating on-street transfer opportunities at major intersections.

Two new routes, Route 6 and a redesigned Route 4, are proposed to operate in Lancaster to provide greater access to key destinations like the AV Hospital, while a redesigned Route 7 provides access to Kaiser Permanente. Routes 4 and 8 provide 30-minute service and is an important piece to improve access to medical centers as well as other community destinations.

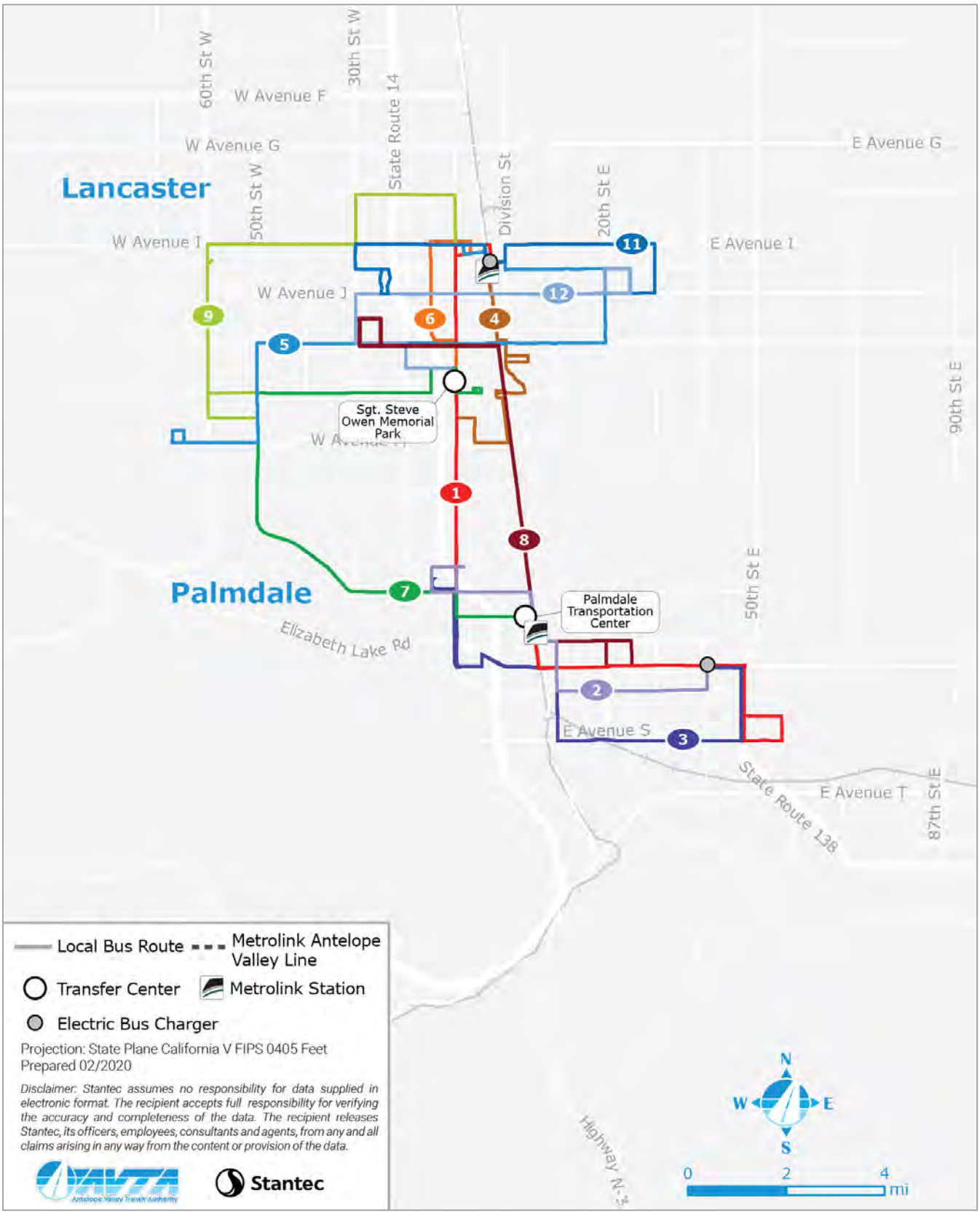


Figure 10: Proposed local transit network

Figure 11 and Figure 12, which depict existing and proposed weekday headways, show how the concept of service layers was applied to create a network that addresses existing travel patterns and prepares AVTA for the planned growth in the Antelope Valley. Most notably, Route 1 and Route 12 have headways of 15 minutes compared to approximately 30 minutes today, and the community routes operate at no more than 60-minute headways. In particular, Route 9 is proposed to operate every 60 minutes, while Routes 50, 51 and 52 are proposed to operate on request. The public had previously expressed concerns about these routes, indicating that if they miss their bus, they have no alternative but to wait 90-120 minutes for the next bus. In some cases, this has impacted their employment due to late arrivals at work. The increase in frequency across the AVTA network increases freedom for riders and is expected to attract new and existing riders to make more trips on transit.

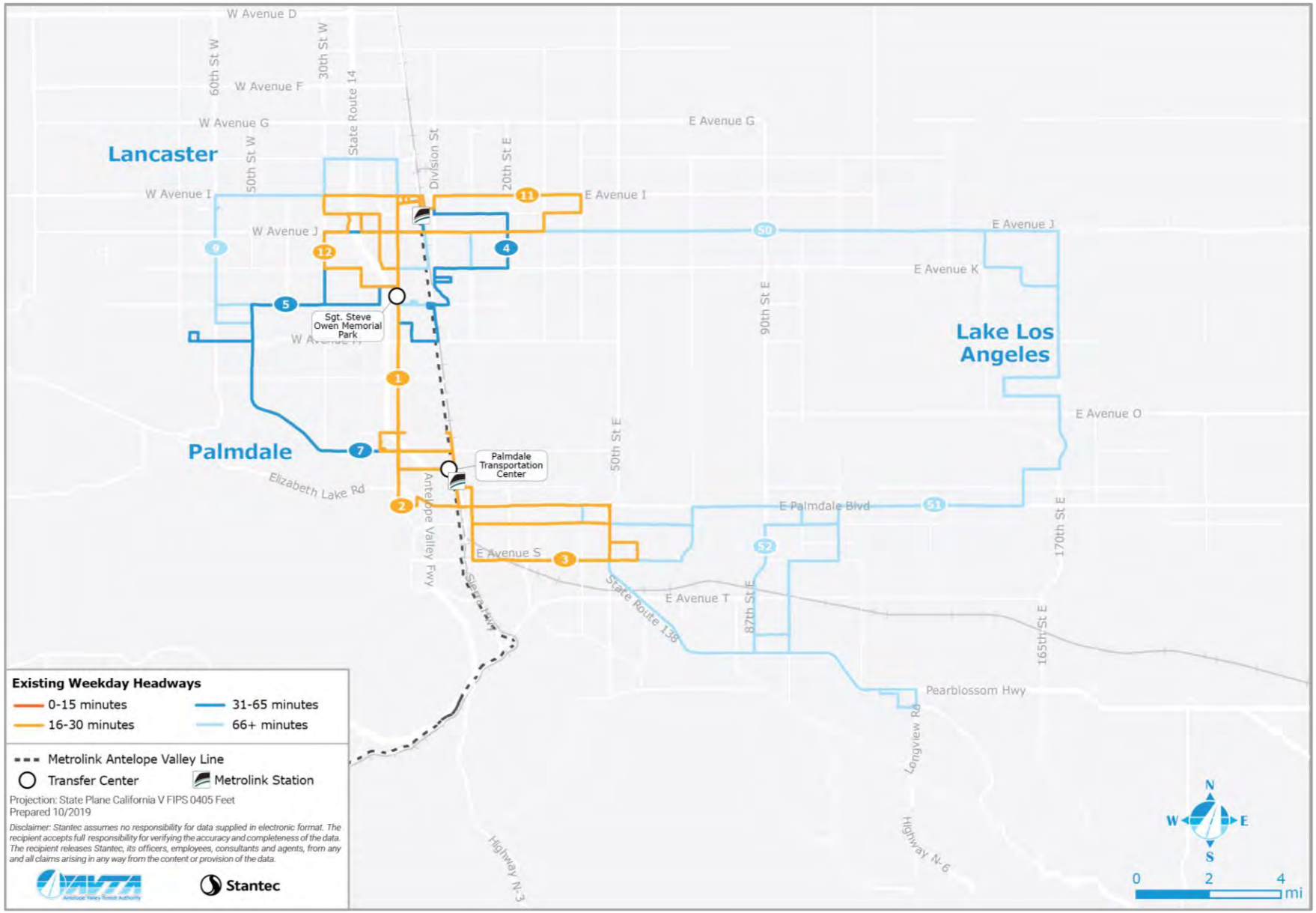


Figure 11: Existing local service weekday headways

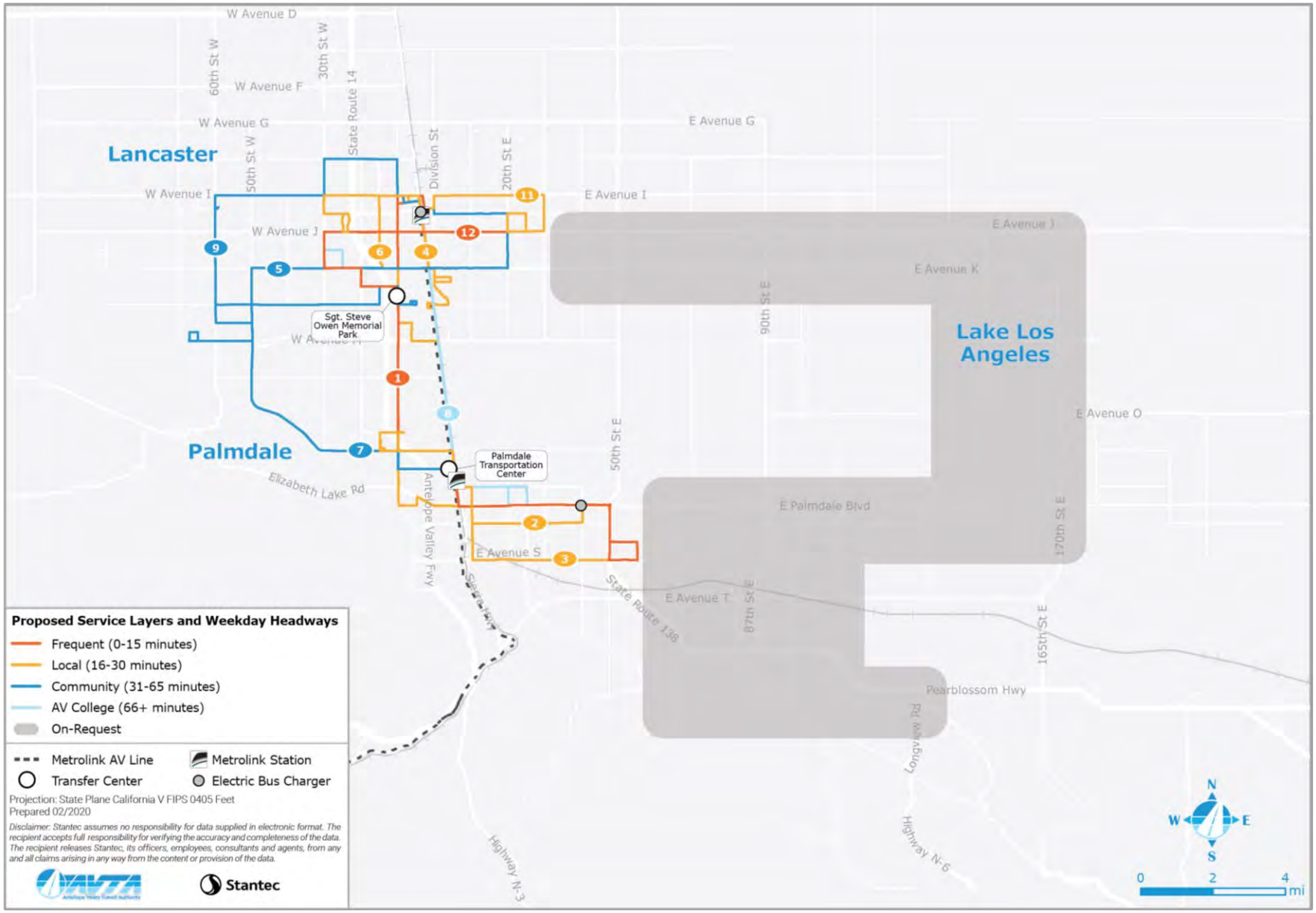


Figure 12: Proposed local service layers and weekday headways

Service Frequency and Span

Service frequency (and its inverse, headway between buses or transit vehicles) **is perhaps the most important attribute for choosing or forgoing transit** as a mode choice, particularly for people with other modes at their disposal. Frequent service, which in North America is understood as headways of 15 minutes or less, allows people in a community to travel with great freedom on transit. The best part of a personal vehicle is the ability to leave whenever one wishes, rather than relying on a scheduled bus. Headways of 15 minutes or better can help transit approach that level of convenience since, on-average, the wait time is approximately 7.5 minutes.

Nevertheless, **increasing service frequency directly increases operating costs**. While costly, analyses of route productivity and frequency from agencies across North America reveal a strong and positive relationship between the two—the greater the **service frequency, the greater the route productivity**. We caution that frequent or **ridership routes** be designed with a purpose, that is, used to connect high-density activity centers (a lot of people and jobs, with mixed land uses) along a relatively straight line.

Route 1 for example, is a good candidate for a frequent route because of the markets it serves and its high ridership (33% of AVTA's ridership is on Route 1). On the other hand, routes into Lake LA and routes that serve peak demand locations like schools, are not good candidates for frequent service and can be classified as **coverage or policy routes** that serve a specific purpose, operate at a lower frequency, and can be circuitous in alignment. Low productivity for coverage routes is acceptable because they serve another goal.

Transit service needs to be available when people travel. **Service span tells customers between what hours transit service operates.** AVTA generally operates between 5 am and midnight on weekdays, but that varies by route; weekends see shorter service spans which generally matches decreased transit demand. However, with the increase in non-traditional work hours, typical service spans generally no longer reflect current travel patterns.

Ensuring transit is available when people need it is important but costly. **Like service frequency, lengthening the service span will increase operating costs (more buses and more operators)**. Adjusting the service span by pruning early morning hours can help re-coup costs to invest in later service hours, or longer weekend hours, although this needs to be done with caution.

Figure 13 and Figure 14 below provide the frequency (headways) and span for each route in the local network on weekdays, Saturdays and Sundays. Specific route-level changes in frequency and span are provided in Section 6.1.3, but a summary of changes is provided below:

- Overall, no decreases in service frequency are recommended. All routes will maintain the same headways or better because service frequency is one of the greatest determinants of ridership. By designing straighter routes with greater frequencies that reduce passenger waiting time, along with priority measures designed to increase the flow of buses, AVTA can work to reduce travel time to a point where bus travel becomes competitive with car travel.

- The Route 1 pilot with 15-minute weekday service should be extended from ending at 3PM to ending at 7PM, with 30-minute headways during the early morning and late night. Route 12 should also operate at 15-minute headways during the same period as Route 1 (7AM to 7PM). On Saturdays, both routes should operate at 30-minute headways, from 8AM to 8PM. Depending on the success of 30-minute service on Saturdays, AVTA can explore the feasibility of providing 30-minute service on Sundays.

- Given the low demand for fixed-route transit during the late evening, the proposed services in the local and community layers should terminate at 8PM on weekdays, with on-request service operating from 8PM to midnight. Since many of the existing local and community routes stop running service at 9 or 10PM, on-request will allow the service span to extend later into the evening at a lower cost than today. Similar recommendations are suggested for weekends as well, where fixed-route service could be supplemented by on-request service after 8PM and 7PM on Saturday and Sunday, respectively.

- As the backbone of the proposed network, Route 1 and Route 12 will continue to operate until midnight on weekdays, 11PM on Saturdays and 10PM on Sundays while other local and community routes will be replaced by late-night on-request microtransit at night.

- Routes 50, 51, and 52 will be replaced with on-request microtransit, which will operate alongside late-night on-request microtransit. AVTA is currently in the process of procuring a turnkey vendor for on-request shared mobility services, which is planned to begin in 2020. Through this process, AVTA will be provided with greater detail on the potential wait times for customers.

- We recommend consolidating existing Dial-a-Ride services, late-night on-request service, on-request microtransit substitution for low-performing routes, and non-emergency medical transportation (NEMT) into one on-request, shared mobility service offering. By doing so, AVTA can find efficiencies in service delivery by matching a variety of different types of trips. More information about shared-ride services can be found in Section 6.2.

- Community routes will continue to begin operation at the same time as today, but the service span will be extended later through on-request service. No community route will see greater than 60 minutes between buses on the weekday, Saturday or Sunday. We recommend using clock-facing headways whenever possible to improve clarity and make it easier for riders and potential riders to understand.

- A set of two interlined routes (Routes 4 and 6) are proposed as part of the local layer, replacing parts of Route 4 and 11. They will operate at 30-minute headways on weekdays and 60-minute headways on Saturdays and Sundays.

