

**Congress of the United States**  
**Washington, DC 20515**

June 11, 2009

The Honorable James L. Oberstar  
Chairman  
Committee on Transportation and Infrastructure  
2165 Rayburn House Office Building  
Washington, D.C. 20515

Dear Chairman Oberstar:

Thank you for the opportunity to testify before you and the Highways and Transit Subcommittee on April 28, 2009, in support of a funding mechanism for nationally significant mega projects in the next surface transportation authorization.

The Brent Spence Bridge project will improve delivery times, reduce congestion costs resulting from excessive time spent in traffic, and improve national productivity and economic performance.

During the hearing you requested that we provide specific evidence as to how this project, if funded, would reduce travel time and improve productivity. In response to your request and to obtain relevant data from an objective expert source, our offices asked the Texas Transportation Institute (TTI) to assess the potential benefits of the project based upon the considerations that you raised during the hearing.

In response to our request, TTI completed a study of the Brent Spence Bridge Replacement and Revitalization Project. They concluded that rehabilitation of the current bridge and construction of a new parallel bridge would substantially improve delivery times and reduce congestion costs from excessive time spent in traffic.

TTI concluded that with its current eight lanes, congestion attributable to the Brent Spence Bridge costs 3.6 million person-hours of delay each year for passenger cars and 240,000 vehicle-hours of delay for commercial vehicles. If the Brent Spence Bridge Project was completed today with fifteen lanes in service (via the rehabilitated current structure and new bridge), these numbers would drop to 710,000 person-hours of delay for passenger cars and 30,000 vehicle-hours of delay for commercial vehicles per year.

Additionally, with the current eight lanes, TTI estimates that 1.6 million gallons of fuel are wasted during one year. If the project were completed today, this number would fall to just

380,000 gallons annually on the roads affected by the bridge. Further, TTI estimates that without completion of the project, annual fuel wasted would be 5.7 million gallons per year by 2030. With project completion this number would fall to just 2.1 million gallons of wasted fuel annually.

Twenty years after the completion of the project, TTI estimates that the initial investment of 2.5 to 3 billion dollars would result in a total project benefit to commuters, shippers and manufacturers of \$18.9 billion (in 2008 dollars). The complete results of the TTI study are enclosed.

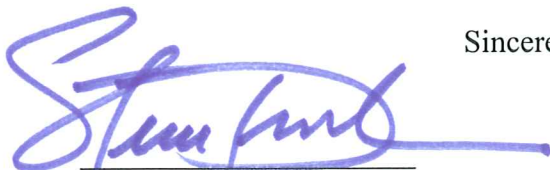
The Brent Spence Bridge is a nationally significant mega project. Completion of the project under the current system would require an allocation of more than the entire highway infrastructure budgets for both Ohio and Kentucky for more than a year. The bridge is a key part of America's mid-west transportation infrastructure and is vital to commerce in Alabama, Florida, Georgia, Illinois, Indiana, Iowa, Kentucky, Michigan, Ohio, and Tennessee. An estimated \$417 billion of freight (three- percent of GDP) crosses the Brent Spence Bridge every year with an expected increase in real dollars to \$830 billion by 2030. The planned expansion of the Norfolk Southern and CSX railways will bring even more freight to the I-71, I-74 and I-75 corridors that connect to the bridge. Specifically, the proposed CSX facility in North Baltimore, Ohio will serve as a major rail freight hub. Additionally, Norfolk Southern anticipates a spring 2010 opening of the Heartland Corridor from Norfolk, VA to Columbus, Ohio resulting in substantial increases to north-south truck traffic across the Ohio River (to and from the Columbus hub) and in particular across the Brent Spence Bridge. The bottom line is that this is a vitally important commercial corridor, and the aging bridge does not adequately serve current volume and certainly cannot meet increasing demand.

The conclusion is clear. Congress must provide a funding mechanism for projects of national significance in the next surface transportation authorization. As we noted in our testimony, completion of the Woodrow Wilson Bridge project and the potential impact of the Brent Spence Bridge Project, as noted by TTI, are graphic examples of the critical need for Congress to act now in support of such projects.

We look forward to further dialog with you on the Brent Spence Bridge project and, most importantly, on provisions for the funding of projects of national significance in the next surface transportation authorization.

Thank you for your consideration of our request. Please feel free to contact either Aaron Wasserman at 225-2216 or Dan Adelstein 225-3465 if you have any questions

Sincerely,



Steve Driehaus  
Member of Congress



Geoff Davis  
Member of Congress

Enclosure

CC: Congressman John L. Mica, Ranking Member, House Transportation and Infrastructure Committee  
Chairman Peter A.DeFazio, Chairman, Subcommittee on Highways and Transit, House Transportation and Infrastructure Committee  
Congressman John J. Duncan, Ranking Member, Subcommittee on Highways and Transit, House Transportation and Infrastructure Committee  
Congresswoman Jean Schmidt  
Senator Sherrod Brown  
Senator Jim Bunning  
Senator Mitch McConnell  
Senator George Voinovich

## Congestion Analysis Summary for I-71 and I-75 in vicinity of Brent Spence Bridge

	Summary Information for 2030	Summary Information for 2007	
Current (Base)	Altern C&D	Current (Base)	Altern C&D
Configuration		Configuration	

### Analysis Factor - Annual Values

Annual hours of recurring delay	5,827,659	1,883,005	1,479,955	326,692
Annual hours of incident delay	8,881,428	2,353,756	2,434,863	419,037
Annual hours of total delay	14,709,087	4,236,760	3,914,819	745,729

Annual psgr car delay (pers-hr)		3,614,903	708,167
Annual commercial delay (veh-hr)		239,933	30,049

Annual gallons wasted fuel	5,737,247	2,059,426	1,630,137	378,806
Annual fuel cost (psgr car)	17,211,740	6,178,278	4,890,411	1,136,419
Annual hours of delay (pers-hrs)	14,709,087	4,236,760	3,914,819	745,729
Annual delay cost psgr cars	217,175,008	63,809,731	58,091,486	11,380,247
Annual delay/fuel cost comm veh	101,393,289	22,575,877	25,452,077	3,187,628
Annual congestion cost	335,780,037	92,563,886	88,433,973	15,704,294
Travel Time Index	2.14	1.33	1.39	1.07

**Congestion cost calculations (see summary of benefits on other worksheets) based on Alt C and D (10 Lanes on new bridge and 5 lanes on existing structure)**

Kentucky I-71 and I-75  
Current Volumes (2007)

Analysis Factor	Current (Base) Configuration			Alternative C&D Design		
	8-lane close to bridge	8-lane away from bridge	Corridor (Combination of close & away)	14-lane close to bridge	12-lane away from bridge	Corridor (Combination of close & away)
Daily traffic Volume (ADT)	155,000	160,000		155,000	160,000	
Miles	2	6.465		2	6.465	
Vehicle-Miles of Travel (VMT)	310,000	1,034,400		310,000	1,034,400	
Lanes	8	8		14	12	
Daily Traffic per Lane	19,375	20,000		11,071	13,333	
Peak Period VMT	155,000	517,200		155,000	517,200	
Peak Period factor (max 0.5)	0.5	0.5		0.5	0.5	
Congested Peak Period VMT	155,000	517,200		155,000	517,200	
Directional Factor	0.58	0.58		0.58	0.58	
Peak Direction VMT	89,900	299,976		89,900	299,976	
Off-Peak Direction VMT	65,100	217,224		65,100	217,224	
Peak Direction speed	50.88	50.00		59.00	59.00	
	50.88	50.00		59.00	59.00	
Off-Peak Direction speed	54.53	54.00		60.00	60.00	
	54.53	54.00		60.00	60.00	
Freeflow speed	60	60		60	60	
Recurring Peak Dir Delay (veh-hr)	269	1,000		25	85	
Recurring Off-Peak Dir Delay (veh-hr)	109	402		-	-	
Recurring delay (veh-hr)	378	1,402		25	85	
Incident factor	2.5	1.25		1.25	1.25	
Incident delay (veh-hr)	944	1,753		32	106	
Daily delay (veh-hr)	1,321	3,155		57	191	
Peak truck percent	0.12	0.12		0.12	0.12	
Passngr car delay (veh-hr)	1,163	2,776		50	168	
Commercial vehicle delay (veh-hr)	159	379		7	23	
Value of time (psgr veh)	16.07	16.07		16.07	16.07	
Value of commercial time	106.08	106.08		106.08	106.08	
Annual psgr car delay (pers-hr)	363,395	867,603		15,713	52,432	
Annual commercial delay (veh-hr)	39,643	94,648		1,714	5,720	
Fuel cost	3.00	3.00		3.00	3.00	
Fuel efficiency peak direction (mpg)	21.52	21.30		23.55	23.55	
Fuel efficiency off-peak direc (mpg)	22.43	22.30		23.80	23.80	
Freeflow fuel efficiency (mpg)	23.8	23.8		23.8	23.8	
Peak fuel wasted (psgr car)	352	1,302		35	118	
Off-Pk Fuel Wasted (psgr car)	147	540		-	-	
Annual gallons wasted fuel	124,772	460,520	585,292	8,822	29,436	38,258
Annual fuel cost (psgr car)	374,316	1,381,561	1,755,877	26,465	88,309	114,774
Annual hours of delay (pers-hrs)	412,949	985,913	1,398,862	17,856	59,582	77,438
Annual delay cost psgr cars	5,839,765	13,942,380	19,782,145	252,515	842,586	1,095,101
Annual delay/fuel cost comm veh	4,205,344	10,040,217	14,245,562	181,842	606,765	788,607
Annual congestion cost	10,419,426	25,364,159	35,783,584	460,822	1,537,660	1,998,482
Travel Time Index	1.51	1.37	1.40	1.02	1.02	1.02
Incident speed (pk dir)	36.86	41.38		57.80	57.80	
Incident speed (op dir)	44.41	48.00		60.00	60.00	

