ALEXANDRIA TRANSIT DEVELOPMENT PLAN FY 2017 - FY 2022

November 2016

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Chapter 1
Overview of the Transit System

1.0 INTRODUCTION

The Virginia Department of Rail and Public Transportation (DRPT) requires that all transit agencies in the Commonwealth receiving state funding complete a Transit Development Plan (TDP) every six years. This document is the first full TDP for the City of Alexandria and includes an operating and capital needs assessment for local DASH fixed route service, the Washington Metropolitan Area Transit Authority (WMATA) Metrorail and Metrobus service within Alexandria, as well as other public transit entities operating in the City.

The purpose of a TDP is to improve the efficiency and effectiveness of public transportation service. It serves as a management and policy document for the transit operator that would maximize the investment of public funds, achieve the greatest possible public benefit, and provide the basis for inclusion of an operator's capital and operating programs in state and local planning documents. The TDP once completed must be adopted by the transit agency's governing body and an annual update letter submitted every year prior to the grant application being reviewed by DRPT.

1.1 Overview of Alexandria Population and Employment

Alexandria, Virginia is an incorporated city located in northern Virginia across the Potomac River from Washington, D.C. The City is bounded on the south and west by Fairfax County, on the north by Arlington County and the east by the Potomac River. According to the 2010 U.S. Census, the City's population was 139,866, a 9.11% increase from 2000. The 2010 population in the central jurisdictions (Washington, D.C., Arlington County and the City of Alexandria) and inner suburbs (Cities of Rockville and Gaithersburg in Montgomery County, Prince George's County, Fairfax County, and the Cities of Fairfax and Falls Church) of the Washington, D.C. region was 3.9 million[1]. The City is densely populated with 9,077 persons per square mile. Based on Metropolitan Washington Council of Governments (MWCOG) projections, City population is forecasted to be 158,102 in 2020, an increase of 13% relative to 2010; in contrast, the central jurisdictions and inner suburbs of the Washington, D.C. region are projected to grow at a rate of 9.4% to approximately 4.3 million in 2020.

Alexandria is also an important employment center within the Washington region, with 110,248 jobs based on the 2015 MWCOG population and employment forecasts; the central jurisdictions and inner suburbs of the Washington, D.C. region had 2.8 million jobs in 2015. Employment concentrations within the City include Old Town, Mark Center, and the Eisenhower Avenue corridor. Projected employment in the City in 2020 is 116,812, an increase of 5.95% from 2015; jobs in the central jurisdictions and inner suburbs of the Washington, D.C. region are projected to grow by 7.3% to 2.95 million in 2020.

2.0 Alexandria Transit Providers

Public transportation within Alexandria is provided through a number of different public and private operators. Each element of the overall provision of public transportation within the City is summarized below.

2.1 Alexandria Transit Company (DASH)

DASH provides fixed route transit within the City of Alexandria, generally focused on local trips to destinations inside the City, but also provides commuter trips to the Pentagon – a major regional

[1] *MWCOG - Final Round 8.3 Summary Tables*

employment center. According to the Alexandria Transit (DASH) Comprehensive Operational Analysis (completed in 2014), DASH generates approximately 12,900 daily boardings on an average weekday. The DASH service complements Metrobus service running in the City, which is focused more on regional and inter-jurisdictional trip connections. The impetus for the original development of the DASH system by the City of Alexandria was to provide transit service to portions of the City that were not being effectively served by Metrobus (service began in March 1984 and the system has gradually expanded over the years since implementation). DASH fixed route service consists of ten fixed routes which run predominantly in an east-west direction toward Old Town Alexandria (there is one crosstown route that does not serve Old Town but rather runs between the growing Potomac Yard area of the City and Mark Center, located in the western portion of the City). DASH also operates the King Street Trolley, which connects the King Street Metrorail Station and the Waterfront.

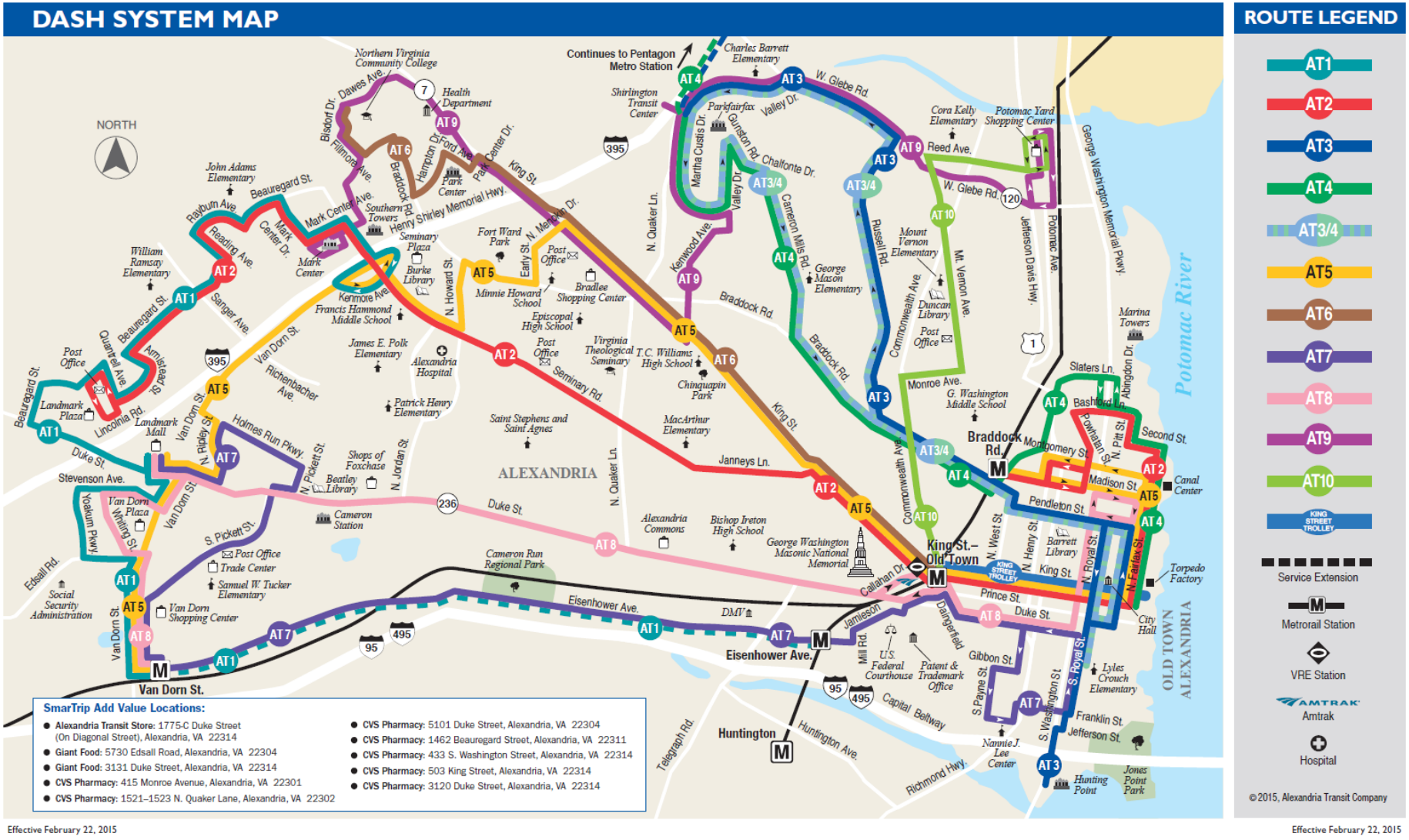
Seven of the ten routes run seven days per week. One route runs six days a week, but not on Sunday, and two routes run only on weekdays. Weekday starting times for DASH routes range between 5:05 AM and 6:37 AM, and weekday ending times range between 7:25 PM and 12:15 AM. Saturday starting times range between 6:25 AM and 8:28 AM. Saturday ending times range between 7:38 PM and 11:29 PM. Sunday starting times range between 6:52 AM and 9:10 AM and Sunday ending times range between 6:16 PM and 11:05 PM.

Weekday DASH peak period headways range from 10 minutes to 30 minutes while weekday mid-day headways range from 30 minutes to 60 minutes. DASH Saturday headways range from 30 to 60 minutes and on Sunday one route has a 30 minute headway while all of the other routes run at 60 minute headways.

The DASH route system is shown in Figure 1.1.

A more detailed summary of DASH service is provided in Appendix A.

Figure 1.1 – DASH Routes



2.2 DOT Paratransit Program

The Americans with Disabilities Act of 1990 (ADA) requires public entities operating fixed route transportation systems to provide comparable complementary paratransit services to people with disabilities. The DOT Paratransit program is the City's specialized transportation service for Alexandria residents who cannot use regular fixed route transit due to a disability. DOT will provide service to eligible city residents with destinations in the City of Alexandria, the City of Falls Church, Arlington County, Fairfax City, and Fairfax County. Trips for Alexandria residents wishing to make a trip outside these jurisdictions would be required to use MetroAccess service. 55,291 DOT Paratransit trips originated in Alexandria in FY 2014; this translates to approximately 152 trips per day. Trips are provided by taxicabs and wheelchair accessible vans. DOT operates seven days per week. Hours of service by day of week are summarized below and are coordinated with operating hours for the regional Metrorail service:

- Monday – Thursday 5:30 AM to Midnight
- Friday 5:30 AM to 3:00 AM
- Saturday 5:30 AM to 3:00 AM
- Sunday 7:00 AM to Midnight

2.3 Metrobus

Metrobus is the regional transit provider within the Washington D.C. metropolitan area and is focused on providing regional and inter-jurisdictional transit trips, including providing access to Metrorail stations. Metrobus operates 15 lines that run at least partially within Alexandria; the average daily boardings within Alexandria on these 15 routes was 11,700 in 2014. Of these 15 lines, nine operate seven days per week while six operate only on weekdays. Weekday starting times on Metrobus services ranges between 4:30 AM and 6:50 AM and weekday Metrobus ending times range between 5:48 PM and 3:30 AM. Saturday start times range between 4:48 AM and 7:40 AM and Saturday ending times range between 8:10 PM and 3:30 AM. Sunday start times range between 4:50 AM and 8:04 AM. The range in weekday service frequencies is between 6 minutes and 60-70 minutes. The range on Saturday is between 20 and 60-70 minutes while the Sunday range is 20 to 60 minutes. The Metrobus network within Alexandria is shown in Figure 1.2 and these routes in Alexandria at a regional level are shown in Figure 1.3. A summary of Metrobus service within Alexandria is provided in Appendix A.

2.4 Metrorail

Metrorail is the regional heavy rail system providing service throughout the region, including in the Maryland counties of Prince George's and Montgomery, the District of Columbia, and the northern Virginia jurisdictions of Fairfax County, Arlington and Alexandria. Alexandria is served by two Metrorail Lines, the Yellow and Blue. There are four stations within the City (See Figure 1.3). Two of these, Braddock Road and King Street are served by both the Blue and Yellow Lines. Eisenhower Avenue Station is the southernmost station in Alexandria on the Yellow Line and Van Dorn Street is westernmost within the City on the Blue Line. Average weekday boardings in 2014 were 4,631 at Braddock Road; 9,170 at King Street; 1,919 at Eisenhower Avenue; and 3,374 at Van Dorn Street[2].

[2] http://www.wmata.com/pdfs/planning/2014%2010%20Year%20Historical%20Rail%20Ridership.pdf, *accessed on March 16, 2015*

Generally, Metrorail operates Monday through Thursday between the hours of 5:30 AM and midnight, on Fridays between 5:30 AM and 3:00 AM, on Saturdays between 7:00 AM and 3:00 AM, and on Sundays between 7:00 AM and midnight.

Figure 1.2 – Metrobus Lines within Alexandria

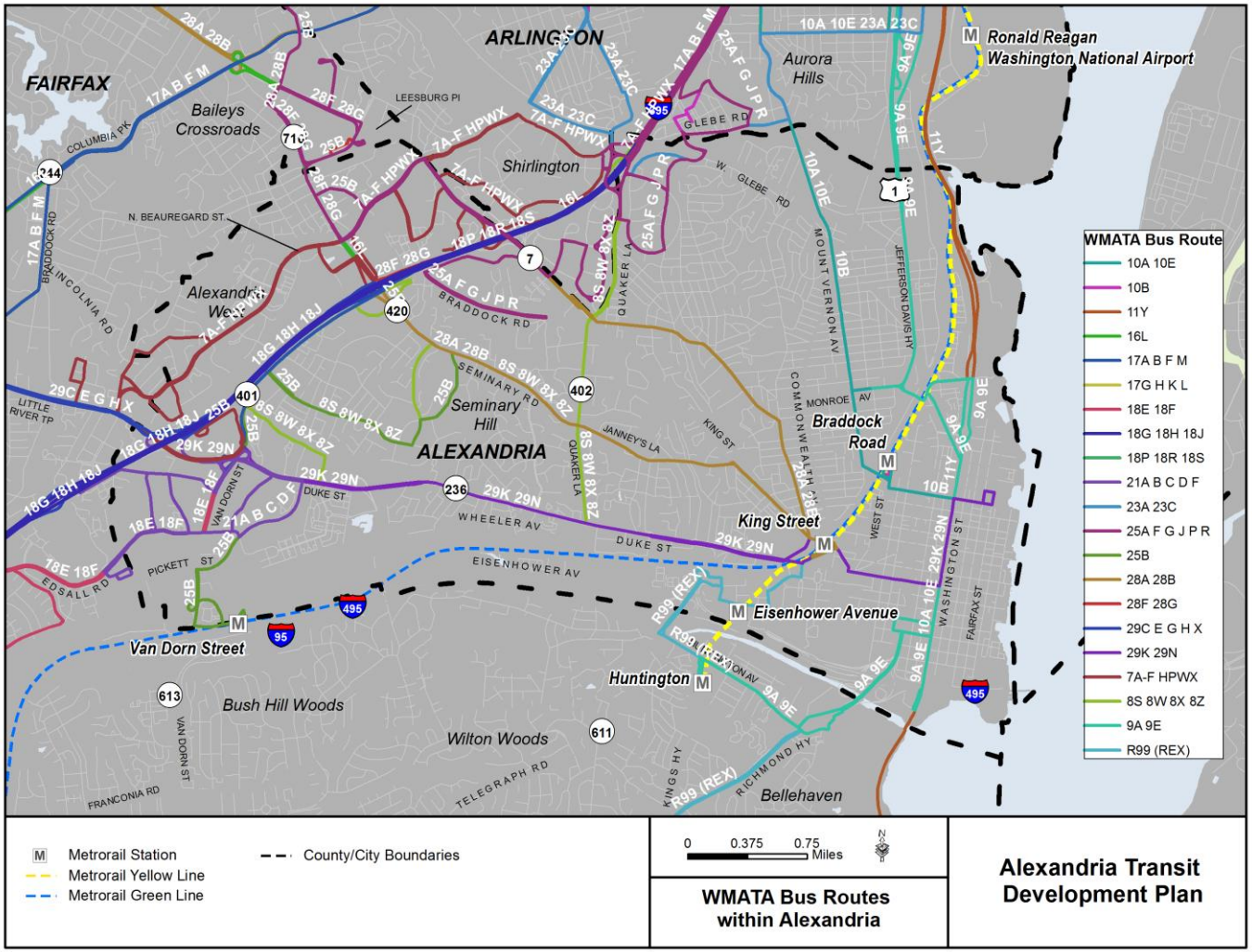


Figure 1.3 – Metrobus Lines Running in Alexandria – Regional Level

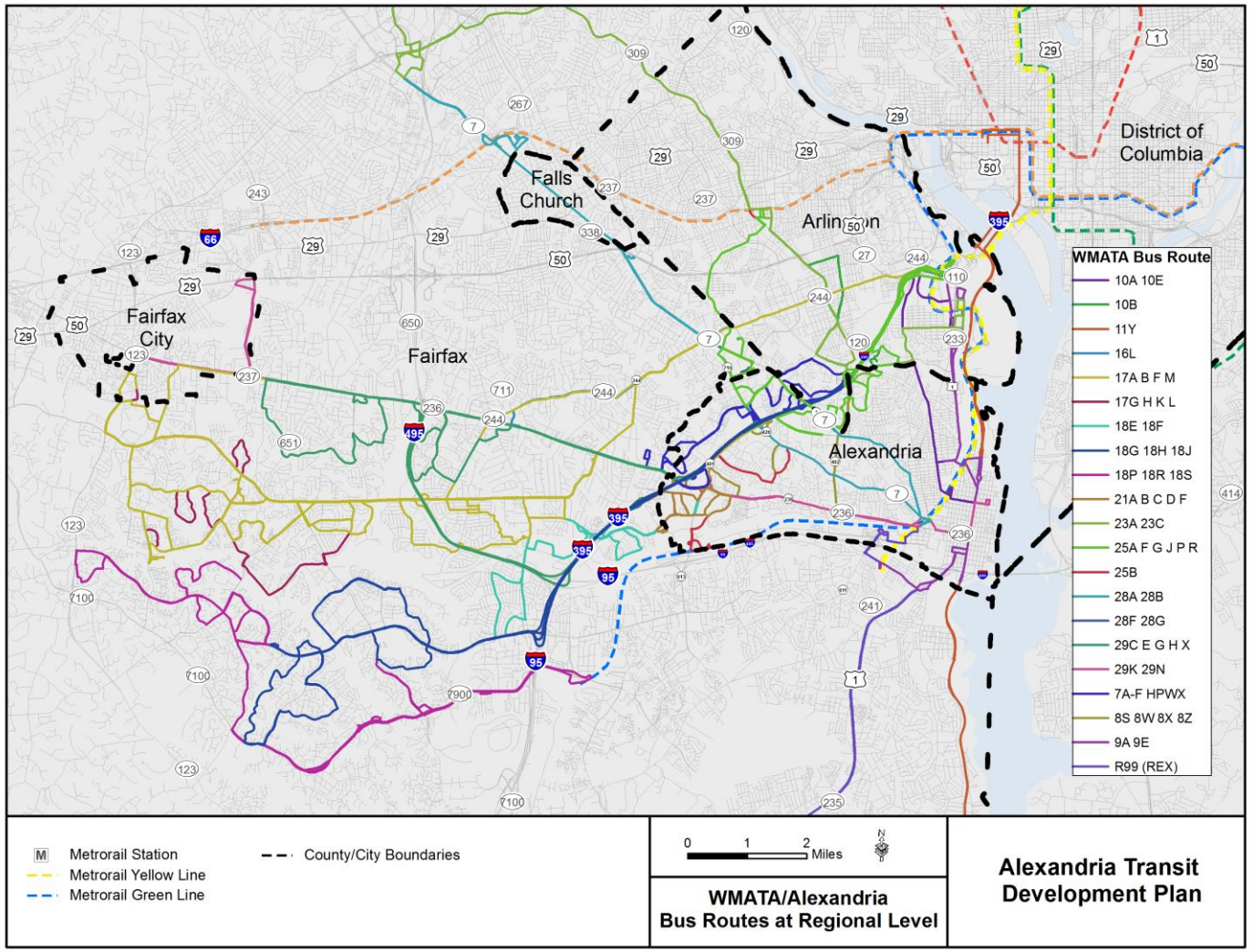
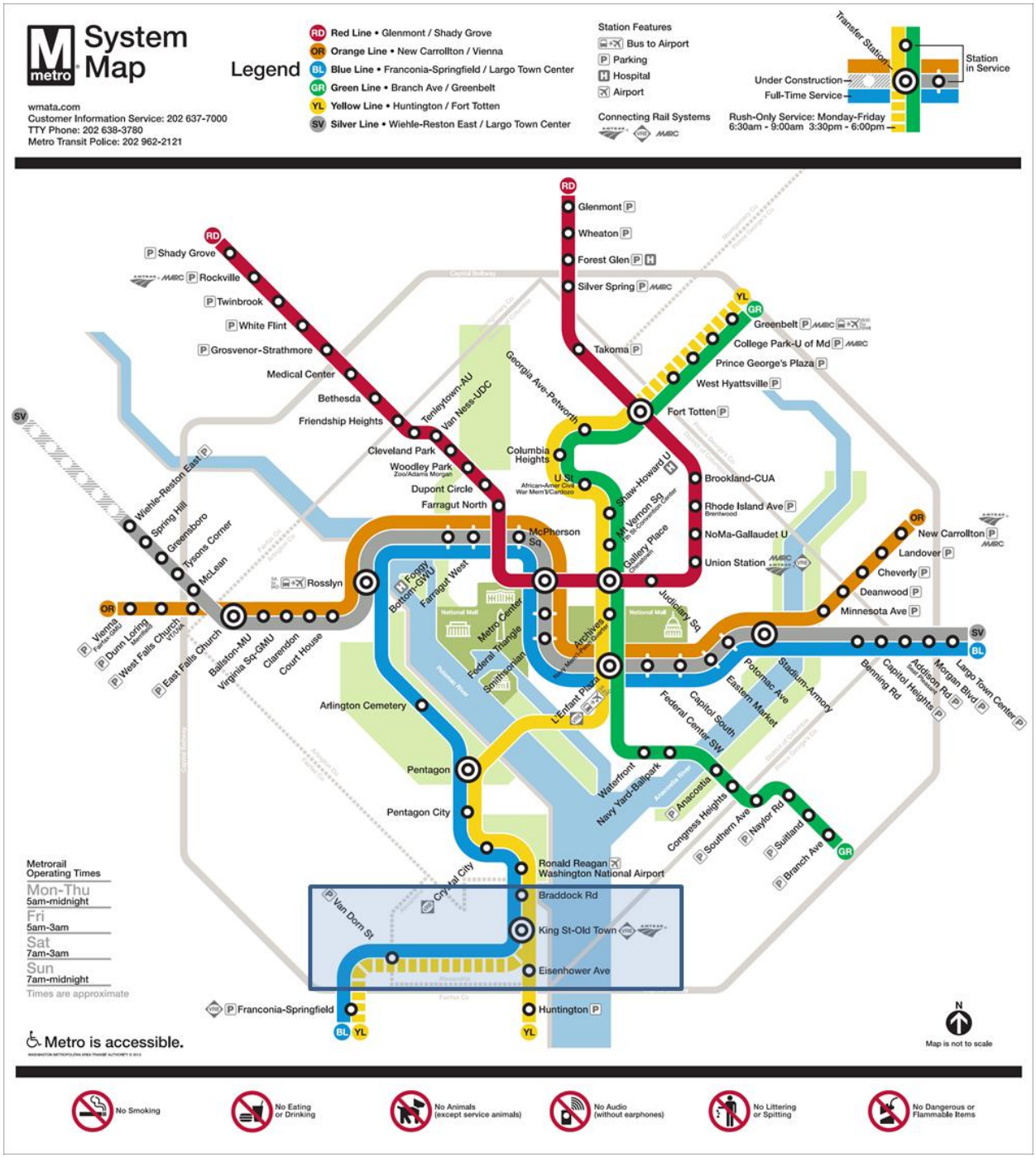


Figure 1.4 – WMATA Metrorail System Map and Alexandria Stations



2.5 MetroAccess

MetroAccess is a regional paratransit service provider for persons with disabilities. The service is part of WMATA and complements Metrorail, Metrobus, and local bus services throughout the region. MetroAccess is available to riders who meet specific disability criteria as outlined in the Americans with Disabilities Act (ADA) and who have been certified as eligible for MetroAccess service. Unlike DOT Paratransit that operates in Northern Virginia only, MetroAccess provides service in all jurisdictions comprising the WMATA service area. Ridership on MetroAccess in Alexandria is much lower than DOT Paratransit; in February 2015 (most recent data), there were approximately 1,550 trips scheduled by MetroAccess in Alexandria for an average of 50 weekday trips.

MetroAccess core hours of service reflect the same hours of operation as WMATA Metrorail operations: Monday through Thursday: 5:00 AM to midnight; Friday: 5:00 AM to 3:00 AM; Saturday: 7:00 AM to 3:00 AM; Sunday: 7:00 AM to midnight.

MetroAccess fares are two times the fastest comparable fixed-route fare, with a maximum fare of $6.50 per one-way trip.[3]

2.6 Virginia Railway Express (VRE)

VRE is a commuter rail service connecting northern Virginia and Washington D.C. VRE is operated under a partnership of the Northern Virginia Transportation Commission (NVTC) and the Potomac Rappahannock Transportation Commission (PRTC). Service is provided on two lines, Fredericksburg to Washington D.C. and Manassas to Washington D.C. Trains on both lines serve Alexandria Union Station, which is located adjacent to the King Street - Old Town Metrorail Station. There are seven northbound trips and seven southbound trips on the Fredericksburg Line that stop at Alexandria Union Station while there are eight northbound and eight southbound trips on the Manassas Line stopping at the station. Service is predominantly peak period, peak direction.

2.7 Amtrak

Regional Amtrak trains running to and from Richmond as well long-distance trains running to and from points south of Richmond stop at Alexandria Union Station and thus provide an alternative method for passengers accessing Washington D.C. There are eight daily northbound Amtrak trips stopping in Alexandria and 10 southbound trips. Alexandria may also be served by Washington D.C. to Richmond High Speed Rail line, which is a DRPT project. Scoping meetings for the project were held in November and December 2014.

2.8 Access to Transit/Non-Auto Mobility Options

In addition to the public transit providers outlined above, Alexandria has developed a focus on other public transportation modes within the city in order to enhance the mobility of city residents. These are summarized below:

- Pedestrian Facilities – Alexandria is high-density urban environment with sidewalks on nearly all of its streets. This extensive sidewalk network greatly enhances mobility for city

[3] http://www.wmata.com/about_metro/docs/Tariff_33v2_Effective_070114.pdf, accessed on April 15, 2015

residents and provides a viable option for accessing the full range of transit services and other activities within the City.

- Bicycle Facilities – Alexandria has an extensive on-street and off-street bike lane/bike path network that covers a significant portion of the city. This network complements the city's pedestrian network and enhances mobility for city residents. The City has 16 Capital Bikeshare stations and also has bike storage facilities at each of its Metrorail stations.

- Ridesharing/Carpooling – Commuter Connections is a regional network of D.C. area transportation agencies that is coordinated by the Metropolitan Washington Council of Governments (MWCOG). One of the roles of Commuter Connections is to act as a clearing house for people wishing to carpool. Commuter Connections also operates the regional Guaranteed Ride Home program. The City of Alexandria also operates a Transportation Demand Management (TDM) program called Local Motion and is a member of the Commuter Connections network. Local Motion provides information about TDM, telework, transit, bike share, carpools and vanpools to commuters driving to and from and residents travelling within Alexandria.

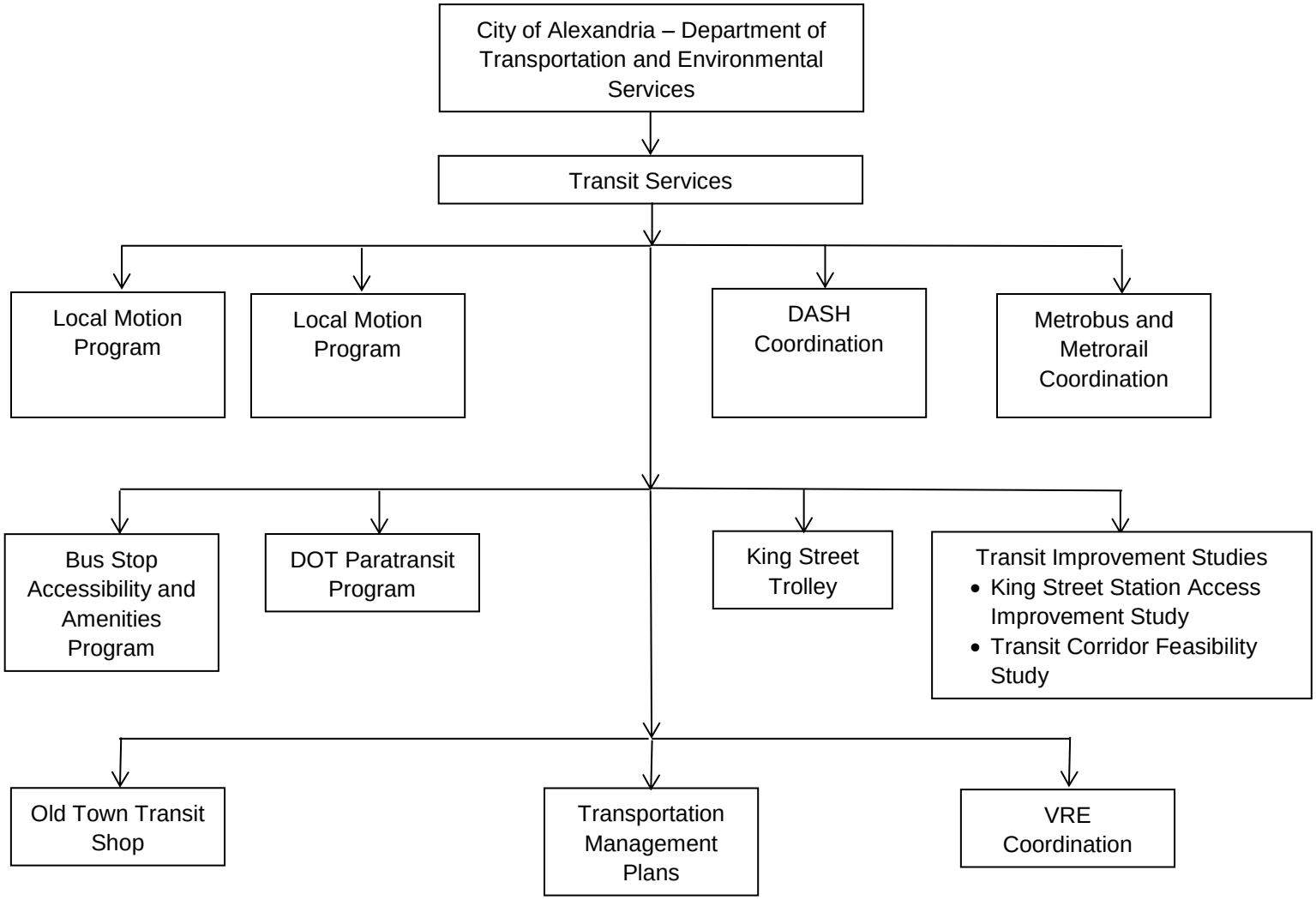
3.0 Organizational and Governance Structure

This section outlines the organizational structure of the City of Alexandria Department of Transportation and Environmental Services, DASH, the local public transit provider and DOT, the city's paratransit provider. This section also provides an understanding of the interactions between the City of Alexandria and other regional entities in terms of the flow of transit capital and operating assistance from the Commonwealth of Virginia and the flow of funds to WMATA to cover the costs of their operations within Alexandria.

3.1 Department of Transportation and Environmental Services (City of Alexandria)

The Transit Services Division of the City of Alexandria's Department of Transportation and Environmental Services (T&ES), coordinates the Alexandria DASH bus service, DOT paratransit for the mobility impaired, Metrobus and Metrorail service, as well as ridesharing to promote the formation of car and vanpools, VRE commuter rail, bus stop amenities, and other programs designed to increase the use of alternatives to the single occupant vehicle and to protect the environment. The Transit Services Division also coordinates with the Transportation Planning Division within T&ES to improve mobility throughout the City. A Transit Services Division responsibility chart is shown in Figure 1.5.

Figure 1.5 - Department of Transportation and Environmental Services – Transit Services Division – Responsibility Chart



3.2 DASH

The DASH organizational structure is relatively unique within Virginia, with only a few other transit systems in the state structured in the same manner. The Alexandria Transit Company (ATC), the entity that operates the DASH system, is a separate public service corporation that is wholly owned by the City of Alexandria. The ATC Board of Directors is elected by the Alexandria City Council, serving in the capacity of ATC's stockholders. The ATC Board of Directors is composed of nine members, and includes six citizen members and three city officials. Sandy Modell, the DASH General Manager, is the sole ATC employee and reports - and is the principal transit advisor - to the Board of Directors.

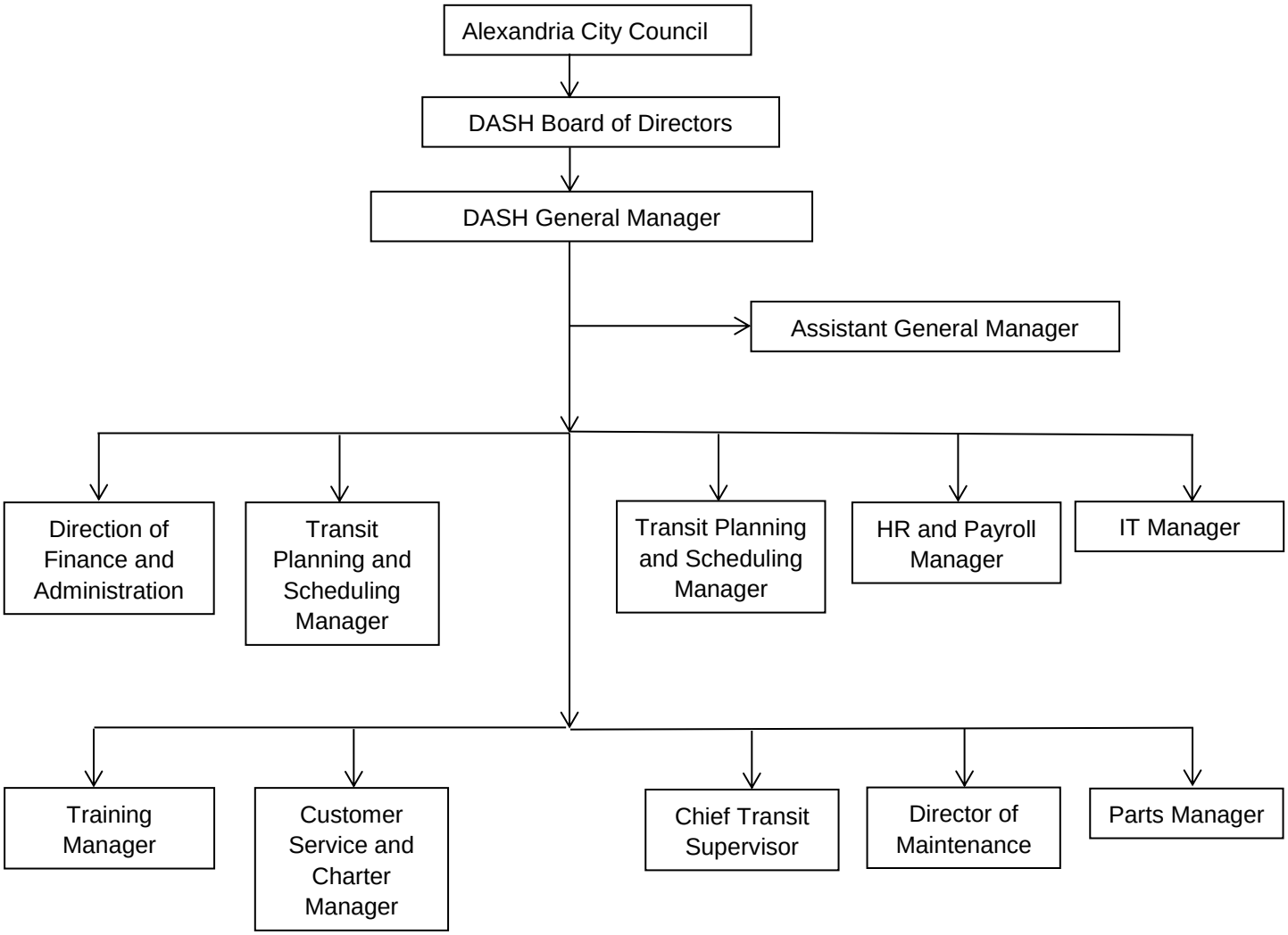
The ATC also has a management services contract with First Transit Inc. First Transit augments ATC staffing and provides an Assistant General Manager of Administration. This position assists the General Manager in a number of major project areas, including the ATC real-time bus information initiative, information technology, and grant projects. As needed, First Transit also provides technical assistance and bus line inspections, and also provides buying power through First Transit's National accounts for tires, filters, and a variety of parts and materials.

The remainder of the ATC employees are employed by Transit Management of Alexandria Inc., which is a subsidiary of First Transit. These employees are, however, not First Transit employees. Rather, Transit Management of Alexandria was set up as a subsidiary of First Transit when ATC was first developed for the purpose of providing an entity for collective bargaining, mirroring the organizational structure successfully in use in Richmond, Roanoke, and Lynchburg.

The DASH headquarters building and maintenance facility is owned by the City of Alexandria and was funded with DRPT assistance. The assets within the building such as vehicle lifts, the revenue vehicle fleet, and the maintenance fleet are owned by ATC.

A DASH organization chart is shown in Figure 1.6 below.

Figure 1.6 - DASH Organization Chart



3.3 DOT Paratransit Program

DOT is the City of Alexandria-supported paratransit service for Alexandria residents who are eligible to receive ADA paratransit services. DOT is a complementary service to DASH, for riders unable to utilize DASH buses, with the DOT pickup area incorporating all areas of the City within ¾ of mile of a DASH route. Riders can utilize the service for trips to destinations within the City of Alexandria, the City of Falls Church, Arlington County, Fairfax County and Fairfax City (trips to destinations outside these jurisdictions are provided by the WMATA MetroAccess service). The service is managed by City of Alexandria Department of Transportation and Environment staff and is funded by the City of Alexandria. Trips are provided by taxicabs and wheelchair accessible vans and are scheduled on an advance reservation basis (reservations must be made at least one day in advance). City staff is responsible for managing the contracts with the private sector service providers. The providers are responsible for developing daily trip manifests and dispatching vehicles to provide service.

3.4 Washington Metropolitan Area Transit Authority (WMATA)

WMATA is a regional agency providing Metrobus, Metrorail, and Metro Access service in the northern Virginia jurisdictions of Fairfax County, Arlington County, Loudon County, City of Fairfax, and the City of Falls Church. It also provides service in the District of Columbia, and Prince George's and Montgomery Counties in Maryland. WMATA is governed by the "WMATA Compact", which is an agreement between the District of Columbia, the State of Maryland, and the Commonwealth of Virginia to "*plan, develop, finance, and cause to be operated improved transit facilities, in coordination with transportation and general development planning for the Transit Zone (WMATA service area) as part of a balanced regional system of transportation…..".* WMATA manages the daily operation of the Metrobus and Metrorail services that run through Alexandria and also manages the Metro Access service providing mobility for trips outside the DOT service area.

WMATA day-to-day operations are overseen by the WMATA General Manager. Reporting to the General Manager are:

- Chief of Safety
- Deputy General Manager – Operations
- Chief of the Metro Transit Police
- General Counsel
- Deputy General Manager – Administration/Chief Financial Officer
- Assistant General Manager – Bus Services
- Assistant General Manager – Customer Service, Communications, and Marketing
- Chief – Human Resources
- Chief of Staff
- Assistant General Manager/Chief Information Officer – Information Technology

The General Manager reports to the WMATA Board of Directors, which determines agency policy and provides oversight for funding. The Board of Directors is composed of eight voting members and eight alternate members. Maryland, the District of Columbia, Virginia, and the federal government each appoint two voting and two alternate directors.

4.0 Funding Structure

The first source of funding to cover required operating subsidies for DASH, DOT, and the King Street Trolley services is the City of Alexandria General Fund, which in turn relies on funding from City tax revenues and the City's Transportation Improvement Program. This funding is a direct transfer from the City to each of the operating entities and is identified based on consultation between staff from DASH, the Department of Transportation and Environmental Services, and the Office of Management and Budget. This General Fund contribution covers the majority of the required operating subsidy funding for each operating entity.

The City of Alexandria also provides capital funding, through its Capital Improvement Program (CIP), for DASH to cover capital items such as bus replacement, new buses for service expansion, and the purchase and installation of improvements such as Automatic Vehicle Location, enhanced passenger information capabilities, Computer Aided Dispatch (CAD), and Automated Passenger Counters (APC). The CIP also includes funding for other transit facilities within the City such as bus stop improvements and improvements at the Metrorail stations located within the City.

The second source of funding for operating subsidies for DASH, DOT, and the King Street Trolley is the Commonwealth of Virginia. These funds come through the Northern Virginia Transportation Commission (NVTC), which is the conduit for operating and capital assistance from the Commonwealth of Virginia and the Federal Transit Administration (FTA) to the local Alexandria operators, as well as to WMATA. By law the maximum state subsidy to local transit agencies is 95% of eligible operating expenses (eligible expenses include administrative expenses, fuel, tires, and maintenance expenses but not eligible are salaries, wages, and fringe benefits of vehicle operators, mechanics, on-vehicle maintenance workers and cleaners). Historically, however, the Operating Assistance Program covers between 35% and 50% of expenses. DRPT, which manages the state funding programs for transit, began implementing a performance-based operating fund allocation in FY14. Under this system, operating assistance is not allocated solely on a local system's total annual operating cost; rather it also takes into consideration system performance. Performance metrics include net cost per rider, customers per revenue hour, and customers per revenue mile. Performance-based funding applies to statewide operating assistance above $160 million. In FY15, the amount was $53.6 million and Alexandria/DASH's share was $1.07 million.

Capital assistance from the Commonwealth, which is also disbursed through the NVTC to transit agencies in northern Virginia, is available based on projects that are categorized into one of three tiers:

- Tier 1 – replacement and rehabilitation of rolling stock, which is the highest priority for the Commonwealth. In FY14, Tier 1 was funded at 68%, 4% above the estimated total project share for FY15-19.
- Tier 2 – capital assistance for new or replacement facilities or new service or expansion of existing service. In FY14, Tier 2 was funded at 34%, 1% above the estimated total project share for FY15-19.
- Tier 3 – capital assistance for discretionary programs. In FY14, Tier 3 was funded at 17%.

Capital assistance requests for replacement and rehabilitation of existing equipment will be evaluated by DRPT relative to consistency with the DRPT Asset Management System as well as consistency with the capital budgeting information submitted by the local transit agencies each year for use in developing the Six-Year Improvement Program.

In addition, a capital assistance request for new or expanded service must be based on an adopted Transit Development Plan that identifies these new or expanded service initiatives and be consistent with the TDP annual update letter.

In addition to funding for local services, Alexandria also provides operating subsidy funding for Metrobus and Metrorail services to WMATA through the Northern Virginia Transportation Commission for its portion of regional service, based on an allocation formula.

For Metrorail service the allocation formula is based on the population and population density of the jurisdiction, average weekday ridership by jurisdiction residence (based on rail passenger survey), and the number of rail stations by jurisdiction. The jurisdictions are currently discussing the next Capital Funding Agreement (CFA), which takes effect in FY16.

For Metrobus regional routes (routes that serve a regional market by crossing jurisdictional boundaries and feeding the regional Metrorail system) the formula elements are the population and population density of the jurisdiction, revenue hours of service, revenue miles of service, and ridership by jurisdiction of residence (based on bus passenger survey).

For Metro Access, the allocation formula is based on the "cost of service – revenue for each rider, allocated by jurisdiction of residence".

5.0 Fare Structure

The fare structure for the different service providers are summarized below:

5.1 DASH

The DASH fare structure is as follows:

Fare Type	Fare	Notes
Regular Fare	$1.60	Cash or SmarTrip
DASH Pass	$40.00	Cost is for one calendar month – can be provided as a paper pass or loaded onto a person's SmarTrip card (same cost for either)
Other Fare Media		DASH accepts the 7-day Regional Bus Pass, the Transit Link card, and Metrobus tokens
Transfers		• No paper transfers accepted • When passenger pays for trip with SmarTrip, transfer automatically added. Provides 4 hours to transfer to another DASH route and 2 hours to transfer to a Metrobus route. • Transfers to DASH from Metrorail are discounted ($1.00 rather than full $1.60 fare)
King Street Trolley	Free	

5.2 DOT Paratransit Service

Fare Type	Fare	Notes
Trip within Alexandria or within a 5 mile distance outside the City boundaries	$3.00	
Trip beyond a 5 mile distance outside City boundaries	$5.00	

5.3 Metrobus

The Metrobus fare structure is as follows:

Fare Type	Fare	Notes
Regular Fare	$1.75	Cash or SmarTrip
Transit Link or VRE Monthly Passes	Free on regular Metrobus routes	
Other Fare Media		Adult tokens no longer sold but accepted on Metrobus for regular cash fare
Transfers		• Metrobus to Metrobus - free within 2 hours utilizing a SmarTrip card. No paper transfers are provided. • Metrobus to Metrorail = $.50 discount for passengers transferring to Metrorail from Metrobus if SmarTrip is utilized • Metrorail to Metrobus - $.50 discount for passengers transferring to Metrobus from Metrorail if SmarTrip is utilized.

5.4 Metrorail

The Metrorail fare a passenger pays will vary depending on time of day traveled, the distance traveled and fare media utilized. Each is described below:

- Distance – Metrorail fares are distance based, with a fare identified for each potential station-to-station trip in the system, by time of day.
- Time of Day – Metrorail fares vary by time of day, with peak period fares higher than off-peak fares.
- Fare Media – Fares purchased with a paper farecard are assessed a $1.00 surcharge regardless of distance traveled or time of day the trip is made.

An example of fares from the King Street station to different stations throughout the region is provided below, for a fare paid with SmarTrip.

- King Street to Federal Triangle: Peak: $3.55; Off –Peak: $2.80
- King Street to Bethesda: Peak: $5.55; Off –Peak: $3.60
- King Street to McLean: Peak: $5.60; Off –Peak: $3.60

6.0 Vehicle Fleet

DASH operates a revenue vehicle fleet comprised of 79 buses. These are summarized below in Table 1.1.

Table 1.1 – Summary of DASH Revenue Vehicle Fleet

ID	Year	Make	Length	# of Vehicles
9034-9037	1996	Gillig	35’	4
9054-9058	1999	Gillig	35’	5
9059-9068	2000	Orion	35’	10
9069 - 9076	2002	Orion	35’	8
9077 - 9090	2005	Orion	35’	14
9091 – 9099	2007	Orion	35’	9
9100 - 9103	2007	Gillig	35’	4
9200 - 9206	2011	Gillig	35’	7
9300 - 9302	2011	Gillig	40’	3
9400 - 9404	2011	Gillig (replica trolley)	29’	5
9207 - 9211	2012	Gillig	35’	5
9303 - 9307	2012	Gillig	40’	5
Total				**79**

7.0 Facilities

This section describes passenger, operations/maintenance and dedicated transit guideway facilities within Alexandria for the full range of transit providers within the City. Outlined first are passenger facilities.

7.1 Passenger Facilities

Transit passenger facilities within the City of Alexandria consist of on-street stops, intercity/commuter rail stations, intermodal facilities at Metrorail stations, and stand-alone transit facilities that are not located at Metrorail stations. Each of these is summarized below:

7.1.1 On-street stops

There are 785 on-street stops bus stops within the City of Alexandria. These stops, regardless of which operator utilizes the stop, are maintained by the City of Alexandria. 213 of the stops are utilized by Metrobus only, 396 of the stops are utilized by DASH only, and 176 of the stops are shared stops, utilized by both Metrobus and DASH. Individual stops have a range of passenger amenities, with heavier boarding stops equipped with shelters and benches while others have fewer amenities. Passenger amenities are determined primarily by daily boardings at each stop and amenities such as shelters, benches, lighting, trash receptacles, etc. are identified in the *City of Alexandria, VA Bus Stop Hierarchy* document (last updated April 2014); for example, all stops with daily boarding of 40 and higher should have a standard shelter.

7.1.2 Intermodal Facilities at Metrorail Stations

Each of the Metrorail stations within the City of Alexandria have intermodal facilities to accommodate buses and other modes serving the station. A brief summary of the facilities at each Metrorail station within Alexandria are outlined below in Table 1.2.

Table 1.2 - City of Alexandria - Metrorail Station Amenities

	Braddock Road Metrorail Station	King Street-Old Town Metrorail Station	Eisenhower Avenue Metrorail Station	Van Dorn Street Metrorail Station
Bus Bays	5	6	3	6
Bike Racks/Lockers	48/12	34/20	10/6	20/6
Capital Bikeshare	Yes	Yes	No	No
Taxi Stands	4	7	None	7
Short-term metered Spaces	8	30	None	46
Park & Ride Spaces	8 (unreserved)	22(unreserved)	None	361
Carshare/Zipcar Spaces	3	3	2	2
DASH Bus Routes at Station	AT2, AT3, AT4, AT3/4, AT5	AT2, AT2X, AT5, AT6, AT7, AT8, AT10	AT1, AT6, AT7	AT1, AT5, AT7, AT8
Metrobus Routes at Station	10A,E,R,S 10B	REX, 29K, N 28A	REX	25B
Fairfax Connector Routes at Station	n/a	n/a	n/a	FXC 109, FXC 231, FXC 232, FXC 322

7.1.3 Non-Metrorail Station Transit Centers

There are two additional transit centers within the city that are not attached to a Metrorail Station. The first is at the Landmark Mall. This facility, which is maintained by the current Mall owner, will be fully redesigned in conjunction with the redevelopment of the Mall and in anticipation of the West End Transitway implementation. This facility will be a major stop on the transitway.

The second non-Metrorail related facility is located at the Mark Center. The Mark Center Transportation Center is managed by the Department of Defense and handles DASH, WMATA, and PRTC service and will also be an important stop on the proposed West End Transitway.

7.1.4 Alexandria Union Station

Alexandria Union Station is the City's commuter rail and intercity rail station. The station is located on Callahan Drive between King Street and Duke Street, just west of Old Town and adjacent to the King Street/Old Town Metrorail Station. The station serves VRE commuter rail service from both the VRE Fredericksburg and Manassas Lines as well as Amtrak. VRE service consists of seven northbound and seven southbound trips on the Fredericksburg Line and eight northbound and eight southbound trips on the Manassas Line.

Amtrak service at the station consists of both regional trains running to and from Richmond as well long-distance intercity trains running to and from points south of Richmond. There are eight northbound Amtrak trips stopping in Alexandria and 10 southbound trips. Alexandria Union Station may also be served by Washington D.C. to Richmond High Speed Rail line, which is a DRPT project. Scoping meetings for the project were held in November and December 2014.

7.1.5 Dedicated Transitway

Alexandria is also home to a dedicated transit way and stations along U.S. Route 1 that currently hosts the region's first Bus Rapid Transit line.

- Crystal City – Potomac Yard Transitway – the City of Alexandria has recently completed construction of a dedicated BRT guideway in the median of the U.S. Route 1 corridor within the City. The southern limit of the guideway is the intersection of Route 1 and Potomac Avenue and the northern limit is the intersection of Route 1 and East Glebe Road. There are three BRT stations along the guideway at Potomac Avenue, Custis Avenue and East Glebe Road. This dedicated guideway is part of the overall Metroway service that runs between the Braddock Road Metrorail Station and Crystal City (the service details for the Metroway are provided in Appendix A).

7.2 Operations and Maintenance Facilities

DASH stores and maintains its fleet at its own facility located at 3000 Business Center Drive in Alexandria (the facility was opened in 2009). The facility has the capacity for the storage of 90 buses, with capacity for ultimate expansion to 130 buses. The facility has 10 maintenance bays along with two service lanes and a bus washer. The facility also houses the DASH administrative offices and the DASH operations and dispatch functions.

WMATA has recently closed its Royal Street operations and maintenance facility, which was located at the north end of Old Town Alexandria. WMATA services within Alexandria are now based out of multiple WMATA facilities including Shepherd Parkway in the District of Columbia, Four Mile in Arlington and West Ox Road in Fairfax County.

8.0 Transit Security Program

Transit security for DASH and at bus stops throughout the City of Alexandria is provided by the Alexandria City Police Department. For Metrorail stations in Alexandria, security is provided by Alexandria City Police and Metro Transit Police.

9.0 Intelligent Transportation Systems

Currently the DASH fleet is not equipped with Automatic Vehicle Locator (AVL) systems or Automatic Passenger Counters (APC). In addition, because these technologies are not available, the system does not currently provide real-time passenger information or utilize Computer Aided Dispatch (CAD). However, the system is moving forward aggressively to implement AVL in order to ultimately support CAD and real-time passenger information via hand-held devices as well as via bus arrival displays at the heaviest ridership stops on the DASH system (real-time information is ultimately planned for the nine heaviest stops in the DASH system). As part of this technology expansion DASH will also be installing APC, which will significantly enhance their data analysis and service planning capabilities. The AVL systems will also provide up-to-date run time information, which will also support more advanced service planning on the DASH system. DASH buses are currently equipped with security cameras and alarm systems.

The large majority of Metrobus vehicles in service are equipped with AVL and APC, which supports sophisticated service planning and advanced real-time passenger information. Metrobus vehicles are also equipped with on-board cameras and other security-related devices such as alarm systems.

10.0 Public Outreach/Marketing

DASH has an aggressive public outreach program focused on increasing awareness of the system among Alexandria residents. The system utilizes different social media including Twitter and Facebook to reach out to riders and other members of the public. It also does a significant outreach in schools within the City as well as taking part in different community events, including at Farmers Markets within the City. Other efforts include outreach to businesses within the City, joint promotional efforts, sponsorship of DASH routes, and discounts for riders at local retail establishments. DASH also held public meetings during the COA process to communicate study findings and recommendations. Finally, detailed information about all facets of the system is provided on the DASH website, which is updated on a regular basis.

WMATA's public outreach process is focused on providing information related to the requirements of Title VI of the Civil Rights Act of 1964, as amended. Title VI helps ensure that "no person shall, on the grounds of race, color, or national origin, be excluded from participating in, or be denied the benefits of, or be subject to discrimination under any program or activity receiving federal financial assistance without regard to whether specific projects or services are federally funded". Further, any agency receiving federal funds "must ensure that federally supported transit services and related benefits are distributed in an equitable manner."

In 2014 WMATA's Board of Directors adopted a public participation plan which outlines proactive strategies that WMATA will use to engage populations protected by Title VI, including minority and limited English proficient populations. The plan is also part of a broader public outreach strategy that also targets other traditionally underserved communities including low-income and people with

disabilities. Overall, public participation activities are designed to be accessible to all persons and planned through a single, inclusive process.

WMATA utilizes a number of different outlets to implement its public outreach strategy. These include:

- The WMATA website, which provides detailed information on Metrobus and Metrorail, including information on current operations as well as proposed service changes.
  - Customers may register for route and specific alerts which will provide real-time information on service delays and disruptions on every Metrobus and Metrorail lines as selected by the customer. This same information can also be found on the WMATA website.
- WMATA also maintains a very active presence on Twitter, allowing customers to raise concerns and offer suggestions.
- WMATA also maintains an agency blog "Plan-It-Metro, which allows WMATA to provide information on findings from various planning activities to improve service. This also provides customers with an opportunity to provide feedback on different planning study results and recommendations.
- WMATA also maintains a separate website, Metrobus-Studies.com, where all of the technical analysis associated with each service planning study completed by WMATA is available for review by the public.
- In completing different planning studies, including Priority Corridor Network studies and Service Evaluation Studies, WMATA follows a rigorous public outreach process for each study. Activities include:
  - An onboard survey at the beginning of each study to receive feedback from riders regarding issues on the lines as well suggestions for change. The survey is also available on-line. The results of the survey provide a key input into the development of recommendations.
  - A series of focus groups at the beginning of the planning process also focused on receiving input on issues on the Line being studied as well as suggestions for improvement.
  - Public meetings to present preliminary service and operational recommendations as well as to receive feedback on the recommendations.
  - A final "Executive Summary" sent to all participants in the planning process in order to apprise them of the final recommendations.

Chapter 2
Goals, Objectives, and Standards

1.0 Introduction

There are a series of published goals and objectives and service standards that act as frameworks to guide transit operations, development, and investment within Alexandria. These include strategic goals and objectives for long-term transit development as outlined in the Transit section of the City of Alexandria's Transportation Master Plan as well as service standards and service design principles for both the DASH system (including standards used to guide recommendations made in the DASH system Comprehensive Operations Analysis) and WMATA service within the City. Each of these is summarized below.

2.0 Transit Section of the Transportation Master Plan

The transit section of the City's Transportation Master Plan outlines "*a progressive vision for the future of travel within the City of Alexandria with the development of the City of Alexandria Transit Concept Plan".* The basis of this vision is *"a system of innovative transit vehicles operating along three primary transit corridors within secure rights-of-way dedicated exclusively to transit use. These corridors will provide access to the City's major population and activity centers, and connectivity to local and regional destinations. The state-of-the-art vehicles will provide for a clean, quiet, enjoyable commuting experience, resulting in minimal impact on existing neighborhoods, traffic routes, and the environment. The City's new transit system will be linked through circulator shuttles as well as intermediate transit services offered via DASH that complete the transit network, providing access to all residents who are not located in direct proximity of the newly designated transit corridors. The entire transit network will be linked by way of Smart Stops, Shelters, and Stations along all transit routes*".

The Transit Concept Plan outlines the primary components of the proposed system as well as a framework for the system's implementation. The overall framework for the concept plan is based on the goal and objective, as follows:

> **Goal**: Ensure that people can travel into, within and out of the City of Alexandria by providing a mass transit system that combines different modes of travel into a seamless, comprehensive and coordinated effort.
>
> **Objective:** A reliable and convenient mass transit system integrated with surrounding land uses and existing transportation connections that offers travel time savings and an enjoyable transit experience for its riders, featuring advanced technology and passenger amenities.

This overarching strategic goal and objective is further elaborated upon within the Transit Concept Plan with a discussion of the primary issue facing transit in the City and a proposed comprehensive solution to the issue:

> **Issue: Transit is not viewed as a comparable alternative to the private automobile** (as stated in the Transit Concept Plan) – Metrobus, Metrorail, Virginia Railway Express, and DASH lack the flexibility, efficiency, and convenience of the automobile. Transit usage is often a result of necessity versus choice and is generally perceived unfavorably, particularly concerning reliability and safety. Insufficient service hours, geographic coverage, capacity and frequency have all been identified as problems. Lack of real-time information, long headways, difficulty of transfers, and lack of connections to preferred destinations discourage existing and potential riders.

Solution: Secure dedicated, congestion free, transit rights-of-way for future transit services using advanced technologies (as stated in the Transit Concept Plan) – The main emphasis of the Transit Concept Plan is to secure dedicated, congestion free, transit rights-of-way for future transit services. The expansion of transit and dedicated lanes will provide the residents of Alexandria an alternative mode of travel that is fast, efficient, comfortable, and reliable. Existing local bus service in general, is characterized by frequent stops routed along, or traveling on congested roads, thus offering limited incentives to riders in terms of travel time, comfort, and convenience. The Transit Concept Plan's success will hinge upon the ability to provide superior transit service levels that:

- Are competitive with the private automobile;
- Coordinate feeder services and enhancements to the existing local transit services offered by DASH; and
- Connect with existing local and regional services including WMATA Metrorail, commuter rail, other rail-based transit services, and major highway portals.

This transit concept must be fully integrated with existing regional services and coordinated with future services in order to truly serve Alexandrians. The City will work diligently to foster regional cooperation and coordination with the future transit plans of Arlington, Fairfax and other regional entities to ensure that new services are coordinated, and provide the most efficient means of operation.

Three corridors were identified as part of Transit Concept Plan

- Corridor A – Route 1/North-South recommendation – this corridor runs between the Braddock Road Metro Station north along Route 1 and through Potomac Yards. This corridor then extends into the Potomac Yard and Crystal City areas of Arlington. This corridor has recently been implemented as the new Metroway service.

- Corridor B – Duke Street/Eisenhower Avenue – This overall corridor, which consists of a number of alternative alignments, provides a critical link between Alexandria and Fairfax County. Traveling east from Fairfax County the corridor will provide access to the Landmark Mall area, Foxchase, Alexandria Commons, and the King Street Metrorail Station. At its eastern terminus Corridor B will follow a loop around the East Eisenhower area.

- Corridor C – Corridor C is currently in the NEPA/Preliminary engineering phase of project development. The proposed Build Alternative alignment would start in the south at the Van Dorn Metrorail station and would continue north via Van Dorn Street. Service would divert from Van Dorn to serve the Landmark Mall. From there it would continue north on Van Dorn and transition to the Beauregard Street corridor via Sanger Lane. After serving the Mark Center, the alignment would split. One leg would enter I-395 at Seminary Road and run directly to the Pentagon via the I-395 HOV lanes. The second leg would run through the Northern Virginia Community College campus and then cross into Arlington via Walter Reed Drive before accessing I-395 via Arlington Mill Drive. Once on I-395, this leg would run into the Pentagon via the HOV lanes.

To support the implementation of Transit Concept, the following actions and strategies were developed:

T1. The City will conduct extensive public outreach to educate citizens and stakeholders on the proposed concept, the process, and to determine where the greatest support lies for implementation of a major transit investment.

T2. The City will coordinate closely with adjacent jurisdictions, specifically Arlington County, Prince George's County in Maryland, Fairfax County, WMATA, the City of Fairfax and other stakeholders to ensure that the City Transit Concept is integrated into existing services where feasible and to explore opportunities for future connections that would provide for enhanced regional connectivity.

T3. The City will prioritize transit corridors for investment.

T4. The City will develop corridor-specific plans for dedicated transit lanes along these corridors and ensure that new developments do not preclude development of dedicated transit lanes.

T5. The City will identify locations for smart stations that will serve both the new system and existing transit modes.

T6. The City will ensure that development and redevelopment does not preclude efforts to expand public transit infrastructure.

T7. The City will further identify specific transit mode technology and newest techniques best suited in the identified transit corridors and for the system as a whole.

T8. The City will integrate existing DASH bus service with new transit system elements for DASH to serve as a high-frequency feeder system.

T9. The City will incorporate traffic signal priority, traffic signal changes, pedestrian and other on-street enhancements into the new system for the benefit of transit vehicles and riders.

T10. The City will create Transportation Management Plans, Transit Overlay Zoning Districts, Parking Management Zones etc. to coordinate efforts to support the system.

T11. The City will investigate potential funding available through existing, new, and innovative revenue sources.

- Develop a funding priority plan that identifies potential funding opportunities, applicability, deadlines and requirements for requesting funds.

T12. The City will develop an extensive public outreach and marketing campaign to energize the citizenry around Alexandria's transportation future.

T13. The City will coordinate with pertinent Alexandria Boards and Commissions, such as the Commission on Aging and the Alexandria Commission on Persons with Disabilities, to ensure that the special needs of all citizens are considered.

The Transit Concept Plan also discusses generally the need to integrate transit and land use and specifically advocates for a policy to encourage future transit supportive land-use and also proposes City

Department of Planning and Zoning efforts to adequately review and comment on all new land use/development adjacent to the designated transitway corridors, including:

- Identification of rights-of-way to be dedicated as part of future development planning or approvals.
- Encouragement and coordination of an appropriate mixture and density of activity around transit stations.

3.0 Service Evaluation Metrics

DASH recently completed a Comprehensive Operations Analysis (COA) of its system and one element of the analysis was an evaluation of existing DASH service. This existing service analysis incorporated two evaluations, one of service performance and one of service quality and customer experience.

The service performance evaluation relied on three metrics, outlined below:

- Service Effectiveness (Productivity) – Boardings per Revenue Hour – No specific standard for boardings per revenue hour was set for the COA but boardings per revenue hour were evaluated for each route by day for weekdays, Saturdays and Sundays and were further broken out for weekdays by time of day and by route segment. A proposed standard for future service evaluations would be for a route to be identified as productive if it's boardings per revenue hour equals or exceeds 24, which is the average boardings per revenue hour of the systems evaluated in the peer analysis contained in Chapter 3.

