

Transit Service Design Guidelines

Department of Rail and Public Transportation
November 2008



Why were these guidelines for new transit service developed?

In FY2008 alone, six communities in Virginia contacted the Virginia Department of Rail and Public Transportation about starting new transit service in their community. They and many other communities throughout Virginia are interested in learning how new transit services can enhance travel choices and mobility and help to achieve other goals, such as quality of life, economic opportunity, and environmental quality. They have heard about or seen successful transit systems in other parts of the state, the nation, or the world, and wonder how similar systems might serve their communities. They need objective and understandable information about transit and whether it might be appropriate for them. These guidelines will help local governments, transit providers and citizens better understand the types of transit systems and services that are available to meet community and regional transportation needs.

The guidelines also help the Virginia Department of Rail and Public Transportation (DRPT) in making recommendations to the Commonwealth Transportation Board for transit investments, by 1) providing information on the types of systems or services that are best matched to community needs and local land use decisions, and 2) ensuring that resources are used effectively to achieve local, regional, and Commonwealth goals.

Who were these guidelines developed for?

These guidelines are intended for three different audiences: local governments, transit providers and citizens. Therefore, some will choose to read the entire document while others may only be interested in certain sections. The intent is to provide each audience with the following:

- **Local governments** - information that will help local leaders match community needs and local land use decisions with the most appropriate transit services
- **Transit providers** - guidance on how best to develop and advance projects that will be considered for funding by the Commonwealth
- **Citizens** - knowledge about how to make effective transportation choices so that citizens can better engage the public involvement portion of the decision making process

How can the guidelines be used?

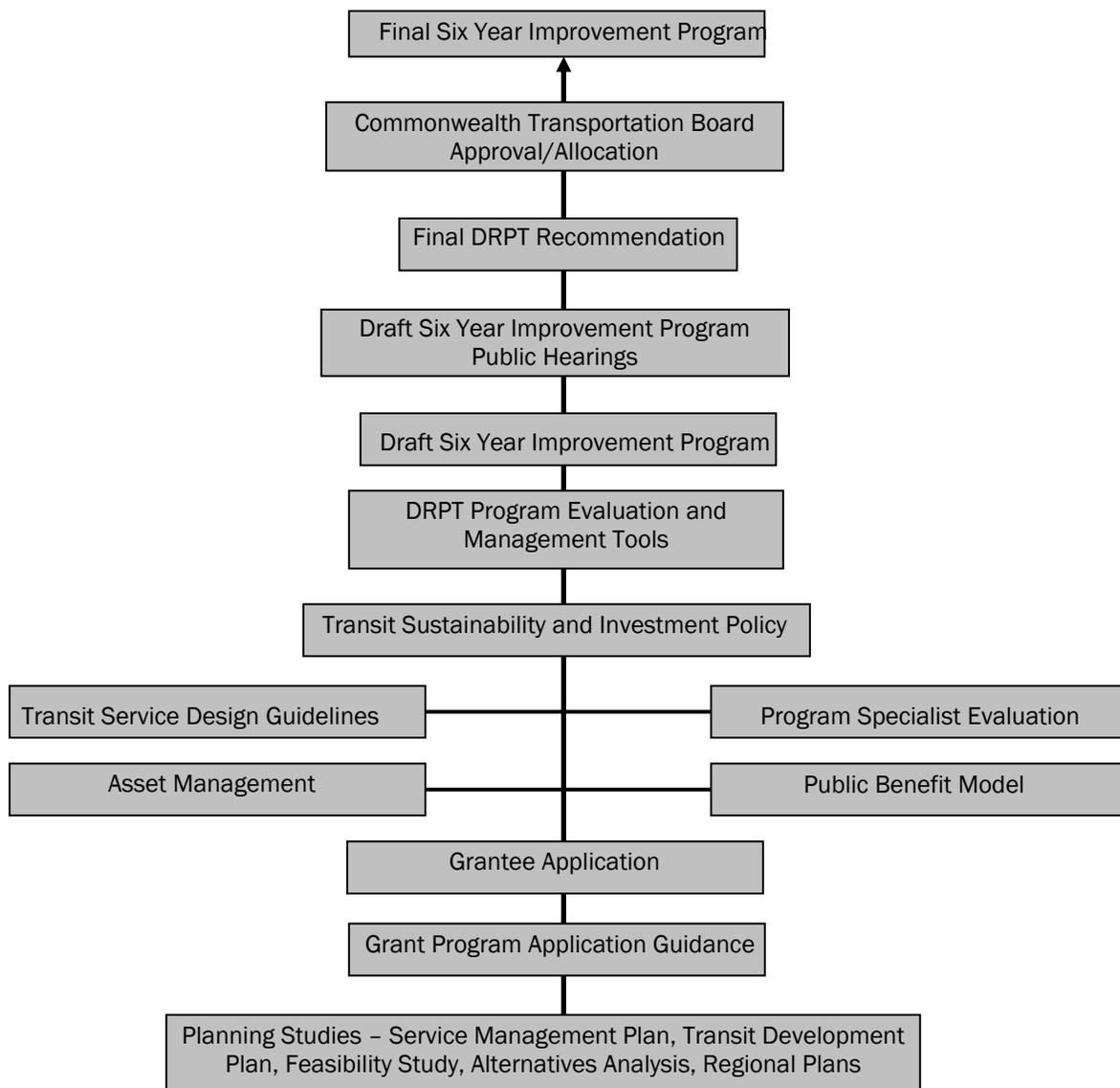
The guidelines can be used in two fundamental ways. First, they are an educational tool. Specifically, the guidelines provide basic information on different types of transit and service characteristics and which types of services work best in different communities. The guidelines should be used at the early stages of a transit planning effort, to assess the feasibility of certain types of transit in the context of specific community characteristics and needs.

Second, the guidelines also help communities shape ideas for new transit projects in a way that is more likely to meet funding requirements. In this way, the guidelines help to improve decision making and support the most effective allocation of limited resources.

How is DRPT using the guidelines?

DRPT has incorporated these guidelines into its procedures for evaluating grant applications for new transit services. Funding recommendations are approved by the Commonwealth Transportation Board by June 30th of every year through the development of the Six Year Improvement Program.

As part of its evaluation process, DRPT will analyze documentation provided by the applicant to determine the likelihood of the proposed service being successful based upon consistency with the Transit Service Design Guidelines. However, consistency with the guidelines is only part of the investment decision making process by DRPT. Other factors such as DRPT’s Transit Investment and Sustainability Policy (see Attachment A), Asset Management System, Public Benefit Model and planning studies such as Transit Development Plans and Alternatives Analysis are also considered (see figure below). For more details on application requirements and the evaluation process for new transit services, please consult DRPT’s Grant Program Application Guidance.



How are they organized?

This document is organized into four major sections:

1. **Planning for Transit** – identifies ways to plan for transit and key considerations for matching local needs with solutions, including: local land use, trip patterns, affordability, economic development goals, environmental factors and many others.
2. **Transit Service Guidelines** – defines specific types of transit services and modes. For each of four categories – **Rail**, **Fixed Route Bus**, **Demand Response Bus**, and **Ferry** – individual types of transit are detailed, including the physical, operating, functional, and financial characteristics of each.
3. **State and Federal Investment** – identifies state and federal grant programs that are available for new transit service. This section also includes a discussion on how grant application requests for new transit service will be evaluated by DRPT.
4. **For More Information** – provides DRPT contact information and other resources available to learn more about transit.

1.0 Planning for Transit

Based upon experience conducting transit planning studies, the Virginia Department of Rail and Public Transportation (DRPT) has identified a need to develop user-friendly transit service design guidelines to help local governments, transit agencies and citizens make informed decisions about implementing new transit services in their community. The intent of these guidelines is to provide upfront information on every transit mode and identify important considerations that each community should take into account when deciding if transit is an appropriate part of the solution for their needs. Through the publication of this document, DRPT hopes to provide useful information that will help advance successful transit services.

1.1 Transit in Virginia

Benefiting from its central location on the East Coast, Virginia ranks among the fastest growing states in the nation, whether measured by its rising population, overall income gains, or economic growth. While being in the center of it all gives Virginia certain advantages, it also places pressure on all aspects of the state's infrastructure, including the regional and local transit systems. Transit systems and services in Virginia must accommodate the mobility and consumer needs of an increasing number of residents, workers, visitors, retirees, and businesses, and do so reliably, safely, and efficiently. For these reasons, a thoughtful and rationale decision-making process is needed to guide future transit investment in the state.

As of 2007, Virginia was home to 7.7 million residents, making it the 12th most populous state in the nation. The state has consistently enjoyed population growth at a rate that exceeds the national average and is expected to add over 2.7 million more people by 2030 reaching a population of 10.4 million. Virginia is increasingly becoming an urban state. The combined population living in Northern Virginia, Richmond, and Hampton Roads is now at 5.3 million, or roughly 7 out of 10 Virginians. Northern Virginia localities lead the state in population growth, with Loudoun County seeing a phenomenal 59 percent growth over the period 2000 to 2006. Prince William County had the state's second largest increase and Fairfax County, the state's largest jurisdiction with over one million residents, also saw significant gains. During this period, Virginia's population has shifted to metropolitan areas and away from older central cities and rural areas in the Southcentral and Southwestern portions of the state.

Virginia's transportation system is strategically located within the nation's transportation network – Dulles International Airport and the Port of Virginia are important global gateways, Interstates 95 and 81 represent major north-south arteries for the flow of people and goods throughout the eastern U.S., and Interstate 64 and Route 460 serve east-west passengers and carry freight to and from the port. In addition, the rail network connects people and businesses to destinations and markets across the country, and Virginia's air transportation system is one of the most sophisticated in the nation.

Due to all of the factors above and many others (i.e. environmental, safety, capacity), transit in Virginia is a critical component of the transportation network in both urban and rural areas. Virginia has 56 transit agencies, ranging from the operation of a modest number of buses in rural areas to heavy rail service provided by the Washington Metropolitan Area Transit Authority

(Metro). Metro is the second largest rail and fifth largest bus operator in the nation today. Between 2000 and 2006, ridership in Virginia grew by 20 percent, or 30 million trips. This compares to a national growth trend of only four percent during the same period. This impressive statistic demonstrates that Virginia residents are choosing transit as an effective way to meet their travel needs.

1.2 Examining All of the Options

Transit is a critical component of Virginia's transportation network; however, not every problem requires a significant investment in transit to solve. Before looking at more capital-intensive transit options, communities initially should consider Transportation Demand Management (TDM) techniques as a possible approach to better managing their local travel demands. TDM techniques can be defined as a collection of strategies used to change travel behavior, however, one size does not fit all. Some TDM strategies go hand-in-hand with transit service, while others do not involve transit. Some TDM strategies may lend themselves to certain conditions found in urban and growing areas, while others are applicable anywhere in the state. For communities that do apply these strategies, it is possible to see significant transportation improvements with limited investment.