**Congestion cost calculations (see summary of benefits on other worksheets) based on Alt C and D (10 Lanes on new bridge and 5 lanes on existing structure)**

Kentucky I-71 and I-75  
Future Volumes (2030)

Analysis Factor	Current (Base) Configuration			Alternative C&D Design		
	8-lane close to bridge	8-lane away from bridge	Corridor (Combination of close & away)	14-lane close to bridge	12-lane away from bridge	Corridor (Combination of close & away)
Daily traffic Volume (ADT)	210,000	215,000		210,000	215,000	
Miles	2	6.465		2	6.465	
Vehicle-Miles of Travel (VMT)	420,000	1,389,975		420,000	1,389,975	
Lanes	8	8		14	12	
Daily Traffic per Lane	26,250	26,875		15,000	17,917	
Peak Period VMT	210,000	694,988		210,000	694,988	
Peak Period factor (max 0.5)	0.5	0.5		0.5	0.5	
Congested Peak Period VMT	210,000	694,988		210,000	694,988	
Directional Factor	0.58	0.58		0.58	0.58	
Peak Direction VMT	121,800	403,093		121,800	403,093	
Off-Peak Direction VMT	88,200	291,895		88,200	291,895	
Peak Direction speed	37.68	36.76		56.50	52.92	
Off-Peak Direction speed	37.68	36.76		56.50	52.92	
Freeflow speed	43.70	42.70		58.00	55.77	
Recurring Peak Dir Delay (veh-hr)	43.70	42.70		58.00	55.77	
Recurring Off-Peak Dir Delay (veh-hr)	60	60		60	60	
Recurring delay (veh-hr)	1,203	4,247		126	899	
Incident factor	548	1,971		51	369	
Incident delay (veh-hr)	1,751	6,218		176	1,268	
Daily delay (veh-hr)	2.5	1.25		1.25	1.25	
Peak truck percent	4,378	7,772		221	1,585	
Passngr car delay (veh-hr)	6,129	13,990		397	2,853	
Commercial vehicle delay (veh-hr)	0.12	0.12		0.12	0.12	
Value of time (psgr veh)	5,394	12,311		349	2,511	
Value of commercial time	736	1,679		48	342	
Annual psgr car delay (pers-yr)	16.07	16.07		16.07	16.07	
Annual commercial delay (veh-yr)	106.08	106.08		106.08	106.08	
Fuel cost	1,685,549	3,847,139		109,173	784,699	
Fuel efficiency peak direction	183,878	419,688		11,910	85,604	
Fuel efficiency off-peak direction	3.00	3.00		3.00	3.00	
Freeflow fuel efficiency (mpg)	18.22	17.99		22.93	22.03	
Peak fuel wasted (psgr car)	19.73	19.48		23.30	22.74	
Off-Pk Fuel Wasted (psgr car)	23.8	23.8		23.8	23.8	
Annual gallons wasted fuel	1,380	4,813		172	1,198	
Annual fuel cost (psgr car)	674	2,397		70	502	
Annual hours of delay (pers-yr)	513,342	1,802,401	2,315,743	60,468	424,960	485,428
Annual delay cost psgr cars	1,540,027	5,407,204	6,947,230	181,405	1,274,879	1,456,284
Annual congestion cost	1,915,397	4,371,749	6,287,145	124,061	891,703	1,015,764
Travel Time Index	27,086,772	61,823,523	88,910,295	1,754,417	12,610,111	14,364,528
Incident speed (pk dir)	19,505,786	44,520,491	64,026,277	1,263,394	9,080,821	10,344,215
Incident speed (op dir)	48,132,584	111,751,218	159,883,802	3,199,216	22,965,811	26,165,027
Travel Time Index	2.75	2.21	2.33	1.11	1.25	1.22
Incident speed (pk dir)	19.52	24.77		52.66	46.11	
Incident speed (op dir)	26.02	31.39		55.68	51.25	

**Congestion cost calculations (see summary of benefits on other worksheets) based on Alt C and D (10 Lanes on new bridge and 5 lanes on existing structure)**

Brent Spence Bridge  
Current Volumes (2007)

Brent Spence Bridge  
Future Volumes (2030)

Analysis Factor	Brent Spence Bridge Current Volumes (2007)		Brent Spence Bridge Future Volumes (2030)	
	Current (Base) Configuration 8-lane on bridge	Alternative C&D Design 15 lanes on bridge	Current (Base) Configuration 8-lane on bridge	Alternative C&D Design 15 lanes on bridge
Daily traffic Volume (ADT)	160,000	160,000	200,000	200,000
Miles	1	1	1	1
Vehicle-Miles of Travel (VMT)	160,000	160,000	200,000	200,000
Lanes	8	13	8	13
Daily Traffic per Lane	20,000	12,308	25,000	15,385
Peak Period VMT	80,000	80,000	100,000	100,000
Peak Period factor (max 0.5)	0.5	0.5	0.5	0.5
Congested Peak Period VMT	80,000	80,000	100,000	100,000
Directional Factor	0.58	0.58	0.58	0.58
Peak Direction VMT	46,400	46,400	58,000	58,000
Off-Peak Direction VMT	33,600	33,600	42,000	42,000
Peak Direction speed	50.00	59.00	39.50	56.15
Off-Peak Direction speed	50.00	59.00	39.50	56.15
Freeflow speed	60	60	60	60
Recurring Peak Dir Delay (veh-hr)	155	13	502	66
Recurring Off-Peak Dir Delay (veh-hr)	62	-	219	27
Recurring delay (veh-hr)	217	13	721	93
Incident factor	2.5	1.25	2.5	1.25
Incident delay (veh-hr)	542	16	1,802	117
Daily delay (veh-hr)	759	29	2,523	210
Peak truck percent	0.1	0.1	0.1	0.1
Passngr car delay (veh-hr)	683	27	2,270	189
Commercial vehicle delay (veh-hr)	76	3	252	21
Value of time (psgr veh)	16.07	16.07	16.07	16.07
Value of commercial time	106.08	106.08	106.08	106.08
Annual psgr car delay (pers-hr)	213,500	8,294	709,464	59,004
Annual commercial delay (veh-hr)	18,978	737	63,063	5,245
Fuel cost	3.00	3.00	3.00	3.00
Fuel efficiency peak direction (mpg)	21.30	23.55	18.68	22.84
Fuel efficiency off-peak direc (mpg)	22.30	23.80	20.23	23.24
Freeflow fuel efficiency (mpg)	23.8	23.8	23.8	23.8
Peak fuel wasted (psgr car)	206	19	602	92
Off-Pk Fuel Wasted (psgr car)	85	-	281	38
Annual gallons wasted fuel	72,852	4,657	220,661	32,612
Annual fuel cost (psgr car)	218,555	13,970	661,982	97,837
Annual hours of delay (pers-hrs)	237,222	9,216	788,293	65,560
Annual delay cost psgr cars	3,430,945	133,292	11,401,081	948,192
Annual delay/fuel cost comm veh	2,013,163	78,212	6,689,769	556,367
Annual congestion cost	5,662,663	225,474	18,752,831	1,602,397
Travel Time Index	1.57	1.02	2.51	1.13
Incident speed (pk dir)	35.29	57.80	21.30	51.99
Incident speed (op dir)	43.20	60.00	28.64	55.20