- Financial Effectiveness (Farebox Recovery) – Farebox recovery was the first of two financial effectiveness metrics utilized in the COA. No specific standard for farebox recovery was set for the COA but total all-day farebox recovery data was provided for weekday, Saturday, and Sunday service. Fare recovery was further broken out by segment for all-day weekday. A proposed standard for future service evaluations would be for a route to be considered financially effective if its farebox recovery is equal to or exceeds 23%. This is the average fare recovery for the systems evaluated in the peer analysis in Chapter 3.

- Financial Effectiveness (Subsidy per Passenger) – The second financial effectiveness metric utilized in the COA was subsidy per passenger. As with the other metrics, no specific standard for subsidy per passenger was set for the COA but total all-day subsidy per passenger was provided for weekday, Saturday, and Sunday service. Subsidy per passenger was further broken out by segment for all-day weekday. A potential standard for future service evaluations would be for a route to be considered financially effective if its subsidy per passenger were equal to or below $5.00.

The results of this analysis were utilized in the development of COA service recommendations and were also an important resource in the development of this Transit Development Plan.

A financial effectiveness measure that was not utilized in the COA but which should be considered for future service evaluations would be cost per boarding. A proposed standard for cost per boarding is that a route is considered financially effective if its cost per boarding is equal to or below $4.40 per hour, which is the average cost per boarding for the systems evaluated in the peer analysis in Chapter 3.

A final proposed evaluation metric is boardings per revenue mile. The proposed metric is that a route is considered productive if its boardings per revenue mile meet or exceed 2.15, the average for the systems evaluated in Chapter 3.

The service quality and customer experience evaluation incorporated six metrics, each of which is summarized below.

- Passenger wait time (service frequency) – the first of the service quality and customer experience evaluation metrics utilized in the COA was service frequency. As with the performance evaluation metrics, a specific service frequency standard was not set but weekday service frequency data was generated and presented for each DASH route for both the peak and off-peak time periods as well as all-day data for Saturday and Sunday. A proposed frequency standard, reflecting the urban nature of Alexandria, is 15 minute service in the weekday peak and 30 minutes in the weekday off-peak and 30 minutes on weekends.

- Travel time (operating speed) – all day operating speed data was generated for each DASH route on weekdays. In addition, weekday operating speed by line segment for each DASH route was also generated and presented in the COA.

- Service Reliability (on-time performance) – All-day weekday on-time performance data was generated and presented as part of the COA analysis.

- Access to coverage (stop spacing and coverage) – Stop spacing, or distance between stops, data was generated and presented for each route in the DASH system.

- Capacity utilization (passenger loads) – Passenger load data was evaluated in the COA in order to determine if there are crowding issues on DASH routes. The findings showed that one route, the AT8, experienced crowding on select peak period trips but that crowding was not an issue on other routes during the week or on Saturdays and Sundays.

- Customer comments – In addition to the numerical-based evaluations described above, the service quality and customer experience evaluation incorporated a review of customer comments received from on-board and telephone survey.

As with the performance evaluation, the results of the service quality and customer experience evaluation were utilized in the development of the COA service recommendations and were also an important resource in the development of this Transit Development Plan.

4.0 Service Design Goals and Strategies

In addition to the evaluation metrics described above, a series of goals and strategies were also developed as part of the COA to guide the development of the recommendations made in the COA. As with the evaluation metrics outlined above, these design goals and strategies were an important resource in the development of this Transit Development Plan.

- **Goal 1 – Build on Market Strengths**. This overall category focused on three areas that provide a strong basis for current and future DASH service.

Strategies

- Support population and employment growth – the significant growth occurring in Alexandria, including the growth in population and employment density, provides a strong basis for a successful DASH system.
- Maintain community support for the DASH system.
- Maintain Metrorail and Metrobus Presence – Investment around existing and planned Metrorail stations supports ongoing community growth and supports transit usage. Ensuring efficient transit connections at Metrorail stations is vital to the performance of DASH service.

- **Goal 2 – Build on Success of Current Network**. This overall category focuses on enhancing DASH service based on a strong existing transit network.

  Strategies

  - Support strong corridors – there are currently strong transit corridors already in place within Alexandria and this principle states that transit investment should build on these existing strengths.
  - Serve high density trip generators – a second design principle related to the current network is to link key customer origins to activity centers throughout Alexandria in order to best leverage the DASH system.
  - Integrate with other transit modes – this principle focuses on schedule coordination at key transit hubs within Alexandria in order to enhance overall network connectivity.

- **Goal 3 – Enhance the Customer Experience**. This overall category focuses on enhancing the customer experience on DASH in order to make it more attractive to riders and to enhance its role in providing mobility to Alexandria residents.

  Strategies

  - Add more frequent service – this design principle focuses on creating spontaneous use, or walk up, DASH service frequencies (ideally 10 minutes during peak and 15 minutes minimum, including during the off-peak) and streamlining routes where possible to reduce customer waits and travel times. These efforts would lead to a network focused on fast and frequent service that would support network synergy on both the DASH system and the overall regional network.
  - Leverage technology – this design principle focuses on advance technology such as automated vehicle location (AVL), on-board automated passenger counters (APC) and computer aided dispatch (CAD). AVL allows DASH to communicate real-time information such as next bus arrivals to customers, thus enhancing customer convenience. Automated passenger counters provide detailed passenger boarding and alighting and passenger load data, thus allowing for sophisticated service planning backed by detailed data. Computer aided dispatch allows for greater control of vehicles in service, thus ensuring optimized service on a day-to-day basis.

- **Goal 4 – Improve Financial Sustainability**. This overall category focuses on ensuring the DASH system as currently operated as well as in the future is financially sustainable:

  Strategies
  - Effectively use resources – this design principle is focused on the best use of limited financial resources and states that efficiency should be designed into each route and the DASH network overall and that resources should be focused where transit is most competitive.
  - Grow ridership – this design principle states that increased ridership increases revenues, thus decreasing the required subsidy. This decrease in required subsidy allows more service to be operated with the same subsidy.
  - Properly match service needs to demand – this design principle states simply that service levels should be consistent with market demand for service. The principle further states that DASH service frequencies should be supportive of Metrorail frequencies and frequencies on the proposed transitways.

5.0 WMATA Productivity and Service Standards

As noted above, WMATA is an important provider of regional bus service within Alexandria. When evaluating service, WMATA currently relies on a set of productivity and service standards that have been used in each of the Priority Corridor Network (PCN) restructuring studies. WMATA is currently working on updating these standards but this effort has not been finalized. The current standards utilized are outlined below:

- Service Standards – WMATA has two service standards; one related to hours of service and one related to service frequencies. These standards are further segregated based on the characteristics of the route's service area. For an urban route class, which reflects the densely populated nature of Alexandria, the service standards are as follows:

  - Hours of Service Standards

    - Weekday
      - The first AM trip of the day should arrive at its final destination terminus no later than 7:00 AM.
      - The final trip of the day should depart from its starting terminus no earlier than 10:00 PM.
    - Saturday
      - The first AM trip of the day should arrive at its final destination terminus no later than 7:00 AM.
      - The final trip of the day should depart from its starting terminus no earlier than 10:00 PM.
    - Sunday
      - The first AM trip of the day should arrive at its final destination terminus no later than 8:00 AM.
      - The final trip of the day should depart from its starting terminus no earlier than 10:00 PM.

  - Service Frequency Standards

- Weekday
  - Minimum service frequency – peak period – 15 minutes
  - Minimum service frequency – mid-day – 30 minutes
- Weekend
  - Minimum service frequency – all day – 30 minutes

- Productivity and Financial Effectiveness Standards – WMATA has outlined the following productivity and financial effectiveness standards in their Metrobus Service Guidelines. These metrics are calculated by Metrobus line type: regional or non-regional, with the metrics for a regional line compared against all other regional lines and a non-regional line compared against all other non-regional lines.

  The metrics are as follows:

  - Ridership: If ridership on a line is less than 1/8 the average line ridership for the entire Metrobus system for its line type (regional or non-regional), the line fails to meet the minimum criteria for ridership.

  - Cost Recovery: A line must recover at least ½ the average cost recovery for the entire Metrobus system for its line type in order to meet the minimum criteria for cost recovery.

  - Average Subsidy per Passenger: A line fails to meet the minim criteria for subsidy per passenger when its subsidy per passenger is at least twice the system average for its line type.

  - Passengers per Revenue Trip: If passengers-per-trip on a line is less than 1/3 the system average for its line type then the line fails to meet the minimum criteria for passengers per trip.

  - Passengers per Revenue Mile: If passengers-per-revenue mile on a line is less than 1/3 the system average for its line type then the line fails to meet the minimum criteria for passengers per revenue mile.

Chapter 3

Service and System Evaluation

1.0 Introduction

The purpose of this chapter is to provide a detailed and comprehensive understanding of the operations and performance of the key transit providers within the City of Alexandria as well as potential unmet transit demand both within the City and for trips between the City and other jurisdictions in the Washington region. The intent of the analysis included in this chapter is to provide a foundation for identifying the need for potential service changes and equipment requirements, including modifications to existing service as well as potential new services to meet transit demand that is not currently being met. The chapter is structured around five key analyses:

- Existing Service Analysis
- Unmet Transit Demand/Trip Flow Analysis
- Development and Redevelopment Areas
- DOT Operations and Service
- Facility and ITS Needs

The evaluations contained in this chapter rely on current DASH and WMATA Metrobus ridership and productivity data, public timetables, U.S. census data, MWCOG population and employment forecasts, and the MWCOG regional model 2015 trip table.

2.0 Existing Service Analysis – Fixed Route Transit

DASH and WMATA Metrobus each provide fixed-route bus transit within the City of Alexandria. This section contains an analysis of these two providers relative to a wide range of evaluation metrics. The first analysis contained here is a trend analysis of DASH service between Calendar Year 2009 and 2013 relative to a number of evaluation metrics (this analysis relies on National Transit Database data in order to be consistent with the peer analysis outlined in the next section. The most recent NTD data is for calendar year 2013). The second analysis involves a comparison of DASH performance to a group of peer agencies that have comparable characteristics to DASH.

2.1 DASH Trend Analysis

Table 3.1 below provides data outlining trends over the last five years for key metrics for the Alexandria Transit DASH system. The data, which is derived from data from the National Transit Database, shows generally very stable trends for each of the metrics presented.

Of note is the fairly significant increase in costs between 2011 and 2012, which also reflects an expansion of service and an increase in peak bus pull out. Annual ridership declined between the first year of the analysis, 2009, and 2011 but then began to increase again in 2012 (this increase at least partially reflects the fact that Alexandria Transit began operating the King Street Trolley in 2012), though there was a decline between 2012 and 2013.

The decrease in boardings and the increase in operating cost resulted in an increase in the cost per boarding metric, which has increased each year of the analysis. Of note is the improvement in cost recovery from fares starting in 2011, which reflects a fare increase implemented in July 2010.

Boardings per revenue hour and boardings per revenue mile, which measure how productively the service provided is utilized, dropped after 2009 as ridership declined but then remained generally stable between 2011 and 2013.

The data in the table generally shows stability in each of the metrics, which indicates a stable balance between the level of service provided and the utilization of that service by riders.

Table 3.1 – DASH Trend Analysis

Measure	Calendar Year				
	2009	2010	2011	2012	2013
Annual Operating Cost	$12,241,274	$12,177,736	$12,889,560	$13,657,919	$13,765,515
Annual Boardings	4,564,995	4,283,850	4,188,320	4,309,179	4,265,417
Peak Bus Pullout	52	52	52	61	57
Cost per Revenue Hour	$77.28	$75.19	$79.28	$79.97	$81.53
Cost Recovery from Fares	21.09%	22.19%	25.67%	26.36%	25.29%
Cost per Boarding	$2.68	$2.84	$3.08	$3.17	$3.23
Boardings per Revenue Hour	28.82	26.45	25.76	25.23	25.26
Boardings per Revenue Mile	3.16	3.04	2.94	2.89	2.89

Source: National Transit Database

2.2 DASH Peer Analysis

This section evaluates Alexandria Transit's operating and financial performance relative to a number of peer transit agencies that have characteristics that are comparable in some way to Alexandria Transit. The use of a peer comparison helps put DASH performance in context and allows for an assessment of its performance along a continuum of agencies, not simply as a discrete stand-alone performance evaluation that provides only limited perspective.

The selection of peers to compare DASH performance against was somewhat difficult because of DASH's relatively unique characteristics, including the City of Alexandria's high population density, the sharing of service within the City with WMATA Metrobus service, and the fact that DASH is a locally operated system within a larger metropolitan area. Within this context, selection of a set of perfectly comparable peers was not feasible. Rather, peers with some comparable characteristics were selected.
Criteria used in selecting the peers incorporated into this evaluation include:

- Service area characteristics, including population density.
- Peer location.
- Annual operating budget.
- Peak bus pull-out.
- Annual boardings.

Outlined below is a description of each of the peer systems selected for the analysis, including the reason for the system's inclusion in the group of peers.

Arlington Virginia (ART) – The locally operated ART system was selected for inclusion in the peer group for three key reasons. The first is its close proximity to Alexandria. The second is its great similarity in terms of service area characteristics, as evidenced by its comparable population density to Alexandria. Finally, Arlington is served both by its ART service as well as Metrobus service, in the same way as Alexandria. ART does have a smaller number of annual boardings and a smaller operating budget than the Alexandria DASH system.

Fairfax Virginia (Fairfax Connector) – The Fairfax Connector was selected based primarily on its location within Northern Virginia and the fact that the County is served by both the Connector and WMATA Metrobus.

Richmond Virginia (GRTC) – The Richmond GRTC system was selected primarily due to its location within Virginia and its size as one of the largest locally operated systems in Virginia (comparable to Alexandria as one of the largest systems in the state).

Harrisburg Pennsylvania (Capital Area Transit) – Capital Area Transit was selected for the peer group primarily because of its annual operating budget, which is comparable to Alexandria, and because of the service area characteristics. There was also a desire to include comparable peer systems that are located outside of Virginia.

Allentown Pennsylvania (LANTA) - LANTA was selected for many of the same reasons Harrisburg was selected; comparable operating budget and relatively comparable service area characteristics.

Culver City California (Culver CityBus) – Culver City was selected based on a number of similarities to Alexandria. These include service area characteristics, as evidenced especially by comparable population densities; annual operating cost; annual boardings; and the fact that the Culver City system is a locally operated system within a larger urbanized area, comparable to Alexandria.

Table 3.2 below provides a wide range of data on the Alexandria DASH system as well as its selected peers. Data is provided in five categories, each summarized below:

- Service Area Characteristics – Service area characteristics are represented by the service area population density.

- Background Data – This data category provides background data on each system in the analysis in order to provide context for the size of each system and includes annual operating cost, annual boardings, and peak bus pullout.

- Cost of Service – This category focuses on how much it costs each system in the analysis to provide service, as measured by the cost per revenue hour.

- Cost Effectiveness – This category focuses on how effectively the financial resources used to provide service are utilized, as measured by cost per passenger boarding and cost recovery from fares.

- Productivity – This category focuses on how productively the service provided to the public is actually utilized by riders, as measured by boarding per revenue hour and boarding per revenue hour.

Alexandria's performance relative to its peers in each of these categories is summarized below.

Population Density – Alexandria has the second highest population density of the peer group, at 8,748 persons per square mile, behind just Culver City California (this high population density in Alexandria was one of the reasons it was difficult to find a fully comparable set of peers). Arlington's population density is slightly lower than Alexandria, at 8,077. The two Pennsylvania systems included in the peer

group both have densities in the range of 3,600 to 3,700 while Fairfax is at approximately 2,648 and Richmond has the lowest density of the peer group at 1,980.

Annual Operating Cost – Alexandria's annual operating cost is $13,765,515. Two of the Virginia systems, Fairfax and Richmond, have the highest annual operating cost of the peer group, and are much larger than Alexandria's cost at $72,033,351 and $38,178,547 respectively. Harrisburg, Allentown, and Culver City also exceed Alexandria's operating cost but are much closer: $20,484,272 (Allentown), $18,731,308 (Culver City), and $14,248,097 (Harrisburg). The smallest annual operating budget in the peer group is Arlington at $8,706,973.

Annual Boardings – Alexandria's annual boardings are 4,265,417. The two largest systems in the peer group, Fairfax County and Richmond, have 10,650,401 and 8,032,266 annual passenger boardings respectively. Two additional systems in the peer group have higher annual boardings than Alexandria, though these boardings are much closer to Alexandria's: Culver City (5,550,045) and Allentown (4,926,294). Harrisburg and Arlington both have smaller annual boardings, at 2,674,422 and 2,644,933 respectively.

Cost of Service – Cost per Revenue Hour - The cost of service metric data in Table 3.2 represents very good news for Alexandria, which has the second lowest cost of service in the peer group ($81.53 per revenue hour), behind only Arlington ($80.21 per revenue hour). This lower cost per revenue hour means more service can be provided to Alexandria residents while maintaining reasonable budgets. The highest cost of service is in Culver City, at $126.39 per revenue hour. Of the remaining systems in the peer group, only one other system, Allentown PA, has a cost per revenue hour below $100.

Cost Effectiveness – Cost Recovery from Fares – Alexandria's low cost of service translates into the second highest cost recovery from fares in the peer group (25.33%) behind only Arlington (31.11%). A number of systems' cost recovery from fares falls just below Alexandria's, generally ranging from 21% to 25%. The lowest cost recovery from fares is in Fairfax, at 17.72%.

Cost Effectiveness – Cost per Boarding – The cost per boarding metric shows very positive news for Alexandria, with the DASH system having the lowest cost per boarding of the entire peer group ($3.23). Alexandria's performance on this metric reflects its low costs but also its relatively high ridership relative to the amount of service it provides. A close second in the peer group is Arlington, with a cost per boarding of $3.29. Culver City also has a low cost per boarding, which in this case reflects higher ridership relative to the service it provides, given its high cost of service.

Productivity – Boarding per Revenue Hour – Alexandria is second among the peer group relative to this metric (25.26 boardings per revenue hour), behind only Culver City (37.45 boardings per revenue hour). Alexandria's performance on this metric relative to the peer group shows productive use of the service it provides on a daily basis. This productive use of provided capacity tracks with its performance on the cost-effectiveness measures. Boardings per revenue hour for the remaining systems in the peer group range from a low of 17.19 (Fairfax County) to 24.37 (Arlington).

Productivity – Boardings per Revenue Mile – As with the boardings per revenue hour metric, Alexandria is second among the peer group relative to this metric (2.89 boardings per revenue mile), again behind only Culver City (3.50 boardings per revenue mile). Arlington is the only other system in the peer group that exceeds 2 boardings per revenue mile, with the remaining systems ranging between 1.12 and 1.84 boardings per revenue mile.

Alexandria has much to be happy about regarding its performance relative to the peer group included in this analysis. The data in Table 3.2 show that the Alexandria DASH system has a very healthy foundation, starting with low operating costs per revenue hour. This low operating cost per unit of service provided, supports, in turn, high cost-effectiveness, meaning a low cost relative to the number of riders who utilize the system. Alexandria's productivity, which measures the level of utilization of the service provided, tracks very closely with the cost-effectiveness measure and shows high productivity relative to the other systems in the peer group. The peer group analysis shows the Alexandria DASH system as a very healthy system, providing cost-effective and productive service to the benefit of its riders and the residents of the City of Alexandria.

Table 3.2 - Peer Analysis Data

	Population	Background Data			Cost of Service	Cost Effectiveness		Productivity	
System	Population Density (per square mile)	Annual Operating Cost	Annual Boardings	Peak Bus Pullout	Cost per Revenue Hour	Fare Recovery	Cost per Boarding	Boarding per Revenue Hour	Boarding per Revenue Mile
Alexandria	**8,748**	**$13,765,515**	**4,265,417**	**57**	**$81.53**	**25.29%**	**$3.23**	**25.26**	**2.89**
Arlington VA	8,077	$8,706,973	2,644,933	37	$80.21	31.11%	$3.29	24.37	2.30
Fairfax VA	2,648	$72,033,351	10,650,401	207	$116.25	17.72%	$6.76	17.19	1.12
Richmond VA	1,980	$38,178,547	8,032,266	128	$101.42	25.24%	$4.75	21.34	1.82
Harrisburg PA	3,675	$14,248,097	2,674,422	63	$113.72	23.48%	$5.33	21.35	1.62
Culver City CA	10,355	$18,731,308	5,550,045	43	$126.39	21.42%	$3.37	37.45	3.50
Allentown PA	3,670	$20,484,272	4,926,294	69	$92.86	21.21%	$4.16	22.33	1.84

Source: National Transit Database

2.3 Service Sufficiency

The next set of analyses involves an analysis of DASH and WMATA service relative to a range of evaluation metrics. The first set of metrics focus on service sufficiency and how well these services meet the needs of Alexandria residents, with a specific focus on the ability of a resident to conveniently use transit at different times of the day, on both weekdays and weekends, and for different trip purposes. Three metrics are considered in the service sufficiency evaluation: hours of service; service frequency; and service coverage. A summary of each of these metrics is outlined below.

2.3.1 Hours of Service

The first element of the hours of service analysis concentrates on the Alexandria Transit DASH system and the King Street Trolley. DASH operates local neighborhood service within Alexandria, connecting to neighborhoods, to Metrorail Stations and employment centers within the City including the Mark Center, Pentagon, Landmark, Old Town, and Potomac Yard. DASH operates 11 fixed routes within the City with ten providing all day weekday service between the general hours of approximately 5:00 - 6:00 AM and 10:00 - 11:00 PM. Exceptions to these general system hours include the AT7 service, which ends after the PM peak period; the AT8 service, which operates past midnight; the combined AT3/4 service which operates only in the off-peak (peak period service in the AT3/4 service area is provided by two stand –alone routes, the AT3 and AT4); and the AT2X express service, which runs in both directions but in the peak periods only.

In addition to these 11 DASH routes, the King Street Trolley begins service at 10:00 AM and operates until 10:15 PM Sunday to Wednesday and to midnight on Thursday, Friday and Saturday. Seven of the 11 DASH routes operate on Saturday and six of the 11 routes operate on Sunday. Table 3.3 summarizes the weekday, Saturday, and Sunday hours of service for all DASH bus routes operating within the City.

Table 3.3 - DASH - Hours of Service

Route	Weekday	Saturday	Sunday
King Street Trolley	10:00 AM to 10:15 PM (Mon - Wed) 10:00 AM to 12:00 AM (Thur - Fri)	10:00 AM to 12:00 AM	10:00 AM to 10:15 PM
AT 1	5:05 am to 10:42 PM	6:44 AM to 10:43 PM	8:20 AM to 7:21 PM
AT2	5:38 am to 11:04 PM	7:12 AM to 11:10 PM	7:59 AM to 7:03 PM
AT2X	6:13 AM to 9:13 AM 3:00 PM – 6:00 PM	n/a	n/a
AT3	5:32 AM to 9:57 AM; 3:30 PM to 7:44 PM	n/a	n/a
AT4	5:50 AM to 9:40 AM; 3:07 PM to 7:25 PM	n/a	n/a
AT3-4	10:26 AM to 2:26 PM; 8:18 PM to 10:07 PM	8:28 AM to 7:38 PM	9:07 AM to 6:16 PM
AT5	5:16 AM to 10:17 PM	6:43 AM to 10:52 PM	7:48 AM to 7:17 PM
AT6	5:35 AM to 10:43 PM	n/a	n/a
AT7	5:09 AM to 7:43 PM	n/a	n/a
AT8	4:54 AM to 12:15 AM	6:25 AM to 11:29 PM	6:52 AM to 11:05 PM
AT9	6:37 AM to 9:10 PM	6:52 AM to 9:52 PM	n/a
AT10	6:33 AM to 10:33 PM	7:00 AM to 10:30 PM	9:10 AM to 6:34 PM

Source: DASH Timetables – effective February 22, 2015

The data in Table 3.3 show very robust weekday hours of service on DASH service, with only two routes ending before 10:00 PM (this does not include the AT3 and AT4 and AT2X, which operate only in the peak period). This long span of service on most DASH routes means riders can use the service not only for traditional work commutes but for other trips purposes. It also means that many riders working non-traditional work shifts can utilize DASH for their work trips. Hours of service on Saturdays, for routes running on Saturday, remain robust, while Sunday span of service falls off significantly relative to weekdays and Saturday.

The King Street Trolley also has quite robust hours, especially on Thursday, Friday, and Saturday. The late start time in the morning means it is not generally available for Old Town residents who might be traditional commuters but other DASH services are available for these commuters in the morning. The hours of service reflect the key market for the Trolley, which is for tourists and visitors to Old Town.

Metrobus operates 35 fixed routes that operate at least partially within the City of Alexandria. On weekdays, 13 of these routes provide all day service while others generally run in the peak period only. Of these peak period services, some provide supplementary service to all-day services while others are peak only services and their service area has no off-peak Metrobus service. Of these all-day weekday services, six run until after midnight, four end service between 10:00 PM and 12:00 AM and three end service before 10:00 PM. All 13 weekday all-day routes begin service prior to 6:00 AM.

11 of the 35 weekday routes run on Saturday and nine run on Sunday. On Saturday and Sunday, all routes in service run all day. Six of the 11 Saturday routes run past midnight, two end service between 10:00 PM and midnight, and three end service before 10:00 PM. Six of the 11 Saturday routes begin service before 6:00 AM and five begin service after 6:00 AM. Of the nine Metrobus

routes that run on Sunday, one ends service after midnight, five end service between 10:00 PM and midnight and three end service before 10:00 PM. Of the nine Sunday services, three start service before 6:00 AM and the remainder start after 6:00 AM. More detail on Metrobus hours of service, by day of week, is provided in Table 3.4 below.

Table 3.4 - WMATA Metrobus - Hours of Service

Route	Weekday	Saturday	Sunday
7A	4:45 AM to 3:30 AM	6:49 AM to 3:30 AM	7:30 AM to 12:12 AM
7F	5:34 AM to 11:50 PM (no peak period, peak direction service - provided by 7Y)	6:17 AM to 10:27 PM	n/a
7Y	5:09 AM to 8:46 AM and 3:01 PM to 7:13 PM (peak period, peak direction service)	n/a	n/a
7B	6:12 AM to 8:31 AM and 4:32 PM to 6:57 PM (peak period, peak direction only)	na	n/a
7C	6:05 AM to 8:47 AM and 4:15 PM to 7:05 PM (peak period, peak direction only)	n/a	n/a
7W	6:25 AM to 8:33 AM and 3:55 PM to 6:50 PM (peak period, peak direction only)	n/a	n/a
7X	6:26 AM to 8:16 AM and 4:15 PM to 6:35 PM (peak period, peak direction only)	n/a	n/a
7H	2 AM, 2 PM trips - reverse peak direction	n/a	n/a
7P	6:14 AM to 8:47 AM and 4:03 PM to 6:03 PM	n/a	n/a
7M	5:40 AM to 6:46 PM	n/a	n/a
8S	6:27 AM to 8:15 AM and 4:15 PM to 6:02 PM (peak period, reverse peak direction service)	n/a	n/a
8W	6:09 AM to 8:54 AM and 3:55 PM to 8:24 PM (peak period, peak direction)	n/a	n/a
8Z	5:35 AM to 8:32 AM and 3:40 PM to 8:00 PM	n/a	n/a
9A	4:30 AM to 1:37 AM	5:24 AM to 1:30 AM	5:00 AM to 12:35 AM
10A	4:37 AM to 12:35 AM (does not run in the peak period peak direction - service is replaced by 10E during that time and direction)	5:17 AM to 12:40 AM	6:15 AM to 10:50 PM
10B	4:52 AM to 1:00 AM	5:37 AM to 1:00 AM	6:45 AM to 11:00 PM
10E	6:02 AM to 8:20 AM and 4:14 PM to 6:31 PM (service is peak period, peak direction service only, replacing the 10A during that time)	n/a	n/a
10R	6:00 AM to 8:00 AM and 4:15 PM to 6:13 PM (service is peak period, peak direction service only - provides bus connections to Rosslyn to mitigate decreased Blue Line headways)	n/a	n/a

Route	Weekday	Saturday	Sunday
10S	6:50 AM to 7:50 AM and 4:48 PM to 5:48 PM (reverse peak service between Rosslyn and Potomac Yard - Blue Line mitigation	n/a	n/a
11Y	6:40 AM to 7:45 AM and 4:10 PM to 6:15 PM (peak period, peak direction)	n/a	n/a
21A	6:00 AM to 8:37 AM and 4:00 PM to 7:20 PM (peak period, peak direction	n/a	n/a
21D	Three AM trips and three PM trips (peak period, peak direction)	n/a	n/a
25A	5:50 AM to 8:48 AM and 3:15 PM to 10:41 PM (AM peak, PM peak, and evening	7:40 AM to 8:42 PM	8:04 AM to 8:40 PM
25B	6:00 AM to 9:30 PM	6:10 AM to 8:10 AM	n/a
25C	5:54 AM to 8:44 AM and 4:58 PM to 8:15 PM (AM peak eastbound and PM peak westbound	n/a	n/a
25D	6:18 AM to 8:05 AM and 4:42 PM to 7:38 PM (AM peak westbound and PM peak eastbound)	n/a	n/a
25E	8:43 AM to 2:45 PM (Midday, both directions)	n/a	n/a
28A	5:09 AM to 12:40 AM	5:50 AM to 12:45 AM	5:50 AM to 11:30 PM
28F	5:47 AM to 8:32 AM and 2:45 PM to 6:32 PM (Southbound in AM Peak and Northbound in PM peak)	n/a	n/a
28G	6:02 AM to 8:50 AM and 3:45 PM to 6:55 PM (Northbound in the AM peak and Southbound in the PM peak)	n/a	n/a
28X	5:14 AM to 6:25 PM	n/a	n/a
29K	5:40 AM to 10:40 PM	n/a	n/a
29N	5:30 AM to 10:10 PM	6:10 AM to 9:20 PM	6:10 PM to 9:20 PM
Rex	5:08 AM to 10:57 PM	4:48 AM to 10:03 PM	4:50 AM to 9:10 PM
Metroway	5:30 AM to 12:00 AM	6:30 AM to 12:00 AM	7:30 AM to 10:00 PM

Source: Metrobus Timetables

The data in Table 3.4 show some very robust service spans on some routes, while other routes have much less extensive spans. Service spans fall fairly significantly on Saturdays and Sundays.

2.3.2 Service Frequency

One of the greatest indicators of the convenience of a transit service is whether a person can arrive at a stop without a timetable and be confident that a bus will arrive within a reasonable amount of time. The more infrequent a service, as measured by the time between buses, the less convenient it becomes. This convenience, in turn, dictates the types of riders who utilize a service, with the greater the convenience, the greater the attractiveness of the service to people who have other transportation options. Table 3.5 summarizes the weekday, Saturday, and Sunday service frequency for all DASH bus routes.

Table 3.5 - DASH Service Frequency

Route	Weekday Peak	Weekday Mid-day	Saturday All Day	Sunday All Day
King Street Trolley	15	15	15	15
AT 1	30	30	30	60
AT2	30	30	60	60
AT2X	15 (avg.)	n/a	n/a	n/a
AT3	20	n/a	n/a	n/a
AT4	20	n/a	n/a	n/a
AT3-4	n/a	60	60	60
AT5	20	30	30	60
AT6	15	30	n/a	n/a
AT7	30	60	n/a	n/a
AT8	10	30	30	30
AT9	30	30	60	n/a
AT10	30	30	30	60

Source: DASH Timetables

The 10-minute weekday peak period frequencies on the AT2 and the AT8 would support random arrival at a stop but the frequencies on the other routes would not support this type of random arrival. 15 minute service on additional routes provides a fairly high level of convenience, especially during the mid-day but the 30 and 60 minute headways on other routes and on weekends provides a basic service that does not provide a high level of convenience. Of note is that DASH is focused on improving service frequencies as part of an initiative to make DASH service levels more in line with the urban nature of Alexandria (more detail is provided in Chapter 4 of the TDP).

Metrobus routes within Alexandria generally run irregular service frequencies that are demand-based and operate between 10 and 60 minutes during the weekday peak periods and 20 to 60 minutes during the off-peak and weekends. The exception is the Metroway Bus Rapid Transit (BRT) service on Route 1 which operates on 12 minutes throughout the day within Alexandria on weekdays and 20 minutes on weekends. Table 3.6 summarizes the average weekday, Saturday, and Sunday service frequency for all Metrobus routes operating within the City.

Table 3.6 -WMATA Metrobus – Service Frequency

Route	Weekday Peak	Weekday Mid-day	Saturday All Day	Sunday All Day
7A	20-30	40	60	40
7F	55-60	40	60	n/a
7Y	10 (7AM to 8 AM)	n/a	n/a	n/a
7B	30	n/a	n/a	n/a
7C	30	n/a	n/a	n/a
7W	15-20	n/a	n/a	n/a
7X	15-20	n/a	n/a	n/a
7H	2 trips in each peak period	n/a	n/a	n/a
7P	20 - 30	n/a	n/a	n/a
7M	10	15	n/a	n/a
8S	30	n/a	n/a	n/a
8W	15 to 30	n/a	n/a	n/a
8Z	15 to 30	n/a	n/a	n/a
9A	30	30	30	40
10A	30	30	30	60
10B	30	30	30	60
10E	15 minutes	n/a	n/a	n/a
10R	30 minutes	n/a	n/a	n/a
10S	30 minutes	n/a	n/a	n/a
11Y	12 to 20	n/a	n/a	n/a
21A	20 to 30	n/a	n/a	n/a
21D	Three AM trips and three PM trips (peak period, peak direction)	n/a	n/a	n/a
25A	30-60	n/a	60-65	60
25B	20-30	60	60	n/a
25C	15-20	n/a	n/a	n/a
25D	20-30	n/a	n/a	n/a
25E	n/a	60	n/a	n/a
28A	30	20	20	30
28F	20 to 30	n/a	n/a	n/a
28G	20-30	n/a	n/a	n/a
28X	15	n/a	n/a	n/a
29K	60-70	60-70	n/a	n/a
29N	60	60	60	60
Rex	10-20	30	30	60
Metroway	12	12	20	20

Source: Metrobus Timetables

The data in Table 3.6 shows generally infrequent service on Metrobus services that run at least partially within Alexandria, especially on weekends. It should be noted that some of these services (such as the 10A and 10B) run together along a trunk portion of the routes to provide a higher combined service frequency but that is not the case in all instances. Where this combined service does occur, the trunk portion of the combined routes may receive high quality service but the outer edges of the route often receive an inadequate level of service.

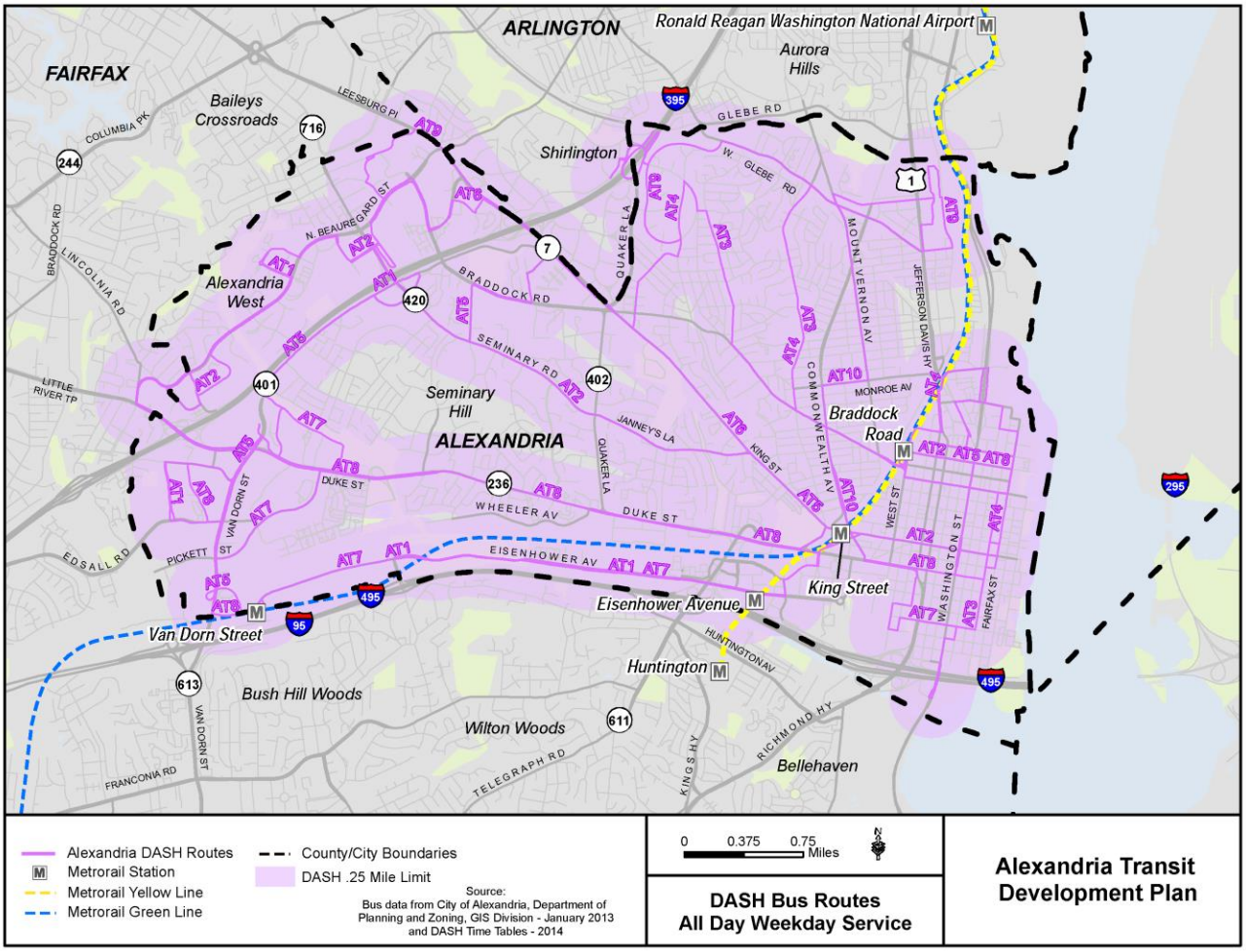
2.3.3 Service Coverage

The fixed-route bus routes service coverage analysis contained in this section identifies the geographic areas within the City of Alexandria that are served by transit as well as areas that are lacking coverage. The analysis takes into account the service coverage by time period (if there is a difference in the number of routes providing service different periods of the day), weekday and weekend, and by transit provider (DASH and Metrobus). The following map series depicts transit service coverage during the weekday peak, weekday mid-day, and the weekend (Saturday and Sunday).

The evaluation of coverage is based on a ¼ mile buffer around each route. This ¼ mile buffer represents the typical distance most riders will walk to access transit.

The first service coverage map is shown in Figure 3.1 and represents DASH weekday service coverage. This map covers the entire day since all DASH routes run throughout the day (unlike WMATA service, where many routes are peak period only).

Figure 3.1 – DASH Service Coverage – All Day Weekday

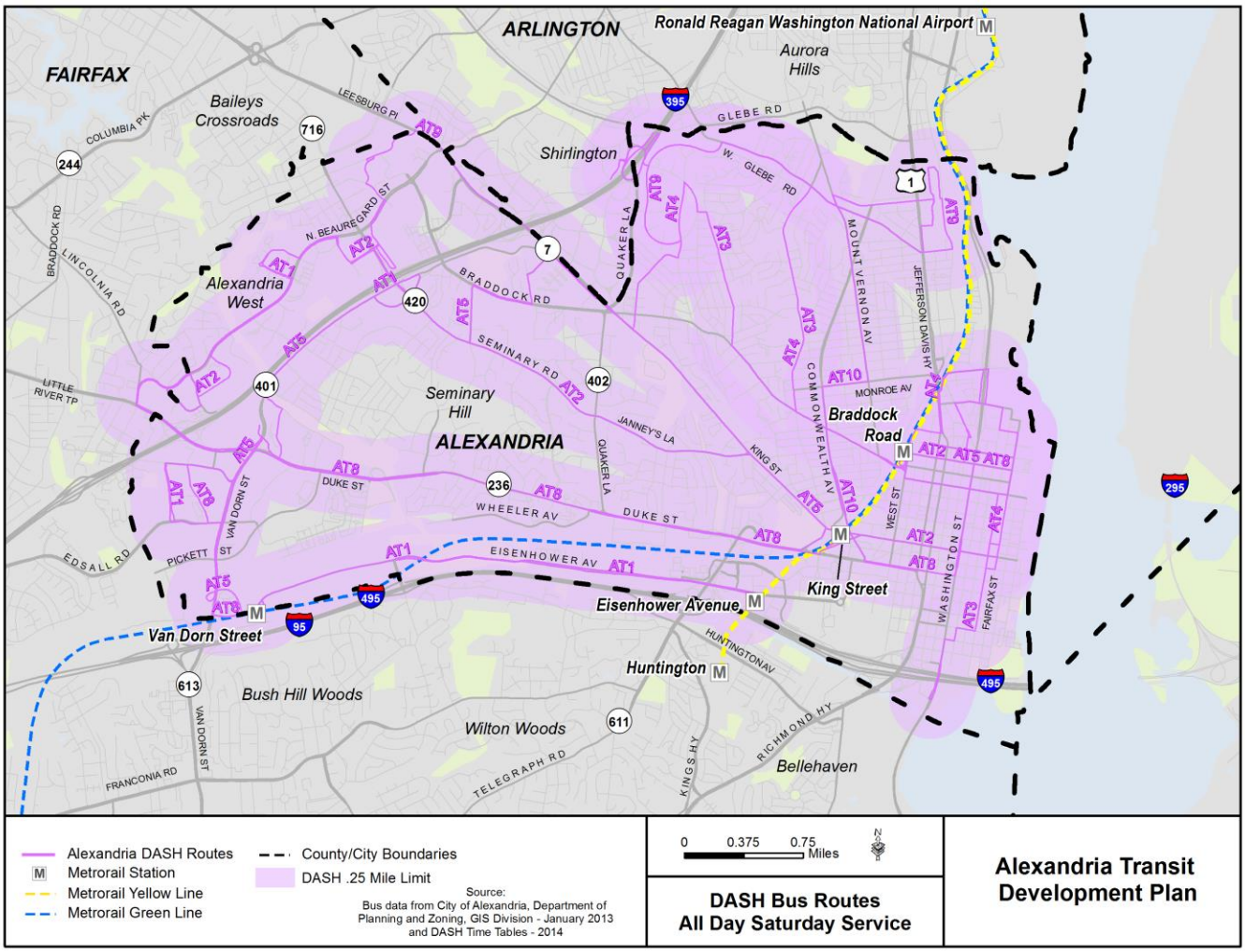


Source: DASH Geographic Information System DATA

This map shows nearly the entire city is covered by some form of DASH service, but with three specific areas not covered. The first area not covered is in the Seminary Hill neighborhood between Seminary Road and Duke Street. This gap reflects the fact that DASH services are generally focused in an east/west direction on Seminary and Duke, running toward Old Town. The second coverage gap is north of Braddock Road and south of Potomac Yard. This reflects the fact that service that runs north from Old Town does not run north of Braddock Road but rather terminates at the Braddock Road Metrorail Station. The final area where there is a small gap in service is in the Eisenhower East area, reflecting the fact that the Eisenhower Avenue services leave the corridor to access the King Street Metrorail station.

Figure 3.2 contains a map showing DASH Saturday coverage.

Figure 3.2 – DASH Service Coverage – Saturday

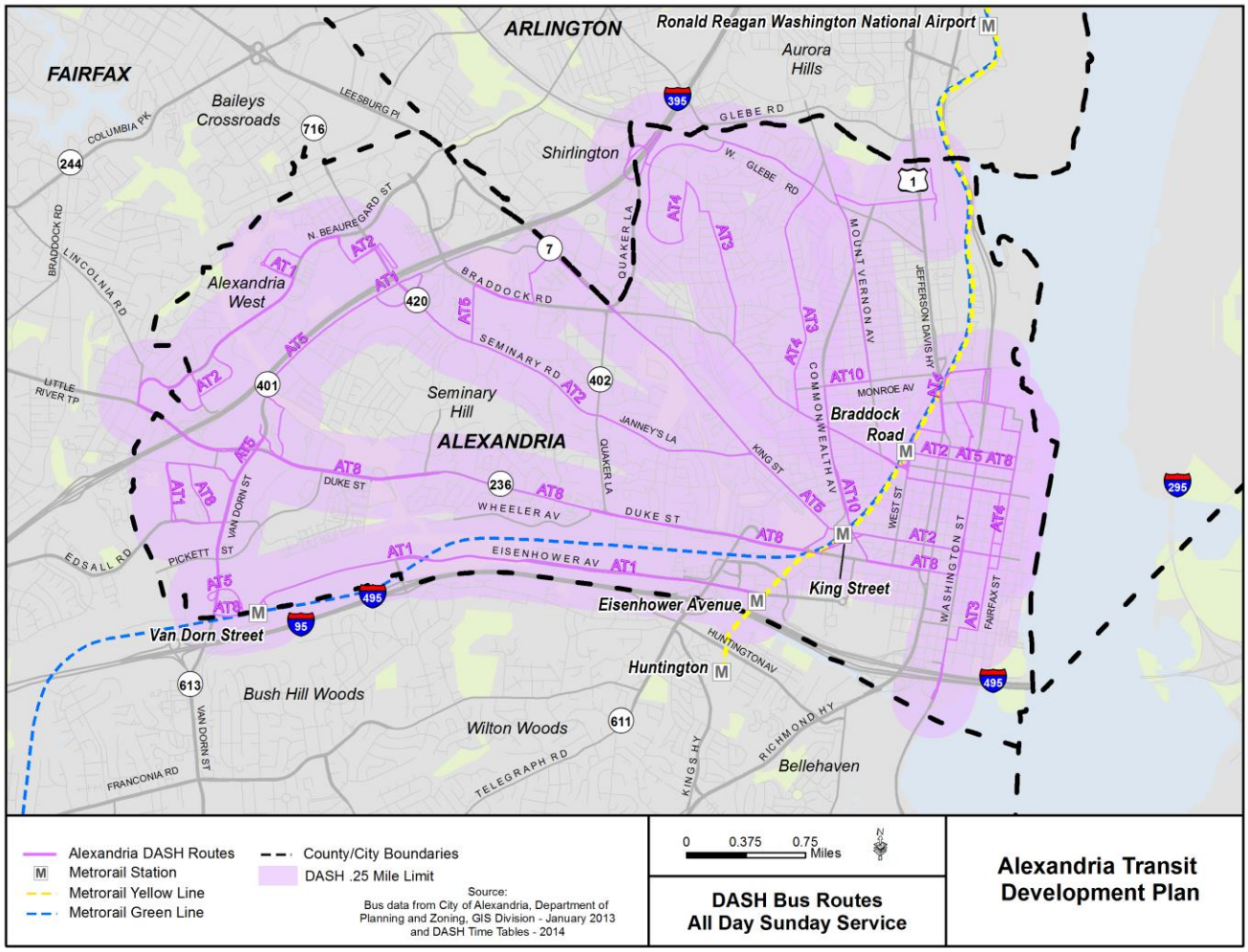


Source: DASH Geographic Information System DATA

The first area of the City with DASH service coverage on weekdays that does not have it on Saturdays is in the southeastern portion of the City, approximately between the Capital Beltway and Eisenhower Avenue. On weekdays, this area is covered by the AT3 and the AT7, neither of which run on Saturdays. The second area that is not covered is in the southwest portion of the City, along S. Pickett Street. This area is covered by the AT7, which, as noted, does not run on Saturday.

Figure 3.3 contains a map showing DASH Sunday coverage.

Figure 3.3 – DASH Service Coverage - Sunday

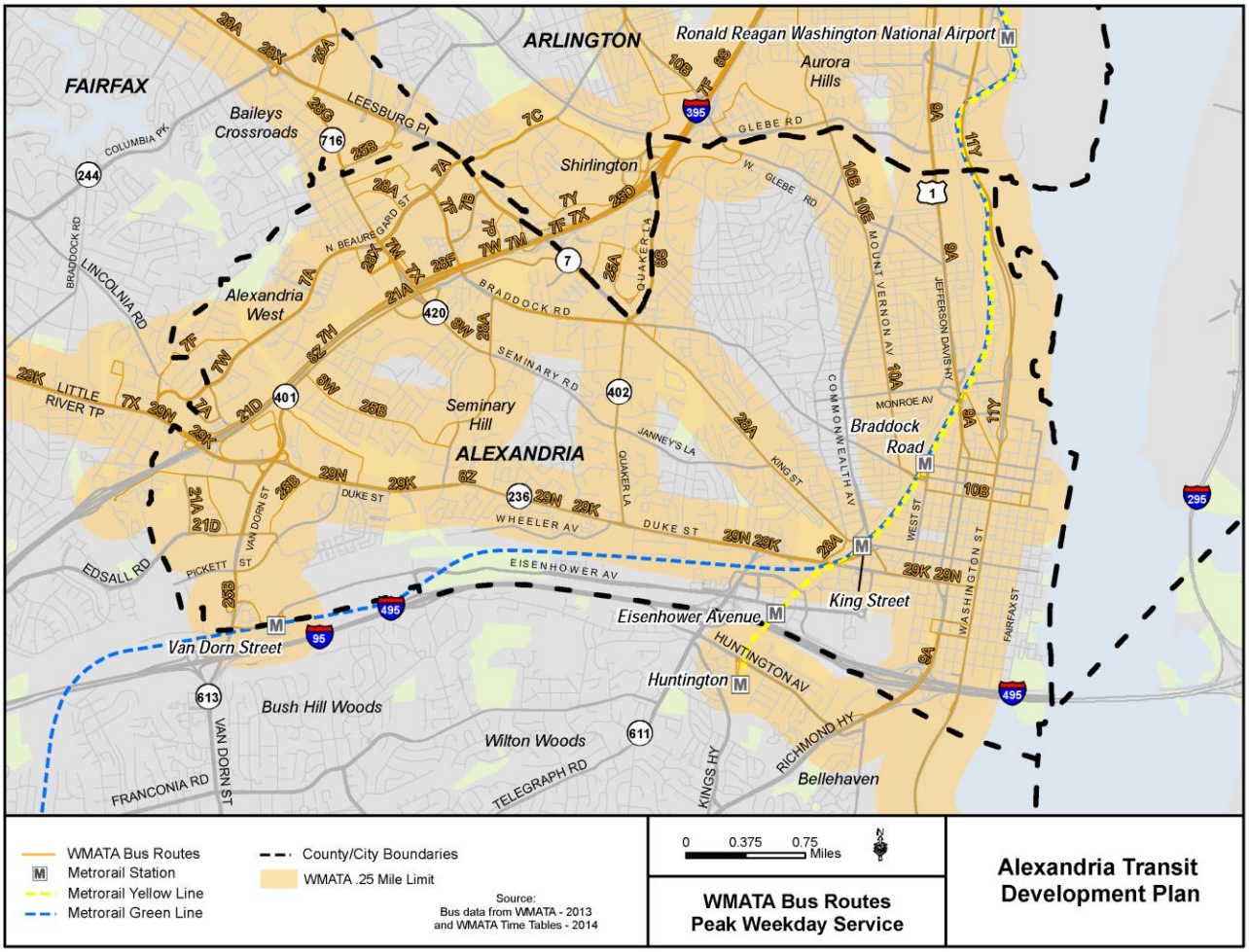


Source: DASH Geographic Information System Data

Two additional areas of the City that are served by DASH on weekdays and Saturdays are not served on Sunday. The first is in the area between Braddock Road and the southern border of Potomac Yards. The portion of this area that is not served on weekdays grows on Sundays due to the fact that the AT9, which runs into Potomac Yard on W. Glebe Road, does not run on Sundays. The other portion of the City that loses DASH service coverage on Sundays is the northwestern most portion of the City, which is also served by the AT9.

Figure 3.4 contains a map showing Metrobus weekday peak period service coverage.

Figure 3.4 – WMATA Metrobus Weekday Peak Period Service Coverage

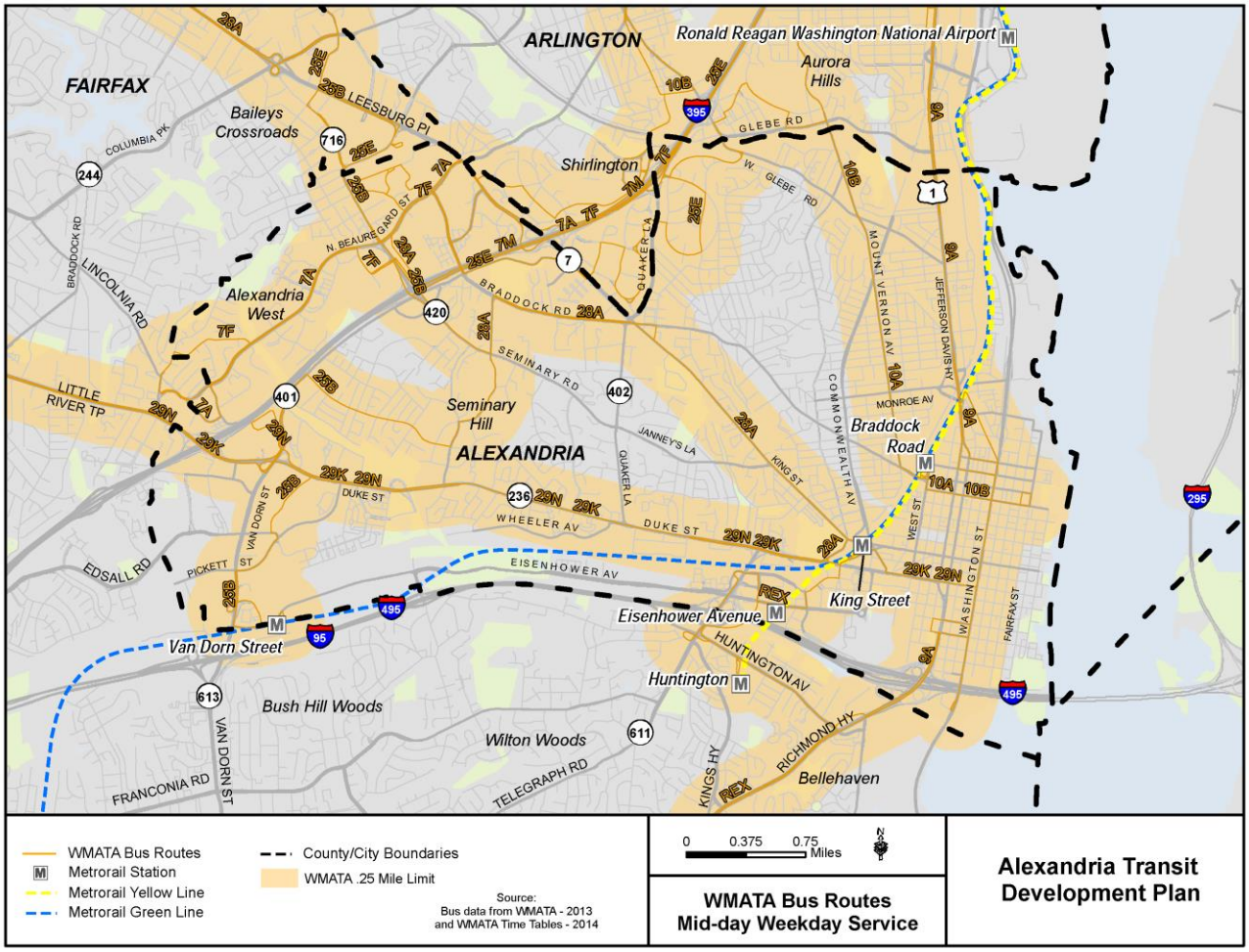


Source: WMATA Geographic Information System DATA

The first section of the City not covered by peak period Metrobus service is along the Eisenhower corridor. There also three areas in the central part of the City between Seminary Road and Duke Street. Finally, there is a large section of the City approximately north of King Street, west of Commonwealth Avenue, and east of Quaker Lane that is not served by Metrobus.

Figure 3.5 contains a map showing Metrobus weekday mid-day service coverage.

Figure 3.5 – WMATA Metrobus Weekday Peak Midday Service Coverage

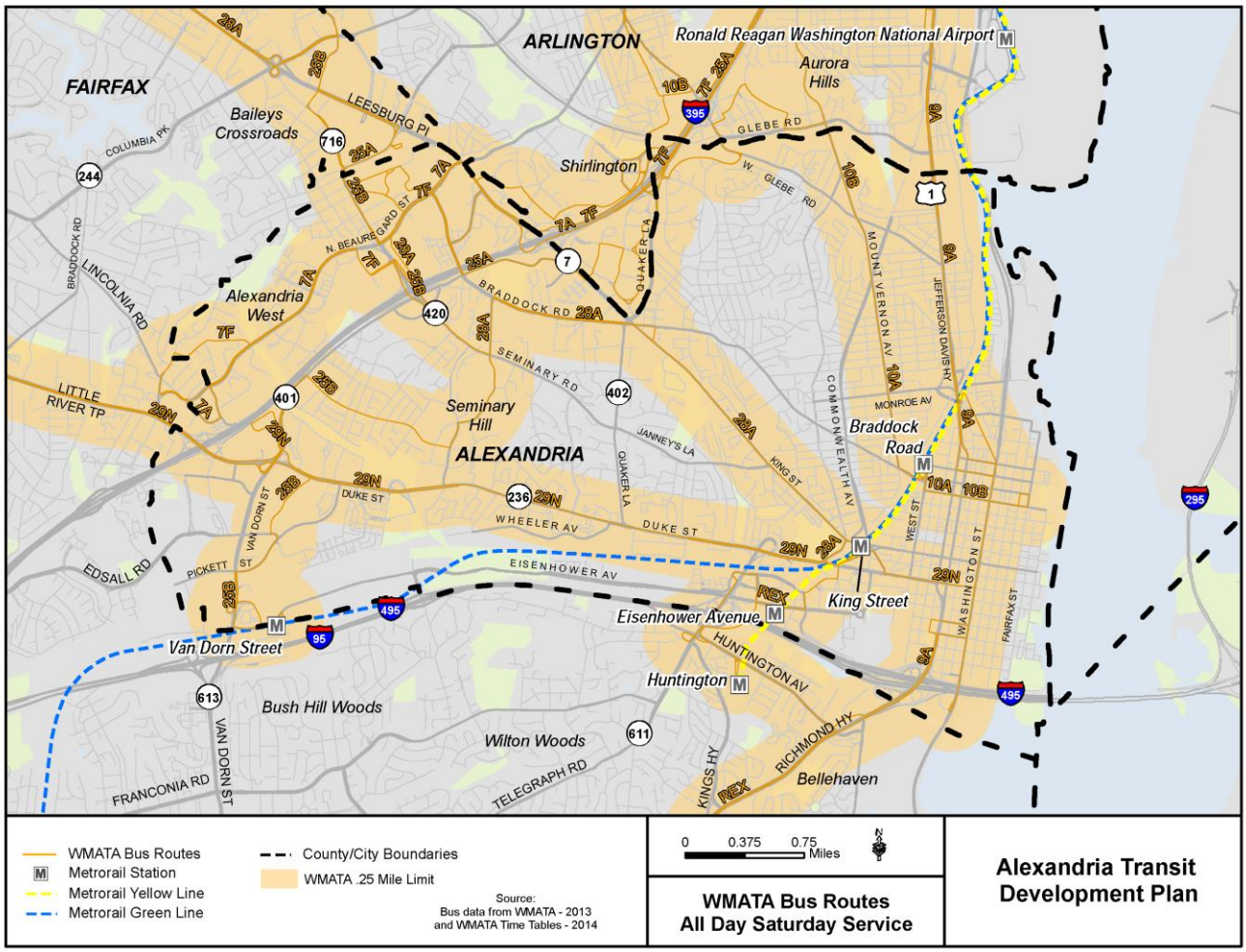


Source: WMATA Geographic Information System DATA

Because many of the Metrobus services within the City are peak period services only, the midday portions of the City not covered by Metrobus grow relative to the peak period. This includes a greater portion of the center of the City between approximately Seminary Road and Duke Street. It also includes a small increase in the size of the area between Commonwealth Avenue and Quaker Lane that is not covered during the peak period.

Figure 3.6 contains a map showing Metrobus Saturday service coverage.

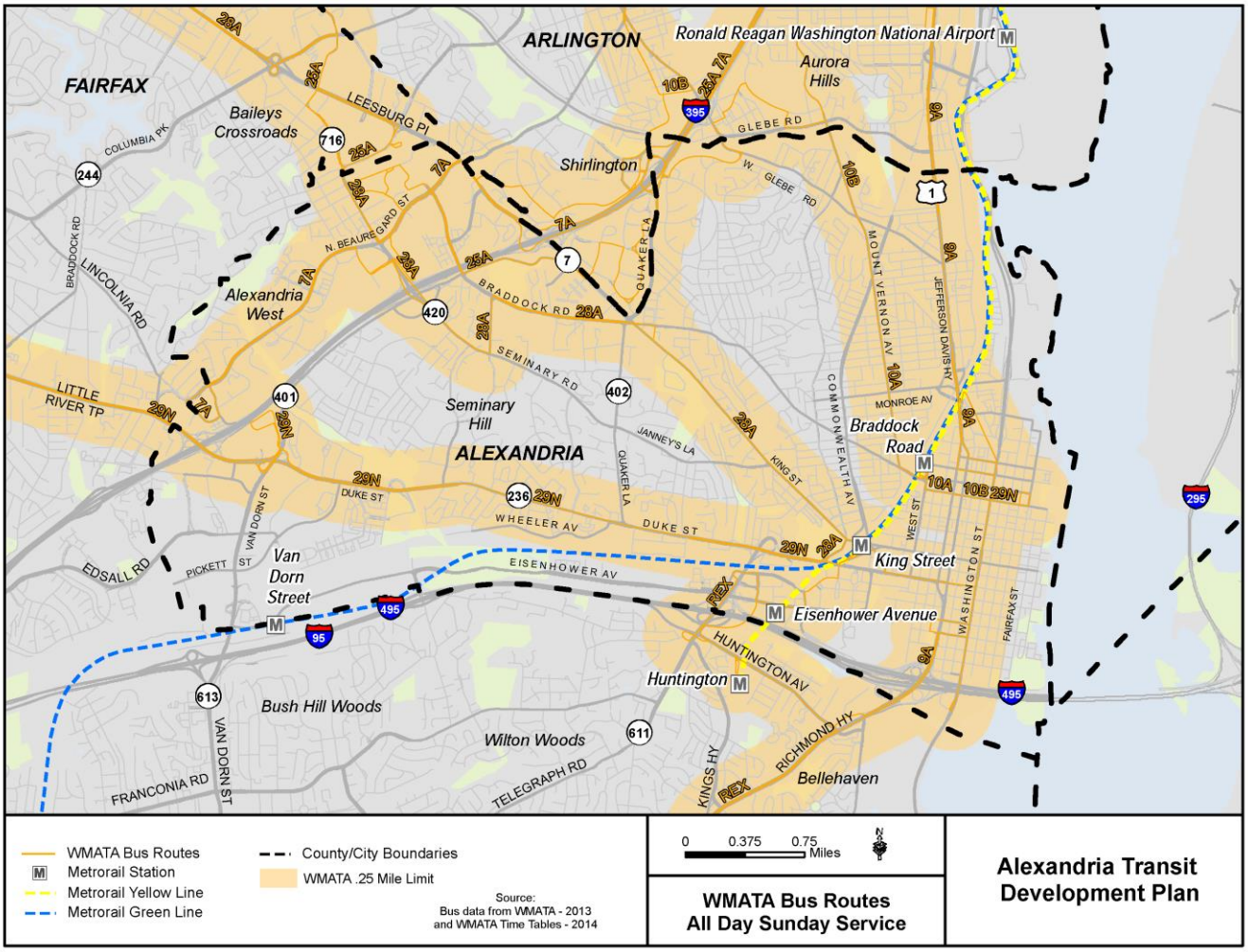
Figure 3.6 – WMATA Metrobus Saturday Service Coverage



Source: WMATA Geographic Information System DATA

The Saturday coverage map generally corresponds to the weekday Midday service coverage. This reflects the fact that core services run all day on weekdays and on Saturdays while supplemental service runs only in the weekday peak period.

