VIRGINIA RAILWAY EXPRESS
CRYSTAL CITY STATION IMPROVEMENTS

Community Meetings
June 7, 2017
TODAY’S MEETING

- Present evaluation of the refined options
- Key questions for which we want your input:
  1. Do you agree with the evaluation factors?
  2. Do you agree with the overall evaluation results/rankings?
  3. Any other comments?
- Next Steps
PROJECT TIMELINE

**IDENTIFY OPTIONS**
- Technical Working Group
- VRE / NVTC / PRTC / County Board Briefings
- Community Meetings

**OUTCOMES**
- Range of station locations to be evaluated has been identified
- Framework for making decisions has been prepared

**EVALUATE OPTIONS**
- MARCH 30, 2017

**OUTCOMES**
- Preferred station location determined and process documented

**DEVELOP CONCEPT DESIGN**
- JUNE 7, 2017

**OUTCOMES**
- General design of station
- Environmental disciplines to be evaluated have been identified
- Costs, schedule, and next steps determined

**WINTER 2016 – EARLY SPRING 2017**
- LATE SPRING 2017
- SUMMER 2017

**FISCAL YEAR 18**
- FUTURE

PRELIMINARY ENGINEERING ENVIRONMENTAL DOCUMENTATION

FINAL DESIGN CONSTRUCTION
CRYSTAL CITY STATION — DESIGN OBJECTIVES

- New island platform between Tracks 2 & 3
  - Serve 8-10 cars
  - Two grade-separated access points
- Assume a 4-track environment
- Stay within existing rail right-of-way
- Enhance local & regional connectivity
  - Metrorail, Metroway, Buses, Shuttles
  - Bicycle and walk access
- Support Crystal City’s vision for growth
- Build a sustaining relationship with the community
REFINEMENTS TO PROPOSED OPTIONS
OPTION 1A

Crystal Drive
Capital Bikeshare Station

Elevator
Demolish Existing Platform

Stairs
Bridge

Proper Platform

Existing Culvert

Tunnel
Ramp

CSX Siding Track
Track 3
Track 2
Track 1
Future Track 0

George Washington Memorial Parkway

VIRGINIA RAILWAY EXPRESS
OPTION 1A: SOUTH ACCESS – BIRD’S EYE VIEW
OPTION 1A: SOUTH ACCESS – FROM CRYSTAL DRIVE
OPTION 1B
OPTION 1B: SOUTH ACCESS – BIRD’S EYE VIEW
OPTION 1B: SOUTH ACCESS – FROM CRYSTAL DRIVE
OPTION 2

Existing Bicycle/Pedestrian Underpass

Crystal City Water Park

Proposed New Metrorail Entrance

Crystal Drive

20th St S

18th St S

Metroway Stop

Capital Bikeshare Station

Elevator

Stairs

Bridge

Proposed Platform

Ramp

Tunnel

George Washington Memorial Parkway

VIRGINIA RAILWAY EXPRESS
OPTION 2: SOUTH ACCESS – BIRD’S EYE VIEW
OPTION 2: SOUTH ACCESS – FROM CRYSTAL DRIVE
OPTION 3: NORTH ACCESS – BIRD’S EYE VIEW
OPTION 3: SOUTH ACCESS – BIRD’S EYE VIEW
EVALUATION AND RANKING
MAJOR EVALUATION FACTORS

- Local transportation connections
  (Bicycle and walk access)

- Regional transportation connections
  (Metrorail, Metroway, Buses, Shuttles)

- Land use connections
  (Proximity to existing and future destinations incl. offices, airport)

- Major cost elements
  (Bridges, Tunnels, Track reconstructions)

- Community and environmental impacts and benefits
  (Visual Impact, Natural Resources)

Factors as presented on March 30, 2017
VIRGINIA RAILWAY EXPRESS
## EVALUATION FACTORS AND MEASURES

<table>
<thead>
<tr>
<th>EVALUATION FACTOR</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Transportation Connections</td>
<td>Proximity to jobs, residences, and bicycle network</td>
</tr>
<tr>
<td>Regional Transportation Connections</td>
<td>Proximity to Metrorail and Metroway</td>
</tr>
<tr>
<td>Community and Environmental Impacts</td>
<td>Changes to Existing Conditions (Built and Natural environment)</td>
</tr>
<tr>
<td>Major Cost Elements</td>
<td>Anticipated cost relative to other options</td>
</tr>
</tbody>
</table>
CRYSTAL CITY STATION — TRIP DESTINATIONS

VRE Trip Destinations
VRE Crystal City Station
Other VRE Stations
WMATA Metrorail Stations

Source: 2016 Virginia Railway Express Master Agreement Survey Destinations
## LOCAL TRANSPORTATION CONNECTIONS

