Memo

Stantec

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	DKS		Stantec
File:	Oregon Congestion Pricing	Date:	September 22, 2010

Reference: Cornelius Pass 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 Cornelius Pass Project.

The Project

The Cornelius Pass Project would implement an "all electronic toll—transponder only" collection point on Cornelius Pass immediately south of US 30 for passenger vehicles (**there would be no toll charges for trucks).**

Four sets of potential toll rates were selected for review:

Low Tolls: $1.00 in peak hours and $0.50 in non-peak hours

Low/Base: $1.50 in peak hours and $0.75 in non-peak hours

Base Tolls: $2.00 in peak hours and $1.00 in non peak hours

High Tolls: $4.00 in peak hours and $2.00 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 Cornelius Pass on a typical 24-hour weekday basis; this location is 0.1 miles north of Germantown Road.

Also as shown in the table are METRO model outputs for a non-tolled Cornelius Pass link just south of US 30 in 2012, some distance north of this count location. As indicated, the volumes at the identified periods are comparable to the automobile count, although the truck counts are very different than the model outputs.

Reference: Cornelius Pass Project

This project indicates a typical radial route pattern of traffic—high AM peak volumes toward developed areas (Southbound), and high PM peak volumes away from developed areas (Northbound).

Cornelius Pass	4/20/10			0.1 M north of Germantown		
	SB Total			NB Total		
12:00 AM	8			23		
1:00 AM	6			12		
2:00 AM	8			10		
3:00 AM	10			11		
4:00 AM	48			25		
5:00 AM	191			73		
6:00 AM	341			156		
7:00 AM	423	771	619 Auto	253	438	409 Autos
8:00 AM	348		METRO	185		METRO
9:00 AM	222		462 Trcks	180		542 Trcks
10:00 AM	233			135		
11:00 AM	206		228 Autos	186		202 Autos
12:00 PM	200		METRO	204		METRO
1:00 PM	192		143 Trcks	206		210 Trcks
2:00 PM	195			272		
3:00 PM	242			371		
4:00 PM	285	583	438 Auto	517	981	619 Autos
5:00 PM	298		METRO	464		METRO
6:00 PM	201		331 Trcks	369		361 Trcks
7:00 PM	130			213		
8:00 PM	87			119		
9:00 PM	51			85		
10:00 PM	36			52		
11:00 PM	17			31		
	3978	3425	Autos	4152	3575	Autos
		553	Trucks		577	Trucks

Average Speed 48 mph
Posted Speed 55 mph

Reference: Cornelius Pass Project

We have taken the METRO model and expanded to a typical 24 hour basis, using the counts from April 20, 2010; the results are shown in the following table.

	Counts April 20, 2010				METRO Pro Forma 2010			
	SB Total		NB Total		Autos SB	Trucks SB	Autos SB	Trucks SB
12:00 AM	8		23		9	6	25	26
1:00 AM	6		12		7	4	13	14
2:00 AM	8		10		9	6	11	11
3:00 AM	10		11		11	7	12	12
4:00 AM	48		25		53	33	27	28
5:00 AM	191		73		211	133	79	82
6:00 AM	341		156		377	237	169	176
7:00 AM	423	771	253	438	619	462	409	542
8:00 AM	348		185					
9:00 AM	222		180		246	154	195	203
10:00 AM	233		135		258	162	147	152
11:00 AM	206		186		228	143	202	210
12:00 PM	200		204		221	139	222	230
1:00 PM	192		206		213	133	224	233
2:00 PM	195		272		216	135	295	307
3:00 PM	242		371		268	168	403	419
4:00 PM	285	583	517	981	438	331	619	361
5:00 PM	298		464					
6:00 PM	201		369		222	140	401	417
7:00 PM	130		213		144	90	231	240
8:00 PM	87		119		96	60	129	134
9:00 PM	51		85		56	35	92	96
10:00 PM	36		52		40	25	56	59
11:00 PM	17		31		19	12	34	35
	3978	3425	4152	3575	3961	2615	3998	3990
		Autos		Autos				
		553		577				
		Trucks		Trucks				

As indicated, while the overall volumes relate fairly closely, the number of trucks in the METRO model output is 5 to 6 times as high as those indicated in the count program, which have only about a 14% truck share.

Reference: Cornelius Pass 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 Cornelius Pass; in general, the "Low" Tolls will reduce auto traffic by about 15% to 30% compared to the non-tolled scenario, while the "Low/Base" will reduce it an additional 5% to 35%. The "Base" and "High" tolls will reduce auto traffic on Cornelius Pass to zero.

