Appendix A:
Direct Recipiency Technical Memorandum

MEMORANDUM

TRANSIT DEVELOPMENT PLAN

DATE: August 18, 2023
TO: Garry Ford and Lauren Simcic, City of New Braunfels
FROM: Alliance Transportation Group
RE: Transit Service Opportunities

Contents

Introduction

As a result of the 2020 Census, the City of New Braunfels is now classified as a small Urbanized Area (UZA) with a population ranging from 50,000 to 199,999. This reclassification renders the City of New Braunfels eligible to receive funding under FTA's Section 5307 Urbanized Area Formula Program and other applicable discretionary grant programs. Funding for small UZAs is apportioned to the State to support transit needs within these areas.

To be eligible for funding through FTA and other Federal transportation programs, transit providers in Urbanized Areas are required to participate in federally prescribed multimodal planning processes led by a metropolitan planning organization (MPO). With coordination and approval from the Texas Department of Transportation (TxDOT), the City of New Braunfels may choose to become a direct recipient of FTA funds. Being designated as a direct recipient entails oversight by the FTA, which includes additional reporting requirements and compliance reviews, including National Transit Database (NTD) Annual reports, triennial reviews, and other essentials such as an Agency Safety Plan (ASP) and Transit Asset Management (TAM) plan. Before FTA can award funding, recipients must comply with applicable FTA requirements and have completed FTA’s preliminary capacity review.

Given these changes and the implications they may have on New Braunfels' public transportation, the City’s desire to become a direct recipient of FTA funds can offer greater autonomy over funding allocation, access to additional resources for transit planning and operations, and provide the City a more direct role in decision-making processes that impact local transportation infrastructure. A precise action plan is unpredictable based on each potential recipient’s unique local situation, and the City’s timeline is heavily dependent on the regional, state, and federal processes, the following memo outlines the necessary steps to prepare for this transition effectively.

Ongoing Coordination

Becoming a direct recipient involves an ongoing coordination process with various entities, including AAMPO (Alamo Area Metropolitan Planning Organization), TxDOT, and FTA. **Table 1** includes relevant points of contact affiliated with these agencies. While this coordination is fluid and ongoing, it generally flows from the local level upwards in terms of formal approvals while the resulting funding generally flows from the federal level down. The City Council's formal support is required to officially kick off the direct recipiency process, though coordination has already begun between the City, TxDOT, and FTA. The next step is coordinate with AAMPO to identify the City as a Direct Recipient.

Table 1: Interagency Coordination Contact List

Name	Affiliation	Role/Title
Sean Scott	AACOG	General Manager (Alamo Regional Transit)
Sonia Jimenez	AAMPO	Deputy Director
Isidro Martinez	AAMPO	Director
Eric Gleason	TxDOT	Director of Public Transportation Division
Mark Sprick	TxDOT	Director of Administration & Program Support (PT Division)
Gail Lyssy	FTA	Regional Administrator (Region 6)
David Bartels	FTA	Director of Planning and Program Development (Region 6)
Tony Ogboli	FTA	Community Planner (Region 6)

Regional Level - Coordinate with AAMPO

The MPO for the UZA will be obligated to adhere to Federal planning requirements by preparing a Unified Planning Work Program (UPWP), a Metropolitan Transportation Plan (MTP), and a Transportation Improvement Program (TIP). These documents enable transit providers to access Section 5307 funding and other funding opportunities. Additionally, funding is allocated to the MPO to support transit planning activities.

State Level - Set Up Urban Transit District (UTD) with TxDOT

Working with TxDOT, the City must establish an Urban Transit District (UTD) to qualify as a direct recipient of FTA funding. In Texas, public transportation services are primarily provided by metropolitan transit authorities (MTAs), UTDs, and rural transit districts (RTDs). MTAs serve areas with populations of 200,000 or more and have the authority to levy local sales taxes for funding. TxDOT provides State transit funding to UTDs and RTDs and is the designated recipient for FTA Section 5307 formula grant funding for small UZAs with populations ranging between 50,000 to 199,999. To become a direct recipient with FTA, New Braunfels must establish a UTD with TxDOT.

While designated recipients receive FTA formula funding through TxDOT, direct recipients have the ability to apply for and receive discretionary grant programs directly from FTA or FHWA (Federal Highway Administration) on a competitive basis. Both agencies offer various competitive grant programs annually to fund targeted projects based on specific notice of funding opportunities (NOFO).

Texas Transportation Code Chapter 458 empowers UTDs to provide transit services in the state, requiring a public transportation provider to form an urban transit district to receive state or federal public transportation funding. The creation of a UTD for New Braunfels offers various advantages, as it allows the transit provider access to all City departments for legal, financial, human resources, and other functions. The UTD's governing body may simply mirror the members of the City Council or include representatives from surrounding counties or cities.

Federal Level - FTA Review of Legal, Financial, and Technical Capacity

Once it is ready, the City should formally initiate the process with FTA by sending a letter to Region VI outlining the its intentions to use federal transit funding. This letter should include

the type of FTA funding sought, the types of activities the funding may support, the "planning basis" for the activities (TDP, MTP, STIP/TIP, etc.), and the identification of a point of contact at the City that will work with FTA through the preliminary review process. The official review process typically begins after an assigned coordinator at the FTA regional office receives all required documentation and may take 6 months or more from the time the City begins compiling and developing required documentation through a series of reviews and revisions to ultimately receiving approval of requirements, access to FTA systems, and confirmation of Direct Recipiency status. The process includes a review of the City's legal, financial, and technical capacities as well as an overview of applicable Civil Rights compliance.

Legal Capacity

This review area includes eligibility and authorization under State or local law to request, receive, and spend FTA funds for FTA-assisted projects. Officials acting on behalf of the applicant must have appropriate authority designated by State or local law or the governing body of the applicant. The City will need to submit an Opinion of Counsel and Authorizing Resolution, and FTA may require legal opinions and supporting documentation throughout the funding period. The Opinion of Counsel identifies the legal authority of the applicant and any pending legislation or litigation that may affect their legal status. The Authorizing Resolution demonstrates the authority of officials acting on behalf of the applicant. The FTA Master Agreement contains federal requirements applicable to recipients and projects and should be reviewed by the City. Applicants must provide all certifications and assurances required by federal laws and regulations, attested electronically with a personal identification number (PIN) in the electronic award management system, before FTA can award federal funding.

Financial Management

To demonstrate financial management and capacity, recipients must have financial policies, organizational structures, and management systems in place to match, manage, and charge allowable costs to the award. They must also conduct required internal audits and provide financial oversight of contractors and subrecipients. The financial management system must meet standards in financial reporting, accounting records, internal control, budget control, allowable costs, source documentation, and cash management.[1] The FTA regional office may request various documentation, including operating and capital budgets, and recent audit reports. Policies and procedures for grants management, cash management, budgeting, accounts payable, payroll processing, and other aspects may be requested. Additionally, a financial plan should demonstrate adequate revenues to maintain and operate existing systems and complete projects, with stable and reliable revenue sources to meet future costs.

[1] See: Award Management Requirements Circular (5010.1E), https://www.transit.dot.gov/regulations-and-guidance/fta-circulars/award-management-requirements-circular-50101e

Technical Capacity

Technical capacity refers to the grant applicant's ability to effectively manage and carry out Federal grants. The City must demonstrate its capability to comply with all requirements outlined in the grant application and agreement while adhering to applicable laws and regulations using sound management practices. To assess the City's technical capacity, requested documentation may include the current policies in place to meet FTA award management requirements, an organizational chart with roles and offices responsible for grant-related activities, as well as job descriptions of certain key positions. Familiarity with the FTA Contractors Manual for triennial reviews is beneficial as it provides comprehensive assessments and guidance on FTA requirements and performance evaluation processes.

Procurement Capacity

FTA emphasizes that it does not make third-party contract decisions for its recipients but instead relies on the recipient's annual self-certification of procurement system compliance with FTA requirements. However, recipients must conduct federally assisted procurements with full and open competition. The FTA regional office may request procurement procedures conforming to applicable federal laws, FTA guidance, and the FTA Master Agreement, including checklists or other management tools to ensure compliance. FTA requires written procurement policies and procedures, approved by the individual responsible for the potential grantee's transit system. FTA's website contains a Procurement System Self-Assessment Guide that may help identify specific policy requirements.[2] It is recommended that the City implement a checklist for contracting/procurement staff to ensure clear roles, responsibilities, and adherence to solicitation processes that comply with applicable Federal regulations. Additionally, recipients are responsible for ensuring contractors and sub-recipients comply with applicable federal requirements and standards.

Compliance with Civil Rights

Potential new recipients of FTA funding must commit to complying with all relevant civil rights statutes and implementing regulations, regardless of the type of funding they receive. Major Civil Rights programs require relevant documentation to FTA, including the Title VI Plan, Equal Employment Opportunity (EEO) Plan, and Disadvantaged Business Enterprise (DBE) Plan. Additionally, two other Civil Rights areas, the Americans with Disabilities Act (ADA) and Environmental Justice, may be reviewed and considered during the process. Although these areas may not require specific documentation for review, all FTA recipients are still obligated to adhere to their requirements.

[2] *Procurement System Self-Assessment Guide*. Federal Transit Administration. Last updated: Thursday, February 27, 2020. Accessed on 7/27/2023. https://www.transit.dot.gov/funding/procurement-system-self-assessment-guide

Implementation Action Plan

After the City of New Braunfels was identified as a Small UZA by the Federal Transit Administration (FTA) based on the 2020 Census data, some preliminary coordination meetings took place.

- March 7, 2023: Small UZA determination was formally conveyed to the City through an official letter
- March 23, 2023: New Braunfels staff met with TxDOT Public Transportation Division to discuss the subsequent steps.
- May 23, 2023: New Braunfels staff met with FTA, who provided an overview of the process towards direct recipiency.

Given that the overall process is expected to take approximately a year, it is essential for New Braunfels to decide on transit service provisions for 2024 while simultaneously planning for 2025, which is a distinct issue from the City's path to direct recipiency. The following initial steps position the City of New Braunfels to become a direct recipient of FTA funds, enhancing its ability to address local transportation needs effectively and efficiently. The Implementation Timeline that follows outlines the subsequent phases of this process and provides general actions and timelines toward achieving direct recipiency status.

1. **City Council Resolution to Create an Urban Transit District:** The City will draft and pass a resolution to establish an Urban Transit District.
2. **City Council Resolution in Support of Becoming an FTA Direct Recipient:** The City Council will pass a resolution declaring support for New Braunfels to become an FTA Direct Recipient and authorize coordination with AAMPO, TxDOT, and FTA to that end.
3. **Formal Concurrence from AAMPO, TxDOT, and FTA:** The City will send letters with the resolutions attached to AAMPO, TxDOT, and FTA to seek their formal concurrence.

Conceptual Timeline

Table 2 is a conceptual timeline for the general process of the City's transit service transition over the next few years. It includes a progression of interdependent schedules and activities that may shift sooner or later based on the response time and actions of the several agencies which the City must coordinate with as well as the City's own, internal processes. This concept illustrates a scenario in which the City continues their existing demand-response transit services (provided by ART) while the path toward direct recipiency continues through the procedures outlined in the preceding sections. This sample timeline also considers the time needed to issue an RFP for a new transit service contractor to begin implementing the recommendations of the TDP. Until the TDP is approved, this timeline may shift based on the final outcomes of the analysis, public participation process, and approval of the plan.

Table 2: Conceptual Timeline for Transit Service Action Plan Implementation

Timeline Concept - Contract Transt Service Option																															
City of New Braunfels - Gradual Model																															
		Administrative Tasks																												New Service	
	Timeline	**2023**					**2024**													**2025**											
		A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	
	Agents	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
Meeting with TxDOT/City	TxDOT/City of NB																														
Accept TDP/Service Model Recommendations	City of NB																														
Demand Response Service Delivery to City	AACOG/City of NB																														
Confirm Direct Recipiency	FTA/TxDOT/City of NB																														
Set Up Urban Transit District	TxDOT/City of NB																														
Confirm/Receive transit funding from TxDOT	TxDOT/City of NB																														
Develop/Award Service (RFP)	City of NB										RFP Prep					Ad		Award													
Notice for IGA End (60 days prior)	City of NB to AACOG											7/9													7/9						
Service Transition Period (For New Contractor)	City of NB/Contractor																														
Date of New Service (October 1, 2025)	Contractor																														

Time from Start Identified Above		
RFP Prep		
City Prep/Review	Day	1-45
TxDOT Review	Day	60-75
FTA Region VI	Day	60-75
Edit/Complete	Day	75-90
Finish Document	**4-5 Months**	
Advertise		
Release Ad	Day	1-60
Q&A	Day	2-15
Release Addenda	Day	14-45
Close Ad	Day	45
Record Responses	Day	45
Finish Process	**2 Months**	
Award		
Internal Evaluation	Day	1-30
Interviews	Day	45
Council Presentatic	Day	55-60
Final Evaluation	Day	65
Council Approval	Day	90
Finish Process	**3 Months**	

Appendix B:
Public Information Survey Results Technical Memorandum

MEMORANDUM

TRANSIT DEVELOPMENT PLAN

DATE: July 12, 2023
TO: Garry Ford, Lauren Simcic
CC:
FROM: Alliance Transportation Group
RE: New Braunfels TDP – Survey Results Summary

The City of New Braunfels opened the Transit Development Plan (TDP) survey on its website from Monday, June 5 through Friday, July 7, 2023 to gauge residents' attitudes toward current public transportation services and preferences for future service. The online survey was supplemented by other outreach efforts detailed below.

- Flyers were distributed at key locations around town for about 2 weeks after launch.
- The City promoted the survey at AAMPO Walk & Bike Night on June 14.
- City staff interviewed Alamo Regional Transit (ART) passengers on June 15.
- The survey was reported in the Downtown newsletter on June 20.
- The survey was sent to recipients of the McKenna Foundation listserv around June 27.
- The survey was reported in the AAMPO newsletter on June 27.
- City staff tabled at the New Braunfels Public Library on June 27.

The survey registered the opinions of 932 total respondents. Overall, the responses indicate that New Braunfels has great interest in transit from residents who do not currently use public transportation, but who would like transportation alternatives for recreational, social, and convenience purposes. Most respondents are familiar with Uber/Lyft, own smartphones, and have higher household incomes, and are interested in a fixed-route network and willing to walk to bus stops. A significant proportion of respondents, including those who currently use ART and who have less access to private automobile transportation, said they would use transit for most of their everyday travel needs. This suggests that expanding New Braunfels' public transportation would not only improve transportation outcomes for residents with relatively high need for transit service but could also provide enhanced quality of life for all people as the City continues to grow. The following memo summarizes the results by question.

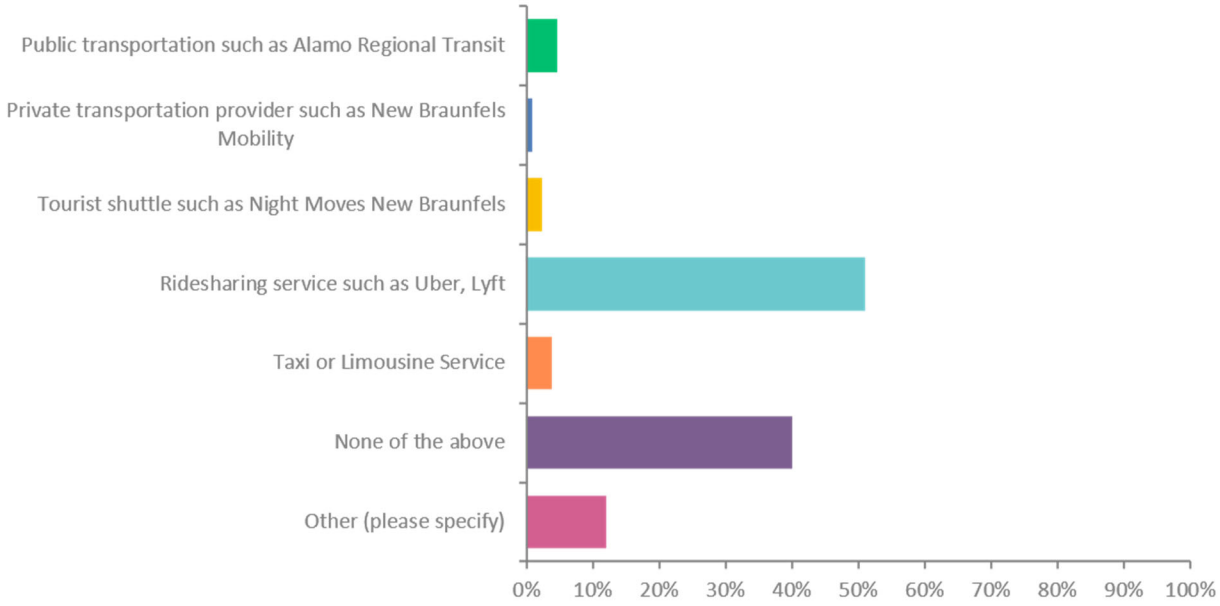
Question 1: When not traveling in a personal vehicle, what transportation options have you used in New Braunfels? [Select all that apply]

Around half of all respondents reported using a ridesharing service (including Uber and Lyft) while 40% indicated that they have not used any of the listed transportation alternatives. Less than 5% have used ART or other public transit.

As for the 12% of respondents who had used another option besides the ones provided, walking and riding a bicycle were very common responses, together accounting for almost all of the responses in the "Other" category. A few other respondents indicated that they ask friends or family for rides.

Figure 1 displays the answers to Question 1.

Figure 1: Transportation Options Used in New Braunfels



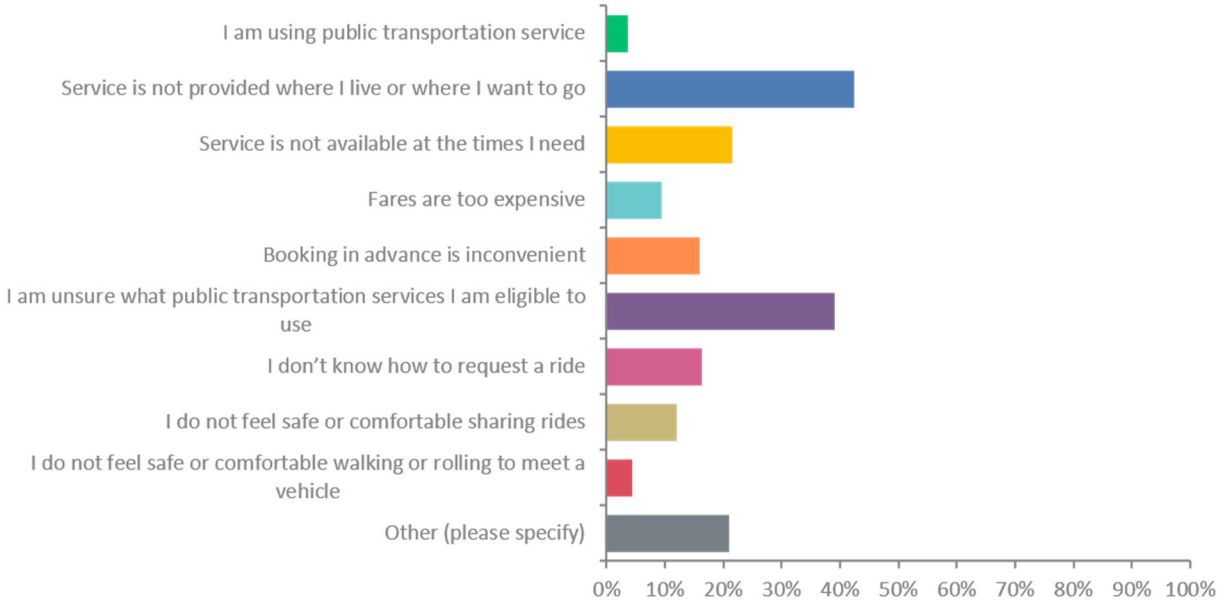
Question 2: If you are not using public transportation services, why not? [Select your top 3]

The most common responses to why respondents don't currently use public transportation are that service is not provided where the respondents live or where they want to go (43%), closely followed by the respondents being unsure of what public transportation services they are eligible to use (39%). Similar to those responses, other common answers were that service is not available at the times the respondents need (22%) and that they don't know how to request a ride (16%). Others felt the quality of existing public transportation is insufficient in one way or another: that booking in advance is inconvenient (16%), that sharing rides does not make the respondents feel safe and comfortable (12%), and that fares are too expensive (10%).

Other reasons provided are that the respondents are satisfied using their own private vehicles for transportation – this amounted to about 13% of all responses. A subset of these expressed that they do not see a need for public transportation in New Braunfels. Several write-in responses also expressed a lack of awareness of existing public transportation options.

Figure 2 shows how respondents answered Question 2.

Figure 2: Reasons for Not Using Public Transportation



Question 3: Which of the following would be a reason you would you use public transportation? [Select all that apply]

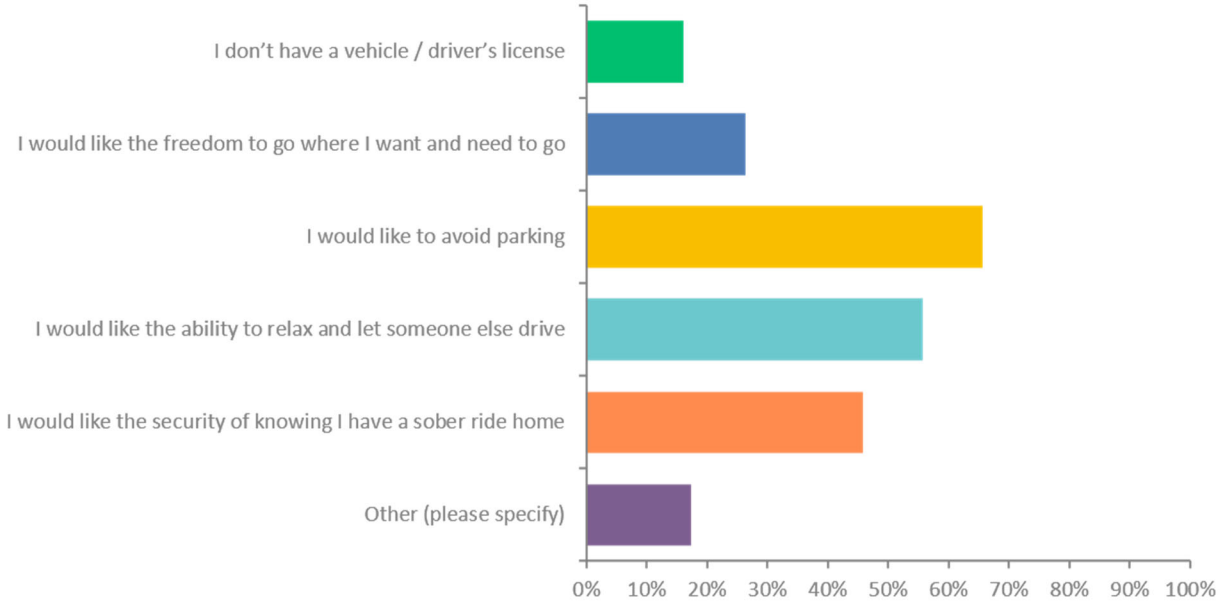
Of the responses provided, the most common was that respondents would like to avoid parking (66%). Other frequent responses were that they would prefer to relax and let someone else drive (56%) or that they want a sober ride home (46%). While these responses indicate that the respondents have access to a personal vehicle, other respondents (16%) reported they don't have a vehicle/driver's license. Over a quarter (26%) of respondents said they would use transit because they want the freedom to go where they want and need to go.

17% of respondents wrote other reasons to use public transportation besides those provided, including:

- Because disabilities, medical conditions, or old age might cause them to need public transportation.
- To benefit the environment.
- To reduce traffic congestion.
- To provide a reliable alternative when private automobiles are inoperable.
- Several respondents selected "other" to express that they do not believe more public transportation is necessary New Braunfels.

Figure 3 shows how respondents answered Question 3.

Figure 3: Reasons to Use Public Transportation



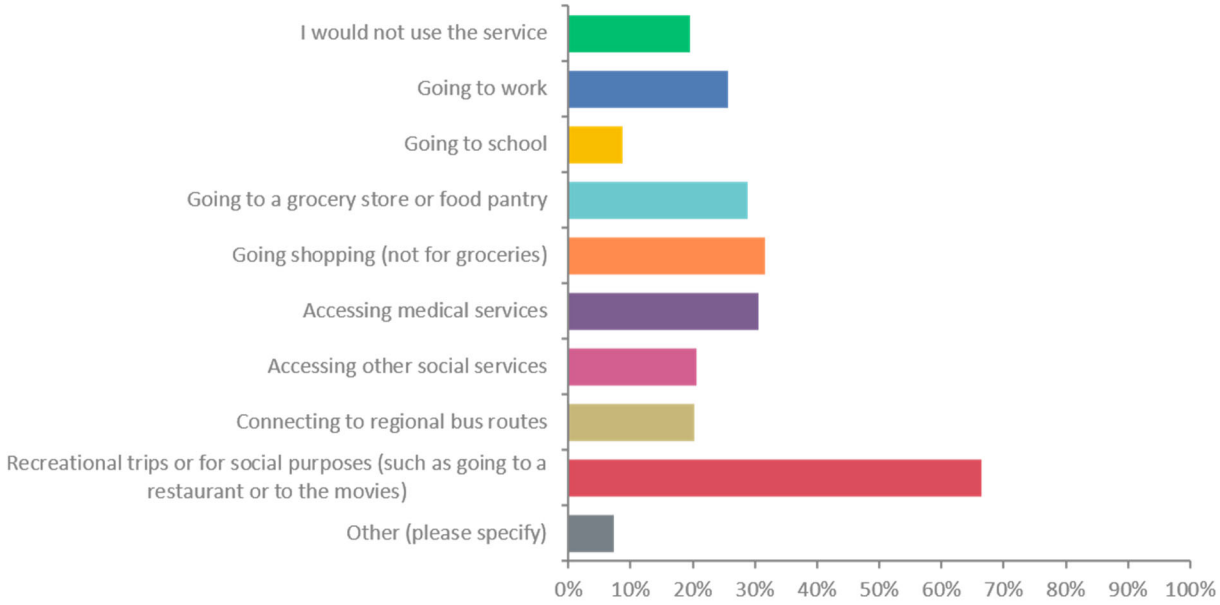
Question 4: Which of the following types of trips would you use public transportation for? [Select all that apply]

The most common response (66%) was that respondents would use public transportation for recreational trips and social purposes, such as restaurants and movies. Shopping (both for groceries and otherwise) and medical services were other common responses.

Among the write-in responses for "other" were several people indicating they would use transit to reach out-of-town destinations including San Antonio, Austin, San Antonio International Airport, or Amtrak and Greyhound transportation hubs in San Antonio or San Marcos. As this study is focused on providing transit within the City of New Braunfels, it may not be able to address these needs, but they are valuable input for regional services that could be provided separately and connected to New Braunfels public transportation.

Figure 4 shows the distribution of responses to question 4.

Figure 4: Trips for Which Respondents Would Use Public Transportation

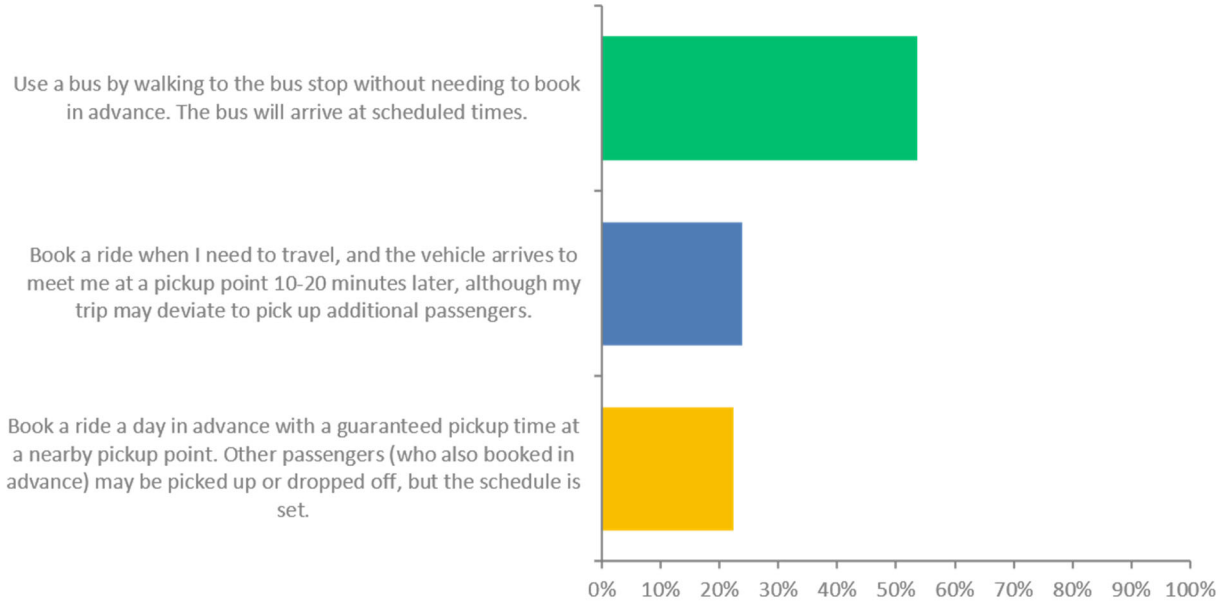


Question 5: Which of the following three options would be the most useful to you? [Select one]

Most respondents (54%) indicated a fixed-route network would be most useful to them. The remainder were evenly split between the two forms of on-demand service: 24% preferred microtransit that could be summoned when a passenger needs to travel, and 22% preferred dial-a-ride services like those currently operated by ART.

Figure 5 shows the breakdown of what types of transit service residents prefer.

Figure 5: Preferred Transit Service Options

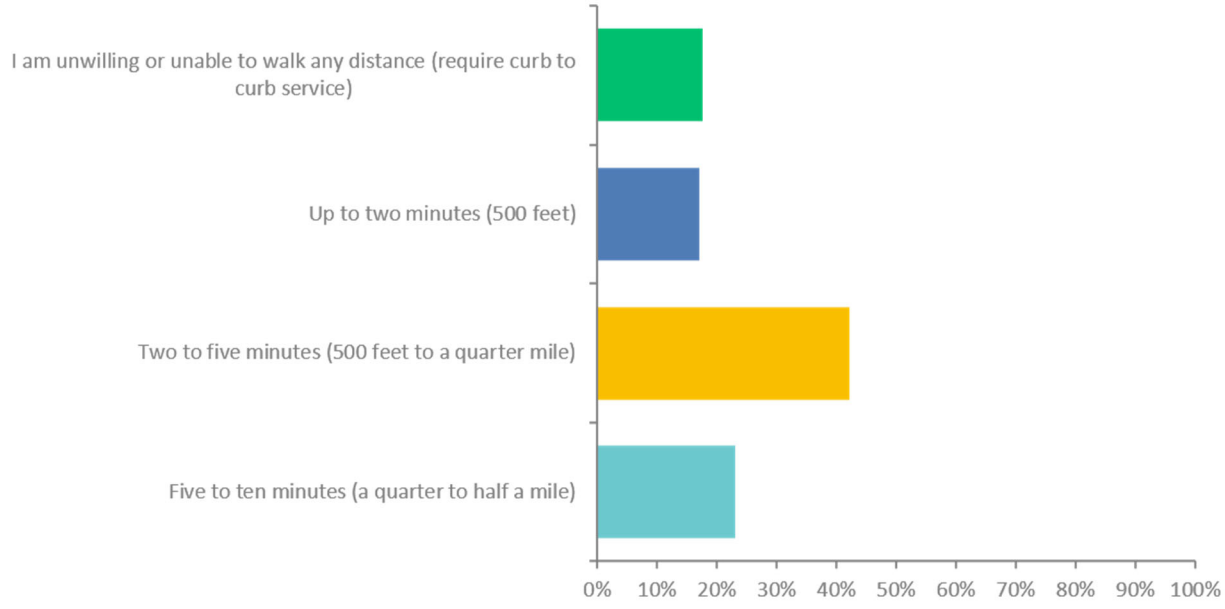


Question 6: How far would you be willing to walk to a bus stop? [Select one]

The most common response (42%) was that people would be willing to walk two to five minutes to a bus stop (approximately 500 feet to a quarter mile), which corresponds to between one and four blocks in the street grid of central New Braunfels. About 23% of respondents would be willing to walk further, up to 10 minutes or a half mile (around 5-7 blocks). Seventeen percent were only willing to walk as long as 2 minutes (500 feet or about one block), and 18% would require curb-to-curb service because they are unable or unwilling to walk any distance.

Figure 6 shows how far survey respondents would be willing and able to walk to traditional bus stops.