There is long list of TDM techniques that can be considered, including many that are directly implemented by others, such as employers in urban and growing areas, rather than the transit agency. These include several types of cash subsidies offered by employers as an incentive to use carpooling, vanpooling, existing transit services, as well as other services and benefits that employers might provide to reduce the number of employees who must drive alone. Employers are encouraged to provide the incentives, services, and benefits to help attract and retain employees. The numerous ways that employers can offer TDM programs include:

- **Alternative Cash Incentive Program.** These employer-developed programs allow employees to participate in an incentive program where they are rewarded with gifts and prizes for using alternative commute modes.
- **Carpool and Vanpool Matching.** Employers can help match commuters by maintaining a central database of potential carpoolers. This database can be web-based to provide access to company employees. Vanpooling is a more ambitious form of carpooling, as more commuters are involved, more coordination is necessary, and a van needs to be procured and maintained. Outside of employers, Virginia has 15 Commuter Assistance Agencies that offer ridematching services, as well as information on transit services. In Northern Virginia, Richmond, and Hampton Roads, there is also a privately operated ridematching service called Nu-Ride that offers a rewards program similar to other private companies.
- **Car Sharing and Bike Sharing Programs.** Car sharing programs make vehicles available to people on a per-use basis. They allow people to use a car when they need it without incurring fixed costs, chiefly the cost of buying the car. Fees are paid based on how much the driver uses the car. Lots are conveniently located throughout the urban area, and reservations are available on-line. A car sharing program known as "Zipcar" is actively used in Northern Virginia with locations at Metrorail Stations and other key activity centers within several local jurisdictions.

Bike sharing programs are also beginning to develop in the United States in the same format as car sharing programs. In May 2008, Clear Channel Outdoor, an outdoor advertising company, launched the country's first bike-share service in Washington, D.C. SmartBike DC is a partnership with DC's Department of Transportation and will initially offer annual subscribers access to 100 bikes at 10 stations in the city's central business district. Other cities throughout the U.S. have also expressed interest in the program.

- **Flexible Schedules.** Employers can allow employees to set their own work hours, or set staggered work hours, to change the company's peak travel period and reduce peak period demand on local roadways.
- **Friendly, Accessible Services.** Offering employees the amenities they need at and near their work sites makes alternative commute modes more desirable. Popular amenities include bicycle facilities (lockers and racks, shower facilities), pedestrian-friendly roadway networks that include sidewalks, and employee-serving uses both onsite – such as cafeterias and postal services – and off-site – such as shuttle services to activity centers during lunch. Filling in the missing links in sidewalks and trails can also be an easy way to help employees access services near work sites.
- **Guaranteed Ride Home.** Employees are sometimes reluctant to take transit or participate in carpooling or vanpooling activities because schedules might be perceived as being inflexible. Without a guarantee that employees will be able to get around in an emergency – for example, the employee is called home during the day unexpectedly – employees may choose not to ride transit or in a carpool or vanpool. Guaranteed ride home (GRH) programs are designed to address this issue. Employees who enroll in GRH programs receive access to transportation such as taxi service in the event of a personal emergency, for a limited number of times every year. Experience has shown that the cost of GRH programs is very low and people are in fact more likely to ride transit, carpool or vanpool knowing that they have another way to get home if necessary.
- **Parking Cash Out Programs.** Employers provide a cash allowance to an employee equivalent to the parking subsidy that the employer would otherwise pay to provide the employee with a parking space. U.S. employers spend \$36 billion annually on employee parking. It is the most common commute benefit offered to employees and the most common fringe benefit of any kind. Implementation of this program requires some level of transit service and local zoning ordinances may need to be updated.
- **Subsidizing Ridesharing.** Employers can encourage carpooling by picking up the fuel costs, or by subsidizing by a pre-determined dollar amount per day for those who choose to carpool. Employers also can encourage vanpooling by subsidizing the cost of the vehicle.
- **Tax-free Transit Pass.** Employers can offer their employees monthly tax-free transit passes as a means of encouraging the use of transit. This tax-free benefit is currently set at \$115 per employee.
- **Telecommuting.** Some employers allow their employees to work from home some of the time and provide them with the computer equipment and support to do so. Other arrangements may involve “virtual” employees who are not even located within a central office but instead do their work remotely. Employers can obtain free information from

DRPT on how to start or expand a program and receive training, technical assistance and financial assistance through programs such as Telework!VA (www.teleworkva.org).

In addition to the TDM strategies that are discussed above, there are additional road and parking pricing measures that can be used to help communities manage demand. While these strategies have significantly different implementation costs, they may be worth considering in congested areas:

- **Road Pricing.** Road pricing programs charge commuters a direct cost for driving on a particular roadway or in a particular area. The tolled facility can encourage some drivers to consider alternative modes to avoid the extra costs of driving. Such programs will be most effective when reliable and convenient alternatives, such as a transit line that parallels the roadway or serves the area, are available to commuters.
- **Congestion Pricing.** This is a more dynamic form of road pricing where commuters are tolled on a roadway or in a particular area based on congestion levels. Typically this means that commuters are charged more to travel on the roadway during peak hours, and less during the off-peak. Like road pricing, this program is more effective when ample choices, like transit, are available and improved upon as part of the pricing plan.
- **Parking or Pricing Management.** Charging drivers to pay for parking on city streets, or increasing the parking costs on city streets are effective ways to reduce automobile travel. As costs go up, commuters are likely to find alternate ways to reach their destination without paying for parking, such as taking a bus or carpooling. This strategy can be especially effective in dense urban areas where congestion problems are greatest, where demand for parking is highest, and where transit, walking, and bicycling options are typically most available.

1.3 Planning For Success

If a community has made the determination that they need new transit services to help them achieve their local goals, the question becomes what type of transit will work. To help answer the question, an appropriate level of transportation and land use planning should be conducted by the community, local transit agency and/or DRPT. Planning is essential to providing decision makers, stakeholders and citizens with comprehensive information that serves as a foundation for making sound investments.

Planners are trained to develop and analyze numerous types of information to create a comprehensive plan for implementing transit improvements including, but not limited to:

- Demographics and socioeconomic data
- Existing and future travel and land use patterns, problems, and needs;
- Short term and long term transportation solutions to meet the needs
- Economic development opportunities
- Capital, operating and maintenance cost forecasts
- Financial planning
- Environmental benefits and impacts
- Social benefits and impacts
- Traffic Impacts
- Performance measurement and evaluation

Planning studies involving transit and land use can take several forms depending upon the complexity of the problem and the level of information needed to develop potential solutions.

Urban/Small Urban Area Transportation Systems Planning

Before a specific study is done in a particular corridor in an urban area, there must first be an appropriate level of systems planning for the urban area. Systems planning refers to the continuing, comprehensive, and coordinated transportation planning process carried out by metropolitan planning organizations (there are 14 in Virginia) - in cooperation with state departments of transportation, local transit operators, and affected local governments. This planning process results in the development of long range multimodal transportation plans and short term improvement programs. Many of the activities performed during systems planning necessarily precede a systematic consideration of a major transit project in locally-identified corridors. During systems planning, local agencies examine long range urban development trends, collect travel data, forecast needs, and evaluate regionwide transportation policies and investment options. Based on their assessments of travel patterns and establishment of goals and objectives for regional mobility, local transportation agencies and governments identify transportation problems and needs in priority transportation corridors throughout the metropolitan area.

Rural Area Transportation Systems Planning

In rural (non-urban) areas of Virginia, systems planning is usually accomplished to a lesser degree through local planning district commissions (there are 21 in Virginia), the Virginia Department of Transportation (VDOT) and DRPT.

Transit Planning

In coordination with continuous systems planning, more targeted short and long term planning for a specific area, corridor or routes can be conducted. Below is a brief description of the most typical types of studies that are done. The level of planning conducted should be commensurate with the type of investment being contemplated. For example, the level of effort for developing a new bus route in a rural area that has no transit service does not need to be as extensive or complex as developing a new rail line for an urban area with an existing regional rail system.

Prior to initiating a study, transit systems should consult with DRPT on the most appropriate planning approach. This will allow DRPT to support transit systems throughout the planning process and ensure that the planning study will meet DRPT's requirements. Examples of transit planning studies are provided below. DRPT can provide technical assistance by conducting and/or participating in any of these types of studies. Financial assistance to conduct studies may also be available from DRPT. Section 4.0 provides contact information for any community that is interested in assistance from DRPT.

If your community does not have any transit service...

Transit service is present in all urban areas of the state, most small urban areas and some rural areas. If your community has no transit service at all, the first step is to conduct a feasibility study (or request that DRPT conduct a feasibility study on your behalf). A typical feasibility study is an area or corridor planning study that:

- Collects data on an area or corridor such as: population and employment data, demographic and socioeconomic data, previous and existing transportation plans, roadway network information, comprehensive plan information, list of activity centers – employment, shopping, medical, entertainment, etc.
- Evaluates transit markets and transit modes to determine at a rough order of magnitude if transit service is warranted
- Recommends where the service would operate
- Recommends which mode is the most appropriate based upon markets and demand
- Discusses the potential benefits of providing transit service
- May provide information on potential ways to provide the service (contract out versus operated by the community)
- Discusses capital, operating and maintenance costs and potential funding sources

The study structure can be very flexible and can focus on short term, medium term and/or long term improvements. The study can also point out any fatal flaws to implementing transit. The study should provide enough information for stakeholders to make a determination on whether or not they want to implement service. If a decision is made to move forward with transit service, DRPT can work with the community to identify funding under the appropriate federal and state programs and provide any necessary technical assistance.

If your community has existing transit service and is considering adding new service...

In communities where transit service is already present and consideration is being given to adding a new service, there are several options:

- **Transit Service Management Plan** – a plan that specifically addresses the goals, objectives and business rules under which a transit agency will add, remove, develop or modify service. An analysis of existing service and markets is conducted based largely on

performance measures and cost and new markets may also be identified. The plan recommendations are typically short term (one to three years).

- **Transit Development Plan (TDP)** – a strategic plan for a transit agency that generally covers a five to ten year period (DRPT requires agencies in Virginia to use a six year period). The TDP typically includes an evaluation of existing services, a review of demographic and travel behavior characteristics of the service area, a summary of local transit policies, the development of proposed transit enhancements, and the preparation of a six year implementation plan. DRPT has developed a Transit Development Plan Requirements document for transit agencies that describes in greater detail the structure and content required for TDPs.
- **Feasibility Study** – an area or corridor planning study that evaluates existing and future transit markets and modes to determine at a rough order of magnitude if transit service is warranted and if so, where would it operate, which mode is appropriate and what would be the benefits and costs. The study structure can be very flexible and can focus on short term, medium term and/or long term improvements. The study can also point out any fatal flaws to implementing transit.
- **Alternatives Analysis** – a detailed corridor planning study that identifies major transit investments and compares the costs, benefits, and impacts of a range of transportation alternatives (typically rapid transit – heavy rail, commuter rail, light rail, bus rapid transit). The study concludes with the selection of a locally preferred alternative that is then carried forward through the planning and project implementation process. The Federal Transit Administration and DRPT are heavily involved in the development of the scope of work and analysis that is conducted when federal and state funds are anticipated to help pay for the locally preferred alternative. Additional information on alternatives analysis is available in Section 3.0.

