13. POLICY RECOMMENDATIONS

In addition to the services and facilities conceptualized in the previous chapters, the RTFS also puts forth policy recommendations for regional transit. These policies are intended to improve the efficacy, efficiency, desirability and reach of regional transit services, both today and in the future; in fact, some of these policies are critical to their success. These policy recommendations, moreover, can be carried forward regardless of which recommended services are implemented.

These policy recommendations address topics such as regional cooperation, transit-supportive land use and development, bicycle and pedestrian access to transit, operations management, parking management, transportation demand management, the leveraging and integration of new technologies and services, and marketing and building ridership.

It is understood that some of these policies cannot be implemented by providers on their own but will require the assistance of municipal, county and state government and agencies as well as the private sector. Providers should work with each other as well as these other entities to promote policies that benefit the most number of people and provide the most service efficiency.

REGIONAL COOPERATION AND CONNECTIVITY

A truly regional transit framework that accomplishes the guiding principles of this study requires that regional transit providers work together; this cannot be understated.

Regional providers should not think of themselves in isolation or take the view that "everything ends" at their service area boundary. Transit riders want to travel all over the region. They are unlikely to place much importance on which provider is transporting them, as long as they are able to reach their destination conveniently, nor are they likely to regard "we can't serve you because you're outside our service area" as an acceptable response to their unmet transit need.

Areas of policy focus for cooperation and connectivity between regional providers include seamless services, regional fare, a single information source, and cooperative use of resources.

SEAMLESS SERVICES

Today, there is little connectivity between transit providers in the region. Where connectivity does exist, it is mostly in the form of peak-period express bus services that typically focus on commuter service in a single direction, from the suburban periphery to the urban core.

While efforts are being made to create other forms of connectivity between providers – for example, Harris County Transit's Baytown-LaPorte Shuttle now stops in the Gulfgate area to provide connectivity to METRO – interregional travel using public transportation is difficult and in many cases impossible. Some of the potential new services described in the previous chapters, such as Regional Bus and HCT Peak services, are designed to address this service gap, but the region's individual providers need to work together to plan, operate, fund and maintain these connections. There are several arrangements by which these connections could be provided:

Transfer points at the core

Where connectivity between providers does currently exist within the region, it typically takes this form. Suburban providers such as Fort Bend County Transit or The Woodlands Express operate non-stop Express Bus to downtown Houston, the Texas Medical Center, and other activity centers inside the region's core. From these activity centers it is possible for riders to transfer to METRO Local Fixed-Route Bus and HCT All Day services to complete a journey to a destination not

directly served by the Express Bus. These services, however, are geared towards traditional, peak-period "inbound" work commutes; reverse "outbound" travel using these services is theoretically possible but difficult due to schedule constraints and a lack of first mile/last mile connectivity at suburban park and rides. Midday connectivity on these services is very limited, and evening and weekend service does not exist at all.

Providers are encouraged to adopt policies that encourage reverse commutes on these services by optimizing schedules to better facilitate such travel, implementing first mile/last mile solutions (such as Flex Zones) at suburban park and rides, routing return buses through activity centers such as Sugar Land Town Square or The Woodlands Town Center, adding midday and evening runs, and marketing their "reverse" services to suburban employers. Coordination between providers regarding stops and schedules should also be undertaken so as to facilitate suburb-to-suburb commutes, such as The Woodlands to Sugar Land or Bay Area to The Woodlands, through easy connectivity downtown. Doing so will not only provide new transit options for suburban employees but also allow providers to gain revenue on commuter services that currently run empty back to the suburbs.

Transfer points at service area boundaries

While connectivity between service providers at the region's core should be enhanced, it is best suited for Express Bus services to core employment centers. Another logical point of connectivity between service providers is at service area boundaries.

Currently, this type of connectivity is relatively rare. There is the aforementioned Harris County Transit/METRO connection at Gulfgate near the eastern edge of METRO's service area, there is limited connectivity between Fort Bend County Transit and METRO services at the West Bellfort Park and Ride near the Harris/Fort Bend County line, and a recently-implemented Island Transit Express Bus Service to Galveston connects to METRO Express Bus services at the Bay Area Park and Ride at the southern edge of METRO's service area. Otherwise, the region's transit networks are currently so geographically isolated from one another that there are limited opportunities for these types of connections to occur.

As the region grows and new services are added, however, opportunities for these types of connections will arise. For rider safety and comfort, these types of transfers are recommended to take place at passenger facilities such as park and rides and transit centers. For example, new Local Fixed-Route Service in Pasadena could connect to METRO services at the Hobby Airport Transit Center or the proposed Lawndale Park and Ride. For Regional Bus services in eastern Montgomery County, the Townsen Park and Ride is a logical connection point to the METRO system. A proposed Enhanced Transfer Point in Seabrook could facilitate connectivity between services in eastern Harris County and services in Galveston County.

Contracting between providers

Providers can share the cost of providing services that cross service area boundaries through contractual arrangements. For example, an existing Local Fixed-Route Bus route might be extended to operate in an adjacent jurisdiction, with that service operator being reimbursed for the cost of providing service in the adjacent jurisdiction.

This arrangement provides a service option for municipalities which want transit service but do not have the capability to provide it. It also has the advantage of allowing riders to travel between service areas without transferring. However, it requires that the provider operating the service have sufficient capacity to operate this expanded service. It furthermore requires agreement regarding issues such as cost and farebox revenue allocation, ridership reporting (for NTD and formula funding purposes), liability, placement and funding of stops and shelters, and the like.

This arrangement is normally done through interlocal agreement; the agreement between METRO and Harris County Transit to operate and fund the Baytown Park and Ride is a notable existing example.

Contracting with third party/private sector entities

In addition to contracting with each other to provide services, transit providers can expand the reach of their services and implement completely new services by individually or collectively contracting with third parties (such as human and social service agencies) and private sector interests (such as taxi companies, TNCs or intercity bus services). For example, TNCs can be contracted to provide first mile/last mile service centered around a park and ride, and intercity bus companies can be contracted to provide a new Regional Bus or Express Bus service.

The Harris County RIDES service that contracts with area taxi companies to provide subsidized trips to eligible customers is a regional example of third party/private sector contracting.

Overlay transit services

This service provision arrangement does not exist in the H-GAC region but is common in other parts of the country. For example, in the San Francisco Bay area, Bay Area Rapid Transit (BART) provides regional HCT All Day service while local agencies (San Francisco Muni, AC Transit in Oakland, the Santa Clara VTA) provide locally-focused transit services which connect to BART. Sound Transit provides a similar role in the Seattle/Puget Sound area, providing regional Express Bus, HCT Peak and HCT all Day services while local authorities provide Local Fixed-Route Bus and other transit services.

Should it come into being in the region, this type of "overlay" provider could be responsible for services that have a presence in multiple service areas, such as Regional Bus and HCT Peak services.

The services included in the Incremental Expansion and Vision Scenarios do not identify which provider will operate a given service or take any service area boundaries into account. As the region grows and evolves, existing service areas may expand, providers may consolidate, and new jurisdictions may add transit service such that the region's service provider profile in 2040 could look very different than it does today. With that said, regional transit providers should collaborate today on improving existing regional connections and creating new ones, so that the practice becomes standard and accepted as the region grows and as new services are added.

REGIONAL FARE

Regional (or "seamless") fare is a concept whereby riders use a common payment instrument to board and transfer between any public transportation service in the region, without having to pay multiple fares or manage multiple fare media. The regional fare concept has been identified as a priority by other planning efforts, such as the RCTP, as well as by providers themselves.

Regional fare, as implemented in other in other regions both nationally and internationally, generally utilizes electronic fare payment systems (EFPS) to collect, track, manage and distribute fares. Examples of EFPS payment instruments used by the rider include smart cards, smartphone apps and scannable QR codes that can be verified electronically (by fare collection machine) or visually (by bus operator or fare inspector) upon boarding.

According to *TCRP Synthesis 125: Multiagency Electronic Fare Payment Systems*, a multiagency EFPS provides the following kinds of benefits:

- Enhanced customer convenience through the use of a single fare instrument to access regional travel;
- Increased ridership through seamless regional travel and discounts and loyalty benefits to customers;

- Reduced fare collection costs through reduction of cash collections, fraud and abuse;
- Better collection of rider information through electronic collection and analysis capabilities;
- Agencies' ability to modify fare policies and structures more efficiently and quickly through electronic means; and the additional ability to integrate fare policies and structures; and
- Increased timeliness, accuracy, and equity in reconciling, allocating and settling revenues to agency partners.

METRO has been successfully using EFPS for fare collection for about a decade: first, through the introduction of the Q Card, a "tap-and-go" smart card which automatically deducts fares from a rider's prepaid account as that rider boards a bus or train; and more recently, through the Q-Ticketing mobile app, which allows riders to purchase a fare on their smartphone and show it to a bus operator or train fare inspector for verification. Other providers within the region have also expressed interest in, or are planning to implement, EFPS systems of their own.

The next logical step would be to coordinate and, eventually, integrate these various existing and proposed EFPS systems to create a true multiagency EFPS that could be used anywhere in the region. However, it is recognized that the logistical and technical challenges of implementing a multiagency ESPS for the H-GAC region are significant.

Different providers have different fares (most regional providers charge $1.00 for a standard local trip; METRO charges $1.25), structures (local fares, park and ride fares, day passes and monthly passes), discounts (elderly, disabled, students, bulk ticket discount, etc.) and collection methods (smart card, ticket book, token, etc.) that would all need to be regularized or otherwise incorporated into a multiagency EFPS. Rules for governing the multiagency EFPS – fare integration, financial allocation, and decision-making authority – will need to be crafted. There needs to be agreement as to the architecture and technical specifications of any multiagency EFPS network. Policies for organizing, managing, operating and maintaining the multiagency EFPS would need to be agreed upon by regional providers as well. Extensive testing would be necessary, and outreach and education to all the region's transit users regarding the multiagency EFPS – what it is, how to use it and the benefits it conveys – is critical.

In other words: implementing the EFPS technology itself on a regional level will likely be the easy task; agreeing upon and implementing the policies and structures behind it will require more effort.

Multiagency EFPS has been successfully implemented in other regions, including the DFW region in Texas, the Atlanta, Georgia region, and the Chicago, Illinois, region. Brief descriptions of these systems follow:

GoPass App (Dallas-Fort Worth-Denton): GoPass is a smartphone app that can be used on the services of all three regional transit agencies: DART (including the Trinity Railway Express), The T, and DCTA. Users download the app onto their iPhone or Android device, set up an account linked to a credit or debit card, and select and purchase fares based on the geography (local or regional), duration (single ride, day pass, weekly pass or monthly pass), rider type (standard, elderly, disabled or student) and number of fare they want. Once the fare is purchased, the rider shows the smartphone's screen to a bus operator or rail fare inspector. The app also includes features such as system maps, a trip planner, real-time bus or train arrival information and connectivity to TNC (Uber and Lyft) and carsharing (ZipCar) providers. GoPass requires possession of a

smartphone to use the app as well as a credit or debit card to create an account for fare purchases, so it may not be available to all riders.

Breeze Card (Atlanta area): The Breeze Card is a stored-value card that is usable on MARTA rail and bus services, GRTA Express Bus services, and Cobb and Gwinnett County local and express services. Riders tap their cards at MARTA rail fare gates or at bus fareboxes; fares are automatically deducted from the cards based on the type of length of service being boarded. Breeze Cards can be reloaded at kiosks, bus fareboxes or online. Breeze seeks to encourage inter-jurisdictional travel by eliminating confusing transfer policies, simplifying fare media, and establishing a common fare clearinghouse that distributes revenues between the participating transit providers in the Atlanta region.

Ventra Card/App (Chicago area): the Ventra card is a "tap-and-go" smart card used to board Chicago Transit Authority trains and buses and PACE suburban buses. It was launched in 2013 and joined a couple of years later by the Ventra smartphone app, which added METRA commuter rail to the services available for purchase (the rider shows the app screen to the METRA conductor to verify payment). The Ventra app also allows riders to manage and add value to their Ventra card balances and has real-time arrival information for CTA, PACE and METRA trains and buses.

Multiagency EFPS can be successfully deployed and scaled over time to be used by a very large number of regional providers. The Transit Access Pass (TAP) card in the Los Angeles region works with 24 different regional and municipal transit providers in the Los Angeles region, including LACMTA, LADOT, Burbank Bus, Long Beach Transit, Foothill Transit, Pasadena Transit, Santa Monica Big Blue Bus, and can even be used to rent bicycles in the downtown Los Angeles area. The Clipper card, likewise, is valid on 17 different providers in the San Francisco Bay area, including BART, San Francisco Muni, AC Transit, Golden Gate Transit, Caltrain and Santa Clara VTA.