Figure 6: Distance to Walk to Fixed-Route Bus Stops

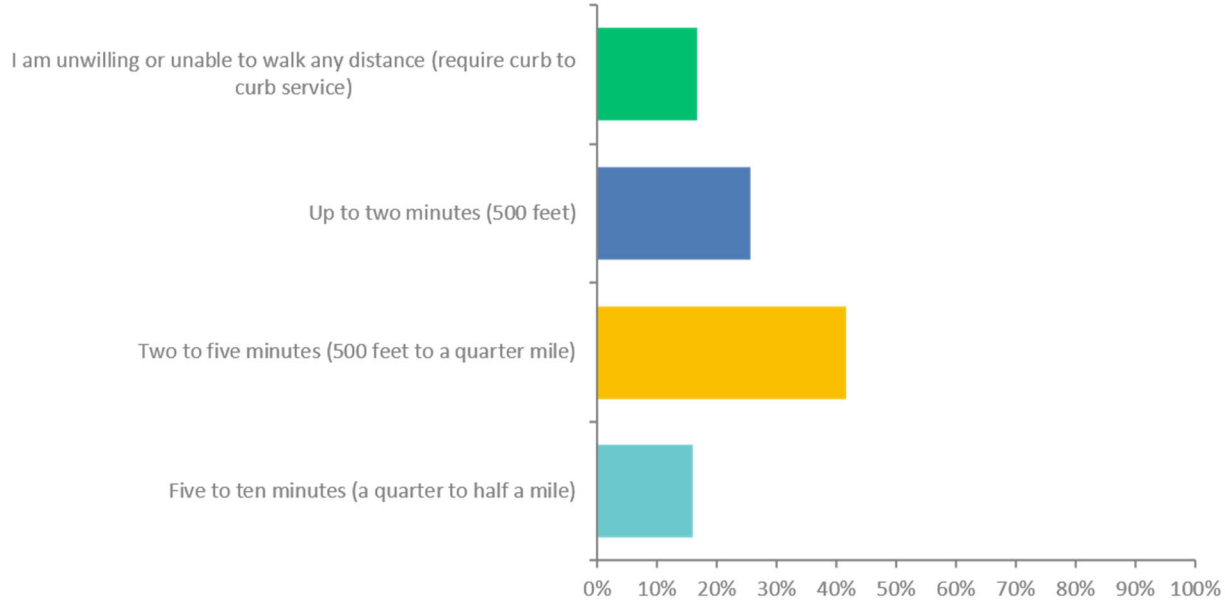


Question 7: If a new public transportation service that operated similar to Uber was offered, how far would you be willing to walk to a location to be picked up by a shuttle? [Select one]

Relative to the distance people would walk for a fixed-route bus, respondents would not be willing to walk as far for a demand-response microtransit service. Only 16% would be willing to walk as far as ten minutes (or half a mile) as compared with 23% for fixed-route buses. 26% indicated they would only walk up to two minutes (500 feet) for microtransit as opposed to 18% for fixed-route buses.

Figure 7 shows how far survey respondents would be willing and able to walk to a microtransit pickup spot.

Figure 7: Distance to Walk to Microtransit Pickup Spots

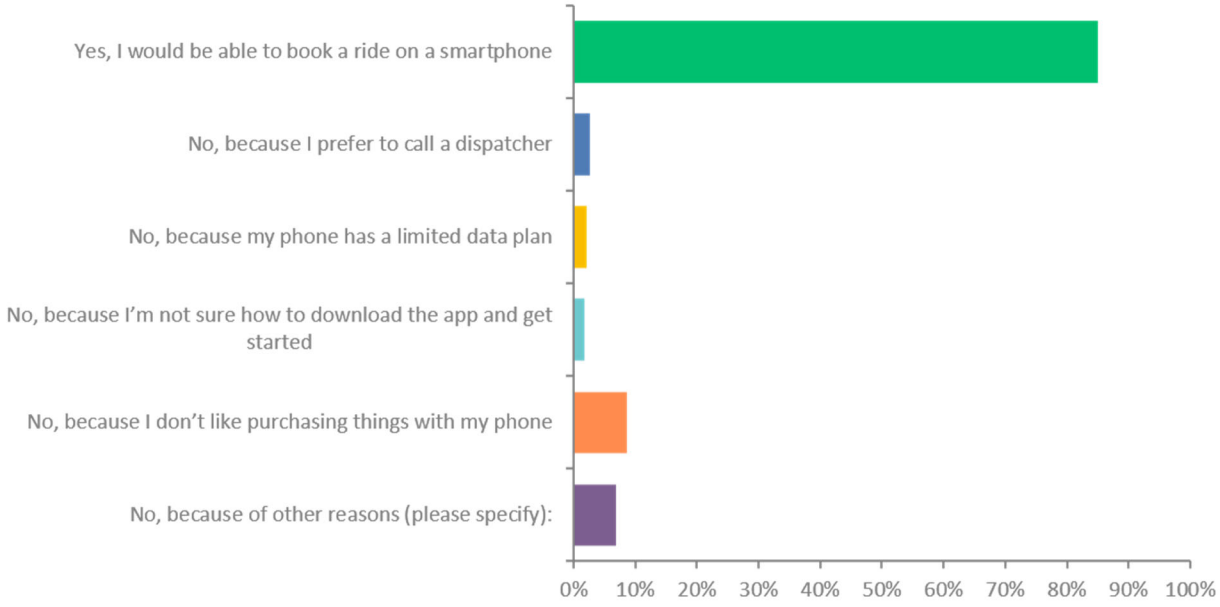


Question 8: Would you be able to use a smartphone app to book an on-demand ride? [Select up to 3]

Most respondents (85%) expressed that they would be willing and able to book rides on smartphones. Some expressed reservations that they don't like purchasing things on their phones (9%), they prefer to call a dispatcher (3%), they have limited phone data (2%), or that they would find it challenging to download and use an app (2%). Other reasons respondents mentioned for not using a smartphone app include not owning a smartphone, not finding smartphones and/or apps reliable, or privacy concerns over downloading and using a location-tracking app.

Figure 8 shows how respondents feel about using a smartphone to book public transportation trips.

Figure 8: Smartphone App Preferences

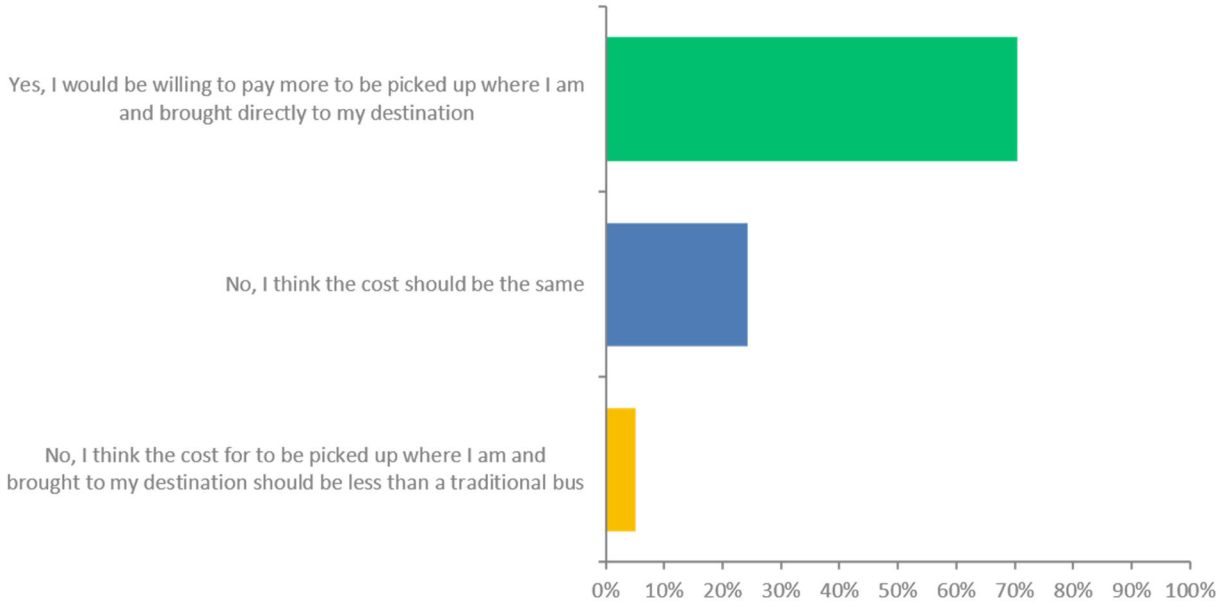


Question 9: Would you be willing to pay more to be picked up where you are and brought directly to your destination compared to a traditional bus service? [Select one]

Most respondents (70%) would be willing to pay more for a demand-response service that takes them directly to their destination, but 24% thought the cost should be the same to use a demand-response as a fixed-route bus. Five percent thought demand-response services should be cheaper than traditional buses.

Figure 9 shows how respondents compared the costs of fixed-route versus microtransit services.

Figure 9: Transit Service Cost Preferences

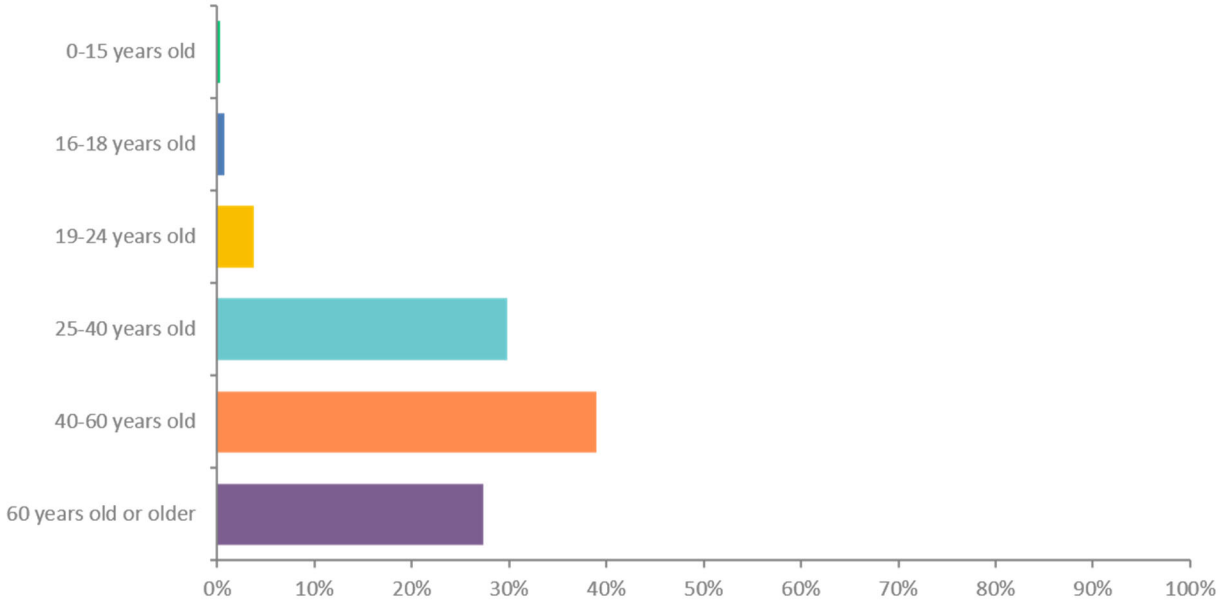


Question 10: Which best describes your age? [Select one]

Of the age groups provided, the largest number of respondents (39%) were between 40 and 60 years old. 30% were between 25 and 40. 27% were over 60 years old, and a total of 5% were below 25.

Figure 10 breaks down the survey respondents by age.

Figure 10: Survey Respondent Ages

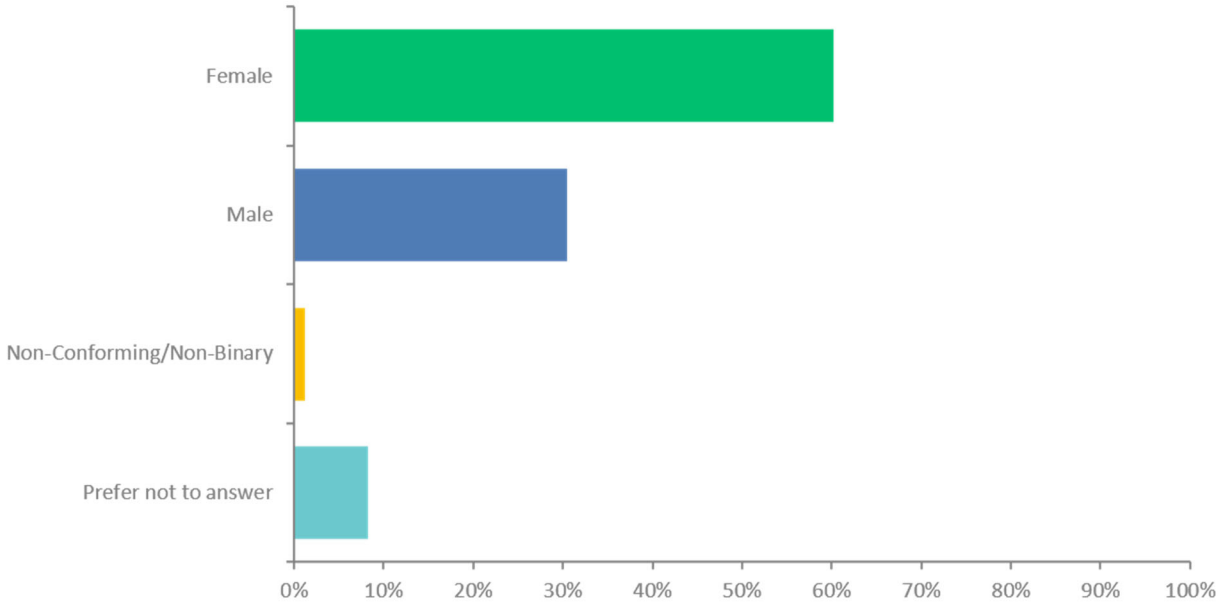


Question 11: Which best describes your gender identity? [Select one]

Most respondents (60%) identified as female while 30% identified as male. 8% preferred not to answer and 1% indicated that they do not identify as either female or male.

Figure 11 shows how respondents identified their gender.

Figure 11: Survey Respondent Gender Identities

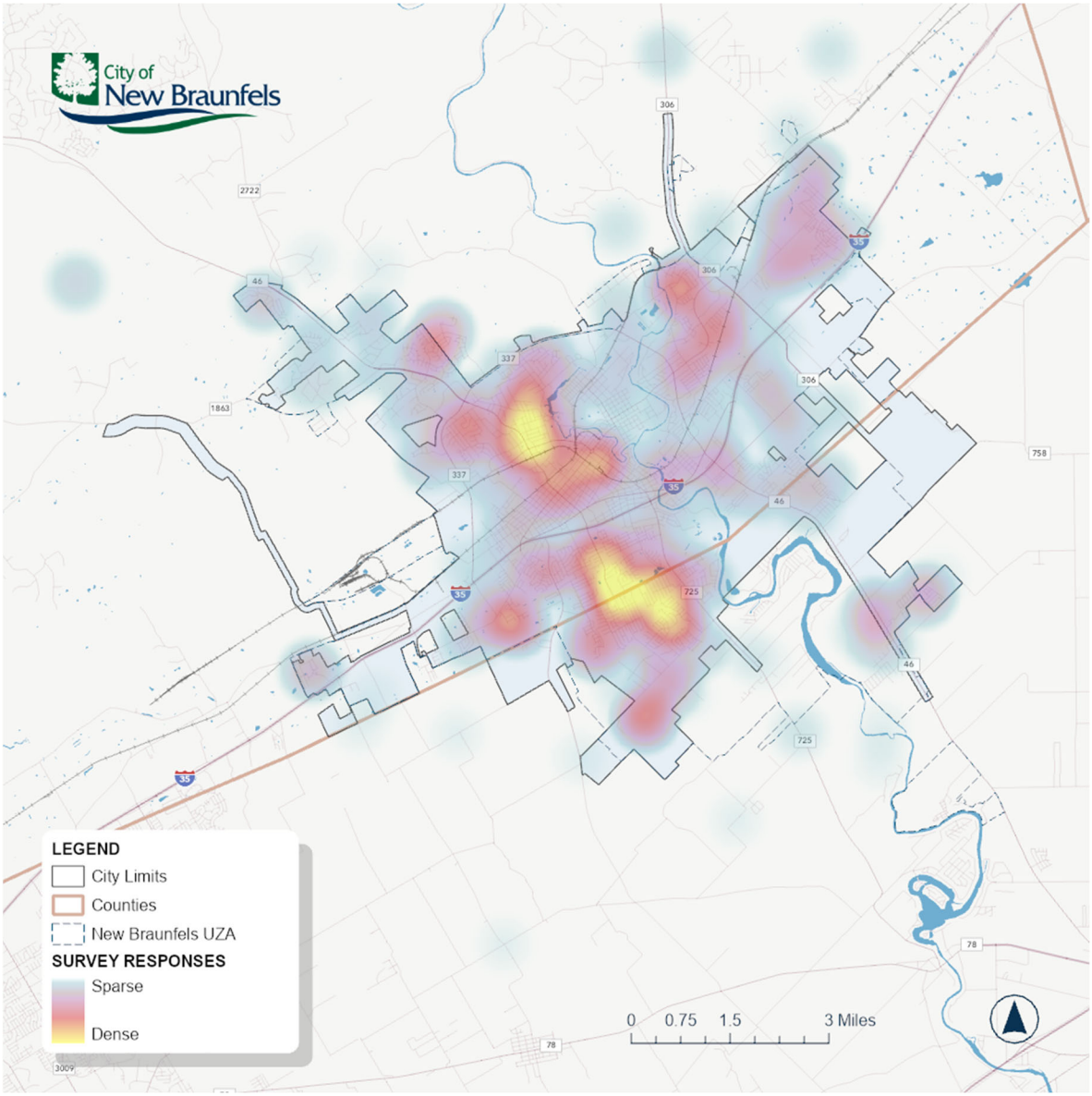


Question 12: What neighborhood do you live in? If you don't know the neighborhood, feel free to name a nearby intersection. [Write-in]

Of 890 responses to this question, 88% (784) could be positively identified with a neighborhood, an intersection, or a street in and around New Braunfels. A heat map of the approximate locations where these respondents live is in Figure 12.

Some residents lived outside the City limits, including a cluster of about ten respondents from Canyon Lake not displayed in this map. Major concentrations of responses are in the areas of Landa Park and The Hill, Downtown, and around County Line Road. Areas with relatively few responses include the west side and the neighborhood across the Comal River from downtown, although due to the imprecise nature of this data, it is possible that there were respondents living in these areas who reported their location as Downtown.

Figure 12: Heat Map of Approximate Home Locations Reported by Survey Respondents

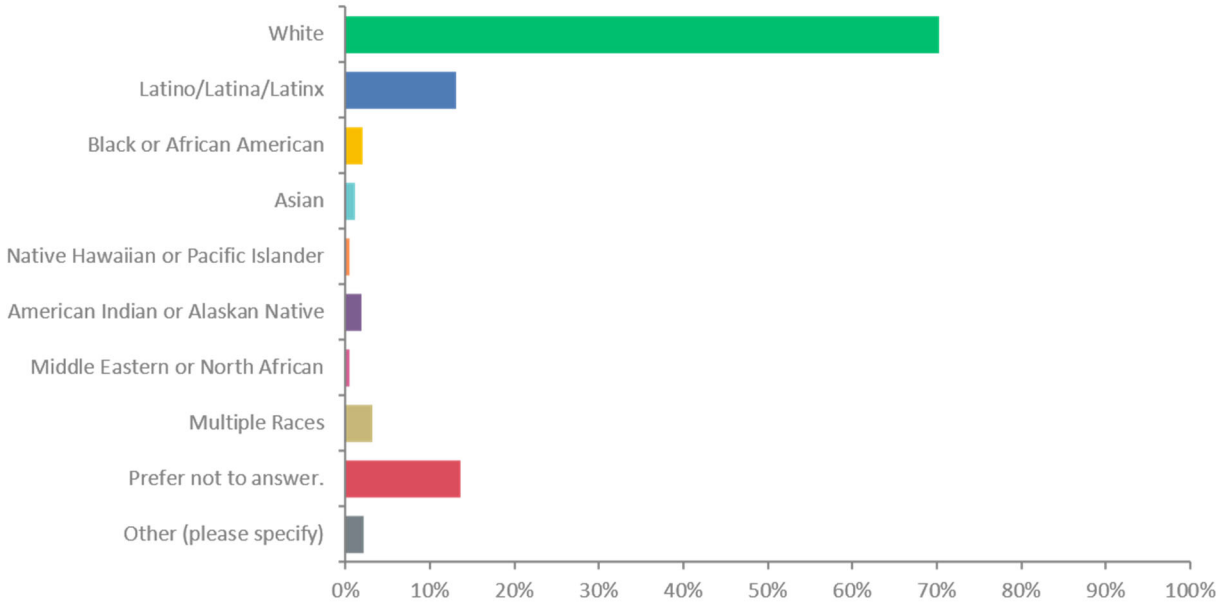


Question 13: Which best describes your racial and/or ethnic identity? [Select all that apply]

Most respondents, 70%, identify as White. The next largest group of people, 13%, indicated Latino/Latina/Latinx, and all other options accounted for less than 5% each, except for the 14% who preferred not to answer.

Figure 13 shows how respondents identified their race.

Figure 13: Survey Respondent Racial/Ethnic Identities

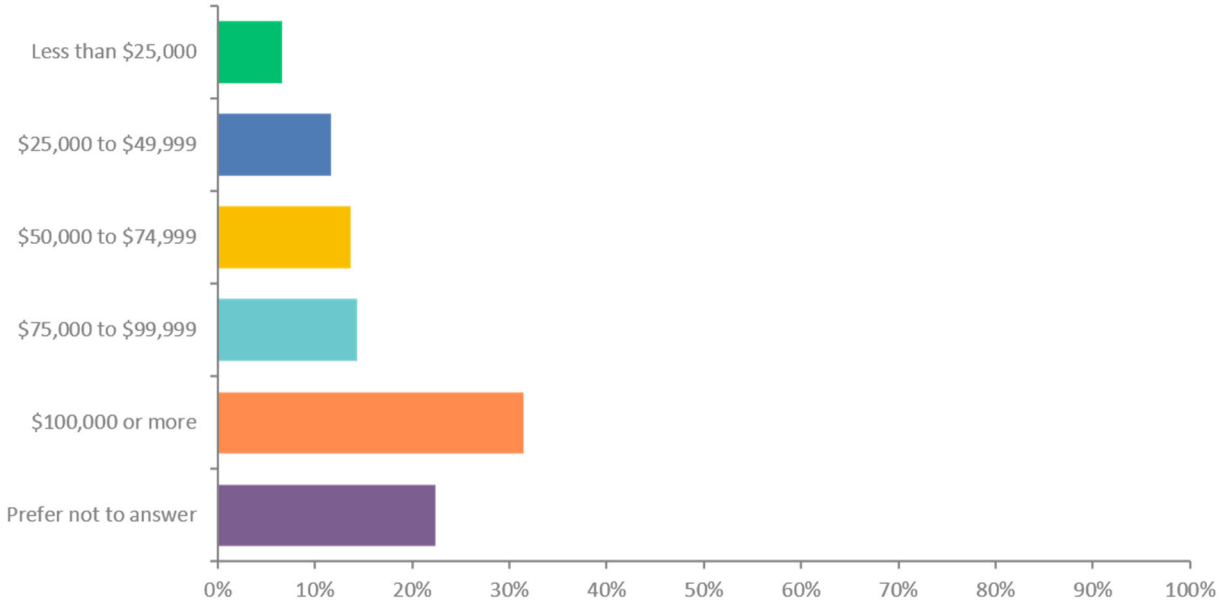


Question 14: Which best describes your household income? [Select one]

The largest group of respondents said their households earn over $100,000 annually, accounting for 31% of all responses.The next two most common categories, from $75,000-$99,000 and from $50,000-$74,999, each accounted for about 14% of respondents. Those in the last two categories, housholds earning under $50,000 per year, together accounted for 18% of all responses.

Figure 14 displays the breakdown of respondents by their reported household income.

Figure 14: Survey Respondent Household Incomes



Appendix C:
Existing Conditions and Existing Service Analysis Technical Memorandum

MEMORANDUM

TRANSIT DEVELOPMENT PLAN

DATE: July 20, 2023
TO: Garry Ford and Lauren Simcic, City of New Braunfels
FROM: Alliance Transportation Group
RE: Existing Transit Conditions and Service

Contents

Introduction

This memo provides an overview of land use and activity centers in New Braunfels, a demographic assessment and geospatial analysis of the city's potential transit market, and an assessment of existing transit services. The transit market assessment includes a look at transit-supportive densities of population and employment as a basis for introducing or enhancing transit services. Additionally, the prevalence and location of several demographic groups are explored to indicate other areas that can be indicative of transit demand or serve to inform decision-makers in terms of enhancing opportunity or transportation equity. The transit service assessment touches on VIA's transit services in nearby San Antonio but primarily focuses on assessing Alamo Regional Transit's existing service within the City of New Braunfels. This includes an examination of service performance, a profile of the service's riders, and measures of productivity and cost of the service provided in New Braunfels.

Land Use and Activity Centers

New Braunfels was the third-fastest growing large city in the US between 2010 and 2019, experiencing a 56.4% increase in population, according to the US Census Bureau.[1] Based in part on these population changes, New Braunfels became a new Small Urbanized Area (UZA) separate from that of Greater San Antonio after the 2020 Census**. Figure 1** shows the study area, including both the City limits in light blue as well as the New Braunfels UZA, which differ somewhat because the Census Bureau defines an urban area based on population density at the tract and block levels,[2] whereas City limits are defined by the municipality. Several "urbanized" areas extend into unincorporated Comal and Guadalupe Counties, such as developments along the Guadalupe River southeast of the City. This report's study area includes the UZA in addition to the City limits, because well-developed areas are likely to impact residents' travel patterns even if they are not within City limits.

Land Use

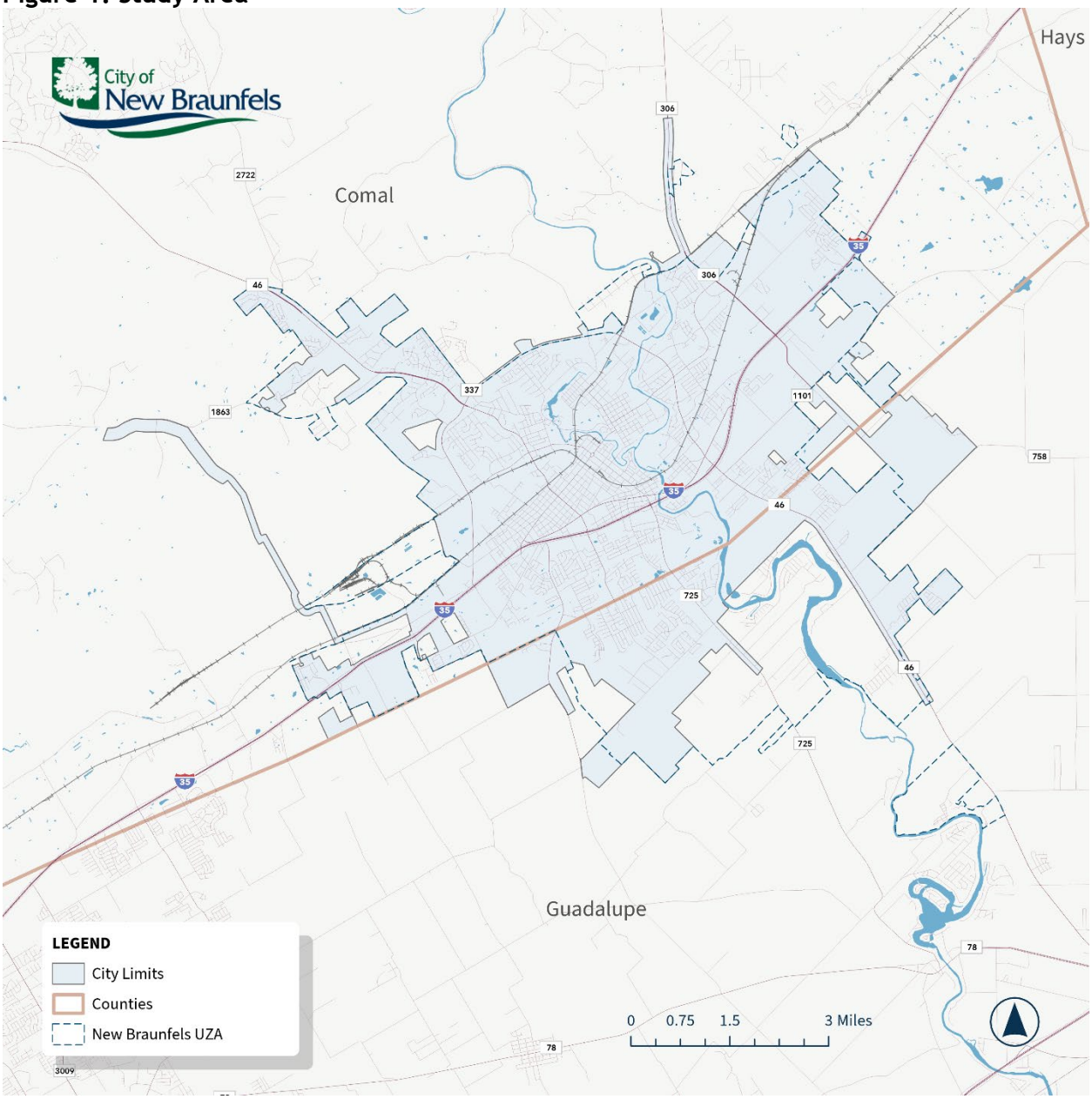
Land use information provided by the City, as shown in **Figure 2**, shows commercial areas clustered among major corridors, such as IH 35, Loop 337, and SH 46. Industrial areas are mostly located along major road and rail corridors, with large concentrations along FM 306 in the northeast, Loop 337 near its railroad crossings, and the southwestern intersection of Loop 337 and IH 35. Residential areas expand from the urban core in radial patterns following major commercial corridors including to the south along S. Walnut Ave and FM 725, to the northwest along Common St., and to the northwest along SH 46.

Where various land uses exist close together, this can indicate a transit-supportive area, because although any one land use tends to attract trips at similar times and for similar purposes, multiple land uses near each other can create different types of trips. For example, a retail strip may draw shoppers at different times with different needs than an office development with traditional working hours will. Areas of mixed land use thus produce stronger, more consistent demand for travel. Mixed-use areas also tend to be more walkable because trips from one type of place to another, such as from home to a store, can be shorter, and transit can supplement these walkable areas to make more trips possible without

[1] Includes all cities over 50,000 population. From The 15 Fastest-Growing Large Cities - By Percent Change: 2010-2019
[2] From Redefining Urban Areas following the 2020 Census

needing a car.[3] Downtown is a mixed-use district, and other areas with diverse land uses include Landa St., W. San Antonio St., and the Common St. corridor northeast of Loop 337.

