APPENDIX A

Purpose and Need Report

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Route 1

Multimodal Alternatives Analysis

Route 1 Multimodal Alternatives Analysis

Purpose and Need Report

June 2014

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1.0 Introduction

The Virginia Department of Rail and Public Transportation (DRPT) is undertaking the Route 1 Multimodal Alternatives Analysis ("the Project") in coordination with Fairfax County, Prince William County, the Virginia Department of Transportation (VDOT), and the Office of Intermodal Planning and Investment (OIPI). *The purpose of the project is to provide improved performance for transit, bicycle and pedestrian, and vehicular conditions and facilities along the U.S. Route 1 ("Route 1") corridor that support long-term growth and economic development.*

The project defines key transportation issues for local and through travelers, and considers a range of transportation solutions to address the needs. These solutions include a combination of transit, roadway, and pedestrian and bicycle improvements. Solutions also consider future land use and development on the corridor. Through stakeholder participation and technical analysis, the project will result in a recommended program of transportation improvements for adoption by Fairfax County and Prince William County.

This memorandum summarizes the purpose of the project and explains why multimodal improvements are needed along the corridor. The "Purpose and Need" is the cornerstone of any transportation improvement project. It summarizes the existing conditions and relevant issue(s) to be solved, defines the transportation problem, and sets the context for consideration of alternatives. The Purpose and Need informs the project goals and objectives and helps guide the development and evaluation of alternatives. A comprehensive assessment of the corridor needs is provided in *Needs Assessment Technical Memorandum* (September 2013).

1.1 Methodology

The Purpose and Need is derived through three primary inputs:

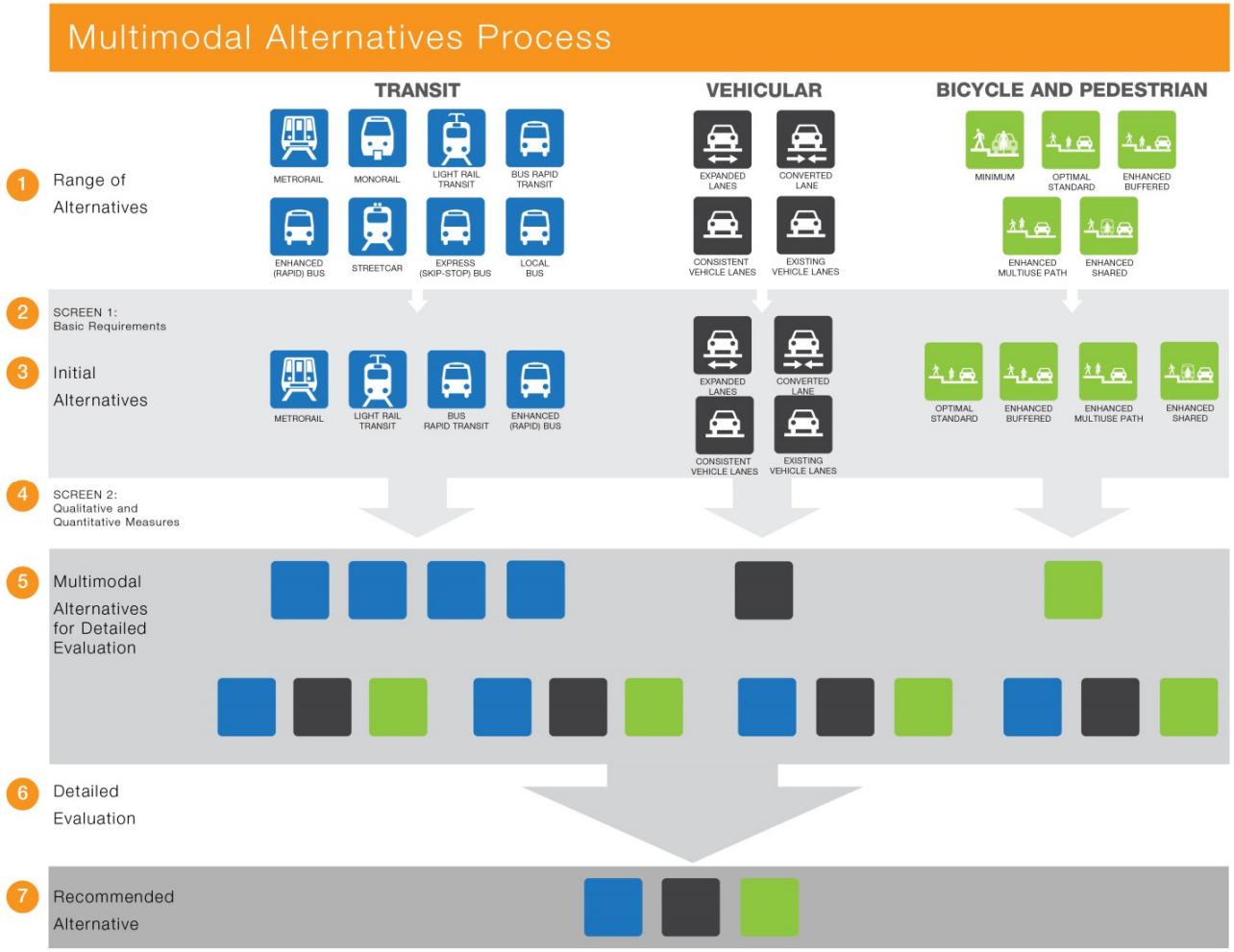
1. Review and analysis of past plans and studies and current policy guidance
2. Assessment of existing and forecasted/desired conditions for transportation and land use
3. Engagement with the community and solicitation of public and stakeholder input

Past plans and studies, agency and stakeholder inputs, and assessment of existing conditions to date have repeatedly identified the following broad issue areas of need on the corridor:

- Viable multimodal travel options on the corridor are limited and/or insufficient
- Congestion impedes reliable and efficient travel
- Existing transportation services and networks fail to support planned land uses and economic development efforts, and vice versa

The process to define and evaluate alternatives to meet the needs identified in the corridor is provided in **Figure 1-1**. This figure illustrates the general process prescribed for defining, assessing, and selecting alternatives to be advanced into detailed study.

Figure 1-1: Multimodal Alternatives Evaluation Process



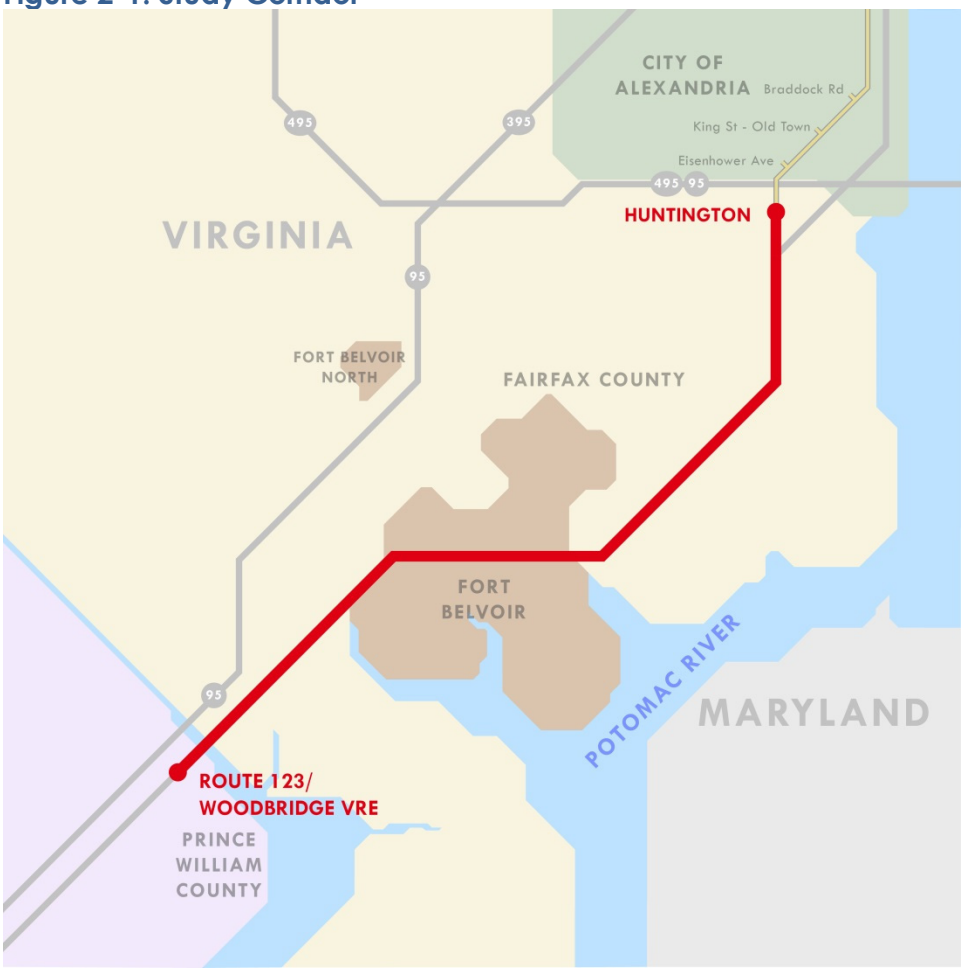
The outcome of the Alternatives Analysis will be a recommended program of transportation investments that the two counties, VDOT, and other may adopt and advance through their capital improvement programs. The transit recommendation would be defined and advanced potentially as a project through the Federal Transit Administration Capital Investment Program project development process.

