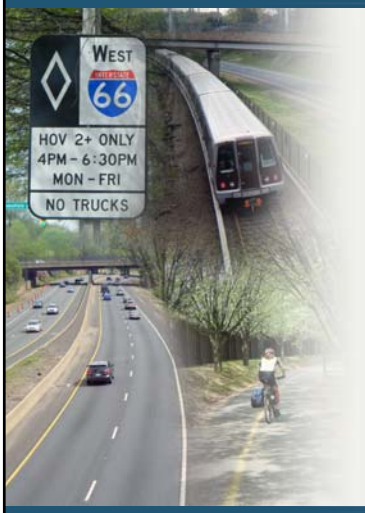
Study Overview
TPB Travel Forecasting Subcommittee



I-66 Multimodal Study Inside the Beltway

July 2012

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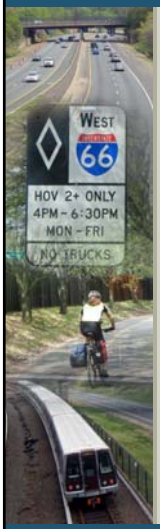
Transportation leadership you can trust.

Study Overview



TASK	Jul '11	Aug '11	Sep '11	Oct '11	Nov '11	Dec '11	Jan '12	Feb '12	Mar '12	Apr '12	May '12	Jun '12
Finalize Work Plan												
Identify Key Corridor Transportation Issues and Needs												
Develop Option Elements to Address Congestion, Reliability, and Mobility												
Commuter Survey to Solicit Feedback on Critical Issues and Needs												
Interviews with Elected Officials and Transportation Stakeholders												
Analyze and Evaluate Mobility Options to Develop Multimodal Packages												
Analyze and Evaluate Multimodal Packages												
Develop Recommendations for Enhanced Mobility on I-66												
Public Meetings												
Interim and Final Reports												

Public Meetings Report Delivered

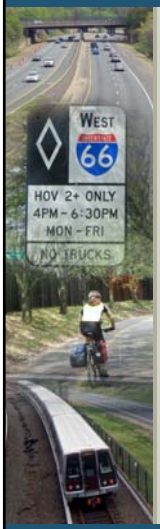
I-66 Multimodal Study Inside the Beltway

Study Overview

- **Extensive outreach/input component**
  - » **Commuter survey (i.e., market research)**
  - » **Stakeholder interviews and personal briefings**
  - » **Participating Agency Representatives Committee**
  - » **Local government committee briefings**
  - » **Public information open houses**
  - » **Periodic fact sheets**
  - » **Study phone line, web page, email**

I-66 Multimodal Study

Path to Recommendations



Mobility Option **Elements** → Mobility **Options** → Multimodal **Packages** → **Recommendations**

I-66 Multimodal Study

Baseline Assumptions for 2040

- **Financially Constrained Long-Range Plan (CLRP)**
  - I-66 restricted to Bus/HOV 3+ in the peak direction
  - I-66 westbound spot improvements #1, #2, #3
  - Same I-66 HOV hours of operation as today
  - Silver Line Phase I (to Wiehle Avenue) and Silver Line Phase II (to Dulles)
- **Metrorail core capacity improvements, including systemwide 8-car trains**
- **Plus, I-66 Transit/TDM study recommendations**
  - Priority Bus services on I-66, U.S. 29, and U.S. 50
  - Corridor-focused TDM strategies (e.g., support for rideshare program operation, teleworking, transit subsidies)

Multimodal Package Development

- **Some Mobility Option Elements were screened before the packages were developed:**
  - Metrorail expansion beyond core capacity improvements (WMATA determined additional tracks not needed before 2040)
  - Metrorail extension to Centreville (outside study area; benefits minimal inside the Beltway)
  - Light rail on U.S. 50 (supportive land use needed, bus on shoulder available as proxy)
  - VRE extension options (outside study area; being addressed in Tier 1 EIS)
- **VDOT elected to do a bus-on-shoulder pilot implementation outside of the study**

Multimodal Package Development

- **Four multimodal packages developed with significant transit and roadway elements**
- **All packages also include…**
  - » **Bicycle/pedestrian projects (on and off-road) to improve access to transit and bicycle connectivity**
  - » **Enhanced TDM strategies (near doubling over baseline)**
  - » **Integrated Corridor Management (ICM), including enhanced ramp metering, dynamic merge, speed harmonization, advanced transit parking management, multimodal real-time traveler information, and signal priority for transit vehicles**

