

Memo



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Note: The five-ramp toll assumption is based on an earlier version of the project proposal that included a second phase of toll ramp implementation. The final report only analyzes the effects of tolling for the three ramps proposed for initial implementation, which was the proposal put forward by the project sponsors for consideration. [May 2011]

To: Carl Springer
DKS
From: G. Nielsten, S. Abendschein
Stantec
File: Oregon Congestion Pricing
Date: November 23 , 2010

Reference: SR 217 Project

Introduction

The purpose of this analysis is to take the traffic assignment outputs from the METRO traffic model, to review the reasonableness of the model outputs, and to create a likely range of potential traffic and revenues for the SR 217 Project.

The Project

The SR 217 Project would implement an “all electronic toll—transponder only” collection points on Wilshire Boulevard southbound ingress , Walker Road ingress ramps, and Denny Road ingress ramp, with future tolls on Pacific Highway and SW 72nd Street **(there would be no toll charges for trucks).**

Three sets of potential toll rates were selected for review:

Low Tolls: \$0.25 in peak hours and \$0.15 in non-peak hours

Base Tolls: \$ 0.50 in peak hours and \$0.25 in non peak hours

High Tolls: \$2.00 in peak hours and \$1.00 in non-peak hours.

It is assumed at this point that these tolls would be in place without increases for the life of the project.

Existing Traffic conditions

The following table provides the typical traffic patterns on SR 217 on a typical 24-hour weekday basis.

This project indicates an unusual pattern of traffic on these ramps in the corridor in that the traffic volume demand is not symmetric; for example, the southbound traffic on Walker Road is nearly double the northbound traffic, or Denny road peaks in the am period in both directions. This likely indicates the relatively free choice of parallel interchange movements at adjacent interchanges.

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	Wilshire		Walker		Denny	
	SB		NB	SB	NB	SB
Beginning of Hour	Milepost 0.45		Milepost 0.66	Milepost 0.76	Milepost 2.68	Milepost 3.12
12:00 AM	13		22	38	29	17
1:00 AM	9		13	22	20	13
2:00 AM	9		9	14	20	14
3:00 AM	5		10	23	31	17
4:00 AM	5		21	48	66	35
5:00 AM	17		68	139	204	119
6:00 AM	63		142	346	481	248
7:00 AM	199		271	540	547	358
8:00 AM	175		250	403	475	308
9:00 AM	169		219	356	488	309
10:00 AM	176		217	358	465	311
11:00 AM	210		241	421	481	338
12:00 PM	217		275	464	498	356
1:00 PM	194		287	459	438	233
2:00 PM	191		310	459	354	232
3:00 PM	208		315	471	377	253
4:00 PM	234		307	552	383	281
5:00 PM	241		303	594	351	266
6:00 PM	152		263	503	335	254
7:00 PM	96		193	340	266	178
8:00 PM	72		155	261	205	134
9:00 PM	52		121	203	160	105
10:00 PM	32		75	109	105	55
11:00 PM	21		44	69	56	36
Total	2762		4130	7193	6835	4467

Reference: SR 217 Project

Year 2012 METRO Traffic Model Outputs

As shown in the attached table, the METRO model outputs indicate that tolls in the manner described previously will reduce traffic on SR 217. It is difficult to generalize the traffic changes since the data displays no discernable pattern of traffic loss. The “Low” Tolls will reduce auto traffic by about 10% to 80% compared to the non-tolled scenario. The “Base” toll will reduce it an additional 10% to 90%. The “High” tolls will reduce auto traffic on SR 217 to zero.