The design, implementation, and ongoing operation of multiagency EFPS is complex and will require the close cooperation of the region's transit providers. However, as these systems have been implemented in other parts of the country, a set of "lessons learned" and best practices has developed even as the technologies behind them has improved. *TCRP Synthesis 125* concludes:

> *In summary, multiagency EFPS benefit every customer, region and agency that participates in the system. From customer convenience to agency efficiencies, the reward is apparent in areas such as fare policy flexibility, seamless transit payment, rich data analysis, customer discounts, and mobility service integration. The complexity of the system is still an obstacle to adoption, yet new models are evolving to lower barriers. The deployment of the new architectures may eventually help transition regions from their ticket or magnetic card technology to payment methods that allow users to cross geographical and institutional boundaries with new payment technologies.*[1]

In order for the new and expanded service concepts of the RTFS to have full effect, implementation of multiagency EFPS technology – as well as agreement on the policies and structures supporting it – is critical.

SINGLE POINT OF INFORMATION

As the region's transit providers integrate services and adopt a single fare system, it will also become critical to provide a "one-stop" regional information center for route, schedule, fare and other information. This is especially true for riders who are using multiple providers for a trip

[1] *TCRP Synthesis 125: Multiagency Electronic Fare Payment Systems*. p. 70

and who would otherwise need to go to multiple websites or call multiple customer service lines to collect the information they need.

A regional, multi-provider transit information system can be as simple as a website containing accurate route, schedule and fare information for all the region's transit providers, or it can be a complex system providing functions such as automated itinerary building, automated demand response scheduling, and real-time vehicle location information. It can even be incorporated into a regional EFPS smartphone app, described in the previous chapter.

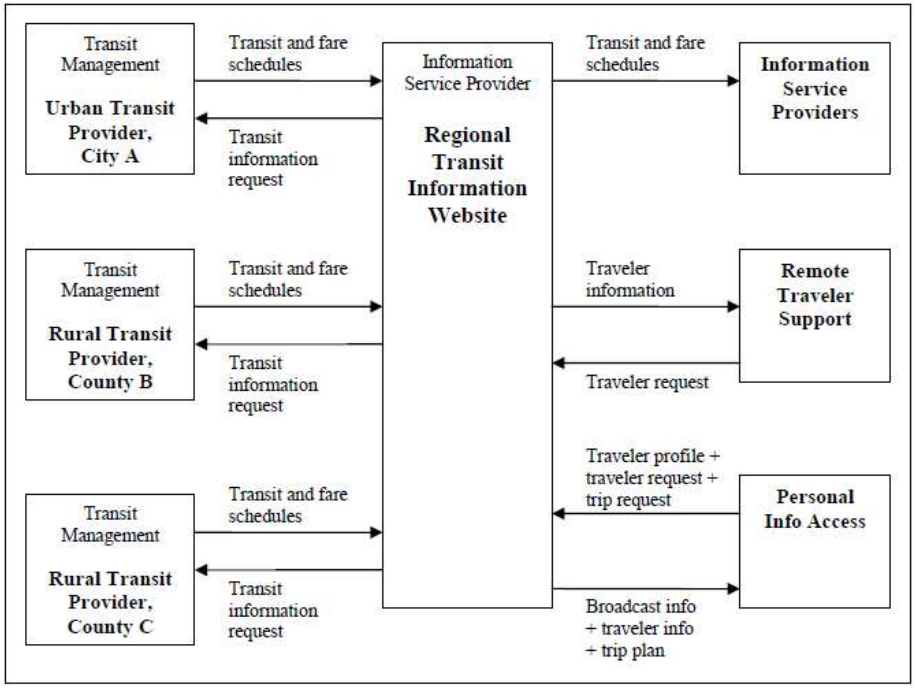
The success of a single point of information for regional transit services is dependent on full participation from all the region's transit providers; partial participation leads to partial information, which in turn makes the service less useful. For that reason, it might also make sense to involve social and human service providers, taxi companies, TNCs and even intercity bus companies in the system at some level.

The system's success is also dependent on the quality of the information provided. Providers must ensure that stop locations, route alignments, schedules and other data is accurate and up-to-date; for that reason, a central coordinating entity should lead the task of maintaining and updating the information in the system and regularly check with providers to ensure that any changes to their services are reflected in the data (H-GAC is currently doing this for one data platform; see section on GTFS Data at the end of this chapter).

Regional providers will need to reach consensus on nature of the system: its functions, its architecture (i.e. how the data is stored, organized, accessed and shared; see the example shown in **Figure 13.1**), how it is managed and maintained, and how it is funded. Selecting technologies with open or standardized architectures will help to ensure that they will be compatible with other commercial software and hardware systems. Some custom-designed systems may become obsolete quickly if they are too specialized or proprietary.

As is the case with EFPS, it is probably best to start small (e.g. with a simple website) and then grow the system over time. Gradually introducing new technologies or functionalities allows time to ensure that each new system is working before adding the next technology or function, that no information is missing or outdated, and that operational errors can be identified before the system is made available to the public.

Figure 13.1: Example Schematic of Architecture for a Multi-Provider Transit Information System



Source: Texas Southern University & Texas Transportation Institute

The following are some questions to consider when selecting and implementing the technology packages that would support a regional, multi-provider transit information system:

- How will the technology will work with current transit business practices? Is it possible and desirable to alter certain business

practices (such as scheduling methods) to benefit from the product's capabilities? How much training will be needed for staff to be able to use the technology?

- What are the costs associated with the technology? How is it priced (e.g. by the number of transit providers, by the number of computer workstations, by the number of routes or vehicles, etc.)? What about costs for maintenance and technical support? What about agency staff (e.g. for procurement, training, data entry, etc.)?
- What about future expansion? Can the selected technology system be expanded later—for example, to add capacity or to perform additional functions—without the need for a complete overhaul of the system? Will the technology grow to meet future business? What are licensing and upgrade requirements?

Low public awareness of a new regional information system will greatly limit the system's benefits, so promotion and marketing of the regional information system is key. The website and/or phone number for regional transit information should be included on bus stop signs, city or transit agency maps, and city and agency websites. If possible, a marketing component should be incorporated into the development process of the regional information system.

The system should also be evaluated on a regular basis. Collecting user feedback from the general public and from human and social service agency representatives can help to identify problems as well as guide future upgrades. A feedback mechanism should be included on the website (or smartphone app) to collect user comments and questions on the interface design, the usefulness and accuracy of the transit information provided, and other aspects of the information system.

Finally, it must be remembered that, even in this automated age, there are still people who either cannot use such technology or simply prefer to speak to a real person when planning their travel or scheduling a demand response ride. For that reason, the multi-provider transit information system will never replace the customer service call center. In fact, a call center should be part of any long-range plan for a multi-provided transit information system; if agreements can be reached between providers, this call center could eventually even replace or become a consolidation of the various customer service and dispatch centers currently operated by each of the region's service providers.

As is the case with regional fare, agreement on policy is just as important as agreement on technology. Creating and sustaining a single point of information for regional transit services will require close coordination between providers and agreement on many details. However, the benefits that it would provide to transit users and providers alike are significant; it is difficult to provide a transit system that is truly "regional" without it.

COOPERATIVE USE OF RESOURCES

Resources available for the provision of transit services in the region are scarce, and a regional strategy for managing those resources is critical if services are going to be maintained and expanded. This includes sharing or pooling resources, eliminating duplicative services and creating economies of scale. Strategies for cooperatively using resources include:

- **Shared or co-located facilities:** vehicles of multiple providers are stored and maintained at a single operations and maintenance facility; providers share the capital cost of a passenger facility at a location where transfers between multiple providers will occur.
- **Collaborative contracting and procurement:** providers cooperatively contract with third parties to provide transit or operations and maintenance services (e.g. a shared regional vehicle maintenance program); providers cooperatively

purchase materials and equipment for maintenance (oil, tires, tools, etc.), or administration (software, office supplies, etc.).

- **Consolidated processes:** providers consolidate or cooperatively contract for operational and administrative processes such as accounting, record keeping, or dispatching and customer service.
- **Consolidated services:** duplicative services (e.g. multiple routes by multiple providers along the same corridor) are consolidated into a single service usable by riders of multiple agencies.

Cooperative use of resources is already a focus of the RCTP, and some cooperative activity similar the examples described above is already occurring in the region (oftentimes involving human and social service agencies as well as transitional transit providers).

Cooperatively using resources requires creativity and a willingness to be flexible among the region's transit providers; this is especially true as funding or other circumstances change. Opportunities for collaborative uses of resources in the region should continue to be identified. In addition to providing better and more expansive transit service for riders, coordination between providers can reduce operating costs by eliminating duplicative services, creating economies of scale, increasing transit visibility and realizing other beneficial synergies.

BRANDING, MARKETING AND EDUCATION

For transit to be successful, it needs to be used. For that reason, it is important to create awareness of the services available – what they are, where they go, and how to use them – and to promote their use. Selling people on transit service increases the likelihood that they will use it. Increased ridership, in turn, makes the service more efficient and has regional benefits. Ways of promotion include:

- **Branding** the service to create a recognizable identity
- **Marketing** the service to promote its use
- **Educating** existing and potential riders on how to use it

Many, if not all, of the region's transit providers already undertake these promotional activities at a local level. As the region grows, however, it will become increasingly important to undertake these three activities at a region-wide level as well.

BUILDING A REGIONAL BRAND

From London's iconic Underground logo to Boston's "the T", a recognizable and attractive brand can entrench transit within a region and provide a clear identity for the system. The American Marketing Association Dictionary defines branding as a "name, term, design, symbol or any other feature that identifies one seller's good or service as distinct from those of other sellers." Branding distributes messaging about the transit system in words, graphics, and infrastructure design to existing and potential users, stakeholders, and the region at large.

As of today, every regional provider has their own brand, i.e. a specific name, logo, color scheme, vehicle livery, etc., that identifies their service. However, there is not a true single brand for a regional transit system.[2]

As transit services in the region grow and connect to each other, it will become increasingly important to create a regional brand for transit. Establishing a regional brand is the essential first step to take prior to

[2] H-GAC has been using a "Ride the Gulf Coast" brand for regional transit planning and coordination activities, which includes a logo and a web address; however, outside of H-GAC products such as the RCTP, it is not widely used.

initiating education and promotional campaigns about the region's transit services and how it is possible to use them to travel throughout the region. A regional brand would not necessarily replace the branding currently in use by the region's individual transit providers, as it makes sense to retain a familiar identity to their local users. However, a supplementary or auxiliary brand identifying regional service and connectivity could be applied to:

- A regional multi-provider transit information system (single point of information) website and/or smartphone app
- Regional fare media or smartphone app
- At bus stops and passenger facilities where transfers between different providers occur
- On transit vehicles that provide regional connectivity (i.e. HCT Peak, Express Bus, Regional Bus or even Local Fixed-Route Bus that cross service area boundaries)
- On vanpools
- On maps, schedules and brochures of regional transit providers, especially as those materials relate to services that connect to other providers or otherwise provide regional connectivity
- On material distributed to major employers, management districts, chambers of commerce, and elected officials that discusses the benefits of a regional transit network
- On material relating to a region-wide transit advertising campaign

Creating, testing and launching a regional brand will require participation and buy-in from all the region's providers. It might be worthwhile to create a "regional brand development committee" consisting of representatives of regional providers and other stakeholders to brainstorm potential themes, palettes, names and tag lines, conduct design charrettes, and generate draft brands for testing those drafts with focus groups, riders and other stakeholders.

Once a final brand is chosen and refined, an initial brand launch campaign should be planned. For maximum effectiveness, the launch could be timed to coincide with the implementation of new regional transit services, a regional multi-provider information system, and/or a regional EFPS.

Regional Branding in the Research Triangle

The Raleigh-Durham-Chapel Hill area of North Carolina provides an example of how multiple local and regional transit providers can establish a regional service brand. In the mid-2000s, local providers from Raleigh (Capital Area Transit), Durham (Durham Area Transit Authority), Chapel Hill (Chapel Hill Transit) and Cary (C-Tran) and regional and express bus provider Triangle Transit (TTA) began to work closely on initiatives such as regional fare, a single point of information (including website and call center), a regional marketing plan and a regional brand.

In 2015, the regional branding effort took another step forward. A new regional brand, GoTransit, was unveiled, and local and regional services were rebranded as GoRaleigh, GoDurham, GoCary and GoTriangle (Chapel Hill Transit has the option of rebranding as GoChapel Hill but has not yet done so). A new logo was adopted, disparate color schemes of the various bus fleets were given a uniform design, with providers being differentiated by color, and a new single point of information website – gotransitnc.org – was launched where map, schedule, fare, real-time bus location and service change information for all five providers can be found. The unified marketing and branding approach emphasizes that while there are multiple transit providers in the Research Triangle, they effectively function as a single entity providing regional transit service.

MARKETING

Marketing is more than simply advertising. The American Marketing Association Dictionary defines marketing as "the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large." This means not only creating the customer – in this case, a transit rider – through promotion and awareness activities, but also keeping the customer by providing a service that they find useful and satisfactory.

