Gainesville-Haymarket Extension (GHX)

VRE Operations
Board Work Session
July 15, 2016
GHX Project Overview

Contingent upon Norfolk Southern approval and funding availability.

Schedule as of June 2016
Selecting a Preferred Alternative

<table>
<thead>
<tr>
<th>Spring 2016</th>
<th>Summer-Fall 2016</th>
<th>Summer 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INITIAL ALTERNATIVES</strong></td>
<td><strong>REFINED ALTERNATIVES</strong></td>
<td><strong>PREFERRED ALTERNATIVE</strong></td>
</tr>
<tr>
<td>• Preliminary planning analysis conducted</td>
<td>• More detailed engineering and technical evaluation</td>
<td>• Evaluate small set of alternatives through NEPA process</td>
</tr>
<tr>
<td>• Results shared at committee and community meetings</td>
<td>• Incorporate stakeholder input</td>
<td>• Seek committee and community feedback</td>
</tr>
<tr>
<td></td>
<td>• Identify most viable alternative(s)</td>
<td>• Selection of Preferred Alternative by VRE Ops. Board, Prince William Co., Norfolk Southern</td>
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</tbody>
</table>

VIRGINIA RAILWAY EXPRESS
Gainesville-Haymarket Extension
Strategic Direction

Follow Natural Growth profile to run longer trains

Continue to pursue funding for System Plan 2040 service concepts

- Additional peak trains
- Reverse peak and off-peak service
- Gainesville Haymarket Extension
## Analysis Progress Timeline

<table>
<thead>
<tr>
<th></th>
<th>July 2016</th>
<th>Fall 2016</th>
<th>Summer 2017</th>
<th>Winter 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Railroad</td>
<td><img src="image1" alt="Graph" /></td>
<td><img src="image2" alt="Graph" /></td>
<td><img src="image3" alt="Graph" /></td>
<td><img src="image4" alt="Graph" /></td>
</tr>
<tr>
<td>Environmental effects</td>
<td><img src="image5" alt="Graph" /></td>
<td><img src="image6" alt="Graph" /></td>
<td><img src="image7" alt="Graph" /></td>
<td><img src="image8" alt="Graph" /></td>
</tr>
<tr>
<td>Costs/Benefits</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ridership</td>
<td><img src="image9" alt="Graph" /></td>
<td><img src="image10" alt="Graph" /></td>
<td><img src="image11" alt="Graph" /></td>
<td><img src="image12" alt="Graph" /></td>
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<tr>
<td>Economic benefits</td>
<td><img src="image13" alt="Graph" /></td>
<td><img src="image14" alt="Graph" /></td>
<td><img src="image15" alt="Graph" /></td>
<td><img src="image16" alt="Graph" /></td>
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<tr>
<td>Cost estimates</td>
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<td><img src="image18" alt="Graph" /></td>
<td><img src="image19" alt="Graph" /></td>
<td><img src="image20" alt="Graph" /></td>
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<tr>
<td>Funding Plan</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital (HB2, NVTA, FTA)</td>
<td><img src="image21" alt="Graph" /></td>
<td><img src="image22" alt="Graph" /></td>
<td><img src="image23" alt="Graph" /></td>
<td><img src="image24" alt="Graph" /></td>
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<tr>
<td>Operating</td>
<td><img src="image25" alt="Graph" /></td>
<td><img src="image26" alt="Graph" /></td>
<td><img src="image27" alt="Graph" /></td>
<td><img src="image28" alt="Graph" /></td>
</tr>
<tr>
<td>(General Assembly)</td>
<td></td>
<td></td>
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</tbody>
</table>
GHX Project Goals

1. Add capacity to the I-66 corridor
2. Accommodate current and future freight operations
3. Provide cost-effective and reliable mobility options
4. Enhance service on existing line for current and future riders
5. Support local and regional economic development and plans
# Service Plans

## Existing Service
(16 trains per day)

## Enhanced Service Options:
6 additional daily trains (22 Trains Per Day)

**Allowed under current railroad operating agreements**

### Extension to Haymarket
- Realigns Manassas Line to Haymarket terminus
- Eliminates Broad Run station

### Broad Run Terminus
- Relocates Broad Run station
- No Extension

### Extension & Broad Run
- Operationally undesirable
- Reduces service frequency at end-of-line stations

### Extension + Off-Peak Shuttle
- Off-peak ridership 10-15% of peak commute potential
- Greater operating cost and infrastructure required
Station Sites for Detailed Analysis
Yard Sites for Detailed Analysis