OR 217 Project		Year 2012		
		AM	MiD	PM
Wilshire Street				
	NO Toll	830	114	901
	Low	147	104	524
	Base	78	83	170
	High	0	0	0
Walker Road				
Southbound	NO Toll	1781	658	1736
	Low	1342	476	1253
	Base	197	53	108
	High	0	0	0
Northbound	NO Toll	547	366	634
	Low	552	188	511
	Base	139	51	127
	High	0	0	0
Denny Road				
Southbound	NO Toll	730	193	599
	Low	257	89	302
	Base	145	62	157
	High	0	0	0
Northbound	NO Toll	1087	258	740
	Low	699	59	311
	Base	246	53	134
	High	0	0	0

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Reference: SR 217 Project

We have taken this data and applied it to a 24 hour basis, using the typical traffic patterns on SR 217 for each ramp, and produced the traffic and revenue calculations at each ramp location and for the each Toll scenario. As an example, here is the calculation for Wilshire Road for the “Low” Toll scenario.

Beginning of Hour				
12:00 AM	13	\$0.15	6	\$1
1:00 AM	9	\$0.15	4	\$1
2:00 AM	9	\$0.15	5	\$1
3:00 AM	5	\$0.15	2	\$0
4:00 AM	5	\$0.15	3	\$0
5:00 AM	17	\$0.15	8	\$1
6:00 AM	63	\$0.15	30	\$5
7:00 AM	199	0.25	147	\$37
8:00 AM	175			\$0
9:00 AM	169	\$0.15	81	\$12
10:00 AM	176	\$0.15	85	\$13
11:00 AM	210	\$0.15	101	\$15
12:00 PM	217	\$0.15	104	\$16
1:00 PM	194	\$0.15	93	\$14
2:00 PM	191	\$0.15	92	\$14
3:00 PM	208	\$0.15	100	\$15
4:00 PM	234	0.25	524	\$131
5:00 PM	241			\$0
6:00 PM	152	\$0.15	73	\$11
7:00 PM	96	\$0.15	46	\$7
8:00 PM	72	\$0.15	35	\$5
9:00 PM	52	\$0.15	25	\$4
10:00 PM	32	\$0.15	15	\$2
11:00 PM	21	\$0.15	10	\$2
	2762		1590	\$306
ANNUAL				\$91,663

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Reference: SR 217 Project

For this example, assuming an average weekday factor of 300 equivalent weekdays per year, which assume weekend traffic volume are about 50% of the weekday levels, produces an annual revenue potential of some \$ 92,000.

For all the toll scenarios at Wilshire, the following is a summary of the traffic and revenue potential:

WILSHIRE

Year 2012

Toll Scenario	Ave Weekday		Annual Revenues
	Vehicles	Revenue	
Low Toll	1,590	\$306	\$91,663
Base Toll	981	\$307	\$92,184
High Toll	0	\$0	\$0

For all the toll scenarios at Walker Road, the following is a summary of the traffic and revenue potential:

WALKER

Year 2012

Toll Scenario	Ave Weekday		Annual Revenues
	Vehicles	Revenue	
Low Toll	10,941	\$2,007	\$602,103
Base Toll	1,710	\$272	\$171,091
High Toll	0	\$0	\$0

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Reference: SR 217 Project

For all the toll scenarios at Denny Road, the following is a summary of the traffic and revenue potential:

DENNY

Year 2012

Toll Scenario	Ave Weekday		Annual Revenues
	Vehicles	Revenue	
Low Toll	2,602	\$547	\$164,172
Base Toll	1,789	\$618	\$185,346
High Toll	0	\$0	\$0

Combining all three ramps and all toll scenarios produces the following summary of the traffic and revenue potential.

2012 ALL RAMPS

Year 2012

Toll Scenario	Ave Weekday		Annual Revenues
	Vehicles	Revenue	
Low Toll	15,133	\$2,860	\$857,937
Base Toll	4,481	\$1,197	\$448,622
High Toll	0	\$0	\$0

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Reference: SR 217 Project

Year 2012 Adjusted METRO Model Outputs

Recognizing the very sensitive nature of the model outputs in response to all toll levels , we have re-built the optimal traffic and revenue curves in an attempt to more closely predict future traffic behavior in the corridor.