2012 AM	CP SB Toll	CP SB Auto Traffic	CP SB Revenue	CP NB Toll	CP NB Auto Traffic	CP NB Revenue
No toll	$0.00	619	$0	$0.00	409	$0
Low Toll	$1.00	438	$438	$1.00	312	$312
Low/Base	$1.50	295	$443	$1.50	208	$312
Base Toll	$2.00	0	$0	$2.00	0	$0
High Toll	$4.00	0	$0	$4.00	0	$0

Midday	CP SB Toll	CP SB Auto Traffic	CP SB Revenue	CP NB Toll	CP NB Auto Traffic	CP NB Revenue
No toll	$0.00	228	$0	$0.00	202	$0
Low Toll	$0.50	170	$85	$0.50	170	$85
Low/Base	$0.75	162	$122	$0.75	144	$108
Base Toll	$1.00	0	$0	$1.00	0	$0
High Toll	$2.00	0	$0	$2.00	0	$0

PM	CP SB Toll	CP SB Auto Traffic	CP SB Revenue	CP NB Toll	CP NB Auto Traffic	CP NB Revenue
No toll	$0.00	438	$0	$0.00	619	$0
Low Toll	$1.00	302	$302	$1.00	459	$459
Low/Base	$1.50	253	$380	$1.50	342	$513
Base Toll	$2.00	0	$0	$2.00	0	$0
High Toll	$4.00	0	$0	$4.00	0	$0

Reference: Cornelius Pass Project

Taking this data, applying it to a 24 hour basis, using the typical traffic patterns on Cornelius Pass, produces the following traffic and revenue calculation for the “Low” Toll scenario.

			Southbound				Northbound	
		Low Toll						
12:00 AM		$ 0.50	7	$ 3		$ 0.50	19	$ 9
1:00 AM		$ 0.50	5	$ 2		$ 0.50	10	$ 5
2:00 AM		$ 0.50	7	$ 3		$ 0.50	8	$ 4
3:00 AM		$ 0.50	8	$ 4		$ 0.50	9	$ 5
4:00 AM		$ 0.50	40	$ 20		$ 0.50	21	$ 10
5:00 AM		$ 0.50	158	$ 79		$ 0.50	60	$ 30
6:00 AM		$ 0.50	281	$ 141		$ 0.50	129	$ 64
7:00 AM		$ 1.00	438	$ 438		$ 1.00	312	$ 312
8:00 AM		$ 1.00				$ 1.00		
9:00 AM		$ 0.50	183	$ 92		$ 0.50	149	$ 74
10:00 AM		$ 0.50	192	$ 96		$ 0.50	111	$ 56
11:00 AM		$ 0.50	170	$ 85		$ 0.50	170	$ 85
12:00 PM		$ 0.50	165	$ 83		$ 0.50	168	$ 84
1:00 PM		$ 0.50	158	$ 79		$ 0.50	170	$ 85
2:00 PM		$ 0.50	161	$ 80		$ 0.50	224	$ 112
3:00 PM		$ 0.50	200	$ 100		$ 0.50	306	$ 153
4:00 PM		$ 1.00	302	$ 302		$ 1.00	459	$ 459
5:00 PM		$ 1.00				$ 1.00		
6:00 PM		$ 0.50	166	$ 83		$ 0.50	305	$ 152
7:00 PM		$ 0.50	107	$ 54		$ 0.50	176	$ 88
8:00 PM		$ 0.50	72	$ 36		$ 0.50	98	$ 49
9:00 PM		$ 0.50	42	$ 21		$ 0.50	70	$ 35
10:00 PM		$ 0.50	30	$ 15		$ 0.50	43	$ 21
11:00 PM		$ 0.50	14	$ 7		$ 0.50	26	$ 13
			2905	$ 1,823			3043	$ 1,907

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 $1,120,000.