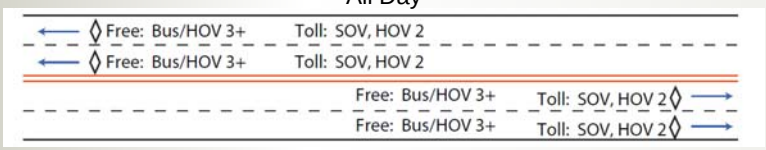
I-66 Multimodal Study

Multimodal Package #1

- SOV and HOV 2 vehicles would be tolled
- Bus/HOV 3+ vehicles would not be tolled
- Applies to all lanes in both directions 24/7

- **Convert existing I-66 to a Bus/HOV/HOT lane system**

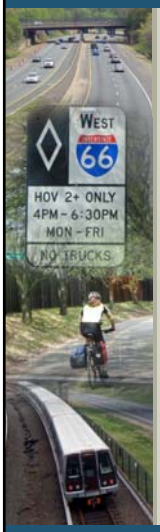
All Day



- » **Bus transit service enhancements include**
  - » **Route changes and additions for local, regional, and commuter bus; many increases feed rail stations**
  - » **New and enhanced Priority Bus services with 10-minute peak period frequency**
  - » **More than 20% additional bus seats at cutlines**

I-66 Multimodal Study

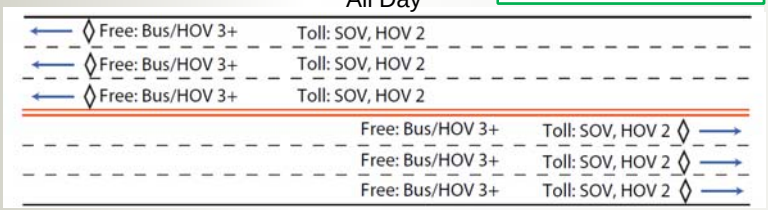
Multimodal Package #2



- SOV and HOV 2 vehicles would be tolled
- Bus/HOV 3+ vehicles would not be tolled
- Applies to all lanes in both directions 24/7

- **Convert I-66 to a Bus/HOV/HOT lane system and add a lane in each direction**

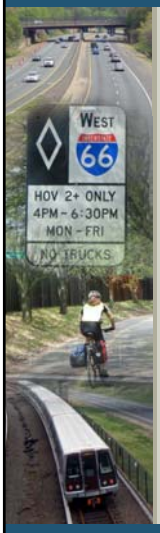
All Day



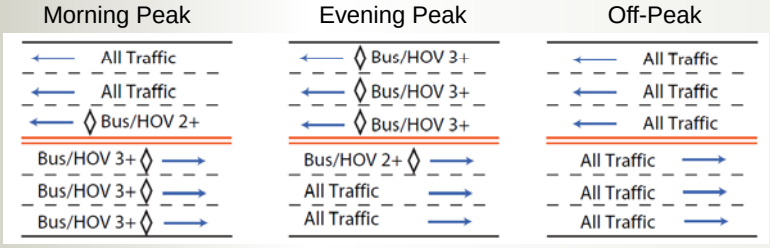
- **Bus transit service enhancements include**
  - **Route changes and additions for local, regional, and commuter bus; many increases feed rail stations**
  - **New and enhanced Priority Bus services with 10-minute peak period frequency**
  - **More than 20% additional bus seats at cutlines**

I-66 Multimodal Study

Multimodal Package #3



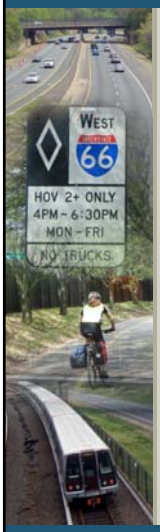
- **Add a Bus/HOV lane to I-66 in each direction**



- **Bus transit service enhancements include**
  - **Route changes and additions to local, regional, and commuter bus services; added U.S. 50 bus service**
  - **New and enhanced Priority Bus services with 10-minute peak period frequency**
  - **More than 30% additional bus seats at cutlines**

