

DRAFT Vision 2040: Roanoke Valley Transportation Technical Content for TTC Review

This Google document will be used for the TTC to review and suggest edits on draft content developed for the Vision 2040: Roanoke Valley Transportation Technical Document prior to their meeting. Once the TTC has provided feedback on the draft content, it will be moved to a separate Google document that will contain the final draft technical document.

February 9, 2017

Staff Report: Constrained Long-Range Multimodal Transportation Plan Technical Document Selected Sections

As the RVARC staff and TTC work towards completion of the Vision 2040: Roanoke Valley Transportation technical document, RVARC staff are providing the following for TTC review. TTC members are invited to provide suggested edits on the Google Document in advance of the TTC meeting on February 15, 2017.

Sections to Review:

1. Transportation Demand Management
2. Future Considerations for Transportation

THE FOLLOWING SECTIONS ARE DRAFT CONTENT FOR TTC REVIEW AND COMMENT.

Transportation Demand Management

Transportation Demand Management, or TDM, is a set of strategies to encourage travellers to use less intensive modes of transportation. Less intensive here can mean migrating to a high-occupancy vehicle (HOV) mode such as carpooling, vanpool, transit, or cycling; or, it could mean deferring intensive trips altogether through telework or through encouraging the adoption of alternative work schedules that will spread trips out over non-peak times. TDM is traditionally commuter focused as these are the most common and predictable trips to offset, but increasingly TDM is concerned with non-work trips as well.

At its core, TDM is a marketing program aimed at changing the behavior of travellers through education, promotions, and incentives. TDM can also reach its goals via policy. Sometimes, this is policy implemented at the local government level, such as through Complete Streets initiatives that create amenities for cyclists and pedestrians, or the implementation of Bus Rapid Transit (BRT) or other services that improve the performance and competitiveness of high-occupancy modes. More commonly, TDM programs work with the private sector to implement policies at the employer level that encourage the adoption of

high-occupancy modes. Examples of such policies might be compressed work weeks, parking buyouts, carpool matching, or offering transportation fringe benefits to employees. In general, TDM is most successful when all three stakeholders - local governments, the TDM program, and employers - work together to create, market, and incentivize useful services.

Economic Impacts of Transportation Demand Management

Of course, as seen throughout this document, the Roanoke Valley's transportation system has a critical impact on its economic prosperity. Transportation Demand Management contributes to this in two broad ways:

- The vast majority of the cost of a gallon of gas - approaching 90% - leaves the local economy. Some stays in or returns to the Roanoke Valley in the form of taxes, but most of what the consumer pays goes to cover drilling, refining, shipping, and other related expenses. When Transportation Demand Management shifts drivers from single-occupant to higher-occupancy transportation modes, not only do those drivers save money, what they save is more likely to stay in the local economy. For example, if we were able to get 10% of 10,000 daily commuters to shift mode, travelling at an average of 10 miles a day on a round trip commute, this change could bring approximately \$400,000 a year back into the local economy based on a gallon of gas costing \$3.00 a gallon. Obviously, for longer commutes, the impact is greater.
- Increasingly, as we show later, transportation choice is as much a lifestyle choice as it is a practical one. In choosing where they live and how they get around, people - especially the Millennial generation - are making statements about their values. Decisions to live in urban centers, to commute by foot or by bike, or to use transit, may reflect not only economic decisions, but preferences for local businesses and local goods, concern for the environment and climate change, or a commitment to physical fitness. In all of these cases, a TDM program that actively encourages and facilitates transportation behavior change not only can enable people to make that change, but also serves as a marketing program to external audiences that a community is ready and able to meet these needs. An active TDM program in the Roanoke Valley not only helps its citizens reduce their "consumption" of transportation, it gives the region a competitive edge in attracting talent - both individuals and businesses - for whom transportation choice is a critical tool.
- The robust mode offerings encouraged by Transportation Demand Management do more than simply offer choices to existing commuters, they provide services to people with no or limited access to an automobile. Services like public transportation and vanpooling present mode shift opportunities by moving existing commuters out of single-occupant vehicles and into buses and vans, while also providing seat capacity to transit-dependent commuters. Without one class of rider, the service

would likely not be viable; yet by coordinating trips a single TDM strategy can have both VMT reduction and employment benefits.