DRPT can help communities determine which type of study may best address their needs. Any request for state investment in new transit service must involve some level of planning. The remainder of this section focuses on some of the most common considerations that are taken into account in any of the plans above.

1.4 Framing the Purpose and Need

Regardless of which type of planning study a community pursues, a first step in assessing effective solutions is defining the purpose and need for the study. A purpose and need statement describes the mobility problem to be solved based upon data such as population, employment and travel demand trends, as well as land use plans.

For example, is it a matter of needing to move more people during rush hour to address projected increases in employment in a corridor? If so, how many people? A standard 40-foot bus can carry about 45-60 passengers. Assuming bus service operates every 15 minutes during rush hour, that would be a maximum load point of 240 passengers per hour. A three-car light rail train, on the other hand, operating every 15 minutes can carry on average about 270 passengers (90 per car), or a maximum load point of 1080 passengers an hour (four and a half times more than the bus example above). In some cases it may make sense to begin with bus service and build the market for rail.

Another way to think about problems can relate to local goals, such as reducing the number of people driving a car alone. For every driver who chooses a transit service, that is a car that is taken off the road. How many people driving alone need to be attracted to transit service, carpooling, vanpooling or telecommuting to reach a goal of reducing the number of cars traveling in a particular corridor or area?

Or what if the goal is to better coordinate transportation and land use? Are there ways that certain types of high capacity transit services can help encourage high density development that combines different uses such as employment, retail and housing? Can coordination of transportation and land use create economic development opportunities for a community or a corridor? What level of economic growth are people looking for?

And some problems may focus on certain socioeconomic segments of the population that have no other access to transportation. How, for example, can transit help the elderly or the disabled with basic needs, such as getting to the grocery store or a doctor's appointment? How can it support welfare to work initiatives? What is the local need for these types of "lifeline" transportation services?

A clear statement of the desired goal or outcome is central to helping sort through the potential transit solutions. Local governments and agencies should begin by describing and quantifying the need, to better allow them to match it with feasible solutions. If assistance is needed, DRPT can work with local governments and agencies to help them through this process.

1.5 Land Use Considerations

When matching a specific mode of transit to a local need, communities and transit agencies should first consider the types and locations of existing and planned land uses that will be served. The connection between land use and transit is profound: as a transportation mode that is generally intended to move high volumes of people, the more people who collectively move from one place (origin) to another (destination), the more effective transit will be in serving them. An obvious example is a transit line that connects a major residential area to jobs in a central business district (CBD). In contrast, small numbers of people traveling to many different destinations are much harder to serve with transit.

Transit Supportive Development Levels By Transit Category

The tables below provide a rough guide of levels of development that would be appropriate to support rail and fixed route bus. These are not absolutes, and other local factors such as the types and mix of land uses will provide important information on whether conditions are appropriate for certain types of transit. For demand response service, other factors will apply and density can be of lesser importance when determining the appropriateness of demand response. Rather, considerations like the populations to be served, such as the disabled, elderly, or otherwise transit-dependent, will be a primary consideration when identifying potential demand response services. Similarly, for the ferry category, greater consideration might be given to the location of development – i.e., along a navigable waterway – and the specific types of trips to be served.

Rail

Rail services are some of the most costly to implement, so consideration must be given to the markets, activity centers, and development conditions that rail will serve. These guidelines provide some suggested gross levels of development that are supportive of rail service (note: levels for commuter rail may be considerably less outside of the core area – for example 1-2 dwelling units per acre).

Development Levels Supportive of Rail

Measure	Development Level
Population densities (persons per square mile)	6,667 - 15,000
Employment Served	125,000 - 250,000
Central Business District commercial floor to area ratio (FAR)*	6.0 - 10.0
Other commercial floor to area ratio (FAR)	1.0 - 2.5
Residential dwelling units per acre	10 - 25

Sources: Federal Transit Administration: Guidelines and Standards for Assessing Transit Supportive Land Use – May 2004

* Floor to Area Ratio (FAR) is the relationship of total building floor area to the area of its zoning lot. Each zoning district has a FAR control number which, when multiplied by the square foot area of the lot, produces the maximum amount of floor area allowable in a building. For example, on a 10,000-square-foot lot in a district with a maximum FAR of 6.0, the floor area of a building can be up to 60,000 square feet.

Fixed Route Bus

Fixed route bus service can offer substantial flexibility to serve different types of markets, as compared to rail services. These markets include dense urban areas that can also be well served by rail, but also suburban and rural areas that are less dense but have a number of concentrated activity areas. These guidelines suggest development levels that are supportive of fixed route bus services. But as is the case for rail-supportive development levels, other factors also should be considered, such as services needed to provide mobility options for transit-dependent populations and local policy objectives.

Development Levels Supportive of Fixed Route Bus

Measure	Development Level
Population densities (persons per square mile)	2,500 - 4,000
Employment Served (per acre)	4 - 5
Commercial floor to area ratio (FAR)	0.35 - 1.0
Residential dwelling units per acre	4 - 5

Sources: Institute of Traffic Engineers, A Toolbox for Alleviating Traffic Congestion, 1998; Pushkarev and Zupan, 1977; Ewing, 1999; Cervero, et. al., 2004; TCRP Report 100, 2003.

Virginia Initiatives to Improve Transit Supportive Development

In addition to the general rules of thumb described above, Virginia Governor Tim Kaine and the Virginia General Assembly have recently instituted several initiatives that significantly improve the linkages between land use and transportation planning that will encourage transit supportive development in Virginia.

In 2006, the Code of Virginia was amended to add §15.2-2222.1, which establishes procedures by which localities are directed to submit to VDOT for review and comment a traffic impact analysis for development proposals that would significantly impact the state transportation system. The goals of the amendment are to improve coordination between land use and transportation planning across Virginia by providing consistent information regarding traffic impacts of proposed land-use decisions to local decision-makers and citizens; and ensuring traffic impacts, both local and regional, are considered when land use decisions are made.

The requirement for localities to submit development proposals for VDOT to review through a traffic impact analysis is triggered at three key stages of land use: comprehensive plans and amendments, rezonings and site plans. At each of these key stages, VDOT has a fixed timeframe to review and comment on the traffic impact of the proposed land use change. The information and comments provided back to localities by VDOT is advisory since land use decisions remain a local prerogative.

The objectives of VDOT's traffic impact analysis include the following:

- Present recommendations for potential improvements or changes that may mitigate traffic impacts of proposed development
- Identify impacts to the existing transportation network associated with vehicle trips generated by the proposed development
- Identify potential impacts to bicycle and pedestrian facilities as well as to transit accommodations
- Determine need for signal additions or modifications and other traffic engineering features

The Commonwealth has formalized this process through regulations, known as Chapter 527. VDOT will implement the regulations through a phased process and is scheduled to have them in place statewide by January 2009. More information on the Chapter 527 regulations is available at VDOT's website: www.virginiadot.org.

The Code of Virginia was also amended in 2006 to add §15.2-2223.1, which includes new urban development area requirements for local comprehensive land use plans. Under these requirements every county, city or town that has adopted zoning pursuant to the Code of Virginia (Article 7, §15.2-2280) and that has a population of at least 20,000 and population growth of at least 5%; or has population growth of 15% or more, must (and any county, city or town may) amend its comprehensive plan to incorporate one or more urban development areas. An urban development area is defined as an area designated by a locality that is appropriate for higher density development due to proximity to transportation facilities, the availability of a public or community water and sewer system, or proximity to a city, town, or other developed area. The comprehensive plan must provide for commercial and residential densities within urban development areas that are appropriate for reasonably compact development at a density of at least four residential units per gross acre and a minimum floor

area ratio of 0.4 per gross acre for commercial development. As discussed in the previous section above on transit supportive development levels, these minimum requirements fit very well with necessary development levels to support fixed route bus and going beyond the minimum requirements can achieve a level that supports rail.

The amendment to the Code also requires comprehensive plans to incorporate principles of new urbanism (a development strategy that encourages smart managed growth; sustainable green development; and reduced traffic) and traditional neighborhood development, which may include but is not limited to: pedestrian-friendly road design, interconnection of new local streets with existing local streets and roads, connectivity of road and pedestrian networks, preservation of natural areas, satisfaction of requirements for stormwater management, mixed-use neighborhoods, including mixed housing types, reduction of front and side yard building setbacks, and reduction of subdivision street widths and turning radii at subdivision street intersections. Many of these principles will benefit transit.

Finally, on June 11, 2008, Governor Kaine issued Executive Order 69 establishing the Sub-Cabinet on Community Investment. The Sub-Cabinet is tasked with promoting smart, sustainable growth through investment in projects that reduce suburban sprawl. Their main tool to promote smart, sustainable growth is the distribution of state discretionary funds to incentivize desirable growth. Decisions on grants, loans, matching funds, and other discretionary funds are evaluated with several principles in mind:

- Invest in innovation;
- Invest in the use of existing infrastructure;
- Invest in compact development;
- Protect and restore Virginia's natural resources;
- Conserve Virginia's limited natural resources;
- Invest in diverse housing opportunities;
- Invest in alternative transportation choices; and,
- Take a long-term view to planning.

The goal of the investments is to properly maintain and make more efficient use of existing infrastructure, thereby saving the Commonwealth money and conserving resources. The investments will be made in projects that promote compact development, consume less land, conserve open space, and minimize the negative social, economic, and environmental consequences of sprawl.

The Sub-Cabinet is chaired by the Secretary of Natural Resources, and consists of the Secretary of Administration, Secretary of Commerce and Trade, Secretary of Finance and the Secretary of Transportation.

Chapter 527 regulations and Executive Order 69 are just two examples of Virginia's commitment to improving land use and transportation planning. DRPT will continue to work with communities to make information available on successful techniques and lessons learned.

Community Planning Principles of Transit Supportive Development at Station Areas

A major consideration in selecting an appropriate transit station area is the community planning principles of transit supportive development, known as the "4Ds" - **Density, Diversity, Design** and **Distinguish**. Information on the 4Ds that is provided below is not intended to be

prescriptive and may vary among urban and rural communities. Instead, it is intended to help communities determine which areas might already best be suited for transit. For communities that do not have transit supportive development, this information provides some of the key considerations that should be taken into account when trying to create transit supportive development.