Figure 3.7 – WMATA Metrobus Sunday Service Coverage

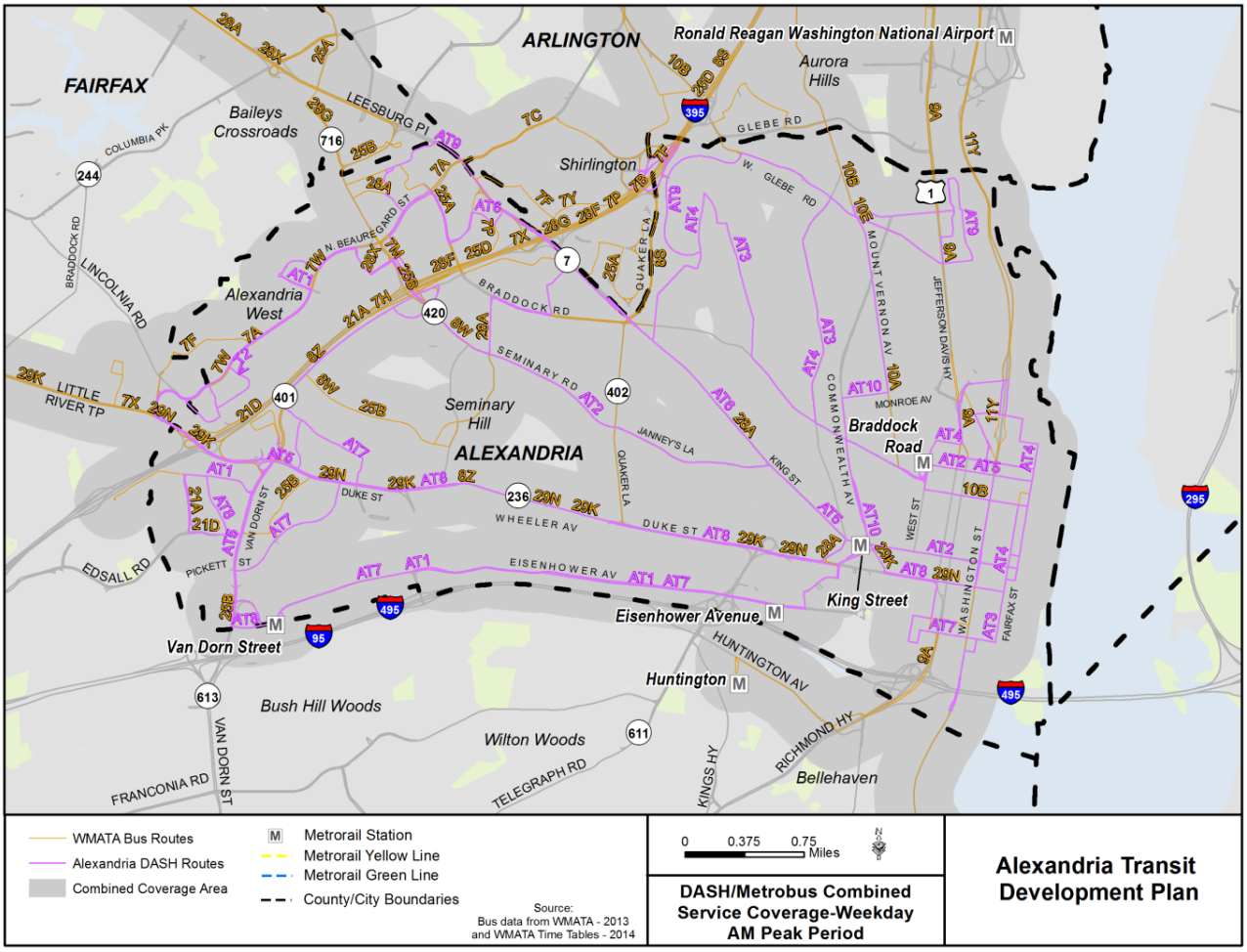


Source: WMATA Geographic Information System DATA

Sunday Metrobus service coverage patterns generally reflect those on Saturday and midday weekdays but the portion of the central portion of the City increases as does the portion along the Eisenhower corridor, especially relative to the far southwestern portion of the City straddling Van Dorn Street.

Figure 3.8 shows weekday peak service coverage for the combined DASH and Metrobus services within the City.

Figure 3.8 – DASH and Metrobus Weekday Peak Service Coverage

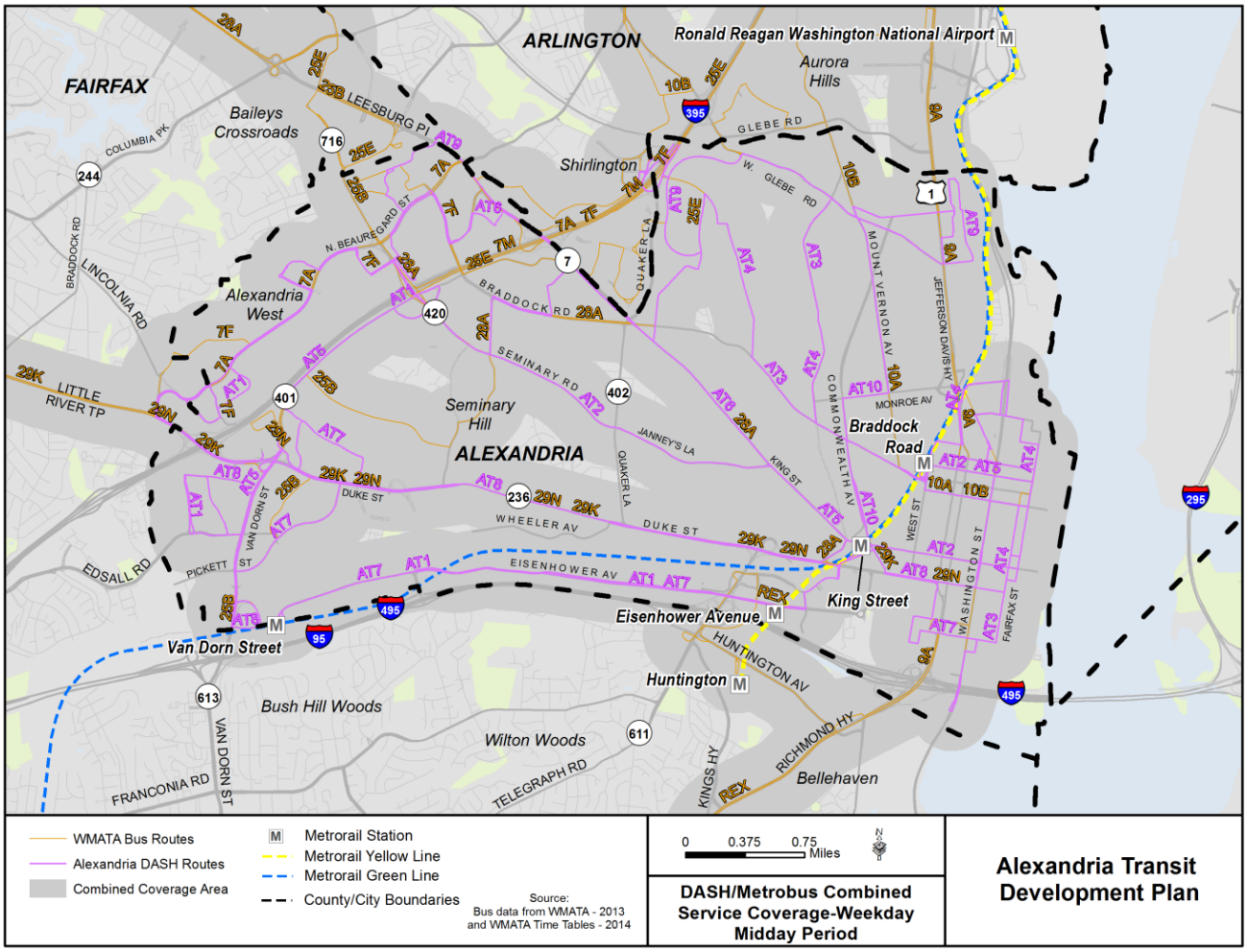


Source: DASH and WMATA Geographic Information System DATA

Combined weekday peak period Metrobus and DASH service coverage show a few minor gaps in service coverage throughout the City. This includes the Eisenhower East area, and in the center of the City between Seminary Road and Duke Street (Seminary Hill). Overall the combined services show that nearly all Alexandria residents are within walking distance of bus service during the peak periods on weekdays.

Figure3.9 shows weekday mid-day service coverage for the combined DASH and Metrobus services within the City.

Figure 3.9 – DASH and Metrobus Weekday Midday Service Coverage

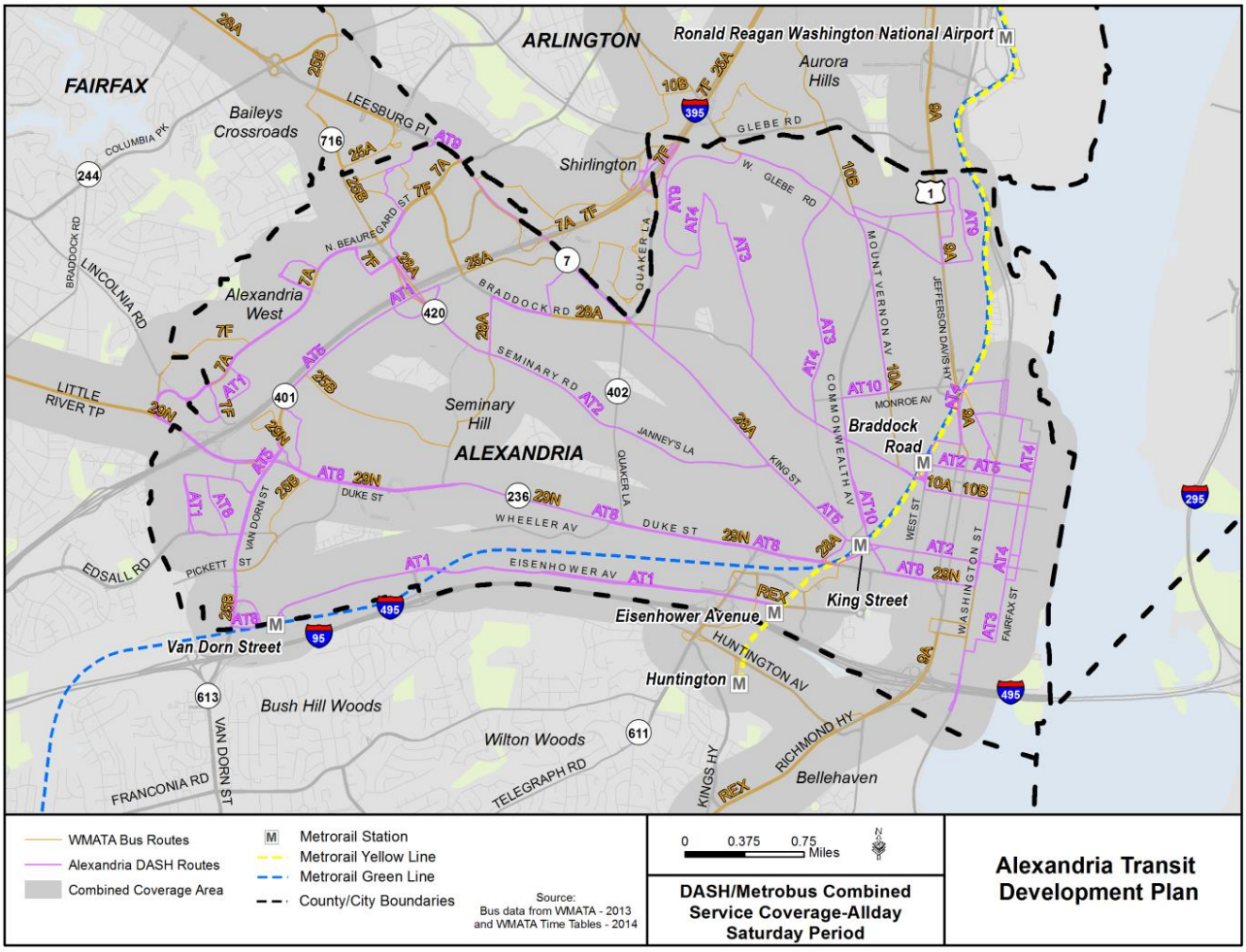


Source: DASH and WMATA Geographic Information System DATA

Combined weekday midday Metrobus and DASH service coverage generally track service coverage in the weekday peak period with the exception of a small expansion of unserved areas between Seminary Road and Duke Street and a small uncovered area north of Seminary Road along Quaker Lane.

Figure 3.10 shows Saturday all day service coverage for the combined DASH and Metrobus services within the City.

Figure 3.10 – DASH and Metrobus Saturday Service Coverage

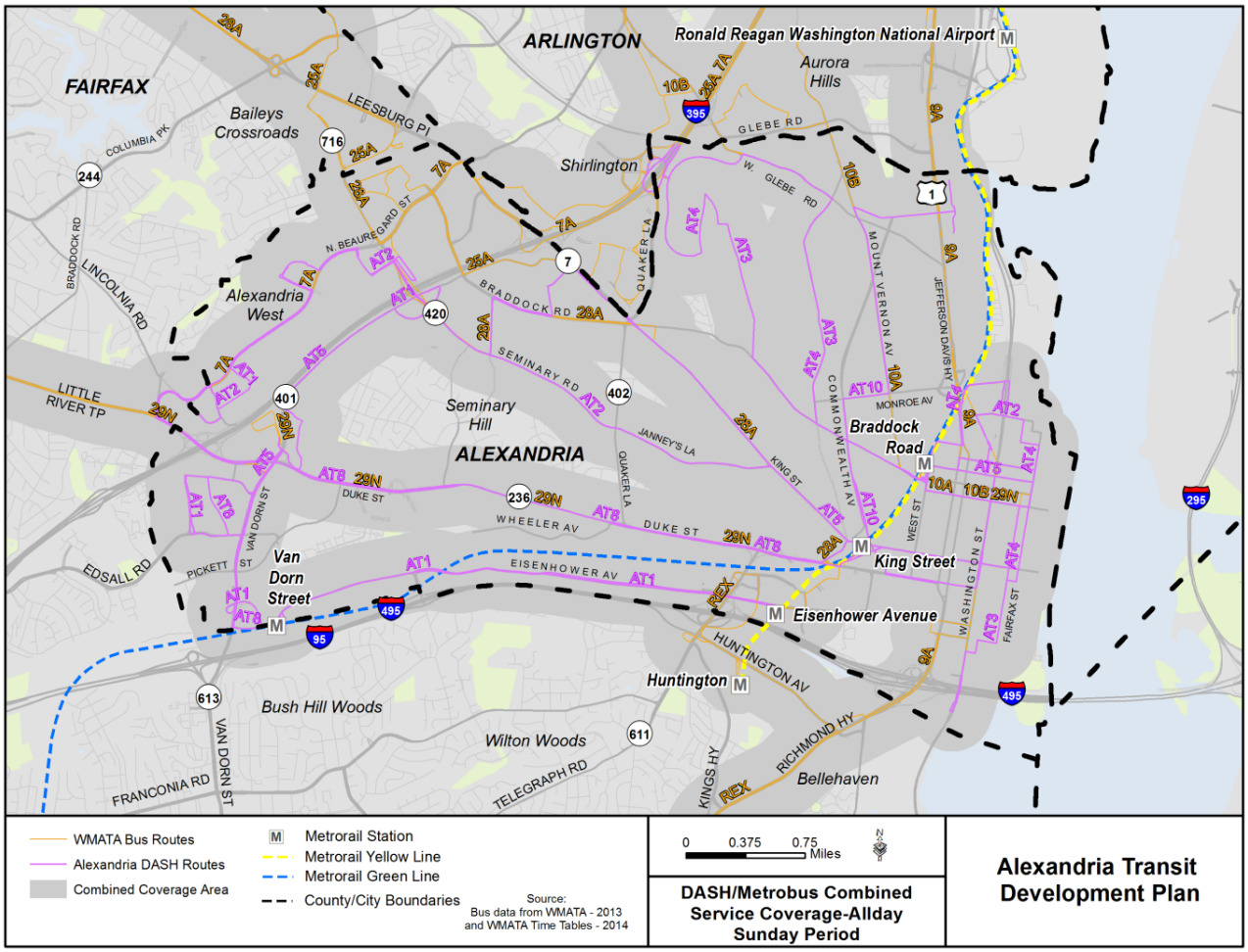


Source: DASH and WMATA Geographic Information System DATA

Portions of the City that are not covered by combined DASH and Metrobus services on Saturday include those areas not covered in the midday on weekdays as well as the area just north of Old Town North. Saturday combined service coverage is still quite extensive.

Figure 3.11 shows Sunday all day service coverage for the combined DASH and Metrobus services within the City.

Figure 3.11 – DASH and Metrobus Sunday Service Coverage



Source: DASH and WMATA Geographic Information System DATA

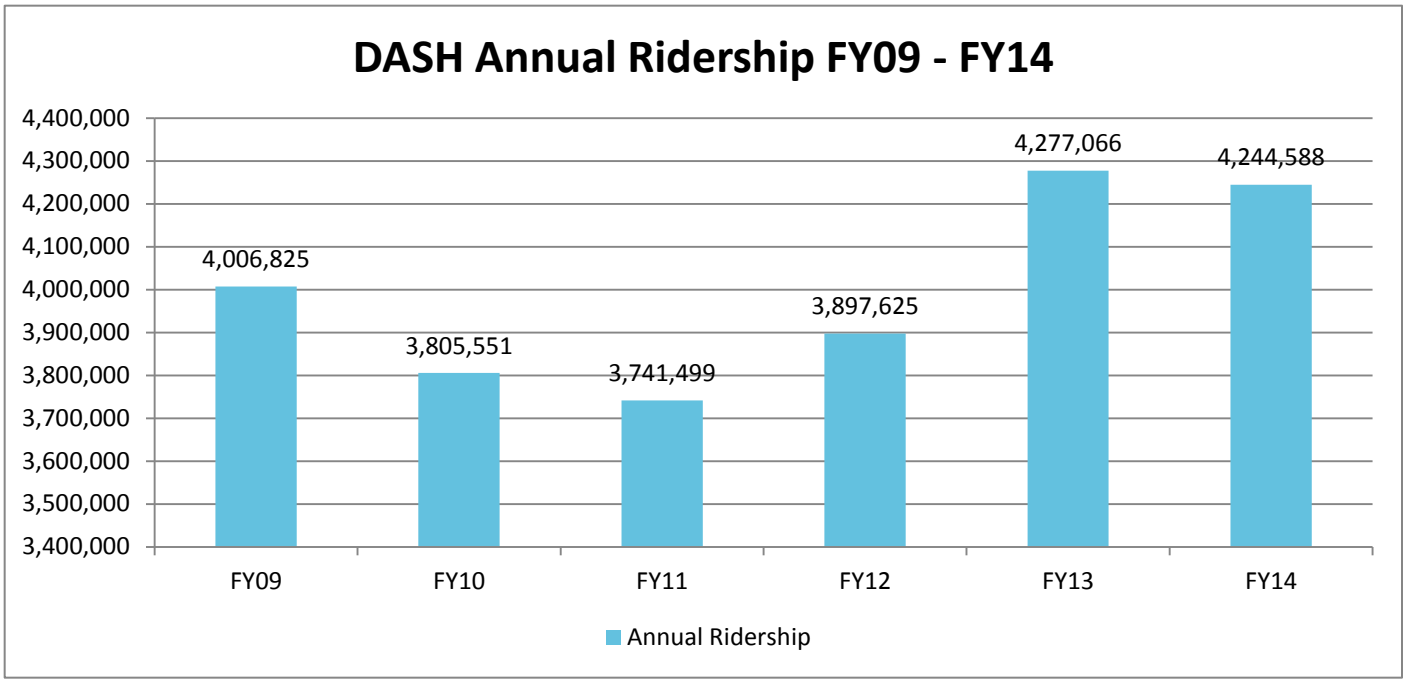
Areas of Alexandria not covered on Sunday by either DASH or WMATA include a larger area between Seminary Road and Duke Street in the Center of the City, north of Old Town, in Eisenhower East, and in the area north of the Van Dorn Metrorail Station,

2.4 Service Evaluation

2.4.1 Ridership

The first metric considered as part of the fixed route service evaluation is ridership. Outlined first is ridership data for DASH service and then following the DASH analysis is ridership data for Metrobus service within the City. Provided first in Figure 3.12 is a graphic showing ridership trends for the DASH system over the last six fiscal years.

Figure 3.12 - DASH Annual Ridership Trends – Last Five Years

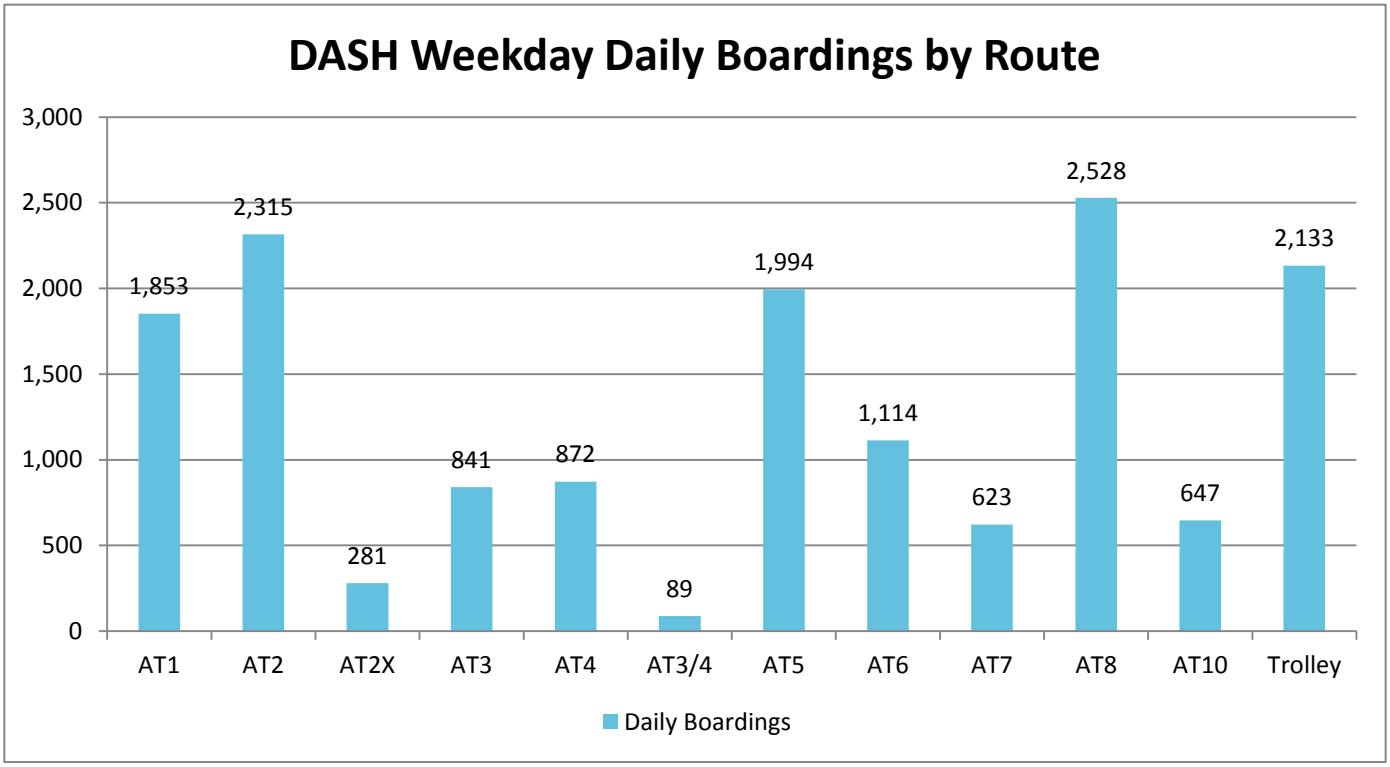


Source: DASH FY 2016 Draft Transit Development Program
Note: Annual Ridership after FY 2012 includes the King Street Trolley, which DASH assumed operation of in FY 2012

The data in Figure 3.12 shows a decline in annual ridership to a low point in FY11 but then an increase reflecting the assumption of King Street Trolley service at the beginning of FY12. There was a slight decline in annual ridership between FY13 and FY14.

Provided below in Figure 3.13 is a graphic showing DASH daily weekday ridership by route based on the On-Board Ridecheck completed in 2014.

Figure 3.13 - DASH Daily Weekday Ridership by Route



Source: DASH Comprehensive Operations Analysis (2014)

Note: The Trolley and AT2X data was not collected as part of the Comprehensive Operations Analysis. The ridership data for these routes is from the FY 2016 Alexandria Transit Development Program and represents ridership data for FY 2013

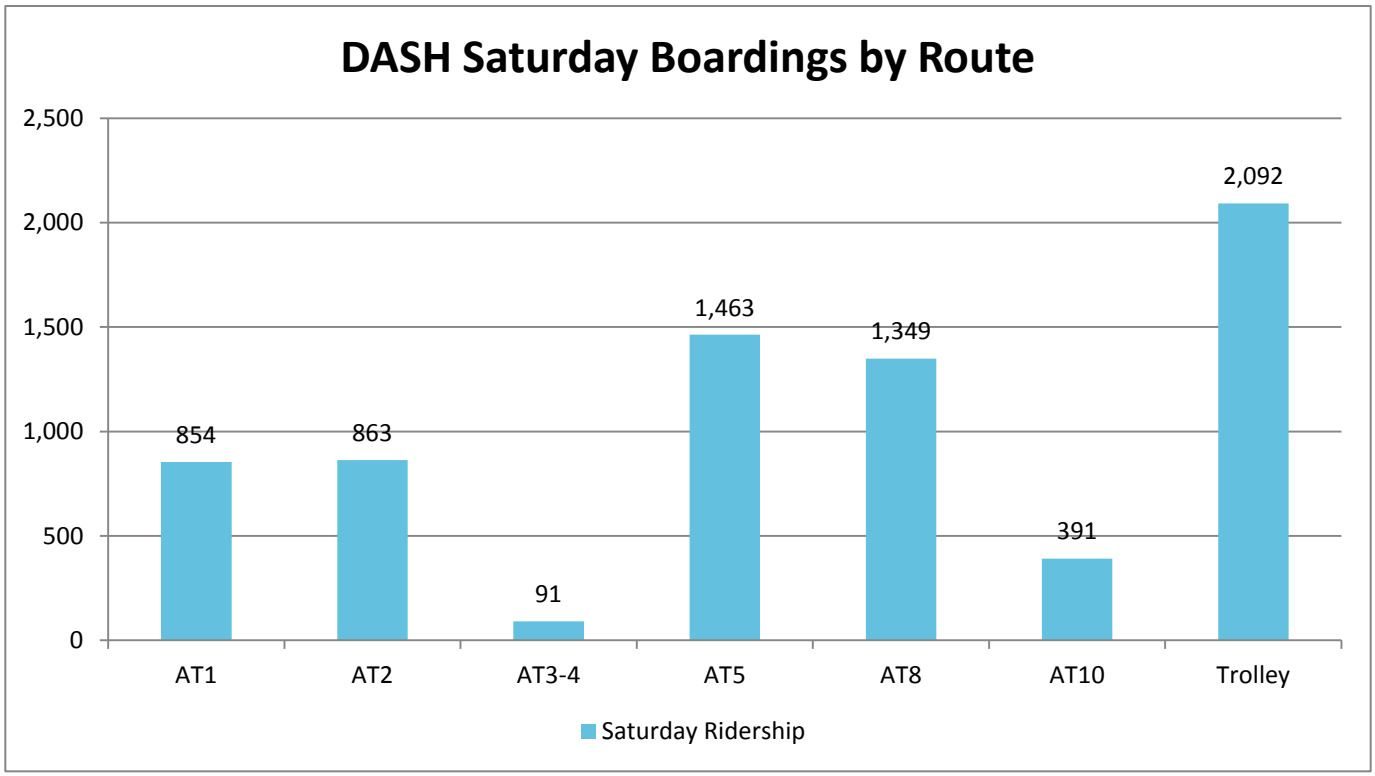
The data in the graphic show that DASH system ridership is dominated by four routes; the AT8, the AT2, the AT5, and the AT1. Together these routes carry 67% of all DASH Riders. The key market for each of these routes is as follows:

- The AT8 route serves the Duke Street corridor.
- The AT2 serves the Seminary Road corridor and also provides service to Mark Center and the Beauregard corridor.
- The AT5 serves the King Street corridor and also provides crosstown connections along the Van Dorn Street corridor
- The AT1 serves the Eisenhower Avenue corridor and also provides crosstown service to Landmark, the Beauregard corridor and Mark Center.

The data also show high ridership on the King Street Trolley, which serves visitors and tourists to the King Street corridor within Old Town Alexandria.

Outlined below in Figure 3.14 is data on daily DASH Saturday ridership by route.

Figure3.14 - DASH Saturday Ridership by Route



Source: DASH Comprehensive Operations Analysis (2014)

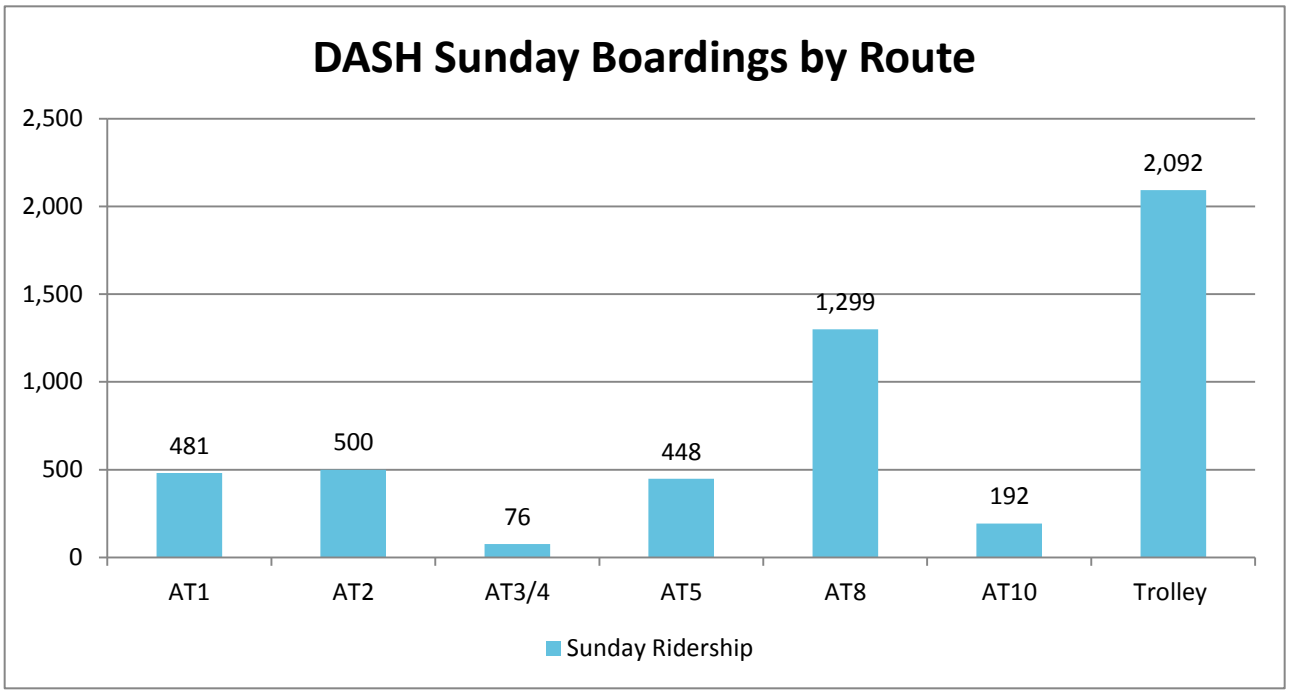
Note: Weekend Trolley ridership is available only as an annual figure. Saturday daily ridership presented here is an estimate based on factoring of annual figure.

The data in Figure 3.14 show that two DASH routes, the AT5 and AT8, dominate Saturday DASH ridership, carrying approximately 56% of Saturday DASH riders. Of note is that the AT5 has the highest ridership on Saturday of all Saturday DASH routes. On weekdays the highest ridership route is the AT8.

The King Street Trolley Saturday ridership is comparable to ridership on weekdays. This high Saturday ridership reflects the target market for the Trolley, which is visitors and tourists to the King Street corridor.

Outlined below in Figure 3.15 is data on daily Sunday DASH ridership by route.

Figure 3.15 - DASH Sunday Ridership by Route



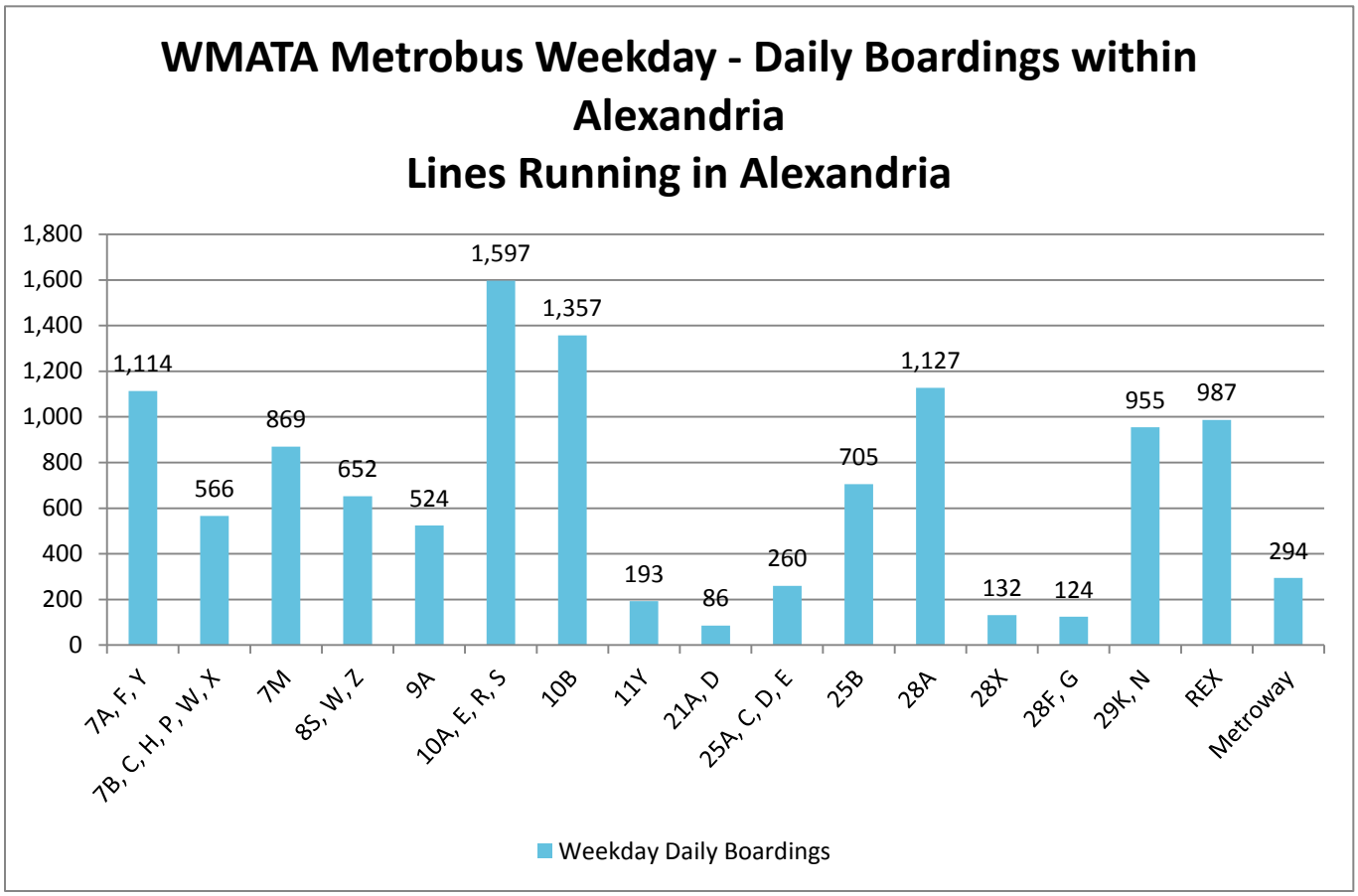
Source: DASH Comprehensive Operations Analysis (2014)

Note: Weekend Trolley ridership is available only as an annual figure. Sunday daily ridership presented here is an estimate based on factoring of annual figure.

The AT8 dominates Sunday DASH ridership, carrying 43% of all DASH Sunday riders. The King Street Trolley ridership estimate shows comparable ridership to Saturday.

Outlined below in Figures 3.16, 3.17 and 3.18 is daily boardings within Alexandria by day of week for each of the WMATA Metrobus services that run in Alexandria. Outlined first in Figure 3.16 is daily weekday boardings within Alexandria.

Figure 3.16 - WMATA Metrobus Alexandria Services - Weekday Daily Boardings within Alexandria

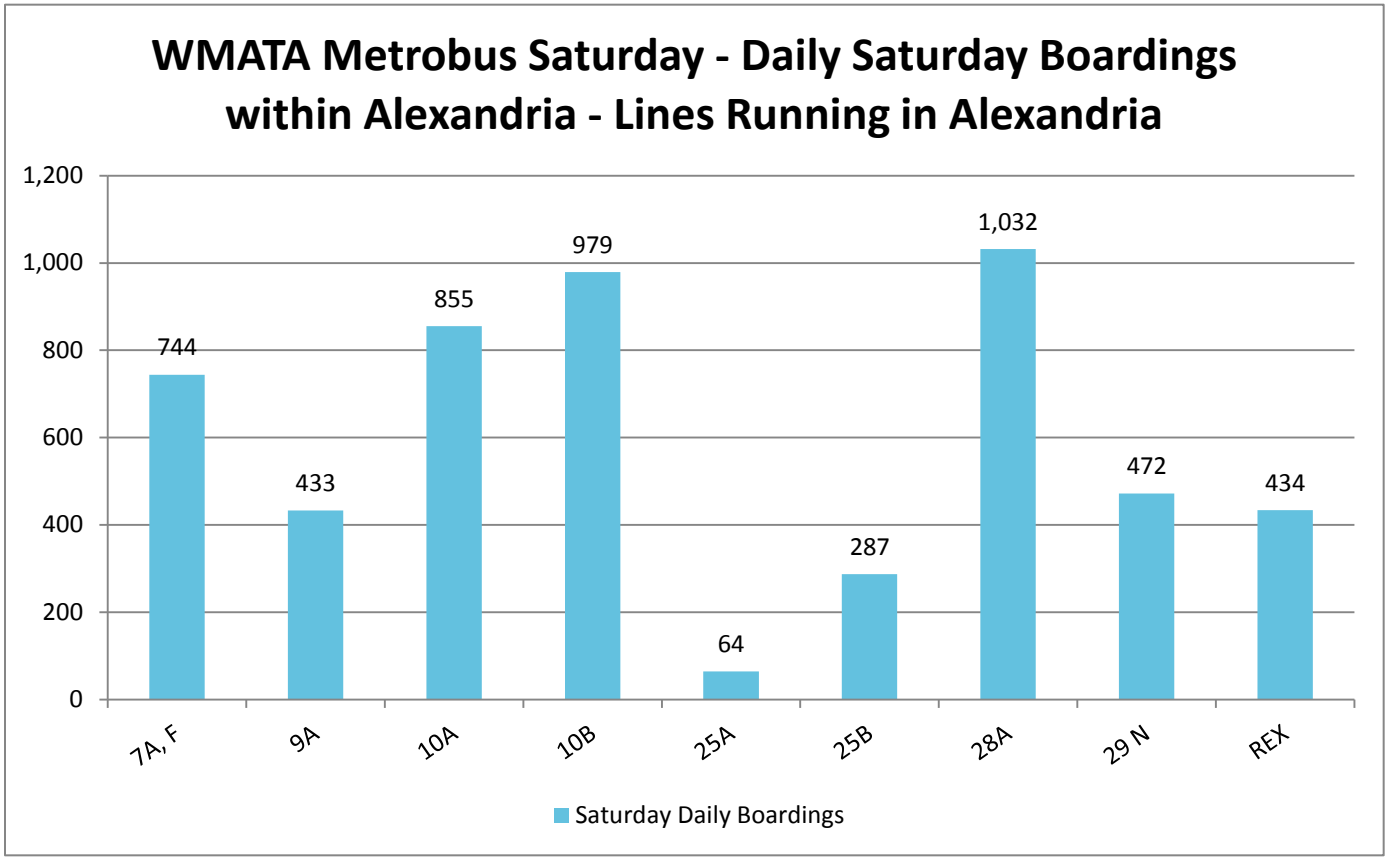


Source: WMATA Boardings and Alightings by Stop Data - 2014

The majority of these Metrobus lines run within Arlington and Alexandria, with a focus for many on the Pentagon Metrorail Station. Two of the heaviest ridership Lines, the 10 A, E, R, S and the 10B have the majority of their stops within Alexandria, though they provide important connections between Arlington and Alexandria. Also of note is the 28A, which though it runs predominantly within Fairfax County on VA Route 7 (Leesburg Pike), has significant boardings within Alexandria as well.

Figure 3.17 shows Saturday ridership on Metrobus Lines running in Alexandria.

Figure 3.17 - WMATA Metrobus Alexandria Services - Saturday Daily Boardings within Alexandria

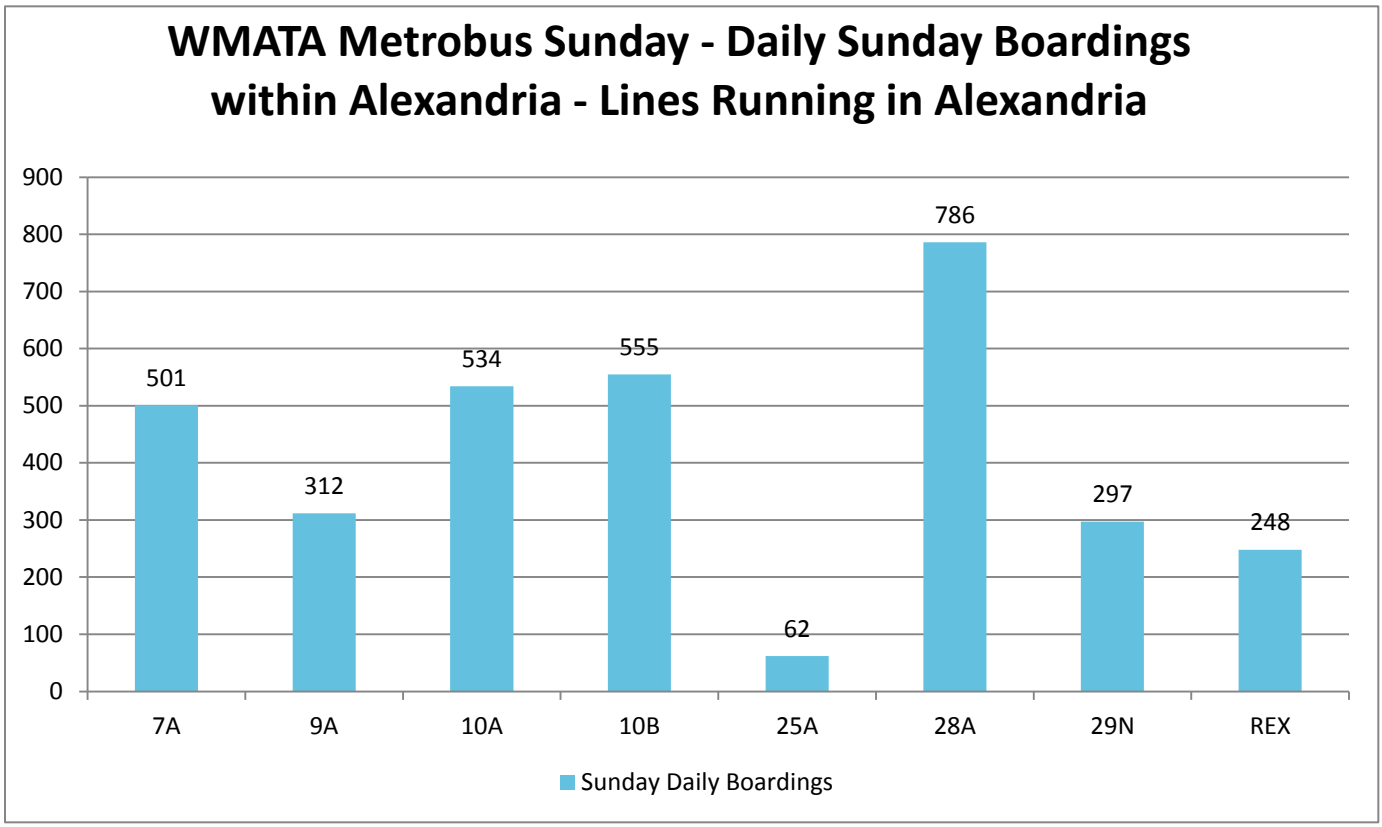


Source: WMATA Boardings and Alightings by Stop Data – 2014

Of significant note regarding Saturday boardinrgs is the high Saturday ridership on the 28A Line, with Saturday boardings within Alexandria nearly equaling 28A weekday boardings.

Figure 3.18 shows Sunday ridership on Metrobus Lines running in Alexandria.

Figure 3.18 - WMATA Metrobus Alexandria Services – Sunday Daily Boardings within Alexandria



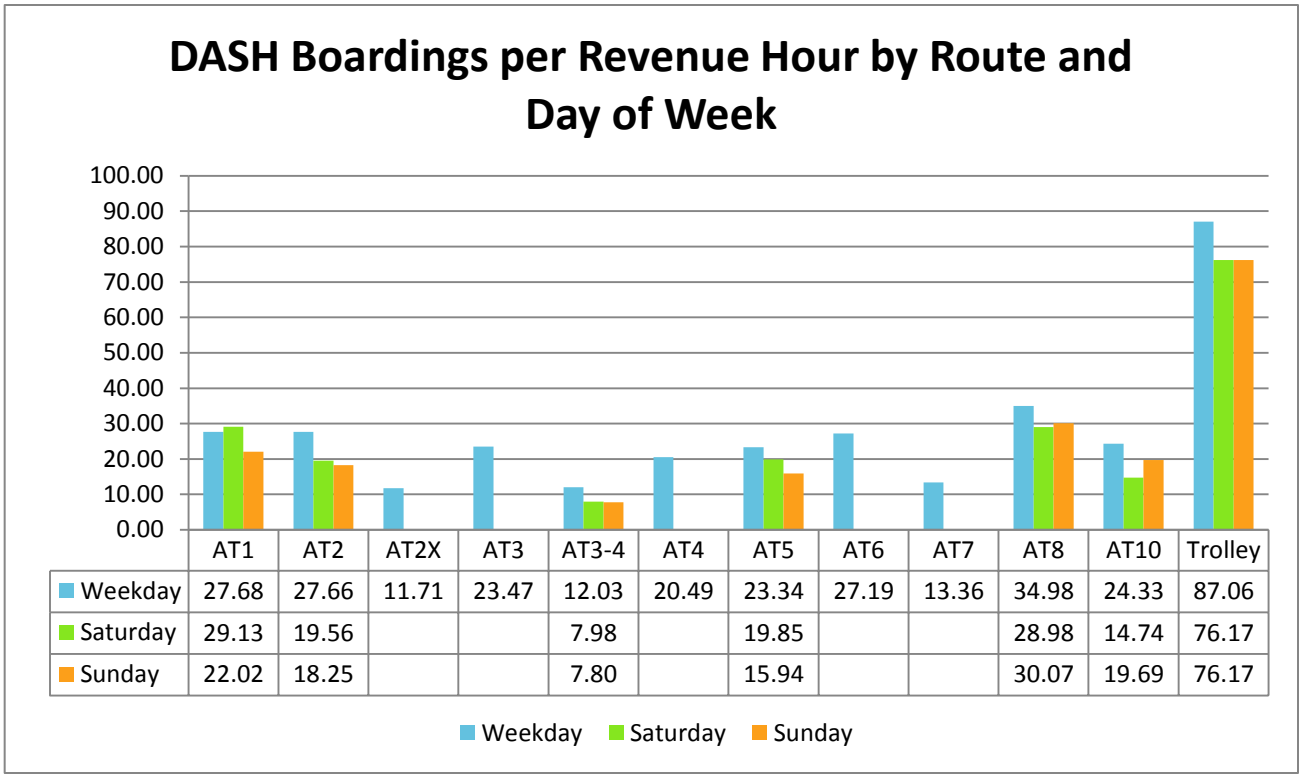
Source: WMATA Boardings and Alightings by Stop Data – 2014

2.4.2 Productivity

Three productivity measures are evaluated for both DASH and WMATA Metrobus service within Alexandria: boardings per revenue hour; boardings per revenue mile; and boardings per trip. The first analysis is of Boardings per Revenue Hour.

Figure 3.19 below shows DASH boardings per revenue hour by route and day of week.

Figure 3.19 - DASH Boardings per Revenue Hour by Route and Day of Week



	AT1	AT2	AT2X	AT3	AT3-4	AT4	AT5	AT6	AT7	AT8	AT10	Trolley
Weekday	27.68	27.66	11.71	23.47	12.03	20.49	23.34	27.19	13.36	34.98	24.33	87.06
Saturday	29.13	19.56			7.98		19.85			28.98	14.74	76.17
Sunday	22.02	18.25			7.80		15.94			30.07	19.69	76.17

Source: DASH Comprehensive Operations Analysis (2014)

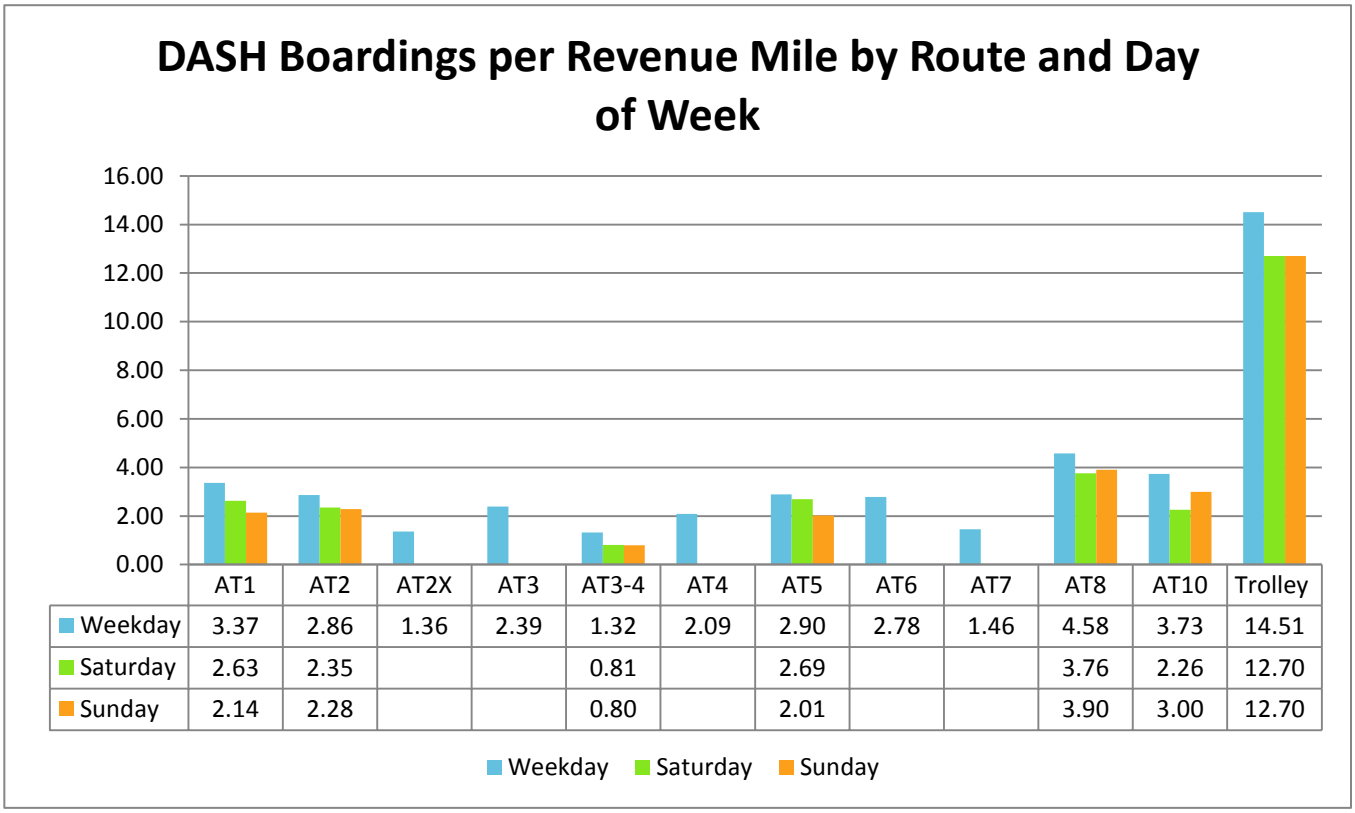
The data in Figure 3.19 show that DASH boardings per revenue hour, not surprisingly, track closely with daily overall boardings. Of interest on two routes, the AT8 and AT10, is that Sunday boardings per revenue hour are higher than Saturday. This likely reflects robust ridership on Sundays in conjunction with less frequent service, thus fewer revenue hours of service provided. Also of note is the higher boardings per revenue hour on Saturday on the AT1 than on weekdays.

The high boardings per revenue hour on the King Street Trolley reflect high ridership and a short route (1.5 miles in length) that requires relatively few revenue hours to meet service.

Relative to the proposed DASH productivity standard outlined in Chapter 3 of 24 boardings per revenue hour, weekday routes not meeting this standard are the AT2X, the AT3-4, the AT4, and the AT7. These routes generally serve less dense portions of the City. DASH and the City accepts this lower productivity in order to ensure all portions of the City receive transit coverage.

Outlined below in Figure 3.20 is data on DASH boardings per revenue mile by route and day of week.

Figure 3.20 - DASH Boardings per Revenue Mile by Route and Day of Week



	AT1	AT2	AT2X	AT3	AT3-4	AT4	AT5	AT6	AT7	AT8	AT10	Trolley
Weekday	3.37	2.86	1.36	2.39	1.32	2.09	2.90	2.78	1.46	4.58	3.73	14.51
Saturday	2.63	2.35			0.81		2.69			3.76	2.26	12.70
Sunday	2.14	2.28			0.80		2.01			3.90	3.00	12.70

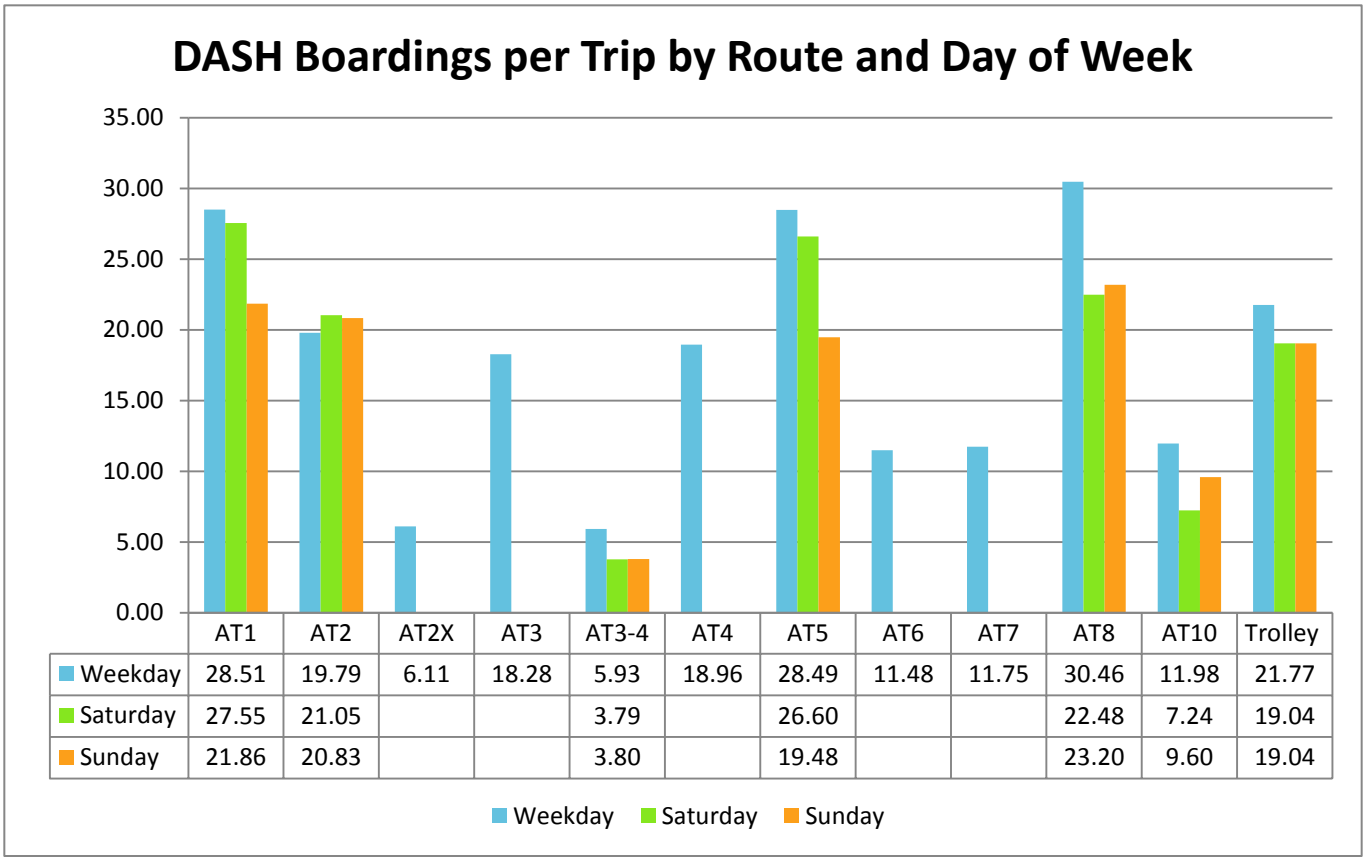
Source: DASH Comprehensive Operations Analysis (2014)

The boardings per revenue mile data in Figure 3.20 generally follow the same patterns as those in Figure 3.19 (boardings per revenue hour), with the highest boardings per revenue mile tracking with route ridership.

The higher figure for the Alexandria Trolley again reflects high ridership and a very short trip distance.

Outlined below in Figure 3.21 is data on DASH boardings per trip.

Figure 3.21 - DASH Boardings per Trip by Route and Day of Week



	AT1	AT2	AT2X	AT3	AT3-4	AT4	AT5	AT6	AT7	AT8	AT10	Trolley
Weekday	28.51	19.79	6.11	18.28	5.93	18.96	28.49	11.48	11.75	30.46	11.98	21.77
Saturday	27.55	21.05			3.79		26.60			22.48	7.24	19.04
Sunday	21.86	20.83			3.80		19.48			23.20	9.60	19.04

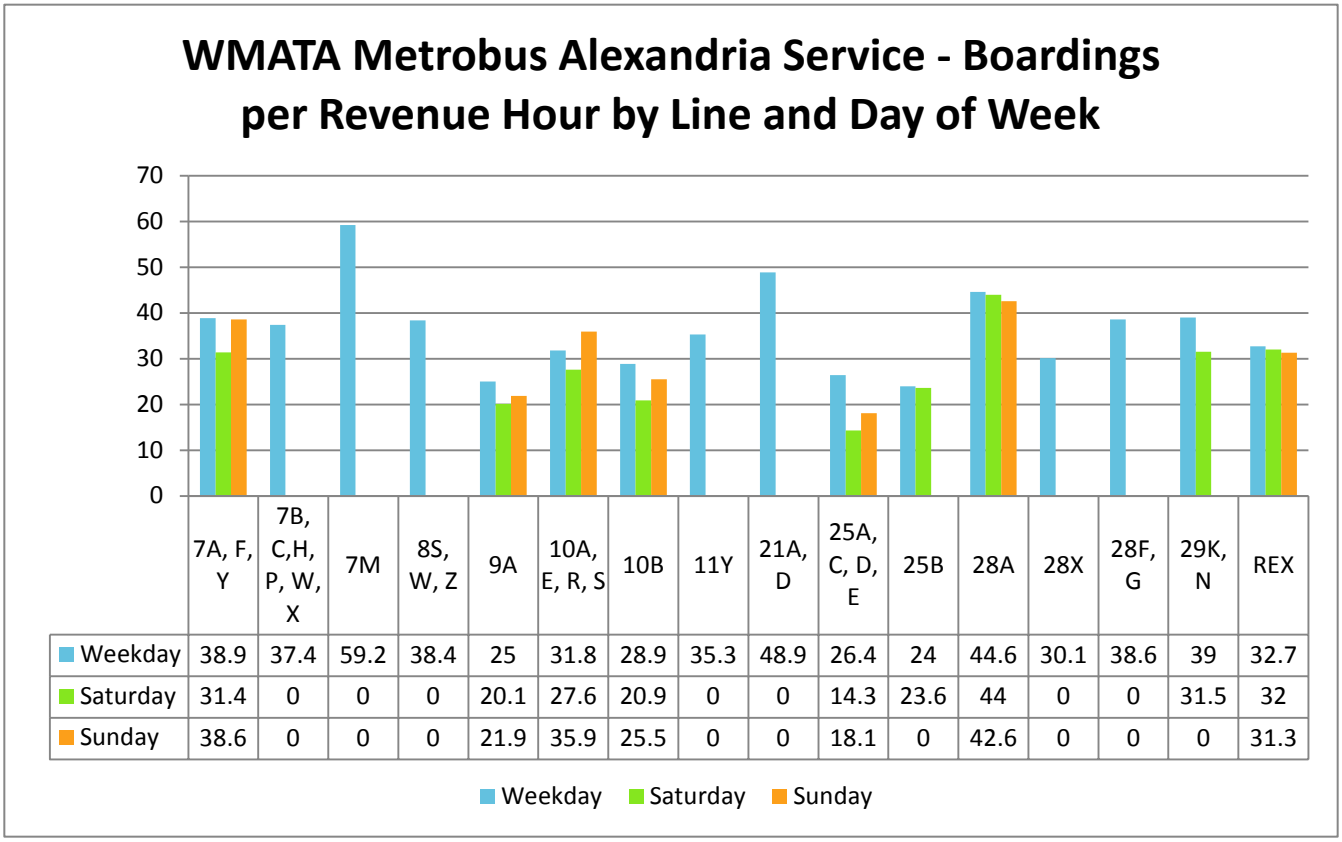
Source: DASH Comprehensive Operations Analysis (2014)

The boardings per trip data in Figure 3.21 generally follow the same patterns as the boardings per revenue hour and boardings per revenue mile data outlined in the previous figures. As with those metrics, the highest performing routes are also those with the highest daily ridership.

The Trolley boardings per trip do not stand out like they do for boardings per revenue hour and boardings per revenue mile because in spite of the high ridership, the Trolley service has a large number of trips on which to carry these riders (the trolley service runs 15 minute headways throughout the day and has long service hours, thus resulting in a large number of trips provided).