**Congestion cost calculations (see summary of benefits on other worksheets) based on Alt C and D (10 Lanes on new bridge and 5 lanes on existing structure)**

Ohio (I-71)  
Current Volumes (2007)

Analysis Factor	Current (Base) Configuration			Alternative C&D Design		
	8-lane close to bridge	8-lane away from bridge	Corridor (Combination of close & away)	8-lane close to bridge	8-lane away from bridge	Corridor (Combination of close & away)
Daily traffic Volume (ADT)	115,000	150,000		115,000	150,000	
Miles	2.9	4.85		2.9	4.85	
Vehicle-Miles of Travel (VMT)	333,500	727,500		333,500	727,500	
Lanes	8	8		8	8	
Daily Traffic per Lane	14,375	18,750		14,375	18,750	
Peak Period VMT	166,750	363,750		166,750	363,750	
Peak Period factor (max 0.5)	0.5	0.5		0.5	0.5	
Congested Peak Period VMT	166,750	363,750		166,750	363,750	
Directional Factor	0.58	0.6		0.58	0.6	
Peak Direction VMT	96,715	218,250		96,715	218,250	
Off-Peak Direction VMT	70,035	145,500		70,035	145,500	
Peak Direction speed	59.00	51.75		59.00	51.75	
	59.00	51.75		59.00	51.75	
Off-Peak Direction speed	60.00	55.06		60.00	55.06	
	60.00	55.06		60.00	55.06	
Freeflow speed	60	60		60	60	
Recurring Peak Dir Delay (veh-hr)	27	580		27	580	
Recurring Off-Peak Dir Delay (veh-hr)	-	217		-	217	
Recurring delay (veh-hr)	27	797		27	797	
Incident factor	2.5	1.25		2.50	1.25	
Incident delay (veh-hr)	68	997		68	997	
Daily delay (veh-hr)	96	1,794		96	1,794	
Peak truck percent	0.05	0.04		0.05	0.04	
Passngr car delay (veh-hr)	91	1,722		91	1,722	
Commercial vehicle delay (veh-hr)	5	72		5	72	
Value of time (psgr veh)	16.07	16.07		16.07	16.07	
Value of commercial time	106.08	106.08		106.08	106.08	
Annual psgr car delay (pers-hr)	28,388	538,207		28,388	538,207	
Annual commercial delay (veh-hr)	1,195	17,940		1,195	17,940	
Fuel cost	3.00	3.00		3.00	3.00	
Fuel efficiency peak direction (mpg)	23.55	21.74		23.55	21.74	
Fuel efficiency off-peak direc (mpg)	23.80	22.57		23.80	22.57	
Freeflow fuel efficiency (mpg)	23.8	23.8		23.8	23.8	
Peak fuel wasted (psgr car)	41	835		41	835	
Off-Pk Fuel Wasted (psgr car)	-	321		-	321	
Annual gallons wasted fuel	10,245	289,080	299,325	10,245	289,080	299,325
Annual fuel cost (psgr car)	30,736	867,240	897,976	30,736	867,240	897,976
Annual hours of delay (pers-hrs)	29,882	560,632	590,514	29,882	560,632	590,514
Annual delay cost psgr cars	456,192	8,648,980	9,105,172	456,192	8,648,980	9,105,172
Annual delay/fuel cost comm veh	126,795	1,903,098	2,029,893	126,795	1,903,098	2,029,893
Annual congestion cost	613,724	11,419,318	12,033,042	613,724	11,419,318	12,033,042
Travel Time Index	1.03	1.30	1.21	1.03	1.30	1.21
Incident speed (pk dir)	56.64	44.16		56.64	44.16	
Incident speed (op dir)	60.00	49.93		60.00	49.93	



**Congestion cost calculations (see summary of benefits on other worksheets) based on Alt C and D (10 Lanes:  
new bridge and 5 lanes on existing structure)**

Ohio (I-71)  
Future Volumes (2030)

Analysis Factor	Current (Base) Configuration			Alternative C&D Design		
	8-lane close to bridge	8-lane away from bridge	Corridor (Combination of close & away)	8-lane close to bridge	8-lane away from bridge	Corridor (Combination of close & away)
Daily traffic Volume (ADT)	140,000	190,000		140,000	190,000	
Miles	2.9	4.85		2.9	4.85	
Vehicle-Miles of Travel (VMT)	406,000	921,500		406,000	921,500	
Lanes	8	8		8	8	
Daily Traffic per Lane	17,500	23,750		17,500	23,750	
Peak Period VMT	203,000	460,750		203,000	460,750	
Peak Period factor (max 0.5)	0.5	0.5		0.5	0.5	
Congested Peak Period VMT	203,000	460,750		203,000	460,750	
Directional Factor	0.58	0.6		0.58	0.6	
Peak Direction VMT	117,740	276,450		117,740	276,450	
Off-Peak Direction VMT	85,260	184,300		85,260	184,300	
Peak Direction speed	53.50	41.38		53.50	41.38	
	53.50	41.38		53.50	41.38	
Off-Peak Direction speed	56.13	47.63		56.13	47.63	
	56.13	47.63		56.13	47.63	
Freeflow speed	60	60		60	60	
Recurring Peak Dir Delay (veh-hr)	238	2,074		238	2,074	
Recurring Off-Peak Dir Delay (veh-hr)	98	798		98	798	
Recurring delay (veh-hr)	337	2,872		337	2,872	
Incident factor	1.25	1.25		1.25	1.25	
Incident delay (veh-hr)	421	3,590		421	3,590	
Daily delay (veh-hr)	757	6,462		757	6,462	
Peak truck percent	0.05	0.04		0.05	0.04	
Passngr car delay (veh-hr)	719	6,204		719	6,204	
Commercial vehicle delay (veh-hr)	38	258		38	258	
Value of time (psgr veh)	16.07	16.07		16.07	16.07	
Value of commercial time	106.08	106.08		106.08	106.08	
Annual psgr car delay (pers-hr)	224,787	1,938,749		224,787	1,938,749	
Annual commercial delay (veh-hr)	9,465	64,625		9,465	64,625	
Fuel cost	3.00	3.00		3.00	3.00	
Fuel efficiency peak direction (mpg)	22.18	19.14		22.18	19.14	
Fuel efficiency off-peak direc (mpg)	22.83	20.71		22.83	20.71	
Freeflow fuel efficiency (mpg)	23.8	23.8		23.8	23.8	
Peak fuel wasted (psgr car)	344	2,712		344	2,712	
Off-Pk Fuel Wasted (psgr car)	144	1,111		144	1,111	
Annual gallons wasted fuel	122,200	955,727	1,077,927	122,200	955,727	1,077,927
Annual fuel cost (psgr car)	366,600	2,867,180	3,233,780	366,600	2,867,180	3,233,780
Annual hours of delay (pers-hrs)	236,618	2,019,530	2,256,148	236,618	2,019,530	2,256,148
Annual delay cost psgr cars	3,612,330	31,155,695	34,768,025	3,612,330	31,155,695	34,768,025
Annual delay/fuel cost comm veh	1,004,018	6,855,416	7,859,434	1,004,018	6,855,416	7,859,434
Annual congestion cost	4,982,947	40,878,291	45,861,239	4,982,947	40,878,291	45,861,239
Travel Time Index	1.22	1.84	1.65	1.22	1.84	1.65
Incident speed (pk dir)	47.12	29.81		47.12	29.81	
Incident speed (op dir)	51.93	37.86		51.93	37.86	

son Congestion cost calculations (see summary of benefits on other worksheets) based on Alt C a on new bridge and 5 lanes on existing structure)

Ohio (I-75)  
Current Volumes (2007)