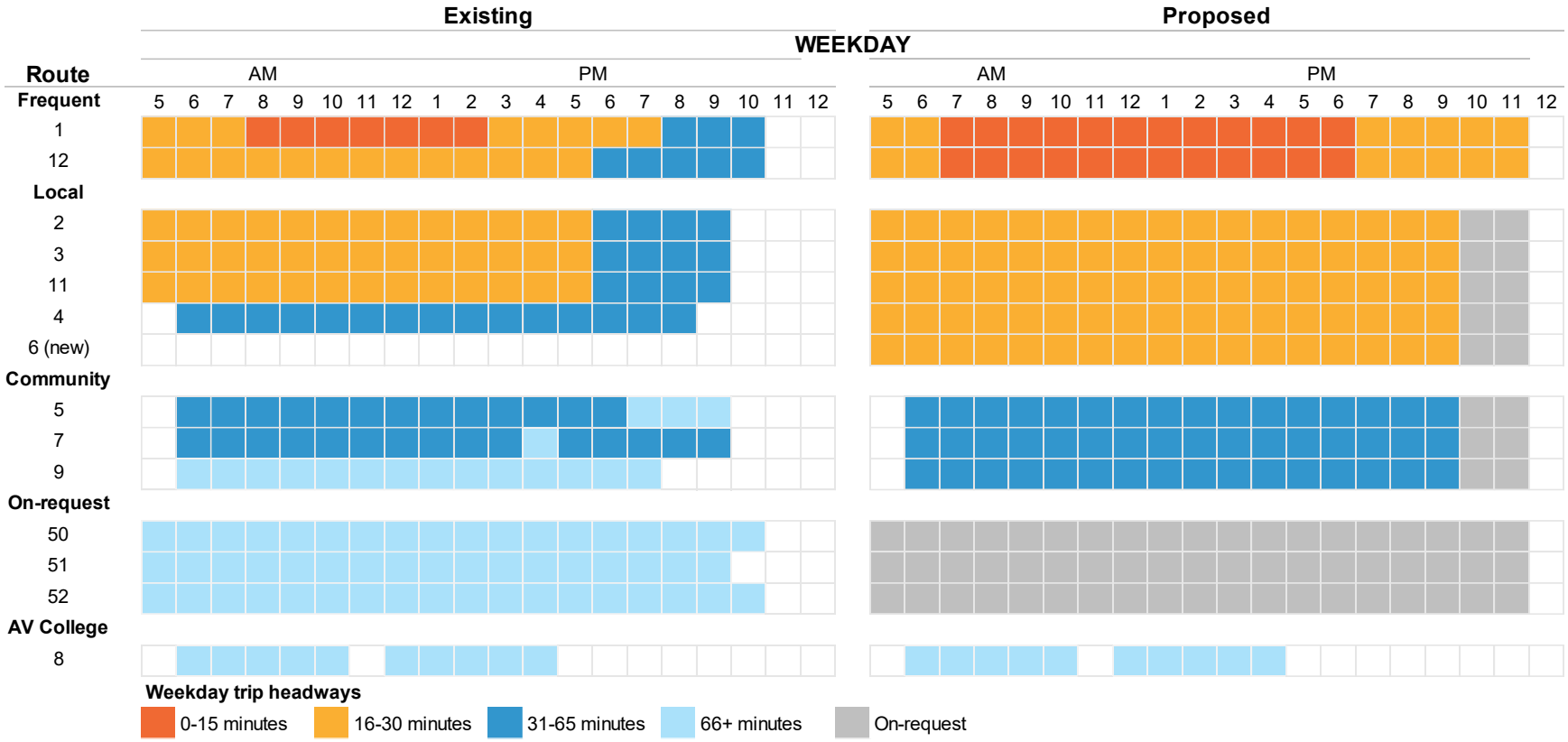


Figure 13: Existing and proposed weekday service headway and span by layer

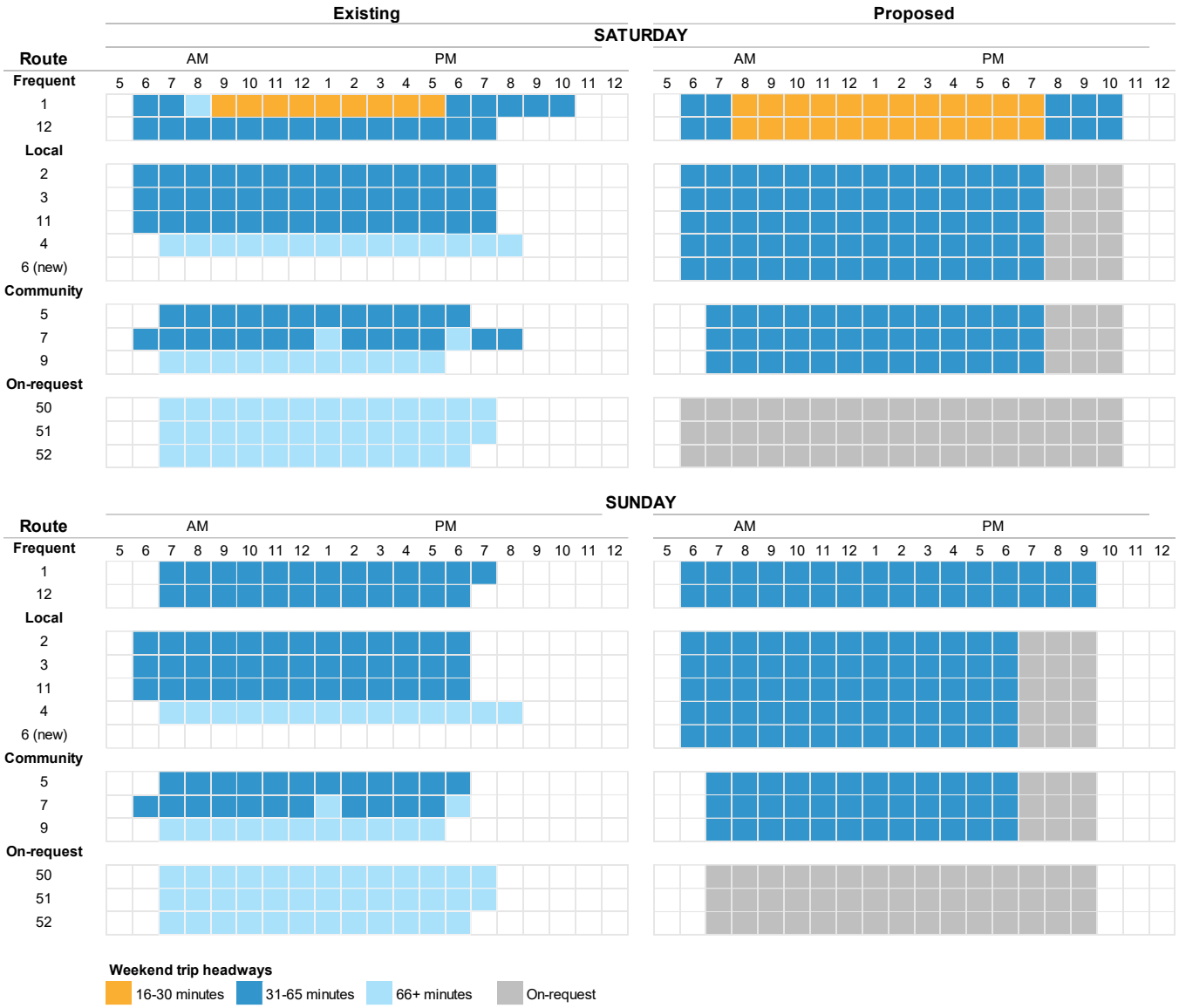


Figure 14: Existing and proposed weekend service headway and span by layer

6.1.3 Route-Level Recommendations

Frequent Routes

Route 1

- Route 1 is a successful route, carrying the greatest number of passengers per weekday, Saturday, and Sunday. Therefore, no changes to the alignment are suggested.
- As part of the frequent service layer, we propose increasing Route 1's frequency to headways of 15 minutes. As an early action item, AVTA implemented a 15-minute pilot in June 2019. As such this route currently operates at 15-minute headways during the morning and midday periods (i.e. until 3PM). We proposed extending frequent service to 7PM to encourage people to use Route 1 for a variety of trip purposes, such as to and from work during peak hours or for discretionary trips during the midday. Since implementation, AVTA has seen an increase in ridership of about 20% on Route 1 compared to the same time frame in the previous year (Figure 15).
- During our engagement activities, riders requested to increase Route 1 service frequency on the weekend. We recommend continuing to operate Route 1 on Saturdays at 30-minute headways but extending 30-minute service until 8PM. At some transit agencies, Saturdays can be as busy as a weekday on their workhorse route, thus warranting frequent (less than 15 minute) service. AVTA should monitor both weekday and weekend ridership to determine if increasing service frequency results in ridership increases on this route, at which point improvements to weekend headways can be considered.

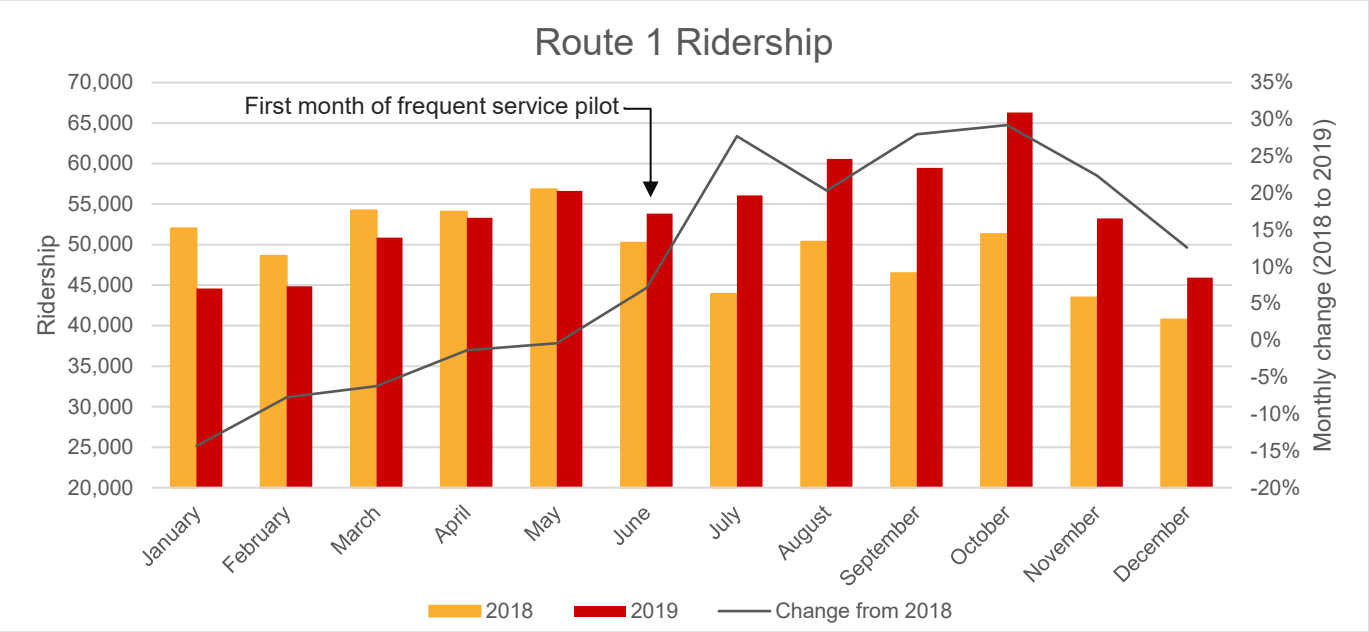


Figure 15: Monthly ridership on Route 1 in 2018 and 2019 showing a stable and sustained increase in ridership after service improvements.

Route 12

Figure 16: Existing and proposed alignment for Route 12

- Route 12 is the most productive route in the network based on boardings per revenue hour. For that reason, we recommend that AVTA increases its frequency and operates at 15-minute headways instead of 30-minute headways. This would result in a frequent east-west local service in Lancaster, which was identified as a need during the Needs and Opportunities task of this study.

- Therefore, Route 1 and Route 12 will act as the backbone of the reimaged network, providing north-south and east-west frequent service that allow riders to travel spontaneously without planning their trips, knowing that a bus will be arriving shortly, on average every 7.5 minutes. These two routes will also provide service later into the evening than other routes, providing late-night fixed-route coverage on weekdays and weekends in the areas with the highest demand.

- To provide faster and more direct service, the proposed Route 12 does not detour off W Ave J to serve Valley Central Shopping Mall (Walmart Supercenter) off 25th St W. The purpose of frequent transit services is to quickly bring passengers along straight corridors, wherever possible. Valley Central will be served by Route 11.

- Since Route 12 (frequent) will operate on a different service layer than Route 11 (local), these services should no longer be interlined. We recommend that Route 12 terminates near 20th St E, where riders can then transfer to Route 11 if desired. A one-way loop at the east terminus of the route is required for the

bus turnaround and should be kept as short as possible. Turning around in the Walmart parking lot is currently not feasible due to turning radii but could be considered in the future to promote transit use to and from this destination.

Local Routes

Route 2 and 3

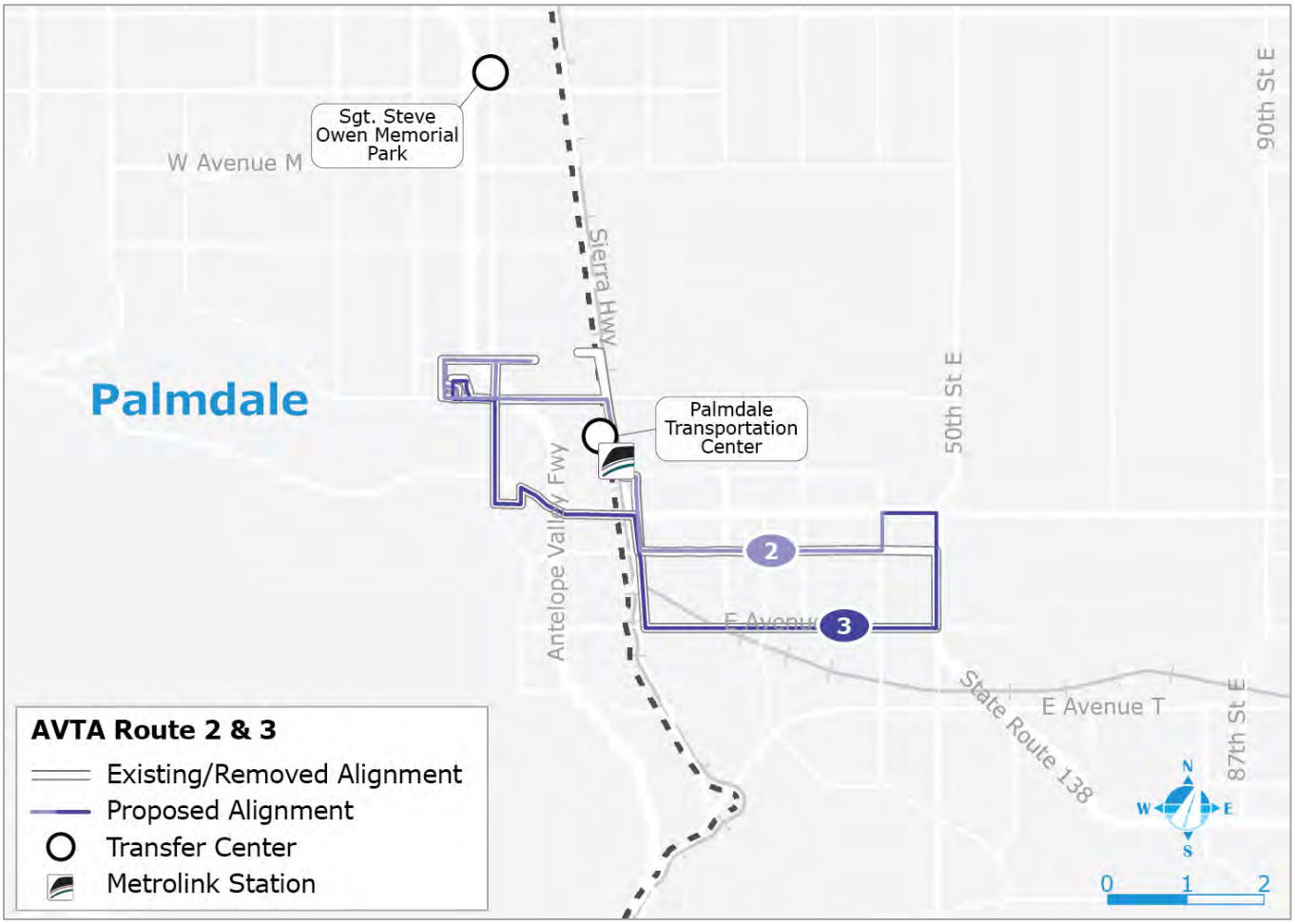


Figure 17: Existing and proposed alignment for Route 2 and Route 3

- Routes 2 and 3 operate as interlined routes, operating at 30-minute weekday headways. These routes provide east-west service to Palmdale and the southern portion of the Antelope Valley. Route 3 provides access to the Palmdale Transportation Center, with available transfers to other local routes, supplemental routes, commuter routes, and Metrolink. For the purposes of this plan, we propose keeping these headways, but in the future, given sufficient development and demand, future demand may support 15-minute frequencies.

- Combined, Routes 2 and 3 account for 19% of total local fixed route ridership, with Route 2 providing slightly more annual passenger trips (205,259) than Route 3 (182,421). These routes are relatively productive routes that do a good job of bringing people to major transfer locations.

- The primary changes proposed to Routes 2 and 3 regard minor routing alterations to account for the construction of an on-route charger at 40th St E and E Palmdale Blvd near the South Valley Health Center. This site will be developed into a hub with passenger amenities and to accommodate on-route charging. This is also one of the proposed transfer hubs from on-request to fixed route service, giving passengers the opportunity to transfer to Routes 1, 2, and 3 at this location.

- One minor change proposed includes the 'uncrossing' of route alignments—routes 2 and 3 alignments will be swapped. Route 3 will operate along 10th St W, Palmdale Blvd, and Ave R, while Route 2 will operate along Rancho Vista Blvd/Ave P, Sierra Hwy, 10th St E and Ave S.

- Another proposed change to the alignment of Route 2 is to remove the segment of the route that detours to serve E Avenue O-8 (currently on Route 3). This detour adds approximately 10 minutes to the total cycle time of the route and results in very little ridership. Removal of these stops would result in approximately a 10-minute walk from E Avenue O-8 for a small number of riders and would create a faster and more direct route that serves the area more efficiently and strengthens east-west travel in Palmdale.

- Otherwise, these routes are proposed to stay the same, with 30-minute service during the weekday and 60-minute service on the weekend as part of the local network that carries riders to the frequent routes. Service every 30 minutes will be available until 8PM on weekdays, unlike today where the frequency of service drops after 6PM. These services are proposed to stop operating at 10PM on weekdays and Saturdays and 7PM on Sundays, when it will be replaced with late-night on-request service. The late-night on-request service increases the service span to midnight on weekdays, 11PM on Saturdays and 10PM on Sundays.

Route 11

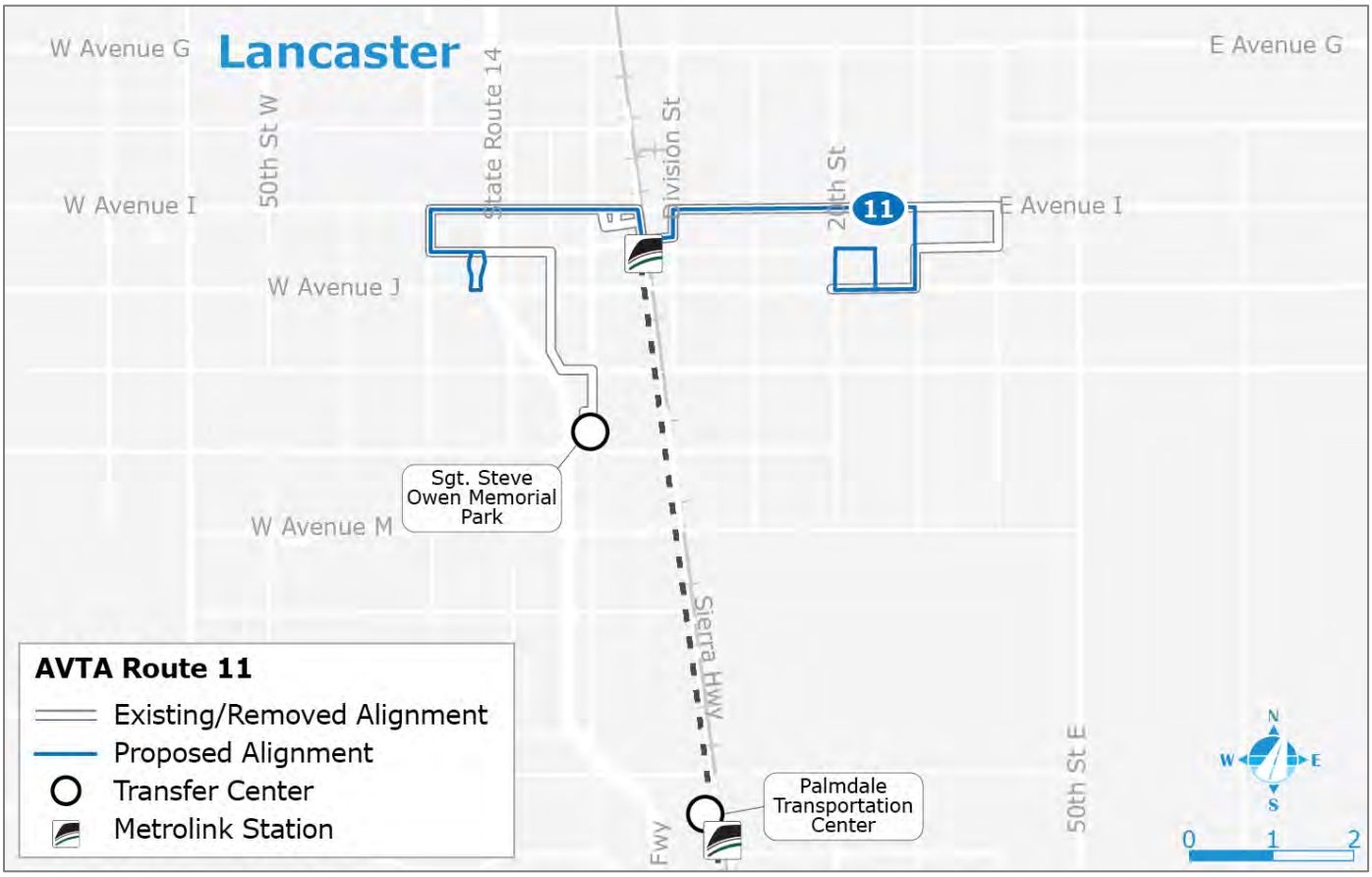


Figure 18: Existing and proposed alignment for Route 11

- Route 11 currently provides access to Sgt. Steve Owen Memorial Park, Lancaster Metrolink Station, and transfer opportunities to supplemental and local routes. It is currently interlined with Route 12 where it operates at 30-minute weekday headways.
- The proposed Route 11 no longer serves Sgt. Steve Owen, and instead turns around at Valley Central Shopping Mall and will continue to operate at 30-minute headways while Route 12 operates at 15-minute headways. These changes allow Route 12 to provide continuous frequent service along Avenue J without detouring into the shopping center.
- For these route changes to be achieved, AVTA may consider installing a bus turnaround at Valley Central Shopping Mall or the Walmart Supercenter at Avenue J and 20th St E (either terminus). Constructing a bus turnaround at this location would also reduce the running time of Route 11 and 12 as they would no longer require a large loop around a residential area.
- The new alignment removes the portion of the route that extends east of 30th St. E due to very low passenger activity between 30th St. E and 40th St. E. However, it is acknowledged that there are special events (such as job fairs) that take place beyond 30th St. E. For these special occasions, temporary route deviations can be scheduled to accommodate these events.

- Transit systems that operate on a grid of north-south and east-west corridors increase the number of route options riders have. Instead of all services pulsing out of Sgt. Steve Owen, a grid system can better facilitate on-street transfers and will increase the efficiency of operation. This local route will strengthen east-west movement within Lancaster and help develop a transit network on a grid of straight and direct services with minimal detours.