Outlined below in Figure 3.22 is data on WMATA Metrobus boardings per revenue hour.

Figure 3.22 - WMATA Metrobus Boardings per Revenue Hour by Route and Day of Week



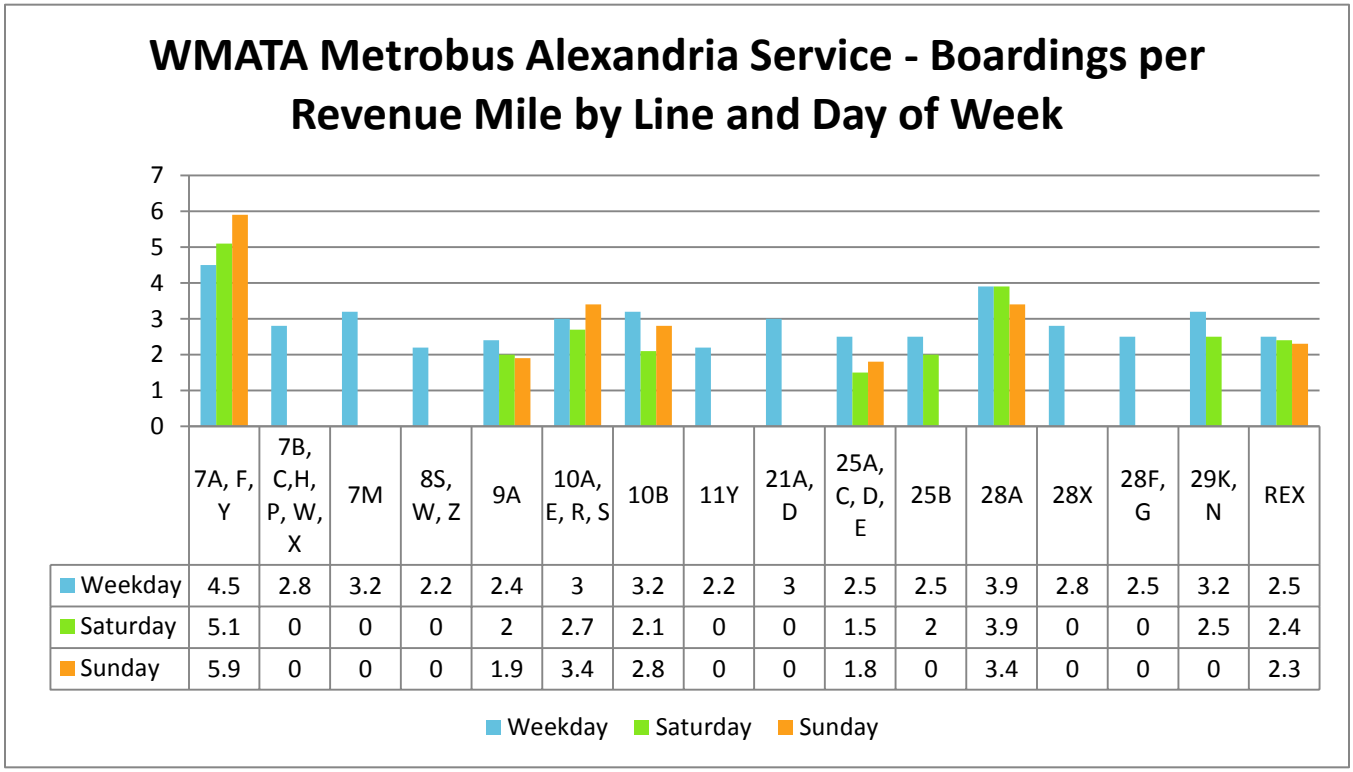
	7A, F, Y	7B, C,H, P, W, X	7M	8S, W, Z	9A	10A, E, R, S	10B	11Y	21A, D	25A, C, D, E	25B	28A	28X	28F, G	29K, N	REX
Weekday	38.9	37.4	59.2	38.4	25	31.8	28.9	35.3	48.9	26.4	24	44.6	30.1	38.6	39	32.7
Saturday	31.4	0	0	0	20.1	27.6	20.9	0	0	14.3	23.6	44	0	0	31.5	32
Sunday	38.6	0	0	0	21.9	35.9	25.5	0	0	18.1	0	42.6	0	0	0	31.3

Source: WMATA Productivity Report (2014)
Note: This data is for the entirety of each line, not just the portion of the line within Alexandria. Service data is not broken out by jurisdiction

Unlike DASH service, WMATA Metrobus boardings per revenue hour do not generally track with daily ridership on the Line. For instance, the 28A Line has significantly higher daily ridership than the other Metrobus Lines evaluated but its boardings per revenue hour are lower than two of the other Lines evaluated and approximately the same as a number of others. This pattern of not tracking directly with ridership is related to differences in line lengths and run times for the services evaluated. The 28A for instance is a long route in terms of length and run time, thus resulting in high revenue hours required to provide the service. Even with its high ridership, the high revenue hours necessary for the service result in a lower boardings per revenue hour.

Figure 3.23 below summarizes data on boardings per revenue mile on the Metrobus routes running in Alexandria.

Figure 3.23 - WMATA Metrobus Boardings per Revenue Mile by Route and Day of Week



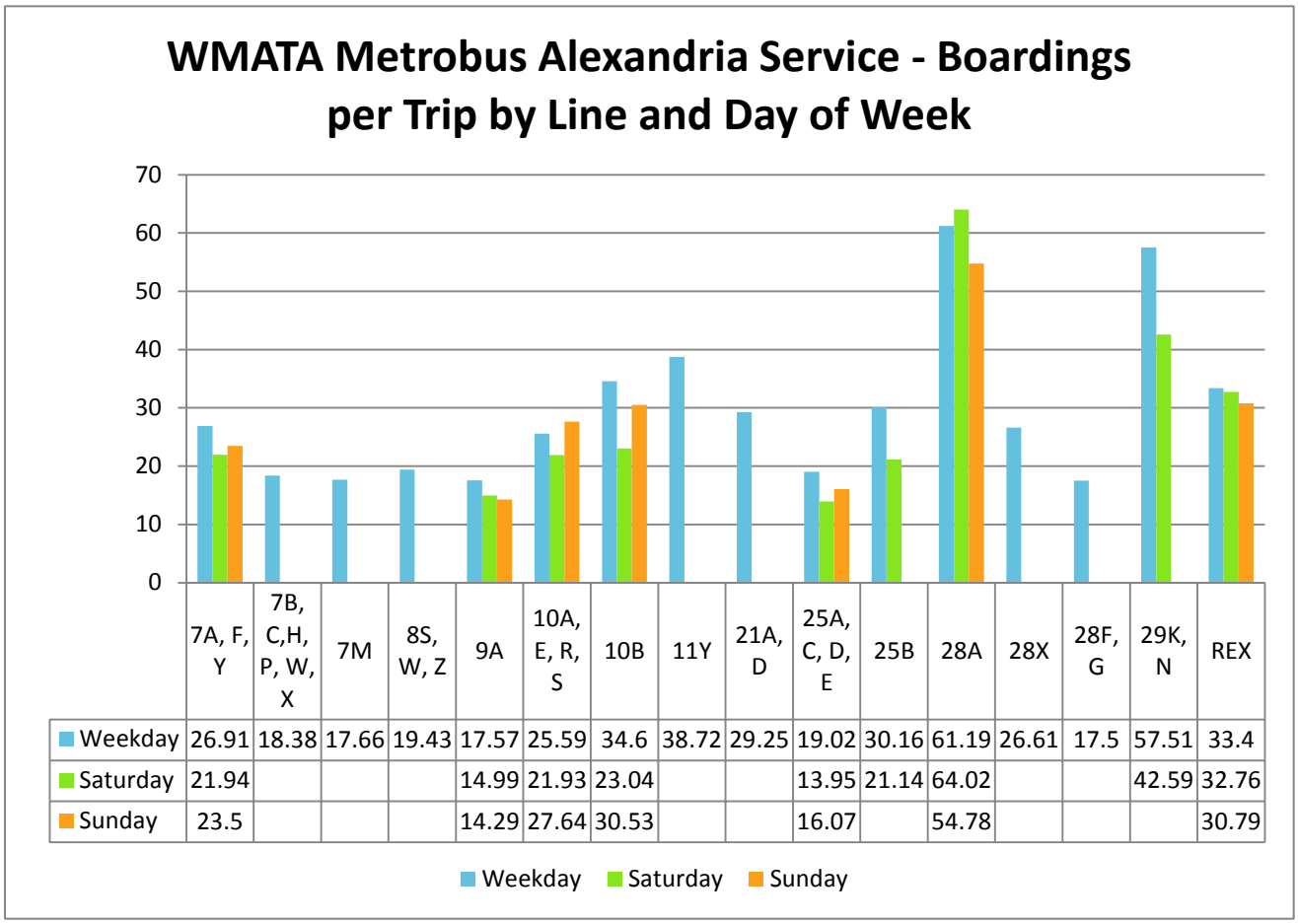
	7A, F, Y	7B, C,H, P, W, X	7M	8S, W, Z	9A	10A, E, R, S	10B	11Y	21A, D	25A, C, D, E	25B	28A	28X	28F, G	29K, N	REX
Weekday	4.5	2.8	3.2	2.2	2.4	3	3.2	2.2	3	2.5	2.5	3.9	2.8	2.5	3.2	2.5
Saturday	5.1	0	0	0	2	2.7	2.1	0	0	1.5	2	3.9	0	0	2.5	2.4
Sunday	5.9	0	0	0	1.9	3.4	2.8	0	0	1.8	0	3.4	0	0	0	2.3

Source: WMATA Productivity Report (2014)
Note: This data is for the entirety of each line, not just the portion of the line within Alexandria. Service data is not broken out by jurisdiction

The data in Figure 3.23 shows the 7A, F, Y Line with the highest boardings per revenue mile of the Metrobus Lines running in Alexandria. Of significant interest is the fact the highest boardings per revenue mile on this line occur on Sunday, reflecting the fact that there is robust ridership on Sunday relative to the level of service provided. Boardings per revenue mile on the other Metrobus Lines generally range between 2.5 and 4 throughout the week.

Figure 3.24 below summarizes Metrobus boardings per trip data.

Figure 3.24 - WMATA Metrobus Boardings per Trip by Route and Day of Week



	7A, F, Y	7B, C,H, P, W, X	7M	8S, W, Z	9A	10A, E, R, S	10B	11Y	21A, D	25A, C, D, E	25B	28A	28X	28F, G	29K, N	REX
Weekday	26.91	18.38	17.66	19.43	17.57	25.59	34.6	38.72	29.25	19.02	30.16	61.19	26.61	17.5	57.51	33.4
Saturday	21.94				14.99	21.93	23.04			13.95	21.14	64.02			42.59	32.76
Sunday	23.5				14.29	27.64	30.53			16.07		54.78				30.79

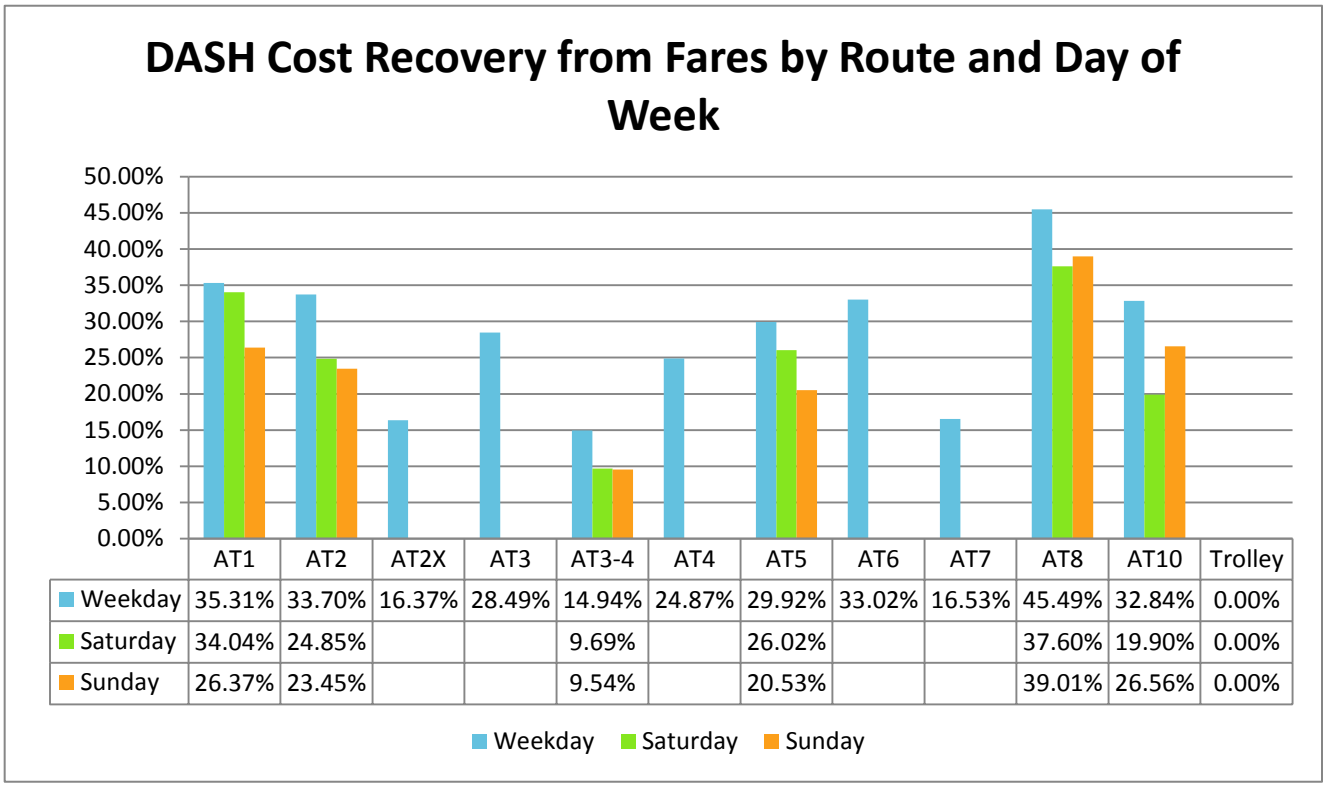
Source: WMATA Productivity Report (2014)
Note: This data is for the entirety of each line, not just the portion of the line within Alexandria. Service data is not broken out by jurisdiction

As with the other productivity metrics, Metrobus boardings per trip are based on a balance between total daily ridership on the Line, level of service, and trip length. An example of a Line with relatively low ridership but robust boardings per trip is the 11Y which is a peak period peak direction service that makes productive utilization of the service provided, especially given that there are relatively few stops served. A second interesting example is the 28A, which has the highest boardings per trip of all the lines evaluated. These boardings per trip exceed the capacity of a bus which means that there is ongoing turnover along the long 28A trip, thus resulting in effective utilization of the capacity provided.

2.4.3 Financial Performance

This section provides information on the financial performance of DASH and Metrobus service running in Alexandria. Two metrics are evaluated, cost recovery from fares and subsidy per passenger. Outlined first below in Figure 3.25 is cost recovery from fares for each DASH route, by day of week.

Figure 3.25 - DASH Cost Recovery from Fares – by Route and Day of Week



	AT1	AT2	AT2X	AT3	AT3-4	AT4	AT5	AT6	AT7	AT8	AT10	Trolley
Weekday	35.31%	33.70%	16.37%	28.49%	14.94%	24.87%	29.92%	33.02%	16.53%	45.49%	32.84%	0.00%
Saturday	34.04%	24.85%			9.69%		26.02%			37.60%	19.90%	0.00%
Sunday	26.37%	23.45%			9.54%		20.53%			39.01%	26.56%	0.00%

Source: DASH Comprehensive Operations Analysis (2014)

Based on the data in Figure 3.25, the DASH system does very well with regard to recouping costs from fares. The majority of the routes have weekday fare recoveries over 30%, with the AT8 on weekdays recovering nearly 46% of costs from the farebox. Fare recovery declines on Saturday and Sunday but a number of routes continue to perform quite well. Two routes do not meet the proposed standard of a 23% fare recovery outlined in Chapter 3, the AT2X and the AT7.

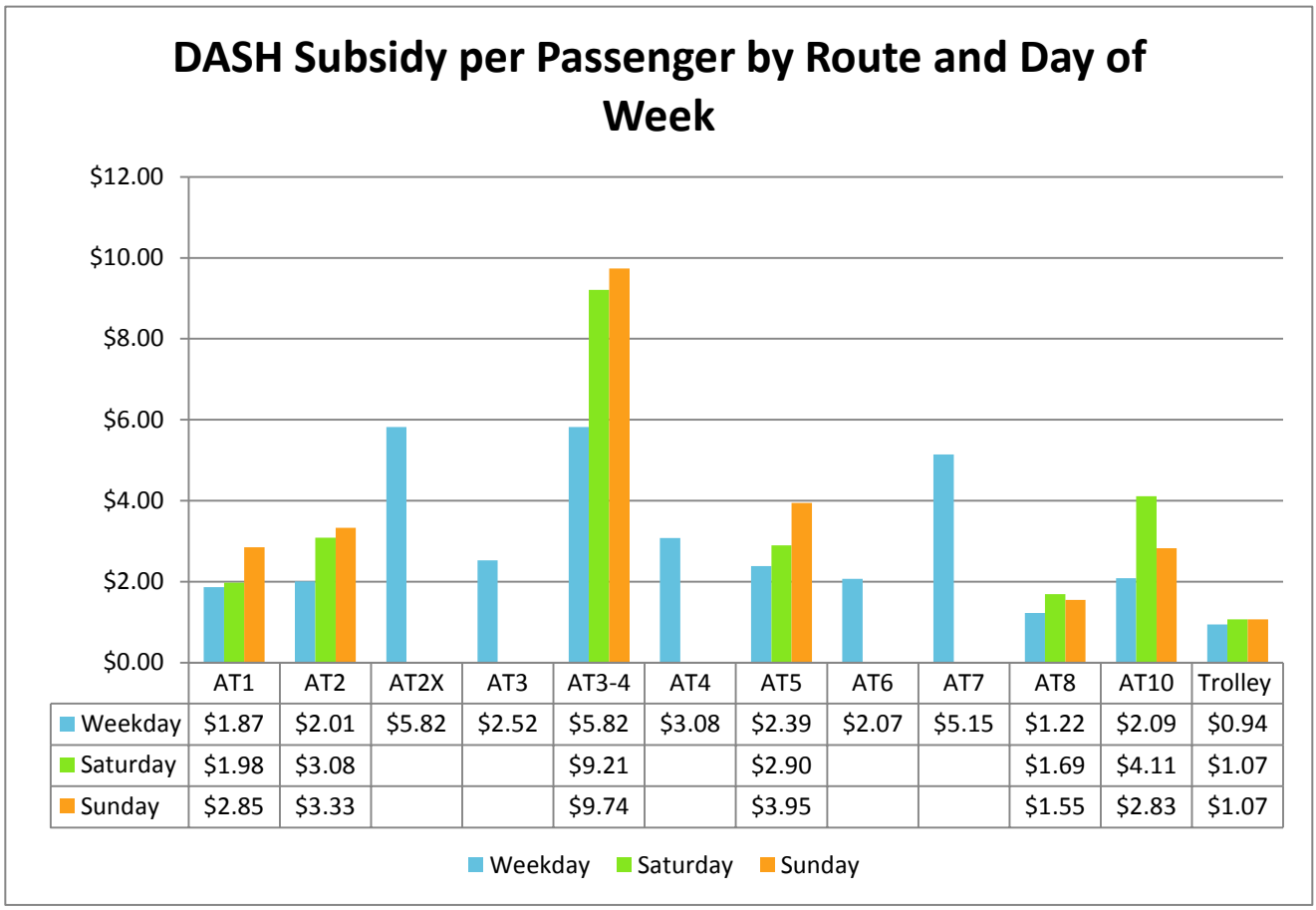
The King Street Trolley is free for riders so there is a 0% fare recovery.

It is also important to note that the funding sources to subsidize the AT2X DASH route and the King Street Trolley do not come from the City of Alexandria general fund that subsidizes DASH. Specifically, the King Street Trolley is paid for through funds from the City's Transportation Improvement Program and the Alexandria Convention and Visitors Association while the AT2X is

funded by the Department of Defense. Final decisions regarding these services will require input from the funding sources.

Outlined in Figure 3.26 is data on a complementary metric, subsidy per passenger.

Figure 3.26 - DASH Subsidy per Passenger – by Route and Day of Week



	AT1	AT2	AT2X	AT3	AT3-4	AT4	AT5	AT6	AT7	AT8	AT10	Trolley
Weekday	$1.87	$2.01	$5.82	$2.52	$5.82	$3.08	$2.39	$2.07	$5.15	$1.22	$2.09	$0.94
Saturday	$1.98	$3.08			$9.21		$2.90			$1.69	$4.11	$1.07
Sunday	$2.85	$3.33			$9.74		$3.95			$1.55	$2.83	$1.07

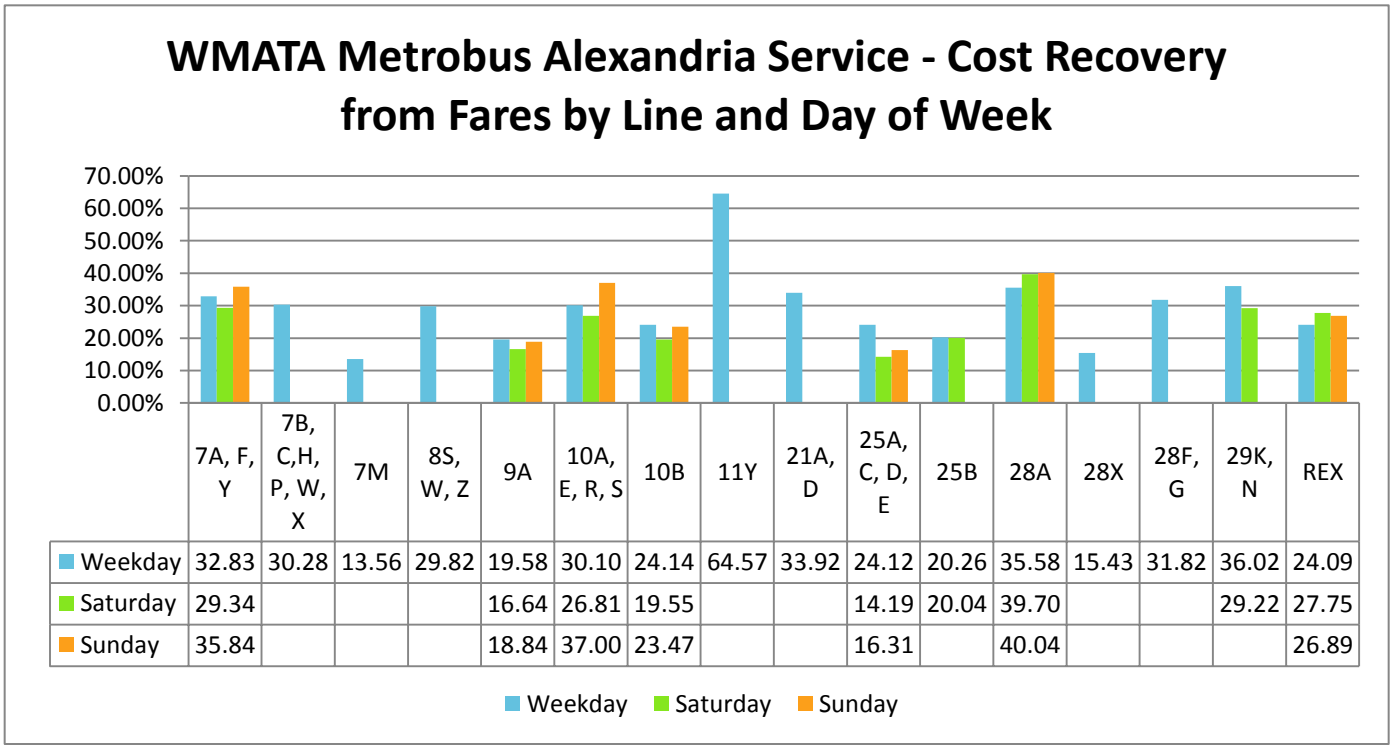
Source: DASH Comprehensive Operations Analysis (2014)

The data in in Figure 3.26 show the reverse pattern to what is shown in Figure 3.25, with the routes with the highest cost recovery having the lowest subsidy per passenger. As with the cost recovery, the data shows that DASH service is highly cost effective, with a low subsidy per passengers, especially on the heaviest ridership routes. Three weekday DASH routes exceed the proposed subsidy per passenger standard of $5.00 or less. These are the AT2X, the AT3-4 and the AT7. Again, DASH and the City accept these lower performing routes in order to provide full transit coverage to the City.

Of note is that even though the Trolley earns no revenue because it is free, its relatively low cost and high ridership means it has the lowest subsidy per passenger in the DASH system.

Outlined below in Figure 3.27 is the cost recovery from fares data for WMATA Metrobus Lines running in Alexandria.

Figure 3.27 - WMATA Metrobus Alexandria Services – Cost Recovery from Fares



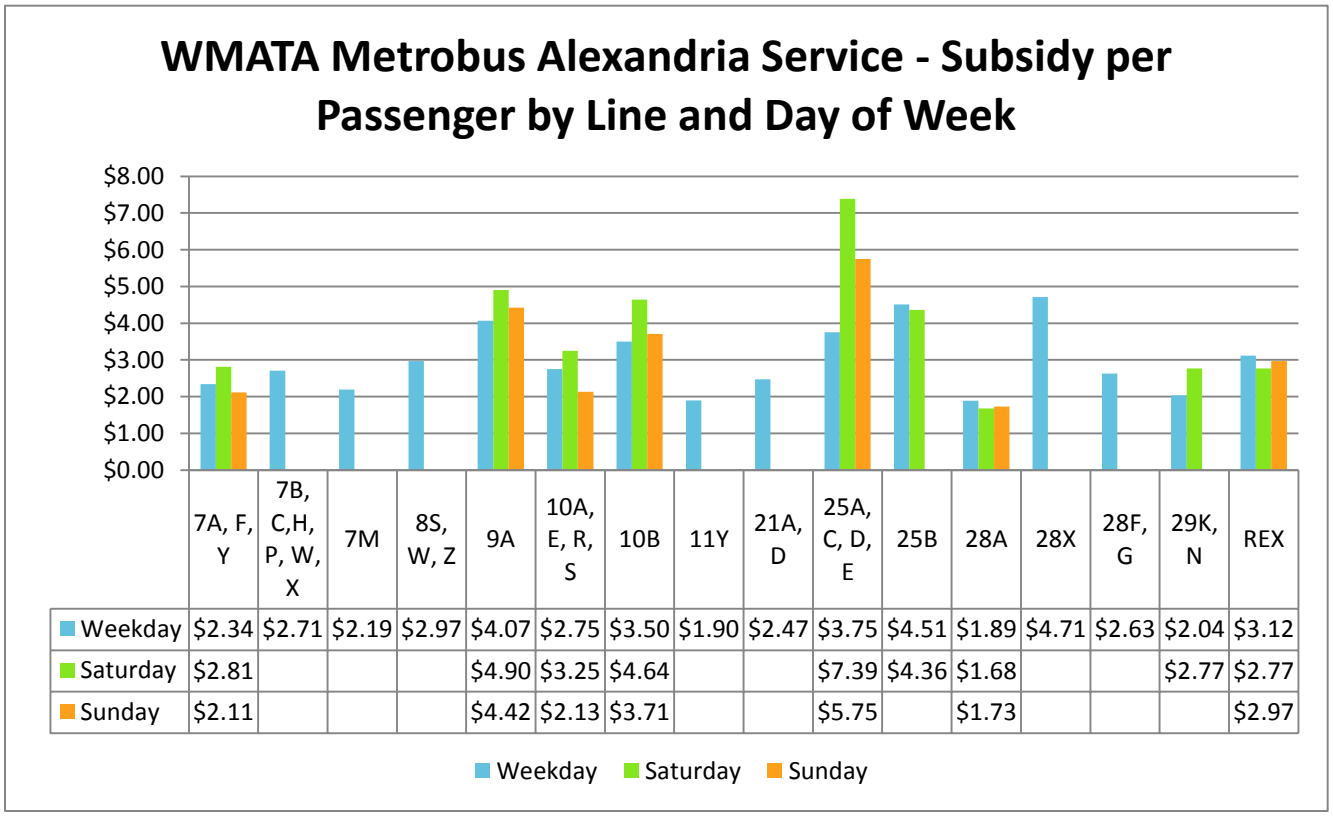
	7A, F, Y	7B, C,H, P, W, X	7M	8S, W, Z	9A	10A, E, R, S	10B	11Y	21A, D	25A, C, D, E	25B	28A	28X	28F, G	29K, N	REX
Weekday	32.83	30.28	13.56	29.82	19.58	30.10	24.14	64.57	33.92	24.12	20.26	35.58	15.43	31.82	36.02	24.09
Saturday	29.34				16.64	26.81	19.55			14.19	20.04	39.70			29.22	27.75
Sunday	35.84				18.84	37.00	23.47			16.31		40.04				26.89

Source: WMATA Productivity Report

The data in Figure 3.27 show generally lower cost recovery form fares on WMATA services than on DASH services. This reflects the higher cost of providing the WMATA service. Of note, however, is the very high cost recovery on the 11Y, which is nearly 65%. Also of note is the higher cost recovery on Sunday relative to weekdays on a number of the Lines including the 7A, F, Y, the 10A, E, and the 28A.

Outlined below in Figure 3.28 is the subsidy per passenger data for the Alexandria Metrobus routes.

Figure 3.28 WMATA Metrobus Alexandria Services – Subsidy per Passenger



	7A, F, Y	7B, C,H, P, W, X	7M	8S, W, Z	9A	10A, E, R, S	10B	11Y	21A, D	25A, C, D, E	25B	28A	28X	28F, G	29K, N	REX
Weekday	$2.34	$2.71	$2.19	$2.97	$4.07	$2.75	$3.50	$1.90	$2.47	$3.75	$4.51	$1.89	$4.71	$2.63	$2.04	$3.12
Saturday	$2.81				$4.90	$3.25	$4.64			$7.39	$4.36	$1.68			$2.77	$2.77
Sunday	$2.11				$4.42	$2.13	$3.71			$5.75		$1.73				$2.97

Source: WMATA Productivity Report

As with the DASH service, the subsidy per passenger metric shows a reverse pattern relative to cost recovery from fares. The lowest subsidy per passenger occurs on the 28A while the 11Y and the 29K, N are the next most cost-effective Lines.

2.4.4 Operations

Two additional operational metrics that take into account passenger comfort and convenience are evaluated in this section. The evaluation of these metrics focuses on DASH services, given that the data to complete this evaluation is more readily available for DASH. The first of these metrics is bus crowding. Based on DASH service standards, a trip is considered crowded if the passenger load on the trip has a load factor of 1.25, meaning the trip's passenger load is 1.25 that of the bus's seated capacity. Based on this load standard, only a few trips in the DASH system, on the AT8, are considered crowded.

The second operational metric evaluated is DASH on-time performance. On-time performance relates to service reliability and passenger convenience, with the lower the on-time performance the less reliable the service. A number of DASH routes experience over 20% of their trips running late, with service on weekends often less reliable than weekday service. DASH is aware of this issue and is making adjustments to schedules to improve on-time performance and reliability.

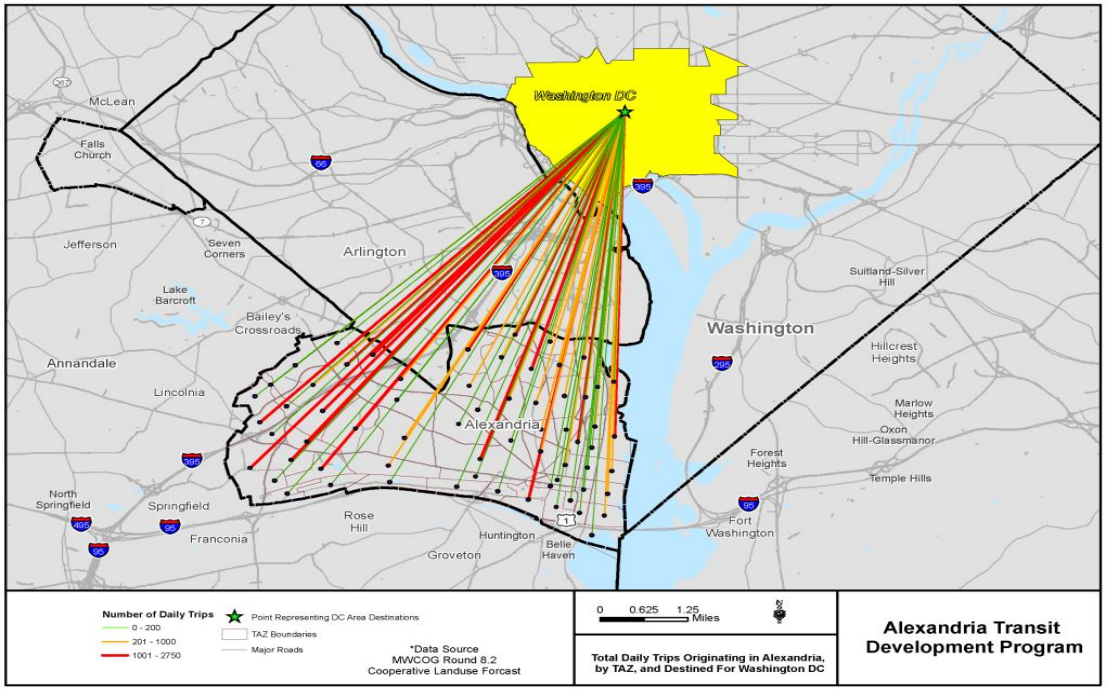
3.0 Unmet Service Demand – Travel Flows

This section of the Service Evaluation chapter considers potential unmet trip demand for trips within Alexandria, trips originating in Alexandria and going to large regional employment destinations outside the City, and for trips coming from outside Alexandria to destinations within the City.

The first set of maps evaluates trips from Alexandria to regional destinations outside the City. The data in these maps is from the Metropolitan Council of Governments regional model trip table for 2015, and includes all trip purposes and trips by all modes. Each map represents trips from Alexandria to a major activity center in the Washington region and contains the total trips originating in each Transportation Analysis Zone (TAZ) within Alexandria (65 TAZs in Alexandria) and going to that activity center. The purpose of showing all trips is to assess total demand potential for trip flows to the subject activity center, especially for trip flows not currently covered by transit.

Figure 3.29 below shows trips from each Alexandria TAZ to downtown Washington DC.

Figure 3.29 - Trip Flows from Alexandria to Washington DC



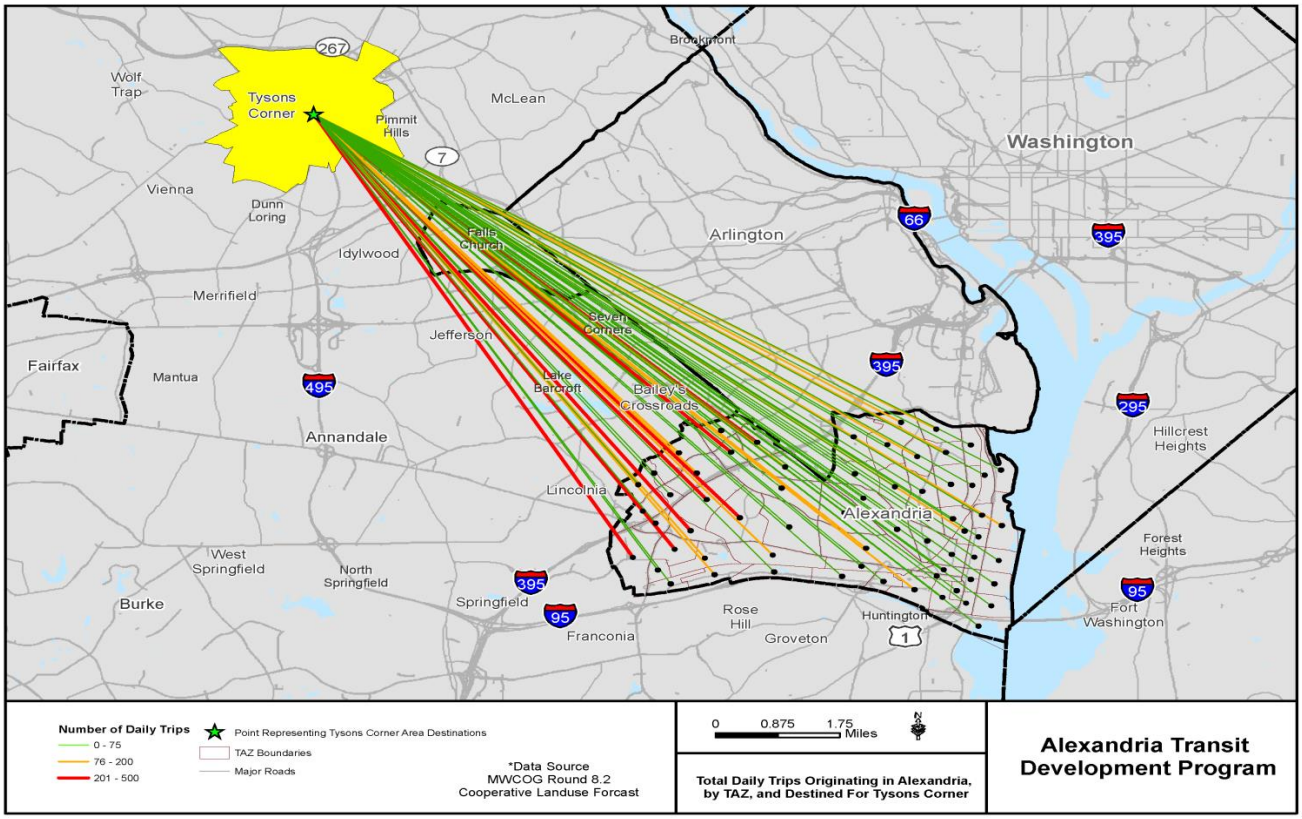
Source: MWCOG Regional Model – 2015 Trip Table

The trip patterns in the map show the origin TAZs within Alexandria that are generating the most trips to DC are generally located in the west end of the City, with secondary generators in the Eisenhower Avenue corridor. Transit access to DC from the western portion of the City can be made from the Van Dorn Metrorail Station on the Blue Line or on the Metrobus 7 Lines via the Pentagon. The proposed West End Transitway service will also provide for improved transit access to downtown DC for trips from this portion of the City.

Transit access to DC from the Eisenhower Avenue corridor is provided via the Eisenhower Yellow Line station. Given that DC is the focus of the regional transit system, the heaviest trips flows from Alexandria to DC are currently generally well served by transit.

Figure 3.30 shows trips from each Alexandria TAZ to Tysons Corner.

Figure 3.30 - Trip Flows from Alexandria to Tysons Corner

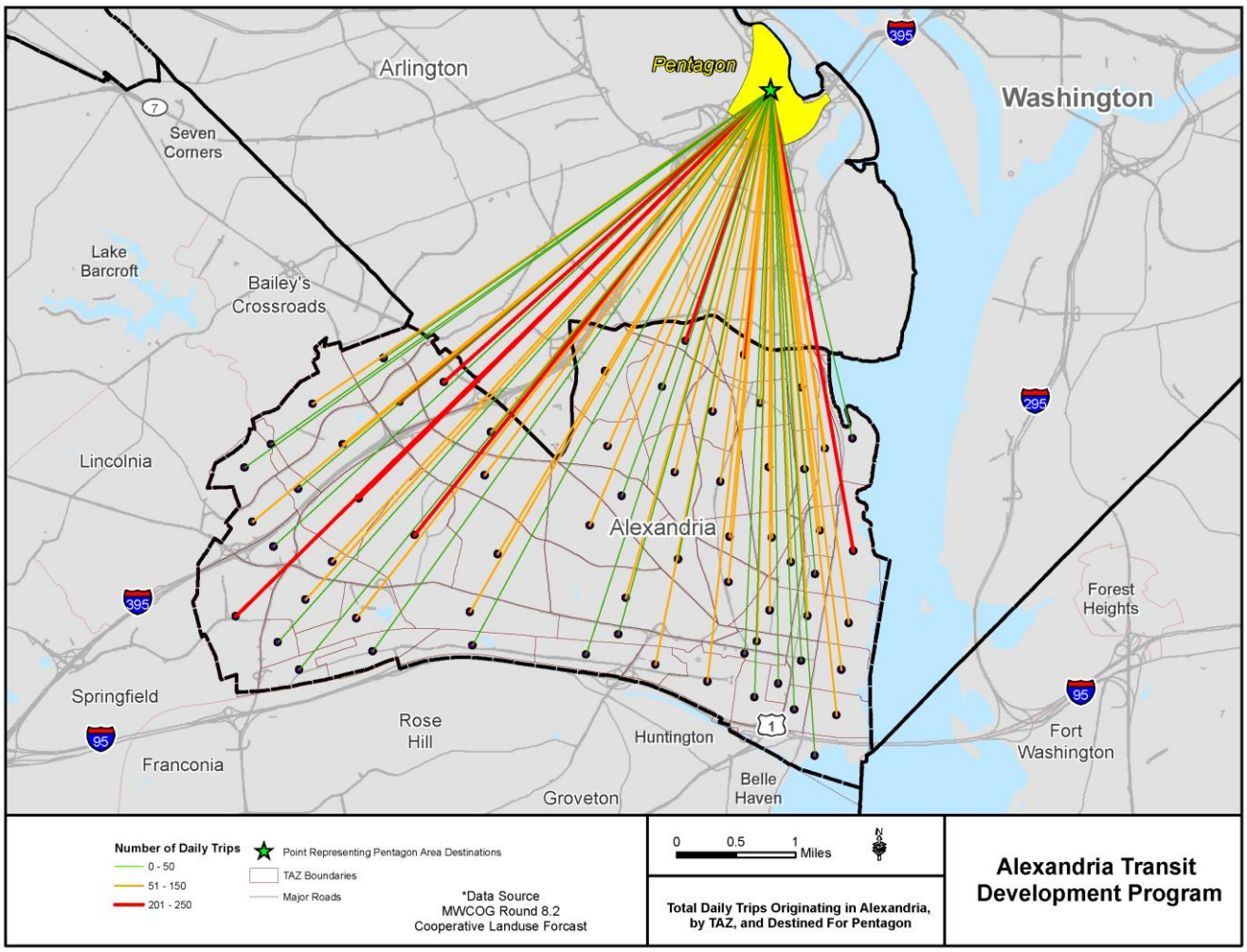


Source: MWCOG Regional Model – 2015 Trip Table

The trip patterns in the map show that the origin TAZs within Alexandria that are generating the most trips to Tysons are generally located in the west end of the City. Current transit access to Tysons from these TAZs is not especially direct, with a transfer on either bus or rail required. In the long run the West End Transitway will provide a more convenient and strong link to service along Leesburg Pike but in the short run links are indirect. Extension of select 28A trips farther south along the Van Dorn and Beauregard corridor may make this link stronger or moving the southern terminal of the 28X farther south may be another alternative.

Figure 3.31 shows trips from each Alexandria TAZ to the Pentagon.

Figure 3.31 - Trip Flows from Alexandria to the Pentagon

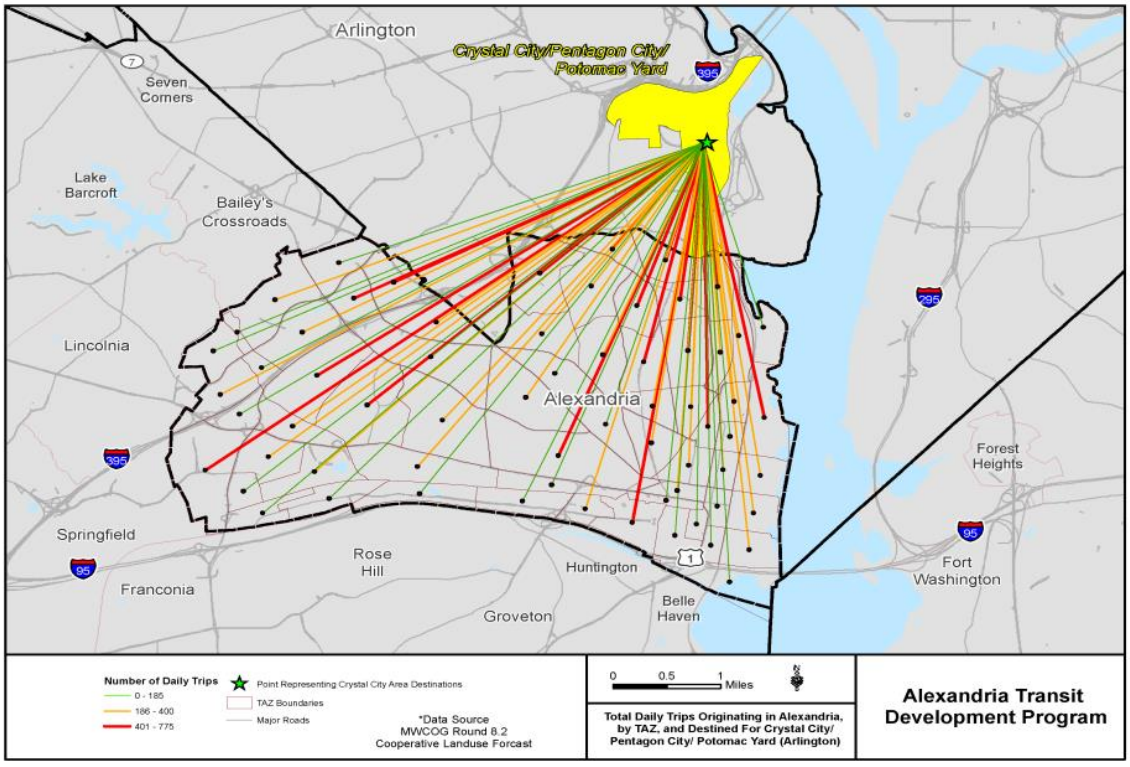


Source: MWCOG Regional Model – 2015 Trip Table

As with the other figures, the heaviest trips flows to the Pentagon generally come from the west side of the City. These TAZs generally have good transit access to the Pentagon. The TAZs in the southwestern most portion of the City have access to the Pentagon via the Blue Line and the Metrobus 8Z and 8W routes. Farther north, in the Beauregard corridor, riders can access the Pentagon via the 7 Lines. Longer term, the West End Transitway will provide excellent transit access to the Pentagon.

Figure 3.32 shows trips from each Alexandria TAZ to Crystal City, Pentagon City, and Arlington Potomac Yard.

Figure 3.32 - Trip Flows from Alexandria to Crystal City, Pentagon City, and Arlington Potomac Yard

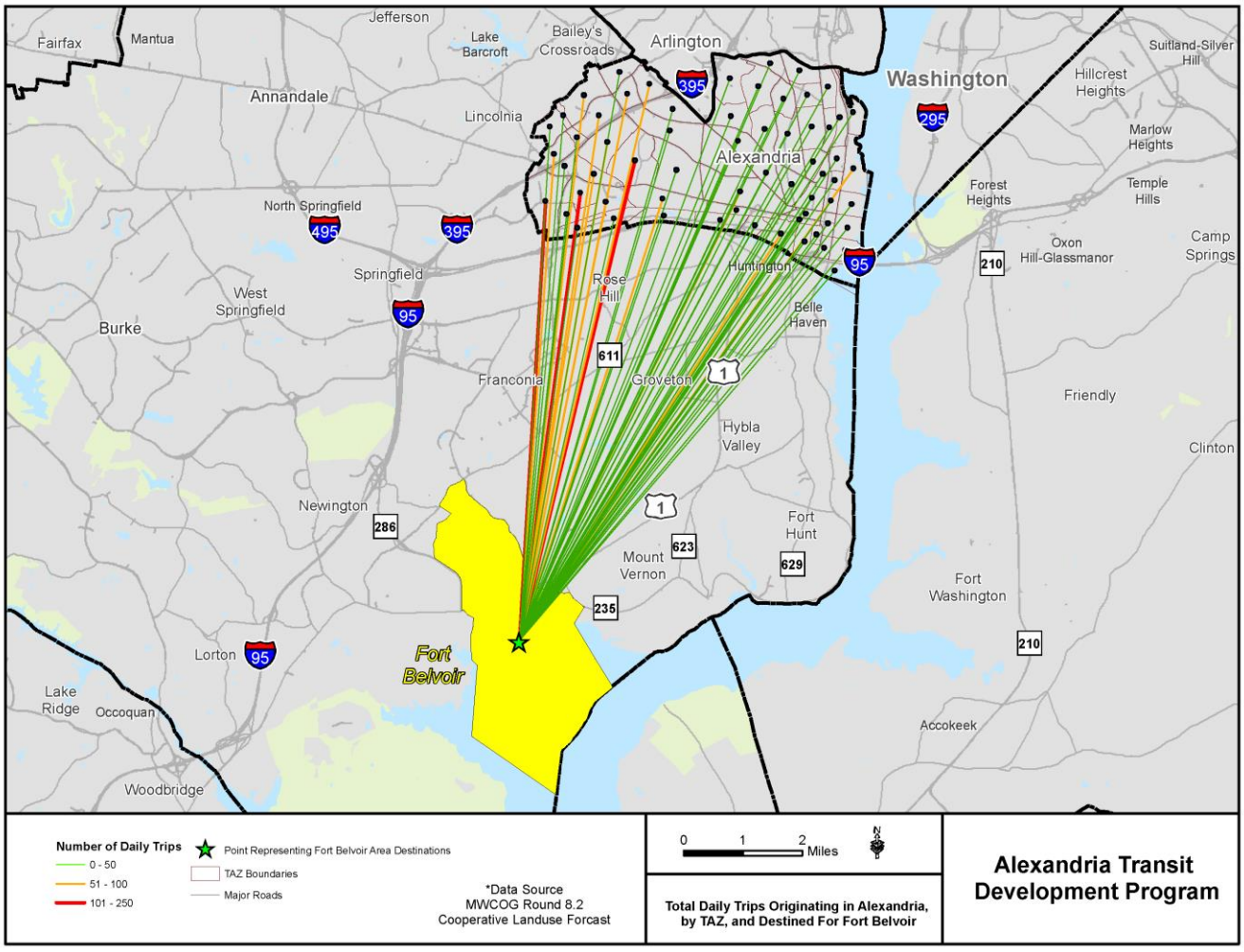


Source: MWCOG Regional Model – 2015 Trip Table

TAZs generating heavy trip flows to Crystal City, Pentagon City and Arlington Potomac Yard are generally more spread out than in the other figures. The first concentration of TAZs generating trips destined for the area is located in the west end of the City. These TAZs generally have access to Crystal City via the Blue Line. Two individual TAZs generating heavy trips, along Eisenhower Avenue and north of King Street in Old Town have access to Crystal City via Metrorail. A significant concentration of TAZs concentrated on Cameron Mills and Russell Roads have relatively direct access via the AT3 and AT4 services to the Pentagon (in the peak period) and then doubling back to Crystal City via the Blue or Yellow lines.

Figure 3.33 shows trips from each Alexandria TAZ to Fort Belvoir.

Figure 3.33 - Trip Flows from Alexandria to Fort Belvoir

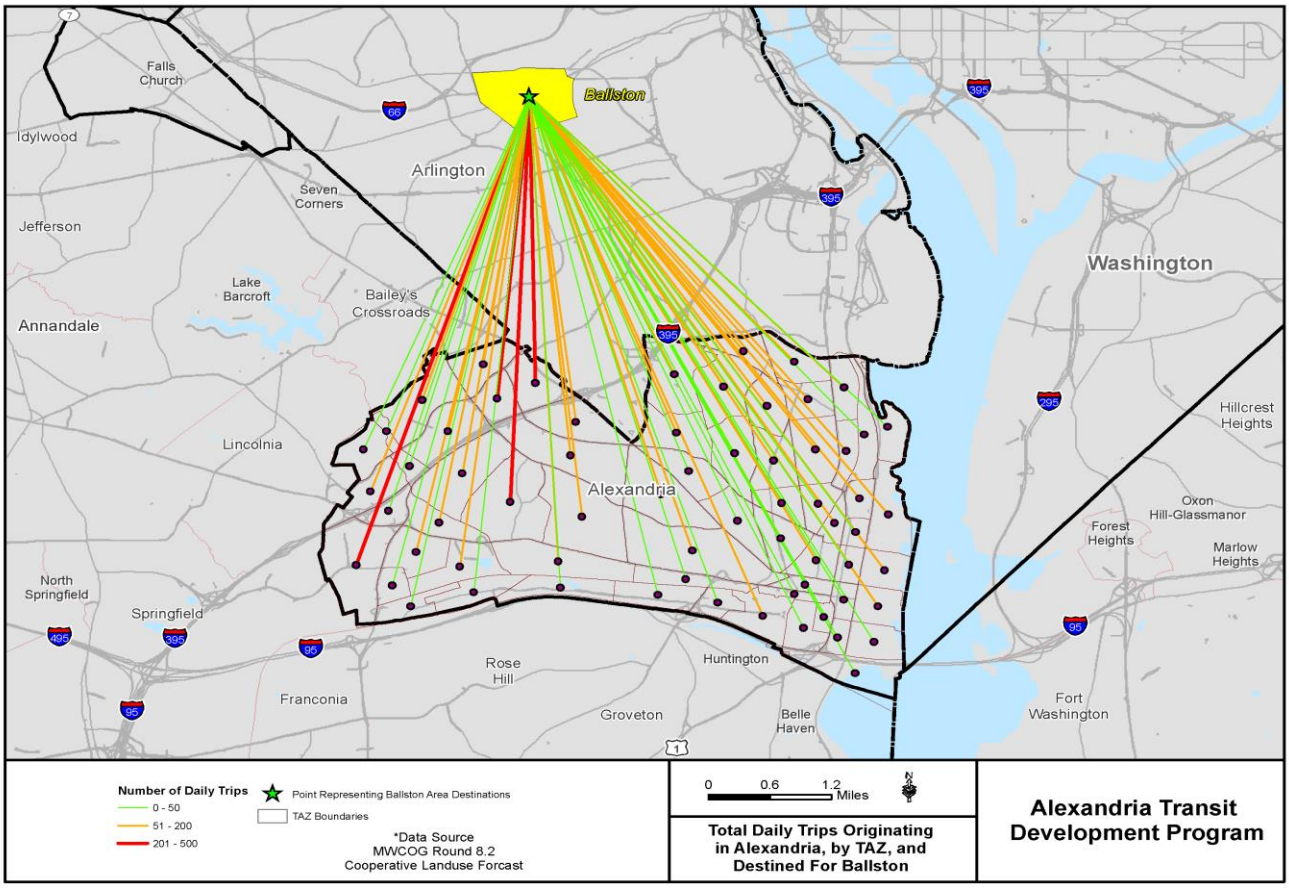


Source: MWCOG Regional Model – 2015 Trip Table

TAZs generating heavy trip flows to Fort Belvoir are generally located in the southwestern section of the City. These TAZs do not have direct transit access to Fort Belvoir. Rather people who wish to make this trip via transit would have to access the Eisenhower or King Street Metrorail station and transfer to the Route 1 REX service.

Figure 3.34 shows trips from each Alexandria TAZ to Ballston.

Figure 3.34 - Trip Flows from Alexandria to Ballston

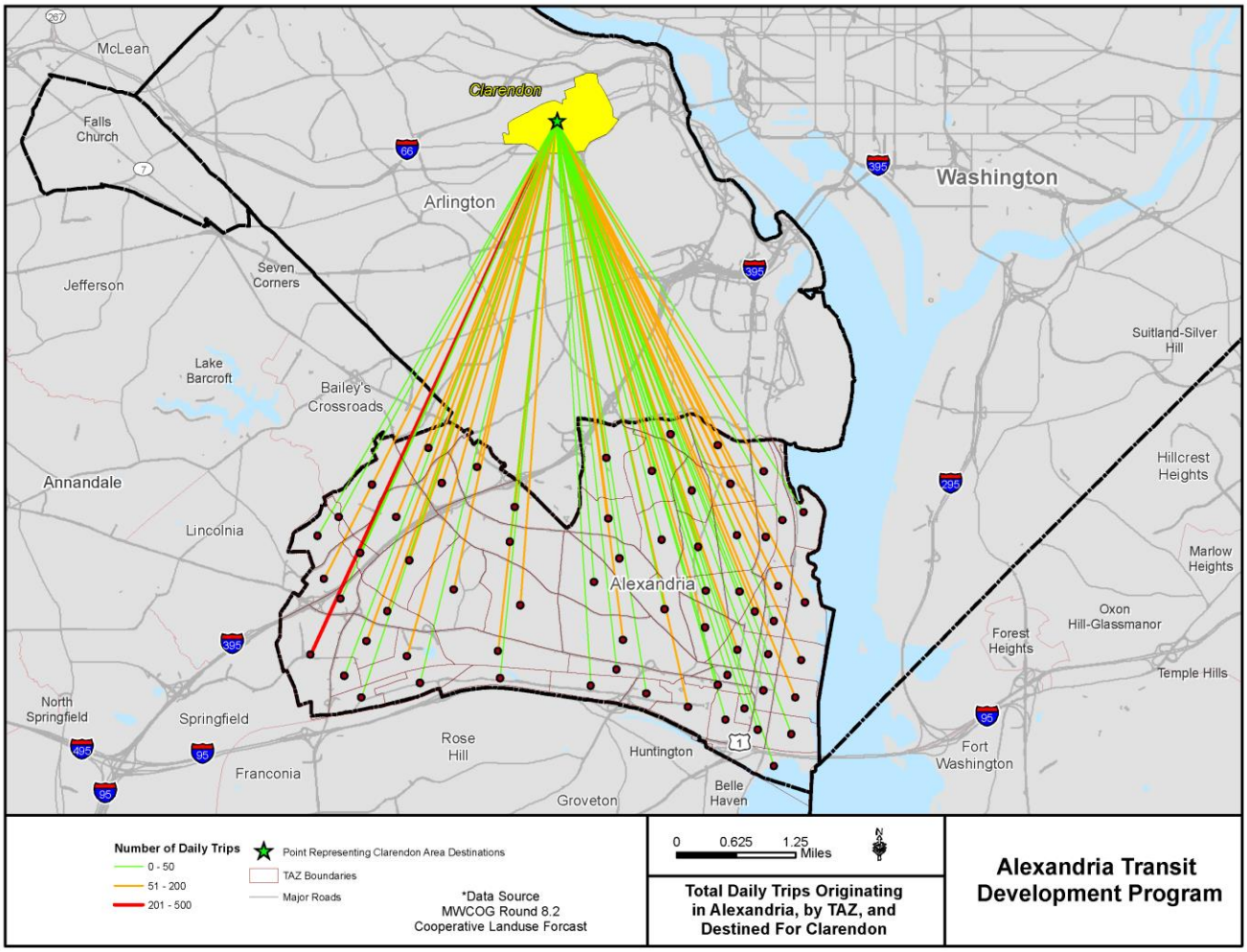


Source: MWCOG Regional Model – 2015 Trip Table

The TAZs generating the heaviest trip flows to Ballston are in the west end of the City, ranged along the Van Dorn and Beauregard Corridors. The most direct transit access for riders from Van Dorn corridor would likely be the Blue Line, with a transfer to the Orange Line in Rosslyn. For riders farther north, the most direct access would be via the Metrobus 25B service that runs between Landmark and Ballston or via the Metrobus 7 Lines service and then a transfer to the 23 Lines or the 10 Lines at the Shirlington Transit Center. Recommendations for enhanced 10 Line service in order to strengthen connections between Arlington and Alexandria are outlined in Chapter 4 of this document. The proposed West End Transitway will also provide more convenient connections for this trip movement.

Figure 3.35 shows trips from each Alexandria TAZ to the Clarendon/Courthouse portion of Arlington.

Figure 3.35 - Trip Flows from Alexandria to Clarendon/Courthouse

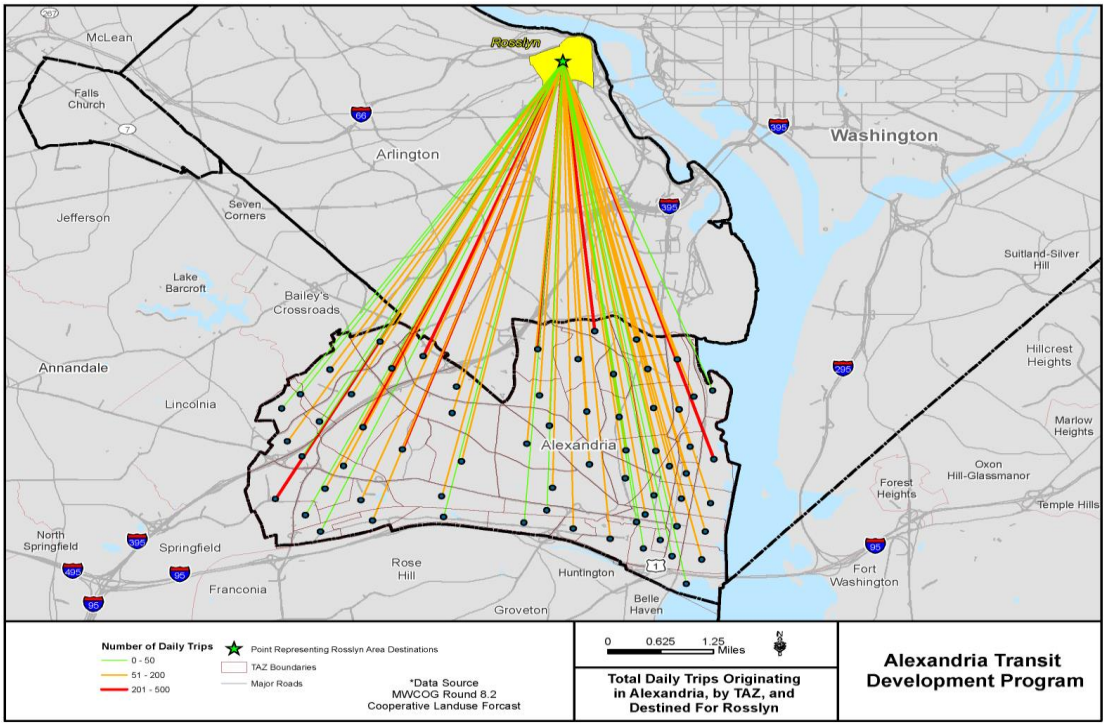


Source: MWCOG Regional Model – 2015 Trip Table

The map shows that the heaviest flows to Clarendon/Courthouse come from the southwestern portion of the City. The most direct transit access to Clarendon from this part of the City is via the Blue and Orange Lines.

Figure 3.36 shows trips from each Alexandria TAZ to Rosslyn.

