WHAT CAN WE DO? - TRANSIT

Transit Element – In Coordination with VIA's Vision 2040 Plan

VIA Metropolitan Transit Agency has provided public transportation in the San Antonio area since March 1978. VIA currently operates 91 transit routes, with 7,080 bus stops and serves approximately 140,000 riders per day and over 44 million riders annually. VIA's services include frequent, metro, express, skip, VIA Primo downtown circulator, VIATrans, and Vanpool. VIA's first bus rapid transit (BRT) line, VIA Primo, which began operation in December 2012, circulates through downtown, then continues northwest along Fredericksburg Road to the South Texas Medical Center, with extended service to UTSA and Leon Valley. VIA Primo carries over 6,000 riders per day, and has increased use by 15% since it began operation. VIA also currently operates eight park & rides, ranging from 30 to 500 parking spaces, and five transit centers, primarily serving to facilitate transfers between transit lines. Almost 20% of VIA's daily boardings occur in the downtown area, 60% of which are originating from or destined for that employment center. VIA is implementing two transit centers at the west and east ends of downtown to provide an improved rider experience for the remaining 40% of downtown boardings served in that area. Centro Plaza (formerly Westside Multimodal Transit Center) serves about 60 buses per hour in the peak, and Robert Thompson Transit Center is currently in project development, expected to open in the 2017-2018 timeframe.

VIATrans service provides paratransit service for residents with disabilities who are unable to use the fixed-route system. This service provides approximately 1 million rides annually, using a fleet of 230 paratransit vans. VIA also offers a rideshare program called Vanpool, which allows six or more passengers the ability to commute up to 100 miles to their place of employment with trips either originating or destined for Bexar County. VIA recently initiated a new service, "The E" line which is a free downtown circulator that begins operating between the hours of 6 PM and midnight, Tuesday through Saturday, on March 28, 2015. The E service is a joint effort between CENTRO, VIA and the City of San Antonio to provide access to entertainment venues, dining and cultural sites within downtown.

VIA's bus fleet includes 450 buses, of which 30 are diesel/electric hybrids, 16 are 60 foot articulated buses fueled with compressed natural gas, and 3 are fully electric. VIA buses operate 7 days a week, from 4:00 AM to 1:00 AM.

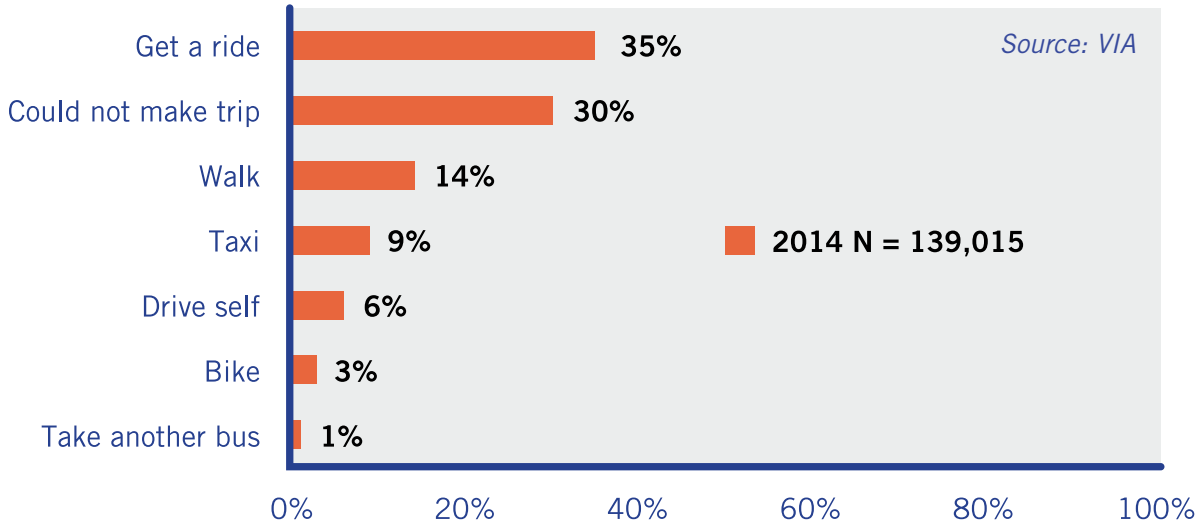
The highest boarding and alighting locations are heavily concentrated near downtown due to the level of bus service and concentration of access to employment and other destinations found downtown. While this information, along with that found in Tables 6 and 7 can help VIA plan improvements to respond to existing needs, transit services can be considered to offer more diverse choices to meet other major travel demands throughout the region. This will be studied further in the Vision 2040.

HOW DO PEOPLE GET TO THE BUS

2014 O&D Survey	
Mode	Percentage
Walked up	94%
Got a ride	4%
Drove	1%
Rode a bike	1%

Source: VIA

"How would you make this trip if the bus was not availabile?"



TRAVEL OPTIONS IF NO TRANSIT SERVICE

In the table to the left, you can see that the vast majority of residents that use VIA services walk to the bus, reinforcing the need to ensure that pedestrian improvements are prioritized in areas where there is high demand for public transit. While other means of access and egress like getting a ride, driving, or cycling are used less often, this may show an opportunity to improve bike infrastructure to better access areas where there is high transit demand, or to improve express services that cater more to the park & ride market providing access to other major employment centers

outside downtown. The bar chart on the prior page shows that many residents that rely on VIA would not have many other choices if their current service was not available to them.

VIA's current improvements in addition to Centro Plaza and Robert Thompson mentioned earlier include a transit center to be located at Brooks City Base, a comprehensive shelter program that includes the installation of 1,000 user-friendly shelters at bus stop locations across the service area with a goal to increase sheltered boarding from 50% to 95%, larger-scale improvements at existing transfer locations at Naco Pass and Five Points, a Park & Ride on the southwest corner of US 281 and Stone Oak Parkway, corridor mobility improvements in the I-35, I-10, and Highway 151 corridors, and new Primo services on Southwest Military Drive, Zarzamora, San Pedro, and West Commerce. Additional investments in the near-term include renovations at