Trends in Transportation Behavior

For most of its history, TDM has been a congestion mitigation strategy, though the last decade - both industry wide and in the Roanoke Valley - its focus has broadened. earlier, it was noted that vehicle miles travelled annually have been flat or shrinking since approximately 2008, reversing a consistent trend of year-over-year increases in mileage that has been seen since records started being kept. This has occurred despite continued population growth and appears tied into several broader trends:

- Millennials, compared to previous generations, are less interested in car ownership and are more likely to turn to alternative modes and technology to reduce their dependence on automobiles.
- 2010 U.S. Census data shows a shift in population back to urban centers. In some cases these are historic downtowns or other traditional urban centers, in other cases these may be developments in traditional suburban development that attempt to emulate the multi-use land use of urban centers. In either cases, population is shifting back to communities that are more walkable, bikeable, and transit friendly, and which contain a broader array of amenities in a denser environment.

In the Roanoke Valley, the story of Downtown Roanoke proves this trend. Residential occupancy in downtown has grown from 50 to 1,500 over the eight years preceding 2015. This has followed a series of redevelopment projects, enabled largely by historic tax credits, that have converted a number of underused or derelict buildings into multi-use structures. The Hancock Building, Cotton Mill Lofts, Patrick Henry Hotel, Parkway 301, Ponce de Leon, and more are all examples of new residential buildings that have almost immediately leased out all of their units before the buildings were complete. Along with this has come a return in services, such as the downtown Roanoke Natural Foods Co-Op market, the Big Lick Pharmacy, and other basic services. Further, the City of Roanoke has extended the boundaries of its downtown zoning designation to include a new development near Carilion Clinic that will include commercial, residential, dining, and recreation amenities. All this is linked by the Star Line Trolley on Jefferson Avenue and a series of greenway sections that augment bicycle and pedestrian accommodations between downtown and its surrounding neighborhoods.

- Economic pressures may be driving younger generations into areas where car ownership isn't a necessity. Besides the price of gasoline, which - though it fluctuates from year to year - is always on an upwards trend, the Millennial generation is also graduating college with record-high levels of student debt. This debt load may be deferring decisions about car and home ownership that these

demographic cohorts might have made at a much earlier age in previous generations, choosing to go without the debt load of a car, and choosing to rent a home rather than own, both of which are going to encourage settling in denser urban centers.

In all of these cases, TDM will continue to play a strong role, both in terms of identifying and facilitating new accommodations and tools that this group may need, as well as marketing and promoting the accommodations that exist.

TDM in the Roanoke Valley

Transportation Demand Management activities have been undertaken in the Roanoke Valley through the Roanoke Valley-Alleghany Regional Commission's RIDE Solutions program. Started in 2001, TDM was initially a strategy implemented as part of the then-MPO's Ozone Early Action Compact, focused on reducing vehicle trips to reduce emissions and avoid slipping into ozone non-attainment and its concordant regulatory burden. Early TDM activities focused on promoting carpooling through mass media efforts and early support for the Smart Way commuter bus when that service began. Little attention was paid to bicycle, pedestrian, and local fixed-route transit support. Over time, as it became clear the valley would remain in attainment, RIDE Solutions responded to local market demand by expanding its range of services to include significant bicycle commuter support, employer outreach, and even program expansion.

In 2006 the Regional Commission partnered with the New River Valley Planning District Commission to expand TDM activities into the New River Valley. In 2013 a partnership was formed to expand into the Region 2000 area of greater Lynchburg, and in 2015 RIDE Solutions partnered with the West Piedmont Workforce Investment Board to offer services in southside Virginia. In all cases, expanding the reach of the RIDE Solutions message had a positive effect on transportation demand within the TPO - for example, a key partner in the NRV expansion was Virginia Tech, who draws both employees and commuter students from within the Roanoke Valley, and at the time of the expansion into Region 2000 approximately 10,000 people per day commuted between the two regions.