Routes 4 and 6

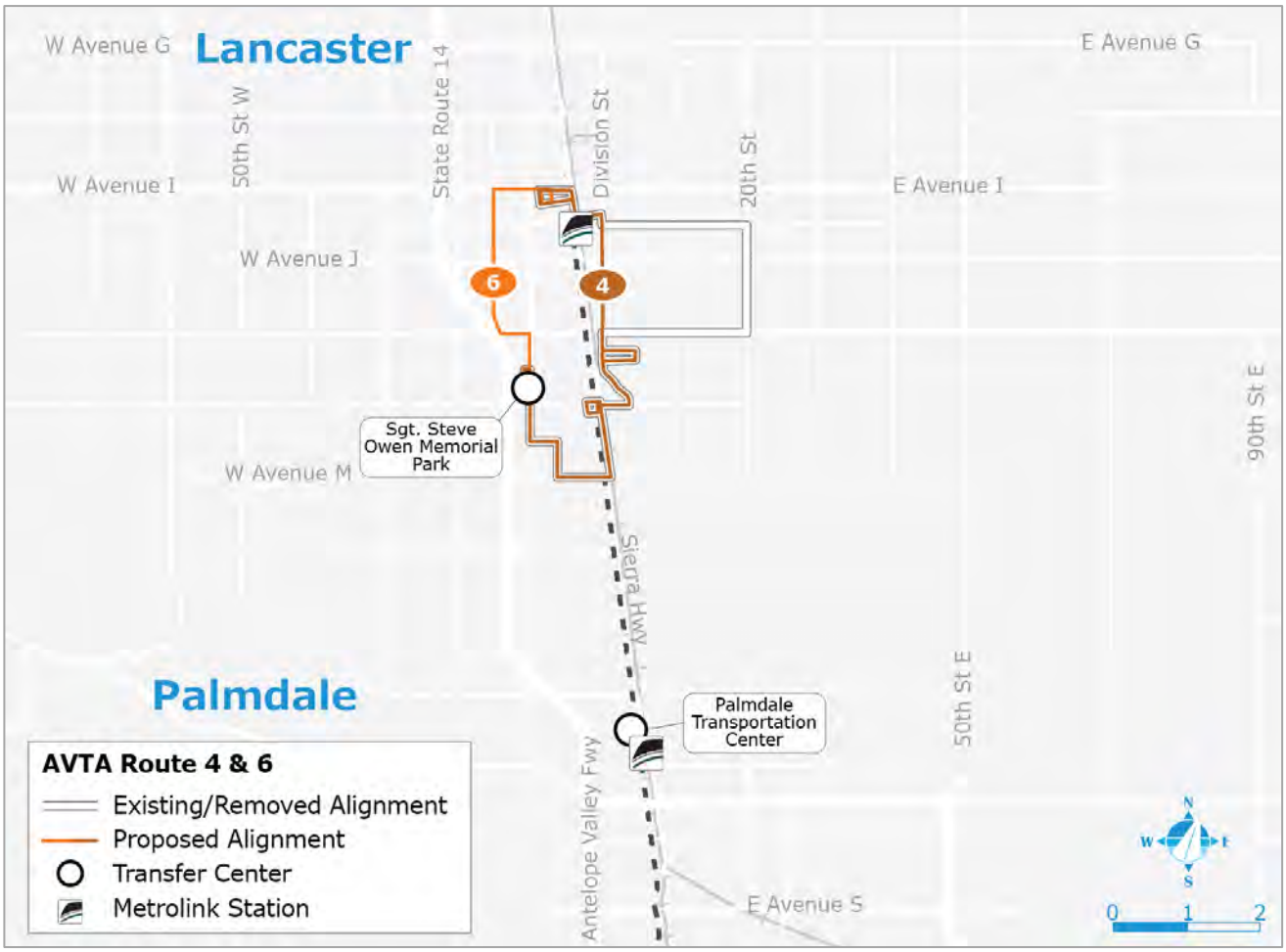


Figure 19: Proposed alignment for Routes 13 and 14

- Modified Route 4 and new Route 6 arose from stakeholder and residents' concerns about the need for improved transportation to important community destinations. Route 4 answers that call by providing service between Lancaster Metrolink Station, the new Lancaster DMV, the courthouse, and Sgt. Steve Owen Memorial Park. Route 6 connects to Route 4 to provide service to Antelope Valley Hospital.

- These proposed local services will operate as interlined routes at 30-minute headways during weekdays and 60-minute headways on the weekend. Riders can transfer to and from these routes from the frequent routes (Route 1 and 12) at multiple transfer locations, providing greater connectivity to health care facilities such as the Antelope Valley Hospital.

- In addition to health care centers, these new routes serve other destinations such as employment opportunities off Division St/Business Center Pkwy. Service headways of 30 minutes all day on weekdays

is therefore important to serve peak commuting patterns as well as off-peak commuting and discretionary trips.

- During our stakeholder workshops and public engagement, a common request from riders was to provide better access to the Lancaster DMV. While the DMV is only approximately seven minutes from the frequent network (Route 1) by walking, the pedestrian environment does not facilitate walking connections as sidewalks are either absent or discontinuous. The Lancaster DMV is a good example of how land use planners and transportation planners must work together to site new developments in transit-friendly environments. The DMV is difficult to serve by transit because it is not *on the way* from one transit destination to another and cannot be served by a relatively direct and efficient route. Instead, routes must detour to serve developments like this one that are surrounded by vacant land. Developments that are located along mixed-use and medium-density corridors are able to be more efficiently served by frequent transit service. As such an important community destination, the DMV is proposed to be served by a deviation of Route 4 at 30-minute headways.
- Improvements to the pedestrian environment along W Avenue L-6, paired with transit-oriented development on the northeast corner of 10th St W and W Avenue L-6 may eliminate the need for transit to detour to the DMV in the future as transit riders may be more willing to walk to their destination.
- The existing Route 4 alignment serves many community destinations, such as the LA County Sheriff's Department, Sgt. Steve Owen Memorial Park, apartment homes, and commercial and employment destinations
- We recommend that Route 4 operate along Division to reduce circuity, while 20th St E will be served by Route 5.
- Route 6 is recommended to operate along 15th St E, covering portions of existing Route 11.

Community Routes

Route 7

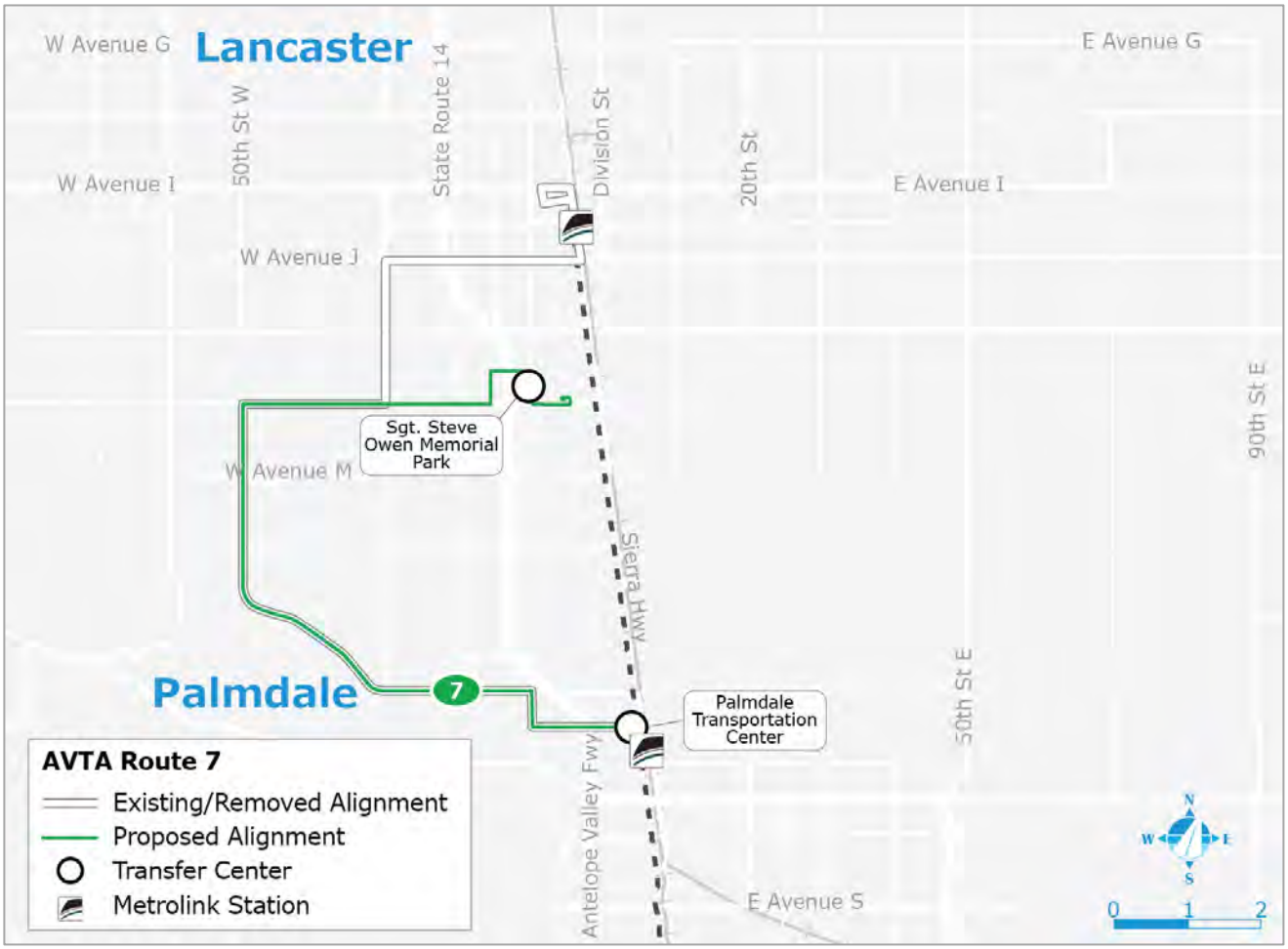


Figure 20: Existing and proposed alignment for Route 7

- The existing Route 7 provides access to destinations such as Antelope Valley College at 30th St. and Ave. K, Quartz Hill Elementary School and Library at 50th St. and Ave. M, and Antelope Valley Mall at 10th St. and Marketplace.
- To avoid duplication with Route 5, the proposed Route 7 alignment removes duplicative service on Avenue L and instead serves Avenue K. Destinations that were not previously served by AVTA's fixed-route system can now be served by the proposed Route 7, including Endeavour Middle School, which was requested during the public engagement process for this study. The idea to relocate part of Route 7 service to Avenue K and serve Endeavour Middle School was supported by multiple comments from the public.
- The proposed alignment continues past Sgt. Owen to serve the Kaiser Permanente which will lose fixed-route service due to the proposed removal of Route 50. At a 60-minute headway and with connection at Sgt. Owen, more customers will have better access to Kaiser along Ave L. However, we note that

entering the parking lot with a large bus is not ideal—the design of the site and right-of-way makes it impossible to serve without entering the parking lot.

- Existing Route 7 schedules have inconsistent headways during weekday service (between 55 and 68 minutes) and weekend service (between 50 and 70 minutes). It is recommended that Route 7's new schedules follow clock-facing headways to improve clarity for riders, or at the very least, operate with a maximum headway of 60 minutes.

Route 5

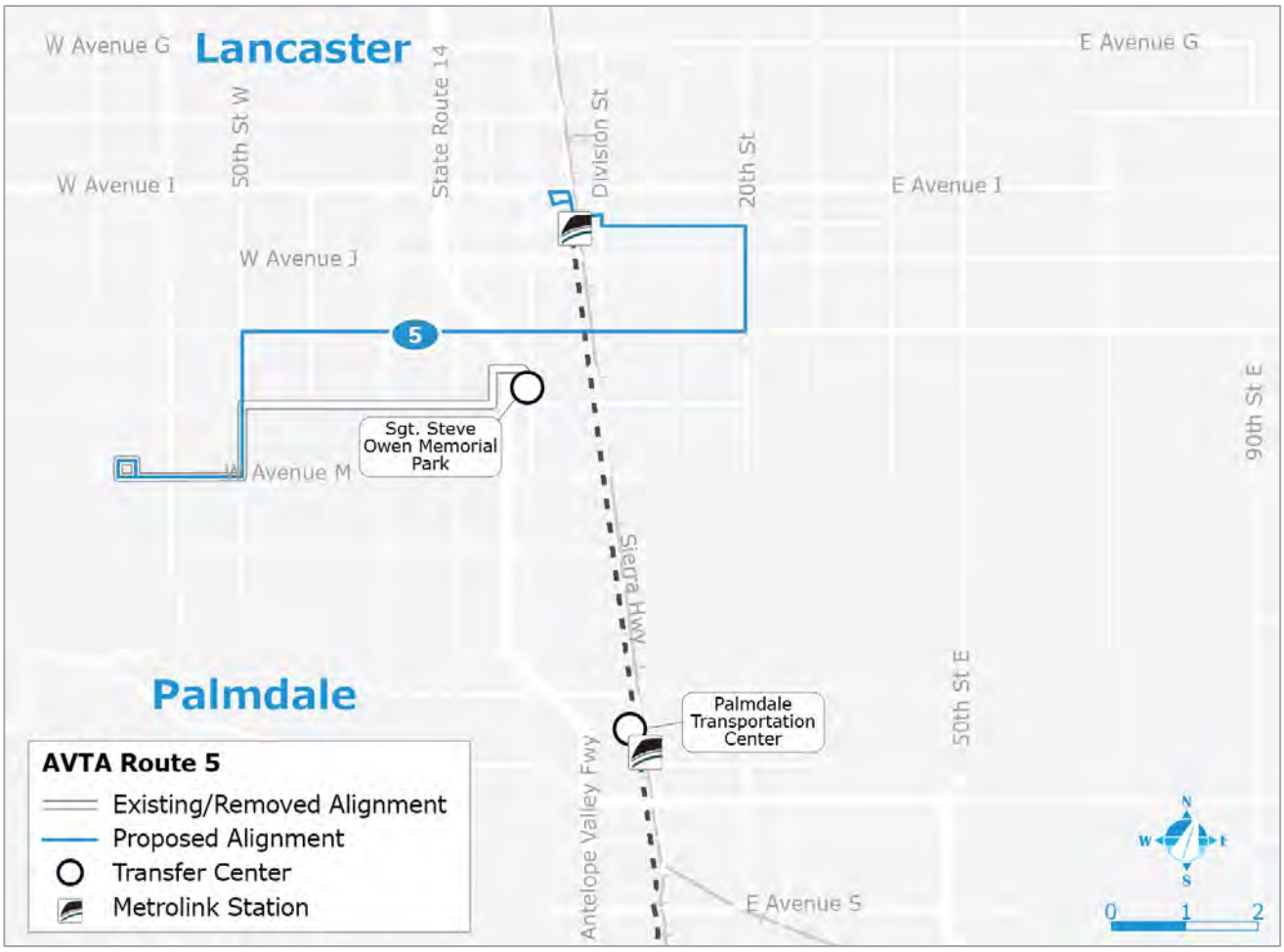


Figure 21: Existing and proposed alignment for Route 5

- Route 5 is proposed to operate along some portions of existing Route 7 along 30th St W, serve Ave K, 20th St E and Lancaster Blvd which is currently served on Route 4 and terminate at Sierra Hwy and Lancaster Blvd.

- Route 5 is part of the community layer and as such will operate at 60-minute headways.

Route 9

- Route 9 began operating service in 2017 and ridership on this route has increased significantly since its inception. However, as a relatively new service operating in a low-density area, this route is one of the least productive routes in the local system.
- Route 9 provides access to the western portion of Lancaster, which provides service coverage to areas with no other transit routes. As the west of Lancaster continues to experience development growth, this service become increasingly important. It is suggested that AVTA works with local planning authorities to ensure new developments are transit-supportive and can be served without deviating from main corridors. Features such as active frontages on main streets, pedestrian facilities and building access doors near transit stops can ensure Route 9 ridership grows alongside development growth.
- New developments are likely to encourage ridership growth, but there are additional steps AVTA can take to improve service on this route as well. We heard from the community that more frequent service is required on this route, so we are proposing that the route operates every 60 minutes during all seven days of the week instead of 90-120 minutes like today. This change is expected to attract more riders to the system by providing greater travel flexibility.
- The only change in alignment suggested for Route 9 is to terminate the route at Lancaster Metrolink Station. Route 4 will now provide service along the eliminated segment of Sierra Hwy. As development growth increases and transit demand increases, new stops can be added along the route to respond to new ridership potential.

Route 8

- Route 8 began operation in Fall 2018. Also known as the AVC Shuttle, Route 8 is intended to provide limited-stop, express service between the Palmdale Transportation Center, the AVC Palmdale Center, and Antelope Valley College.
- In its first year of operation, this route saw 4,507 riders. However, this number rose to 13,975 riders in 2019, an increase of 210%[3]. This clearly shows that this route is becoming a more popular transportation option for those traveling to and from AVC. Additional ways to incentivize transit use by students should be explored, and ridership should continue to be monitored as time goes on.
- As this route operates for a specific reason and provides a specific purpose (transporting students to and from Antelope Valley College), there are no proposed changes to this route and will remain as-is.

On-Request

- Routes 50, 51, and 52 are proposed to be replaced by an on-request shared-ride service due to low ridership and productivity of the fixed-route services. AVTA currently operates these routes infrequently and riders have asked for greater frequency and availability of transit services in areas such as Lake LA, Littlerock, and Pearblossom. Since the cost per ride is expensive for Routes 50, 51 and 52, and the routes have long segments with very few riders, it is not financially viable to increase their frequency.

[3] https://www.avta.com/downloads/meetings/bod/2020/01282020-agenda.pdf

Instead, it is more cost-effective to provide on-request services where the trips and resources can match the demand of these neighborhoods. Mobility hubs or transfer locations are still to be determined.

- As part of the on-request layer of transit service, these routes are proposed to be replaced with on-request services. It is anticipated that Dial-A-Ride (DAR), late-night service, and service in these low demand areas will all operate as part of the on-request layer. More details about the proposed on-request shared-ride service can be found in Section 6.2.

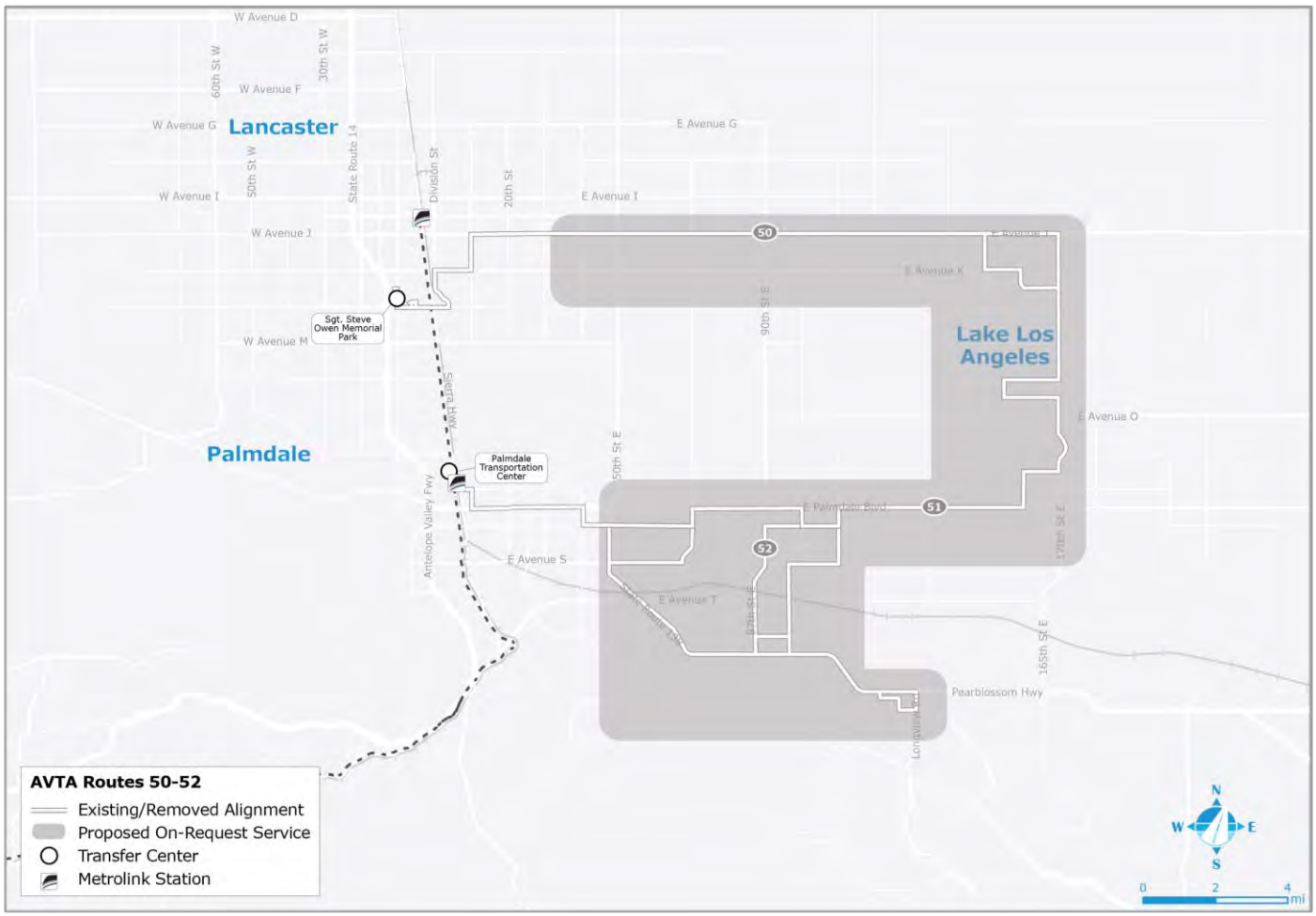


Figure 22: Existing Routes 50, 51, and 52 proposed to be replaced by on-request service

Routes 747 – Edwards AFB and 748 – Mojave

Routes 747 and 748 are newly implemented routes that provide service to the large employment centers of Edwards AFB and Mojave Air and Space Port. Despite the large amount of people commuting from the AV to these destinations and coordination with stakeholders, these routes have not resulted in high ridership due to a myriad of factors. These destinations have large footprints that are difficult to serve conveniently, unconstrained parking, security clearance issues at Edwards AFB, and employee worries regarding emergency rides home. While it is important to continue to monitor ridership before determining whether to terminate these services, there are several other strategies AVTA can explore to reduce SOV trips to and from these destinations.