2.0 Study Corridor

The study corridor consists of a 15-mile segment of Route 1, extending from Route 123 in Woodbridge in Prince William County to the I-95/I-495 Beltway in Fairfax County near its border with the City of Alexandria. The corridor is known more familiarly in this segment as Richmond Highway. **Figure 2-1** shows a map of the study corridor.

Through Prince William County, the study corridor runs parallel to I-95. Within Fairfax County, Route 1 diverges from I-95 to service the well-established communities settled between the Potomac River and I-95. The highway is a major north-south connector in the Washington Region and often used as an alternative route when disruptions occur on the interstate. Although a vital commuter route, the corridor is also a destination unto itself. Regionally recognized activity centers line the corridor, as well as major employment centers including Fort Belvoir. In Virginia, the facility was recently designated "Historic Route 1" by the Virginia General Assembly to promote tourism, transportation improvements, and economic development (House Bill No. 530, 2010 Session).

Figure 2-1: Study Corridor

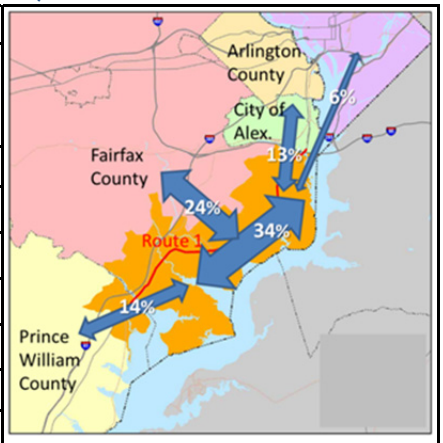


2.1 Travel Patterns and Existing Transit Service

To understand the transit and automobile trip patterns for the corridor, the Metropolitan Washington Council of Governments (MWCOG) data were used to estimate where people were traveling to and from along the Route 1 corridor. Trip patterns include the mode choice (private automobile or transit) and the origin/destinations of the trips (within the corridor, District of Columbia, etc.). The typical average weekday travel patterns to/from and within the Route 1 corridor are summarized in **Table 2-1** below. The data show the largest share of trips are intra-corridor trips, or trips that begin and end in the corridor, comprising of about 34 percent of all trips. The next largest share of travel are to and from other areas within Fairfax County, and account for 24 percent of both average weekday and peak period trips.

Table 2-1: Average Weekday (Auto and Transit) To, From, and Within Route 1 corridor

Route 1 From/To	Total Trips		
	Total Trips (Auto and transit)	% of Total Trips	Transit Share
District of Columbia	52,000	6%	29%
Arlington/Alexandria	116,000	13%	6%
Within Rt.1 Corridor	310,000	34%	1%
Fairfax Other	216,000	24%	0%
Prince William Other	124,000	13%	0%
Other Areas	95,000	10%	2%
Total	**913,000**	**100%**	**3%**



Source: MWCOG/WMATA Version 2.2 Year 2010 model and Regional On-Board Transit Survey Data

2.1.1 Transit Travel

Although there are relatively fewer total trips between the study corridor and the regional core in Washington DC and Arlington/Alexandria, those trips have the highest transit share; 29 percent of the daily trips between Route 1 corridor and D.C are being currently made by transit.

Figures 2-2 and **Figure 2-3** summarize the existing transit travel market trip patterns. Of people who live within the corridor, the majority of corridor transit users (52 percent) are commuting to Washington D.C., using Metrorail, and 86 percent of corridor transit users are traveling to either Arlington/Alexandria or Washington, DC. Of people traveling by transit to destinations within the corridor, 64 percent of transit commuters to the corridor use the bus mode exclusively, and most transit trips begin and end in the corridor.

Figure 2-2: Transit Trips originating along Route 1 traveling to various destinations

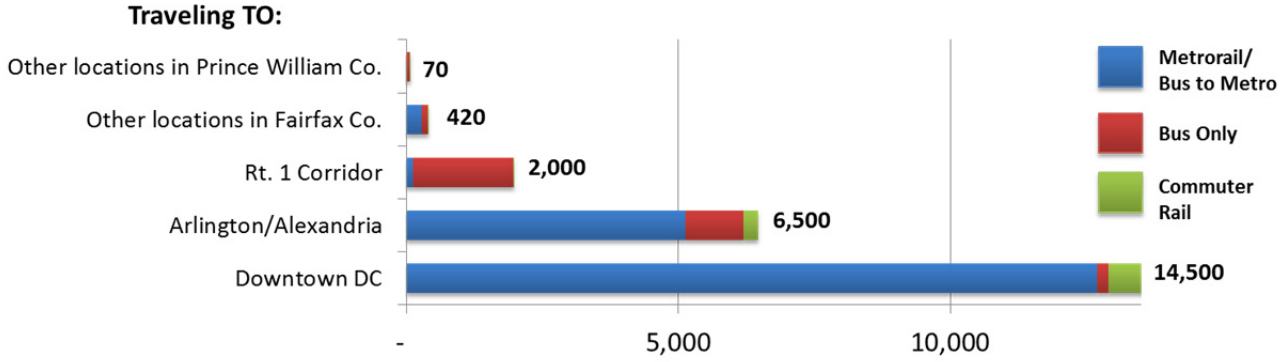
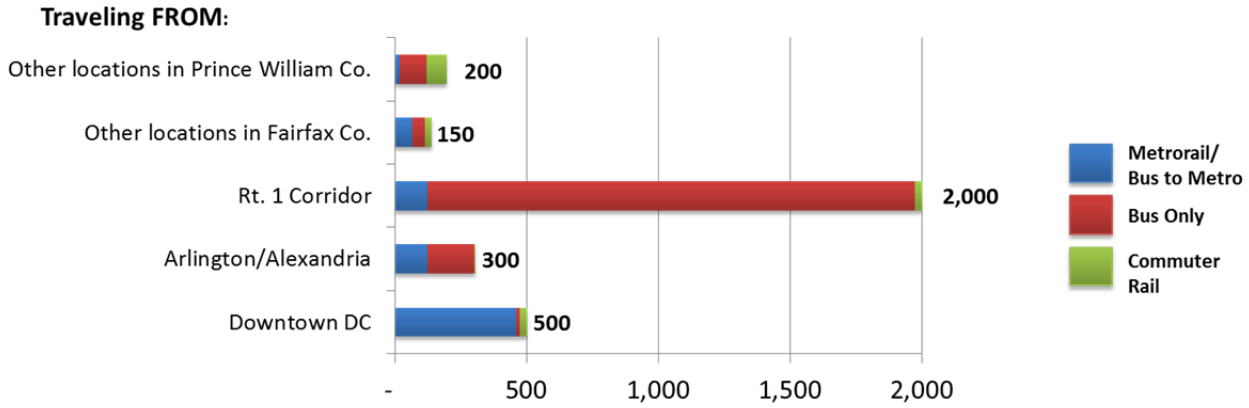


Figure 2-3: Transit Trips originating at various locations traveling to Route 1



2.2 Existing Transit Service

Several transit operators provide service along the Route 1 Corridor:

- **Fairfax County Connector (FCC):** operates standard local service and limited-stop service around the corridor, as well as circulator services to Fort Belvoir.

- **Potomac and Rappahannock Transportation Commission (PRTC):** operates local service (OmniLink), shuttle service (MetroDirect), and commuter service (OmniRide), in the Woodbridge portion of the Route 1 corridor.

- **Washington Metropolitan Area Transit Authority (WMATA):** operates the Richmond Highway Express Services (REX) as a limited-stop express bus service between Fort Belvoir and the Huntington and King Street Metrorail Stations. REX service operates in regular traffic along Richmond Highway, but vehicles feature signal optimization technology that adds time to green traffic signals when buses are approaching intersections. REX vehicles also features unique branding scheme on buses and has separate bus stop flags to differentiate it from other transit services.

In addition to bus transit service, the Virginia Railway Express (VRE) provides commuter rail services parallel to the southern portion of the Route 1 corridor. The VRE Fredericksburg Line operates service from Fredericksburg to Union Station in Washington, DC. VRE has stations in the Route 1 Corridor at Woodbridge and west of Route 1 at Lorton. **Figure 2-4** shows the existing transit network.

Ridership varies between bus routes along the Route 1 corridor. Routes with the greatest frequency tend to have the highest ridership. The three routes with the highest ridership are: WMATA's REX service with 3,519 daily boardings; FCC's Route 171 with 3,238 daily boardings; and FCC's Route 151 with 1,232 daily boardings.