Commute Sheds: While TDM activities have significant impact within the TPO, they are implemented in a service area that extends far beyond the TPO's boundaries, or even the boundaries of the Regional Commission. RIDE Solutions promotes its services both within the regions it serves and the commute sheds that serve those regions. For the TPO, this means that TDM activities that have an impact on travel demand within its boundaries may be implemented as far west as Radford, as far east as Lynchburg, as far north as Alleghany County, and as far south as Martinsville. When the entirety of the RIDE Solutions service area is taken into account, its commute shed extends from Wytheville, to West Virginia, to Harrisonburg, and North Carolina.

When considering impacts on the TPO, it is useful to consider the corridors that TDM

activities might impact. RIDE Solutions focuses on three primary corridors: Route 220 from Covington to Martinsville; I-81 between Roanoke and Radford, and Route 460 between Roanoke and Lynchburg.

Long and Short Range TDM Activities

Short Range: Over the next 1 to 5 years, the TDM program will concentrate on:

- **Focus on residents in urban cores:** A number of current and planned development projects will bring additional residential units to downtown Roanoke's West End, such as the Locker Room Lofts on Church Avenue, formerly the YMCA, and the former Health Department building on Campbell, which was recently sold to developer Ed Walker, who has a history of successful mixed-use development projects. A focus of Housing and Urban Development funds and other monies in the West End and Hurt Park neighborhoods of Roanoke City may result in improvements for on-road bike infrastructure and pedestrian accommodations, and other improvements in both downtown Salem and Vinton may see additional residential growth in these areas.

In these cases, TDM activities will focus on improving the way transit information is delivered to potential riders as well as improving the overall public perception of Valley Metro through continuing programs like Art by Bus and additional Try Transit Week promotions. Expecting that technology, particularly smartphone technology, will become a necessary, if not primary, way information about transit is delivered, TDM activities will involve constant monitoring of and research into new technologies and improvements to core systems like the General Transit Feed Specification (GTFS), which even now is the standard way transit route information is delivered to a wide variety of platforms.

Beyond transit, the TDM program will continually make improvements to the ways in which its core service offerings - carpool matching, bike routing assistance, and related products - are delivered.

- **Vanpool Implementation:** Elsewhere in Virginia, vanpooling is a significant presence in most mobility programs. A hybrid of carpooling and public transit, vanpooling can both provide service to an area where commute options don't exist, and augment existing services as a complement to public transit. In Virginia, vanpooling is primarily implemented through a third party - namely, Enterprise Rideshare or vRide (formerly VPSI). RIDE Solutions will engage with each of these providers and, through its regular employer outreach efforts, seek to implement vanpooling with qualified businesses.

It is likely that early vanpool efforts will have only a minimal impact on the TPO

directly, though they will serve employers within the TPO boundaries. Vanpooling is most successful and makes the most economic sense for the riders when passengers are travelling from farther than 30 miles away, so only employers who are drawing employees from outside the urban core will be likely to make use of vanpooling. That said, some major employers in the region - including those location at the Roanoke Center for Industry and Technology - have identified a need to extend their employment base farther afield in an effort to reach qualified employees. In many cases, the jobs these employers are attempting to fill are entry-level, shift, or seasonal work. To that extent, vanpool implementation - even if its impact on VMT is relatively minor - will be an important job-access tool for these employers.

- **Bikeshare:** In many communities, bikeshare programs like D.C.'s Capital Bikeshare and New York's CitiBike have become a vital "last mile" component of their transit networks, efficiently connecting bus stops to broader commercial and residential areas without the need to run additional buses or increase headways to extend routes. Bikeshare also provides easy access to bicycles for short, one way trips for both residents and visitors. In particular, as rail returns to the Roanoke Valley, RIDE Solutions will investigate the intersection between rail, bus transit, and bike share as a way to provide easy, multimodal service to folks traveling into the region from elsewhere, and for folks within the region to connect to rail for travel elsewhere.
- **Technology:** In many ways, TDM modes haven't changed, but the way people access them have. App-based services like Uber and Lyft have changed the way people rideshare and have had a dramatic effect on the taxi market. Google Maps and the now-universally accepted General Transit Feed Specification continue to make it easier for the public to access transit route information. Our TDM efforts will focus on staying on the forefront of this technology so that our core services remain relevant and accessible to our audience.