The recommendations for routes 747 and 748 include:

- As the commuter services to Edwards AFB and Mojave are still new, it is important to continue to monitor ridership.
- Implementing an emergency ride home program could help to assuage worries that those using the commuter services will be “stranded” or will not have any alternative ways to get home in the case of an emergency. This could be implemented using an existing emergency ride home service (such as the Regional Guaranteed Ride Home Program) or potentially implemented using forthcoming on-request infrastructure and resources.
- If ridership does not grow, it is recommended to eliminate these routes and instead redeploy these resources on key services. Strategies for reducing SOV use for commuters traveling to and from these destinations should continue to be explored, such as through partnering with Edwards AFB and Mojave to advertise and expand the use of carpooling and vanpooling services.

Additional Stakeholder and Community Feedback

Throughout the process of developing this plan, customer and community feedback was collected, comments and requests from riders, stakeholders, and community members. As seen above in the route-level recommendations, these comments were important considerations in crafting recommendations to AVTA. While all comments were considered, not all were accommodated in service recommendations. Some examples of these, along with notes that provide our reasoning, are included in the table below.

Table 6: Additional stakeholder and community comments considered

Comment	Notes
[redacted] is inquiring about a bus that will go to 30th Street East and Ave K	As seen in many areas throughout the Antelope Valley, current population and land use densities are too low to support fixed-route transit to this location. As discussed in Task 5, land uses that are transit-supportive need to work together with fixed route transit to provide service that is productive.
Service to Palmdale Blvd and 58th St. E (children go to Aerospace Academy in Palmdale and have to walk because there is no bus service in their neighborhood)	Similar to the request above, this area is currently too low-density to warrant fixed-route service. However, if future development patterns in this area result in higher-density development, AVTA could consider extending service to this area in the future.
[redacted] would like to know if there is any chance of a bus going down Ave J. She stated that she lives on Ave J and 45th St West and does not have any transportation out there at this time.	This single-family residential neighborhood displays auto-centric land uses that are not conducive to supporting fixed-route transit.
I believe we should look into a route that goes down Ave K and 30th St E due to new developments	While areas of new development should be analyzed to see if transit service is warranted, the new developments in this area are auto-centric (such as residences with multiple-car garages) and present barriers to pedestrian access, providing further constraints to transit use.
Route 1: should turn down Ave L to Kaiser and then back to 10th St W	The purpose of Route 1 is to provide frequent, direct service with quick travel times. The new proposed network provides access to the Kaiser facility with proposed local Route 14.
Please consider adding a bus route along Pearblossom Highway from 47th Street East to Ave S via 25th Street East. Currently the closest bus connection is along Ave S about a mile away. Lots of homes along that stretch of Pearblossom.	Transit demand in this area is likely too low to warrant fixed-route service due to low density and auto-centric land uses. This area will be better served under the future on-request model.
Line 52 from Littlerock should be able to connect to Palmdale Transportation Center directly by going on Palmdale Blvd or Avenue R and at least every hour	Direct travel between Littlerock and the Palmdale Transportation Center will be possible under the new on-request model.

Impacts of Service Changes

Of course, increasing the frequency on multiple routes in the proposed network will result in greater operating costs. It is anticipated that the changes proposed above in local services will result in an increase in operating costs of approximately $1.9 million, not including on-request service delivery—service hours will remain unchanged for 747 and 748, with minor changes for supplemental school routes. The increase in operating costs is largely due to the increase in frequency on routes such as Route 12 (from 30 minutes to 15 minutes on weekdays), Route 9 (to 60 minutes on weekdays and weekends) and Route 5 (extended alignment). The cost estimates presented below were developed using Remix's transit planning software and represent high-level estimates based on an average cost of $90 per revenue hour[4] and assuming average speeds comparable to today's routes to estimate revenue hours. Efficiencies may be found once AVTA develops their vehicle and crew schedules, including interlining routes where appropriate and developing schedules that reflect actual operating conditions.

Forecasted costs for local services are expected to grow by ~13%, while ridership is estimated, conservatively, to grow by ~15-20% (Table 7). Additional outreach, marketing, and travel training would help boost these ridership numbers, also acknowledging the fact that, as some other agencies have experienced, a large-scale overnight network change may decrease ridership in the short-term as riders learn to use the new network and more riders are attracted. AVTA needs to make the transition as painless as possible with communication and trip planning assistance.

Table 7: Existing and Proposed Annual Service Hours and Cost

	Local service[5]
Existing Hours (est.)	165,600
Proposed Hours	186,620
Difference	15,990
Existing Ridership (est.)	2,075,512
Forecasted Ridership	2,420,574
Difference	345,062
Existing Operating Costs	$14,903,000
Forecasted Operating Costs	$16,793,500
Difference	$1,890,500
Existing Farebox Recovery (est.)	17%
Forecasted Farebox Recovery	18%

These changes in the local network are expected to be accommodated within the existing conventional transit fleet, with potentially a need for 2-4 additional vehicles during peak service. The number of vehicles required will be confirmed as more detailed route schedules are cut.

The investment into improved transit service is expected to result in ridership increases that can recover some of service delivery costs. Removing routes such as Route 50, 51, and 52 (approximately 17,000 annual revenue hours) that have a high cost per boarding will result in a more efficient and cost-effective local transit system.

[4] This hourly rate was derived from the hourly rate charged by AVTA's service provider, including an escalation factor for service operated in 2021, when most of this service would be fully implemented.
[5] Does not include 747 and 748, which would be unchanged, but includes the elimination of Routes 50, 51, and 52. Does not include estimates of on-request service for Routes 50-51. Farebox recovery includes only estimated farebox revenue.

Changes to the commuter network, such as terminating Route 785 at North Hollywood Station, can also help to offset the cost to provide local service. Details about funding opportunities can be found in Section 10.0.

While these services are expected to generally increase access to destinations by transit, there are some individuals whose transit service will be eliminated or replaced in the new network. In a sample of typical weekdays, there is an average of 335 boardings at existing bus stops that will no longer have fixed-route service. Out of the daily weekday boardings of 8,965, this represents 3.7% of daily boardings. Riders who will no longer be able to ride Routes 50, 51 or 52 will have on-request microtransit available to them.

Table 8 below provides a line-by-line estimate of revenue hours and costs on an annual basis, as well as peak vehicle requirements. Note that cost is based on $90 per hour, except for Routes 50, 51, and 52 in the proposed scheme, where costs are $58 per hour (for on-request services, assuming a port over of existing revenue hours from scheduled fixed-route to on-request for Routes 50, 51, and 52).

Table 8: Existing and Proposed Annual Service Hours and Cost by Route

Route	Existing Service Hours	Proposed Service Hours	Difference in Service Hours	Existing Cost	Estimated Proposed Cost	Difference in Cost	Est. Peak Vehicles
1	45,900	48,890	2,990	$4,130,700	$4,399,700	$269,000	11
2	17,140	17,110	-30	$1,542,800	$1,539,700	$(3,100)	4
3	17,240	22,280	5,040	$1,551,900	$2,004,800	$452,900	5
4	9,160	14,900	5,740	$824,000	$1,341,300	$517,300	3
5	5,120	11,520	6,400	$461,000	$1,036,800	$575,800	3
6	0	5,030	5,030	$0	$452,900	$452,900	2
7	11,160	10,380	-780	$1,004,100	$934,100	$(70,000)	2
8	1,070	1,070	0	$96,200	$96,200	$0	1
9	4,610	6,480	1,870	$414,500	$582,800	$168,300	2
11	20,000	16,000	-4,000	$1,800,300	$1,439,600	$(360,700)	4
12	15,910	32,160	16,250	$1,432,200	$2,894,000	$1,461,800	7
50	5,940	5,940	0	$534,300	$344,520	$(189,780)	-
51	5,680	5,680	0	$510,800	$329,440	$(181,360)	-
52	5,720	5,720	0	$514,400	$331,760	$(182,640)	-
94	510	430	-80	$46,200	$38,500	$(7,700)	1
97	190	160	-30	$16,900	$14,100	$(2,800)	1
98	250	210	-40	$22,900	$19,100	$(3,800)	1
Total	**165,600**	**186,620**	**38,360**	**$14,903,200**	**$17,799,320**	**$2,896,120**	**47**

The figures below illustrate the change in total population, jobs, low-income population, and minorities within a 0.25-mile distance (5-minute walk) of fixed-route transit service by service layer.

As shown in Figure 23, the number of people within 0.25 miles (5-minute walk) of frequent service (0-15 minutes) increases from 0 to nearly 60,000 in the proposed network, with increases in the number of people living within 0.25 miles of 30-minute and 60-minute service as well.

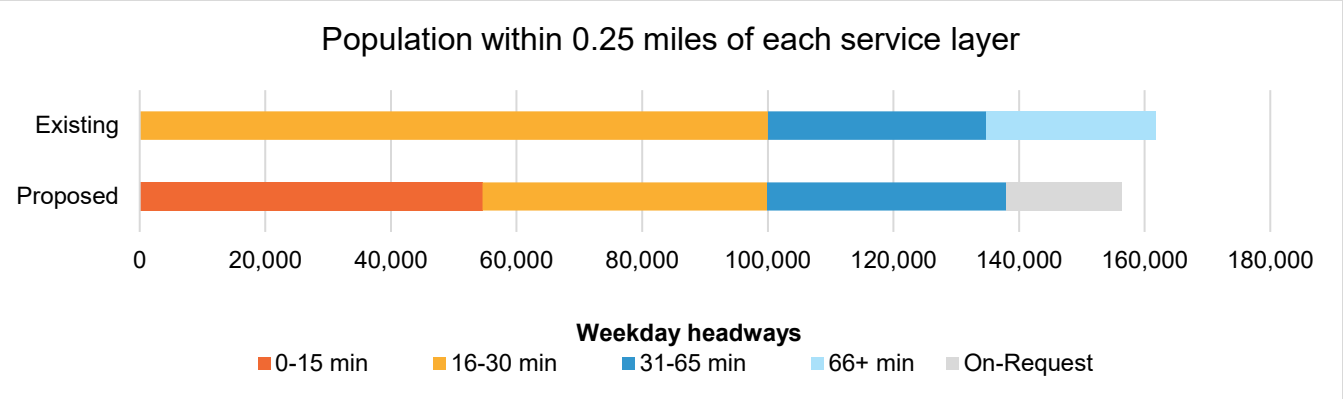


Figure 23: Population within 0.25 miles of each service layer

It is important to also consider the number of jobs, low-income residents, and minority residents who are served by the new network, keeping in mind that additional jobs and residents will be served by the on-request shared service. Figure 24 and Figure 25 and Figure 26 illustrate the increase in jobs, low income residents, and minority residents located within 0.25 miles of 15-minute and 30-minute network.

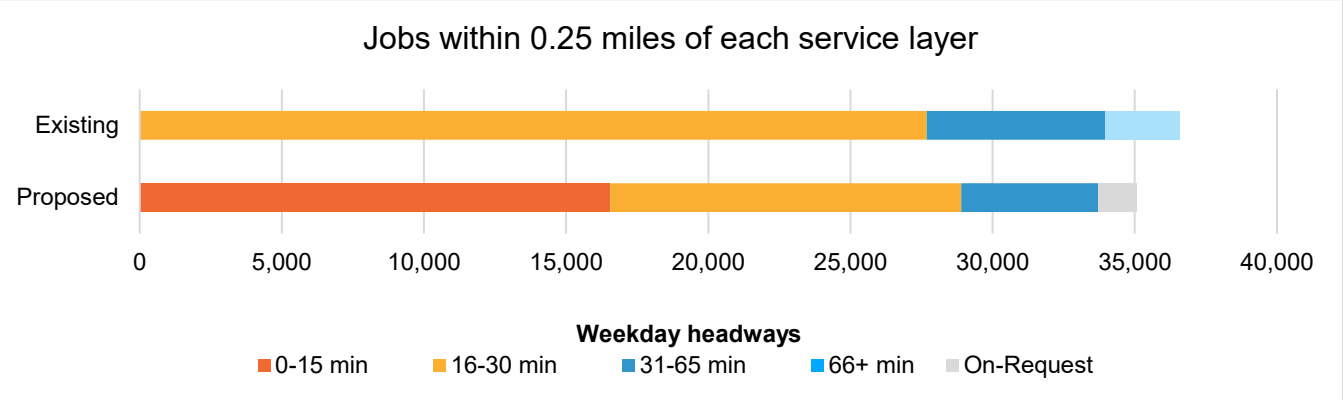


Figure 24: Jobs within 0.25 miles of each service layer

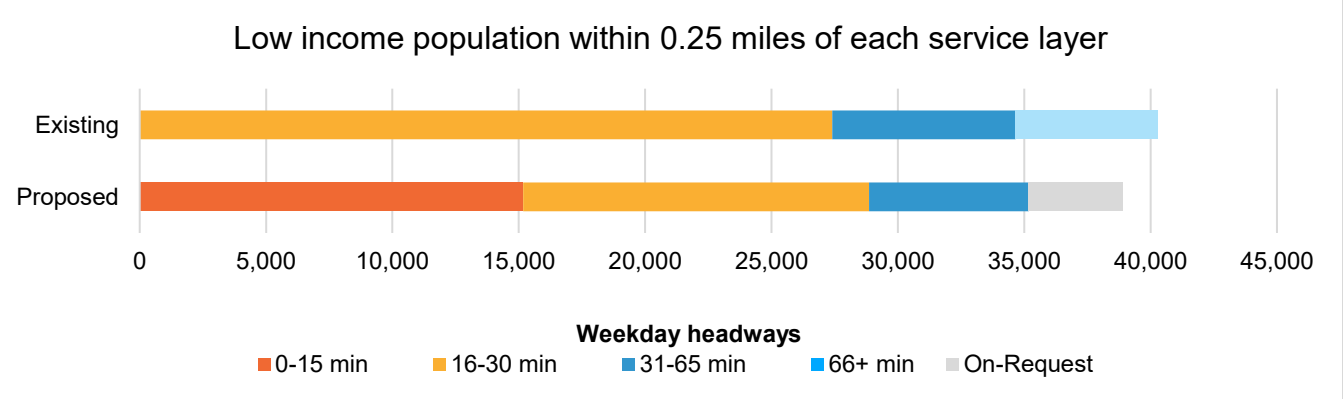


Figure 25: Low-income population within 0.25 miles of each service layer

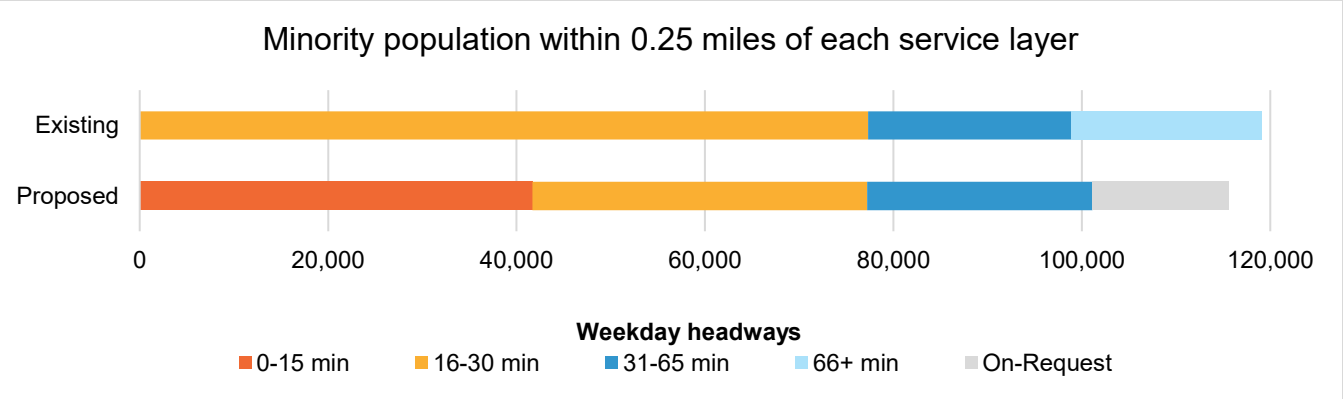


Figure 26: Minority population within 0.25 miles of each service layer

Note that the figures above likely provide a slight undercount of the coverage impacts of the frequent network—that is, for frequent services, the catchment area is actually larger, typically a 10-minute walk (about 0.5 miles) from the route.

As well, the on-request service, based on the proposed service design should result in waits, on average, not longer than 20 minutes, a vast improvement for the customers accustomed to headways of longer than one hour.

Figure 27 below provides an example of residents' enhanced access to Kaiser Permanente in Lancaster under the proposed local system. Improved access to healthcare and medical facilities was a large focus of the plan as well as a common request heard during stakeholder and community engagement, and this visual example shows that proposed service changes help to achieve this goal, specifically through the proposed changes to local routes 4 and 7.

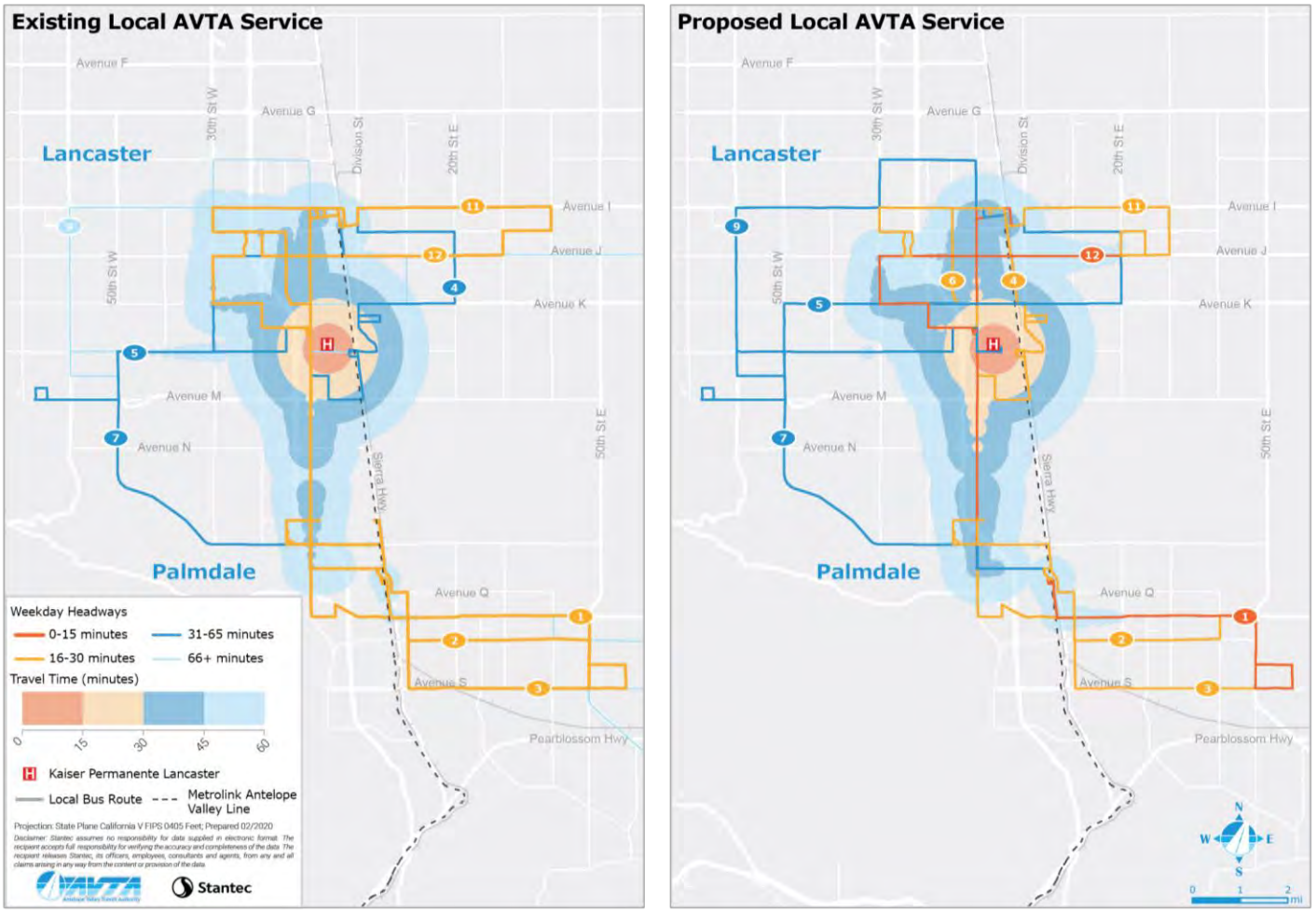


Figure 27: Access of residents to Kaiser Permanente Lancaster comparison of existing and proposed local service

6.2 ON-REQUEST MICROTRANSIT AND DIAL-A-RIDE SERVICES

Several opportunities exist within AVTA's service area for a new, flexible, dynamic, and innovative way(s) to provide transportation services, particularly in areas of Antelope Valley like Lake Los Angeles with low population densities that are difficult to serve with conventional fixed transit. As described in the section above, routes such as 50, 51 and 52 are unproductive due to low-density and dispersed development. Through a smart mobility strategy, we recommend substituting these unproductive fixed-route services with on-request transit given the prevalence of on-request technology.