The region's various transit providers market their services in different ways, based on the types of services they provide, the target population or geography for those services, and the resources they have available for marketing. For example, METRO is running a very visible advertising campaign using radio, television and social media to promote the use of their services to the general population of their service area. Other regional providers with a much smaller budget for marketing might use lower-cost, specifically-targeted strategies that promote their services through employers, educational institutions, and human and social service agencies. During its meetings with providers in 2015, H-GAC staff discovered that some regional providers do not actively promote their services at all because they are already oversubscribed.

As the region grows and its transit services expand and interconnect, it will become increasingly important to not just market at the local level (i.e. each individual provider promotes their own services), but at the regional level (i.e. the region's providers promote their interconnectivity) as well. Some of the aforementioned recommendations – creating a regional fare system, creating a single point of information for regional services, and creating a regional transit brand – will go a long way towards promoting regional transit. Additional measures to market regional transit use will still be necessary, including:

Communications: paid advertising (radio, television, web, print, direct mail, etc.); social media; e-mail blasts; news releases; public service announcements; public speaking (for example, through a regional transit speakers' bureau) to elected officials, social and human service organizations, civic groups, convention and visitors bureaus, and employer groups (such as management districts and chambers of commerce); information displays at businesses and institutions, information aboard vehicles or at passenger facilities; and hosting or participating in community events are all well-known methods of communication and are the basis of any transit promotion campaign, whether it be at the local or regional level. A campaign touting the benefits of a seamless regional transit system will require a cooperative approach among all the region's providers.

Targeted Messaging: a region-wide promotional campaign targeting the general population is useful, but different services attract different types of riders. This requires a second, more focused level of marketing targeting different rider types and geographies. The process would begin with identification and categorizations of each target audience likely to use a given transit service. Communications approaches that may effectively reach each group would be outlined. Examples of targeted message distribution approaches include:

- **"Choice" commuters (as well as their employers):** management districts, corporate HR departments, new-hire welcome packets, company intranets
- **Shift workers (retail, restaurant, healthcare):** chambers of commerce, management districts, hospital districts, conventions and visitors bureaus, job fairs
- **Students (middle school, high school and college):** school districts, community college districts, four-year universities, new student orientation packets, scholastic sporting events

- **Those needing transport to regular health services (dialysis, physical therapy, etc.):** hospital districts, health and human service agencies, health fairs, client information packets
- **Elderly, disabled and veterans:** senior living facilities, health and human service agencies, Veterans Administration, senior fairs, client information packets
- **Able-bodied persons without cars:** civic and neighborhood associations (especially in lower-income communities), neighborhood and community events, social service agencies
- **Persons with cars who might be "transit-interested:"** civic and neighborhood organizations, management districts, neighborhood and community events, sporting events

Messaging for each rider group should include the regional brand but be customized to describe the services of each provider. A more detailed discussion regarding targeted marketing techniques, especially as they relate to employees, residents and visitors of major activity centers, can be found in a later section on Transportation Demand Management (TDM) strategies.

Incentives: just as some businesses will distribute "free samples" of their product to get people to try it, transit providers may induce people to use their service by offering discount or free rides in hopes that they will find the service useful and become regular paying riders. Transit providers may offer incentives on their own or in partnership with another public or private interest. They may do it as part of a special or community event, or when a new service is inaugurated[3]. Incentives can be done at a local/provider level or region-wide. Examples of incentives include:

- Free one-week pass provided to students or commuters to encourage them to try commuting by transit.
- Free ride day for all riders or for a specific group — seniors, youth, service workers in uniform, etc.
- An award (such as a T-shirt or water bottle) given to riders who take a certain number of trips during a promotional period.
- Sign-up at community events to win a free monthly pass or other prize.
- Rewards for regular riders (e.g., buy 11 monthly passes and the 12th is free, etc.).

The incentive, like the message. should be selected to fit the needs of the targeted group.

METRO's partnership with the Houston Dynamo and Houston Dash to provide free HCT All Day rides to games is an example of both targeted marketing and incentives. (source: ridemetro.org)

Quality Control: ensuing that a service meets established specifications – that is, it performs as advertised – is just as important as promoting it. A service that is unsafe, unreliable or difficult to access will not build

[3] For example, METRO offered free rides for an entire week when the New Bus Network was implemented in August 2015.

ridership, no matter how aggressively it is promoted. For this reason, it is important that providers implement service standards such as those discussed in Chapter 9, and develop procedures for monitoring and maintaining those standards. A robust quality control process – one that monitors factors such as on-time performance, distance between mechanical failures or passenger safety and makes operational adjustments to improve those factors as necessary – can ensure that the service satisfies existing riders and attracts new ones. Conversely, even "transit-dependent" individuals will find another way to make a trip, such as getting a ride from a friend or neighbor, or decide not to make at trip at all, if the quality of a particular transit service is so unreliable, so unsafe or otherwise so poor as to be unusable.

Customer Service: as mentioned in Chapter 9, staff are the public face of the transit provider. They provide an important marketing function just by being available to answer questions and provide assistance to riders. Operators, supervisors, dispatchers and representatives that are knowledgeable, helpful and polite will make a good impression on first-time transit users and ensure that regular riders are satisfied. As the region grows and transit services become more interconnected, customer service processes will become more complex because a growing number of riders will be using multiple providers to complete their journeys.

Customer Feedback: listening to customers to improve service is another aspect of marketing. The region's providers should regularly seek feedback from their users regarding the quality of the service provided, the problems that they encounter, and suggestions for improvements. A call center for suggestions and complaints, a comment form on a provider or regional website, surveys and questionnaires are all methods of collecting customer feedback. Obviously, collecting customer feedback serves no point if it is going to be ignored. Providers must be responsive to the feedback they receive, be especially mindful of patterns or recurring issues in customer feedback they receive, and be prepared to correct and improve services based on feedback to the extent that it is possible.

Finally, it is worth remembering that some services, such as coverage routes and selected demand responsive services, are not intended to build ridership. This isn't to say that these services shouldn't be marketed to the areas they serve, but they should not be considered "failures" from a marketing point of view if ridership does not increase.

EDUCATION

Potential transit riders can be aware of a service and be interested in using it, but if they do not know how to use it – how to pay fares, access the service, select the correct route, transfer between services, request a stop – then they will remain potential riders. Rider education – also known as travel training – is the process by which people learn how to use, and become comfortable with using, public transportation services.

Oftentimes, providers produce and distribute "how to ride" brochures, or create videos demonstrating how to ride and put them on their websites. These are simple and logical forms of rider education, and every regional provider should create these resources if they are not already available. However, for some people, such as seniors or persons with disabilities, this might not be sufficient. More active methods of travel training might be required.

Travel training can be approached in both group and one-on-one settings. It can be conducted by agency staff, human and social service agency staff, and even peer volunteers. A group travel training presentation at a social or human service agency, job fair, senior living center, or college student orientation might consist of a PowerPoint presentation or video, followed by a short on-vehicle experience. One-

on-one travel training is more intensive in nature and is generally reserved for persons with special needs: those with developmental disabilities, sight impairment, or the need to use a wheelchair or other mobility device. It might include making an entire trip with the person, including transfers, and helping the person find their way from the transit stop to their intended destination.

Page from a DART "how to ride" brochure. (source: Dallas Area Rapid Transit)

Travel training can be a powerful tool for generating ridership as it takes the guesswork and apprehension out of riding transit for the first time. Providers may want to provide participants with a free ticket to incentivize them to make their first trip on their own. Providers can also make materials such as brochures, videos, and PowerPoints available to social and human service agencies, clinics, volunteer groups and other organizations who wish to conduct travel training with their clients.

Rider education, furthermore, does not only apply to new riders; it also applies to existing riders who want to use new services or providers but need to know how to connect to them. Previous recommendations will help in this regard: a regional fare system would eliminate the guesswork and hassle of having to handle multiple fare items, and a single point of transit information would replace the fractured information available about current regional services (which can be confusing to even the most regular riders, let alone new ones) with a new, comprehensive information system.

Finally, a good rider education program can help build a "culture of transit" in the region by causing people to be comfortable with using transit and alleviating general apprehension on the part of people who have never used transit because they didn't feel it was "for them." The H-GAC region is overwhelmingly automobile-oriented, and travel by personal car is ingrained in the region's culture. Educating area residents on transit – how to use it and where it goes – can work towards erasing a "stigma" associated with transit and increase its mode share for travel throughout the region.

COSTS AND BENEFITS

There are, of course, costs associated with regional branding, marketing and education campaigns. Depending on the scope of activities undertaken, these costs can be significant, and providers' budgets are limited. Providers who are struggling to maintain actual transit services may not be able to fully participate, even if they understand the benefits associated with these activities. While some state and local resources are available for branding, marketing and education – federal CMAQ program funds are used for H-GAC's Commute Solutions program[4] – overall funding for a regional branding, marketing and education campaign is generally limited.

For that reason, cost-benefit analyses may be useful in demonstrating the benefits of branding, marketing and education campaigns – for example, increases in ridership, regional travel time savings, decreased need for parking, or personal savings resulting from decreased automobile usage – to not only the region's providers, but also to

[4] See www.findasmarterwaytowork.org for more information on Commute Solutions.

government entities, management districts, business and real estate interests, and even philanthropic organizations who may be willing to participate in funding for these campaigns.

Due to the highly-variable nature of a regional branding, marketing and education efforts, the RTFS does not attempt to estimate an overall budget for such a campaign.

LAND USE AND PEDESTRIAN/BICYCLE ACCESS

Good transit doesn't start or stop at a station or bus stop. As the *Transit Capacity and Quality of Service Manual* states:

> *Transit passengers must of necessity be pedestrians or bicyclists at one, or usually, both ends of their trips. It is therefore important that the land uses along transit routes and around transit stations help support transit service by providing safe and direct linkages between transit stops and passengers' original and destinations. Providing these linkages also helps develop a more walking- and bicycling-friendly environment that encourages the use of these modes for other trips, thereby creating a more active, and potentially more secure environment around transit stops. Providing transit-supportive land uses around transit stops and stations also helps take full advantage of the quality of service provided at that location and can generate the ridership that supports even better quality of service.*[5]

As explained in Chapter 9, accessibility is the ability of all people to get to and from their origin or destination to the nearest transit service (i.e. a stop or station). Simply put, people can't use transit if they can't access it. The integration of transit investments and multimodal connectivity is a critical element of the concepts and proposals contained in the RTFS; the transit services it suggests are not formulated in a vacuum but rather designed with the understanding that transit's success is dependent on its ability to serve the built environment as well as the ability of riders to access those services.

Fundamentally, this means that **new transit services should not be implemented, nor existing services be extended, unless and until safe, barrier-free and ADA-compliant infrastructure for cyclists, pedestrians and persons with mobility impairments to access the service is provided**. This includes sidewalks, bike paths, and other ways to access bus stops, HCT stations and other passenger facilities.

This also means that the implementation of other transit-supportive strategies, programs and policies intended to promote safety, encourage transit use and influence future transportation behaviors, is strongly recommended as well. These strategies, programs and policies relate to the built environment, land use planning, roadway design, bicycle and pedestrian infrastructure, and parking, and are described in detail below.

TRANSIT-SUPPORTIVE PLANNING

Transit-supportive design concepts are those that encourage transit patronage through walkability, mixed-use development, sustainability, aesthetics, convenient access for bicyclists and pedestrians, and transit-supportive parking facilities. Land use policies that support compact development, mixed-uses, and inclusion of pedestrian facilities, encourage increased transit use. Context Sensitive Design- or solution-derived concepts such as Complete Streets, Living Streets, and Green Streets include elements that encourage and enhance transit riders' experience through design and integration into the urban environment.

[5] TCRP Report 165 – *Transit Capacity and Quality of Service Manual, 3rd Edition* (2013), pp 4-3 to 4-4

Land Use Policies

Land use refers to the way that a given area is developed, both in regards to how a piece of property is used (e.g. residential, commercial, industrial, institutional, etc.) as well as the characteristics of that use (e.g. density, floor-area ratio, site layout, etc.).

Transportation and land use are two concepts that are fundamentally interconnected. Transportation investment has tremendous power to shape development, influence property values, and determine a neighborhood's character and quality of life. How communities are developed, on the other hand, affects how convenient and appealing public transportation, bicycling, and walking are for their residents. Despite this inextricable connection, transportation and land use are often designed, regulated and executed by completely separate departments, agencies and, in fact, entire sectors of the economy; the bulk of transportation infrastructure is designed, built and owned by the public sector whereas the bulk of land use development is performed by the private sector.

Transit providers generally have little to no control of the land use policies (zoning, development regulations, etc.) within the municipalities they serve, even though those same policies can have a significant access on the efficacy and efficiency of the services they provide. There are, however, several strategies that providers can adopt to encourage development that is transit-supportive, including:

1. Involve transit in the land use planning process.

This can be done by providers becoming involved in both the long-term comprehensive planning process as well as the short-term development review process.

Comprehensive plans are long-range land use plans that articulate a vision by which a given city should grow and upon which zoning and development decisions are typically based. Incorporating long-range transit plans into comprehensive plans, and vice versa, can help guide decisions about land uses, densities, districts and corridors, and transit provision as the city grows and develops.