Figure 3.36 - Trip Flows from Alexandria to Rosslyn

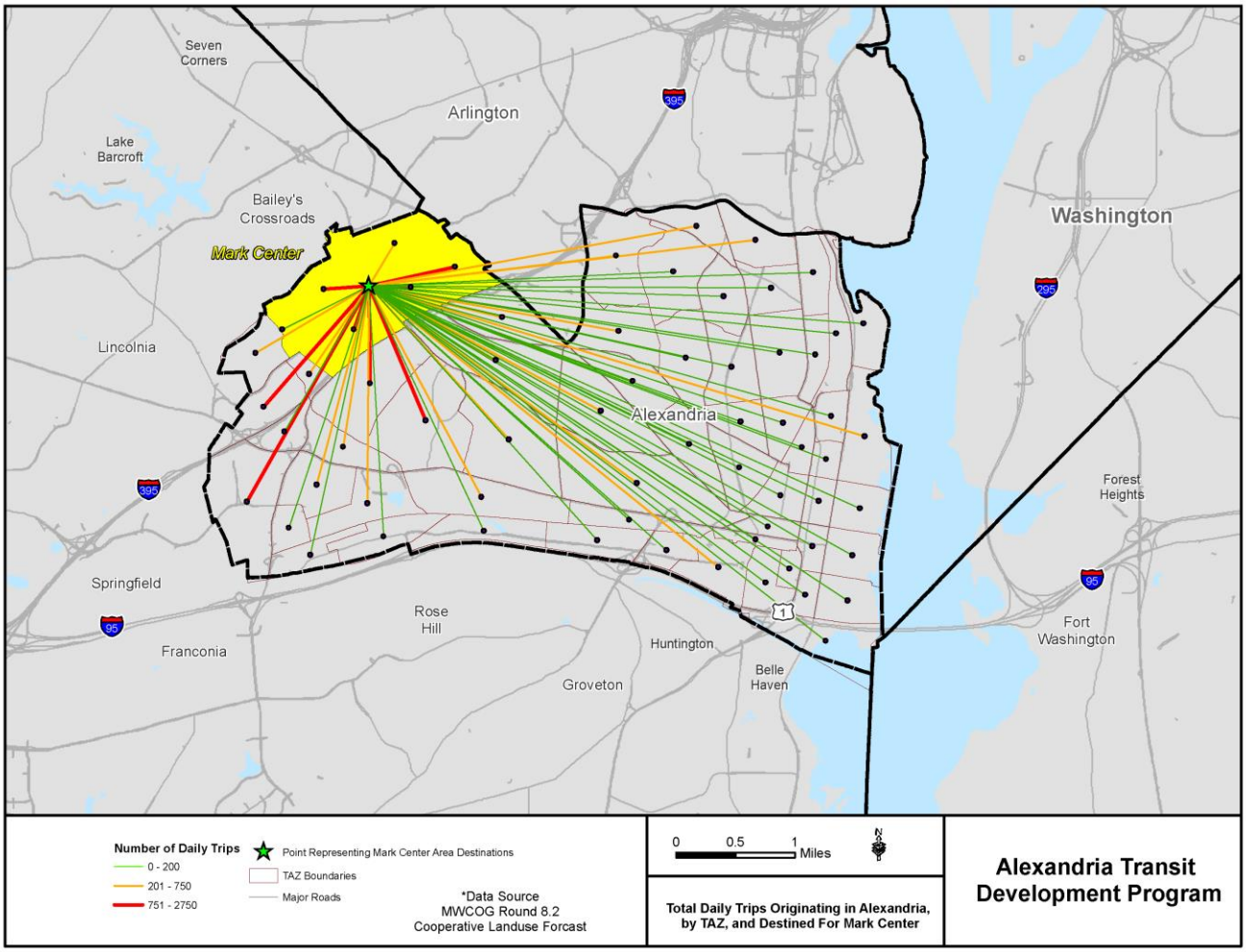


Source: MWCOG Regional Model – 2015 Trip Table

There are three primary areas within the City with heavy trip flows to Rosslyn. The first is the west-end of the City. The most direct transit access for these trips is via the Blue Line. Old Town is a second origin with heavy trip flows to Rosslyn. The most direct transit access for these trips is also via the Blue Line at the King Street Station. These people can also access the recently implemented 10R route which provides a direct bus service from Alexandria to Rosslyn to supplement Blue Line service. The final origin area with heavy trip flows to Rosslyn is from Arlandria. The most direct transit service for this trip flow is likely via the 10B Line to Ballston and then a transfer to the Orange Line.

The next set of maps show trip flows from each Alexandria TAZ to key activity centers within the City. Figure 3.37 shows trip flows to Mark Center from TAZs within Alexandria.

Figure 3.37 - Trip Flows from Within Alexandria to Mark Center

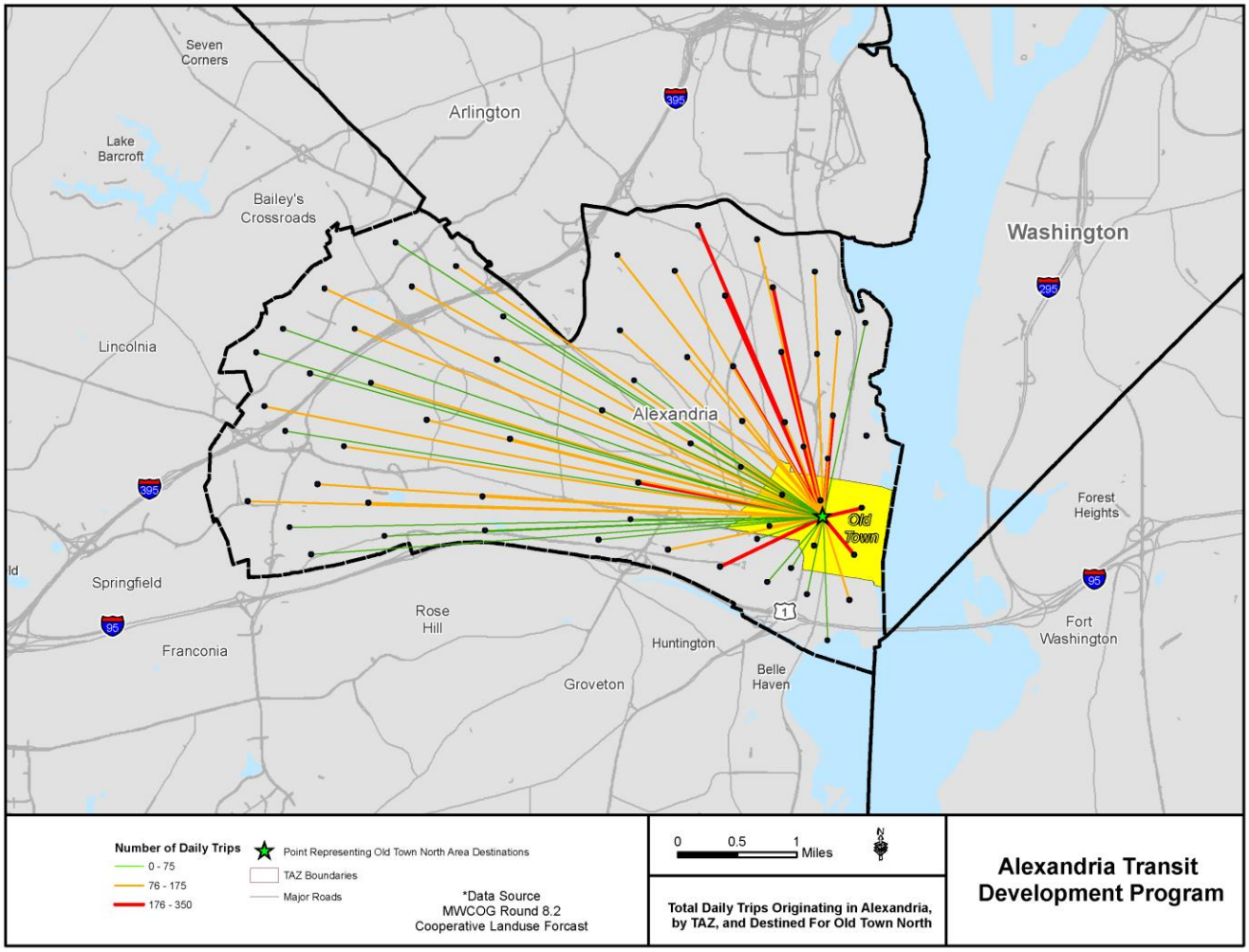


Source: MWCOG Regional Model – 2015 Trip Table

The data here show that the heaviest trips flows come from TAZs close to Mark Center as well as from the west end of the City. Access to the Mark Center from the west end is currently provided by the DASH AT5 Line, and the Metrobus 8 Lines, 7 Lines, and the 25 Line. The West End Transitway, once implemented, will provide excellent access from the west end to Mark Center.

Figure 3.38 shows trip flows to Old Town Alexandria from TAZs within Alexandria.

Figure 3.38 - Trip Flows from Within Alexandria to Old Town

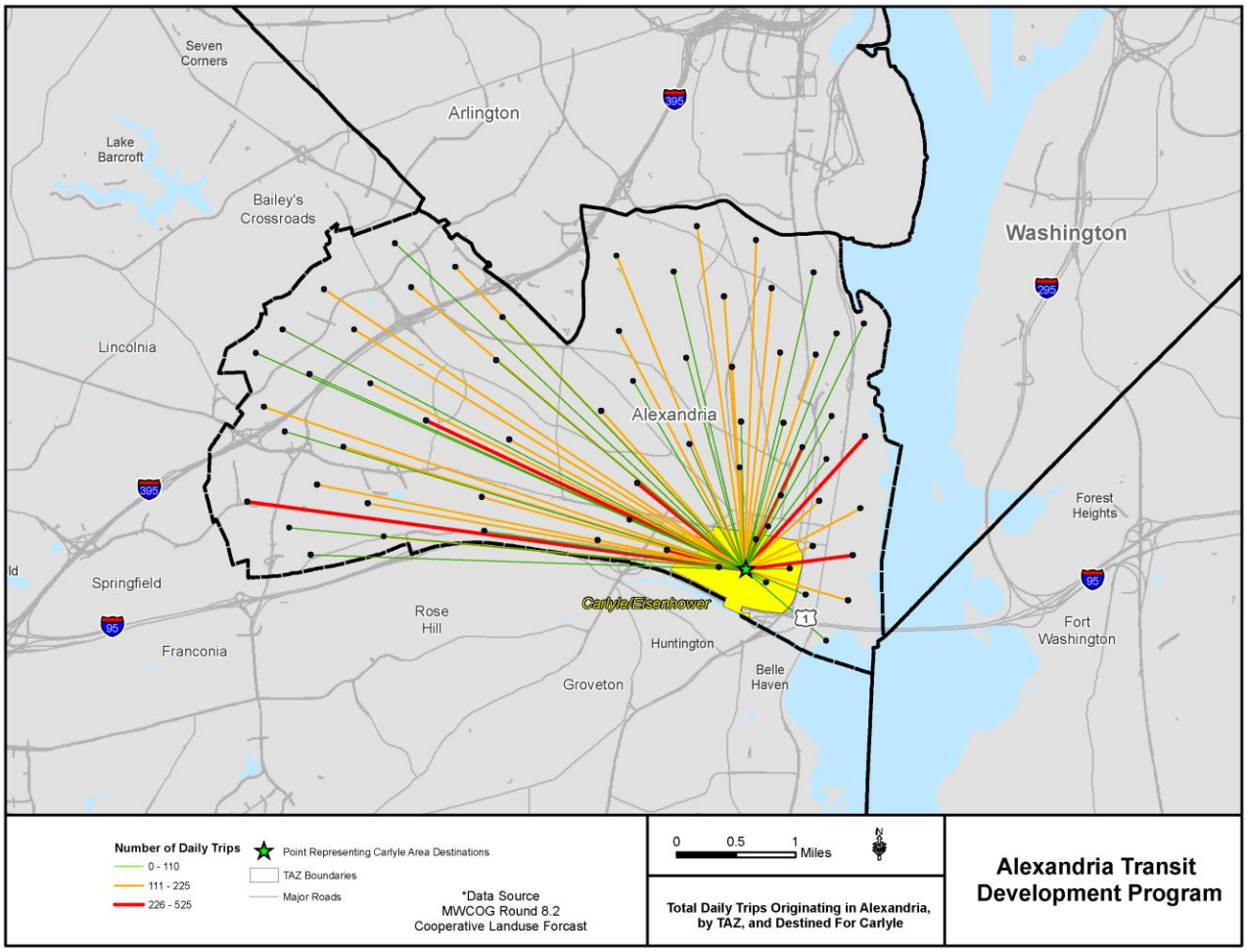


Source: MWCOG Regional Model – 2015 Trip Table

The data show that the heaviest trip flows come from TAZs close to Old Town. Each of these trip flows is served by an existing DASH service. Of note is that the TAZ located along the Eisenhower corridor would be served by a new service recommendation contained in Chapter 4 of this document, the Eisenhower Circulator.

Figure 3.39 shows trip flows to Carlyle/Eisenhower from TAZs within Alexandria.

Figure 3.39 - Trip Flows from Within Alexandria to Carlyle/Eisenhower

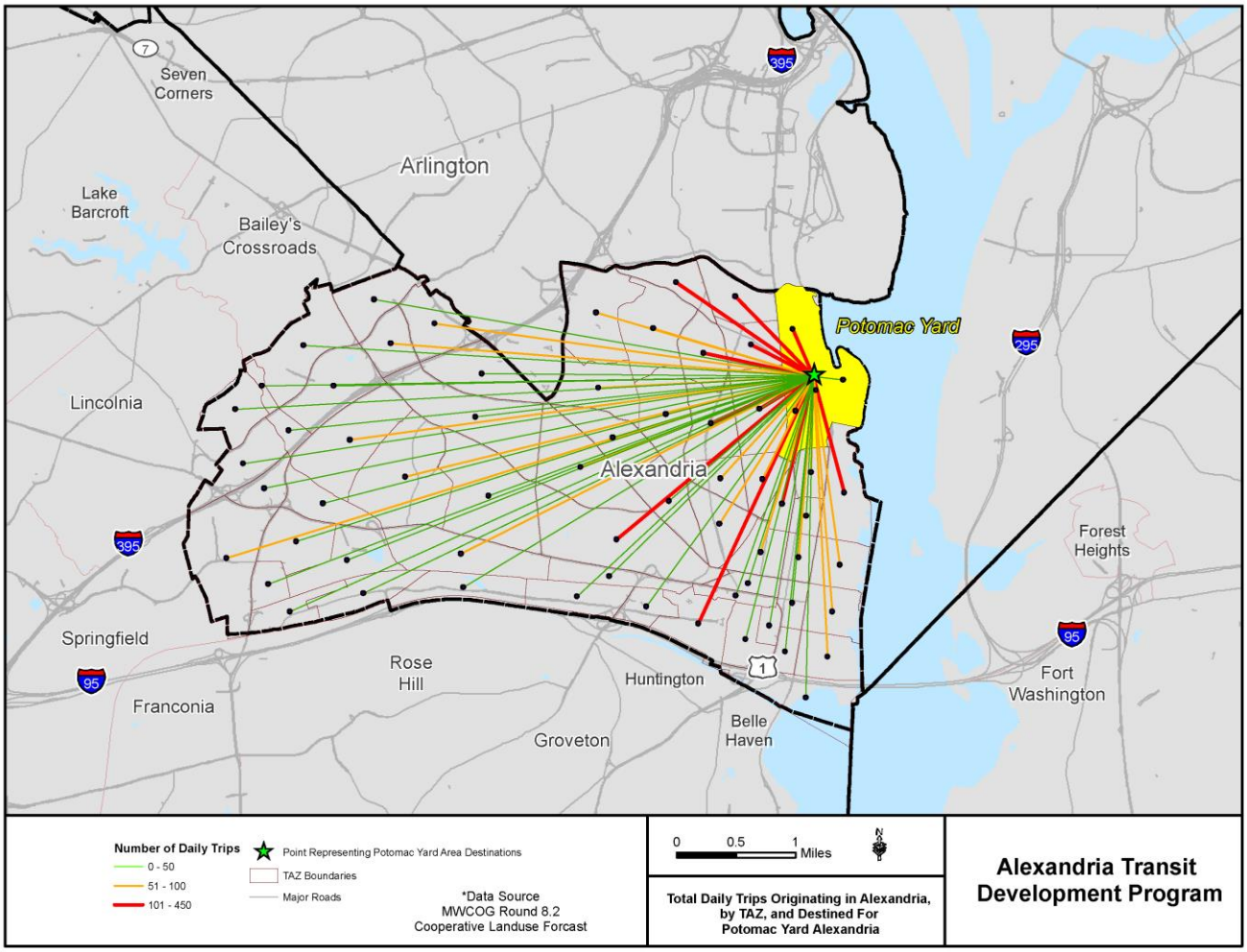


Source: MWCOG Regional Model – 2015 Trip Table

The data show that the heaviest trip flows to the Carlyle area of the City come from the Old Town area, west of Carlyle along the Eisenhower Avenue and Duke Street corridors, and the area of the City south of Old Town. All of these areas are covered by DASH service and generally the Carlyle area can be reached directly by DASH service without a transfer.

Figure 3.40 shows trip flows to the Alexandria portion of Potomac Yard from TAZs within Alexandria.

Figure 3.40 - Trip Flows from Within Alexandria to Alexandria Potomac Yard

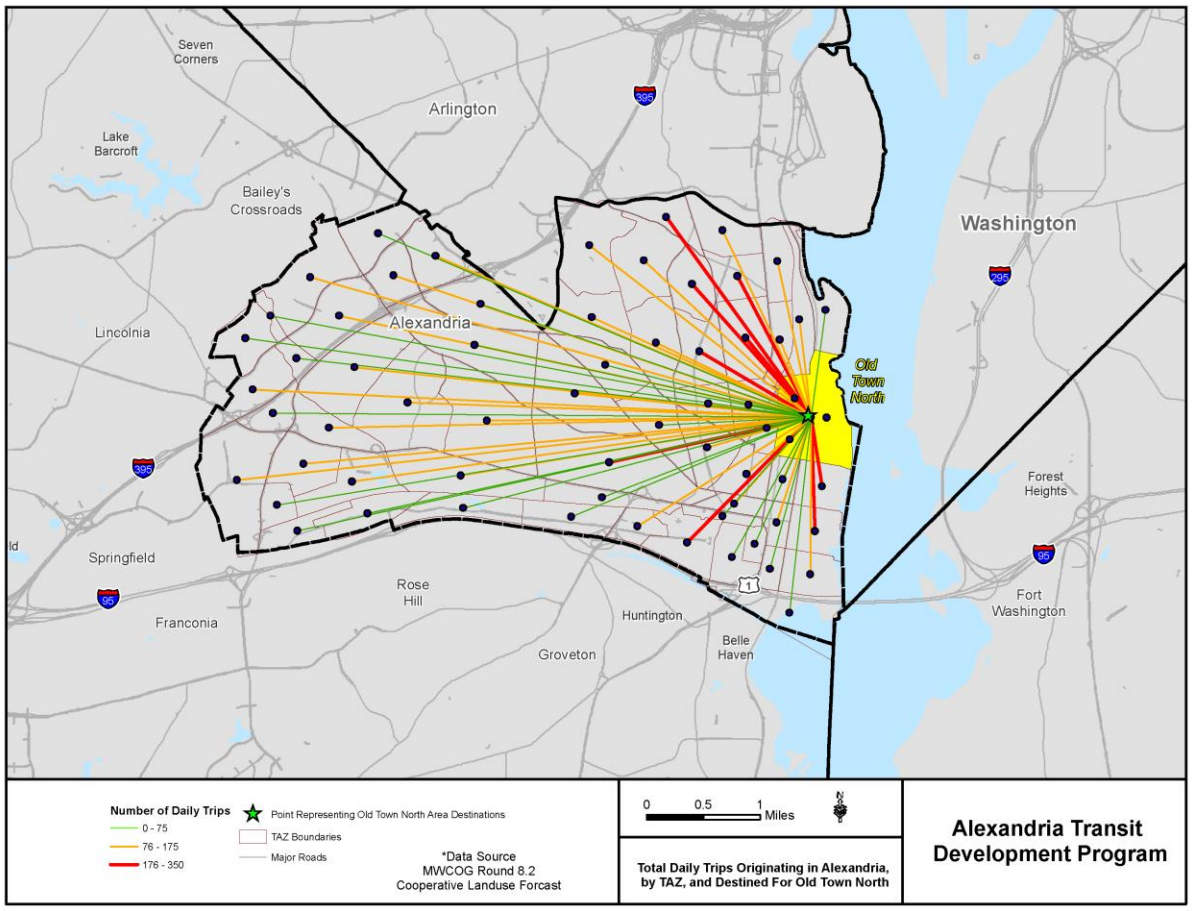


Source: MWCOG Regional Model – 2015 Trip Table

The first concentration of TAZs with heavy trip flows to Potomac Yard is located directly west of Potomac Yard. These TAZs can access the area via the AT9. TAZs to the south of Potomac Yard with heavy trip flows to the area can access the area via Metroway and the DASH AT10 route. Some of the trips from these TAZs can be made directly while others would require a transfer in Old Town.

Figure 3.41 shows trip flows to Old Town North from TAZs within Alexandria.

Figure 3.41 - Trip Flows from Within Alexandria to Old Town North



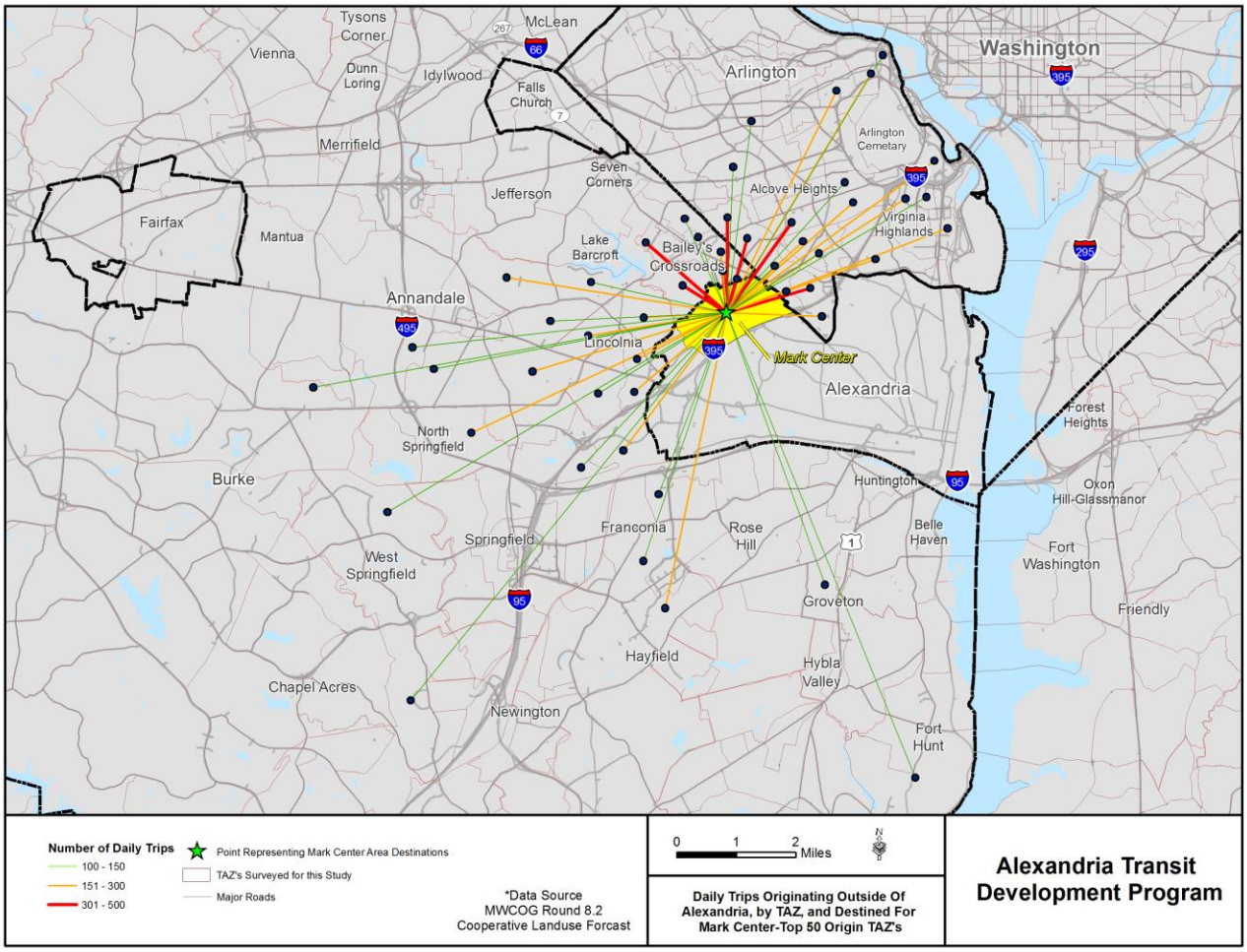
Source: MWCOG Regional Model – 2015 Trip Table

The first concentration of heavy origins to Old Town North is the area located to the northwest of this destination. Access for these trips is provided by the DASH AT3, AT4 and the AT10 routes, as well as the Metrobus 10 Line. Service from the heavy origins south of Old Town is provided by the Metrobus 10 Line as well as the DASH AT2, AT3, AT4, and AT5 routes.

The final set of trip flow maps contain data on trip flows from outside Alexandria to key employment centers within Alexandria. Each map shows the top 50 origin TAZs outside the City to the subject employment center within the City. It is important to note that this analysis covered the entire MWCOG region but each map was scaled to encompass only those origin TAZs that fell within the top 50 origin TAZs to the subject activity center.

Figure 3.42, shows trip flows to Mark Center.

Figure 3.42 - Trip Flows from Outside Alexandria to the Mark Center

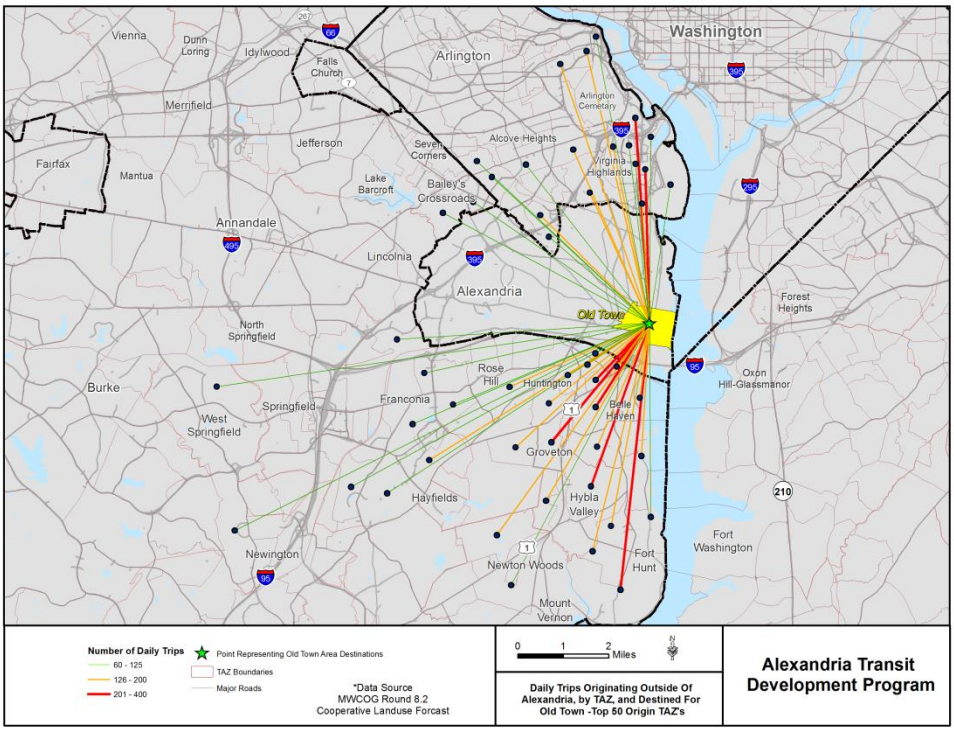


Source: MWCOG Regional Model – 2015 Trip Table

The data in the map shows the heaviest trip flows to Mark Center are concentrated in TAZs close-by in Arlington and Fairfax County. Transit access to the Mark Center from these origin TAZs are provided by the 25, 28, and 7 Metrobus Lines, with some TAZs accessible by direct service, while other TAZs would require a transfer.

Figure 3.43 shows trip flows to Old Town from TAZs located outside the City.

Figure 3.43 - Trip Flows from Outside Alexandria to Old Town

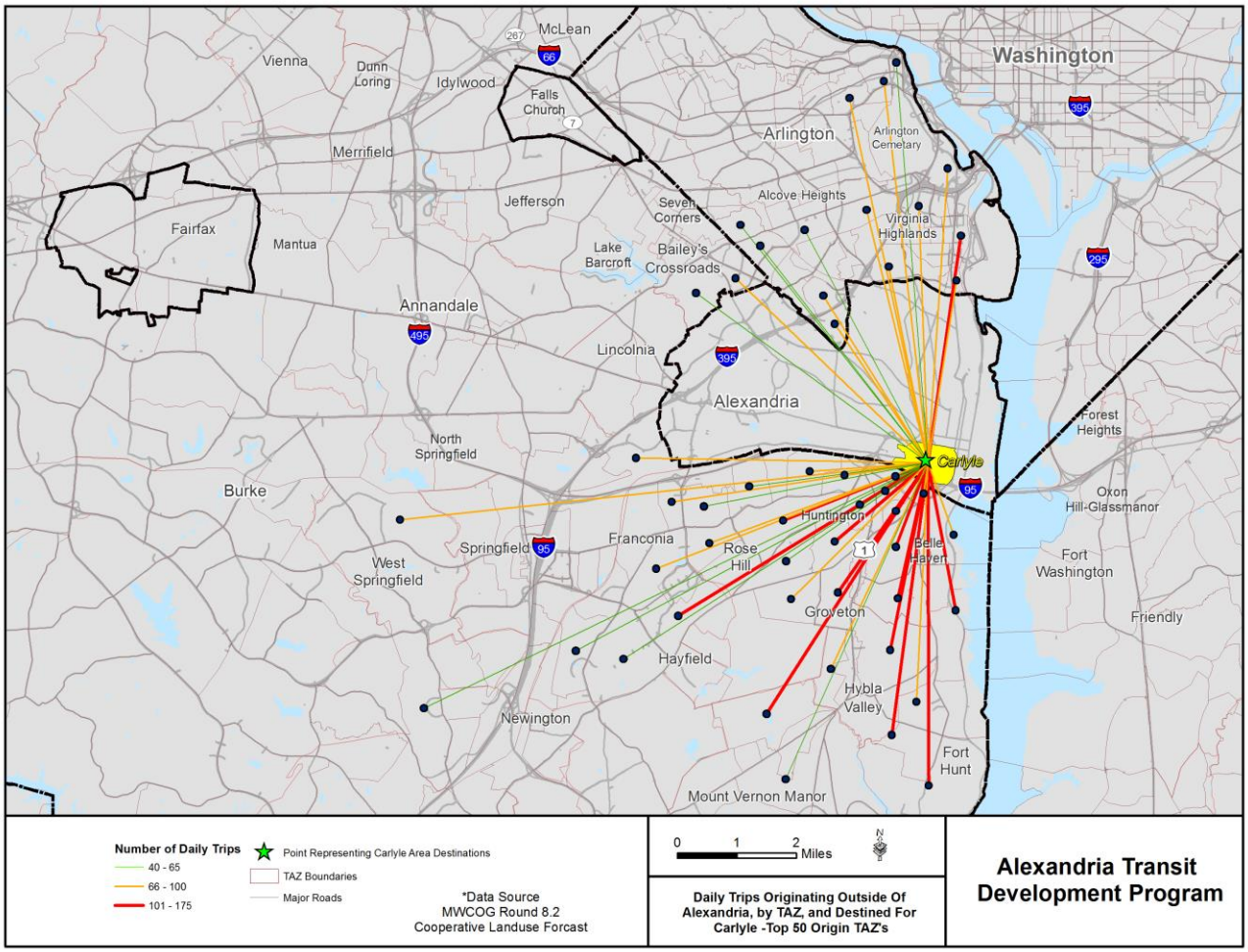


Source: MWCOG Regional Model – 2015 Trip Table

The data in the map shows the heaviest trips flows coming from the Route 1 corridor and just west of Route 1 south of the City in Fairfax County and along the Route 1 corridor in Arlington. The origin TAZs south of the City are served by the REX service, the Yellow Line and Fairfax Connector service while the service north of the City is served by the Blue Line, Metroway, and the Metrobus 9A and 10R routes.

Figure 3.44 shows trip flows to Carlyle from TAZs located outside the City.

Figure3.44 - Trip Flows from Outside Alexandria to Carlyle

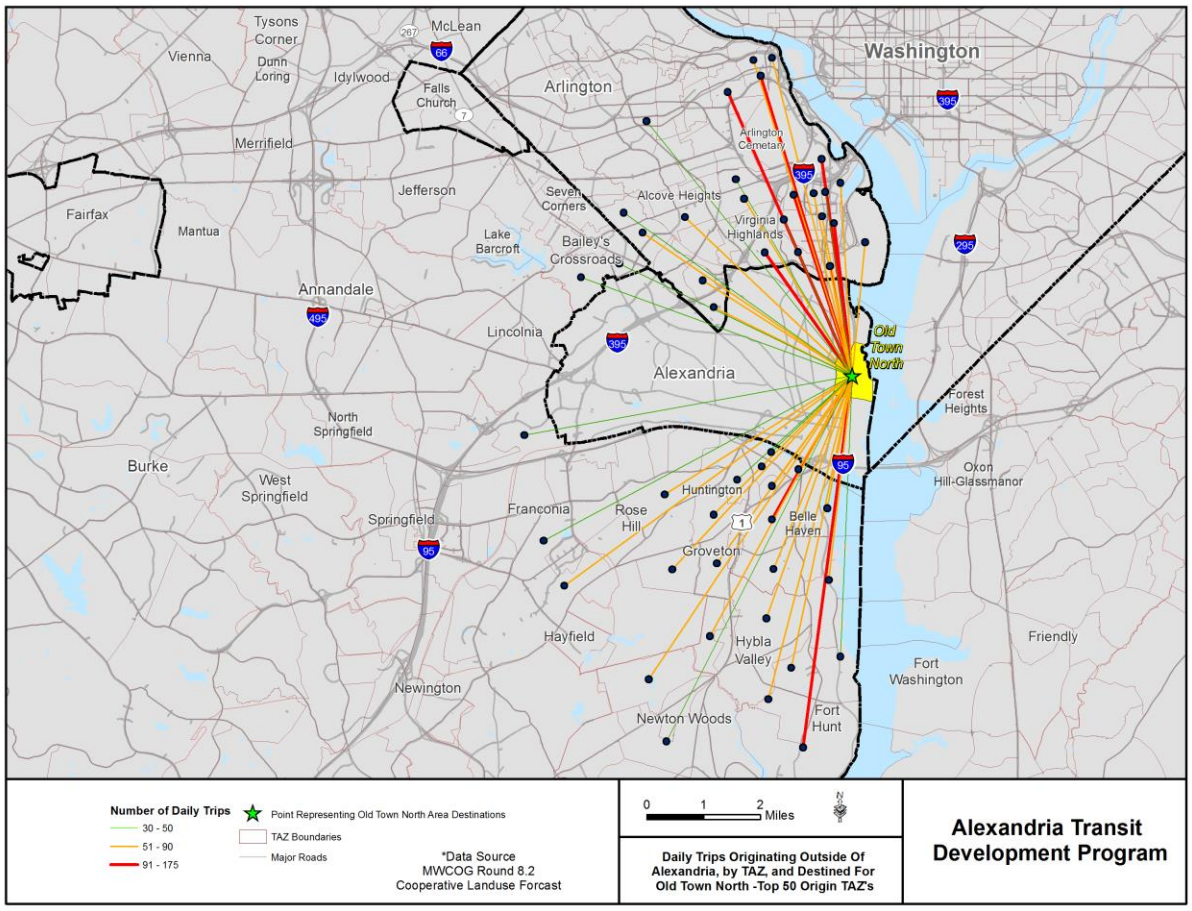


Source: MWCOG Regional Model – 2015 Trip Table

The data in the map show the first concentration of heavy origin zones close by Carlyle to the south in Fairfax County. REX service and the Yellow Line provide transit access for some of these TAZs while others would rely on Fairfax Connector service and a transfer to the Yellow Line or REX. A second heavy trip flow comes from Rosslyn in Arlington. This TAZ would be accessible by the Blue Line or the Metrobus 10R service. The proposed Eisenhower Circulator, outlined in Chapter 4, would play an important role in helping people get from the King Street Metrorail Station, which would be a transfer point for the services noted above, and Carlyle.

Figure 3.45 shows trip flows to Old Town North from TAZs located outside the City.

Figure 3.45 - Trip Flows from Outside Alexandria to Old Town North



Source: MWCOG Regional Model – 2015 Trip Table

The heaviest trip flows to Old Town North come from Arlington, with a secondary concentration south of Alexandria in Fairfax County. The trip flows from Arlington are served by the Metrobus 10 Line and the Blue Line while the flows from the south are best served by the REX service.

4.0 Development and Redevelopment Areas

This section summarizes key development and redevelopment areas within the City, with a specific focus on whether new transit service, or improvements to existing service, will be required to support this planned growth.

4.1 Potomac Yard North

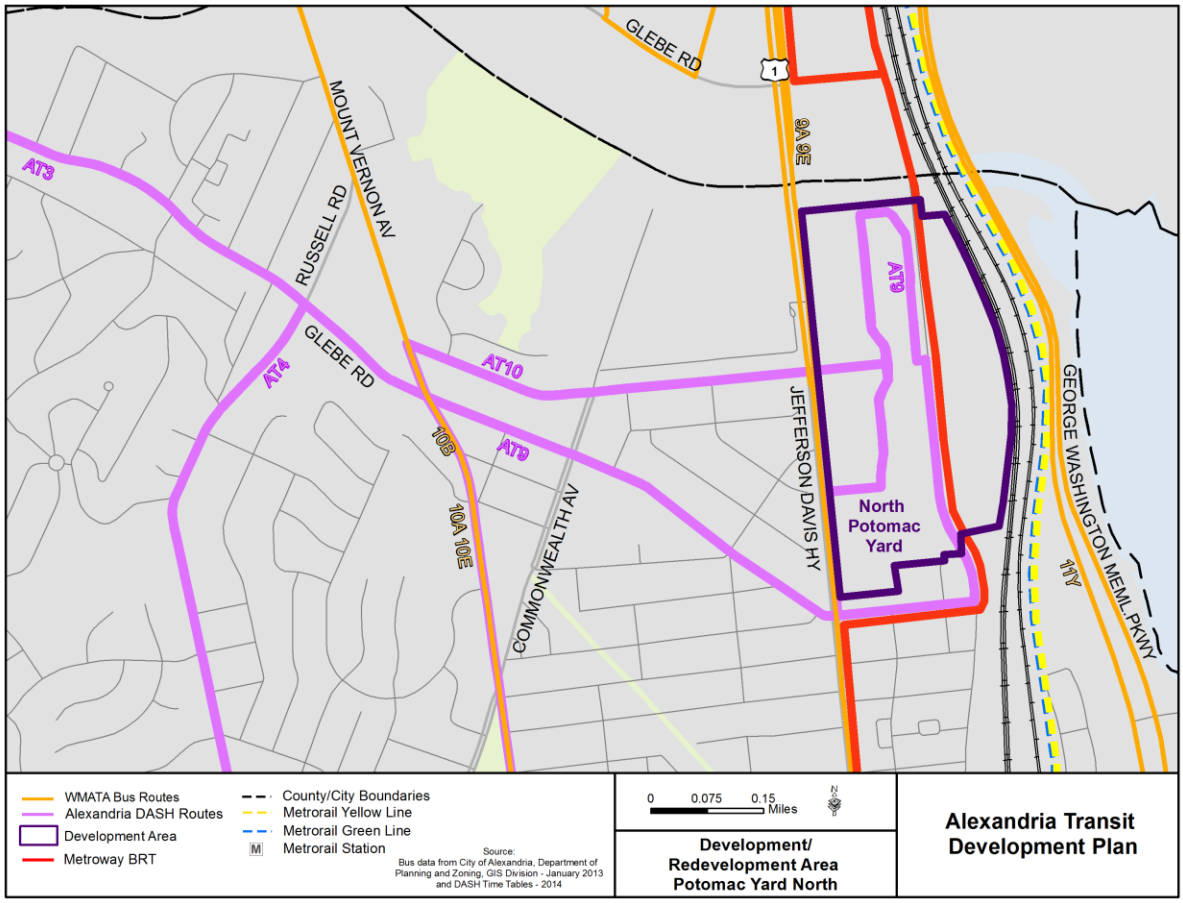
The North Potomac Yard area consists of 295 acres of proposed mixed-use commercial and residential development that will be anchored by the proposed Potomac Yard Metrorail Station. The allocation and mix of land uses planned for North Potomac Yard are based on the proximity and relationship of parcels to transit, planned surrounding uses, open space, and the proposed street network. The ultimate intent of the development is to have a walkable 24-hour community that does not rely on the automobile for mobility. Given these goals, transit is an essential element of the development strategy.

A key focus of the plan is a balance between office, residential, and retail uses, with two to three times more residential than office proposed to achieve this balance.

The Potomac Yard area is currently served by Metrobus 9A service along U.S. Route 1, the Metroway service that runs through the heart of the North Potomac Yard area, and the DASH AT9 and AT10 routes.

A map of the Potomac Yard North development area and the transit services within the development area are shown in Figure 3.46.

Figure 3.46 - North Potomac Yard Development Area



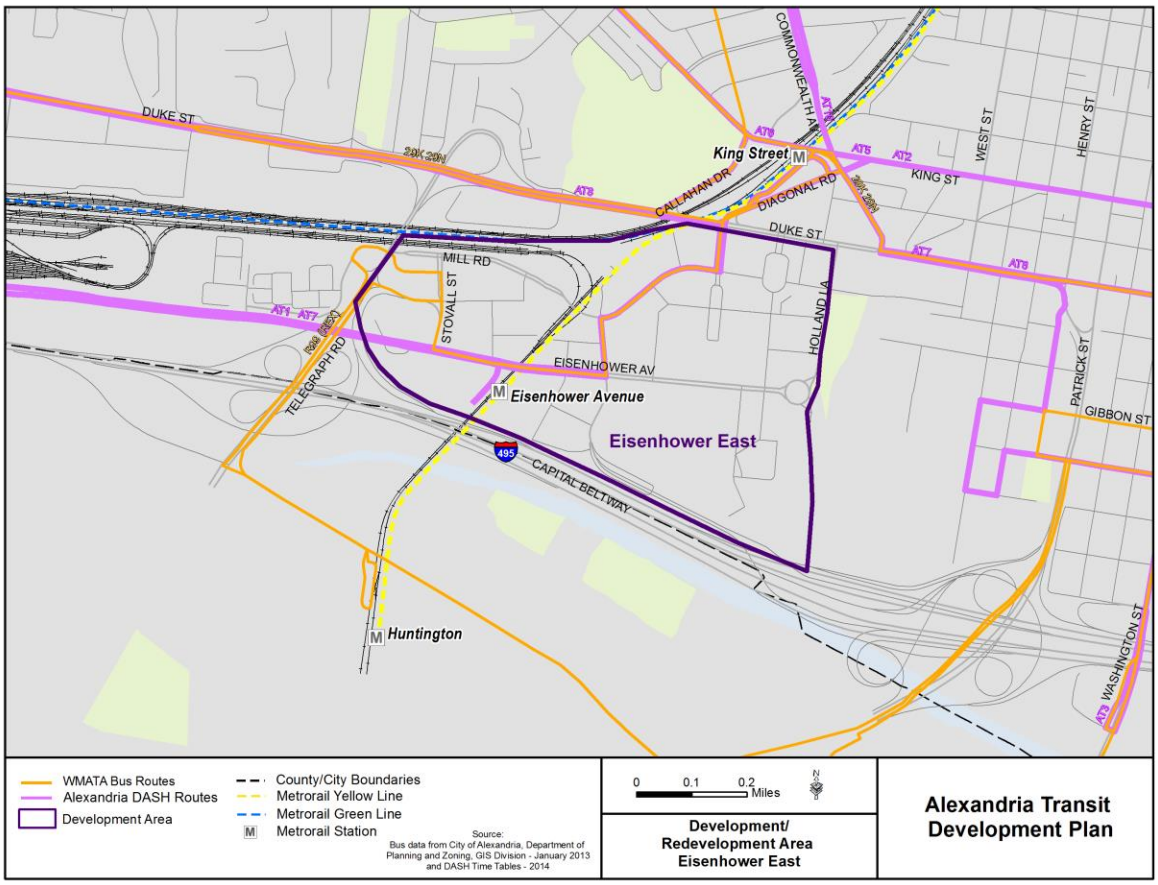
4.2 Carlyle/Eisenhower East

Carlyle/East Eisenhower is a newer mixed-use development that was once predominantly industrial and vacant land. The area is in close proximity to two Metrorail stations (King Street and Eisenhower), Old Town, and Interstate 495.The area consists of about 230 acres bounded on the north by Duke Street and the south by I-495. The eastern boundary is Holland Lane and the western boundary is Telegraph Road (see map in Figure 3.56). The proposed development plan for the area would encompass an urban mixed-use community that is anchored by the Eisenhower Metrorail Station. The redevelopment would rely on transit for mobility and would include a mix of jobs, housing and a retail/entertainment. In economic terms Eisenhower East is a resource of great importance for the City of Alexandria as it provides the foundation for the City's near and long-term commercial and residential growth. The redevelopment represents the opportunity to create additional value outside the Alexandria historic core.

The development area is currently served by the Yellow Line at the Eisenhower Metrorail Station, the DASH AT 8 on Duke Street, the DASH AT1 and AT7 on Eisenhower Avenue, the Metrobus 29K, N on Duke Street, and the Metrobus Route 1 REX service. The area is also a focus of a new proposed service, the DASH Eisenhower Circulator. The area is also close to the King Street Metrorail Station, which is served by the Yellow and Blue Lines as well as a large number of DASH and WMATA bus routes.

The development area and the transit services serving it are shown in Figure 3.47.

Figure 3.47 – Carlyle – Eisenhower East Development Area

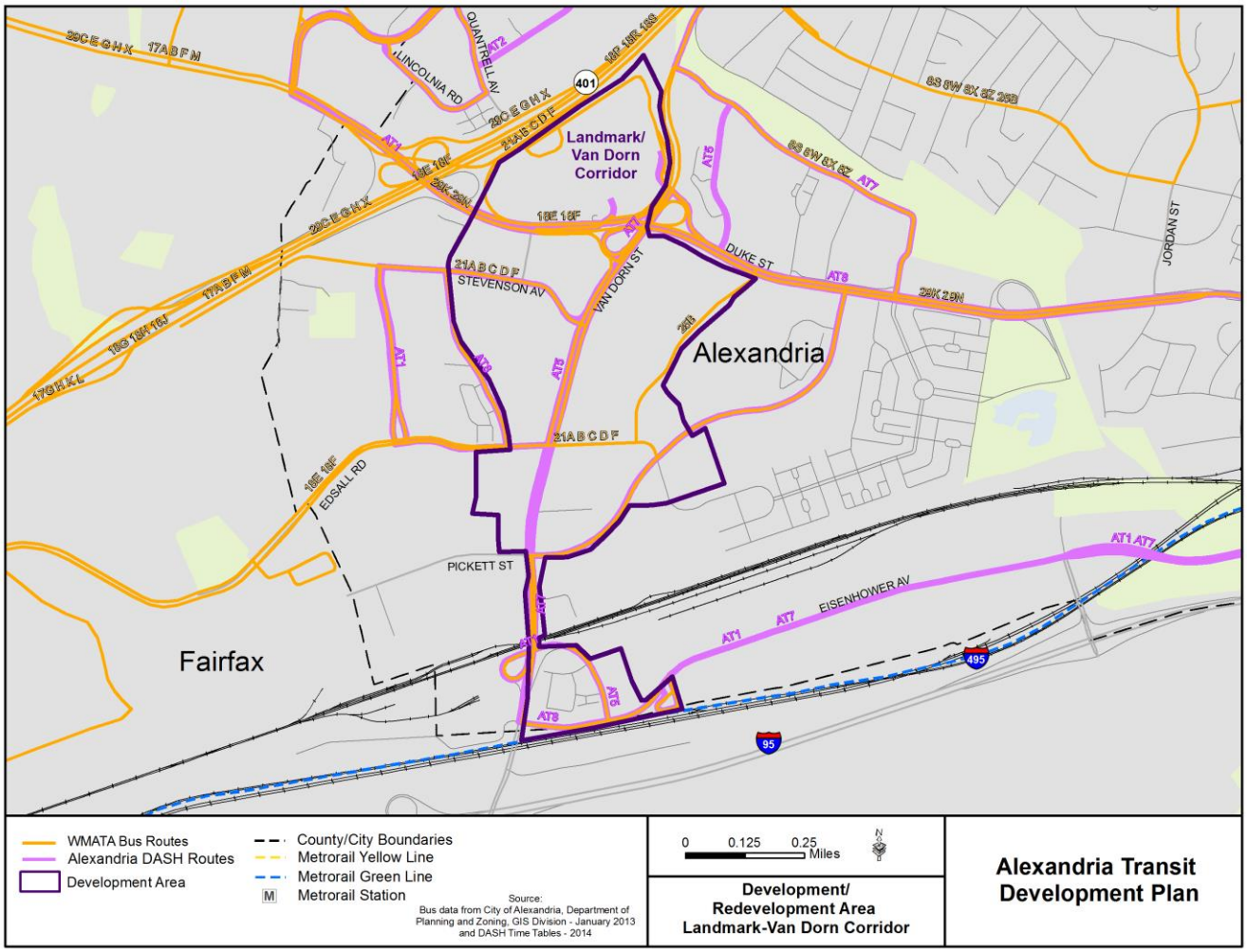


4.3 Landmark/Van Dorn

The Landmark/Van Dorn Corridor Plan begins by noting that the area is characterized by automobile-dominated corridors, disconnected commercial, multi-family, and industrial uses and a lack of a sense of place. The focus of the plan is to transform the current suburban development pattern into a quality mixed use urban community that serves the residents of the development/redevelopment area as well as the City of Alexandria as a whole. The 240 acre development area is focused along Van Dorn Street and extending from the Landmark Mall to the Van Dorn Metrorail Station. Given the existing development within the area, the creation of new urbanized area will require a combination of private development and public sector action. The anchor of the redevelopment will be the transformation of the current Landmark Mall into a mixed-use town center that includes office, residential, and retail uses. The redevelopment area is served by a dense transit network including the Van Dorn Metrorail Station, the DASH AT1, AT5, AT7 and AT8 routes and the Metrobus 25B, and 29K, N Lines. In addition, the proposed West End Transitway will run along Van Dorn Street, thus providing a backbone transit service through the heart of the redevelopment area.

The development area and the transit services serving it are shown in Figure 3.48.

Figure 3.48 – Landmark/Van Dorn Redevelopment Area



4.4 Beauregard

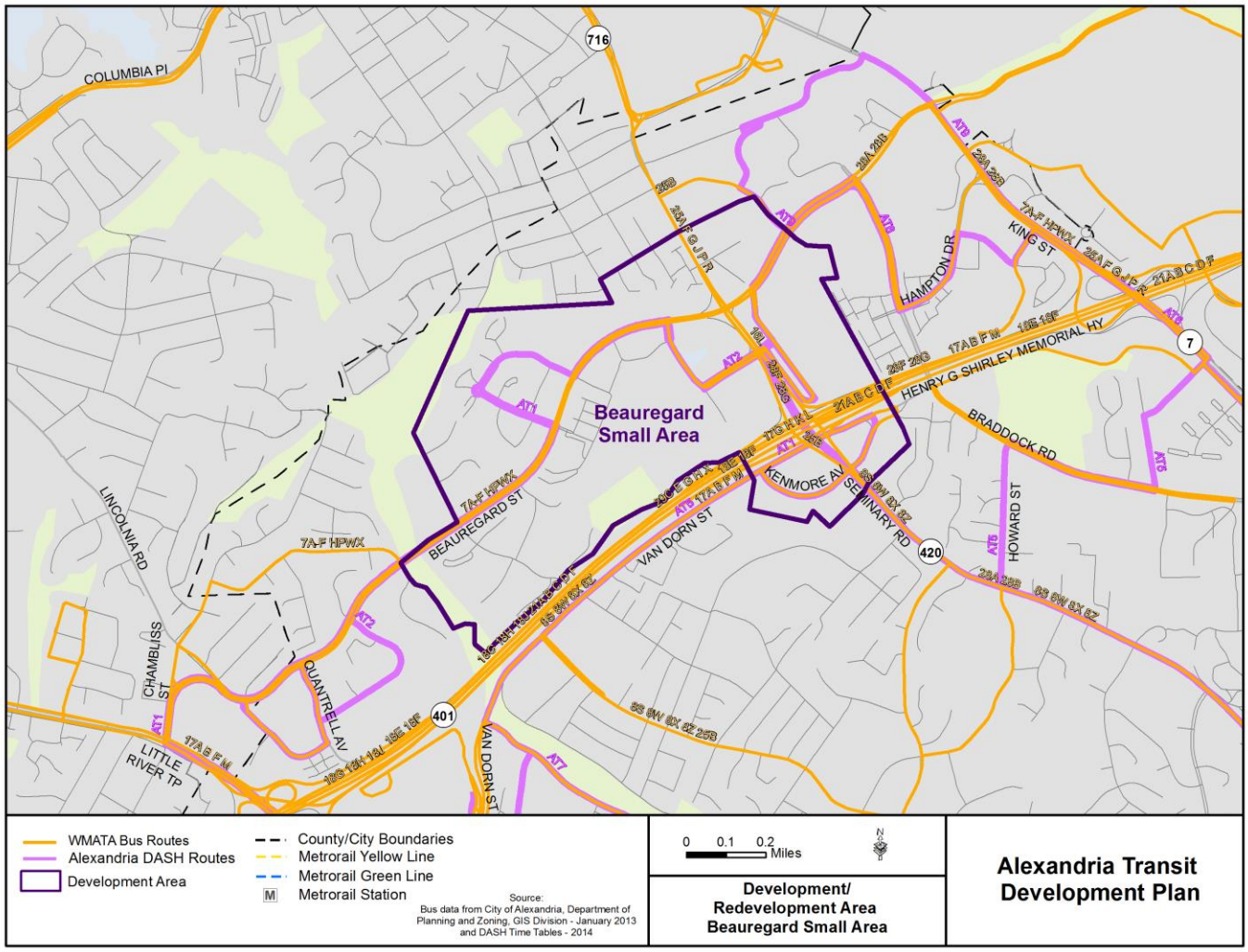
The Beauregard redevelopment area consists of approximately 287 acres that is focused on the North Beauregard corridor in the westernmost portion of Alexandria. The proposed framework for the redevelopment is seven distinct neighborhoods within the overall planning area. The overall land use strategy for the redevelopment is based on the following elements:

- Concentrate redevelopment density at transit stops;
- Appropriate building heights at transit stops;
- A balance of commercial and residential uses;
- Mix of land uses within each of the seven proposed neighborhoods;
- Concentration of retail at transit stops;
- Appropriate transitions to existing neighborhoods;
- Management of parking to support transit;
- Overall focus on open space and parks, especially within specific neighborhoods.

The overall plan recommends increasing density where it can be properly supported by transit. The Beauregard redevelopment area is served by a very dense network of transit service including the Metrobus 7 Lines, the Metrobus 25B Line, the Metrobus 8 Line, the Metrobus 21 Line, and the DASH AT1 and AT2 routes. The proposed West End Transitway would also be located along Beauregard Street and would be a key foundation for the proposed redevelopment described above.

A map of the Beauregard redevelopment area and the transit services within the redevelopment area are shown in Figure 3.49

Figure 3.49 – Beauregard Redevelopment Area



4.5 Waterfront

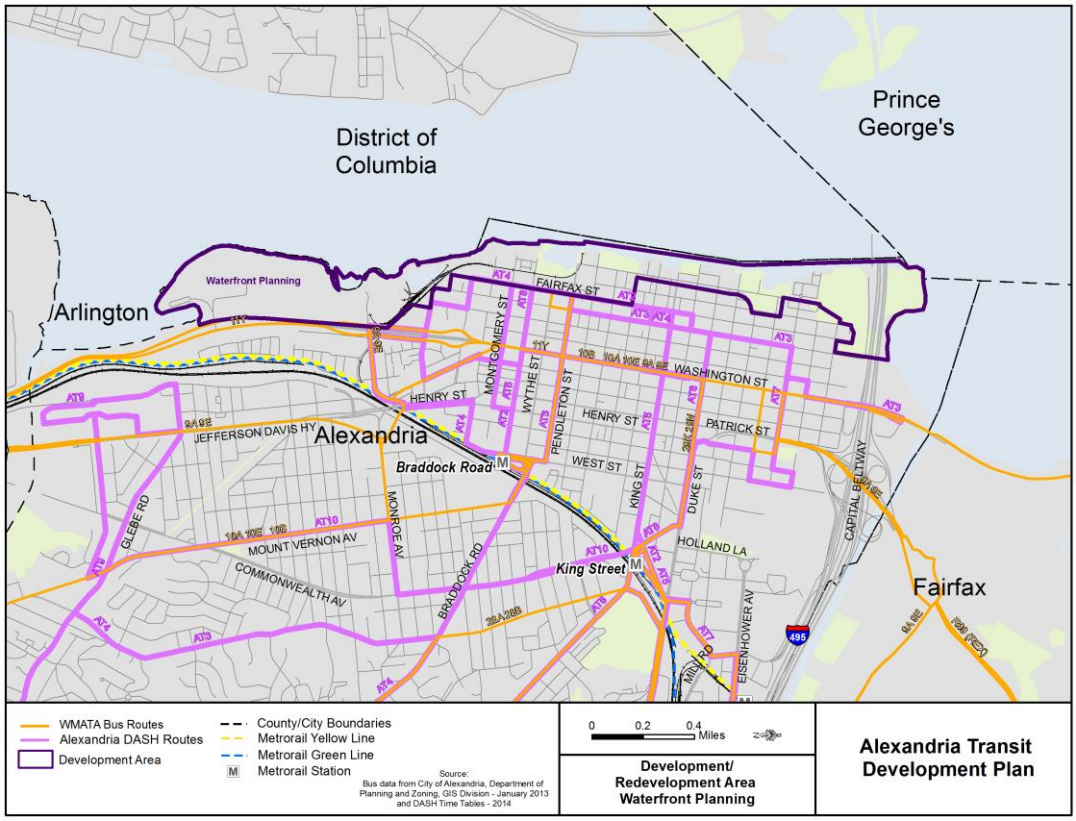
The planning process for the Alexandria waterfront is focused on a comprehensive and consistent redevelopment of key sites along the Alexandria waterfront from I-95 in the south to approximately Slaters Lane in the north. The focus of the plan includes:

- Redevelopment of active and inactive industrial areas along the waterfront, predominantly into mixed used developments. Maintaining the character of the waterfront will be essential in these redevelopments.
- Increase opportunities for access to the waterfront for Alexandria residents, including ensuring that no redevelopment precludes waterfront access.
- Improve parkland and recreational uses along the waterfront.
- Increase marina space along the waterfront.

The area of the Alexandria waterfront identified in the Waterfront Plan is served by the King Street Trolley and a number of adjacent transit services, though no services other than the Trolley actually run within the redevelopment area itself. Adjacent services include the DASH AT2, AT3, AT4, AT5, and AT7, and the Metrobus 10 and 11Y lines.

A map of the Waterfront redevelopment area and the transit services running adjacent to the area are shown in Figure 3.50.

Figure 3.50 – Waterfront Redevelopment Area



4.6 Arlandria/Del Ray

The Arlandria neighborhood is centered on the northern end of Mount Vernon Avenue and is adjacent to Arlington, located across 4 Mile Run. Key goals of the redevelopment framework set out in the Arlandria Neighborhood Plan (2003) include:

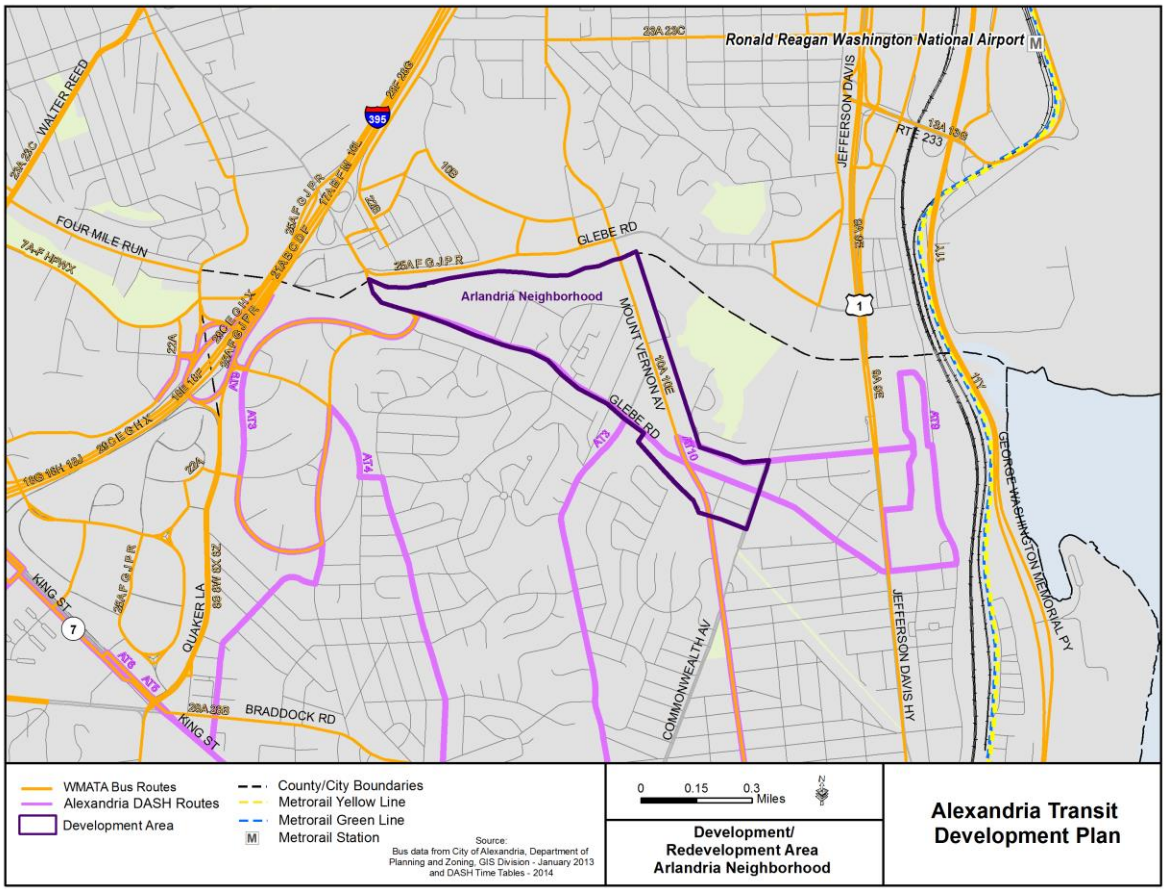
- Active and viable commercial retail that serves both the neighborhood and broader community;
- A transition in uses from automobile oriented to pedestrian oriented;
- Visual and physical connections to Four Mile Run Park; and
- A safer environment for pedestrians.

Current redevelopment projects include the Mount Vernon Village Center and Del Ray Tower along Mount Vernon Avenue. Mount Vernon Village Center will add 685 units and 53,530 square feet of retail to the Arlandria commercial district. Del Ray Tower (aka The Calvert) will add 332 units and 10,900 square feet of retail along Mount Vernon Avenue.

Arlandria is served by the DASH AT3, AT4, AT3/4, AT9 and AT10 routes as well as the WMATA Metrobus 10 Lines.

A map of the Arlandria redevelopment area and the transit services running through or adjacent to the area are shown in Figure 3.51.

