



I-66 Inside the Beltway Bus on Shoulder Pilot Program

**Update To TPB Task Force
April 17, 2013**

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Presentation Overview

- **Pilot Program Overview**
- **Tasks For Working Group**
- **Preliminary Data Collection & Analysis**
- **Factors For Selecting Locations BOS**
- **Preliminary Locations**
- **I-66 BOS Pilot Program Implementation Plan**
- **I-66 BOS Pilot Program Evaluation Plan**
- **Next steps**

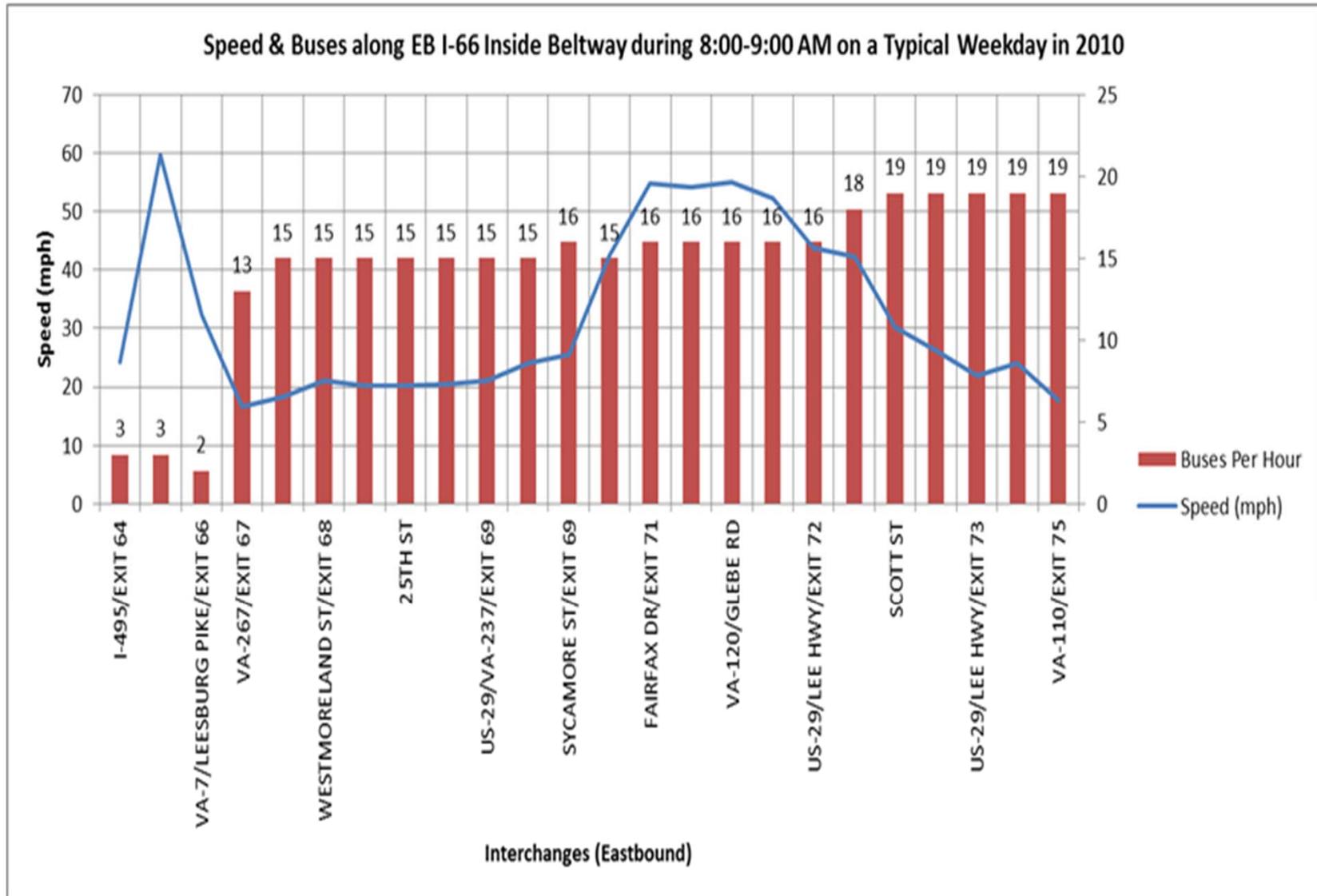
Pilot Program Overview

- **Impetus**
 - I-66 Inside the Beltway Multimodal Study
 - Low-cost, high impact, quick turn around congestion mitigation projects
- **Program Goals**
 - Successfully implement pilot
 - Develop Design and Operational protocol for BOS
 - Experience in Design, Operation, Safety, Maintenance, Costs
- **Working Group Products**
 - Operational & Design protocol
 - Rank and Recommend locations along I-66 (Inside the Beltway)
 - Transit services on BOS System
 - Monitoring & Evaluation plan
- **VDOT Follow up Actions**
 - Federal concurrence
 - Fund and Implement Engineering/Operational improvements
 - Implement pilot program