Development review is the process by which new development is ensured to comply with existing regulations prior to permitting. It is standard practice for city planning departments to run zoning and platting applications through a **development review committee** made up of staff from other city departments (police, fire, public works, parks, etc.) as well as outside agencies (utility providers, school districts, etc.) that would serve the proposed development. Transit providers should ask to be included in these committees within the municipalities they serve. That way they can be aware of new developments that may affect transit service; they can also approach developers themselves with suggestions for making a certain development more transit-friendly.

2. Make transit-friendly development easy to do.

Municipal zoning and development regulations are oftentimes automobile-oriented, requiring large setbacks, minimum lot sizes, strict land-use separation and parking standards that make transit-friendly development difficult without going through a cumbersome variance process. Providers can do their part to encourage changes to the zoning and development code that allow and even encourage bicycle-, pedestrian- and transit-friendly development in areas where such development is suitable.

The region's largest municipality, the City of Houston, has a mechanism to encourage pedestrian- and transit-friendly development along HCT All Day corridors through its Transit Corridor Ordinance. Adopted in 2009, the ordinance requires 6-foot-wide sidewalks along transit (defined as the route of any existing or proposed METRORail line) and intersecting streets, and has incentives for builders to reduce setbacks, move parking to the

rear of the building, provide greenery, and incorporate plazas and other pedestrian-friendly elements into their building design.

Houston also, rather famously, lacks land use controls in the form of zoning. This presents both challenges and opportunities, in terms of creating transit-friendly development, when compared to cities that do have zoning. Most of the other municipalities in the eight-county region do have zoning ordinances. Several master-planned communities in unincorporated areas, such as The Woodlands, have land use controls as well.

Transit-friendly development cannot, and should not, occur everywhere. Large subdivisions of single-family homes, office and industrial parks, and semi-rural or exurban areas are examples of land use types that are not effectively served by traditional transit services. However, transit-friendly development should be encouraged in districts that are already dense, have a mix of uses and are already well-served by transit.

3. Promote transit-oriented development (TOD) on and around provider-owned properties and facilities.

TOD is generally defined as compact, mixed-use, walkable development organized around a transit station. It is based on the concept that locating amenities, employment, retail and housing around transit stops or stations promotes use of transit and other alternative modes of travel. When built on provider-owned property (such as a park and ride), it is one of the few instances were providers have absolute control over land use decisions.

Transit-oriented development is discussed in greater detail in the next section of this chapter.

4. Work closely with institutional interests to ensure that hospitals, schools, and human and social service agencies are placed where they can be easily served by transit.

Oftentimes new institutional facilities are placed where land is cheapest, which is understandable given budgetary constraints faced by government and non-profit agencies. However, this sometimes means that these facilities are placed where they are not easily served by the existing transit network even though they are important destinations for transit riders. This, in turn, places strain on providers, who are expected to serve these institutional facilities even though doing so is costly and difficult.

Providers should stay engaged with institutional interests to stay aware of facilities planning efforts and emphasize the importance of nearness to transit service when decisions regarding new facilities are made.

5. Engage policymakers as well as the private sector regarding the importance of land use and transportation integration.

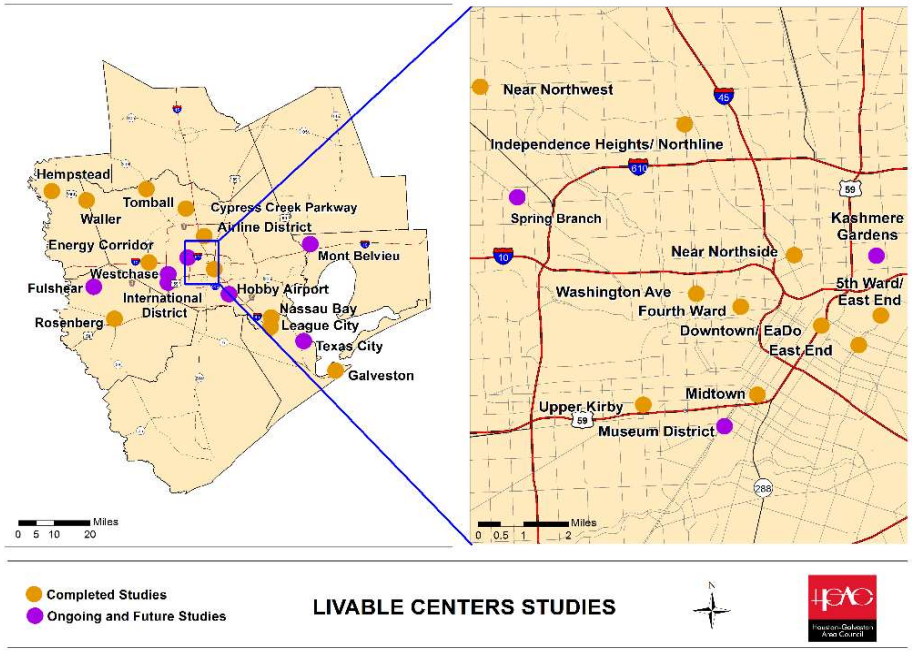
Elected officials, development planners, property owners and real estate developers may be more inclined to support transit-friendly development if they better understand its benefits, especially in terms of economic and quality of life issues. Integrated land use and transportation planning, whether it be at the regional or neighborhood level, needs champions. Transit providers, given their experience with the areas and people they serve, are uniquely qualified to play that role.

Integrated transportation and land use planning can provide people with more mobility choices. When homes, offices, retail, and services are near transit stations as well as each other, it becomes more convenient to walk, bicycle, or use transit. This expanded transportation choice reduces automobile-related transportation costs. It also expands mobility to low-income individuals, senior citizens, disabled persons, and others who cannot or choose not to drive or own a car.

Livable Centers

One way to encourage people to further utilize public transportation is to implement policies that develop connections between pedestrians, bicycles, automobiles and transit. The H-GAC Livable Centers Program and similar sustainable transportation development programs in other regions contain elements that directly support increased transit patronage. The goal of H-GAC's Livable Centers Program is to help create walkable, mixed-use places that provide multi-modal transportation options, improve environmental quality and promote economic development. **Figure 13.2** shows completed, current and future Livable Center studies.

Figure 13.2: Completed, Ongoing and Future Livable Center Studies



source: H-GAC

The purpose of the Livable Centers Planning Studies is to facilitate the implementation of Livable Centers projects. Project outcomes may include proposed future land uses, transportation facilities, street design and pedestrian improvements, and parking plans. Studies also include a fiscal feasibility analysis and a proposed implementation plan. Implementation projects aim to foster travel choices by creating safe environments for walking, bicycling and using transit. The Livable Centers program recognizes the important integration of land use and transit and identifies strategies to facilitate transit use not only through creation of safe and accessible pedestrian environments but also through transit supportive land uses.

ROADWAY STRATEGIES

In the Houston-Galveston region, all existing transit services operate for at least some their length in city streets; the METRORail HCT All Day system operates almost exclusively at-grade in the median of city streets, and even Express Bus services that utilize barrier-separated HOT/HOV lanes for most of their trips utilize the streets of a major activity center, such as downtown Houston or the Texas Medical Center, to drop off and pick up commuters.

The design of streets and roadways is therefore crucial in promoting safe, attractive and high-quality transit service; however, much of the region's street and roadway network has been designed primarily for the automobile. There are, however, several philosophies and techniques that can be employed to design streets that meet the needs of all its users and promote transit use.

Complete Streets: The Complete Streets concept derives from Context Sensitive Design/Solutions. Complete Streets are designed to accommodate safe access for pedestrians, bicyclists, motorists, and transit riders. Additionally, Complete Streets are more compatible with adjacent land uses, community character, and are convenient for a variety of users. Complete Streets policies implement many of the Livable Centers Program design strategies and benefit public transit by making alternatives to the automobile viable.

College Street, a complete street in Toronto, Ontario. source: City of Toronto

A Complete Street can include such design elements as narrowing the auto travel right-of-way, expanding the pedestrian facilities and enhancing the pedestrian environment, accommodating bicycles with dedicated right-of-way or marked facilities, accommodating transit stops and related facilities, implementing street parking to act as a buffer between street and sidewalk, and improving pedestrian street crossings. These street improvement techniques are often coupled with land use policies that emphasize compact development, mixed uses and the inclusion of pedestrian priorities within that development.

Transit Streets: Transit Streets are similar to Complete Streets in that they are designed to safely accommodate all users and modes; however, Transit Streets prioritize transit by including features such as dedicated bus lanes or transitways, high-quality stops and stations, signage and wayfinding, intersection strategies, and operational improvements. These features are intended to increase the quality and reliability of transit as well as expand the number of people the street can move. *The Transit Street Design Guide*, published by the National Association of City Transportation Officials, contains detailed descriptions of the tools and concepts that are available to prioritize transit on the street.

Living Streets: Living streets is a concept that brings "life" to a street by integrating the built environment with the adjacent transportation infrastructure. Practices include extending businesses onto the sidewalk by adding cafe patios, newspaper stands or other vending opportunities that create mini outdoor markets. This land use technique can increase the visibility of people at the street level, provide walking, cycling and transit incentives, and potentially influence driver behavior by slowing vehicle movements.

Essential Transit-Friendly Features

Pedestrian- and Transit-Oriented Design, published by the American Planning Association and the Urban Land Institute, is intended to serve as a "how-to manual" for creating places that are walkable and transit-oriented. It presents "checklists" of design features that are essential to the creation of these places:

- Medium-to-high densities
- Fine-grained mix of land uses
- Short- to medium-length blocks
- Transit routes every half mile or closer
- Two- to four-lane streets (with rare exceptions)
- Continuous sidewalks appropriately scaled
- Safe Crossings
- Appropriate buffering from traffic
- Street-oriented buildings
- Comfortable and safe places to wait

In addition to essential features, there are also checklists of "highly-desirable" features (such as supportive commercial uses, closely-spaced shade trees, traffic calming and parks and public spaces) as well as "worthwhile additions" (such as special pavements, water features, public art, street furniture and outdoor dining areas).

The City of Denver, Colorado worked with the Complete Streets concept in developing its 2009 Living Streets Initiative. The City of Denver received public support for the "living street" concept because of the recognition of the role of transit, bike and pedestrian mobility, coupled with the benefits such a street has to the urban environment, economic development, public health and environmental quality.

Green Streets: Another sustainable transportation system design strategy is the Green Streets concept. Green Streets are environmentally sustainable and can provide a more aesthetic and comfortable walking environment for pedestrians and transit users by transforming the street surface with landscaping and greenscape. Green Streets turn public spaces into multifunctional environments that provide attractive transportation infrastructure and help to protect the environment. Transit users may benefit from Green Streets through enhanced shade opportunities that provide protection from weather and integrated landscape barriers, which offer an improved sense of safety through separation with automobile traffic.

The recent reconstruction of Bagby Street in Midtown Houston incorporates many features of a Green Street into its streetscape, including increased vegetation and rain gardens.

PEDESTRIAN STRATEGIES

Pedestrian corridors that are safe and aesthetically appealing encourage walking and provide strong connections to transit facilities. To encourage pedestrian use, local agencies can ensure that minimum quality standards for pedestrian facilities such as sidewalks and curb ramps, are met. Other pedestrian improvements that should be considered as part of a comprehensive pedestrian environment include:

- Traffic signal timing for longer pedestrian movements at certain times of day
- Countdown pedestrian signals
- Better crossing markings or materials at intersections
- Pedestrian bridges/tunnels to address drainage issues
- Newly paved ADA accessible sidewalks
- Tree plantings or landscape zones
- Benches and light posts

As suggested in Chapter 9, providers are encouraged to set service standards regarding the percentage of existing stations or bus stops

Preferences for "Walkable Urbanism"

The H-GAC region is sprawling and automobile-oriented. However, a majority of area residents have expressed interest in living in areas that are walkable and mixed-use. The 2017 Kinder Houston Area Survey found that, by a margin of 56 to 40 percent, area residents were more likely to agree that they wanted to live in "an area with a mix of developments, including homes, shops and restaurants," rather than "in a single-family residential neighborhood." This is the highest percentage for this preference at any time since the question was first asked in 2007.

The authors of the survey note that changing demographics and lifestyle preferences are fueling this increasing desire for walkable, mixed- use communities:

> *Families with children are being replaced across America by empty nesters wanting shorter commutes, by young creatives postponing marriage and having fewer children, and by the increasing numbers of single-person and elderly households. It is not surprising therefore that area residents everywhere in the Houston region are calling for more "walkable" alternatives and for "complete streets," able to serve the needs not only of motorized vehicles, but of bikers and pedestrians as well. Developers are responding to these demands by building more transit-oriented walkable communities, not just in Houston's Downtown but also in the urbanizing "town centers" throughout this far-flung metropolis.**

*Kinder Institute for Urban Research. *The Kinder Houston Area Survey: Thirty-Six Years of Measuring Responses to a Changing America*. Rice University, 2017. p. 13.

that are served by a good, barrier-free and ADA-compliant sidewalk network with connections to the larger local area. It also bears repeating that new transit services should not be implemented until those same conditions are met. It cannot be overemphasized that people will not use transit if they cannot safely get to it.