Figure 3.51 – Arlandria/Del Ray Redevelopment Area



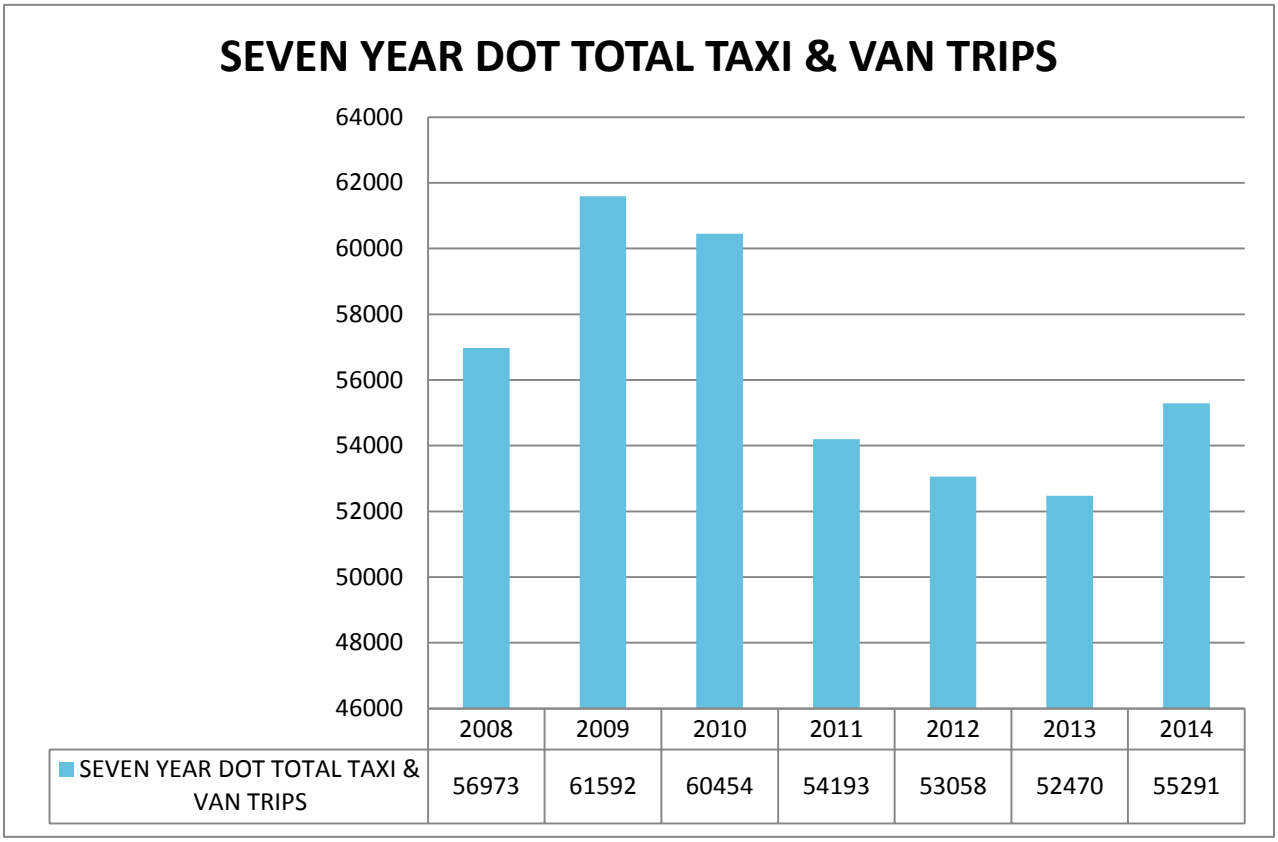
5.0 DOT Paratransit Service

The DOT Demand Response service is operated by the city and is provided for Alexandria City residents with disabilities as an alternative to DASH fixed route service. The service provides disabled Alexandria residents access for all trip purposes to Alexandria, Falls Church, Fairfax County, Fairfax City, and Arlington County. DOT does not go to Washington DC or Maryland (disabled riders wishing to go to those jurisdictions would use the regional MetroAccess demand response service).

Seven year trend data for DOT operational and performance metrics are remarkably stable.

Figure 3.52 shows the number of trips annually since 2008.

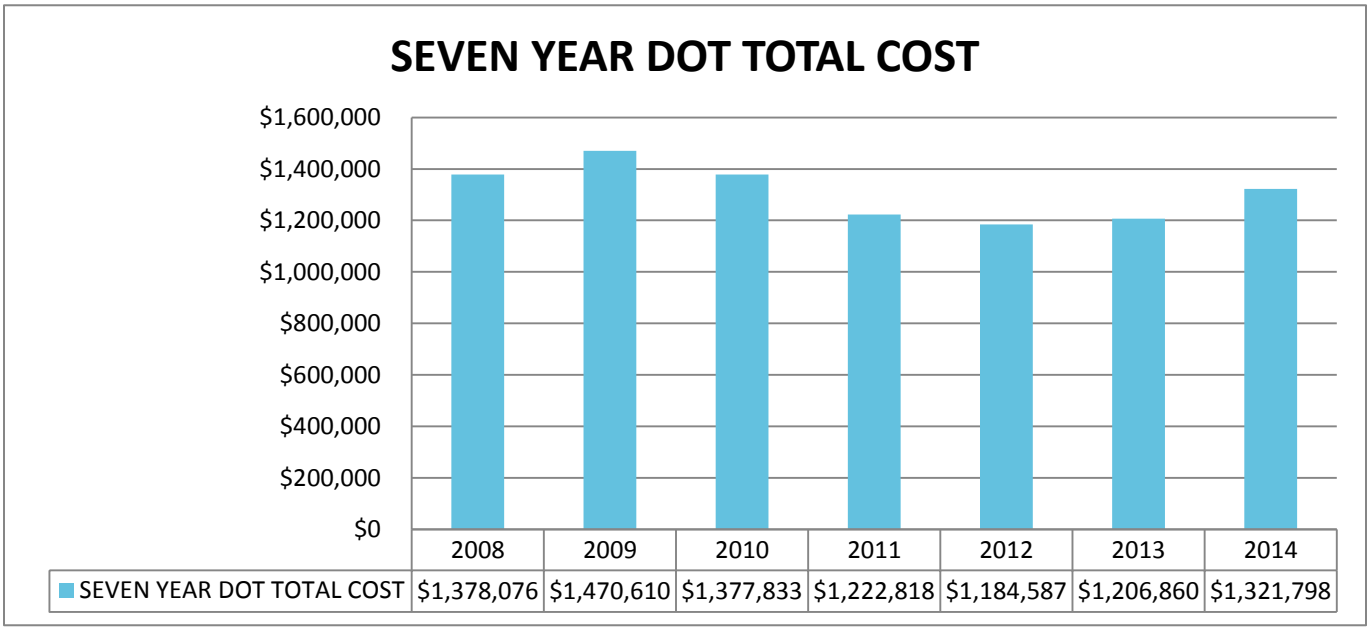
Figure 3.52 – DOT Demand Response Service Annual Trips



The data in Figure 3.52 show a high of 61,592 trips in 2009 to a low of 52,470 trips in 2013, though the average has remained generally around 54,000 to 56,000 annual trips.

Figure 3.53 shows annual operating costs for DOT.

Figure 3.53 – DOT Demand Response Service Annual Cost



The cost data also show significant stability, with a low annual cost of $1,184,587 in 2012 and a high of $1,378,076 in 2008. Other metrics such as cost per trip, cost per mile, and total miles generally show the same stability from year to year.

6.0 Equipment Deficiencies

Alexandria Transit (ATC) plans bus replacement requirements based on a 12-year useful life for vehicles. ATC has noted in its FY 2016 Transit Development Program that due to budgetary constraints, they have had to delay the purchase of replacement buses, thus requiring them to maintain and operate buses beyond their useful life. They have requested capital funding in the FY 2016 Transit Development Program to catch up on all of their replacement requirements (see Chapter 6 for replacement bus funding included in the City's Capital Improvement Program).

Alexandria Transit has also requested funding to begin replacing hybrid bus battery packs, which have a useful life approximately ½ the life of a bus. The battery packs on the first set of hybrid vehicles are nearing the time for replacement.

The final deficiency that Alexandria Transit has requested funding to address is bus storage parking constraints at its existing maintenance and storage facility. They have developed a short-term temporary plan for accommodating the capacity constraint and have also requested funding for a longer-term solution.

In sum, Alexandria Transit is facing some equipment deficiencies but these are not major, and they have plans in place to address these deficiencies.

7.0 ITS Technologies

Alexandria Transit has a detailed technology expansion plan in place. Elements of this plan include:

- Automatic Vehicle Location (AVL) technology on each DASH bus. This AVL capability will support a number of operational and passenger information improvements, including:
    - Real time bus arrival information. Passengers will have the capability to access bus arrival information via their handheld device and there will also be bus arrival signs installed at a number of high ridership stops throughout the DASH system.
    - Computer Aided Dispatch (CAD) capabilities to enhance operations and service reliability.
    - Automated Passenger Counters (APC), which will support collection of boarding and alighting data by stop and trip. This capability will support more sophisticated operations and service planning, and will also support more effective deployment of service to match service levels to demand.
        - To support the most effective use of the APC data, Alexandria Transit will also be procuring a data management system to manage APC data for analysis and reporting requirements.
- The final technology expansion element will be an automated garage mapping system to more effectively manage vehicle maintenance and dispatch.

Chapter 4
Service Expansion Projects

1.0 Introduction

This chapter has two key purposes. The first is to provide a demographic context for transit service in Alexandria, with a focus on understanding changes over time in key demographic factors within Alexandria such as population and employment as well on key demographic indicators of potential transit need such as household income and auto ownership.

The second purpose of this chapter is to outline service expansion projects for each of the transit service providers within the City of Alexandria. The projects described in this chapter provide the framework for the financially constrained operations plan described in Chapter 5 of this document. The basis of the service expansion projects list is an extensive range of studies and analyses completed over the last five years by the City, the Alexandria Transit Company (DASH) and WMATA that have identified a large universe of proposed transit service improvements. These improvements are focused on providing more convenient service to existing and potential new riders as well as meeting increased transit demand in existing and new corridors within the City.

This chapter outlines the full universe of proposed service improvements based on the recommendations from this wide range of studies and analyses. This list is financially unconstrained and represents the full range of anticipated transit needs for all transit providers in the City. The sources for this list of expansion projects include:

- The Alexandria Transit Company (ATC) Comprehensive Operations Analysis and the ATC FY 2016 Transit Development Program.
- Multiple WMATA Service Evaluation and Priority Corridor Network Studies covering Metrobus service within Alexandria as well as ongoing service evaluations completed by WMATA operations and service planning staff.
- Discussions with technical staff at the City of Alexandria, Alexandria Transit Company, WMATA, and the Virginia Department of Rail and Public Transportation regarding transit needs and goals within Alexandria.
- Technical analysis completed in Chapter 3 of this Transit Development Plan, with a focus on identifying and meeting the unmet transportation needs of Alexandria residents.
- Discussions with the Transit Development Plan Project Management Team regarding the City's, Region's, and State's transit goals.
- The West End Transitway planning process currently underway. This project is focused on the development of a premium service utilizing dedicated transit lanes and connecting the west-end of Alexandria with key regional residential and employment centers as well as other key transit corridors.

General service expansion themes derived from these different sources include:

- Expansion of Alexandria Transit Company DASH service frequencies to meet "urban service level" targets. This proposed expansion focuses predominantly on improvements in service frequency on existing services, with an ultimate focus on providing service that is more convenient to riders and which allows riders to randomly arrive at a stop and be assured a bus will arrive within a reasonable amount of time.
- Implementation of weekend service on DASH routes where weekend service is not currently provided.
- Implementation of new neighborhood circulator services that are focused on providing greater transit connectivity within existing and planned high density neighborhoods.

- Consolidation and rationalization of service within Old Town and the introduction of an Old Town Circulator in order to provide a more focused and customer-friendly service within the heart of Alexandria.
- Service improvements and rationalizations on WMATA Metrobus Lines within Alexandria, with a focus on improved connections with key employment and residential centers in Arlington County and enhanced productivity on existing services.
- Improved inter-jurisdictional services focused on improved connectivity for Alexandria residents accessing employment centers and other destinations outside Alexandria and for non-residents entering Alexandria for employment and other purposes.
- Service and facility improvements on the WMATA Metrobus 29K, N Line, including a new MetroExtra service in the 29K, N service corridor.
- Premium service utilizing dedicated transit lanes, where feasible. Key premium transit corridors identified for future implementation include:
    - In the west end of Alexandria and connecting to current and proposed major employment and activity centers at Van Dorn, Landmark, Mark Center, Skyline, and the Pentagon. This project is currently in the NEPA and Conceptual Engineering phase of project development.
    - Within the Duke Street Corridor.

A priority subset of the of the full universe of service improvements identified in this chapter, financially constrained based on estimated available funding over the six-year time frame of this study, is the subject of Chapter Five of this document (Chapter Five outlines financially constrained service improvements).

The remainder of this chapter outlines the demographic context for transit service in Alexandria as well as the unconstrained universe of service expansion projects identified in each of the sources noted above.

2.0 Demographic / Socioeconomic Characteristics

This section outlines the demographic characteristics of the City of Alexandria, with a specific focus on demographic characteristics that will impact transit markets within the City as well as needed service modifications and improvements. Demographic characteristics evaluated include population and forecasted population growth, employment and forecasted employment growth, and demographic characteristics that identify potential transit dependent populations. Population and population growth is evaluated first.

2.1 Population and Forecasted Population Growth

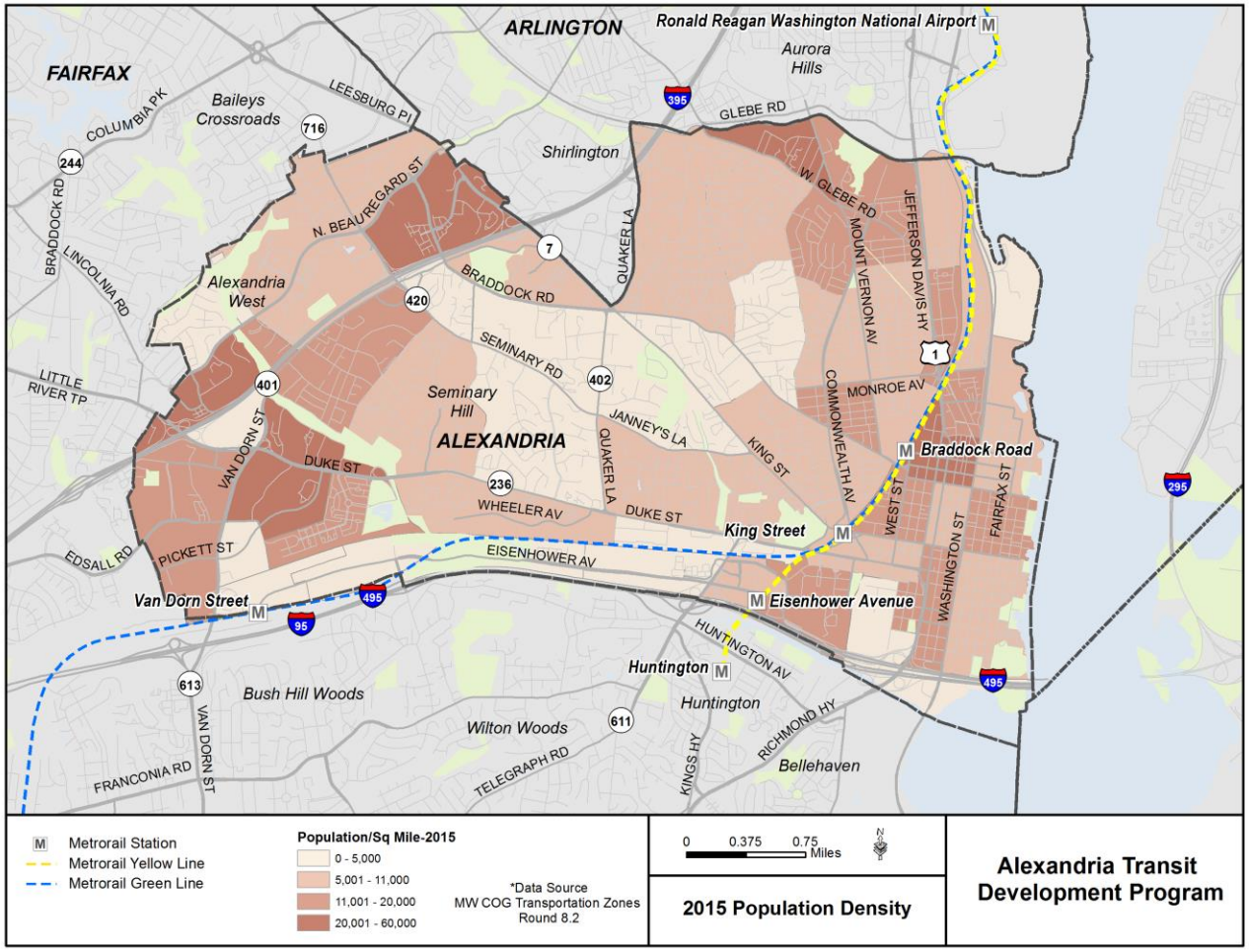
Based on the Metropolitan Washington Council of Governments (MWCOG) 2015 population and employment forecasts, the City of Alexandria's 2015 population is 149,100, representing a 6.6% increase from the 2010 Census. MWCOG forecasts estimate the City's population will increase to 158,500 or 6.3% by 2020. Population is forecasted to increase to 166,900 or an additional 5.3% by 2025.

Figures 4.1 through Figure 4.3 show current and forecasted population densities by Traffic Analysis Zone (TAZ) in 2015, 2020, and 2025. In 2015, the highest population densities within the City are located in the Alexandria West End, along Beauregard Street, along Duke Street near the Landmark Mall, North Old Town near the Braddock Road Metrorail Station, Carlyle, and Arlandria. These high density population

areas often correspond to the highest trip generation TAZs in the unmet trip demand analysis outlined in Chapter 3.

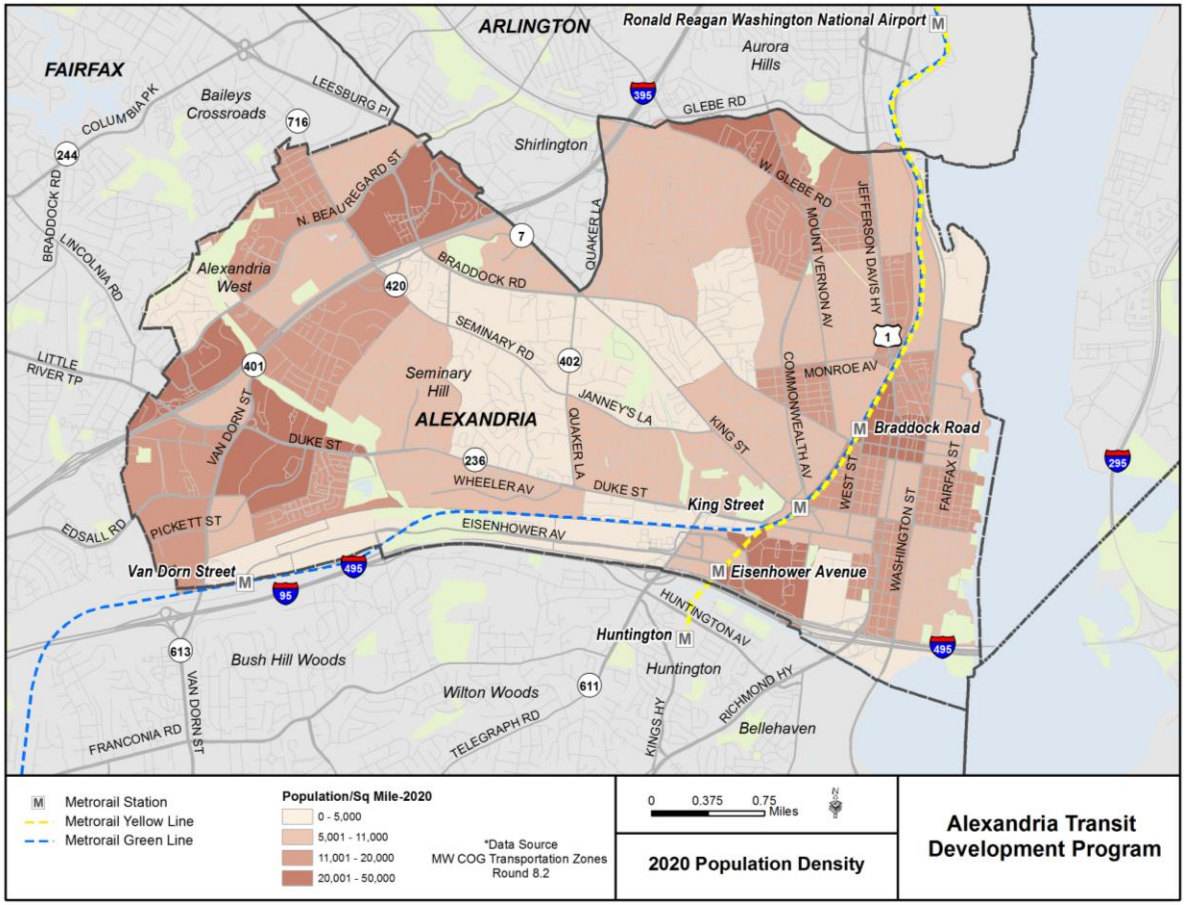
In 2020, forecasted population densities will grow in the Carlyle area, and in the Beauregard corridor, especially on the west side of Beauregard Street (current high densities along Beauregard are concentrated on the east side). In 2025, in addition to the areas already noted, there will be forecasted density growth in the northern end of Potomac Yard, as that area is further developed.

Figure 4.1 – City of Alexandria 2015 Population Density



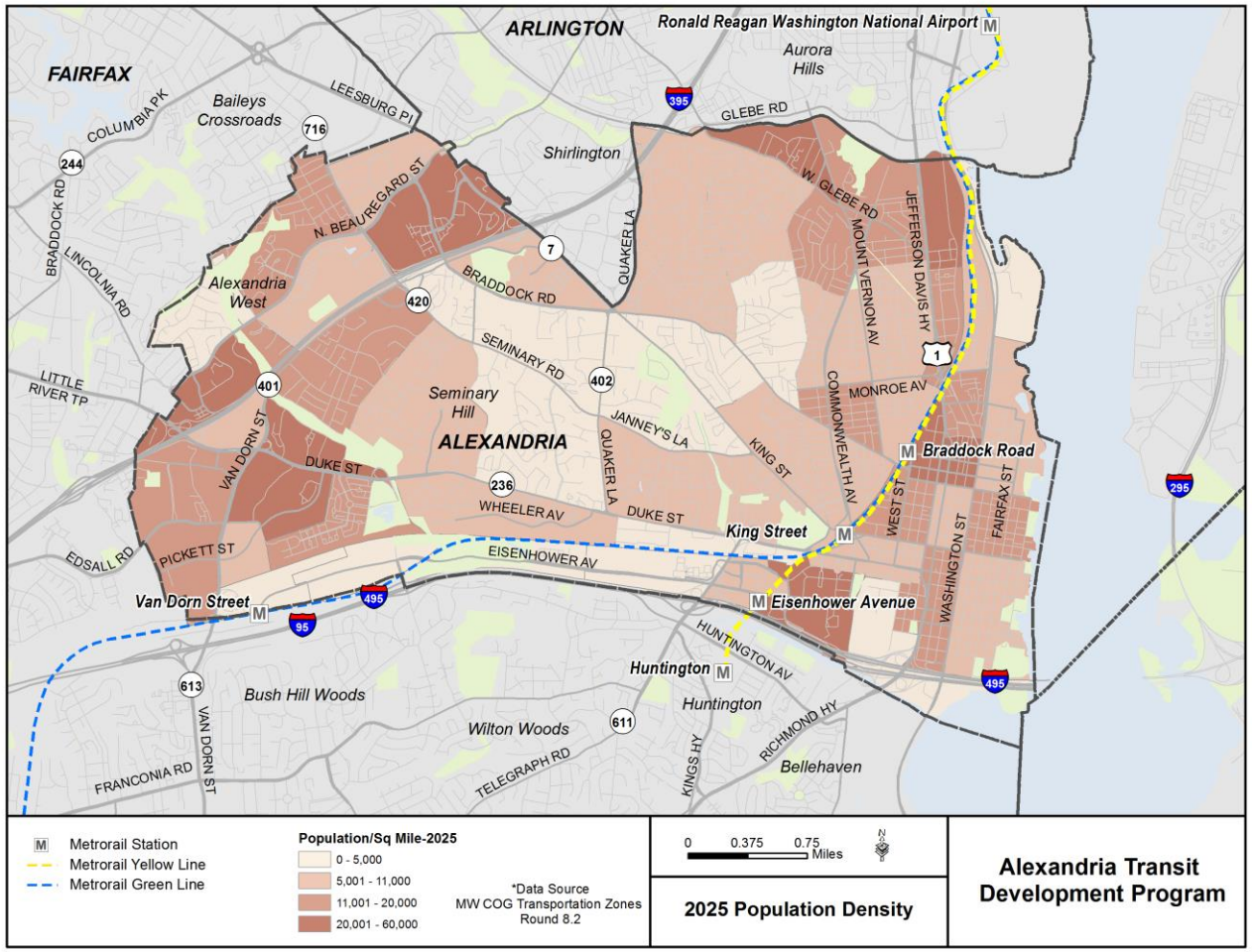
Source: MWCOG Population and Employment Forecasts

Figure 4.2 - City of Alexandria 2020 Forecasted Population Density



Source: MWCOG Population and Employment Forecasts

Figure 4.3 - 2025 Population Density



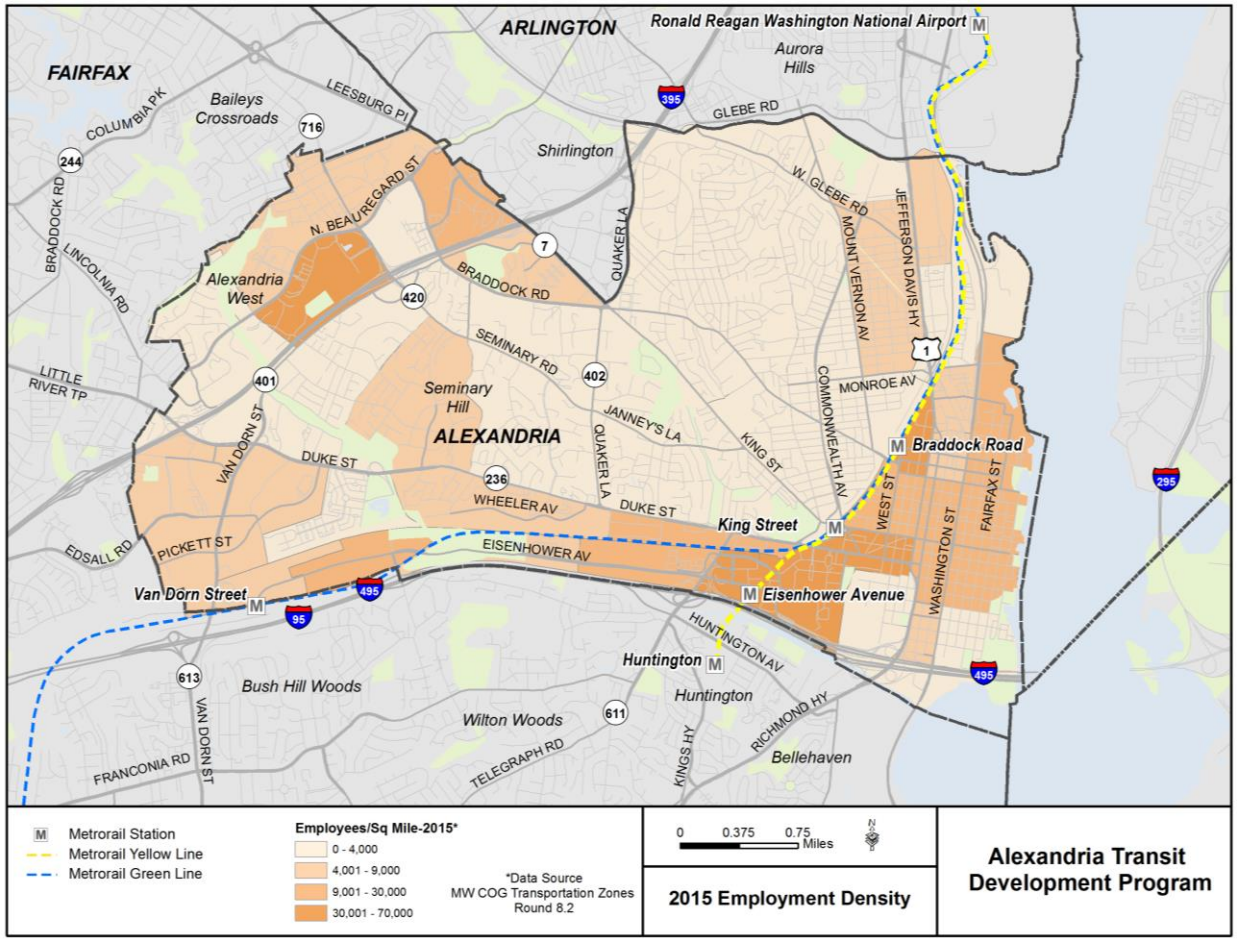
Source: MWCOG Population and Employment Forecasts

2.2 Employment and Forecasted Employment Growth

Based on MWCOG population and employment forecasts, the 2015 forecasted employment in the City of Alexandria is 117,700, representing an 8.0% increase from the 2010 estimate. MWCOG forecasts that employment in the City of Alexandria will increase to 124,100, or 5.4%, by 2020. Employment is forecasted to further increase to 135,400 or another 9.1%, by 2025.

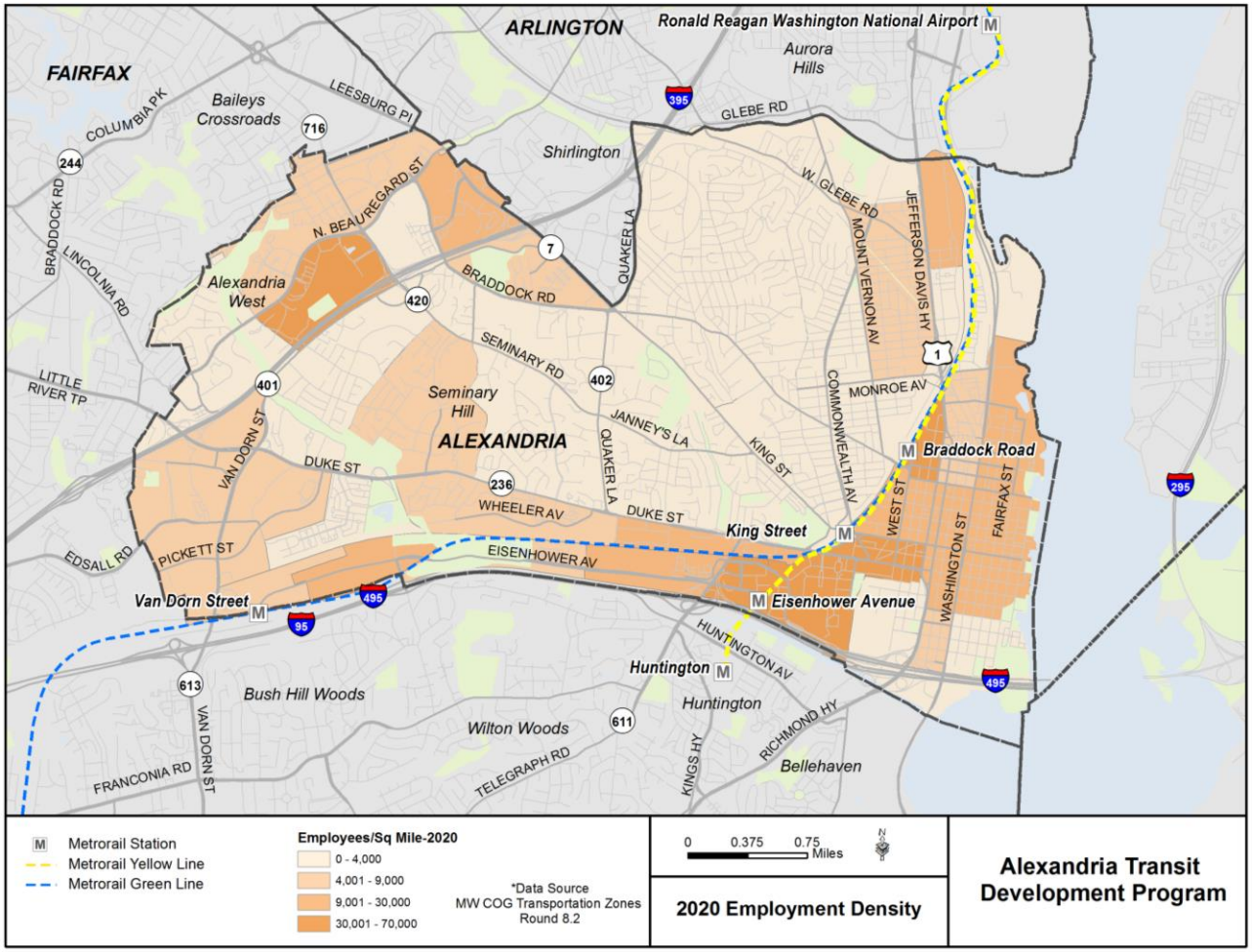
Figures 4.4 through Figure 4.6 show employment densities by Transportation Analysis Zone in 2015, 2020, and 2025. In 2015, the highest employment densities in the City are located in Carlyle, Old Town near the King Street Metrorail Station, North Old Town near the Braddock Road Metro, and the Mark Center. In 2020, employment densities are forecasted to increase in the redevelopment areas of Landmark Mall and Potomac Yard (North). By 2025, Potomac Yard (South), North Old Town, the area around the Van Dorn Street Metrorail Station and West Eisenhower Avenue, along Beauregard Street, and in the vicinity of the Landmark Mall are all forecasted to experience employment growth.

Figure 4.4 - City of Alexandria 2015 Employment Density



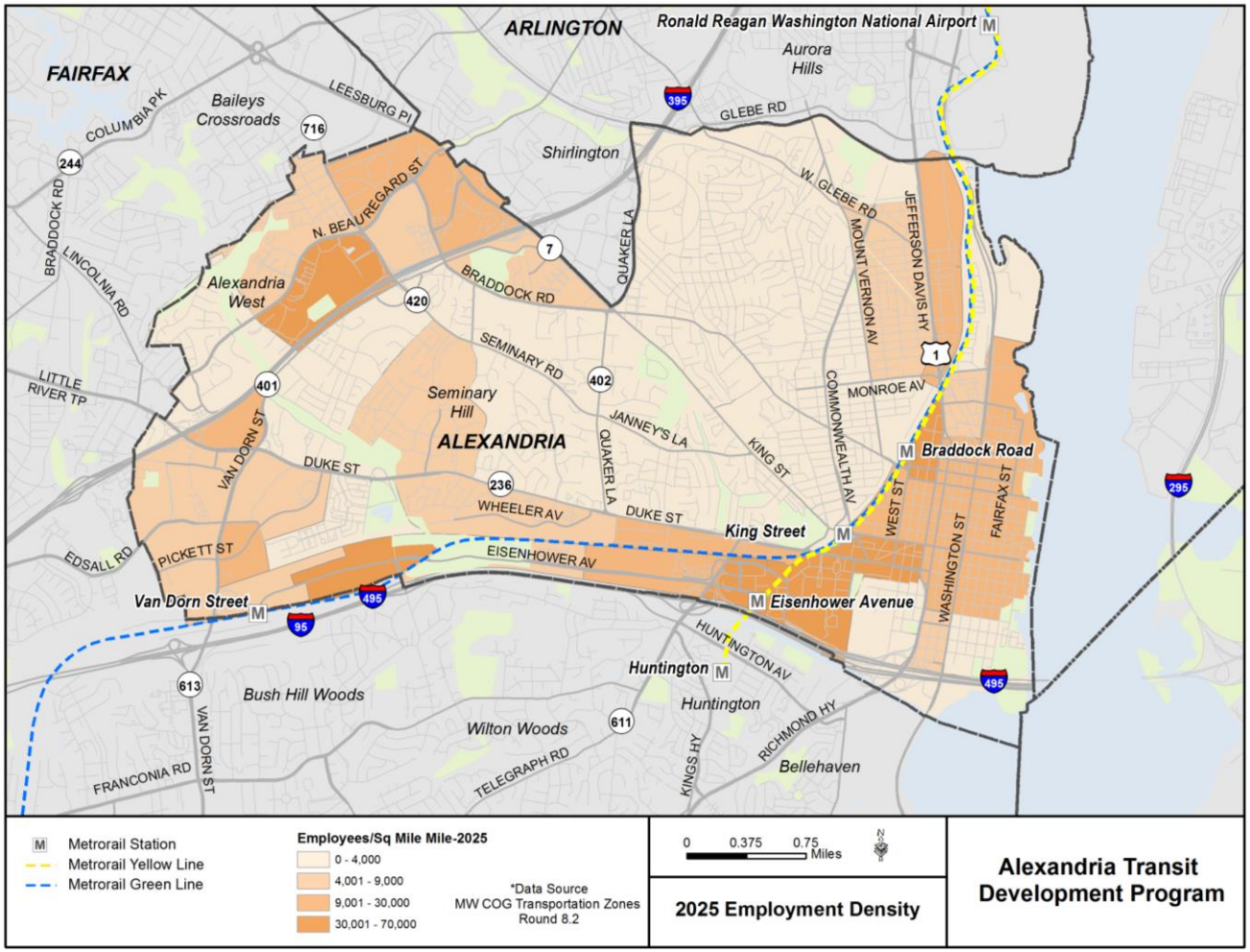
Source: MWCOG Population and Employment Forecasts

Figure 4.5 – City of Alexandria 2020 Employment Density



Source: MWCOG Population and Employment Forecasts

Figure 4.6 – City of Alexandria 2025 Employment Density



Source: MWCOG Population and Employment Forecasts

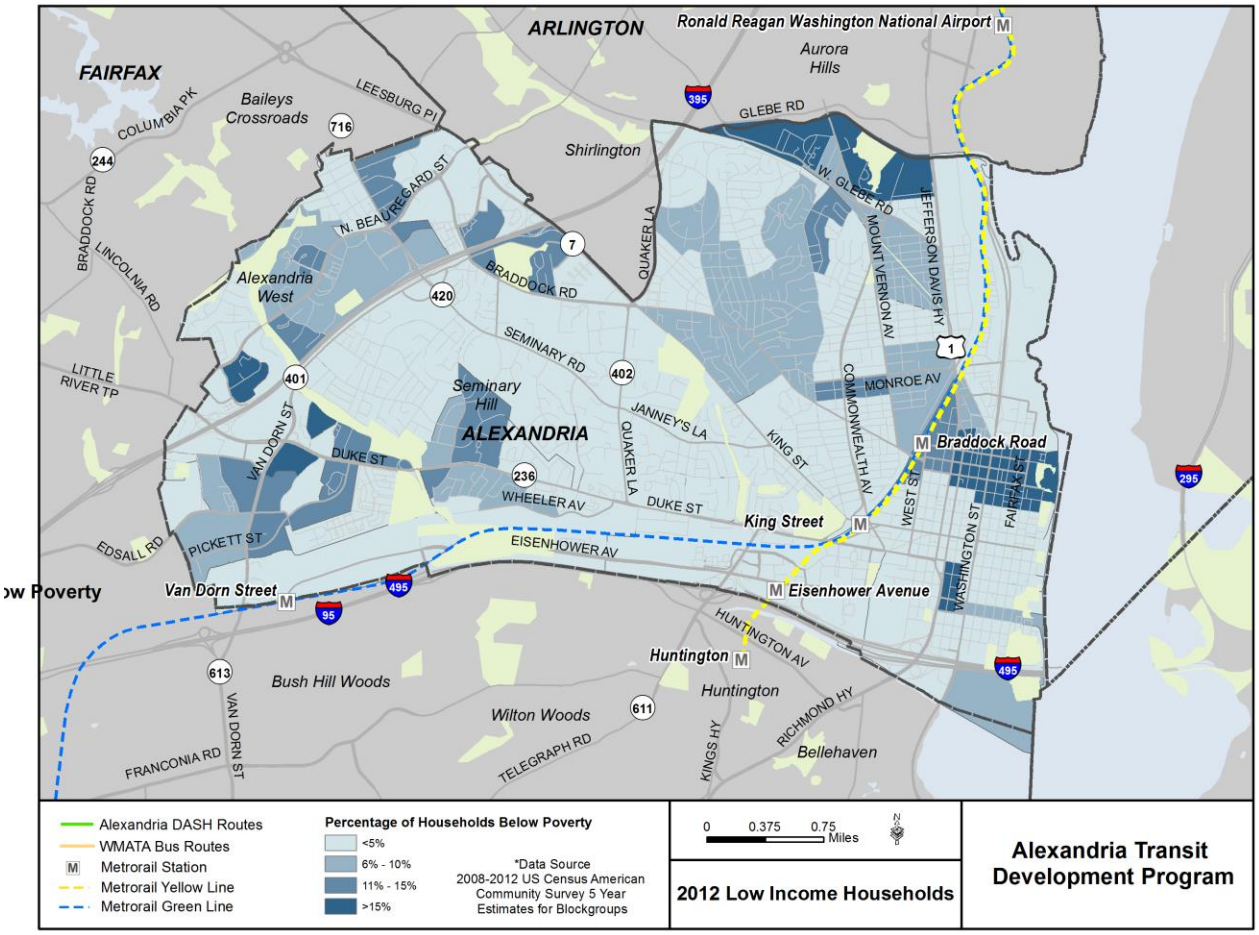
2.3 Transit Dependent Populations

This section analyzes 2012 census block level data to identify concentrations of likely transit dependent populations located within the City of Alexandria. Likely transit dependent populations were identified based on specific demographic characteristics including those 1) without private transportation, 2) elderly (over age 65), and 3) persons below poverty levels as defined by the U.S. Census Bureau. The first analysis is of low income populations within the City.

2.3.1 Low Income Populations

Figure 4.7 shows the percentage of households within Alexandria below poverty in 2012, by census block group. Generally areas at the highest threshold (>15% of households living below the poverty level) are spread throughout the City and include Arlandria, North Old Town near the Braddock Road Metrorail Station, Seminary Hill off of Duke Street, the intersection of Van Dorn & Duke Streets, and the West End Corridor (Beauregard Street North). Each of these concentrations of households living below the poverty level is well served by either DASH or WMATA Metrobus service.

Figure 4.7 - 2012 Percentage of Households below Poverty

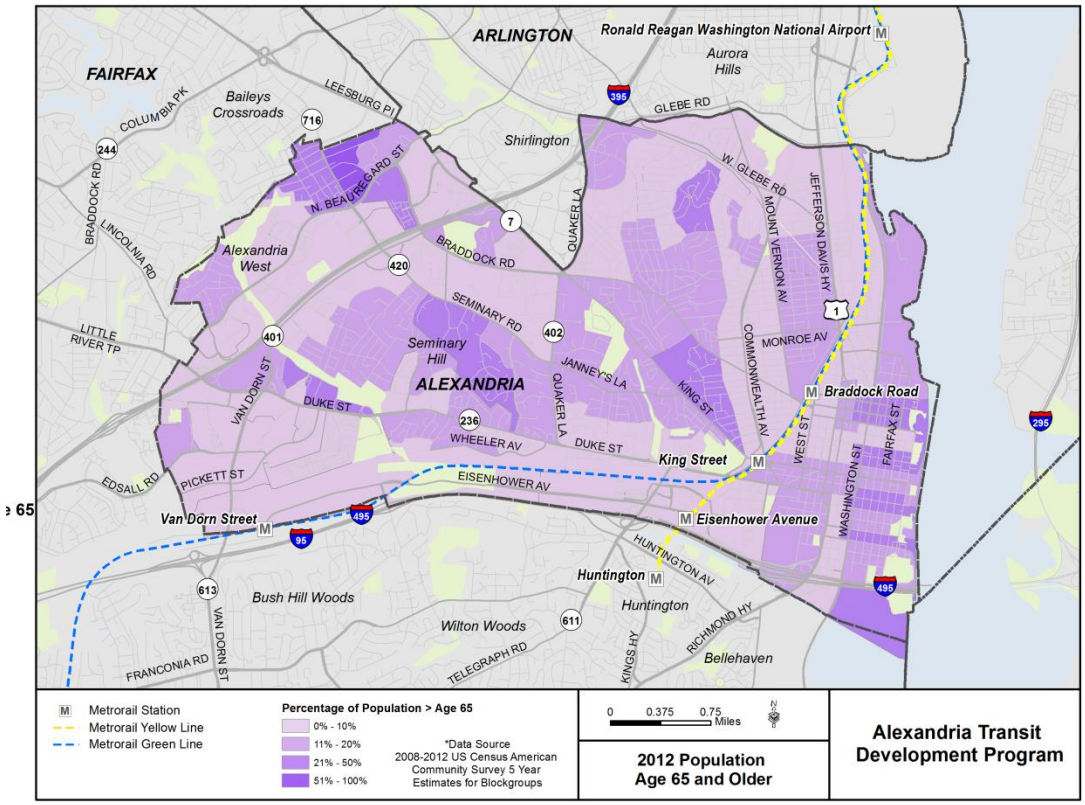


Source: U.S. Census Data (2012)

2.3.2 Population over Age 65

Figure 4.8 shows concentrations of populations over 65 within the City of Alexandria. Areas where over 50% of the population is over 65 are generally found spread throughout the City. Specific concentrations include Seminary Hill, Old Town, Old Town North, North Ridge/Rosemont, and the Alexandria West End corridor along Beauregard Street. Each of these areas is well served by transit, though portions of Seminary Hill are beyond walking distance to DASH services along Duke Street or Seminary Road.

Figure 4.8 - 2012 Population over Age 65

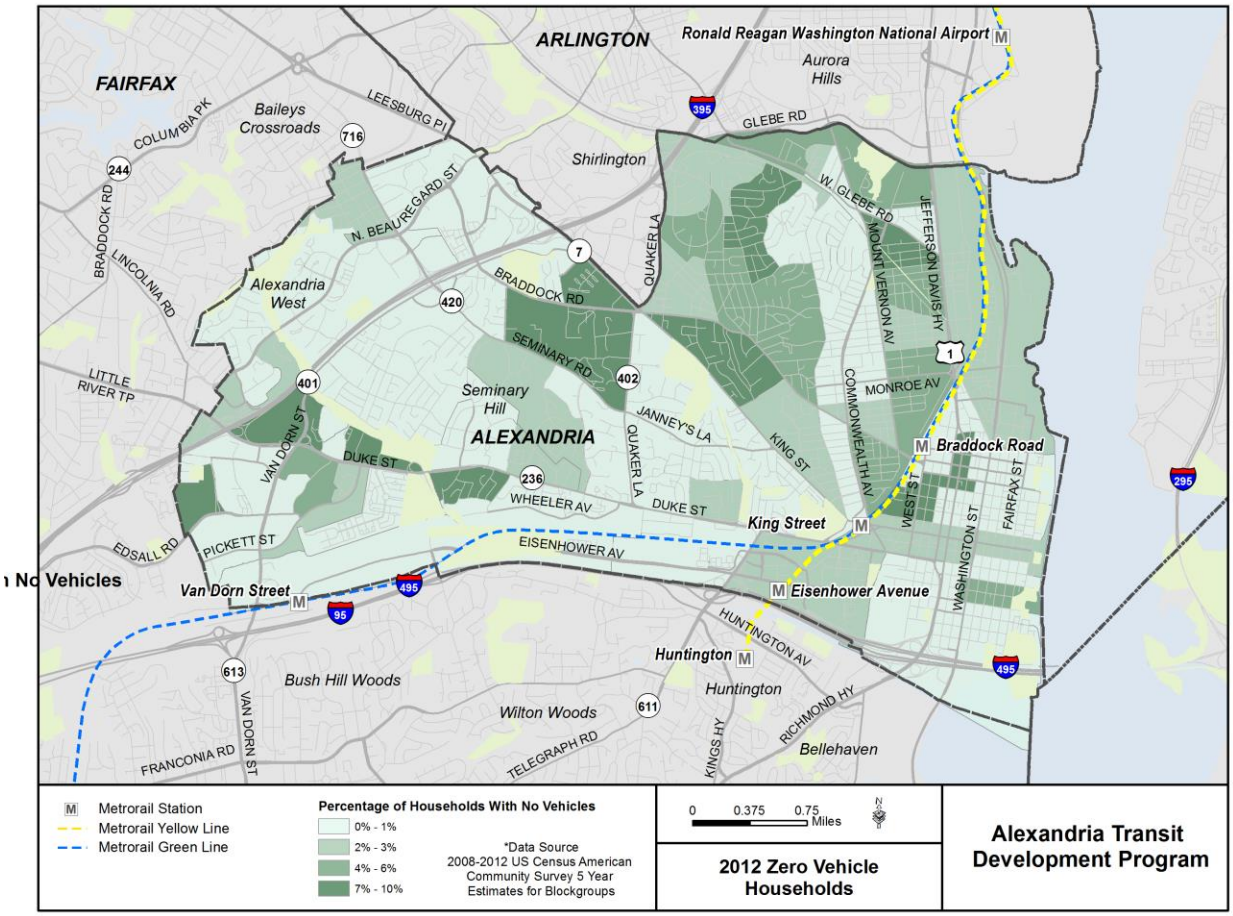


Source: U.S. Census Data (2012)

2.3.3 Zero Car Households

Figure 4.9 shows concentrations of households with zero vehicles within the City of Alexandria. Concentrations of over 50% zero car households are generally found throughout the City including in Arlandria, Landmark/Van Dorn, Duke Street, Fairlington/Bradlee, North Ridge/Rosemont, and Del Ray. It should be noted that the zero-car household percentages in some areas of the city are likely skewed by large institutional land uses such as Inova Hospital, Senior Centers, and large shopping centers. The areas of low auto ownership are all well served by either DASH or WMATA Metrobus service.

Figure 4.9 - 2012 Zero Vehicle Households



Source: U.S. Census Data (2012)

3.0 DASH Service Improvements

DASH completed a detailed Comprehensive Operations Analysis (COA) in 2014 which identified an extensive range of service expansion projects/improvements in three key areas. Each of these is described in greater detail below.

3.1 Enhanced Service Frequencies

The City of Alexandria is a densely developed urban area and the focus of the enhanced service frequency recommendations contained in the COA is to develop a transit network that reflects these urban characteristics. To this end, the COA has identified an extensive set of service frequency improvements throughout the DASH system. Ultimately, the intent of these service frequency expansion recommendations is provide a service level such that a passenger can arrive at a stop randomly without utilizing a timetable but be assured that a bus will arrive within a reasonable time. This service frequency goal reflects a level of service convenience that is in concert with the true urban nature of Alexandria.

The specific service frequency recommendations are outlined below in Table 4.1. The order of the recommendations contained in Table 4.1 represents the implementation priority for the full set of improvements but the actual implementation schedule is indeterminate at this point given limited resources available to support implementation (more detail is provided in Chapter 5 on the service frequency expansion recommendations that have funding available to support implementation. It is projected that funding will be available for two of the proposed frequency expansions over the six-year life of this TDP).

These frequency expansions and the additional buses required in the DASH revenue vehicle fleet to support these expansions are not included in in the State's Six Year Improvement Program (SYIP), the Washington Region's Transportation Improvement Program (TIP) or the regional Constrained Long Range Plan (CLRP).

Table 4.1 – DASH Service Frequency Improvement Recommendations

Route	Day of Week/Time Period of Proposed Enhancement	Current Service Frequency	Proposed Service Frequency	Estimated Annual Ridership Change	Estimated Total Operating Cost Total	Estimated Annual Revenue	Estimated Annual Net Operating Cost	Capital Cost Associated with Improvement
AT1	Weekday Peak	20-30	15	107,700	$430,852	$110,931	$319,921	$1,950,000
AT1	Weekend All Day	60	30	88,800	$243,653	$91,464	$152,189	$0
AT8	Weekday Off Peak	30	15	65,209	$608,157	$67,165	$540,992	$0
AT8	Weekend All Day	20 (on trunk)	15	134,700	$333,326	$138,741	$194,585	$0
AT5	Weekday Peak and Off Peak	20 peak 30 off-peak	15 peak 20 off-peak	177,500	$1,467,584	$182,825	$1,284,759	$1,950,000
AT2	Weekday Peak and Off Peak	20 peak 30 off-peak	15 peak 20 off-peak	135,900	$730,032	$139,977	$590,055	$1,950,000
AT9	Saturday All Day	60	30	80,200	$134,059	$82,606	$51,453	$0
AT2	Weekend All Day	60	30	98,800	$157,180	$101,764	$55,416	$0
AT5	Sunday All Day	60	30	61,400	$203,055	$63,242	$139,813	$
AT3	Weekday Peak	20	15	21,000	$189,499	21,630	$167,869	$1,300,000
AT4	Weekday Peak	20	15	22,600	$191,100	$23,278	$167,822	$1,300,000
AT10	Weekday Peak	30	15	37,500	$246,140	$38,625	$207,515	$1,300,000
AT10	Sunday All Day	60	30	3,700	$43,790	$4,811	$38,979	$0
AT9	Weekday Peak	30	15	88,000	$861,984	$90,640	$771,344	$1,950,000
AT8	Weekday All Day	30	10	208,200	$1,390,869	$214,446	$1,176,423	$3,250,000
AT1	Weekday Peak	15 (further improvement from recommendation above)	10	95,600	$526,524	$98,468	$428,056	$1,950,000
AT5	Weekday Peak	15 (further improvement from recommendation above)	10	90,800	$946,680	$93,524	$853,156	$3,900,000

Route	Day of Week/Time Period of Proposed Enhancement	Current Service Frequency	Proposed Service Frequency	Estimated Annual Ridership Change	Estimated Total Operating Cost Total	Estimated Annual Revenue	Estimated Annual Net Operating Cost	Capital Cost Associated with Improvement
AT2	Weekday Peak	15 (further improvement from recommendation above)	10	70,800	$438,965	$72,924	$366,041	$1,950,000
AT8	Weekend All Day	15 (further improvement from recommendation above)	10-20	115,800	$405,542	$119,274	$286,268	$0
AT9	Weekday All Day	15 (further improvement from recommendation above)	10	146,800	$1,388,101	$151,204	$$1,236,897	$2,600,000
AT6	Weekday Peak	15	10	38,000	$278,835	$38,870	$239,965	$1,300,000
AT10	Weekday Peak	15 (further improvement from recommendation above)	10	35,500	$287,949	$36,565	$251,384	$1,300,000
AT7	Weekday Off Peak	60	30	16,600	$160,669	$17,098	$143,571	$0
AT1	Weekday Off Peak	30	20	42,900	$181,522	$44,187	$137,335	$0

3.2 Expand Days of Service

There is one recommendation included in the FY 2016 ATC Transit Development Program for expansion of service to a day on which the service does not currently run. Specifically, the FY 2016 Program recommends that service on the DASH AT9 be expanded to run on Sunday (AT9 service currently runs on weekdays and Saturdays). The service would run at a 60 minute service frequency throughout the day. The schedule for this expansion is indeterminate due to the current lack of financial resources for implementation. Further, this recommendation is not included for implementation in the constrained operating plan (see Chapter 5) covering the six-year time frame of this TDP.

The estimated annual ridership for this service expansion is 92,000. The estimated annual operating cost is $106,329, estimated revenue is $94,760 and the estimated net annual operating cost is $11,569. There would be no capital cost associated with this improvement. This improvement is not included in the State's Six Year Improvement Program (SYIP), the Washington Region's Transportation Improvement Program (TIP) or the regional Constrained Long Range Plan (CLRP).

3.3 New Service/Restructuring of Existing Service

A review of Chapter 3 shows that service coverage within the City, especially during the two peak periods, is quite extensive, with nearly no part of Alexandria not having some form of transit accessibility. New services were proposed, however, as part of the COA and the FY 2016 Transit Development Program. These new services are not focused on providing additional service coverage but rather to provide more direct and convenient service in high density portions of the City as well as parts of the City slated for significant redevelopment. A summary of each proposed new service initiative is outlined below.

3.3.1 Old Town Circulator/Old Town Service Restructuring

Currently Old Town Alexandria is served by a number of different DASH routes running at different service frequencies and with different routings. These multiple routes can lead to rider confusion regarding which services they can utilize to reach their final destination. The proposed circulator would provide a consistent service in the Old Town area running every 15 minutes throughout the day. This single service would have a unique brand that separates it from current DASH services and which will give riders greater comfort regarding routing, destinations served, and service frequencies. As part of this service implementation, the AT2 and AT5 services, which currently run to the Braddock Road Metro via Old Town, would terminate at the King Street Metrorail Station, thus providing enough financial savings to fund the implementation of the Circulator.

The schedule for implementation of this recommendation is indeterminate and is not included in the operating plan for the six-year time frame of this TDP. The estimated annual ridership for this service expansion is 145,700. Due to the service restructuring on the AT2 and AT5, the estimated net cost of this overall recommendation is $0. This recommendation is not included in the State's Six Year Improvement Program (SYIP), the Washington Region's Transportation Improvement Program (TIP) or the regional Constrained Long Range Plan (CLRP).

3.3.2 Eisenhower Circulator

This Circulator service would connect residential and commercial complexes located between the Eisenhower and King Street Metrorail Stations. This Circulator would provide direct and convenient service between the two Metrorail Stations and would also provide enhanced access to employment centers along the route alignment, including the Carlyle employment and residential center and the Eisenhower East redevelopment area. It would also provide direct and convenient connections between additional residential areas along the alignment to the two Metrorail stations as well as other bus routes at the two stations. The service would run on weekdays only, with a 10-minute peak service frequency and a 15-minute off-peak service frequency. The service would require an estimated three additional vehicles in the fleet.

The schedule for this expansion is indeterminate due to the current lack of financial resources for implementation. Further, this recommendation is not included for implementation in the financially constrained operating plan (see Chapter 5) covering the six-year time frame of this TDP.

The estimated annual ridership for this service expansion is 68,850. The estimated annual operating cost is $600,892, estimated revenue is $70,915 and the estimated net annual operating cost is $529,977. The estimated capital cost associated with this improvement is $1,950,000. This improvement and the associated new vehicles to provide the service is not included in the State's Six Year Improvement Program (SYIP), the Washington Region's Transportation Improvement Program (TIP) or the regional Constrained Long Range Plan (CLRP).

3.3.3 Van Dorn Circulator/AT 7 Restructuring

The Van Dorn Circulator will run in the southwest portion of Alexandria, centered on the Van Dorn Metrorail station and the Landmark Mall. Major streets served by this new circulator will include Pickett Street, Holmes Run Parkway, Van Dorn Street, Stevenson Avenue, Yoakum Parkway, and Edsall Road. This circulator service will replace a portion of the current AT7 in order to better match service levels to rider demand as well as to provide frequent feeder service to the proposed West End Transitway (the AT7 currently runs along Eisenhower Avenue via the Van Dorn Metrorail station before terminating at the Landmark Mall). Under this change the AT7 would terminate at the Van Dorn Metrorail. . The new circulator service would run on both weekdays and weekends at a consistent 15 minute service frequency throughout the day. This new service would require an estimated six additional vehicles in the fleet.

The schedule for this expansion is indeterminate due to the current lack of financial resources for implementation as well a precise understanding of the implementation schedule for the West End Transitway. Further, this recommendation is not included for implementation in the financially constrained operating plan covering the six-year time frame of this TDP.

The net estimated annual ridership change resulting from this combined service change is 201,727. The estimated operating cost of the combined changes is $2,435,422 and the estimated combined revenue is $207,779. The net cost of the combined change after accounting for revenue is $2,227,643. The estimated capital cost associated with the combined improvement is $3,250,000. This improvement and the associated new vehicles to provide the service is not included in the State's Six Year Improvement Program (SYIP), the Washington

Region's Transportation Improvement Program (TIP) or the regional Constrained Long Range Plan (CLRP).

4.0 WMATA Service Improvements

WMATA Bus Planning staff has undertaken an extensive service evaluation of its bus lines regionally over the last 5-6 years through ongoing staff evaluation as well as through two key planning initiatives: 1) the WMATA Priority Corridor Service Restructuring Studies and; 2) WMATA Service Evaluation Studies. The recommendations from this staff work as well as these studies has focused on ensuring adequate service levels in high demand corridors, improved transit connections between key regional activity centers, improved productivity, and the most productive allocation of scarce financial resources between WMATA lines.

The recommendations resulting from these different evaluations are outlined below.

4.1 Restructuring of 9A and 10A Service – Utilize Savings to Improve Service on Other Lines

This potential service change has been developed by WMATA staff with a focus on re-allocating resources in order to address service deficiencies on two high ridership lines while also addressing low productivity. The potential service change is outlined below. It is very important to note that no firm decision on whether this service change will move forward has been made. It will be presented to the public in September 2015 and then a final decision will be made based on public input as well as a technical analysis of the impacts of the change.

The key elements of this potential service change are as follows:

- Current 9A service would be eliminated. The implementation of the Metroway service, in concert with 10 Lines parallel service, made nearly all of the 9A Line duplicative of other service. The one portion of the 9A that is unique - between Franklin Street, located north of the Capital Beltway, and the Huntington Metrorail Station - would be served by re-routed 10A service.
    - The re-route of the 10A service would have an impact on riders boarding at Hunting Point, south of the Capital Beltway. Currently, the combined service frequency from Hunting Point is 15 minutes throughout the day. This combined frequency is based on the 10B leaving the Hunting Point terminal every 30 minutes and either the 10A or the 10R leaving the terminal every 30 minutes (the 10R service runs from Hunting Point during the peak periods while the 10A serves the terminal during the off-peak). With this service change, only the 10B service would run from Hunting Point (see below for more detail on changes to the 10R associated with this potential service change), which would provide riders there a 30 minute service frequency. Based on daily ridership from Hunting Point as well as WMATA service standards, this 30 minute service frequency would be reasonable.
- The 10R and 10S routes would be eliminated. These two routes are services that provide direct service between Alexandria and Rosslyn in order to supplement Blue Line service. The 10R runs in the peak direction in the AM and PM peak and runs between Hunting Point and Rosslyn via Washington Street, Mount Vernon Avenue, Crystal City, and Jefferson Davis Highway. The 10S is

reverse peak service and runs between Rosslyn and the Braddock Road Metro Station via Jefferson Davis Highway and Washington Street.

- The savings resulting from the elimination of the 9A, 10R, and 10S services would support service improvements on two existing services:
    - Sunday 10B service frequency would be improved from every 60 minutes to every 30 minutes. The 10B is the key surface transit connection between Alexandria and Arlington and the current 60 minute service frequency has been deemed inadequate.
    - Saturday and Sunday 29N service frequencies would be improved from 60 minutes to 30 minutes.

The service eliminations under this potential service change would result in an estimated savings of $1,450,000. Based on preliminary analysis, the net costs of the service changes, after accounting for revenue, would approximate these cost savings such that these service changes would be cost neutral.

Again, it is essential to note that no firm decision regarding implementing this potential service change has been made. A final decision will be made after the September 2015 Public Hearing.

The estimated annual change in ridership on the Sunday 10B service due to this potential service change is 20,500 and estimated annual change in ridership on the 29N line is 18,170.

This potential service change is not included in the State's Six Year Improvement Program (SYIP), the Washington Region's Transportation Improvement Program (TIP) or the regional Constrained Long Range Plan (CLRP).