Analysis Factor	Current (Base) Configuration			Alternative C&D E	
	8-lane close to bridge	8-lane away from bridge	Corridor (Combination of close & away)	12-lane close to bridge	12-lane away from bridge
Daily traffic Volume (ADT)	170,000	160,000		170,000	160,000
Miles	2.8	4.87		2.8	4.87
Vehicle-Miles of Travel (VMT)	476,000	779,200		476,000	779,200
Lanes	8	8		12	12
Daily Traffic per Lane	21,250	20,000		14,167	13,333
Peak Period VMT	238,000	389,600		238,000	389,600
Peak Period factor (max 0.5)	0.5	0.5		0.5	0.5
Congested Peak Period VMT	238,000	389,600		238,000	389,600
Directional Factor	0.55	0.55		0.55	0.55
Peak Direction VMT	130,900	214,280		130,900	214,280
Off-Peak Direction VMT	107,100	175,320		107,100	175,320
Peak Direction speed	47.13	50.00		59.00	59.00
	47.13	50.00		59.00	59.00
Off-Peak Direction speed	51.88	54.00		60.00	60.00
	51.88	54.00		60.00	60.00
Freeflow speed	60	60		60	60
Recurring Peak Dir Delay (veh-hr)	596	714		37	61
Recurring Off-Peak Dir Delay (veh-hr)	280	325		-	-
Recurring delay (veh-hr)	876	1,039		37	61
Incident factor	2.5	1.25		1.25	1.25
Incident delay (veh-hr)	2,189	1,299		46	76
Daily delay (veh-hr)	3,065	2,338		83	136
Peak truck percent	0.05	0.05		0.05	0.05
Passngr car delay (veh-hr)	2,911	2,221		79	129
Commercial vehicle delay (veh-hr)	153	117		4	7
Value of time (psgr veh)	16.07	16.07		16.07	16.07
Value of commercial time	106.08	106.08		106.08	106.08
Annual psgr car delay (pers-hr)	909,835	693,975		24,700	40,433
Annual commercial delay (veh-hr)	38,309	29,220		1,040	1,702
Fuel cost	3.00	3.00		3.00	3.00
Fuel efficiency peak direction (mpg)	20.58	21.30		23.55	23.55
Fuel efficiency off-peak direc (mpg)	21.77	22.30		23.80	23.80
Freeflow fuel efficiency (mpg)	23.8	23.8		23.8	23.8
Peak fuel wasted (psgr car)	817	1,004		55	91
Off-Pk Fuel Wasted (psgr car)	399	471		-	-
Annual gallons wasted fuel	304,013	368,654	672,667	13,867	22,700
Annual fuel cost (psgr car)	912,039	1,105,963	2,018,002	41,600	68,099
Annual hours of delay (pers-hrs)	957,721	730,500	1,688,221	26,000	42,561
Annual delay cost psgr cars	14,621,045	11,152,178	25,773,223	396,925	649,756
Annual delay/fuel cost comm veh	4,063,801	3,099,658	7,163,459	110,322	180,594
Annual congestion cost	19,596,885	15,357,799	34,954,684	548,847	898,449
Travel Time Index	1.77	1.36	1.52	1.02	1.02
Incident speed (pk dir)	30.67	41.38		57.80	57.80
Incident speed (op dir)	38.75	48.00		60.00	60.00

ind D (10 Lanes

Design  
Corridor  
(Combination of  
close & away)

0

36,566  
109,699  
68,561  
1,046,681  
290,917  
1,447,297  
1.02

**Congestion cost calculations (see summary of benefits on other worksheets) based on Alt C and D (10 Lanes on new bridge and 5 lanes on existing structure)**

Ohio (I-75)  
Future Volumes (2030)

Analysis Factor	Current (Base) Configuration			Alternative C&D Design		
	8-lane close to bridge	8-lane away from bridge	Corridor (Combination of close & away)	12-lane close to bridge	12-lane away from bridge	Corridor (Combination of close & away)
Daily traffic Volume (ADT)	190,000	220,000		190,000	220,000	
Miles	2.8	4.87		2.8	4.87	
Vehicle-Miles of Travel (VMT)	532,000	1,071,400		532,000	1,071,400	
Lanes	8	8		12	12	
Daily Traffic per Lane	23,750	27,500		15,833	18,333	
Peak Period VMT	266,000	535,700		266,000	535,700	
Peak Period factor (max 0.5)	0.5	0.5		0.5	0.5	
Congested Peak Period VMT	266,000	535,700		266,000	535,700	
Directional Factor	0.55	0.55		0.55	0.55	
Peak Direction VMT	146,300	294,635		146,300	294,635	
Off-Peak Direction VMT	119,700	241,065		119,700	241,065	
Peak Direction speed	41.38	35.85		55.75	52.33	
	41.38	35.85		55.75	52.33	
Off-Peak Direction speed	47.63	41.25		57.50	56.00	
	47.63	41.25		57.50	56.00	
Freeflow speed	60	60		60	60	
Recurring Peak Dir Delay (veh-hr)	1,098	3,308		186	719	
Recurring Off-Peak Dir Delay (veh-hr)	518	1,826		87	287	
Recurring delay (veh-hr)	1,616	5,134		273	1,006	
Incident factor	2.5	1.25		1.25	1.25	
Incident delay (veh-hr)	4,040	6,418		341	1,258	
Daily delay (veh-hr)	5,656	11,552		613	2,264	
Peak truck percent	0.05	0.05		0.05	0.05	
Passngr car delay (veh-hr)	5,373	10,974		583	2,151	
Commercial vehicle delay (veh-hr)	283	578		31	113	
Value of time (psgr veh)	16.07	16.07		16.07	16.07	
Value of commercial time	106.08	106.08		106.08	106.08	
Annual psgr car delay (pers-hr)	1,679,129	3,429,496		182,102	672,222	
Annual commercial delay (veh-hr)	70,700	144,400		7,667	28,304	
Fuel cost	3.00	3.00		3.00	3.00	
Fuel efficiency peak direction (mpg)	19.14	17.76		22.74	21.88	
Fuel efficiency off-peak direc (mpg)	20.71	19.11		23.18	22.80	
Freeflow fuel efficiency (mpg)	23.8	23.8		23.8	23.8	
Peak fuel wasted (psgr car)	1,420	3,997		273	1,030	
Off-Pk Fuel Wasted (psgr car)	714	2,360		129	422	
Annual gallons wasted fuel	533,561	1,589,355	2,122,916	100,435	363,024	463,459
Annual fuel cost (psgr car)	1,600,684	4,768,064	6,368,748	301,304	1,089,072	1,390,376
Annual hours of delay (pers-hrs)	1,767,505	3,609,996	5,377,500	191,687	707,602	899,288
Annual delay cost psgr cars	26,983,608	55,112,000	82,095,608	2,926,385	10,802,602	13,728,987
Annual delay/fuel cost comm veh	7,499,875	15,317,934	22,817,809	813,365	3,002,496	3,815,861
Annual congestion cost	36,084,167	75,197,998	111,282,165	4,041,053	14,894,170	18,935,224
Travel Time Index	2.28	2.29	2.29	1.14	1.25	1.22
Incident speed (pk dir)	23.30	23.85		51.22	45.13	
Incident speed (op dir)	31.42	29.66		54.65	51.69	

		From OKI COG	TTI Estimate
		base economic shipper impacts	base configuration delay growth
Base economic shipper impacts - from OKI COG \$684M in 2005\$; \$755M in 2008\$	2005	755	
annual growth in shippers economic effect	2006	775	
1.026	2007	795	3,914,819
base config annual delay growth	2008	815	4,127,686
1.054	2009	836	4,352,127
15-lane annual delay growth	2010	858	4,588,773
1.072	2011	880	4,838,286
	2012	903	5,101,366
	2013	926	5,378,751
	2014	950	5,671,219
	2015	975	5,979,589
	2016	1,000	6,304,727
	2017	1,026	6,647,545
	2018	1,052	7,009,003
	2019	1,080	7,390,115
	2020	1,108	7,791,950
	2021	1,136	8,215,635
	2022	1,166	8,662,357
	2023	1,196	9,133,370
	2024	1,227	9,629,994
	2025	1,259	10,153,622
	2026	1,291	10,705,721
	2027	1,324	11,287,841
From OKI COG	2028	1,359	11,901,614
2030 economic shipper impacts	2029	1,394	12,548,760
\$1.3B in 2005\$; \$1.43B in 2008\$	2030	1,430	14,709,087
	2031	1,467	15,508,888
	2032	1,505	16,352,179
	2033	1,544	17,241,323
	2034	1,584	18,178,815
	2035	1,625	19,167,281
	2036	1,667	20,209,496
	2037	1,710	21,308,381
	2038	1,754	22,467,017
	2039	1,800	23,688,653
	2040	1,846	24,976,716