- **Density** must be compatible to the local transit station area. Ensuring proper development densities within the transit station area supports transit ridership and reduces parking requirements. Important density considerations for transit supportive development include:
 - Effective transit supportive development should offer easily accessible critical services in order to help reduce automobile dependence.
 - Highest density development (such as apartment buildings, office buildings, shopping centers and medical facilities) should be placed nearest transit stations/bus stops.
 - Using structured parking increases density by increasing the availability of developable land.
 - Compact building design and infill development strategies are both ways to help increase density.
 - The Federal Transit Administration uses population density as a measure of transit supportive development feasibility for projects in its New Starts Program (typically rapid transit) and considers low density to be below 3,333 people per square mile. In rural areas, population density will be considerably less and is geared more towards fixed route or demand response transit service as opposed to rapid transit.
- **Diversity of Uses** within the transit station area helps create an exciting destination that offers a wide variety of services and amenities.

Some key points to consider when thinking about diversity of uses include:

- Mixed-use development is a major factor in creating a vibrant, active community that will have transit supportive population density. For a wider variety of options, uses should be mixed within the same building and between adjacent sites.
 - Successful transit supportive development includes a variety of uses like: public, commercial, residential, office/employment, entertainment, retail and open space.
 - Transit supportive development should also include a wide range of housing choices including: small lot single-family, multi-family, town homes, lofts above commercial and retail uses, multi-story apartments and affordable housing.
- **Design Aesthetics** are an important factor in creating a sense of place within the station area. Good design aesthetics will contribute to a vibrant, safe and attractive transit station environment.

Examples of aesthetic treatment considerations for transit supportive development are:

- Use well crafted design guidelines and building standards to create a unique sense of place. The guidelines and standards should scale the size and variety of the development to fit the needs of the local community.
 - Define community character with coordinated visual treatments like: streetscape elements unique to the development, unique street signage, unique landscape treatments, and varied architectural style and building height.
 - Provide for bicycle and pedestrian access by considering: interconnected trails and pathways, placing storefront development close to the street, reducing required biking and walking distances and matching the building scale to suit the bike and pedestrian environment.
 - Reduce the impacts of automobile traffic by limiting parking and automobile access to the outer edges of the development, provide structured parking instead of surface parking and place it behind buildings and at the edges of the community.
- **Distinguishing Transit Station Typology** is the most important of the 4-D's. This process ensures that the appropriate station type is selected for each station area using criteria based on development potential, land use and transit facilities. The components of station typology include station area types, station development potential, land use characteristics and station facilities and services.

Station typology facilitates transit supportive development in the following ways:

- It recognizes the unique qualities of each community and corridor and provides a customized approach instead of a one size fits all approach.
- It provides a framework for conceptual regional level planning, determining appropriate design and development standards and encourages more detailed station area planning.
- It facilitates the evaluation of transit impacts on existing development patterns and future land use.

By using the 4Ds communities can begin to focus in on the transit mode and transit station areas that will best serve their community. In general, dense mixes of uses designed in ways that are easy for bicyclists and pedestrians to get to are the most conducive to rapid transit service. For example, a typical Central Business District (CBD) with a vibrant mix of jobs, shopping, healthcare and educational facilities, and recreational activities would be a logical location for transit service that connects these activities to nearby populations. In fact, many CBDs across the country are well served by rapid transit, such as Metrorail in Washington, DC and similar systems in other major urban settings. But other types of development patterns can also support transit, such as suburban park-and-ride locations where people living in the suburbs can drive their car, park for the day, and then ride commuter rail systems, like the Virginia Railway Express, into downtown. On the opposite extreme, highly dispersed development such as in rural settings can be served by demand response transit systems that can provide more flexible routes to pick up passengers based upon requests that fall within certain limits.

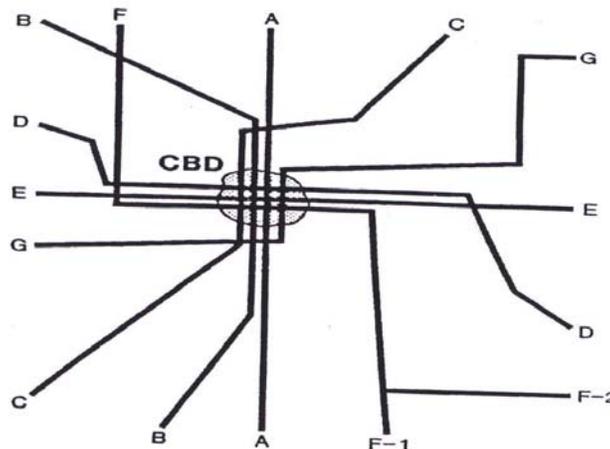
One of the valuable lessons that the history of transit in the U.S. has taught is that a lack of connection between land use and transit planning will result in less effective projects, in terms

of how well the transit system can attract and serve riders. A common refrain heard from transit agencies is that they do not do land use planning; that is the responsibility of local governments. But unless there is coordination with local land use plans, transit systems will not be able to effectively provide services that meet the needs of the most people possible.

1.6 Service Area and Transit Network Design

Virginia has large and small sized urban areas that typically have combinations of high density and low density areas of development, while rural areas are typically low density. As noted above, there is a strong relationship between development levels and transit, and the previous tables identified development levels that might be considered supportive of either rail or fixed route bus service. In addition to levels of development, there are other service area characteristics that should be considered when assessing the appropriateness of various transit options and the design of the transit network.

Each existing or potential transit operating environment is different, and the resulting system design, target markets, and ridership levels also vary. For example, VRE and Metrorail both serve the Washington, DC Metropolitan Area, however, they serve different markets. VRE is a commuter service designed principally to carry travelers with long commutes into and out of the downtown DC area during the peak commuting periods five days a week, whereas Metrorail is intended for shorter commuting trips and trips throughout the day seven days a week. The systems operated by VRE and WMATA are “radial,” that is, they radiate out from the center of Washington, DC like spokes on a wheel, with most of the trips traveling to, from, and through the densely developed areas of the city (see the figure below). Throughout Washington, DC, parking is limited and therefore fairly expensive, roughly \$12 per day or \$240 per month; this monthly rate is nearly 60 percent higher than that of other U.S. cities. The combination of dense development, high rates of congestion, and constrained parking provide substantial transit-supportive characteristics.

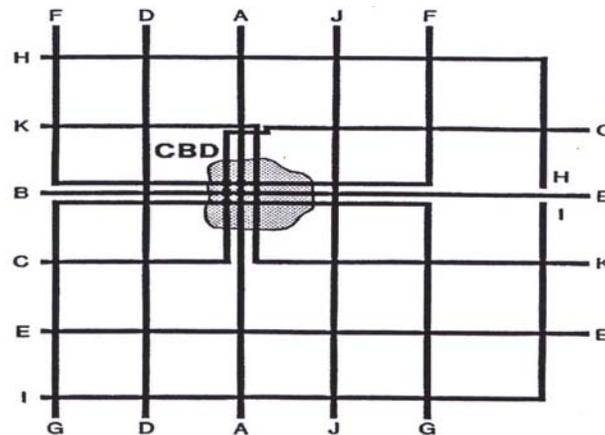


Radial systems are most typical in older cities, where major activities are concentrated in downtown areas. In comparison, there are other urban areas in the state that may be more decentralized with some combination of the following characteristics:

- Relatively low density for an urban area and an abundance of free or low-cost parking;

- A lack of a strong Central Business District;
- Dispersed travel patterns; or
- High income levels, which correlate to higher automobile ownership levels.

These service area characteristics are not as conducive to high capacity forms of transit such as rail. For these types of areas, bus systems provide greater flexibility. As an example, bus systems operated along a grid (see the figure below) can provide an efficient option because it often allows riders to travel anywhere on the grid by making one transfer.



Grid-type bus networks have relatively straight, parallel routes spaced at regular intervals; these routes are then crossed by a second group of similar routes. The advantage of a grid network is that it provides much more direct service to more destinations as compared to the radial network where all routes converge at a central point. A disadvantage is that such networks typically require one or possibly more transfers to reach a desired destination. On the one hand, frequent headways will help ease these transfers, since riders will not want to wait long for a bus to arrive. However, if densities and/or ridership are low, then frequent headways would not be cost effective.

Variations of bus network types should be considered, based on local markets and travel patterns, including networks that combine elements of radial and grid systems.

1.7 Other Important Considerations

Local needs, land use and transit network designs are central to finding the best match with a transit solution, however, there are also a number of other considerations. While these considerations are not discussed in the same level of detail, they should not be underestimated in terms of their importance in the process of selecting an appropriate transit solution. As with local needs and land uses, these other important considerations will vary throughout Virginia from community to community:

- **Affordability**, the financial feasibility in terms of the initial capital expense and continuing operating expenses is critical to understand when considering transit. In Virginia, federal and state funds typically contribute toward a higher portion of capital funding than

operating and maintenance funding. Local jurisdictions contributing significantly to long term operating and maintenance costs.

- **Compatibility with existing services**, new services should not compete for the same customers (unless the purpose is to provide redundancy for customer choice or to facilitate emergency response). Fare structures should also be compatible and transfer policies should be well thought out.
- **Economic development goals** of local jurisdictions, such as growing, sustaining or revitalizing the local economy in specific areas or corridors.
- **Environmental factors**, for example, if a proposed transit project helps attain regional air quality standards.
- **Fares** are often policy driven and are typically not set at a market rate. Fares are traditional held lower than the market rate to allow access for as many people as possible. Fare structures can also vary based upon distances, commuting hours versus non-commuting hours, and among various groups (seniors, disabled, youths).
- **Quality of life or other community objectives** that may be supported by a high capacity transit investment as opposed, for example, to new roadway expansion.
- **Legislative Direction** – new legislation or changes to existing legislation at the federal and state level can effect how transit services are developed and delivered.
- **Service frequency** is an important factor in attracting ridership, especially commuters, and is a significant driver of the cost to operate the service.
- **Socio-economic characteristics** such as auto ownership, income, and mobility limitations (e.g., disabilities, age).
- **Special markets** to be served, such as choice riders (i.e., people who have access to an automobile but could alternatively choose to take a transit service) as well as transit-dependent or mobility-impaired populations.
- **Technology**, known as Intelligent Transportation Systems (ITS), can be applied to encourage ridership by improving passenger comfort, security and information (i.e. GPS, traffic signal priority, electronic fare payment).
- **Topographical features**, whether natural or man-made, such as waterways or freeways can provide barriers or separate segments of the communities in the area to be served.
- **Transit agency history and goals**, including whether the agency has experience with the mode to be operated, what future service is anticipated in terms of markets served and level of service and any impacts that new service will have on an existing system.

With all of the many considerations outlined above, the next step is to better understand the transit modes themselves. Section 2.0 provides a detailed description and typical characteristics for all of the transit modes in the **Rail, Fixed Route Bus, Demand Response Bus** and **Ferry** categories.

2.0 Transit Modes

Once the transportation needs, land use characteristics and other considerations have been identified, individual transit modes should be assessed to see which can best meet local needs.

These guidelines address four broad categories of transit modes ranging from small vans serving low-density rural areas to high capacity rail systems providing quick, convenient service for commuters traveling in high-density urban areas. Many transit modes already serve Virginia today, while others may be visions for the future. All have features that should be matched to local needs and objectives.

