

Appendix C: Toll Sensitivity Analysis



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1.0 Introduction

This appendix describes the toll sensitivity analysis that was performed for purposes of supporting the Illiana Corridor Tier Two Draft Environmental Impact Statement (DEIS). It should not be construed to represent the results of the very detailed financial and toll revenue analyses being performed in support of the P3 procurement for the Illiana Corridor.

For the Tier Two DEIS, a tolled scenario was assumed for determination of “The Alternatives to be Carried Forward Technical Memorandum” (September 2013) documented that non-toll scenarios would not be carried forward for analysis in the Tier Two DEIS. The basis for that decision is summarized below.

The Governors of Illinois and Indiana signed a Memorandum of Understanding (MOU) in June 2010 concerning their mutual objective to investigate all options available to finance the Illiana Expressway as a public private partnership (P3). Both states also previously passed enabling legislation to allow for P3 agreements between Illinois and Indiana and one or more private entities to design, build, finance, operate, and maintain the Illiana Corridor. The inclusion of funding for preliminary engineering in their current respective programs, the MOU, and the P3 legislation demonstrate the intent of the states’ to use tolling as a delivery mechanism and to provide some portion of financing for the Illiana project. An additional consideration is the importance of demonstrating financial commitment in order for the metropolitan planning organizations (MPOs) to adopt the Illiana Corridor into their fiscally constrained plans.

With the stated implementation timeframe for the Illiana Corridor, the Governors of both states have indicated their state’s commitment to investigating any and all options to deliver the Illiana Corridor in the most rapid and cost-effective manner possible. In Illinois, the current Illinois Department of Transportation (IDOT) multi-year program (Fiscal Year 2014-2019 Multi-Modal Transportation Improvement Program) includes \$9.53 billion in federal, state and local funds that are designated for state and local highway improvements over six years. The funding in the IDOT multi-year program for the Illiana Corridor is limited to \$92.3 million for preliminary engineering, land acquisition, and P3 advisory services. In Indiana, the current Indiana Department of Transportation (INDOT) multi-year program, Fiscal Year 2014-2017 Statewide Transportation Improvement Program (STIP), based on the current adoption timeline, includes \$6.77 billion in federal, state, and local funds that are designated for state and local highway improvements over four years. The funding in the INDOT multi-year program for the Illiana Corridor is limited to \$44.4 million for preliminary engineering, right-of-way acquisition, and construction. Implementation of the INDOT multi-year program, including funding for the Illiana Corridor, requires an amendment of the NIRPC Transportation Improvement Program (TIP), which is anticipated to occur during October-December, 2013, followed by amendment of the STIP during January-March 2014.

On this basis, both states have determined that traditional funding alone is inadequate for project implementation. Therefore, a combination of traditional and innovative funding and financing strategies, including tolling, will be required, with further analysis to be performed as part of the financial plan to be developed for the project. As such, project delivery with only federal, state, and local funding is an unreasonable alternative, and the use of tolling to finance a portion of the project cost is seen as the only viable method of project delivery, with the level of toll revenues depending on a number of factors including traffic volumes and tolling pricing. Therefore, project delivery under an entirely non-tolled scenario will not be considered further as part of the Tier Two DEIS.

The Tier One Combined FEIS/ROD presented travel performance for both a non-tolled scenario, and a range of tolled scenarios. For the initial screening of alternatives, it was assumed that between 25 percent and 75 percent of the traffic on the Illiana facility (as compared to a non-tolled scenario) would be retained for tolling scenarios. For the finalist alternatives, and the selected alternative, the B3 Corridor, it was assumed that between 30 percent and 60 percent of the traffic would be retained for tolling scenarios.

As part of the Tier Two DEIS, a sensitivity analysis was performed to evaluate the affect of a range of traffic projections based on a variation in this traffic retention amount as a result of a range of tolling assumptions.

2.0 Consideration of Tolling

For the Tier Two DEIS, a tolled scenario was assumed for determination of the footprint and traffic-related impacts of the Build Alternatives. This tolled scenario for the Build Alternatives assumed 43 percent traffic retention on the Illiana Corridor. A toll sensitivity analysis was performed to present the sensitivity of traffic to a range of tolling scenarios.