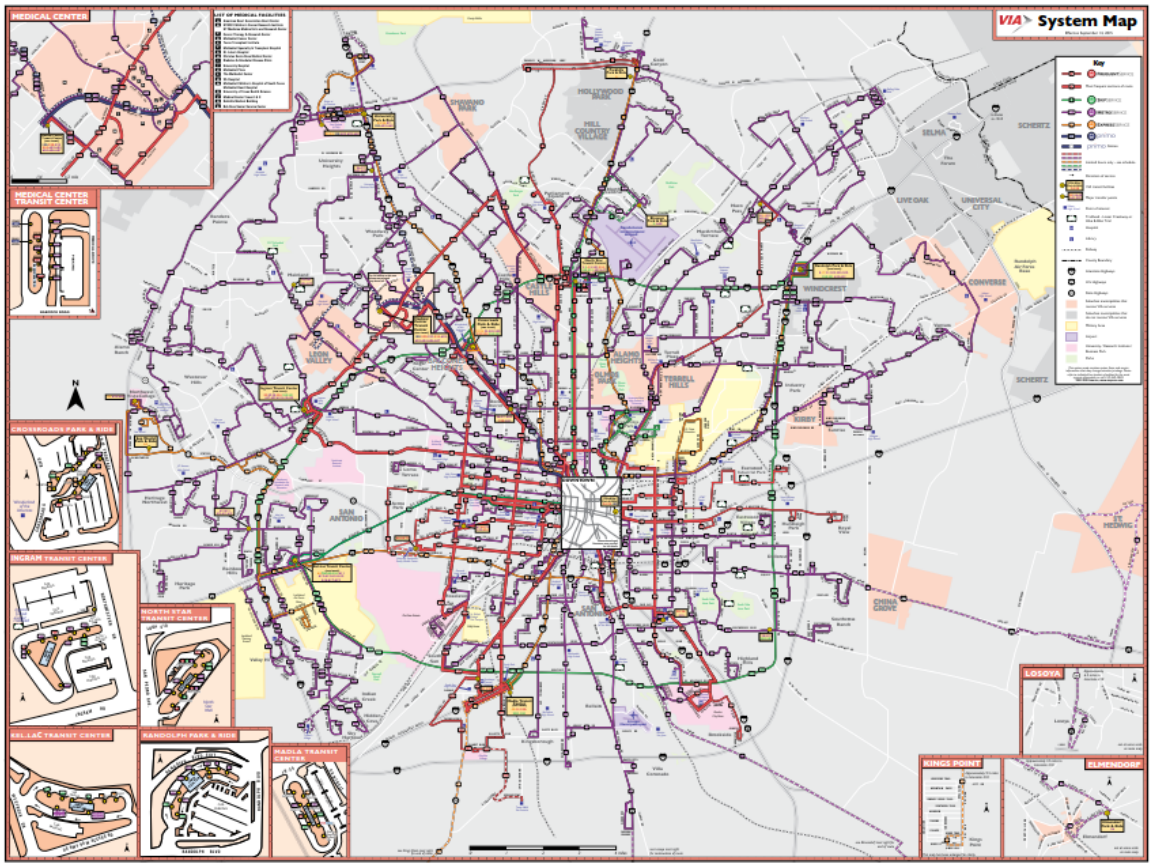


Figure 15 - VIA's System Map

several existing passenger facilities and the replacement of the entire VIA bus fleet over the next five to seven years. Vision 2040 will help VIA identify how to continue these investments once these projects have been fully implemented.

Transit Element Context – VIA 2040

The transit element of the SA Tomorrow will need to address capacity, mobility and access. Many of the current key roadway configurations in the city offer limited opportunity to expand capacity because of their narrow rights-of-way within established neighborhoods. At the same time, there is an increasing need to move more people as the population of the region grows. Part of that expanding population includes more seniors, transit dependent riders and those who prefer not to drive who will increasingly depend on transportation other than a personal vehicle. Furthermore, the destination of many residents is no longer exclusively to Downtown San Antonio, but to a growing number of activity centers around the region that demand improved transportation services as they evolve from minor collections of businesses into fully developed identifiable suburban and exurban communities.

Transit in the future will be as much about connecting the many outlying activity centers to the population base in the region and to each other as it will be about connections to downtown. This requires a broad approach to designing the transit element that relies less on radial connections into downtown and offers more direct links among the many centers in the region. The VIA visioning process is evaluating this shift in direction as they develop their long term plan. While the City's SA Tomorrow can help shape the VIA Plan as well as influence how transportation decisions are made going forward, it starts with the VIA Vision 2040 as the foundation for future transit development.

With limited ability to widen streets in many parts of the city because of the extent of the impacts on adjacent land uses and neighborhoods, there is a need to use the available capacity more efficiently. Such an approach is advisable under any circumstances, but essential where there are limits to modifying the roadway cross-section. More efficient use of the roadways could include enhancing the roadway environment through technology along with strategic physical corrections to improve performance in narrow corridors (e.g., widening intersections, access management, adding intelligent transportation systems (ITS) improvements, etc.). It can also be achieved by adopting a more multimodal transit-focus and replacing general purpose travel lanes in some corridors with high capacity bus-only lanes that can carry more people in fewer vehicles. Widening intersections, ITS, etc. will marginally help move more cars along crowded roadways. A renewed emphasis on transit offers a longer term prospect of realigning how people think about and use transportation that can lead to a much more equitable and sustainable emphasis on moving people rather than vehicles.

Among the corridors evaluated in SA Tomorrow, there are some that lend themselves well to an auto focus and others that will support a heavier emphasis on transit by virtue of the character of the land uses they serve. In all cases, because of the implications of some of the physical improvements needed, the changes will require a commitment to a chosen course of action. In the case of a transit-oriented plan, there will be many associated decisions about supporting land uses and allocating funding that will be needed to make the plan work. These decisions will be as much about the way land use and transportation work together as they will be about the physical infrastructure required to deploy the services contemplated. With the proper City policies in place and close coordination with VIA, the transit program can contribute significantly to accommodating the demand of the anticipated growth in the region, while doing so more sustainably.

Transit Element Concept

The transit program can be adapted to any circumstance. VIA has a successful system and provides extensive service on nearly 100 routes throughout the region. As VIA seeks to refine its network and assess opportunities for more robust service in corridors that carry high demand, the City will be asked to support decisions about aspects of the plan that require local agency action. The range of choices for transit service can vary from adding more buses to increasing service frequency where it is warranted to creating a transit-intensive network that can operate in parallel with other transportation modes and provide a comprehensive alternative to other travel choices.

Current VIA plans call for adding Primo routes, similar to the service operated now on Fredericksburg Road, on Zarzamora and SW Military Roads in 2018. These will operate largely as limited stop services augmented by a more extensive deployment of transit signal priority treatments to expedite transit operations where possible. Beyond that, based on the VIA Vision 2040 that is currently being developed, there will be more high capacity corridors introduced over time. Some of those include not only basic Primo services, but Primo Plus service which include dedicated bus rapid transit (BRT) and light rail transit (LRT). While these measures can provide an improved level of service in those corridors, to a significant extent the VIA Plan is dependent on the configuration of the roadways it uses and by what the City is willing and able to implement in support of transit.

SA Tomorrow takes a very long range view of the transportation system, but also identifies opportunities for short term improvements to critical corridors that will help all users regardless of mode. The transit element in SA Tomorrow provides a long range menu of future-oriented concepts that are designed to

stimulate thinking about how to handle transportation issues as comprehensively as possible in the future. Some of the options require a major investment and others have associated effects on their locations, but benefits outweigh challenges when taking a broad view of the long term plan.

More traditional concepts in the corridors also vary from BRT to LRT complemented by pedestrian and bicycle network improvements to facilitate the use of alternative modes. Many of these options require use of parallel or perpendicular links in the network because of limitations in the primary corridor, but are designed to provide an improved level of access while continuing to accommodate all travel.

Premium Transit and Choice Riders

Most are VIA routes are local buses that travel their designated route from stop to stop as riders request service. VIA also operates six express bus routes from outlying areas into the downtown. More recently, VIA has introduced the VIA Primo service which is a premium travel mode that uses modern rubber-tired, high capacity vehicles; improved fare collection systems, and controlled traffic signals to move riders more efficiently. Boarding takes place at "stations" rather than bus stops. The purpose of this premium transit service is to get riders to their destinations faster. The emphasis on premium transit service is designed to address capacity limitations in the system and the ability to more effectively serve as an alternative to the private vehicle. This latter point, the ability of the new service to entice choice riders who would otherwise drive, is a critical part of transit long range planning. This is where the public transit can have the greatest influence on how effectively the transportation system functions and can help mitigate long term transportation challenges.

Much of the transit program in the SA Tomorrow focuses on where high capacity transit options make the most sense. Working with VIA, the SA Tomorrow transit element makes recommendations for how San Antonio can help move travelers' perceptions of their travel needs beyond relying exclusively on a car to make a trip. The more efficient the transit system and the more convenient and comfortable the service, the more likely people will be to opt for public transportation.

VIA recognizes the local bus network is the backbone of the public transportation program and must be the foundation of the overall system. However, VIA Vision 2040, currently under development, shows a growing orientation toward introducing services that are likely to generate higher ridership in critical corridors. Over the next 25 years, the existing 18 miles of premium transit

services could grow to over 200 miles. That includes not only service into the downtown, but also services that will move travelers more directly between outlying activity centers such as the Medical Center and UTSA or Fort Sam Houston and Brooks City Base.

These new connections provide more efficient travel for all users in the corridors they serve, but a primary intent is to draw choice riders to transit in the interest of reducing cars on streets and managing congestion.