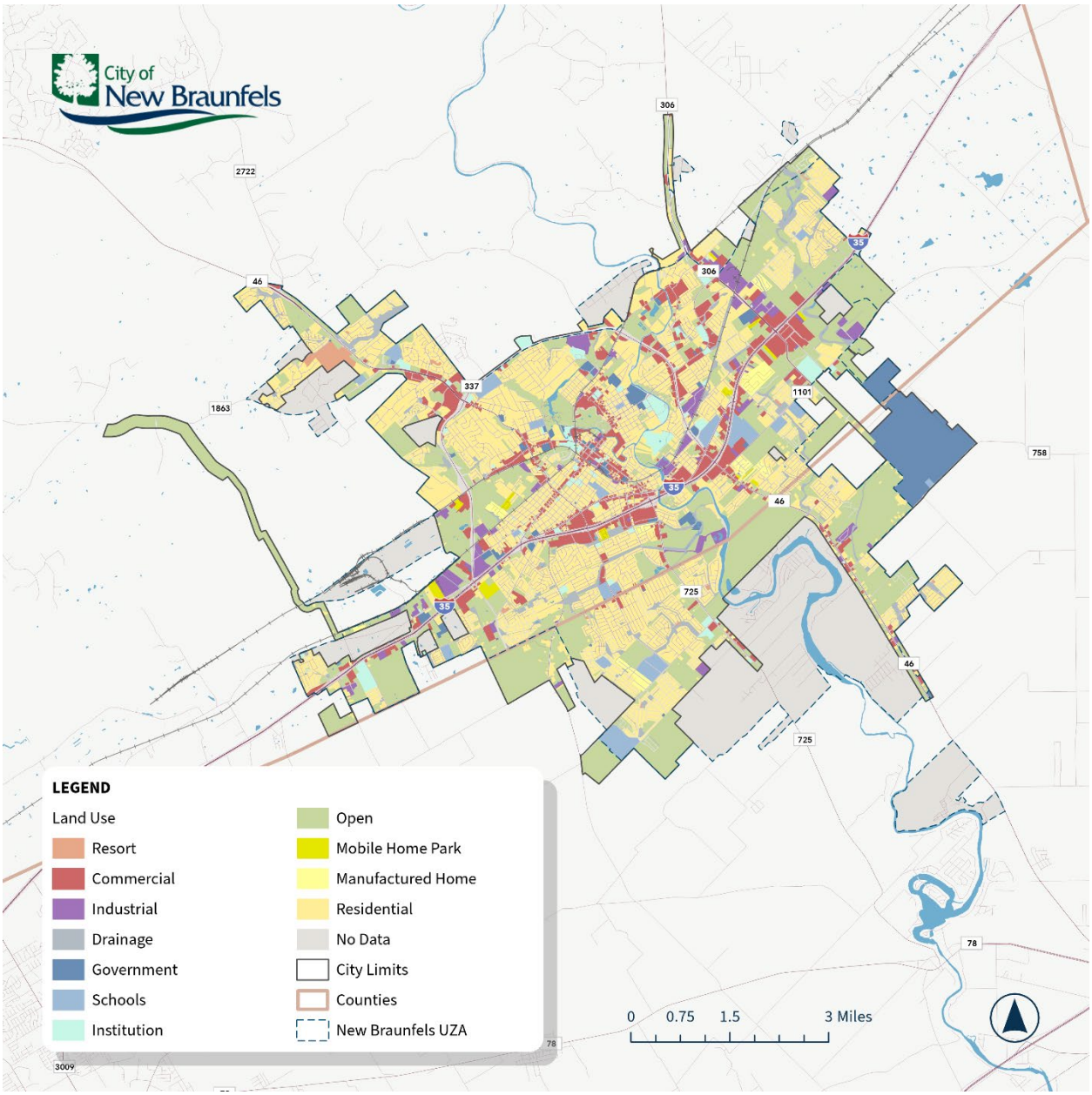
Figure 1: Study Area



Sources: City of New Braunfels, US Census Bureau

[3] From mxd+ Travel Demand Modelling Tool

Figure 2: Land Use within City limits

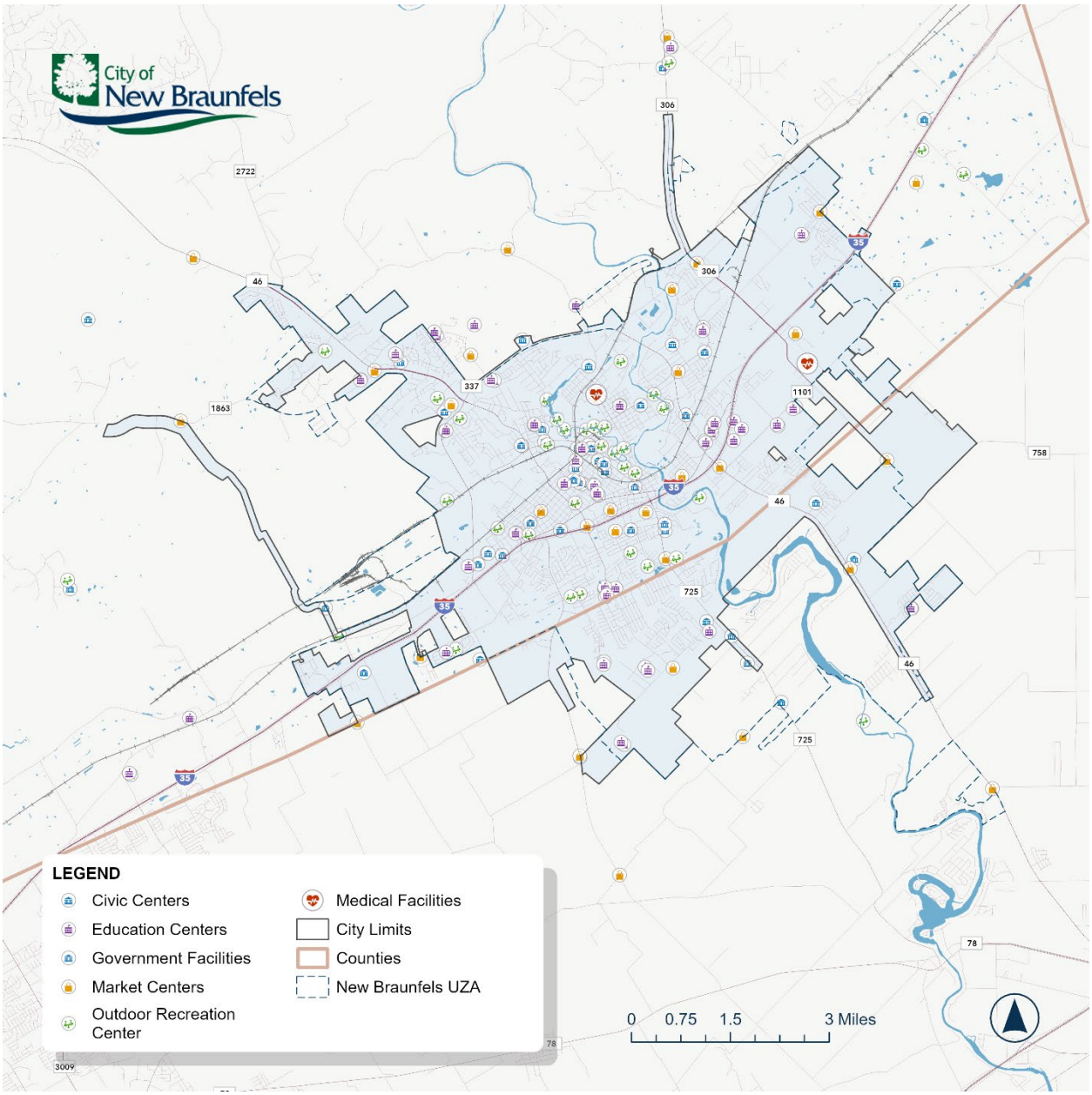


Source: City of New Braunfels (2023)

Key Destinations

Clarifying the picture of what land uses attract travel and for what purposes, several key destinations are displayed in **Figure 3**. Civic facilities include government offices, churches, and the New Braunfels Public Library. Education centers include both public and private schools. Other destinations include Market centers, Outdoor recreation areas, and medical facilities. Medical Facilities, namely Christus Santa Rosa Hospital and Resolute Health Hospital, are particularly important in transit planning because persons with mobility difficulties may especially need public transportation to reach appointments, and hospitals are major job centers. Not captured in Figure 3 but also significant are tourism-related destinations like Downtown New Braunfels, the New Braunfels National Airport, water parks like Schlitterbahn, and the historic town of Gruene.

Figure 3: Key Destinations



Source: City of New Braunfels (2023)

Transit Market Assessment

Transit Propensity

In order to plan and analyze transit service potential, it is necessary to analyze population and employment characteristics to estimate where people will be most likely to use public transportation to meet their travel needs. Transit is typically most successful when serving communities with denser populations of people who are more likely to need transit. This memo analyzes what areas of New Braunfels could benefit most from transit service.

Population Density

Population density is an indicator of potential transit demand in an area, because if more people live within a reasonable walking distance of a transit stop, then more people might use it. Furthermore, the denser an area's population, the more frequently transit can efficiently serve that area - a sparsely populated area might not generate enough riders to justify serving it with buses more often than once per hour, but denser areas can support more frequent service.

A broad review of research indicates the following population densities can support transit at the following frequencies, shown in **Table 1**. Areas with low density may still be prioritized for transit service based on transit need, as low-density but high-need areas may be better served with flexible transit service, such as microtransit, rather than fixed-route buses. Microtransit is a new twist on an old form of demand-response transit service that leverages ride-sharing mobile software in tandem with advanced dispatching systems to quickly route vehicles and shared rides. This will be explored further in a following section.

Table 1. Transit-Supportive Population Densities

Population Density (People per Acre)	Transit Frequency
More than 16	30 minutes or better
8-16	60 minutes
Less than 8	Less than 60 minutes or Demand-Response/Microtransit opportunity

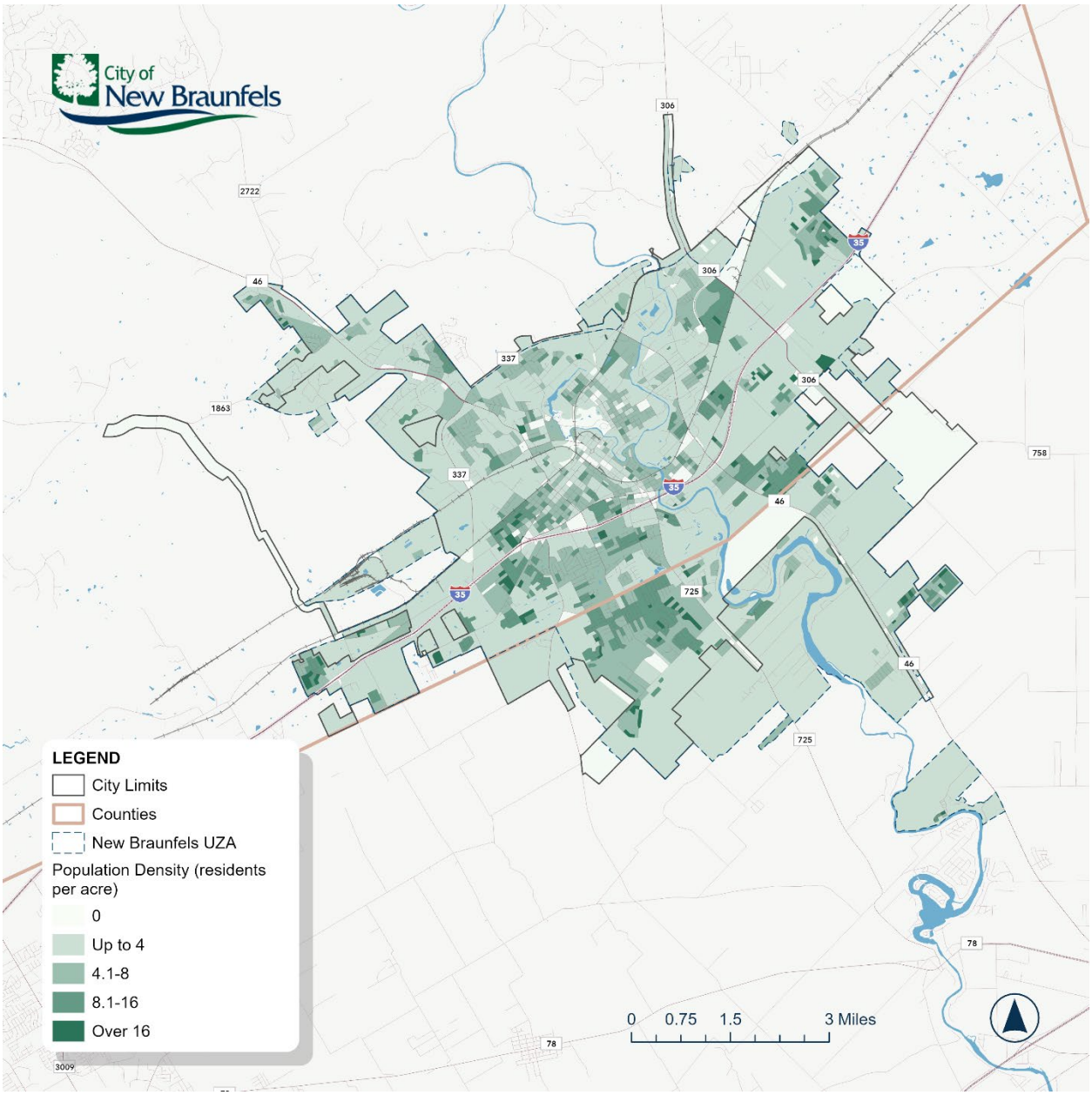
Source: New Orleans Regional Transit Authority[4]

Using those thresholds as a guide, **Figure 4** indicates areas of the city (at the block level) that display the population density to support economical transit frequencies. W. San Antonio St., SH 46 south of IH 45, Common St. northeast of Loop 337, and the newly developed areas south of County Line Rd. stand out for the relatively high frequencies they could support based on their population density.

The thresholds shown in **Table 1** and **Figure 4** are a general framework for decisionmakers to consider rather than a precise measurement of success, and population density is only one of many factors that can indicate transit-supportive areas. The connection between transit-supportive densities and service frequencies informs the data breaks used in the maps rather than explicitly recommending a level of service. In reality, a route of any frequency is likely to pass through areas of widely varying densities.

[4] From 2018 Strategic Mobility Plan, Market Analysis. Other transit agency studies were consulted, including from agencies in Fort Worth and McAllen, TX, as well as the Institute of Transportation Engineers. The NORTA study's thresholds are approximately average for all studied ranges.

Figure 4: Transit Frequencies Supportable by Population Density, by Block



Source: US Census Bureau OnTheMap (2020)

Employment Density

Employment density is another indicator of transit demand. Research shows that employment density can induce transit demand more strongly than population density,[5] [6] and as with population density, employment density can be sorted by thresholds for how much transit frequency a given density of jobs per acre can support. Because employment density is a stronger driver of transit demand than population density, areas with concentrated jobs could support more frequent transit, as buses from outlying neighborhoods could converge on job centers so that multiple buses pass through these dense areas every hour.

Table 2. Transit-Supportive Employment Densities

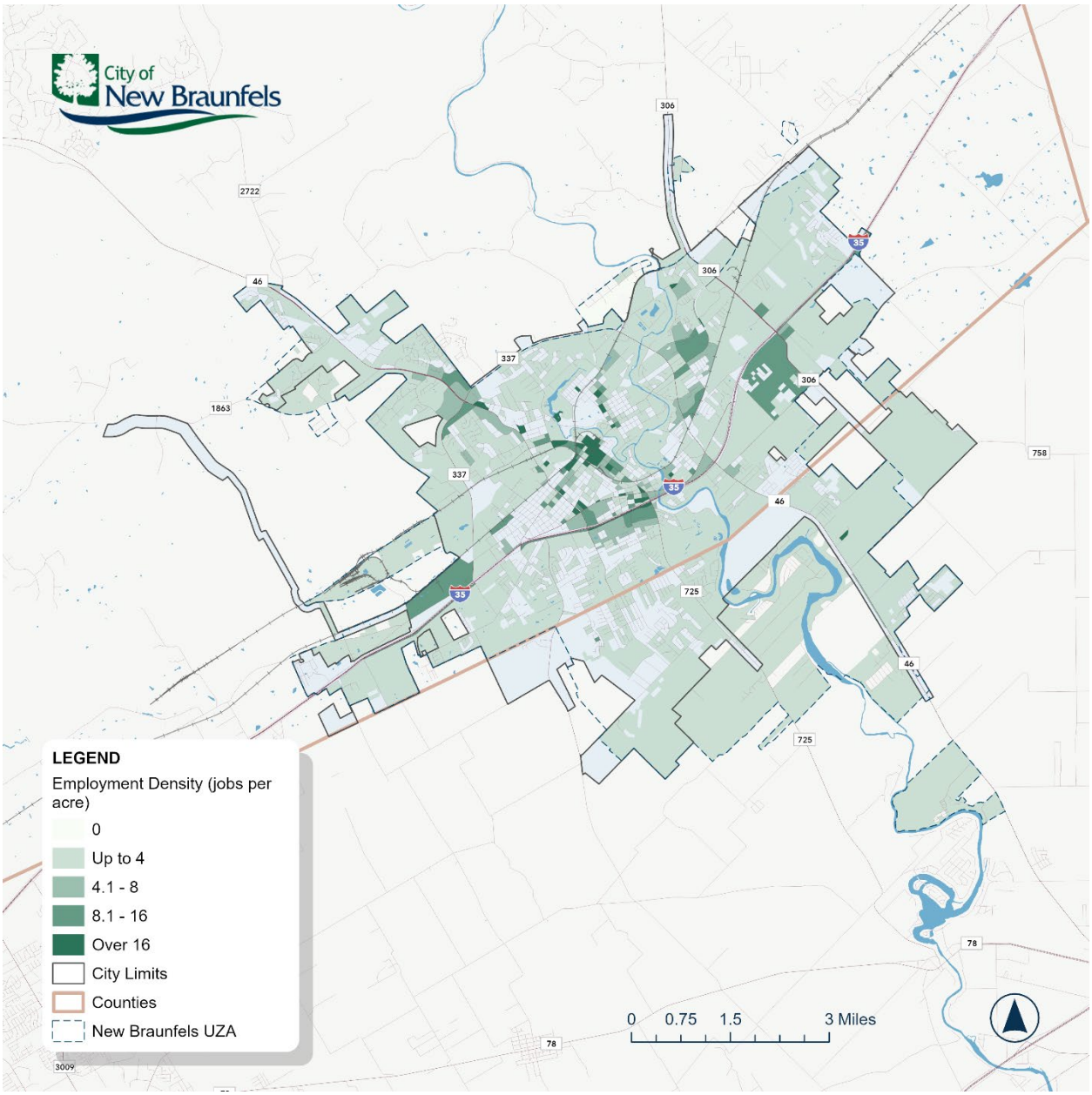
Employment Density (Jobs per Acre)	Transit Frequency
More than 16	15 minutes
8-16	30 minutes
4-8	60 minutes
Less than 4	Less than 60 minutes or Demand-Response/Microtransit opportunity

Source: New Orleans Regional Transit Authority

Based on these thresholds, **Figure 5** shows what transit frequencies could be supported based on employment densities. Downtown (including the nearby Christus Santa Rosa Hospital) is the only area with employment density supportive of 15-minute frequency, but there are some notable areas that could support two buses per hour, or every 30 minutes. These include Elliot Knox Blvd, FM 306 (Creekside Crossing), Industrial St., Common St. northeast of Loop 337, the Westpointe Village area at the intersection of Loop 337 and SH 46, and SH 482 in the southwest of the city.

[5] From The Importance of Trip Destination in Determining Transit Share
[6] From Making the Most of Transit: Density, Employment Growth, and Ridership around New Stations

Figure 5: Transit Frequencies Supportable by Employment Density, by Block



Source: US Census Bureau OnTheMap

Transit Needs

Having explored density and destinations that are supportive of transit use, this section analyzes population and employment characteristics that are indicative of disproportionate need for public transportation as a transportation alternative. People may choose to use public transportation in part because they face barriers to owning and operating their own vehicles. These barriers are analyzed to account for areas of New Braunfels that may present a disproportionate need for transit service or otherwise be more likely to use transit.

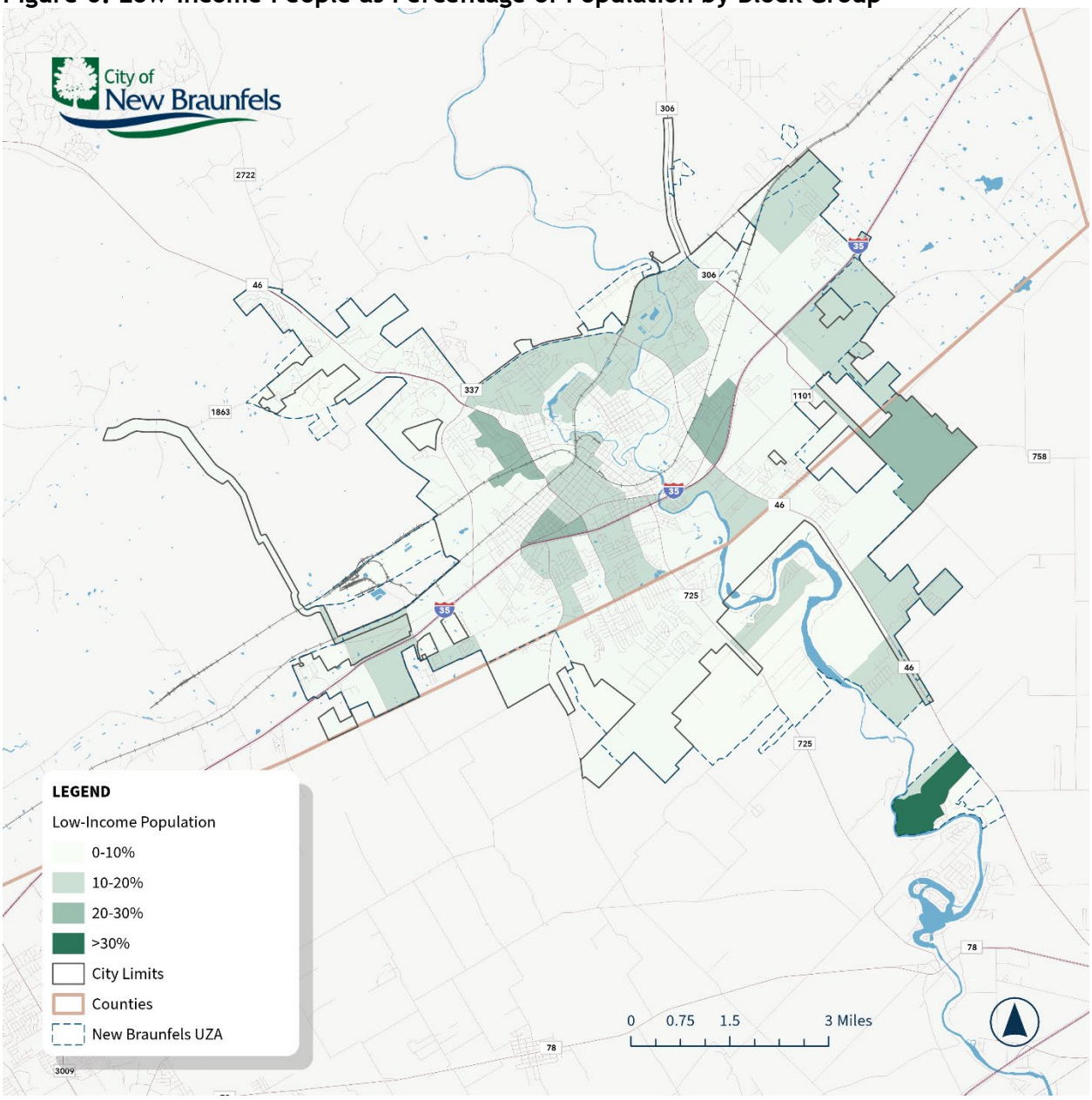
Transportation costs typically account for around 13% of household expenditures, but low-income households may have to pay as much as 30% of their income. This is due to the many costs of private automobile transportation, including gasoline costs, maintenance, parking, and tolls.[7] This makes the fixed, predictable costs of riding transit an attractive alternative, if not a necessary service, to people living on a smaller budget. Analyzing where low-income people live can help anticipate where transit service could have a more equitable impact.

Low-Income Population

Figure 6 shows the areas with the highest proportions of low-income households are outside of the city limits along SH 46. Within New Braunfels, lower income areas may be found along Landa St., along IH 35 near its intersection with SH 46 and Loop 337, and near where Schmidt Ave. crosses IH 35.

[7] From The High Cost of Transportation in the United States

Figure 6: Low-Income People as Percentage of Population by Block Group



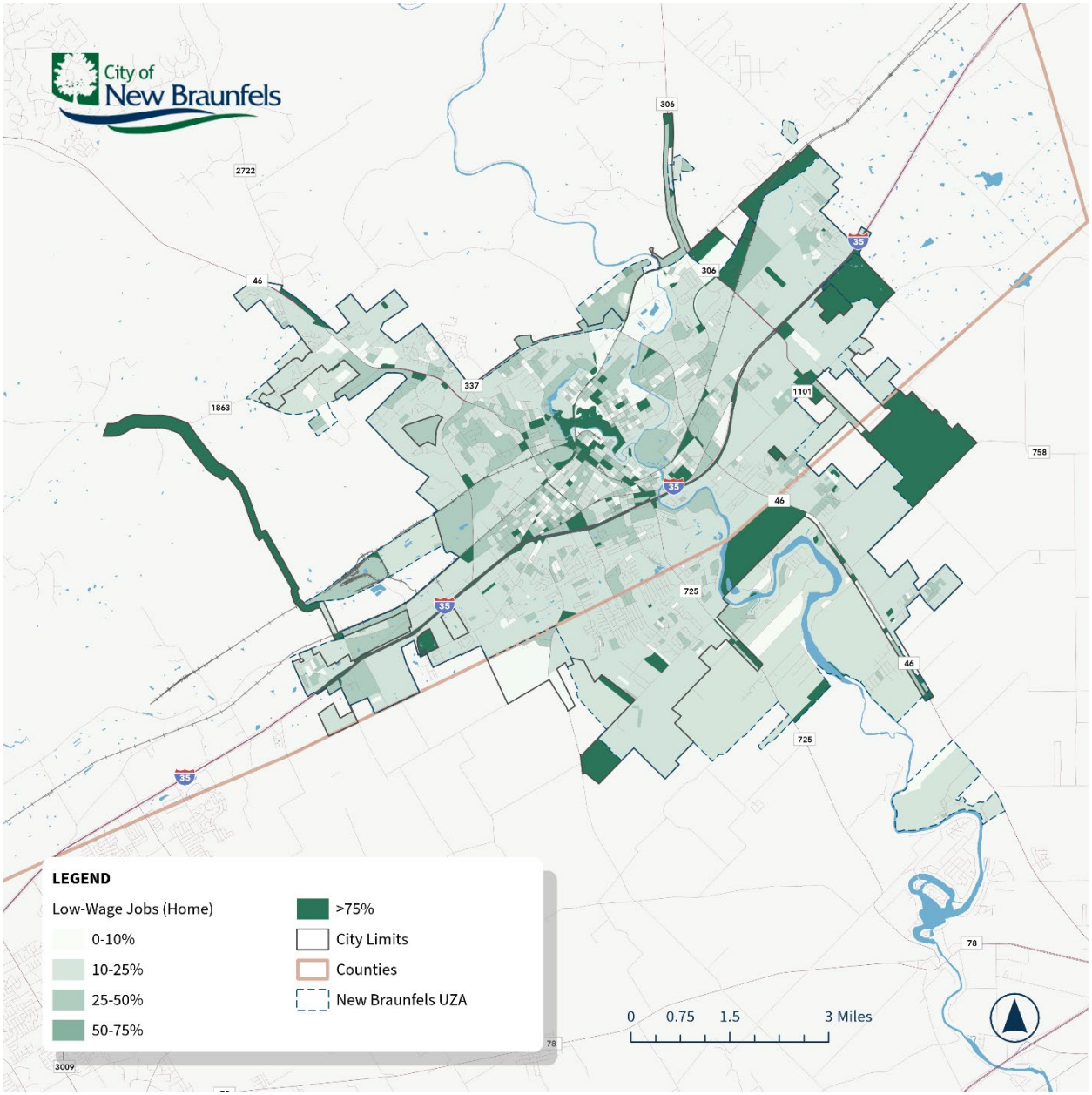
Source: American Community Survey (2021)

Low-Wage Jobs and Workers

The Census Bureau's OnTheMap tool allows population and employment statistics to be disaggregated from the census tract down to the block level, allowing a more nuanced analysis of where jobs and residents may be found and served with transit.

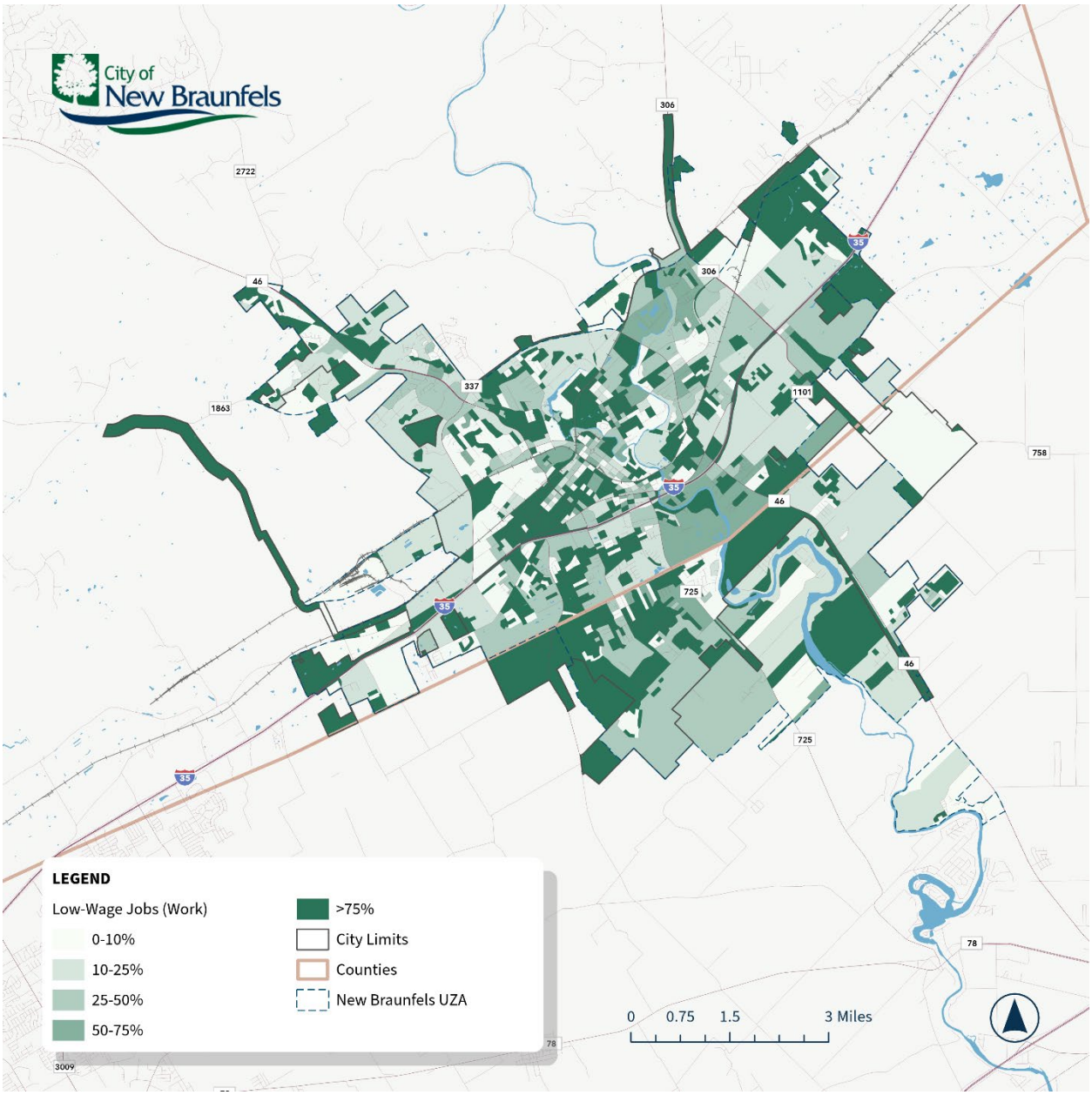
Figure 7 shows where employees with low-wage jobs live. There is a cluster in the vicinity of downtown and several others on the fringes of town. **Figure 8** shows where employees with low-wage jobs work. These jobs appear evenly spread across the city with no clear pattern.

Figure 7: Employees Earning Low Wages, Home Locations, by Block



Source: US Census Bureau OnTheMap

Figure 8: Employees Earning Low Wages, Workplace Locations, by Block

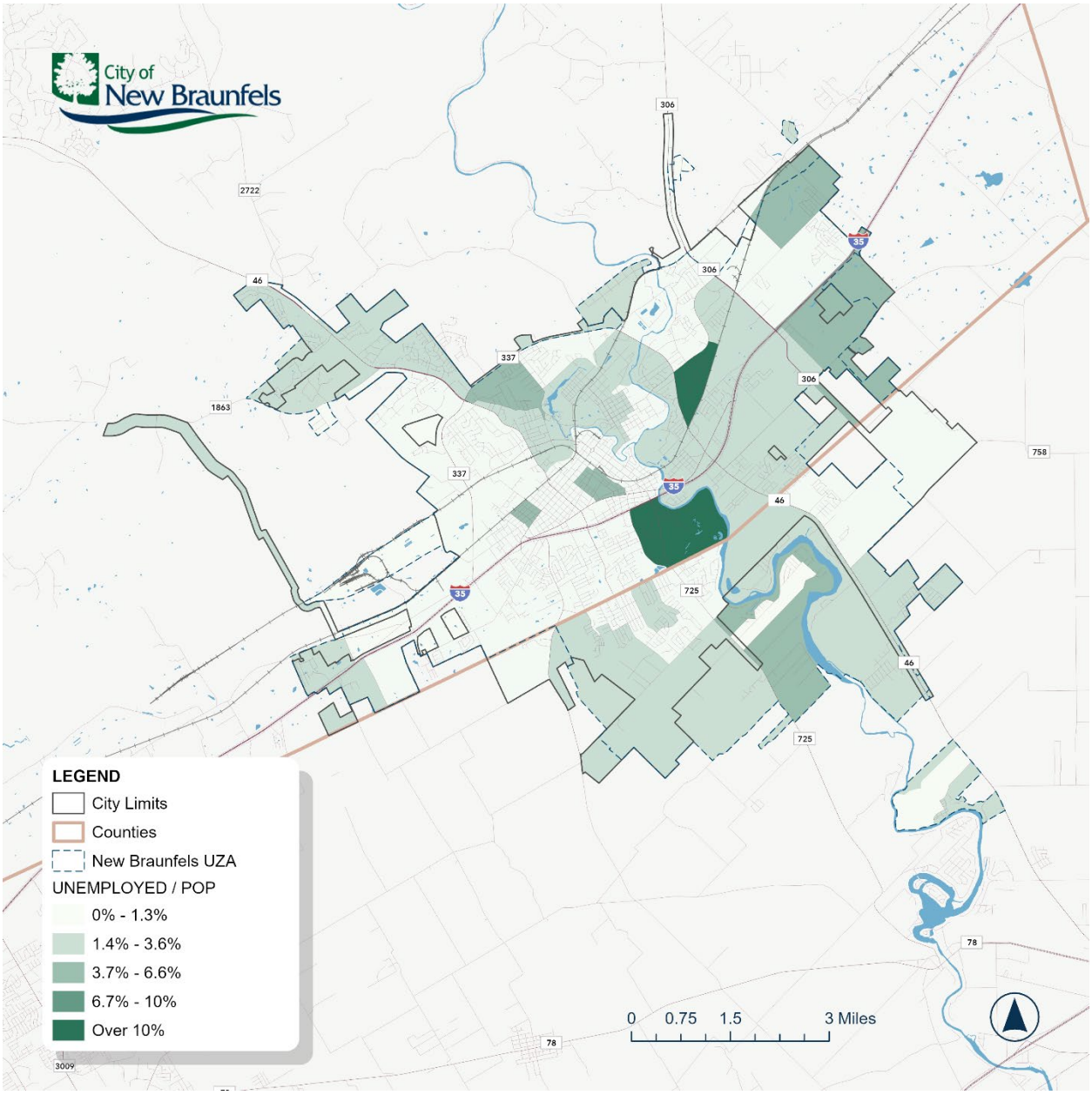


Source: US Census Bureau OnTheMap

Unemployment

People and communities struggling with unemployment may also struggle to afford private vehicle transportation to find new jobs. Public transit can help them reach job opportunities. As **Figure 9** shows, areas with the highest unemployment rates can be found along S. Seguin Ave. between IH 35 and W. County Line Rd., as well as in the vicinity of Industrial St. between Loop 337, Common St., and the Union Pacific railroad tracts.

