



**LOS ANGELES COUNTY
METROPOLITAN
TRANSPORTATION AUTHORITY**

**TDM PHASE II PROGRAM
PART III-C
TECHNICAL APPENDIX
COST BENEFIT ANALYSIS**



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ASSUMPTIONS AND TRAVEL CHARACTERISTICS FOR THE COST EFFECTIVENESS MODEL

	VARIABLES	VALUE	SOURCE
1	Transit vehicle miles in LA County	251,410	MTA
2	Transit peak fleet	1,733	MTA
3	Active fleet	2,294	MTA
4	Contingency fleet	87	MTA
5	Capital cost of a bus		
5.1	Diesel	210,000	MTA
5.2	Methanol	220,000	MTA
5.3	CNG	260,000	MTA
6	Additional costs for radio and wheel chair	75,000	MTA
8	Total capital bus cost		
8.1	Diesel	285,000	MTA
8.2	Methanol	295,000	MTA
8.3	CNG	335,000	MTA
9	Transit ridership on a weekday	1,169,786	MTA
10	Transit ridership on Saturdays	837,722	MTA
11	Transit ridership on Sundays	580,335	MTA
12	Passenger mile/bus mile	18.2	MTA
13	Subsidy per passenger mile	\$0.27	MTA
14	Cost per bus hour	\$109.70	MTA
15	Revenue per passenger mile	\$0.16	MTA
16	Total bus hours	17,726	MTA
17	Operation cost	1944524	MTA
18	Fare box revenue	729,973	MTA
19	Total seat miles	10,800,996	MTA
20	Total passenger miles	4,569,352	MTA
21	Operation cost per revenue mile	\$7.73	MTA
22	Revenue per revenue mile	\$2.90	MTA
23	Amortization period for construction projects	30	MTA
24	Amortization period for equipment purchase	12	MTA
25	Amortization period for vehicles (BUSES)	12	MTA
26	Amortization period for vehicles (VANS, OR CARS)	5	MTA

ASSUMPTIONS AND TRAVEL CHARACTERISTICS FOR THE COST EFFECTIVENESS MODEL

	VARIABLES	VALUE	SOURCE
27	Average vanpool occupancy	7.00	REG. XV
28	Average length of a vanpool trip (miles)	20	REG. XV
29	Average cost per mile to drive	\$0.48	AAA
30	Average cost per commute trip of 11.4 miles	\$5.47	CALCULATED
31	Average cost per commute trip of 20 miles	\$9.60	CALCULATED
32	Percent of VMT on freeways	50%	LARTS MODEL
33	Average subsidy for vanpoolers	\$1.00	ASSUMED
34	Purchase cost of a van	\$32,000	CTS
35	Amortization period for a van (years)	12	VPSI
36	Average cost of a passenger vehicle	\$16,000	AAA
37	Operation and Maintenance cost per passenger van (\$ per mile)	\$0.50	AAA
38	Operating and maintenance cost per passenger car	\$0.48	AAA
39	Number of vans needed	1,000	
40	Interest rate	8%	MARKET RATE
41	Average cost of a vanpool trip to the passenger (\$ per month)	\$150	CTS
42	Average cost per parking (\$ per month)	\$100	MTA
43	Construction cost of arterial (\$ per lane mile)	\$425,000	CALTRANS
44	Capital cost of bicycle racks (\$/rack)	\$40	ESGVEQG
45	Capital cost of shower facilities (\$/sq. ft)	\$300.00	ESGVEQG
46	capital cost of lockers (\$/locker)	\$75	ESGVEQG
47	Operation and Maintenance of shower facilities (\$/sq. ft.)	\$0.75	ESGVEQG
48	Operation and Maintenance of lockers (\$/per user)	\$5	ESGVEQG
49	Capital cost of bikes (\$/bike)	\$350	ESGVEQG
50	Operation and maintenance of bikes work space (\$/sq. ft.)	\$2	ESGVEQG
51	Capital cost of hamlet (\$/unit)	\$40	ESGVEQG
52	Operation and maintenance of bike (\$/user)	\$25	ESGVEQG
53	Construction cost of bikeway including new paving & striping (\$/lane mile) (CLASS I)	\$620,000	MTA(PATTI HELM)
54	Construction cost of bikeway including new paving & striping (\$/lane mile) (CLASS II)	\$20,000	MTA(PATTI HELM)
55	Construction cost of freeway (\$/lane mile) not including right of way	\$2,500,000	SANDAG
56	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$12,000,000	CALTRANS (MIN) (IN METROPOLITIAN AREA)

