Route 1 Transit Study
SJ292

Background – Legislative Action

- Senate Joint Resolution (SJ 292) – 2011 General Assembly Session
  Requesting the Department of Rail and Public Transportation to evaluate the level of study necessary to identify and advance potential public transportation services to Fort Belvoir in Fairfax County and the Marine Corps Base at Quantico in Prince William and Stafford Counties
Background – Existing Conditions

- 27 miles long from the Capital Beltway (I-495/I-95) to Prince William County/Stafford Line.

Off-Peak Travel Time (via auto)
- From Huntington to Fort Belvoir: 20-25 minutes
- From Huntington to Quantico: 50-55 minutes

Travel Time (via transit)
- Huntington to Fort Belvoir: 20 min. (REX) / 40 min. (Rt. 171)
- Huntington to Lorton: 50 minutes (Rt. 171)
- Woodbridge VRE to Quantico: 50 minutes

Corridor serves an important north-south link for residents, commuters, transit vehicles, visitors, retail businesses and military installations.
- “Main Street” for local residents (Mount Vernon District / Town of Dumfries)
- Access to Activity Centers
- Alternative to Interstate 95 (traffic congestion, accidents, summer travel)
- Fairfax Connector 171
- WMATA REX
- PRTC Local and Commuter Services

Upcoming BRAC action combined with persistent levels of extreme congestion on the corridor prompted Virginia Senator Toddy Puller’s and Delegate Scott Surovell’s Legislative action to conduct a Route 1 Transit Study.

Existing Corridor-wide Transit Service

- WMATA – “Rex” Service
  - King Street Metro to Fort Belvoir Main Post
  - 12 stops / 12 minute peak and 30 minute off peak period headways
  - 35-40 mins. from Huntington Metro to Fort Belvoir
  - Traffic Signal Priority emitter on some buses
  - Limited intersections outfitted to receive signal
  - Ridership (May 2011)
    - Weekly total 71,386
    - Average weekday 3,386
    - Saturday total 7,642
    - Saturday Average 1,586
    - Sunday Total 5,237
    - Sunday Average 873
    - Monthly total 84,284

- Fairfax Connector
  - Route 171 (local route)
  - Huntington Metro to Franconia/Springfield Metro via Fort Belvoir and Lorton
  - Multiple stops / 30 minute headways
  - Fall Service Change will terminate route at Lorton VRE
    - Currently looking to split the 171 route and terminate at Lorton
    - Create new route 371 from Lorton to Franconia/Springfield Metro

- PRTC OmniLink
  - Route 1 (Woodbridge VRE to Quantico)
  - 55 stops total (28NB, 29SB) / 50-55 minute headways
  - Route Deviation
  - Ridership
    - FY11 Total Ridership 91,225
    - Average Daily 355
    - FY11 Total Saturday Ridership 7,648
    - Saturday Average Daily 153

Note:
- WMATA, Fairfax Connector, and PRTC have other bus routes that operate on portions of Route 1
- FRED does not provide service to Quantico and there are no plans to provide additional service
Existing Conditions

Summary of Background Research
Studies and Efforts

• Route 1 has been the subject of numerous roadway and transit-related studies and efforts.
  – Fairfax County Comprehensive Plan
  – Mount Vernon District Long-Range Visioning Report
  – BRAC EIS / BRAC Existing Conditions Report
  – VDOT Location Study / Corridor Study
  – Fairfax Connector & PRTC TDP
  – WMATA Regional Bus Study
  – Richmond Highway Public Transportation Initiatives
  – BRT Feasibility Study (Prince William County)
  – Potomac Communities, Urban Land Use Institute Report
  – North Woodbridge Study Area Long Range Plan
  – WMATA US 1 Fort Belvoir to Huntington Metro Rail Station ~ Transit Improvement Study
  – Prince William County BRAC Report
  – NVTC ~ Route 1 Corridor Bus Study 2001

Transit Related Recommendations

Fairfax County Comprehensive Plan
• Implement enhanced transit service along Richmond Highway, such as Metro, Light Rail, Bus Rapid Transit
• Establish transit stations at North Kings Hwy; at Beacon Hill Road; near Fordson Lane; near Mohawk Lane; near Sacramento; near Railroad line on Fort Belvoir Base; and at Telegraph Road