4.2 Improve 10B Weekday Peak Period Headway (from current 30 minutes to proposed 15 minutes)

The 10B is the key WMATA bus service connecting Alexandria and Arlington, running between Hunting Point in south Alexandria and the Ballston Metrorail station (the 10B route runs predominantly via Washington Street, Mount Vernon Avenue, Walter Reed Drive, and N. Glebe Road). The 10B is scheduled in conjunction with the 10A route, which runs between Hunting Point and the Pentagon. The two routes share a common routing along a portion of their alignment (predominantly along Washington Street and Mount Vernon Avenue) but then each split in order to serve their two distinct termini. Each route runs every 30 minutes in the peak period, thus providing a combined 15 minute headway along the shared portions of the two routes. The disadvantage of this service structure is that the branches of the two routes receive only 30 minute service, including service between Alexandria and Arlington. In evaluating service frequency sufficiency, the WMATA service evaluation framework states that bus service in urban areas should have a maximum headway of 15 minutes during the weekday peak period. Based on the importance of the 10B as the key surface transit connection between Alexandria and Arlington as well as the results of the service frequency evaluation, it has been recommended that the peak period 10B headway be changed from 30 minutes to 15 minutes.

The total estimated annual incremental operating cost associated with this service change is $1,023,212. The estimated annual increase in ridership due to this service change is 39,500. Estimated additional annual revenue associated with this service change is $43,450. The estimated net annual incremental cost of this service is $977,762. The estimated capital cost for this service change is $3,200,000. The

schedule for implementing this service change is indeterminate given the current lack of financing available to support implementation.

This proposed service change is not included in the State's Six Year Improvement Program (SYIP), the Washington Region's Transportation Improvement Program (TIP) or the regional Constrained Long Range Plan (CLRP).

4.3 Implement Weekday Peak Period MetroExtra Service Along the Current 29K Alignment

This recommendation involves implementation of new MetroExtra service along the current 29K alignment. The service would be an overlay on existing service (there would be no changes to existing service) and would run every 15 minutes during weekday peak periods. The estimated change in annual ridership associated with this service change is 30,271. The estimated annual revenue change associated with this service change is $38,444. The estimated total annual operating cost of this service improvement is $2,037,626 and the estimated net annual cost is $1,991,181. The estimated capital cost of this improvement is $3,200,000. The schedule for implementing this service change is indeterminate given the current lack of financing available to support implementation.

This proposed service change is not included in the State's Six Year Improvement Program (SYIP), the Washington Region's Transportation Improvement Program (TIP) or the regional Constrained Long Range Plan (CLRP).

4.4 Improve Sunday Service Frequency on the 28A Line

This recommendation would involve service frequency improvements on the Sunday 28A Line from the current 30 minutes to 20 minutes. The estimated annual ridership change from this service improvement is 12,600. The estimated increase in operating cost associated with this change is $405,720, the estimated change in revenue associated with this service change is $13,860 and the net operating cost accounting for revenue is $391,860. There would be no additional capital cost associated with this service change. The schedule for implementing this proposed service change is indeterminate given the current lack of financing available to support implementation.

This proposed service change is not included in the State's Six Year Improvement Program (SYIP), the Washington Region's Transportation Improvement Program (TIP) or the regional Constrained Long Range Plan (CLRP).

4.5 Sunday Service Restructuring on the 7A and7F Routes

This service recommendation includes the following elements:

- 7F service would be implemented on Sunday, running at a service frequency of 60 minutes. Currently the 7F runs only on weekdays and Saturdays.
- Current Sunday 7A service would be modified to run at a 60 minute service frequency rather than its current 40 minutes.

This service change would provide Sunday service to areas of the 7 Lines service area served only by the 7F and would also improve Sunday service frequencies along the common portion of the 7A, 7F from 40 minutes to 30 minutes.

The estimated annual ridership change from this service improvement is 2,800. The estimated annual increase in operating cost associated with this change is $278,208. The estimated annual change in revenue associated with this service change is $3,080 and the estimated net operating cost after accounting for revenue is $275,128. There would be no additional capital cost associated with this service change. The schedule for implementing this proposed service change is indeterminate given the current lack of financing available to support implementation.

This proposed service change is not included in the State's Six Year Improvement Program (SYIP), the Washington Region's Transportation Improvement Program (TIP) or the regional Constrained Long Range Plan (CLRP).

4.6 Run All 25B Mid-day Service to Van Dorn Metrorail Station

Currently during the weekday mid-day every other 25B trip runs to the Van Dorn Metrorail Station (the other trips terminate at the Landmark Mall). Based on this trip pattern, the 25B mid-day service frequency to the Van Dorn Metrorail station is every 60 minutes. Under this proposed service recommendation, all mid-day 25B trips would run to the Van Dorn Metrorail Station. This service change would result in a 30-minute service frequency to Van Dorn, compared to the current 60 minutes.

The estimated annual ridership change from this service improvement is 6,000. The estimated annual increase in operating cost associated with this change is $224,250. The estimated annual change in revenue associated with this service change is $6,600 and the estimated net operating cost after accounting for revenue is $217,650. There would be no additional capital cost associated with this service change. The schedule for implementing this proposed service change is indeterminate give the current lack of financing available to support implementation.

This proposed service change is not included in the State's Six Year Improvement Program (SYIP), the Washington Region's Transportation Improvement Program (TIP) or the regional Constrained Long Range Plan (CLRP).

4.7 Run all 25B Saturday Service to Van Dorn Metrorail

Currently on Saturdays every other 25B trip runs to the Van Dorn Metrorail Station (the other trips terminate at the Landmark Mall). Based on this trip pattern, 25B Saturday service frequency to the Van Dorn Metrorail station is every 60 minutes. Under this proposed service recommendation, all Saturday 25B trips would run to the Van Dorn Metrorail Station. This service change would result in a 30-minute service frequency to Van Dorn, compared to the current 60 minutes.

The estimated annual ridership change from this service improvement is 2,300. The estimated annual increase in operating cost associated with this change is $185,472. The estimated annual change in revenue associated with this service change is $2,530 and the estimated net operating cost after accounting for revenue is $182,942. There would be no additional capital cost associated with this service change. The schedule for implementing this proposed service change is indeterminate give the current lack of financing available to support implementation.

This proposed service change is not included in the State's Six Year Improvement Program (SYIP), the Washington Region's Transportation Improvement Program (TIP) or the regional Constrained Long Range Plan (CLRP).

4.8 Run all 25B Sunday Service to Van Dorn Metrorail

Currently on Sundays every other 25B trip runs to the Van Dorn Metrorail Station (the other trips terminate at the Landmark Mall). Based on this trip pattern, 25B Sunday service frequency to the Van Dorn Metrorail station is every 60 minutes. Under this proposed service recommendation, all Sunday 25B trips would run to the Van Dorn Metrorail Station. This service change would result in a 30-minute service frequency to Van Dorn, compared to the current 60 minutes.

The estimated annual ridership change from this service improvement is 1,800. The estimated annual increase in operating cost associated with this change is $185,472. The estimated annual change in revenue associated with this service change is $1,980 and the estimated net operating cost after accounting for revenue is $183,492. There would be no additional capital cost associated with this service change. The schedule for implementing this proposed service change is indeterminate given the current lack of financing available to support implementation.

This proposed service change is not included in the State's Six Year Improvement Program (SYIP), the Washington Region's Transportation Improvement Program (TIP) or the regional Constrained Long Range Plan (CLRP).

5.0 West End Transitway Operations

The City of Alexandria is currently conducting an Alternatives Analysis (AA) and Environmental Assessment (EA) for the West End Transitway. A majority of the required capital funds have been identified in the City's Capital Improvement Program for the design and construction of this facility. The City plans to apply for a Federal Transit Administration (FTA) Small Starts grant to complete the funding package. Funding for operations will likely be funded through the City's Transportation Improvement Program (TIP). The final proposed operating plan for the service is being developed as part of the planning phase currently underway but has not yet been finalized and therefore operating costs and revenue cannot yet be estimated. This operating plan is also necessary for calculating the capital costs associated with the vehicle fleet used to operate the service. The estimated start of operations for the West-End Transitway is 2020.

The West End Transitway is included in the State's Six Year Improvement Program (SYIP) and the regional Constrained Long Range Plan (CLRP). It is not included in the Washington Region's Transportation Improvement Program (TIP).

6.0 Chapter 3 - Service Evaluation Related Improvements

The recommendations contained in Sections 2 and 3 of this chapter address many of the service needs identified in the service evaluation contained in Chapter 3. Further, the analysis of potential unmet transit needs in Chapter 3 indicated that the large majority of heavy trip flows to and from Alexandria are generally being met with existing transit service, either through direct service or through a transit trip that requires a single transfer. Implementation of the West End Transitway will also result in a significant increase in transit travel choices and convenience for current riders and potential new riders in some of the most heavily populated portions of Alexandria.

One heavy trip flow that is not well served by transit is from the southwest corner of the City and the Beauregard corridor to Tysons Corner. The 28A and 28X services along Leesburg Pike provide strong connections from the King Street Corridor and the NVCC/Mark Center area of the City to Tysons but not

from the heavily populated Beauregard corridor and the southwest corner of the City. One possible method of improving the connection between these areas of the City and Tysons is through an extension of 28X service farther south to these underserved areas of the City. Another alternative is to route select 28A trips to this part of the City in order to strengthen the connection with Tysons.

7.0 DOT Paratransit Service

Feedback received from City of Alexandria staff responsible for managing DOT paratransit service indicated that DOT ridership and demand is generally constant from year to year and that there is not any indication that there is unmet demand for the service. Based on trend data from many years, there is no anticipated need for expanded DOT service.

8.0 Transit Supportive Land Use Activities

The effective integration of transit and land use is an overriding focus of transportation and land use planning within the City of Alexandria. The City is a densely developed urban area and a number of redevelopments throughout the City that will result in increased density are being planned specifically with transit in mind (see Chapter 3 for a more detailed description of the most significant redevelopment areas). Two key examples of this integrated planning are the Potomac Yard development and the Beauregard Corridor.

The Potomac Yard development will ultimately be served by three levels of transit. The first two, local Alexandria Transit DASH routes, and the Metroway BRT service, are already in place. Local transit provides connections between the Potomac Yard area and other parts of Alexandria while the Metroway provides connections to Metrorail stations as well as job centers in the Arlington portion of Potomac Yard as well as Crystal City. The third element of transit within Potomac Yard is the planned Potomac Yard Metrorail Station, which is currently in the planning phase.

The second key example is the Beauregard corridor, which is located in the west end of the City. The Beauregard corridor will be served the West End Transitway and the Transitway will be a key foundation in the redevelopment of the corridor, which will include increased densities as well as concentrations of density to allow for increased green space within the corridor. Transit and land use planning in this corridor have been integrated from the very beginning of the Transitway planning process.

Chapter 5
Operations Plan

1.0 Introduction

The first four chapters of this document provide background information on the public transportation providers within the City of Alexandria, including an overview of each provider, each provider's goals and objectives and service standards, and each provider's desired expansion projects.

The purpose of this chapter is to outline operations plans for each provider over the next six years, the time frame of this TDP. These operations plans reflect current operations as well as future expansion plans, and are presented within the context of the revenues and subsidies available to support each provider's operations (as presented in Chapter 7).

The operations plan for each provider is outlined in the following sections.

2.0 DASH Operations Plan – Conservative Subsidy Growth Scenario

As outlined in Chapter 7, two financial plans to cover DASH operations were developed, one based on conservative subsidy growth assumptions and one assuming more robust subsidy growth. The two plans were developed to reflect different assumptions regarding subsidy growth rates for the different sources of subsidy funding. The level of available funding to support operations will, in turn, impact the ability to maintain current operations as well as the amount of service expansion that is possible.

Table 5.1 outlines the incremental funds that will be available to support operations over the six-year time frame of this TDP under the conservative subsidy growth scenario. The data in this table shows the incremental changes in DASH revenues and different funding sources compared to the estimated increase in operating expenses resulting from general inflation. The "Available Funds for Service Expansion" line in the Table shows the amount of funds available to support additional service expansion beyond current operations. The data in this line of the table shows that there is actually a small deficit between the increase in subsidies and revenues versus the estimated increase in operating cost. These small deficits can be addressed through tweaks in DASH operations or small increases in funding but will not support service expansion as outlined in the DASH Comprehensive Operational Analysis (COA) and the ATC FY 2016 Transit Development Program.

Table 5.1 – Additional Funding Available for DASH Service Expansion – Conservative Subsidy Growth Scenario

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Incremental Increase DRPT Subsidy		$67,266	$68,988	$70,754	$72,565	$74,423	$76,328
Incremental Increase City Subsidy		$68,820	$69,370	$69,925	$132,158	$134,141	$136,153
Incremental Increase in DASH Revenues		$60,050	$60,801	$61,561	$62,330	$63,109	$63,898
Total Increase in Available Funds		$196,135	$199,158	$202,239	$267,053	$271,673	$276,379
Increase in Operating Subsidy Requirement		$296,472	$304,299	$312,332	$320,578	$329,041	$337,728
Available Funds for Service Expansion		-$100,337	-$105,141	-$110,093	-$53,525	-$57,369	-$61,349

Based on limited funding available to support service expansion, the DASH operations plan over the six-year time frame of this TDP under a fiscally constrained financial plan will consist of maintaining current service levels, as summarized in Table 5.2.

Table 5.2 – DASH Operations Plan under Fiscally Constrained Financial Plan

	Weekday		Saturday		Sunday	
Route	Hours of Service	Average Service Frequency	Hours of Service	Average Service Frequency	Hours of Service	Average Service Frequency
AT1	5:05 AM to 10:42 PM	Peak - 30 Mid-day - 30	6:44 AM to 10:43 PM	All Day - 30	8:20 AM to 7:21 PM	All Day - 60
AT2	5:38 am to 11:04 PM	Peak - 30 Mid-day - 30	7:12 AM to 11:10 PM	All Day - 60	7:59 AM to 7:03 PM	All Day - 60
AT2X	6:13 AM to 9:13 AM 3:00 PM – 6:00 PM	Peak – 15 No mid-day service	No Saturday service	No Saturday service	No Sunday service	No Sunday service
AT3*	5:32 AM to 9:57 AM; 3:30 PM to 7:44 PM	Peak – 20 No mid-day service	No Saturday service	No Saturday service	No Sunday service	No Sunday service
AT4*	5:50 AM to 9:40 AM; 3:07 PM to 7:25 PM	Peak – 20 No mid-day service	No Saturday service	No Saturday service	No Sunday service	No Sunday service
AT3/4	10:26 AM to 2:26 PM; 8:18 PM to 10:07 PM	No peak service Mid-day – 60	8:28 AM to 7:38 PM	All day - 60	9:07 AM to 6:16 PM	All day - 60
AT5	5:16 AM to 10:17 PM	Peak – 20 Mid-day - 30	6:43 AM to 10:52 PM	All day - 30	7:48 AM to 7:17 PM	All day - 60
AT6	5:35 AM to 10:43 PM	Peak – 15 Mid-day - 30	No Saturday service	No Saturday service	No Sunday service	No Sunday service
AT7	5:09 AM to 7:43 PM	Peak – 30 Mid-day - 60	No Saturday service	No Saturday service	No Sunday service	No Sunday service
AT8	4:54 AM to 12:15 AM	Peak – 10 Mid-day – 30	6:25 AM to 11:29 PM	All day - 30	6:52 AM to 11:05 PM	All day - 30
AT9	6:37 AM to 9:10 PM	Peak – 30 Mid-day - 30	6:52 AM to 9:52 PM	All day - 60	No Sunday service	No Sunday service
AT10	6:33 AM to 10:33 PM	Peak – 30 Mid-day - 30	7:00 AM to 10:30 PM	All day - 30	9:10 AM to 6:34 PM	All day - 60

*Weekday mid-day service provided by Route AT3/4. Saturday and Sunday service also provided by AT3/4

3.0 DASH Operations Plan – Moderate Subsidy Growth Scenario

This section outlines the DASH operations plan under a moderate subsidy growth scenario, as outlined in Chapter 7. Table 5.3 outlines the incremental funds that will be available to support DASH operations over the six-year time frame of this TDP under this moderate subsidy growth scenario. The data in the table shows the incremental changes in DASH subsidies from different funding sources and revenues compared to the estimated increase in operating expenses resulting from general inflation. The "Available Funds for Service Expansion" line in the table shows the amount of funds available to support service expansion beyond current operations. The data in Table 5.3 show that in the out years of the moderate growth financial plan, funds would be available for service expansion based on increases in DRPT operating assistance and the availability of funds from the City's Transportation Improvement Program.

Table 5.3 – Additional Funding for DASH Service Expansion – Moderate Subsidy Growth Scenario

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Incremental Increase DRPT Subsidy		$67,266	$155,546	$46,697	$155,368	$429,355	$82,824
Incremental Increase City Subsidy		$68,820	$69,370	$69,925	$132,158	$134,141	$136,153
Incremental Increase in DASH Revenues		$60,050	$60,801	$61,561	$62,330	$63,109	$63,898
Expansion Funds from TIP		$0	$0	$319,921	$324,720	$676,365	$686,510
Total Increase in Available Funds		$196,135	$285,717	$498,103	$674,576	$1,302,970	$969,385
Increase in Operating Subsidy Requirement		$296,472	$304,299	$312,332	$320,578	$329,041	$337,728
Available Funds for Service Expansion		-$100,337	-$18,582	$185,771	$353,998	$973,929	$631,657

Note: Under the assumptions of this financial plan, there would be a spike in DRPT operating assistance in FY 2021. This spike is a one-time occurrence and therefore the total amount available in FY 2021 was not assumed to be available on a long-term basis to support expanded DASH service. The service expansion recommendations below reflect this assumption.

Based on the additional available funding under the fiscally unconstrained financial plan, the following service expansion projects identified in the Alexandria Transit FY 2016 Transit Development Program would be implemented.

- FY 2020 – AT 1 Weekday Peak Headway Improvement - This service expansion project would involve an improvement in headways on the AT 1 service during weekday peak periods. Currently weekday peak period headways are between 20 and 30 minutes on the AT1 depending on the direction of the service. Under this service improvement, weekday peak period headways would be a consistent 15 minutes in both directions. The estimated subsidy requirement for this service change is approximately $320,000 annually. This service improvement would also require four additional vehicles in the DASH fleet. The estimated annual increase in ridership associated with this service change is 107,700 (based on estimates from the DASH COA).

- FY 2021 – AT1 Weekend All Day Headway Improvement – This service expansion project would involve an improvement in headways on the AT 1 service on weekends. Currently Saturday AT1 frequencies are 60 minutes in the early morning and evening and 60 minutes all day on Sunday. This service change would result in consistent 30 minute headways throughout the weekend. The estimated subsidy requirement for this service change is approximately $152,000 annually. No additional vehicles would be required to support this service change. The estimated annual increase in ridership associated with this service change is approximately 88,800 (based on estimates from the DASH COA).

Table 5.4 outlines the impact of these new service expansions on available funding.

Table 5.4 – Service Expansion Impacts on Available Funding

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Incremental Increase DRPT Subsidy		$66,621	$181,386	$46,697	$155,368	$429,355	$82,824
Incremental Increase City Subsidy		$69,021	$69,573	$70,130	$132,545	$134,534	$136,552
Incremental Increase in DASH Revenues		$70,266	$71,250	$72,247	$73,259	$74,284	$75,324
Expansion Funds from TIP		$0	$0	$319,921	$324,720	$676,365	$686,510
Total Increase in Available Funds		$205,908	$322,209	$508,995	$685,892	$1,314,538	$981,210
Increase in Operating Subsidy Requirement		$296,472	$304,299	$312,332	$320,578	$329,041	$337,728
Available Funds for Service Expansion		-$90,564	$17,911	$196,662	$365,314	$985,497	$643,482
AT-1 Weekday Peak Headway Improvement					$319,921	$328,367	$337,036
AT-1 Weekend All Day Hdwy Improve						$152,189	$156,207
Surplus/Deficit after Expansion					$45,393	$504,941	$150,239

Note: Service expansion subsidy requirements are assumed to grow by 2.64% annually to reflect increase in operating expenses associated with general inflation.

A new summary of the DASH operating plan with these service expansions is shown in Table 5.5. The changes due to the service expansions are highlighted in blue.

Table 5.5 – DASH Operations Plan under Moderate Subsidy Growth Scenario

	Weekday		Saturday		Sunday	
Route	**Hours of Service**	**Average Service Frequency**	**Hours of Service**	**Average Service Frequency**	**Hours of Service**	**Average Service Frequency**
AT1	5:05 AM to 10:42 PM	Peak - 15 Mid-day - 30	6:44 AM to 10:43 PM	All Day - 30	8:20 AM to 7:21 PM	All Day - 30
AT2	5:38 am to 11:04 PM	Peak - 30 Mid-day - 30	7:12 AM to 11:10 PM	All Day - 60	7:59 AM to 7:03 PM	All Day - 60
AT2X	6:13 AM to 9:13 AM 3:00 PM – 6:00 PM	Peak – 15 No mid-day service	No Saturday service	No Saturday service	No Sunday service	No Sunday service
AT3*	5:32 AM to 9:57 AM; 3:30 PM to 7:44 PM	Peak – 20 No mid-day service	No Saturday service	No Saturday service	No Sunday service	No Sunday service
AT4*	5:50 AM to 9:40 AM; 3:07 PM to 7:25 PM	Peak – 20 No mid-day service	No Saturday service	No Saturday service	No Sunday service	No Sunday service
AT3/4	10:26 AM to 2:26 PM; 8:18 PM to 10:07 PM	No peak service Mid-day – 60	8:28 AM to 7:38 PM	All day - 60	9:07 AM to 6:16 PM	All day - 60
AT5	5:16 AM to 10:17 PM	Peak – 20 Mid-day - 30	6:43 AM to 10:52 PM	All day - 30	7:48 AM to 7:17 PM	All day - 60
AT6	5:35 AM to 10:43 PM	Peak – 15 Mid-day - 30	No Saturday service	No Saturday service	No Sunday service	No Sunday service
AT7	5:09 AM to 7:43 PM	Peak – 30 Mid-day - 60	No Saturday service	No Saturday service	No Sunday service	No Sunday service
AT8	4:54 AM to 12:15 AM	Peak – 10 Mid-day – 30	6:25 AM to 11:29 PM	All day - 30	6:52 AM to 11:05 PM	All day - 30
AT9	6:37 AM to 9:10 PM	Peak – 30 Mid-day - 30	6:52 AM to 9:52 PM	All day - 60	No Sunday service	No Sunday service
AT10	6:33 AM to 10:33 PM	Peak – 30 Mid-day - 30	7:00 AM to 10:30 PM	All day - 30	9:10 AM to 6:34 PM	All day - 60

*Weekday mid-day service provided by Route AT3/4. Saturday and Sunday service also provided by AT3/4

4.0 DOT Paratransit Operations

As noted in Chapter 1 of this document, DOT paratransit service is the City of Alexandria's specialized transportation service for Alexandria residents who cannot use regular fixed route transit due to a disability. DOT will provide service to eligible city residents with destinations in the City of Alexandria, the City of Falls Church, Arlington County, Fairfax City, and Fairfax County. Trips for Alexandria residents wishing to make a trip outside these jurisdictions would be required to use WMATA MetroAccess service. The number of trips DOT has made over the last seven years has remained quite steady at about 55,000 trips per year and there is no sign of unmet demand for DOT service. Therefore, there is no anticipated change in DOT service levels or trips provided. The current hours of service for DOT, which would remain the same moving forward, are shown below.

- Monday – Thursday 5:30 AM to Midnight
- Friday 5:30 AM to 3:00 AM
- Saturday 5:30 AM to 3:00 AM
- Sunday 7:00 AM to Midnight

5.0 King Street Trolley Operations

The current operating plan for the King Street Trolley is summarized below:

- Hours of Service:
  - Sunday – Wednesday: 10:00 AM – 10:15 PM
  - Thursday – Saturday: 10:00 AM – 12 midnight

- Service Frequency: 15 minutes during all service hours (currently running 10 minutes during summer months)

The King Street Trolley is now running at a 10 minute service frequency during the summer months but this is being done with no increase in its annual budget. Longer term, there is a desire to run 10 minutes year-round but this initiative has not been formalized.

There is also concern about King Street Trolley operations, specifically long layovers that hurt the service's productivity. A review of King Street Trolley operations is proposed to determine if layovers can be modified or the extra slack time in the schedule can be used to serve other portions of Old Town.

6.0 WMATA Metrobus and Metrorail Operations within Alexandria

As shown in Chapter 7, Alexandria is striving to hold steady City operating support to WMATA, given the City's minimal growth in tax revenues. This need to hold steady City support means that any service changes would need to be cost neutral. This cost-neutral requirement is in line with WMATA's overall State-of Good-Operations strategy (SOGO), which is focused on maximizing the benefit of resources expended on WMATA bus operations. WMATA staff is continually evaluating WMATA bus service to determine where there are issues such as crowding or poor reliability as well as identifying poorly performing routes that could be modified to free up funds to address issues on more productive routes. Potential changes to WMATA service within Alexandria as described below have been developed within this SOGO framework.

One additional initiative that is focused on cost savings that is in its early stages is the idea of DASH taking over some WMATA routes within the City. This initiative would focus on routes within the City that are not truly regional in nature and therefore may be more appropriately operated by DASH. The primary benefit of this switch would be significant cost savings due to DASH's much lower operating cost.

One set of cost neutral service changes have been recently implemented during the June 2015 schedule change. These include:

- 7A, F, Y: Minor changes in trip start times and trip destinations
- 11Y: Additional bus stops were added in Old Town Alexandria
- 22A, C, F 22 Line service was rerouted to cover former 25 Line routing
- 25A, C, D, E: Service replaced with 22 re-routes
- 25B: Changes in service frequency

A second potential service change is being evaluated and will be presented at the September 2015 service change public hearings, though if and when this service change is implemented is still unknown. This potential change would involve the following elements:

- Elimination of 9A service and restructuring of 10A service to cover most portions of the eliminated 9A. 10A service would terminate at the Huntington Metrorail station rather than Hunting Point in order to cover this eliminated portion of the 9A.
- Elimination of 10R and 10S trips, which are trips that run to Rosslyn to supplement Blue Line service.

These service reductions would result in a net savings of $1,450,000. These net savings would be used for two service improvements, proposed for potential implementation, though the final implementation schedule is still unknown.

- Sunday 10B service frequency would be improved from 60 minutes to 30 minutes. The estimated annual increase in riders due to this service change is 20,500 (based on estimates from the WMATA Service Evaluation Study for the 10A, E Hunting Point – Pentagon Line, 10B – Hunting Point – Ballston Line).
- Saturday and Sunday 29N service would be improved from 60 minutes to 30 minutes. The estimated annual increase in ridership due to these service changes is 18,170 (based on estimates from the WMATA Priority Corridor Network Study for 29 Lines).

As noted, this potential change is at this point simply being evaluated. No time frame for implementation has been set and implementation may not move forward at all.

The Alexandria Metrobus service plan for the six-year time frame of this TDP with June 2015 service changes is summarized below in Table 5.6. The changes implemented in June 2015 are highlighted in blue.

Table 5.6 – Metrobus Operating Plan – Six-Year Time Frame of TDP

	Weekday		Saturday		Sunday	
Route	Hours of Service	Average Service Frequency	Hours of Service	Average Service Frequency	Hours of Service	Average Service Frequency
7A	4:45 AM to 3:30 AM	Peak – 20-30 Mid-Day - 40	6:49 AM to 3:30 AM	60	7:30 AM to 12:12 AM	40
7F	5:34 AM to 11:50 PM (no peak period, peak direction service - provided by 7Y)	Peak – 55-60 Mid-day - 40	6:17 AM to 10:27 PM	60	n/a	n/a
7Y*	5:09 AM to 8:46 AM and 3:01 PM to 6:38 PM (peak period, peak direction service)	10 (7AM – 8AM)	n/a	n/a	n/a	n/a
7B	6:12 AM to 8:31 AM and 4:32 PM to 6:57 PM (peak period, peak direction only)	30	n/a	n/a	n/a	n/a
7C	6:05 AM to 8:47 AM and 4:15 PM to 7:05 PM (peak period, peak direction only)	30	n/a	n/a	n/a	n/a
7W	6:25 AM to 8:33 AM and 3:55 PM to 6:50 PM (peak period, peak direction only)	15-20	n/a	n/a	n/a	n/a
7X	6:26 AM to 8:16 AM and 4:15 PM to 6:35 PM (peak period, peak direction only)	15-20	n/a	n/a	n/a	n/a

	Weekday		Saturday		Sunday	
Route	Hours of Service	Average Service Frequency	Hours of Service	Average Service Frequency	Hours of Service	Average Service Frequency
7H	2 AM, 2 PM trips - reverse peak direction	2 trips in each peak period	n/a	n/a	n/a	n/a
7P	6:14 AM to 8:47 AM and 4:03 PM to 6:03 PM	20-30	n/a	n/a	n/a	n/a
7M	5:40 AM to 6:46 PM	Peak – 10 Mid-Day – 15	n/a	n/a	n/a	n/a
8S	6:27 AM to 8:15 AM and 4:15 PM to 6:02 PM (peak period, reverse peak direction service)	30	n/a	n/a	n/a	n/a
8W	6:09 AM to 8:54 AM and 3:55 PM to 8:24 PM (peak period, peak direction)	15-30	n/a	n/a	n/a	n/a
8Z	5:35 AM to 8:32 AM and 3:40 PM to 8:00 PM	15-30	n/a	n/a	n/a	n/a
9A	4:30 AM to 1:37 AM	Peak – 30 Mid-Day 30	5:24 am to 1:30 AM	30	5:00 AM to 12:35 AM	40
10A	4:37 AM to 12:35 AM (does not run in the peak period peak direction - service is replaced by 10E during that time and direction)	Peak – 30 Mid-Day 30	5:17 AM to 12:40 AM	30	6:15 AM to 10:50 PM	60
10B	4:52 AM to 1:00 AM	Peak – 30 Mid-Day - 30	5:37 AM to 1:00 AM	30	6:45 AM to 11:00 PM	60
10E	6:02 AM to 8:20 AM and 4:14 PM to 6:31 PM (service is peak period, peak direction service only, replacing the 10A during that time)	15	n/a	n/a	n/a	n/a

	Weekday		Saturday		Sunday	
Route	Hours of Service	Average Service Frequency	Hours of Service	Average Service Frequency	Hours of Service	Average Service Frequency
10R	6:00 AM to 8:00 AM and 4:15 PM to 6:13 PM (service is peak period, peak direction service only)	30	n/a	n/a	n/a	n/a
10S	6:50 AM to 7:50 AM and 4:48 PM to 5:48 PM (reverse peak service between Rosslyn and Potomac Yard)	30	n/a	n/a	n/a	n/a
11Y	6:40 AM to 7:45 AM and 4:10 PM to 6:15 PM (peak period, peak direction)	12-20	n/a	n/a	n/a	n/a
21A	6:00 AM to 8:37 AM and 4:00 PM to 7:20 PM (peak period, peak direction	20-30	n/a	n/a	n/a	n/a
21D	Three AM trips and three PM trips (peak period, peak direction)	Three AM trips and three PM trips (peak period, peak direction)	n/a	n/a	n/a	n/a
22A*	9:30 AM – 3:00 PM and 7:00 PM to 10:00 PM (off-peak service only – mid-day and evening)	30	6:30 AM to 9:30 PM	45	7:30 AM to 8:15 PM	60
22B*	5:40 AM to 8:45 AM and 2:43PM to 6:25 PM (peak period, bi-directional service)	20	n/a	n/a	n/a	n/a
22C*	5:30 AM to 9:30 AM and 3:30 PM to 7:30 PM (peak period, bi-directional service)	20	n/a	n/a	n/a	n/a
22F*	6:15 AM to 9:28 AM and 3:15 PM to 8:15 PM (peak period, peak direction service)	20	n/a	n/a	n/a	n/a

	Weekday		Saturday		Sunday	
Route	Hours of Service	Average Service Frequency	Hours of Service	Average Service Frequency	Hours of Service	Average Service Frequency
25A, C, D, E*	Service removed as part of June schedule change -					
25B*	5:48 AM to 11:17 PM	Peak – 15 Mid-day - 30	6:10 AM to 9:17 PM	30	7:38 AM to 8:10 PM	60
28A	5:09 AM to 12:40 AM	30 peak 20 – mid-day	5:50 AM to 12:45 AM	20	5:50 AM to 11:30 PM	30
28F	5:47 AM to 8:32 AM and 2:45 PM to 6:32 PM (Southbound in AM Peak and Northbound in PM peak)	20-30	n/a	n/a	n/a	n/a
28G	6:02 AM to 8:50 AM and 3:45 PM to 6:55 PM (Northbound in the AM peak and Southbound in the PM peak)	20-30	n/a	n/a	n/a	n/a
28X	5:12 AM to 8:15 AM and 3:35 PM to 6:25 PM (bi-directional peak period service only	15	n/a	n/a	n/a	n/a
29K	5:40 AM to 10:40 PM	Peak – 60-70 Mid-Day – 60 - 70	n/a	n/a	n/a	n/a
29N	5:30 AM to 10:10 PM	Peak – 60 Mid-day - 60	6:10 AM to 9:20 PM	60	6:10 PM to 9:20 PM	60
REX	5:08 AM to 10:57 PM	Peak – 10-20 Mid-Day - 30	4:48 AM to 10:03 PM	30	4:50 AM to 9:10 PM	60
Metroway	5:30 AM to 12:00 AM	Peak – 12 Mid-Day – 20	6:30 AM to 12:00 AM	20	7:30 AM to 10:00 PM	20

* Reflects changes made in June 2015 schedule change. 22 Line service previously did not provide service in Alexandria. June service changes resulted in 22 Line now providing service in Alexandria where 25A, C, D, E previously provided service.

7.0 DASH Operations Plan Vision

DASH completed a Comprehensive Operations Analysis in 2014 that generated a wide range of recommendations covering service restructuring, new service, and service frequency expansion. The most extensive recommendations related to improving service frequencies in order to make the system more convenient and to more accurately reflect the dense urban characteristics of Alexandria. The number of recommendations from the COA in each of the three areas noted above is well beyond the current financial capability of DASH and the City to implement but they reflect the strategic vision for DASH and thus are outlined here for reference if financial resources become available. Outlined below in Table 5.7 is a summary of the additional recommendations identified in the COA and the Alexandria

Transit Development Program that have not been included in the constrained operations plan due to the lack of available financial resources. The projects identified in Table 5.7 are listed in order of priority as set by DASH staff and are further broken out by proposed implementation year.

One final note is that a proposal was made in DASH's COA regarding restructuring DASH services in the City's west end as well as along the Beauregard corridor in conjunction with the implementation of the West End Transitway. This would involve re-routes and cutting service on routes that would duplicate the new BRT service as well as implementation of a new Circulator service around the Van Dorn Metro station. This restructuring would result in a net savings to DASH. More detailed service plans and cost estimates will be completed as the West End Transitway moves closer to implementation.

Table 5.7 – DASH Service Expansion Vision

Route	Improvement #	Service Change	Estimated Total Annual Cost	Estimated Required Subsidy	Additional Required Vehicles	Estimated Annual Ridership Change
Proposed in DASH Transit Development Program for Implementation in FY 2017						
AT8	#1	Improve off-peak weekday service frequency from current 30 minutes to 15 minutes	$608,157	$540,992	0	65,209
AT8	#2	Improve Saturday and Sunday from current 30 minutes to 15 minutes	$333,326	$194,585	0	134,700
Total FY 2017			**$941,483**	**$735,577**	**0**	**199,909**
Proposed in DASH Transit Development Program for Implementation in FY 2018						
AT5	#3	Improve weekday peak period headways from current 20-30 minutes to a consistent 15 minutes. Improve weekday off-peak headways from current 30 minutes to 20 minutes.	$1,467,584	$1,284,759	3	177,500
AT2	#4	Improve weekday peak period headways from current 20 minutes to 15 minutes. Improve weekday off-peak headways from current 30 minutes to 20 minutes	$730,032	$590,055	3	135,900
New: Eisenhower Circulator	#5	Implement circulator system to serve the Eisenhower East growth area. Service would be on weekdays only, running every 10 minutes in the peak and 15 minutes in the off-peak.	$600,892	$529,977	3	68,850
AT9	#6	Improve existing Saturday headways from current 60 minutes to 30 minutes	$134,059	$51,453	0	80,200
Total FY 2018			**$2,932,567**	**$2,456,244**	**$9**	**$462,450**

Route	Improvement #	Service Change	Estimated Total Annual Cost	Estimated Required Subsidy	Additional Required Vehicles	Estimated Annual Ridership Change
Proposed in DASH Transit Development Program for Implementation in FY 2019						
AT2	#7	Improve Saturday and Sunday headways from current 60 minutes to 30 minutes	$157,180	$55,416	0	98,800
AT5	#8	Improve Sunday AT5 headways from current 60 minutes to 30 minutes	$203,055	$139,813	0	61,400
AT3	#9	Improve weekday peak headways from current 20 minutes to 15 minutes	$189,499	$167,869	2	21,000
AT4	#10	Improve weekday peak headways from current 20 minutes to 15 minutes	$191,100	$167,822	2	22,600
AT9	#11	Implement AT9 Sunday service at a 60 minute headway	$106,329	$11,569	0	92,000
AT10	#12	Improve weekday peak period headways from current 30 minutes to 15 minutes	$246,140	$207,515	2	37,500
Total FY 2019			**$1,093,303**	**$750,004**	**6**	**333,300**
Proposed in DASH Transit Development Program for Implementation in FY 2020						
AT10	#13	Improve Sunday all day headways from current 60 minutes to 30 minutes	$43,790	$39,979	0	3,700
AT9	#14	Improve weekday peak period headways from current 30 minutes to 15 minutes	$861,984	$771,344	3	88,000
Total FY 2020			**$905,774**	**$751,323**	**3**	**91,700**

Route	Improvement #	Service Change	Estimated Total Annual Cost	Estimated Required Subsidy	Additional Required Vehicles	Estimated Annual Ridership Change
Proposed in DASH Transit Development Program for Implementation in FY 2021						
AT8	#15	Improve headways during all periods of the day to run a consistent 10 minutes throughout the day (further improvement to headways beyond recommended under improvement #1).	$1,390,869	$1,176,423	5	208,200
AT1	#16	Improve weekday peak period headways to 10 minutes (further headway expansion beyond headway improvement proposed as part of the fiscally unconstrained financial plan as outlined in Section 3.0 of this chapter)	$526,524	$428,056	3	95,600
AT5	#17	Improve weekday peak period headways to 10 minutes (further headway expansion beyond headway improvement proposed under improvement #3)	$946,680	$853,156	6	90,800
AT2	#18	Improve weekday peak period headways to 10 minutes (further headway expansion beyond headway improvement proposed under improvement #4)	$438,965	$366,041	3	70,800
AT8	#19	Improve weekend headways to 10 minutes during busiest times of day and 20 minutes the remainder of the day. minutes (further headway expansion beyond headway improvement proposed under improvement #2)	$405,542	$286,268	0	115,800
Total FY 2021			**$3,708,580**	**$3,109,944**	**17**	**581,200**

Route		Service Change	Estimated Total Annual Cost	Estimated Required Subsidy	Additional Required Vehicles	Estimated Annual Ridership Change
Proposed in DASH Transit Development Program for Implementation in FY 2022						
AT9	#20	Improve weekday headways to 10 minutes during all times of the day (further headway expansion beyond headway improvement proposed under improvement #14)	$1,388,101	$1,236,897	4	146,800
AT6	#21	Improve weekday peak headways to 10 minutes from current 15 minutes	$278,835	$239,695	2	38,000
Total – FY 2022			**$1,666,936**	**$1,416,118**	**6**	**$184,800**
Total – all years – six-year time frame of Alexandria Transit Development Plan			**$11,248,643**	**$9,219,210**	**41**	**1,853,359**

8.0 WMATA Operations Plan Vision

WMATA staff has identified a range of potential longer term service modifications that are on hold until funding becomes available. These are summarized in Table 5.8. These modifications come from a number of sources including WMATA staff work, the 29 Lines Priority Corridor Study, and the 10 Lines Service Evaluation, completed in 2013.

Table 5.8 - WMATA Service Expansion Vision

Route	Service Change	Total Estimated Annual Cost	Net Annual Cost After Fare Revenue	Estimated Annual Ridership Change
10B	Improve 10B peak period headways to 15 minutes from current 30 minutes	$1,023,212	$977,682	39,500
MetroExtra Service in 29K corridor	Implement weekday peak period MetroExtra service along the current 29K Line alignment. Service would run every 15 minutes during both peak periods.	$2,037,626	$1,991,181	30,270
28A	Improve Sunday Service Frequency from 30 minutes to 20 minutes	$405,720	$391,860	12,600
7A, 7F	Implement 7F service on Sunday, running at 60 minutes. Modify current 7A service to run at 60 minutes rather than current 40. Combined Sunday 7A, F service would be 30 minutes.	$278,208	$275,128	2,800
25B	Modify 25B weekday mid-day service such that all mid-day trips run to Van Dorn Metro. This would result in mid-day 30 minute service at Van Dorn compared to current 60 minutes	$224,250	$217,650	6,000
25B	Modify 25B Saturday service such that all trips run to Van Dorn Metro. This would result in Saturday 30 minutes service at Van Dorn compared to current 60 minutes.	$185,472	$182,942	2,300
25B	Modify 25B Sunday service such that service is now 30 minutes and all trips run to Van Dorn.	$185,472	$183,492	1,800
Total		**$4,339,960**	**$4,219,935**	**95,270**

9.0 VRE Operations

VRE is currently constrained in expanding service by its operating agreements with the freight railroads CSX and Norfolk Southern, on whose tracks VRE service runs. Capital improvements such as developing a third track on the CSX Fredericksburg Line are necessary before the operating agreements can be modified to accommodate more trains. VRE has outlined in detail the required capital improvements and the associated increases in service that would be possible due to the improvements in its "Systems Plan", developed in 2014. The systems plan does not put a firm date on service expansion given the time variability of the capital improvements. General system expansion plans by phase are summarized below:

- Phase 1 – Longer trains on existing trips and an additional round trip on both the Manassas and Fredericksburg lines.
- Phase 2 and 3 - Up to six additional trains per hour on both lines during the peak period, reverse peak service from Washington DC to activity centers in Virginia consisting of up to two trips per hour, hourly off-peak service during the weekday mid-day and evening, and weekend service running hourly.

Chapter 6

Capital Improvement Program

1.0 Introduction

This chapter outlines the Capital Improvement Program required to support public transportation within the City of Alexandria and covers the full range of public transportation providers within the City. Capital improvement requirements are outlined by capital asset category.

In some instances, for projects outlined below that are included in the Commonwealth's Six Year Improvement Program (SYIP), there are slight differences between the funding budgeted in the City's Capital Improvement Program and the funding identified in the SYIP. These differences relate to the process for the transfer of funds from the SYIP to cover the City's expenditures. The process starts with the expenditure of funds by the City of Alexandria. The City then applies to the Commonwealth for reimbursement of these funds. This reimbursement is not sent directly to the City but rather is funneled through NVTC to cover a portion of the City's required subsidy to WMATA (NVTC handles the WMATA subsidy transfers from each Northern Virginia jurisdiction and then bundles them for transfer to WMATA). Under this reimbursement process the City keeps the dollars that it would have otherwise transferred to NVTC to cover a portion of its WMATA subsidy requirements. This rather indirect flow of reimbursement funds means that there may be slight differences between what was budgeted in the Six Year Improvement Program and the City's Capital Improvement Program.

It should also be noted that the City of Alexandria intends to take full advantage of all Commonwealth capital funding sources available to it over the six-year time frame of this Transit Development Plan. For all bus replacement and expansion, the City will be applying for DRPT matching funds (see Table 6.1 below for the projected state match for different capital asset categories).

It should also be noted that the City will be seeking a multi-year capital funding agreement with the Commonwealth to cover a portion of the capital costs of the West End Transitway/Corridor C. In addition, the City now anticipates shifting the construction of Corridor C to start in 2018 or 2019. This change will be reflected in the City's next Fiscal Year Capital Improvement Program.

Table 6.1 – Projected Capital Funding State Match by Capital Asset Category, by Fiscal Year

Capital Asset Category	FY 2017	FY 2018	FY 2019	FY 2020	FY20121
Replacement & Expansion Vehicles (Tier 1)	68%	68%	68%	68%	68%
Infrastructure/Facilities (Tier 2)	5%	34%	8%	6%	0%
Other Eligible Capital Items (Tier 3)	0%	17%	0%	0%	0%

2.0 Revenue Vehicles

2.1 Vehicle Replacement

DASH has an extensive program for replacing vehicles as they reach the end of their useful life. The current City of Alexandria policy is to replace vehicles being retired with Hybrid vehicles, each at an estimated cost of $650,000 through FY 2018, $675,000 in FY 2019 and 2020 and $700,000 in FY 2021 and FY 2022. These vehicles would be standard 35' or 40' coaches and would be comparable in configuration to vehicles in the current DASH revenue fleet, with an estimated life of 12 years. The current City Capital Improvement program has budgeted $25,975,000 for DASH revenue vehicle replacement over the six-year time frame of this TDP. The schedule of planned revenue vehicle replacements is shown below in Table 6.2.

Table 6.2 – DASH Vehicle Replacement Schedule

	FY 16	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22
# of Vehicles	6	6	6	6	6	4	5
Unit Cost	$650,000	$650,000	$650,000	$675,000	$675,000	$675,000	$675,000
Total Cost	$3,900,000	$3,900,000	$3,900,000	$4,050,000	$4,050,000	$2,800,000	$3,375,000

As noted, $25,975,000 of the required vehicle replacement funds identified in Table 6.2 has been budgeted in the City's Capital Improvement Program over the six-year time frame of this TDP. A portion of this total vehicle replacement budget is included in the Commonwealth Six Year Improvement Program (SYIP) ($3,600,000 total, with $2,448,000 of the total to be provided by state funds).

WMATA Metrobus vehicle replacements are covered under the WMATA Capital Improvement Program, which is funded by the jurisdictions within the WMATA service area (see more detail regarding City of Alexandria capital funding contributions to WMATA under Section 8 of this chapter).

DOT Paratransit service is provided with contractor vehicles and therefore has no fleet requirements.

VRE vehicle replacements are covered by VRE's Capital Improvement Program.

2.2 Fleet Expansion

The operating plan scenario for the moderate subsidy growth scenario financial plan, as outlined in Chapter 5, would require four additional vehicles to support the service improvement and would be implemented in FY 2020. At an estimated cost of $675,000 per vehicle, the required capital funds to support this service expansion are $2,700,000. This fleet expansion cost is not included in the City's Capital Improvement Program or in the Commonwealth's Six Year Improvement Program.

The unconstrained operating plan vision for DASH as outlined in Chapter 5 would require 41 new vehicles over the six-year time frame of the TDP to support the service improvements identified in that vision. This would translate into a capital requirement to support these service improvements of $27,675,000 based on an average price per vehicle of $675,000. The capital cost associated with this unconstrained fleet expansion is not included in the City's Capital Improvement Program or in the Commonwealth's Six Year Improvement Program.

As shown in Chapter 5, any WMATA service improvements impacting Alexandria would be cost-neutral, with cuts on one service to support service improvements on other lines. This approach would also mean no net change in vehicles required to meet new service.

3.0 Passenger Facilities

Alexandria has undertaken an extensive capital improvement program associated with passenger facilities on its different public transportation services. Each of these passenger facility improvements is incorporated into the City's Capital Improvement Program. At this point there are no additional unfunded passenger amenity improvements that are planned for implementation during the six-year time frame of this TDP. A summary of the passenger facility capital improvements is outlined below. In addition, none of the improvements summarized below are included in the Commonwealth's Six Year Improvement Program.

3.1 Alexandria Metrorail Stations Improvements

The CIP line items cover a series of capital improvements at three of Alexandria's Metrorail Stations: Eisenhower Avenue, King Street-Old Town, and Van Dorn Street. Overall improvements at the three stations include pedestrian improvements, improvements to kiss-and-ride and bus bay areas and station access improvements. Specific improvements at each station include:

3.1.1 Eisenhower Avenue Metrorail Station

Improvements at the Eisenhower Station are being made to accommodate proposed development and redevelopment in the Eisenhower East section of Alexandria. The City has agreed to fund several improvements to the Station, including renovation of the bus loop at the station, service relocations, design and construction of an attractive pedestrian plaza in front of the station, the addition of canopies for sheltering riders, and real-time bus arrival information displays. The capital funds committed for these improvements over the next six years is $1,574,229. Previous expenditures on this project are $4,742,085, for a total project cost of $6,316,314

3.1.2 King Street-Old Town Metrorail Station

Improvements to the King Street-Old Town Metrorail station are being made to accommodate increased bus service to the station as well as to accommodate increased ridership. Improvements are also being made to strengthen connections between the station and the surrounding area, for all modes of transit. The planned station reconfiguration will include segregation of modes to improve safety, widening of walkways around and through the facility, space for short and long-term bicycle storage, and modification of the kiss-and-ride into a one-way loop. The capital funds committed for these improvements over the next six years is $3,700,000. Previous expenditures on this project are $7,995,878, for a total project cost of $11,695,878.

3.1.3 Van Dorn Street Metrorail Station

Improvements to the Van Dorn Metrorail Station will include the re-design of the kiss-and-ride area at the station in order to accommodate the large number of private shuttles that serve the

station. In addition, the bus loading area will be reconfigured to accommodate buses from the West End Transitway. The capital funds committed for these improvements over the next six years is $2,170,000. This is also the total project cost.

3.2 Potomac Yard Metrorail Station

This project involves the development of a new Metrorail Station on the Blue and Yellow Lines in Potomac Yard, with the purpose of supporting the significant proposed development in Potomac Yards. The Draft Environmental Impact Statement for the project is currently available for public review, with a Final EIS planned for the Fall of 2015 and a Record of Decision in early 2016. The capital funds committed in the City's Capital Improvement Program for this project over the next six years is $274,000,000. Previous expenditures on this project are $$11,864,325, for a total project cost of $285,864,325. This project is also included in the Washington Region's Constrained Long Range Plan but is not included in the Commonwealth's Six Year Improvement Program.

3.3 Bus Shelters and Benches

This project will replace existing shelters and benches with new enhanced infrastructure that will improve passenger convenience and comfort. The focus will be on replacing current infrastructure that has exceeded it useful life and also on bringing existing stops into compliance with ADA standards. The capital funds committed for these improvements over the next six years is $870,000. Previous expenditures on this project are $$3,438,973, for a total project cost of $4,308,973. This project is not included in the Commonwealth's Six Year Improvement Program.

3.4 Landmark Transit Station

This project provides funding for initial planning, design and acquisition of transit center amenities for a transit center at the Landmark Mall. Ultimately this facility would be a key transfer point between the proposed West End Transitway and the proposed Duke Street Transitway. No funds for this project are committed during the six-year time frame of this TDP but $6,000,000 is committed in the City's Capital Improvement Program in fiscal years 2023 and 2024. This project is not included in the Commonwealth's Six Year Improvement Program but is included in the Washington Region's CLRP.

3.5 Alexandria Union Station

Both VRE and AMTRAK are planning service expansions over the coming years as additional track capacity is added, especially along the Fredericksburg line. While no specific plans for capital improvements at the Station beyond what is identified under Section 9.0 below (VRE capital improvements), additional capital improvements to support service expansion may be required.

4.0 Tool and Equipment Upgrades/Replacement

This section outlines capital funding requirements for tool and equipment upgrades or replacement. One project has been identified for DASH. WMATA equipment upgrades are covered under their Capital Improvement Program, which is partially funded with contributions from the City of Alexandria (see below under section 8 for more detail).

4.1 Hybrid and Trolley Battery Pack Replacement

This improvement involves replacement of DASH hybrid transit vehicle battery packs that have reached the end of their useful life (useful life is estimated at five years). $1,900,000 in funding is committed in the City's Capital Improvement Program for battery pack replacements over the six-year time frame of this TDP (additional funding is included in the out years of the CIP that are not covered in this TDP). Previous expenditures on this project are $100,000, for a total project cost through FY 2022 of $2,000,000. A portion of the total cost of the Hybrid Battery Pack upgrades is included in the Commonwealth's Six Year Improvement Program. Specifically, $200,000 is included in the SYIP with $34,000 to be covered by Commonwealth funds.

5.0 Technology Upgrades

This section identifies committed and proposed technology upgrades to support public transportation operations within Alexandria, with the identified projects primarily focused on supporting DASH operations. Some of the identified projects have committed funds while others have been identified for implementation but are not funded in the City's Capital Improvement Program. Each improvement is summarized below.

5.1 Region's New Electronic Payment Program (NEPP) – DASH Upgrades

Over the next several years, WMATA will upgrade to a new fare payment system called the New Electronic Payment Program (NEPP). This project will fund the upgrade of the DASH fare system to integrate with the new regional fare system. $1,200,00 is committed in the City's Capital Improvement Program to this improvement over the six-year time frame of this TDP. There have been no previous expenditures on this project.

A second piece of this program is upgraded fare collection technology for the U.S. 1 Metroway, which will be an essential technology to aid in the implementation of off-board fare collection along the Metroway. This project will fund the procurement of the off board fare collection hardware and software. $1,500,00 is committed in the City's Capital Improvement Program to this improvement over the six-year time frame of this TDP. There have been no previous expenditures on this project. There have been no previous expenditures on this project.

Neither of these projects is included in the Commonwealth's SYIP.

5.2 Real Time Bus Information System/Other Analytic Capabilities

In May 2013 the City of Alexandria entered into an agreement to purchase an Automatic Vehicle Location (AVL) system for the DASH system and has been implementing since that agreement. This AVL system is the foundation for real time passenger information as well as additional analytic capabilities that have not yet been funded. This program would involve additional investments in transit technology by DASH. These additional investments would build on the Automatic Vehicle Location improvements currently underway. These additional improvements include:

- Real-Time Passenger Information – Not having a full understanding of when a bus will arrive is one of the major impediments to attracting new riders and riders who have a choice regarding which mode they will utilize. Real time passenger information, based on the AVL system, is a key

means of addressing this impediment. This project will include real-time arrival information signs at heavily used bus stops as well as the capability for riders to access this information via a hand-held device.

- Computer Aided Dispatch (CAD) capabilities – Computer aided dispatch would provide a significant leap forward over current operations controls. Currently DASH is operating at a disadvantage regarding understanding where buses are at any given time, with this understanding of revenue bus locations based on communications with drivers and street supervisors via radio or phone.

  Computer aided dispatch, building on the AVL base, would give an Operations Control Center a complete picture of where every bus in revenue service is located. This capability allows DASH to maintain much tighter control over bus movements. This will allow DASH to be much more proactive in operations, thus improving service reliability and rider convenience. Ultimately, implementation of CAD may also result in a need for fewer street supervisors.

- Automated passenger counters – Currently the only means for DASH to collect boarding and alighting data by stop is through labor intensive manually collected on-board ridechecks. This approach is not only costly but it also means data is not collected on a routine basis, leading to out-of-date data. Automatic Passenger counters collect boarding and alighting data electronically on every trip and every day. The data provided by automated counters is an extraordinary leap over manual ridechecks, and provides the foundation for much more sophisticated service planning. This enhanced service planning, in turn, allows for much more pinpoint service modifications such that the most successful and productive routes are provided necessary resources. It also allows much more sophisticated response to passenger issues such as bus crowding.

- Data Management System – The additional data collected by the AVL-based systems described above will be immense. This data management system will support the mining and storage of this data such that it can be used for the purposes identified above. This system will be an integral part in making the most effective use of the data to be collected.

Funding for these additional capabilities has not yet been dedicated in the City's Capital Improvement Program. Estimated cost for this program in FY 2016 is $603,000.

6.0 High Capacity Transit Corridors

The City of Alexandria has had an initiative underway for many years for the planning and implementation of high capacity transit corridors in high density and high growth areas of the City. The Route 1 Transitway, which is now home to the WMATA-run Metroway service, was completed in 2014. Planning for one additional corridor is underway and a third corridor has been identified for implementation in later years. Each corridor is summarized below.

6.1 West End Transitway

This project involves the development of a dedicated transitway, where possible, between the Van Dorn Street Metrorail station and the Pentagon Transit Center. The project is currently in the planning (Alternatives Analysis and Environmental Assessment) and preliminary design (Conceptual Engineering) phases and is funded to move into more detailed design within the next few years and construction

within the time frame of the TDP. $89,340,000 has been committed to this project for design and construction over the six-year time frame of this TDP. This committed funding is currently concentrated in fiscal years 2016 through 2019, though this is likely to be updated in next Fiscal Year's Capital Improvement as the City anticipates moving the construction of the transit way out a couple of years from its current schedule. Operations funding for this project has not been specifically committed but City of Alexandria staff anticipate funding coming from the City's Transportation Improvement Program. This project is included in the Commonwealth's SYIP and is also included in the Washington Region's CLRP. The portion of the project included in the SYIP is $2,400,000, with $816,000 of that to be covered by Commonwealth funds.

6.2 Corridor B – Duke Street Transitway

This is a longer-term transitway project that would provide a combination of dedicated lanes and a reversible dedicated transit lane along the Duke Street corridor. Funding is available to support planning and preliminary design beginning in FY 2020. $2,310,000 has been committed to this project in the City's Capital Improvement Program during the six-year time frame of this TDP. This project is not covered in the Commonwealth's SYIP but is included in the Washington Region's CLRP.

7.0 Operations and Maintenance Facilities

One project has been identified related to operations and maintenance facilities. This project is summarized below.

7.1 DASH Bus Storage Expansion

Alexandria Transit is reaching its bus storage parking limits. A temporary solution has been implemented but this capital item would involve a long-term solution to accommodate long-term fleet expansions. Funds to support this expansion are not yet committed in the City's Capital Improvement Program. Estimated cost for this capital item in FY 2016 is approximately $509,000.

8.0 WMATA Capital Contributions

This CIP line item is for City of Alexandria funding contributions to support the WMATA Capital Improvement Program. City contributions to the WMATA Capital Improvement Program over the six-year time frame of this TDP, as outlined in the City's FY 2016 Capital Improvement Program, is $79,960,000. This contribution will support maintenance of base infrastructure as well as support to implement Metro 2025 improvements. WMATA capital contributions are included in the Commonwealth's SYIP, broken out by category. These are summarized below in Table 6.3.

Table 6.3 – WMATA Capital Contributions in SYIP

Category	Total	State Contribution
WMATA CIP – Tier 1	$7,476,323	$1,556,441
WMATA CIP – Tier 2	$15,083,617	$5,030,934
WMATA CIP – Tier 3	$2,447,764	$416,120
Jurisdiction Debt Service	$1,013,171	$344,478
WMATA Project Development	$133,000	$22,610
Total	$26,153,875	$7,370,583

9.0 VRE Capital Improvements

There are a number of capital improvements contained in the VRE long range capital plan that will have an impact on Alexandria residents. While the City of Alexandria does not have funding responsibilities relative to these improvements, a description of the improvements was deemed important given their potential impacts to the City. Each proposed improvement is summarized below.

- Alexandria Station and Tunnel Improvements – This proposed improvement would include:
    - The design and construction of a pedestrian tunnel between Alexandria Union Station and the King Street Metrorail Station.
    - Modification of the west side platform within Alexandria Union Station to service trains from both sides of the platform.
    - Modification of the Slaters Lane crossover to enhance capacity and improve operating flexibility.

- Fredericksburg Line Third Track – VRE has been working in sections on adding a third track to the VRE Fredericksburg Line in order to increase capacity and operational flexibility. The next third track section contained in the VRE Capital Plan is between Franconia/Springfield and Woodbridge. Improvements in capacity and operational flexibility will have a positive benefit for riders boarding at Alexandria Station, including ultimately improved VRE service frequency.

- L'Enfant Mid-day Storage – This improvement would provide for a new storage track in the L'Enfant area to help alleviate capacity constraints at the main storage yard in Ivy City in the District of Columbia. As with the third track, this improvement will be part of a set of improvements that will allow for a greater VRE service frequency at Alexandria Union Station, to the benefit of Alexandria residents.

- Long Bridge Expansion – This improvement would include a new two-track bridge over the Potomac River as well as upgrades to the existing bridge. This improvement would be part of a set of improvements that would allow for greater operational flexibility and added capacity to support additional trains in service, to the benefit of Alexandria.

- Southeast High Speed Rail Corridor – this project is examining the feasibility of additional rail capacity between Washington D.C. and Atlanta. This would result in additional service at Alexandria Union station, thus potentially increasing the need for additional improvements at the station.

Chapter 7

Financial Plan

1.0 Introduction

This chapter provides a description of financial plans for both capital and operating expenses for each of the public transportation operators within Alexandria over the six-year time frame of this Transit Development Plan (TDP). The first set of plans (sections 2.0 through 8.0) focus on the operations expenses of each operator, with a specific focus on the anticipated growth in operating assistance from the City of Alexandria general fund and the Virginia Department of Rail and Public Transportation. The availability of operations funding to support existing service as well as service expansions relative to available funding, for each public transportation operator in the City, is the subject of Chapter 5 of this TDP.

2.0 Financial Plan to Support DASH Operations – Conservative Funding Scenario

This section and the next outline two different financial plans for the support of DASH operations. The first is based on conservative assumptions regarding subsidy growth and incorporates assumptions on the growth in operating assistance to DASH from the City of Alexandria (from both tax revenues and the City's Transportation Improvement Program) and the Virginia Department of Rail and Public Transportation (DRPT). The final assumptions regarding growth in operating assistance are based on detailed consultation with staff from DRPT, Alexandria Transit, and the City of Alexandria Department of Transportation and Environmental Services (T&ES) regarding operating subsidy growth. A specific focus of the financial analysis outlined below is whether additional funding will be available to support expansion of DASH service as proposed in the DASH Comprehensive Operations Analysis and the Alexandria Transit FY 2016 Transit Development Program.

Outlined below is a description of assumed available funding from each source of revenue that supports DASH operations.

2.1 DRPT Operating Assistance

Based on consultation with DRPT, it was assumed that operating assistance to support DASH under a conservative funding scenario will grow by 2.56% per year over the six-year timeframe of the TDP. The estimated annual total DRPT operating assistance available for DASH as well as the estimated annual change is shown below in Table 7.1.

Table 7.1 – Estimated DRPT Operating Assistance over Six-Year TDP Time Frame

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Available for DASH	$2,627,562	$2,694,827	$2,763,815	$2,834,568	$2,907,133	$2,981,556	$3,057,884
Annual Change		$67,266	$68,988	$70,754	$72,565	$74,423	$76,328
Annual Percent Change		2.56%	2.56%	2.56%	2.56%	2.56%	2.56%

Note: Total DRPT FY 16 operating assistance to the City will be $3,180,023 based on the Commonwealth's FY 16 Six-Year Improvement Program (SYIP). This assistance covers DASH, the King Street Trolley and DOT Paratransit service. For the purposes of identifying the portion of DRPT operating assistance that would be available for DASH for use in this analysis, an estimate of the portion of the total DRPT assistance that would be allocated to DASH was developed. This estimate is based on the DASH portion of the combined total subsidy for all three operators as

identified in the City of Alexandria FY 2016 Operating Budget. The DASH total subsidy from the City Operating Budget is 82.63% of the total combined subsidy of $13,591,178 for all three operators. This 82.63% was applied to the total DRPT operating assistance in order to estimate the portion of this DRPT operating assistance that would be available for DASH. It is important to note that this exercise was completed for use in this analysis but that the City has complete flexibility in how the DRPT operating assistance funds are allocated among the three operators and may choose to allocate funds differently than presented here based on the needs of the different operators.