I-66 Multimodal Study

Multimodal Package #4

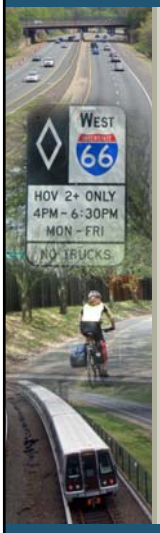


- **Enhanced Bus Service and U.S. 50 Bus on Shoulder**

- Headway on individual routes that were not part of trunk line services were set at a minimum of 15 minutes in the peak and 30 minutes in the off-peak.
- Trunk line routes were set for a combined headway of 15 minutes in the peak and 30 minutes in the off-peak.

- **Bus transit service enhancements include**
  - **Increased transit service for all routes entering the study area (local, regional, commuter)**
  - **Enhanced U.S. 50 bus service, using new bus-on-shoulder lane**
  - **New and enhanced Priority Bus services with 10-minute peak period frequency**
  - **More than 50% additional bus seats at cutlines**

Sensitivity Tests



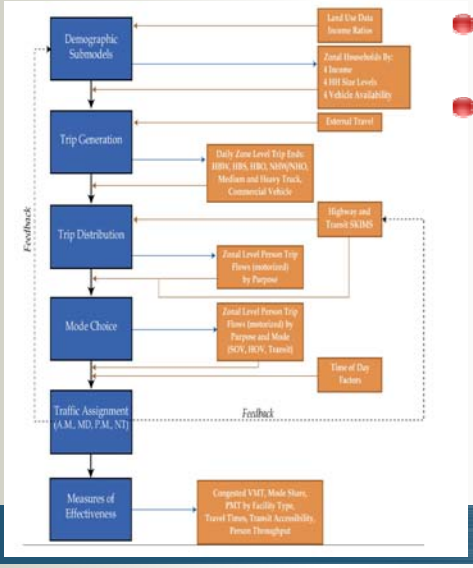
- **Test 1: Modified Multimodal Package 1**
  - **HOT lanes are during peak periods only**
- **Test 2: Modified Multimodal Package 3**
  - **Added lanes are HOT lanes**

Travel Demand Forecasting
Uses of the Model

- **Three stages of the project where travel demand forecasting came into play**
  - » **Identification of issues and needs**
  - » **Testing of mobility options**
  - » **Testing of multimodal packages**
- **Difficult to test scenarios**
  - » **HOV 3+ corridor in future year scenarios**
  - » **Variety of HOT and transit elements**

I-66 Multimodal Study

Travel Demand Forecasting
Framework and Measures of Effectiveness



- **TPB V2.3 Model**
- **Key measures of effectiveness included**
  - » **Congested VMT**
  - » **PMT**
  - » **Travel Time**
  - » **Non-SOV Mode Share**

I-66 Multimodal Study

Travel Demand Forecasting
Framework and Measures of Effectiveness

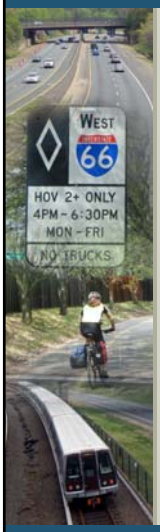


Figure 3.2 CLRP+ Baseline VMT by Level of Service

VMT

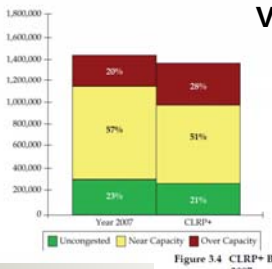


Figure 3.3 CLRP+ Baseline Daily PMT

PMT

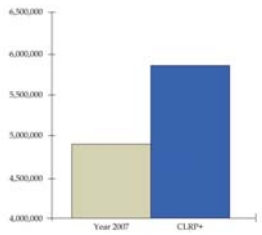
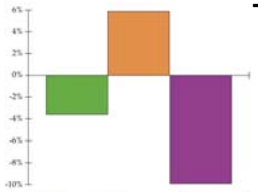


Figure 3.4 CLRP+ Baseline Improved Travel Time by Mode Compa
2007

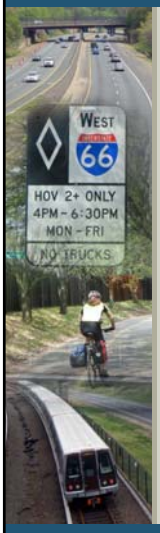
Travel Time Savings



Represents travel times between the following origins and destinations: Rosslyn, Ballston, and the D.C. core, Pentagon, Seven Corners, Tysons, Reston, Manassas, Merrifield, and the City of Fairfax.