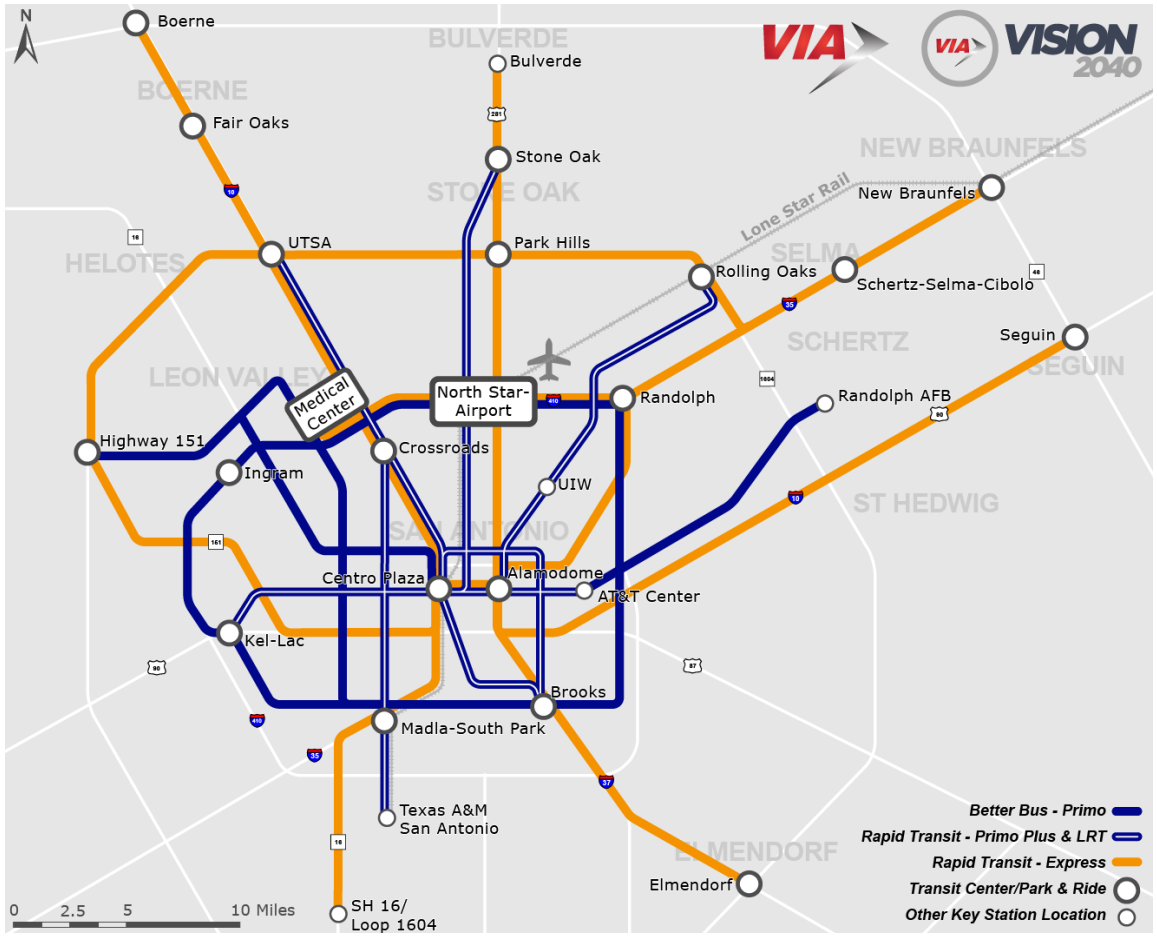
Within the timeline of the Vision 2040, forecasts of ridership suggest that some of the premium services could be BRT in dedicated lanes or LRT. Because at truly higher capacity levels of these modal options (i.e., dedicated BRT and LRT) require substantial advance planning, identification of routes and operating plans must occur far in advance of the actual deployment of the service. By identifying the key decisions and a timeline for their consideration, the SA Tomorrow can support the VIA Long Range Plan by offering a foundation upon which to build a comprehensive implementation strategy that makes transit a competitive element in the regional transportation plan.

The SA Tomorrow transit element is intended to complement the VIA plan and help the community see the role of transit more broadly within the overall transportation system. If transit can offer competitive travel times by making some key infrastructure changes, it can begin to move choice travelers away from cars and into buses or trains and help manage system congestion and improve safety. The SA Tomorrow identifies changes required to accomplish such a goal by taking a very long view of how the city's street network can be reinvented for a wider multimodal appeal.

Transit Modes

The success of how San Antonio accommodates the travel needs of both existing residents and those anticipated to move to the region over the next 25 years will depend on how comprehensively the City and the surrounding communities can adopt a multimodal approach to transportation. There is and will continue to be a heavy emphasis on the single occupant vehicle (SOV), but a critical broadening of the acceptance of other modes of transportation needs to complement the car given increasingly higher levels of congestion over time. Adding modes will help manage congestion levels and, more importantly, will give people a choice in how they move about the region.

A multimodal commitment goes beyond the transportation system in that it also needs a complementary land use plan that is built to support and encourage alternative mode use. Within the SA Tomorrow, there are references to key



land use decisions that will not only help build projects that will support transit and active transportation, but that will also help create places and activity centers around which community life will revolve and flourish. Well-structured, complete places have the added benefit of reducing the amount of travel needed to manage daily demands by locating many activities in close proximity to each other. Given the large projected increase in population, such activity centers and any possible reduction in trip-making they contribute, will be critical to the City's ultimate success.

Among the many modes discussed in SA Tomorrow and to be considered going forward are:

Bus - The backbone of the transit system in San Antonio is a large local bus network. It will continue to be the primary mode of public transportation, but its intent and network configuration could change over time to accommodate

other line-haul modes (i.e., BRT, LRT and streetcar) for which they can provide effective feeder services. There is also an express bus network that connects outlying areas into downtown that will continue to serve its current function. A circulator in the downtown area is proposed to to be replaced by a future fixed rail (streetcar) service which should also help focus development or redevelopment activity in the area. The ViaTrans paratransit system will continue to provide similar services though a more flexible bus system could accommodate some of the special demands of many paratransit users and afford them a more efficient service option with wider coverage. Daily transit ridership in San Antonio is over 140,000 and is expected to carry substantially more in the future as more people come to the area and require alternative mode options. In consideration of growing demand going forward, VIA's Vision 2040 contemplates new services and substantial increases in frequency on key routes.

VIA Primo Station along Fredericksburg Road

Bus rapid transit (BRT) - BRT in San Antonio is represented by Primo (mixed flow BRT) and proposed Primo Plus (dedicated BRT or LRT) services. These services offer a very attractive option on the most heavily travelled bus routes. The quality of the vehicles and the features and flexibility they afford the user are designed to entice choice riders to consider the benefits of taking the bus for many trips. Primo service has already deployed a successful service on Fredericksburg Road as a mixed use BRT and will introduced similar services on Zarzamora Street and Military Drive starting in 2018.

BRT is one of the most likely and appropriate components of the future San Antonio transportation network. It offers capacity and expeditious service, particularly in a dedicated guideway. That, at times, may come at the expense of single occupant vehicle (SOV) capacity.

VIA Primo Bus at stop on Fredericksburg Road

SA Tomorrow recommends aggressive reliance on dedicated BRT. Among the corridors recommended for BRT is Zarzamora Street, for example. (A Primo route is planned by VIA on Zarzamora to begin service by 2018.) Over time, given the limitations of the narrowest portions of the corridor and the expected growth in demand, a center-running dedicated BRT route in exchange for some of the SOV capacity would afford more person-carrying capacity than the current configuration. The individual corridor descriptions show how these are proposed to become part of the plan.

