

I-35W Mississippi River Crossing Road-User Cost Computations

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See accompanying report (Microsoft Word document) for discussion of the methodology and assumptions underlying the analysis.

AADT on I-35W Mississippi River crossing was 140,000 (year 2006)
 Heavy-commercial percentage = 3.4%
 (AADT and heavy-commercial percentage obtained from Mn/DOT 2006 Metrowide Traffic Overview Map with HCA DT)

Assumption: 90,000 of the 140,000 uses Detour A while 50,000 of the 140,000 uses Detour B.
 See accompanying report for explanation of reasoning behind this assumption.

Route is heavily traveled by commuters; accordingly the following average vehicle occupancies are assumed:

Auto occupancy = 1.1 persons/auto
 Truck occupancy = 1.0 persons/truck

See the report for maps of Detour A and Detour B.

Note: In the following computations, more digits than significant are carried and displayed for intermediate values, to avoid introducing error due to rounding. The final result is then rounded to the appropriate number of significant digits.

Detour A

	Distance (mi.)	Estimated Average Speed (mph)	Travel time (hh:mm:ss)	Travel time (hr)
<i>Original route</i>				
I-35W from W Jct. I-94 (Minneapolis) to Jct. I-694 (New Brighton–Arden Hills)	9.9	55	00:10:46	0.18
<i>Detour route, assume 50% of volume of served during the following congested condition:</i>				
I-94 from W Jct. I-35W (Minneapolis) to Jct. I-694 (Brooklyn Center) +	8.8	45	00:11:44	0.20
I-694 from Jct. I-94 (Brooklyn Center) to Jct. I-35W (New Brighton–Arden Hills)	5.5	45	00:07:19	0.12
Total:	14.3		00:19:03	0.32
<i>Detour route, assume 50% of volume of served during the following uncongested condition:</i>				
I-94 from W Jct. I-35W (Minneapolis) to Jct. I-694 (Brooklyn Center) +	8.8	55	00:09:36	0.16
I-694 from Jct. I-94 (Brooklyn Center) to Jct. I-35W (New Brighton–Arden Hills)	5.5	55	00:05:59	0.10
Total:	14.3		00:15:35	0.26

For motorists displaced from I-35W:

Additional distance resulting from detour:	4.4 miles per vehicle
Additional travel time resulting from detour, congested condition:	00:08:17 hh:mm:ss per vehicle
Additional travel time resulting from detour, congested condition:	0.14 hours per vehicle
Additional travel time resulting from detour, uncongested condition:	00:04:49 hh:mm:ss per vehicle
Additional travel time resulting from detour, uncongested condition:	0.08 hours per vehicle
Autos displaced from I-35W to Detour A:	86,940 autos per day
Trucks displaced from I-35W to Detour A:	3,060 trucks per day
Auto increase in variable operating cost due to detour:	\$103,801 per day
Truck increase in variable operating cost due to detour:	\$10,148 per day
Auto occupant increase in time cost due to detour:	\$135,847 per day
Truck occupant increase in time cost due to detour:	\$7,022 per day

Regarding motorists who ordinarily used the route now designated as Detour A, who encounter delays due to higher traffic on this route under congested conditions (assume 50% of traffic passes during congested conditions):

Vehicles: 131,000 per day
 Truck percentage of AADT: 5.1% per day

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Autos: 124,319 per day
 Trucks: 6,681 per day
 Autos: 62,160 per day under congested conditions
 Trucks: 3,341 per day under congested conditions

No increase in distance for vehicles ordinarily using this route.
 No increase in variable operating cost for vehicles ordinarily using this route.

Auto occupant increase in time cost due to congestion delays: \$51,322 per day
 Truck occupant increase in time cost due to congestion delays: \$4,050 per day

Total road-user cost associated with Detour A: \$312,191 per day
 (includes cost to motorists displaced from I-35W as well as cost to those who ordinarily used the route designated as Detour A and who now encounter delays due to higher traffic on this route)

Detour B

	Distance (mi.)	Estimated Average Speed (mph)	Travel time (hh:mm:ss)	Travel time (hr)
<i>Original route</i>				
I-35W from E Jct. I-94 (Minneapolis) to Jct. TH 280 (Roseville)	4.8	50	00:05:45	0.10
<i>Detour route, assume 50% of volume served during the following congested condition :</i>				
I-94 from east junction I-35W (Minneapolis) to Jct. TH 280 (Saint Paul) +	2.8	35	00:04:49	0.08
TH 280 from Jct. I-94 (Saint Paul) to Jct I-35W (Roseville)	3.7	35	00:06:22	0.11
Total:	6.5		00:11:11	0.19
<i>Detour route, assume 50% of volume served during the following uncongested condition :</i>				
I-94 from east junction I-35W (Minneapolis) to Jct. TH 280 (Saint Paul) +	2.8	50	00:03:22	0.06
TH 280 from Jct. I-94 (Saint Paul) to Jct. I-35W (Roseville)	3.7	50	00:04:27	0.07
Total:	6.5		00:07:50	0.13

For motorists displaced from I-35W:

Additional distance resulting from detour: 1.7 miles per vehicle

Additional travel time resulting from detour, congested condition: 00:05:26 hh:mm:ss per vehicle
 Additional travel time resulting from detour, congested condition: 0.09 hours per vehicle

Additional travel time resulting from detour, uncongested condition: 00:02:05 hh:mm:ss per vehicle
 Additional travel time resulting from detour, uncongested condition: 0.03 hours per vehicle

Autos displaced from I-35W to Detour A: 48,300 autos per day
 Trucks displaced from I-35W to Detour A: 1,700 trucks per day

Auto increase in variable operating cost due to detour: \$22,613 per day
 Truck increase in variable operating cost due to detour: \$2,211 per day

Auto occupant increase in time cost due to detour: \$43,259 per day
 Truck occupant increase in time cost due to detour: \$2,236 per day

Regarding motorists who normally used the route now designated as Detour B, who now encounter delays due to higher traffic on this route under congested conditions (assume 50% of traffic passes during congested conditions):

Vehicles: 45,400 per day
 Truck percentage of AADT: 6.2% per day
 Autos: 42,585 per day
 Trucks: 2,815 per day
 Autos: 21,293 per day under congested conditions
 Trucks: 1,407 per day under congested conditions

No increase in distance for vehicles ordinarily using this route.
 No increase in variable operating cost for vehicles ordinarily using this route.

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Auto occupant increase in time cost due to congestion delays:	\$17,022
Truck occupant increase in time cost due to congestion delays:	\$1,652

Total road-user cost associated with Detour B \$88,993 per day
(includes cost to motorists displaced from I-35W as well as cost to those who ordinarily used the route designated as Detour B and who now encounter delays due to higher traffic on this route)

Grand total road-user cost: \$400,000 per day.

If there are any questions about this analysis, please contact Paul Jung of the Office of Investment Management at (651) 366-3758.