

TDM AND PUBLIC TRANSIT 7

TRANSPORTATION DEMAND MANAGEMENT, or TDM, is an increasingly important tool to address worsening traffic congestion, increasing travel times and parking demands, and air quality issues in the region. The main focus of TDM is to move the public away from trips made by automobiles and Single Occupant Vehicles (SOVs) and toward bicycling, walking, telecommuting, carpooling, vanpooling, or public transit.

In a period when revenues that support the maintenance and expansion of traditional transportation infrastructure are shrinking, TDM offers a compelling alternative because it allows for the movement of the same number of people in a more efficient manner without new infrastructure demands. Further, it serves as an attractive option for commuters looking to cut their transportation costs by allowing them to share costs with other commuters. TDM provides both a viable transportation improvement strategy for a growing region, as well as a valuable public service.

At its core, TDM is a marketing and educational endeavor, but successful implementation of a TDM program requires:

- some basic infrastructure elements (such as park-and-rides)
- incentives (such as HOV lanes)
- disincentives (such as the reduction or limitation of free parking).



BENEFITS OF TDM

TDM has been shown to help areas deal with congestion mitigation, air quality/environmental improvement, and mobility/transportation choices. Though each of these has a role to play in the Roanoke region, the two primary drivers for the RIDE Solutions program have been air quality improvement and the desire to offer transportation options to commuters in the region.

Air quality is measured by the Ozone Early Action Plan (EAP) through the Environmental Protection Agency. In 2003 the Roanoke region was at risk of receiving a noncompliance designation, but the Ozone EAP allowed the region to take steps to reduce ozone over the next five years. Local governments enacted such measures as moving to biodiesel in vehicle fleets and burning bans, but mode shift away from single-occupant vehicles to cleaner, less-polluting alternatives became a key component of the effort. The successful implementation of these strategies led to the Roanoke area reaching ozone compliance in March of 2008, and the continuing growth of these efforts will be key to remaining in compliance.

Another important benefit of TDM is increased commuting options, especially in regions of diverse geography, varying commuting distances, and limited transit options such as the Roanoke Valley, Blacksburg, and the surrounding communities. The transit agencies serving the region have limited penetration in the non-metropolitan areas. Blacksburg Transit serves the Town of Blacksburg and Virginia Tech, with limited service to Christiansburg and no service to outside areas such as Radford or south Christiansburg. Pulaski Area Transit is a non-fixed-route service supporting the Pulaski County area. The Greater Roanoke Transit Company (GRTC) offers regular bus service within the City of Roanoke, limited connection to the City of Salem and the Town of Vinton, and no service into Roanoke County. GRTC also offers a commuter bus, Smart Way, between the Roanoke and New River Valleys that has grown increasingly popular since March of 2008 when gas prices soared.

Many commuters in the region travel long distances to the urban employment centers in Roanoke and Blacksburg. Roanoke regularly draws commuters from all over Franklin and Bedford Counties, particularly as the Smith Mountain Lake area has seen incredible development and growth. Virginia Tech aided in the launch of RIDE Solutions service in the New River Valley because it draws employees from as far away as West Virginia and other communities further southwest in Virginia. Many commuters have regular one-way trips of 35 miles or more. With limited or no transit options, carpool facilitation with RIDE Solutions is often the only viable option. Roanoke serves as the headquarters for the region's largest employer, Carilion Clinic, with 11,000 employees from across both the Roanoke and New River Valleys. Carilion is in the process of building a new clinic, a medical school (in cooperation with Virginia Tech), and a biomedical research facility near downtown Roanoke. It also plans to redevelop a brownfield. A 1,600 space parking garage was built to support these new developments, which will create additional congestion and parking demand in an already busy Downtown Roanoke Jefferson Street Corridor and along the 581/Route 220 corridor.

WHAT CONSTITUTES A TDM ACTIVITY OR ACCOMMODATION?

The menu of TDM activities is both broad and flexible in order to provide the greatest number of strategies, but this flexibility can lead to confusion over what constitutes a TDM activity.

TDM's focus is to increase the efficiency of existing systems by reducing Vehicle Miles Traveled (VMT) through mode shift or moving vehicle trips into higher-occupancy and non-motorized modes. TDM activities and accommodations include:

- Marketing or outreach efforts that encourage commuters to move to carpools, vanpools, transit, biking, walking, or telecommuting
- Parking buyouts or reducing free parking
- Commuter Choice tax benefits for transit, vanpooling, or bicycling subsidies
- Commuter Choice tax benefits for parking subsidies only if used as an incentive for carpooling or vanpooling
- Bicycle accommodations such as bike lanes, wide shoulders, shared-used paths, and bike trails
- Bicycle traffic control devices such as sharrows
- Sidewalks and greenways
- Public park-and-ride lots
- Private park-and-ride lots such as those made through informal arrangements by carpool participants, or those dedicated to commuters through leasing or other arrangement between the TDM agency and private owner
- High-Occupancy Vehicle (HOV) lanes
- Transit service, particularly express commuters buses or bus rapid transit service
- Car sharing, either through local nonprofit efforts or with a for-profit service such as Zipcar, to provide access to a vehicle during the day for those who carpool or use transit to get to work
- Zoning policies that reduce the number of required parking spaces for new development
- Carpool matching services

Such activities may be undertaken by the TDM agency itself, by local governments, by private businesses, or by any combination thereof. In fact, a TDM agency's main activities are education and advocacy to encourage organizations to take on TDM efforts on their own.

TDM PARTNERS

LOCAL GOVERNMENTS

TDM programs work with local governments and the private sector to provide best practice strategies for promoting or marketing TDM services. These include accommodations such as bike lanes, as well as data collection and reporting to measure the effectiveness of TDM efforts. Public awareness of transportation options can lead commuters to use agency services (such as a carpool database) or to pursue similar activities on their own. Therefore, TDM effectiveness is often measured both in the number of commuters registered with a TDM agency and transportation mode shifts over time. These shifts are measured by census or American Community Survey data, and the Commonwealth of Virginia also deploys an annual State of the Commute survey that measures mode split specifically for the work commute.