From OKI COG	TTI Estimate	TTI Estimates		TTI Estimates	
		base economic benefit	15-lane economic benefit	base configuration	15-lane roadway
15-lane economic shipper impacts	15-lane delay growth			Congestion cost (millions of 2008\$)	
				growth rates	
				1.055	1.074
	745,729			88	16
	799,391			93	17
	856,914			98	18
	918,576			104	19
	984,676			109	21
	1,055,532			115	22
	1,131,487			122	24
	1,212,908			128	26
	1,300,187			136	28
	1,393,747			143	30
	1,494,040			151	32
	1,601,549			159	34
	1,716,795			168	37
	1,840,333	262	846	177	40
262	1,972,762	268	868	187	42
	2,114,719	275	890	197	46
	2,266,892	282	913	208	49
	2,430,015	290	937	219	52
	2,604,876	297	961	231	56
	2,792,320	305	986	244	60
	2,993,252	313	1,012	257	65
	3,208,643	321	1,038	271	70
	3,439,534	329	1,065	286	75
	4,236,760	338	1,092	336	93
	4,541,633	346	1,121	354	99
	4,868,444	355	1,150	374	107
	5,218,771	365	1,179	394	115
	5,594,308	374	1,210	416	123
	5,996,868	384	1,241	438	132
	6,428,396	394	1,273	463	142
	6,890,976	404	1,306	488	152
	7,386,843	414	1,340	515	163
	7,918,392	425	1,375	543	175
	8,488,190				
		6,742	21,803	6,596	1,855
divided by 2		3,371	10,901	Total benefit - 2020 to 2039 (20 years)	\$ 4,741
(assume that only half of the total corridor analyzed by OKI will be affected by project)					

**Congestion Analysis Summary**

Congestion Measure	Base	Build
Travel Time Index	2.14	1.33
Annual Person-hours of Delay		
Recurring	5,827,659	1,883,005
Incident	8,881,428	2,353,756
Total	14,709,087	4,236,760
Annual Wasted Fuel (gal)	5,737,247	2,059,426
Annual Congestion Cost (\$mil)	336	93

Economic efficiencies value is from calcs tab. (Between \$10.9 billion and \$11.1 billion. This is derived from OKI COG study; we estimated the change in delay and applied to the base OKI data (\$684 million in congestion value to shippers in 2005)

Economic return on the increased efficiencies is \$1.7 billion. The improved efficiencies translate into higher profits (assume 5% profit margin); the profit that gets paid out is income to someone and this component measures the economic impact of that income.

The construction impact is \$1.6 billion. The payroll, materials, etc. This is based on the construction cost spread over 6 years of construction schedule.

Delay and fuel savings are based on change in congestion levels from current case to either of the wider roadways.

### 20-year totals, millions of 2008 dollars

	15 total lanes on all bridges
Economic efficiencies	10,901
Economic return on increased efficiencies	1,700
Construction impact	1,600
Delay and fuel benefits	4,741

### Total project benefits

**18,942**

**\$18.9 billion in economic impact**

### Conditions in 2030

	Current Configuration	15 total lanes on all bridges
Congestion Measure		
Travel Time Index	2.14	1.33
Buffer Index	90%	40%
Annual Person-hours of Delay		
Recurring	5,827,659	1,883,005
Incident	8,881,428	2,353,756
Total	14,709,087	4,236,760
Annual Wasted Fuel (gal)	<b>5,737,247</b>	<b>2,059,426</b>
Annual Congestion Cost (\$Million)	336	93





**Congestion cost calculations (see summary of benefits on other worksheets) based on Alt C and D (10 Lanes on new bridge and 5 lanes on existing structure)**

Kentucky I-71 and I-75  
Current Volumes (2007)

Analysis Factor	Current (Base) Configuration			Alternative C&D Design		
	8-lane close to bridge	8-lane away from bridge	Corridor (Combination of close & away)	14-lane close to bridge	12-lane away from bridge	Corridor (Combination of close & away)
Daily traffic Volume (ADT)	155,000	160,000		155,000	160,000	
Miles	2	6.465		2	6.465	
Vehicle-Miles of Travel (VMT)	310,000	1,034,400		310,000	1,034,400	
Lanes	8	8		14	12	
Daily Traffic per Lane	19,375	20,000		11,071	13,333	
Peak Period VMT	155,000	517,200		155,000	517,200	
Peak Period factor (max 0.5)	0.5	0.5		0.5	0.5	
Congested Peak Period VMT	155,000	517,200		155,000	517,200	
Directional Factor	0.58	0.58		0.58	0.58	
Peak Direction VMT	89,900	299,976		89,900	299,976	
Off-Peak Direction VMT	65,100	217,224		65,100	217,224	
Peak Direction speed	50.88	50.00		59.00	59.00	
	50.88	50.00		59.00	59.00	
Off-Peak Direction speed	54.53	54.00		60.00	60.00	
	54.53	54.00		60.00	60.00	
Freeflow speed	60	60		60	60	
Recurring Peak Dir Delay (veh-hr)	269	1,000		25	85	
Recurring Off-Peak Dir Delay (veh-hr)	109	402		-	-	
Recurring delay (veh-hr)	378	1,402		25	85	
Incident factor	2.5	1.25		1.25	1.25	
Incident delay (veh-hr)	944	1,753		32	106	
Daily delay (veh-hr)	1,321	3,155		57	191	
Peak truck percent	0.12	0.12		0.12	0.12	
Passngr car delay (veh-hr)	1,163	2,776		50	168	
Commercial vehicle delay (veh-hr)	159	379		7	23	
Value of time (psgr veh)	16.07	16.07		16.07	16.07	
Value of commercial time	106.08	106.08		106.08	106.08	
Annual psgr car delay (pers-hr)	363,395	867,603		15,713	52,432	
Annual commercial delay (veh-hr)	39,643	94,648		1,714	5,720	
Fuel cost	3.00	3.00		3.00	3.00	
Fuel efficiency peak direction (mpg)	21.52	21.30		23.55	23.55	
Fuel efficiency off-peak direc (mpg)	22.43	22.30		23.80	23.80	
Freeflow fuel efficiency (mpg)	23.8	23.8		23.8	23.8	
Peak fuel wasted (psgr car)	352	1,302		35	118	
Off-Pk Fuel Wasted (psgr car)	147	540		-	-	
Annual gallons wasted fuel	124,772	460,520	585,292	8,822	29,436	38,258
Annual fuel cost (psgr car)	374,316	1,381,561	1,755,877	26,465	88,309	114,774
Annual hours of delay (pers-hrs)	412,949	985,913	1,398,862	17,856	59,582	77,438
Annual delay cost psgr cars	5,839,765	13,942,380	19,782,145	252,515	842,586	1,095,101
Annual delay/fuel cost comm veh	4,205,344	10,040,217	14,245,562	181,842	606,765	788,607
Annual congestion cost	10,419,426	25,364,159	35,783,584	460,822	1,537,660	1,998,482
Travel Time Index	1.51	1.37	1.40	1.02	1.02	1.02
Incident speed (pk dir)	36.86	41.38		57.80	57.80	
Incident speed (op dir)	44.41	48.00		60.00	60.00	

**Congestion cost calculations (see summary of benefits on other worksheets) based on Alt C and D (10 Lanes on new bridge and 5 lanes on existing structure)**

Kentucky I-71 and I-75  
Future Volumes (2030)