<table>
<thead>
<tr>
<th>Conflict with freight and other VRE trains</th>
<th>Haymarket</th>
<th>Broad Run</th>
<th>Storage at Haymarket / Maintenance at Broad Run</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>High</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td>Annual Deadhead Cost</td>
<td>$2.9 M</td>
<td>$17.0 M</td>
<td>$4.8 M</td>
</tr>
<tr>
<td>Capital Cost</td>
<td>$91 M</td>
<td>$45 M</td>
<td>$70 M</td>
</tr>
<tr>
<td>Net Present Value of Costs</td>
<td>$193 M</td>
<td>$1,120 M</td>
<td>$312 M</td>
</tr>
</tbody>
</table>

DRAFT results based on analysis through 7/14/16
Ridership Forecasts

Expanded Manassas Line service attracts:
+5,600 additional VRE riders by 2040 with Extension
+4,900 additional riders with Broad Run terminus

Existing Service (16 trains) | Extension (22 trains) | Broad Run Terminus (22 trains) | System Plan 2040 (44 trains)

9,100 | 14,700 | 14,000 | 25,400

GHX Stations | Total Manassas Line (2025) | Total Manassas Line (2040)

Source: VRE/MWCOG Travel Demand Model, DRAFT results as of 7/14/16
Potential Ridership (2040)

Ridership could increase with coordinated I-66 express bus service, concentrated land use around new VRE stations, and improved VRE travel time.

- **Existing Service**: 9,100 (16 trains)
- **Extension**: 18,300+ (22 trains)
- **Broad Run Terminus**: 16,500+ (22 trains)
- **System Plan 2040**: 25,400 (44 trains)

Source: VRE/MWCOG Travel Demand Model, DRAFT results as of 7/14/16
Congestion Relief
Reduction in Vehicles Miles Traveled

-70,000 -60,000 -50,000 -40,000 -30,000 -20,000 -10,000 0 10,000

Daily Vehicle Miles Traveled (2025)

Fewer cars in the I-66 Corridor

Fewer cars on Local Roads

More cars on Local Roads

Source: VRE/MWCOG Travel Demand Model, DRAFT results as of 7/14/16
Extension Closer to Current and Future Riders

**Average drive to GHX stations:**
5 miles

**43% of County population growth focused along extension**

**Average drive to Broad Run Station:**
8 miles
Land Use and Economic Development Potential

Lorton Station Area

Potential Visual Density around proposed VRE stations

Source: LHB Communications, Inc.
Source: Bignell Watkins Hasser Architects
Source: Condo.com
Source: Thecosmopolitanlorton.com
Case Study: Lorton and Leeland Road Stations

VRE stations contribute to more focused growth

- Supports greater tax revenues
- Minimizes sprawl and conserves open space
# Effects on Existing Manassas Line Stations

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>% Manassas Line Riders</th>
<th>Existing Service 16 Trains</th>
<th>Extension 22 Trains (2040)</th>
<th>Broad Run 22 Trains (2040)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fairfax</td>
<td></td>
<td>36%</td>
<td>43%</td>
<td>46%</td>
</tr>
<tr>
<td>Prince William</td>
<td></td>
<td>39%</td>
<td>39%</td>
<td>33%</td>
</tr>
<tr>
<td>Manassas</td>
<td></td>
<td>9%</td>
<td>9%</td>
<td>9%</td>
</tr>
<tr>
<td>Manassas Park</td>
<td></td>
<td>6%</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>Loudoun</td>
<td>&lt;0%</td>
<td>1%</td>
<td>&lt;0%</td>
<td></td>
</tr>
<tr>
<td>Fauquier</td>
<td></td>
<td>5%</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>Other Jurisdictions</td>
<td></td>
<td>4%</td>
<td>0%</td>
<td>1%</td>
</tr>
</tbody>
</table>

100% 100% 100%

*Existing Service results from October 7, 2015 Master Agreement Survey*

*Extension and Broad Run rider distribution estimated based on VRE/MWCOG Travel Demand Model DRAFT results as of 7/14/16*
Effects on Existing Manassas Line Stations

Extension 22 Trains (2025)

Train by Arrival Time at Union Station

Train Capacity
Estimated Riders Boarding in Fairfax County
Estimated AM Peak Load Point (between Backlick and Alexandria Stations)