**ASSUMPTIONS AND TRAVEL CHARACTERISTICS
FOR THE COST EFFECTIVENESS MODEL**

	VARIABLES	VALUE	SOURCE
57	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$16,000,000	CALTRANS (MAX) (IN METROPOLITAN AREA)
58	Average construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$14,000,000	CALTRANS (AVERAGE) (IN METROPOLITAN AREA)
59	Construction cost of HOV lane (\$/lane mile)	\$2,500,000	MTC
60	Construction cost of loading facilities (\$/facility)	\$25,000	SIERRA
61	Construction cost of sidewalk (\$/SQ. FT.)	\$325	MTA
62	Cost of telecommuting system (\$/SYSTEM)	\$2,000	SIERRA
63	Cost/ridesharing ride (\$/DAY)	\$2	MTA
64	Lane miles arterial/vehicle trip	0.0018	COMSIS
65	Lane miles freeway/vehicle trip	0.0015	COMSIS
66	O&M cost of arterial (\$/LANE MILE)	\$565	CALTRANS
67	O & M COST/MILE OF TRANSIT	\$4	MTA
68	O&M cost/passenger of transit	\$1	MTA
69	O&M cost of freeway (\$/LANE MILE)	\$2,000	CALTRANS
70	O&M cost of HOV lane (\$/LANE MILE)	\$8,000	MTC
71	O&M cost of vehicle	0.48	
72	Air pollution cost per mile	\$0.015	
73	Cost per vehicle—miles of delay	\$0.11	

PARAMETERS USED FOR QUANTIFYING TIME COST

VALUE OF IN-VEHICLE TRAVEL TIME IS ASSUMED TO

BE 20% TO 50% OF THE COMMUTER WAGE RATE (STOPHER 1976, RUTHERFORD AND WELLANDER, 1986)

VALUE OF IN-VEHICLE TRAVEL TIME AS A PERCENT OF WAGE

35% STOPHER, 1976

VALUE OF OUT-OF-VEHICLE TIME AS A PERCENT OF WAGE

85.00% RUTHERFORD AND WELLANDER, 1986

COST OF AIR AND NOISE POLLUTION FOR AUTOMOBILE (\$/MILE)

\$0.015 RUTHERFORD AND WELLANDER, 1986

COST OF AIR AND NOISE POLLUTION FOR BUSES (\$/MILE)

\$0.173 RUTHERFORD AND WELLANDER, 1986

1990 TOTAL VEHICLE MILES TRAVELED

1990 TOTAL VEHICLE TRIPS

1990 VEHICLE MILES TRAVELED (VMT), VEHICLE HOURS TRAVELED (VHT), DELAY AND SPEED BY FACILITY TYPE

(SOURCE: REGIONAL TRAVEL FORECAST MODEL)

	VMT	VHT**	DELAY***	SPEED****
AM PEAK (2 HOURS)				
FREEWAY	11,909,631	357,647	158,798	33.3
MAJOR ARTERIAL	1,802,432	82,680	25,300	21.8
PRIMARY ARTERIAL	6,251,289	312,564	127,739	20
SECONDARY ARTERIAL	1,663,250	90,394	32,515	18.4
HOV	56,494	1,267	398	44.6
CENTROID CONNECTOR	1,525,867	52,616	0	29
TOTAL	23,208,963	896,099	344,750	25.9
PM PEAK (3 HOURS)				
FREEWAY	22,391,380	691,092	317,876	32.4
MAJOR ARTERIAL	3,757,502	203,108	82,731	18.5
PRIMARY ARTERIAL	12,784,266	770,137	386,880	16.6
SECONDARY ARTERIAL	3,733,007	242,403	110,762	15.4
HOV	180,428	3,922	1,145	46
CENTROID CONNECTOR	393,529	13,570	0	29
TOTAL	46,240,112	2,028,075	899,394	22.8
AM AND PM PEAK (5 HOURS)				
FREEWAY	34,301,011	1,048,739	476,674	32.70692293
MAJOR ARTERIAL	5,559,934	285,789	108,031	19.45470997
PRIMARY ARTERIAL	19,035,555	1,082,701	514,619	17.58154446
SECONDARY ARTERIAL	5,396,257	332,797	143,277	16.21485712
HOV	236,922	5,189	1,543	45.65824933
CENTROID CONNECTOR	1,919,396	66,186	0	29
TOTAL	69,449,075	2,924,174	1,244,144	23.74997996