BICYCLE STRATEGIES

Bicycle use can "extend the reach" of transit far beyond the one-quarter (or, less commonly, one-half) mile typical pedestrian walk. They are therefore an integral part of public transit service and need infrastructure that is well-connected to the regional transportation system. There are several categories of measures to promote bike-transit integration:

- Provision of bike parking at rail stations and bus stops
- Multi-functional bike stations providing not only parking but a range of services such as rentals, repairs, and sales of parts and accessories
- Bike racks on buses or on board rail vehicles
- Bike paths, lanes and on-street routes that link to transit stops or stations

The 2014 Bike and Ride Access and Implementation Plan, a joint effort of H-GAC and METRO, puts forth detailed recommendations regarding the measures mentioned above as well as others intended to improve integration between cycling and transit. These include specific recommendations for physical connections around and wayfinding signage to passenger facilities, bicycle amenities at stops and aboard vehicles, expansion of the city's B Cycle bikeshare program to new passenger facilities, and policies that encourage bicyclists to use transit, and vice versa.

Other regional transit providers also provide bicycle accommodations such as bike racks on buses or at passenger facilities. It is recommended that all regional providers create and implement policies encouraging and facilitating bicycle connectivity to transit, if they have not already done so. Outreach to the bicyclist community to encourage transit use and solicit feedback is also strongly encouraged.

Bike rack on front of Conroe Connection bus.
source: City of Conroe

As noted in the previous chapter, the demonstration budget for the Incremental Expansion scenario contains an annual expenditure of $5 million that funds stops, shelters and bicycle and pedestrian connectivity to transit. This amount is increased to $7.5 million per year in the Vision scenario.

PARKING STRATEGIES

The availability and cost of parking can be a significant factor in a person's decision to use transit. If parking is easily obtained, personal vehicle use is encouraged and the likelihood of attracting new riders is reduced. Parking that is costly or limited in supply creates a more viable transit environment. The provision of space for parking also has an enormous impact on land use decision-making and design, which in turn has impacts on walkability and access to transit.

Parking policies such as pricing strategies and constrained parking supply at destinations served by transit can be very effective in generating and sustaining strong transit ridership levels. Parking policies that support transit include:

- **Minimize acreage dedicated to parking use:** large expanses of surface parking and stand-alone parking structures can discourage walking and make driving the only viable transportation between destinations.
- **Locate parking to allow compact, concentrated development near stations:** better-managed parking can support lively, economically strong, mixed-use districts such as TOD; encourage walking and transit use; and reduce the costs of redevelopment and infill projects. Structured parking can free land for development. Wrapping parking with retail has aesthetic and economic benefits.
- **Share transit parking with compatible adjacent land uses:** coordination and partnerships with other public agencies as well as the private sector allows for efficiency and flexibility of the parking system and makes the transit system more successful. Some providers in this region operate park and rides out of movie theater lots, because park and ride patrons typically occupy spaces during the day whereas theatergoers typically occupy the spaces on evenings and weekends.
- **Encourage municipalities to re-think minimum parking requirements:** conventional parking regulations found in municipal zoning and development codes are oftentimes based on generic requirements that do not take into site need or context and can deter compact, mixed-use development and redevelopment in older neighborhoods. In 2004 London abolished minimum parking requirements; a subsequent study showed that parking for new residential developments fell from an average of 1.1 spaces per flat to 0.6 spaces. This indicated that parking minimums had inflated the supply of parking to about twice as much as was the market actually needed.
- **Encourage municipalities to adopt variably-priced on-street parking:** free on-street parking provides an incentive for motorists to eschew transit usage and circle around congested urban blocks in search of a space or to bypass commercial garages that do have space but for which the driver must pay to use. Introducing on-street-parking pricing is a public acceptance challenge, although technologies such as pay-by-cell-phone systems and mid-block ticket-dispensing machines that accept credit cards can help. Variable pricing based on demand can promote efficient use of on-street parking spaces – a scarce and valuable resource - by increasing turnover of spaces during busier periods.
- **Use parking revenues to improve connectivity to transit.** Revenues from on-street parking can be used for public improvements, including those related to transit. **Parking benefit districts (PBDs)** are defined geographic areas or corridors in which a portion of the revenue generated from on-street parking fees is returned to that area or corridor to finance improvements. These can include sidewalk improvements, lighting, landscaping, wayfinding, and other improvements that promote the use of public transit. The City of Houston designated the Washington Avenue corridor as a PBD in December 2012.
- **Encourage employers to adopt parking cash-out policies:** Most employers provide their employees with free parking at work; few offer any transit or other commuter benefits. Recent research indicates that, even if transit benefits are provided at the same value as transit benefits, motorists will continue to drive. An alternative is parking cash-out, which employers to offer their employees the option of receiving taxable cash in lieu of any parking subsidy offered, thus providing employees an incentive to find alternatives to driving alone during peak periods. Among 1,700 employees in eight case study firms in Southern California, parking cash-out led to an 11-percent reduction in commuter trips and a 12-percent reduction in commuter vehicle miles traveled.

A good parking strategy addresses the projected level of transit use to a given site, minimizes parking supply and development requirements, and looks for allowances for shared development costs and fees for operation and maintenance of the parking facility.

Finally, transit providers should give significant thought to how their own parking policies either encourage or discourage transit use and how to efficiently use resources engaged for parking at transit facilities. For example, many transit providers provide free parking at park and ride lots in order to encourage ridership and extend the reach of transit into (usually suburban) areas not directly served by transit; however, the tradeoff is that parking revenues, as well as revenues from development of an agency-owned property that might have a more valuable use than surface parking, go unrealized.[6]

TRANSIT ORIENTED DEVELOPMENT

Transit-oriented development (TOD) is compact development built around a transit station, or within easy walking distance (typically no more than a half-mile) of a station, which contains a mix of land uses such as housing, offices, shops, restaurants, and entertainment. TOD can lower household transportation costs by promoting bike/ped and transit use[7], boost public transit ridership, spur economic development, provide a source of revenue for transit providers, and make housing more affordable by reducing developer expenditures on parking and allowing higher-density zoning.

TOD has been employed successfully in other parts of the country. The Rosslyn-Ballston Corridor in Arlington County, Virginia, features a string of dense, mixed-use developments at stations along the Washington Metro Orange Line; it has become the "commercial spine" or Arlington County. The Portland, Oregon region has been particularly aggressive about TOD along MAX light rail lines; the Pearl District in downtown Portland, Orenco Station in Hillsboro and The Round at Beaverton Central Station are three such developments. In the Dallas-Fort Worth area, Addison Circle, Mockingbird Station and Eastside Village in Plano

All Transportation is Local

Transportation policy has an enormous impact on social, economic and quality-of-life conditions at the local level. However, local elected officials might be wary of attempting policies that benefit transit, bicycle, pedestrian and other alternative transportation modes due to concerns about state and federal regulations, oversight or funding availability. A handbook recently published by TransitCenter, *All Transportation is Local: A Field Guide for City Leaders*, attempts to combat this inertia by providing suggestions, guidelines and examples for mayors, councilmembers and other local elected officials to consider as they aim to test and implement transportation initiatives in their municipalities.

As the handbook's authors explain, "cities can make progress by creating an environment where transit works for more people and where walking and biking are viable ways to get around" regardless of political, regulatory or fiscal conditions at the state or federal level. The document provides leadership, policy and physical recommendations that local leaders can take to improve their transportation networks; discusses strategies such as street redesign, parking management strategies, campaigns and incentives, and the creation of partnerships; and provides examples and resources for each recommendation. Further information can be found at:

http://transitcenter.org/publications/atil/

[6] Refer to Table 1 in *TCRP Synthesis 122: Transit Supportive Parking Policies and Regulations* for a full summary of benefits and drawbacks related to agency policies regarding parking pricing, partnerships and development.

[7] According to *TCRP 128: Effects of TOD on Housing, Parking and Travel*, residents of TODs are less likely to own a car and use transit for work trips two to five times more than residents of conventional development. Studies have also shown that TOD can create considerably less traffic than what is generated by conventional development.

are well-known examples. Within the H-GAC region, Cypress Village Station – a mix of residential and commercial uses located around the Cypress Park and Ride – incorporates elements of TOD.

Mockingbird Station, Dallas. source: Dallas Area Rapid Transit

CHARACTERISTICS OF TOD

The characteristics of TOD will vary based on the unique qualities of the communities in which they are located. TOD can exist in urban or suburban areas; it can be either new/greenfield development or infill/brownfield development; and it can occur on provider-owned properties already housing a transit station, private property adjacent to a transit station, or a combination of the two.

With that said, there are some general guidelines for the effective design of TOD, as well as the character of the transit serving it. Successful TOD requires a collaboration of transit providers, local governments, residents and the development community.

TOD design should obviously incorporate the transit-, bicycle- and pedestrian-friendly features outlined in the previous section. Some additional guidelines identified for good TOD development include the following:

- The TOD planning area should include at least the half-mile radius around the transit station.
- The TOD plan should have a phasing program, include a section on implementation, and identify responsible parties for making the plan a reality.
- The street network should be connected and designed to lead to the transit facility.
- The densest areas of the development should be clustered closest to the transit station, with gradually decreasing densities as distance increase from the station.
- The uses and densities of the development should be appropriate for the type of station area and its location in the larger neighborhood.
- The uses should be transit-friendly (i.e. people traveling to them will find it convenient to use transit) and attract people throughout the day/night and week.
- Uses that would be conveniences for surrounding residents, workers and transit users (coffee shops, dry cleaners) should be included. New and existing residents and workers should be able to generate enough demand to support proposed retail.
- Non-compatible uses, such as drive-thus and car washes, should be phased out over time.
- The design of public spaces in the TOD should be appropriate to adjacent uses, e.g. parks and playgrounds in residential areas, public plazas in commercial and retail areas.

- Parking should be hidden from view from the street behind buildings or in parking structures lined with other uses, such as retail or residential.
- A mix of housing types should be provided. Incentives or set-asides for subsidized affordable housing should be provided, and there should be plans to preserve, rehabilitate or replace existing affordable housing, so that a mix of incomes can benefit from the TOD and so that the TOD does not spur gentrification of the surrounding community.
- Parking requirements should be reduced for buildings and uses most likely to attract transit users. Parking should be priced to encourage transit use over driving. Less land consumed for parking means more land for development.
- TOD is most effective when it is served by frequent transit. This is usually HCT All Day service, but even Local Fixed-Route Bus can effectively serve TOD if it is frequent and reliable. As has been discussed previously in this report, the more frequent the service is, the more useful it becomes.
- The destinations that can be reached from the TOD (especially in regards to work) is critical to the TOD's success. Employment access appears to be a primary consideration for TOD residents, and employment densities at trip ends have more influence on ridership than population densities at trip origins.

TOD IMPLEMENTATION

TOD is a long-term development strategy that requires careful coordination between transit providers, the real estate development community, municipalities, management districts, neighborhood groups and other entities that may be interested in, it or affected by it. In order to be successfully implement, several keys need to be met.

The first key is provider, municipality, and community support. Providers must have internal clarity regarding TOD and be willing and able to provide service levels (capacity, frequency, connectivity, etc.) that will support it. As was mentioned previously, this type of development needs to be "easy to do." Municipalities should ensure that development regulations do not create roadblocks to building where it is appropriate. Community and neighborhood understanding and acceptance is important as well, especially as it relates to the effects TOD will have on property values, amenities, mobility and other conditions in the community.

The second key is a careful understanding of market conditions, as they play a role in virtually all TOD projects. Even TOD built entirely on transit provider property, such as an underutilitzed park and ride lot or over an existing facility (i.e. air rights development), requires that market conditions such as residential or commercial demand near transit be favorable for a project to attract developer interest and financial support. Projects that align with market conditions can catalyze future development. Development community participation in the TOD planning process is essential.

The third key is financing. TOD is still "non-traditional" development, especially in the H-GAC region, and so creative financial solutions may be required. Public-private partnerships and joint development are natural arrangements for TOD, but oftentimes additional incentives – for example, targeted infrastructure improvements to sidewalks, streets and utilities – will be required. TOD has the ability to concentrate development and activity in a way that allows for focused value capture strategies, which is an advantage when financing is considered.

TOD advocacy in the region recently took a step forward when METRO, with support from the City of Houston and H-GAC, completed a Transit Oriented Development Study aimed at encouraging and generating interest in TOD around METRO passenger facilities. The scope of the study included eleven HCT All Day stations on all three lines and four park and ride facilities. The study conducted existing conditions and market assessment reports for each of these sites which inventoried

demographic and land use patterns, identified market trends, and made site-specific recommendations for opportunity sites and infrastructure improvement.