RIDE SOLUTIONS: THE REGION'S TDM SERVICES PROVIDER

Established in a cooperative effort between RVARC and the New River Valley Planning District Commission, RIDE Solutions is the regional TDM agency for the Roanoke and New River Valley regions of Southwest Virginia. RIDE Solutions has been housed within RVARC since its inception in 2001. In 2006, an agreement was made to offer ridematching services in the New River Valley region. RIDE Solutions is funded primarily by VDRPT's Commuter Assistance grant with matching funds coming from each PDC and additional financial support from Virginia Tech. Current staff consists of a Program Director at RVARC, whose responsibilities include: general marketing, branding, and awareness campaigns; all technical work (including web site development, ridematching, database maintenance); and employer outreach efforts within the Roanoke Valley region. An Employer Outreach Coordinator is staffed part-time out of the New River Valley Planning District Commission and works exclusively with New River Valley businesses and professional organizations to establish employer programs and build program awareness.



Defined by the boundaries of its parent Planning District Commissions, the area serviced by RIDE Solutions is primarily rural with two urban centers (RVAMPO and the Blacksburg-Christiansburg-Montgomery Area MPO). Commuting between the two regions accounts for a significant number of daily trips up and down the congested I-81 corridor, a major freight route. Trucks and other traffic along this corridor will likely increase with the installation of an intermodal center in Elliston and the expansion of Virginia Tech's Corporate Research Center in Blacksburg.

RIDE Solutions has seen tremendous growth since its inception, particularly during the spring and summer of 2008 -- when gas prices skyrocketed. During that period, RIDE Solutions saw its database of carpoolers, bicyclists, transit users, and pedestrian commuters swell by nearly 300% (see chart below.)

RIDE Solutions Database growth, 11/2006 through 01/2009.

The spike in registrations starting in June of 2008 corresponds both to sustained increases in gas prices as well as the launch of a Workplace program with Carilion Clinic at the end of May.

Registration rates began to level in October, though growth remained steady.



During the same period, RIDE Solutions also established or renewed partnerships with a number of Workplace partners, including the largest employers in the region - Carilion Clinic and Virginia Tech. In all, RIDE Solutions served over 40,000 employees of the Roanoke and New River Valleys through its Workplace partnerships.

RIDE Solutions was involved with air quality mitigation efforts, and as a result became recognized as a leader in the field of sustainable transportation in the region. Many localities are becoming increasingly interested in, or have already undertaken steps towards, policies that address local contributions to climate change. Blacksburg is seeking designation from the Sierra Club's Cool Cities program, and Blacksburg's Mayor Ron Rordam serves on the Governor's Climate Change Committee. The Roanoke Valley Cool Cities Coalition, of which RIDE Solutions is an affiliate, has worked to get Roanoke City, Roanoke County, and the City of Salem to measure their carbon footprints via the ICLEI process and is developing strategies to bring down overall greenhouse gas emissions.

In all of these efforts, a regional approach will be necessary to reduce emissions generated by vehicles, and RIDE Solutions will continue to be a major player in implementing regional trip reduction programs.

TDM vs TSM

TRANSPORTATION SUPPLY MANAGEMENT

Some confusion exists when distinguishing between Transportation Demand Management and Transportation Supply Management (TSM). While

TSM's focus is to increase the efficiency of existing systems by reducing vehicle travel time through congestion mitigation efforts, though not necessarily by reducing the number of cars on the road.

TSM activities include:

- Signal timing coordination to move traffic more quickly down specific congested corridors
- Access management provisions to reduce conflict caused by vehicles entering and exiting roadways
- Connectivity enhancements such as the reduction of cul-de-sacs and the addition of neighborhood connections to each other and to the primary road systems
- Intelligent Transportation System products such as multi-directional lanes and variable message signs
- Information resources for route planning such as the Virginia 511 website and phone number

Activities under TSM are generally undertaken by local or state governments and often involve infrastructure enhancements that might be included in new construction or maintenance projects.

The basic difference between the TDM and TSM comes down to activities or accommodations that influence either driver mode choice or traffic flow. In other words, TDM can be considered a function of driver behavior, while TSM is a product of engineering.

MEASURING THE EFFECTIVENESS OF TDM

The most common effectiveness measures for TDM agencies are mode shift and VMT. The goal of a TDM program is to move people either to a higher occupancy vehicle or out of an automobile altogether through a combination of activities which promote the benefits of TDM activities to individual commuters. These activities generally emphasize cost-savings associated with both ridesharing and transit use or the health benefits of bicycling and walking.

Mode shift measures a TDM program's *public awareness* and *effectiveness* by recording changes in individual commuter behavior (i.e., how many commuters shifted out of single-occupancy vehicles into HOV mode) and indicates how successful the program has been in getting commuters to change their behavior.

VMT measures the reduction in the actual number of vehicle miles traveled. For example, two commuters driving separate cars 10 miles each day would have a total VMT of 20 miles. If those commuters carpool, their VMT is reduced to 10 miles.

VMT is generally an aggregate measure of all or part of a transportation network, but can also be effective when looking at individual commuters. Two commuters who begin carpooling together each reduce their VMT by half; two commuters who begin using transit drop their VMT to zero. VMT measures a program's actual *impact*.

To illustrate the difference between the mode shift and VMT, consider the following scenarios: imagine a TDM program that succeeds in bringing broad awareness to the suburbs immediately surrounding a central business district. Consequently, 10% of the area's 20,000 commuters shift to transit. The mode shift in this case would be admirable -- 2,000 commuters are now in an HOV mode. Even the individual VMT impact would be impressive. Those 2,000 commuters all reduced their individual VMT to zero. If each of those commuters were driving 4 miles round trip to the central business district, the aggregate VMT impact is 8,000 miles a day.