It should be emphasized that for this range of tolling scenarios, the Tier Two DEIS Build Alternatives will have an almost identical footprint, and that impacts to most resources would not be affected by the imposition of this range of tolling scenarios. Traffic-related impacts, such as noise and air quality, will change based on the resulting traffic retainage on the Illiana Corridor for the range of tolling scenarios. However, it will be shown that the base 43 percent traffic retention assumption for the Illiana Corridor that was used for the Tier Two DEIS is representative of the range of traffic resulting from the sensitivity analysis of a range of tolling scenarios.

Finally, the results of this toll sensitivity analysis for the Tier Two DEIS should not be construed to represent the results of the very detailed financial and toll revenue analyses being performed in support of the P3 procurement for the Illiana Corridor being conducted by IDOT and INDOT. This toll sensitivity analysis was performed for purposes of supporting the Illiana Corridor Tier Two DEIS. This toll sensitivity analysis is not intended for use in financial and toll policy decisions for the actual financing and operation of the proposed Illiana Corridor.

3.0 Tolling Methodology

The methodology used to perform the toll sensitivity analysis involves the use of the Illiana Corridor Study travel demand forecasting model that was used to determine the forecast traffic and travel performance for the Illiana Corridor Study. The Illiana Corridor Study regional travel demand forecasting model uses a TransCAD multi-modal, multi-class traffic assignment process that implements the user-equilibrium assignment method in a framework which can handle more than one mode and vehicle class. The basis of the user-equilibrium assignment method is that no traveler can reduce the generalized cost of their trip by unilaterally changing paths.

In the multi-modal, multi-class assignment, a value of time (VOT) is used to convert toll charges from dollars to minutes. This VOT has been set equal to a different value for each trip purpose/mode being modeled. Table 1 provides a summary of the VOT for each trip purpose/mode. Thus, when tolls are implemented in the traffic assignment, the VOT is used to convert the toll charge from dollars to minutes. Operating costs are included in the multi-modal multi-class assignment. Operating costs of \$0.15 per mile for passenger cars, \$0.40 per mile for MTRUCKS and SUT trucks, and \$0.60 per mile for HTRUCK and MUT was assumed.

Table 1. Traffic Assignment Mode-Specific Parameters

Trip Purpose/ Mode	VOT (\$/min)	Operating Cost (\$/mile)
HBWSOVLI	\$0.20	\$0.15
HBWHOVL	\$0.30	\$0.15
HBWSOVHI	\$0.33	\$0.15
HBWHOVHI	\$0.50	\$0.15
Oth_SOV	\$0.20	\$0.15
Oth_HOV	\$0.30	\$0.15
AIRPASS	\$0.50	\$0.15
ExtAuto	\$0.30	\$0.15
MTRUCK	\$0.42	\$0.40
HTRUCK	\$0.67	\$0.60
SUT	\$0.42	\$0.40
MUT	\$0.67	\$0.60

The 12 trip purposes/modes are derived from a combination of CMAP internal auto trip model outputs, the long-distance auto model, and the local and long-distance freight models. HBWSOVLI trips represent the home-based work trips made in single occupant vehicles (SOV) by low-income households, and HBWHOVL trips represent the home-based work trips made in vehicles with more than one occupant (HOV) from low-income households. The HBWSOVHI and HBWHOVHI purposes are home-based work trips

from high-income households in single-occupant and multiple-occupant vehicles respectively. The Oth_SOV and Oth_HOV modes represent trips that are either home-based but not work-related or non-home-based in SOVs and HOVs. These first six trip purposes are generated by the CMAP internal auto model procedures, and the AIRPASS mode is a special generator in the CMAP model showing trips to and from the major airports in the CMAP area. The ExtAuto mode gives the long-distance auto trips from the national external auto model, and the SUT and MUT modes give the single-unit truck and multi-unit truck trips generated by the national long-distance truck model. The final two modes, MTRUCK and HTRUCK, represent the single-unit truck and multi-unit truck trips from the short-distance truck model.

4.0 Toll Sensitivity Analysis

A toll sensitivity analysis was performed by varying the Illiana Corridor toll rates (\$/mile) for passenger cars, single-unit trucks, and multi-unit trucks (semi-trailer trucks), resulting in a range of traffic retention on the Illiana facility. As seen in Table 2, the traffic retention on the Illiana Corridor ranges from 100 percent for a no-toll scenario to between 59 and 28 percent under various tolled scenarios. Thus, for a no-toll scenario, projected 2040 Illiana Corridor average daily traffic (ADT) is 46,000 vehicles per day, and tolled scenarios ranging from 27,000 to 13,000 vehicles per day, reflecting a range of 59 percent to 28 percent traffic retention. The Base tolled scenario used for the Tier Two DEIS represents a 43 percent traffic retention or a projected 2040 Illiana ADT of 20,000 vehicles per day, which approximately represents the midpoint of 2040 Illiana ADT for the tolled scenarios examined in this sensitivity analysis. The Base case (43 percent traffic retention) is representative (plus or minus 7,000 ADT in 2040) of the range of tolled scenarios.