Analysis Factor	Current (Base) Configuration			Alternative C&D Design		
	8-lane close to bridge	8-lane away from bridge	Corridor (Combination of close & away)	14-lane close to bridge	12-lane away from bridge	Corridor (Combination of close & away)
Daily traffic Volume (ADT)	210,000	215,000		210,000	215,000	
Miles	2	6.465		2	6.465	
Vehicle-Miles of Travel (VMT)	420,000	1,389,975		420,000	1,389,975	
Lanes	8	8		14	12	
Daily Traffic per Lane	26,250	26,875		15,000	17,917	
Peak Period VMT	210,000	694,988		210,000	694,988	
Peak Period factor (max 0.5)	0.5	0.5		0.5	0.5	
Congested Peak Period VMT	210,000	694,988		210,000	694,988	
Directional Factor	0.58	0.58		0.58	0.58	
Peak Direction VMT	121,800	403,093		121,800	403,093	
Off-Peak Direction VMT	88,200	291,895		88,200	291,895	
Peak Direction speed	37.68	36.76		56.50	52.92	
	37.68	36.76		56.50	52.92	
Off-Peak Direction speed	43.70	42.70		58.00	55.77	
	43.70	42.70		58.00	55.77	
Freeflow speed	60	60		60	60	
Recurring Peak Dir Delay (veh-hr)	1,203	4,247		126	899	
Recurring Off-Peak Dir Delay (veh-hr)	548	1,971		51	369	
Recurring delay (veh-hr)	1,751	6,218		176	1,268	
Incident factor	2.5	1.25		1.25	1.25	
Incident delay (veh-hr)	4,378	7,772		221	1,585	
Daily delay (veh-hr)	6,129	13,990		397	2,853	
Peak truck percent	0.12	0.12		0.12	0.12	
Passngr car delay (veh-hr)	5,394	12,311		349	2,511	
Commercial vehicle delay (veh-hr)	736	1,679		48	342	
Value of time (psgr veh)	16.07	16.07		16.07	16.07	
Value of commercial time	106.08	106.08		106.08	106.08	
Annual psgr car delay (pers-veh-hr)	1,685,549	3,847,139		109,173	784,699	
Annual commercial delay (veh-hr)	183,878	419,688		11,910	85,604	
Fuel cost	3.00	3.00		3.00	3.00	
Fuel efficiency peak direction	18.22	17.99		22.93	22.03	
Fuel efficiency off-peak direction	19.73	19.48		23.30	22.74	
Freeflow fuel efficiency (mpg)	23.8	23.8		23.8	23.8	
Peak fuel wasted (psgr car)	1,380	4,813		172	1,198	
Off-Pk Fuel Wasted (psgr car)	674	2,397		70	502	
Annual gallons wasted fuel	513,342	1,802,401	2,315,743	60,468	424,960	485,428
Annual fuel cost (psgr car)	1,540,027	5,407,204	6,947,230	181,405	1,274,879	1,456,284
Annual hours of delay (pers-veh-hr)	1,915,397	4,371,749	6,287,145	124,061	891,703	1,015,764
Annual delay cost psgr cars	27,086,772	61,823,523	88,910,295	1,754,417	12,610,111	14,364,528
Annual delay/fuel cost comm	19,505,786	44,520,491	64,026,277	1,263,394	9,080,821	10,344,215
Annual congestion cost	48,132,584	111,751,218	159,883,802	3,199,216	22,965,811	26,165,027
Travel Time Index	2.75	2.21	2.33	1.11	1.25	1.22
Incident speed (pk dir)	19.52	24.77		52.66	46.11	
Incident speed (op dir)	26.02	31.39		55.68	51.25	

**Congestion cost calculations (see summary of benefits on other worksheets) based on Alt C and D (10 Lanes on new bridge and 5 lanes on existing structure)**

Brent Spence Bridge  
Current Volumes (2007)

Brent Spence Bridge  
Future Volumes (2030)

Analysis Factor	Brent Spence Bridge Current Volumes (2007)		Brent Spence Bridge Future Volumes (2030)	
	Current (Base) Configuration 8-lane on bridge	Alternative C&D Design 15 lanes on bridge	Current (Base) Configuration 8-lane on bridge	Alternative C&D Design 15 lanes on bridge
Daily traffic Volume (ADT)	160,000	160,000	200,000	200,000
Miles	1	1	1	1
Vehicle-Miles of Travel (VMT)	160,000	160,000	200,000	200,000
Lanes	8	13	8	13
Daily Traffic per Lane	20,000	12,308	25,000	15,385
Peak Period VMT	80,000	80,000	100,000	100,000
Peak Period factor (max 0.5)	0.5	0.5	0.5	0.5
Congested Peak Period VMT	80,000	80,000	100,000	100,000
Directional Factor	0.58	0.58	0.58	0.58
Peak Direction VMT	46,400	46,400	58,000	58,000
Off-Peak Direction VMT	33,600	33,600	42,000	42,000
Peak Direction speed	50.00	59.00	39.50	56.15
	50.00	59.00	39.50	56.15
Off-Peak Direction speed	54.00	60.00	45.70	57.77
	54.00	60.00	45.70	57.77
Freeflow speed	60	60	60	60
Recurring Peak Dir Delay (veh-hr)	155	13	502	66
Recurring Off-Peak Dir Delay (veh-hr)	62	-	219	27
Recurring delay (veh-hr)	217	13	721	93
Incident factor	2.5	1.25	2.5	1.25
Incident delay (veh-hr)	542	16	1,802	117
Daily delay (veh-hr)	759	29	2,523	210
Peak truck percent	0.1	0.1	0.1	0.1
Passngr car delay (veh-hr)	683	27	2,270	189
Commercial vehicle delay (veh-hr)	76	3	252	21
Value of time (psgr veh)	16.07	16.07	16.07	16.07
Value of commercial time	106.08	106.08	106.08	106.08
Annual psgr car delay (pers-hr)	213,500	8,294	709,464	59,004
Annual commercial delay (veh-hr)	18,978	737	63,063	5,245
Fuel cost	3.00	3.00	3.00	3.00
Fuel efficiency peak direction (mpg)	21.30	23.55	18.68	22.84
Fuel efficiency off-peak direc (mpg)	22.30	23.80	20.23	23.24
Freeflow fuel efficiency (mpg)	23.8	23.8	23.8	23.8
Peak fuel wasted (psgr car)	206	19	602	92
Off-Pk Fuel Wasted (psgr car)	85	-	281	38
Annual gallons wasted fuel	72,852	4,657	220,661	32,612
Annual fuel cost (psgr car)	218,555	13,970	661,982	97,837
Annual hours of delay (pers-hrs)	237,222	9,216	788,293	65,560
Annual delay cost psgr cars	3,430,945	133,292	11,401,081	948,192
Annual delay/fuel cost comm veh	2,013,163	78,212	6,689,769	556,367
Annual congestion cost	5,662,663	225,474	18,752,831	1,602,397
Travel Time Index	1.57	1.02	2.51	1.13
Incident speed (pk dir)	35.29	57.80	21.30	51.99
Incident speed (op dir)	43.20	60.00	28.64	55.20

**Congestion cost calculations (see summary of benefits on other worksheets) based on Alt C and D (10 Lanes on new bridge and 5 lanes on existing structure)**

Ohio (I-71)  
Current Volumes (2007)

Analysis Factor	Current (Base) Configuration			Alternative C&D Design		
	8-lane close to bridge	8-lane away from bridge	Corridor (Combination of close & away)	8-lane close to bridge	8-lane away from bridge	Corridor (Combination of close & away)
Daily traffic Volume (ADT)	115,000	150,000		115,000	150,000	
Miles	2.9	4.85		2.9	4.85	
Vehicle-Miles of Travel (VMT)	333,500	727,500		333,500	727,500	
Lanes	8	8		8	8	
Daily Traffic per Lane	14,375	18,750		14,375	18,750	
Peak Period VMT	166,750	363,750		166,750	363,750	
Peak Period factor (max 0.5)	0.5	0.5		0.5	0.5	
Congested Peak Period VMT	166,750	363,750		166,750	363,750	
Directional Factor	0.58	0.6		0.58	0.6	
Peak Direction VMT	96,715	218,250		96,715	218,250	
Off-Peak Direction VMT	70,035	145,500		70,035	145,500	
Peak Direction speed	59.00	51.75		59.00	51.75	
	59.00	51.75		59.00	51.75	
Off-Peak Direction speed	60.00	55.06		60.00	55.06	
	60.00	55.06		60.00	55.06	
Freeflow speed	60	60		60	60	
Recurring Peak Dir Delay (veh-hr)	27	580		27	580	
Recurring Off-Peak Dir Delay (veh-hr)	-	217		-	217	
Recurring delay (veh-hr)	27	797		27	797	
Incident factor	2.5	1.25		2.50	1.25	
Incident delay (veh-hr)	68	997		68	997	
Daily delay (veh-hr)	96	1,794		96	1,794	
Peak truck percent	0.05	0.04		0.05	0.04	
Passngr car delay (veh-hr)	91	1,722		91	1,722	
Commercial vehicle delay (veh-hr)	5	72		5	72	
Value of time (psgr veh)	16.07	16.07		16.07	16.07	
Value of commercial time	106.08	106.08		106.08	106.08	
Annual psgr car delay (pers-hr)	28,388	538,207		28,388	538,207	
Annual commercial delay (veh-hr)	1,195	17,940		1,195	17,940	
Fuel cost	3.00	3.00		3.00	3.00	
Fuel efficiency peak direction (mpg)	23.55	21.74		23.55	21.74	
Fuel efficiency off-peak direc (mpg)	23.80	22.57		23.80	22.57	
Freeflow fuel efficiency (mpg)	23.8	23.8		23.8	23.8	
Peak fuel wasted (psgr car)	41	835		41	835	
Off-Pk Fuel Wasted (psgr car)	-	321		-	321	
Annual gallons wasted fuel	10,245	289,080	299,325	10,245	289,080	299,325
Annual fuel cost (psgr car)	30,736	867,240	897,976	30,736	867,240	897,976
Annual hours of delay (pers-hrs)	29,882	560,632	590,514	29,882	560,632	590,514
Annual delay cost psgr cars	456,192	8,648,980	9,105,172	456,192	8,648,980	9,105,172
Annual delay/fuel cost comm veh	126,795	1,903,098	2,029,893	126,795	1,903,098	2,029,893
Annual congestion cost	613,724	11,419,318	12,033,042	613,724	11,419,318	12,033,042
Travel Time Index	1.03	1.30	1.21	1.03	1.30	1.21
Incident speed (pk dir)	56.64	44.16		56.64	44.16	
Incident speed (op dir)	60.00	49.93		60.00	49.93	