Figure 9: Percent Unemployed by Block Group

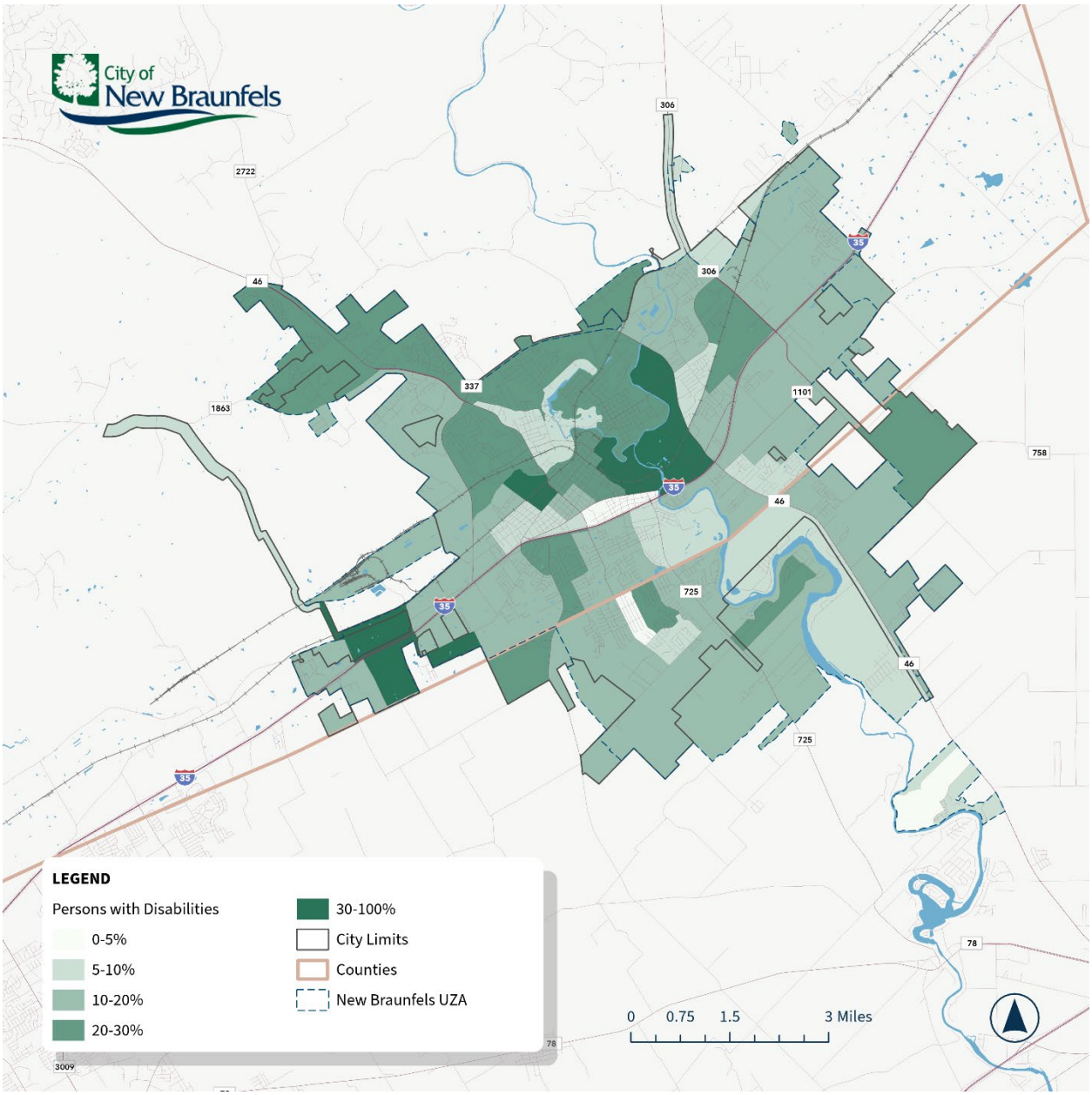


Source: American Community Survey (2021)

Persons with Disabilities

Disabilities may limit a person's mobility, including their ability to drive a car. Public transportation can make it easier for people with disabilities to access jobs, shopping, medical appointments, and other destinations. **Figure 10** shows that the greatest concentrations of people living with disabilities in the areas southeast of Downtown, west of Downtown around W. San Antonio St. and N. Walnut Ave., and in the far southwest of the UZA.

Figure 10: Percent Persons with Disabilities by Block Group

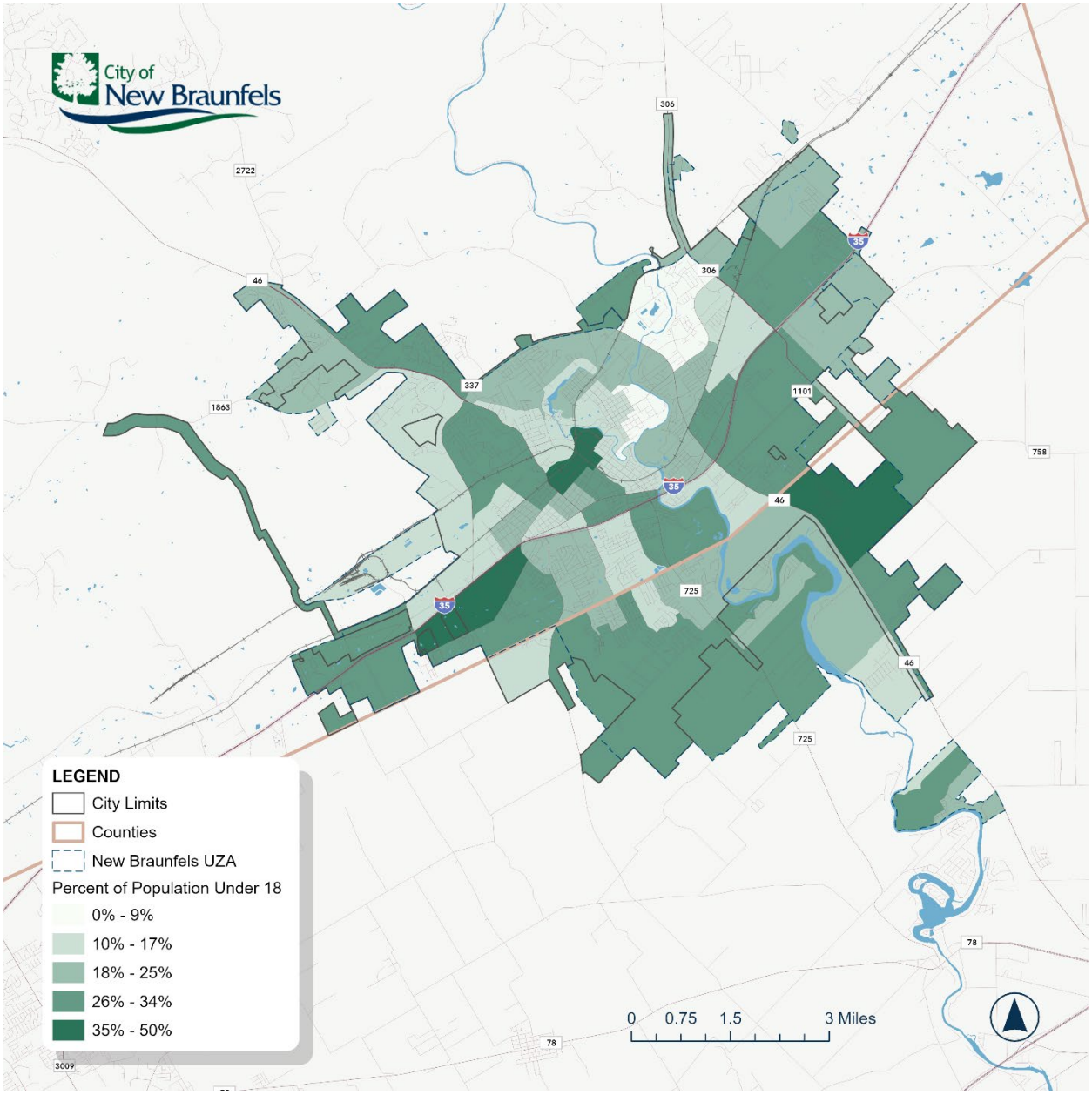


Source: American Community Survey (2021)

People Under 18

People too young to drive a car rely on others for motorized transportation. Even teenagers old enough to have a driver's license may be unlikely to own their own cars. Hence, the percentage of the population under 18 years old, a measure that essentially shows where families with children live, helps predict where more transit ridership could be generated. **Figure 11** demonstrates that although the population under age 18 is reasonably spread out through the city, areas with particular concentrations can be found near Downtown, along IH 35 to the southwest of the City, and along SH 46 to the southeast.

Figure 11: Percent of Population Under 18 Years Old by Block Group

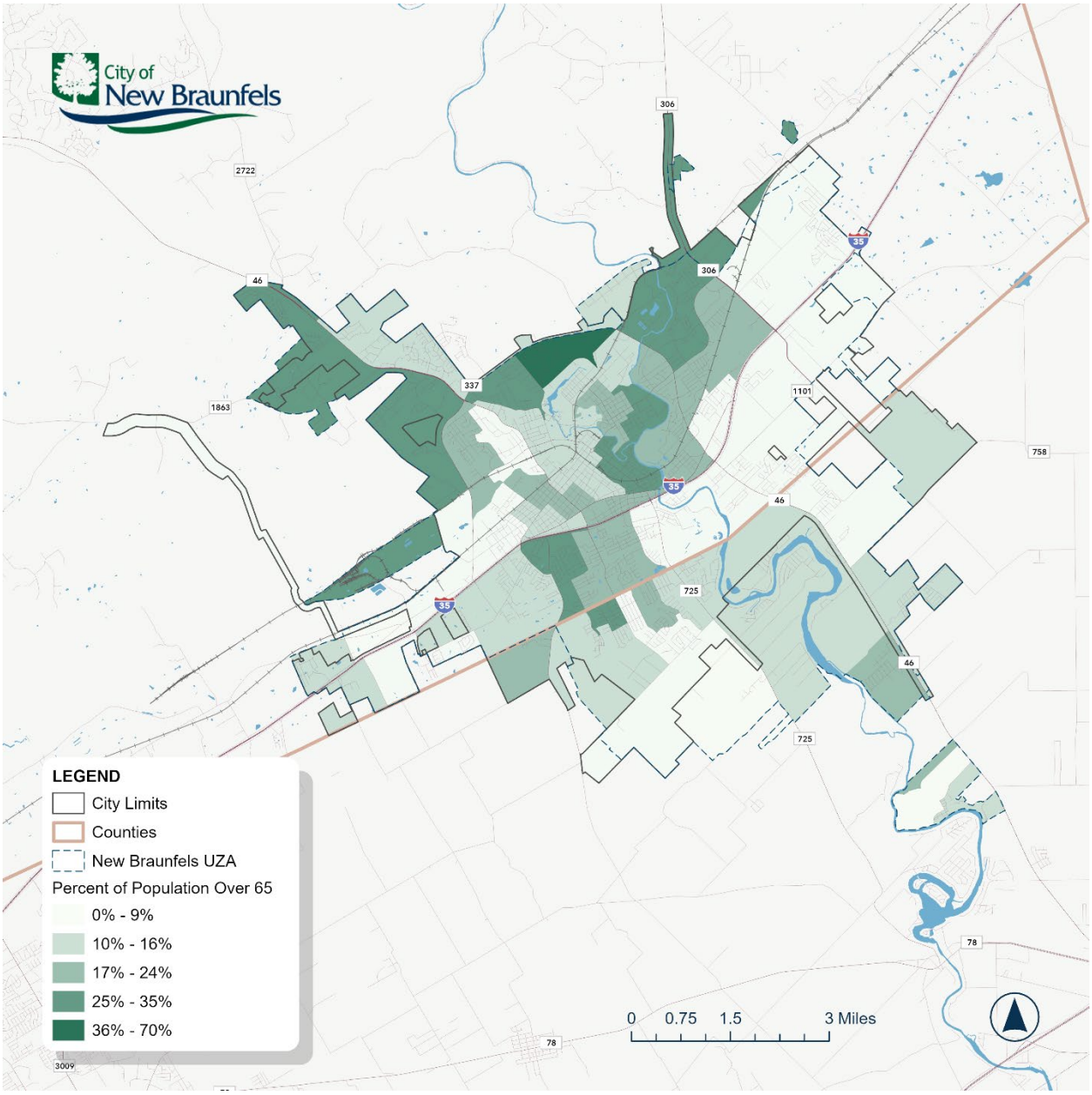


Source: American Community Survey (2021)

People Over 65

People may also face difficulties driving cars as they age. The elderly may therefore take advantage of public transportation to meet their needs. As shown in **Figure 12**, elderly residents are mostly concentrated in the north and northwest areas of the city. The block group with the highest percentage of people over 65 contains the EdenHill retirement community on Lakeview Blvd.

Figure 12: Percent of Population Over 65 Years Old by Block Group

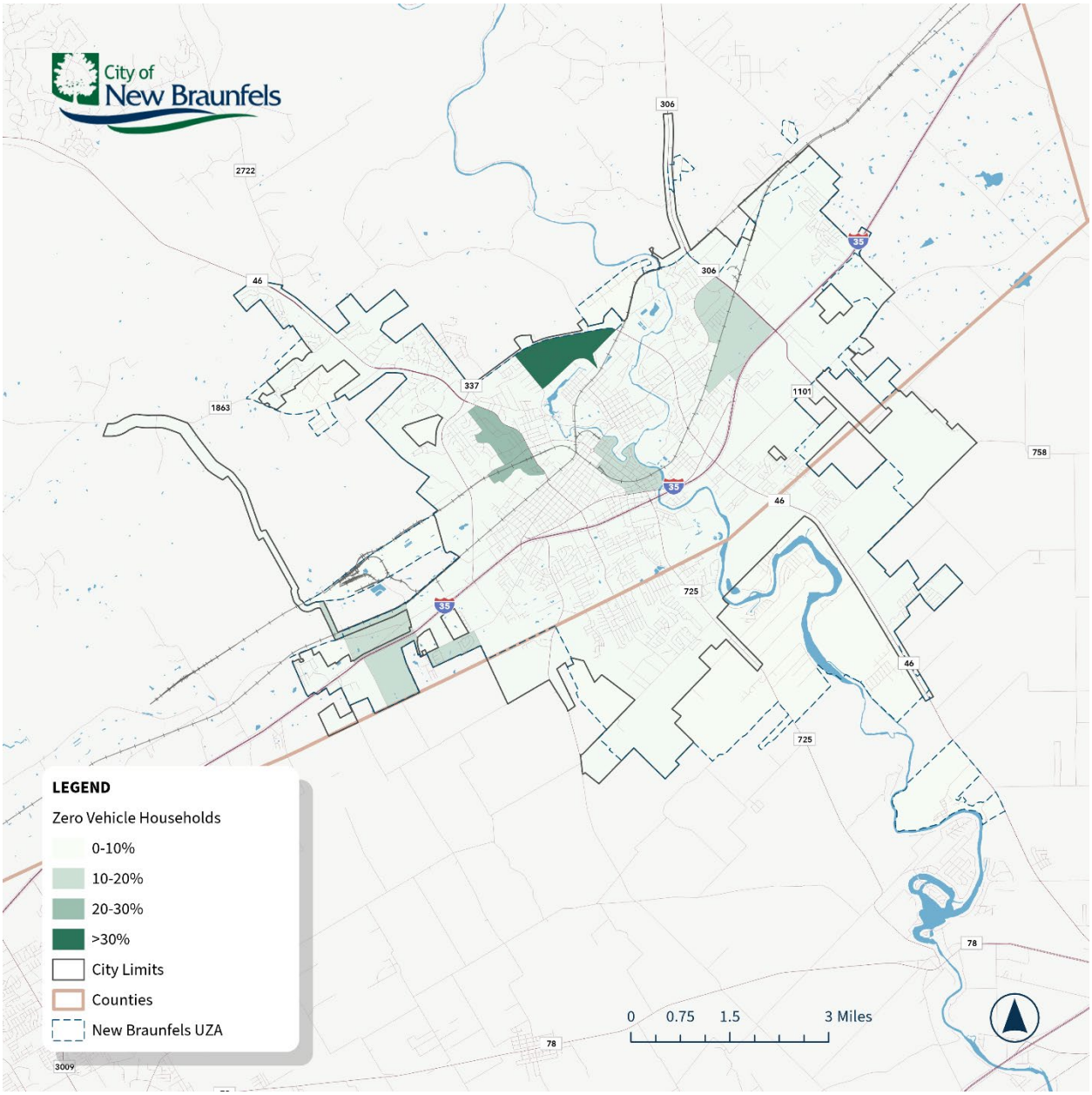


Source: American Community Survey (2021)

Households with No Vehicles

Most households in New Braunfels have access to personal vehicles. The areas where car-free households are located (**Figure 13**) overlap with the population over 65 (**Figure 12**). The area with the highest percentage of seniors contains the EdenHill retirement community, which provides transportation services for its residents.[8] Another concentration of zero-car households is found along Landa St. west of N. Walnut Ave. where the Comal County Senior Citizens' Center, Landa Place, and the New Braunfels Housing Authority are located. Other areas include between Seguin Ave. and the Comal River southeast of Downtown, between Common St. and IH 35 (which contains senior living), and FM 482 in the southwest of the UZA.

Figure 13: Zero-Vehicle Households, Percentage, by Block Group



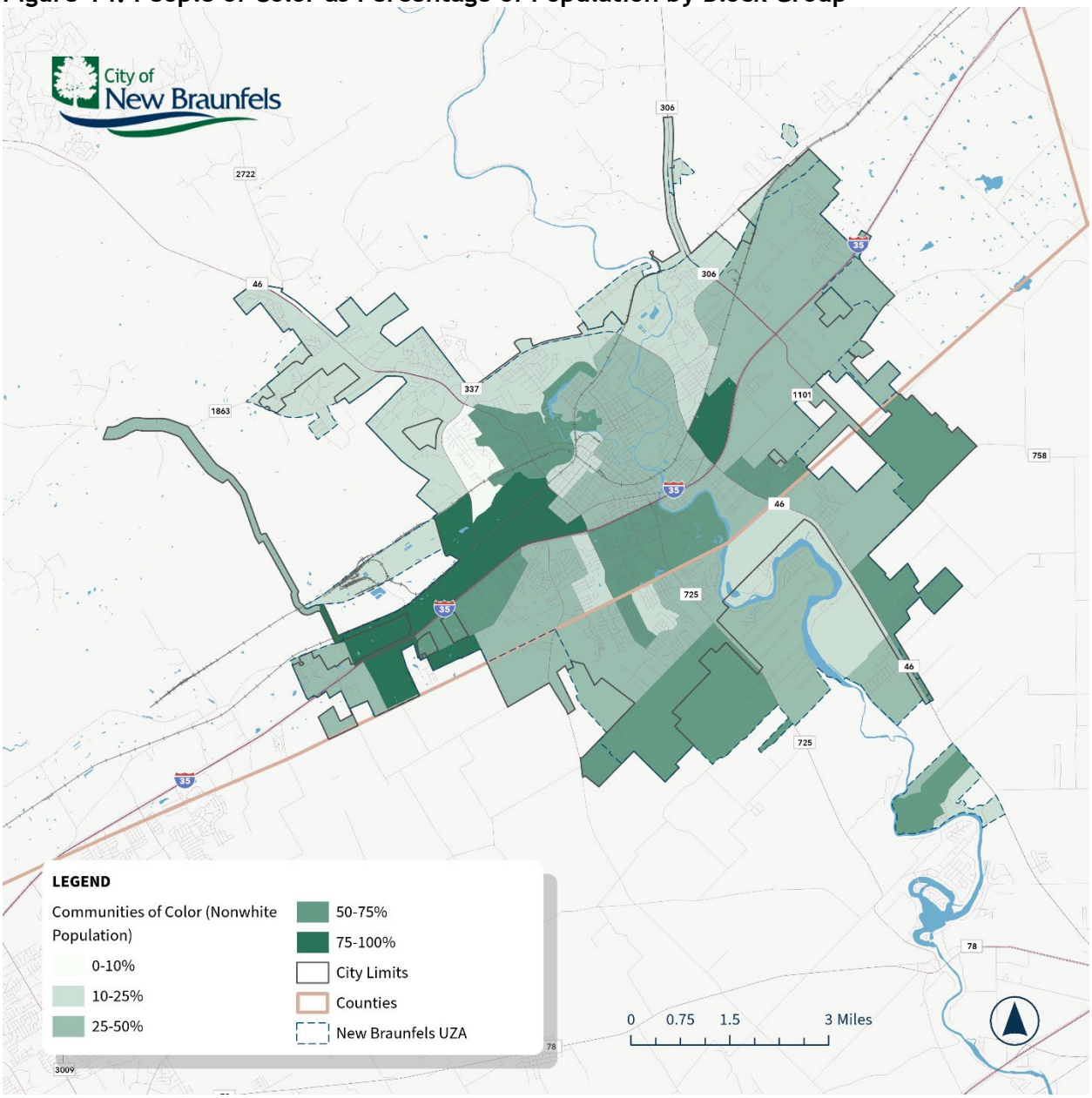
Source: American Community Survey (2021)

[8] https://edenhill.org/edenhill-communities/about-us/lifestyle/#amenities

Communities of Color

Non-White people historically experience social disadvantages that result in lower incomes and wealth.[9] Partly as a result, nationwide statistics show that Black people are 4 times more likely to commute by transit than White people in the same area, and Latinos are 3 times more likely.[10] Therefore, areas where non-White people live can be indicative of transit demand or reveal where transit may address equity. The 2020 Census shows the population of New Braunfels is about 57% White, 35% Hispanic or Latino, 3% Black, and 1% Asian. **Figure 14** shows the highest percentages of non-White population along IH 35 and in Guadalupe County.

Figure 14: People of Color as Percentage of Population by Block Group



Source: American Community Survey (2021)

[9] From Racial Inequality in the United States
[10] From To Move Is To Thrive: Public Transit and Economic Opportunity for People of Color

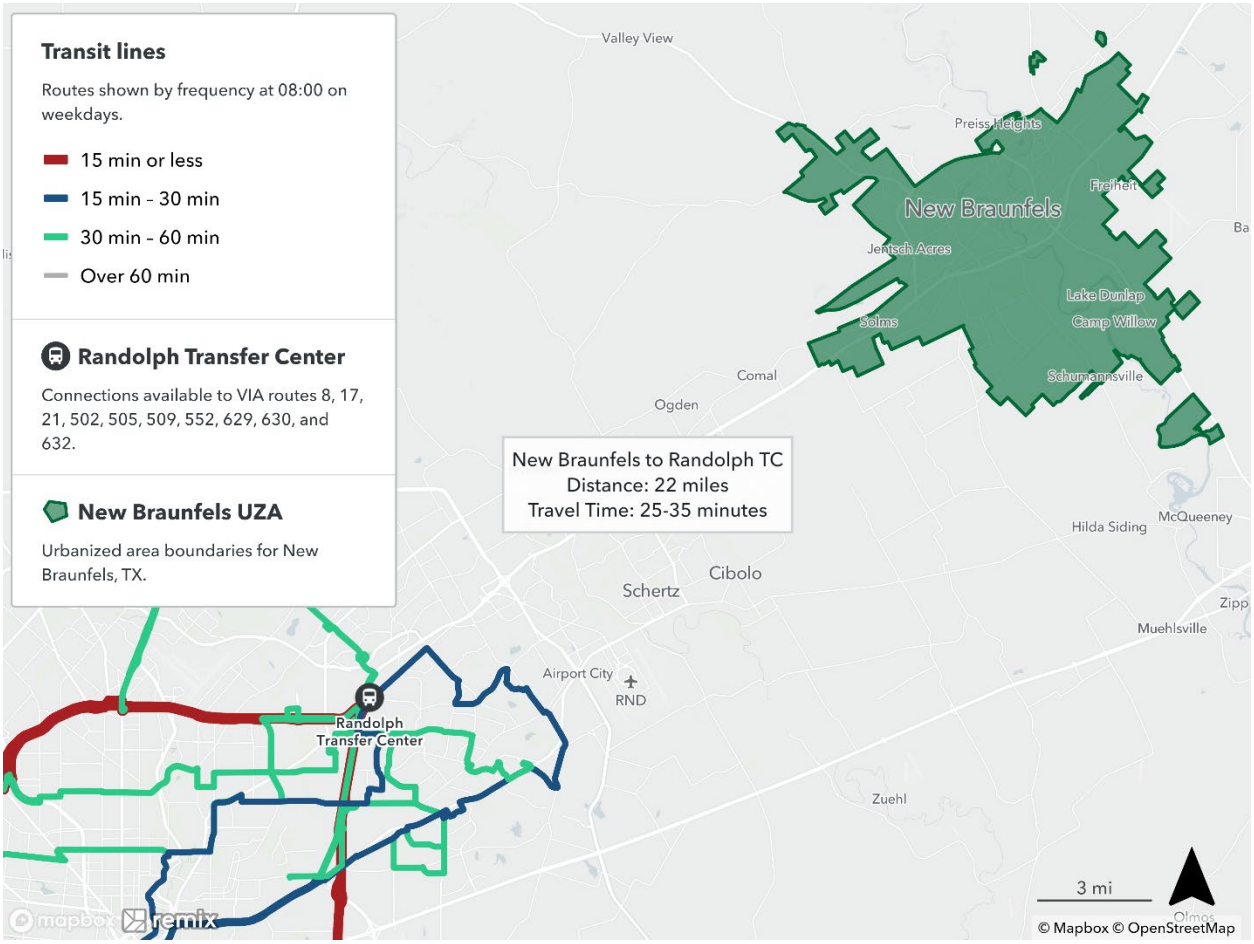
Transit Service Assessment

The transit service available in and around New Braunfels can be broadly categorized into two groups: Fixed-Route and Demand-Response. Fixed-route services are open to the public and serve a predetermined order of stops on a fixed schedule. In contrast, demand-response services do not operate on a fixed timetable as each day's routes are traditionally based on pick-up and drop-off requests collected over the preceding days. In addition to this style of "pre-booked" service, demand-response trips may also be dynamically created based on real-time requests using an app, website, or call center. This is often called "on-demand" service.

VIA San Antonio

Fixed-route service in the San Antonio region is provided by VIA Metropolitan Transit. In addition to traditional bus routes, VIA operates a range of commuter-focused Express, higher-speed Prímo, and tourist-focused VIVA services. VIA service is largely contained within the Loop 1604 freeway and is not immediately accessible from New Braunfels. The closest transfer point to VIA services is the Randolph Transfer Center, located approximately 22 miles southwest of downtown New Braunfels near the I-35/Loop 410 interchange (**Figure 15**). The facility is served by ten bus routes, which provide a mix of local coverage, express service to San Antonio, and high-frequency service along the Loop 410 beltway.

Figure 15: Fixed-Route VIA Services Available from the Randolph Transfer Center



Alamo Regional Transit

Pre-booked demand-response service in New Braunfels is provided by Alamo Regional Transit (ART). ART operates within a 12-county service area forming a ring around Bexar County (and the City of San Antonio).[11] In addition to pre-booked demand-response service, ART operates two deviated fixed-route services: one in Seguin (Connect Seguin) and one in the communities of Jourdanton, Poteet, and Pleasanton (Atascosa Cowboy Connect). These services operate on a hybrid model where a set route is followed unless a rider requests a detour. The services can detour up to 0.5 miles from the set route, for an additional cost to the rider.

ART's demand-response service is the only transit option that operates within the New Braunfels city boundaries. The following provides a summary of the system's overall design.

- **Rider Eligibility:** ART service is open to the general public. Service is typically provided using a curb-to-curb model (where riders meet the vehicle directly outside their pick-up location and are dropped off directly outside their requested destination). Door-to-door service (where riders are given assistance to and from the vehicle) is available for riders with mobility limitations.

- **Service Area:** Riders can travel from New Braunfels to anywhere in the 12-county ART service area, as well as to destinations in and around San Antonio. Service is available to the Randolph Transfer Center, where riders can transfer to fixed-route VIA services.

- **Booking a Trip:** Service is pre-booked only. Trips must be scheduled a minimum of 24 hours before the desired pick-up time. Trips in the afternoon must be scheduled by 12:00 PM on the preceding day. Reservations can be made for trips up to 30 days in the future. Trips can be scheduled through a call center, online booking portal, or mobile app.

- **Return Trips:** Return trips cannot be scheduled until after the originally reserved trip is complete. When riders are ready for pickup, they must inform the ART dispatch center. A vehicle will then arrive in 60 minutes or less to complete the return trip request.

- **Service Span:** Service is available Monday to Friday from 7:30 AM to 5:00 PM. Exceptions to these guidelines are made on a per-rider basis as needed. Dedicated ART programs also provide additional transportation service to youths and large groups.

Ridership Trends

To understand how well ART demand-response service meets the needs of New Braunfels residents, the project team reviewed six months of trip-level ridership data for the period from October 1, 2022 to April 30, 2023. This dataset includes information on rider origins and destinations, pickup and drop-off times, trip purpose, and basic rider demographics (age and required mobility aids). To be included in the dataset, trip requests had to either (1) start in New Braunfels, (2) end in New Braunfels, or (3) both start and end in New Braunfels.

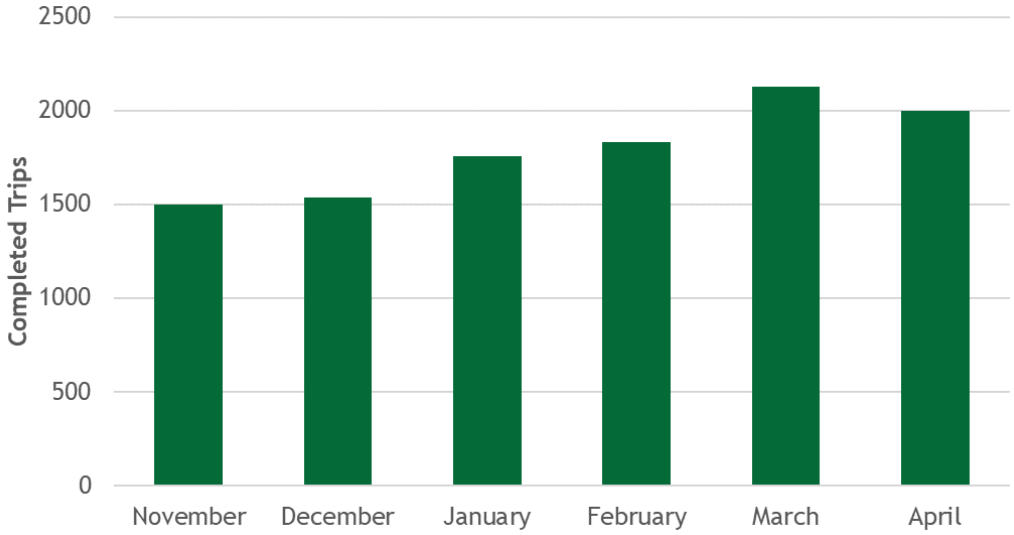
Monthly Ridership

The number of completed trips in each month of the dataset is illustrated in **Figure 16**. Across the six-month sample period, an average of 1,790 trips were provided each month. Ridership generally increased month-to-month, growing from 1,500 trips in November to 2,000

[11] The ART service area includes Atascosa, Bandera, Comal, Frio, Gillespie, Guadalupe, Karnes, Kendall, Kerr, Medina, McMullen, and Wilson Counties.

trips in April. In March — the highest ridership month — slightly more than 2,100 trips were provided.

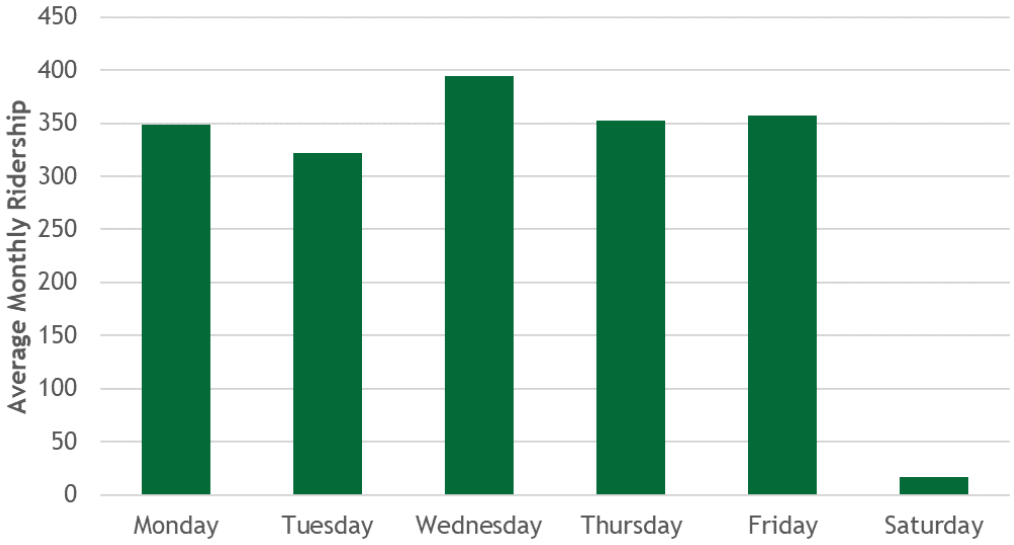
Figure 16: Monthly Ridership, November 2022 to April 2023



Ridership by Day of Week

Average monthly ART ridership by weekday during the sample period is illustrated in **Figure 17**. With nearly 400 trips completed each month, Wednesday was typically the highest-ridership day. Although the standard span of service is Monday to Friday only, a small number of Saturday trips were recorded during the sample period. These trips reflect accommodations made to meet the needs of specific riders.