2.2 City of Alexandria General Fund Subsidy from City Tax Revenues and Previously Committed Transportation Improvement Program (TIP) Funds

Based on consultation with staff from the Department of Transportation and Environmental Services, it was assumed that the general fund subsidy from City tax revenues and previously committed TIP funds for DASH under a conservative funding assumptions scenario will grow by 0.8% between FY 2016 and FY 2019 and then by 1.5% between FY 2020 and FY 2022. The estimated annual total City of Alexandria operating assistance from City tax revenues and TIP funds available for DASH as well as the estimated annual change is shown below in Table 7.2.

Table 7.2 – Estimated City of Alexandria Operating Assistance from City Tax Revenues over Six-Year TDP Time Frame

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Portion from City	$8,602,438	$8,671,258	$8,740,628	$8,810,553	$8,942,711	$9,076,852	$9,213,005
Annual Change		$68,820	$69,370	$69,925	$132,158	$134,141	$136,153
Percent Change		0.8%	0.8%	0.8%	1.5%	1.5%	1.5%

Note: The total operating subsidy for DASH as outlined in the FY 2016 City of Alexandria operating budget combines both DRPT operating assistance and City contributions from City tax revenues as a single line item. In the FY 2016 operating budget this total amount is $11,230,000. In order to estimate the amount of the total DASH subsidy coming from City tax revenues and the TIP for analysis purposes, the DRPT assistance identified in Table 7.1 was subtracted from the total $11,230,000 subsidy ($11,230,000-$2,627,562 = $8,602,438).

2.3 Total Available Operating Subsidy – All Sources

The total subsidy amount available to support DASH existing, as well as expanded future, operations from all sources over the six-year time frame of this TDP is shown below in Table 7.3.

Table 7.3 – Estimated Total Operating Assistance for DASH over Six-Year TDP Time Frame

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
DASH Subsidy – All Sources*	$11,230,000	$11,366,085	$11,504,443	$11,645,121	$11,849,845	$12,058,408	$12,270,889
Annual Change		$136,085	$138,358	$140,679	$204,723	$208,563	$212,481
Percent Annual Change		1.2118%	1.2173%	1.2228%	1.7580%	1.7601%	1.7621%

* From City of Alexandria FY 2016 Approved Operating Budget

2.4 Estimated Increase in Revenue – No Changes in Level of Service

DASH revenues are estimated in the Alexandria Transit Company FY 2016 Transit Development Program to grow by $75,000, or 1.25%, between FY 2015 and FY 2016. For the purposes of this analysis, this 1.25% growth rate in revenues is assumed for the entire six-year time frame of this plan. The resultant revenue growth is shown in Table 7.4.

Table 7.4 – Estimated Increase in DASH Revenue over Six-Year TDP Time Frame

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
DASH Revenue	$4,804,000	$4,864,050	$4,924,851	$4,986,411	$5,048,741	$5,111,851	$5,175,749
Annual Change		$60,050	$60,801	$61,561	$62,330	$63,109	$63,898
Annual Percent Change		1.25%	1.25%	1.25%	1.25%	1.25%	1.25%

2.5 Estimated Required Increase in DASH Operating Subsidy to Cover Increase in DASH Operating Expenses

The estimated required increase in DASH operating subsidy based on an increase in operating expenses due to general inflation is shown below in Table 7.5. The data in this Table is based on an assumed growth in DASH operating expenses of 2.64%, based in turn on the change in the cost per platform hour between FY 2013 and FY 2014 (the last two years for which data is available), as outlined in the Alexandria Transit FY 2016 Transit Development Program. This inflation factor may change over time and therefore the growth in expenditures over the life of this TDP will be continually monitored. If there is a significant difference between the assumed inflation factor and actual inflation, the scenarios outlined here and in the Operating Plan in Chapter 5 may have to be modified. This will be done as part of the annual TDP update.

Table 7.5 – Estimated Increase in Required Subsidy to Cover Increase in DASH Operating Expenses

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Growth in Subsidy	$11,230,000	$11,526,472	$11,830,771	$12,143,103	$12,463,681	$12,792,722	$13,130,450
Annual Change		$296,472	$304,299	$312,332	$320,578	$329,041	$337,728
Percentage Change		2.64%	2.64%	2.64%	2.64%	2.64%	2.64%

2.6 Estimated Funds Available for DASH Service Expansion

This section identifies the incremental change in available operating subsidy and revenues compared to the estimated increase in required subsidy to support increased operating expenses. The bottom line in Table 7.6 provides data on whether there are available surplus funds to support DASH service expansion, as proposed in the DASH COA and the Alexandria Transit FY 2016 Transit Development Program.

Table 7.6 – Funds Available to Support DASH Service Expansion

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Incremental Increase DRPT Subsidy		$67,266	$68,988	$70,754	$72,565	$74,423	$76,328
Incremental Increase City Subsidy		$68,820	$69,370	$69,925	$132,158	$134,141	$136,153
Incremental Increase in DASH Revenues		$60,050	$60,801	$61,561	$62,330	$63,109	$63,898
Total Increase in Available Funds		$196,135	$199,158	$202,239	$267,053	$271,673	$276,379
Increase in Operating Subsidy Requirement		$296,472	$304,299	$312,332	$320,578	$329,041	$337,728
Available Funds for Service Expansion		-$100,337	-$105,141	-$110,093	-$53,525	-$57,369	-$61,349

The data in Table 7.6 show that there will be a small deficit between the additional required subsidy from all sources to support DASH operations (including the estimated increase in DASH operating costs), and the estimated actual increase in funds based on assumed subsidy growth rates. This small deficit means that under a conservative subsidy growth scenario there will not be funds available to support DASH service expansion.

3.0 Financial Plan to Support DASH Operations – Moderate Subsidy Growth Scenario

This section outlines a financial plan to support DASH operations under a moderate subsidy growth scenario. This scenario contains more robust growth assumptions regarding available operating assistance from both DRPT and the City of Alexandria. As with the conservative growth scenario financial plan, the final assumptions regarding growth in operating assistance are based on detailed consultation with staff from DRPT, Alexandria Transit, and the City of Alexandria Department of Transportation and Environmental Services regarding operating subsidy growth.

Outlined below is a description of assumed available funding from each source of revenue that supports DASH operations.

3.1 DRPT Operating Assistance

Table 7.7 contains the assumed amount of operating assistance from DRPT under a moderate subsidy growth scenario, based on consultation and feedback from DRPT staff.

Table 7.7 – Estimated DRPT Operating Assistance over Six-Year TDP Time Frame – Moderate Subsidy Growth Scenario

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Available for DASH	$2,627,562	$2,694,827	$2,850,373	$2,897,070	$3,052,438	$3,481,793	$3,564,617
Annual Change		$67,266	$155,546	$46,697	$155,368	$429,355	$82,824
Annual Percent Change		2.56%	5.77%	1.64%	5.36%	14.07%	2.38%

As with the data in Table 7.1, the data in Table 7.7 is an estimated amount of DRPT assistance to DASH only, based on DASH's portion of the total combined subsidy for DASH, DOT paratransit service, and the King Street Trolley (as outlined in the City's operating budget).

3.2 City of Alexandria General Fund Subsidy from City Tax Revenues and Previously Committed Transportation Improvement Program (TIP) Funds

Based on consultation with T&ES staff, the assumed growth rate for the City's subsidy from tax revenues and previously committed TIP funds under the moderate subsidy growth scenario remains the same as under the conservative subsidy growth scenario. This data is shown in Table 7.2 in Section 2.0.

3.3 Total Available Operating Subsidy – All Sources

The total subsidy amount available to support DASH as well as expanded future operations from all subsidy sources over the six-year time frame of this TDP is shown below in Table 7.8.

Table 7.8 – Estimated Total Operating Assistance for DASH over Six-Year TDP Time Frame – Moderate Subsidy Growth Scenario

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
DASH Subsidy - All Sources	$11,230,000	$11,366,085	$11,591,001	$11,707,623	$11,995,149	$12,558,645	$12,777,622
Annual Change		$136,085	$224,916	$116,622	$287,526	$563,496	$218,977
Percent Annual Change		1.2118%	1.9788%	1.0061%	2.4559%	4.6977%	1.7436%

3.4 Estimated Increase in Revenue – No Changes in Level of Service

The assumed increase in DASH revenues are the same as assumed under the conservative growth scenario financial plan. This data is shown in Table 7.4 in Section 2.0.

3.5 Available Funds from the City of Alexandria Transportation Improvement Program (TIP)

This moderate subsidy growth scenario financial plan assumes additional funds will be available from the City's Transportation Improvement Program to support DASH service expansion. This funding has been designated in the FY 2016 to FY 2022 TIP but was not included in the conservative growth scenario financial plan because this funding is not dedicated and therefore may not actually be available to support expanded DASH operations. Therefore, not assuming its availability was considered the most conservative approach. The proposed funding in the TIP is outlined below in Table 7.9.

Table 7.9 – Funds Included in TIP to Support DASH Expansion

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
AT 1 Peak Improvements				$319,921	$324,720	$329,591	$334,534
AT8 and AT 1 Weekend Improvements						$346,774	$351,976
Total	$0	$0	$0	$319,921	$324,720	$676,365	$686,510

3.6 Estimated Required Increase in DASH Operating Subsidy to Cover Increase in DASH Operating Expenses

The estimated increase in the required operating subsidy to cover an increase in operating expenses due to general inflation would be the same as shown in Table 7.5 under the conservation growth scenario.

3.7 Estimated Funds Available for DASH Service Expansion

This section identifies the incremental change in available operating subsidy and revenues compared to the estimated increase in required subsidy to support increased operating expenses due to general inflation. This analysis will help to determine the amount of available surplus funds available to support DASH service expansion, as proposed in the DASH COA. This analysis is outlined below in Table 7.10.

Table 7.10 – Funds Available to Support DASH Service Expansion – Moderate Subsidy Growth Scenario

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Incremental Increase DRPT Subsidy		$67,266	$155,546	$46,697	$155,368	$429,355	$82,824
Incremental Increase City Subsidy		$68,820	$69,370	$69,925	$132,158	$134,141	$136,153
Incremental Increase in DASH Revenues		$60,050	$60,801	$61,561	$62,330	$63,109	$63,898
Expansion Funds from TIP		$0	$0	$319,921	$324,720	$676,365	$686,510
Total Increase in Available Funds		$196,135	$285,717	$498,103	$674,576	$1,302,970	$969,385
Increase in Operating Subsidy Requirement		$296,472	$304,299	$312,332	$320,578	$329,041	$337,728
Available Funds for Service Expansion		-$100,337	-$18,582	$185,771	$353,998	$973,929	$631,657

The data in Table 7.10 shows a substantial increase in an operating surplus starting in FY 2019 to support service expansion starting in FY 2019. More detail on the operating plan and service expansion associated with this financial plan is outlined in Chapter 5 of the TDP.

Tables 7.21 and 7.22, provided after Sections 4.0 and 5.0, provide summary operating budget statistics for DASH, the King Street Trolley and DOT Paratransit service for each year of this six-year TDP based on the analysis contained in this chapter.

4.0 Financial Plan to Support DOT Paratransit Operations

This section outlines the financial plan to support DOT paratransit operations. Total annual trips provided by DOT have remained very steady over the last five years and DOT projects that this pattern will remain into the future. Further, DOT has indicated that currently there is no current unmet demand for trips and that it does not anticipate that trip demand will change significantly in the future. With no anticipated change in the number of trips it provides, the only increases in required subsidy to support DASH operations would be to cover increased costs associated with the contract operators that provide DOT service. Outlined below is a description of assumed available funding from each source of revenue that supports DOT operations.

4.1 DRPT Operating Assistance

As discussed in Section 2.0 it was assumed that DRPT overall operating assistance to DASH, DOT, and King Street Trolley operations would grow by 2.56% per year over the six-year time frame of this this TDP. The estimated annual DRPT operating assistance available for DOT as well as the estimated annual change is shown below in Table 7.11.

Table 7.11 – Estimated DRPT Operating Assistance to Support DOT Operations over Six-Year TDP Time Frame

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Available for DOT	$311,266	$319,235	$327,407	$335,789	$344,385	$353,201	$362,243
Annual Change		$7,968	$8,172	$8,382	$8,596	$8,816	$9,042
Percent Change		2.56%	2.56%	2.56%	2.56%	2.56%	2.56%

Note: As with the allocation of DRPT operating assistance to DASH, the portion of the overall DRPT operating assistance that would be allocated to DOT was estimated based on DOT's proportion of the total combined subsidies for DOT, DASH, and the King Street Trolley as outlined in the City's FY 2016 Operating Budget. As noted for DASH, this was done for analysis purposes only. The City of Alexandria has flexibility in how these DRPT funds are allocated and thus the amount of funds shown in Table 7.11 may change based on the needs of each of the three operators.

4.2 City of Alexandria General Fund Subsidy from City Tax Revenues

The same growth assumptions for the general fund subsidy from City tax revenues that was used for DASH was also used for DOT paratransit service. Specifically, it was assumed that the DOT subsidy would grow .8% between FY 2016 and FY 2019 and then by 1.5% between FY 2020 and FY 2022. The estimated annual total City of Alexandria operating assistance from City tax revenues available for DOT as well as the estimated annual change is shown below in Table 7.12.

Table 7.12 – Estimated City of Alexandria Operating Assistance from City Tax Revenues over Six-Year TDP Time Frame

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
City Portion of Expenditure	$1,019,062	$1,027,214	$1,035,432	$1,043,716	$1,059,371	$1,075,262	$1,091,391
Annual Change		$8,152	$8,218	$8,283	$15,656	$15,891	$16,129
Percent Change		0.8%	0.8%	0.8%	1.5%	1.5%	1.5%

Note: The total operating subsidy for DOT as outlined in the FY 2016 City of Alexandria operating budget combines both DRPT operating assistance and City contributions from City tax revenues as a single line item. In the FY 2016 operating budget this total amount is $1,330,328. In order to estimate the amount of the total DOT subsidy coming from City tax revenues, for analysis purposes, the DRPT assistance identified in Table 7.12 was subtracted from the total subsidy of $1,330,328 ($1,330,328 - $311,266 = $1,019,062).

4.3 Total Available Operating Subsidy – All Sources

The total subsidy amount available to support DOT existing and future operations from all subsidy sources over the six-year time frame of this TDP is shown below in Table 7.13.

Table 7.13 – Estimated Total Operating Assistance for DOT over Six-Year TDP Time Frame

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Total Available for DOT	$1,330,328	$1,346,449	$1,362,839	$1,379,504	$1,403,756	$1,428,463	$1,453,634
Annual Change		$16,121	$16,390	$16,665	$24,252	$24,707	$25,171
Percent Annual Change		1.21%	1.22%	1.22%	1.76%	1.76%	1.76%

4.4 Estimated Required Increase in DOT Operating Subsidy to Cover Increase in DOT Operating Expenses

The estimated required increase in DOT operating subsidy is based on an increase in operating expenses as shown below in Table 7.14. The data in this Table is based on an assumed growth in DOT operating expenses of 1% based on past budget trends.

Table 7.14 – Estimated Increase in Required Subsidy to Cover Increase in DOT Operating Expenses

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
1% Growth Rate -Expense	$1,330,328	$1,343,631	$1,357,068	$1,370,638	$1,384,345	$1,398,188	$1,412,170
Annual Change		$13,303	$13,436	$13,571	$13,706	$13,843	$13,982
Percent Change		1.0%	1.0%	1.0%	1.0%	1.0%	1.0%

4.5 Funds Available to Support DOT Operations

This section identifies the incremental change in available operating subsidy FOR dot compared to the increase in required subsidy to support increased operating expenses. This data, as outlined in Table 7.15, is used to determine whether sufficient funds will be available to support DOT operations over the next six years.

Table 7.15 – Funds Available to Support DOT Operations

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Incremental Increase in DRPT Subsidy		$7,968	$8,172	$8,382	$8,596	$8,816	$9,042
Incremental Increase in City Subsidy		$8,152	$8,218	$8,283	$15,656	$15,891	$16,129
Total Increase in Available Funds		$16,121	$16,390	$16,665	$24,252	$24,707	$25,171
Increase in Operating Subsidy Requirement		$13,303	$13,436	$13,571	$13,706	$13,843	$13,982
Surplus/Deficit		$2,818	$2,954	$3,094	$10,546	$10,863	$11,189

The data in Table 7.15 show that there will be sufficient funds available to support DOT operations if the subsidy and expense growth assumptions used in this analysis remain intact.

5.0 Financial Plan to Support King Street Trolley Operations

This section outlines the financial plan to support King Street Trolley operations. No anticipated major expansion of Trolley operations that would generate additional operating cost is anticipated over the six-year time frame of this TDP and therefore the only anticipated increases in required subsidy to support Trolley operations would be to cover increased costs associated with general inflation. Outlined below is a description of assumed available funding from each source of revenue that supports King Street Trolley operations.

5.1 DRPT Operating Assistance

As discussed in Sections 2.0 and 4.0 it was assumed that DRPT overall operating assistance to DASH, DOT, and King Street Trolley operations would grow by 2.56% per year over the six-year time frame of this TDP. The estimated annual DRPT operating assistance available for the Trolley as well as the estimated annual change is shown below in Table 7.16.

Table 7.16 – Estimated DRPT Operating Assistance to Support King Street Trolley Operations over Six-Year TDP Time Frame

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Available for King Street Trolley	$241,195	$247,370	$253,702	$260,197	$266,858	$273,690	$280,696
Annual Change		$6,175	$6,333	$6,495	$6,661	$6,832	$7,006
Percent Change		2.56%	2.56%	2.56%	2.56%	2.56%	2.56%

Note: As with the allocation of DRPT operating assistance to DASH and DOT, the amount of DRPT operating assistance allocated to the King Street Trolley was estimated based on the King Street Trolley portion of the total combined operating subsidies for the three operators and was done for analysis purposes only. The City of Alexandria has flexibility in how these DRPT funds are used and thus the amount of funds shown in Table 7.16 may change based on the needs of each of the three operators.

5.2 City of Alexandria General Fund Subsidy from City Tax Revenues

The same growth assumptions for the general fund subsidy from city tax revenues that were used for DASH and DOT was also used for the King Street Trolley. Specifically, it was assumed that the King Street Trolley subsidy would grow .8% between FY 2016 and FY 2019 and then by 1.5% between FY 2020 and FY 2022. The estimated annual total City of Alexandria operating assistance from City tax revenues available for the Trolley as well as the estimated annual change is shown below in Table 7.17.

Table 7.17 – Estimated City of Alexandria Operating Assistance from City Tax Revenues over Six-Year TDP Time Frame

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
City Portion of Expenditure	$789,655	$795,972	$802,340	$808,759	$820,890	$833,203	$845,701
Annual Change		$6,317	$6,368	$6,419	$12,131	$12,313	$12,498
Percent Change		0.8%	0.8%	0.8%	1.5%	1.5%	1.5%

Note: The total operating subsidy for the King Street Trolley as outlined in the FY 2016 City of Alexandria operating budget combines both DRPT operating assistance and City contributions from City tax revenues as a single line item. In the FY 2016 operating budget this total amount is $1,030,850. In order to estimate the amount of the total Trolley operating subsidy coming from City tax revenues for analysis purposes, the DRPT assistance identified in Table 17 was subtracted from the total subsidy of $1,030,850 ($1,030,850 - $241,195 = $789,665).

5.3 Total Available Operating Subsidy – All Sources

The total subsidy amount available to support King Street Trolley existing and future operations from all subsidy sources over the six-year time frame of this TDP is shown below in Table 7.18.

Table 7.18 – Estimated Total Operating Assistance for King Street Trolley over Six-Year TDP Time Frame

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Total Available for Trolley	$1,030,850	$1,043,342	$1,056,042	$1,068,956	$1,087,748	$1,106,893	$1,126,398
Annual Change		$12,492	$12,700	$12,914	$18,792	$19,145	$19,505
Percent Annual Change		1.21%	1.22%	1.22%	1.76%	1.76%	1.76%

5.4 Estimated Required Increase in Trolley Operating Subsidy to Cover Increase in Trolley Operating Expenses

The estimated required increase in Trolley operating subsidy is based on an increase in operating expenses as shown below in Table 7.19. The data in this Table is based on an assumed annual growth in Trolley operating expenses of 2.64% based on the increase in the DASH cost per revenue hour between

FY 2013 and F 2014 (the last years for which data is available). DASH data was used for this growth rate assumption because it is responsible for operating the Trolley.

Table 7.19 – Estimated Increase in Required Subsidy to Cover Increase in Trolley Operating Expenses

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
2.64% Growth Rate -Expense	$1,030,850	$1,058,064	$1,085,997	$1,114,668	$1,144,095	$1,174,299	$1,205,300
Annual Change		$27,214	$27,933	$28,670	$29,427	$30,204	$31,001
Percent Change		2.64%	2.64%	2.64%	2.64%	2.64%	2.64%

5.5 Funds Available to Support Trolley Operations

This section identifies the incremental change in available operating subsidy compared to the increase in required subsidy to support increased operating expenses. The data in Table 7.20 is used to determine whether sufficient funds will be available to support Trolley operations.

Table 7.20 – Funds Available to Support Trolley Operations

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Incremental Increase in DRPT Subsidy		$6,115	$6,272	$6,433	$6,597	$6,766	$6,939
Incremental Increase in City Subsidy		$6,336	$6,386	$6,438	$12,167	$12,349	$12,535
Total Increase in Available Funds		$12,451	$12,658	$12,870	$18,764	$19,115	$19,474
Increase in Operating Subsidy Requirement		$27,214	$27,933	$28,670	$29,427	$30,204	$31,001
Surplus/Deficit		-$14,763	-$15,275	-$15,800	-$10,663	-$11,089	-$11,528

The data in Table 7.20 show that there may be a slight deficit in the operating subsidy required to support Trolley operations, if the subsidy growth and growth in expenses assumptions utilized for these estimates remain intact. Some minor modifications in subsidy growth from City tax revenues may be required over the six-year time frame of this TDP to support Trolley operations.

Summarized below in Table 7.21 and Table 7.22 are total cost and revenue summaries for the three public transportation services managed by the City of Alexandria. Table 7.21 contains a summary of costs and revenues under the conservative subsidy growth scenario and Table 7.22 contains a summary under the moderate growth assumptions scenario.

Table 7-21 – Alexandria TDP Bus Requirements and Funding/Revenue Budgets – Conservative Subsidy Growth Funding Scenario

Vehicle Requirements and Annual Revenue Hours

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Weekday Peak Buses (DASH)	61	61	61	61	61	61	61
Saturday Peak Buses (DASH & Trolley)	22	22	22	22	22	22	22
Sunday Peak Buses (DASH & Trolley)	14	14	14	14	14	16	16
Fleet Buses	84	84	84	84	84	84	84
Annual Revenue Hours - DASH	130,167	130,167	130,167	130,167	130,067	130,067	130,067
Annual Revenue Hours - Trolley	14,040	14,040	14,040	14,040	14,040	14,040	14,040

DASH Funding, Revenues and Costs

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Projected Operating Costs - DASH	**$16,034,000**	**$16,230,135**	**$16,429,294**	**$16,631,532**	**$16,898,585**	**$17,170,259**	**$17,446,638**
Funding Sources							
Revenues							
Farebox	$4,003,000	$4,053,038	$4,103,701	$4,154,997	$4,206,934	$4,259,521	$4,312,765
Contract Service	$791,000	$800,888	$810,899	$821,035	$831,298	$841,689	$852,210
Advertising	$10,000	$10,125	$10,252	$10,380	$10,509	$10,641	$10,774
State Operating Assistance	$2,627,562	$2,694,827	$2,763,815	$2,834,568	$2,907,133	$2,981,556	$3,057,884
City of Alexandria Operating Assistance	**$8,602,438**	**$8,671,258**	**$8,740,628**	**$8,810,553**	**$8,942,711**	**$9,076,852**	**$9,213,005**
Total DASH Funding/Revenue	**$16,034,000**	**$16,230,135**	**$16,429,294**	**$16,631,532**	**$16,898,585**	**$17,170,259**	**$17,446,638**

DOT Funding, Revenues and Costs

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Projected Operating Costs - DOT Paratransit	**$1,330,328**	**$1,346,449**	**$1,362,839**	**$1,379,505**	**$1,403,756**	**$1,428,463**	**$1,453,634**
Funding Sources							
Revenues							
Farebox	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Contract Service	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Advertising	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
State Operating Assistance	$311,266	$319,235	$327,407	$335,789	$344,385	$353,201	$362,243
City of Alexandria Operating Assistance	$1,019,062	$1,027,214	$1,035,432	$1,043,716	$1,059,371	$1,075,262	$1,091,391
Total DOT Funding/Revenue	**$1,330,328**	**$1,346,449**	**$1,362,839**	**$1,379,505**	**$1,403,756**	**$1,428,463**	**$1,453,634**

Trolley Funding, Revenues and Costs

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Projected Operating Costs - King Street Trolley	**$1,030,850**	**$1,043,342**	**$1,056,042**	**$1,068,956**	**$1,087,748**	**$1,106,893**	**$1,126,397**
Revenues							
Farebox	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Contract Service	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Advertising	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
State Operating Assistance	**$241,195**	**$247,370**	**$253,702**	**$260,197**	**$266,858**	**$273,690**	**$280,696**
City of Alexandria Operating Assistance	**$789,655**	**$795,972**	**$802,340**	**$808,759**	**$820,890**	**$833,203**	**$845,701**
Total Trolley Revenue	**$1,030,850**	**$1,043,342**	**$1,056,042**	**$1,068,956**	**$1,087,748**	**$1,106,893**	**$1,126,397**

All Operators Funding, Revenues and Costs

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Projected Operating Costs - DASH, DOT, Trolley	**$18,395,178**	**$18,619,926**	**$18,848,175**	**$19,099,993**	**$19,390,089**	**$19,705,615**	**$20,026,669**
Revenues							
Farebox	$4,003,000	$4,053,038	$4,103,701	$4,154,997	$4,206,934	$4,259,521	$4,312,765
Contract Service	$791,000	$800,888	$810,899	$821,035	$831,298	$841,689	$852,210
Advertising	$10,000	$10,125	$10,252	$10,380	$10,509	$10,641	$10,774
State Operating Assistance	$3,180,023	$3,261,432	$3,344,924	$3,450,554	$3,518,376	$3,608,447	$3,700,823
City of Alexandria Operating Assistance	$10,411,155	$10,494,444	$10,578,400	$10,663,028	$10,822,972	$10,985,317	$11,150,097
Total Revenue - Alexandria Operators	**$18,395,178**	**$18,619,926**	**$18,848,175**	**$19,099,993**	**$19,390,089**	**$19,705,615**	**$20,026,669**

Table 7-22 – Alexandria TDP Bus Requirements and Funding/Revenue Budgets – Moderate Subsidy Growth Funding Scenario

Vehicle Requirements and Annual Revenue Hours

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Weekday Peak Buses (DASH * Trolley)	61	61	61	61	65	65	65
Saturday Peak Buses (DASH & Trolley)	22	22	22	22	22	24	24
Sunday Peak Buses (DASH & Trolley)	14	14	14	14	14	16	16
Fleet Buses	84	84	84	84	89	89	89
Annual Revenue Hours - DASH	130,167	130,167	130,167	130,167	136,032	139,204	139,204
Annual Revenue Hours - Trolley	14,040	14,040	14,040	14,040	14,040	14,040	14,040

DASH Funding, Revenues and Costs

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Projected Operating Costs - DASH	**$16,034,000**	**$16,230,135**	**$16,515,852**	**$17,013,955**	**$17,368,610**	**$18,346,861**	**$18,639,881**
Funding Sources							
Revenues							
Farebox	$4,003,000	$4,053,038	$4,103,701	$4,154,997	$4,206,934	$4,259,521	$4,312,765
Contract Service	$791,000	$800,888	$810,899	$821,035	$831,298	$841,689	$852,210
Advertising	$10,000	$10,125	$10,252	$10,380	$10,509	$10,641	$10,774
State Operating Assistance	$2,627,562	$2,694,827	$2,850,373	$2,897,070	$3,052,438	$3,481,793	$3,564,617
City of Alexandria Operating Assistance	$8,602,438	$8,671,258	$8,740,628	$8,810,553	$8,942,711	$9,076,852	$9,213,005
Additional TIP Funds - Expansion				$319,921	$324,720	$676,365	$686,510
Total DASH Funding/Revenue	**$16,034,000**	**$16,230,135**	**$16,515,852**	**$17,013,955**	**$17,368,610**	**$18,346,861**	**$18,639,881**

DOT Funding, Revenues and Costs

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Projected Operating Costs - DOT Paratransit	**$1,330,328**	**$1,346,449**	**$1,362,839**	**$1,399,505**	**$1,403,756**	**$1,428,463**	**$1,453,634**
Funding Sources							
Revenues							
Farebox	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Contract Service	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Advertising	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
State Operating Assistance	$311,266	$319,235	$327,407	$355,789	$344,385	$353,201	$362,243
City of Alexandria Operating Assistance	$1,019,062	$1,027,214	$1,035,432	$1,043,716	$1,059,371	$1,075,262	$1,091,391
Total DOT Funding/Revenue	**$1,330,328**	**$1,346,449**	**$1,362,839**	**$1,399,505**	**$1,403,756**	**$1,428,463**	**$1,453,634**

Trolley Funding, Revenues and Costs

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Projected Operating Costs - King Street Trolley	**$1,030,850**	**$1,043,342**	**$1,056,042**	**$1,068,956**	**$1,087,748**	**$1,106,893**	**$1,126,397**
Revenues							
Farebox	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Contract Service	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Advertising	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
State Operating Assistance	**$241,195**	**$247,370**	**$253,702**	**$260,197**	**$266,858**	**$273,690**	**$280,696**
City of Alexandria Operating Assistance	**$789,655**	**$795,972**	**$802,340**	**$808,759**	**$820,890**	**$833,203**	**$845,701**
Total Trolley Revenue	**$1,030,850**	**$1,043,342**	**$1,056,042**	**$1,068,956**	**$1,087,748**	**$1,106,893**	**$1,126,397**

All Operators Funding, Revenues and Costs

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Projected Operating Costs - DASH, DOT, Trolley	**$18,395,178**	**$18,619,926**	**$18,934,733**	**$19,142,495**	**$19,535,394**	**$20,205,852**	**$20,533,402**
Revenues							
Farebox	$4,003,000	$4,053,038	$4,103,701	$4,154,997	$4,206,934	$4,259,521	$4,312,765
Contract Service	$791,000	$800,888	$810,899	$821,035	$831,298	$841,689	$852,210
Advertising	$10,000	$10,125	$10,252	$10,380	$10,509	$10,641	$10,774
State Operating Assistance	$3,180,023	$3,261,432	$3,431,482	$3,493,056	$3,663,681	$4,108,684	$4,207,556
City of Alexandria Operating Assistance	$10,411,155	$10,494,444	$10,578,400	$10,663,028	$10,822,972	$10,985,317	$11,150,097
Additional TIP Funds - Expansion				$319,921	$324,720	$676,365	$686,510
Total Revenue - Alexandria Operators	$18,395,178	$18,619,926	$18,934,733	$19,462,416	$19,860,114	$20,882,217	$21,219,912

6.0 Financial Plan to Support West End Transitway Operations

Based on the current schedule for the completion the West End Transitway's construction, operations would begin in approximately FY 2021. Currently there is no identification of funding to support West End Transitway operations, though City staff has indicated that this operational support will likely become part of the City' Transportation Improvement Program (TIP).

7.0 Alexandria Financial Support for WMATA Operations

Operating assistance to cover WMATA Metrorail and Metrobus operations within the City of Alexandria come from multiple sources. Outlined below are estimated expenditures to support WMATA operations within the City from each source.

7.1 WMATA Operating Assistance from Alexandria General Fund

The City of Alexandria has identified a goal of minimizing growth in operating support to WMATA that comes from the City's general fund, due to minimal growth in City tax revenues. As a result, City staff has indicated that any operating modifications in WMATA service within the City would have to be cost-neutral, meaning expansion of service on one line would have to be offset by service cuts on other lines. For that reason, the estimated increase in City WMATA operating assistance is assumed to grow at the same rate as City support for other operating entities. This subsidy growth is shown in Table 7.23.

Table 7.23 – Estimated City of Alexandria Operating Assistance from City Tax Revenues over Six-Year TDP Time Frame to Support WMATA Operations

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
City Portion of Expenditure*	$8,685,156	$8,754,637	$8,824,674	$8,895,272	$9,028,701	$9,164,131	$9,301,593
Annual Change		$69,481	$70,037	$70,597	$133,429	$135,431	$137,462
Percent Change		0.8%	0.8%	0.8%	1.5%	1.5%	1.5%

* From City FY 2016 Operating Budget

7.2 WMATA Operating Assistance from Commonwealth, NVTA, and NVTC (Six Year Improvement Program)

The Commonwealth of Virginia, NVTC, and NVTA funds a substantial subsidy to support WMATA operations in northern Virginia. Operating assistance for FY 2016 for WMATA service within Alexandria as outlined in the City of Alexandria Operating Budget is shown in Table 7.24. Assistance from these sources for WMATA operations for the remainder of the six-year time frame of this TDP is assumed to grow based on the growth rate in total transit operating assistance as outlined in the DRPT Six-Year Improvement program.

Table 7.24 – Estimated DRPT Operating Assistance to Support WMATA Operations with Alexandria over Six-Year TDP Time Frame

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
VA, NVTC, NVTA Assistance	$25,870,384	$26,594,755	$27,366,003	$28,132,251	$28,863,689	$29,556,418	$30,265,772
Annual Change		$724,371	$771,248	$766,248	$731,439	$692,729	$709,354
Percent Change		2.8%	2.9%	2.8%	2.6%	2.4%	2.4%

7.3 Total Operating Assistance – All Sources

The total subsidy amount available to support WMATA operations from all subsidy sources over the six-year time frame of this TDP is shown below in Table 7.25.

Table 7.25 – Estimated Total DRPT Operating Assistance for WMATA over Six-Year TDP Time Frame

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Total Available for WMATA	$34,555,540	$35,349,392	$36,190,677	$37,027,522	$37,892,390	$38,720,549	$39,567,365
Annual Change		$793,852	$841,285	$836,845	$864,868	$828,159	$846,816
Percent Annual Change		2.30%	2.38%	2.31%	2.34%	2.19%	2.19%

7.4 Estimated Required Increase in WMATA Operating Subsidy to Cover Increase in WMATA Operating Expenses

The estimated required increase in WMATA operating subsidy is based on an increase in operating expenses as shown below in Table 7.26. The data in this Table is based on an assumed growth in WMATA operating expenses of 2.0% based on general assumptions regarding wage and operating expense inflation.

Table 7.26 – Estimated Increase in Required Subsidy to Cover Increase in WMATA Operating Expenses

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
2.0% Growth Rate -Expense	$34,555,540	$35,246,651	$35,951,584	$36,670,615	$37,404,028	$38,152,108	$38,915,151
Annual Change		$691,111	$704,933	$719,032	$733,412	$748,081	$763,042
Percent Annual Change		2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

7.5 Funds Available to Support WMATA Operations

This section identifies the incremental change in available operating subsidy from all sources compared to the increase in required subsidy to support increased WMATA operating expenses. This data is used to determine whether sufficient funds will be available to support WMATA operations during the years of this TDP. This analysis is outlined below in Table 7.27.

Table 7.27 – Funds Available to Support WMATA Operations

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Incremental Increase in City Subsidy		$69,481	$70,037	$70,597	$133,429	$135,431	$137,462
Incremental Increase from Other Sources		$724,371	$771,248	$766,248	$731,439	$692,729	$709,354
Total Increase in Available Funds		$793,852	$841,285	$836,845	$864,868	$828,159	$846,816
Increase in Operating Subsidy Req.		$691,111	$704,933	$719,032	$733,412	$748,081	$763,042
Surplus/Deficit		$102,741	$136,352	$117,814	$131,455	$80,078	$83,774

The data in Table 7.27 show that there is slight surplus in the operating subsidy required to support WMATA, if the subsidy growth and growth in expenses assumptions used in this analysis remain intact.

The 2.0% increase in operating expenses utilized for this analysis will be monitored to ensure that it is tracking with actual inflation rates over the 6 year life of this TDP. If there is a wide divergence between actual inflation and the assumptions used here, the scenarios outlined in this chapter will be modified to reflect actual inflation during the annual TDP update.

8.0 Financial Plan to Support Alexandria Portion of VRE Operations

Alexandria provides a small amount of operating assistance to VRE. The amount identified in the FY 2016 City of Alexandria operating budget is $140,859. Given this small amount allocated for VRE operating assistance, it is assumed funds for this purpose will be available over the six-year time frame of this TDP.

9.0 Capital Budget

Capital improvements to support transit with committed funding are identified in the City of Alexandria's FY 2016 – FY 2025 Capital Improvement Program (CIP). A summary of the line items from the CIP related to transit are summarized below in Table 7.28. A short description of each improvement included in the CIP is provided in Chapter 6. In addition to the committed projects in the CIP, additional projects that do not yet have committed funding are also shown in Table 7.28. Bus expansion estimates are provided for two different service scenarios; a moderate service expansion during the life of the TDP and an unconstrained service expansion as identified in the DASH Comprehensive Operations Analysis and the Alexandria Transit FY 2016 Transit Development Program.

Following Table 7.28 in Table 7.29 is a summary of the funding sources that are supporting each capital improvement that currently has committed funding. Following Table 7.29 is a short description of each funding source.

Table 7.28 – City of Alexandria Capital Improvement Program – FY 2016 – FY 2022 – Transit Projects – Projects with Committed Funding and Additional Projects Identified in Chapter 6

	Previous Expenditures	FY 16	FY17	FY18	FY19	FY20	FY21	FY22	Total - FY 16 - FY 22	Total Project through FY 22
South Eisenhower Metrorail Station - S. Ent.	$4,742,085	$1,574,229	$0	$0	$0	$0	$0	$0	$1,574,229	$6,316,314
King St. Metro Station - Station Area Improve	$7,995,878	$3,700,000	$0	$0	$0	$0	$0	$0	$3,700,000	$11,695,878
Potomac Yard Metrorail Station	$11,864,325	$4,000,000	$270,000,000	$0	$0	$0	$0	$0	$274,000,000	$285,864,325
WMATA Capital Contributions	$95,689,579	$8,310,000	$7,700,000	$7,500,000	$14,300,000	$13,900,000	$15,900,000	$11,500,000	$79,110,000	$174,799,579
Van Dorn Metrorail Station Area Improvements	$0	$0	$1,500,000	$670,000	$0	$0	$0	$0	$2,170,000	$2,170,000
Bus Shelter and Benches	$3,438,973	$0	$0	$270,000	$0	$0	$600,000	$0	$870,000	$4,308,973
DASH Bus Fleet Replacements	$4,550,000	$3,900,000	$3,900,000	$3,900,000	$4,050,000	$4,050,000	$2,800,000	$3,375,000	$25,985,000	$30,535,000
DASH Hybrid Bus Battery Pack Replacement	$100,000	$100,000	$150,000	$250,000	$300,000	$350,000	$350,000	$400,000	$1,900,000	$2,000,000
DASH Real Time Bus Information System	$1,273,000	$0	$0	$0	$0	$0	$0	$0	$0	$1,273,000
DASH NEPP Implementation	$0	$0	$0	$0	$0	$450,000	$750,000	$0	$1,200,000	$1,200,000
Landmark Transit Station	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Route 1 Transitway (NEPP)	$0	$0	$0	$0	$500,000	$500,000	$500,000	$0	$1,500,000	$1,500,000
Transit Corridor "C" - Beauregard	$3,000,000	$2,400,000	$22,340,000	$32,100,000	$32,500,000	$0	$0	$0	$89,340,000	$92,340,000
Transit Corridor "B" - Duke Street	$250,000	$0	$0	$0	$0	$210,000	$0	$2,100,000	$2,310,000	$2,560,000
Total Committed		**$23,994,229**	**$305,590,000**	**$44,690,000**	**$51,650,000**	**$19,460,000**	**$20,900,000**	**$17,375,000**	**$483,659,229**	**$616,563,069**

	Previous Expenditures	FY 16	FY17	FY18	FY19	FY20	FY21	FY22	Total – FY 16 - FY 22	Total Project through FY 22
Additional Needs – No Committed Funding										
DASH Fleet Expansion - Moderate Svc Exp	$0				$2,025,000				$2,025,000	$2,025,000
DASH Technology Program	$0		$603,000						$603,000	$603,000
DASH Bus Storage Expansion	$0		$509,000						$509,000	$509,000
Additional - Moderate Svc. Expansion	**$0**	**$0**	**$1,112,000**	**$0**	**$2,025,000**	**$0**	**$0**	**$0**	**$3,137,000**	**$3,137,000**
DASH Fleet Expansion Unconstrained Svc Exp	$0		$2,025,000	$6,075,000	$4,050,000	$2,025,000	$10,125,000	$4,050,000	$28,350,000	$28,350,000
DASH Technology Program	$0		$603,000						$603,000	$603,000
DASH Bus Storage Expansion	$0		$509,000						$509,000	$509,000
Additional - Unconstrained Svc. Expansion	**$0**	**$0**	**$3,137,000**	**$6,075,000**	**$4,050,000**	**$2,025,000**	**$10,125,000**	**$4,050,000**	**$29,462,000**	**$29,462,000**

Table 7.29 – City of Alexandria Capital Improvement Program – FY 2016 – FY 2022 – Transit Projects – By Source of Funds

Funding Source	FY 16	FY17	FY18	FY19	FY20	FY21	FY22	Total - FY 16 - FY 22
1. South Eisenhower Metrorail Station - S. Ent. - Total	$1,574,229	$0	$0	$0	$0	$0	$0	$1,574,229
CMAQ/RSTP Funds	$1,574,229	$0	$0	$0	$0	$0	$0	$1,574,229
Total	**$1,574,229**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$1,574,229**
2. King Street Metro Station Area Improvements	$3,700,000	$0	$0	$0	$0	$0	$0	$3,700,000
Prior Year Tip - Cash	$150,000	$0	$0	$0	$0	$0	$0	$150,000
Prior Year Tip - GO Bonds	$1,225,000	$0	$0	$0	$0	$0	$0	$1,225,000
Reprogrammed VDOT Funds	$2,325,000	$0	$0	$0	$0	$0	$0	$2,325,000
Total	**$3,700,000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$3,700,000**
3. Potomac Yard Metrorail Station	$4,000,000	$270,000,000	$0	$0	$0	$0	$0	$274,000,000
Special Tax District Revenue	$3,000,000	$0	$0	$0	$0	$0	$0	$3,000,000
GO Bonds - Potomac Yard	$0	$154,000,000	$0	$0	$0	$0	$0	$154,000,000
VTIB State Loan	$0	$50,000,000	$0	$0	$0	$0	$0	$50,000,000
NVTA 70%	$1,000,000	$66,000,000	$0	$0	$0	$0	$0	$67,000,000
Total	**$8,000,000**	**$540,000,000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$274,000,000**

Funding Source	FY 16	FY17	FY18	FY19	FY20	FY21	FY22	Total - FY 16 - FY 22
4. WMATA Capital Contributions	$9,160,000	$7,700,000	$7,500,000	$14,300,000	$13,900,000	$15,900,000	$11,500,000	$79,960,000
GO Bonds	$6,250,000	$4,950,000	$5,000,000	$12,550,000	$11,900,000	$14,150,000	$9,750,000	$64,550,000
Prior Year WMATA Balance	$0	$1,000,000	$0	$0	$0	$0	$0	$1,000,000
NVTA 30%	$600,000	$650,000	$1,750,000	$1,000,000	$1,500,000	$650,000	$1,500,000	$7,650,000
TIP Cash	$0	$1,100,000	$750,000	$750,000	$500,000	$1,100,000	$250,000	$4,450,000
Prior Year TIP - GO Bonds	$1,460,000	$0	$0	$0	$0	$0	$0	$1,460,000
Total	**$8,310,000**	**$7,700,000**	**$7,500,000**	**$14,300,000**	**$13,900,000**	**$15,900,000**	**$11,500,000**	**$79,110,000**
5. Van Dorn Metrorail Station Area Improvements	$0	$1,500,000	$670,000	$0	$0	$0	$0	$2,170,000
Prior Year TIP - GO Bonds	$0	$750,000	$0	$0	$0	$0	$0	$750,000
Prior Year TIP - Cash	$0	$325,000	$0	$0	$0	$0	$0	$325,000
NVTA - 30%	$0	$425,000	$0	$0	$0	$0	$0	$425,000
CMAQ/RSTP	$0	$0	$670,000	$0	$0	$0	$0	$670,000
Total	**$0**	**$1,500,000**	**$670,000**	**$0**	**$0**	**$0**	**$0**	**$2,170,000**
6. Bus Shelters and Benches	$0	$0	$270,000	$0	$0	$600,000	$0	$870,000
CMAQ/RSTP	$0	$0	$270,000	$0	$0	$600,000	$0	$870,000
Total	**$0**	**$0**	**$270,000**	**$0**	**$0**	**$600,000**	**$0**	**$870,000**
7. DASH Bus Fleet Replacements	$3,250,000	$3,900,000	$3,900,000	$4,050,000	$4,050,000	$2,800,000	$3,375,000	$25,325,000
General Obligation Bonds	$0	$0	$650,000	$0	$675,000	$675,000	$675,000	$2,675,000
Prior Year City Funds	$650,000	$0	$0	$0	$0	$0	$0	$650,000
Reprogrammed TIP Funds	$0	$660,000	$0	$0	$0	$0	$0	$660,000
NVTA 30%	$3,250,000	$3,250,000	$3,250,000	$4,050,000	$3,375,000	$2,125,000	$2,700,000	$22,000,000
Total	**$3,900,000**	**$3,910,000**	**$3,900,000**	**$4,050,000**	**$4,050,000**	**$2,800,000**	**$3,375,000**	**$25,985,000**

	Funding Source	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	Total - FY 16 - FY 22
8. Hybrid Bus Battery Pack Replacement		$100,000	$150,000	$250,000	$300,000	$350,000	$350,000	$400,000	$1,900,000
	Cash Capital	$100,000	$150,000	$250,000	$300,000	$350,000	$350,000	$400,000	$1,900,000
	Total	**$100,000**	**$150,000**	**$250,000**	**$300,000**	**$350,000**	**$350,000**	**$400,000**	**$1,900,000**
9. DASH New Electronic Payment System (NEPP)		$0	$0	$0	$0	$450,000	$750,000	$0	**$1,200,000**
	CMAQ/RSTP	$0	$0	$0	$0	$450,000	$750,000	$0	$1,200,000
	Total	**$0**	**$0**	**$0**	**$0**	**$450,000**	**$750,000**	**$0**	**$1,200,000**
10. Route 1 Metroway New Electronic Payment (NEPP)		$0	$0	$0	$500,000	$500,000	$500,000	$0	$1,500,000
	CMAQ/RSTP	$0	$0	$0	$500,000	$500,000	$500,000	$0	$1,500,000
	Total	**$0**	**$0**	**$0**	**$500,000**	**$500,000**	**$500,000**	**$0**	**$1,500,000**
11. Transit Corridor "C" - Beauregard		$2,400,000	$22,340,000	$32,100,000	$32,500,000	$0	$0	$0	$89,340,000
	NVTA 70%	$2,400,000	$19,740,000	$20,000,000	$20,000,000	$0	$0	$0	$62,140,000
	Private Capital Contributions	$0	$2,600,000	$12,100,000	$12,500,000	$0	$0	$0	$27,200,000
	Total	**$2,400,000**	**$22,340,000**	**$32,100,000**	**$32,500,000**	**$0**	**$0**	**$0**	**$89,340,000**
12. Transit Corridor "B" - Duke Street		$0	$0	$0	$0	$210,000	$0	$2,100,000	$2,310,000
	NVTA - 70%	$0	$0	$0	$0	$210,000	$0	$2,100,000	$2,310,000
	Total	**$0**	**$0**	**$0**	**$0**	**$210,000**	**$0**	**$2,100,000**	**$2,310,000**

Outlined below is a short description of each of the funding sources shown in Table 7.29.

- Congestion Mitigation and Air Quality Improvement Program (CMAQ)/Regional Surface Transportation Program (RSTP) – These are Federal government funds distributed to local jurisdictions by the Commonwealth of Virginia. CMAQ funds are distributed to jurisdictions that are not in conformity with air quality targets in order to support projects that would help decrease the emissions that lead to air quality issues. RSTP funds are flexible funds for use on surface transportation projects.

- Transportation Improvement Program (TIP) – The City of Alexandria Transportation Improvement Program is a fund set up by the City Council to support expansion of transportation infrastructure and transit options throughout the City, as well as the maintenance of existing transportation infrastructure. The TIP is funded utilizing a 2.2 cent increase on the base real estate tax and additional funds from the City General Fund.

- General Obligation (GO) Bonds – General Obligation bonds are issued by the City to support items in the City's Capital Improvement program. Bond issuances must be approved by the City Council.

- NVTA 30% and NVTA 70%- Virginia House Bill (HB) 2313 created a series of taxes and fees to support transportation projects in different parts of the Commonwealth, including northern Virginia. These revenues are sent to the Northern Virginia Transportation Authority for distribution to different jurisdictions. The funds are further divided into one of two categories NVTA 70% (regional) funds and NVTA 30% (local). Regional funds are used to support projects that have a regional impact while the local funds are used to support projects that a have a specific local focus.

- Virginia Transportation Infrastructure Bank (VTIB) State Loan – The VTIB is a revolving loan fund maintained by the Virginia Department of Transportation to support important transportation infrastructure investments throughout the Commonwealth. The VTIB is a sub-fund of the Transportation Trust Fund.

- Private Capital Contributions – These revenues are contributions from private entities that will benefit from a specific transportation infrastructure improvement.

- Special Tax District Revenue – This source of funds comes from a special tax district set up within Potomac Yards to generate revenues to support infrastructure improvements that will provide overall benefit to residents and businesses in the tax district.

Chapter 8

TDP Monitoring and Evaluation

1.0 Introduction

As described in Chapter 1, this TDP serves as a "road map" for public transportation improvements in Alexandria, and covers all public transportation providers in the City. In order to forecast service and capital needs over the six year time frame of this TDP, certain financial and service expansion priority assumptions were made. These assumptions may change and therefore an ongoing review of the TDP will be required to determine where modifications may be required. The purpose of this Chapter is to outline the proposed review process as well as to outline additional proposed reviews and evaluations.

2.0 Co-ordination with Other Plans and Programs

Transit is a cornerstone of each of the many development and redevelopment projects that are either planned or underway in Alexandria. As described in Chapter 3, each of these redevelopment projects will result in increased densification in an already very dense Alexandria. The success of these projects as well as the health of the City overall will rely on a robust transit system that reflects the urban characteristics of Alexandria.

This proposal is simply that City land use planning and economic development staff continue their already rigorous co-ordination with transportation staff in order to ensure that the transit components necessary to support the ongoing redevelopment of the City are fully addressed.

3.0 Service Performance Monitoring

Chapter 2 identified proposed service standards for DASH related to productivity and cost-effectiveness. These standards are objective measurements that DASH can use to monitor transit performance and to assist in making performance-based service planning decisions. It is recommended that DASH monitor these proposed standards monthly and also develop trend analysis to determine if there are major changes in performance over time. These monthly reports can also be rolled up to annual report that can be included in the required annual TDP update (outlined below).

4.0 Annual TDP Monitoring

DRPT guidance currently requires that grantees submit an annual TDP update letter that describes the progress that has been made toward implementing the adopted TDP. If actual implementation of the TDP differs greatly from what has been outlined in the adopted plan, a more thorough update to the TDP than the simple update letter may be warranted.

The update letter to DRPT should document the implementation progress of the service expansion and service initiatives outlined in the TDP, and should also report the ridership impacts of any implemented projects.

The update letter should also describe any changes to system goals, objectives or service standards.

Finally, the letter should outline whether additional expansion projects have been added or removed based on changes in funding availability and the associated changes in the financial plan.

Appendix A
DASH and Metrobus Summary

DASH Service Summary

Route	Terminal Points	Major Roadways	Hours of Service - Weekday	Hours of Service - Saturday	Hours of Service Sunday	Weekday Peak Service Frequency	Weekday Mid-day Service Frequency	Saturday Peak Service Frequency	Saturday Mid-day Service Frequency	Sunday Peak Service Frequency
AT 1	Seminary Road to Eisenhower Metro	Eisenhower, Duke, Beauregard, Seminary	5:05 am to 10:42 PM	6:44 AM to 10:43 PM	8:20 AM to 7:21 PM	30	30	30	30	60
AT2 & AT2X	Braddock Road Metro to Landmark Plaza	Fairfax, King, Seminary, Beauregard, Lincolnia	5:38 am to 11:04 PM	7:12 AM to 11:10 PM	7:59 AM to 7:03 PM	10 (1)	30	60	60	60
AT3	Hunting Point to Pentagon Metro	Washington, Royal, Pendelton, Braddock, W. Glebe, Martha Custis, I-395	5:32 AM to 7:44 PM	n/a	n/a	20	n/a	n/a	n/a	n/a
AT4	Old Town (City Hall) to Pentagon Metro	Fairfax, Slaters, Braddock, Cameron Mills, Martha Custis	5:50 AM to 7:25 PM	n/a	n/a	20	n/a	n/a	n/a	n/a
AT3-4	Old Town (City Hall) to Parkfairfax	Fairfax/Royal, Pendelton, Braddock, Russell, W. Glebe, Martha Custis	10:26 AM to 10:07 PM	8:28 AM to 7:38 PM	9:07 AM to 6:16 PM	n/a	60	60	60	60

Route	Terminal Points	Major Roadways	Hours of Service - Weekdays	Hours of Service - Saturday	Hours of Service Sunday	Weekday Peak Service Frequency	Weekday Mid-day Service Frequency	Saturday Peak Service Frequency	Saturday Mid-day Service Frequency	Sunday Peak Service Frequency
AT5	Braddock Road Metro to Van Dorn Metro	Fairfax, King, Van Dorn	5:16 AM to 10:17 PM	6:43 AM to 10:52 PM	7:48 AM to 7:17 PM	20	30	30	30	60
AT6	King Street Metro to NVCC	King, Park Center, Braddock, Beauregard	5:35 AM to 10:43 PM	n/a	n/a	15	30	n/a	n/a	n/a
AT7	Lee Center to Landmark Mall	Henry, Duke, Eisenhower, Van Dorn	5:09 AM to 7:43 PM	n/a	n/a	30	60	n/a	n/a	n/a
AT8	Van Dorn Metro to Pendelton & Fairfax	Washington, Duke, Van Dorn	4:54 AM to 12:15 AM	6:25 AM to 11:29 AM	6:52 AM to 11:05 PM	10	30	30	30	30
AT9	Potomac Yard to Mark Center	E. and W. Glebe, Martha Custis, King, Leesburg Pike, Beauregard	6:37 AM to 9:10 PM	6:52 AM to 9:52 PM	n/a	30	30	60	60	n/a
AT10	King Street Metro to Potomac Yard	Commonwealth, Monroe, Mount Vernon, Reed	6:33 AM to 10:33 PM	7:00 AM to 10:30 PM	9:10 AM to 6:34 PM	30	30	30	30	60

METROBUS Service Summary

Route	Terminal Points	Major Roadways within Alexandria	Hours of Service - Weekday	Hours of Service - Saturday	Hours of Service Sunday	Weekday Peak Service Frequency	Weekday Mid-day Service Frequency	Saturday Peak Service Frequency	Saturday Mid-day Service Frequency	Sunday Peak Service Frequency
7A	Lincolnia to Pentagon	Lincolnia, Beauregard, I-395	4:45 AM to 3:30 AM	6:49 AM to 3:30 AM	7:30 AM to 12:12 AM	20-30	40	60	60	40
7F	Lincolnia to Pentagon	Lincolnia, Beauregard, King	5:34 AM to 11:50 PM (no peak period, peak direction service - provided by 7Y)	6:17 AM to 10:27 PM	n/a	55-60	40	60	60	n/a
7Y	Southern Towers to Downtown DC	Beauregard, King	5:09 AM to 8:46 AM and 3:01 PM to 7:13 PM (peak period, peak direction service)	n/a	n/a	10 (7AM to 8 AM)	n/a	n/a	n/a	n/a
7B	NVCC to Pentagon	Beauregard, Northampton, King Street	6:12 AM to 8:31 AM and 4:32 PM to 6:57 PM (peak period, peak direction only)	n/a	n/a	30	n/a	n/a	n/a	n/a

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7C	Park Center to Pentagon	Park Center Drive, King Street	6:05 AM to 8:47 AM and 4:15 PM to 7:05 PM (peak period, peak direction only)	n/a	n/a	30	n/a	n/a	n/a	n/a
7W	Lincolnia & Quantrell to Pentagon	Beauregard, Mark Center Drive, Seminary, I-395	6:25 AM to 8:33 AM and 3:55 PM to 6:50 PM (peak period, peak direction only)	n/a	n/a	15-20	n/a	n/a	n/a	n/a
7X	Southland Ave & Wingate Street	Beauregard, Mark Center Drive, Seminary, I-395	6:26 AM to 8:16 AM and 4:15 PM to 6:35 PM (peak period, peak direction only)	n/a	n/a	15-20	n/a	n/a	n/a	n/a
7H	Pentagon to Lincolnia & Quantrell	I-395	2 AM, 2 PM trips - reverse peak direction	n/a	n/a	2 trips in each peak period	n/a	n/a	n/a	n/a

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7P	Pentagon to Park Center	I-395, King Street	6:14 AM to 8:47 AM and 4:03 PM to 6:03 PM	n/a	n/a	20 - 30	n/a	n/a	n/a	n/a
7M	Pentagon to Mark Center	Rotary Road, I-395, Seminary Road	5:40 AM to 6:46 PM	n/a	n/a	10	15	n/a	n/a	n/a
8S	Radford & Quaker (Fairlington Shopping Center) to Pentagon	Quaker Lane	6:27 AM to 8:15 AM and 4:15 PM to 6:02 PM (peak period, reverse peak direction service)	n/a	n/a	30	n/a	n/a	n/a	n/a
8W	Mark Center Transit Center to Pentagon	Seminary, Van Dorn, Taney, Howard, I-395	6:09 AM to 8:54 AM and 3:55 PM to 8:24 PM (peak period, peak direction)	n/a	n/a	15 to 30	n/a	n/a	n/a	n/a

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8Z	Quaker Lane and Osage to Pentagon	Quaker Lane, Duke Street, Holmes Run Pkway, Van Dorn Street, I-395	5:35 AM to 8:32 AM and 3:40 PM to 8:00 PM	n/a	n/a	15 to 30	n/a	n/a	n/a	n/a
9A	Huntington Metro Station to Pentagon	Patrick Street, Washington Street, Jeff Davis Highway	4:30 AM to 1:37 AM	5:24 AM to 1:30 AM	5:00 AM to 12:35 AM	30	30	30	30	40
10A	Hunting Point to Pentagon	Washington Street, Mount Vernon Avenue	4:37 AM to 12:35 AM (does not run in the peak period peak direction - service is replaced by 10E during that time and direction)	5:17 AM to 12:40 AM	6:15 AM to 10:50 PM	30	30	30	30	60

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10B	Hunting Point to Ballston	Washington Street, Mount Vernon Avenue, S. Glebe Rd.	4:52 AM to 1:00 AM	5:37 AM to 1:00 AM	6:45 AM to 11:00 PM	30	30	30	30	60
10E	Braddock Rd Metro to Pentagon	Mount Vernon Avenue	6:02 AM to 8:20 AM and 4:14 PM to 6:31 PM (service is peak period, peak direction service only, replacing the 10A during that time)	n/a	n/a	15 minutes	n/a	n/a	n/a	n/a

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10R	Hunting Point to Rosslyn	Washington Street, Mount Vernon Avenue	6:00 AM to 8:00 AM and 4:15 PM to 6:13 PM (service is peak period, peak direction service only - provides bus connections to Rosslyn to mitigate decreased Blue Line headways)	n/a	n/a	30 minutes	n/a	n/a	n/a	n/a
10S	Potomac Yard to Rosslyn	Jefferson Davis Highway	6:50 AM to 7:50 AM and 4:48 PM to 5:48 PM (reverse peak service between Rosslyn and Potomac Yard - Blue Line mitigation	n/a	n/a	30 minutes	n/a	n/a	n/a	n/a

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11Y	Mount Vernon to Downtown DC	Washington Street, E. Abingdon Drive, George Washington Pkway	6:40 AM to 7:45 AM and 4:10 PM to 6:15 PM (peak period, peak direction)	n/a	n/a	12 to 20	n/a	n/a	n/a	n/a
21A	Reynolds and Duke Street to Pentagon	Reynolds Street, Edsall Street, Van Dorn Street, I-395	6:00 AM to 8:37 AM and 4:00 PM to 7:20 PM (peak period, peak direction	n/a	n/a	20 to 30	n/a	n/a	n/a	n/a
21D	Reynolds and Duke Street to Pentagon via Landmark Mews	Reynolds Street, Edsall Street, Stevenson Avenue, Van Dorn Street, I-395	Three AM trips and three PM trips (peak period, peak direction)	n/a	n/a	Three AM trips and three PM trips (peak period, peak direction)	n/a	n/a	n/a	n/a
22F	NVCC to Pentagon	Beauregard Street, Braddock Road, Van Dorn Street, King Street	AM Peak - Eastbound Only PM Peak Westbound Only	n/a	n/a	20	n/a	n/a	n/a	n/a

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25B	Ballston to Landmark	Van Dorn, Taney, Howard, Seminary	6:00 AM to 9:30 PM	6:10 AM to 8:10 AM	n/a	20-30	60	60	60-70	n/a
28A	Tysons Corner to King Street Metro	Seminary, Braddock, King Street	5:09 AM to 12:40 AM	5:50 AM to 12:45 AM	5:50 AM to 11:30 PM	30	20	20	20	30
28F	Skyline to Pentagon	Seminary, I-395	5:47 AM to 8:32 AM and 2:45 PM to 6:32 PM (Southbound in AM Peak and Northbound in PM peak)	n/a	n/a	20 to 30	n/a	n/a	n/a	n/a
28G	Skyline to Pentagon	Seminary, I-395	6:02 AM to 8:50 AM and 3:45 PM to 6:55 PM (Northbound in the AM peak and Southbound in the PM peak)	n/a	n/a	20-30	n/a	n/a	n/a	n/a

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28X	Tysons Corner to Mark Center	Seminary, Mark Center Drive	5:14 AM to 6:25 PM	n/a	n/a	15	n/a	n/a	n/a	n/a
29K	George Mason University to King Street Metro	Little River Tpk., Duke Street	5:40 AM to 10:40 PM	n/a	n/a	60-70	60-70	n/a	n/a	n/a
29N	Vienna Metro Station to King Street Metro	Little River Tpk., Duke Street	5:30 AM to 10:10 PM	6:10 AM to 9:20 PM	6:10 PM to 9:20 PM	60	60	60	60	60
Rex	Fort Belvoir to King Street Metro	Telegraph Road, Eisenhower Ave., Jamieson Ave, Diagonal Road	5:08 AM to 10:57 PM	4:48 AM to 10:03 PM	4:50 AM to 9:10 PM	10-20	30	30	30	60
Metroway	Braddock Road Metro to Crystal City Metro	Jefferson Davis Highway, East Glebe	5:30 AM to 12:00 AM	6:30 AM to 12:00 AM	7:30 AM to 10:00 PM	6	12	20	20	20