Compare that to a TDM program that concentrates its efforts on commuters traveling to a major university 35 miles away. Marketing to its 7,000 employees results in a 4% mode shift to carpooling, for a total mode shift of 280 commuters. The total number of participants is small, and each carpooler has only reduced their effective VMT by half. However, because each commuter is traveling a much longer distance - 35 miles one way - the total VMT has actually been reduced by 9,800 miles a day, a 22.5% improvement over the previous example. In this case, the TDM program has had a much larger impact by concentrating on a much smaller audience with a larger base VMT.

By making assumptions about average fuel economy, vehicle type, driver speed, and other factors, VMT can be used to calculate other impacts such as congestion mitigation, air quality improvement, mobility, providing a public service, or reducing a region's carbon footprint.

The Commonwealth of Virginia provides financial support for local TDM activities through the VDRPT Commuter Assistance grant program using a 20% local match. VDRPT encourages local TDM programs to diversify funding sources to include partnerships with the private sector, grants from outside foundations or non-profits, and programmed funds through RVAMPO's constrained long-range planning process. Future funding for TDM activities will, of necessity, concentrate on local support from these diverse sources or run the risk of their state-level funds being reduced or their ability to grow being severely constrained.

The 2005 SAFETEA-LU provides explicit policy statements allowing federal transportation funds to be programmed to support non-motorized transportation activities. It includes references to "pedestrian walkways and bicycle transportation facilities" in the scope of planning work and states explicitly that whenever possible no new projects should remove existing facilities unless alternative accommodations are provided for. Importantly, "transportation plans and projects" require "contiguous routes for bicycles and pedestrians" (23 U.S.C. 217(g)(2)). Connectivity of pedestrian and bicycle accommodations are particularly important for a successful non-motorized transportation network, as significant gaps can create safety concerns that reduce the effectiveness of existing facilities.

FUNDING TDM PROGRAMS

In addition to the federal policy, VDOT's Bicycle and Pedestrian Accommodation Policy allows primary and urban system funds to be used in the creation of bicycle lanes, wide shoulders, off-road trails, shared-used paths, and projects related to any of these things. In fact, VDOT is required to set aside 2% of its paving budget to be used for the creation of bicycle accommodations. To date, RVAMPO has not actively directed set aside funds in this manner. Further, projects like park-and-ride lot creation or expansion can be programmed through the TIP.

RVAMPO has included TDM accommodations in the planning process through its "Bikeway Plan for the Roanoke Valley Area MPO," the "Rural Bikeway Plans," the "Conceptual Greenway Plan," and related planning projects. The next step for RVAMPO is to actively pursue implementation of the recommendations developed in these plans through vigorous use of VDOT paving and maintenance funds and by adding TDM-related efforts to the list of constrained projects. In addition, if RVAMPO is designated as a Transportation Management Area (TMA) after the 2010 census, under current SAFETEA-LU regulations additional funds could be allocated for TDM activities through the TMA's Congestion Management Process.

TDM PRIORITIES IN THE ROANOKE VALLEY

A detailed list of priority TDM projects for the region is contained in the Long Range TDM Plan. When completed, the Long Range TDM Plan should be considered for integration into CLRPT 2035. However, some improvements are needed in the region to lay the foundation for a stronger TDM program. Detailing these priorities, as well as a handful of long-range national trends that will no doubt reach the Roanoke area, can provide insight into their connections with the broader transportation goals.

INCREASE PARK-AND-RIDE CAPACITY: Because of the region's rural character, park-and-ride lots are an important TDM tool to connect long-distance commuters to each other. Commuters are generally more willing to connect with other carpoolers if there is a convenient place to leave their car during the day, and park-and-ride lots offer that amenity. Park-and-rides also collect vehicles at traffic pinch points and therefore alleviate congestion on major roads. Most formal park-and-ride lots in the greater Roanoke region are located along major highways such as I-81 and Route 220.

However, informal park-and-ride locations within the urban area can also be beneficial. As there are no formal park-and-ride accommodations for urban commuters, informal lots have met this demand. The known informal lots are primarily at shopping centers, such as the one at Gander Mountain parking lot on north Plantation Road in Roanoke County. Sometimes the lots are associated with existing transit stops, such as the Tanglewood Mall parking lot. In these cases, collecting information on usage is difficult, since the use of the lots as park-and-rides is not sanctioned or is outright banned by the private lot owners. This creates difficulties when matching commuters, as it would be inappropriate for a TDM agency to encourage the use of such lots. They are used nonetheless, suggesting that a more formalized approach to urban park-and-rides is needed, and Valley Metro's Transit Development Plan (TDP) includes the development of park-and-rides within its service area as goal 4.2 in its *Goals, Objectives, and Standards*.

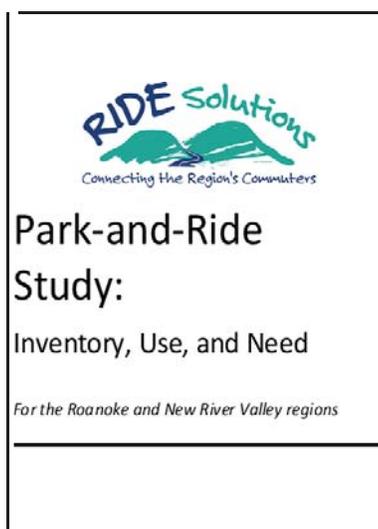
Existing park-and-ride lots in the Roanoke region are either at or over capacity and have been for several years. Of particular concern are the VDOT lots at I-81 exits 150 and 140, which suffer from significant overcrowding. This has been particularly acute at the exit 140 lot, which also serves as a Smart Way bus stop. Gas price spikes in 2008 caused a significant increase in both transit ridership and carpooling, and consequently caused demand for this lot to outpace its capacity and other regional park-and-rides.

Where additional right-of-way cannot be purchased to expand existing lots, VDOT and localities (in coordination with RIDE Solutions) should consider the creation of overflow lots at the next closest highway interchange or through leasing arrangements with private retail lot owners. To improve transit accommodations, bus shelters should be installed at both the exit 140 lot and the Falling Branch Park-and-Ride in Christiansburg.