Fairfax County Transit Development Plan
• Modify schedule for Metrobus 11Y Mt. Vernon Express Line trips
• Restructure and Improve Metrobus REX service
• Increase service and revise routing on Connector 151/152 and 161/162

Prince William County Comprehensive Plan
• Identify and develop alternative transit concepts such as bus rapid transit, light rail transit, Potomac ferry service, Metro Rail extension (Blue Line) to Potomac Mills
• Establish a transit center on Belvoir Road at Pence Gate
• Extend PRTC’s Route 1 OmniLink Route from Prince William County to South Post entrance and improving connections to existing transit centers by extending the Metrobus REX line to Lorton VRE and improve local bus connections to the Franconia-Springfield Station

Prince William County / PRTC BRT Feasibility Study (2011)
• Implement two local BRT routes to service the PRTC Transit Center and the Route 1 123 Commuter Lot as land use and ridership demand increase to support the investment
• To offset travel time due to traffic congestion implement queue jump lanes and transit signal priority
Transit Related Recommendations Continued

Mount Vernon District Visioning Task Force (2010)
• Implement a peak period HOV/bus lane on Richmond Highway
• Encourage VDOT to install traffic responsive technology on all of the traffic signals in the Mount Vernon District

Potomac and Rappahannock Transportation Commission TDP
OmniLink – Route 1 Extension to Ft. Belvoir (timeframe 2011 – 2020)
• Improve weekday peak period service frequency from 30 minutes to 20 minutes,
• Improve weekday midday service frequency from 45 minutes to 30 minutes,
• Improve weekday night service frequency from 45 minutes to 30 minutes,
• Improve Saturday service frequency from 110 minutes to 60 minutes, and
• Add Sunday service at a frequency of 110 minutes

VDOT Centerline Study (2009)
• Widen Route 1 from Capital Beltway to the Stafford County line with accommodations for trails and transit bus pullouts in key locations

Transit Related Recommendations Continued

WMATA US 1 Ft. Belvoir to Huntington Metro Station Transit Improvement Study
Three phases of recommendations:
Phase one (2003 – 2010)
– Streamline bus service and routes
– Add GPS and SmartCard payment technology to buses
– Implement signal priority in the corridor for buses
– Improve/enhance pedestrian and passenger facilities

Phase two (2010 – 2025)
– Implement Bus Rapid Transit

Phase three (2025+)
– Implement light rail transit in the corridor as ridership demand and land-use density and development will support the major capital investment
Infrastructure Recommendations

- Widen Route 1 from the Capital Beltway to the Stafford County line with accommodations for trails, right shoulder bus lane pull-offs and shelters at high-demand stops
- Encourage VDOT to install traffic responsive technology on all of traffic signals in the Mount Vernon District
- Procure and Deploy Traffic Signal Priority on Richmond Highway
- Improve pedestrian network along the corridor and passenger experience at bus stops (e.g., shelters)

Current Efforts

Transit
- Richmond Highway Public Transportation Initiative
  - $55 Million Program ($28 M allocated for initiative so far)
  - Some sidewalk and bus stop improvements completed
  - Route 1 Transit Center (near Fordson Road) – conceptual study
- Fairfax Connector
  - Streamline Route 171 to improve overall route performance
- Fort Belvoir Area / Route 1 Transit Study (Fairfax County)
  - Scoping Underway

Road Improvements
- Route 1 Widening from Joplin and Brady’s Hill in Prince William County (near Quantico)
- Route 1 / VA 123 Intersection (Woodbridge)
  - Phased Construction due to funding availability
Potential “Next Steps” for Transit in the Route 1 Corridor

Near-term
• Improve conditions for transit operations and riders
  – Conduct necessary study and analysis to implement BRT
  – Conduct pedestrian facility and shelter assessment and develop a funding strategy to improve the existing conditions
  – Focus redevelopment to the corridor

Long-term
• Plan for the future:
  – Conduct land use analysis and develop a vision for economic development/redevelopment in the corridor
  – Feasibility analysis to determine potential for extending metro or implementing light rail