Figure 2-4: Existing Transit Network

2.3 Population and Employment Growth

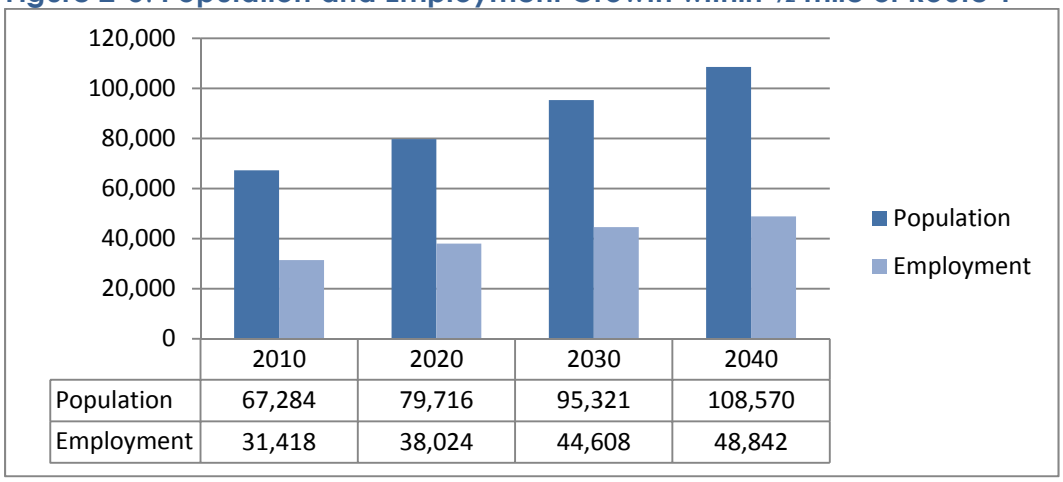
In 2010, the population and employment within ½ mile of the Route 1 was about 67,000 and 31,000, respectively. Both housing and employment are expected to increase along the study corridor by 20 percent by 2030 (see **Table 2-2**). **Figure 2-5** shows the estimated population and employment increase along the corridor between 2010 and 2040.

Table 2-2: Population and Employment Percent Change - Study Corridor

	2010-2020	2020-2030	2030-2040	2010-2040
Population	18%	20%	14%	61%
Employment	21%	17%	9%	55%

Source: MWCOG Round 8.2 Land Use Forecast.

Figure 2-5: Population and Employment Growth within ½ mile of Route 1



	2010	2020	2030	2040
Population	67,284	79,716	95,321	108,570
Employment	31,418	38,024	44,608	48,842

Fort Belvoir is a major employer along the Route 1 corridor. The 2005 Base Realignment and Closure (BRAC) Report recommends nearly 26,000 military, federal civilian, and private embedded contractor jobs to be relocated to Fort Belvoir and Quantico. Of these jobs, 90 percent will be located at Fort Belvoir. Recent reports by Fort Belvoir estimate that employment will increase by 3,500 new jobs by 2017 and 17,000 new jobs by 2030.

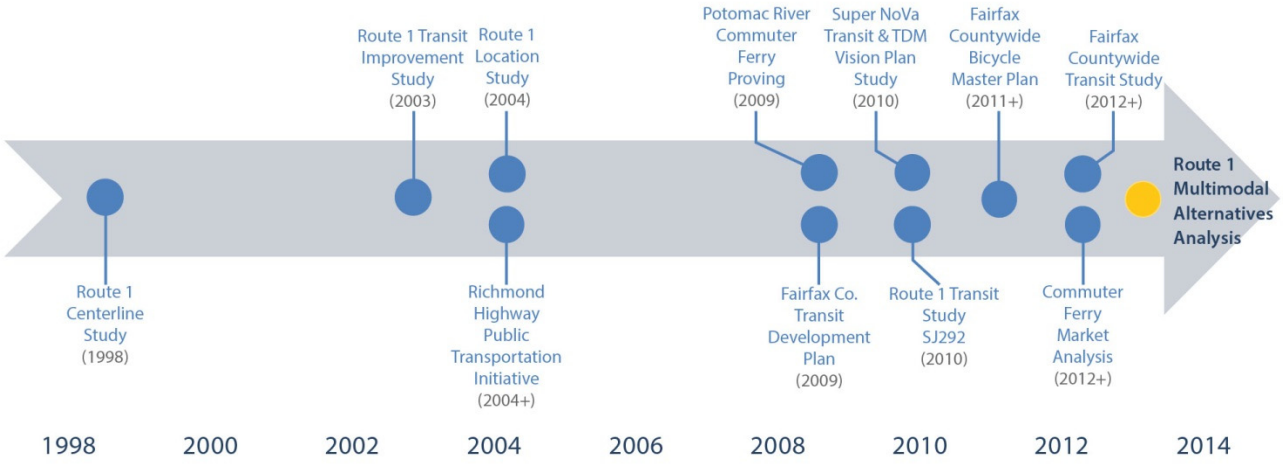
Fairfax and Prince William counties are each anticipated to add roughly a quarter of a million new residents in the coming decades. Fairfax will add roughly 230,000 more jobs, while Prince William will add about 150,000. Connecting residents to jobs, and employers to workers, will continue to be a significant need and challenge.

The Washington metropolitan region is expected to grow to nearly 6.5 million people (24 percent growth) and increase employment by 36 percent by 2040. Outer jurisdictions are expected to continue to grow more rapidly, with population more dispersed in the future than it is today. Jobs are projected to continue to be concentrated in the core and toward the western side of the region.

3.0 Planning Context

Community, agency, and political leaders have long recognized the transportation challenges in the Route 1 corridor. Numerous studies and plans have been completed for the corridor specifically. These studies are listed below in **Figure 3-1** and summarized in **Table 3-1**.The need for improvements has been identified in numerous past studies. Growth in general regional population and employment, as well as local changes in job concentration, have driven greater demand for travel in the constrained corridor. Safety for users of all types remains a concern. Land use and economic plans anticipate further growth and development. Maintaining affordability and diversity is an increasing challenge.

Figure 3-1: Previous Studies



The two foundational studies for this effort are the VDOT Route 1 Centerline Study (1998) and the DRPT Route 1 Transit Study (2010). These studies are described below.

VDOT Route 1 Centerline Study (1998 and 2004 Location Study): The Centerline study examined 27 miles of Route 1 from Stafford County north to I-495 and Alexandria: Project A (Stafford County line to Route 123), Project B (Route 123 to Armistead Road), and Project C (Belvoir Woods Parkway to the Capital Beltway). Projects B and C correspond with this project study area. The Study projected an increase in traffic of roughly 71 percent by 2025 over 2000 volumes thus requiring additional capacity recommending widening from 4 lanes to 6 in the southern portion and 6 lanes to 8 in the northern segment. Pedestrian and bicycle improvements including both facilities along the corridor and improved crossings were also recommended. The study recommended the preservation of right of way for transit but did not make a final recommendation or determination on transit alignment, running way or mode.

DRPT Route 1 Transit Study SJ292 (2010): This transit study was intended to define the next steps to advance transit services to the growing employment centers of Fort Belvoir in Fairfax County and Marine Base Quantico in Prince William and Stafford Counties along Route 1. The study found that existing transit services and roadway operations were generally insufficient to address the travel demand needs resulting from BRAC that concentrated employees at those facilities. The study found substantial need to improve transit service on the corridor to accommodate the projected growth, increase transit mode

share, and preserve mobility on the Route 1 corridor. Pedestrian access and safety were noted as significant needs. Persistent levels of extreme congestion on the corridor necessitated an increase of person capacity on the corridor to provide viable options for higher capacity vehicle travel. The study recommended further detailed assessment to examine the feasibility of dedicated transit running way and evaluation of modes.

Table 3-1: Needs and Recommendations Identified from Previous Plans

Plan	Agency	Date	Needs Identified	Recommendation for Route 1
Route 1 Centerline ("Location") Study	VDOT	1998	• Increasing congestion threatens mobility and economic development • Non-motorized facilities are inadequate • Enhanced transit is necessary to meet travel demands	• Widen Route 1 to six travel lanes (three in each direction) to Mount Vernon Memorial Highway and eight lanes to Huntington • Provide bicycle and pedestrian accommodations • Provide accommodation for higher quality transit
Route 1 Transit Improvement Study	WMATA	2003	• Substantial growth in development requires enhanced transit services	• Phase I – bus service and technology improvements • Phase IIa: BRT "light" (in shared lanes) • Phase IIb: BRT in dedicated curbside lanes. • Phase III: Light rail in dedicated or semi-exclusive lanes; increased development density • Access facilities (Park and Ride and Kiss and Ride) • Intermodal stations
Richmond Highway Public Transportation Initiative	Fairfax DOT	2004 - 2010	• Seriously deficient pedestrian facilities • Bus stop amenities are lacking	• Sidewalk and pedestrian improvements • Bus stop improvements and improving bus service
Potomac River Commuter Ferry Feasibility	Prince William County	2009	• Increasing congestion threatens mobility and economic development • Roadway network may be insufficient to meet needs – must explore waterborne • Intermodal connections are needed	• Further demand analysis • Intermodal stations
Mt. Vernon Vision	Citizens	2010	• Transportation should support land use development • Substantial growth in development requires enhanced transit services	• Extend Metrorail. Light rail or monorail as an alternative • Provide/require sidewalk network
Route 1 Transit Study SJ292	DRPT	2010	• Enhanced transit is necessary to meet travel demands	• Near term BRT operations • Improve pedestrian safety and accommodation • Widen the corridor by one lane in each direction
Fairfax County Comprehensive Plan	Fairfax County	2011	• Increasing congestion threatens mobility and economic development • Substantial growth in development requires enhanced transit services	• Examine heavy rail, light rail, monorail, and bus rapid transit for the corridor • Widen Route 1 by one lane in each direction in segments to achieve consistent 3-lane per direction section.