Light rail – Light rail is a high capacity mode of transit service that operates passenger rail cars in short, usually two or three-car trains, on fixed rails in right-of-way that is most often physically separated from other traffic. Light rail vehicles in the U.S. are typically electrically driven with power being drawn from an overhead catenary delivery system. Where LRT uses street rights-of-way, in most cases, it benefits from traffic signal priority treatments at intersections to permit efficient operation and allow closer adherence to schedules. Light rail vehicles can travel at over 50 mph in open isolated areas, but are required to abide by posted speeds on streets they occupy.

Streetcar - Streetcar systems are typically designed to serve a connection of nearby destinations, usually in a downtown, to expedite short distance travel among them. Streetcars travel more slowly, stop more frequently, usually carry smaller passenger loads and are less capital intensive than light rail systems. On the other hand, they are very effective at moving people within the localized environment in which they operate. Streetcars also help strengthen the connection between transportation and land use because they activate their routes and can pick up and drop off riders

in front of their origins and destinations. San Antonio has been developing a streetcar for downtown applications that has been paused pending further evaluation of funding and routing.

Dedicated right-of-way network – In VIA 2040, VIA has identified a future network of dedicated right-of-way corridors for the deployment of high capacity services. While there is no specific designation for the technology associated with each corridor (Primo Plus BRT or light rail), they include major roadways such as San Pedro Avenue, Fredericksburg Road, Barrera Parkway/Houston Street, Zarzamora Road, New Braunfels Avenue, South Presa Street, among others. These corridors would require a reconfiguration of their cross-sections to accommodate the dedicated service they would carry. This would impact car travel in those corridors, but as noted, would expand the overall person-carrying capacity of the corridor.

Lone Star Commuter Rail – Lone Star Rail is evaluating the initiation of commuter rail service between San Antonio and the Metroplex using existing Union Pacific Railroad tracks. The proposed route connects the cities of New Braunfels, Austin and others to the northeast with downtown San Antonio. The route also runs adjacent to San Antonio International Airport (SAT). While this is a separate undertaking not under the purview of VIA or the City, it has the ability to offer additional mobility within the region. Depending on the final configuration, a portion of the Lone Star Rail line could also afford access to light rail services into the downtown from SAT.

Dedicated guideway transit options, as contemplated in the Primo Plus program envisioned by VIA, will raise the level of service quality. The expansion of high capacity, high quality modes that can provide competitive travel times and high convenience and safety is an important element of a long range plan that will help balance travel demand among modes. Though in some cases, roadways may need to be widened, adding a high capacity transit service can often be accomplished without widening roadway cross-sections. Overall high capacity or rapid transit services are forecast to carry 190,000 daily riders in 2040 under the VIA Vision 2040 plan when combined with the necessary transit-oriented development (TOD).

The City of San Antonio has been participating in an organization supporting high-speed rail. The Texas High-Speed Rail and Transportation Corporation is a not-for-profit Texas corporation dedicated to bringing specific regions of the state together in a grassroots, collective effort to improve transportation and create a network of high-speed rail service in Texas that can connect to states and countries beyond.

Since its inception in 2002, the corporation's goal and approach has been to connect cities and counties by high-

speed rail in the main Texas "triangle" of dense population, including the Dallas-Fort Worth, Houston and San Antonio-Austin areas and points within, including College Station and Fort Hood. The corporation's members represent millions of Texans. The goal is to coordinate High Speed Rail within the triangle and to Monterrey, Mexico.

Mike Frisbie, Director, Transportation & Capital Improvements, City of San Antonio, currently serves as Vice Chairman of the organization. Our members share an intense interest in the future of transportation, are supported by a Legislative and Congressional caucus, and proactively pursue Texas' best interests.

Activity Centers – opportunities to provide connections to other modes, create walkable communities.

In coordination with the update of the Comprehensive Plan and in keeping with VIA's Vision 2040, the SA Tomorrow transit element places emphasis on activity centers around the region to define how demand for travel in the region will evolve over the next 25 years. In addition to the downtown, activity centers represent a primary focus of growth and an opportunity to manage how the region changes over time. From a transit perspective, the activity center plan provides a basis for reconfiguring transit services to offer connections that have not historically been available. The link to the downtown will continue to be strong, but employment centers in particular are adapting to a more distributed pattern of growth and demanding more flexible travel options.

Historic travel patterns were city center oriented and service designs reflected that radial pattern. The issue now is that the radial transit network design required most transfers to take place in the downtown even if travel was between activities on the outskirts of the urban area. That inconvenient and time-consuming system design is being updated to serve changing demands more efficiently. VIA proposes direct links among many of the identified activity centers which can also provide more direct access to the downtown and other locations at transfer points within the activity centers.

The other consideration related to the activity center design concept is that, while activity centers may have evolved from an auto-centric development pattern, they are also a potential for creative land use planning that can help tie the region together. Introducing TOD development with walkable environments and ready access to local services can

help reduce demand for long distance congestion-inducing travel. Some of this may be accomplished through overlay district zoning that will define TOD and sustainability requirements and could be implemented at least partly through value capture financing and P3s within the activity centers. These could help encourage transit ridership and could reduce the demand for highway capacity on major routes between activity centers.

SA Tomorrow identifies concepts for long term transit development that take advantage of the corridors that link the activity centers. The activity center concept allows for a renewed interpretation of travel by any mode but an opportunity to encourage transit ridership through complementary land use and transportation system design.