*Proximity To Jobs, Residences, And Bicycle Network*

<table>
<thead>
<tr>
<th>MEASURE</th>
<th>OPTION 1</th>
<th>OPTION 2</th>
<th>OPTION 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jobs within 1/2 mile from center of platform</td>
<td>10,760 jobs</td>
<td>18,460 jobs</td>
<td>17,000 jobs</td>
</tr>
<tr>
<td><em>(American Community Survey 2015)</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VRE rider destinations within 1/2 mile from platform center</td>
<td>530 VRE riders</td>
<td>555 VRE riders</td>
<td>530 VRE riders</td>
</tr>
<tr>
<td><em>(VRE 2016 rider survey)</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residents within 1/2 mile from center of platform</td>
<td>8,670 residents</td>
<td>6,960 residents</td>
<td>7,620 residents</td>
</tr>
<tr>
<td><em>(American Community Survey 2015)</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance to bicycle network from closest point on station platform</td>
<td>240 feet</td>
<td>420 feet</td>
<td>450 feet</td>
</tr>
<tr>
<td>using local street network</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| SUMMARY RATING                                                         | ○                             | ●                             | ◆                             |

VIRGINIA RAILWAY EXPRESS
## REGIONAL TRANSPORTATION CONNECTIONS

*Proximity To Metrorail and Metroway*

<table>
<thead>
<tr>
<th>MEASURE</th>
<th>OPTION 1</th>
<th>OPTION 2</th>
<th>OPTION 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance to existing Metrorail station entry from closest point on platform, using local street network</td>
<td>1,470 feet (6 min)</td>
<td>1,330 feet (5 min)</td>
<td>2,350 feet (9 min)</td>
</tr>
<tr>
<td>Distance to expected new Metrorail station entry from closest point on platform, using local street network</td>
<td>860 feet (3 min)</td>
<td>750 feet (3 min)</td>
<td>1,780 feet (7 min)</td>
</tr>
<tr>
<td>Number of street crossings to Metrorail station</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Distance to Metroway station from closest point on platform, using local street network</td>
<td>700 feet to 18th St stop</td>
<td>580 feet to 18th St stop</td>
<td>530 feet to 23rd St stop</td>
</tr>
</tbody>
</table>

**SUMMARY RATING**

- ![Green Circle] (Option 1)
- ![Green Circle] (Option 2)
- ![Red Circle] (Option 3)
## COMMUNITY & ENVIRONMENTAL IMPACTS

*Changes to Existing Conditions (Built & Natural Environment)*

<table>
<thead>
<tr>
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<th>OPTION 2</th>
<th>OPTION 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise and Vibration impacts to sensitive receptors</td>
<td>Station is located in a noisy environment.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Horn sounding locations would move relative to platform location.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Changes in noise conditions are not significant based on FTA guidance.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vibration levels were below the FTA criterion for interior residential use.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Property acquisition impacts to residential property</td>
<td>No acquisition of residential property needed.</td>
<td>Access easements will be required. South access of Option 1 uses existing easement.</td>
<td></td>
</tr>
<tr>
<td>Impacts to Historic, Cultural, and/or Recreational resources</td>
<td>No direct impacts to George Washington Memorial Parkway.</td>
<td>North access to Option 1 may impact the edge of Gateway Park. South access to Option 1 may impact Water Park. North access to Option 2 may impact Water Park and is adjacent to the Mount Vernon connector trail.</td>
<td>No Section 4(f) properties identified.</td>
</tr>
<tr>
<td>Impacts to EJ populations</td>
<td>None. No environmental justice (EJ) populations identified in study area.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visual Resources</td>
<td>Visual analysis likely required during NEPA because of proximity to George Washington Memorial Parkway and Mount Vernon Trail.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water resources &amp; floodplains</td>
<td>None. No sensitive water resources or floodplains identified in study area.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SUMMARY RATING**

- Option 1
- Option 2
- Option 3
- Option 4
NOISE & VIBRATION MEASUREMENT

- **Long term (24-hour) noise measurements**
  - Evaluated contributions from all sources (CSX, VRE, and Amtrak trains, DCA flights, & GW Parkway)
  - Near existing station at 1501 Crystal Dr. and on 11th flr balcony of 1805 Crystal Dr.

- **Short-term (30 - 60 min) measurements**
  - Evaluated noise due to VRE train operations (constant-speed pass-bys, horn soundings)
  - In parks and open areas

- **Ground-borne vibration measurements of trains at 45 mph at 1805 Crystal Dr.**
EXISTING NOISE MEASUREMENT NEAR THE STATION

- Noise at residences is evaluated using 24-hour day-night average noise levels (Ldn) accounting for:
  - how loud noise events are
  - how long noise events last
  - how many events occur during day
  - how many events occur during night (10 dB penalty)

- Overall Noise Levels = 76 dBA

- Contribution by source near existing station:
  - VRE Northbound = 71 dBA
  - VRE Southbound = 54 dBA
  - CSX Trains = 74 dBA
  - Amtrak = 54 dBA
  - DCA Airport ~ 60 dBA

- Contributors:
  - Morning VRE horn soundings prior to departing station
  - Night-time CSX operations
NOISE ASSESSMENT - COMPARING OPTIONS

- FTA assesses noise impact by comparing existing and future noise levels
- Changes in noise levels are not significant based on FTA guidance
- Changes in noise effects are primarily due to locations of horn soundings at different station locations

Source: FTA Transit Noise and Vibration Impact Assessment Manual (2006), table 3-2 (pg. 3-6)
FTA evaluates vibration as:
- Maximum vibration generated by the trains
- Change in vibration due to the proposed project

Vibration generally increases with train speed.