We assume a 65% drop off of traffic upon the imposition of a toll of \$0.25; this is predicated based upon the proximity of adjacent interchanges to bypass these “tolled” ramps. Experience indicates the likely range is 50% to 70% drop off from “no-toll” to “any-toll collection”, and used the higher end of this range based upon the METRO outputs. We then assumed a high (40% reduction) drop in increments from \$0.50 to \$1.00 and an even higher drop (70% reduction) from \$1.00 to \$4.00

The following three tables provides the results for Wilshire, Walker and Denny.

WILSHIRE

Year 2012

Toll Scenario	Ave Weekday		Annual Revenues
	Vehicles	Revenue	
Low Toll	958	\$204	\$61,298
Base Toll	575	\$235	\$70,386
High Toll	172	\$282	\$84,463

WALKER

Year 2012

Toll Scenario	Ave Weekday		Annual Revenues
	Vehicles	Revenue	
Low Toll	5,574	\$1,000	\$300,144
Base Toll	3,344	\$334	\$324,808
High Toll	677	\$899	\$269,609

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Reference: SR 217 Project

DENNY

Year 2012

Toll Scenario	Ave Weekday		Annual Revenues
	Vehicles	Revenue	
Low Toll	2,617	\$503	\$150,918
Base Toll	1,586	\$562	\$168,628
High Toll	476	\$675	\$202,354

Combining all three locations to summarize the SR 217 project is as follows:

2012 ALL RAMPS

Year 2012

Toll Scenario	Ave Weekday		Annual Revenues
	Vehicles	Revenue	
Low Toll	9,149	\$1,708	\$512,360
Base Toll	5,505	\$1,130	\$563,822
High Toll	1,325	\$1,855	\$556,426

As the METRO model has no means to apply the “transponder only” restriction to the traffic demand, we assume the only 80% of the potential users are likely to have transponders and be toll payers. This will reduce both the METRO model outputs and our revenue estimates by 20%.

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Reference: SR 217 Project

Year 2012 SR 217 Summary

In summary, taking into account all of the information above, the project has the revenue potential in 2012 as follows:

Year 2012 SR 217 Project		
Toll	METRO Model	Adjusted METRO
Low (\$ 0.25/\$0.15)	\$ 690,000	\$ 410,000
Base (\$0.50/\$0.25)	\$ 360,000	\$ 450,000
High (\$2.00/\$1.00)	\$0	\$ 440,000

Year 2035 METRO Traffic Model Outputs

As shown in the attached table, the METRO model outputs indicate that tolls in the manner described previously will reduce traffic on SR 217. It is difficult to generalize the traffic changes since the data displays no discernable pattern of traffic loss. The “Low” Tolls will reduce auto traffic by about 10% to 80% compared to the non-tolled scenario. The “Base” toll will reduce it an additional 10% to 90%. The “High” tolls will reduce auto traffic on SR 217 to zero.

Highlighted are several outputs that are not explainable in any easy fashion. Walker Road northbound traffic increases in the Low Toll case versus the No Toll, as does Denny Road northbound and Pacific Road southbound. Perhaps a more detailed review of traffic changes on all ramps in the corridor would explain these abnormal results but that is not simply part of this assignment.

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Reference: SR 217 Project

		AM	Mid	PM
Wilshire Street				
	NO Toll	953	196	953
	Low	637	133	811
	Base	118	97	234
	High	0	0	0

Walker Road				
Southbound	NO Toll	2167	1096	2321
	Low	1647	847	1964
	Base	1267	692	1864
	High	0	0	0
Northbound	NO Toll	592	448	869
	Low	875	232	829
	Base	357	147	470
	High	0	0	0

Denny Road				
Southbound	NO Toll	619	234	660
	Low	103	1	293
	Base	3	0	0
	High	0	0	0
Northbound	NO Toll	1419	529	987
	Low	1274	381	1019
	Base	775	287	808
	High	1	0	0