Other major corridors leading into the Roanoke metro area should also be examined for possible park-and-ride lots. Route 419 in Salem at I-81 should be considered not only for a park-and-ride lot, but also as a connector transit service to Valley Metro. Both Route 220 south near Boones Mill and 221 South near Bent Mountain provide ride share opportunities if safe park-and-ride options were available.

In situations where the spot best suited for a park-and-ride lot is not available for purchase, either because funding isn't available or the land is privately held, every attempt should be made to arrange for informal park-and-ride availability through leasing agreements or other formal arrangements between RIDE Solutions and a private party such as a church or shopping center. In the Roanoke region, churches are especially likely candidates for informal park-and-ride arrangements due to their prevalence, proximity to major corridors, and operational hours that leave much of their parking capacity open during the work week. An update of the 2005 Park-and-Ride Study completed by RIDE Solutions will address the capacity issues facing the region and offer suggestions both for informal lot locations as well as a list of best-practice recommendations for leasing or sharing arrangements.

RIDE Solutions recommends expanding, or creating supplemental capacity for, the exit 140 and 150 park-and-ride lots and the construction of bus shelters at exit 140 and Falling Branch within the next 12 months. Within the next 12 to 18 months, RIDE Solutions recommends creating additional park-and-ride lots either through the purchase of land by VDOT or the leasing of parking surplus from a private enterprise for routes 419 at I-81, 221 South between Bent Mountain and Back Creek, 220 South at Boones Mill, and route 460 near Bedford.



The 2009 Park-and-Ride study updates the Park-and-Ride inventory and conditions in the Roanoke and New River Valleys and recommends improvements in key areas.

IMPLEMENT CAR SHARING: One often-cited barrier to the use of alternative transportation has been the need for access to a vehicle during the day or for emergencies. RIDE Solutions addressed this through its Guaranteed Ride Home program, which pays for up to four taxi rides a year for commuters who are registered in the ride share database and who use an alternative mode at least twice a week.

Another way to address this barrier could be through car sharing. Car sharing is essentially short-term vehicle rental. Users pay a monthly or annual subscription fee to gain access to a fleet of vehicles, generally parked in strategic areas in a central business district or other destination locations.

Through their subscription, users have the ability to reserve a vehicle, generally paying some additional usage cost such as refueling. All maintenance, insurance, and other costs are handled through the service provider. Local government plays a role in promoting car sharing by providing dedicated parking spaces and signage for car share locations. Local government can also allow exceptions to parking regulations that would allow developers to reduce the number of required parking spaces in exchange for offering car sharing.

There are several methods by which a car share program can be organized and managed. A grass roots nonprofit arrangement has been successful in many areas of the country including San Francisco, Philadelphia, and Ithaca, NY. Car sharing can also be provided through smaller, informal efforts, often by a collectively formed, well-defined neighborhood or other group. In addition, there is a national for-profit car sharing service, Zipcar, which has seen significant growth since its inception.



Car share programs such as the City of Boulder's provide an incentive for the use of alternative commuting options.

RIDE Solutions recommends pursuing the implementation of car share service in the Roanoke region. A feasibility study completed by RIDE Solutions in FY2010 recommends concentrating on the downtown core and Hollins University and partnering with a business or local government to swap out fleet vehicles with carshare memberships,

INCREASE BIKE AND PEDESTRIAN ACCOMMODATIONS FOR ELDERLY MOBILITY: Providing safe bicycle and pedestrian accommodations continues to be a TDM priority in the Roanoke valley. Bicycling and walking are not only the cleanest, most environmentally friendly transportation modes, they also provide options to improve physical fitness and public health, and they contribute to a more sustainable community by emphasizing non-motorized transportation and greenspaces.

In general, the primary drivers for the inclusion of bicycle and pedestrian accommodations have been transportation equity, availability of transportation options, environmental preservation, and recreation. In the Roanoke region, recreation has been the dominant driver, with environmental preservation growing in popularity recently. However, as our population ages, transportation options may become increasingly important, and bicycle and pedestrian accommodations may need to

expand to include nontraditional vehicles such as golf carts and mobility scooters.

For the Roanoke region, whose population growth has remained flat for the past several years, the aging of the baby boom generation will put enormous pressure on its transportation and health care systems. More than in previous generations, Baby Boomers are likely to value their independence, meaning many will choose to age in place, i.e., remaining in their own homes, opting out of retirement and nursing homes, and taking advantage of home health care and traveling nurses. Similarly, many will be loathe to have their mobility reduced even as their ability to drive safely becomes impaired. For some, the inflexibility of public transit schedules and routes may become a barrier. For them, moving to alternative vehicles may be their best option. In addition, persons with disabilities and those struggling with obesity may turn to scooters, Segways, and similar vehicles to increase their mobility options.



RIDE Solutions recommends that RVAMPO plan for the increased use of these vehicles. This includes determining whether existing bike and pedestrian accommodations – particularly bike lanes, bike routes, sidewalks, and shared-used paths – can double as lanes for scooters and Segways and whether implementation of existing bikeway and pedestrian planning – particularly existing vision list projects – will not only contribute to mode shift now, but will lay the foundation for accommodations for mobility devices.

INCREASE TRANSIT SERVICE CAPACITY: While broader issues of transit service expansion are beyond the scope of this section, RIDE Solutions recommends immediate attention to the gaps in transit service created by jurisdictional boundaries. Some of the areas of particular concern are:

- Route 419 corridor at Tanglewood Mall
- Brambleton Avenue
- Shenandoah Avenue and Main Street in Salem

Significant service gaps are created by the termination of existing routes and what might be considered natural stops (such as the Cave Spring Corner shopping plaza on Brambleton Avenue, a mile from the terminal of the route) or by jurisdictional boundaries. Existing stops at intersections along 419 should be considered the hubs of connecting service along the corridor.

In addition, service issues for paratransit should be reviewed and addressed as soon as possible. RVAMPO and VDOT have undertaken a corridor study of Route 419/ Electric Road addressing this issue. The draft of that study suggests the creation of transit service connecting Tanglewood Mall with the Exit 140 Smart Way stop, with park-and-rides at the intersection of 419 and Brambleton Avenue, as well as the in-

tersections of Braeburn Drive and Electric Road, Roanoke Boulevard and Electric Road, Main Street and Electric Road in Salem, and Green Ridge Road and Electric in Roanoke County. The park-and-rides would provide direct access to the proposed transit service as well as provide carpool meeting locations for those traveling into Downtown Roanoke, which could reduce traffic congestion along a few key corridors.