Plan	Agency	Date	Needs Identified	Recommendation for Route 1
			• Transportation should support land use development	• Provide multiuse trails
SuperNoVa Transit/TDM Vision Plan	DRPT	2012	• Additional transportation options are necessary to accommodate growth • Enhanced intermodal connections and facilities	• BRT or LRT on northern segment / commuter bus on southern segment • Pedestrian and bicycle accommodation • Additional intermodal facilities
Fairfax County Bicycle Master Plan	Fairfax County	2012	• Identification of designated bicycle trails and paths • Safety improvements • Expanded network of recreational and commuter bikeways	• Route 1 is designated as a bicyclist "caution" zone • Bike lanes, safety improvements recommended north of Gunston Road
Watershed Management Program	Fairfax County	2012	• Comprehensive and continuing program of watershed management	• Belle Haven, little Hunting Creek, Dogue Creek, Accotink Creek, Pohick Creek, Mill Branch watersheds are impacted by Route 1
Constrained Long Range Plan and Regional Vision	MWCOG	2013	• Additional transportation options are necessary to accommodate growth • Foster walkable communities • Enhanced intermodal connections and facilities • Affordable transportation options • Secure and reliable funding for transit	• Widen Route 1 to six travel lanes (three in each direction) • Provide bus right turn lanes
Fairfax County Countywide Transit Network Study	Fairfax DOT	Ongoing	• Increasing congestion threatens mobility and economic development • Substantial growth in travel demand and increase in transit demand • Enhanced transit is necessary to meet travel demands • Transportation should support land use development	• Route 1 is a "destination corridor" • Study is ongoing; No final recommendations to date

4.0 Problems and Needs

The need for the project stems from existing and expected transportation problems along the corridor related to limited transit service, poor bicycle and pedestrian facilities, and high traffic volumes. These deficiencies limit accessibility and are not supportive of the desired economic development growth along the corridor.

The existing carrying capacity of the corridor is constrained. People traveling by automobile experience congestion and delays; people traveling by transit experience infrequent service as well as delays because of traffic congestion. Integrated multimodal improvements are needed to support the anticipated high levels of employment and residential growth. County Comprehensive Plans envision this growth in the form of focused, pedestrian- and transit-oriented development. Without transportation capacity improvements that encourage pedestrian and transit travel, it is unlikely that the projected growth can be accommodated within the corridor, and the associated economic opportunity of additional jobs and residents will be limited.

Attractive multimodal options are needed to help serve the high transit-dependent population who rely on bicycling, walking and/or transit to meet the needs of daily life. According to the American Community Survey (2008-2012), within ½-mile of the study corridor, there are over 2,000 households that do not own a car.

Of the existing transit riders, nearly three-quarters of existing transit riders have no access to an automobile as a travel alternative. Over half of corridor transit riders have household incomes of less than $30,000. Preserving community and affordability over the long term requires improved transit and other transportation options to meet the needs of this population.

The document identifies four specific areas of need for a major multimodal investment in the corridor: Transit, Pedestrian and Bicycle, Vehicular, and Land Use/Economic Development. **Table 4-1** summarizes the problems and need by area; the subsequent sections describe the needs in more detail.

Table 4-1: Problems and Need Summary

Multimodal Area	Problems and Needs	
Transit	• Transit travel time is not competitive with auto • Peak and off-peak transit service is infrequent • Dwell time at stops and peak period congestion delays transit	*Attractive and competitive transit service to support transit dependent population*
Pedestrian/ Bicycle	• Facilities for non-auto travel are limited, substandard, and unable to compete with the attractiveness of single occupancy vehicle travel • Pedestrian crossings of Route 1 are infrequent, wide, and not near existing transit stops • Bicycle access is difficult with few alternative paths.	*Safe and accessible pedestrian and bicycle access*
Vehicular	• Users experience significant congestion along Route 1 during peak periods • Travel times are highly variable and unpredictable	*Appropriate level of vehicle accommodation*
Land Use/Economic Development	• Current development patterns fail to optimize development potential at designated activity centers • Existing street connectivity is poor at commercial nodes	*Support and accommodate more robust land development to support anticipated population and employment growth*

4.1 Transit Needs

The corridor needs attractive, high-quality transit service to improve local and regional mobility. The corridor is home to a high population of transit-dependent riders. High-quality transit would reduce travel time and increase frequency, reliability, and attractiveness. Currently, transit service in the corridor does not meet the needs of current and future residents, which is leading to low transit mode choice. The transit needs are listed and described below.

- Transit travel time is not competitive with automobile
- Peak and off-peak transit service is infrequent
- Dwell time at stops and peak period congestion delays transit

Transit travel time is not competitive with auto

At present, transit does not compete well as an alternative to automobile travel, particularly for those with mobility choices. Frequent stops and congested segments of roadway make transit travel both slower and more unpredictable than auto travel, with bus travel times increasing significantly during peak hours. **Table 4-2** compares the travel time between automobile and transit to regional destinations. The slow transit travel time could lead to the low transit mode choice. Currently, over 92

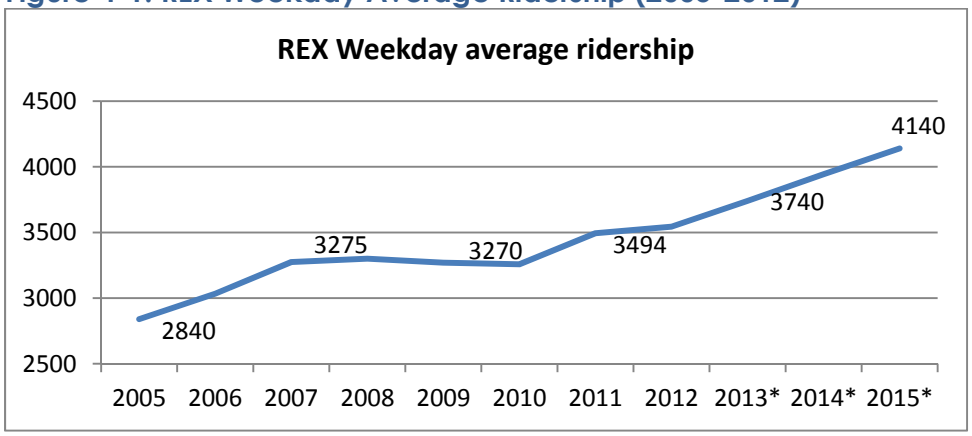
percent of corridor travelers commute by auto and roughly 8 percent commute by bus. This is below the regional average of 15 percent transit mode share for "middle ring" locations.[1]

Table 4-2: Sample Travel Times

Origin	Destination	Distance	Drive Time	Transit Time	Transit Transfers
Fort Belvoir Community Hospital	Huntington Metro Station	8.8 miles	20 min	35 min	0
Fort Belvoir Community Hospital	Mt. Vernon Shopping Center (Hybla Valley)	5.7 miles	15 min	25 min	0
Mt. Vernon Shopping Center (Hybla Valley)	Huntington Metro Station	5.2 miles	15 min	20 min	0
Woodbridge	Fort Belvoir Community Hospital	8 miles	15 min	40 min	1

Despite the relatively high transit travel time, there appears to be significant latent demand for quality transit service on the corridor as evidenced by the dramatic ridership growth of the REX express bus service. REX service has seen a relatively steady ridership growth of approximately 25 percent over the past seven years (See **Figure 4-1**). Past studies have found strong demand for enhanced transit on the corridor.

Figure 4-1: REX Weekday Average Ridership (2005-2012)



Peak and off-peak transit service is infrequent

Transit service is fairly frequent in the peak hours (every 12 to 20 minutes), but less frequent in non-peak periods (30 to 60 minute headways). The bus routes along Route 1 have several frequency levels that vary throughout the day. Most FCC peak period services operate at a 20-30 minute headway, while off-peak services operate closer to a 60 minute headway. PRTC's OmniLink service mostly operates 30 minute peak period and 60 minute off-peak period service, while OmniRide service only runs in the peak

[1] MWCOG "State of the Commute" survey findings reported September 18, 2013. Middle Ring locations surround the inner core area and include Fairfax, Montgomery, and Prince George's counties). http://www.mwcog.org/transportation/weeklyreport/2013/files/09-17/TPB-Presetnation_2013_StateOfTheCommute.pdf

periods with approximately 30 minute headways and provides more limited runs during the midday. MetroDirect operates about every 40 minutes during the day with more limited runs after 8:00PM. Metrobus commuter routes (11Y) operate on 30 minute headways during the peak period, while local routes (9A) operate with 30 minute headways all day. REX service operates at approximately 12 minute headways during the peak period and 30 minutes during off-peak periods. Figure 4-2 compares the peak and off-peak frequency of the two most popular routes.