AVTA's Dial-A-Ride (DAR) service is designed as a complementary and voluntary service to Access's ADA paratransit service. As such, DAR does not strictly conform to ADA requirements, and is not a requirement for AVTA to provide. With the current DAR contract up for renewal, we recommend that a new on-request, shared mobility service be combined with the DAR program into one on-request service for optimal effectiveness and efficiency.

Rebranding the existing zones of the DAR program into AVTA *Mobility Zones* should proceed according to Table 9 and Figure 29 below. The intent of the rebranding is to indicate that the service is new and improved compared to the legacy DAR program.

Note that **Mobility Zone 4 (Rural) is newly created** for the purposes of replacing routes 50, 51, and 52.

Table 9: Proposed Mobility Zones replacing existing DAR zones

Proposed Mobility Zone	Existing DAR Zone
Mobility Zone 1 (Urban)	Urban Zone 1
Mobility Zone 2 (Rural)	Rural Zone 2
Mobility Zone 3 (Rural)	Rural Zone 1
Mobility Zone 4 (Rural)	Urban Zone 1/Rural Zone 1
Mobility Zone 5 (Rural)	Rural Zone 2

The maps below provide a conceptual view of the existing DAR zones (Figure 28) and proposed Mobility Zones (Figure 29).

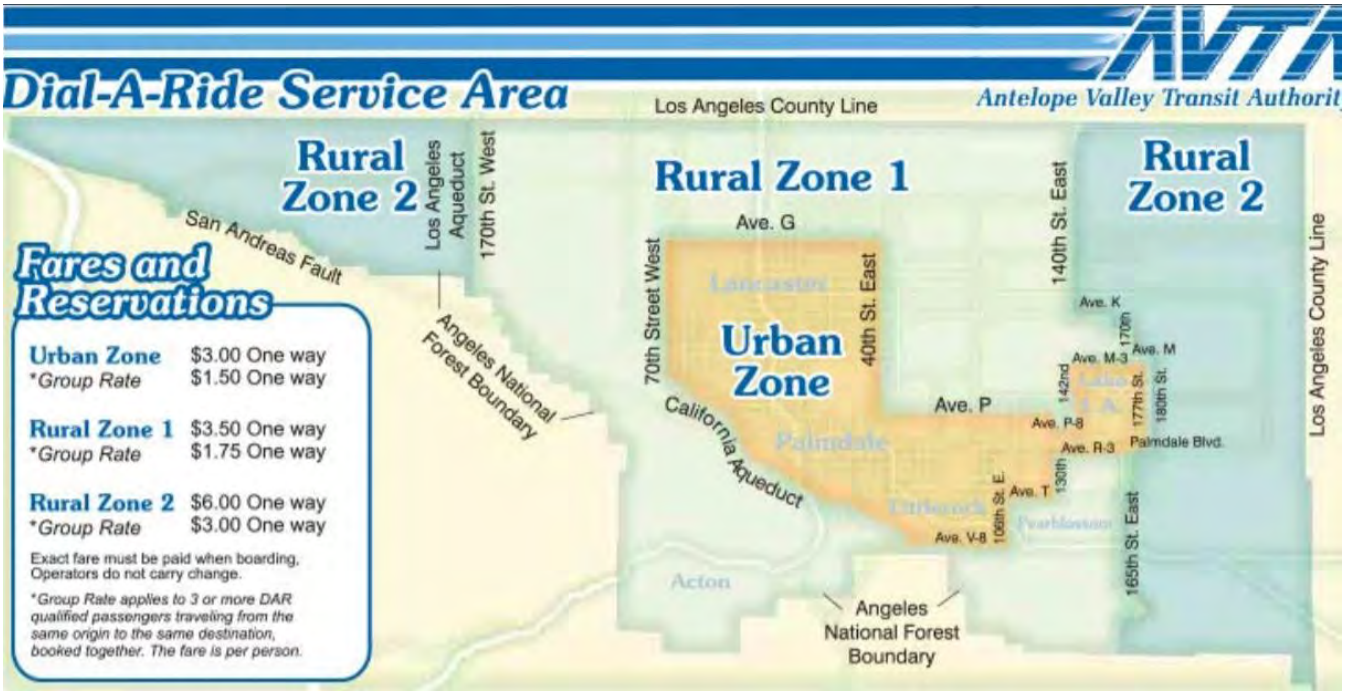


Figure 28: Existing DAR Service Area

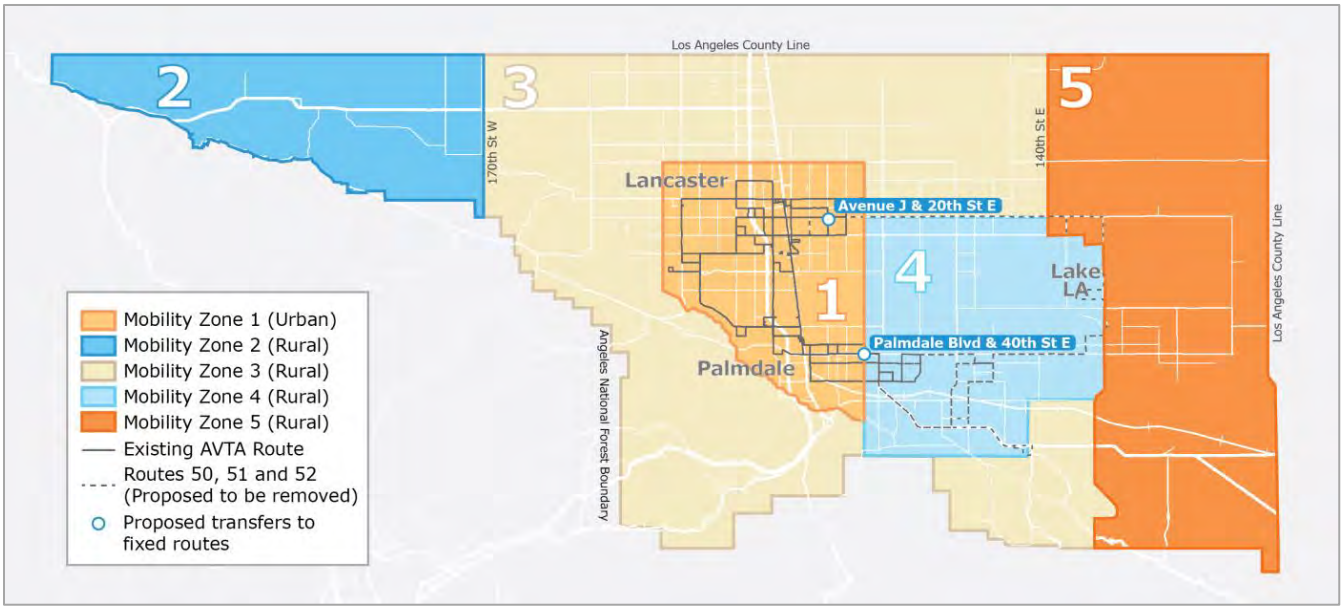


Figure 29: Concept map including a proposed Urban and Rural Mobility Zones

We propose the following the following services to be included in the on-request program:

- **On-request, shared-ride service for DAR-eligible customers.** Transition the current DAR system into an 'on-request' system, merging the on-request service delivery (service substitution of Routes 50, 51 and 52) for the eastern portion of the service area (Lake LA, Pearblossom and Littlerock) into a service whereby customers can request a journey through a mobile phone app or by calling a phone number. DAR-eligible customers (seniors and persons with a disability who are unable to take conventional transit) will still qualify for door-to-door accessible transit in any zone (Mobility Zones 1-5, Urban or Rural).

- **On-request curb-to-curb or home-to-hub service in rural areas lacking fixed-route transit.** For customers living in existing DAR Rural Zone 1 or 2 (proposed Mobility Zones 2, 3 and 5) who do not have access to fixed-route transit, on-request service will be provided to the nearest transit hub or will be delivered curb-to-curb below a certain distance. Mobility Zone 4 will be added as service substitution for Routes 50, 51, and 52, which will also operate as curb-to-curb or home-to-hub for non-DAR eligible customers.

    - Hubs for the home-to-hub service from Rural Zones are planned to include Lancaster Blvd. and Sierra Hwy in Lancaster (to connect to Routes 1, 11 and 14 as well as the Lancaster Metrolink station) and Palmdale Blvd & 40th St. E in Palmdale (to connect to Routes 1, 2, and 3). Passengers in Mobility Zone 1 (Urban) traveling to Mobility Zone 4 (Rural) for instance would use fixed-route services to reach one of these hubs and then summon an on-request ride to travel to Mobility Zone 4 (Lake Los Angeles, Pearblossom, etc.). These mobility hubs are still to be confirmed.

    - The trip matrix below (Table 10) represents a high-level view of service delivery for customers **who do not qualify for DAR**—all DAR-eligible customers should continue to receive curb-to-curb service as today but through an on-request scheme. The major differences between the designated rural Mobility Zones will likely include fares and service span.

- **On-request, late-night service substitution.** Use of on-request transit services to replace conventional fixed routes in evening hours. Primarily app-based, but in the case of AVTA, call center services are envisioned to complement the app since not all customers have access to smart phones. Route 1 and Route 12 will continue to operate until midnight, while other local and community routes can be substituted with on-request service for short local trips or to feed customers into Route 1 and 12 after 10PM on weekdays, and if resources exist, after 8PM Saturdays and 7PM on Sundays. This service is a low-cost way of extending the service span to midnight across the entire system.

- **Non-emergency medical transportation.** AVTA has secured a grant to provide non-medical emergency transportation (NEMT) as a pilot and will be bundled within the future on-request, shared mobility project. The NEMT service will allow riders and caregivers to book rides in advance of appointments as well as on-request. Riders will also be able to request recurring trips for repeating appointments, such as weekly or monthly appointments. This NEMT pilot will provide mobility as a "last resort" to individuals without any other funding coverage for service (Private Insurance, Medicaid, etc.) and does not intend to compete with other NEMT providers in the AV.

Table 10: Conceptual trip matrix for on-request/DAR service for non-eligible DAR customers.

From/To	Mobility Zone 1 (Urban)	Mobility Zone 2 (Rural)	Mobility Zone 3 (Rural)	Mobility Zone 4 (Rural)	Mobility Zone 5 (Rural)
Mobility Zone 1 (Urban)	Fixed route	Fixed-route to hub then on-request	Fixed-route to hub then on-request	Fixed-route to hub then on-request	Fixed-route to hub then on-request
Mobility Zone 2 (Rural)	On-request to hub, then fixed-route	On-request	On-request	On-request	On-request
Mobility Zone 3 (Rural)	On-request to hub, then fixed-route	On-request	On-request	On-request	On-request
Mobility Zone 4 (Rural)	On-request to hub, then fixed-route	On-request	On-request	On-request	On-request
Mobility Zone 5 (Rural)	On-request to hub, then fixed-route	On-request	On-request	On-request	On-request

Because of the evolving nature of on-request, shared-ride mobility services, we recommend that AVTA fully develops concepts and determines what services are feasible for the Antelope Valley through the RFI/RFP process.

- **Rationalize the current DAR service area and eligibility criteria.** AVTA should reexamine its eligibility criteria for DAR to ensure that eligibility aligns with service needs and financial realities. DAR is costly to provide and should available to individuals who need it most. We recommend that AVTA investigate whether to reduce the DAR zones, as well as reexamine fares and eligibility once on-request service concepts are more fully formed.

- **Expand travel training by advertising and disseminating information related to the program.** While AVTA already provides some form of travel training, our analysis revealed that AVTA needs to do a better job at communicating this program, particularly for non-English speakers and for persons with disabilities. Travel training for able-bodied persons is a good way to teach potential customers about AVTA and public transit while reducing barriers to transit uptake. AVTA could hire a part-time dedicated travel trainer, or transition an existing staff with excellent customer service skills into that role.

- **Explore volunteer transportation programs.** These programs can be structured and supported by AVTA, and residents throughout the community could post trip requests and drivers can offer rides. This strategy could eventually supplement DAR in the very rural parts of the Antelope Valley.

- **Establish an advisory committee on accessibility.** AVTA should develop the framework and mandate for an advisory committee on accessibility. This committee would meet every two months to discuss issues with accessibility and develop action items to prioritize accessibility needs, such as information accessibility and infrastructure accessibility. This committee would also inform travel training programs and related policies.

Overall, the intent of the rebranding is to indicate that the service is new and improved compared to the legacy DAR program. Initial cost estimates of on-request services, which include service substitution for Routes 50-52, DAR, NMET, and late-night service hover around ~$2.6 annually.

6.3 COMMUTER SERVICES

It's clear that while AVTA's commuter services have shed ridership in recent years, the commuter routes provide important connections to job markets in the region that are oftentimes not well connected by other transit services. However, our analyses reveal that beyond decreasing ridership, many of the trips on most routes are typically operating with loads of less than 50% occupancy.

A literature review and peer agency scan of commuter bus service shows that agencies tend to measure commuter bus service efficiency and create service standards based on passengers per trip, passengers per revenue hour, and vehicle occupancy. Based on these findings, typical service standards used by other agencies can include 20-25 passengers per trip, 15-20 passengers per revenue hour, and at least 50% seated capacity. Specific runs or lines that do not meet these thresholds are then examined for service changes or termination. Thus, we also recommended that AVTA adopt service standards to assess the efficiency and productivity of their own commuter bus services going forward.

We summarize the key observations that have led to the recommendations and strategies proposed here:

- The most productive or well-used bus trips (based on seat occupancy) are earlier departures from the Antelope Valley to the Los Angeles area. With worsening traffic, travel times are longer and more unpredictable forcing commuters to leave earlier. As such, later departures are mainly empty (Figure 30).

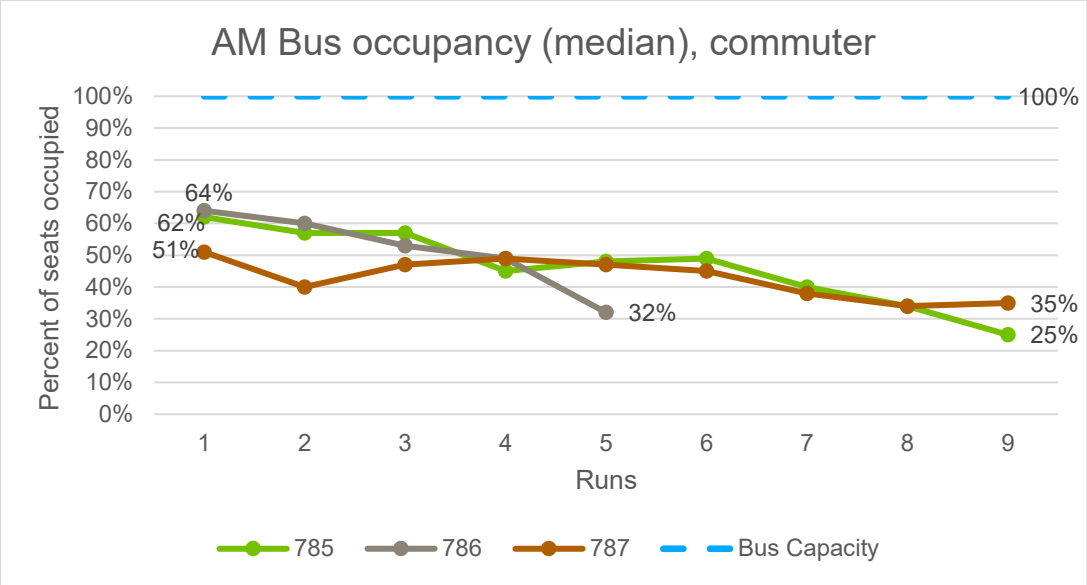


Figure 30: Commuter bus occupancy (median), AM peak

- The same is true for reverse or afternoon trips—earlier departures have greater occupancy than later trips (Figure 31). Again, longer travel times and worsening traffic have eroded most benefits of this type of service (i.e, the cost of not having to find and pay for parking, being stuck in traffic, being productive onboard, etc.)

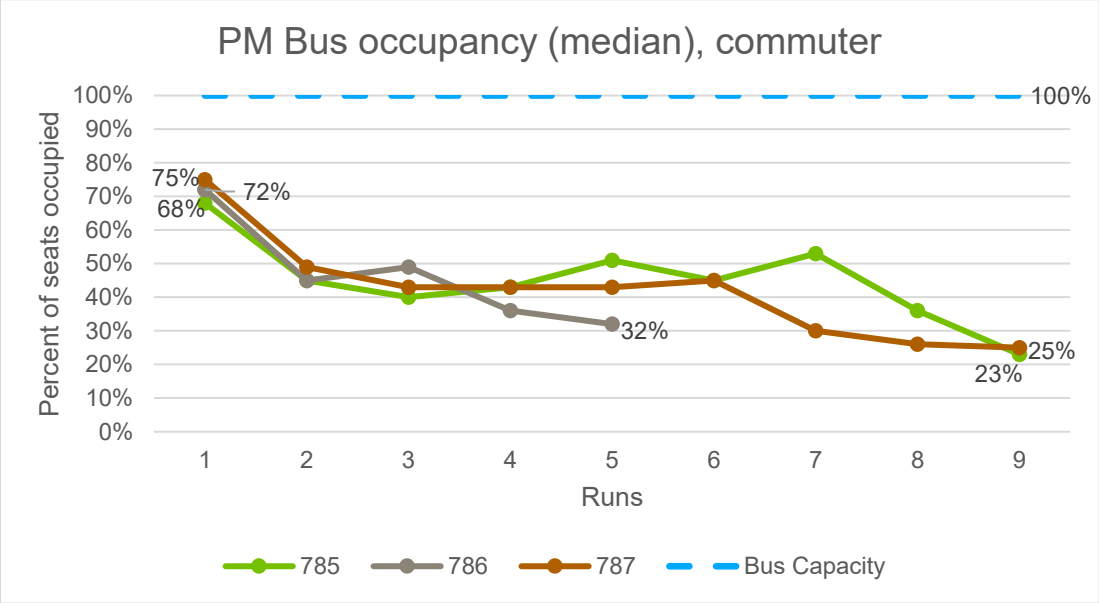


Figure 31: Commuter bus occupancy (median), PM peak

- The commuter market has changed or the routes don't reflect potential customers. For example, service into Century City (route 786) may have too many variants that make it too complicated to use, or the San Fernando service (route 787) may benefit from schedules that provide service for students rather than commuters.

- Collaborating with Santa Clarita Transit offers a new opportunity to expand AVTA's market for services that Santa Clarita Transit does not provide.
- Providing different approaches to commuter type services, including emergency ride homes and vanpooling, may also be effective approaches to reducing SOV commuting beyond a commuter coach or traditional 40-ft. bus.
- And finally, telecommuting is growing as a 'mode share', whereby working remotely from home has simply reduced the number of commuters or commuting journeys.

We propose to **redesign commuter bus routes and improve schedules as discussed for each route below:**

Route 785 – Downtown Los Angeles

The main purpose of this route is to connect the Antelope Valley to downtown Los Angeles, mainly redundant of Metrolink's Antelope Valley Line service, as well as other commuter services, like from Santa Clarita.

The major issues we identified were the lack of ridership considering the number of commuters or persons who live in the Antelope Valley but work in downtown Los Angeles (approximately 71,000 commuters), as well as the slow and unpredictable travel time as noted by AVTA staff and customers we spoke with.

The recommendations for route 785 include:

- Realigning the route to terminate at North Hollywood Red Line station so that customers can transfer to the subway which provides a quick travel time to downtown (about 25 minutes travel time to Union Station), as well as offer other connections to the Orange Line and destinations in the San Fernando Valley. The current downtown bus stops are all within a half-mile of Metro subway stations, so customers who use the 785 would still be able to reach their destinations.
- With the realignment, AVTA will need to redesign the schedule and should provide earlier departures and eliminate those after 6 am. It is also recommended to eliminate the two final trips in each direction as they have the lowest median vehicle occupancy, resulting in a total of 14 daily trips.
- AVTA will need to reduce fares to reflect the shorter distance as well as the fact that the need for customers to transfer may be perceived as inconvenient, even though the travel time will likely be shorter and more consistent (reliable). Providing information to longtime riders highlighting the benefits of shorter travel times and increased reliability of arrival times may also be an important component to ensure no riders are lost when transitioning services. Robust public education is a must.
- AVTA would also need reconsider layover strategies in North Hollywood.