The four transit mode categories are: **Rail**, **Fixed Route Bus**, **Demand Response Bus**, and **Ferry**. While there are a very large number of transit modes that could be organized in numerous ways, the four categories attempt to combine modes that have similar features.

Rail

Rail encompasses a number of different modes, but all are intended to provide high capacity and/or high speeds of travel. Rail modes can operate along a fixed guideway, separate from the roadways traveled by automobiles, trucks, and buses; or can operate with mixed traffic on streets depending on the type of rail. Rail systems can also utilize sophisticated technologies to manage operations.

The specific modes and service options within the rail category are as follows:

- Heavy rail
- Light rail
- Streetcar
- Commuter rail, including systems using Diesel Multiple Units (DMUs)
- Intercity rail
- Magnetic levitation
- Automated guideway transit, including
 - Monorail
 - People Mover
- Personal rapid transit

Virginia currently is served by three rail modes:

- **Heavy Rail.** Washington Metrorail is a heavy rail system serving the Washington Metropolitan Region. Three of Metrorail's five lines serve Virginia: the Orange Line with

a terminal station at Vienna/Fairfax, the Yellow Line with a terminal station at Huntington, and the Blue Line, with a terminal station at Franconia-Springfield. Twenty of Metrorail's 86 stations are located in Virginia.

- **Commuter Rail.** Virginia Railway Express (VRE) is a commuter rail system with two lines: Fredericksburg Line - serving 12 stations, and Manassas Line - serving 10 stations. Both lines have terminal stations at Union Station in Washington, DC. The system operates on privately owned freight railroad tracks and tracks owned by Amtrak. The freight railroads and Amtrak control the movement of freight and passenger trains on their tracks and Amtrak crews operate and maintain VRE's trains.
- **Intercity Rail.** Amtrak is the national intercity rail system, which operates corridor service from Boston, MA, to Richmond/Newport News, VA. Within Virginia, regional service operates over 184 miles, and includes stops at Alexandria, Franconia/Springfield, Woodbridge, Quantico, Fredericksburg, Ashland, Richmond, Williamsburg and Newport News. In addition, Amtrak's long distance trains and the North Carolina funded *Carolinian* service from the Northeast through Washington D.C. serve many communities in Virginia, as well as those of many southern states to final destinations such as Charlotte, NC, Savannah, GA, Miami, FL, New Orleans, LA. Amtrak also operates service along the Route 29 Corridor with stops in Danville, Lynchburg, Charlottesville, Culpeper, and Manassas on in to Washington, DC and service in the western part of the state that stops in Staunton and Clifton Forge.

Additionally, **Light Rail Transit** will be introduced in 2010 to the Norfolk area, with the construction of the "Tide" project, a 7.4 mile light rail system with 11 stations extending from Eastern Virginia Medical Center through downtown Norfolk to the Virginia Beach city line.

In terms of future additional rail modes that might be implemented in Virginia, **Streetcar** service is currently in the planning phase in Northern Virginia. Arlington County and Fairfax County are working to advance a 4.7-mile Columbia Pike streetcar line, connecting Pentagon City in Arlington County to the Skyline area of Fairfax County.

Fixed Route Bus

Fixed route bus service operates along designated routes with specific stops according to a fixed schedule. There are numerous bus systems throughout Virginia that operate fixed route bus services, including intercity bus operated by providers such as Greyhound, express bus, local bus, and feeder service to rail lines, as well as trolleys and circulators. The specific types of fixed route bus service covered by these guidelines are:

- Intercity bus
- Bus Rapid Transit (BRT)
- Express bus
- Local bus
- Feeder service
- Circulator shuttles

- Tourist trolleys/circulators

Virginia transit agencies offer most types of fixed route bus service, including the following:

- **Intercity bus** routes are operated by Greyhound with 24 stops in Virginia and many services extending to other states. Stops include: Amtrak Charlottesville (limited stop), Charlottesville, Danville, Emporia, Exmore, Farmville, Fredericksburg, Ft Eustis Newport News, Hampton, Lynchburg, Marion, Norfolk, Oak Hall, Petersburg, Richmond, Roanoke, South Boston, South Hill, Springfield, Suffolk, Virginia Beach, Williamsburg, Woodbridge, and Wytheville
- **Bus Rapid Transit (BRT)** systems are being considered in Virginia in the I-95/I-395 Corridor and Route 1 Corridor in Northern Virginia and the Broad Street Corridor in Richmond.
- **Express bus** services are offered in several areas of high demand, including the Richmond Highway Express operating between Fort Belvoir along the Richmond Highway to the Eisenhower and King Street Metrorail stops connecting to Washington, DC, and a service that operates in the Dulles Corridor with connections to Metrorail. Similarly, express routes operated by Hampton Roads Transit utilize high occupancy vehicle (HOV) lanes in the congested Norfolk downtown and Naval Station areas.
- **Local bus** service is operated by 16 agencies throughout Virginia, in major metropolitan areas such as Fairfax and Loudon County, as well as in smaller urban areas such as Blacksburg and Harrisonburg.
- **Feeder bus** service connects to rapid transit service operated by WMATA and VRE.
- A **circulator shuttle** operates in Reston (called RIBS) and serves the major activity centers.
- **Tourist trolleys** operate in a number of tourist locations in the state, for example during the summer along the Virginia Beach oceanfront and on Chincoteague Island.

Demand Response Bus

Demand response bus service is provided as requested by individual passengers from one location to another, either door-to-door, with the driver assisting the passenger into and out of the vehicle, or curb-to-curb, where the passenger is picked up and dropped off in front of their house, for example. There are three types of demand response services in Virginia:

- **Deviated Fixed Route.** Also known as “route deviation” or “flex route” service, this type of service is essentially fixed route service with the flexibility to go off route to provide occasional pick-ups and drop-offs. If there are not requests for deviation, the service operates as a traditional fixed route, fixed schedule service. Requests for deviations can be handled in several ways. For pick-ups off the route, riders typically call the transit office in advance with their request for deviation. For drop-offs located off the route, riders may call the transit office in advance or ask the driver upon boarding. The specific procedures for accommodating deviation requests are determined by transit providers based on policy, level and type of demand or other factors.

Deviated fixed-route service can be used to expand the potential service area of a single route in a low density area, particularly in rural areas, by allowing deviations to set a distance from the regular route to serve additional riders. It is also used by some transit providers as a way to meet ADA requirements mandating complementary paratransit service: ADA regulations consider deviated fixed-route to be “demand responsive” service and, as such, it is not subject to complementary paratransit requirements.

- **Complementary paratransit service.** This is service that is required by the Americans with Disabilities Act (ADA) and is provided for mobility impaired and other individuals who cannot use fixed route service.
- **General demand response service.** This second type of demand response service is not required by law, but may be aimed at other groups such as senior citizens or low-income or transit-dependent populations that have specific transportation needs that cannot otherwise be met (human services, doctor visits, etc.). Alternatively, it may be available to anyone, for example, in cases where it is used in place of some fixed route bus service during late night or weekend hours.

Virginia has numerous demand response services, most of which is operated consistent with ADA requirements, but also includes other demand response service such as contracted service operated in Roanoke.

The **Fixed Route Bus** and **Demand Response Bus** include different types of buses to provide the services that fall within each category. Buses can vary significantly in areas such as: average life, cost and capacity. The table below provides some of the typical vehicle characteristics and the minimum life requirements that have been established by the Federal Transit Administration.

Category	Typical Characteristics			Minimum Life (whichever comes first)	
	Length	Seats	Average Cost	Years	Miles
Heavy-Duty Large Bus	35 to 48 ft and 60 ft artic.	27 - 40	\$325,000 - \$600,000 +	12	500,000
Heavy-Duty Small Bus	30 ft	26 - 35	\$200,000 - \$325,000	10	350,000
Medium-Duty and Purpose-Built Bus	30 ft	22 - 30	\$75,000 - \$175,000	7	200,000
Light-Duty Mid-Sized Bus	25 - 35 ft	16 - 25	\$50,000 - \$65,000	5	150,000
Light-Duty Small Bus, Cutaways, and Modified Van	16 - 28 ft	10 - 22	\$30,000 - \$40,000	4	100,000

Nationwide, transit bus and van fleets are dominated by 12-year and 4-year vehicles. Of the roughly 91,000 transit buses and vans currently in service at U.S. transit operators, more than 70,000 (about 78 percent) are 12-year vehicles; about 16,500 (18 percent) are 4-year vehicles; and the remaining 5 percent are divided between the 10-year, 7-year, and 5-year vehicle categories.

Ferry

As a coastal state, Virginia operates seven **ferry** services. These include the only 24-hour ferry in the state across the James River between Jamestown and Scotland operated by the Virginia Department of Transportation (VDOT). VDOT also operates the Sunnybank Ferry across the Little Wicomico River, the Merry Point Ferry across the western end of the Corrotoman River, and the Hatton Ferry, one of the last two “poled” ferries in the United States. Other ferry services are the Elizabeth River Ferry operated by Hampton Roads Transit between Portsmouth and downtown Norfolk; passenger-only ferry service to Tangier Island; and White’s Ferry operating from Leesburg to Poolesville, MD.

2.1 Mode Characteristics

This section of the guidelines provides an overview of specific modes within each of the four transit mode categories. For each mode, a brief description is provided, along with typical physical and operating characteristics of the system based upon information from systems around the country (not Virginia specific since Virginia does not contain every type of transit) such as station spacing and frequency of the service. Typical physical and operating characteristics of each mode are presented in ranges. As for capital costs, which end of the range a local project proposal is likely to end up on is highly dependent on local circumstances and the transportation and other needs the project is intended to address. This includes information on how long the line or route might be, how far apart stations are located, and how fast service can be operated. Information also is provided about how the service might be operated, and over what periods of time and days of the week. Through this type of information about the typical characteristics of each mode, local agencies can better assess whether those features are appropriate in their own projects.

Rail

- Heavy rail
- Light rail
- Commuter rail, including systems using diesel multiple units (DMUs)
- Intercity rail
- Magnetic levitation
- Streetcar
- Automated guideway transit, including
 - Monorails
 - People movers

Heavy Rail



WMATA – Metrorail



San Francisco – BART



Metro North – New York

Description

Often referred to as metro or subway, heavy rail is an electric railway with the capacity for a heavy volume of traffic. It is characterized by high speed and rapid acceleration passenger rail cars operating in multi-car trains on fixed rails; separate rights-of-way from which all other vehicular and foot traffic are excluded; sophisticated signaling, and level platform loading.

The specific physical and operating characteristics of a heavy rail line will depend on a variety of factors, many of them unique to the area in which the line will be built and operated. For example, some lines must span rivers or other natural or manmade barriers on bridge structures, while others might need to be in a tunnel. These specific circumstances will have a substantial effect on the cost to build the line. Additionally, the length of the line might vary, depending on whether the line is entirely new to a region, or is constructed as an extension of an existing line.