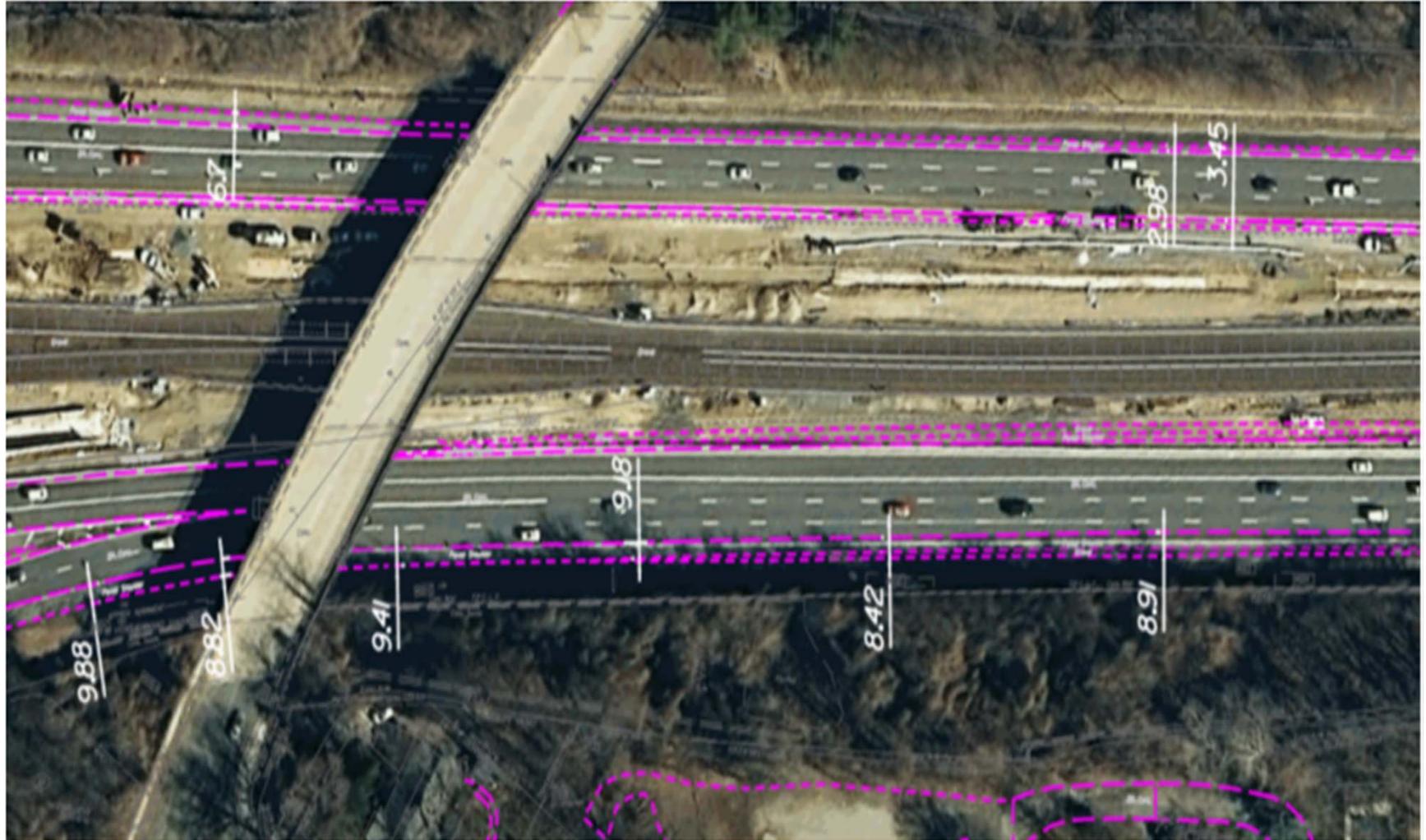
Working Group Tasks

- **Literature review – Completed**
 - To identify best practices related to implementation features, design, operations and safety experience
- **Baseline data collection and analysis – Completed**
(AM: 5:00- 11:00; PM: 1:00-8:00)
 - Speed data
 - Bus volume data
 - Right of way data
 - Geo technical data to determine shoulder strength
 - Incident data for the corridor
- **Definition of Problem / Opportunities – Completed**
 - Recurring congestion
 - Mainline speed < 35 mph
 - High volume of buses

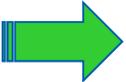
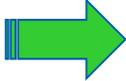
Operational Data Analysis For BOS Location - Example



Geometric Data Analysis For BOS Location - Example



Working Group Tasks (Continued)