Table 2. Illiana Toll Sensitivity on Mainline

Illiana Traffic Retention	Pass. Car Toll (\$/Mile)	Pass. Car Retention	Single-Unit Truck Toll (\$/Mile)	Single-Unit Truck Retention	Multi-Unit Truck Toll (\$/Mile)	Multi-Unit Truck Retention	Illiana 2040 ADT	Illiana 2040 Truck ADT
100%	0	100%	0	100%	0	100%	46,100	21,200
59%	0.13	65%	0.32	60%	0.47	49%	27,200	10,900
48%	0.20	55%	0.46	49%	0.68	36%	22,000	8,300
Base (43%)	0.23	50%	0.53	41%	0.79	32%	19,800	7,200
38%	0.27	45%	0.62	35%	0.91	28%	17,500	6,300
28%	0.35	36%	0.79	24%	1.17	18%	13,100	4,200

The toll sensitivity analysis also examined the Illiana cross-roads with proposed interchanges. Table 3 shows the forecast 2040 daily volumes along the freeways and arterials that have interchanges with the Illiana. Traffic immediately to the north of the

Table 3. 2040 ADT on Arterials North and South of Illiana

Illiana Traffic Retention	N/S of Illiana	I-55	IL-53	Wilton Center	US-45/52	I-57	IL-50	IL-1	US-41	SR-55	I-65
		100%	N	46,600	36,100	19,000	9,800	25,900	33,100	33,100	21,200
	S	50,800	27,400	4,500	5,800	53,000	16,400	16,400	21,000	13,700	66,700
59%	N	44,700	35,000	17,000	6,200	27,400	27,500	27,500	19,400	15,300	67,500
	S	45,600	26,500	4,600	5,000	50,400	15,200	15,200	20,600	13,100	64,400
48%	N	44,300	34,800	16,400	5,500	29,000	26,300	26,300	19,000	14,100	66,200
	S	44,600	26,400	4,900	5,000	49,600	15,200	15,100	20,600	12,500	64,300
Base (43%)	N	44,400	34,600	16,100	4,900	29,800	25,000	26,300	19,000	13,700	65,600
	S	44,400	26,400	5,300	5,000	48,900	31,600	15,100	20,400	12,400	64,000
38%	N	44,200	34,200	15,800	4,800	30,100	24,900	26,300	18,900	13,300	65,100
	S	44,200	26,200	5,400	5,000	48,300	30,600	15,100	20,400	12,300	63,600
28%	N	44,000	33,800	14,800	5,700	31,200	24,600	24,700	18,700	12,500	64,000
	S	44,000	26,000	5,600	5,000	46,900	29,500	15,400	20,400	12,200	62,700

Illiana Corridor tends to decrease as the toll rate increases. Traffic immediately to the south of the Illiana Corridor also decreases on the freeways. The arterials to the south of the Illiana have volumes that vary as the toll rate changes, with some increasing as the tolls increase, while others decrease, while others stay constant. The Base (43 percent) case volumes are representative of the 2040 ADTs for the cross-roads with Illiana Corridor interchanges in all the toll scenarios.

5.0 Conclusion

A toll sensitivity analysis was performed by varying the Illiana toll rates (\$/mile) for passenger cars, single-unit trucks, and multi-unit trucks (semi-trailer trucks), resulting in a range of average Illiana mainline volumes and cross-road volumes north and south of the Illiana Corridor. The Base case that assumed 43 percent traffic retention on the Illiana project was used for the Tier Two DEIS analysis. This analysis shows that the Base case toll scenario is representative of the volumes that would result under a range of other higher and lower toll scenarios.

It should be emphasized that the information presented in this toll sensitivity analysis should not be construed to represent the results of the very detailed financial and toll revenue analyses being performed in support of the P3 procurement for the Illiana Corridor. The information presented in this analysis is for illustrative purposes, reflecting the sensitivity of Illiana mainline and cross-road volumes to a range of toll assumptions.

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