ABC Innovative Projects

Cedar Street Bridge (Wellesley)						
Location	Cedar Street (urban minor arterial) over Route 9 in the town of Wellesley in Norfolk County, just west of the I-95/9 Interchange and west of Boston					
State	Massachusetts					
Owner	State					
Year ABC Built	2011					
State ID #	W-13-015					
NBI #	W13015-2MH-DOT-NBI					
Coordinates	***Latitude:***	42.31549444		***Longitude:***	-71.24710556	
Contact Person	Shoukry Elnahal, P.E. Deputy Chief Engineer for Bridges and Tunnels Massachusetts Department of Transportation Phone: 617-973-7995 Email: shoukry.elnahal@state.ma.us					
Mobility Impact Time	***ABC:***	One weekend closure (72 hrs); 30 days of night or off-peak one-lane closures on Rte 9		***Conventional:***	24 months; two construction seasons	
Impact Category	*Tier 1*	***Tier 2***	*Tier 3*	***Tier 4***	*Tier 5*	
		X – Cedar Street		X – Rte 9		
Primary Driver(s)	• reduced traffic impacts • reduced onsite construction time • improved work-zone safety • improved site constructability • improved material quality and product durability					
Description	• 83.08-ft-long and 53.33-ft-wide two-span continuous steel girder bridge roll-in (41.54 ft – 41.54 ft); 7º skew; 530-ton self-weight • Urban location • Average Daily Traffic count: 12,184 (Cedar Street, 2010); 39,000 (Rte 9, 2010) • Traffic management alternative, if constructed conventionally: extended use of detours through city streets ***Existing Bridge:*** Built in 1932, the existing two-span two-lane steel girder bridge was structurally deficient and had a minimum vertical clearance of 13.75 ft. The superstructure was in poor condition and needed to be replaced, but the pier and abutments were able to be repaired, adjusted, and reused. ***Replacement Bridge:*** The replacement bridge has three traffic lanes, one in each direction with a left-turn-only lane in the southbound direction. There is a 6-ft-wide sidewalk on the east side of the bridge and a 5-ft-wide sidewalk on the west side. The 2.17-ft-deep cross-section consists of 8 steel girders (W14x159) at 6.75-ft spacing with 8-inch-thick composite cast-in-place concrete deck and 3-inch-thick hot-mix asphalt (HMA) wearing surface. To avoid future truck collisions, MassDOT increased the bridge's vertical clearance to 15 ft. ***Construction Methods:***					

	The contractor built the replacement bridge on temporary shoring towers on site within the east cloverleaf ramp north of the bridge. At 10 pm on Friday, July 1, Cedar Street and Route 9 within the work area were closed and traffic detoured. The contractor demolished the old bridge and erected new precast abutment caps, a new precast pier cap, and elastomeric bearings. At 5 am Sunday, four lines of self-propelled modular transporters (SPMTs) moved the superstructure from the cloverleaf onto the Cedar Street ramp and down the ramp onto Rte 9, arriving at the pier and abutments at 9:30 am. The SPMTs lowered the bridge into position early Sunday afternoon. The contractor then worked to put temporary lane markings in place and open one sidewalk for pedestrians. The bridge and Rte 9 were reopened at 12:00pm noon on Monday, July 4. The holiday weekend was selected due to historically low traffic volumes. The remaining work, including installation of architectural pilasters and completion of sidewalks, was done subsequently during off-peak hours. A membrane system was applied to waterproof the deck prior to moving the bridge. Five windows were left in the membrane to monitor for cracks during and after the bridge move. After the bridge was moved, the five windows in the waterproof membrane were covered and the HMA wearing surface was applied. There were four milestone incentives/disincentives used for this contract. Milestone 1 involved having all construction plans approved, the bridge fully constructed in the clover leaf and ready for the move, all traffic management plan measures in place and ready for deployment and the SPMTs on site by July 1, 2011. A $50,000 incentive / disincentive was associated with this milestone. Milestone 2 was demolishing and replacing the Cedar Street Bridge on the 4th of July weekend within 72 hours. There was a $2,500 per hour incentive / disincentive to a maximum of $150,000 Milestone 3 was substantial completion by July 20, 2011 for a $50,000 incentive/disincentive. Milestone 4 was Final Acceptance by August 20, 2011 for a $50,000 incentive / disincentive. This milestone was revised to allow only the evergreen trees to be planted by September 30, 2011 for the evergreen planting season fell after the August 20, 2011 date, although all other parts of this project were still to be completed by August 20, 2011. ***Stakeholder Feedback:*** Feedback from local residents and stakeholders was very positive, due to maintained mobility during construction and strong education/outreach prior to the move weekend.
High Performance Materials	• High performance concrete (HPC) deck

