

Intelligent Transportation Systems Strategies for the Bella Vista Bypass

The use of fiber optic technologies will provide a reliable means of communication between ITS elements and allow for electronic tolling of the facility and expansion of this technology for future highway use. The cost for providing fiber optic connectivity is shown in detail below.

Fiber Placement Estimate - Bella Vista Bypass								
Cost Category	Units	Per Unit	Vender 1		Vender 2		Vender 3	
			Cost/Unit	Total	Cost/Unit	Total	Cost/Unit	Total
Estimated Hardware Costs								
SM Armored Twelve Strand	80000	feet	\$0.55	\$44,000.00	\$0.00	\$0.00	\$0.00	\$0.00
2" Conduit	75000	feet	\$0.70	\$52,500.00	\$0.00	\$0.00	\$0.00	\$0.00
Bridge Fiber Termination Point w/LIU POD	8	each	\$4,000.00	\$32,000.00	\$0.00	\$0.00	\$0.00	\$0.00
Type II Hand Hole (every 1kft)	70	each	\$300.00	\$21,000.00	\$0.00	\$0.00	\$0.00	\$0.00
Type III Hand Hole (every 20kft)	4	each	\$600.00	\$2,400.00				
Total Hardware Costs				\$151,900.00		\$0.00		\$0.00
Estimated Labor Costs								
	Units	Per Unit	Contractor 1		Contractor 2		Contractor 3	
Trenching	73000	feet	\$6.00	\$438,000.00		\$0.00		\$0.00
Boring	2000	feet	\$15.00	\$30,000.00		\$0.00		\$0.00
Termination & Test Fiber	96	fiber end	\$70.00	\$6,720.00		\$0.00		\$0.00
Fiber Pull	80000	feet	\$0.70	\$56,000.00		\$0.00		\$0.00
Direct Bury Cable		feet		\$0.00		\$0.00		\$0.00
Contractor Provided Hardware		per incident		\$0.00		\$0.00		\$0.00
Labor Variance - Overtime/Overnight		per incident		\$0.00		\$0.00		\$0.00
Labor Variance - Excessive Drive Distance		per incident		\$0.00		\$0.00		\$0.00
Labor Variance - Bore/Trench Soil Condition		per incident		\$0.00		\$0.00		\$0.00
Total Labor Costs				\$530,720.00		\$0.00		\$0.00
Estimated Fiber Provider Splicing Costs								
LightCore				\$6,000.00				
Windstream				\$0.00				
Verizon				\$0.00				
Contractor (4 splice points x 12 fibers x \$210.00 per fiber)				\$10,080.00				
Total Fiber Provider Splicing Costs				\$16,080.00				
Approximate Hardware Total				\$151,900.00		\$0.00		\$0.00
Approximate Labor Total				\$530,720.00		\$0.00		\$0.00
Approximate Fiber Provider Splice Costs				\$16,080.00		\$0.00		\$0.00
Approximate Project Total Cost				\$698,700.00		\$0.00		\$0.00

The AHTD will utilize its Smart Bridge System technology on all main lane bridges within the Arkansas portion of the Bypass. Approximately 4 of these bridges will integrate Environmental Sensor Stations (ESS) consisting of pavement and ambient air temperatures sensors, for the higher elevation and longer span structures as well as the bridges that span over water (5), Road Weather Information Systems (RWIS) will be installed. The RWIS integrate pavement and ambient air temperatures sensors, ice sensors, wetness sensors, wind speed collectors, and relative humidity sensors. All of this data will be collected and sent through the fiber optic network to the toll operation center and be supplied to the ITS central controller. The central controller will automatically

analyze this information and post it on the overhead message boards along the Bypass and also communicate with roadway maintenance staff. All of this information will also be transmitted to *Clarus* to be used for the National Surface Transportation Weather Observing and Forecasting System. See www.its.dot.gov/clarus/. These cost are shown are in detail below.

Smart Bridge System - Bella Vista Bypass				
Cost Category	Units	Per Unit	Cost/Unit	Total
Environmental Sensor Stations (ESS)				
Estimated Hardware Cost				
Pavement Temperature Sensor	4	each	\$10,000.00	\$40,000.00
Ambient Air Temperature Sensor	4	each	\$10,000.00	\$40,000.00
Total Hardware Costs				\$80,000.00
Estimated Labor Cost				
Installation	4	each	\$25,000.00	\$100,000.00
Total Labor Costs				\$100,000.00
Road Weather Information Systems (RWIS)				
Estimated Hardware Cost				
	Units	Per Unit		
Pavement Temperature Sensor	5	each	\$10,000.00	\$50,000.00
Ambient Air Temperature Sensor	5	each	\$10,000.00	\$50,000.00
Ice Sensor	5	each	\$9,000.00	\$45,000.00
Wetness Sensor	5	each	\$8,000.00	\$40,000.00
Wind Speed Collector	5	each	\$9,000.00	\$45,000.00
Relative Humidity Sensor	5	each	\$9,000.00	\$45,000.00
Total Hardware Costs				\$275,000.00
Estimated Labor Cost				
Installation	5	each	\$25,000.00	\$125,000.00
Total Labor Costs				\$125,000.00
Overhead Message Boards				
Estimated Hardware Cost				
	Units	Per Unit		
Overhead Message Boards	3	each	\$75,000.00	\$225,000.00
Total Hardware Costs				\$225,000.00
Estimated Labor Cost				
Installation	3	each	\$15,000.00	\$45,000.00
Total Labor Costs				\$45,000.00
Overhead Structures				
Estimated Hardware Cost				
	Units	Per Unit		
Overhead Structures	3	each	\$75,000.00	\$225,000.00
Total Hardware Costs				\$225,000.00
Estimated Labor Cost				
Installation	3	each	\$15,000.00	\$45,000.00
Total Labor Costs				\$45,000.00
Approximate Hardware Total				\$805,000.00
Approximate Labor Total				\$315,000.00
Approximate Project Total Cost				\$1,120,000.00