PARAMETERS USED FOR QUANTIFYING TIME COST

OFF- PEAK PERIOD (19 HOURS)				
FREEWAY	47,600,458	908,751	115,516	52.38008454
MAJOR ARTERIAL	7,236,056	247,129	28,767	29.28052669
PRIMARY ARTERIAL	27,524,923	1,035,250	240,036	26.58771827
SECONDARY ARTERIAL	7,419,659	362,074	103,151	20.49209181
HOV	124,345	1,961	35	63.4
CENTROID CONNECTOR	7,708,116	265,797	0	29
TOTAL	97,613,557	2,820,962	487,505	34.60293391
ALL PERIODS (24 HOURS)*				
FREEWAY	81,901,469	1,957,490	592,190	
MAJOR ARTERIAL	12,795,990	532,917	136,798	
PRIMARY ARTERIAL	46,560,478	2,117,950	754,655	
SECONDARY ARTERIAL	12,815,916	694,871	246,428	
HOV	361,267	7,150	1,578	
CENTROID CONNECTOR	9,627,512	331,983	0	
TOTAL	167,062,632	5,745,136	1,731,649	

* COMBINED DATA FOR MID-DAY PERIOD (6 HOURS) AND NIGHT PERIOD (13 HOURS)

** COMPUTED BY DIVIDING VMT BY SPEED

*** DELAYS WERE COMPUTED AS FOLLOWS:
 $(VMT/EXISTING\ SPEED) - (VMT/FREE\ FLOW\ SPEED)$

BASED ON SCAG PAPER "THE ECONOMIC WAY OF COMMUTING, 1987" AND USING THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS A MANUAL ON USER BENEFIT ANALYSIS OF HIGHWAY AND BUS-TRANSIT IMPROVEMENTS. THE FOLLOWING PERCENTAGES FOR BUSINESS TRIPS ON EACH FACILITY TYPE AND FOR EACH PERIOD IS AS FOLLOWS:

	BUSINESS TRIP PERCENTAGE
A.M. PEAK	
FREEWAY	10.63%
ARTERIAL#	10.63%
P.M. PEAK	
FREEWAY	10.10%
ARTERIAL	10.10%
OFF-PEAK	
FREEWAY	14.83%
ARTERIAL	14.83%

COMBINED DATA FOR ARTERIAL, SECONDARIES, AND CENTROID CONNECTORS.

PARAMETERS USED FOR QUANTIFYING TIME COST

IN ORDER TO ESTIMATE THE COSTS ASSOCIATED WITH DELAYS, THE VEHICLE-HOURS OF DELAY

IS TRANSFORMED INTO VEHICLE MILES OF DELAY: $\text{VEHICLE MILES OF DELAY} = \text{VEHICLE HOURS OF DELAY} / \text{SPEED}$

	VEHICLE-HOURS OF DELAY	SPEED	VEHICLE MILES OF DELAY
AM PEAK (2 HOURS)			
FREEWAY	158,798	33.3	5,287,973
MAJOR ARTERIAL	25,300	21.8	551,540
PRIMARY ARTERIAL	127,739	20	2,554,780
SECONDARY ARTERIAL	32,515	18.4	598,276
HOV	398	44.6	17,751
CENTROID CONNECTOR	0	29	0
TOTAL	344,750	25.9	8,929,025
PM PEAK (3 HOURS)			
FREEWAY	317,876	32.4	10,299,182
MAJOR ARTERIAL	82,731	18.5	1,530,524
PRIMARY ARTERIAL	386,880	16.6	6,422,208
SECONDARY ARTERIAL	110,762	15.4	1,705,735
HOV	1,145	46	52,670
CENTROID CONNECTOR	0	29	0
TOTAL	899,394	22.8	20,506,183
AM AND PM PEAK (5 HOURS)			
FREEWAY	476,674	32.71	15,590,540
MAJOR ARTERIAL	108,031	19.45	2,101,712
PRIMARY ARTERIAL	514,619	17.58	9,047,797
SECONDARY ARTERIAL	143,277	16.21	2,323,216
HOV	1,543	45.66	70,451
CENTROID CONNECTOR	0	29.00	0
TOTAL	1,244,144	23.75	29,548,395
OFF-PEAK PERIOD (19 HOURS)			
FREEWAY	115,516	52.38	6,050,738
MAJOR ARTERIAL	28,767	29.28	842,313
PRIMARY ARTERIAL	240,036	26.59	6,382,010
SECONDARY ARTERIAL	103,151	20.49	2,113,780
HOV	35	63.40	2,219
CENTROID CONNECTOR	0	29.00	0
TOTAL	487,505	34.60	16,869,103
ALL PERIODS (24 HOURS)*			
FREEWAY	592,190		21,641,278
MAJOR ARTERIAL	136,798		2,944,025
PRIMARY ARTERIAL	754,655		15,429,806
SECONDARY ARTERIAL	246,428		4,436,996
HOV	1,578		72,670
CENTROID CONNECTOR	0		0
TOTAL	1,731,649		46,417,498