**Congestion cost calculations (see summary of benefits on other worksheets) based on Alt C and D (10 Lane: new bridge and 5 lanes on existing structure)**

Ohio (I-71)  
Future Volumes (2030)

Analysis Factor	Current (Base) Configuration			Alternative C&D Design		
	8-lane close to bridge	8-lane away from bridge	Corridor (Combination of close & away)	8-lane close to bridge	8-lane away from bridge	Corridor (Combination of close & away)
Daily traffic Volume (ADT)	140,000	190,000		140,000	190,000	
Miles	2.9	4.85		2.9	4.85	
Vehicle-Miles of Travel (VMT)	406,000	921,500		406,000	921,500	
Lanes	8	8		8	8	
Daily Traffic per Lane	17,500	23,750		17,500	23,750	
Peak Period VMT	203,000	460,750		203,000	460,750	
Peak Period factor (max 0.5)	0.5	0.5		0.5	0.5	
Congested Peak Period VMT	203,000	460,750		203,000	460,750	
Directional Factor	0.58	0.6		0.58	0.6	
Peak Direction VMT	117,740	276,450		117,740	276,450	
Off-Peak Direction VMT	85,260	184,300		85,260	184,300	
Peak Direction speed	53.50	41.38		53.50	41.38	
Off-Peak Direction speed	56.13	47.63		56.13	47.63	
Freeflow speed	60	60		60	60	
Recurring Peak Dir Delay (veh-hr)	238	2,074		238	2,074	
Recurring Off-Peak Dir Delay (veh-hr)	98	798		98	798	
Recurring delay (veh-hr)	337	2,872		337	2,872	
Incident factor	1.25	1.25		1.25	1.25	
Incident delay (veh-hr)	421	3,590		421	3,590	
Daily delay (veh-hr)	757	6,462		757	6,462	
Peak truck percent	0.05	0.04		0.05	0.04	
Passngr car delay (veh-hr)	719	6,204		719	6,204	
Commercial vehicle delay (veh-hr)	38	258		38	258	
Value of time (psgr veh)	16.07	16.07		16.07	16.07	
Value of commercial time	106.08	106.08		106.08	106.08	
Annual psgr car delay (pers-hr)	224,787	1,938,749		224,787	1,938,749	
Annual commercial delay (veh-hr)	9,465	64,625		9,465	64,625	
Fuel cost	3.00	3.00		3.00	3.00	
Fuel efficiency peak direction (mpg)	22.18	19.14		22.18	19.14	
Fuel efficiency off-peak direc (mpg)	22.83	20.71		22.83	20.71	
Freeflow fuel efficiency (mpg)	23.8	23.8		23.8	23.8	
Peak fuel wasted (psgr car)	344	2,712		344	2,712	
Off-Pk Fuel Wasted (psgr car)	144	1,111		144	1,111	
Annual gallons wasted fuel	122,200	955,727	1,077,927	122,200	955,727	1,077,927
Annual fuel cost (psgr car)	366,600	2,867,180	3,233,780	366,600	2,867,180	3,233,780
Annual hours of delay (pers-hrs)	236,618	2,019,530	2,256,148	236,618	2,019,530	2,256,148
Annual delay cost psgr cars	3,612,330	31,155,695	34,768,025	3,612,330	31,155,695	34,768,025
Annual delay/fuel cost comm veh	1,004,018	6,855,416	7,859,434	1,004,018	6,855,416	7,859,434
Annual congestion cost	4,982,947	40,878,291	45,861,239	4,982,947	40,878,291	45,861,239
Travel Time Index	1.22	1.84	1.65	1.22	1.84	1.65
Incident speed (pk dir)	47.12	29.81		47.12	29.81	
Incident speed (op dir)	51.93	37.86		51.93	37.86	

**son Congestion cost calculations (see summary of benefits on other worksheets) based on Alt C a on new bridge and 5 lanes on existing structure)**

Ohio (I-75)  
Current Volumes (2007)

Analysis Factor	Current (Base) Configuration			Alternative C&D	
	8-lane close to bridge	8-lane away from bridge	Corridor (Combination of close & away)	12-lane close to bridge	12-lane away from bridge
Daily traffic Volume (ADT)	170,000	160,000		170,000	160,000
Miles	2.8	4.87		2.8	4.87
Vehicle-Miles of Travel (VMT)	476,000	779,200		476,000	779,200
Lanes	8	8		12	12
Daily Traffic per Lane	21,250	20,000		14,167	13,333
Peak Period VMT	238,000	389,600		238,000	389,600
Peak Period factor (max 0.5)	0.5	0.5		0.5	0.5
Congested Peak Period VMT	238,000	389,600		238,000	389,600
Directional Factor	0.55	0.55		0.55	0.55
Peak Direction VMT	130,900	214,280		130,900	214,280
Off-Peak Direction VMT	107,100	175,320		107,100	175,320
Peak Direction speed	47.13	50.00		59.00	59.00
Off-Peak Direction speed	47.13	50.00		59.00	59.00
Freeflow speed	60	60		60	60
Recurring Peak Dir Delay (veh-hr)	596	714		37	61
Recurring Off-Peak Dir Delay (veh-hr)	280	325		-	-
Recurring delay (veh-hr)	876	1,039		37	61
Incident factor	2.5	1.25		1.25	1.25
Incident delay (veh-hr)	2,189	1,299		46	76
Daily delay (veh-hr)	3,065	2,338		83	136
Peak truck percent	0.05	0.05		0.05	0.05
Passngr car delay (veh-hr)	2,911	2,221		79	129
Commercial vehicle delay (veh-hr)	153	117		4	7
Value of time (psgr veh)	16.07	16.07		16.07	16.07
Value of commercial time	106.08	106.08		106.08	106.08
Annual psgr car delay (pers-hr)	909,835	693,975		24,700	40,433
Annual commercial delay (veh-hr)	38,309	29,220		1,040	1,702
Fuel cost	3.00	3.00		3.00	3.00
Fuel efficiency peak direction (mpg)	20.58	21.30		23.55	23.55
Fuel efficiency off-peak direc (mpg)	21.77	22.30		23.80	23.80
Freeflow fuel efficiency (mpg)	23.8	23.8		23.8	23.8
Peak fuel wasted (psgr car)	817	1,004		55	91
Off-Pk Fuel Wasted (psgr car)	399	471		-	-
Annual gallons wasted fuel	304,013	368,654	672,667	13,867	22,700
Annual fuel cost (psgr car)	912,039	1,105,963	2,018,002	41,600	68,099
Annual hours of delay (pers-hrs)	957,721	730,500	1,688,221	26,000	42,561
Annual delay cost psgr cars	14,621,045	11,152,178	25,773,223	396,925	649,756
Annual delay/fuel cost comm veh	4,063,801	3,099,658	7,163,459	110,322	180,594
Annual congestion cost	19,596,885	15,357,799	34,954,684	548,847	898,449
Travel Time Index	1.77	1.36	1.52	1.02	1.02
Incident speed (pk dir)	30.67	41.38		57.80	57.80
Incident speed (op dir)	38.75	48.00		60.00	60.00

ind D (10 Lanes

Design  
Corridor  
(Combination of  
close & away)

0

36,566

109,699

68,561

1,046,681

290,917

1,447,297

1.02



**Congestion cost calculations (see summary of benefits on other worksheets) based on Alt C and D (10 Lanes on new bridge and 5 lanes on existing structure)**

Ohio (I-75)  
Future Volumes (2030)

