Woodrow Wilson Bridge Project

a mega-project success story

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Outline

- Part 1: Project Overview
- Part 2: BR-3 Re-bidding Challenge & Lessons Learned
- Part 3: Proactive Construction Management
The Woodrow Wilson Bridge Project is located in the Washington DC Metropolitan Area.
Project Overview

7.5-mile corridor on I-95/Capital Beltway from Telegraph Rd. in VA to MD 210
Project Overview
Why This Project Was Important

Safety . . .
*nearly twice the accident rate of similar highways in VA and MD*

Traffic Volume. . .
*seven hours of congestion daily and frequent several-mile backups*

Service Life. . .
Wear and tear on the 40-year old bridge required its replacement in the near term

Commerce. . .
At least 1.3% ($58 Billion) of trucked GDP crossed the Bridge in 1993.
Project Overview

Four Project Sponsors
Project Overview: Governance

- **Joint Ownership Agreement**
  - Old bridge owned by FHWA, bascule operated by DC, and bridge maintained by MD and VA
  - New bridge jointly owned, operated and maintained by MD and VA

- MD and VA each had a PM.

- Strong GEC was “trusted advisor” to both MD and VA

- Project Financial Plan - “nuclear option”
Woodrow Wilson Bridge Project

Project Overview: Project Roles

- General Engineering Consultant (“GEC”)
  JV of PB/URS/RK&K
  Program and Construction Management

- Section Design Consultants (“SDC’s”)
  5 Project Designers

- Contractors – Project Builders
  36 Prime Construction Contracts
  • 26 Prime Contractors + 260 Subcontractors
2000 – Begin construction with river dredging

2001 – Begin bridge foundations, VA & MD soil improvement, Hunting Tower demo, and MD interchange work

2003 – Begin bridge superstructure and VA & MD tie-in projects
Dredge disposal site at Weanack, VA

Dredge Disposal Facts
- Site is 170 miles from bridge
- Project paid property owner $4.90/CY “tipping fee”
- Restored a strip-mined site to productive farmland

Corn growing in former sand and gravel pit
River work for the foundations contact (looking towards MD)
60” Diameter Pipe Piles
Project Overview - VA Interchanges
Move 273 people in VA; Move 3 in MD
40,000 Tons of Structural Steel
Project Overview

Significant Milestones

Mid 2006 – Complete 1st new bridge, switch traffic, demolish old bridge

2008 – Complete 2nd new bridge and most of US Route 1, I-295 and MD 210 Interchanges

2013 – Complete Telegraph Road Interchange
Project Overview:
Construction Sequence Phase 1

Traffic on Old Bridge

2000-2006
Both Inner & Outer Loop Bridges Under Construction
Project Overview:
Construction Sequence Phase 1
Project Overview:
Construction Sequence Phase 2

Old Bridge Demolished

2006
Outer Loop Open to Two-Way Traffic
Project Overview –
Construction Sequence Phase 2
Project Overview:
Construction Sequence Phase 3

Inner Loop Bridge Under Construction

2006-2008
Outer Loop Open to Two-Way Traffic
Project Overview:
Construction Sequence = Final Configuration

2008
Inner Loop Open to SB Traffic

2008
Outer Loop Open to NB Traffic
Project Overview

Maryland Interchanges

MARYLAND CONSTRUCTION CONTRACTS
Potomac River Bridge & Maryland Approach

MA-1
Ramp E, F, E-1

PO 2461173
(ME-69-SF-2007)

ADVIS
4-24-05A

MD
1-15-04A

MD
11-20-04A

COMPLETE
12-15-04A

CONTRACTOR: WASSERMAN

MA-2 and MA-3
Outer Loop
N.H. Interchange

PO 3475173
(ME-69-SF-2007)

ADVIS
4-24-05A

MD
1-15-04A

MD
11-20-04A

COMPLETE
12-15-04A

CONTRACTOR: WASSERMAN

MA-4
Inner Loop & Rosalie Island Park

PO 605173
(ME-69-SF-2004)

ADVIS
11-4-03A

MD
11-20-04A

COMPLETE
12-15-04A

CONTRACTOR: WASSERMAN

MB-1 and MB-2
Noles Walls, Bald Eagle Rd.

PO 306173
(ME-69-SF-2006)

COMPLETE

CONTRACTOR: WASSERMAN

MB-3
MD 210 Interchange, Oxon Hill Road Int.