PARAMETERS USED FOR QUANTIFYING TIME COST

BASED ON THE AUTOMOBILE CLUB OF SOUTHERN CALIFORNIA, THE FOLLOWING DATA IS USED FOR AUTOMOBILE OPERATING EXPENSE

OPERATION COST	COST PER MILE
GASOLINE AND OIL	\$0.06
MAINTENANCE	\$0.03
TIRES	\$0.09
TOTAL	\$0.10
OWNERSHIP COST*	COST PER YEAR
INSURANCE	\$1,715.00
COMPERHENSIVE INSURANCE (\$250 DEDUCTIBLE)	
COLLISION INSURANCE (\$500 DEDUCTIBLE)	
UNINSURED MOTORIST (\$2000)	
PROPERTY DAMAGE & BODILY INJURY	
LICENSE/REGISTRITION/TAXES	\$412.00
DEPRECIATION**	\$2,830.00
FINANCE CHARGE (10% INTEREST)	\$670.00
TOTAL	\$5,627.00
ASSUMING THAT ON AVERAGE AN INDIVIDUAL DRIVES 15,000 AMILES A YEAR THE COST PER MILE IS	\$0.48
PERCENT OF OWNERSHIP COST	78.95%

* OWNERSHIP COSTS ARE INCURRED EVEN IF THE CAR IS NOT DRIVEN

** COSTS BASED ON A 4-YEAR/60,000 MILES RETENTION CYCLE

COST – EFFECTIVENESS MODEL

LACMTA

TCM # 1 TRIP REDUCTION PROGRAM FOR SMALL EMPLOYERS

ASSUMPTIONS

1	Transit ridership on a weekday	1,169,786	MTA
2	Transit ridership on Saturdays	837,722	MTA
3	Transit ridership on Sundays	580,335	MTA
4	Passenger mile/bus mile	18.2	MTA
5	Subsidy per passenger mile	\$0.27	MTA
6	Cost per bus hour	\$109.70	MTA
7	Revenue per passenger mile	\$0.16	MTA
8	Total bus hours	17,726	MTA
9	Operation cost	1944524	MTA
10	Fare box revenue	729,973	MTA
11	Total seat miles	10,800,996	MTA
12	Total passenger miles	4,569,352	MTA
13	Operation cost per revenue mile	\$7.73	MTA
14	Revenue per revenue mile	\$2.90	MTA
15	Amortization period for construction projects	30	MTA
16	Amortization period for equipment purchase	12	MTA
17	Amortization period for vehicles (BUSES)	12	MTA
18	O&M cost of vehicle (\$/MILE)	\$0.48	AAA
19	Construction cost of arterial (\$/lane mile)	\$900,000	CALTRANS
20	Construction annualization factor (CAF)	0.09	
21	Bus annualization factor (BAF)	0.13	
22	car annualization factor	0.25	
23	Amortization period for cars	5	
24	Percent of VMT on freeways	50%	LARTS MODEL
25	Interest rate	8%	MARKET RATE
26	Lane miles arterial/vehicle trip	0.0018	COMSIS
27	Lane miles freeway/vehicle trip	0.0015	COMSIS
28	O&M cost of arterial (\$/LANE MILE)	\$765	CALTRANS
29	O&M cost of freeway (\$/LANE MILE)	\$2,000	CALTRANS
30	Monthly parking cost for SOV	\$100	MTA
31	Monthly parking cost for ridesharing employees	\$40	
32	Monthly parking saving per ridesharing employee	\$60	
33	Percent of parking paid by private sector	90%	SCAQMD
34	Percent of parking paid by individual	10%	SCAQMD
35	Air pollution cost per mile	\$0.015	RUTHERFORD AND WELLANDER, 1986
36	Cost per vehicle – miles of delay	\$0.11	RUTHERFORD AND WELLANDER, 1986
37	Construction cost of freeway (\$/lane mile) not including right of way	\$2,500,000	SANDAG
38	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$12,000,000	CALTRANS (MIN) (IN METROPOLITAN AREA)
39	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$16,000,000	CALTRANS (MAX) (IN METROPOLITAN AREA)
40	Average construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$14,000,000	CALTRANS (AVERAGE) (IN METROPOLITAN AREA)
41	Construction cost of HOV lane (\$/lane mile)	\$2,500,000	MTC
42	Average cost of a passenger vehicle	\$16,000	AAA
43	Operation cost per transit passenger	\$1.66	MTA
44	Fare box revenue per transit passenger	\$0.62	MTA
45	Average cost of long express trip on buses and rail	\$5	MTA
46	Average capital cost per parking space including land	\$10,000	MTA
47	Average vanpool occupancy	7.00	REG. XV