Figure 17: Average Monthly Ridership by Weekday

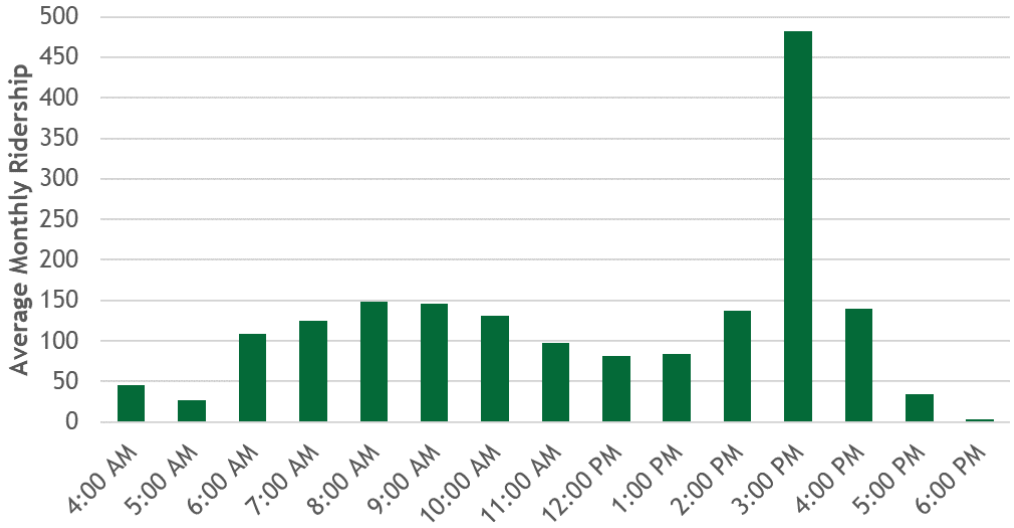


Ridership by Time of Day

The number of completed trips each month during each hour of the day is illustrated in **Figure 18**. The data illustrates a slight morning peak followed by a sharp afternoon peak. The hour from 3:00 PM to 4:00 sees more than twice as many trips completed as any other hour throughout the day. This peak is potentially attributable to multiple factors, including the

process for reserving return trips concentrating demand in the afternoon and the overall trip mix for New Braunfels containing a high number of after-school trips for youths.

Figure 18: Average Monthly Ridership by Time of Day



Service Performance

Trips by Completion Status

Not all trip requests received by a demand-response transit agency result in the agency delivering a trip. Requests fall into three general categories:

- **Completed:** A trip request is received from a rider and scheduled by dispatch staff. The rider is successfully picked-up and delivered to their requested destination.

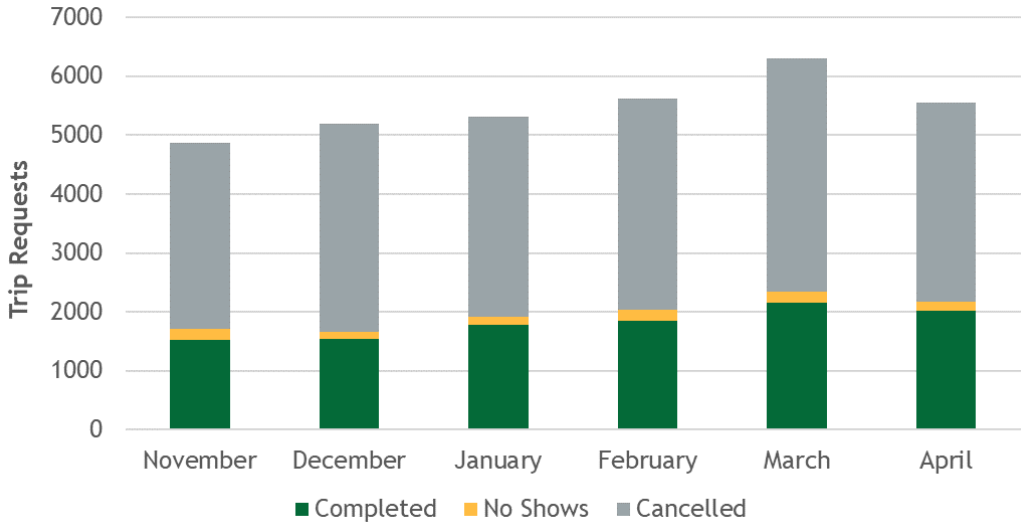
- **Rider No-Show:** A trip request is received and scheduled, but cancelled after a vehicle is sent to pick up the rider. Essentially, vehicle and driver time is lost travelling to a rider pick-up that does not occur. Rider no-shows negatively impact system capacity (by tying up vehicles that could be used to serve other riders) and cost efficiency (since drivers are on the clock but not transporting riders). As a result, agencies try to minimize these instances to the greatest extent possible and may also suspend riders who repeatedly no-show scheduled pickups. This category also encompasses instances where drivers are unable to find a rider within the scheduled pick-up window, the rider takes too long to arrive at the scheduled pick-up location, or the rider cancels when the driver arrives for a scheduled pick-up.

- **Trip Cancellation:** This category describes a broad range of outcomes where a trip is scheduled but modified or cancelled before a vehicle is sent to pick up a rider, as well as situations where riders request a trip but are unable to confirm a reservation due to inadequate system capacity. In addition to tracking the number of cancelled trips, ART tracks cancellation reasons. For additional information, refer to *Cancelled Trips*.

The outcome of trip requests received by ART between November 2022 and April 2023 is presented in **Figure 19**. During these six months, about 63% of all received requests were marked as cancelled, with a further 34% of requests resulting in completed trips. The final 3% of requests resulted in rider no-shows. These percentages remained relatively consistent

across the sample period, although the percentage of requests resulting in completed trips improved steadily each month, growing from 31% in November 2022 to 37% in April 2023.

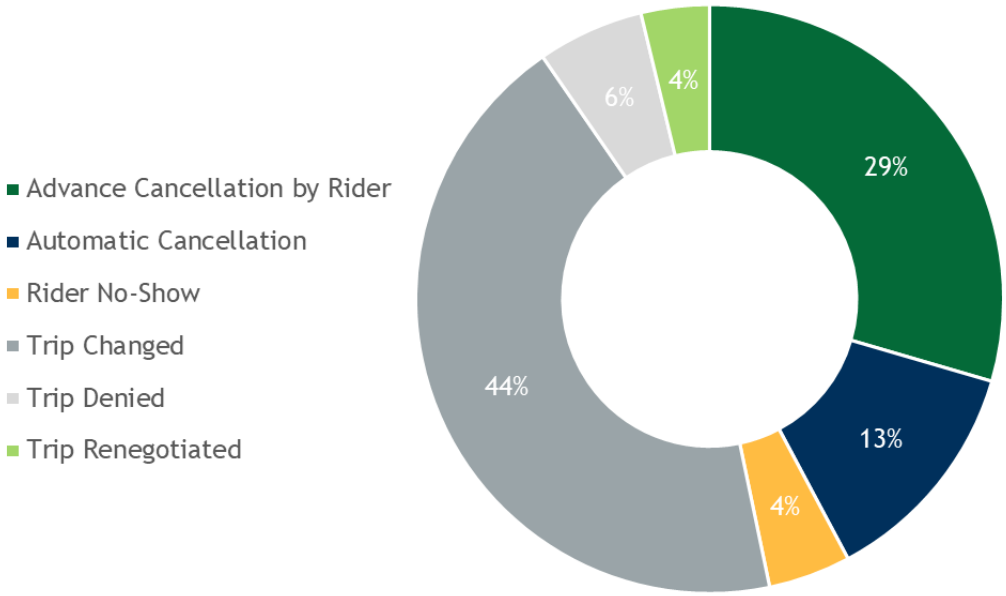
Figure 19: Result of Received Trip Requests by Month



Cancelled Trips and Rider No-Shows

As shown in **Figure 19**, only one-third of received trip requests resulted in completed trips during the sample period. The reasons for requests not resulting in completed trips — as well as the associated impact to the capacity and efficiency of the ART system as a whole — vary substantially. The cancellation type associated with all requests not resulting in a completed trip during the sample period are illustrated in **Figure 20** and discussed below.

Figure 20: Reasons for Cancelled Requests, November 2022 to April 2023



- **Advance Cancellation by Rider:** Accounting for nearly 30% of all cancelled and no-show requests, this category describes all trips that were cancelled (online or over the phone) by riders in accordance with ART's cancellation policy. As these trips were cancelled before vehicles were dispatched to riders, the negative impact on system capacity and efficiency is limited to non-existent.

- **Automatic Cancellation:** Trips that were cancelled without direct rider or dispatcher involvement, primarily including instances where a rider manually cancelled the first in a series of scheduled trips or was otherwise removed from the ART system.

- **Rider No-Show:** During the six-month sample period, nearly 1,000 scheduled trips resulted in rider no-shows. Although these instances represent a relatively small portion of all received trip requests, each negatively impacts the capacity and efficiency of the overall ART system.

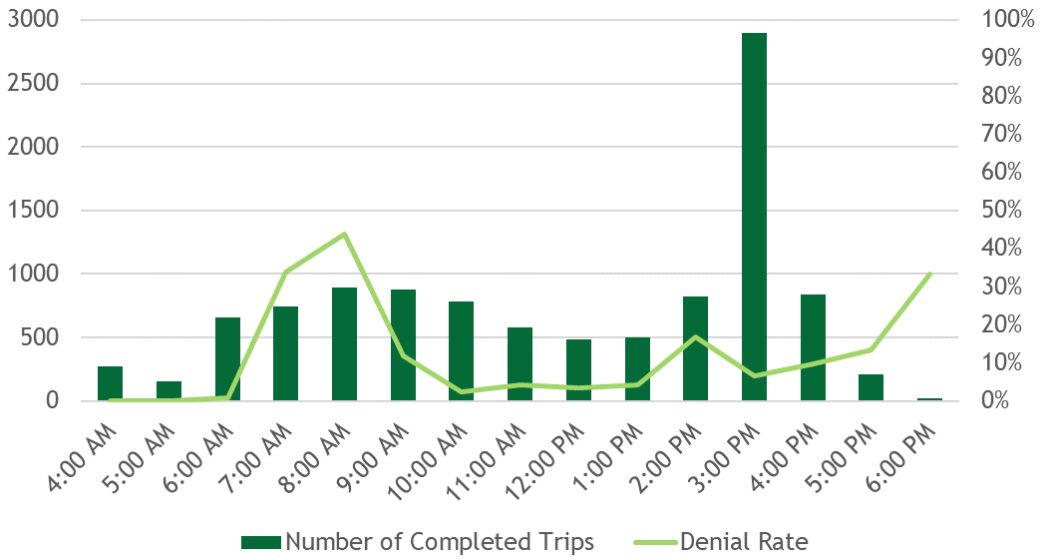
- **Trip Changed:** Accounting for nearly half of all cancelled and no-show trips, this category describes requests where a rider modified a scheduled trip (either online, through an automated phone system, or by talking to dispatch staff). For reporting purposes, ART counts the modified trip as a new, separate request.

- **Trip Denied:** This category describes trips where riders requested a pick-up or drop-off time that ART was unable to meet (within a window beginning one hour before and ending one hour after the requested time). These instances indicate a lack of adequate capacity to meet rider demand.

- **Trip Renegotiated:** As with denied trips, this category includes instances where a rider's requested trip time was unavailable. However, these instances resulted in a suitable alternative being negotiated instead of an outright service denial.

Denied Trips
To analyze the prevalence of denied trips within the ART system, the hourly denial rate was calculated. This rate, which represents a ratio of denied ride requests to completed trip, is mapped by hour in **Figure 21**.

Figure 21: Hourly Ridership and Ratio of Denied Requests to Completed Trips



The data presented in **Figure 21** indicates a spike in denied requests during the morning peak period, with some hours approaching 40 denied requests per 100 completed trips. This indicates a general lack of system capacity during the morning hours.

Requested and Scheduled Pickup Times
To better understand rider experience and system capacity, the difference between requested, scheduled, and actual pick-up times can be evaluated. A brief definition of each term is provided below:

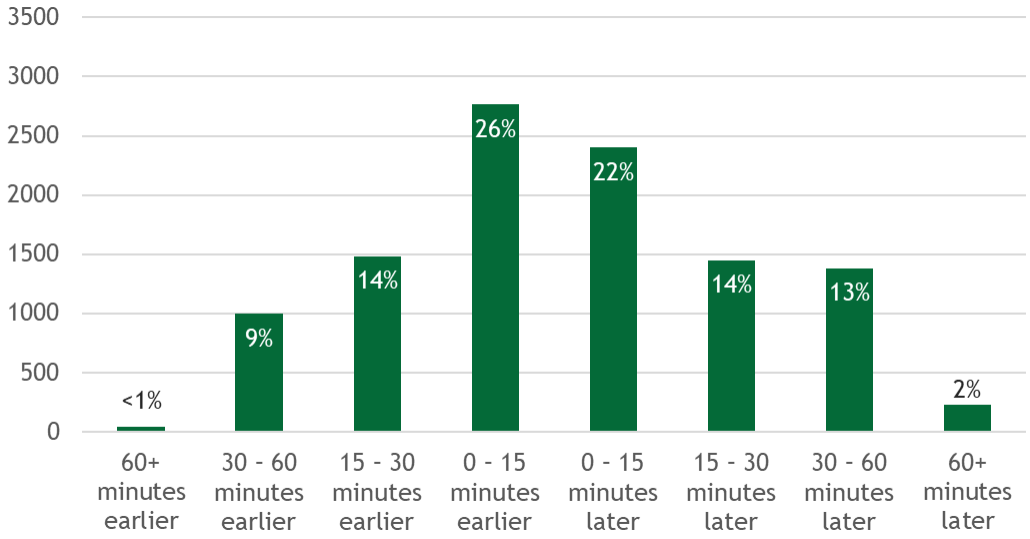
- **Requested Time:** When booking a trip, riders request a specific pickup ("depart at") or drop-off ("arrive by") time. If the requested time slot is available, the transit agency will then confirm a ride booking. If the requested time slot is unavailable, the transit agency will attempt to negotiate a mutually agreeable trip time with the rider. If an alternate trip time cannot be agreed upon, or the scheduled time differs from the requested time by more than 60 minutes, the request is recorded as a denied trip.

- **Scheduled Time:** The pick-up time agreed between the rider and the transit agency, which may align with the requested time or be modified through negotiations.

- **Actual Arrival:** The time at which a transit vehicle arrives to collect a rider. The difference between scheduled and actual arrival times is used to calculate on-time performance.

The difference between requested and scheduled times for completed trips is summarized in **Figure 22**. Nearly half of all trips were scheduled 15 minutes or less from the requested pick-up or drop-off times, while nearly three-quarters of trips were scheduled less than 30 minutes from the requested time. Fewer than 3% of completed trips had pick-ups or drop-offs scheduled more than 60 minutes from the rider-requested time.

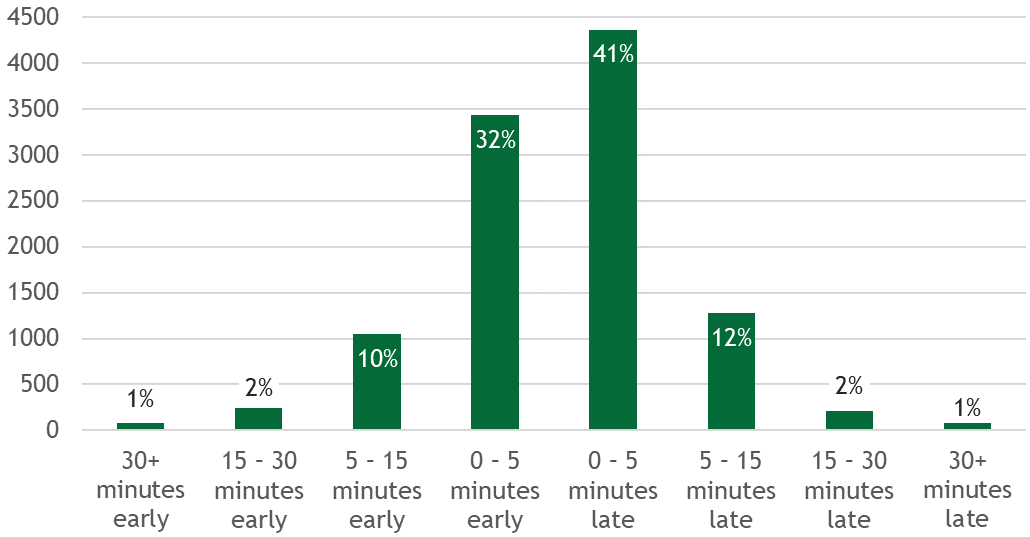
Figure 22: Scheduled Time Relative to Requested Time for Completed Trips



On-Time Performance

The difference between scheduled and actual arrival times for completed trips is summarized in **Figure 23**. Nearly 75% of trips ended with an arrival less than five minutes from the scheduled time, while only 6% of trips ended more than 15 minutes from the scheduled time.

Figure 23: On-Time Performance for Completed Trips



Routing Efficiency and Trip Duration

The efficiency of demand-response transit service can be gauged with two key ratios:

- **Route Efficiency:** The actual distance travelled by riders, compared to the direct distance between origin and destination. This measure accounts for the distance added by detours to pick up and drop off other riders.

- **Time Efficiency:** The actual time riders were onboard a transit vehicle, compared to the direct travel time between origin and destination. This metric captures the additional travel time added by detours, the time spent boarding and alighting other riders, and the slower average speed travelled by transit vehicles on surface streets.

These metrics are summarized at key thresholds for ART service in New Braunfels in **Table 3.** Distance and Time Efficiency of ART Service. In general, routings are relatively efficient, with 75% of trip routes no longer than twice the direct (i.e. no detour) distance. However, the service is typically much slower than driving: slightly less than 40% of trips take less time than twice the driving duration.

Table 3. Distance and Time Efficiency of ART Service

Route Efficiency		Time Efficiency	
Percent of trips within **1.2x** the direct travel distance	**54%**	Percent of trips within **1.2x** the direct travel time	**15%**
Percent of trips within **1.5x** the direct travel distance	**65%**	Percent of trips within **1.5x** the direct travel time	**24%**
Percent of trips within **2x** the direct travel distance	**75%**	Percent of trips within **2x** the direct travel time	**38%**
Percent of trips within **3x** the direct travel distance	**87%**	Percent of trips within **3x** the direct travel time	**59%**

Although the metrics in Table 1 are useful in evaluating quality of service, it is important to note that they do not provide a full picture and need to be properly contextualized. Route detours result in shared trips, which help drive down the cost of individual rides and increase the amount of service provided by each individual vehicle and driver. Additionally, the transit ridership base in suburban areas like New Braunfels tends to be using transit out of need (i.e., no access to a personal vehicle, bike, or walkable route) rather than choice. Providing a transportation option — even if it is substantially slower than direct routes — to as many riders as possible takes precedence over delivering travel times competitive with driving.

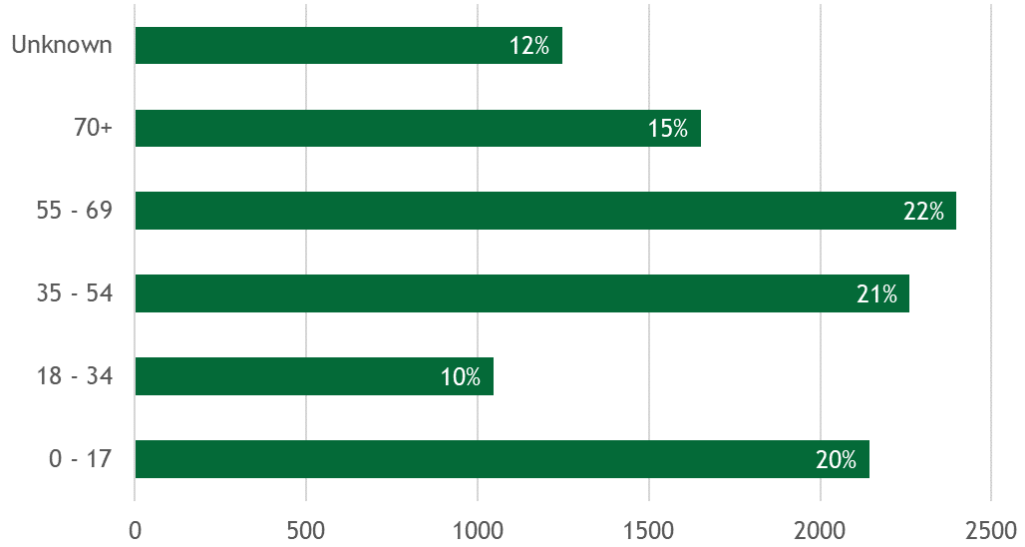
Rider Profile

The following section summarizes available data on **rider age**, **required mobility aids**, and **trip purpose** for completed ART trips in the New Braunfels area. To be included, trips had to either start or end in New Braunfels (or both start and end in the city) and had to occur between November 2022 and April 2023. Reviewing these demographic factors helps ensure the service design meets rider needs.

Rider Age

Residents of all ages rely on ART service. The distribution of completed trips by age cohort (illustrated in **Figure 24**) shows a broad user base, from youths to senior citizens.

Figure 24: Completed Trips by Age Cohort



Although ART provides service to all age groups, the rate at which each age group uses ART varies substantially. As shown in **Table 4**, ART provides an average of 195 trips each year for every 1,000 New Braunfels residents. Significant usage differences are visible between residents in different age cohorts: a typical resident between 55 and 69 is almost twice as likely as the average resident to take a trip on ART. That same resident is more than four times as likely to take an ART trip than a typical resident between the ages of 18 and 34.

Table 4. Transit Usage by Age Cohort

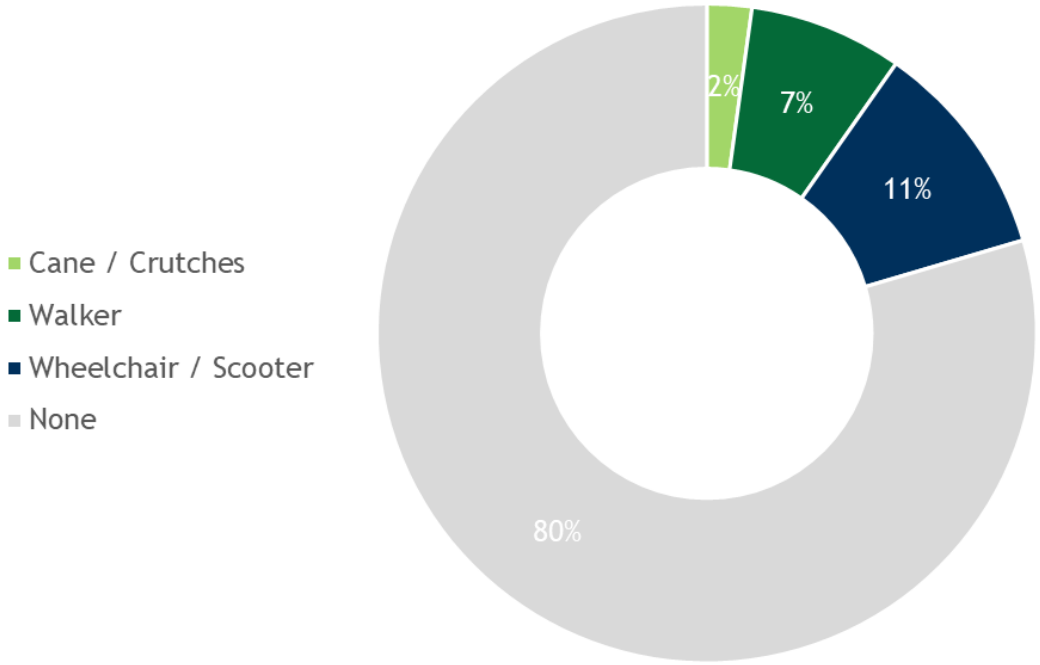
Age Cohort	Completed ART Trips	Total Cohort Population	Annual Trips per 1,000 Residents	Indexed Transit Usage by Cohort
0 - 17	2,144	22,650	190	0.95
18 - 34	1,047	23,800	90	0.45
35 - 54	2,261	27,850	160	0.85
55 - 69	2,398	12,700	375	1.90
70+	1,651	9,650	340	1.75
City Average	-	-	*195*	*1.00*

Required Mobility Aids

During the period between November 2022 and April 2023, one in five ART riders required the use of a mobility aid during their trip (illustrated in **Figure 25).**

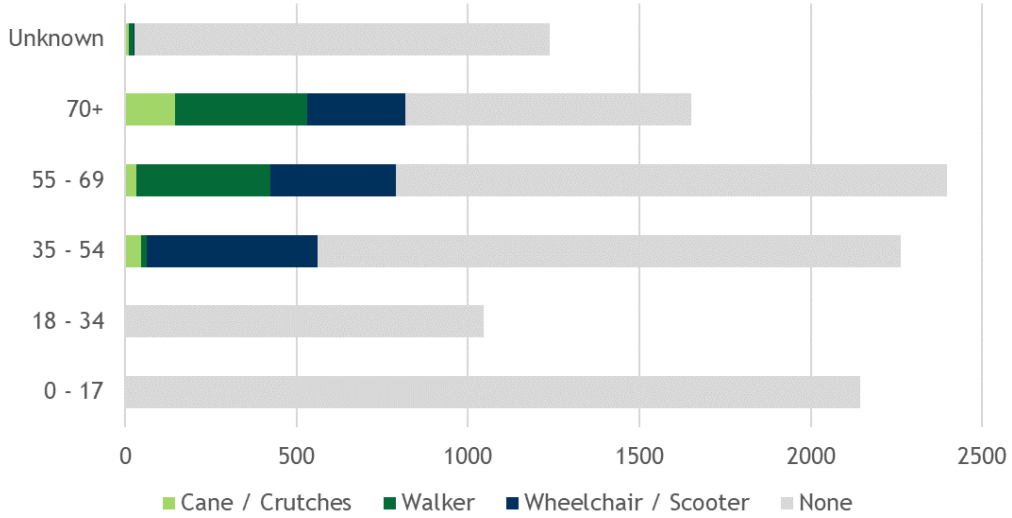
Slightly more than half of the riders in this group (1150 trips) required a wheelchair or scooter, while riders on a further 800 trips required a walker. Use of canes and crutches was less common, but still accounted for a total of about 250 trips during the sample period.

Figure 25: Trip Volume by Required Mobility Aid



As shown in **Figure 26**, the need for mobility aids was not distributed evenly across age groups. Fewer than 1% of riders younger than 35 required a mobility aid, compared to 25% of riders between age 35 and 54. One in three riders between the ages of 55 and 69 required a mobility aid, while half of riders 70 and over required the same.

Figure 26: Trip Volume by Age and Required Mobility Aids

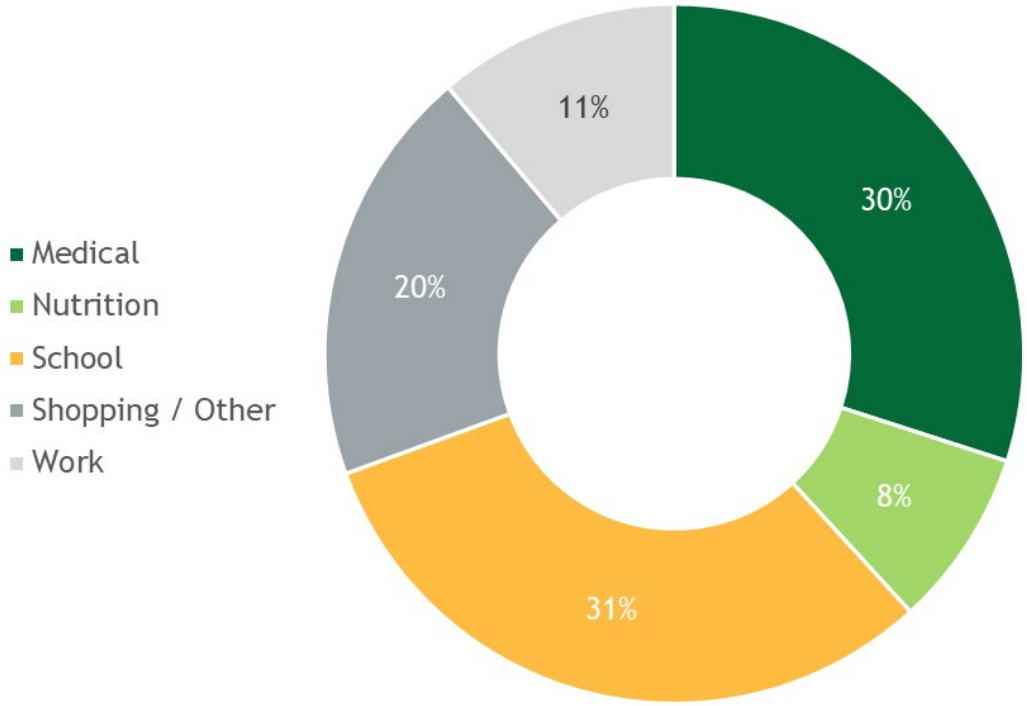


Trip Purpose

Tracking trip purposes allows agencies to (1) better understand rider needs and usage patterns and (2) draw on supplementary grant funding for specific trip purposes (i.e., medical appointments for seniors) where appropriate. The purpose of trips completed between November 2022 and April 2023 is summarized in **Figure 27**. The most common trip purposes

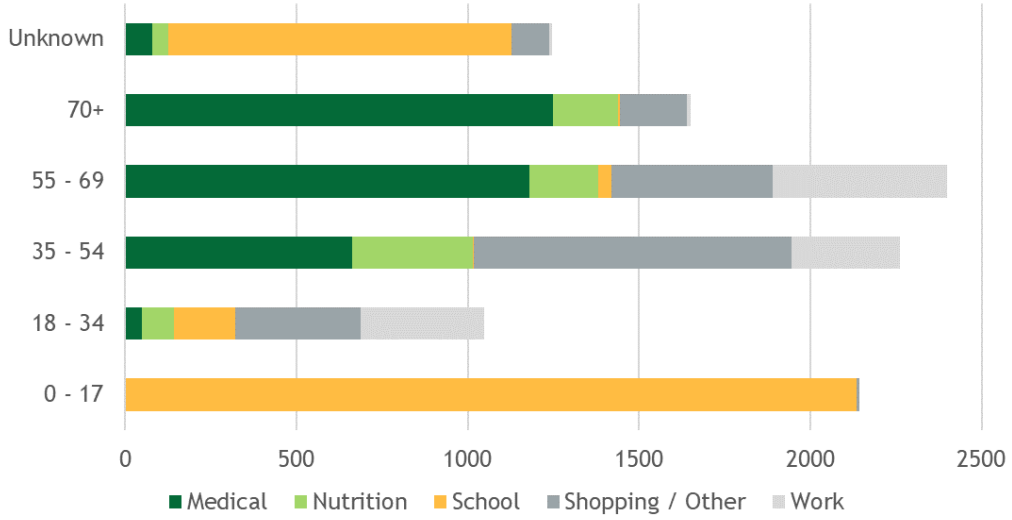
were accessing school or medical care, followed by shopping (or otherwise uncategorized general-purpose) trips.

Figure 27: Completed Trips by Purpose



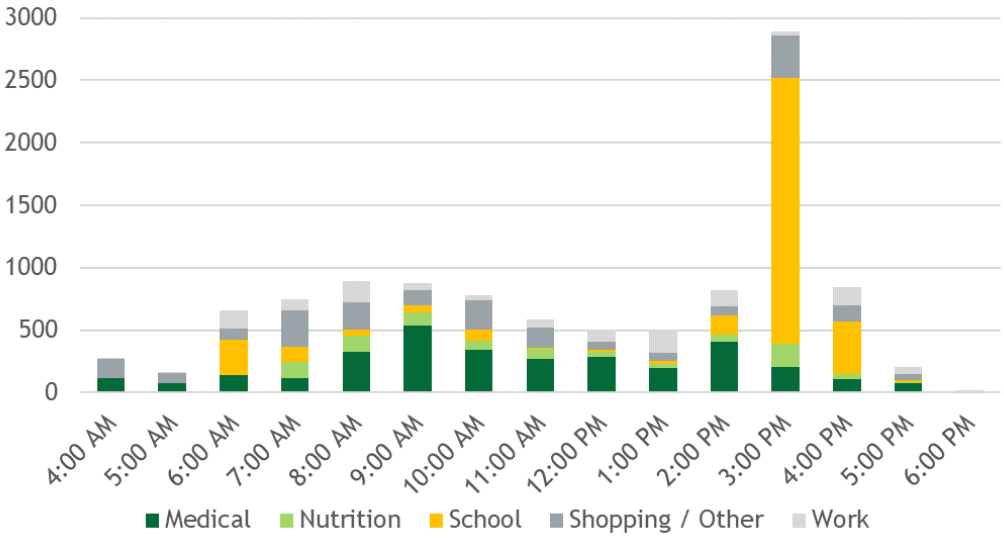
Trip purposes are segmented clearly by age cohort, as shown in **Figure 28**. Almost all transit service provided to youths was for school-related transportation. In contrast, more than 75% of transit service provided to riders aged 70 or over was for medical appointments. Nearly all work-related transportation was provided to riders between the ages of 18 and 69. Finally, the majority of trips provided to riders of unknown age were school-related, suggesting that the group is largely comprised of younger riders.

Figure 28: Completed Trips by Rider Age and Trip Purpose



In addition to being clearly segmented by age cohort, trip purposes can be separated by scheduled pick-up time. Although medical trips are distributed relatively evenly through the day, school-related trips are heavily concentrated between 3:00 PM and 4:00 PM. This high degree of concentration (illustrated in **Figure 29**) combines with the high proportion of school-related trips within the ART network to skew hourly demand well upwards in the 3:00 PM hour.

Figure 29: Completed Trips by Purpose and Scheduled Pick-Up Time



This sharp spike in demand can create capacity challenges, since rider demand (and as a result, demand for drivers and vehicles) in one hour is much higher than at all other times of the day. The result is evident when reviewing booking denials by trip purpose (**Table 5**): school-related trips account for more than two-thirds of all denials and have the highest denial rate of all trip types.