Additional recommendations made by the study include:

- Coordination with stakeholders to identify potential partnerships and pilot projects
- Work with the City of Houston to strengthen transit-oriented aspects of Chapter 42
- Support improved bicycle and pedestrian access to METRO facilities
- Encourage options for shared-use parking and parking management districts
- Work with H-GAC to align project evaluation for the Transit Improvement Program (TIP) with TOD projects
- Leverage METRO infrastructure and investment for potential revenue
- Educate developers and stakeholders on joint development opportunities

TOD is a long-term development strategy, meaning that full build out of a given station area may take years or even decades to complete. A commitment to a long-term vision is necessary, and interim guidelines and phasing plans might be useful in guiding a given development to its final build-out. However, a well-designed TOD can provide benefits to presidents, businesses, transit riders, transit providers, neighborhoods, municipalities, and the overall region for decades to come.

OPERATIONS MANAGEMENT

Most of the region's transit services currently operate, and will continue to operate, in mixed traffic on the region's streets and roadways. This means that these services will be subject to delay caused by traffic congestion, traffic incidents, and traffic signals; as well as by factors unique to transit service such as entry to/exit from bus stops and dwell time at stops. This delay, in turn, reduces overall transit speed and impacts reliability, making transit less attractive.

These types of delays can be managed by optimizing the overall mixed-traffic network through transportation systems management, as well as by optimizing the transit services themselves through operations management. Transit planning can also be coordinated with freight planning (see discussion below) for synergies between two modes not normally considered together.

Transit benefits of these management strategies include better reliability, higher average travel speeds, and operational savings through the ability to deploy fewer buses to maintain headways through congested areas.

TRANSPORTATION SYSTEMS MANAGEMENT

Disruptions in general traffic flow result from regular, recurring causes such as peak-period congestion; irregular and sporadic incidents such as collisions, breakdowns, malfunctioning signals and traffic related to special events; and infrastructure-related problems such as poorly-timed signals, bottlenecks and unsafe roadway geometrics.

Techniques to monitor the overall transportation network and solve or otherwise mitigate the causes of traffic congestion are collectively known as Transportation Systems Management (TSM) strategies. TSM techniques are designed to get the most out of the existing transportation network and are a lower-cost alternative to major added capacity projects like road widenings. TSM strategies include:

- **Traffic signal improvements:** optimizing traffic signals by improving timing, operations, and even the locations of signals and their controls can promote smoother and safer traffic flows. Signals can also be controlled by vehicle detection devices or

from a central system that optimizes area-wide traffic flow. Care should be taken so that traffic signal optimization does not reduce pedestrian and bike crossing time at intersections.

- **Geometric improvements:** these can be simple improvements such as lane assignment changes or pavement re-striping, or reconstruction activities such as adding new turn lanes at intersections, widening narrow lanes, improving dangerous curves, replacing intersections with roundabouts, or even building grade separations at particularly congested intersections. These improvements are typically smaller in scope and require less right-of-way than added capacity projects.
- **Access management:** access management practices can combine multiple driveways, thereby removing friction points between arterial traffic and cars that are entering and exiting. Conflicts can also be reduced by adding raised medians and channelized turn lanes along two-way arterials. Local businesses sometimes worry that these improvements will reduce business from pass-by traffic, so outreach and education is important.
- **Informational improvements:** the installation of better and more visible wayfinding signage can reduce incidents that result from motorist confusion. Variable message signage can alert motorists to traffic problems and select alternate routes.
- **Intelligent Transportation Systems (ITS):** this is an umbrella term for technologies that collect real-time traffic data (from sources such as cameras, drones, roadside sensors or in-pavement detectors); this data can then be used to dispatch tow trucks and emergency services, make adjustments to traffic flow through remote traffic signal timing or variable speed limits, and inform motorists through variable message signage or real-time traffic maps. ITS systems are oftentimes managed through a central "hub;" Houston Transtar is a regional example of such a hub.
- **Incident management:** this includes the rapid detection and clearing of vehicles that are disabled by accidents or mechanical failures. Incident removal programs (a regional example being the SafeClear towing program) are designed to quickly dispatch tow trucks to move damaged or disabled vehicles out of travel lanes. So far this concept has only been tested on area freeways, however, much of the region's bus services operate on surface streets, where this concept has not been tested.
- **Education and enforcement:** the bad driving habits of a small number of motorists can cause a lot of accidents and congestion for everyone else. Driver education and awareness campaigns and strict enforcement of traffic laws can reduce the number of incidents caused by poor or distracted driving.

TSM improvements are generally planned and executed by traffic engineers in state and local jurisdictions. For that reason, transit providers should engage state and local staff on a regular basis, especially when they become aware of a congestion-related issue that is affecting transit operations and may be mitigated by TSM strategies.

TRANSIT OPERATIONS IMPROVEMENTS

In addition to improvements in overall traffic flow, there are improvements that providers and other agencies can make specifically for transit. *TCRP Synthesis 110: Commonsense Approaches for Improving Transit Bus Speeds* lists a variety of operational improvements transit providers can make to improve the speed and reliability of transit services operating in mixed traffic. These improvements include:

Schedule adjustments, including running time adjustments or changes to layover and recovery policies (these types of adjustments usually have a better effect on reliability than speed);

Route adjustments, such as keeping buses on major corridors to reduce the number of time-consuming turns and deviations, or instituting limited-stop service;

Stop-related actions, including increasing spacing between bus stops (although, as discussed earlier in this report, there are trade-offs related to access), lengthening bus pads to allow multiple-door boarding or placing stops at the far side of signalized intersections;

Vehicle-related actions, including using low-floor buses, larger buses, buses with better acceleration, buses with different seating configurations, or buses with all-door boarding to speed the ability to quickly get on or off a bus and therefore reduce dwell times;

Fare-related actions, such as encouraging the use of prepaid fare media, off-board fare collection, and free-fare zones that reduce or eliminate the need for a bus to wait at a stop while a boarding patron manually pays a fare;

Legal/regulatory-related actions, such as restricting lanes on arterial streets to bus-only use during peak periods, prohibiting curbside parking or deliveries during peak periods, or implementing yield-to-bus laws (these actions necessarily require the cooperation of municipal authorities); and

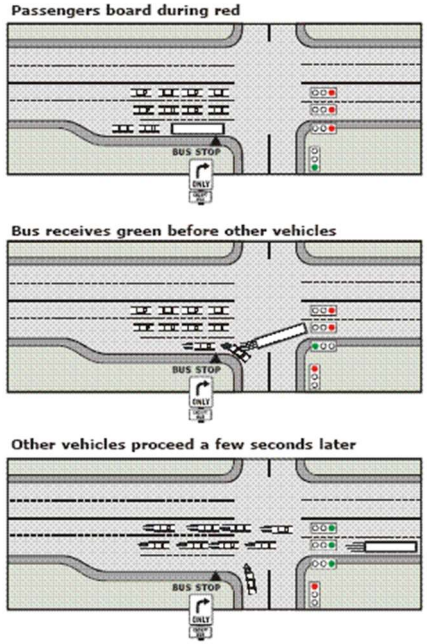
Bus priority infrastructure, which can include:

- **Transit Signal Priority (TSP):** modifies the traffic signal at an intersection to provide and oncoming bus with an advanced or extended green light. It is generally controlled by a detection system at the intersection or by a central computer system that tracks the bus along its route using AVL hardware. TSP is different than signal preemption (such as that used for emergency vehicles) in that it does not interrupt the normal signal cycle; it simply shortens or lengthens a phase of the cycle to let a transit vehicle pass. TSP is oftentimes used with far-side bus stops.
- **Bus Advance Signal:** a dedicated, short traffic signal phase for the bus that allows a bus to advance ahead of regular traffic. Often used with queue jumps (see below).
- **Bus-Specific Signals:** traffic signals intended for use by buses only. Providing buses with a separate set of signals improves bus priority and reduces driver confusion.
- **Bus-Specific ITS:** technology that improves vehicle performance and monitoring, such as AVL, driver assist technologies (including collision avoidance or curbside docking), vehicle mechanical monitoring, GPS-connected real-time traveler information (next-bus signage at stops or next-stop announcements inside the vehicle), and automatic passenger counters (APCs).
- **Queue jumps:** a bay or short lane (commonly a right-turn lane) that allows a bus to bypass waiting cars at an intersection. Oftentimes used with signal priority. **Figure 13.3** shows an example of a queue jump and how it functions.
- **Bus bulbs:** an extension of the sidewalk pavement into the curbside parking lane and flush with the travel lane which allows buses to stop and serve passengers without having to pull out of the travel lane. This eliminates the need to maneuver out of the travel lane to service the stop, and subsequently wait for general traffic to clear to re-enter the travel lane afterward. In addition to reducing delay, bus bulbs also provide additional space for shelters, benches and other passenger amenities. **Figure 13.4** provides an example of a mid-block bus bulb.

Many of these operational and infrastructure improvements are critical components of the Signature Bus corridors recommended by the RTFS, but these types of improvements could also be useful along Local

Fixed-Route Bus corridors as well, especially where routes are frequent and/or high-ridership.

Figure 13.3: Bus Queue Jump



(a) Near-Side Concept

(b) Near-Side Application (Copenhagen)

(c) Far-Side Application (Portland, Oregon)

Source: *TCRP Report 118: Bus Rapid Transit Practitioner's Guide*

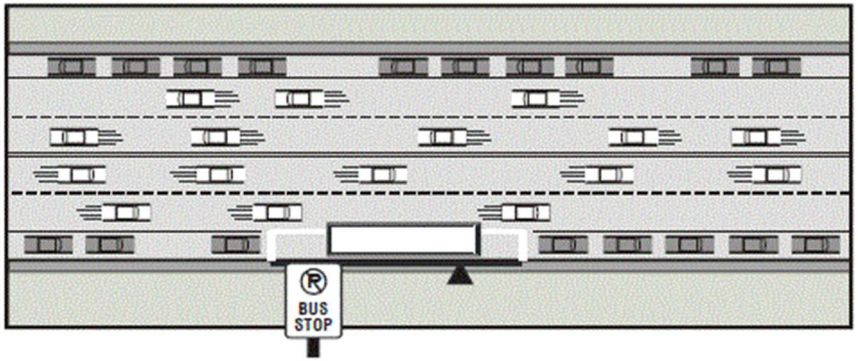
While bus priority infrastructure might be the most desirable type of improvement for providers, it is also the most expensive. It may be more reasonable to implement modest operational improvements to transit service, at least in the short term, based on resources available. According to *TCRP Synthesis 110*, "Even small increases in average travel speeds can mean reductions in operating costs to transit agencies while improving service to customers. Improved service to customers can translate into increased ridership and potential reductions in automobile use."

Obstacles to implementation of transit operations improvements might include opposition from riders, lack of cooperation from municipalities, opposition from stakeholders and business interests, and general constraints regarding costs and funding. For that reason, outreach and communication to riders and other stakeholders conveying the benefits of any proposed operational improvement is crucial. This is especially true of relationships between transit providers and municipal traffic

Figure 13.4: Bus Bulb

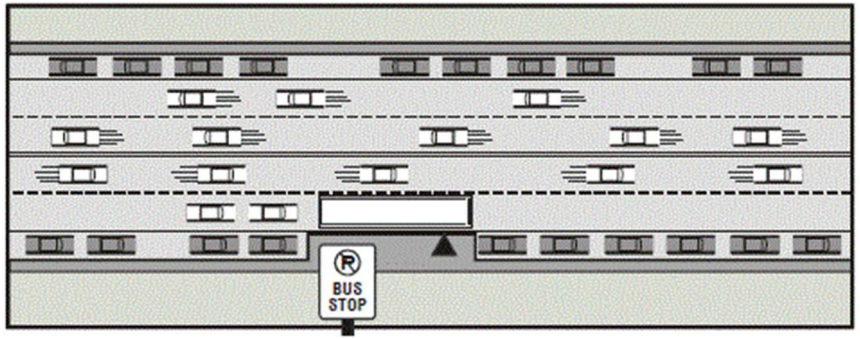
Before

Bus pulls to curb at bus stop: must wait for gap in traffic to proceed.



After

Curb extended into parking lane, bus stops in travel lane; more curbside parking available.



Source: *TCRP Report 118: Bus Rapid Transit Practitioner's Guide*

engineers regarding ways to expedite the flow of transit vehicles: the municipal traffic engineer's expertise in signal timing and traffic flow and the transit provider's expertise in operations should be synergistic rather than adversarial. The positive case studies described by *TCRP Synthesis 110* emphasize strong cooperation between providers, municipal agencies, and other stakeholders.

Freight and Transit

Freight movement and public transit are oftentimes thought of as completely separate aspects of the transportation network, because they serve two fundamentally different purposes: the former moves goods and the latter moves people. However, there are instances where good freight movement planning can be beneficial to transit, and vice versa:

- Improvements made for truck traffic could also potentially benefit bus operations on roads that buses share with trucks (through better pavement, wider roads and turning radii, and overall congestion reduction).
- Truck-only facilities can remove freight-related congestion from the local road network, benefitting transit services that operate in mixed traffic.
- The elimination of railroad at-grade crossings could benefit transit by reducing delay and improving reliability for buses that are stopped for trains. (METRO currently recognizes that the large number of railroad at-grade crossings in the Houston area is a major factor degrading bus reliability).
- Temporal planning of freight movement has benefit, as goods do not necessarily have to move at the same time people are moving. Strategies include encouraging freight movements at night, when transit is generally not operating, and prohibiting curbside deliveries along arterial streets during peak hours, when it is most likely to negatively affect transit.
- Finally, the H-GAC Regional Goods Movement Plan contained several recommended freight rail improvements that it noted could create capacity for potential commuter rail operations.