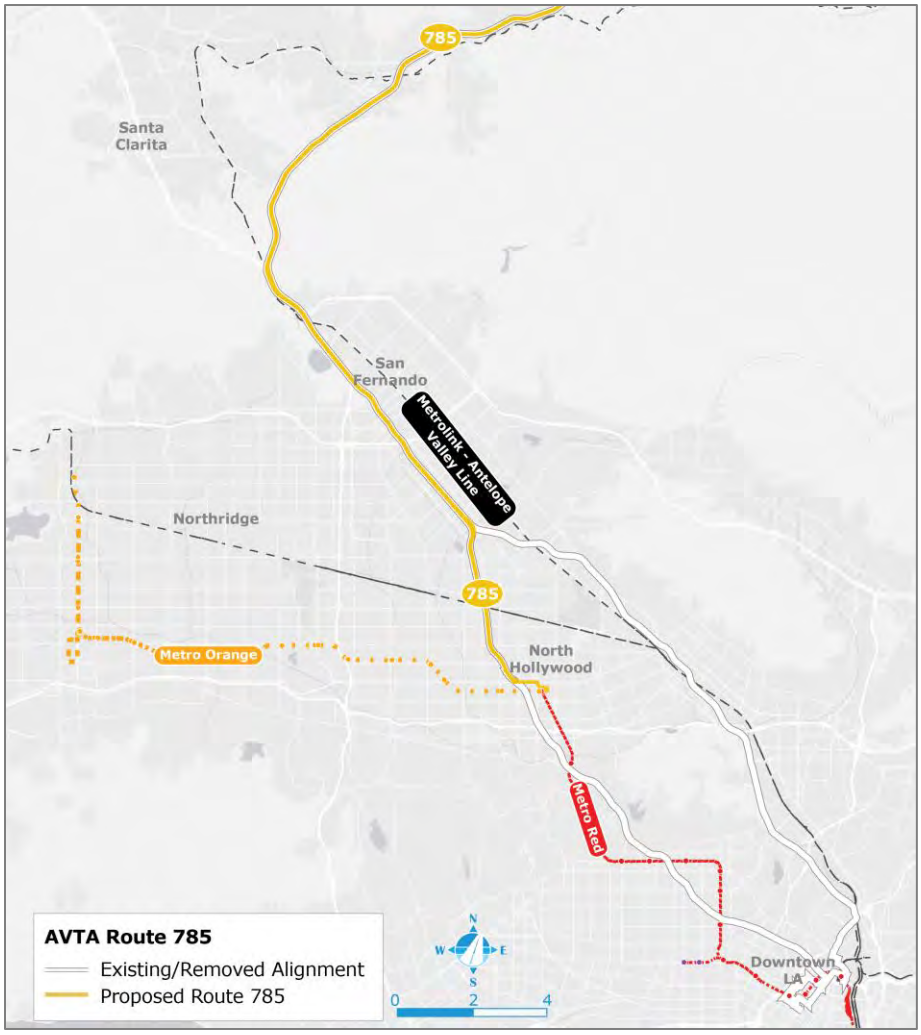


Figure 32: Existing and Proposed Alignment for route 785

Route 786 – Century City/West Los Angeles

This route serving the West Side has the lowest ridership of all the commuter routes as well as the second-highest cost per boarding. Specifically, this route serves those commuting to the West LA/Century City area largely down the Wilshire corridor between La Brea and Westwood Blvd., which includes large employment centers, UCLA campus and medical center, and the Veterans Administration Medical Center. Out of the five morning runs operated by this route, runs 4 and 5 provide a variant to serve Century City via Olympic Blvd., providing access to 20th Century Studios and the VA Medical Center. Afternoon runs 2 and 3 also serve the VA Medical Center. These variants may be perceived as inconvenient to riders and is the main motivation behind our first recommendation.

The recommendations for route 786 include:

- Route 786's multiple variants can be confusing to customers as well as reduce the number of available travel times to certain destinations. AVTA should simplify the alignment to the one originating in Westwood and terminate at Santa Monica Blvd. and Wilshire Blvd, and no longer provide the variant beginning at Santa Monica Blvd. and La Brea Ave., as more passenger activity is seen in Westwood and

Century City than east of Century City, and both the morning and afternoon runs of the Santa Monica and La Brea variant see median occupancy below 50%.

- We also recommend to eliminate the fifth run in each direction (as these operate at only 32% median vehicle occupancy), resulting in a total of eight daily trips.
- Meetings with Santa Clarita Transit revealed that Santa Clarita is having difficulties accommodating the high demand between Santa Clarita and Century City with their commuter lines 792 and 797. AVTA should consider adding a stop to serve the Newhall station in Santa Clarita to accommodate these travelers.
- Based on the analysis of stop-level passenger activity, demand east of Century City is recommended to be terminated. The following termination and transfer points (seen in Figure 33) are recommended to be explored:
    - Short-term: terminate at Wilshire Blvd. and Santa Monica Blvd., where passengers traveling farther east can transfer to LA Metro 20 or 720, which provides rapid service through dedicated bus-only lanes along Wilshire Blvd. This area also provides transfers to Metro lines 4, 16, 316, and 704.
    - Medium-term: align termination point with LA Metro NextGen Bus Plan changes, scheduled to be rolled out in phases through December 2021. The current draft plan is scheduled to be released for public review in early 2020, and service improvements are set to begin implementation in December 2020. Terminating service and providing transfers to the new proposed Metro R20 line (a consolidation of lines 720 and 20 with five-minute frequencies during AM and PM peak periods) is recommended for those commuters who need to continue to travel east along Wilshire Blvd.
    - Long-term: The currently under-construction Metro Purple Line Extension will eventually provide underground heavy-rail service from downtown Los Angeles down Wilshire Blvd. to terminate at the VA Medical Center. As with the recommendation to terminate Route 785 at the Red Line North Hollywood Station, AVTA can plan for future service changes to terminate service at one of the new Purple Line stops, from which customers will be able to transfer to the subway which will provide fast and reliable service to West Los Angeles and Century City. It is recommended to terminate at the future UCLA/Westwood or Westwood/VA Hospital station.

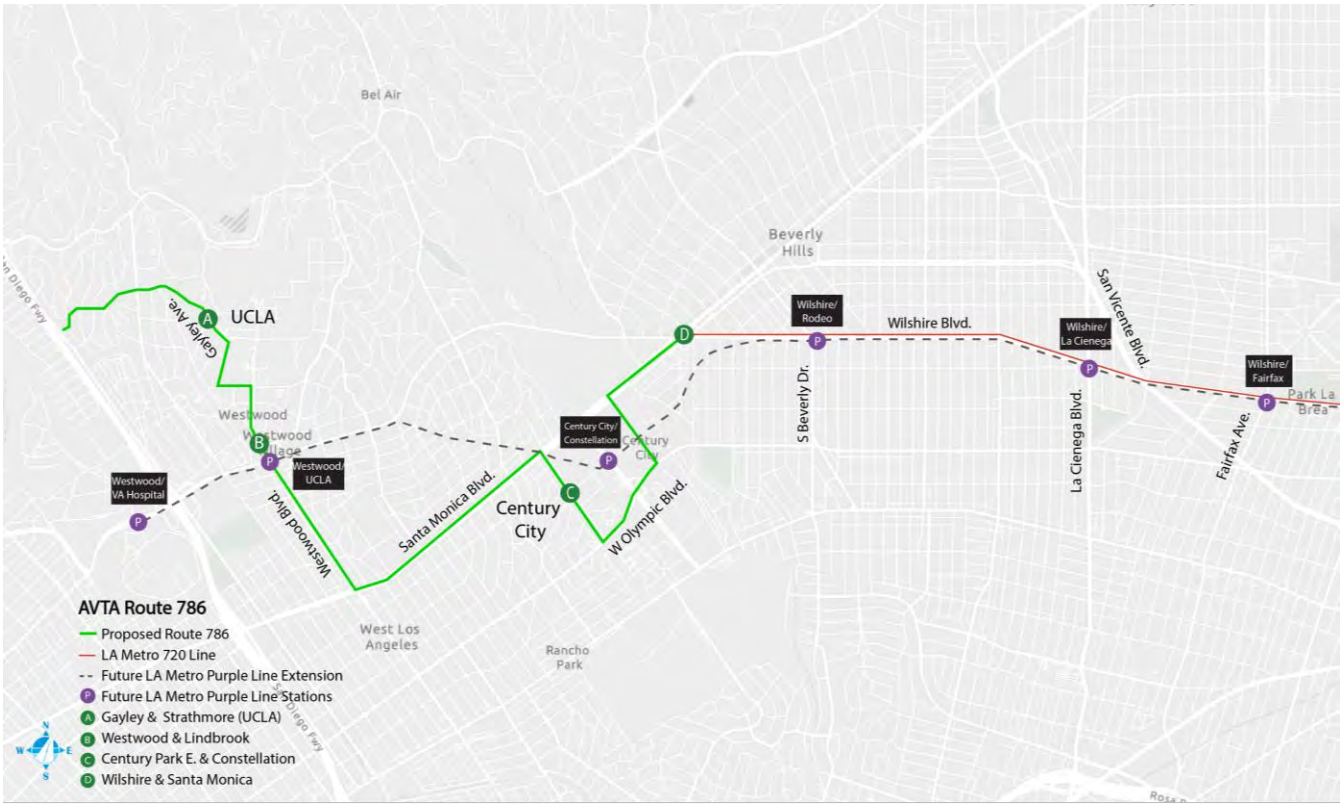


Figure 33: Proposed alignment for route 786

Route 787 – West San Fernando Valley

Route 787 provides service to the West San Fernando Valley, serving destinations such as the Warner Center, Pierce College, and CSUN. Route 787 provides the greatest amount of revenue service hours of all of AVTA's commuter services with nine weekday runs in each direction.

The recommendations for Route 787 include:

- As with Route 786, there is an opportunity for AVTA to provide an additional stop at the Newhall station in Santa Clarita to pick up commuters that could not be accommodated by Santa Clarita's current commuter services.
- As the largest trip generator along this route is CSUN, it is likely that a significant portion of total riders are CSUN students. Understanding that students tend to have class schedules that are not aligned with traditional commuter schedules presents an opportunity to provide additional, off-peak service to and from CSUN, such as during the midday or later evening periods.
- As with other commuter services, it is recommended to eliminate poor-performing trips. For the 787, we recommend eliminating two trips in each direction, for a total of 14 daily trips. These could be the last two morning and afternoon trips as they show low median occupancy, but AVTA can also reevaluate morning and afternoon trip times to provide service geared more towards CSUN students while still providing seven trips in each direction.

- We also explore examining the feasibility of modifying the current route alignment to serve West San Fernando Valley area destinations in proximity to, but not currently served by, Route 787, such as the VA Medical Center in North Hills, approximately 2.5 miles east of CSUN (see Figure 34). This routing change also involves using the carpool lanes on the I-5 and I-405 freeways to reach the San Fernando Valley as opposed to the SR-118 and Balboa Blvd. Due to overall low passenger activity, we also recommend to terminate service at the Warner Center. Providing connections to the Metro Orange Line stations or Ventura County Metrolink stations in the area can also be explored. A natural connection point to the Orange Line may be around the Warner Center, where there is a nearby Orange Line station at Canoga Ave. and the Orange Line Busway. The Warner Center is currently served by a Metro circulator (Line 601) that connects with the Orange Line at Canoga Station with 10-minute frequencies.

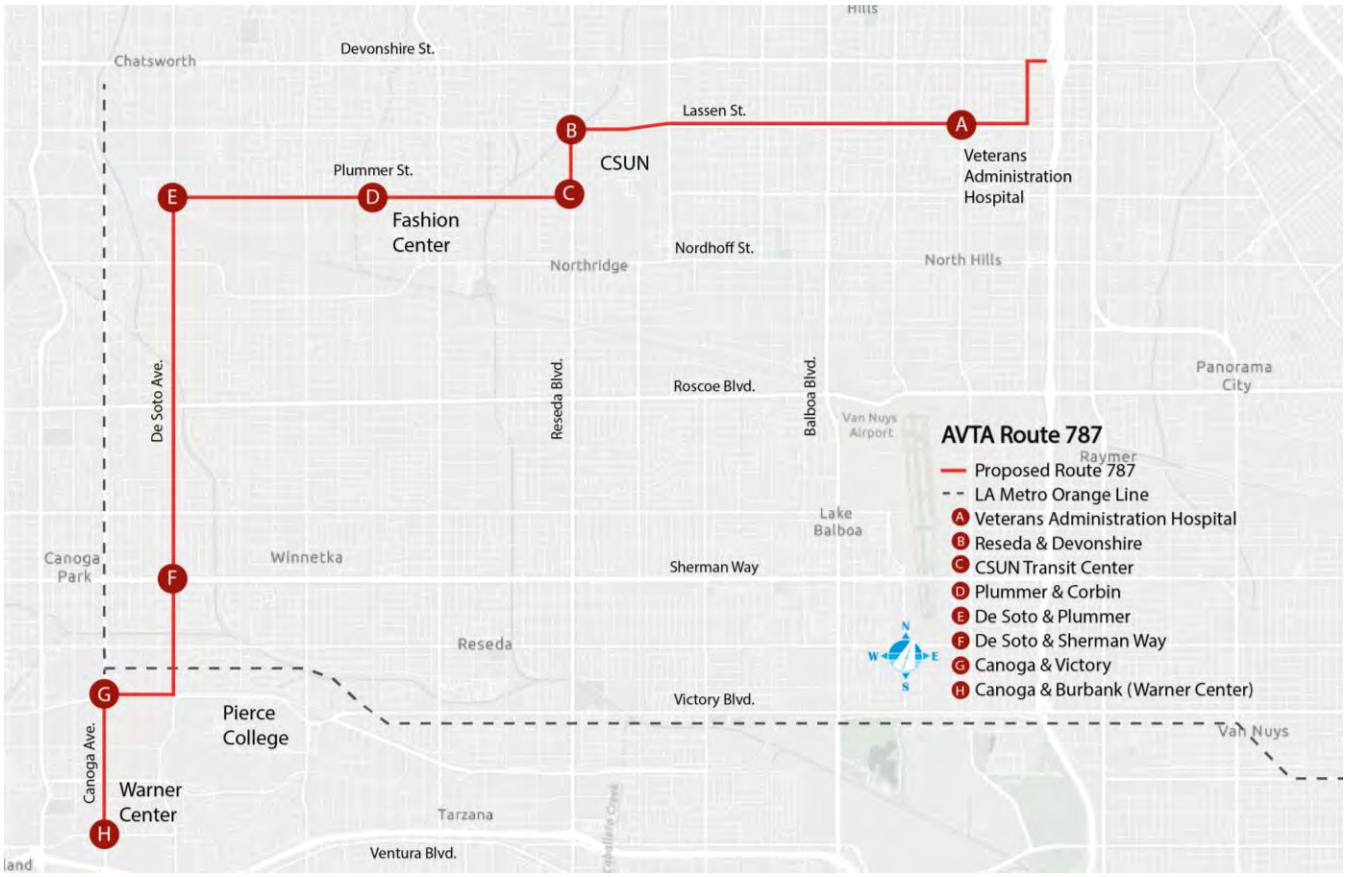


Figure 34: Proposed alignment for route 787

TRANSporter 790 – Metrolink Connections

Route 790, while a 700-series commuter-type service, is not a commuter route in the sense of the other 700-series routes that focus on the peak hour commute. Instead, route 790 or the TRANSporter, serves as a bridge for the Antelope Valley to Metrolink service that terminates in Santa Clarita during the midday. As such, the TRANSporter plays a vital role in providing connections to the region at times when the Antelope Valley line train does not reach the Antelope Valley; in fact, the service is captured in the Metrolink schedule as a bus bridging service.

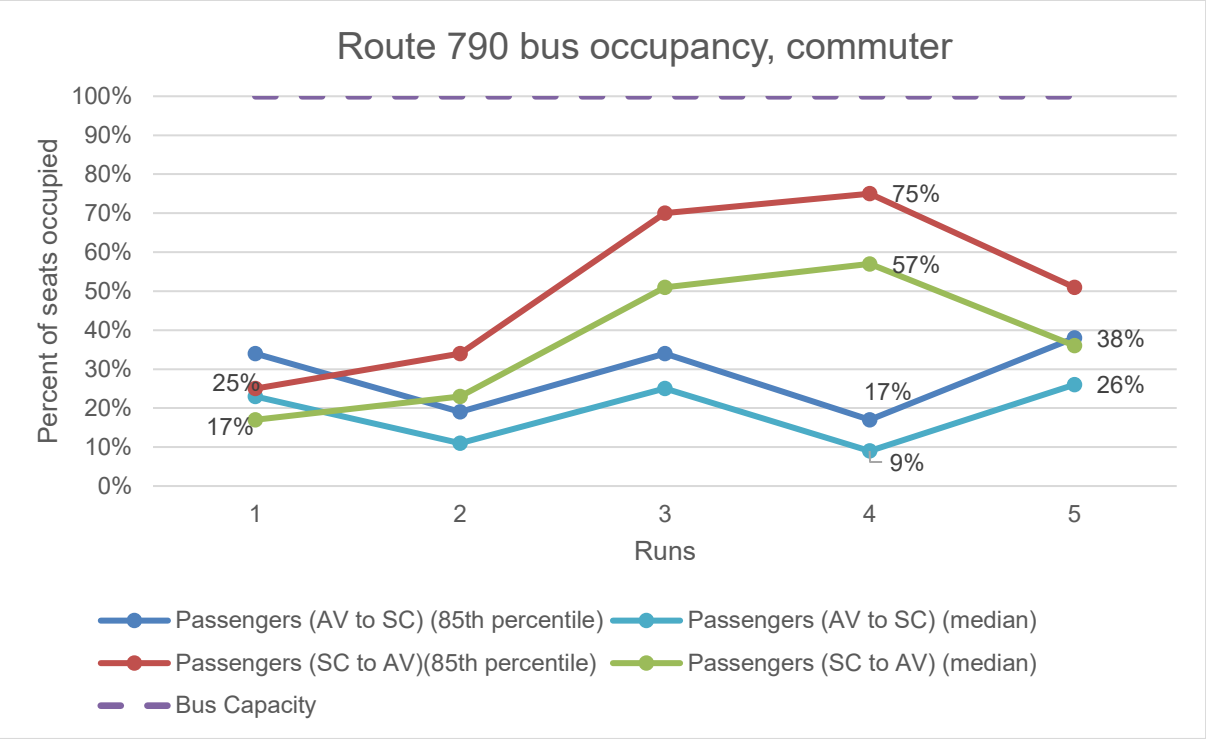


Figure 35: Commuter bus occupancy, midday

- **Route 790 appears to be more popular traveling from Santa Clarita to Antelope Valley**. Higher occupancies are observed along runs 3 and 4. Run 3 makes additional stops in Santa Clarita at a regional transit center, Henry Mayo Newhall Memorial Hospital and a local community college (College of the Canyons). Run 4 leaving Newhall Metrolink station at 3PM and arriving in Palmdale just before 4PM and has the greatest occupancy with a median and 85th percentile of 57% and 75%, respectively.

- **Between Antelope Valley to Santa Clarita, Route 790 operates with low occupancies** across all 5 runs, remaining within an 85th percentile occupancy of 10-40%. The median occupancies do not exceed 25% full. Despite this low usage, ridership was roughly 26,000 on the 790 in 2018.

- Our analysis of 790 and AV Line schedules revealed that one train departure towards LA Union Station does not have TRANSporter service, while one train arrival from Union Station at Newhall station does not have TRANSporter service. These missing trains result in a gap of over two hours for service to LA, from 12:48PM to 3:03PM—meeting the train at 2:05PM would reduce that by about one hour; for the train from LA, the gap is nearly three hours.

- Moreover, given Metrolink's recent, but minor schedule adjustments (for example, TRANSporter service is scheduled to arrive at 8:40AM for a 9:21AM train, but the train now departs at 9:19 am) should be accounted for. The 790's on-time performance is in the 70% range and missing a train departure results in a subsequent wait time of hours, rather than minutes, making on-time performance crucial. The following changes are recommended:

    - Revise schedules for 790 to account for new Metrolink departure times and to improve on-time performance. On-time performance should be at 85% since missing a train results in waits in the order of hours, not minutes.

- Add a trip to meet the 2:05PM southbound (LA Union Station) trip at Newhall Station (train number 218).
- Add a trip to meet the 12:54PM northbound arrival at Newhall Station (train number 211).

- **Explore collaboration with Santa Clarita Transit.** Santa Clarita Transit is a neighboring agency and during stakeholder engagement, it became clear that opportunities exist to share ridership by having certain commuter routes stop through Santa Clarita. AVTA should form a working group to define objectives and action items for collaboration.

Taken together, the proposed changes for commuter services aim at making better use of finite resources, while focusing on connections to other transit services over one-seat rides. In combination with alignment changes and fewer trips, we estimate that these recommendations can result in cost savings of ~$1.2 million.