PO 5075173
(ME-69-SF-2006)

COMPLETE

CONTRACTOR: WASSERMAN

MB-4
Inner and Outer Loops Ramp B

PO 9905173
(ME-69-SF-2007)

COMPLETE

CONTRACTOR: WASSERMAN

Bridge SDC: P.T.G.
I-295 Interchange SDC: JMT / WRA Joint Venture
MD 210 Interchange SDC: KCI Technologies

See POTOMAC RIVER BRIDGE CONTRACTS for DETAILS

BR-1
Dredging

BR-2
Foundations

BR-3
Superstructure Contracts

BR-3A, BR-3B
Superstructure Contracts

BR-3C
Superstructure Contracts
Project Overview – VA Interchanges

Telegraph Road  US Route 1  River Crossing  I-295  MD-210
Project Overview – VA Interchanges
Project Overview:
Dedication Ceremony-First New Span
May 18, 2006
Project Overview: Old Bridge Demolition
August 28, 2006

Photo credit Trevor Wrayton, VDOT
Woodrow Wilson Bridge Project

All Lanes Open
December 13, 2008
First Bridge Opening – July 2007
WWB Multi-use Trail Opens
June 6, 2009 all WWB facilities open
Awards Won

- Over 70 regional, state and national awards
- ASCE’s Opal and AASHTO’s America’s Transportation Award Grand Prize in 2008
- Four ARTBA Globe Awards for Environmental Excellence
- Gustav Lindenthal Medal
Part 2: BR-3 Re-bid Challenge & Lessons Learned
Timeline:
Bridge Contracts

- **October 2000**  BR-1 Dredging $14.5M
- **May 2001**  BR-2 Foundations $125.4M
- **December 2001** - BR-3 Superstructure
Bridge Contract BR-2 Foundations

Designer:
PTG (Parsons)

Notice to Proceed
May 7, 2001

Foundation Locations
(V7 thru M10)
Woodrow Wilson Bridge Project

Bridge Contract BR-3

**Designer:** PTG (Parsons)

**Advertised:** August 13, 2001

**Pre-Bid Meeting:** September 11, 2001

**Bids Opened:** December 13, 2001
Wilson Bridge Bid Called a ‘Budget Buster’

Lone, $860 Million Offer Exceeds Estimates by 75 Percent; Price Tag Could Delay Construction

By Katherine Shaver
Washington Post Staff Writer

The only contractor to bid on building the two spans of the new Woodrow Wilson Bridge said yesterday that the job would cost almost $860 million—75 percent more than the highest earlier estimates.

Maryland engineers in charge of the project said yesterday that they have no choice but to either redesign the bridge or repeat their request for bids, hoping to attract competitors. But either step would throw bridge construction several months behind schedule. With foundation work already underway, the next building phase was set to begin in the spring.

State highway officials said they were stunned by the $850.9 million bid by Kiewit, Tidewater & Clark to build the “superstructure”—the parts of the two six-lane spans above water. Estimates ranged from $450 million to $500 million.

Maryland State Highway Administrator Parker F. Williams said state engineers could not remember a bid ever coming in so high above estimates.

“If this thing had come in under 5 percent over our engineers’ estimate, I suspect we could figure out a way to do it,” Williams said. “But, my word, $859 million versus $500 million is significant. . . . This bid just absolutely blew us away.”

Any more delays in the 12-year saga to replace the 40-year-old span connecting Oxon Hill and Alexandria would prolong one of the region’s biggest traffic headaches. About 200,000 vehicles per day—

See BRIDGE, B5, Col. 3
Bid Opening Day - December 13, 2001

**BR-3 Contract**

- One Bid - $860 million - is $373 million (75%) above the estimate
- Funding Responsibility – Maryland must cover Overruns

**Budget Implications – Non-Starter**
Potential Issues that Limited Competition

- Uncertainty in the economy (especially after Sept. 11)
- Contract size / complexity
- Surety bonding issues
Potential Issues that Limited Competition

- Many mega-transportation projects bidding concurrently
- Many contract specifications were not seen as "contractor friendly"
- Uncertainty about the Project Labor Agreement (PLA)
Immediate Decisions

- Preserve the Approved Bridge Concept
- Continue Building the Bridge’s Foundations
- Act Quickly, but Get it Right
- Collect the Best Advice Available
Increase Competition

- Break Contract into Three Smaller Contracts with staggered Ad Dates
- Conduct Nationwide Marketing Campaign
- Make Contracts More Contractor Friendly
Make Contracts more Contractor Friendly

- Reduced performance/payment bonds to 50%
- Reduced insurance requirements
- Lowered retainage to 2.5%
- Increased Mobilization Cap from 10% to 15%
- Allowed payment for stored materials
- Clarified PLA Requirement
Decrease Cost of Structure

- Replaced steel box girders with steel plate girders
- Refined V-piers to simplify some elements
- Standardized more elements
Re-Advertise Strategy (Advertise 3 Contracts)