Medium Range: Over the next 5 to 15 years, the TDM program will concentrate on:

- **Car sharing:** Carsharing is, by now, a fairly common concept; essentially short-term car-rentals, participants in a car sharing service often pay a monthly fee that gives them access, via their computer or smartphone, to the use of a vehicle for small trips. The vehicles are parked in high density areas such as downtowns, village centers, and college campuses. While carsharing serves as an alternative to car ownership for some people, it can also enable the use of alternative transportation for folks who may have need of a car throughout the day. The Roanoke urban core, for example, has a number of professional services jobs in the legal, banking, and engineering fields, the kinds of jobs that may require travel during the day to a jobsite or client meeting. Because of this, employees in such industries may choose not to bike, carpool, or take transit to work because of the need for a personal vehicle for these occasional trips. The presence of carsharing will enable them to make that choice.

Carsharing is already present in the RIDE Solutions service area at Virginia Tech, though the service does not extend to the Roanoke Valley. RIDE Solutions will complete a market analysis on the viability of carsharing for the downtown Roanoke core and select sites throughout the valley.

- **Parking Policy:** Parking policy can have a tremendous effect on transportation choice, with plentiful free parking effectively subsidizing automobile travel over transit, biking, and walking. Well-considered parking policy, however, can meet both the needs of providing well-managed parking to those who need or choose to drive, as well as appropriate incentives for non-SOV modes such as carpooling and transit.

In 2016, Downtown Roanoke will undertake a demonstration project examining the feasibility of on-street parking meters in certain areas of the urban core. The demonstration project will determine the feasibility, practical effect, and public response (both citizen and business) to the meters. Already serving on the downtown mobility group which oversees the meter project, RIDE Solutions will continue to engage with all appropriate stakeholders- including PARK Roanoke Downtown Roanoke Inc.

Long Range:

- **Enhanced Transit Service:** In support of the strategies laid out in the *Transit Vision Plan*, RIDE Solutions will bring its marketing and public relations support to implementing recommendations from that plan.
- **Automated Vehicle Technology:** Although it's unclear in what form automated vehicle technology may come to the region, it is beyond a doubt that it will be here. Automated Vehicles provide exciting possibilities for transportation demand management solutions. In particular, the automated mass transit systems can provide service expansion without the expense of extended driver hours. Further, automated vehicles could provide carpool-like service, where seat capacity is filled via the use of smartphone apps rather than direct commuter facilitation.

More information about the Roanoke Valley's TDM program and initiatives can be found in the adopted plan.

Future Considerations for Transportation

Tomorrow isn't going to be like today.

As mentioned previously in Part 1: Section 4, several changes are in progress that are already affecting transportation and will continue to do so even more as time passes. Transportation needs will change as a result of aging and evolving values between generations, shopping online rather than in-person, and embracing vehicle automation. Additional considerations discussed in this section are the impact of vehicle automation on the transportation system and on land development patterns, the impact of shared mobility, the declining health of increasing numbers of people, and the limited availability of transportation funding.

Vehicle Automation and the Transportation System

The focus of transportation technology, commonly called Intelligent Transportation Systems (ITS), has shifted over time from a strong operations, management and systems vantagepoint to a blended focus that includes in-vehicle systems. There are many levels of driver-assist technologies before reaching full automation. As the technology evolves so will many other issues related to consumers, infrastructure, government, policy, legal, insurance, and overall society adaptation and acceptance.

The purpose of this section is to anticipate some of the effects and benefits that driver assist and full automation technologies may have on the transportation system over the long-range time horizon including but not limited to:

- Potential benefits for public transportation;
- Effective capacity increase for highways due to automated platooning;
- Improvements in transportation safety;
- Effects on intermodal freight, the supply/logistics chain; and,
- Potential of ITS technologies to both complement and substitute for existing design approaches.