6.4 SUPPLEMENTAL SERVICES

AVTA's supplemental routes provide important service to and from local public high schools in different areas of the Antelope Valley. While these services are open to the general public, the main purpose of these routes is to transport students to school in the AM and return trips in the PM. Because these routes serve a specific purpose and are currently very productive, no route changes are recommended. However, opportunities to improve supplemental routes include adjusting schedules to accurately reflect student schedules, expanding services to those living one-three miles from school, and address issues of fare evasion, which was an issue heard multiple times during community and stakeholder outreach.

The recommendations for supplemental routes include:

- Supplemental routes are designed to take students to and from school; however, current supplemental route schedules either do not accurately reflect bell times or do not give students enough time to reach the bus after the dismissal bell. Adjusting supplemental route schedules to both accurately reflect school beginning and end times, as well as providing sufficient time for students to reach the bus, can help to increase ridership and improve rider satisfaction. However, it should be noted that schools release bell times approximately one month prior to the beginning of the school year, which provides insufficient time to adjust schedules for supplemental service. Because of this, more communication between AVTA and the schools is recommended to find a solution to this issue.

- In addition, supplemental routes currently operate year-round, even when school is not in session. While supplemental routes are open to the general public and some riders are of the non-student population, demand is not high enough to warrant service when school is out of session.

- There are approximately 14,450 high school students living within a three-mile radius of their schools. As these students are not eligible for the school bus service provided by the Antelope Valley Schools Transportation Agency, this is an opportunity for AVTA to fill this gap through existing supplemental routes. While it is likely that many of those living within one mile of their schools are likely able to walk, there are over 10,000 students between one and three miles from their schools that AVTA could provide service to, either through supplemental routes or fixed route service.

- The student population is traditionally one of the largest potential markets for transit agencies. Partnering with schools to create a reduced student fare could help to boost ridership on supplemental routes as well

as encourage students to use the fixed-route system for other purposes. The launch of a reduced fare program also presents an opportunity to launch an educational outreach and training campaign to student riders of supplemental routes regarding the importance of paying your fare, which can help reduce fare evasion.

6.5 COST ESTIMATES

The following table provides an high-level estimate of annual costs. Fixed-route services were modeled at $90 per hour, commuter services at $142, and on-request services (including DAR, night service, NMET, Routes 50, 51, and 51 replacement) at $58 per hour.

Table 11: Total Estimated Annual Costs for AVTA Services.

	Existing	Proposed	Difference
Local and supplemental (excluding Routes 50, 51, 52)	$13,373,000	$16,793,500	$3,420,500
Dial-a-Ride	$1,648,010	$1,210,920	$(437,090)
Routes 50, 51, 52	$1,530,000	$986,000	$(544,000)
Commuters (785, 786, 787, 790)	$4,134,590	$2,944,130	$(1,190,460)
Routes 747, 748	$406,910	$406,910	-
Late-night on-request	-	$232,000	$232,000
NEMT	-	$130,500	$130,500
Total	**$21,092,510**	**$22,703,970**	**$1,611,460**

Based on the assumptions and recommendations discussed throughout this report, we estimate that annual operating expenses will increase by about $1.6 million, or by about 8% of current operating costs. Together with aggressive marketing and outreach, optimized runcutting, scheduling, and route design, we estimate that ridership, overall, could grow by 15-20%. Below, we discuss some approaches to address fare policy, another lever in the ridership recipe.

6.6 FARE STRATEGIES

Fare policy is important to manage demand for transit services while recouping a reasonable amount of operating costs from fare revenues. A difficulty arises when fares are set too low to sustain service improvements or develop an attractive and useful bus service, as well when they are set too high that the system loses riders, particularly riders who switch to driving since the bus provides no added incentive, such as not needing to pay for parking or using priority lanes, cutting travel times. Inappropriate fare structures can also add to instances of fare evasion unintentionally if fare tables are overly complicated but also deliberately from perceived low value for money and poor service quality.

Based on our outreach, feedback, and analysis of AVTA's fare structures, we provide the following recommendations and strategies.

- **Implement short term changes in fare policy including:**
    - For local fixed-route services, raise the base fare every couple of years in a predictable manner, such as $0.25 to ensure that fares track with the increased cost of doing business. Regular, predictable fare increases, particularly with service improvements, help customers plan for fare

increases and reduces the need for AVTA to increase fares suddenly in a large increment in order to adjust fares that have not kept pace with inflation.

- Discontinue the 4-hour pass. This fare product is not well used based on customer feedback (and data we never received from AVTA) and having fewer products streamlines fare purchasing. Moreover, by removing this product, more customers may switch to day passes, increasing revenue for AVTA while providing unlimited trips to customers using that day pass.

- Identifying new partnerships with local employers to distribute employee passes. EcoPasses are transit passes that are subsidized by employers and distributed to their employees for a reduced fare. These passes provide benefits for all parties involved:

    i. Employees have an incentive to take transit to work and leave their car at home, reducing traffic congestion and increasing the transit mode share.
    ii. Employers who do not have enough parking spots to accommodate workers can provide an alternative travel option, and work towards their goals of creating a more sustainable workplace.
    iii. Transit agencies receive a consistent revenue stream from participating employers and improve productivity by carrying more riders.

- Promote TAP card adoption and LIFE fares for those who qualify.

- Provide day passes with pre-loaded day fares to healthcare facilities.

- **Launch a fare study to rationalize commuter fares and other fares when implementing route restructuring.** In particular, shortening commuter routes will necessitate fare adjustment. This offers a great opportunity to also examine other fares and policy in general. In addition, a reimaged fixed route network is likely to increase ridership; this effect should be considered in the context of fares.

- **Partner with universities, colleges, and school districts in the Antelope Valley to develop a discounted student fare associated with a TAP card.** Student ridership is an area of opportunity for AVTA, particularly improving ridership by students who already use supplemental routes to get to school. Providing a discounted fare in partnership with local schools can incentivize transit use for purposes other than schools—improving ridership. Moreover, by having a student pass with a bulk purchase agreement, AVTA can have a secured revenue stream for financial planning.

7.0 IMPROVE THE CUSTOMER EXPERIENCE

Putting the customer at the heart every decision AVTA makes will help ensure that outcomes and policies are geared to improving the rider experience, translating into ridership loyalty and growth.

7.1 IMPROVE CUSTOMER AND COMMUNITY AWARENESS OF AVTA SERVICE

It became clear during our stakeholder engagement activities, particularly the focus group meetings, that the public, even AVTA customers, have little knowledge about the agency. For example, half of the riders were aware of the AVTA mobile application that enables live arrival information tracking. Most participants believed that AVTA was a privately owned and operated company. Riders were unanimous in the belief that AVTA has not grown its services in response to the growth of the Antelope Valley, and agree that AVTA does not do enough marketing or communicating with them as frequent riders. Furthermore, non-riders mentioned that while walking is probably the best way to access an AVTA bus stop, they did not know the location of the bus stop closest to their home. One non-rider stated that she would "love to ride the bus" but she didn't know enough about the service to try AVTA nor how to access the information. This signals a potential need for travel training and more promotion of AVTA's online trip planning services and information portals, so that non-riders can feel more confident about using the service to replace some trips they would normally take in their private vehicles.

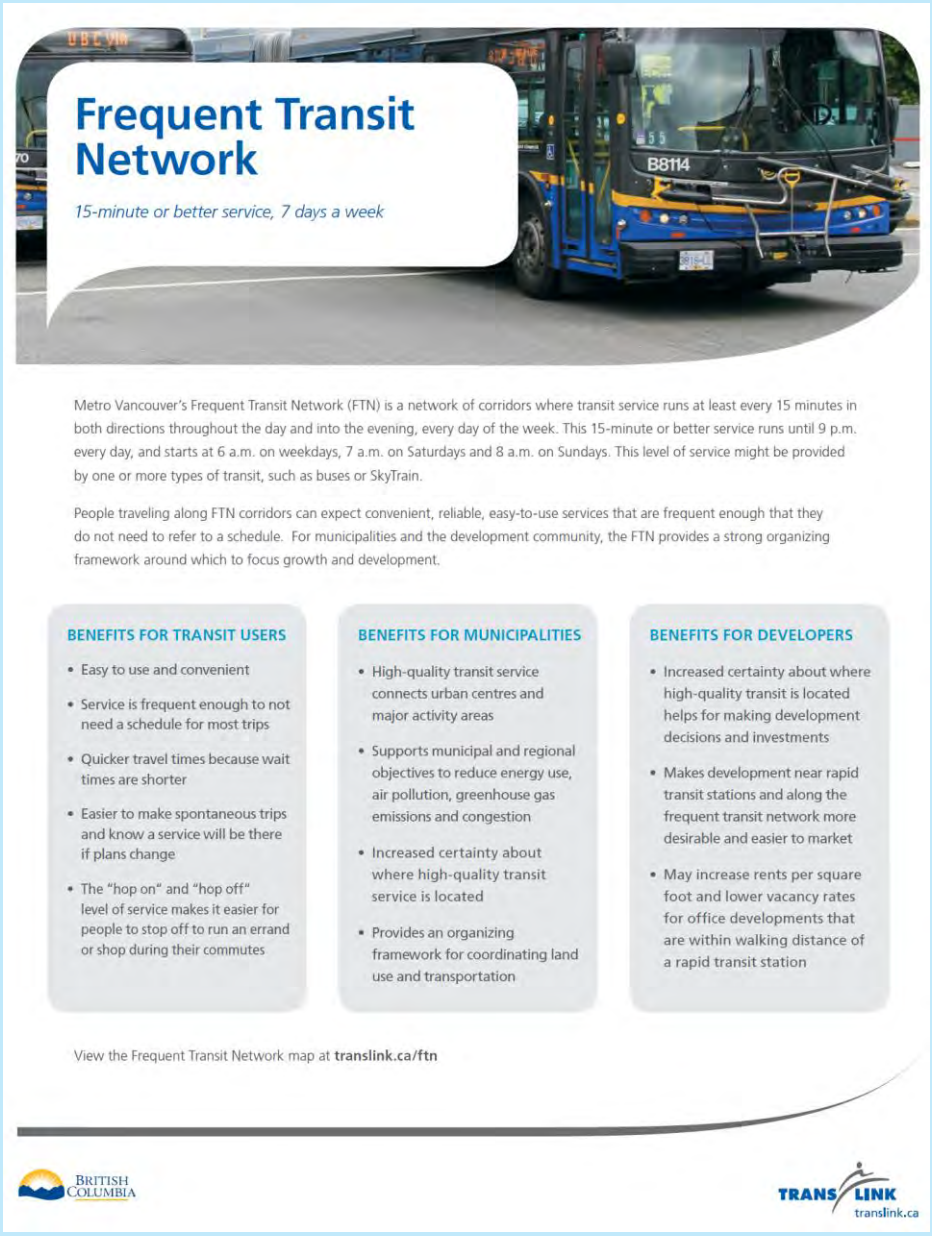
- **Improve awareness among current customers and non-customers by actively participating in the Antelope Valley community, particularly on transportation-related matters.**
    - Continue to leverage social media channels to not only improve awareness and marketing of AVTA, but also provide service information and other information related to riding the bus.
    - Use large initiatives, such as redesigned bus routes or services, to update a brand refresh or brand frequent services using a certain moniker. For example, TriMet in Portland, Oregon brands its frequent services with a green marker at bus stops, while TransLink in Vancouver, British Columbia brands its frequent service as the Frequent Transit Network (FTN). AVTA could look to provide a distinct bus stop brand for the frequent network product we propose here as part of a larger brand refresh or marketing outreach.

Figure 36: Frequent service branding from TriMet, Portland, Oregon.

Frequent Transit Services

Many transit agencies develop a ‘brand’ or ‘sub-brand’ for routes or services that are ‘frequent’, typified by headways that are usually 15-minutes or less during most of the day. These services are great enablers of access and freedom because they remove the need to use a schedule to use transit—people can pick up and go. Frequent service also means that workers who need to leave work early for any reason can rely on transit to do so since frequency isn’t necessarily tied to peak morning or afternoon rush hours.

In addition to branding this service, differentiating it at bus stops and on maps, AVTA could also develop a primer on the benefits of frequent services, similar to the fact sheet from TransLink shown below (and found here: https://www.translink.ca/-/media/Documents/plans_and_projects/ftn/Frequent-Transit-Network-Fact-Sheet.pdf).



Frequent Transit Network

15-minute or better service, 7 days a week

Metro Vancouver's Frequent Transit Network (FTN) is a network of corridors where transit service runs at least every 15 minutes in both directions throughout the day and into the evening, every day of the week. This 15-minute or better service runs until 9 p.m. every day, and starts at 6 a.m. on weekdays, 7 a.m. on Saturdays and 8 a.m. on Sundays. This level of service might be provided by one or more types of transit, such as buses or SkyTrain.

People traveling along FTN corridors can expect convenient, reliable, easy-to-use services that are frequent enough that they do not need to refer to a schedule. For municipalities and the development community, the FTN provides a strong organizing framework around which to focus growth and development.

BENEFITS FOR TRANSIT USERS

- Easy to use and convenient
- Service is frequent enough to not need a schedule for most trips
- Quicker travel times because wait times are shorter
- Easier to make spontaneous trips and know a service will be there if plans change
- The "hop on" and "hop off" level of service makes it easier for people to stop off to run an errand or shop during their commutes

BENEFITS FOR MUNICIPALITIES

- High-quality transit service connects urban centres and major activity areas
- Supports municipal and regional objectives to reduce energy use, air pollution, greenhouse gas emissions and congestion
- Increased certainty about where high-quality transit service is located
- Provides an organizing framework for coordinating land use and transportation

BENEFITS FOR DEVELOPERS

- Increased certainty about where high-quality transit is located helps for making development decisions and investments
- Makes development near rapid transit stations and along the frequent transit network more desirable and easier to market
- May increase rents per square foot and lower vacancy rates for office developments that are within walking distance of a rapid transit station

View the Frequent Transit Network map at **translink.ca/ftn**

BRITISH COLUMBIA

TRANSLINK translink.ca

- Redesign and reissue a new network map, particularly after route changes. The new map should focus on a clean, clear, and modern aesthetic that does away with the 3D perspective of the current map. Route alignments should be colored or line-weighted by service type or hierarchy, like a thick line weight for frequent routes, and lighter line weights for less frequent services. On-request areas should be cleared demarcated.

- Host open houses or pop-ups to discuss this strategic mobility plan with the community to obtain buy-in. While an important component of developing this plan was talking to customers and other stakeholders and gathering ideas, it will now be important for AVTA to own the final product and inform and educate the broader community, including customers, local businesses, transportation allies, municipal and elected officials, and other interested stakeholders about the plans recommendations and strategies and to get buy-in for implementation. In particular, developing working relationships and collaboration with key stakeholders—like city planning, transportation planning, Metrolink, Metro—will be crucial to the success of many of this plan's strategies.

- Ensure that information is available in English and in Spanish, as well as in accessible formats for persons with disabilities.

- Update all information regarding DAR to be cohesive. Currently, the brochure available online specifies that anyone 65 years or older is eligible, while the main AVTA website specifies anyone over 62 years old. AVTA should ensure that information is consistent to remove confusion or potential challenges from customers. Additionally, with the launch of the new on-request service, new marketing materials should be developed outlining the program and how it works. Short videos should be created explaining the new program. These short videos could also serve as a tutorial on how to use the app which will be the foundation of the new program.

7.2 RETRAIN OPERATORS

- **Develop operator training and retraining programs.** Working with the third-party service contractor to develop them, these programs should focus on ensuring safe and efficient bus operations as well as customer service. As the frontline, operators must be brand ambassadors of AVTA.

- **Train and retrain operators and monitor performance.** Proactively work with AVTA's service contractor to ensure the program is robust. Hold service contractor responsible for insufficient performance.

- **Include operators as stakeholders during service change and planning exercises**. Being inclusive and considering operator input can help improve operator buy-in to service changes and help them become champions of AVTA.

7.3 EMERGENCY OR GUARANTEED RIDE HOME

Many transit agencies that operate commuter services similar to AVTA's offer emergency ride home services that offer flexibility to customers who may need to return home for an emergency during the midday when commuter services are not operating. Offering this service is typically costly, as it involves dispatching a vehicle to pick-up a person and then returning to the Antelope Valley, roughly a three-and-half-hour return trip to Los Angeles; as such agencies, typically offer only a limited number per year per customer to prevent abuses and maintain costs.

- **We recommend that AVTA explore implementing an emergency ride home service.**

    1. Survey customers onboard AVTA services to determine home and work locations, interest in the emergency ride home and other pertinent information.

    2. Inform customers about the Regional Guaranteed Ride Home (GRH) supported by Metro in Los Angeles County.

        - The GRH program requires that employers are enrolled in the program, but AVTA should help customers become aware of this program.

7.4 IMPROVE BUS STOP AMENITIES

To a large degree, particularly for agencies like AVTA with services that for the most part are not frequent, the bus stop waiting environment plays a substantial role in customer experience and satisfaction. Providing shade, in particular, would go a long way to improving customer experience during the waiting portion of a transit journey.

- **Establish a committee to develop bus stop guidelines and an improvement plan.** This committee should use industry best practices to identify proper infrastructure for bus stops and develop an action plan that prioritizes stops based on need. AVTA should leverage information provided in Task 5 (section 3.2.1) when developing guidelines.

- **Install new bus shelters, benches, and other amenities as outlined in the improvement plan.** Installation and new infrastructure provide an excellent marketing opportunity for social media.

7.5 COLLABORATE WITH OFFICIALS AND THE COMMUNITY TO IMPLEMENT TRANSIT-SUPPORTIVE DESIGN AND DEVELOPMENT

AVTA should work cross-collaboratively across the greater Antelope Valley community to demonstrate the value and benefits of public transit and how public transit provides economic opportunities to residents and businesses. Leading an educative campaign and establishing partnerships with community-based and faith-based organizations, with decisionmakers and other stakeholders, particularly development firms and other players responsible for *how* the community develops will ensure that development supports rather than detracts from transit's appeal.

- **Establish a working group of staff from municipalities, community organizations, and AVTA to develop transit-supportive guidelines.** These guidelines, in conjunction with *transit service guidelines* should provide a workable framework for developments and land uses in the Antelope Valley that are supportive of transit ridership, including provisions for pedestrian infrastructure, set-backs, parking guidelines and so on. This group should develop an actionable list of low-hanging fruit for infrastructure to make part of the service area more transit-friendly, such as implementing pedestrian crosswalks near the Antelope Valley Mall to facilitate access to Route 1 along 10th St. W.

- **Implement and monitor developments and their transit supportiveness.** AVTA and the working group should also develop a set of indicators or metrics to measure success of transit-supportive guidelines, such as ridership or passenger activity near new developments, or vehicle miles-traveled by

residents of new developments near transit. This group should leverage existing work, like the Palmdale TOD Overlay Zone Land Use Framework Plan[6] as well as resources from Metro[7].

[6] http://media.metro.net/projects_studies/tod/images/plan-tod-R3-Palmdale.pdf
[7] https://www.metro.net/projects/transit-oriented-communities/.

8.0 BUILD AND SUPPORT AN INCLUSIVE, MULTIMODAL NETWORK

The attractiveness of transit that produces ridership depends to a large extent upon the environment around bus stops—does a customer feel safe and comfortable when waiting for a bus? Are bus stops accessible with sidewalk infrastructure? Is cycling a viable range extender of transit? If transit is not viable, are other non-single-occupancy vehicle modes available?

8.1 IMPROVE SIDEWALK AND BICYCLE ACCESS TO AVTA SERVICES

Our analysis revealed that nearly 90% of fixed-route customers access AVTA bus by walking, strongly indicating that where possible, AVTA must work with the cities of Lancaster and Palmdale to improve sidewalk infrastructure at and around bus stop. Furthermore, to improve first-last mile connectivity and extend the range of transit, bicycle infrastructure needs to provide a safe and viable opportunity for cyclists wishing to combine cycling and transit.

- **AVTA should establish a pedestrian and cyclist access working group and action plan.** This group should include staff from municipal departments as well as advocacy groups. The group should develop an action plan detailing critical steps for improving pedestrian paths and cycling access to transit.

8.2 IMPROVE THE UNIVERSAL ACCESSIBILITY OF AVTA INFRASTRUCTURE

- **Working together with the accessibility advisory group and local officials, AVTA needs to develop an action plan for improving the universal (ADA) accessibility of its infrastructure.** This action item works in conjunction with 8.1.
- In recent years, AVTA has taken the initiative to improve stop accessibility by ensuring new stops have shelters, benches and meet universal accessibility standards. AVTA even provides designated waiting areas in shelters for persons with a disability. However, not all stops are fully compliant with ADA standards, particularly legacy stops that have not been recently upgraded.
- In addition to barriers for persons with physical disabilities, AVTA should improve its amenities for persons with a sensory disability, such as providing tactile information for people who are blind or have low vision. Providing bilingual stop and agency information at AVTA's stops and stations would also improve the universal accessibility of its amenities.
- AVTA should assess the level of accessibility of its bus stops, identify low-hanging fruit, and prioritize investments based on stop usage. Moreover, AVTA could examine usage of stops by persons with disabilities and develop an accessibility advisory group to help inform stop design and other accessibility issues in an inclusive manner.