Analysis Factor	Current (Base) Configuration			Alternative C&D Design		
	8-lane close to bridge	8-lane away from bridge	Corridor (Combination of close & away)	12-lane close to bridge	12-lane away from bridge	Corridor (Combination of close & away)
Daily traffic Volume (ADT)	190,000	220,000		190,000	220,000	
Miles	2.8	4.87		2.8	4.87	
Vehicle-Miles of Travel (VMT)	532,000	1,071,400		532,000	1,071,400	
Lanes	8	8		12	12	
Daily Traffic per Lane	23,750	27,500		15,833	18,333	
Peak Period VMT	266,000	535,700		266,000	535,700	
Peak Period factor (max 0.5)	0.5	0.5		0.5	0.5	
Congested Peak Period VMT	266,000	535,700		266,000	535,700	
Directional Factor	0.55	0.55		0.55	0.55	
Peak Direction VMT	146,300	294,635		146,300	294,635	
Off-Peak Direction VMT	119,700	241,065		119,700	241,065	
Peak Direction speed	41.38	35.85		55.75	52.33	
	41.38	35.85		55.75	52.33	
Off-Peak Direction speed	47.63	41.25		57.50	56.00	
	47.63	41.25		57.50	56.00	
Freeflow speed	60	60		60	60	
Recurring Peak Dir Delay (veh-hr)	1,098	3,308		186	719	
Recurring Off-Peak Dir Delay (veh-hr)	518	1,826		87	287	
Recurring delay (veh-hr)	1,616	5,134		273	1,006	
Incident factor	2.5	1.25		1.25	1.25	
Incident delay (veh-hr)	4,040	6,418		341	1,258	
Daily delay (veh-hr)	5,656	11,552		613	2,264	
Peak truck percent	0.05	0.05		0.05	0.05	
Passngr car delay (veh-hr)	5,373	10,974		583	2,151	
Commercial vehicle delay (veh-hr)	283	578		31	113	
Value of time (psgr veh)	16.07	16.07		16.07	16.07	
Value of commercial time	106.08	106.08		106.08	106.08	
Annual psgr car delay (pers-hr)	1,679,129	3,429,496		182,102	672,222	
Annual commercial delay (veh-hr)	70,700	144,400		7,667	28,304	
Fuel cost	3.00	3.00		3.00	3.00	
Fuel efficiency peak direction (mpg)	19.14	17.76		22.74	21.88	
Fuel efficiency off-peak direc (mpg)	20.71	19.11		23.18	22.80	
Freeflow fuel efficiency (mpg)	23.8	23.8		23.8	23.8	
Peak fuel wasted (psgr car)	1,420	3,997		273	1,030	
Off-Pk Fuel Wasted (psgr car)	714	2,360		129	422	
Annual gallons wasted fuel	533,561	1,589,355	2,122,916	100,435	363,024	463,459
Annual fuel cost (psgr car)	1,600,684	4,768,064	6,368,748	301,304	1,089,072	1,390,376
Annual hours of delay (pers-hrs)	1,767,505	3,609,996	5,377,500	191,687	707,602	899,288
Annual delay cost psgr cars	26,983,608	55,112,000	82,095,608	2,926,385	10,802,602	13,728,987
Annual delay/fuel cost comm veh	7,499,875	15,317,934	22,817,809	813,365	3,002,496	3,815,861
Annual congestion cost	36,084,167	75,197,998	111,282,165	4,041,053	14,894,170	18,935,224
Travel Time Index	2.28	2.29	2.29	1.14	1.25	1.22
Incident speed (pk dir)	23.30	23.85		51.22	45.13	
Incident speed (op dir)	31.42	29.66		54.65	51.69	

		From OKI COG	TTI Estimate
		base economic shipper impacts	base configuration delay growth
Base economic shipper impacts - from OKI COG \$684M in 2005\$; \$755M in 2008\$	2005	755	
annual growth in shippers economic effect	2006	775	
1.026	2007	795	3,914,819
base config annual delay growth	2008	815	4,127,686
1.054	2009	836	4,352,127
15-lane annual delay growth	2010	858	4,588,773
1.072	2011	880	4,838,286
	2012	903	5,101,366
	2013	926	5,378,751
	2014	950	5,671,219
	2015	975	5,979,589
	2016	1,000	6,304,727
	2017	1,026	6,647,545
	2018	1,052	7,009,003
	2019	1,080	7,390,115
	2020	1,108	7,791,950
	2021	1,136	8,215,635
	2022	1,166	8,662,357
	2023	1,196	9,133,370
	2024	1,227	9,629,994
	2025	1,259	10,153,622
	2026	1,291	10,705,721
	2027	1,324	11,287,841
From OKI COG	2028	1,359	11,901,614
2030 economic shipper impacts	2029	1,394	12,548,760
\$1.3B in 2005\$; \$1.43B in 2008\$	2030	1,430	14,709,087
	2031	1,467	15,508,888
	2032	1,505	16,352,179
	2033	1,544	17,241,323
	2034	1,584	18,178,815
	2035	1,625	19,167,281
	2036	1,667	20,209,496
	2037	1,710	21,308,381
	2038	1,754	22,467,017
	2039	1,800	23,688,653
	2040	1,846	24,976,716

From OKI COG	TTI Estimate	TTI Estimates		TTI Estimates	
		base economic benefit	15-lane economic benefit	base configuration	15-lane roadway
15-lane economic shipper impacts	15-lane delay growth			Congestion cost (millions of 2008\$)	
				growth rates	
				1.055	1.074
	745,729			88	16
	799,391			93	17
	856,914			98	18
	918,576			104	19
	984,676			109	21
	1,055,532			115	22
	1,131,487			122	24
	1,212,908			128	26
	1,300,187			136	28
	1,393,747			143	30
	1,494,040			151	32
	1,601,549			159	34
	1,716,795			168	37
	1,840,333	262	846	177	40
	1,972,762	268	868	187	42
	2,114,719	275	890	197	46
	2,266,892	282	913	208	49
	2,430,015	290	937	219	52
	2,604,876	297	961	231	56
	2,792,320	305	986	244	60
	2,993,252	313	1,012	257	65
	3,208,643	321	1,038	271	70
	3,439,534	329	1,065	286	75
	4,236,760	338	1,092	336	93
	4,541,633	346	1,121	354	99
	4,868,444	355	1,150	374	107
	5,218,771	365	1,179	394	115
	5,594,308	374	1,210	416	123
	5,996,868	384	1,241	438	132
	6,428,396	394	1,273	463	142
	6,890,976	404	1,306	488	152
	7,386,843	414	1,340	515	163
	7,918,392	425	1,375	543	175
	8,488,190				
		6,742	21,803	6,596	1,855
divided by 2		3,371	10,901	Total benefit - \$	4,741
				2020 to 2039	
				(20 years)	
(assume that only half of the total corridor analyzed by OKI will be affected by project)					

**Congestion Analysis Summary**

Congestion Measure	Base	Build
Travel Time Index	2.14	1.33
Annual Person-hours of Delay		
Recurring	5,827,659	1,883,005
Incident	8,881,428	2,353,756
Total	14,709,087	4,236,760
Annual Wasted Fuel (gal)	5,737,247	2,059,426
Annual Congestion Cost (\$mil)	336	93

Economic efficiencies value is from calcs tab. (Between \$10.9 billion and \$11.1 billion. This is derived from OKI COG study; we estimated the change in delay and applied to the base OKI data (\$684 million in congestion value to shippers in 2005)

Economic return on the increased efficiencies is \$1.7 billion. The improved efficiencies translate into higher profits (assume 5% profit margin); the profit that gets paid out is income to someone and this component measures the economic impact of that income.

The construction impact is \$1.6 billion. The payroll, materials, etc. This is based on the construction cost spread over 6 years of construction schedule.

Delay and fuel savings are based on change in congestion levels from current case to either of the wider roadways.

**20-year totals, millions of 2008 dollars** 15 total lanes on all bridges

Economic efficiencies 10,901  
 Economic return on increased efficiencies 1,700  
 Construction impact 1,600  
 Delay and fuel benefits 4,741

**Total project benefits**

**18,942**

**\$18.9 billion in economic impact**

<b>Conditions in 2030</b>	<b>Current Configuration</b>	<b>15 total lanes on all bridges</b>
Congestion Measure		
Travel Time Index	2.14	1.33
Buffer Index	90%	40%
Annual Person-hours of Delay		
Recurring	5,827,659	1,883,005
Incident	8,881,428	2,353,756
Total	14,709,087	4,236,760
Annual Wasted Fuel (gal)	<b>5,737,247</b>	<b>2,059,426</b>
Annual Congestion Cost (\$Million)	336	93