Typical Characteristics

- Capital cost \$60 - \$250 million per mile
- Operating cost \$0.30 – \$0.50 per passenger mile
- Service distance 15 – 40 miles
- Station spacing 0.5 – 5 miles
- Speeds (avg/max) 30 mph/70 mph
- Service frequency 5 – 10 minutes (peak)
10 – 20 minutes (off-peak)
- Span of service 7 days per week
5:00 a.m. to 1:00 a.m. on weekdays
7:00 a.m. to 3:00 a.m. on weekends
- Car capacity 60 – 80 seated (plus standees)
- Typical loads 150 percent in peak
- Maximum capacity 9,600 passengers per hour
(8-car train, 120 pass. per car/every 6 min.)

Light Rail



Portland – MAX



Hampton Roads – The Tide

Description

Light rail involves lightweight passenger rail cars operating in short (usually one, two or three) car trains on fixed rails in right-of-way that may or may not be separated from other traffic for much of the way. Light rail vehicles are typically driven electrically with power being drawn from an overhead electric line.

Similar to heavy rail, the specific physical and operating characteristics of a light rail line will depend on a variety of factors, many of them unique to the area in which the line will be built and operated. These specific characteristics will have a substantial effect on the cost to build the line. Additionally, the length of the line might vary, depending on whether the line is entirely new to a region, or is constructed as an extension of an existing line. Light rail lines are typically shorter than heavy rail lines, and operate with more frequent stops.

Typical Characteristics

- Capital cost \$50 - \$150 million per mile
- Operating cost \$0.40 - \$0.80 per passenger mile
- Service distance 5 - 20 miles
- Station spacing 0.5 - 2 miles
- Speeds (avg/max) 20 - 25 mph/70 mph
- Service frequency 5 - 10 minutes (peak)
10 - 20 minutes (off peak)
- Span of service 7 days per week
5:00 a.m. to 1:00 a.m. on weekdays
7:00 a.m. to 1:00 a.m. on weekends
- Car capacity 32 - 60 seated (plus standees)
- Typical loads 150 percent in peak
- Maximum capacity 2,160 passengers per hour
(3-car train, 90 pass. per car/every 7.5 min.)

Commuter Rail



Maryland – MARC



Virginia – VRE



Florida – TRI-Rail

Description

Commuter rail (also called metropolitan rail, regional rail, or suburban rail) is an electric or diesel propelled railway for passenger train service providing regional travel operating between a central city and adjacent suburbs. Such rail service, using either locomotive hauled or self propelled railroad passenger cars (e.g., diesel multiple units), is generally characterized by multi-trip tickets, specific station to station fares, railroad employment practices and usually only one or two stations in a central business district.

Typical Characteristics

- Capital cost
 - \$5 - \$8 million per mile (track and systems)
 - \$15 - \$35 million per station
- Operating cost
 - \$0.30 - \$0.50 per passenger mile
- Service distance
 - 10 - 50 miles
- Station spacing
 - 5 - 10 miles
- Speeds (avg/max)
 - 25 - 40 mph/80 mph
- Service frequency
 - 20 minutes (peak)
 - 60 minutes (off peak)
- Span of service
 - 5-7 days per week
 - 5:00 a.m. to 8:00 p.m. on weekdays
 - 7:00 a.m. to 8:00 p.m. on weekends
 - (Note: may not provide weekend service)
- Car capacity
 - 90 - 140 seated (plus standees)
- Typical loads
 - 100 percent in peak
- Maximum capacity
 - 2,520 passengers per hour
 - (6-car train, 140 pass. per car/every 20 min.)

Intercity Rail



Amtrak

Description

Intercity rail refers to passenger service operated between urban areas. Amtrak was established in 1971 and is the national operator of intercity passenger rail service in the U.S. Amtrak runs about 265 trains per day to 500 stations over 22,000 route miles in 46 states, and carried more than 24 million passengers in the last year, mainly in the Northeast and on the West Coast. Amtrak directly owns roughly 730 miles of track, mostly in the Northeast corridor, while contracting with private railroads to run in the rest of the nation. In 2007, Amtrak operated 20 daily intercity trains and two tri-weekly trains in the Commonwealth.

Typical Characteristics

- Capital cost
 - \$5 - \$8 million per mile (track and systems)
 - \$15 - \$35 million per station
- Operating cost
 - \$1.28 - \$2.05 per passenger mile
- Service distance
 - varies significantly, up to hundreds of miles
- Station spacing
 - varies significantly, up to tens of miles
- Speeds (avg/max)
 - 25 - 40 mph/80 mph
- Service frequency
 - 60 minutes (peak)
 - 180 minutes (off peak)
- Span of service
 - 5-7 days per week
 - 5 a.m. to 12 p.m. on weekdays/weekends
- Car capacity
 - 90 - 140 seated
- Typical loads
 - 100 percent in peak
- Maximum capacity
 - 840 passengers per hour
 - (6-car train, 140 pass. per car/every 60 min.)

Magnetic Levitation



Shanghai Transrapid

Description

A magnetic levitation or maglev train is a form of transportation that suspends, guides, and propels trains using electromagnetic force. This method has the potential to be fast and quiet when compared to steel wheel transit systems, potentially reaching velocities comparable to turboprop and jet aircraft (600 mph). The highest recorded speed of a maglev train is 361 mph, achieved in Japan in 2003. Maglev trains are not currently operating in the U.S., although there have been some preliminary studies performed in Florida and California, as well as corridors between Atlanta and Chattanooga, Baltimore, and Washington, DC, and in Pittsburgh. Internationally, maglev has been in operation in Shanghai, China since 2004.

Because there are no U.S. maglev systems in operation, there are no reliable sources of information on typical characteristics.

Streetcar



San Francisco MUNI Streetcar



New Orleans RTA Streetcar



Portland Streetcar

Description

Streetcars are rail transit vehicles designed for local transportation, powered by electricity received from an overhead wire. Streetcar systems are in operation in such locations as New Orleans, Portland, Oregon, and Seattle. Many other localities are considering streetcar systems to support downtown circulation needs.

Several other cities, such as Memphis, Little Rock, Tampa, and Kenosha, Wisconsin operate heritage streetcars, which combine local transportation with historical nostalgia. These systems are used frequently by tourists and visitors to travel to downtown areas.

Typical Characteristics

- Capital cost \$10 - \$30 million per mile
- Operating cost \$0.50 - \$0.85 per passenger mile
- Service distance 2 - 4 miles
- Streetcar stop spacing 0.10 - 0.25 miles
- Speeds (avg/max) 8 - 12 mph/45 mph
- Service frequency 8 - 15 minutes (peak)
20 - 60 minutes (off peak)
- Span of service 7 days per week
5:00 a.m. to 1:00 a.m. on weekdays
7:00 a.m. to 1:00 a.m. on weekends
- Streetcar capacity 30 - 50 seated (plus standees)
- Typical loads 150 percent in peak
- Maximum capacity 565 passengers per hour
(75 passengers per car/every 12 minutes)

Automated Guideway Transit



Miami Metro Mover



Morgantown, WV People Mover



Detroit People Mover

Description

Automated Guideway Transit (AGT) is guided transit passenger vehicles operating with single or multi-car trains with a fully automated system (no crew). Service may be on a fixed schedule or in response to a passenger-activated call button. AGT systems are often interchangeably referred to as monorails and people movers. The majority of AGT systems usually operate as a local distribution system in an environment where there are many trips concentrated over short distances.

Typical Characteristics

- Capital cost: \$100 - \$150 million
- Operating cost: \$2.50 – \$5.50 per passenger mile
- Service distance: 2 - 10 miles
- Station spacing: 0.5 - 1.5 miles
- Speed (avg): 25 mph - 50 mph
- Service frequency: 2 - 10 minutes (peak)
3 - 15 minutes (off peak)
- Span of service: 7 days per week
5:00 a.m. to 1:00 a.m. on weekdays
7:00 a.m. to 1:00 a.m. on weekends
- Car capacity: 8 - 40 seated
- Typical loads: 150 percent in peak
- Maximum capacity: 1,200 passengers per hour
(2-car train, 60 pass. per car/every 6 min.)

Personal Rapid Transit



ULTra Personal Rapid Transit test vehicle

Description

Personal Rapid Transit (PRT) is an experimental transit technology that entails the movement of passengers using a network of slender, elevated rail and operated with a large fleet of small vehicles that operate over that rail. As conceived, a PRT system would be implemented in dense urban areas, and have many small stations, close together. Service would operate in response to passenger demand, rather than according to a fixed schedule. A journey on PRT is nonstop between any two stations in the system, with no need to transfer to another vehicle or transit mode.

PRT differs from automated guideway transit primarily in the number of passengers it intended to serve, with PRT focused more on personal mobility rather than the movement in one vehicle of larger numbers of passengers. So-called PRT systems in operation in the U.S. today serving Morgantown and West Virginia University might more appropriately be termed people movers, given their larger capacity vehicles and operating plans that run according to established schedules. A PRT system is currently in construction at London's Heathrow Airport and in Masdar, a city currently being developed in Abu Dhabi, United Arab Emirates.

A recent report on the viability of PRT in Virginia that was presented to the Governor and the General Assembly of Virginia in January 2008 concluded that PRT could theoretically have application for short trips of four to 10 track miles in urban dense areas throughout the state with land use characteristics appropriate for rail transit modes, such as urban centers and dense neighborhoods. PRT also could have application connecting activity centers, such as college campuses and nearby town centers, or as circulators in retail, employment, or entertainment centers, or college campuses. It also has potential application as an airport circulator. However, PRT is not yet ready for commercial application, and would therefore require considerable additional research and development before such service could be implemented.

Typical Characteristics

- Capital cost \$30 - \$50 million per mile
- Operating cost \$0.30 - \$0.80 per passenger mile
- Service distance 3 - 5 miles
- Station spacing 0.25 - 0.75 miles
- Speeds (avg) 25 - 50 mph
- Service frequency on demand
- Span of service 7 days per week, 24 hours per day
- Vehicle capacity 1 - 4 seated
- Typical loads 100 percent in peak
- Maximum capacity 120 passengers per hour
(4 passengers per car/every 2 minutes)

Fixed Route Bus

- Intercity bus
- Bus rapid transit (BRT)
- Express bus
- Local bus
- Feeder service
- Circulator shuttles
- Tourist trolleys

Intercity Bus



Greyhound bus and terminal

Description

Intercity bus service refers to buses operated with other traffic on streets and highways between urban areas and smaller cities and other destinations. Intercity buses are designed for high speed, long distance travel, and are equipped with front doors only, high backed seats, and usually restroom facilities. Such service is operated by private companies. Greyhound is the largest operator of intercity bus service in North American with over 3,100 routes served by a fleet of some 1,250 buses. Other smaller intercity bus operators include Peter Pan, Bonanza, and MegaBus.

Because private bus operators design their services to respond to market demands, typical characteristics will vary by operator and market. Further, these private operators do not publicly report performance data on their operations.