Comparable Capital and O&M Costs

- Broad Street BRT, 7 miles:
  - $68M Capital
  - $5.4M Annual O&M

- The Tide LRT, 7 miles
  - $300+M Capital
  - $15M Annual O&M

- Metro Silver Line, 11.6 miles:
  - $2.5B Capital
  - $50M Annual O&M
Federal Funding Programs

- Section 5309 provides federal funding for three major project types
  - **New Starts**: Large major capital investment that require significant project planning, environmental analysis and ridership forecasting
  - **Small Starts**: Smaller projects that may pursue federal funds with streamlined planning and ridership forecasting
  - **Very Small Starts**: Very small capital investment requiring a simplified planning process and project criteria

New Starts vs. Small Starts

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<td>Service Begins</td>
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DRPT

GRTC

Virginia Department of Rail and Public Transportation
Small Starts vs. Very Small Starts

**Small Starts**
- Fixed guideway for 50% of route during peak hours
- Substantial transit stations
- Signal Priority/Pre-emption (for Bus/LRT)
- Low Floor / Level Boarding Vehicles
- Special Branding of Service
- Frequent Service - 10 min peak/15 min off peak
- Service offered at least 14 hours per day
- Less than $250M total cost
- Maximum $75M Federal share

**Very Small Starts**
- Transit Stations
- Signal Priority/Pre-emption (for Bus/LRT)
- Low Floor / Level Boarding Vehicles
- Special Branding of Service
- Frequent Service - 10 min peak/15 min off peak
- Service offered at least 14 hours per day
- Existing corridor ridership exceeding 3,000/day
- Less than $250M total cost
- Less than $3M per mile (excluding vehicles)
- Maximum $25M Federal share

FTA “New Starts” Process Flow Chart for major capital investment, such as LRT or Metro
FTA 5309 Federal Funding Program Rating Criteria

Rating System:
High, Medium-High, Medium, Medium Low, Low

Minimum Project Development Requirements which must be met:

| Metropolitan Planning and Programming Requirements | Project Management Technical Capability | NEPA Process Approvals | Other |

FTA New Starts Rating Criteria

Project Justification Rating (50%)
- Cost Effectiveness (50%)
- Land Use (50%)

Project Finance Rating (50%)
- Non-New Starts Share (20%)
- Capital Funding Plan (50%)
- Operating Funding Plan (30%)
Reasons for Land Use Study

Encourage economic development in transit corridors
- Mobility benefits
- Economic benefits
- Health benefits

Definition of Bus Rapid Transit

- A form of transit using a combination of services, facilities, and branding to provide premium level of service
- Two main objectives
  - Provide travel times comparable to rail
  - Provide a travel experience comparable to rail
Bus Rapid Transit Components

- Running Ways
- Stations
- Vehicles
- Fare Collection
- Intelligent Transportation System
- Service & Operating Plans
- Branding Elements

Running Ways

- Critical to determining speed/reliability
- Often most costly feature of BRT system
- On-Street running way types:

  - Balance of BRT and general purpose traffic priority
Running Way Types

- Side-running
  Boston Silver Line
- Center Running
  Rouen, France
- Dedicated Busway
  Ottawa, Canada

Running Way Features

- Running way markings distinguish running way
- Signs & Pavement Markings
- Raised Lane Delineators
- Pavement Color & Material
- Running way guidance: higher speeds, precision docking
- Curb Guidance
- Optical Guidance
Running Way Features

Lane Delineators  Pavement Markings and Material

Station Examples

Orlando Lymmo  Los Angeles
Station Examples

Boston Silver Line

Brisbane, Australia

York, Ontario

Vehicles

- Symbol of the system
- Impacts to speed, capacity, environment, and comfort

Conventional Standard

Stylized Standard

Conventional Articulated

Stylized Articulated (partial low-floor)

Stylized Articulated (full low-floor)
Vehicles

York, Ontario

Las Vegas

Fare Collection

- Objective is to expedite boarding
- Implications for planning, operations, revenue and ridership