- VA Land-based Work (BR-3B)
- Bascule (BR-3A)
- MD Marine Work (BR-3C)
Bid Results for
3 Bridge Contracts

• Feb 2003  BR-3A Bascule  $186 M
• April 2003 BR-3B Virginia Approach $115 M
• June 2003  BR-3C Maryland Approach $191 M
Bid Results

Combined Re-bid Total = $492 million

Within 1% of Original Engineer’s Estimate ($487 million)!!
Washington Post on the Re-bids

Wilson Bridge Engineers Relieved

Low Bid Brightens Outlook for Bridge

Low Bid Improves Outlook for Bridge Job

Low Bid on Major Bridge Piece Bodes Well for Budget

Unexpectedly Low Bid Keeps Wilson Bridge Under Budget

Wilson Bids in Ballpark

$18 Million Over Estimate Is a Relief to Engineers

Maryland highway officials were relieved yesterday when the lowest bid to build the remaining section of the new Woodrow Wilson Bridge came in $18 million over engineers' estimates. The lowest bid was $18 million over the estimate, a figure that the Maryland State Highway Administration said it was not prepared to pay. The contract was awarded to the lowest bidder, who said they would meet the estimate if they were able to complete the project on time. The bridge is expected to be completed by the end of the year. The project is being funded by the federal government and is expected to be completed in 2023. The bridge will provide improved access to the city and reduce traffic congestion in the area.
Lessons Learned

- Avoid advertising at the same time as other mega-projects
- Reach out to the contracting community to generate interest
- Make the terms contractor friendly
- Set bond limits to enhance competition
Lessons Learned (Continued)

- Remove as much uncertainty as possible prior to advertising
- Emphasize the owner’s active involvement

Techniques exist to mitigate contract interface risks, but there are no techniques to mitigate for a lack of competition
Part 3: Proactive Construction
Corridor Management
Failed Bid Changed the Project Mindset

“We all succeed together”

- Contractors are an indispensable part of the program

- It is in the owner’s best interest to help contractors be productive

- The CM Team can facilitate contractors’ productivity
Construction Management Challenges

- Keep traffic moving during construction

- 6 contractors (vs. 4) must all meet a two week window, four years in the future.

- The critical path shifts among the 6 contractors

- How to manage the interfaces so that all contractors work together as if they were one?
3 Contracts = 2 More Interfaces

- VA Land-based Work (BR-3B)
- Bascule (BR-3A)
- MD Marine Work (BR-3C)
Woodrow Wilson Bridge Project

BR-3B Viewpoint

• Build Outer Loop bridge as quickly as possible, so that traffic can be switched to it.
• Demo of the old bridge controls the critical path
BR-3A Viewpoint

- Build a complex machine to run smoothly for 75 years
- The more time the better to test and commission
BR-3A Viewpoint

- Old bridge not an issue
- Access via Floating bridge - boxed in by other contractors
BR-3C Viewpoint

- Leave traffic on old Bridge as long as possible
- Old bridge is an asset after traffic shift
- Land access after traffic shift - boxed in by other contractors
Strategy: Seek Opportunities to Enhance Production

Example: MD haul road for BR-3C access through MA-4
Strategy: Program Planning and Scheduling

- Contracts were let by each state, key special provisions were Project-wide

- Corridor Coordination meetings kept contractors on the same page

- Integrated corridor schedule kept all contractors moving toward the same dates
Strategy: Program Planning and Scheduling

- Contracts were let by each state, key special provisions were Project-wide
  - Corridor Coordination Meetings
  - Schedule and Submittals - P3 & Expedition
  - Site Safety
  - Lane Closures
  - Holidays
Corridor Coordination meetings kept all contractors on the same page

- Interface management
- Conflict forecasting
- Access release adjustments
- Issue Resolution updates
Strategy: Program Planning and Scheduling

157 Access Releases

Sortable by:

- Contract Number
- Milestone Number
- Original Contract Date for the Milestone
- Current Contract Date for the Milestone
- Current Schedule Data Date
- Schedule Activity ID
# Integrated Program Schedule Management

<table>
<thead>
<tr>
<th>Act ID</th>
<th>Description</th>
<th>Early Start</th>
<th>Early Finish</th>
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<tr>
<td>VBO010</td>
<td>Design Telegraph Road Interchange</td>
<td>09/14/98 A</td>
<td>01/10/03</td>
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<td>Right of Way Appraisal/Negotiate/Relocate</td>
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<td>VBO030</td>
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<td>Design US1 Interchange</td>
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<td>VA0020</td>
<td>RW App/Neg/Acquire/Relocate/Terrace</td>
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<td>VA0030</td>
<td>RW App/Neg/Acquire for Ground Improvement</td>
<td>01/22/01 A</td>
<td>08/20/01</td>
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<td>VA0115</td>
<td>5 Lane Bridge Tie-in Complete</td>
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<td>06/30/08</td>
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**WODROW WILSON BRIDGE PROJECT**