Bus Rapid Transit (BRT)



RTC of Southern Nevada – BRT



BRT in Kansas City



Silver Line BRT in Boston

Description

Bus Rapid Transit (BRT) is a type of limited-stop service developed in the 1990s that relies on technology to help speed up the service. It can operate on exclusive transitways, high-occupancy-vehicle lanes, expressways, or ordinary streets. A BRT line combines intelligent transportation systems technology, priority for transit, rapid and convenient fare collection, and integration with land use policy in order to substantially upgrade bus system performance. BRT was originally conceived as a less costly alternative to light rail.

BRT can utilize various vehicle types and technologies. Some systems use electric trolley buses that they are propelled by electric motors and obtain power from two overhead catenary wires along the route. Two wires are required to complete the electrical circuit, as compared to electric rail vehicles which require only one overhead wire as they complete the circuit by returning power through rails. Electric trolley buses are available as either standard trolleys approximately 40 feet in length or articulated trolleys approximately 60 feet in length. The trolley bus is steerable and needs no guideway, although the reach of its trolley poles limits its locus of movement before they become derailed.

Other BRT systems use a guided bus which can be steered for part or their entire route by some form of external trackway which parallels existing roads. The trackway is dedicated for bus use only and allows for high speed operation and reliable schedules. Small guide wheels are attached to the regular wheels of the bus. Other guided buses are steered on the roadway with guided light transit technology, which allows the bus to guide itself along the roadway following pavement marking detected by the bus.

The cost differential between LRT and BRT is primarily a function of providing the electrical power for light rail as well as the higher cost of LRT vehicles. Due to the difference in the capacity of the vehicles, BRT is likely to have somewhat higher operating costs (more vehicles would be required to provide the same passenger capacity as LRT).

Typical Characteristics

- Capital cost \$2.0 - \$10.0 million per mile for busways
\$325K - \$650K per vehicle
- Operating cost \$0.40 - \$0.65 per passenger mile
- Service distance 5 - 20 miles
- Station spacing 0.5 - 2 miles
- Speeds (avg/max) 12 - 20 mph/50 mph
- Service frequency 5 - 10 minutes (peak)
10 - 20 minutes (off peak)
- Span of service 7 days per week
5:00 a.m. to 1:00 a.m. on weekdays
8:00 a.m. to 1:00 a.m. on weekends
- Car capacity 40 - 50 seated (plus standees)
- Typical loads 150 percent in peak
- Maximum capacity 544 passengers per hour
(68 passengers per bus/every 7.5 minutes)

Express Bus



HRT MAX Express



Richmond Highway Express



Valley Metro Express

Description

Express bus service is designed to speed up longer trips, especially in major metropolitan areas during heavily-patronized peak commuting hours, by operating long distances without stopping. Examples include park-and-ride routes between suburban parking lots and the central business district that operate on freeways, and express buses on major streets that operate local service on the outlying portions of a route until a certain point and then operate non-stop to the central business district.

Express bus service typically commands higher fares than local bus service, given the longer distances traveled. Additionally, some bus services designed to serve longer commutes equip their vehicles with more passenger amenities, such as plush seats and restroom facilities.

Typical Characteristics

- Capital cost \$325K - \$600K per vehicle
- Operating cost \$0.40 - \$0.65 per passenger mile
- Service distance 10 - 20 miles
- Bus stop spacing 1 - 5 miles
- Speeds (avg/max) 15 mph/55 mph
- Service frequency 10 minutes (peak)
60 minutes (off peak)
- Span of service 5-7 days per week
4:30 a.m. to 8:00 p.m. on weekdays
8:00 a.m. to 8:00 p.m. on weekends
- Bus capacity 25 - 55 seated
- Typical loads 100 percent in peak
- Maximum capacity 330 passengers per hour
(55 passengers per bus/every 10 minutes)

Local Bus, Feeder Service, and Circulators



Alexandria DASH Bus

Description

Local bus service, which is designed for vehicles to stop every block or two along a route several miles long, is by far the most common type of bus service. When limited to a small geographic area or to short-distance trips, local service is often referred to as feeder service or circulator service. Such routes, which may have a lower fare than regular local service, may operate in a loop and connect, often at a transfer center or rail station, to major routes for travel to more far-flung destinations. Examples are office park circulator, historic district routes, transit mall shuttles, rail feeder routes, and university campus loops.

Typical Characteristics

- Capital cost
 - \$250K - \$500K per vehicle (heavy duty bus)
 - \$125K - \$250K per vehicle (light duty bus)
- Operating cost
 - \$0.50 - \$0.85 per passenger mile
- Service distance
 - 0.25 - 0.5 miles
- Bus stop spacing
 - 0.25 - 0.5 miles
- Speeds (avg/max)
 - 10- 15 mph/30 mph
- Service frequency
 - 10 - 20 minutes (peak)
 - 30 - 60 minutes (off peak)
- Span of service
 - 7 days per week
 - 5:00 a.m. to 1:00 a.m. on weekdays
 - 8:00 a.m. to 8:00 p.m. on weekends
- Bus capacity
 - 25 - 40 seated
- Typical loads
 - 150 percent in peak
- Maximum capacity
 - 240 passengers per hour
 - (60 passengers per bus/every 15 minutes)

Trolley Bus



King County Metro transit system, Seattle



San Francisco Municipal Railway

Description

Trolley bus is an electrically powered rubber-tired bus that, like circulators, serves a small geographic area or short-distance trips. Buses are propelled by a motor drawing current from overhead wires via connecting pole called a trolley from a central power source not on board the vehicle. Only four transit agencies in the U.S. use trolley buses – Boston, MA, Dayton, OH, San Francisco, CA, and Seattle, WA.

Typical Characteristics

- | | |
|---------------------|---|
| • Capital cost | \$300K - \$400K per vehicle |
| • Operating cost | \$1.00 – \$1.55 per passenger mile |
| • Service distance | 0.25 – 0.5 miles |
| • Bus stop spacing | 0.25 – 0.5 miles |
| • Speeds (avg/max) | 10- 15 mph/30 mph |
| • Service frequency | 10 - 20 minutes (peak)
30 - 60 minutes (off peak) |
| • Span of service | 7 days per week
5:00 a.m. to 1:00 a.m. on weekdays
8:00 a.m. to 8:00 p.m. on weekends |
| • Bus capacity | 25 - 40 seated |
| • Typical loads | 150 percent in peak |
| • Maximum capacity | 240 passengers per hour
(60 passengers per bus/every 15 minutes) |

Demand Response Bus

- Deviated fixed route
- Complementary paratransit service
- General demand response service

Demand Response



Arlington Transit Demand Response Vehicle



Greater Lynchburg Transit Company
Demand Response Vehicles

Description

Demand response service is typically comprised of small buses or vans operating in response to calls from passengers or their agents to the transit operator, who then dispatches a vehicle to pick up the passengers and transport them to their destinations. A demand response operation is characterized by the following: 1) the vehicles do not operate over a fixed route or on a fixed schedule except, perhaps, on a temporary basis to satisfy a special need; and 2) typically, the vehicle may be dispatched to pick up several passengers at different pick-up points before taking them to their respective destinations and may even be interrupted en route to these destinations to pick up other passengers. The following types of operations fall under the above definitions provided they are not a scheduled fixed route basis: many origins-many destinations; many origins-one destination; one origin-many destinations; and one origin-one destination.

There are several types of demand response service:

- **Complementary paratransit service** is required by law for those persons with disabilities and others not able to use fixed-route service. Generally it must operate in the same areas and during the same hours. The fare is limited to twice the fixed-route fare. Service may be provided by the fixed-route bus agency or by a completely separate agency.
- **General demand response service** is not required by law and is not subject to the restrictions imposed on complementary paratransit service. The transit agency may limit the service to certain people or it may be available to anyone. Some such services operate during the late night and weekend hours in place of fixed-route services.

Typical Characteristics

- Capital cost \$40K - \$65K per vehicle
- Operating cost \$1.25 - \$4.00 per passenger mile
- Service distance Complementary paratransit: same as fixed route; other varies by program
- Bus stop spacing not applicable
- Speeds (avg/max) 10- 15 mph/30 mph
- Service frequency as requested
- Span of service 7 days per week
5:00 a.m. to 1:00 a.m. on weekdays
8:00 a.m. to 8:00 p.m. on weekends
- Bus capacity 5 -18 seated
- Typical loads 100 percent in peak
- Maximum capacity 5 - 18 passengers per bus/van

Ferry

- Water Taxi
- Passenger Ferry
- Auto Ferry

Ferry



Hampton Roads Transit Elizabeth River Ferry



Jamestown-Scotland Ferry

Description

Ferry service refers to vessels carrying passengers and/or vehicles over a body of water, and that are generally steam or diesel-powered. Transit ferry service is provided in about 30 metropolitan areas and small cities, where offshore islands, bays, and wide rivers preclude any other type of service at a reasonable cost. In a few places, service may operate between two points on the same shore.

The type of ferry service provided by different operators can vary significantly. Some operators may provide passenger service with short trip lengths, relatively high frequencies, and a number of stops. Other ferry services may accommodate passengers, and possibly their autos, on trips with only one origin and destination. Three typical ferry services include:

- **Water Taxis:** small watercraft that typically serve short cross-waterways or waterway circulation routes;
- **Passenger Ferries:** larger vessels that have higher passenger capacity and speeds than water taxis and typically serve short- to moderate-length routes; and
- **Auto Ferries:** also known as roll-on, roll-off ferries, these ferries transport vehicles as well as passengers. They are typically used on longer routes across major bodies of water and on low-volume rural roads crossing rivers.

In a few far-northern areas, service does not operate in winter. Service may occasionally be curtailed during periods of heavy fog or severe storms for safety reasons. Ferry service is unique among public transit modes in that it is subject to U.S. Coast Guard operating and safety regulations.

Typical Characteristics

- Capital cost \$1.0 - \$10.0 million per ferry
- Operating cost \$1.00 – \$5.00 per passenger mile
- Speeds (avg) 15 – 35 knots
- Service frequency 30 minutes (peak)
60 minutes or more (off peak)
- Span of service 5 - 7 days per week
5:00 a.m. to 1:00 a.m. on weekdays
8:00 a.m. to 8:00 p.m. on weekends
- Ferry capacity 200 – 2,000 passengers
- Typical loads 100 percent in peak
- Maximum capacity 2,220 passengers per hour
(1,100 passengers per ferry/every 30 minutes)

3.0 State and Federal Investment

Both the Commonwealth of Virginia and the federal government offer grant programs to facilitate the development and implementation of new transit service. In Virginia, transit investment is guided by a ***Transit Capital and Operating Fund Sustainability and Investment Policy*** that was adopted by the Commonwealth Transportation Board in October 2008. With respect to Transit Service Design Guidelines, the policy states the following:

“Service design guidelines shall provide guidance on the actions and conditions necessary to effectively implement and operate various modes of transit service. Accordingly, service design guidelines, along with the asset management system, shall be used as part of the evaluation of transit modes and levels of service. Guidelines shall focus on matching transportation needs with project proposals, with a primary emphasis on ridership criteria established for the proposed mode. Guidelines shall help to determine if the proposed mode is the most feasible and appropriate mode for the market and operational environment, and if the proposed mode is the most cost effective option.”