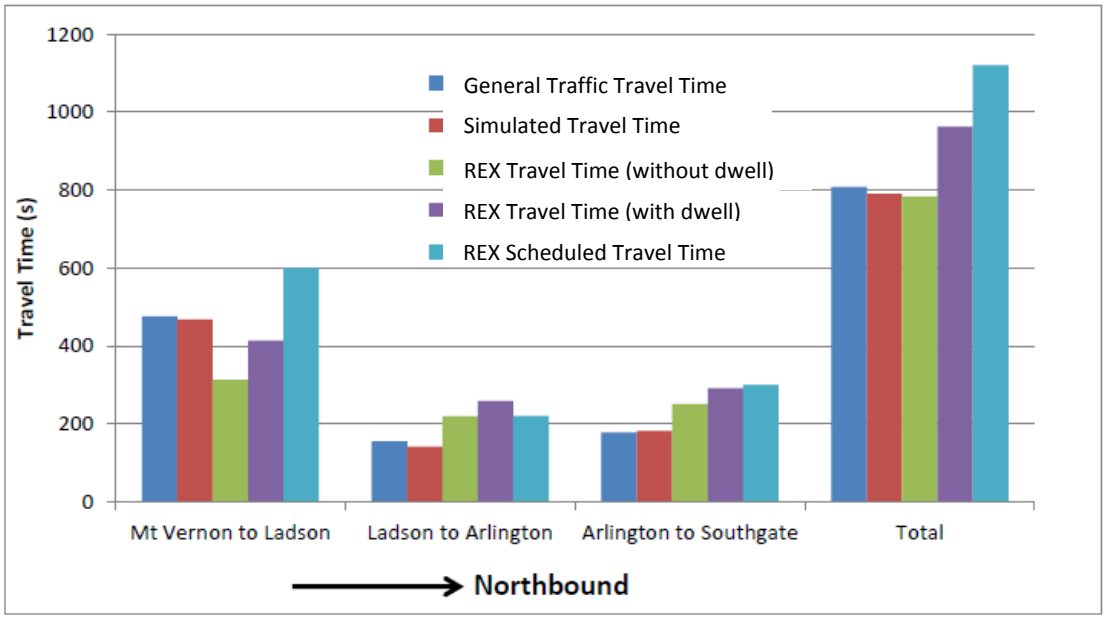
Figure 4-2: Service Frequency

Route		Peak Wait Time	Off-Peak Frequency
	REX	11 min	30 min
	171 (FCC)	20 min	30 min

Dwell time at stops and peak period congestion delays transit

Figure 4-3 shows how travel times for transit compare to estimated travel time for general purpose traffic along segments of the corridor. It shows that while buses and general purpose traffic generally travel at about the same speeds, dwell time at stops increases total transit travel time by about 20% as compare to both transit travel time without dwell and general purpose traffic.

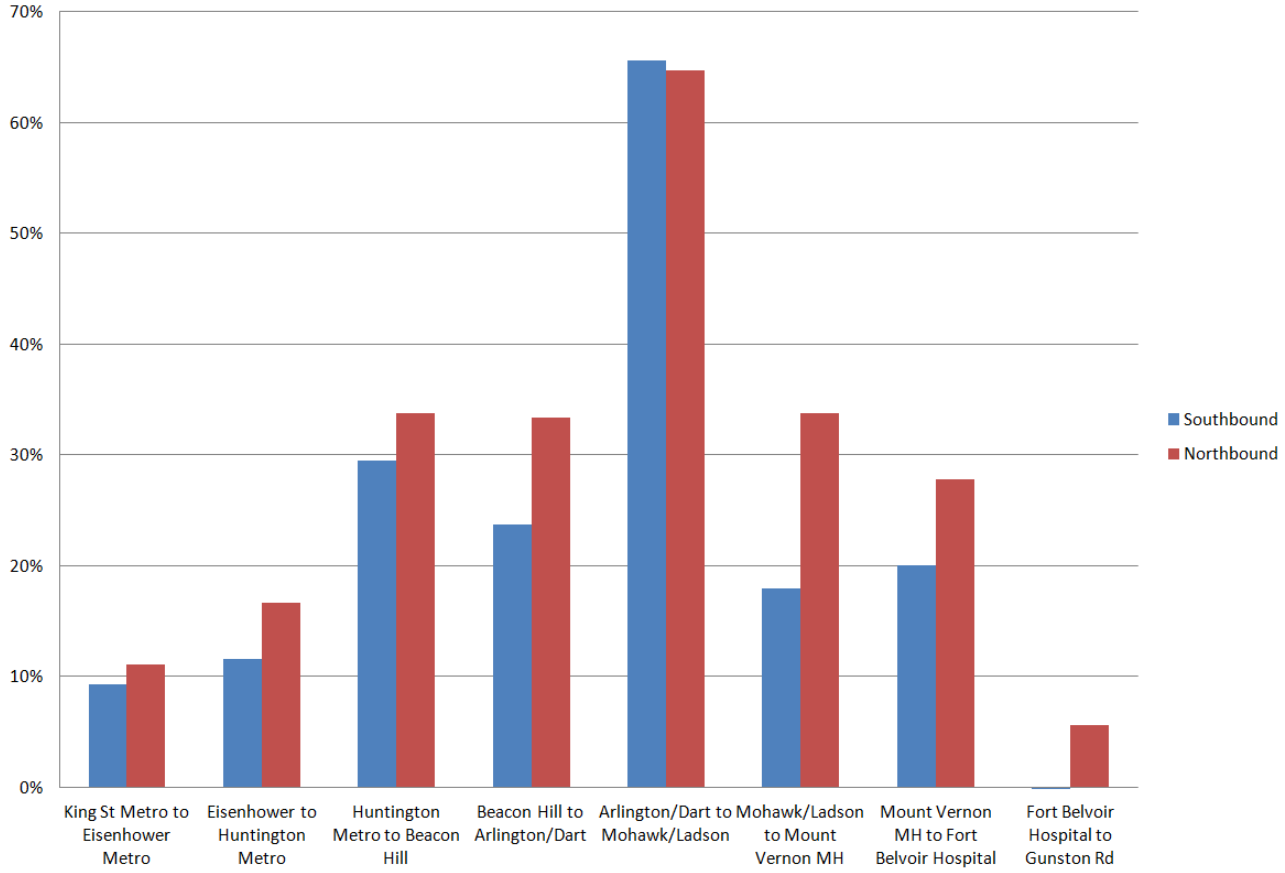
Figure 4-3: Travel Time Comparison in the Northbound Direction along Route 1 AM Peak



Source: REX travel time with dwell was obtained from WMATA, while travel time without dwell was estimated assuming 20 seconds of dwell time at each bus stop

Because transit services presently operate in general purpose travel lanes, there is little advantage to transit customers in terms of competitive travel time. Traffic congestion slows both general purpose traffic and transit during peak periods. **Figure 4-4** shows the percent increase in travel time for REX services during peak periods as compared to periods when traffic flows freely, and shows that traffic congestion introduces significant delays for buses in both directions. The existence of bidirectional congestion supports the need for transit priority treatments along the corridor to reduce transit travel times.

Figure 4-4: Transit travel time: peak vs. off-peak—(Percent increase REX Running Time by Segment, Free Flow (southbound) vs AM PEAK (northbound))



Source: WMATA travel time records, 2013

4.2 Pedestrian and Bicycle Facilities

Existing pedestrian facilities are disjointed and discontinuous, limiting pedestrian travel and reducing access to transit. Attractive, high-quality pedestrian and bicycle facilities are needed to accommodate the future planned growth and appropriately meet the diverse travel demands and abilities of Route 1 residents and stakeholders. Improved bicycle and pedestrian facilities will also improve transit access in the corridor to connect transit with surrounding uses via safe and continuous pathways. Specific pedestrian and bicycle needs are listed and described in more detail below:

- Facilities for non-auto travel are limited, substandard, and unable to compete with the attractiveness of single occupancy vehicle travel
- Pedestrian crossings of Route 1 are infrequent, wide, and not near existing transit stops
- Bicycle access is difficult with few alternative paths

Facilities for non-auto travel are limited, substandard, and unable to compete with the attractiveness and efficiency of single occupancy vehicle travel

Walking paths along the corridor are incomplete with 6.8 miles of identified sidewalk gaps.[2] The sidewalk facilities that exist are largely unbuffered from the heavy traffic on the corridor. ADA accommodations to pedestrian destinations such as bus stops are missing and/or substandard in several locations. Pedestrian ways are interrupted by curb cuts and driveways.

Pedestrian safety is a major concern as well. Jaywalking is observed on the corridor with pedestrians often waiting in the middle of the busy street in an active turn lane. From 2010 to 2012, VDOT reported 18 pedestrian collisions along the corridor. There were also two reported collisions with bicyclists during this time period.

Figure 4-5 shows examples of the existing pedestrian network along the corridor.

Figure 4-5: Current Pedestrian Conditions along the Corridor

Goat Track at Groveton Spring Road

Goat Track at Groveton Spring Road

Accessibly challenges at Hybla Valley and Lockheed Bus Stop

Discontinuous sidewalk at Groveton Spring Road

[2] Richmond Highway Transportation Initiative

Pedestrian crossings of Route 1 are infrequent, wide, and not near existing transit stops

As shown in **Figure 4-6**, only fifteen intersections along the corridor provide crosswalks. Crosswalks are spaced at significant distances from one another, the longest gap exceeding 1.8 miles. Crossing distance across the street commonly exceeds 100 feet. Several intersections lack a median or other type of pedestrian refuge. Residents have also complained that crosswalks are not near existing transit stops, leading to more unsafe crossings. **Table 4-3** lists the characteristics of the selected existing crosswalks along the corridor.