8.3 SUPPORT CAR-SHARING SCHEMES AND OTHER MODES IN THE ANTELOPE VALLEY

Beyond traditional transit services, AVTA should do more to promote and foster multimobility in the Antelope Valley, support active transportation and help reduce reliance on SOV. As a leader in zero-emission technology, AVTA could look to explore other GHG-reducing initiatives, such as:

- **Supporting carpooling, vanpooling and volunteer transportation programs.** Vanpooling and carpooling programs help commuters with similar schedules and destinations get to and from work easily, aid in removing single-occupancy vehicle trips, reduces per-person emissions and improves air quality. It is also estimated that van and carpoolers in Southern California reduce their commute trips by 20 minutes in each direction, and those in participating programs can reduce their commuting costs by 70% when switching from driving alone. AVTA should work with local employers and Metro to support carpooling and vanpooling programs.

- **Supporting car-sharing at major hubs.** AVTA will examine the potential for car-sharing service at major hubs, either through new providers like Getaround, or more established providers like Enterprise CarShare. Either way, providing or supporting the use of shared cars can help reduce car ownership rates, provide vehicles to those who need them but are unable to afford personal vehicles.

- **Provide priority parking for electric and hybrid vehicles.** As industry leaders in the zero-mobility space, AVTA should examine parking allocation at its main terminals and worked with owners and developers to prioritize or dedicate parking spaces for low- and/or no-emission personal vehicles as incentives.

8.4 DEVELOP A MARKETING PLAN AND IMPLEMENT A BRAND REFRESH

Educating residents about AVTA and its service, demonstrating value to the community and establishing a 'transit is cool' brand can help boost ridership and promote services throughout the community. Furthermore, service changes and implementing strategic plans like this one provides AVTA an excellent opportunity to engage with customers at bus stops and on vehicles, as well as public events to promote agency initiatives, like zero-emission vehicles, frequent service on Route 1, and soon, microtransit or on-request services.

- **AVTA should develop a marketing plan that includes messaging and strategies for a variety of audiences** including customers and non-riders. In addition, the plan should detail strategies for educating and obtaining feedback throughout the implementation of this strategic mobility plan.

- **AVTA should launch a brand refresh study** and engage with the community to evaluate ideas and concepts for a different brand. Branding can also extend to the frequent network and bus stops.

8.5 DEVELOP AN INTERNAL COMMUNICATION STRATEGY

Finally, most of the preceding recommendations were customer focused. However, AVTA staff must be the biggest champions of the agency, its mission, and of this strategic mobility plan in order for it to succeed.

- **AVTA should organize internal working meetings** where this plan is presented and then discussions are had about how to implement. The presentations can be tailored to different audiences, but the main goals should include identifying priorities and champions for the plan.

- **AVTA should establish an advisory group of internal champions of this plan from across AVTA departments.** This group should include staff from all functional divisions, including AVTA's third-party operator(s). Ensuring that AVTA has internal advocates for this plan can help prioritize implementation steps and identify appropriate actors to ensure this plan succeeds.

- **AVTA should implement and monitor the actions of this plan and develop a funding action plan.** While this plan describes potential funding sources below (and which source of funding is most suitable), AVTA needs to identify the appropriate funding sources and opportunities to implement a prioritized set of action items and responsible staff.

9.0 PHASING

To implement the action items and recommendations detailed above, the proposed phasing plan is provided below. The phasing plan recommends implementation over a five-year period and identifies potential funding opportunities and parties responsible for implementation. Action items are broken down into the three major goals our recommendations are built on: enhance AVTA's core services, improve the customer experience, and build and support an inclusive, multimodal network.

	Action	Year 1	Year 2	Year 3	Year 4	Year 5	Potential Funding	Responsible Actor(s)
Goal 1 - Enhance AVTA's core services - transit network and mobility services								
	Fixed-route							
1	Layers and network design	Refine network and route concepts and launch new local network (launch in 2020)					5307; CMAQ; Measure R; Props A and C	AVTA
2	Improve schedules	Redevelop schedules to more accurately reflect on-street operating conditions	Expand street supervision to monitor reliability				5307; CMAQ; Measure R; Props A and C	AVTA
3	Explore transit-dedicated infrastructure	Establish working group for studying transit-dedicated infrastructure	Pilot peak hour reserved lanes on Palmdale Blvd. Pilot peak hour reserved lanes on Ave. J	Pilot peak hour reserved lanes on 10th St.			5307; CMAQ; Measure R; Props A and C; SB-1; BUILD	AVTA; City of Lancaster; City of Palmdale; Los Angeles County
	DAR							
4	Launch on-request service	Implement on-request shared mobility services	Monitor and adjust services as program evolves				5310 (already procured for NEMT); CMAQ; 5312; Integrated Mobility Innovation	AVTA
5	Rationalize service area and eligibility	Study whether service area requires reduction and if eligibility should be modified	Modify service area and eligibility as necessary					AVTA; community partners
6	Expand travel training	Refocus program on travel training DAR customers and new fixed-route customers					5310	AVTA; community partners
7	Explore volunteer transportation programs		Establish working group to examine volunteer transportation programs and non-transit services				5310	AVTA; LA Metro; community partners
8	Establish accessibility advisory committee	Develop framework for establishing advisory committee on accessibility & establish committee						AVTA; community partners
	Commuter							
9	Redesign routes	Refine network and route concepts and launch new local network						AVTA
10	Improve schedules	Redevelop schedules to more accurately reflect on-street operating conditions						AVTA
11	Explore collaboration with Santa Clarita	Work with SC Transit to understand opportunities to minimize duplication and best use resources					TIRCP; Props A and C; Measure R	AVTA; Santa Clarita Transit
	Fare policy							
12	Launch a fare study	Implement short-term changes to fares and fare policy	Launch study to rationalize fares due to route and service changes					AVTA
13	Expand student fares to all students in the AV	Create new fare category for any enrolled-student to obtain a discounted fare					AVAQMD	AVTA; AVUSD; University of Antelope Valley; other schools
Goal 2 - Improve the customer experience								
14	Improve customer and community awareness of AVTA services	Work with local groups to understand disability needs for information Ensure all marketing and informational material is bilingual and up-to-date	Implement new community outreach program to inform about AVTA at different locations across AV	Work with accessible advisory group to develop accessible information				AVTA; community partners
15	Retrain operators		Retrain operators for customer service and safe operations					AVTA
16	Leverage Metro's Guaranteed Ride Home program and educate customers	Dedicate a customer rep to working with employers and employees to educate about GRH	Hold internal working meetings to track plan implementation and success				Measure R and M; Props A and C	AVTA; LA Metro; employers
17	Improve bus stop amenities	Establish committee to develop bus stop guidelines & an improvement plan	Install new bus shelters and benches				5307; CMAQ; Measure R; Props A and C; SB-1; BUILD	AVTA; City of Lancaster; City of Palmdale; Los Angeles County
18	Collaborate with officials and community to implement transit supportive design and development	Establish working group of staff from cities, community organizations and AVTA to develop transit-supportive guidelines	Implement and monitor developments and their transit-supportiveness				Measure M; Sustainable Communities Program (SCAG)	AVTA; City of Lancaster; City of Palmdale; Los Angeles County
Goal 3 - Build and support an inclusive, multimodal network								
19	Improve sidewalk and bicycle access to AVTA services	Establish pedestrian and cyclist access working group & action plan	Implement pedestrian and cyclist access and integration program				Measure M; Sustainable Communities Program (SCAG)	AVTA; City of Lancaster; City of Palmdale; Los Angeles County
20	Improve the accessibility of AVTA infrastructure	Work with accessibility advisory committee and local officials to prioritize accessibility improvements					Measure M; Sustainable Communities Program (SCAG)	AVTA; City of Lancaster; City of Palmdale; Los Angeles County
21	Support a car-sharing scheme in the AV	Study potential for car-sharing schemes centered at multimodal hubs					Measure M; 5312	AVTA; LA Metro; car-sharing companies
22	Develop a marketing plan and implement a brand refresh	Develop marketing plan to provide public outreach for the plan	Launch a brand refresh study	Implement brand refresh				AVTA
23	Develop an internal communication strategy	Establish internal advisory group to support implementation of this plan & identify funding priorities	Implement and monitor the actions of this plan & develop a funding action plan					AVTA

Figure 37: AVTA five-year phasing plan.

10.0 FUNDING AND ACTIONS

AVTA is funded through state and local sales tax funds, federal transportation funds, and farebox and advertisement revenue.

The majority of funds are transportation subsidies allocated by the Regional Transportation Planning entity, LA Metro, to Los Angeles County fixed-route transit operators through the Formula Allocation Procedure (FAP) and the Capital Allocation Procedure (CAP). The FAP uses vehicle service miles and passenger revenues to apportion the available revenues into percentage shares for the operators within Los Angeles County. The CAP uses total vehicle miles and active fleet size (based on NTD reporting) to apportion shares. AVTA is also very active in applying for discretionary funding particularly for its zero-emission bus transition.

The various available funding sources are discussed below, while we provide some recommendations for funding for some key recommendations or strategies that follow.

10.1 FEDERAL OPPORTUNITIES

1. **FTA 5307 Urbanized Area Formula Grants**

    - Major funding for urban area transit systems with urbanized areas (UZAs) above 50,000.
    - Distributed using a capital allocation formula based on total vehicle miles, number of vehicles, unlinked boardings, passenger revenue and base fare.
    - Used for capital procurements or preventative maintenance expenditures and requires a 20% local match.

2. **FTA 5339 Buses and Bus Facilities Formula Program**

    - This program will be particularly useful for acquiring new vehicles and expanding or rehabbing AVTA's facilities.
    - In addition to formula funding, two discretionary opportunities are also available
        - Bus and Bus Facilities Discretionary Program to replace, rehab or purchase vehicle and related equipment and facilities
        - Low or No Emissions Bus Discretionary Program to assist with the conversion to a zero-emission fleet.
    - AVTA has applied for this funding and been successful at securing these funds for its electric bus transition.

3. **FTA 5337 State of Good Repair Program**

   - Mainly used for state of good repair of high-intensity transit systems and requiring a 20% local match, 5337 funding can be used for developing and implementing transit asset management plans.

   - AVTA could explore applying for this formula funding in developing a new transit asset management plan, particularly given its zero-emission bus fleet.

4. **FTA 5310 Enhanced Mobility of Seniors and Individuals with Disabilities**

   - AVTA has recently applied for this grant that provides funding to transit agencies and non-profits that transport seniors and individuals with disabilities.

   - The recent grant involves a microtransit strategy for seniors and individuals with disabilities.

5. **CMAQ**

   - Congestion Mitigation and Air Quality Program funding mainly targets areas with non-attainment or maintenance of greenhouse gas or other noxious emissions.

   - This grant requires a 20% local match.

6. **BUILD**

   - Formerly TIGER grants, BUILD provides funding for transportation infrastructure investment.

   - This competitive grant could provide some funding for AVTA's facility needs, and well as passenger-facing infrastructure.

7. **Other federal programs**

   - Given the range of new mobility modes and technology innovation disrupting tradition fixed-route transit, the FTA provides competitive grants for agencies wishing to demonstrate new mobility modes, partnerships, service delivery alternatives and other schemes, such as:

     - **Integrated Mobility Innovation** to demonstrate innovative and effective practices, pilot new technologies and so on. Many receipts have identified partnerships, so this application requires some up-front work. AVTA could look to partner with local stakeholders for microtransit-type solutions.

     - **5312 Public Transportation Innovation** for the development of innovative products and services for transit agencies. As AVTA begins exploring microtransit concepts and strategies, 5312 funding could be a viable source for deployment and evaluation of the pilot-type program.

10.2 STATE OPPORTUNITIES

8. **Transportation Development Act (TDA) Article 4**

   - TDA is a statewide quarter-cent sales tax that is deposited into the State Local Transportation Fund (LTF) and State Transit Assistance (STA) Funds (from sales tax on fuel). TDA funds are eligible for capital and operating expenses and are administered by Metro.
   - LTF is based on county sales tax revenue and apportioned within the county based on population, while STA is formula based on a transit agency's revenues and population.
   - Historically, AVTA has not been awarded TDA funding through local sources.

9. **SB 1 (State of Good Repair Program)**

   - Enacted in 2017, the Road Repair and Accountability Act of 2017 or SB 1, provides nearly double the funding to the STA. SB 1 is focused on reporting and transparency to deliver California's transportation programs.
   - Funds are distributed in the same way as STA formula funding.
   - SB 1 funding is eligible for maintenance, rehabilitation, and capital projects.

10. **Low Carbon Transit Operations Program (LCTOP)**

    - As part of CARB's Cap-and-Trade program and deposited into the Greenhouse Gas Reduction Fund, LCTOP (in SB 852 and 862) aims at reducing greenhouse gas emissions (GHGs).
    - LCTOP funds are eligible for operating and capital projects aimed at reducing GHGs.
    - LCTOP is formula-based on STA formula.
    - AVTA has used LCTOP to acquire new vehicles for revenue service.

11. **Proposition 1B, Public Transportation Modernization, Improvement, and Service Enhancement Account (PTMISEA)**

    - This formula funding program is nearing its end, but has been previously used by AVTA, along with the Transit Security portion of Prop 1B.

12. **Transit and Intercity Rail Capital Program (TIRCP)**

    - Created by SB 862 and modified by SB 9, TIRCP provides competitive funding for "transformative capital improvements that will modernize California's intercity, commuter and urban rail systems, and bus and ferry transit systems to reduce emissions of greenhouse gases by reducing congestion and vehicle miles traveled throughout California."
    - We are not aware of any TIRCP grants or grant applications from AVTA, but this program can be used for AVTA's commuter services, such as for vehicles or related infrastructure. AVTA may look to partner with Santa Clarita to submit a TIRCP grant application.

13. **Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program)**

- Carl Moyer is funded through tire fees and smog impact vehicle registration fees and aims to reduce pollution from transportation.
- It is administered by local air quality boards, and for AVTA, the Antelope Valley Air Quality Management District (AVAQMD).
- Carl Moyer can be used to offset the cost of purchasing zero-emission vehicles (heavy-duty), helpful for AVTA in its transition to a zero-emission fleet.

14. Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP)

- CALSTART and CARB launched HVIP to help agencies acquire costly zero-emission buses by providing funding through a voucher system.
- While funding is currently exhausted for this 2019, additional funds will be made available in January 2020.
- AVTA could apply for HVIP vouchers to offset some of the capital costs of acquiring zero-emission buses.
- Relatedly, through CARB and the Low Carbon Fuel Standard, agencies like AVTA using fuel and fuel with carbon intensity below the established threshold receive credit incentives, with additional incentives for electric charging stations.

15. Other sources

- Volkswagen (VW) Environmental Mitigation Trust provides about $423 million for California to mitigate NOx emissions caused by VW's illegal emissions testing defeat devices for certain VW diesel vehicles. Administered by CARB, the funding process is expected to begin fall 2019.
    - AVTA should monitor this opportunity from CARB related to acquiring zero-emission buses.

10.3 LOCAL AND COUNTY OPPORTUNITIES

16. Proposition A

- Prop A funding is one-half of 1% tax on most retail sales in LA County distributed by Metro.
- Twenty-five percent is distributed to cities for local transportation, 35% for rail, and 40% for discretionary purposes which is typically used to fund bus service by Metro and the munis, including AVTA.

17. Proposition C

- Prop C funding is also one-half of 1% tax on retail sales in LA County distribute by Metro.
- The difference between Prop A and C is the proportion of fund allocation for different purposes, such as construction and operation, rail expansion, and bus security for Prop C.
- Both Prop A and C are eligible for capital and operational expenditures.

18. Measure R

- Approved in 2008, Measure R is an additional one-half of 1% sales tax to fund traffic relief and rail expansion.
- Twenty-percent is allocated for operations including bus operations.

19. Measure M

- Approved in 2016, Measure M is similar to Measure R but is a permanent half-cent sales tax to expedite rail expansion and other improvements.

10.4 OTHER SOURCES

20. Fares

- AVTA's current network-wide farebox recovery ratio is around 20%. Local transit routes have lower farebox recovery compared to commuter services.
- As discussed in Section 6.6, we propose fare policy recommendations, but recommend a more in-depth fare study once AVTA implements other components of this plan.
- Developing new concessions for students, and potentially negotiating bulk rates for schools could provide a guaranteed revenue stream for AVTA.
- Similarly, developing an ecopass or employer pass program (or working through Metro) can provide AVTA with a revenue stream for discounted bulk pass purchases. Leveraging vanpooling or carpooling through Metro as discussed in Task 5 is also a potential stream of revenue.

21. Advertising

- Currently, AVTA uses advertising aboard buses (posters) as well as bus wraps to generate ad revenue. It is important to make sure that bus wraps still reveal the transit agency's brand or logo, as well as any other important information such as bus ID numbers.
- AVTA should look to expand on its brand equity by doing more in ad billings and promotional work, like with the Jethawks and other local businesses, as well as advertisements at bus stops and hubs.

Tips for grant success

To compete more effectively when applying for competitive grants, AVTA should consider the following strategies:

1. **Developing Success Narratives.** Current grant programs focus on benefit-cost analyses, showing value-added benefits to the community and potential public-private-partnerships when submissions are ranked. Highly ranked projects contain narratives of success, and the FTA is encouraging transit properties to send them good news stories and pictures of transit projects to highlight the positive outcomes of grant-funded projects via social media.
2. **Developing Community Partnerships/Alliances**. Highlight partnerships with local community groups, schools, or other strategic alliances that assist AVTA in building capacity or assisting with organizational needs.
3. **Consider Potential Value Capture Strategies.** Value capture refers to a toolbox of project strategies meant to incorporate a share of land value increases to recover and reinvest that may allow for long term revenue streams. Some examples include:
    a. Joint development
    b. Right of way leasing
    c. Development impact fees
    d. Naming rights
    e. Parking fees
    f. Solar/wind installations
4. **Requesting Grant Application Debrief.** Knowing why a grant wasn't successful is imperative to designing stronger cases for the next time.

22. Medicaid reimbursement

- Some California transit properties have pursued Medicaid reimbursements for medical trips. Although the process of becoming eligible for reimbursement is cumbersome, this may be worth pursuing.

23. Hospital partnerships

- NEMT partnerships using AVTA's service (current and/or future on-request services) could be negotiated with hospitals on a per-trip basis, helping AVTA recover some of the expenses in providing trips to and from healthcare facilities.

Summary of Actions, Potential Funding, and Responsible Actors

	Action	Potential Funding	Responsible Actor(s)
Goal 1 - Enhance AVTA's core services - transit network and mobility services			
	Fixed-route		
1	Layers and network design	5307; CMAQ; Measure R; Props A and C	AVTA
2	Improve schedules	5307; CMAQ; Measure R; Props A and C	AVTA
3	Explore transit-dedicated infrastructure	5307; CMAQ; Measure R; Props A and C; SB-1; BUILD	AVTA; City of Lancaster; City of Palmdale; Los Angeles County
	DAR		
4	Launch on-request service	5310; CMAQ; 5312; Integrated Mobility Innovation	AVTA
5	Rationalize service area and eligibility		AVTA; community partners
6	Expand travel training	5310	AVTA; community partners
7	Explore volunteer transportation programs	5310	AVTA; LA Metro; community partners
8	Establish accessibility advisory committee		AVTA; community partners
	Commuter		
9	Redesign routes		AVTA
10	Improve schedules		AVTA
11	Explore collaboration with Santa Clarita	TIRCP; Props A and C; Measure R	AVTA; Santa Clarita Transit
	Fare policy		
12	Launch a fare study		AVTA
13	Expand student fares to all students in the AV	AVAQMD	AVTA; AVUSD; University of Antelope Valley; other schools
Goal 2 - Improve the customer experience			
14	Improve customer and community awareness of AVTA services		AVTA; community partners
15	Retrain operators		AVTA
16	Leverage Metro's Guaranteed Ride Home program and educate customers	Measure R and M; Props A and C	AVTA; LA Metro; employers
17	Improve bus stop amenities	5307; CMAQ; Measure R; Props A and C; SB-1; BUILD	AVTA; City of Lancaster; City of Palmdale; Los Angeles County
18	Collaborate with officials and community to implement transit supportive design and development	Measure M; Sustainable Communities Program (SCAG)	AVTA; City of Lancaster; City of Palmdale; Los Angeles County
Goal 3 - Build and support an inclusive, multimodal network			
19	Improve sidewalk and bicycle access to AVTA services	Measure M; Sustainable Communities Program (SCAG)	AVTA; City of Lancaster; City of Palmdale; Los Angeles County
20	Improve the accessibility of AVTA infrastructure	Measure M; Sustainable Communities Program (SCAG)	AVTA; City of Lancaster; City of Palmdale; Los Angeles County
21	Support a car-sharing scheme in the AV	Measure M; 5312	AVTA; LA Metro; car-sharing companies
22	Develop a marketing plan and implement a brand refresh		AVTA
23	Develop an internal communication strategy		AVTA


Antelope Valley Transit Authority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