- **Identify Potential Location For BOS – Working Completed** 
- **Operations Protocol – Completed**
 - Mainline operating speed <35 mph
 - Max bus operating speed on Shoulder < 25 mph
 - Minimum Shoulder Width > 11 feet with no lateral obstruction
11.5 feet with lateral obstruction
 - All day operations
 - Use limited to Public Transit Buses only
 - Shoulder strength adequate to support pilot for 2 year period
- **Develop Implementation Plan - Completed** 
- **Develop Evaluation Plan – Completed** 
- **Final Report – Working (Complete April 2013)**

Planning Cost Estimates- BOS Locations

Pilot One	
<i>Preliminary Engineering</i>	\$80,000
<i>Construction</i>	\$370,000 - \$470,000
TOTAL	\$450,000 - \$550,000

Pilot Two	
<i>Preliminary Engineering</i>	\$50,000
<i>Construction</i>	\$200,000 - \$300,000
TOTAL	\$250,000 - \$350,000

Pilot Three	
<i>Preliminary Engineering</i>	\$40,000
<i>Construction</i>	\$160,000 - \$260,000
TOTAL	\$200,000 - \$300,000

Pilot Four	
<i>Preliminary Engineering</i>	\$40,000
<i>Construction</i>	\$160,000 - \$260,000
TOTAL	\$200,000 - \$300,000

Pilot Five	
<i>Preliminary Engineering</i>	\$90,000
<i>Construction</i>	\$460,000 - \$560,000
TOTAL	\$550,000 - \$650,000

OVERALL COST PILOT
\$1,650,000 - \$2,150,000

COST ESTIMATES REFLECT WORK NEEDED:

At all locations:

- Signage
- Resurfacing and restriping
- Federal Action

At some locations:

- Drainage grates upgrade
- Junction boxes upgrade
- Shoulder widening and associated drainage improvements

Implementation Plan

- **VSP Coordination**
- **Funding**
 - For PE/Design – ongoing projects/on-call services/ Admin.
 - For Const., O&M – ongoing projects / annual O&M budget
- **Design**
 - Develop design plans – signing, pavement marking, ramp treatment, etc.
 - Design approval – VDOT and FHWA
- **Construction**
 - Roadway
 - Signage
- **Cooperative MOUs**
- **Communication**

Cooperative MOU Contents

- Conditions of use
 - When shoulder is available for use by buses
 - Not being used for enforcement / emergency response
 - Not blocked by broken down / stalled vehicle
 - Not required for snow removal operations
- Operations protocol
 - Only when mainline speeds are less than 35 mph
 - Maximum operating speed on shoulder 25 mph
- Driver training requirements (*see details*)
 - Transit agencies to provide driver training and document completion
- Data collection and reporting

Driver Training Elements*

Purpose of BOS program

- Conditions of use
- Operating protocol
- Speed and speed differential
- Yielding right-of-way
- Interchange areas
- Staying on paved shoulder
- Judging operating speeds of mainline traffic
- Signs, pavement markings
- Motoring public
- Specific information for bus drivers

Applicable statutes and enforcement

Communications

- Intra-agency
- Inter-agency
- Driver to motorist/driver courtesy
- Emergency communication

Pilot Location Elements

- Start and end points
- Interchange and/or intersection locations
- Shoulder widths
- Special attention locations
- Restricted locations

Additional Elements

- Agency-specific policies

Evaluation Plan

- Determine if continued BOS operations are warranted following the 12 month pilot
- Assist with feasibility, planning, design of near-term and long-term BOS locations
- Data collection should be continuous and reviewed each month during the pilot
- Completed three months prior to conclusion of pilot
- Collect bus ridership before pilot for before and after analysis
- Key data elements: shoulder usage by buses, safety, shoulder conditions, customer feedback *(see details)* 

Evaluation Plan: Shoulder Usage Data

- **Reported by transit operators (bus drivers)**
 - **Shoulder used (y/n)**
 - **Distance / time spent in BOS operation**
 - **Revenue or deadhead operation**
 - Bus passenger load for revenue operation
 - Schedule adherence
- **Customer feedback**

Evaluation Plan: Safety Data

- **Data sources: VDOT, VSP and first responders, transit operators (bus drivers)**
 - **VDOT SSP**
 - Number of assists at Pilot locations
 - **VSP data**
 - Number of crashes related to BOS
 - Track illegal use of shoulder by autos (“jealous motorists”)
 - Impedance to emergency operations due to BOS
 - **Transit Agencies**
 - Incidents that require buses operating in shoulder to merge back into traffic (incident nature, location, time)
 - **VDOT Maintenance**
 - Incidents of clearing shoulder debris (*impacts BOS operation*)

Evaluation Plan: Shoulder Conditions Data

- **Data source: VDOT NoVA Materials Section**
- **Conduct pavement assessment six months into pilot and then again at conclusion of pilot**
- **Cross-reference with data on shoulder usage to assess impact of BOS operation**



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QUESTIONS