VIA's Centro Plaza Multimodal Transit Center

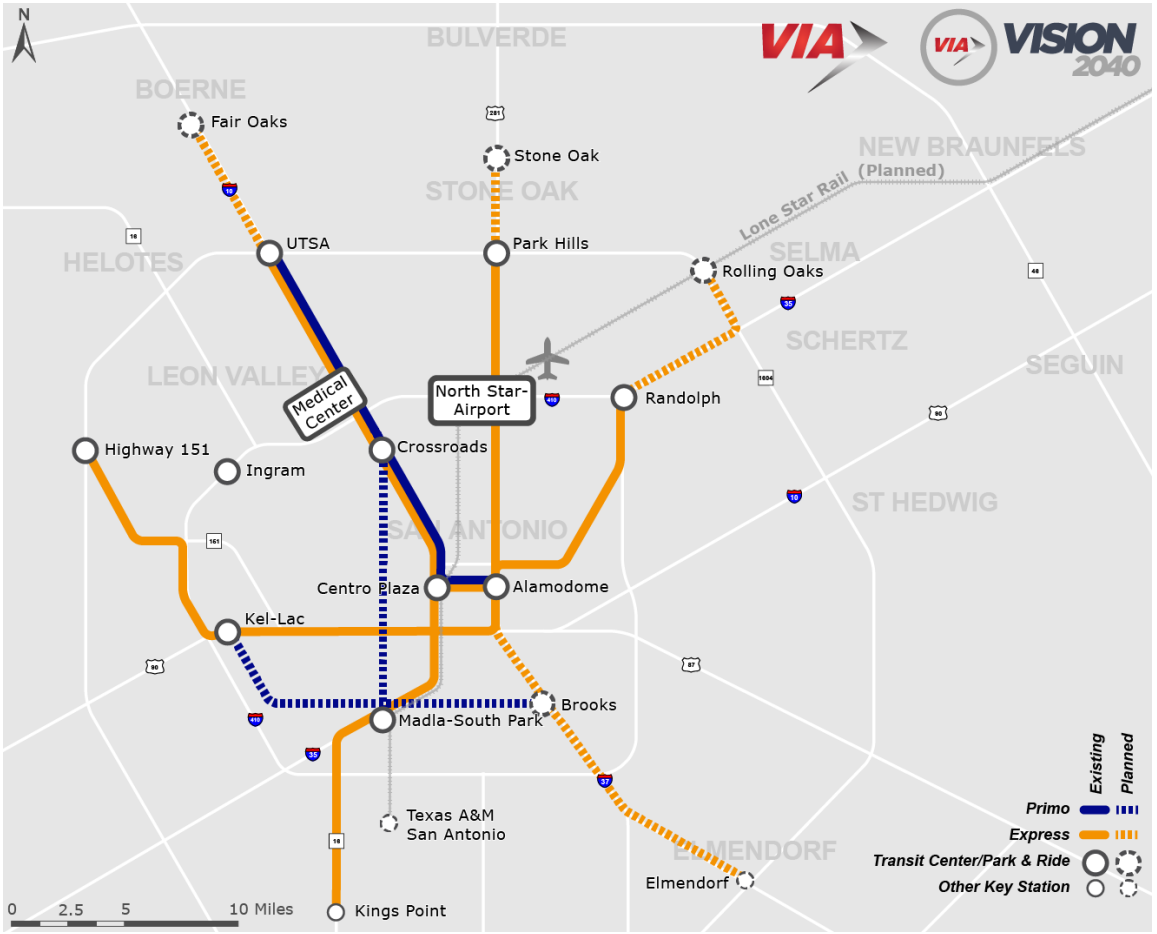
Transit Centers/Multimodal Centers

VIA operates six transit centers and eight park and rides throughout the region. Many more are envisioned as the VIA Vision 2040 comes together. Transit centers are a critical element of the overall transit system in that they provide an anchor for the system. In addition to access to users arriving from many modes (car, bike, walking, other transit users), transit centers define major transfer points and offer economic opportunities in support of the activity centers in which they are located. In San Antonio, placement of transit centers in the future will need to reflect the distributed growth pattern of multiple activity centers around the region to maximize their performance potential.

Transit centers are the connection points in the system. If closely coordinated to anticipated growth, transit centers will not only provide good transit service, they will provide a focal point around which land use and transportation needs can be managed as the communities develop. As noted in the above discussion, creating

a unifying context that requires less reliance on a personal automobile and the ability to reach work/live/play destinations effectively in the absence of such a vehicle. The transit center will define the transportation epicenter of the place. By coordinating the Comprehensive Plan, the VIA Vision 2040 transit center locations, both local and regional access will be enhanced for users.

Downtown transit center - Because of the importance of the transit centers in the structuring of the transportation system, there is one location that deserves special consideration: downtown. The Centro Plaza transit center brings many transportation choices together, including a future commuter rail option, in an attractive new facility. It lies at the west edge of the downtown and beyond a typical walking distance (about ¼ to ½ mile) of most downtown activities or destinations. At present, travel in the downtown area requires the use of the E, a downtown circulator, or various



bus routes that carry passengers along downtown streets to their destinations. Boarding and alighting as well as all transfers between routes happen on the street, which congests both streets and sidewalks in the downtown and creates other associated challenges. The lack of a specific central transit center, such as successfully built in other major cities such as Charlotte, NC; Phoenix, AZ and many other cities, also limits the economic contribution the transit system can make because it is less likely to attract supporting small businesses unless centrally located near the government center and the established urban core where the community comes together for various purposes. In the future, particularly if light rail or streetcar options are part of the plan, a well-placed central station near City Hall, the Riverwalk or other tourist or business centers will help redefine the downtown and provide a recognizable identity to the transit system.

Corridors

A main focus of the corridor assessment completed as part of the SA Tomorrow was to identify opportunities to broaden the use of select corridors beyond a singular focus on the automobile in a way that can accommodate more trips even if not more vehicles. Along with a transit supportive land use policy, the introduction of a multimodal context into the roadway environment, in many cases, requires some physical adjustments and, more importantly, requires a shift in the mindset of the users. Part of the objective is to show how a broader interpretation of the purpose of the roadway space can assist in addressing future needs. Growth in the region over the next 25 or more years suggests the existing automobile emphasis, by itself, will be insufficient to handle expanding travel needs. Hence, there will need to be a broader vision of how travel is managed and served in San Antonio.

That vision starts with how best to link transportation to local land uses so they function in a complementary fashion and provide opportunity for new or redeveloping land uses to take full advantage of a more comprehensive set of travel choices. The vision also includes a commitment to a multimodal approach to the long term transportation system that can address the needs of growth as well as the needs of a changing population. A large part of that approach will rely upon public transportation.
In addition to strengthening the transportation-land use link, there is also a need to prepare the corridors to adopt technology enhancements to improve system management opportunities and to position the transportation system to adopt new autonomous/connected vehicle technologies at the appropriate time. Good ITS and signal coordination within the corridors will help traffic flow as well as transit operations. Transit signal priority and some localized improvements can substantially contribute to improved

transit service quality in all the corridors. Connected/autonomous vehicles may offer an even more robust ability to deliver transit services.

The individual corridor concepts, viewed from a transit perspective, include:

New Braunfels Avenue – Narrow rights-of-way demand either a road diet approach (narrowing rather than widening the road or lanes for improved performance) or a major shift toward a transit intensive emphasis that relies more on transit than other modes of travel in how the corridor will be used. Near term recommendations include incorporating a mixed flow high capacity bus service that addresses high ridership forecasts for the corridor by VIA. New Braunfels connects major destinations and Route 20 already carries high patronage. In the longer term plans recommend more emphasis on public transportation and the supporting bike and pedestrian modes to encourage more people to travel in fewer vehicles among the major centers along or at the ends of the corridor. The roadway narrow right-of-way could take on a number of configurations including transit-only or transit with a single general purpose lane in each direction, along with enhanced bike/ped modes. The sensitive character of portions of the corridor limits how and where property can be acquired to widen rights-of-way if other uses are contemplated. In cases that preserve SOV travel on the roadway, bicycle travel would need to be moved to a parallel roadway such as Gevers St to the east of New Braunfels.

Zarzamora Street – Like New Braunfels, portions of Zarzamora Street are constrained by very narrow rights-of-way. Despite the street limitations, Route 520 bus service is one of the most productive in the city, but it has limited ability to expand service to the levels needed in the future based on travel forecasts. VIA has a plan to deploy a Primo route in this corridor starting in 2018. It is proposed as a mixed flow operation with transit signal priority and limited stop service supported by improved stations and facilities. Over the long run, the Primo service could evolve into a dedicated BRT corridor with improved and continuous sidewalks to streamline pedestrian movement and access to transit. This would address high ridership forecasts and help manage growing demand for travel in the corridor and the region. This configuration could require the reduction of travel lanes for other vehicles and could necessitate restrictions at intersections. Right-of-way in the northerly segment is limited, but the uses along the roadway are largely commercial and potentially more malleable than on corridors with residential frontage. South of US 90, the roadway widens and can better accommodate dedicated transit needs as well general purpose traffic in addition to improving pedestrian facilities.

Perrin-Beitel Road – The corridor is largely commercial within the segment under consideration. It has a reasonably

wide right-of-way that can accommodate a variety of cross-sections. The road carries a lot of traffic during a good portion of the day, but will not be able to grow substantially to handle much higher demand. VIA operates 20 minute headways on Route 14 and carries high ridership. Because of the ridership levels today and those forecast, VIA proposes Perrin-Beitel as a future high capacity corridor in their Vision 2040. Though not identified as such in the Vision 2040, because of the character of the corridor, Perrin-Beitel is an opportunity to introduce center-running BRT while strengthening transit support elements such as bikeways and pedestrian facilities along the corridor and connecting the corridor to the surrounding neighborhoods. The ultimate success of such a long term plan will hinge largely on a commitment to redevelop the corridor away from its heavily car-oriented personality and to manage access to encourage convenient and easy transit use.

Wetmore Road – This corridor links Loop 410 and Loop 1604. It runs adjacent to the San Antonio International Airport (SAT) and through a number of sparsely populated segments northeast of SAT prior to reaching regional centers on Bulverde Road near Loop 1604. There is currently no transit service on Wetmore and none is proposed in near term future plans. The industrial character of the road and its location adjacent to both SAT and UPRR creates challenges as well as opportunities. The advent of Lone Star Rail commuter service could benefit passenger services traveling to or from airport activities within the southerly portion of the corridor. However, there are limited pedestrian facilities to support such service at this point and redevelopment would most likely remain reasonably consistent with current uses because of its placement near the airport. Both conditions raise questions about the viability of a major passenger focus in the corridor.