COST-EFFECTIVENESS MODEL

LACMTA

51	Average cost per commute trip of 11.4 miles	\$5.47	CALCULATED
52	Average cost per rideshare trip	\$2.19	CALCULATED
53	Average saving per rideshare trip	\$3.28	CALCULATED
54	Interest rate	8%	MARKET RATE
55	Average rate of a vanpool trip (\$/mo)	\$150	CTS
56	Average cost per parking	\$100	MTA
57	Car annualization factor	0.25	CALCULATED
58	Construction annualization factor	0.09	CALCULATED
59	Average enforcement cost per participating employee	\$1.82	CALCULATED
60	Average administration cost per participating employee	\$72.73	SCAQMD
61	Total number of employees targeted	2,610,000	MTA
62	Plan evaluation fee per employee	\$1.82	CALCULATED
63	Capital cost of a passenger car	16,000	CALCULATED

METHODOLOGY

PUBLIC SECTOR COST

DAILY PUBLIC CAPITAL COST (DPCC) = 0

DAILY PUBLIC O & M COST (DPOMC) =

(DPAC) + (DVTR*.30)* (DASPTT) WHERE;

DPAC = DAILY PUBLIC ADMINISTRATION COST

DVTR = DAILY VEHICLE TRIPS REDUCED

DSPTT = DAILY SUBSIDY PER TRANSIT PASSENGER

DAILY PUBLIC COST =

(DPCC + DPOMC) WHERE;

DPCC = DAILY PUBLIC CAPITAL COST

DPOMC = DAILY PUBLIC O & M COST

DAILY PUBLIC REVENUES (DPR) =

(DRPE)*(NEP) + (DVTR)*(DRPTP)*.30 WHERE;

DRPE = DAILY PUBLIC REVENUE PER EMPLOYEE

NEP = NUMBER OF EMPLOYEES PARTICIPATING

DRPTP = DAILY REVENUE PER TRANSIT PASSENGER

DAILY PUBLIC COST/REVENUE (DPC/R) =

(DPCOMC) - (DPR) WHERE;

DPCOMC = DAILY PUBLIC CAPITAL AND OPERATION AND MAINTENANCE COST

DPR = DAILY PUBLIC REVENUE

COST-EFFECTIVENESS MODEL

LACMTA

DAILY PUBLIC BENEFITS (DPB) BY AVOIDING HIGHWAY BUILDING =

(DPCB) + (DPOMB) WHERE;

$$\text{DPCB} = (\text{DPTR}) * (\text{LMF/T}) * (\text{CCLMF}) * (\text{CAF})/260 * (\text{POTOF}) + \\ + (\text{DPTR}) * (\text{LMA/T}) * (\text{CCLMA}) * (\text{CAF})/260 * (\text{POTOA}) \text{ WHERE;}$$

DPTR = DAILY TRIPS REDUCED

LMF/T = LANE MILES OF FREEWAY PER TRIP

CCLMF = CONSTRUCTION COST OF FREEWAY LANE MILE

CAF = CONSTRUCTION ANNUALIZATION FACTOR

POTOF = PERCENT OF TRIPS ON FREEWAYS

LMA = LANE MILES OF ARTERIAL PER TRIP

CCLMA = CONSTRUCTION COST OF ARTERIAL LANE MILE

POTOA = PERCENT OF PEAK TRIPS ON ARTERIAL

$$\text{DPOMB} = (\text{DTR}) * (\text{LMFA/T}) * (\text{OMCLMF})/260 * (\text{POTOF}) + \\ + (\text{DTR}) * (\text{LMA/T}) * (\text{OMCLMA})/260 * (\text{POTOA}) \text{ WHERE;}$$

OMCLMF = O & M COST PER LANE MILE OF FREEWAY

OMCLMA = O & M COST PER LANE MILE OF ARTERIAL

POTOF = PERCENT OF TRIPS ON FREEWAY

POTOA = PERCENT OF TRIPS ON ARTERIAL

NET PUBLIC DAILY COST/BENEFIT COUNTING THE AVOIDED COSTS (NDPC/BIAC) =
(NDPC/R) - (DPB)

INDIVIDUAL COST

DAILY INDIVIDUAL CAPITAL COST (DICC) = 0

DAILY INDIVIDUAL OPERATION AND MAINTENANCE COST (DIOMC) =
(DVMTR) * (DOMCPM) * .2105 + (DPC) * (DVTR/2) * .10 WHERE;

DVMTR = DAILY VEHICLE MILES TRAVELED REDUCED

DOMCPM = DAILY OPERATION AND MAINTENANCE COST PER MILE

DPC = DAILY PARKING COST

DAILY INDIVIDUAL BENEFIT (DIB) =

(DICB) + (DIOMB) WHERE;