RIDE Solutions recommends RVAMPO take a leadership role in this. Lacking the presence of a regional transportation authority, RVAMPO has the best opportunity to deal with issues of jurisdictional boundaries and funding limitations. Transit service in the Roanoke Valley will best reach its potential as a public service if its routes are driven by user need and trip paths rather than by artificial boundaries.

GROW RIDE SOLUTIONS' PROMOTIONAL CAPACITY: As a program driven by public awareness and outreach efforts, RIDE Solutions' success is directly related to its ability to market itself. To date, the program has seen great success with low- or no-cost promotional efforts such as online social networking and a successful public relations campaign; however these efforts have primarily appealed to market segments that are naturally inclined towards behavior change/mode shift and for whom a simple awareness effort is sufficient. This might include the growing number of people concerned with their environmental impact, or long-distance commuters actively searching for a way to cut their commute costs. As current promotional efforts saturate these niche markets, the need for more mass-media efforts, creative online promotions, incentives, and other tools will be required. Long-term, high visibility branding campaigns will need to be put into place and maintained so that RIDE Solutions is always top-of-mind when commuters are ready for a change, even if they aren't prepared for mode shift initially.

The City of Roanoke's central business district is the region's primary employment destination. This will grow as the Riverside Park medical complex nears completion and development along the Jefferson Street corridor adds additional destinations within a mile radius of downtown. Therefore, it is certainly in RVAMPO's best interest to invest now in branding and awareness efforts that will slow the growth of transportation demand in this area, and will position RIDE Solutions to spend its resources encouraging commuters to keep vehicles off the road, rather than attempting to build awareness as a reaction to growing congestion after the damage has been done.

In a similar vein, RIDE Solutions and its TDM strategies set the foundation for local governments to quickly react to volatile shifts in gas prices. By investing in awareness campaigns now and continuing to grow promotional capacity, public awareness and brand-recognition of RIDE Solutions' services, they will be high enough that commuters will know exactly how we are able to help them.

RIDE Solutions recommends that the local match necessary for its operations continues to grow at a rate of at least 5% per year.

TRANSIT

Transit services are provided in the Roanoke region by the Greater Roanoke Transit Company (GRTC), which operates not only the fixed-route Valley Metro service and the Smart Way commuter bus between the Roanoke and New River valleys, but also limited-schedule shuttle service to Roanoke College, Ferrum College, and Hollins University. GRTC operates a fleet of thirty-eight Valley Metro buses and five Smart Way buses. In addition, GRTC has four Star Line trolleys along the Jefferson Street corridor between the Downtown Roanoke market and Carilion Roanoke Memorial Hospital.

RADAR provides paratransit service to both Roanoke City and Roanoke County and also operates fixed-route transit service in Alleghany County.



Valley Metro operates an average of 1.6 million revenue miles per year. In 2007, this represented 2.2 million passengers. For 2008, Valley Metro saw a 10% increase in ridership, while the Smart Way bus saw a 20% increase. These ridership levels have been maintained even as gas prices dropped in the last quarter of 2008 in reaction to a softening economy nationwide.

Year	Passenger Trips		O&M Costs		O&M/Pass Trip	
	MB	DR	MB	DR	MB	DR
2003	1,913,318	35,225	\$ 4,661,638	\$ 539,491	\$ 0.41	\$ 0.07
2004	1,887,571	38,410	\$ 4,985,780	\$ 623,201	\$ 0.38	\$ 0.06
2005	1,923,317	41,959	\$ 5,534,724	\$ 723,998	\$ 0.35	\$ 0.06
2006	2,023,169	45,048	\$ 5,987,860	\$ 796,158	\$ 0.34	\$ 0.06
2007	2,143,146	46,085	\$ 6,187,868	\$ 889,210	\$ 0.35	\$ 0.05

These are ridership numbers as reported in the Valley Metro (Greater Roanoke Transit Company) Transit Development Plan, 2010-2015, and show an increase in total passenger trips as well as a reduction in operations and maintenance cost per trip, indicating that the growth of paying passengers has increased along with the growth of free riders, such as student and Star Line Trolley users.

The result of on-board surveys completed for the Transit Development Plan (TDP) reveals the profile of a Valley Metro rider as a transit-dependent user.

The typical Valley Metro rider (including Star Line riders):

- Is female
- Is over 30 years old
- Is Caucasian
- Is at least a High School graduate
- Has \$20,000 annual household income for fixed-route service, \$50,000 annual household income for Star Line service.

To provide the broadest range of transportation alternatives and mobility options to the region, transit service will need to become an even more important part of the long-range planning process. For many reasons, transit service and other TDM strategies are well positioned to meet this need. They are able to react quickly to changing conditions in the transportation network, whether driven by spikes in commuter costs, reductions in road transportation service through cancelled or delayed projects, or even short-term congestion issues caused by construction and other projects. Routes can be changed quickly, and buses added or subtracted from service, to meet changing demands. In addition, transit provides a valuable tool for both economic and transportation equity by supplying transportation alternatives to citizens who, by choice or hardship, do not have access to a vehicle. It will also be an important component in the ongoing efforts to improve air quality measures and address ozone and particulate matter pollution.

Since funding of transit service in the region is done through formula grants requiring local matching funds, localities need to financially support the growth of Valley Metro to meet ridership and public service demands.

Like the Long-Range Transportation Demand Management Plan, Virginia Transit agencies are required to create a Transit Development Plan that will guide the growth of transit service over the next 10 years. This document guides the growth of existing service and the addition of new service through careful analysis of demographic and economic trends in the Valley.