Enrique Barrera Parkway – This corridor is relatively undeveloped, has underused rights-of-way and provides a direct link into the San Antonio downtown from Lackland AFB and the Kel-Lac transit center. East of the corridor, along Commerce and Buena Vista Streets, existing Routes 75 and 76 carry high ridership and are forecast to continue to do so. As a result, Barrera Parkway is identified as a potential high capacity corridor by VIA. An extension to the park-and-ride and even to Lackland AFB, along with supporting land uses, would allow future residents and businesses to evolve within the envelope of a high capacity service and become accustomed to use transit as their primary travel option.. The short term improvements revolve around traffic management improvements to realign offset intersections and strengthen access management. Both will benefit transit by eliminating conflict locations and improving traffic flow. The longer term proposed transit improvements include a dedicated BRT/LRT route as

Fredericksburg Road

well as connecting and improving the pedestrian and bicycle facilities. The available right-of-way will accommodate these features without substantially impacting the existing travelway.

Fredericksburg Road – This is a major corridor in the region that connects multiple activity centers. The first VIA Primo route operates in this corridor. Ridership is high and projected to grow much higher given the high density of residents and jobs in the corridor and the connections between Downtown and the Medical Center campus and UTSA which are among the key regional activity centers in the long term plan for the region. VIA is considering Fredericksburg Road as a potential future dedicated guideway BRT or LRT route to carry long term ridership forecasts. Much of the corridor boasts a wide right-of-way that can accommodate a dedicated guideway facility with some impact to general purpose lanes, but there may be room to adapt such a change given the many underutilized commercial centers along the route. In the narrow section of the corridor, closer to downtown, VIA is considering shifting the guideway alignment to the UPRR Kerrville freight rail line right-of-way to enter the CBD. Complemented with a strong transit-supportive land use plan that takes advantage of underused property and ready access to nearby communities, Fredericksburg Road could accommodate substantial growth in the corridor and provide the basis for a very successful residential and business corridor.

Applewhite Road – There is currently no transit service on Applewhite Road, but there is a major employer that could benefit from a good transit connection to the rest of the region for employee access. Until plans for the area become better defined, it is not likely transit will be a major factor. However, the opportunity

to establish a transit toehold in a very undeveloped area of the city, building upon the connection to the Toyota plant is appealing from a long term perspective. In the short term, this corridor will benefit more from adopting a transit-supportive land use plan than from the transit service itself. In the long term, the short term decisions could set the stage for a community that grows up with a multimodal mindset.

San Pedro Avenue – This is a heavily used roadway that links the San Antonio Airport area with downtown. It is also a heavily used transit corridor where Routes 3 and 4 reflect the demand for service between the airport activity area and the downtown. The San Pedro corridor travels from a highly suburban commercial district with a very wide right-of-way to a very urban environment in a constrained right-of-way. The corridor connects the airport area with downtown and is identified by VIA as a high capacity corridor. Travel forecasts

VIA's North Star Transit Center on San Pedro Avenue at Loop 410

support that designation. In the wider portions of the corridor, the incorporation of a dedicated transit facility for BRT or LRT as a center-running mode will provide a strong connection between transit and local land uses and open opportunities for more economic development. It is relatively easy to accommodate physically, though it will mean adjustments to the configuration of the right-of-way with some effect on the number of lanes and the arrangement of access locations. To the south, where the corridor runs adjacent to older, historic neighborhoods and educational settings, the narrow right-of-way requires a different accommodation of the transit element. BRT can run in mixed flow conditions in the narrower sections, most likely in the curb lane. There is also the potential to take advantage of the UPRR freight rail corridor that travels from near San Pedro and Hildebrand into the downtown. This option would need to be coordinated with a future Lone Star Rail commuter service proposed on the same tracks.

In the longer run, a vision of San Pedro as a "transit first" corridor is worthy of serious consideration. Increasing transit ridership and growing automobile congestion in the corridor will precipitate bolder choices that will require modifying current practice. As the community grows more comfortable with an expanding and increasingly effective transit system, a transit first or "transit only" treatment may become a realistic and necessary option to meet travel needs.

Culebra Road – Provides a major east-west connection between downtown and the growing communities to the west. VIA Route 82 travels Culebra from downtown to the vicinity of Loop 410 at 30 minute headways. Because much of the growth is forecast to occur in the northwest portion of the region, improved transit services will be essential to provide existing and future residents and employees with a viable alternative to driving. In light of that forecast, VIA's Vision 2040 Plan contemplates frequency to be improved to between 15 and 30 minutes in the future. In addition, Culebra also represents the easterly portion of a proposed VIA Primo route that extends from the downtown to the northwest along Bandera Road.

Babcock Road – Also in the northwest of the City, Babcock Road connects Fredericksburg Road with the southerly side of the Medical Center campus. VIA Route 522 currently serves Babcock Road with 30 minute headways. VIA Vision 2040 proposes to reduce headways to as low as 15 minutes and has also identified the combination of General McMullen Dr and Babcock Road as a potential future Primo route given high forecast ridership figures.

SW Military Drive – This is a very suburban, largely commercial corridor that is the primary east-west arterial connection south of downtown. Transit usage is high on Routes 550 and 551 which are part of a major route element that encircles the city. VIA proposes to begin Primo service on SW Military

Drive as a mixed flow BRT in 2018. The environment of the corridor is suburban with a predominance of strip and subregional big box commercial establishments fronted by large parking lots. Residential enclaves are located immediately behind the commercial uses and could become a basis for higher capacity services if improved connectivity to the corridor can be established. The corridor is very wide and could incorporate the requirements for a fully dedicated BRT operation that will become critical as the area grows and needs to accommodate more residents. In the event of redevelopment, consideration should be given to enhancing the attractiveness of transit, including a dedicated median-running BRT and associated amenities, by strengthening the connections between the residential uses and the corridor transit operation. That means stronger bicycle and pedestrian linkages and coordination with property owners to evaluate better use of underutilized space such as parking areas adjacent to the roadway.

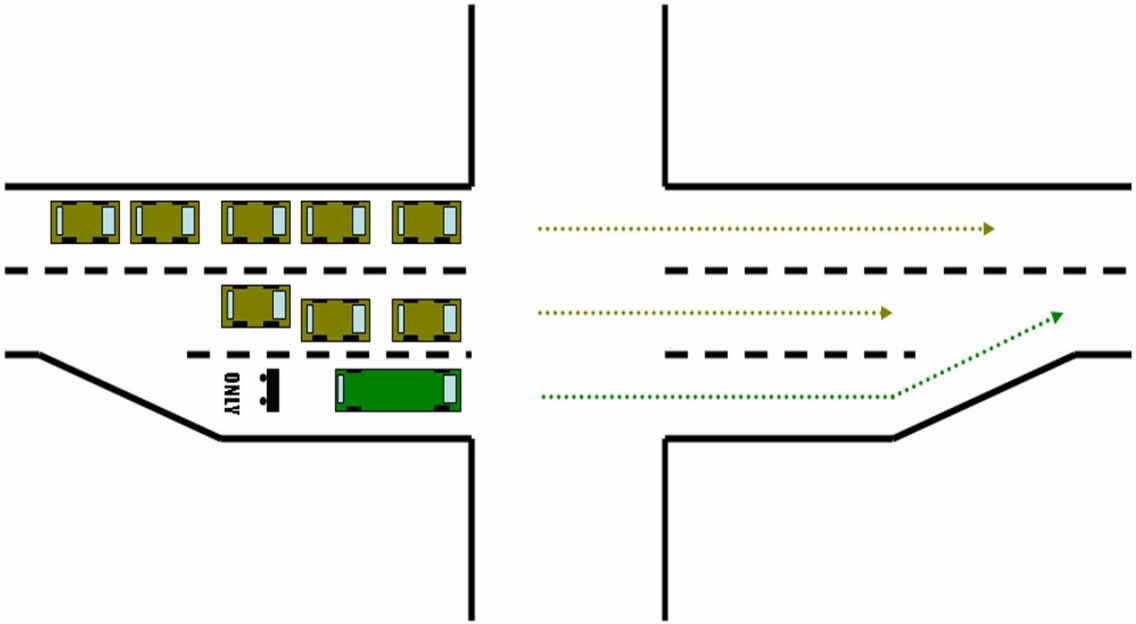
E Houston Street – VIA Route 24 transit service on E Houston Street links downtown San Antonio with the AT&T Center and beyond at 15 to 20 minute intervals. High anticipated demand shows a potential dedicated guideway Primo or LRT service in the 2040 Vision. The corridor's proximity to downtown and the connection to major activities near the AT&T Center suggests ridership will remain high or grow in the future.