DICB = DAILY INDIVIDUAL CAPITAL BENEFIT = 0

DIOMB = DAILY INDIVIDUAL O & M COST SAVING (CAR O & M)

COST-EFFECTIVENESS MODEL

LACMTA

$$\text{DIOMB} = (\text{DOMBPM}) * (\text{DVMTR}) * (.2105) \\ + (.10 * \text{DIPS} * \text{DVTR} / 2) \text{ WHERE;}$$

DOMBPM = DAILY OPERATION AND MAINTENANCE BENEFIT PER MILE

DVTR = DAILY VEHICLE TRIPS REDUCED

.21 IS THE PERCENT OF O & M COST ATTRIBUTED TO SAVINGS

DIPB = DAILY INDIVIDUAL PARKING COST SAVING

DVMTR = DAILY VEHICLE MILES TRAVELED REDUCED

$$\text{NET DAILY INDIVIDUAL COST/BENEFIT (NDIC/B)} =$$

$$(\text{DIC}) - (\text{DIB}) \text{ WHERE;}$$

DIC = DAILY INDIVIDUAL COST

DIB = DAILY INDIVIDUAL BENEFITS

PRIVATE SECTOR COST/BENEFIT

$$\text{DAILY PRIVATE CAPITAL COST (DPRCC)} = 0$$

$$\text{DAILY PRIVATE O \& M COST (DPROMC)} =$$

$$(\text{NEP}) * (\text{CPE}) \text{ WHERE;}$$

NEP = NUMBER OF EMPLOYEES PARTICIPATING

CPE = COST PER EMPLOYEE

$$\text{DALY PRIVATE CAPITAL BENEFIT (DPRCB)} = 0$$

$$\text{DAILY PRIVATE O \& M BENEFIT (DPROMB)} =$$

$$(\text{DVTR}) / 2 * (\text{MPC}) * 12 / 260 * .90 \text{ WHERE;}$$

DVTR = DAILY VEHICLE TRIPS REDUCED

MPC = MONTHLY PARKING COST

.90 = PERCENT OF PARKING PROVIDED BY PRIVATE SECTOR

$$\text{NET DAILY PRIVATE COST/BENEFIT (NDPC/B)} =$$

$$(\text{DPRC}) - (\text{DPRB})$$

SOCIETAL COST

$$\text{DAPC} = \text{DAILY AIR POLLUTION COST/BENEFIT}$$

$$\text{DAPC} = \text{DVMTR} * (\text{APC/M}) \text{ WHERE;}$$

DVMTR = DAILY VMT REDUCED

APC/M = AIR POLLUTION COST PER MILE

COST-EFFECTIVENESS MODEL

LACMTA

DVMDCB = DAILY VEHICLE MILES OF DELAY COST/BENEFIT

DVMDC = (DVMDS) * (C/VMD) WHERE;

DVMDS = (VMT/NEW SPEED) - (VMT/EXISTING SPEED) * (AVERAGE SPEED)

DVMDS = DAILY VEHICLE MILES OF DELAY SAVED

C/VMD = DAILY COST PER VEHICLE MILES OF DELAY SAVED

DSCB = DAILY SOCIETAL COST/BENEFIT

DSCB = (DAPC) + (DVMDCB)

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 1 THE BUILD SCENARIO

TOTAL DAILY COST (TDC) =

(DPC) + (DIC) + (DPRC) + (DSC) WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DSC = DAILY SOCIETAL COST

TOTAL DAILY BENEFITS (TDB) =

(DPB) + (DIB) + (DPRB) + DSB WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DSB = DAILY SOCIETAL BENEFIT

TOTAL DAILY COS/BENEFIT (TDC/B) =

[(DPC) + (DIC) + (DPRC) + (DSC)] - [(DPB) + (DIB) + (DPRB) + (DSB)]

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 2 THE NO BUILD SCENARIO

TOTAL DAILY COST (TDC) =

(DPC) + (DIC) + (DPRC) + (DSC) WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DSC = DAILY SOCIETAL COST

COST-EFFECTIVENESS MODEL

LACMTA

TOTAL DAILY BENEFITS (TDB) =
(DPB) + (DIB) + (DPRB) + (DSB) WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DSB = DAILY SOCIETAL BENEFIT

TOTAL DAILY COST/BENEFIT

[(DPC) + (DIC) + (DPRC) + (DSC)] - [(DPB) + (DIB) + (DPRB) + (DSB)]