I-66 Multimodal Study

Travel Demand Forecasting
Framework and Measures of Effectiveness



- **Other measures**
  - » **VMT by facility type (freeway, arterials, collectors)**
  - » **Cutline crossings (multimodal volumes)**
  - » **Transit accessibility (jobs and households with access to transit service)**
  - » **Non-motorized travel (including transit access)**
- **Most measures were assembled for study area only, but some measures were reviewed for entire region to support benefit-cost analysis**

I-66 Multimodal Study

Recommendations Framework

- Review package benefits against study goals
  - » Reduce congestion
  - » Improve mobility
- Identify meritorious aspects and unique challenges of each package
- Review market research, public comments, stakeholder input, PARC feedback
- Provide decision support for future corridor investments

Recommendations

- Tiered approach for long-term improvements
- Organized into two categories
  - » Core Recommendations – considered top priority
  - » Package Recommendations – derived specifically from the multimodal packages

Recommendations

- **Core Recommendations**
  - » **Implement improvements already contained in the 2011 Constrained Long Range Plan (CLRP)**
    - – **Spot improvements along westbound I-66**
    - – **Increasing the HOV occupancy restriction on I-66 from HOV 2+ to HOV 3+**
    - – **Completing the Silver Line Metrorail extension to Loudoun County**
    - – **Implementing the active traffic management element of an ICM approach**

Recommendations

- **Core Recommendations (continued)**
  - » **Bus services and TDM measures from 2009 DRPT I-66 Transit/TDM Study**
    - – **e.g., Priority Bus services; TDM program enhancement**
  - » **Components of the WMATA Core Capacity Study**
    - – **e.g., 100-percent eight-car trains on the Metrorail Orange and Silver Lines**

Recommendations

- I-66 Bus-on-Shoulder Pilot
  - » Outside of the I-66 Multimodal Study
  - » Working on implementation over the next two years

Recommendations

- Package Recommendations
  - » Long-term planning-level proposal
    - – Not intended to “leap frog” over the core recommendations
  - » Considerations for timing and phasing of implementing the recommendations
    - – Funding availability
    - – Progress against core recommendations
    - – Quality of operations and conditions on the existing key infrastructure assets

Recommendations

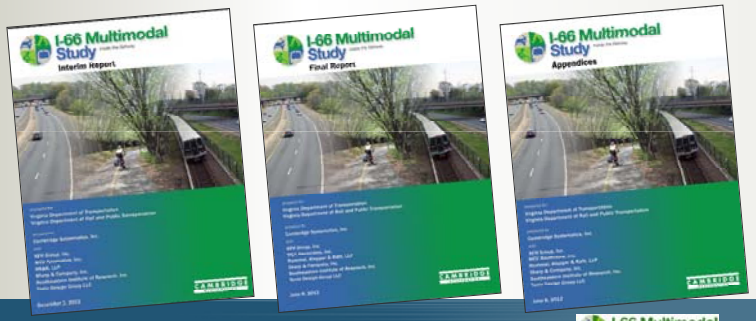
- **Package Recommendations (continued)**
  - » **Elements from several packages**
    - – **Completion of the bicycle and pedestrian network**
    - – **Full operability of an ICM system inside the Beltway**
    - – **Addition and enhancement to TDM programs**
    - – **Implementation of the best performing transit recommendations from Multimodal Package 4**

Recommendations

- **Package Recommendations (continued)**
  - » **At the end, these elements are also needed to get the best combination of congestion relief and enhanced mobility**
    - – **Implementation of HOT lanes on I-66**
    - – **Addition of a third through lane on selected segment(s) of I-66**
    - – **Explore full use of design waivers/exceptions**

Questions

- **Study reports**
  - **http://www.virginiadot.org/projects/northernvirginia/i-66_multimodal_study.asp**
  - **easy link via http://www.i66multimodalstudy.com**



I-66 Multimodal Study