Innovative Ideas & Technologies

Transit signal priority – Transit Signal Priority (TSP) is a general term for a set of operational improvements that use technology to reduce stopped time at traffic signals for transit vehicles by holding green lights longer or shortening red lights. TSP may be implemented at individual intersections or across corridors or entire street systems and has become a widespread technique to improve the reliability of transit services in many communities. In effect, TSP accommodates transit needs rather than preempt the needs of the rest of the users of the transportation system. TSP can reduce trip times by as much as 25% when properly installed and managed. In San Antonio, TSP is advisable for every corridor with transit service and is essential on those offering high capacity services. Fredericksburg Road and Medical Drive currently have TSP for VIA's Primo Service. VIA has plans to implement TSP with the city's assistance, on Military Drive and Zarzamora.

Queue-jumping signals/lanes - A queue jump is a type of roadway geometry used to provide preference to buses at intersections, often found in bus rapid transit systems. It consists of an additional travel lane on the approach to a signalized intersection. This lane is often restricted to transit vehicles only. A queue jump lane is usually accompanied by a signal which provides a phase specifically for vehicles within the queue jump. Vehicles in the queue jump lane get a "head-start" over other queued vehicles and can therefore merge into the regular travel lanes immediately beyond the signal. The intent of the lane is to allow the higher-capacity vehicles to cut to the front of the queue, reducing the delay caused by the signal and improving the operational efficiency of the transit system.

This technique would also apply throughout the San Antonio system, but has highest benefits as well as greatest challenges in the narrow rights-of-



way of corridors such as Zarzamora or New Braunfels where widening of an intersection will have a potentially major impact on local properties. In many cases, it may still be worth investigating the opportunities to improve bus flows if enough benefit can be derived from the improvement.

Vehicle location systems/Automated traveler information system - Automatic vehicle location (AVL) describes the use of computers and global positioning systems (GPS) in dispatching and tracking transit vehicles. AVL is accompanied by added costs of operating and maintaining additional computer equipment, but transit agencies benefit from improvements to customer service through real-time information. Operating costs, however, are not generally reduced by these improvements. Because AVL is becoming so common, it is increasingly becoming expected as standard for fixed-route systems, often as a downloadable application on a smart phone. AVL is very

common on BRT systems. This is typically a technique that can be applied uniformly throughout a transit system operation to help inform riders and keep track of vehicle operations.

Dedicated transit right-of-way (ROW) – The ability to operate buses or trains in dedicated rights-of-way offers significantly improved control over transit service performance. Schedules can be better adhered to, safety is enhanced for both passengers and other users of the transportation system, and there is a clear SA Tomorrow of the purpose of the right-of-way where modes would otherwise share it. In San Antonio, the SMMTP has proposed dedicated BRT or LRT corridors on a number of key corridors including, Fredericksburg Road, Military Rd, Zarzamora, Enrique Barrera Parkway, San Pedro and potentially others. The intent is to offer the best possible access to bus and rail services in the primary corridors of the city.

The use of dedicated rights-of-way will pose challenges where they are proposed because it represents a major departure from a primarily car-oriented environment in favor of the idea of moving people over vehicles. In some corridors such as Zarzamora, the narrowest right-of-way will involve reducing auto travel lanes from four to two to accommodate a dedicated BRT guideway in the middle of the street. In others, such as Enrique Barrera, there is sufficient right-of-way that can be used to provide the necessary transit space within the street.

Transit/pedestrian-only corridors – Among the most far-reaching system design concepts considered that builds on the concept of dedicated guideways, is the idea of transit/pedestrian-only corridors could vastly improve transit and alternative mode operations. This entails the elimination of cars from certain corridors or portions of corridors that carry high transit ridership and cannot effectively accommodate sufficient dedicated space for all modal demands. In these cases, the plan is to offer priority consideration to transit services and the active transportation modes that best support them. Because some of the rights-of-way are so narrow, elimination of cars would allow for the introduction of dedicated busways and supporting well-defined pedestrian and bicycle networks.

At the more ambitious end of the transit/pedestrian-only spectrum is a transit-only network that would allocate key corridors to dedicated high capacity transit service and remove other automotive travel from the selected facilities (subject to appropriate exceptions) to create a network of transit/ped/bike-only corridors. The intent is to introduce a transit-based network that encircles downtown, provides cross-town connections and link key external activity centers in a way that would comprehensively complement automobile travel in the metropolitan area. This system design requires extensive adaptation of the current transportation network and critical decisions about the adjacent areas to support land uses that will

guide and accommodate some of the anticipated regional growth inside the urban area, strengthen ridership and help reduce vehicle usage and manage vehicle congestion.

Autonomous/Connected transit vehicles - This is a rapidly evolving segment that will very likely define how we think of all transportation in the near future and transit will be affected in a major way. As autonomous vehicle/connected vehicle (AV/CV) technology evolves, everything from service coverage to vehicle technologies to labor requirements stands to change for VIA. VIA's leadership will need to completely re-think their services and fee structure in order to stay relevant and competitive in the new transportation environment. VIA might consider:

» Leveraging private mobility companies (e.g., Uber, Lyft, etc.) to provide first/last mile solutions in support of an emphasis on longer-distance transit services such as Primo and Primo Plus. This concept could also be applied to paratransit services. More recently (April 2016) VIA partnered with Uber during Fiesta (a local annual San Antonio celebration with numerous events) to provide riders with a complete trip to and from major Fiesta events scheduled over the weekend (See Figure 15). VIA riders traveling to and from 3 Fiesta park and ride locations were able to use Uber for the first and last leg of the trip. Uber transported people to and from the park and ride locations connecting with VIA buses completing the trip.