Table 5. Denied Requests and Completed Trips by Purpose

Trip Purpose	Denied Requests	Completed Trips	Ratio of Denials to Completed Trips
Medical	211	3,221	7%
Nutrition	190	885	21%
Shopping / Other	3	2,081	0%
School	880	3,357	26%
Work	5	1,204	0%
Total	**1,289**	**10,748**	**12%**

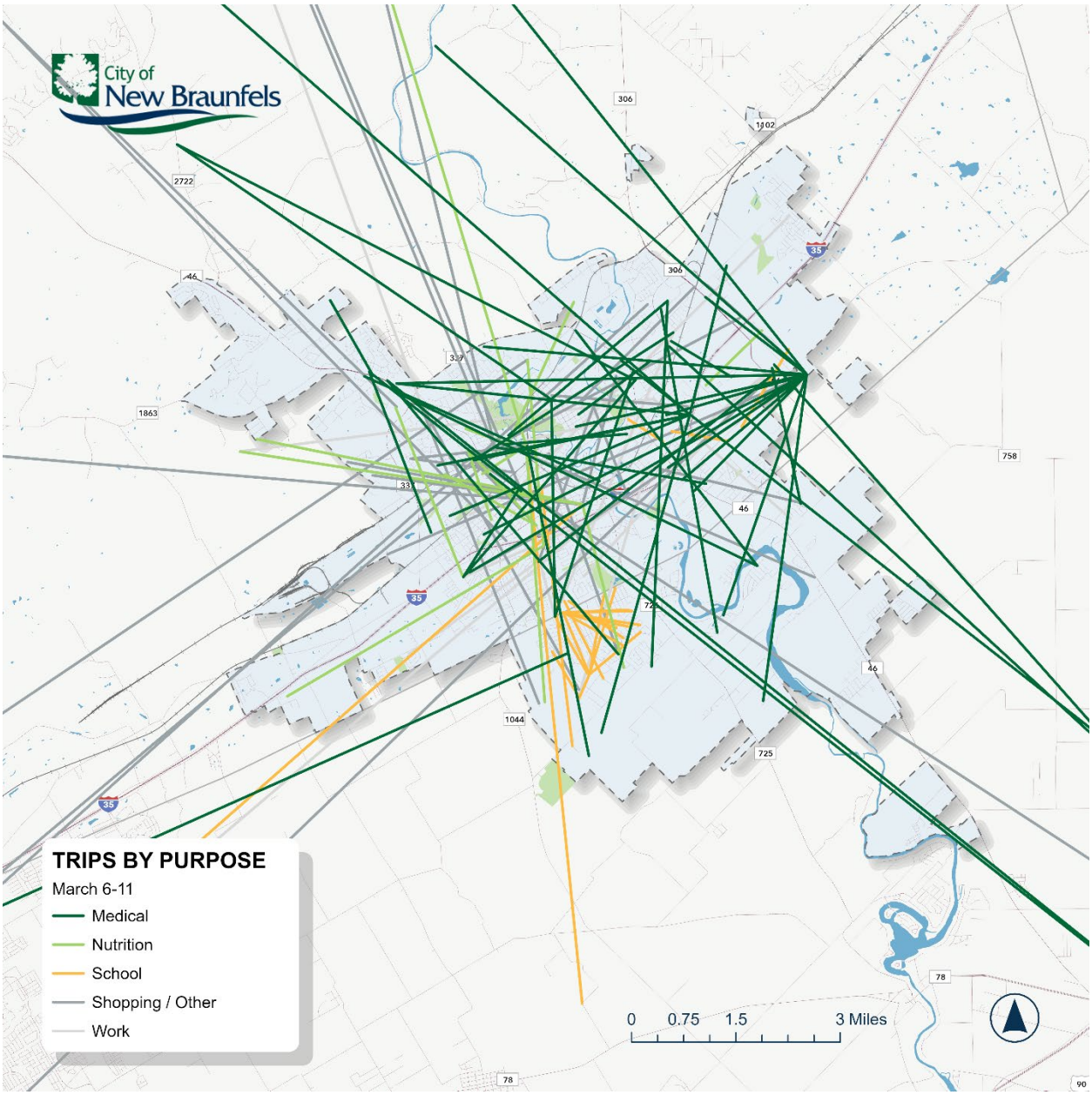
Usage and Key Destinations

To better understand typical usage patterns and identify frequently served destinations, one week of trip-level origin destination data was reviewed. The selected week — Monday, March 6 to Saturday, March 11 — contained the most completed trips of any week in the larger six-month sample period. During the week, a total of 502 trips were completed in New Braunfels.[12] The location of these trips, segmented by purpose, is mapped in **Figure 30**.

The origins and destinations of completed trips are highly dispersed. Two trip types — medical trips and school trips — show clustering at one or more key destinations, while the remaining trip types appear to be distributed largely randomly throughout New Braunfels.

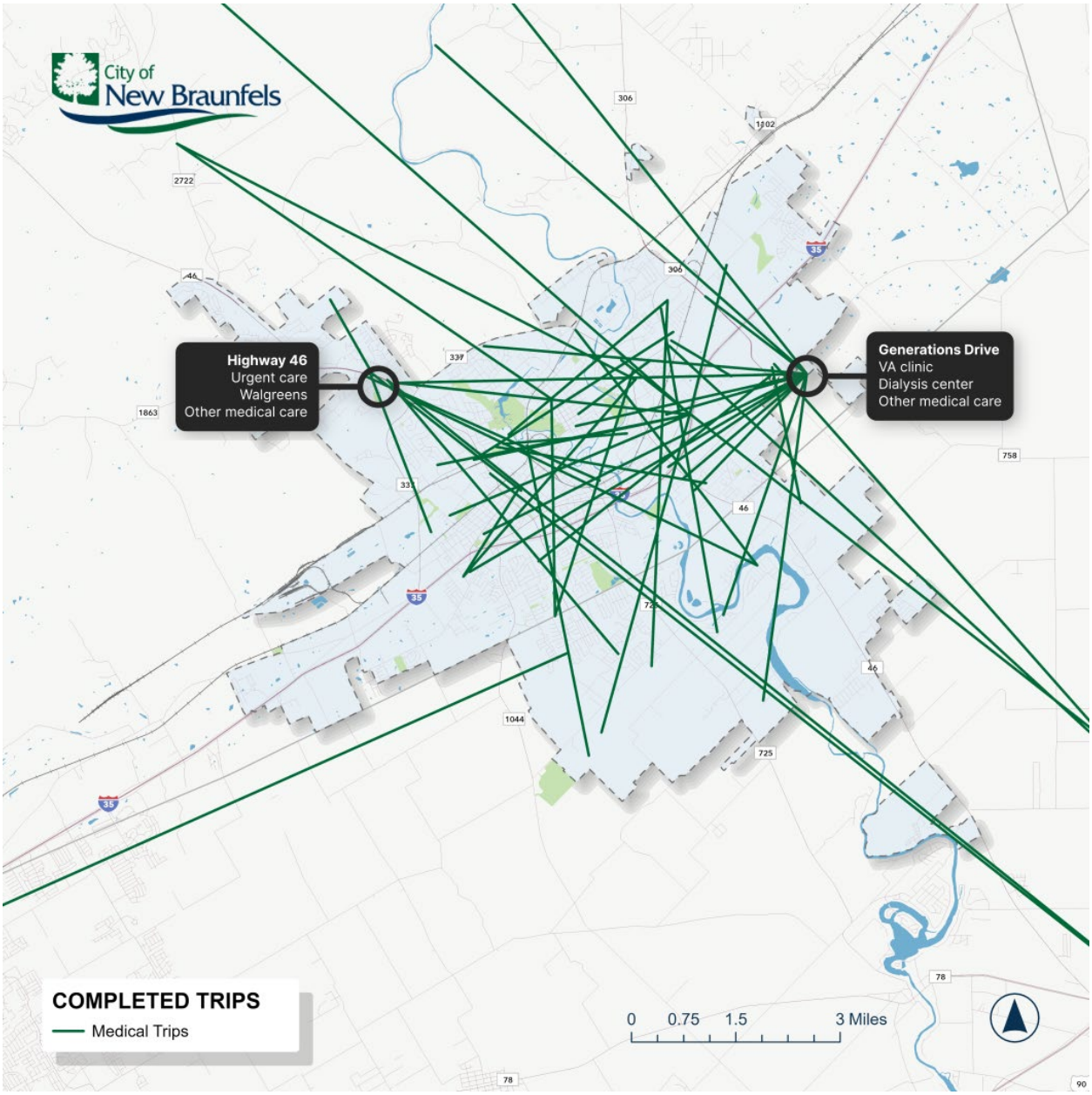
[12] To be included, trips had to (1) start, (2) end, or (3) start and end within the New Braunfels UZA.

Figure 30: Completed Trips by Purpose, March 6 to March 11



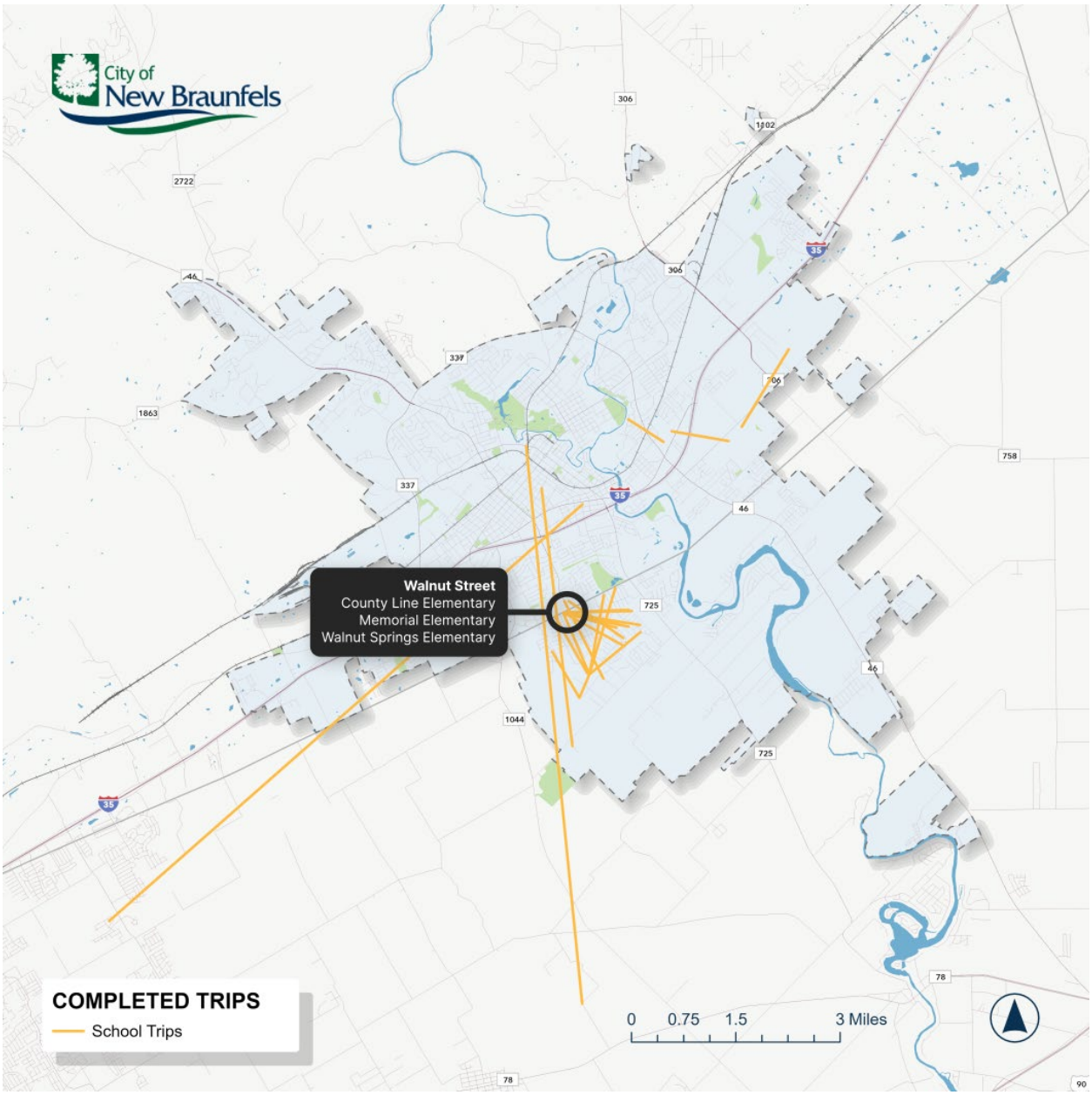
The distribution of medical trips is shown in **Figure 31**. A relatively strong clustering of medical trips is visible: slightly more than 40% of trips travelled to or from a group of medical facilities along Generations Drive, with a further 12% of trips beginning or ending at a group of facilities along Highway 46. In contrast, about 15% of medical trips started or ended more than ten miles from downtown New Braunfels. These longer trips are indicative of both (1) New Braunfels residents travelling to San Antonio for specialized care and (2) residents of adjacent communities travelling to New Braunfels for care.

Figure 31: Completed Medical Trips, March 6 to March 11



School trips similarly exhibit a high degree of clustering, as shown in **Figure 32**. Nearly 60% of all trips began or ended at a cluster of three elementary schools along Walnut Street, helping illustrate how ART's service is able to accommodate the large spike in demand between 3:00 PM and 4:00 PM without seeing a similar spike in trip denials due to lack of capacity.

Figure 32: Completed School Trips, March 6 to March 11



Trip Length
Data from the same week used to find key destinations was also used to analyze typical trip distances. The results of this analysis are shown in **Table 6**. Across all trip types, trips originating and/or ending in New Braunfels had an average length of 9.7 miles. Trips taken to more local destinations like schools and grocery stores had shorter average lengths, while trips taken for more specialized purposes (including medical and uncategorized "other" purposes) tended to be longer.

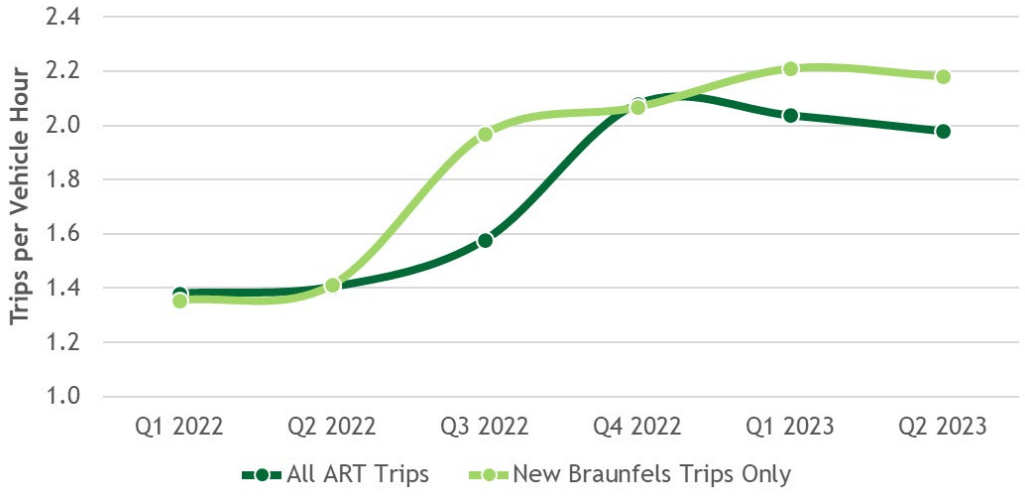
Table 6. Trip Length by Purpose, March 6 to March 11

Trip Purpose	Completed Trips *March 6-11*	Average Trip Distance *March 6-11*
Medical	157	11.2
Nutrition	39	6.8
School	161	6.5
Shopping / Other	96	14.3
Work	49	9.6
Total	**502**	**9.7**

Productivity and Cost

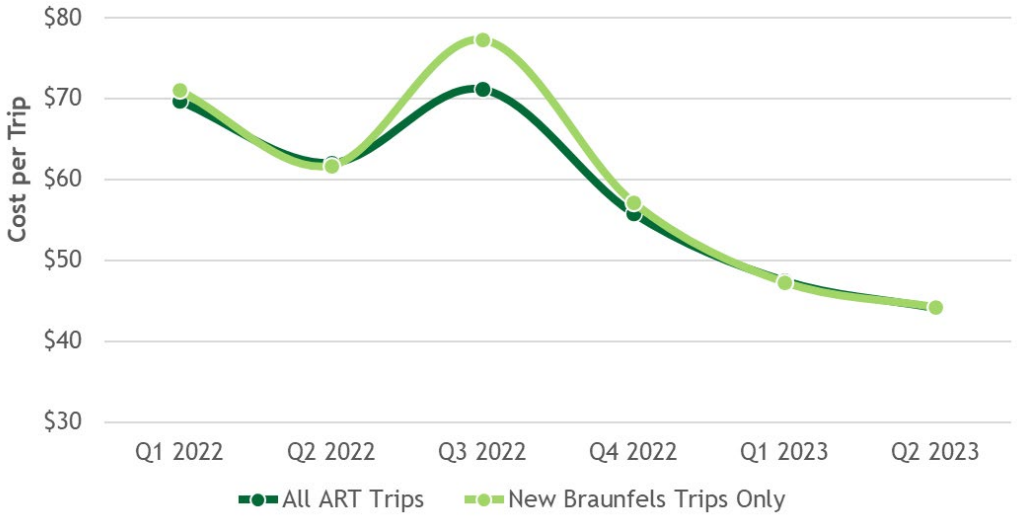
Productivity (or utilization) is measured in trips completed per vehicle hour. The metric is a key indicator of a demand-response transit system's overall efficiency. **Figure 33** compares the productivity achieved by ART with the productivity achieved specifically on New Braunfels trips. Utilization increased steadily from the first quarter of FY 2022 (October to December 2021) to the second quarter of FY 2023 (January to March 2023).

Figure 33: Productivity, All ART Trips and New Braunfels Trips Only



Increases in productivity spread fixed vehicle and driver costs out across more trips, driving the cost of providing each individual cost down. This trend is illustrated in **Figure 34**, where the average cost per trip drops over 18 months from $70 to just under $45, with the exception of Q3 2022.[13]

Figure 34: Cost per Trip, All ART Trips and New Braunfels Trips Only



[13] The reason for the increased cost per trip in New Braunfels during Q3 2022 is unclear based on the data made available to the project team. Although service in New Braunfels was 25% more productive than the overall ART system that quarter, the City was charged an amount that resulted in a higher average cost per trip. A similar trend is visible in both Q1 and Q2 of 2023. New Braunfels paid the same amount ($122,345) for service each quarter of 2022.

Key Findings

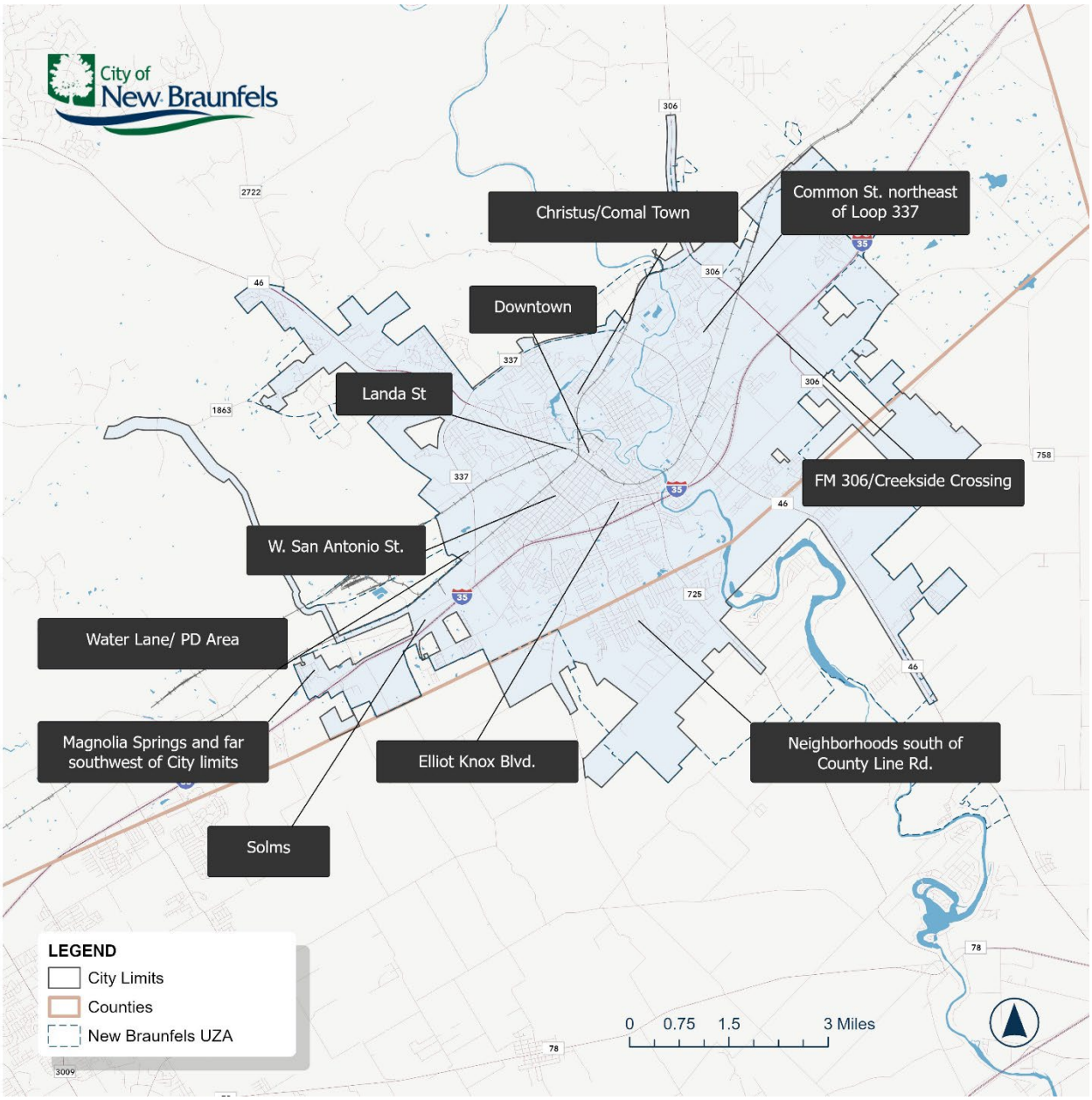
Existing Transit Conditions

New Braunfels was the third-fastest growing city in the US between 2010 and 2019 and sits just outside San Antonio, one of the nation's ten largest cities in terms of population. As the area continues to grow, enhanced transit services will prove critical to the community's transportation options. Several areas of New Braunfels exhibit characteristics supportive of enhanced transit services. **Table 7** summarizes areas and corridors of the City that may be especially important places to serve, and **Figure 35** shows where they are within the City. Additionally, **Appendix A** includes a list provided by the City and the McKenna Foundation of nonprofits in the area that need transit access.

Table 7. Important Areas for Transit Service

Area	Characteristics Supporting Transit Service
Downtown	Dense employment, mixed land uses, low-wage jobs, population under 18 years old, medical facility nearby (Christus Santa Rosa Hospital)
W. San Antonio St.	Dense population, mixed land uses, persons with disabilities, lower-income populations, communities of color
FM 306/Creekside Crossing	Dense employment, medical facility (Resolute Baptist Hospital), low-wage jobs
Magnolia Springs and far southwest of City limits	Dense population, dense employment, persons with disabilities, communities of color
Common St. northeast of Loop 337	Dense population, dense employment, mixed land uses, population over 65 years old
Elliot Knox Blvd.	Dense employment
Landa St.	Mixed land uses, lower-income populations, households with no vehicles
Neighborhoods south of County Line Rd.	Dense population, population under 18 years old

Figure 35: Important Areas for Transit Service



Existing Transit Service

While VIA's Randolph Transfer Center is located around 20 miles from New Braunfels, it still boasts ten bus connections to the neighboring megacity of San Antonio and could serve future transit commuter potential. As for existing service within the city, a few major takeaways stand out in terms of performance, productvity, and cost based on the sample of data analyzed.

- Nearly 75% of trips arrived less than five minutes from the scheduled time
- Lack of system capacity during morning hours indicated by spike in denied requests during the morning peak period
- The average cost per trip dropped from $70 to just under $45 over the sample period
- Service in New Braunfels was 25% more productive than the overall ART system in Q3 2022, but the City was charged an amount that resulted in a higher average cost per trip (similar trend noted in Q1 and Q2 of 2023). The reason for this is unclear based on the data made available to the project team.

The profile of existing riders should be taken into particular consideration for future transit plans. Riders' ages, mobility, and trip purposes may guide decisionmaking in terms of any combination of fixed-route, paratransit, and microtransit.

- Residents aged 55-69 years took the most trips on ART. People in that age bracket are almost twice as likely as the average resident to use ART and four times more likely than a resident between the ages of 18 and 34
- One in five ART riders required the use of a mobility aid during their trip
- The most common trip purposes were accessing **school** or **medical care**
- **School Trips**
  - Almost all transit service provided youths was for school-related transportation
  - 3:00 – 4:00 PM sees more than twice as many trips completed as any other hour throughout the day due to after-school trips by youths
  - School-related trips have the highest denial rate of all trip types (over two-thirds of all denials) because sharp spikes in demand can create capacity issues
  - Nearly 60% of school trips began or ended at a cluster of three elementary schools along Walnut Street, helping illustrate how ART's service is able to accommodate a large spike in demand between 3:00 - 4:00 PM
  - Trips taken to more local destinations like schools (and grocery stores) had shorter average lengths than other trip purposes
- **Medical Trips**
  - More than 75% of service provided riders aged 70+ was for medical reasons
  - More than 40% of medical trips were to or from a group of medical facilities along Generations Drive, with another 12% of trips at facilities along Hwy 46
  - About 15% of medical trips started or ended more than ten miles from downtown New Braunfels, indicating both New Braunfels residents travelling to San Antonio for specialized care and residents of adjacent communities travelling to New Braunfels for care
  - Trips for medical purposes were longer on average than for other purposes

Appendix A

Table 8 lists area nonprofits according to their level of transit need. Sites identified as "high access" are more likely to need to be accessible by those who need to use public transportation with the first eight prioritized as exhibiting the "highest access" needs. Sites identified as "low access" may have less need for transit access in general. The final ten sites listed represent "county resources" located outside the city of New Braunfels but still significant to the area community.

Table 8: Nonprofits with Transit Needs

Organization	Access Level	Address	City	Zip Code	Phone
The Salvation Army New Braunfels	Highest Access	617 Elliot Knox Blvd	New Braunfels	78130	830-608-9129
NBYC-New Braunfels Youth Collaborative	Highest Access	392 W. Mill St	New Braunfels	78130	830-606-9500
Comal County Senior Citizens Foundation	Highest Access	710 Landa St	New Braunfels	78130	830-629-4547
Crisis Center of Comal County	Highest Access	655 Landa Street	New Braunfels	78130	830-620-7520
Hill Country MHDD Centers- Comal County MH Center	Highest Access	358 Landa, Ste. 300	New Braunfels	78130	830-792-3300
New Braunfels Food Bank	Highest Access	1620 S Seguin Ave	New Braunfels	78130	210-337-3663
NB Housing Partners-First Footing	Highest Access	4120 Loop 337	New Braunfels	78130	830.606.9526
NB Housing Partners-Churchill Property	Highest Access	1465 Churchill Dr	New Braunfels	78130	830.606.9526
Any Baby Can of San Antonio, Inc.- New Braunfels Location	High Access	801 W. San Antonio St	New Braunfels	78130	210-227-0170
Any Baby Can of San Antonio, Inc.- VIM Location	High Access	1195 W San Antonio St	New Braunfels	78130	210-227-0170
CentroMed Family Medicine Clinic	High Access	226 N Union Ave	New Braunfels	78130	830-608-5700
CentroMed Pediatric Clinic	High Access	1034 W County Line Rd	New Braunfels	78130	830-608-5700
Family Life Center of New Braunfels	High Access	444 E. San Antonio Street	New Braunfels	78132	830-625-7100
New Braunfels Christian Ministries- Volunteers in Medicine	High Access	1195 W San Antonio St	New Braunfels	78130	210-573-9015
Project MEND- Located at Comal County Senior Center	High Access	710 Landa St	New Braunfels	78130	210-223-6363

RecoveryWerks!	High Access	790 Landa Street	New Braunfels	78130	830-310-2456
River City Advocacy & Counseling Center	High Access	1614 W San Antonio St	New Braunfels	78130	830-643-0200
SOS Food Bank	High Access	248 W. Merriweather St.	New Braunfels	78130	830-629-3663
Westside Community Center	High Access	2932 S IH Frontage Road	New Braunfels	78130	
CIS Thrift Store	High Access	1058 Business 35	New Braunfels	78130	830-387-4453
Goodwill Industries	High Access	1075 S Walnut Ave	New Braunfels	78130	210-924-8581
McKenna Center	High Access	801 W San Antonio St	New Braunfels	78130	830-606-9500
Connections Individual and Family Services	High Access	1414 West San Antonio Street	New Braunfels	78130	830-629-6571
1HOPE for Kids	Low Access	1115 W Bridge St	New Braunfels	78130	210-910-6533
Big Brothers Big Sisters of South Texas, Inc.	Low Access	801 W San Antonio St	New Braunfels	78130	210-225-6322
CASA of Central Texas, Inc.	Low Access	1619 E. Commn Street, Suite 301	New Braunfels	78130	830-626-2272
Children's Advocacy Center of Comal County, Inc.	Low Access	1168 Pride Drive	New Braunfels	78132	830-837-3338
Children's Advocacy Center of Comal County, Inc.- Counseling Office	Low Access	1067 FM 306 # 105	New Braunfels	78130	830-837-3338
Comal County Habitat for Humanity	Low Access	1269 Industrial Dr	New Braunfels	78130	830-625-4025 x204
Community Council of South Central Texas	Low Access	111 W San Antonio St suite 210-3	New Braunfels	78130	830-372-3750
Crisis Pregnancy Center of New Braunfels dba Options for Life	Low Access	1126 N. Loop 337	New Braunfels	78130	830-629-7565
EdenHill Communities	Low Access	631 Lakeview Blvd.	New Braunfels	78130	830-625-1324
Hill Country MHDD Centers- Comal County IDD Center	Low Access	511 E North St.	New Braunfels	78130	830-792-3300
Hill Country MHDD Centers- Comal County Service Coordination	Low Access	457 Landa St., Ste. J	New Braunfels	78130	830-792-3300
Hope Hospice	Low Access	611 North Walnut Avenue	New Braunfels	78130	830-625-7500
New Braunfels 24 Hour Club	Low Access	1142 Eikel Street	New Braunfels	78130	830-608-4667
New Braunfels Christian Ministries- Kid's Club	Low Access	169 S Hickory Avenue	New Braunfels	78130	210-573-9015

STEPS	Low Access	1311 Industrial Drive, Suite A	New Braunfels	78130	830-387-6095
Steve's Pantry, Gruene United Methodist Church	Low Access	2629 E. Common	New Braunfels	78130	830-625-7200
The Gabriel Project- Saints Peter and Paul Catholic Church	Low Access	386 North Castell	New Braunfels	78130	830-832-1489
New Braunfels Family YMCA	Low Access	545 Creekside Crossing	New Braunfels	78130	830-606-9622
Central Texas Dispute Resolution Center	Low Access	880 Landa St	New Braunfels	78130	512-878-0382
Camp Cummings Activity Center	Low Access	241 Business 35 S.	New Braunfels	78130	830-237-9987
The Gabriel Project	Low Access	386 N. Castell Ave.	New Braunfels	78130	830-481-0258
Bulverde Spring Branch Activity Center	County Resource	30280 Cougar Bend	Bulverde	78163	830-438-3111
Bulverde-Spring Branch EMS	County Resource	353 Rodeo Dr	Spring Branch	78070	830-228-4501
Canyon Lake Fire/EMS	County Resource	1074 Scissortail	Canyon Lake	78133	830-907-2922
CRRC of Canyon Lake	County Resource	1917 FM 2673	Canyon Lake	78133	830-964-2324
H.I.S Centre	County Resource	1781 E. Ammann	Bulverde	78163	830-228-4504
Helping Hands Food Pantry	County Resource	11755 N Highway 281	Spring Branch	78070	830-885-4998
Hill Country MHDD Centers- Canyon Lake MH Center	County Resource	230 Shepherd Hill Dr.	Canyon Lake	78133	830-792-3300
Hill Country MHDD Centers- Spring Branch MH Center	County Resource	353 Rodeo Dr.	Spring Branch	78070	830-792-3300
Provisions Outreach, the Bulverde Food Pantry	County Resource	2295-1 Bulverde Rd	Bulverde	78163	830-438-7899
SJRC Texas	County Resource	1400 Ridge Creek Lane	Bulverde	78163	830-629-0659