The proliferation of new technologies -- including GPS-enabled mobile devices, 3G and 4G cellular networks, WiFi access, and application-enabled mobile devices like iPhone and Google Android -- affords users an ever increasing amount of information at their fingertips in an instant. Mobile devices that were once segregated by function (a user might carry a laptop, a cell phone, an MP3 player, and a Palm Pilot) have been integrated into single devices that are faster, more versatile, and more powerful than their predecessors. Many believe that these devices make driving in one's own car not only safer and easier, but more fun.

For transit service to compete against single-occupant vehicle travel among choice riders, it must provide trip planning tools as well as real-time, on-demand information to users about route delays, bus locations, route deviations, and other news and services. Mobile devices with web access can already be used to browse an agency's website for some of this information, but agencies will need to provide more, better, and faster information that takes advantage of the full features of their customers' technology. Unfortunately, the expense associated with GPS technologies (such as Automatic Vehicle Locators) can be cost prohibitive for smaller regional systems like Valley Metro. Fortunately, the information is increasingly available for free. In particular, two recent technologies, Google Transit and Google Latitude, have paved the way for a vast amount of information to be offered with little or no investment. Even social networking services can provide valuable free information.

GOOGLE TRANSIT

Launched in June 2007, Google Transit integrates bus stop and route travel time

ONLINE TRANSIT TOOLS

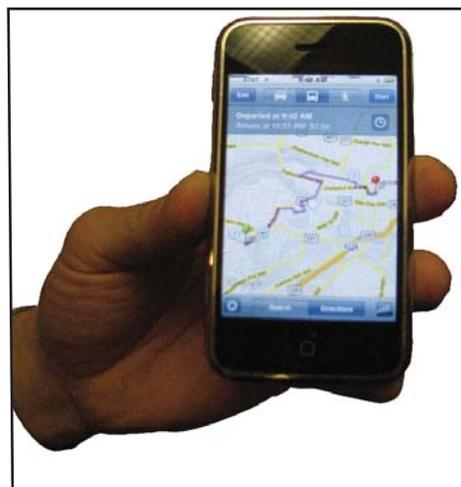
data into its existing Google Maps driving directions tool. In some areas, walking routes are also available. Google identifies the closest bus stop and times, provides walking directions to that stop, and provides information for all pertinent transfers. Google also provides total trip time.

Unlike Google Maps, Google Transit requires the participation of local transit agencies and their partners to provide and update route and schedule information. This is generally done by uploading the necessary files onto a local server with scheduled, regular visits from a Google robot to update the data on their end. There is no cost to participate except that which is incurred in formatting route data to Google's specifications, and even this can be done relatively easily with interns and volunteers.



Google Transit can be accessed via computer or mobile device at <http://transit.google.com>, and transit directions are offered as an option when searching for driving directions from <http://maps.google.com>. In addition, other websites can embed links into their sites that access Google Transit. Valley Metro did this on its website, as has RIDE Solutions on the Transit section of the website <http://www.ridesolutions.org>. This provides both users and developers a number of convenient ways to embed transit information in trip planning tools.

In 2008, the Commonwealth of Virginia partnered with Google to have all major fixed-route transit services in the state available through Google Transit. As of March of 2009, Virginia surpassed even California in total number of transit route maps available online - 21 compared to California's 17. In the Roanoke region, this has created a multi-jurisdictional trip planning tool that can map a route from the City of Roanoke to the Town of Blacksburg entirely by transit. With this foundation laid, Valley Metro and the region in general should make education and promotion of this valuable tool a priority.



Google Transit and Latitude information can easily be accessed through new mobile devices such as the iPhone.

GOOGLE LATITUDE

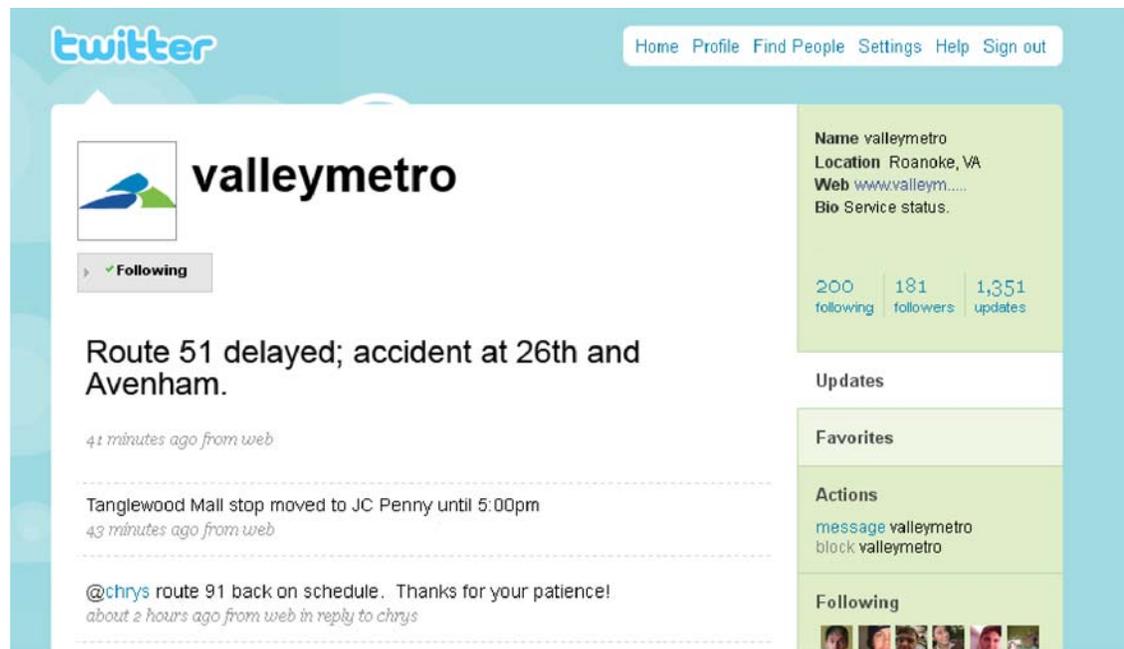
While Google Transit provides free trip-planning solutions, there is still a need for real-time bus location data. Initially, the software required to accomplish this can be prohibitively expensive. For example, the estimated cost for a system for all Valley

Metro buses is \$400,000. Although the system provides more data than simply the location of the nearest bus for riders, that is the piece of information that riders often find most helpful.