**AUGUST 2001 INITIAL FINANCIAL PLAN SUMMARY SCHEDULE**

**Date:** 05/31/01
**Run date:** 08/20/01
**Start date:** 04/01/99
**Finish date:** 05/17/11

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## Integrated Program Schedule Management

<table>
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<th>Project Code</th>
<th>Description</th>
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<th>Duration</th>
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<td>MA-2/3</td>
<td>Stage 1 Bridge #16 Area</td>
<td>15-Mar-03</td>
<td>7-Mar-03</td>
<td>15 days</td>
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<td>VA-5</td>
<td>Complete 78&quot; Drainage</td>
<td>28-Jun-03</td>
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<td>AR Area 1 (301+75 to 307+40)</td>
<td>1-Aug-03</td>
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<td>AR #3 - Ramp A (R Open)</td>
<td>17-Feb-04</td>
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<td>BR-3C</td>
<td>MD OL Abutment</td>
<td>15-Oct-03</td>
<td>17-Oct-03</td>
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<td>BR-3C</td>
<td>MD OL OK Backfill MD Abutment</td>
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<td>AR Area 4 (275+40 to 288+75)</td>
<td>1-Apr-04</td>
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<td>VA-4</td>
<td>Complete Vertical OL</td>
<td>17-May-04</td>
<td>18-May-04</td>
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<td>VA-6/7</td>
<td>AR #01E - Area 5E from VA-2</td>
<td>20-May-04</td>
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<td>VA-6/7</td>
<td>AR #3 - Transm Tiers W Relocated</td>
<td>15-Sep-04</td>
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<td>VA-6/7</td>
<td>Interim Milestone 1 - Installation of Elec Duct Bank</td>
<td>11-Sep-04</td>
<td>11-Sep-04</td>
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<td>MS #1 Installation of Duct Bank</td>
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<td>BR-3B</td>
<td>Access to OL Bridge Level</td>
<td>1-Nov-04</td>
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<td>BR-3B</td>
<td>VA Approach Utilities</td>
<td>31-Dec-04</td>
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<td>AR #01D (a) - Area 5A from VA-2 (250+00 to 251+60)</td>
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<td>OL Pier V1 (able to set girders)</td>
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<td>Ramp L (SW side of BR)</td>
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<td>VA-6/7</td>
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<td>VA-6/7</td>
<td>AR #010 - Area 5 from VA-2</td>
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<td>VA-6/7</td>
<td>AR #010 - Area 5 from VA-2</td>
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<td>BR-3A</td>
<td>Outer Loop Pier M1 (able to receive girders)</td>
<td>18-Feb-05</td>
<td>18-Feb-05</td>
<td>1 day</td>
<td>Complete</td>
</tr>
<tr>
<td>BR-3C</td>
<td>Outer Loop Pier M1 (able to set girders)</td>
<td>18-Feb-05</td>
<td>18-Feb-05</td>
<td>1 day</td>
<td>Complete</td>
</tr>
<tr>
<td>VA-5</td>
<td>Ramp L (BS26, BS28, and BS31)</td>
<td>18-Feb-05</td>
<td>18-Feb-05</td>
<td>1 day</td>
<td>Complete</td>
</tr>
</tbody>
</table>
Strategy: Proactive Public Relations

- Celebrate Successes - Manage publicity events
  - Bridge Bucks
  - Eagle Naming Contest
  - Worst commute contest

- Provide media access to Project site
Strategy: Partnering
Emphasize positive relationships

- Monthly Partnering meetings on all contracts
- Executive Partnering meetings as needed
- Web based rating and comments tool
Strategy: Keep Contractors Moving with Timely Responses

- Early issue identification the norm
- Quick decisions for ordinary issues
- “Show stopper” issues needed careful, yet timely, consideration
What was the final cost of three contracts?

- Total of base bids + changes = $525M (7% > than the combined low bids)
- Most of the cost increase was due to steel escalation
- Only $4 million (< 1%) was due to contractor interface issues
Financial Plan History

- Initial Financial Plan (Approved Sept. 2001)
  - Total Project Budget = $2.443 Billion

- 2014 Final Cost as Close Out
  - Total Project Cost = $2.357 Billion

$86 million under budget after 14 years
WWB as Art
The Completed Woodrow Wilson Bridge

On Schedule

On Budget

http://wwblessonslearned.com/
QUESTIONS ?
Speaker Information

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