<table>
<tr><td>Photos

Additional photos</td><td colspan="4">    </td></tr>
<tr><td rowspan="2">Project Planning</td><td>Decision-Making Tools</td><td>Site Procurement</td><td>Project Delivery</td><td>Contracting</td></tr>
<tr><td>• State process
• Benefit/cost methods</td><td>• Right-of-way acquisition
• Electronic shop drawing submittal & approval process</td><td>• Design-Build</td><td>• Full lane closure
• Incentive / disincentive clauses
• No Excuse bonus
• Lump Sum bonus</td></tr>
<tr><td rowspan="2">Geotechnical Solutions</td><td colspan="2">Foundations & Walls</td><td colspan="2">Rapid Embankment</td></tr>
<tr><td colspan="2">•</td><td colspan="2">•</td></tr>
<tr><td rowspan="3">Structural Solutions</td><td colspan="3">Prefabricated Bridge Elements & Systems</td><td>Construction</td></tr>
<tr><td>Elements</td><td>Systems</td><td>Miscellaneous</td><td rowspan="2">• SPMTs
• High-capacity crane</td></tr>
<tr><td>• Precast column caps
• Precast abutment caps</td><td>• Full-width decked beam (FDcBs)</td><td>• CIP reinforced concrete closure joints
• Bars in splice couplers
• Overlay – asphalt w/ membrane
• Precast approach slab</td></tr>
<tr><td>Costs</td><td colspan="4">The engineer’s estimate for the project was $3.45 million. The actual cost was $3.45 million plus $175,000 in incentives and $123,000 in police details. The cost per square foot of bridge was $831.40.</td></tr>
<tr><td rowspan="2">Funding</td><td>Federal only</td><td>State only</td><td>Federal and State</td><td>Other</td></tr>
<tr><td></td><td>X</td><td></td><td></td></tr>
<tr><td rowspan="2">Incentive Program ($)</td><td>Highways for LIFE</td><td>IBRD</td><td>SHRP2</td><td>Other</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>Contract Plans</td><td colspan="2">Complete Set: Civil Plans (link to pdf)</td><td>ABC *:</td><td>Bridge Plans (link to pdf)</td></tr>
<tr><td>Specifications</td><td colspan="2">Complete Set: Contract Award (link to pdf)</td><td>ABC *:</td><td></td></tr>
<tr><td>Bid Tabs</td><td colspan="4">Not available.</td></tr>
<tr><td>Schedule</td><td>Engineer’s:</td><td>Baseline Schedule-Rev01 (link to pdf)</td><td>Actual:</td><td>Contractor Schedule Update_08-15-11 (link to pdf)</td></tr>
<tr><td>Other Related Information</td><td colspan="4">Official website:
MassDOT Cedar Street-Wellesley Bridge Project Website
[http://www.massdot.state.ma.us/abp/Projects/WellesleyBridge.aspx]

MassDOT ABC Decision Chart (link to pdf)

Page on Town of Wellesley Website:
http://www.wellesleyma.gov/Pages/WellesleyMA_Selectmen/cedar

Project Video:
UTUBE video–Cedar Street Bridge Move
[http://www.youtube.com/watch?v=jZ7FjwSYXEA]</td></tr>
</table>

	Photo Gallery on Flickr: http://www.flickr.com/photos/massdot/sets/72157625631453339/ **News Coverage:** • "Wellesley Bridge Replaced in a Snap" [http://articles.boston.com/2011-07-04/news/29736535_1_new-bridge-bridge-project-bridge-friday-night] • "New Bridge is Milestone for Wellesley" [http://wellesley.patch.com/articles/new-bridge-is-new-milestone-for-wellesley] • "Governor Patrick Tours Wellesley Bridge Project Site" [http://www.wickedlocal.com/wellesley/news/x941157302/Governor-Patrick-tours-Wellesley-bridge-project-site#axzz1iQnyCYYs] • "Jeffrey Mullan Interview" Video [http://www.youtube.com/watch?v=XA52cIPcC8g&feature=related] **Industry Publications:** *BSCES News* **[**http://www.bsces.org/index.cfm/page/MassDOT-Uses-ABC-to-Replace-Wellesley-Bridge-in-a-Weekend/cdid/11359/pid/10371]
Photo Credits	Massachusetts Department of Transportation

* Specific to the ABC used in the project.