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<th>System</th>
<th>Advantages</th>
<th>Constraints</th>
<th>Boarding Speed</th>
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<tr>
<td>On-Board Driver-Validated</td>
<td>Lower cost; no infrastructure outside vehicle</td>
<td>Increased dwell times</td>
<td>★</td>
</tr>
<tr>
<td>On-Board Conductor-Validated</td>
<td>Quicker boarding; all passengers checked</td>
<td>Higher labor requirements</td>
<td>★★★★</td>
</tr>
<tr>
<td>Off-Board Proof-of-Payment</td>
<td>Multi-door boarding; common to light rail systems</td>
<td>Risk of fare evasion; fare inspector required</td>
<td>★★★★</td>
</tr>
<tr>
<td>Off-Board Barrier System</td>
<td>Multi-door boarding; no fare inspectors required</td>
<td>Intensive infrastructure costs at stations</td>
<td>★★★★</td>
</tr>
</tbody>
</table>
Intelligent Transportation System

- **Transit Signal Priority (TSP)**
  - Critical ITS technology
  - Reliability
  - Efficiency
  - Safety
- Two common types: early green & green extension
- TSP ≠ Signal Preemption
- FTA requires signal timing optimization for BRT

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Branding

- Communicates BRT system attributes and performance
- Reinforce impression of premium service

Orlando Lymmo

VIVA Ontario
These 4D’s represent the major community planning principles of transit supportive development.

Click on each topic for more information:

- **Distinguishing Station Typology**
  - Is the most important of the 4-D’s. This process ensures that the appropriate station type is selected for each station area using criteria based on development potential, land use, and transit facilities.

- **Density**
  - Of use must be compatible to the local station area. Ensuring proper development densities within the station area supports transit ridership, and reduces parking.

- **Design Aesthetics**
  - Are an important factor in creating a sense of place within the station area. Good design aesthetics will contribute to a vibrant, safe, and attractive station environment.

- **Diversity of Uses**
  - Within the station area helps create an exciting destination that offers a wide variety of services and amenities.

Following are important DENSITY considerations for transit supportive development:

- The FTA uses population density as a measure of TSD feasibility and considers low density to be below 3,333 people per square mile (2 dwellings per acre).

- Most locations fall below the density threshold.

- Increased density directly correlates with increased transit ridership.

- Good TSD should offer easily accessible critical services in order to help reduce automobile dependence.
4 D's of Transit Supportive Development:

**Density**

- Using structured parking increases density by increasing the availability of developable land.
- Compact building design and infill development strategies are both ways to help increase density.
- Highest density development should be placed nearest transit stations.

**Design Aesthetics**

Some AESTHETIC treatment considerations for TSD are:

- Use well crafted design guidelines and building standards to create a unique sense of place.
- Scale the size and variety of the development to fit the needs of the local community.
- Define community character with coordinated visual treatments like:
  - Streetscape elements unique to the development
  - Unique street signage
  - Way finding elements designed specifically for the TSD
  - Landscape treatments unique to the TSD
  - Varied architectural style and building height
  - Unique entry monuments
4 D's of Transit Supportive Development: Design Aesthetics

- Create prototypical design examples to exhibit the desired community look.

- Provide for easy pedestrian access by considering the following:
  - A network of interconnected trails and pathways
  - Place storefront development close to the street
  - Reduce required walking distances by providing direct pedestrian shortcuts throughout the development
  - Match the building scale to suit the pedestrian environment

- Reduce the impacts of automobile traffic by considering the following:
  - Limit or eliminate off-street parking
  - Place off-street parking facilities behind buildings and at the edges of the community
  - Provide structured parking facilities instead of surface parking
  - Limit automobile access to the outer edges of the development
  - Include traffic calming devices along street corridors

Station aesthetics are an integral part of the TSD design process
Graphic source: HNTB

Multi-use pathways help enhance pedestrian access and aesthetic quality
Photo source: Nashville.gov

Good TSD design provides a vibrant, well lit atmosphere
Photo source: transitgallery.com

Building color, texture, and spacing are all important aesthetic considerations
Photo source: wikimedia.org
### 4 D's of Transit Supportive Development: Diversity of Uses

<table>
<thead>
<tr>
<th>Project Introduction</th>
<th>4 D's of TSD Homes</th>
<th>Diverse Typology</th>
<th>Density</th>
<th>Design Aesthetics</th>
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#### Some key points to consider when thinking about DIVERSITY OF USES in TSD:

- **Mixed-use development** is a major factor in creating a vibrant, active community that will have transit supportive population density.