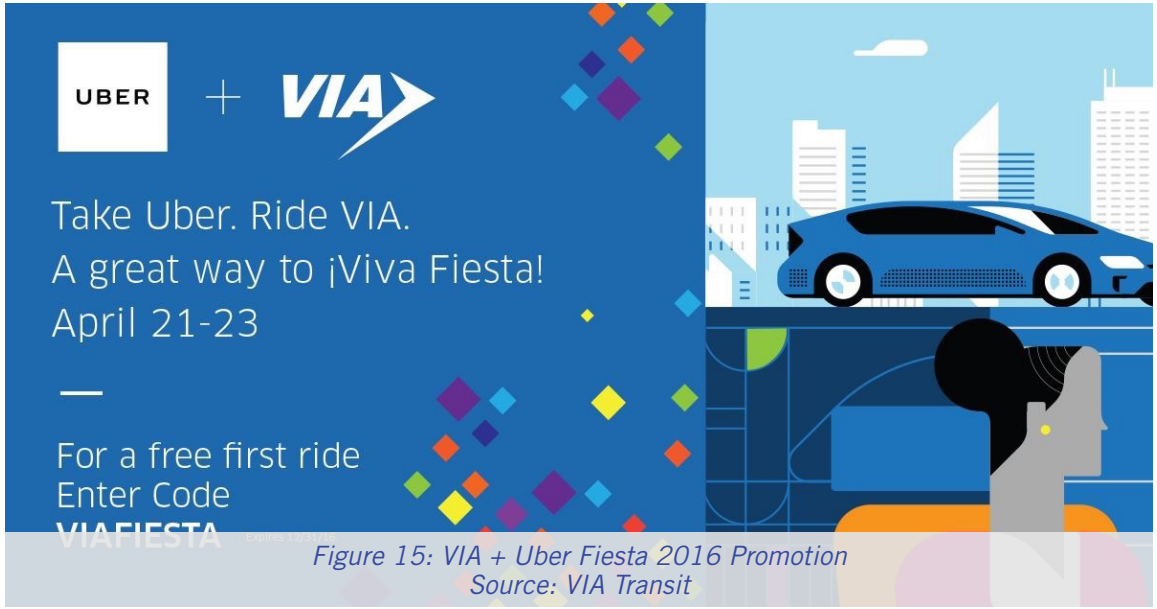


Figure 15: VIA + Uber Fiesta 2016 Promotion
Source: VIA Transit

» Transitioning the transit fleet to take advantage of driverless technology. The most readily adaptable element could be BRT and other services operating in protected guideways. Such services already exist in places.

VIA will also need to re-evaluate its fleet management plan in order to incorporate driverless and connected vehicles in its fleet. This will have significant implications for labor requirements (and union agreements), maintenance facilities, maintenance workers, safety and security of passengers, etc.

In the near-term, connected vehicle systems could begin to replicate or replace existing transit technology, such as Automated Vehicle Locator (AVL) and Transit Signal Priority (TSP) systems. As more vehicles and traffic signals are equipped with connected vehicle

technologies, the Dedicated Short Range Communications (DSRC) radio technology could ultimately replace stand-alone AVL and TSP systems, reducing VIA's deployment, operations and maintenance costs. This potential should be considered as part of any evaluation of further AVL or TSP system investments.

Car share programs - Car sharing is becoming increasingly popular with its promise of personal convenience and social improvement. Car sharing is a model of car rental where people rent cars for short periods of time, often by the hour. They are attractive to customers who make only occasional use of a vehicle, as well as those who would like occasional access to a vehicle of a different type from what they use day-to-day. The organization renting the cars may be a commercial business or the users may be organized as a company, public agency, cooperative, or ad hoc grouping. A popular commercial car share company is Zipcar which has locations in San Antonio. The principle of car sharing is that individuals gain the benefits of private cars without the costs and responsibilities of ownership. Instead a household accesses a fleet of vehicles on an as-needed basis. Car sharing may be thought of as organized short-term car rental.

While not a good alternative for daily commuting, car sharing can also help reduce congestion and pollution. Replacing private automobiles with shared ones directly reduces demand for parking. Since only a certain number of cars can be in use at any one time may reduce traffic congestion at peak times and strong metering of costs provides a cost incentive to drive less. Car sharing can provide numerous transportation, land use, environmental, and social benefits. Neighborhood car sharing is often promoted as an alternative to owning a car where public transit, walking, and cycling can be used most of the time and a car is only necessary for out-of-town trips, moving large items, or special occasions.

Community based alternatives

» Volunteer ride share
» Entrepreneurial businesses

Recommendations for Policy Changes

» Transit oriented development zoning/ incentives – Density bonuses, parking reductions, fee adjustments, etc., should be considered as a means to entice development into "opportunity areas" and create transit-friendly conditions in support of transit services
» Development requirements – incorporate transit and multimodal requirements in all development approvals as they are now for roadways or consider in-lieu financial contributions in specialized cases
» Provide amenities at transit centers/stations – Transit centers must be able to provide basic services in a comfortable and safe environment to help attract ridership
» Access management – Creating a coordinated plan for car travel in commercial environments that encourages sharing of driveways and reduction of unnecessary access points to help move traffic and make transit and active transportation options

safer and more convenient by eliminating obstructions and conflict points.

- Prioritizing sidewalks, curb ramps and crosswalks within a distance from a transit stop that connect to the local community
- Developing street design criteria that eliminate obstructions to multimodal transportation options and streamline automobile travel will help improve safety and reduce congestion
- Additional street lighting near transit routes and stations – The environment around transit is a major determinant of its success. Safety is essential to encourage ridership.
- Transit supportive development policies
  - Establish overlay districts that foster transit supportive practices in regional activity centers and along designated major transit corridors (e.g., Primo Plus corridors)
  - Locate denser uses and developments closer to high capacity transit facilities
  - Encourage active ground floor uses surrounding station areas to promote security
  - Manage parking through a district-wide strategy to reduce off-street parking between the street and building entrances.
  - Encourage maximum street side setbacks, rather than minimums. Encourage 0-10' maximum setbacks.
- Develop a development program and guidelines to:
  - Define project areas
  - Identify long-term circulation easements within the project area
  - Prepare regulating plan for project areas that defines base conditions for building envelopes: height, setback, access ways without infringing on established circulation easements.
  - Participate in the upsizing of infrastructure improvements to anticipate future redevelopment needs.
  - Allow short-term uses as a land bank strategy for essential parcels
  - Consider purchase of key parcels for lease backs to generate additional revenue to pay for O&M
- Emphasize the need to move people over vehicles as the region grows and congestion increases by prioritizing transit and active transportation enhancements over SOV improvements
- Ensuring direct and protected access for transit (like emergency vehicles) during special events
- Prioritizing transit signal priority (TSP) on corridors with premium transit service where service reliability is consistently challenged by localized congestion
- Pioneering comprehensive connected vehicle technology at intersections to prevent vehicle, pedestrian and bicycle conflicts and eliminate crashes
- Invest in regional multimodal trip planning applications to better inform citizens of transportation choices
- Maintain flexibility to accommodate future driverless buses

Prioritization of Implementation

The most common practice in western cities is to focus priorities on the roadway system expressly around expediting travel by car. While many of the proposed improvements in the SA Tomorrow also rely upon the roadway network for their success, how priorities are established going forward can be an effective way to establish a multimodal mindset within the community. The emphasis needs to be on what is most effective over the long run rather than what is accepted practice. Priority for implementation will be addressed on a case by case basis, but there are some basic considerations that can help establish a foundation for transit and active transportation modes to compete more effectively with the single occupancy vehicle (SOV). The main element in priority setting in a multimodal environment is to recognize the advantages of a wider range of travel options and treat them based on the objectives of the project and, ultimately, the system as a whole. In the interest of assessing priorities from a multimodal perspective, some of the following are worthy aspects of a more comprehensive transportation plan approach:

High transit demand corridors – Where transit ridership is already high or projected to be high, it is essential to invest in the success of the service to maintain ridership and improve its competitiveness with the SOV. High demand transit should be a significant factor in determining transportation investment priorities. These will often be compatible with automobile priorities. The difference is the priorities are defined by the transit element rather than the SOV.

Transit Centers/Rail Stations – As part of a multimodal commitment, establishing a safe, convenient and attractive user environment at contact points with the system is essential to multimodal success. The stations are often an economic development opportunity with the prospects for jobs and commercial activity if a transit supportive land use community can be built into the broader concept of station areas serving transit.

Activity Centers – The San Antonio region growth will be shaped by a series of regional activity centers (as further noted in the Comprehensive Plan) in addition to strengthening the downtown. This provides an opportunity to organize transportation investment around strengthening travel within and between the centers. Connecting activity centers is also an effective way to use a transit system in that it can help define a clearly established travel network within the region. This commitment to an activity center-based urban form will be most successful with strong multimodal linkages and in many case a high capacity transit connection. That should be a significant priority consideration in how the system evolves into the future.

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