Pacific Highway				
Southbound	NO Toll	749	637	735
	Low	921	370	1058
	Base	405	284	689
	High	0	0	0
Northbound	NO Toll	959	703	1313
	Low	567	431	1036
	Base	264	356	936
	High	0	0	0

SW 72nd St				
Southbound	NO Toll	639	565	936
	Low	246	355	923
	Base	34	161	312
	High	0	0	0
Northbound	NO Toll	959	703	1313
	Low	567	432	1036
	Base	264	356	938
	High	0	0	0

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Reference: SR 217 Project

We have taken this data, as in the case for the year 2012 scenarios, and applied it to a 24 hour basis, using the typical traffic patterns on SR 217 for each ramp, and produced the traffic and revenue calculations at each ramp location and for the each Toll scenario. As an example, here is the calculation for Wilshire Road for the “Low” Toll scenario.

Beginning of Hour				
12:00 AM	13	\$0.15	8	\$1
1:00 AM	9	\$0.15	6	\$1
2:00 AM	9	\$0.15	6	\$1
3:00 AM	5	\$0.15	3	\$0
4:00 AM	5	\$0.15	3	\$0
5:00 AM	17	\$0.15	10	\$2
6:00 AM	63	\$0.15	39	\$6
7:00 AM	199	0.25	637	\$159
8:00 AM	175			\$0
9:00 AM	169	\$0.15	104	\$16
10:00 AM	176	\$0.15	108	\$16
11:00 AM	210	\$0.15	129	\$19
12:00 PM	217	\$0.15	133	\$20
1:00 PM	194	\$0.15	119	\$18
2:00 PM	191	\$0.15	118	\$18
3:00 PM	208	\$0.15	128	\$19
4:00 PM	234	0.25	811	\$203
5:00 PM	241			\$0
6:00 PM	152	\$0.15	93	\$14
7:00 PM	96	\$0.15	59	\$9
8:00 PM	72	\$0.15	44	\$7
9:00 PM	52	\$0.15	32	\$5
10:00 PM	32	\$0.15	20	\$3
11:00 PM	21	\$0.15	13	\$2
	2762		2623	\$538
ANNUAL				\$161,465

For this example, assuming an average weekday factor of 300 equivalent weekdays per year, which assume weekend traffic volume are about 50% of the weekday levels, produces an annual revenue potential of some \$ 160,000.

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Reference: SR 217 Project

For all the toll scenarios at Wilshire, the following is a summary of the traffic and revenue potential:

WILSHIRE

Year 2035

Toll Scenario	Ave Weekday		Annual Revenues
	Vehicles	Revenue	
Low Toll	2,623	\$538	\$161,465
Base Toll	1,209	\$390	\$117,059
High Toll	1	\$0	\$0

For all the toll scenarios at Walker, the following is a summary of the traffic and revenue potential:

WALKER

Year 2035

Toll Scenario	Ave Weekday		Annual Revenues
	Vehicles	Revenue	
Low Toll	17,156	\$3,105	\$931,462
Base Toll	13,168	\$815	\$1,284,413
High Toll	0	\$0	\$0

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Reference: SR 217 Project

For all the toll scenarios at Denny, the following is a summary of the traffic and revenue potential:

DENNY

Year 2035

Toll Scenario	Ave Weekday		Annual Revenues
	Vehicles	Revenue	
Low Toll	6,580	\$1,256	\$376,768
Base Toll	4,510	\$1,524	\$457,207
High Toll	1	\$2	\$600

For all the toll scenarios at Pacific Highway, the following is a summary of the traffic and revenue potential:

PACIFIC HGHWY

Year 2035

Toll Scenario	Ave Weekday		Annual Revenues
	Vehicles	Revenue	
Low Toll	11,240	\$2,044	\$494,068
Base Toll	8,402	\$2,674	\$802,207
High Toll	0	\$0	\$0

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Reference: SR 217 Project

For all the toll scenarios at SW 72nd Street, the following is a summary of the traffic and revenue potential