Source: City of New Braunfels and McKenna Foundation

Appendix D:
List of Non-profits to Serve

Organization Name	Access Level	Organization Tax Id	Organization Address	Organization City	Organization State	Organization Postal Code	Organization Phone	Organization Website
Bulverde Spring Branch Activity Center	County Resource	74-2625611	30280 Cougar Bend	Bulverde	TX	78163	830-438-3111	www.bsbac.com
Bulverde-Spring Branch EMS	County Resource	74-2060965	353 Rodeo Dr	Spring Branch	TX	78070	830-228-4501	
Canyon Lake Fire/EMS	County Resource	74-2537323	1074 Scissortail	Canyon Lake	TX	78133	830-907-2922	
CRRC of Canyon Lake	County Resource	57-1148206	1917 FM 2673	Canyon Lake	TX	78133	830-964-2324	www.crrcofcanyonlake.org
H.I.S Centre	County Resource	82-3399298	1781 E. Ammann	Bulverde	TX	78163	830-228-4504	www.hiscentre.com
Helping Hands Food Pantry	County Resource	20-8542727	11755 N Highway 281	Spring Branch	TX	78070	830-885-4998	www.rebeccacreek.org
Hill Country MHDD Centers- Canyon Lake MH Center	County Resource	74-2822017	230 Shepherd Hill Dr.	Canyon Lake	TX	78133	830-792-3300	www.hillcountry.org
Hill Country MHDD Centers- Spring Branch MH Center	County Resource	74-2822017	353 Rodeo Dr.	Spring Branch	TX	78070	830-792-3300	www.hillcountry.org
Provisions Outreach, the Bulverde Food Pantry	County Resource	74-2786561	2295-1 Bulverde Rd	Bulverde	TX	78163	830-438-7899	http://provisionsoutreach.org
SJRC Texas	County Resource	74-2469139	1400 Ridge Creek Lane	Bulverde	TX	78163	830-629-0659	https://www.sjrctexas.org/
Any Baby Can of San Antonio, Inc.- New Braunfels Location	High Access	74-2684333	801 W. San Antonio St	New Braunfels	TX	78130	210-227-0170	https://www.anybabycansa.org/
Any Baby Can of San Antonio, Inc.- VIM Location	High Access	74-2684333	1195 W San Antonio St	New Braunfels	TX	78130	210-227-0170	https://www.anybabycansa.org/
CentroMed Family Medicine Clinic	High Access	74-1787031	226 N Union Ave	New Braunfels	TX	78130	830-608-5700	centromedusa.com
CentroMed Pediatric Clinic	High Access	74-1787031	1034 W County Line Rd	New Braunfels	TX	78130	830-608-5700	centromedusa.com
Family Life Center of New Braunfels	High Access	26-3725345	444 E. San Antonio Street	New Braunfels	TX	78132	830-625-7100	www.flcnb.org
New Braunfels Christian Ministries- Volunteers in Medicine	High Access	26-2221231	1195 W San Antonio St	New Braunfels	TX	78130	210-573-9015	www.nbcm.org
Project MEND- Located at Comal County Senior Center	High Access	74-2647324	710 Landa St	New Braunfels	TX	78130	210-223-6363	projectmend.org
RecoveryWerks!	High Access	47-3519239	790 Landa Street	New Braunfels	TX	78130	830-310-2456	http://www.recoverywerks.org/
River City Advocacy & Counseling Center	High Access	74-3004101	1614 W San Antonio St	New Braunfels	TX	78130	830-643-0200	www.rivercityadvocacy.org
SOS Food Bank	High Access	74-2509324	248 W. Merriweather St.	New Braunfels	TX	78130	830-629-3663	sosfoodbankinc.com
Westside Community Center	High Access		2932 S IH Frontage Road	New Braunfels	TX	78130		
CIS Thrift Store	High Access		1058 Business 35	New Braunfels	TX	78130	830-387-4453	
Goodwill Industries	High Access	74-1238444	1075 S Walnut Ave	New Braunfels	TX	78130	210-924-8581	goodwillsa.org
McKenna Center	High Access		801 W San Antonio St	New Braunfels	TX	78130	830-606-9500	www.mckenna.org
Connections Individual and Family Services	High Access	74-2179169	1414 West San Antonio Street	New Braunfels	TX	78130	830-629-6571	www.connectionsifs.org
The Salvation Army New Braunfels	Highest Access	58-0660607	617 Elliot Knox Blvd	New Braunfels	TX	78130	830-608-9129	www.salvationarmysatx.org
NBYC-New Braunfels Youth Collaborative	Highest Access	87-3790582	392 W. Mill St	New Braunfels	TX	78130	830-606-9500	
Comal County Senior Citizens Foundation	Highest Access	74-2330402	710 Landa St	New Braunfels	TX	78130	830-629-4547	www.nbsenior.org
Crisis Center of Comal County	Highest Access	74-2440649	655 Landa Street	New Braunfels	TX	78130	830-620-7520	www.crisiscenternb.org
Hill Country MHDD Centers- Comal County MH Center	Highest Access	74-2822017	358 Landa, Ste. 300	New Braunfels	TX	78130	830-792-3300	www.hillcountry.org
New Braunfels Food Bank	Highest Access	74-2122979	1620 S Seguin Ave	New Braunfels	TX	78130	210-337-3663	https://safoodbank.org/
NB Housing Partners-First Footing	Highest Access	46-1955404	4120 Loop 337	New Braunfels	TX	78130	830.606.9526	http://nbhousingpartners.org/
NB Housing Partners-Churchill Property	Highest Access	46-1955404	1465 Churchill Dr	New Braunfels	TX	78130	830.606.9526	http://nbhousingpartners.org/
1HOPE for Kids	Low Access	46-4987146	1115 W Bridge St	New Braunfels	TX	78130	210-910-6533	1hopeforkids.org
Big Brothers Big Sisters of South Texas, Inc.	Low Access	74-1897630	801 W San Antonio St	New Braunfels	TX	78130	210-225-6322	www.bigmentor.org
CASA of Central Texas, Inc.	Low Access	74-2403373	1619 E. Commn Street, Suite 301	New Braunfels	TX	78130	830-626-2272	www.casacentex.org
Children's Advocacy Center of Comal County, Inc.	Low Access	20-1100412	1168 Pride Drive	New Braunfels	TX	78132	830-837-3338	comalcac.org
Children's Advocacy Center of Comal County, Inc.- Counseling Office	Low Access	20-1100412	1067 FM 306 # 105	New Braunfels	TX	78130	830-837-3338	comalcac.org
Comal County Habitat for Humanity	Low Access	74-2667761	1269 Industrial Dr	New Braunfels	TX	78130	830-625-4025 x204	www.comalhabitat.org
Community Council of South Central Texas	Low Access	74-1541774	111 W San Antonio St suite 210-3	New Braunfels	TX	78130	830-372-3750	
Crisis Pregnancy Center of New Braunfels dba Options for Life	Low Access	74-2393875	1126 N. Loop 337	New Braunfels	TX	78130	830-629-7565	www.optionsforlifenb.org
EdenHill Communities	Low Access	74-1143030	631 Lakeview Blvd.	New Braunfels	TX	78130	830-625-1324	www.edenhill.org

Access Level Descriptions

High Access	1. Sites in NB that may need to be accessible by those who need to use public transportation
Low Access	2. Sites in NB of nonprofits that may have less need for access from those who need to use transportation (example, CASA is not a high-access need)
County Resource	3. Sites of nonprofits outside of NB but in the County that may need to be accessible

Appendix E:
Transit Service Evaluation Technical Memorandum

MEMORANDUM

TRANSIT DEVELOPMENT PLAN

DATE: October 15, 2023
TO: Garry Ford, City of New Braunfels
FROM: Ellen Soll and Colin Ash, Alliance Transportation Group
Cathal O'Gorman and Peter Wajda, Via Transportation
RE: Transit Service Opportunities

Based on the results of the existing conditions and needs assessment processes completed earlier in this project, the following memorandum develops a recommended transit network design for New Braunfels.

Table of Contents

Service Planning Goals

To guide the overall service design process, the project team established four key goals. Each of these is summarized below:

- **Deliver citywide transit coverage:** The recommended network design should provide a transit option to the vast majority of City residents, if feasible.
- **Focus service on key corridors and destinations:** Although the network should provide citywide coverage, higher-quality service should be provided in the portions of the City most likely to generate substantial transit ridership.
- **Develop a system that can be launched quickly:** The City is well into the process of becoming a Direct Recipient of Federal Transit Administration (FTA) funding. To maintain alignment between the launch timeline and expected receipt of future grant funds, the network design should allow for an initial service launch no more than 12 months after adoption of this TDP.
- **Provide adequate capacity for future growth:** The design of the recommended transit network should account for future population growth and increases in transit mode share. For example, although microtransit services have a shorter launch timeline than fixed-route services, fixed-route services have higher ridership capacity and may operate more efficiently in high-ridership areas. The recommended network should balance the benefits and drawbacks associated with each mode.

Service Alternatives

The selected service model will play a pivotal role in meeting the diverse transportation needs of New Braunfels residents while operating sustainably and efficiently. To capture the full range of service options relevant to the City, three primary models were explored: a microtransit-only service, an exclusively fixed-route system, and hybrid design that combines both microtransit and fixed-route service. The unique advantages and challenges associated with each model are explored in the following section.

Microtransit Service

Like the existing ART demand-response transit system in New Braunfels, microtransit is a form of flexible, “on-demand” transit. As with the existing ART demand-response service in New Braunfels, microtransit operates within a predefined service zone. A fleet of vehicles roam throughout the service zone, responding to ride requests in real time. Riders travelling in the same general direction are grouped onto the same vehicle to increase efficiency. Whereas a traditional demand-response system typically requires rides to be scheduled at least 24 hours in advance, microtransit allows riders to be picked up 15-30 minutes after requesting a ride, offering the opportunity for spontaneous travel. While microtransit excels in adaptability and provides an excellent passenger experience, it may face capacity limitations during peak travel periods. In well-patronized areas, microtransit has a lower productivity ceiling than traditional fixed-routes, leading to higher per-trip costs. However, microtransit can have similar or lower costs per trip in areas that are poorly suited to fixed-route buses, such as lower density areas or places with poor pedestrian infrastructure.

Fixed-Route Service

Fixed-route systems provide a scheduled, predictable service for passengers. Larger vehicles and predefined routes make them suitable for denser areas with consistent travel patterns. However, fixed routes may not be the most cost-efficient option for areas with lower demand, leading to underutilized services. Limited flexibility can lead to inefficient routes and service gaps in underserved neighborhoods. To ensure equal access to transit, Federal regulations require ADA paratransit service to be provided within ¾ miles of fixed-route lines.

Hybrid Fixed-Route and Microtransit

A hybrid model combines the strengths of both fixed-route and microtransit systems. Fixed routes provide a backbone for higher capacity travel corridors while microtransit can efficiently serve lower demand areas, connect remote neighborhoods, and provide first/last mile connections to other modes of travel. Integrating different service models can be complex and require careful coordination between providers (if multiple service providers exist) and the public to ensure they understand the transit services being offered. Balancing resources between fixed-route and on-demand services necessitates ongoing strategic planning to optimize cost-effectiveness and customer satisfaction and adapt to changing demographics and development.

Service Model Comparison

Each model considered for New Braunfels offers distinct advantages, and the choice should be tailored to the city's specific needs and demographics. A traditional fixed-route system with ADA paratransit provides reliable service and capacity for future growth, but is a poor fit for the lower-density neighborhoods outside the downtown area. A microtransit-only service offers flexibility and a quick launch timeline, but will struggle to accommodate rising demand without substantial cost increases as transit becomes better established in the City. The hybrid option presents an promising middle ground, but its successful implementation depends on seamless coordination between the fixed-route and microtransit components.

The unique operational characteristics of each of the three system designs considered for New Braunfels are presented in **Table 1**.

***Table 1**. Comparison of Transit Service Models*

	Fixed-Route	Microtransit	Hybrid
Service Flexibility	Limited flexibility with predefined routes and schedules	More flexible, allowing on-demand pick-up and drop-off within a defined service area	Highly flexible and adaptive, optimizing routes in real-time based on demand
Cost Efficiency	Cost-efficient for high passenger volumes and established routes	Cost-efficient in low-demand areas or during off-peak hours	Improved cost efficiency due to optimized routes, but may still have higher costs per passenger
Passenger Capacity	High capacity due to larger buses and dependent on frequencies offered	Lower capacity compared to fixed-route, especially during peak demand periods	Moderate capacity due to use of smaller vehicles
Suitability for Different Areas	Ideal for urban areas and some suburban areas with higher density corridors	Beneficial for rural areas, areas with low demand, and areas lacking fixed routes	Well-suited for areas with variable demand, suburban areas with limited transit access
Accessibility	Accessible for individuals with mobility challenges but requires complementary paratransit for others	Can be made fully accessible to individuals with specific needs or refer riders to paratransit services	Can be made fully accessible to individuals with specific needs or refer riders to paratransit services
Reservation Requirement	No advanced booking required	Often requires prior reservations	May require reservations in advance for better coordination
Technological Integration	Less reliant on technology	Technology-driven, often leveraging mobile apps for bookings and tracking	Uses technology for route optimization and passenger communication

Ridership Projections

The project team developed ridership estimates for the microtransit-only alternative, as well as the hybrid microtransit and fixed-route alternative. As discussed in *Service Alternatives*, the fixed-route only design is not expected to adequately cover the City and was screened out from further analysis.

Microtransit

The ridership projected for a microtransit zone is primarily a factor of the size and shape of the proposed zone. Based on prior analysis and discussion with City officials, the zone shown in **Figure 1** was developed.

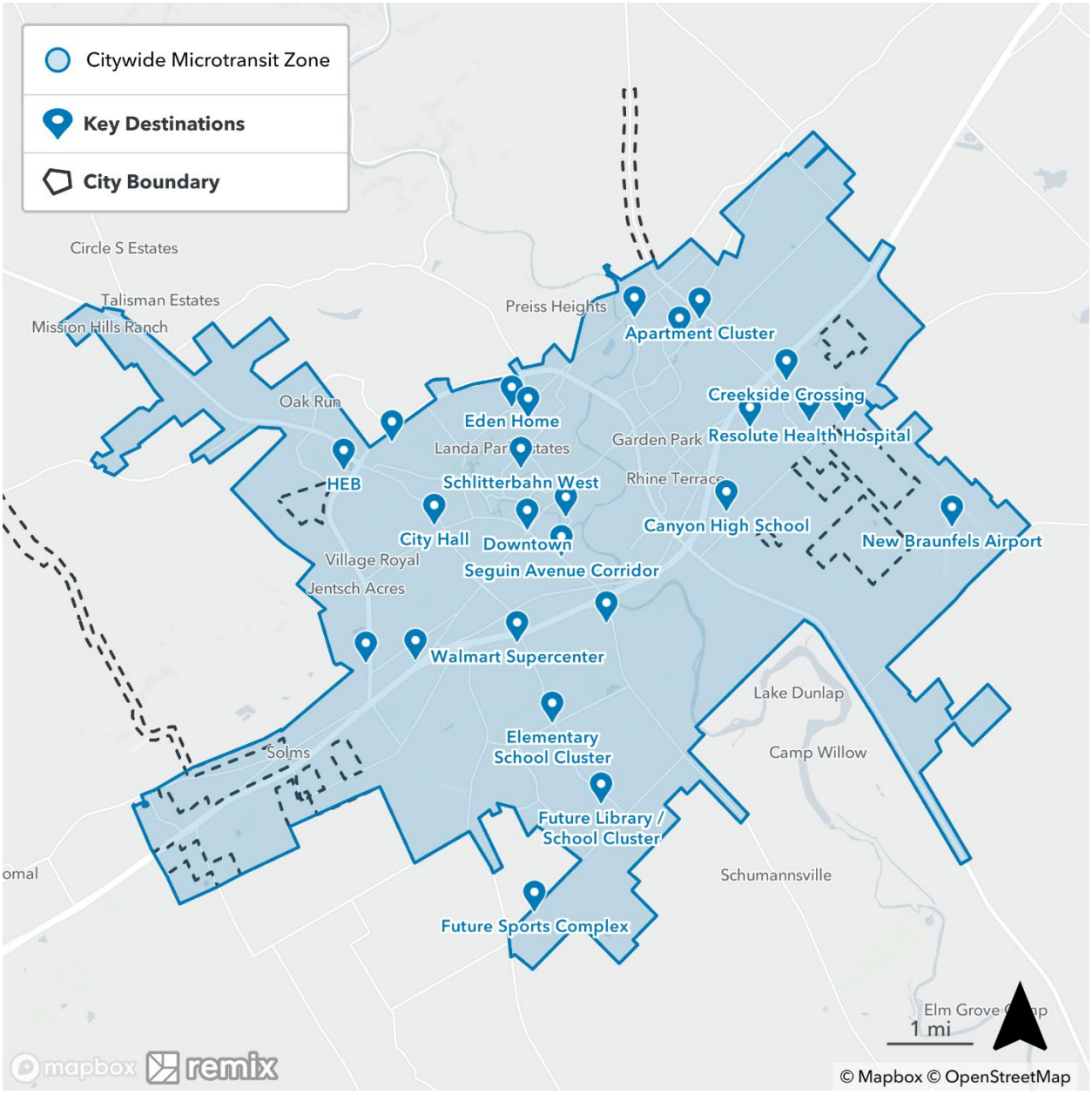


***Figure 1**. Proposed Citywide Microtransit Zone with Key Destinations*

The proposed zone illustrated in Figure 1 largely follows the City boundary. Two narrow (and largely undeveloped) strips extending north and west of the City are excluded, while the unincorporated enclaves completely enclosed by the City are included. These changes help maintain a reasonable and easy-to-understand zone shape.

Demand Scenarios and Ridership Estimates

Ridership estimates for the proposed zone were developed by applying a ratio of completed rides relative to the assumed hours of operation and sum of population and employment, known as the "capture rate." This capture rate is based upon observed ridership patterns on microtransit deployments in contexts similar to New Braunfels. Comparable deployments were identified using the following criteria:

- **Regional similarity:** Services located in the South and Southeast, including in Texas, Alabama, and Tennessee.
- **On-demand service:** Trips are entirely or mostly requested in real time, with a minority of trips pre-scheduled one or more hours in advance of the actual pickup.
- **Fares collected:** Riders pay a fare to use transit services. If the microtransit service is part of a larger multimodal network, the fare collected for microtransit trips is equal (or close to equal) to the fixed-route fare.

After identifying an appropriate capture rate, the project team developed a low-demand, medium-demand, and high-demand ridership scenario to account for the uncertainty inherent in estimating travel demand. This approach recognizes that ridership can be affected by many qualitative and quantitative factors, such as a transit agency's stakeholder partnerships, marketing campaigns, and customer outreach activities, to name just a few. These three scenarios are described below:

- **Low-demand.** This scenario assumes the service does not perform as well as peer microtransit services. Common reasons for lower ridership outcomes could include poor marketing, lack of community support, poor stakeholder relationships (e.g. with major employers), or unforeseen operational challenges that affect the quality of service.
- **Medium-demand.** The medium-demand scenario represents the project team's best estimate of ridership within 6-12 months of operation, at a capture rate similar to the average of peer services.
- **High-demand.** This scenario assumes the service is more popular than most of its peers. Common reasons for an especially high-ridership microtransit service include strong community support, strong stakeholder and employer relationships (often employers are strong advocates of the service), fare-free service, or highly effective marketing campaigns.

The proposed microtransit zone was assumed to operate from 6:00 AM to 9:00 PM on weekdays, and from 8:00 AM to 8:00 PM on Saturdays and Sundays. Based on this span of service and the capture rate developed above, ridership projections for a city-wide microtransit zone are provided in **Table 2**.

***Table 2**. Projected Boardings for Citywide Microtransit Zone*

Demand Scenario	Projected Boardings		
	Weekday	Weekly	Annual
Low	210	1,200	63,000
Medium	330	1,950	102,000
High	480	2,800	147,000

The existing service provided by Alamo Regional Transit (ART) delivers about 21,000 trips per year, meaning that even the low projections in Table 2 represent a dramatic expansion in transit usage.

Fixed-Route Transit

New Braunfels is not currently served by any fixed-route transit. To guide the creation of a future fixed-route network, the project team established a series of design goals:

- **Direct and linear routes:** Routes should be as direct as possible, providing efficient and time-competitive travel between important destinations. Service should be concentrated along the corridors that are likely to produce the most ridership.
- **Centered around transfer hubs:** Direct and linear bus routes enable easy transfers. To facilitate route-to-route transfers, "hubs" should be created where most or all routes come together. Based on analysis of land use patterns and performance in peer systems, two hub locations were identified: Downtown New Braunfels and Walmart (Walnut Avenue).
- **Realistic and sustainable operations:** The number of revenue hours accrued by a given network design annually is a factor of route lengths, desired headways, and service start/end times. The number of revenue hours required to operate the proposed fixed-route network should be comparable to similar cities with quality transit offerings.
- **Avoid one-way routing:** Routes should follow the same alignment in each travel direction as much as possible, allowing passengers to easily travel in both directions. In addition to lengthening some rider trips, maintaining separate alignments for each travel direction makes it harder for riders to understand the bus network.
- **Balance running times on both sides of downtown**: Each route should be centered on the downtown transfer hub. To ensure efficient usage of transit vehicles, the round-trip run-times (the time required for a vehicle to travel from downtown to one end of the route and back) on either side of downtown should be as close to equal as possible. The enables timed transfers, meaning that the vehicles should arrive at the hubs at similar times, minimizing waits for connecting passengers.

Based on these design criteria, the project team created a network of four routes. The alignment of these routes was then reviewed by New Braunfels staff. Comments provided during this review process are reproduced in **Appendix A**.

The proposed fixed-route network is illustrated in **Figure 2**. As drawn, the network places about 65,000 residents and 30,000 jobs within walking distance of a bus stop.[1] These totals represent about 70% of residents and 80% of jobs within New Braunfels.

***Figure 2**. Proposed Fixed-Route Network for New Braunfels*

[1] In this project, walking distance is defined as 0.5 miles.

As with microtransit, a capture rate was used to estimate the number of passengers that would use fixed-route transit were it available in New Braunfels. The capture rate is based on a number of factors, including land use patterns along the proposed routes, demographic characteristics, and performance of comparable services. In addition to capture rate, two additional service parameters must be defined to project ridership:

- **Headways:** 60 minutes headways are assumed; shorter headways were evaluated by the project team, but resulted in unrealistically high costs and significantly more service than is observed in peer cities throughout the United States.
- **Span of Service:** The proposed bus routes were assumed to operate daily from 7:00 AM to 7:00 PM.

Based on this information, boardings were projected for each proposed route. This information is summarized in **Table 3**.

***Table 3**. Projected Ridership for Fixed-Route Services*

Route	Projected Boardings		
	Weekday	Weekly	Annual
Red	150	900	46,800
Orange	200	1,950	102,000
Green	150	900	46,800
Blue	230	1,400	72,800
Total	**730**	**5,150**	**268,400**

Proposed Transit Network

In the *Ridership Estimates* section, on-demand microtransit and fixed-route buses were evaluated separately to understand the expected baseline performance of each mode within New Braunfels. However, launching a transit network comprised exclusively of one mode or the other could present severe operational constraints, as illustrated in **Table 4**.

***Table 4**. Performance Against Service Design Goals by Network Model*

Goal	Microtransit Only	Fixed-Route Only	Hybrid Network
Deliver citywide transit coverage	**Meets goal.** The proposed microtransit zone functionally covers all of New Braunfels. Riders can request trips from anywhere to anywhere within the service zone.	**Does not meet goal.** Even assuming a relatively generous 0.5-mile walkshed around stops, only 70% of residents are covered by a fixed-route only system.	**Meets goal.** A hybrid design can use microtransit to provide citywide coverage and fixed-route services to focus on key corridors.
Focus service on key corridors and destinations	**Somewhat meets goal.** More vehicles are assigned to high-demand areas, but trip aggregation (and efficiency) gains will be limited.	**Meets goal.** Bus routes can be designed to serve specific corridors and destinations.	**Meets goal.** A hybrid design can assign additional resources (bus routes) to important areas.
Develop a system that can be launched quickly	**Meets goal.** Microtransit services routinely begin operating 6-12 months from the day project RFPs are issued.	**Does not meet goal.** Fixed-route services typically take 18-24 months to launch. Items like vehicle procurement tend to take longer than on microtransit services.	**Meets goal.** A phased approach would allow microtransit to be launched first, with fixed-route service to follow as ridership grows.
Provide adequate capacity for future growth	**Does not meet goal.** Operating costs for microtransit-only systems tend to scale linearly with ridership. Essentially, if ridership doubles, the cost of each trip will not dramatically change, and the required fleet size will increase.	**Meets goal.** Fixed-route systems tend to become more productive (and cost-efficient) as ridership grows. Essentially, if ridership doubles, the cost of each trip will be cut in half.	**Meets goal.** A phased approach would allow fixed-route service to be launched once demand grows. This will dramatically increase total capacity from a microtransit-only system.

As shown in Table 4, a hybrid network that incorporates both microtransit and fixed-route transit best aligns with the service design goals for this TDP. In addition, a phased approach — where microtransit is launched first and fixed-route services are added as ridership grows — will allow the City to develop a robust transit network in a sound, data-driven way.

Recommended Phasing Plan

The recommended phasing plan assumes an approximately five-year network buildout, starting with a citywide microtransit zone and adding up to four bus routes. The plan is summarized in **Table 5**.

***Table 5**. Recommended Phasing Plan*

Phase	Network Structure	Launch Timeline	Launch Trigger
Short-Term	Citywide microtransit zone	As soon as feasible	Funding for initial launch is available.
Medium-Term	Citywide microtransit with 1-2 bus routes	2-5 years from plan adoption	Microtransit ridership within one or two of the proposed bus corridors grows to 100-200 trips per day. Above this threshold, bus routes will likely operate more efficiently than microtransit.
Long-Term	Citywide microtransit with 3-4 bus routes	5+ years from plan adoption	The remaining bus corridors reach 100-200 microtransit trips per day.

A snapshot of the service footprint during each phase is provided in the following sections.

Operations Snapshot: Short-Term

During this phase, the City is served by microtransit only. The footprint of the service zone is shown in **Figure 3**. Riders are able to request a trip from anywhere to anywhere within this service zone.

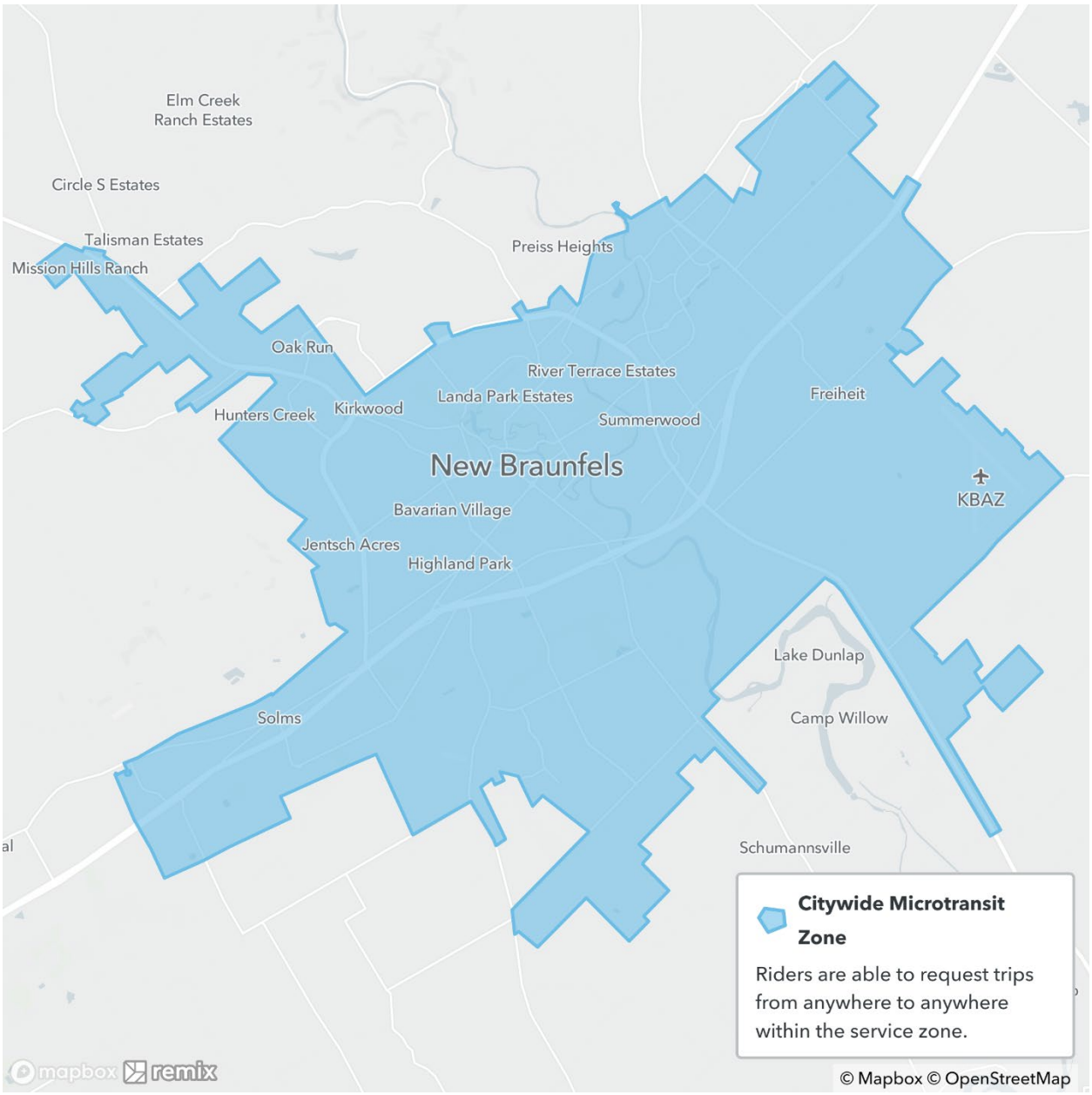


***Figure 3**. Short-Term Transit Network (Microtransit Only)*

Operations Snapshot: Medium-Term

Ridership on the microtransit system is expected to grow in the years following launch. Once ridership along one or more of the future bus routes reaches 100-200 boardings per day, the City should look to launch the first fixed-route services. Based on the areas served, it seems likely that the future Orange and Red lines will cross this threshold within 2-5 years from adoption of this plan. **Figure 4** shows the microtransit zone complemented by these two routes. If the Orange route is indeed one of the first routes to launch, the modified alignment shown in Figure 4 should be used. One the Blue route is launched, the Orange route should be changed to the alignment shown in Figure 2.

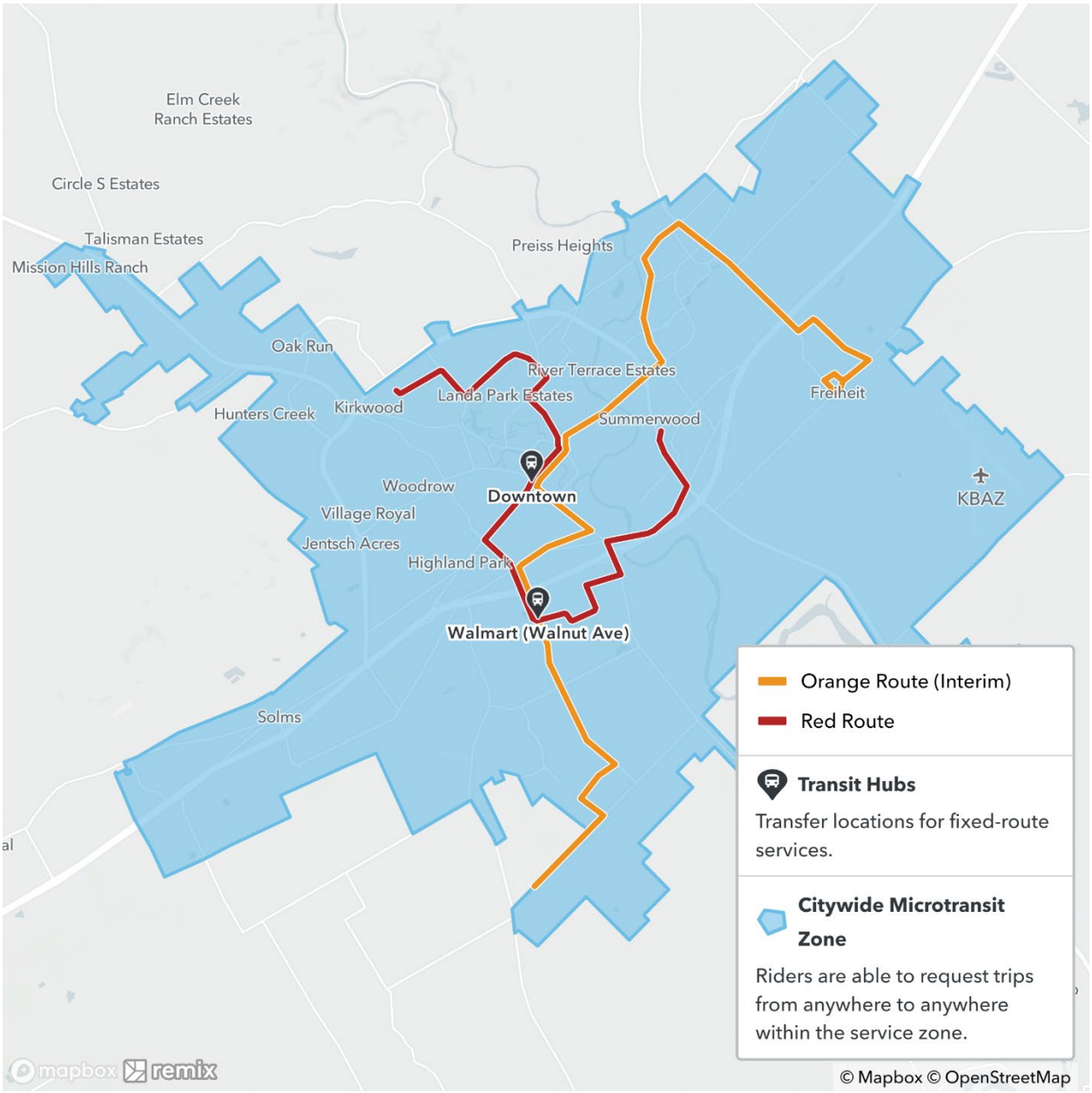


***Figure 4**. Medium-Term Transit Network (Microtransit with Two Bus Routes)*

Operations Snapshot: Long-Term

Once all four routes are launched, the network will appear as shown in **Figure 5**.