Regional transit and regional freight planning should be coordinated so that projects that are beneficial to both freight and transit movement can be identified and advanced as appropriate.

TRANSPORTATION DEMAND MANAGEMENT (TDM)

Transportation Demand Management (TDM) is a term used for strategies that result in the more efficient use of transportation resources. The following are examples of TDM options intended to reduce single-occupancy vehicle use among commuters:

- Transit use
- Carpooling
- Vanpooling
- Walking and Bicycling
- Teleworking
- Using Alternative Work Schedules

Inclusion of compatible TDM strategies is an important element in developing a comprehensive long range regional transit vision as successful TDM solutions generally support the same objectives as public transit service. However, TDM options, like transit service itself, require branding, marketing and education to be effective. This includes activities and strategies such as advertisements, promotions, education, outreach, and the provision of financial incentives.

This section identifies TDM strategies that have been effective in other places and summarizes potential TDM considerations for the H-GAC region.

During the 2010 RTFS effort, twenty case studies were selected to represent transit-related TDM applications in areas that collectively represent a diverse group of land uses or primary activities. The case studies focused on effective TDM examples throughout the United

States that were implemented within areas that can be generally classified into one of the following categories: urban center, office, commercial/retail, medical, hotel and residential.

These diverse types of land uses/activities were selected to provide TDM examples that may be comparable to six different major activity centers identified within the region. These activity centers were selected from dozens of areas identified for consideration because they represent a diverse sampling of regional land uses/activity types. TDM strategies identified for these areas may be applicable to other existing or emerging areas within the region with similar land use characteristics. The six major activity centers are:

- Downtown Houston
- Texas Medical Center
- The Uptown/Galleria
- Greenway Plaza
- Westchase
- The Woodlands

APPLICABLE TDM STRATEGIES

One of the lessons learned from the best practices is to target the TDM strategies to market the transit services that are available. Therefore, for each of the activity centers, existing and contemplated transit services were studied carefully to determine what services would be easiest to market (i.e. those with high frequency or high visibility, such as light rail) and what competing features are located within the activity center that could detract from transit. For example, the Texas Medical Center is served by light rail, which is a highly marketable service, but it is also ringed by remote lots with increasingly frequent shuttle service which makes it easier for commuters to drive to their jobs there.

Marketing transit service in this example takes several forms: awareness, outreach and educational efforts through direct staff contact, signage, and campaigns; increasing access to the benefits of transit through the location of a commuter store and the establishment of pre-tax transit benefit programs; and incentivizing transit use through subsidized and partially-subsidized transit passes. The rule of thumb is: the more frequent and prevalent the transit, the less there's a need for TDM strategies. However, the more prevalent the automobile infrastructure, the more the need for TDM strategies.

Target markets for TDM strategies include:

- People traveling to the activity center for special events, shopping or leisure activities
- People traveling to the activity center on work-related errands or other business
- Commuters who have not tried transit because they did not know about the programs available
- Commuters who drive alone because they want more mobility during the day
- Commuters who may be interested in trying vanpool or transit service
- Commuters who live along frequent transit corridors but who are unaware of or reluctant to use the service

Table 13.1 provides a detailed description of many TDM strategies. They are not in any particular order; some are relatively simple and inexpensive to implement while others are more complex and expensive. Funding and staffing for TDM efforts may come from a variety of sources, including municipalities, transit providers, management districts, conventions and visitors bureaus, the private sector, and H-GAC (through the Commute Solutions program). As with branding, marketing and education efforts for transit service itself, a cost-benefit analysis of TDM strategies may be required to demonstrate their effectiveness to potential funding partners.

Table 13.1: TDM Strategies

Strategy	Description
Increase funding for outreach and education	Fund an awareness campaign, staffed full-time, with a marketing budget intended to capture the attention of those who have previously only driven to the activity center. Include funding for branding, launch event, monthly event staged at various places around the activity center, booths at sports special events in the activity center, signage, and other activities.
Create walking transit ambassadors	Fund full-time staff to walk around the activity center and offer assistance and wayfinding to anyone who needs it. Coverage should include peak periods and midday at a minimum; evening and weekend coverage is dependent on the characteristics of the activity center, special events, and the like.
Market transit to visitors	Conduct outreach to front desks and concierge staff at hotels within the activity center; create maps from the hotels to popular destinations; create guides for tourists and visitors describing how to use the local transit system. Include budget for mapping software and printing.
Create "day pass"	Create newly branded fare media, to be sold online, at a designated commuter store within the activity center, and at transit stops, that allows unlimited rides over a 24-hour period. Include funding for a branding campaign, promotional events, and advertising. (*Since this suggestion was made as part of the 2010 RTFS effort, METRO has re-introduced its day pass.*)
Create worksite trip reduction goals	Outreach to employers to establish a worksite mode split goal, and monitor progress toward achieving it. Reward those who achieve and/or sustain their goals with special events tickets, gift cards or some other prize.
Create a "parking solutions" program	Assist employers in offering parking cash-out programs whereby companies pay employees a cash allowance rather than subsidizing their parking. Parking solutions staff will develop a regional parking guide describing the parking areas owned and served by transit, special event parking, etc. Include budget for parking guide printing.
Sponsor pre-tax transit benefit awareness and sign-up campaign	Create a pre-tax transit benefit brochure; host an annual sign-up campaign; conduct outreach to employers describing the process and benefits of encouraging the set up of pre-tax transit benefits. Include funding for the promotion of an annual sign-up campaign.
Create transit use incentive program	Promote use of transit for travel within the activity center by hosting monthly special events and prize give-aways on designated routes.
Create mobility store	Purchase or lease space within the activity center, staffed full-time, where people can purchase fare media, pick up informational transit brochures, log their transit use to be eligible for rewards, and receive commute assistance from a staff member trained in designing a customized commute. Include budget for office space, at least one staff member from 7am – 7pm daily (7 days a week), budget for printing route and fare information, a computer, and a budget for small special events.
Create Guaranteed Ride Home Program	Fund two or three annual rides home, to be used in the event of a midday emergency, for registered transit and vanpool users. Several regional providers, including METRO, offer this service; it provides peace of mind for commuters who vanpool or ride express routes that do not offer mid-day service.
Create park-and-ride outreach program	Survey park-and-ride lots along Express Bus, Signature Bus, HCT Peak and HCT All Day corridors to determine interest in rideshare parking and rideshare programs. Outreach will also include park-and-ride events intended to promote ridesharing.

Strategy	Description
Create district-wide commuter program (subsidizing transit passes, hosting a website, leading enrollment in pre-tax transit benefits, etc)	Fund and maintain an activity center-wide commuter benefits program to implement programs such as subsidizing transit passes, providing education and promotion, and helping match employees and visitors with the available means of getting to and around the activity center without their cars. Include funding to subsidize transit passes, and funding for promotions and events.
Increase signage and wayfinding	Develop and install transit-related signage to help commuters and visitors identify transit-accessible buildings from each transit station or stop. Include funding for signs, promotion of one unveiling event, and posting information on the activity center's website.
Conduct an Individualized Marketing Campaign for district employees	Fund an on-going individualized marketing program that provides a customized commute using transit for those who request it. Creating a customized commute program would be a free service, with the agreement of the recipient to pledge to use the recommendation for a minimum of three months, and to request and accept coaching at the recipient's discretion. Upon the successful completion of three months of participation, participant can earn an annual transit pass as well as a cash reward. Include budget for at least full time staff position, online tracking program assistance as necessary, funding for incentives and subsidized transit passes.
Create/expand bikeshare program	Implement multiple bike-share centers throughout the activity center. Make "purchase" free with a transit pass. Include budget for signage, bicycles, racks, rental kiosks, maintenance, replacement bicycles, and rental subsidy. (*Since this suggestion was made as part of the 2010 RTFS effort, Houston BCycle bike share program was begun and has been continually expanding.*)
Transit pass subsidies	Subsidize full cost of employees' purchase of transit passes for up to one year. Make the subsidy renewable if an employee utilizes transit for a minimum of three days a week for at least 30 weeks of the year. Include budget for transit subsidies, promotions and advertising.
Create neighborhood trip reduction goals	Fund outreach to neighborhoods and employers and interested community organizations in order to establish a transit use target. Reward those who achieve and/or sustain their goals with special events tickets, gift card or other reward.
Annual challenge to change modes	Fund an annual two week-long challenge to encourage people to try transit. Subsidize the purchase of transit passes for new riders. Reward existing transit riders for different categories: 'most transit trips,' 'most transit miles,' etc. Include funding for the purchase of transit passes, promotions, advertising, and rewards.
Study and Fund a Transportation Management Association (TMA)	To ascertain the best organization for implementing mobility programs, fund a study to determine the activity center's interest in forming and sustaining a TMA. A TMA would engage employers, residents and community groups in the activity center in transportation programs and services.
Create a district-wide carshare program	Carsharing is a membership-based service that allows vehicles to be reserved for use for specific periods of time. Implementing a district-wide carshare program gives employees access to a car to run errands for short periods during the day, thereby allowing them to sue transit to commute. (*The Energy Corridor, in cooperation with Carshare provider ZipCar, has implemented this strategy.*)

Source: UrbanTrans Consultants, 2010.

The following are brief narratives of TDM strategies recommended for each of the six identified major activity centers.

Downtown Houston

The Downtown Houston activity center is primarily comprised of urban office and restaurant/entertainment land uses. The area has high levels of transit service from all areas of the region. The target TDM markets recommended for Downtown Houston include people coming downtown for special events, work commuters, and people who drive single occupancy vehicles for increased mobility during the day. TDM strategies include increased outreach and education funding, walking transit ambassadors, "day passes," worksite trip reduction goals and a parking solutions program.

Texas Medical Center

The target TDM markets for the Texas Medical Center (TMC) include suburban commuters, TMC employees and visitors with midday travel needs, and single occupancy vehicle drivers with the need for increased mobility during the day. TDM recommendations for the TMC include a district-wide commuter program, increase signage and wayfinding, conduct an individualized marketing campaign for district employees, walking transit ambassadors, and a guaranteed ride home program.

Uptown/Galleria

The Uptown/Galleria activity center is primarily comprised of commercial, retail, hotel, and office land uses. The area has limited transit service from most parts of the region. Target TDM markets for the Uptown/Galleria include shoppers, people traveling to leisure activities, and commuters. TDM recommendations include funding for outreach and education, increasing signage and wayfinding, marketing transit to hotels, creating bikeshare programs and transit pass subsidies.

Greenway Plaza

The Greenway Plaza activity center is primarily comprised of office land uses. The area is served by METRO routes from many parts of the region, but much of the service comes from the Katy Corridor. The target TDM markets for Greenway Plaza include employees residing along frequent METRO routes and/or west of Greenway Plaza from the Katy Corridor to Westchase. TDM recommendations include funding for outreach and education, creating worksite trip reduction goals, creating a 'parking solutions' program, and sponsoring a pre-tax transit benefit awareness and sign-up campaign.

Westchase

With the exception of the Woodlands, the fact that Westchase produces more trips than it attracts distinguishes it from the other activity centers. However, the area is currently a small employment center and a large neighborhood with an associated commercial area. The target markets for the TDM programs recommended for Westchase are residents who live in Westchase but work in Downtown, Greenway Plaza or Uptown/Galleria, and Downtown area and Uptown/Galleria area residents who work in Westchase. TDM recommendations include a Transportation Management Association (TMA) Feasibility Study, create neighborhood trip reduction goals, fund an annual challenge to change modes and individualized marketing programs.

The Woodlands

The Woodlands is a large residential and employment hub in the northernmost part of the H-GAC region. Its diverse land uses (residential, employment, and retail) make the Woodlands a good candidate for a Transportation Management Association (TMA). A TMA, or some other designated outreach and programming entity, could outreach to local employers, community associations, schools, neighborhoods, and homeowners associations to increase transit use. Target TDM markets include residents who work in Downtown, TMC, Greenway Plaza, or Uptown/Galleria. Potential Woodlands trolley riders are another target TDM market. TDM programs recommended

for the Woodlands include conduct a Woodlands TMA Feasibility Study, create neighborhood trip reduction goals, fund an annual challenge to change modes, and engage residents through TMA or H-GAC.

An analysis conducted during the 2010 RTFS effort indicated that the TDM strategies outlined above could increase transit's mode share for all six activity centers.

IMPLEMENTATION OF TDM STRATEGIES

Implementing the strategies recommended for each of the activity centers can increase transit ridership by anywhere from one to six percent depending on the extent of the programs offered. However, implementing the programs, especially combinations of programs, should be done incrementally.