Figure 4-6: Crosswalk Gaps

Table 4-3: Pedestrian Crossings along Route 1 Corridor (Select Intersections)

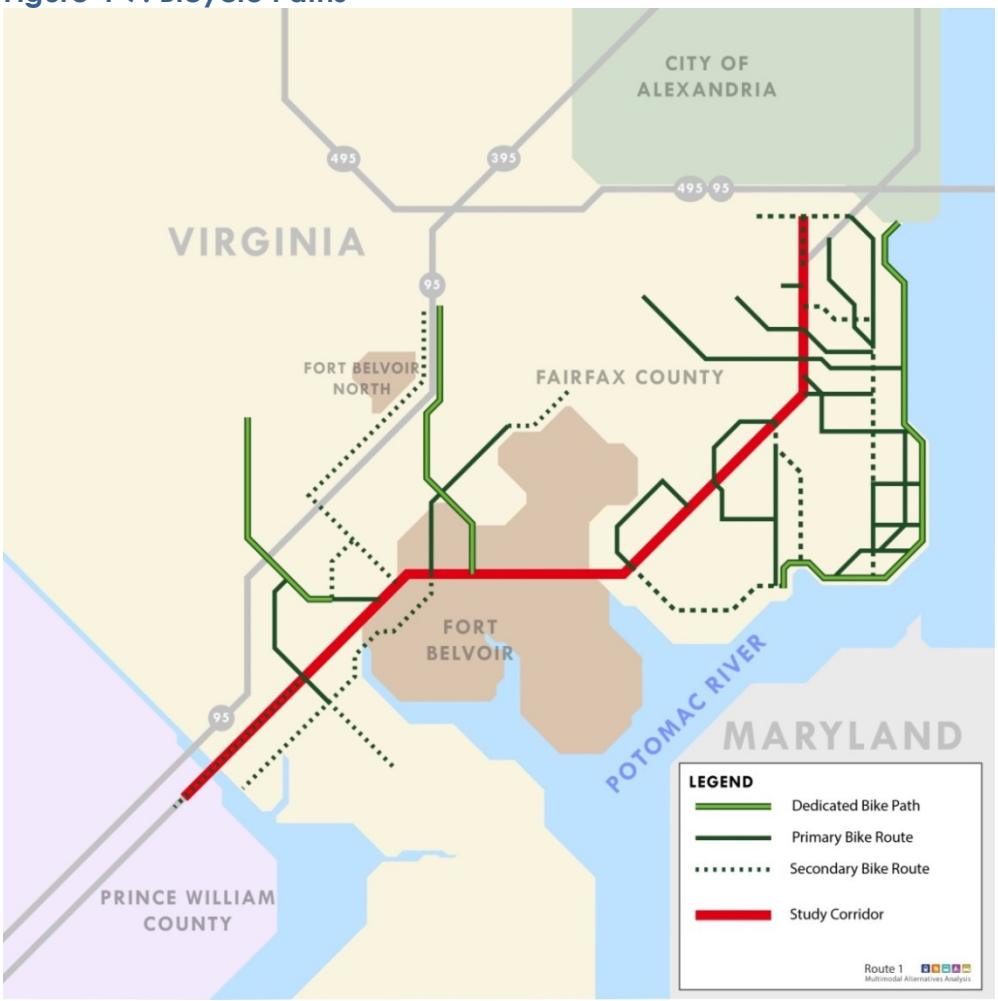
Cross Street	Crossing Distance	Lanes of traffic	Crosswalk	Median or divider
Gunston Road	160 feet	7	North leg	Channelization islands
Lorton Road	112 feet	8	South leg	Raised divider
Pohick Road (638)	140 feet	9	South leg	Raised divider
Belvoir Road	90 feet	7	North leg	none
Old Mill Road	85 feet	7	North leg	none
Luken Lane	80 feet	7	North leg	none
Haft Drive	145 feet	10	North leg	none
Boswell Avenue	116 feet	8	North leg	Raised divider
Lockheed	105 feet	7	All legs	Raised divider
Memorial Street	145 feet	9	North leg	Raised divider

Bicycle access is difficult with few alternative paths

Few bicycle facilities currently exist on Route 1 (see **Figure 4-7**). In its Bicycle Master Plan, Fairfax County characterizes Route 1 as a corridor "of caution" - a route where "bicyclists are urged to exercise extra caution due to narrow shoulders or lanes, poor sight distances, high traffic volumes, or other challenging characteristics." Of particular concern are connections along Route 1 through Fort Belvoir. As documented in the Northern Virginia Regional Bikeway and Trail Network Study (2003), when the military facility was closed to all non-military personnel, bicyclists were forced to ride along Route 1, which most bicyclists find unsafe and challenging. As a result, bicyclists often take a 10.5 mile circuitous bypass around the Richmond Highway and the Fort Belvoir Military Installation between Telegraph Road and the Mount Vernon Trail.

The poor accommodation for cyclists is reflected in a very low rate of cycling in the corridor. The US census estimates that just 0.15% of commuters in both the northern and southern segments of this corridor use a bicycle to get to work. This compares with 2 percent county-wide, according to the 2010 Census.[3]

Figure 4-7: Bicycle Paths



[3] http://www.fairfaxcounty.gov/news/2012/updates/may-is-bike-month.htm

4.3 Traffic Problems and Vehicular Operations Needs

Users experience significant congestion along Route 1 during peak periods

The Route 1 corridor experiences significant peak hour congestion. The corridor is widely perceived to be difficult and congested. Six intersections presently operate at either Level of Service (LOS) E or F in the AM or PM peak hour (see **Figure 4-8**). In the AM peak period, the intersection at Mount Vernon Highway operates at LOS E, and the intersections at Fort Hunt Rd and Buckman Rd operate at LOS F. In the PM peak, the intersection of Route 1 and Backlick Road, the Fairfax County Parkway, and Mount Vernon Memorial Parkway operate at LOS E, while no intersections operate at LOS F. **Table 4-4** summarizes the number of intersections operating at LOS A-F.

Figure 4-8: AM/PM LOS Intersections with Level "E" or Worse (2013)

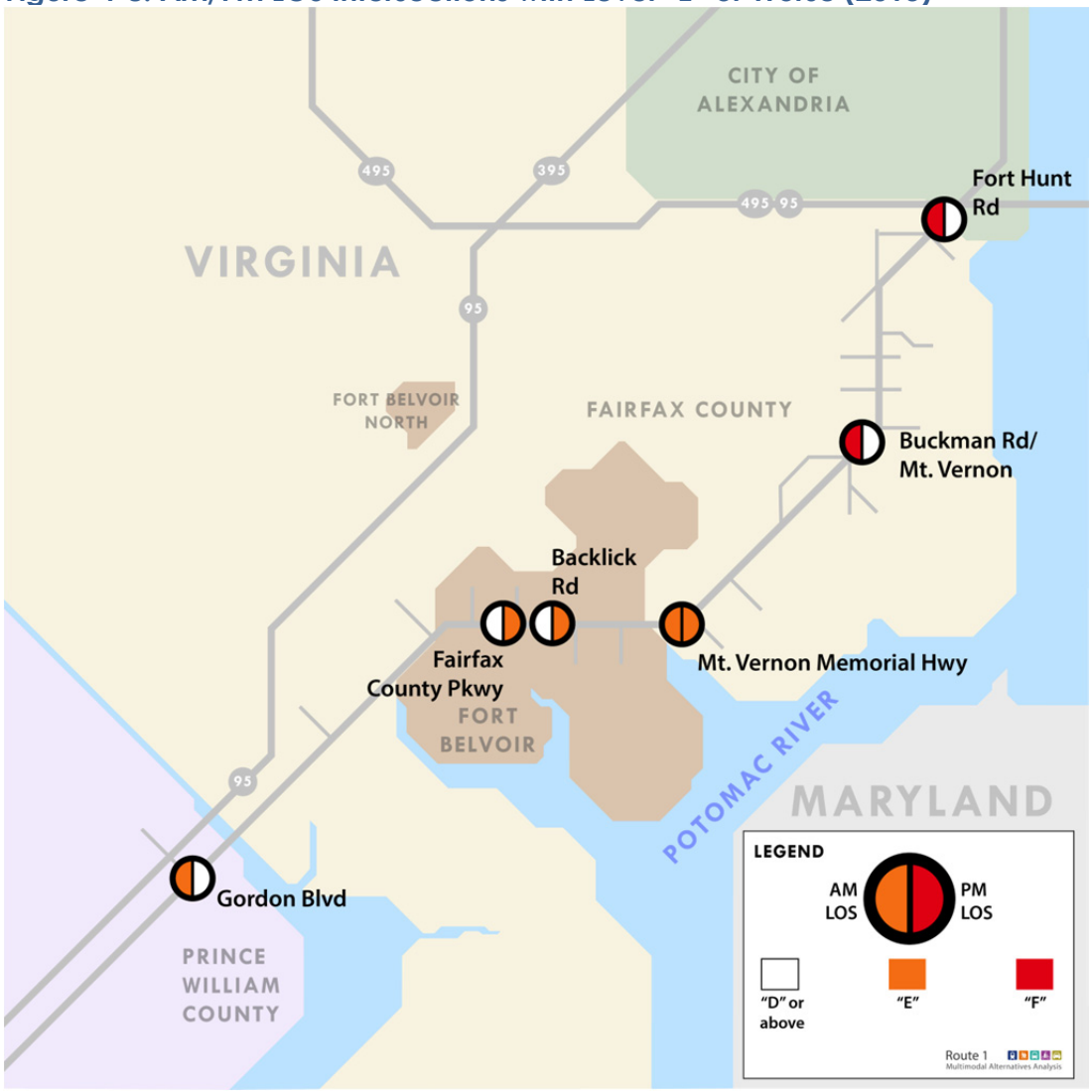


Table 4-4: Intersection Level of Service (2013)

Level of Service	# of intersections: AM	# of intersections: PM
LOS A	9	5
LOS B	15	15
LOS C	9	8
LOS D	6	11
LOS E*	**1**	**3**
LOS F*	**2**	**0**

*Considered failing intersections.