Vibration levels were a maximum of 65 VdB at the closest building exterior (i.e. below the FTA criterion of 72 VdB for interior residential use).

\[ VdB = \text{velocity in decibels} \]
VISUAL IMPACT ASSESSMENT

OPTION 1: SOUTH ACCESS – FROM GW MEMORIAL PARKWAY
NOTE: Red shaded area shows the general location of the pedestrian bridge and is not visible from the GW Memorial Parkway.
VISUAL IMPACT ASSESSMENT

OPTION 2: SOUTH ACCESS – FROM GW MEMORIAL PARKWAY
VISUAL IMPACT ASSESSMENT

OPTION 2: SOUTH ACCESS – FROM GW MEMORIAL PARKWAY

NOTE: Red shaded area shows the general location of the pedestrian bridge and is not visible from the GW Memorial Parkway.
VISUAL IMPACT ASSESSMENT

OPTION 3: NORTH ACCESS – FROM GW MEMORIAL PARKWAY
NOTE: Red shaded area shows the general location of the pedestrian bridge and is not visible from the GW Memorial Parkway.
VISUAL IMPACT ASSESSMENT

OPTION 3: SOUTH ACCESS – FROM GW MEMORIAL PARKWAY

NOTE: Red shaded area shows the general location of the pedestrian bridge and is barely visible from the GW Memorial Parkway.
# MAJOR COST ELEMENTS

*Anticipated cost relative to other options*

<table>
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<th>OPTION 1</th>
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<tbody>
<tr>
<td>Length of track relocation</td>
<td>6,380 feet</td>
<td>10,300 feet</td>
<td>10,710 feet</td>
</tr>
<tr>
<td>Grade-separated Access to the local roadway network</td>
<td>North: Direct access over or under tracks (Assume: <strong>TUNNEL</strong>) South: Direct access over or under tracks (Assume: <strong>BRIDGE</strong>)</td>
<td>North: Direct access under tracks next to bike tunnel (Assume: <strong>TUNNEL</strong>) South: Access through building over or under tracks (Assume: <strong>BRIDGE</strong>)</td>
<td>North: Access through building over or under tracks (Assume: <strong>BRIDGE</strong>) South: Access through building over or under tracks (Assume: <strong>BRIDGE</strong>)</td>
</tr>
<tr>
<td>Construction Sequencing</td>
<td>Build Track 0; Throw Tracks 1, 2; Build Station with Track 3 out of service; Throw Track 3</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Impacts to Railroad Infrastructure</td>
<td>CSX Siding Track; Electric Lock Turnout Relocation;</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>No. of Culverts</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>SUMMARY RATING</strong></td>
<td>●</td>
<td>●</td>
<td>○</td>
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# OTHER BENEFITS (NOT RANKED)

*Economic Development and Land Use*

<table>
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<tr>
<td>Fits within Crystal City Sector Plan</td>
<td>Moderate fit</td>
<td>Best fit</td>
<td>Moderate fit</td>
</tr>
<tr>
<td>Distance to Reagan National Airport</td>
<td>1,960 feet</td>
<td>1,030 feet</td>
<td>940 feet</td>
</tr>
<tr>
<td>Potential development within 1/2 mile</td>
<td>32 million SF Mix of office,</td>
<td>35 million SF Mix of office,</td>
<td>32 million SF. Mix of office,</td>
</tr>
<tr>
<td></td>
<td>residential, hotel, and retail</td>
<td>residential, hotel, and retail.</td>
<td>residential, hotel, and retail.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Slightly greater (~10%) potential</td>
<td></td>
</tr>
</tbody>
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## SUMMARY OF RANKINGS

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<td>○</td>
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<td>☆</td>
<td>☆</td>
<td>☆</td>
</tr>
<tr>
<td>Major Cost Elements</td>
<td>☆</td>
<td>▼</td>
<td>○</td>
</tr>
</tbody>
</table>

**OVERALL RATING**

Legend:
- ● High
- ▼ Medium
- ○ Low
NEXT STEPS
PUBLIC OUTREACH / NEXT STEPS

Pop-up Event at Station (March 29, 2017)

Public Meeting (March 30, 2017)

Your input is requested by email/mail by June 16, 2017:
Do you agree with the evaluation factors? Do you agree with the overall evaluation results/rankings? Any other comments?

June 16: VRE Operations Board Information Item
June 28: Arlington County Board Work Session on VRE Plans & Major Projects

Jul - Aug: Concept Design developed for a Single Station Location
Fall 2017: Preliminary Engineering & Environmental Documentation

VIRGINIA RAILWAY EXPRESS
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Email: SSONEJI@VRE.ORG

PROJECT WEBSITE
www.vre.org/development/crystal-city-station-improvements