This section provides a brief outline of several of the key state and federal grant programs and includes a discussion on how the Virginia Department of Rail and Public Transportation will use the Transit Service Design Guidelines to evaluate funding requests for new service. The Transit Service Design Guidelines are guidelines only and are not the sole determinant of whether or not a project will receive state funding. It is also important to note that each state and federal program mentioned has specific eligibility and program requirements that are described in detailed program application guidance documents (visit www.drpt.virginia.gov and www.fta.dot.gov for more information). Communities should consult these documents as an important step in determining the likelihood of state and/or federal investment.

3.1 STATE PROGRAMS

Urban/Small Urban/Rural Areas

Capital Assistance - This program supports costs borne by eligible recipients for public transportation capital projects including: purchase or lease of new vehicles and equipment, the rehabilitation of vehicles and equipment, the improvement or construction of transit maintenance and operations facilities, the purchase and installation of bus stop signs and shelters, the cost of debt service for major capital projects, and safety and security equipment.

Operating Assistance - This program supports providers of public transportation service in Virginia. Operating assistance funds are restricted to certain categories of public transportation operating expenses and only may be used to help support the costs for public transportation administrative expenses and the expenses for fuels, lubricants, tires, maintenance parts and supplies. State funds shall not be used to support any non-administrative labor expenses. The wages and fringe benefits of any labor related operating expenses such as vehicle operators, vehicle and non-vehicle maintenance workers, cleaners, etc. are not eligible for reimbursement.

Other ineligible expenses are labor costs associated with contracted repairs of vehicles and related equipment.

Technical Assistance - This program supports planning, management, operations, marketing, promotion, capital improvements and other related types of technical assistance to help improve or initiate public transportation or commuter assistance related services.

3.2 FEDERAL TRANSIT ADMINISTRATION PROGRAMS

Urban Area Programs

New Starts and Small Starts (5309) - The New Starts program provides funds for construction of new fixed guideway systems or extensions to existing fixed guideway systems. A fixed guideway refers to any transit service that uses exclusive or controlled rights-of-way or rails, entirely or in part. Eligible purposes are light rail, heavy rail, commuter rail, monorail, automated fixed guideway system (such as a “people mover”), or a busway/high occupancy vehicle (HOV) facility, or an extension of any of these. Projects become candidates for funding under this program by successfully completing the appropriate steps in the major capital investment planning and project development process.

Large Urban Cities (5307) – This program makes Federal resources available to urbanized areas and to Governors for transit capital and operating assistance in urbanized areas and for transportation related planning. An urbanized area is an incorporated area with a population of 50,000 or more that is designated as such by the U.S. Department of Commerce, Bureau of the Census.

Eligible purposes include planning, engineering design and evaluation of transit projects and other technical transportation-related studies; capital investments in bus and bus-related activities such as replacement of buses, overhaul of buses, rebuilding of buses, crime prevention and security equipment and construction of maintenance and passenger facilities; and capital investments in new and existing fixed guideway systems including rolling stock, overhaul and rebuilding of vehicles, track, signals, communications, and computer hardware and software. All preventive maintenance and some Americans with Disabilities Act complementary paratransit service costs are considered capital costs.

For urbanized areas with 200,000 population and over, funds are apportioned and flow directly to a designated recipient selected locally to apply for and receive Federal funds. For urbanized areas under 200,000 in population, the funds are apportioned to the Governor of each state for distribution. A few areas under 200,000 in population have been designated as transportation management areas and receive apportionments directly.

For urbanized areas with populations of 200,000 or more, operating assistance is not an eligible expense. In these areas, at least one percent of the funding apportioned to each area must be used for transit enhancement activities such as historic preservation, landscaping, public art, pedestrian access, bicycle access, and enhanced access for persons with disabilities.

Rail and Fixed Guideway Modernization (5309) - A “fixed guideway” refers to any transit service that uses exclusive or controlled rights-of-way or rails, entirely or in part. The term includes heavy rail, commuter rail, light rail, monorail, trolleybus, aerial tramway, inclined plane, cable car, automated guideway transit, ferryboats, that portion of motor bus service operated on exclusive or controlled rights-of-way, and high-occupancy-vehicle (HOV) lanes.

Eligible purposes are capital projects to modernize or improve existing fixed guideway systems, including purchase and rehabilitation of rolling stock, track, line equipment, structures, signals and communications, power equipment and substations, passenger stations and terminals, security equipment and systems, maintenance facilities and equipment, operational support equipment including computer hardware and software, system extensions, and preventive maintenance.

Funds are allocated by a statutory formula to urbanized areas with rail systems that have been in operation for at least seven years.

Bus and Bus Facilities (5309) - Eligible capital projects include the purchasing of buses for fleet and service expansion, bus maintenance and administrative facilities, transfer facilities, bus malls, transportation centers, intermodal terminals, park-and-ride stations, acquisition of replacement vehicles, bus rebuilds, bus preventive maintenance, passenger amenities such as passenger shelters and bus stop signs, accessory and miscellaneous equipment such as mobile radio units, supervisory vehicles, fare boxes, computers and shop and garage equipment.

Alternatives Analysis (5339) - The objective of the Alternatives Analysis program is to assist in financing the evaluation of all reasonable modal and multimodal alternatives and general alignment options for identified transportation needs in a particular, broadly defined travel corridor. The transportation planning process of Alternatives Analysis:

- Includes an assessment of a wide range of public transportation or multimodal alternatives, which will address transportation problems within a corridor or subarea;
- Provides ample information to enable the Secretary to make the findings of project justification and local financial commitment;
- Supports the selection of a locally preferred alternative; and
- Enables the local Metropolitan Planning Organization to adopt the locally preferred alternative as part of the long-range transportation plan.

Funds may be used to assist state and local governmental authorities in conducting alternatives analyses when at least one of the alternatives is a new fixed guideway system or an extension to an existing fixed guideway system.

Rural and Small Urban Area Programs

Rural and Small Urban Areas (5311) - The goals of the non-urbanized formula program are: 1) to enhance the access of people in non-urbanized areas to health care, shopping, education, employment, public services, and recreation; 2) to assist in the maintenance, development, improvement, and use of public transportation systems in rural and small urban areas; 3) to encourage and facilitate the most efficient use of all federal funds used to provide passenger transportation in non-urbanized areas through the coordination of programs and services; 4) to assist in the development and support of intercity bus transportation; and 5) to provide for the

participation of private transportation providers in non-urbanized transportation to the maximum extent feasible.

3.3 Evaluating Requests for New Services

Grant applications are submitted to the Virginia Department of Rail and Public Transportation once a year for the state and federal programs that the Department is charged with administering. For details on the application period and the programs that are available, visit: www.drpt.virginia.gov.

Requests to the Department to fund new service may come through the Capital Program, Operating Program, Technical Assistance Program or the Federal Transit Administration's Rural and Small Urban Area Program (administered through the Department) depending on where the proposed project for new service is in the project development process and the eligible uses of funds for each program. Requests to the Federal Transit Administration for new service can come through the New Starts and Small Starts Program, Bus and Bus Facilities Program, and Alternatives Analysis Program. Again, this depends on where the proposed project for new service is in the project development process and the eligible uses of funds for each program.

Prior to submitting any application under any program administered by the Department for new service, eligible recipients must first conduct an appropriate level of planning to justify their application. Below is an outline of the requirements for each program:

Technical Assistance Program requests that are seeking planning funds to analyze the potential for new service must include a narrative explanation demonstrating the need for new service and how the applicant expects the service to improve mobility, improve the environment, improve operating efficiencies, and coordinate with local land use. If applicants have an existing transit system, the applicant must also have completed a Transit Development Plan within the last three years. If the applicant has a Transit Development Plan that has not been updated within the last three years or has not done a Transit Development Plan, the Department will request that the applicant complete one in accordance with the Department's Transit Development Plan Guidelines. The necessary planning for new service can be completed as part of this effort.

The Department will evaluate the narrative submitted by the applicant for consistency with the Transit Service Design Guidelines. Specifically, the Department will evaluate the extent to which the applicant addresses Sections 1.2 – 1.7 of the guidelines. While the applicant does not have to specify a specific transit mode for the new service for Technical Assistance Program applications, the applicant should indicate which modes they want to consider. The selection of modes should be consistent with the typical characteristics identified in Section 2.0 of the guidelines.

Capital Program requests that are seeking capital funds for new service must be supported by a Transit Development Plan that specifically addresses the proposed new service and/or any planning documents completed to meet federal requirements for advancing new service. The planning documentation must demonstrate the evaluation of modes for the proposed new service and provide detailed information on: anticipated mobility improvements, environmental benefits, operating efficiencies, land use coordination and capital and operating finances. The applicant must also demonstrate project readiness in terms of: meeting metropolitan planning

and programming requirements, technical capacity to manage the project and environmental approvals.

The Department will evaluate the request for proposed new service for consistency with the Transit Service Design Guidelines. The Department will evaluate the extent to which the applicant addresses Section 1.2 – 1.7 and Section 2.0 of the guidelines.

Operating Program requests that are seeking operating funds for new service must follow the same requirements set out above for the Capital Program and will be evaluated in the same manner.

Rural and Small Urban Areas (5311) requests are submitted to the Department as the designated administrator of these funds on behalf of the Federal Transit Administration. Applicants must provide the same level of information as required for the Capital and Operating Programs. The Department will evaluate requests in the same manner.

In all cases, it is important that applicants carefully read the detailed program application guidance to fully understand the data requirements for the program application, the percentage share of state money that may be invested for a new service under the program, how the state share is calculated and a definition of eligible expenses.

4.0 For More Information

The Department of Rail and Public Transportation is available to assist communities with any questions they have about the Transit Service Design Guidelines, transit planning, and state and federal grant programs. Questions should be directed to:

Mr. Corey W. Hill
Chief of Public Transportation
Department of Rail and Public Transportation
1313 E. Main Street, Suite 300
Richmond, Virginia 23219
804-786-4440

Mr. Darrel M. Feasel
Manager of Transit Programs
Department of Rail and Public Transportation
1313 E. Main Street, Suite 300
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Ms. Amy Inman
Planning and Project Manager
Department of Rail and Public Transportation
1313 E. Main Street, Suite 300
Richmond, Virginia 23219
804-786-4440

Additional information on transit and transportation demand management is also available on the following websites:

Virginia Department of Rail and Public Transportation – www.drpt.virginia.gov

Federal Transit Administration – www.fta.dot.gov

Community Transportation Association of Virginia – www.ctav.org

Virginia Transit Association – www.vatransit.com

American Public Transportation Association – www.apta.com

Association for Commuter Transportation – www.actweb.org

The Urban Land Institute – www.uli.org