For a cost-effective solution, transit agencies might consider Google's newest offering, Google Latitude. Google Latitude combines Google Maps with social networking using the GPS capabilities in certain mobile devices. People who choose to share their information can allow friends to locate them on a map in real time either through a computer or via their mobile device.

The iPhone can accomplish much the same thing, but with Google Latitude not only is the audience much larger, but so is the potential range of devices that support it. A transit service might be able to deliver a similar function with an investment in GPS-enabled



What a Valley Metro Twitter feed might look like

cell phones and an inexpensive cellular plan. Creating Google Latitude accounts for each route, transit users could have free access to add one or more routes to their list of Google Latitude contacts and thus track the location of their preferred bus. Google Latitude allows the status of its users to be displayed, such as a delayed bus, alternate routes, or expected arrival time.

TWITTER

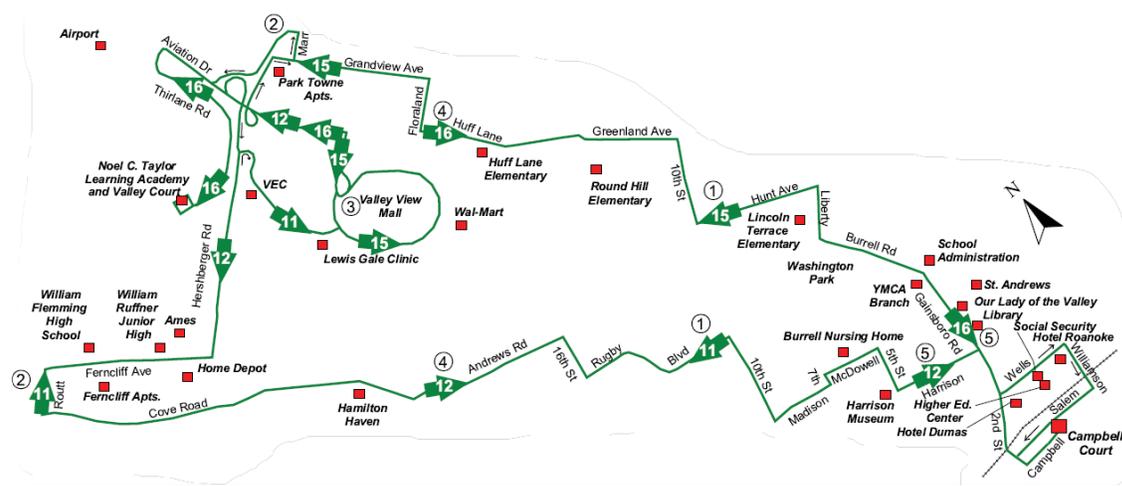
While Google Latitude service is free, there are still some expenses and logistical issues involved with purchasing the mobile devices and data plans and deploying them to the appropriate buses throughout the day. The latter is particularly an issue for systems in which several routes may be run by a single vehicle. One example is Valley Metro's Tanglewood and Valley View Mall loops, where one vehicle covers four separate routes

in a figure-8. If real-time location technology isn't feasible, than communicating through the popular microblogging service, Twitter, might be the answer. Twitter's 140 character limit is generally enough to provide quick information about a route's status and can link back to the agency's main webpage for more information. The already huge and growing Twitter network assures a wide audience, and Twitter's target market of mobile devices users can provide real time data to transit riders as they wait at their stops. Transit agencies could provide one system-wide feed or specific feeds for each route.

Dispatchers may already be updating the agency's website with delay information. Taking the extra step to update Twitter would add little effort to the update process but could potentially reach many more people. Further, Twitter feeds can be included in an RSS (Really Simple Syndication) reader or even be embedded on a website. Employers could embed the agency's feed on a transportation section of their intranet, and local news outlets could include it on their own webpages, significantly broadening the audience even more.

TRANSIT SERVICE IMPROVEMENTS

In FY 2008, RVAMPO staff assisted the Greater Roanoke Transit Company in completing its scheduled National Transit Database (NTD) of unlinked passenger trips for Valley Metro and Smart Way buses. The survey counted boardings and alightings on each stop for over 450 randomly-selected trips throughout the year. The data collected during this survey provides important insights into possible route-specific operations improvements. For example, the data suggests needed improvements along the routes that serve Valley View Mall, the area's largest retail center.



Valley Metro serves Valley View Mall on routes 11 and 15 from Campbell Court to the mall, and on routes 12 and 16 returning from the mall to Campbell Court. Routes 15/16 serve the area of the city between Williamson Road and I-581, while routes 11/12 serve the neighborhoods along Andrews and Cove Roads. William Fleming High School and William Ruffner Junior High are also served on these routes. The buses that run these routes actually travel in a Figure-8 formation, serving Tanglewood Mall in the south via routes 51/52 and 55/56, so that a rider boarding at Tanglewood Mall can travel to Valley View Mall without transferring to a different bus. Thus, it is possible to describe Valley View as being served by a single route of approximately 20 miles in length.

Anecdotal results from the NTD survey process suggested that the Valley View route

had the system's largest ridership and that the stop at the Valley View Walmart, in particular, was often standing-room only. The survey data supports this. The Walmart stop at Valley View had the second highest number of total boardings and alightings. The end-of-line stop had the highest. In all, these two stops accounted for 32% of all traffic on these routes.

Since many of the riders boarding at Walmart and the mall are shoppers, they are filling the bus not only with passengers but with parcels, potentially exacerbating issues of overcrowding. Alightings at subsequent stops are much smaller in number, meaning that the passengers are remaining uncomfortably crowded for longer portions of the trip. In addition, the bus stop at Walmart is essentially a small concrete pad next to the curb with a dirt path leading down a hill to the store's parking lot. These conditions are not only unpleasant in wet weather, when the surrounding area turns to mud, but they make accessibility for wheelchair-bound riders or those with other mobility limitations very difficult.