Broad Run 22 Trains (2025)

Train by Arrival Time at Union Station

Train Capacity
Estimated Riders Boarding in Fairfax County
Estimated AM Peak Load Point (between Backlick and Alexandria Stations)
Track Arrangement

- Norfolk Southern B-Line (Existing single track)
- Additional tracks needed to accommodate VRE service and growth in freight traffic
# Summary of Initial Cost Estimates

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing Service</td>
<td>16</td>
<td>$29 M</td>
<td>$43 M</td>
</tr>
<tr>
<td>Broad Run Terminus</td>
<td>22</td>
<td>+ $7 M</td>
<td>$206 M</td>
</tr>
<tr>
<td>Haymarket Extension</td>
<td>22</td>
<td>+ $16 M</td>
<td>$510 – $650 M</td>
</tr>
</tbody>
</table>

DRAFT results based on analysis through 7/14/16

1. Operating costs based on VRE FY15 average cost per train mile
2. Parking expansion to address current shortfalls at Broad Run and Manassas Park Stations; Broad Run complex configuration constrains future Manassas Line growth
## Capital Costs Detail

<table>
<thead>
<tr>
<th></th>
<th>Extension Cost (2016$)</th>
<th>Broad Run Cost (2016$)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Each station includes 2 platforms, park and ride and land acquisition</td>
<td>$96 M</td>
<td>$33 M</td>
</tr>
<tr>
<td><strong>Equipment Storage and Maintenance Facility</strong></td>
<td>$91 M</td>
<td>$29 M</td>
</tr>
<tr>
<td><strong>Railroad Right-of-Way (ROW)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Est. 60 feet to preserve 120 foot ROW for long-term shared use</td>
<td>$27 M</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Additional Track</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction of one additional B-Line track</td>
<td>$137 M</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Rolling Stock</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diesel locomotives, coaches, cab cars incl. spares</td>
<td>$159 M</td>
<td>$144 M</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$510 M</td>
<td>$206 M</td>
</tr>
</tbody>
</table>

DRAFT results based on analysis through 7/14/16
## Cost Effectiveness

<table>
<thead>
<tr>
<th></th>
<th>Existing Service</th>
<th>Extension</th>
<th>Broad Run</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue Trains</td>
<td>16</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Daily Riders</td>
<td>8,500</td>
<td>13,200</td>
<td>12,700</td>
</tr>
<tr>
<td>Annual Operating Cost ($1000)</td>
<td>$29,000</td>
<td>$45,000</td>
<td>$36,000</td>
</tr>
<tr>
<td>Annualized Capital Cost ($1000)</td>
<td>$16,600</td>
<td>$11,000</td>
<td></td>
</tr>
<tr>
<td>Operating Cost/Rider ($)</td>
<td>$14</td>
<td>$14</td>
<td>$11</td>
</tr>
<tr>
<td>Total Cost/Rider</td>
<td>$19</td>
<td></td>
<td>$14</td>
</tr>
<tr>
<td>Incremental Operating Cost Per Incremental Rider</td>
<td>$14</td>
<td>$7</td>
<td></td>
</tr>
<tr>
<td>Incremental Total Cost per Incremental Rider</td>
<td>$28</td>
<td>$17</td>
<td></td>
</tr>
</tbody>
</table>

DRAFT results based on analysis through 7/14/16

1. Projections based on VRE Travel Demand Model 2015; MWCOG Round 8.4 Cooperative Land Use Forecasts
2. Operating costs based on VRE FY15 average cost per train mile
Capital Funding Sources

- Pending funding applications
  - SmartScale FY 22-23 program
  - NVTA (70%) FY18-23 program
  - DRPT REF/capital formula for FY18
- Federal CIG under investigation
- Other possible funding sources
  - NVTA (30%)
  - Proffers/joint development
  - Local bond funds
  - TIF/TID/value capture
  - CMAQ/RSTP
  - TIGER
  - FAST Act freight grant programs
  - FRA safety grant program
  - TIFIA/RRIF loan programs
Operating Funding Sources

- Minimum 50% fare recovery
- New revenue source(s) required for future operations + extension
- Possible sources
  - Dedicated funding (state)
  - NVTA (30%)
  - TIF/TID/value capture
Next Steps

Continue to refine analysis

- Ridership
- Capital/operating cost estimate
- Economic benefits
- Stakeholder engagement
- Railroad negotiation
- Initiate NEPA
Questions