COST-EFFECTIVENESS MODEL

LACMTA

LIKELY OUTCOMES

PUBLIC SECTOR COST/BENEFIT

		STANDARD	HIGH
1	DAILY PUBLIC CAPITAL COST	\$0	\$0
2	DAILY PUBLIC O & M COST	\$26,740	\$34,820
3	DAILY PUBLIC COST	\$26,740	\$34,820
4	DAILY PUBLIC REVENUES	\$21,422	\$24,440
5	DAILY PUBLIC COST/REVENUE	\$5,318	\$10,380
6	DAILY PUBLIC AVOIDED CAPITAL COST (SCENARIO 2)	\$83,878	\$163,731
7	DAILY PUBLIC AVOIDED O & M COST (SCENARIO 2)	\$159	\$311
8	TOTAL DAILY PUBLIC AVOIDED (SCENARIO 2)	\$84,038	\$164,042
9	NET DAILY PUBLIC BENEFIT (SCENARIO 2)	\$105,459	\$188,482
10	DAILY PUBLIC CAPITAL COST (SCENARIO 1)	\$83,878	\$163,731
11	DAILY PUBLIC O & M COST (SCENARIO 1)	\$159	\$311
12	TOTAL DAILY PUBLIC COST (SCENARIO 1)	\$84,038	\$164,042
13	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 2)	(\$78,720)	(\$153,662)
14	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 1)	\$84,038	\$164,042
15	COST		
16	DAILY PUBLIC COST PER TRIP REDUCED	\$1.57	\$1.05
17	DAILY PUBLIC COST PER VMT REDUCED	\$0.11	\$0.08
18	DAILY PUBLIC COST PER TON OF CO REDUCED	\$5,262	\$3,510
19	DAILY PUBLIC COST PER TON OF ROG REDUCED	\$52,431	\$34,960
20	DAILY PUBLIC COST PER TON OF NOx REDUCED	\$93,823	\$62,626
21	DAILY PUBLIC COST PER TON OF PM REDUCED	\$5,347,932	\$3,482,021
22	BENEFIT		
23	DAILY PUBLIC BENEFIT PER TRIP REDUCED	\$6.19	\$5.67
24	DAILY PUBLIC BENEFIT PER VMT REDUCED	\$0.45	\$0.41
25	DAILY PUBLIC BENEFIT PER TON OF CO REDUCED	\$20,752	\$18,998
26	DAILY PUBLIC BENEFIT PER TON OF ROG REDUCED	\$206,783	\$189,239
27	DAILY PUBLIC BENEFIT PER TON OF NOx REDUCED	\$370,033	\$338,996
28	DAILY PUBLIC BENEFIT PER TON OF PM REDUCED	\$21,091,894	\$18,848,179
29	COST/BENEFIT		
30	NET DAILY PUBLIC COST/BENEFIT PER TRIP REDUCED	(\$4.62)	(\$4.62)
31	NET DAILY PUBLIC COST/BENEFIT PER VMT REDUCED	(\$0.34)	(\$0.34)
32	NET DAILY PUBLIC COST/BENEFIT PER TON OF CO REDUCED	(\$15,490)	(\$15,489)
33	NET DAILY PUBLIC COST/BENEFIT PER TON OF ROG REDUCED	(\$154,353)	(\$154,279)
34	NET DAILY PUBLIC COST/BENEFIT PER TON OF NOx REDUCED	(\$276,210)	(\$276,370)
35	NET DAILY PUBLIC COST/BENEFIT PER TON OF PM REDUCED	(\$15,743,962)	(\$15,368,158)
36	INDIVIDUAL COST/BENEFIT		
37	DAILY INDIVIDUAL CAPITAL COST	\$0	\$0
38	DAILY INDIVIDUAL O & M COST	\$27,492	\$53,665
39	DAILY INDIVIDUAL COST	\$27,492	\$53,665
40	DAILY INDIVIDUAL CAPITAL BENEFIT	\$0	\$0
41	DAILY INDIVIDUAL O & M BENEFIT	\$16,495	\$32,199
42	DAILY INDIVIDUAL BENEFIT	\$16,495	\$32,199
43	NET DAILY INDIVIDUAL COST/BENEFIT	\$10,997	\$21,466