SW 72nd ST

Year 2035

Toll Scenario	Ave Weekday		Annual Revenues
	Vehicles	Revenue	
Low Toll	9,131	\$1,647	\$494,068
Base Toll	5,726	\$1,818	\$545,518
High Toll	0	\$0	\$0

Combining all five ramps and all toll scenarios produces the following summary of the traffic and revenue potential:

2035 ALL RAMPS

Year 2035

Toll Scenario	Ave Weekday		Annual Revenues
	Vehicles	Revenue	
Low Toll	46,730	\$8,590	\$1,469,695
Base Toll	33,014	\$7,221	\$3,206,405
High Toll	2	\$2	\$600

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Reference: SR 217 Project

Year 2035 Adjusted METRO Model Outputs

Recognizing the very sensitive nature of the model outputs in response to all toll levels , we have re-built the optimal traffic and revenue curves in an attempt to more closely predict future traffic behavior in the corridor.

We assume a 65% drop off of traffic upon the imposition of a toll of \$0.25; this is predicated based upon the proximity of adjacent interchanges to bypass these “tolled” ramps. Experience indicates the likely range is 50% to 70% drop off from “no-toll” to “any-toll collection”, and used the higher end of this range based upon the METRO outputs. We then assumed a high (40% reduction) drop in increments from \$0.50 to \$1.00 and an even higher drop (70% reduction) from \$1.00 to \$4.00

The following five tables provides the results for Wilshire, Walker, Denny, Pacific Highway and SW 72nd Street.

WILSHIRE

Year 2035

Toll Scenario	Ave Weekday		Annual Revenues
	Vehicles	Revenue	
Low Toll	1,273	\$258	\$77,299
Base Toll	764	\$291	\$87,306
High Toll	2,386	\$349	\$104,767

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WALKER

Year 2035

Toll Scenario	Ave Weekday		Annual Revenues
	Vehicles	Revenue	
Low Toll	8,010	\$1,410	\$422,892
Base Toll	4,806	\$1,514	\$454,125
High Toll	1,442	\$1,816	\$544,950

DENNY

Year 2035

Toll Scenario	Ave Weekday		Annual Revenues
	Vehicles	Revenue	
Low Toll	3,926	\$718	\$215,341
Base Toll	2,355	\$782	\$234,687
High Toll	707	\$939	\$281,625

PACIFIC HGHWY

Year 2035

Toll Scenario	Ave Weekday		Annual Revenues
	Vehicles	Revenue	
Low Toll	5,805	\$1,002	\$300,650
Base Toll	3,483	\$942	\$320,369
High Toll	1,088	\$1,325	\$397,461

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Reference: SR 217 Project

SW 72nd ST

Year 2035

Toll Scenario	Ave Weekday		Annual Revenues
	Vehicles	Revenue	
Low Toll	4,933	\$875	\$262,358
Base Toll	2,960	\$942	\$282,555
High Toll	591	\$833	\$249,962

Combining all three locations to summarize the SR 217 project is as follows:

2035 ALL RAMPS

Year 2012

Toll Scenario	Ave Weekday		Annual Revenues
	Vehicles	Revenue	
Low Toll	23,945	\$4,262	\$1,278,541
Base Toll	14,367	\$2,587	\$1,379,041
High Toll	7,655	\$5,263	\$1,578,764

As the METRO model has no means to apply the “transponder only” restriction to the traffic demand, we assume the only 80% of the potential users are likely to have transponders and be toll payers. This will reduce both the METRO model outputs and our revenue estimates by 20%

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Reference: SR 217 Project

Year 2035 SR 217 Summary

In summary, taking into account all of the information above, the project has the revenue potential in 2035 as follows:

Year 2035 SR 217 Project		
Toll	METRO Model	Adjusted METRO
Low (\$ 0.25/\$0.15)	\$ 1,175,000	\$ 1,023,000
Base (\$0.50/\$0.25)	\$ 2,564,000	\$ 1,104,000
High (\$2.00/\$1.00)	\$0	\$ 1,263,000