This data suggests improvements are warranted at this site. A standard bus shelter installed at the Walmart stop would improve service for one of the largest segments of passengers in the system. Given the large number of boardings and alightings at this stop, two shelters or a modified, larger shelter similar to the one on Wells Avenue near the Hotel Roanoke should be considered. To relieve overcrowding, Valley Metro should consider having buses come every 15 minutes (instead of every thirty minutes as it is now) during the peak period. Even if other routes were not doubled and passengers had to wait longer for route transfers at Campbell Court, this might still be preferential to riding a crowded bus. Alternatively, Valley Metro could consider adding a PM Peak shuttle or express bus that served only Campbell Court and Valley View.

TRANSPORTATION AND HOUSING CONNECTION

The connection and interaction between transportation and housing patterns has become an area of increasing emphasis for MPO planners. This is especially true in the areas of low-income housing, elderly targeted housing or multi-family housing.

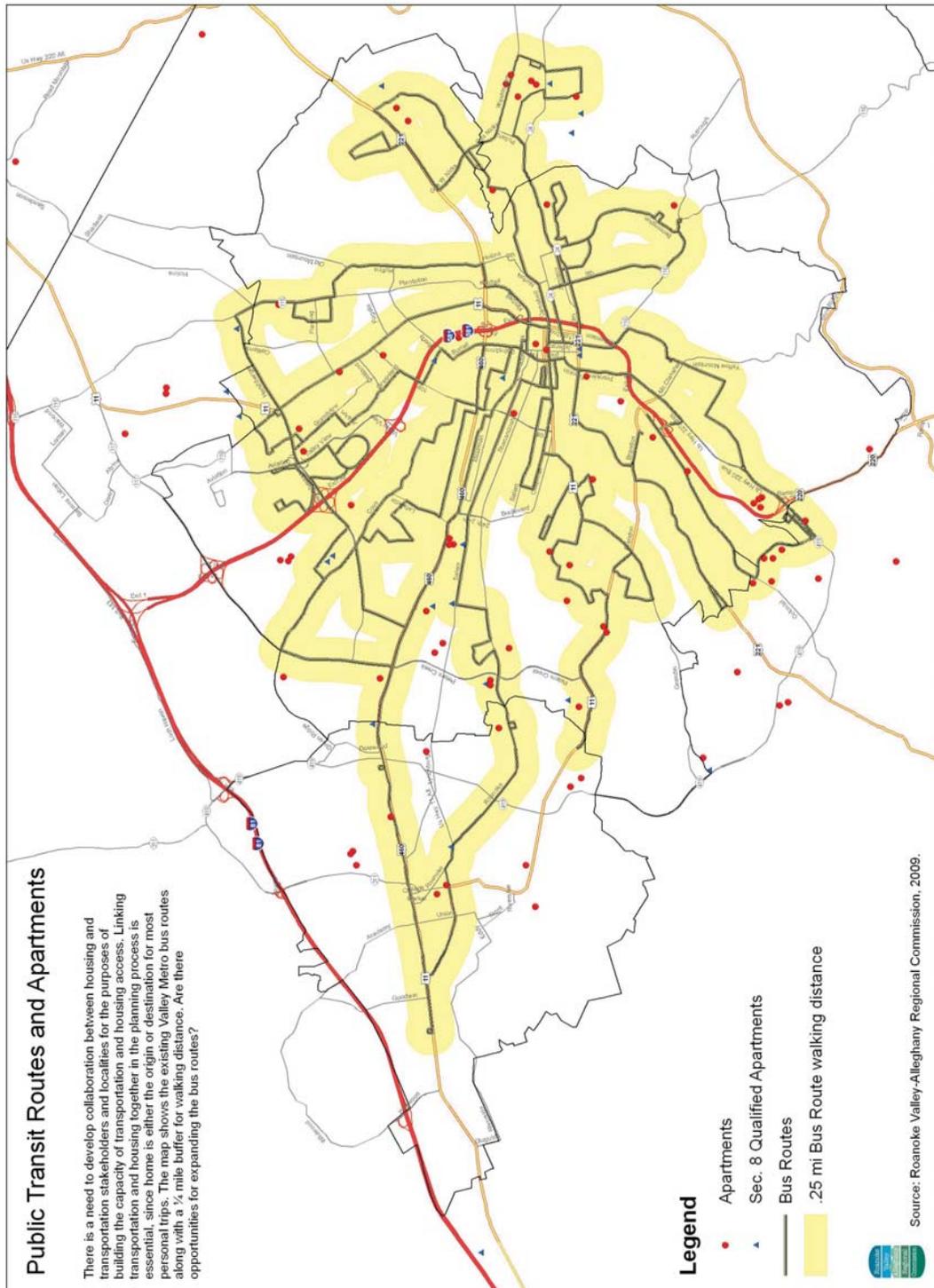
The discussion in Chapter 6 concerning "Baby Boomer Retirement" touched on this issue. That scenario specifically recommended that Baby Boomers who age in place can stay connected to the existing fixed transit system through bicycle, pedestrian, and greenway connections. The scenario also recommended car sharing systems or paratransit connections to serve as a feeder systems to the existing fixed route bus system.

The same recommendations are equally valid for connecting existing multi-family residences (apartments and condominiums) to fixed route bus lines. The map on the following page illustrates the relationship between existing Valley Metro service and existing apartment complexes. The one-quarter mile buffer represented on the map is a typical maximum comfortable walking distance.

This map shows a pattern similar to the age-in-place scenario maps in Chapter 6. That is, many existing apartment complexes are within the fixed route service area. However, several apartment complexes are several miles to the north and south of the existing system. Connecting these apartments to the existing system via paths, bikeways, or car-sharing systems would serve apartment dwellers and

future retiree populations as described in Chapter 6.

The transportation/housing connection will be an increasing area of emphasis in work leading toward the next CL RTP update.



The relationship between apartment complexes and the current fixed route transit system. The pattern of apartment complexes lying farther than one-quarter mile away from transit service resembles some of the future retiree household maps in Chapter 6.