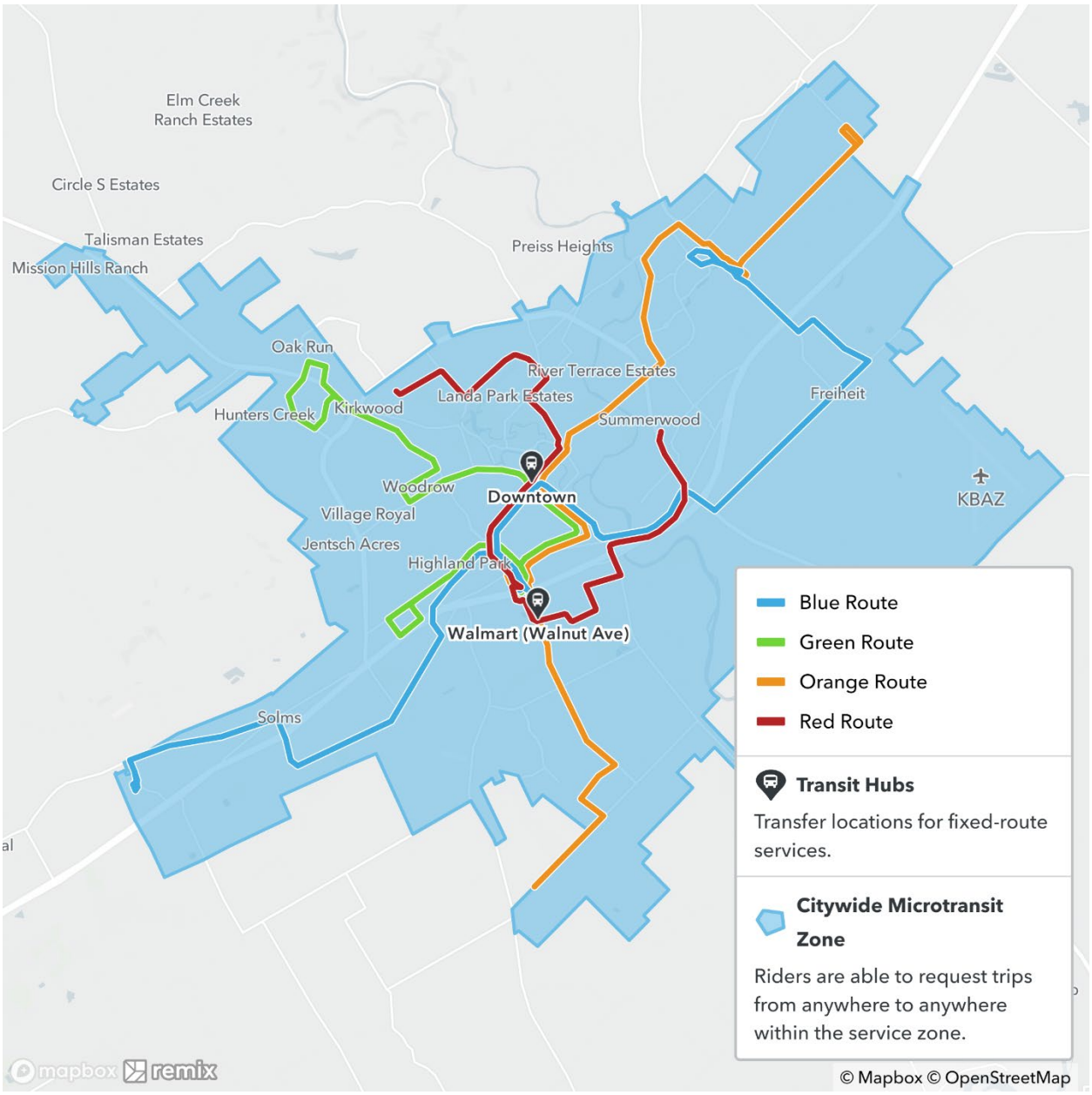


***Figure 5**. Long-Term Transit Network (Microtransit with Four Bus Routes)*

Fleet Requirements

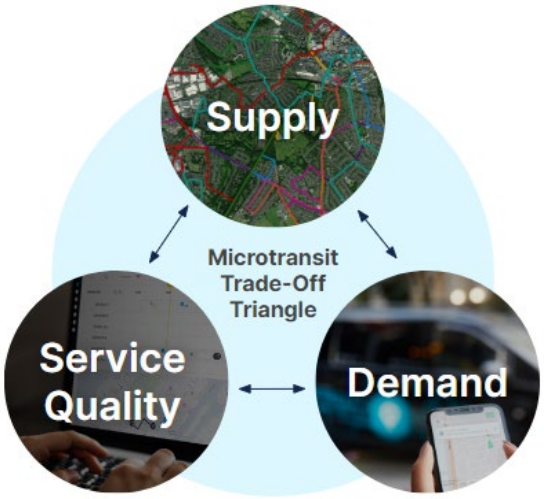
The following section develops fleet size and revenue hour estimates for the proposed transit network, and compares the scale of the recommended buildout to systems in peer cities.

Citywide Microtransit Service

Using the established zone boundaries, ridership estimates, and phased implementation plan, the project team conducted a series of microtransit simulations to number of vehicles and annual revenue hours to provide service in the proposed zone.

Approach to Microtransit Simulations

Designing a microtransit service requires balancing three fundamental variables: vehicle supply, rider demand, and service quality. Adjusting one leg of this "trade-off triangle" will affect the other two — for example, increasing service quality by shortening wait times will either (1) require more vehicles to serve the same number of trips, or (2) reduce the total number of trips the system can serve. By performing multiple rounds of simulations, the project team was able to identify the best fleet mix for New Braunfels. Additional details for each of the three key variables are provided below.



Supply can be measured by vehicle hours, total budget, or the size of the microtransit fleet. Supply also directly correlates with a microtransit service's ongoing operating cost. With increased supply, the microtransit service can complete more passenger trips while keeping quality of service constant or, alternatively, offer greater quality of service (e.g. shorter average wait times) if the passenger demand is kept constant. On the other hand, with reduced supply the quality of service will diminish if passenger demand is kept constant (e.g. longer wait times, fewer available seats at peak times). The reverse is also true — increasing supply can improve service quality if demand is held constant.

Demand is typically expressed in terms of a service's ridership, as effective service design should keep any unmet demand (e.g. rider cancellations or denied ride requests due to seat unavailability) to a minimum. Demand can be increased by enlarging the zone to serve additional activity centers, reducing fares, offering incentives to riders, or conducting focused marketing campaigns to raise awareness of the service. A significant increase in demand will necessitate either (1) lowering the target quality of service to keep vehicle supply constant or (2) adding extra vehicles to ensure that quality of service remains acceptable.

Quality of service encompasses various metrics for how fast, frequent, comfortable, reliable, and efficient the microtransit service is. Quality of service parameters are typically set using the microtransit technology provider's algorithm, although the exact parameters available for adjustment may vary slightly by provider. Significantly increasing quality of service will result in either (1) higher operating costs from the additional vehicles required to serve the same

level of demand or (2) a lower passenger capacity if no vehicles are added. These parameters are designed to balance the efficiency of service — which conserves vehicle resources and therefore operating costs — with the quality of service that riders experience.

Service Quality Parameters

In addition to vehicle supply and customer demand, the service parameters specified below have significant bearing on the quality of service riders experience. Carefully calibrating these parameters early in the microtransit design phase will help produce a service that effectively balances efficiency and cost with quality and rider experience. The parameters and recommended values presented in **Table 6** have the most bearing on a service's performance, cost-effectiveness, and customer satisfaction.

***Table 6**. Quality of Service Parameters for Microtransit Service in New Braunfels*

Parameter	Description	Recommended Value(s)
Stops Model	Two primary stop models are available. In **curb-to-curb service**, microtransit vehicles can pick up riders directly outside their requested pick up address and drop them off directly outside their requested dropoff address. In **corner-to-corner service,** passengers walk to a nearby corner (or to a predetermined hub location) to meet their vehicle at pickup. Riders also walk from their dropoff location to their final destination**.** Note: Riders who indicate they have a **disability will always be offered curb-to-curb service**.	**Corner-to-corner** Riders may be asked to walk a short distance between their requested origin and pickup location and/or their requested destination and dropoff location. Riders who indicate they have a disability will receive curb-to-curb service.
Maximum Walking Distance	In a corner-to-corner stop model, a maximum walking distance is set from the rider's location to the pickup point *and* from the rider's dropoff point to their requested destination. Transit industry research suggests that ¼ mile is the furthest most riders will walk to access local bus service. Note: Operators have the ability to reduce the maximum walking distance in areas without appropriate sidewalk coverage prior to and after a service's launch. Riders requesting trips from these areas will not be asked to walk.	**Max. Walk: 400 meters (about 1,200 feet) at either trip end** The average walking distance riders will experience is expected to range from 600 to 1,000 feet.
Maximum Wait Time	When a rider requests a trip, they will be shown a proposal indicating their estimated pickup time. During especially busy times, there may not be sufficient vehicles to pick up a passenger in a reasonable amount of time due to prior trip commitments. If a passenger has to wait longer than a certain threshold, the service is considered 'unavailable' for on-demand booking and the rider is not offered a proposal. Sufficient vehicle supply should be provided such that very few riders have their ride requests declined.	**Max Wait: 30 minutes** Average wait times are expected to range from 10-20 minutes. A 30-minute threshold is typical for on-demand microtransit services in moderate-density areas.

Parameter	Description	Recommended Value(s)
Detour Allowance	Detour allowance describes the relative and absolute detour thresholds that a vehicle can take to pick up additional riders when a rider is already on-board. If the detour exceeds the maximum allowance, any additional trips will not be assigned to a vehicle and those ride requests would be quoted a somewhat longer wait time.	**Max. Detour Length: 50% of base ride duration, or between 5 and 15 minutes total detour** Example: a 10-minute direct trip could only detour up to 5 minutes, while a 20-minute trip could detour up to 10 minutes.
Vehicle Capacity	Microtransit service is typically operated with vehicles in the minivan, van, or cutaway classes with seating capacity of at least 6 passengers. Larger vehicles can be used as available, although vehicles in the 6-8 seat range will accrue lower per-mile operating costs.	**Vehicle Size: Minimum of 8 seats and 2 wheelchair positions** Simulation results suggest that this capacity is not typically filled in any of the zones; a 6-seat vehicle could be used if desired.

Simulation Results

After establishing the zone boundary, ridership estimates, and quality of service parameters, iterative simulations were performed for the proposed zone. Across simulation runs, quality of service was held constant while demand was varied. This allowed the project team to identify required vehicle supply, as well as the number of vehicle hours that would be accrued each year of operation. The results of microtransit simulations performed for the proposed zone are presented in **Table 7**.

***Table 7**. Simulation Results for Proposed Citywide Microtransit Zone*

Zone Performance	Low Demand	Medium Demand	High Demand
Fleet Size *Vehicles required at peak (excl. spares)*	**4 - 5**	**5 - 6**	**7 - 8**
Weekday Ridership *Boardings*	210	330	480
Daily Avg. Microtransit Productivity *Boardings / Vehicle Hour*	3.5 - 4.5	3.5 - 4.5	3.5 - 4.5
Annual Ridership *Passenger Boardings*	63,000	102,000	147,000
Annual Vehicle-Hours *Hours*	**14,000 - 18,000**	**22,000 - 29,000**	**33,000 - 42,000**

Fixed-Route Buses

Unlike with microtransit, where a complex simulation process is required to estimate fleet size and vehicle hours, estimating the same values for fixed-route services is a relatively straightforward process. Both values can be estimated based on the length of each route, forecasted run time, span of service, and desired headway. Daily revenue hours for the medium-term scenario, where two routes are assumed to be operating, are calculated in **Table 8**. As discussed in *Operations Snapshot: Medium-Term*, the Red and Orange routes are assumed to launch first.

***Table 8**. Daily Fixed-Route Fleet Requirements, Medium-Term Scenario*

Route	Round-Trip Runtime	Route Frequency	Vehicles Required	Daily Revenue Hours
Red	75 mins	Every 60 mins	2	17
Orange (Modified)	110 mins	Every 60 mins	2	24
Total	**-**	**-**	**4**	**41**

Daily revenue hours for the long-term scenario, where all four proposed routes are assumed to be operating, are calculated in **Table 9**.

***Table 9**. Daily Fixed-Route Fleet Requirements, Long-Term Scenario*

Route	Round-Trip Runtime	Route Frequency	Vehicles Required	Daily Revenue Hours
Red	75 mins	Every 60 mins	2	17
Orange	110 mins	Every 60 mins	2	24
Green	75 mins	Every 60 mins	2	17
Blue	130 mins	Every 60 mins	3	29
Total	**-**	**-**	**9**	**87**

The daily revenue hours calculated and Table 8 and Table 9 are converted to annual values in **Table 10**. The number of revenue hours accrued by the fixed-route network each year is expected to remain constant regardless of ridership. Ridership increases will increase fixed-route productivity, but not require additional service to be provided – buses will instead operate with a higher load factor.

***Table 10**. Summary of Fixed-Route Fleet Requirements*

Revenue Hours	Medium-Term Scenario	Long-Term Scenario
Daily	41	87
Weekly	290	610
Annual	**15,100**	**31,700**

Cost Projections

The annual revenue hour projections generated for both microtransit and fixed-route services were converted to cost projections using an estimated cost per revenue hour value. This process results in an estimate of annual operating costs the City can expect to incur. Capital costs are accounted for separately from this calculation.

Microtransit

The assumed microtransit cost per hour was developed using data from the Federal Transit Administration's National Transit Database (NTD). Hourly operating cost data from 2019 for all demand-response operators in Texas was averaged and factored upward by 15% to account for recent inflation. Based on the outcome of this calculation, an hourly operating cost of $85 per revenue hour was developed. Using this value, the annual operating costs of the recommended microtransit service component were calculated. The results of the process are presented in **Table 11**.

***Table 11**. Annual Operating Cost for Microtransit Service*

Scenario	Annual Vehicle Hours	Annual Cost
Low-Demand	14,000 – 18,000	$1.2M - $1.5M
Medium-Demand	22,000 – 29,000	$1.9M - $2.5M
High-Demand	33,000 - 42,000	$2.8M - $3.6M

Fixed-Route

Hourly operating costs for the proposed fixed-route service component were calculated in a similar manner. NTD data for all fixed-route operators in Texas in 2019 were averaged and adjusted upwards by 15% to account for recent inflation. Fixed-route services can operate a greater range of vehicle types and sizes than demand-response services, so upper and lower cost per hour estimates were also established:

- **Lower bound:** $75 per revenue hour. This value represents the 20th percentile of 2019 operator costs in Texas, adjusted for inflation.
- **Midpoint:** $100 per revenue hour. This value represents the 50th percentile of 2019 operator costs in Texas, adjusted for inflation.
- **Upper bound:** $125 per revenue hour. This value represents the 80th percentile of 2019 operator costs in Texas, adjusted for inflation.

Based on these hourly cost estimates, annual operating cost projections were developed. These projections are presented in **Table 12**.

***Table 12**. Annual Operating Cost for Fixed-Route Service*

Scenario	Annual Vehicle Hours	Annual Cost
Medium-term scenario (two routes operating)		
Lower bound cost	15,100	$1.1M
Midpoint cost	15,100	$1.5M
Upper bound cost	15,100	$1.9M
Long-term scenario (four routes operating)		
Lower bound cost	31,700	$2.4M
Midpoint cost	31,700	$3.2M
Upper bound cost	31,700	$4.0M

These cost estimates are in line with the hourly operating costs incurred by neighboring systems. VIA, the public transit operator in San Antonio, reported an hourly fixed-route cost of $100 in 2019 ($115 per hour after cost escalation applied). Capital Metro, the transit operator in Austin, reported an hourly cost of $114 in 2019 ($131 per hour after cost escalation). Both of these values are higher than the midpoint established for New Braunfels, which reflects the higher cost of labor in both comparison cities, as well as the additional complexity of operating the larger comparison networks.

Summary

A phased approach and hybrid network design will allow New Braunfels to scale up transit investment as as demand grows. Initially, microtransit-only coverage will cost between $1.2 million and $3.6 million per year. At full buildout, a citywide microtransit zone and four bus routes is expected to cost between $3.6 million and $7.6 million per year.

Implementation and Management Model

Selecting a transit service model—continuing a demand-response style service like ART provides, implementing a fixed-route network, or opting for alternative solutions in between—will shape the delivery and structure of transit services in New Braunfels at least for the short to medium term. Additionally, the City of New Braunfels must decide on a transit management strategy to determine how transit services are operated. An important consideration will be whether the City elects to directly operate their transit system or pursue a purchased transportation model. In a directly operated management system, the city assumes full responsibility of day-to-day operations whereas a purchased transportation model contracts out varying degrees of management or operations to an external vendor or vendors. This memo introduces those options but primarily focuses on transit service models, which define the specific configurations and approaches employed to provide transportation options to the public.

Deciding between a directly operated, publicly run transit system and a purchased transportation model has significant implications for the City of New Braunfels. The scale of the transit department's role can range from full operation and ownership that offers complete control over service delivery to a turnkey solution that provides minimal involvement in day-to-day operations. Each option presents unique challenges and opportunities. Striking the right balance between flexibility, cost-effectiveness, and meeting the evolving needs of the community will be paramount in building a sustainable and successful transit system.

Directly Operated

In a directly operated transit system, the City of New Braunfels takes full responsibility for managing and operating the transit service. The City procures and owns the fleet of vehicles and recruits, trains, and employs the operators and maintenance staff. In addition to these essential components of directly operating transit service, the City is also responsible for things like strategic planning, route and schedule planning, capital and facilities planning (bus stops, stations), public communications, and customer service. Large transit agencies have a variety of departments tasked with various aspects of operations, and even though a transit department in a small city does not have the same scale of operations to manage, personnel in existing departments will be necessary to fill roles and responsibilities in financial management, procurement, legal, and human resource capacities. However, being in control of the entire operation provides the City with the flexibility to make real-time adjustments to the transit service and ensures direct accountability to the public.

Purchased Transportation

The City may also decide to contract out the transit service operations by issuing a Request for Proposal (RFP) for an operations management contractor. The contractor takes over the day-to-day management and operation of the transit service. This often includes handling operators, scheduling, maintenance, and dispatch. It may also include some aspects of customer service response, such as maintaining an information desk, phone line, and/or email communications for the passengers and public. The RFP will determine precisely which facets of transit service management the contractor will assume, its responsibilities to the City, and the aspects of transit management the City will provide with its own staff.

In addition to a Transit Manager (or equivalent position) that acts as the City's point of contact for its transit system, the City may fill other capacities with its existing financial, procurement, and human resources staff. The City typically retains control over strategic decisions, such as setting fares, approving route changes, and overall service goals. The contractor operates under the City's directives and may be required to adhere to certain performance metrics and service quality standards outlined in the RFP and ultimately, the service contract. The City must monitor the contractor's performance, ensuring that the service meets not only established quality standards but also complies with Federal Transit Administration (FTA) regulations, where federal grant money is concerned. Some aspects of monitoring and compliance may too be contracted out, but the City is required by FTA to monitor all its contractors and assumes full responsibility for its system's compliance with federal regulations.

Table 13: *Potential Shared Responsibilities in a Purchased Transportation Model*

	City's Transit Department	Transit Management Company
Route Planning and Design	Determines fixed-route and service expansion plans, considering public feedback and demographics	May assist in route planning, but final decisions often require city approval
Scheduling and Timetables	Sets policies and service standards	May develop schedules according to city policies and service standards
Vehicle Procurement and Maintenance	May procure the transit fleet with assistance of City's procurement department or rely on contractor to provide "turnkey" service	May oversee fleet maintenance or rely on external contractors
Driver Recruitment and Training	May use City channels to promote driver recruitment; monitors contractor for compliance with FTA regulations	Often recruits, hires, and trains operators in collaboration with applicable City guidelines
Fare Collection and Ticketing Systems	May manage some fare collection or selling of passes on City property	May implement and manage all fare collection systems, reporting revenues to the city; option for 3rd party vendor specifically for ticketing/passes as needed with input from City
Customer Service and Information	May field customer comments, questions, and complaints through general City channels and handle in-house or relay to contractor; Prepare relevant Title VI reporting to track complaints and resolutions	May maintain various avenues for customer service, including help desks, phone lines, and email addresses focusing on operational aspects and maintaining service quality, forwarding other matters to the City; Prepare relevant Title VI reporting to track complaints and resolution on behalf of City

Service Quality and Safety Assurance	Ensures adherence to safety protocols, monitors service quality, and addresses passenger feedback; Develops and implements public transportation agency safety plan (ASP)	Collaborates on service quality assessments, implementing city-defined safety standards; Implements public transportation agency safety plan (ASP) on behalf of City
Marketing and Public Outreach	Engages in marketing campaigns to promote transit services and reach out to potential riders	May contribute to marketing efforts, aligning with the city's strategic goals
Budgeting and Financial Management	Develops and manages the overall transit department budget, allocating necessary funds for operational expenses	Assists with financial management, providing operational cost estimates and financial reports to City
Data Collection and Performance Metrics	Collects and analyzes relevant transit data (including but not limited to NTD) to evaluate performance and inform future decisions	May support data collection and performance tracking, aiding the city in assessing service effectiveness or collect relevant transit data (for NTD and others) on behalf of the City for implementation as designed by the City

The specific responsibilities of a transit management company may vary based on the contractual agreement with the City. The level of involvement and authority delegated to the management company will depend on the terms outlined in the contract. Similarly, the City's transit department may have varying degrees of autonomy and resources, which can influence their roles in day-to-day transit operations and the overall efficiency, effectiveness, and other aspects of the service provided. **Table 14** provides an overview of how each transit operating model performs against these considerations.

***Table 14**: Comparison of Transit Management Models*

	Directly Operated Transit Services	Purchased Transportation Models
Service Efficiency	May offer greater service efficiency due to direct control, quick decision-making, and better integration with city services and departments	Service efficiency can be achieved through specialization, technology-driven solutions, and best practices gained from industry experience
Service Effectiveness	May offer greater potential for service effectiveness as transit may be regarded as a public good responding purely to local demands	May offer comparable service effectiveness with clear communication and performance metrics with the management company
Cost Effectiveness	City may have higher overhead costs if providing an in-house workforce, including dedicated operations and maintenance personnel, as well as the cost of maintaining vehicle fleets, including purchase of parts and products to support operations	Reduced administrative burden and access to specialized resources and technology may offer advantages
Decision-making control	Full control over operations and service decisions	City retains full control over service planning, delegating daily operational decisions to management company, City will provide general oversight and review of operations.
Innovation and expertise	Limited to City's capacity and resources	Can offer expertise, innovation, and best practices from managing multiple transit systems

Each model offers distinct advantages, and the choice should be tailored to the city's specific needs and demographics. A traditional fixed-route system with ADA paratransit provides reliability but may not fully address evolving transportation demands. A full microtransit service offers flexibility but requires careful cost analysis and ongoing monitoring to ensure the public is provided the proper value. The hybrid option presents an enticing middle ground, but its successful implementation depends on seamless coordination between the fixed-route and microtransit components. Via's analysis will dive deeper into each service scenario, examining financial feasibility, potential ridership, and impact on community accessibility. By evaluating these options comprehensively, New Braunfels can build toward a robust and sustainable public transit system that serves as the backbone of the city's future mobility.

Appendix A: Comments Received During Route Design Process

Comment Number	Location		Comment Text	Response
	Latitude	Longitude		
1	29.63641	-98.1259	Future Sports Complex site (early 2025) recommend Route 3 come down S Walnut to Sports Complex and then Return via Pahmeyer	Updated bus routing to terminate at future sports complex.
1A	29.63641	-98.1259	Agree. Can provide turnaround in the Sports Complex.	
2	29.66581	-98.0942	This route should turn onto Klein Road and continue to S Walnut	This leg was removed in the updated route network. This area would be served with microtransit instead.
3	29.69329	-98.0406	I think an Alamo College Stop could be an important route point. Needs more research	The airport and Alamo College are now included in the microtransit zone.
3A	29.69329	-98.0406	Agree. Potential microtransit connection from Clear Springs.	
4	29.71551	-98.1234	Propose route shift to Union Ave with access to hospital and doctor offices. Provide better access to neighborhoods on both sides. Recent sidewalk work on Union Ave. Schlitterbahn is limited to summer with overlap of their large buses. Recommend pedestrian improvements from Liberty Ave to Union Ave. Limited pedestrian accommodations on Liberty Ave.	Updated bus routing to run along Union instead of Liberty.
5	29.71605	-98.1176	Expressed interest in being on route. https://www.rockhausfoundation.org/	We would suggest serving this destination with microtransit initially and considering a route adjustment if justified by microtransit ridership.
6	29.7118	-98.1209	Propose route shift for better access to neighborhoods to the east. West is limited to Schlitterbahn, parking lot, and short term rentals.	Updated bus routing to run along Union instead of Liberty.
6A	29.7118	-98.1209	Union would provide better vehicle clearance and connect to Christus Hospital and planned ped improvements	

7	29.75685	-98.074	Consider loop of Goodwin to Conrads to FM 1102 to Orion back to Goodwin- access for Oak Creek Estates, Wasser, Arroyo Verde, NW Crossing, Quail Valley, Cloud Country, and future Sunflower Ridge, Dwelling Braunfels	Our team generally tries to avoid long one-way loops like this when designing routes -- they can be confusing to riders often perform poorly. In this case, it would also reduce the number of people within walking distance of the route. Moved the turnaround to Conrads to address concerns about routing on local streets; could revisit in the future if more land around Orion / FM 1102 is developed.
8	29.73921	-98.1038	Should at least have one stop in Gruene	Rerouted service from Common Street to Gruene in revised network.
8A	29.73921	-98.1038	Agree. Need route to Gruene. Anticipate frequent service between Gruene and Downtown.	
8B	29.73921	-98.1038	Consider public / private partnership with circulator or "trolley" style service including Downtown Association / Gruene business owners.	
9	29.69953	-98.1245	I think some cross over of stops is good for transfers, but I don't think the long lengths of overlapping routes are necessary	We would suggest keeping as-is for now. The current design concentrates service on the most promising transit (San Antonio and Seguin). This design also provides riders with more transfer opportunities.
10	29.71361	-98.153	Taking a left onto Walnut from Kerlick is difficult and dangerous	Bus rerouted away from this intersection in the revised network.
10A	29.71361	-98.153	Agree. Keep route on Walnut	
11	29.68233	-98.1176	This is a long stretch of single family residential to route through	Our team reviewed this and feels that the current routing is likely to perform better than moving the route down to County Line. Very little is within walking distance of County Line. Suggest keeping as-is for now, and revising if vehicle circulation issues arise in the future.
11A	29.68233	-98.1176	Agree. Recommend the segment of NB1 be moved to Northpark Ridge or County Line Rd.	
12	29.70748	-98.0741	Residential subdivision with high cut-through traffic complaints. Likely future traffic calming area	Removed service from this development and realigned north on FM 1101. Could

12A	29.70748	-98.0741	Agree. No route on local streets.	pursue Alves / Barbarossa as an alternate, but this would add about 5 minutes of travel time per run.
13	29.67914	-98.1501	Comal County Jail and Future Adult/Juvenile Probation and proposed mental health facility- Heavy service center	Updated route to run along Water Lane.
14	29.69125	-98.1364	Residential teen/young adult transitional housing - Connections	The proposed route network runs by this destination; a stop should be located nearby.
15	29.70708	-98.1465	Going up Laurel doesn't make sense.	Rerouted onto Walnut in revised network.
16	29.70911	-98.1352	Should we get any closer to Landa Park as opposed to Landa Park Dr/Landa?	The City can look to run a route along Fredericksburg in the future (instead of Encino / Laurel as drawn now). We would suggest keeping current alignment initially, as this connects more households to bus network.
16A	29.70911	-98.1352	Look for opportunity to provide ped/bike infrastructure on Landa Park Dr to connect.	
17	29.70587	-98.1065	Residential for adults with IDD	Noted.
18	29.70587	-98.1065	When we reach the stage of fixed route service this will likely be serviced by complementary paratransit	This location will be served by microtransit initially, and complimentary ADA service will be available once bus service is launched (the location is within 3/4 miles of a fixed-route service).
19	29.7181	-98.1507	Probably need a stop in proximity to the High School	Service added to this area in revised route network.
19A	29.7181	-98.1507	Look for opportunity to provide ped/bike infrastructure to connect.	
20	29.70951	-98.1003	Future transitional housing and possible Salvation Army	This location is served by a bus route in the revised network.
21	29.67613	-98.0752	Probably don't need this jog.	Jog removed in updated route network.
21A	29.67613	-98.0752	Agree. Recommend Walnut Ave, Klein Rd, FM 725, to Count Line Rd loop.	
22	29.7011	-98.1448	Route needs to come down here - Senior Center, Rehab Center, Largest primary care physician's office and Recovery Werks	Service moved onto Landa to serve these destinations in the revised network.
22A	29.7011	-98.1448	In addition to senior, affordable housing	

23	29.69071	-98.1457	Big section of workforce housing in addition to HEB fields. A stop in proximity would be good around here.	Noted.
24	29.70095	-98.1288	Future NB Youth Center	Noted.
25	29.70541	-98.0843	Potential extension of Seminole Drive would make a good stop with Canyon HS.	Updated routing serves Canyon High School and the FM 1101 corridor.
26	29.7132	-98.1635	Senior Center, Multifamily, Mission Hill Park, etc.	Updated routing includes service along Oak Run / Independence.
27	29.69563	-98.1199	Recommend this route be on Bus 35/Elliot Knox and not on local streets.	Extended the portion of the route along Seguin and removed from local streets. Suggest using Nacogdoches instead of Elliott Know to save about 3 mins of travel time per run.
27A	29.69563	-98.1199	NB3	
28	29.67357	-98.0389	Recommend turnback at this location vs local neighborhood streets. Need to coordinate with HOA.	Leg removed in revised route network. The portion of this area inside City boundaries will be served by microtransit.
29	29.68359	-98.1484	Consider WB San Antonio St to Loop 337/Rueckle for access to library, community center, etc. then EB on Morningside to Schmidt/Spur.	Updated routing includes service along San Antonio Street towards Loop 337.
30	29.69136	-98.1293	Does NB2 need connection to Walmart and another overlapping route on Walnut. Figure transfer in downtown to other routes.	The could always be removed in the future, but the current design provides a multiple benefits: (1) better connections to other routes and access to a key destination, and (2) balancing the runtime on either side of Downtown.
31	29.69913	-98.1051	Rivermill - future mixed use development.	Difficult to serve this location without a road bridge north of Elliott Knox Blvd. We would suggest serving with microtransit for now and considering a jog along McKenna / Porter / Wright in the future if ridership justifies it.

32	29.73687	-98.0978	Maintain NB1 on Common St with improved connectivity to adjacent developments. Refer to initial route recommendations.	Moved service to Gruene Road from Common Street in revised network. Developments along Common will still be served by microtransit (and are in walking distance of Gruene Road).
33	29.75936	-98.0671	Consider turnaround and potential small transit/parking area. Avoid route on local residential streets.	Updated routing focuses on Conrads, with a small section on Northern Lights to facilitate turnaround. Future infrastructure improvements could remove the section along Northern Lights.
34	29.70316	-98.1244	Need to clean up routes downtown and identify location of transit hub.	Noted.
35	29.69652	-98.1306	McKenna Children's Museum and Event Center should be considered for a stop	Noted.
36	29.70446	-98.1368	Das Rec should be considered as a stop	Noted.
37	29.69615	-98.1011	Market Place a potential stop	Noted.
38	29.658	-98.1093	Future SE branch Library / multiple schools	Updated routing serves this area.
39	29.72268	-98.1741	Current ridership maps show no trips beyond this point. Would recommend that in initial phase the terminus be at Oak Run	Routing updated to remove bus service from this area.
40	29.68027	-98.1472	Westside Community Center and Westside Library Branch High Demand area	Routing updated to serve this area.
41	29.68153	-98.1523	New Braunfels Police Department and Veterans Memorial	Routing updated to serve this area.
42	29.72411	-98.1274	Location supported by seniors. Eden Hill provides additional transportation services and may receive FTA funds (?) https://edenhill.org/edenhill-communities/contact-us/transportation/	Noted.
43	29.72153	-98.1242	Future destination. https://headwatersatthecomal.com/	Noted.
44	29.71295	-98.1124	Main Library. Major destination.	Noted.
45	29.70248	-98.143	City Hall should be considered as a stop	Noted.
46	29.72222	-98.0701	Resolute Health Hospital should be considered for a stop	Noted.

47	29.68312	-98.1103	Need to consider improved ped/bike infrastructure to allow access to McQueeney Rd and NB1	Noted.
48	29.64186	-98.1183	Connectivity to schools to the south and shared use path to the north.	Updated routing to continue past school location along Klein to future sports complex.
49	29.65535	-98.1965	Recommend turnaround on Azalea Way	Updated turnaround loop to Marigold / Aster / Azalea.
50	29.68479	-98.1079	Food bank is important connection as the accessibility to it now without a vehicle is poor	We suggest serving these destinations with microtransit initially; serving directly with a bus would introduce a detour/jog into the route.
50A	29.68479	-98.1079	In addition to Villa Serena - housing authority properties here	
51	29.71639	-98.1639	Shorten route to WB SH 46-> left on Oak Run Pkwy-> left on Independence Dr-> right to EB SH 46 (medical offices on Oak Run, apartments, Mission Hill Park, and HEB on Independence)	Updated routing contains this change.
51A	29.71639	-98.1639	Agreed with this. Maybe in later phases move past Oak Run Parkway	
51B	29.71639	-98.1639	Agree	
52	29.74492	-98.0566	Future demand along Kohlenberg corridor, large employers + Mayfair	The microtransit zone includes the west side of Kohlenberg (up to the City boundary). This area could be a potential future expansion once development occurs and funding is secured for coverage outside the City.
53	29.67754	-98.1563	First Footing Shelter - Old Fire Station 2	Suggest covering this with microtransit for now; serving this destination with a bus would force the line to run along the I-35 frontage roads.
54	29.70972	-98.0655	Take NB2 on Alves Ln to Barbarosa Rd.	Realigned the route north to FM 1101. Alves / Barbarossa would work as an alternate, although it would add travel time to the route.