Applying the same methodology to the Low/Base condition, the scenario produces about 5% percent less traffic but almost 30% more revenue, to about $1,430,000 annually

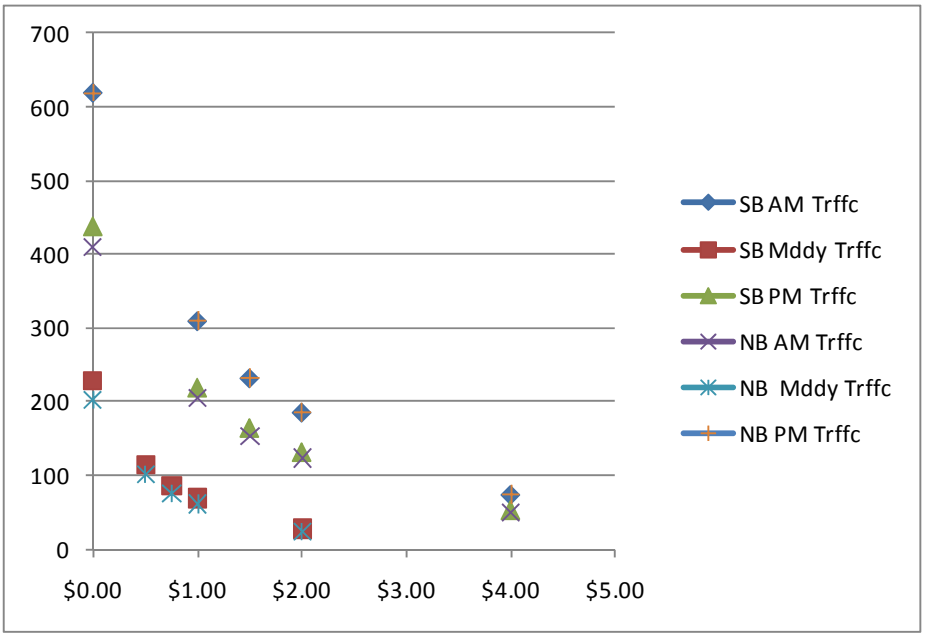
Reference: Cornelius Pass Project

Using the METRO model outputs, the revenue potential for the “Base’ and “High” toll levels is obviously $0.

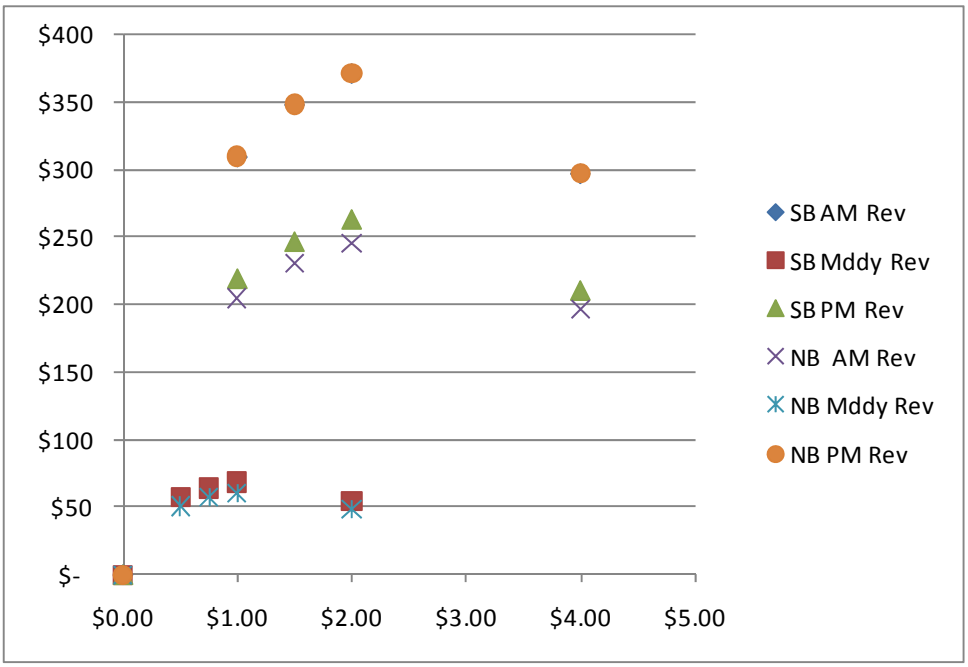
Year 2012 Adjusted METRO Model Outputs

Recognizing the very sensitive nature of the model outputs in response to toll levels beyond $1.50, 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 50% drop off of traffic upon the imposition of a toll of $1.00; 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 $1.00 to $2.00 and an even higher drop (60% reduction) from $2.0 to $4.00. This produces the following traffic curve:



Applying these traffic levels to the non-tolled traffic produces the following revenue levels, by toll rate:



Again, using the typical distribution of traffic, and a 300 equivalent weekday factor provides the following potential revenues for the project.