- Successful TSD often has an established employment base located within close proximity to the transit station.

- For a wider variety of options, uses should be mixed within the same building and between adjacent sites.

#### Diverse uses promote activity and support transit ridership.

- **TSD should include a wide range of housing choices including:**
  - Small lot single-family
  - Multi-family
  - Town homes
  - Lofts above commercial and retail uses
  - Multi-story apartments
  - Affordable housing options

#### Land use Policy Tools

- **Public**
- **Commercial**
- **Residential**
- **Office/employment**
- **Entertainment**
- **Retail**
- **Open space**

- Small lot single-family
- Multi-family
- Town homes
- Lofts above commercial and retail uses
- Multi-story apartments
- Affordable housing options

Source: HNTB Corporation

Source: Trimet
Mixed-use design should consider the inclusion of public uses, examples include:
- Post office
- Courthouse
- Community center(s)
- Police station(s)
- Fire house(s)
- Government center

4 D's of Transit Supportive Development:
- Diversity of Uses

Diversity of Uses
- Mixed use development provides a wide variety of choices for residents and commuters alike
- Mixed uses, including open spaces, help establish a vibrant and active T.S.D. community

4 D's of Transit Supportive Development:
- Distinguish Typology

How does STATION TYPOLOGY facilitate the TSD design process?
- "One size doesn’t fit all"
- Typology provides a framework for conceptual, regional level planning.
- Typology provides a framework for determining appropriate design and development standards.
- Typology provides a framework from which to embark on more detailed station area planning.
- Typology facilitates the evaluation of transit impacts on existing development patterns and future land use.
Distinguish Typology: 5 Station Area Types

More Employment Oriented Station Types
- **Downtown Stations**: Downtown Stations are generally located in major employment and cultural centers. Downtown Stations are typically supported by high-density mixed-use development, including retail and entertainment uses, major office and commercial development, and innovation to high-density housing development.

- **Destination Stations**: Destination Stations are generally located in regional employment areas, potentially near special use areas, airports, stadiums, and convention centers. Destination stations are typically supported by moderate-density mixed-use development, including retail and entertainment uses, office and commercial development, and moderate-to-high-density housing development. These stations may also take the form of a "campus" that is transformed by a reconfiguration of urban or suburban non-residential, non-residential uses, such as a cluster of education, corporate, environmental, and institutional uses with adjacent housing.

- **Sub-Regional Center Stations**: Sub-Regional Center Stations are smaller than Downtown Stations and are typically supported by medium-to-high density mixed-use development including retail and entertainment uses, major office and commercial development, and surrounded by moderate-density residential development. This station type may serve a cultural orientation offering a concentration of arts, cultural, and hospitality.

More Residential Oriented Station Types
- **Community Stations**: Community Stations are typically supported by moderate-to-high density residential projects. Uses include mixed-use development with retail and entertainment uses, major office and commercial development, and moderate-density residential development.

- **Neighborhood Stations**: Neighborhood Stations are generally located in residential communities. These stations typically include single-family housing supported by low-to-moderate density mixed-use development including live-work units.

For Discussion
“Next Steps” for Route 1 Corridor

- **Prepare for the Future**: Develop a vision for Rt. 1 Corridor
  - Land use analysis
  - Pedestrian oriented destination
  - Transit vs. auto oriented
  - Redevelopment potential
  - Conduct feasibility analysis to determine the potential for implementing light rail or extending metro south in the Rt. 1 Corridor in the 2025 - 2030+ timeframe

- **Immediately implement Bus Rapid Transit by dedicating travel lane between Huntington Metro Station and Ft. Belvoir and improve pedestrian environment**
  - pursue "Small Starts" or “Very Small Starts” federal funding
  - advance without pursuing federal funding
  - Conceptual engineering and design
  - Conduct bike and pedestrian connectivity analysis
  - Traffic impact analysis
  - Develop capital and O&M cost
  - Land-use analysis
  - Ridership projections
  - User benefit

- **Immediately improve PRTC service between Quantico and Ft. Belvoir**
  - Expand Route 1 OmniLink Service to Ft. Belvoir
  - Expand OmniRide from 1 to 4 buses as residential development increases

  Local Decision Required
Discussion