The question of whether we should design for peak transportation demand, which leaves infrastructure underutilized much of the time; or, whether we should design for base transportation demand and address peak demand through ITS, is at the heart of the aforementioned list. Highway capacity has traditionally been designed for peak hour demand which leaves large highways and thoroughfares underutilized at off peak times such as during the night, midday, or on weekends. Public transit systems have typically had more

of a choice concerning whether to design for peak demand or base demand. Public transit systems that design for “peak first” see the peak service as the most fundamental product, while those that design for “base first” see the normal pattern as the fundamental product with the peak demand addressed by supplemental “peak” service (Walker, 77). With drivers being the highest operating expenses for transit, such systems have the potential to be early adopters of automated vehicles.

Traditionally, traffic engineers have heavily favored a “peak first” design for highways and determining number of lanes. However several technological and environmental changes may allow traffic engineers to favor “base first” design and supplement peak capacity using ITS technologies such as managed lanes, reversible lanes, adaptive speed limits, High Occupancy Tolling (HOT), or in-vehicle systems that allow automated platooning of vehicles.

*Peak travel times could have 60% fewer cars on the roads.
-Matt Thornhill, Southeastern Institute of Research*

“Base first” design, supplemented by ITS, would have the added benefit of making it easier to comply with stormwater and impermeable surface regulations. There is a real tension and trade-off between adding transportation capacity and complying with increasingly strict stormwater regulations. “Base first” design coupled with ITS technology could give traffic engineers more choices in design of new facilities. When full automation (i.e. self-driving) vehicles finally arrive in large quantities, “base first” design may become the natural choice with automation addressing peak demands.

One very intriguing prospect of fully autonomous vehicles is that driverless cars do not need to park they simply go on to the next person – vehicles cruising the street looking for parking spots account for an astounding 30% of city traffic (Kanter, January 2015). This dynamic could both increase efficiency of existing infrastructure and free up right-of-way for alternative transportation and redevelopment thereby decoupling parking from other urban land uses (Guerra, 37). Autonomous vehicles may have other workforce and economic development impacts. For instance, taxi companies, freight and logistics companies may be among the early adopters of driverless technologies because they could drastically lower labor costs (Guerra, 37). This could change industry structures and opportunities available to the entry level work force of the region.

With limited funding available, planning for improved capacity on existing facilities via

greater use of intelligent transportation systems (and specifically vehicle automation) rather than adding more lanes or parking spaces has great potential to save valuable resources-financial and environmental.

Vehicle Automation and Land Development Patterns

Will Driverless Vehicles Further Contribute to Sprawl or Get Us Back to the City?

Driverless vehicles have the potential to influence land use patterns and urban densities over time. The technology has the potential to both reinforce agglomeration economies where businesses and housing benefit from being near each other, or to help us further sprawl out depending on the context and circumstances. On the one hand, automated vehicles that are paid for per trip will make travelers consider the full marginal cost of each vehicle trip when deciding whether to use a car. Also, automated vehicles could drop passengers off at their destinations and then go park or wait in off site parking lots and staging areas. This could decouple parking from urban land uses allowing urban land to be used more intensely, and for placemaking to be unshackled from parking constraints (Guerra, 37). On the other hand, people with one or more self driving vehicles could send their cars out for errands while they are at work or at leisure activities. Or, automated vehicles could become mini offices, a mobile version of a home office, where individuals could live far from urban concentrations commuting over a large region (Guerra, 38).

At this point it is difficult to anticipate which effect will win out overall. It is likely that successful urban areas with a sense of place could further concentrate taking advantage of economies of agglomeration and further enhancing an urban vibe. However, suburbs and exurbs may further expand, if time, trip costs, and inconveniences are diminished by the utility of driverless cars. In this regard driverless and automated vehicle technology will likely amplify and intensify the existing characteristics and comparative advantages of a place rather than change them. So we may have urban areas getting more dense and exurbs sprawling further out at the same time. Each type of place will be attractive to residents that value its particular amenities.