Toll Scenario	Ave Weekday Vehicles	Ave Weekday Revenue	Annual Revenues
Low Toll	**4,032**	**$2,538**	**$761,508**
Low/Base Toll	**2,761**	**$2,515**	**$867,768**
Base Toll	**2,403**	**$3,033**	**$909,979**
High Toll	**916**	**$2,312**	**$693,604**

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%

Year 2012 Summary

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

Year 2012 Cornelius Pass Project

Toll	METRO Model	Adjusted METRO
Low ($1.00/$0.50)	$ 900,000	$ 610,000
Low/Base ($1.50/$0.75)	$ 1,144,000	$ 700,000
Base ($2.00/$1.00)	$0	$ 730,000
High ($4.00/$2.00)	$0	$ 550,000

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 Cornelius Pass; in general, the “Low” Tolls will reduce auto traffic by about 15% to 30% compared to the non-tolled scenario, while the “Low/Base” will reduce it an additional 5% to 35%. The “Base” and “High” tolls will reduce auto traffic on Cornelius Pass to zero at peak hours, and by about 10% midday.

Reference: Cornelius Pass Project

2035 AM		CP SB Toll	Auto Traffic	Revenue		CP NB Toll	Auto Traffic	Revenue
	No toll	$0.00	754	$0	No toll	$0.00	531	$0
	Low Toll	$1.00	547	$547	Low Toll	$1.00	404	$404
	Low/Base	$1.50	291	$437	Low/Base	$1.50	265	$398
	Base Toll	$2.00	1	$2	Base Toll	$2.00	0	$0
	High Toll	$4.00	0	$0	High Toll	$4.00	0	$0

Midday		Toll	Auto Traffic	Revenue		Toll	Auto Traffic	Revenue
	No toll	$0.00	261	$0	No toll	$0.00	260	$0
	Low Toll	$0.50	212	$106	Low Toll	$0.50	213	$107
	Low/Base	$0.75	200	$150	Low/Base	$0.75	200	$150
	Base Toll	$1.00	183	$183	Base Toll	$1.00	178	$178
	High Toll	$2.00	0	$0	High Toll	$2.00	0	$0

PM		Toll	Auto Traffic	Revenue		Toll	Auto Traffic	Revenue
	No toll	$0.00	517	$0	No toll	$0.00	764	$0
	Low Toll	$1.00	386	$386	Low Toll	$1.00	554	$554
	Low/Base	$1.50	313	$470	Low/Base	$1.50	369	$554
	Base Toll	$2.00	0	$0	Base Toll	$2.00	0	$0
	High Toll	$4.00	0	$0	High Toll	$4.00	0	$0

Taking this data, applying it to a 24 hour basis, we used the typical traffic patterns on Cornelius Pass to produce a traffic and revenue calculation for the “Low” Toll scenario. 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 $1,400,000.

Applying the same methodology to the Low/Base condition, the scenario produces about 5% percent less traffic but almost 30% more revenue, to about $1,800,000 annually.

Unusually, applying the same methodology to the Base condition, the scenario produces about 30% percent less traffic than the Low scenario but almost the same revenue, to about $1,480,000. This is due to the condition that the midday volumes are only down slightly, but at two times the toll, while there is no volume in the peak period.

Using the METRO model outputs, the revenue potential for the “High” toll levels is obviously $0.

As in the year 2012 example above, we have re-built the optimal traffic and revenue curves for year 2035 in an attempt to more closely predict future traffic behavior in the corridor.

We assume a 50% drop off of traffic upon the imposition of a toll of $1.00; 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 $1.00 to $2.00 and an even higher drop (60% reduction) from $2.0 to $4.00.

Again, using the typical distribution of traffic, and a 300 equivalent weekday factor provides the following potential revenues for the project.

Year 2035

	Ave Weekday		Annual
Toll Scenario	**Vehicles**	**Revenue**	**Revenues**
Low Toll	**4,863**	**$3,073**	**$922,023**
Low/Base Toll	**3,646**	**$3,457**	**$1,037,055**
Base Toll	**2,909**	**$3,678**	**$1,103,295**
High Toll	**1,158**	**$2,933**	**$879,824**

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%

Reference: Cornelius Pass Project

Year 2035 Summary

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

Year 2035 Cornelius Pass Project

Toll	METRO Model	Adjusted METRO
Low ($1.00/$0.50)	$ 1.120,000	$ 740,000
Low/Base ($1.50/$0.75)	$ 1,430,000	$ 830,000
Base ($2.00/$1.00)	$ 1,200,000	$ 880,000
High ($4.00/$2.00)	$0	$ 700,000