Travel times are highly variable and unpredictable

Volume to capacity (v/c ratio) is a measure of congestion. A v/c ratio less than 0.85 generally indicates that adequate capacity is available and vehicles are typically not expected to experience significant queues and delays. During the AM peak hour under existing conditions, nine intersections in the study area (22.5 percent of all intersections) have v/c ratios greater than 0.85. In the PM peak hour, six intersections (15 percent of all intersections) experience v/c ratios greater than 0.85. **Figure 4-9** shows the intersections along the corridor that have a V/C ratio greater than 0.85 in the AM and PM peak periods.

Figure 4-9: Congested Intersections (2013)

While the majority of studies have focused on weekday peak-hour congestion, weekend congestion is routine and increasing, particularly in the Hybla Valley and South County area. Weekend travel demand patterns differ from weekday peak patterns. Weekend activity generates significant travel demand from other suburban destinations, as opposed to travel to and from major employment centers typical in the weekday. **Table 4-5** shows that the weekend traffic levels approach the levels observed during the weekday peak periods.

Table 4-5: Weekday and Weekend Congested Intersections

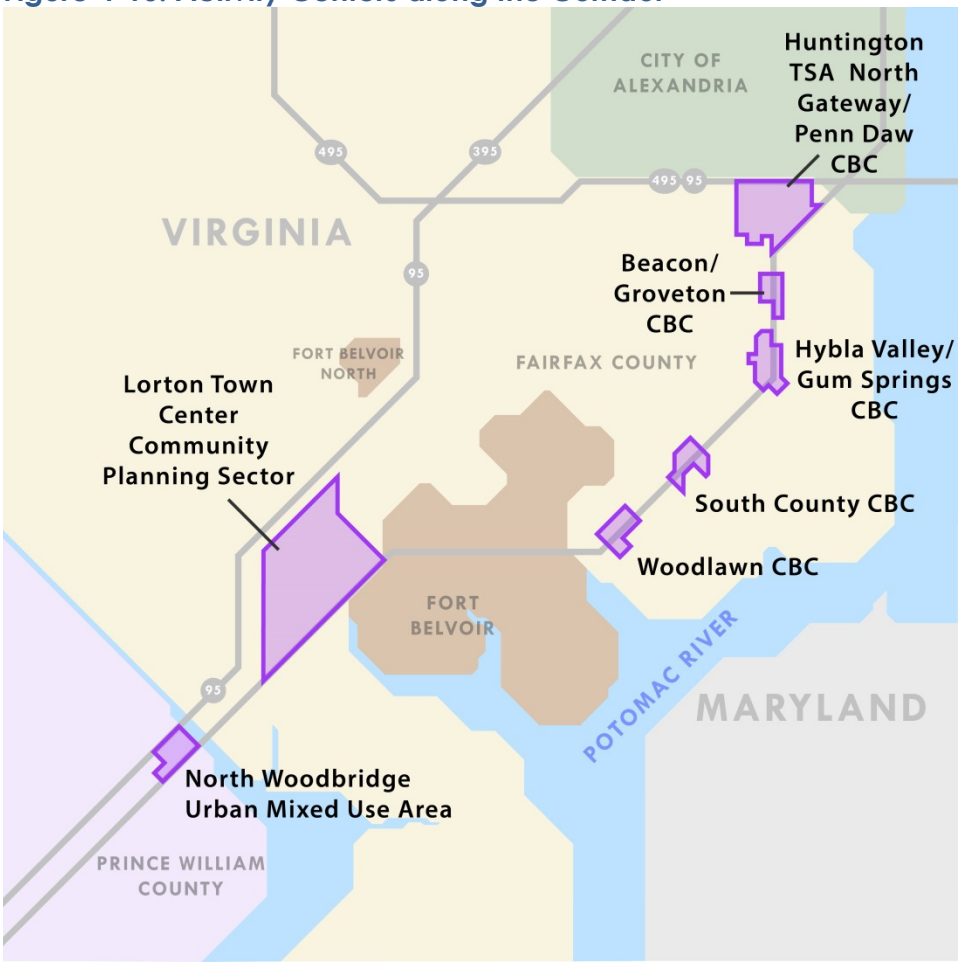
Intersection	Weekday LOS		Weekend LOS	Weekday v/c Ratio		Weekend v/c Ratio
	AM Peak Hour	PM Peak Hour	Saturday Peak Hour	AM Peak Hour	PM Peak Hour	Saturday Peak Hour
Ft Hunt Rd	F	D	D	0.90	0.61	0.73
S King Hwy	D	E	E	0.96	0.92	0.95
Buckman Rd	F	D	E	1.17	0.98	1.01
Mt Vernon Mem Hwy	F	F	E	1.05	1.19	0.96
Backlick Rd	D	F	D	1.01	1.10	0.82
Fairfax County Pkwy	D	E	C	0.90	1.11	0.75
Telegraph Rd	D	D	C	0.82	0.74	0.53
Gunston Rd	D	F	D	0.99	1.21	0.93
Gordon Blvd	D	B	C	0.91	0.82	0.73

Source: Virginia Department of Transportation.

4.4 Land Use and Connectivity

As described in Section 2.2, significant population and employment growth is anticipated regionally and along the Route 1 corridor. Fairfax County has designated several nodes along the Route 1 corridor as Activity Centers, or Community Business Centers (CBCs) (see **Figure 4-10**). County policies anticipate growth to concentrate in these areas, thereby increasing the density of housing and employment activity on the corridor and necessitating additional travel capacity and options to support and enable this growth. The Fairfax County Comprehensive Plan lists specific development targets for each activity center.

Figure 4-10: Activity Centers along the Corridor



Fairfax County and Prince William County plans envision nodes of compact, walkable development focused in moderate to high density activity nodes; however, current development patterns fail to optimize potential development. Much of the corridor is characterized by commercial strip malls with large setbacks and unconnected driveways and access roadways. This leads to greater dependence on driving instead of walking to local destinations.

The corridor needs a clear plan for investment in transportation services and infrastructure that will accommodate expected growth (mix of uses and residents) and provide the basis for ongoing private investment in the corridor. It also needs to define coordinated land use and transportation policies and programmed improvements to facilitate high capacity transit investment and appropriate transit oriented development. Specific land use and economic needs are listed and described below:

- Development potential has not been realized in the designated activity centers
- Existing Street connectivity is poor at commercial nodes

Development potential has not been realized in the designated activity centers

Supporting compact, walkable development requires high quality multimodal transportation choices, but these have not been available. **Figure 4-11** compares the existing, 2035 forecast, and planned Comprehensive Plan activity level densities at each station area. The chart illustrates that although there has been significant development in recent years, this development is lower density and auto-oriented (which is contrary to the vision of several communities along the corridor). The graph shows that the Station Area A, which comprises Huntington Station, Penn Daw, and Beacon Station (see **Figure 4-12**), is projected to have activity levels associated with a premium transit service: Bus Rapid Transit (BRT), according to the DRPT Multimodal Design Guidelines.[4] The purpose of this Figure 4-11 is to also illustrate the low level of density that currently exists along the corridor, which is associated with Fixed Route Bus. The corridor will need to dramatically increase population and employment to support a premium transit service.

[4] The DRPT Multimodal Design Guidelines (2013), specifies activity density levels associated with specific transit modes.