Learning from the case study examples, implementation of new TDM programs should consider the following four key points:

1. Get to know the market for TDM services.

TDM staff should sit with worksite employers, property managers and other commuter representatives to understand:

- What form of marketing is appropriate (E-mail? Worksite signage? Phone calls? Lobby and lunchroom displays and visits?)
- What routes and services are especially important to commuters (what transit routes are they using?)
- Who are the potential public partners in each activity centers who can help increase the likelihood of the TDM programs' success?

2. Determine the interest in funding and implementing these programs with public or a mix or public and private funding.

In some cases there may be enough private interest in TDM programs that private entities will ask to start programming even before public money is available. In other cases, private funding will be unavailable to support TDM programs; in that case, it might make sense to consider a regionally-based program.

3. Target the service to market and target the market.

Marketing must focus on promoting the services that offer something attractive to commuters. For each of the activity centers, this means applying the TDM strategies to specific routes and services that best serve worksites and commuters interested in transit.

4. Introduce programs incrementally, allowing time for TDM staff to build relationships with their clients.

Employers should be convinced that transit can work for them before they are willing to help visitors and guests use it, so TDM strategies should start with employee programs such as subsidized transit passes before growing visitor programs such as a mobility store. In the Texas Medical Center it might make sense to provide wayfinding signage and walking transit ambassadors first, and open a commuter store later.

Each of the TDM strategies recommended is easy to scale to any target market. They can be applied to a worksite of less than 50 people, or to one of over one thousand. This is important because as additional livability centers grow, becoming more like the six activity centers featured in this chapter, commuter programs designed to promote transit ridership can be implemented regardless of the size of the commuting population.

Although TDM recommendations were only formulated for these major activity centers, the TDM strategies described in **Table 13.1** could be

applicable to any major activity center in the region, including the Energy Corridor, Sugar Land, NASA/Bay Area and downtown Galveston.

LEVERAGING NEW SERVICES AND TECHNOLOGIES

New services and technologies have the potential to transform transit use. Some of these technologies, including EFPS and transit-specific ITS, have already been discussed in this chapter. Other new services and technologies include smartphones, ridesourcing and microtransit, and automated vehicles; transit providers should consider ways to leverage them for the benefit of their operations and their riders.

SMARTPHONES

Smartphone apps are changing the way people travel by transit. Not only can they be used to pay transit fares, as explained earlier in this chapter, or used to hail ridesourcing services, but they can also be used to get real-time information about bus or train arrivals, to plan trips, to find the nearest bus stop or train station, to find about dining and shopping options in the area to which riders are traveling, or to check general traffic congestion. METRO's Q Ticketing mobile app, for example, is not only used for fares but also provides access to bus and rail schedules and a trip planner. In addition to transit-specific apps, transit providers can also communicate directly with customers through social media apps, such as Facebook and Twitter, to provide service updates and solicit feedback.

Obviously, no amount of data or app functionality is a substitute for actual service that is frequent and reliable. However, in terms of attracting new and infrequent riders, keeping regular riders updated and satisfied, or serving areas that have limited transit options, the smartphone is a relatively low-cost way to make transit use more attractive and effective.

If there is a drawback to smartphones, it is that not everyone has one. However, the number of people without smartphones is decreasing, because technology tends to become less expensive over time, which makes it more available to more people. There are also persons who may have physical or mental impairments which prevent them from using smartphones. For that reason, it is important that providers continue to offer "traditional" ways to use transit: cash and card fare

Not Everyone Has a Smartphone... Yet.

Mobility apps that operate on smartphones, such as iPhone or Android devices, are becoming increasingly ubiquitous. This raises an issue regarding equity: are those who cannot or do not own a smartphone being left out? And how to accommodate them?

It is worth noting that the number of people who do not have smartphones is gradually decreasing. A Pew Research Center survey conducted in November 2016 indicated that 77% of Americans owned a smartphone. The Pew survey also found that 74% of Americans ages 50-64 were smartphone owners (a 16-percentage-point increase compared with 2015), and that 64% of Americans living in households earning less than $30,000 per year were smartphone owners as well (a 12-point increase compared to 2015).* This suggests that the "smartphone gap" within the elderly and low-income populations (both of which particularly benefit from transit services) is not as significant as might be feared. Furthermore, this gap will continue to narrow in the coming years.

That, nevertheless, still leaves a lot of people who don't – or cannot – use smartphones. For that reason, transit providers should retain "traditional" methods of fare payment, information and communication. But even these traditional methods can use new technologies and services to help transit riders: for example, a customer representative at a call center can reserve a ridesourcing service for a caller to complete their journey, or use real-time vehicle location systems to tell a caller when their next bus or train is going to arrive.

*http://www.pewresearch.org/fact-tank/2017/01/12/evolution-of-technology/

collection systems in addition to smartphone-based EFPS, customer service personnel at a central call center, paper schedules and maps. Even if they have smartphones, many transit riders still prefer to speak to actual humans over the telephone for information and trip-planning assistance, or have paper schedules and maps available because they are easier to read (e.g. they have low vision or are colorblind). Access for persons with limited English proficiency must also be considered.

One thing transit providers should consider in regards to smartphones is not just the advantages it providers in allowing people to use transit, but also transit's advantage in allowing people to use their smartphones. Transit riders with can accomplish activities on transit – checking emails, doing research, shopping online or using social media – that are too dangerous to do while driving. This is an advantage over driving alone that transit providers should promote; they are also encouraged to leverage this advantage by providing tech-friendly amenities, such as wi-fi service at stations or on vehicles and power outlets and charging centers at passenger facilities.

An emerging concept in smartphone-based mobility is Mobility as a Service (MaaS), which combines multiple transportation services (from both public and private providers) through a single gateway that creates, manages and pays for an entire multi-modal trip. MaaS is envisioned as a seamless "anywhere and anytime" interface that can plan and optimize trips based on a variety of factors such as user preferences, weather, transit schedules and taxi or TNC availability.

MaaS is still a concept in development; it requires extensive data needs as well as significant cooperation among a variety of transit services and providers if it is to be successful. Nevertheless, providers should be aware of the concept and be prepared to participate if it takes hold.

RIDESOURCING AND MICROTRANSIT

Ridesourcing (i.e. TNCs, such as Uber or Lyft) usually involves transporting a single passenger at a time, or a small group of passengers going to the same location; in this regard it is similar to traditional taxi services. Microtransit (represented by companies such as Chariot and Via) uses small vans to serve multiple riders and trips; routes are determined by dynamic ride-match software.

Both ridesourcing and microtransit have been used to complement and extend the reach of traditional transit services. For example, transit authorities in places like Colorado, Florida and even the Dallas-Fort Worth Region are already using subsidized trips provided by TNCs to solve "first mile/last mile" feeder services for their riders, linking transit stops to areas that are unserved or difficult to serve with traditional transit. Regional providers might consider partnering with ridesourcing and microtransit companies for specific purposes, such as operating demand responsive service within defined flex zones that hub at a major passenger facility, or providing service at times (such as the late evening) when traditional transit services are not operating.

As was mentioned in Chapter 5, the use of ridesourcing companies to complement transit is not without controversy. Concerns have been raised about the way they are regulated, the way they are staffed (i.e. drivers are considered to be contractors to the TNC, rather than employees), whether they equitably serve lower-income communities and persons with disabilities, whether they pose an existential threat to traditional public transportation, and whether they are financially sustainable in the long-term[8]. Microtransit services, meanwhile, have encountered some difficulty in establishing themselves, as the failure of Kutsuplus in Helsinki, Finland, and the recent closure of Bridj here in the United States can attest. These are all concerns that transit

[8] Uber lost $2.8 billion in 2016. (source: http://money.cnn.com/2017/04/14/technology/uber-financials/)

providers will need to consider when deciding whether and how to partner with these types of companies.

Providers who do wish to partner with these services should be prepared to negotiate for accommodations for all transit riders: a fleet of vehicles that disabled persons can access, for example, or a call-in dispatch center for riders who do not have smartphones. While these services can in many cases be cheaper to provide than low-ridership coverage bus routes, cash-strapped transit providers should not be tempted to view these types of services as an easy "substitute" for traditional transit services, as that could set a dangerous political and fiscal precedent. Finally, while there is a need for first mile/last mile arrangements that could be provided by TNCs, it remains true that the people who use transit most often live and work near it.

AUTONOMOUS VEHICLES

Once the realm of science fiction, autonomous vehicles (also known as driverless cars) are quickly becoming a reality. They could have an enormous impact on transportation in general and public transit in particular. As was noted in Chapter 5, it has been speculated that driverless cars could revolutionize transit for the better by providing some services, such as demand response/ADA paratransit or low-ridership coverage bus routes, at a fraction of their current cost. It has also been speculated that they could revolutionize public transit for the worse, by completely replacing buses and trains with on-demand, point-to-point service for everyone.

Of those two scenarios, the latter is less likely: road space is limited, and there will always situations, such as along a busy transit corridor, where moving many people in a single vehicle is more efficient than putting individual riders into their own self-driving cars. Furthermore, buses and trains could themselves become automated, completely changing the financial dynamic of transit (although probably drawing the wrath of the Transport Union).

Shared Mobility and Public Transit

In March of 2016, the American Public Transportation Association (APTA) and the Transit Cooperative Research Program (TCRP) jointly published a study on ways in which shared modes (bikesharing, carsharing and ridesourcing) are transforming public transportation. The study resulted in four key findings:

1. **The more people use shared modes, the more likely they are to use public transit, own fewer cars, and spend less on transportation overall.** "Supersharers"— people who routinely use several shared modes, such as bikesharing, carsharing, and ridesourcing — save the most money and own half as many household cars as people who use public transit alone.
2. **Shared modes complement public transit, enhancing urban mobility.** Ridesourcing services are most frequently used for social trips between 10pm and 4am, times when public transit runs infrequently or is not available. Shared modes substitute more for automobile trips than public transit trips.
3. **Shared modes will continue to grow in significance, and public entities should identify opportunities to engage with them to ensure that benefits are widely and equitably shared.** Public transit agencies should seize opportunities to improve urban mobility for all users through collaboration and public-private partnerships, including greater integration of service, information and payment methods.
4. **The public sector and private operators are eager to collaborate to improve paratransit service using emerging approaches and technology.** While a number of regulatory and institutional hurdles complicate partnerships in this area, technology and business models from the shared mobility industry can help drive down costs, increase service availability and improve rider experience.

FOR FURTHER READING:
https://www.apta.com/resources/reportsandpublications/Documents/APTA-Shared-Mobility.pdf

The effect that automated vehicles will have on the overall transportation network, furthemore, is still unclear and likely will not be fully understand until well after they are implemented en masse. On one hand, they could reduce congestion by operating more efficiently and avoiding accidents caused by human error; on the other hand, they could make congestion worse: fleets deployed by TNCs could clog the streets of major activity centers as they search for riders, retail companies could hire entire fleets of automated vehicles to serve as "mobile showrooms" that circulate around city streets waiting to be dispatched to potential customers, and personal automated vehicles could loop around city blocks while they wait for their owners to get coffee or pick up dry-cleaning.

EasyMile/Ligier EZ-10 (photo: easymile.com)

For this reason, the RTFS neither embraces nor rejects the automated vehicle; it simply recommends that the region's transit providers – and for that matter, all local, county and regional transportation stakeholders – pay close attention to them as they are tested and deployed, carefully consider their potential effect, and prepare policies to beneficially integrate them into the regional transportation mix.

The implementation of automated vehicles for limited ridesourcing or microtransit applications is already beginning. The Hillsborough Area Regional Authority in Tampa, Florida and the Florida Department of Transportation have recently initiated a pilot project consisting of four mostly-autonmous Tesla electric vehicles to service areas surrounding the University of South Florida campus. A fifth vehicle that can accommodate wheelchairs will be available as well; the service will use an on-demand app similar to those currently used by TNCs. Google's Waymo self-driving car system is now testing a TNC-style program in Phoenix, Arizona. Electric bus manufacturer Proterra has recently teamed with the Washoe County Regional Transportation Commission and the University of Nevada at Reno to test full-size autonomous buses on Reno streets, while Keolis and Navya began testing an autonomous shuttle in downtown Las Vegas at the beginning of November 2017. Meanwhile, smaller automated electric buses, such as the Olli from Local Motors or EasyMile/Ligier EZ-10, are already undergoing testing or are in limited service.

GTFS DATA

All regional providers should ensure that their route, schedule and stop data is available in General Transit Feed specification (GTFS) form. This is a data format that is used on services such as Google Maps, and can be used to build routes and itineraries for travel. It can also be incorporated into route-planning functionalities of the previously-described single point of information.

As of November 2017, the only regional providers who have data publicly available in GTFS form are METRO and Connect Transit; however, H-GAC staff is actively working with other regional providers with the goal of ensuring that every agency has their fixed-route network data in GTFS form in early 2018.

To ensure maximum usefulness, GTFS data should be updated as routes and schedules change.