Driverless cars will likely bring expanded mobility for people who do not drive due to age (children/teenagers and elderly), disability, income or personal choice. This is anticipated to be true for urban and rural populations alike (Guerra, 38). This could improve Environmental and Social Justice dimensions of transportation services.

Shared Mobility

Shared mobility has existed for many years in the form of carpooling, a form of ridesharing, where more two or more people ride together in someone's private vehicle typically with the same origin or destination. Ridesharing also exists in vanpooling, essentially larger scale carpooling though with less degree of familiarity among riders and public funding opportunities to pay expenses. New forms of shared mobility also exist through bikesharing and ridesourcing (also known as Transportation Networking Companies - TNCs or ride-hailing). Common TNCs are Uber and Lyft.

"Ridesourcing and ridesharing business models could help to speed the adoption of automated vehicles, as they become available, by lowering costs of ownership and expanding their accessibility. They can also help to supplement transit service in urban areas by providing efficient, direct service for short trips and providing service during transit system off-hours." (Beyond Traffic, 35)

Ridesourcing in particular has the potential to become a preferred travel option for many people as vehicle automation becomes common as it increases the convenience of traveling without one's own vehicle while reducing overall transportation expenses. Ridesourcing also has the greatest potential to shift people from otherwise choosing to walk, bike, or ride transit as well as serving as a connection between a transit stop and final destination.

All of these forms of shared mobility offer creative ways that people are finding to accomplish their daily trips without the need for a personal vehicle. As shared mobility options become more common in the Roanoke Valley, people's travel choices will change yet the impact on the transportation network is still to be determined.

Health

The recent past has shown an incredible decline in the overall health of many Americans. Chronic diseases are more prevalent in more Americans today and the impact is seen in transportation. Despite increases in cycling among some parts of the population, increasing numbers of people are unable to walk very far or bicycle at all to accomplish their daily needs. In a survey done in 2014, Valley Metro learned that approximately 25% of their riders have a disability, and they also continue to see increasing enrollment in their paratransit services. As people age, disability is more prevalent, and as previously discussed, more of our population will be older in the near future. Thus, more people will be

unable to travel as they have in the past and will be looking for alternative transportation options to help them accomplish their daily tasks and allow them to stay in their homes.

Although shared mobility options have the potential to help people age in place, they also have the potential to compete against healthier transportation options - walking and biking.

“We were running late to our meeting so we caught an Uber instead of walking the 4 blocks like we normally would have. I guess missed out on a brisk 10 minute walk.” -Citizen

Health is greatly influenced by one’s environment and the potential to safely walk or bike to nearby destinations. Good air and water quality are essential to personal health and transportation choices and investments certainly have a direct impact on improving or worsening these critical natural environments. Much can be done in the coordinated planning of land use and transportation to improve people’s health, and health impacts should be considered in every development review and transportation investment decision.

Limited Transportation Funding

The way in which the Roanoke Valley receives transportation funding assistance from federal sources has changed in recent years. With the increasing urbanized area population, the Roanoke Valley became a Transportation Management Area (TMA) and several funding-related changes occurred.

Whereas previously, the Roanoke Valley competed with other small urban areas for a share of federal funds from particularly sources such as the Surface Transportation Program, Transportation Alternatives, and Federal Transit Administration Section 5310 funds, with the change in status, the Roanoke Valley is now apportioned a specific amount.

Additionally, the Greater Roanoke Transit Company (GRTC) became eligible to receive funds directly from the Federal Transit Administration rather than via the Virginia Department of Rail and Public Transportation. As such, GRTC also lost its ability as a small urban grantee to apply for capital support from flexible federal Surface Transportation Program funds. As a large urban grantee, more reliance is placed on the regional apportionment of Surface Transportation Program funds to support capital needs.

A significant change in how funding is distributed throughout Virginia has taken place with the development of the SMARTSCALE system which scores and prioritizes projects based

on a number of factors that aim to fund the right transportation projects for the Commonwealth.

There are more transportation needs and wants than available funding and the region's current limitations on their ability to raise additional funds is an area of concern for many.