Figure 4-11: Existing and Future Activity Level Densities and Associated Transit Modes

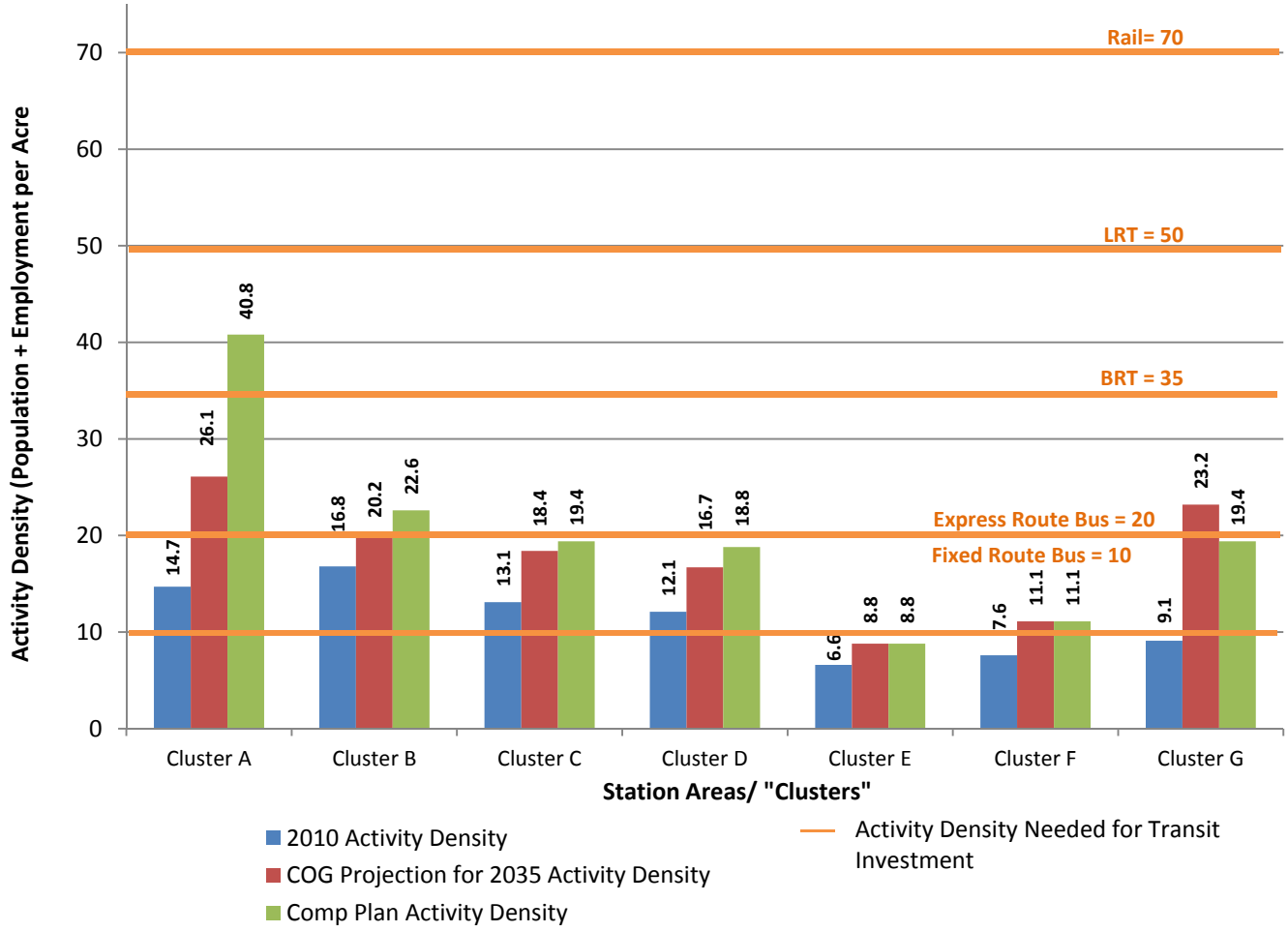
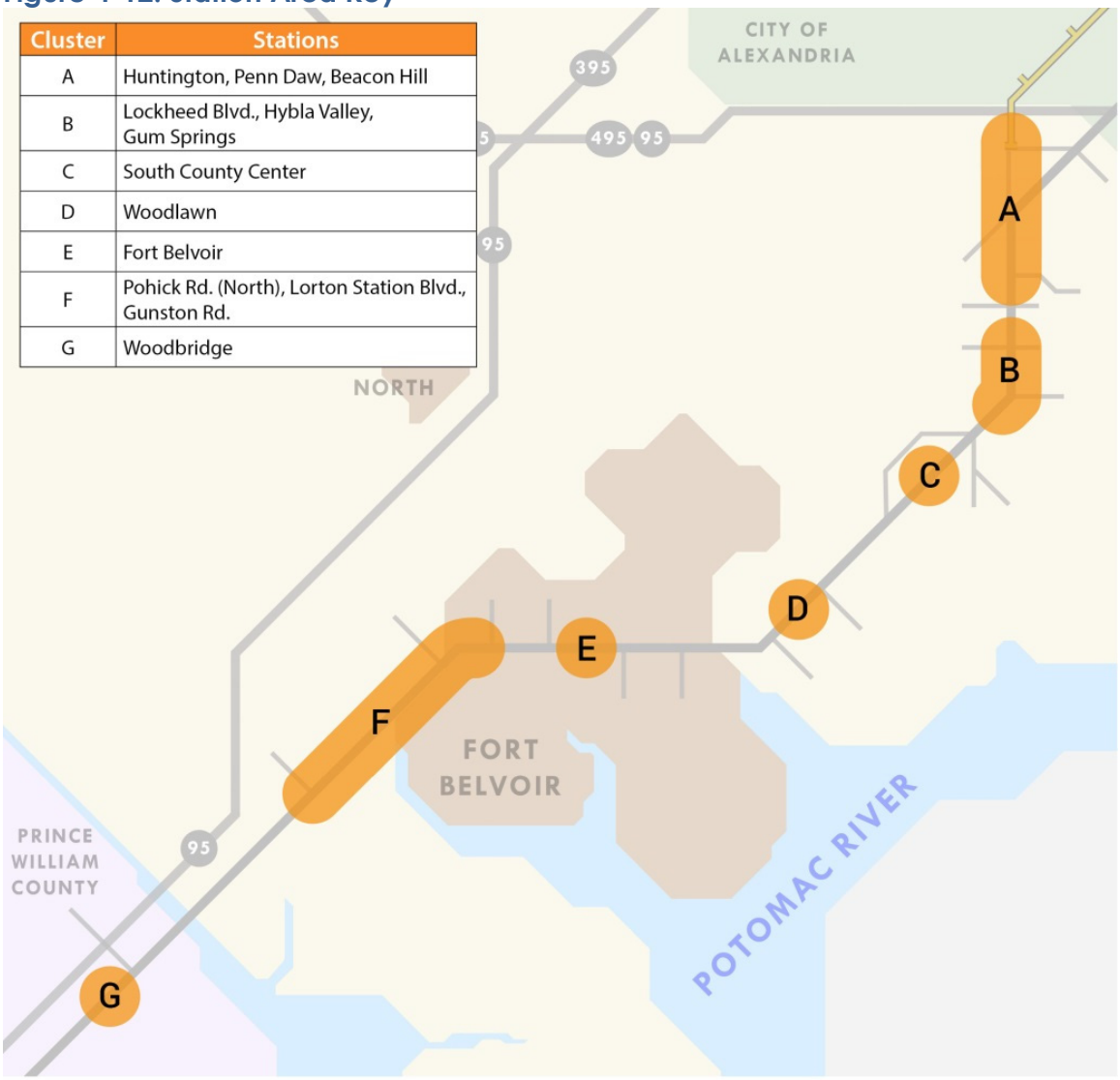


Figure 4-12: Station Area Key

Cluster	Stations
A	Huntington, Penn Daw, Beacon Hill
B	Lockheed Blvd., Hybla Valley, Gum Springs
C	South County Center
D	Woodlawn
E	Fort Belvoir
F	Pohick Rd. (North), Lorton Station Blvd., Gunston Rd.
G	Woodbridge



Existing street connectivity is poor at commercial nodes

Along the corridor, the development pattern fails to optimize potential development. Within the activity zones, there are large "mega-blocks" that support the commercial development. This development pattern limits access and does not support a pedestrian friendly environment. **Figure 4-13** shows existing "megablocks" that currently support the Beacon Mall Shopping Center and parking lot.

Figure 4-13: Beacon Station Area Existing Links and Nodes

5.0 Goals and Objectives

The documentation of needs above informs the project purpose and goals and objectives. Goals are overarching outcomes desired in satisfying the stated needs and reflect community values. Objectives are realistic and accomplishable steps toward achieving the more ambitious goals. The goals and objectives inform the evaluation of measures.

GOAL 1: Expand attractive multimodal travel options to improve local and regional mobility
Objectives:

- Increase transit ridership
- Improve transit to reduce travel times and increase frequency, reliability, and attractiveness
- Increase transportation system productivity (passengers per hour) within the corridor
- Increase comfort, connectivity, and attractiveness of bicycle and pedestrian networks to and along the corridor
- Integrate with existing and planned transit systems and services

GOAL 2: Improve safety; increase accessibility
Objectives:

- Provide accessible pathways to and from transit service and local destinations
- Reduce modal conflicts
- Improve pedestrian crossings
- Maintain traffic delays at acceptable levels

GOAL 3: Increase economic viability and vitality of the corridor
Objectives:

- Increase and improve connectivity to local and regional activity centers
- Encourage and support compact, higher density, mixed use development consistent with local plans, policies, and economic objectives
- Secure public and investor confidence in delivery and sustainability of new transit investments
- Provide high-capacity transit facilities at locations where existing and future land uses make them mutually supportive

GOAL 4: Support community health and minimize impacts on community resources
Objectives:

- Minimize negative impacts to the natural environment
- Contribute to improvements in regional air quality
- Increase opportunities for bicycling and walking to improve health and the environment