COST-EFFECTIVENESS MODEL

LACMTA

44	COST		
45	NET DAILY INDIVIDUAL COST PER TRIP REDUCED	\$1.61	\$1.61
46	NET DAILY INDIVIDUAL COST PER VMT REDUCED	\$0.12	\$0.12
47	NET DAILY INDIVIDUAL COST PER TON OF CO REDUCED	\$5,410	\$5,409
48	NET DAILY INDIVIDUAL COST PER TON OF ROG REDUCED	\$53,907	\$53,881
49	NET DAILY INDIVIDUAL COST PER TON OF NOx REDUCED	\$96,464	\$96,520
50	NET DAILY INDIVIDUAL COST PER TON OF PM REDUCED	\$5,498,465	\$5,366,504
51	BENEFIT		
52	NET DAILY INDIVIDUAL BENEFIT PER TRIP REDUCED	\$0.97	\$0.97
53	NET DAILY INDIVIDUAL BENEFIT PER VMT REDUCED	\$0.07	\$0.07
54	NET DAILY INDIVIDUAL BENEFIT PER TON OF CO REDUCED	\$3,246	\$3,246
55	NET DAILY INDIVIDUAL BENEFIT PER TON OF ROG REDUCED	\$32,344	\$32,328
56	NET DAILY INDIVIDUAL BENEFIT PER TON OF NOx REDUCED	\$57,879	\$57,912
57	NET DAILY INDIVIDUAL BENEFIT PER TON OF PM REDUCED	\$3,299,079	\$3,219,902
58	COST/BENEFIT		
59	NET DAILY INDIVIDUAL COST/BENEFIT PER TRIP REDUCED	\$0.65	\$0.65
60	NET DAILY INDIVIDUAL COST/BENEFIT PER VMT REDUCED	\$0.05	\$0.05
61	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF CO REDUCED	\$2,164	\$2,164
62	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF ROG REDUCED	\$21,563	\$21,552
63	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF NOx REDUCED	\$38,586	\$38,608
64	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF PM REDUCED	\$2,199,386	\$2,146,602
65	PRIVATE SECTOR COST/BENEFIT		
66	DAILY PRIVATE CAPITAL COST	\$0	\$0
67	DAILY PRIVATE O & M COST	\$730,070	\$730,070
68	DAILY PRIVATE COST	\$730,070	\$730,070
69	DAILY PRIVATE CAPITAL BENEFIT	\$0	\$0
70	DAILY PRIVATE O & M BENEFIT	\$14,160	\$27,640
71	DAILY PRIVATE BENEFIT	\$14,160	\$27,640
72	NET DAILY PRIVATE COST/BENEFIT	\$715,910	\$702,430
73	COST		
74	NET DAILY PRIVATE COST PER TRIP REDUCED	\$42.83	\$21.94
75	NET DAILY PRIVATE COST PER VMT REDUCED	\$3.13	\$1.60
76	NET DAILY PRIVATE COST PER TON OF CO REDUCED	\$143,658	\$73,588
77	NET DAILY PRIVATE COST PER TON OF ROG REDUCED	\$1,431,510	\$733,002
78	NET DAILY PRIVATE COST PER TON OF NOx REDUCED	\$2,561,649	\$1,313,075
79	NET DAILY PRIVATE COST PER TON OF PM REDUCED	\$146,013,986	\$73,006,993
80	BENEFIT		
81	NET DAILY PRIVATE BENEFIT PER TRIP REDUCED	\$0.83	\$0.83
82	NET DAILY PRIVATE BENEFIT PER VMT REDUCED	\$0.06	\$0.06
83	NET DAILY PRIVATE BENEFIT PER TON OF CO REDUCED	\$2,786	\$2,786
84	NET DAILY PRIVATE BENEFIT PER TON OF ROG REDUCED	\$27,764	\$27,751
85	NET DAILY PRIVATE BENEFIT PER TON OF NOx REDUCED	\$49,683	\$49,712
86	NET DAILY PRIVATE BENEFIT PER TON OF PM REDUCED	\$2,831,926	\$2,763,969
87	COST/BENEFIT		
88	NET DAILY PRIVATE COST/BENEFIT PER TRIP REDUCED	\$42.00	\$21.11
89	NET DAILY PRIVATE COST/BENEFIT PER VMT REDUCED	\$3.07	\$1.54
90	NET DAILY PRIVATE COST/BENEFIT PER TON OF CO REDUCED	\$140,872	\$70,802
91	NET DAILY PRIVATE COST/BENEFIT PER TON OF ROG REDUCED	\$1,403,746	\$705,251
92	NET DAILY PRIVATE COST/BENEFIT PER TON OF NOx REDUCED	\$2,511,966	\$1,263,364
93	NET DAILY PRIVATE COST/BENEFIT PER TON OF PM REDUCED	\$143,182,060	\$70,243,024

COST-EFFECTIVENESS MODEL

LACMTA

94	SOCIETAL COST/BENEFIT		
95	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
96	DAILY SOCIETAL AIR POLLUTION COST	\$3,497	\$6,827
97	DAILY SOCIETAL CONGESTION COST	\$0	\$0
98	DAILY SOCIETAL COST	\$3,497	\$6,827
99	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
100	DAILY SOCIETAL CONGESTION BENEFIT	\$7,006	\$13,676
101	DAILY SOCIETAL BENEFIT	\$7,006	\$13,676
102	NET DAILY SOCIETAL COST/BENEFIT	(\$3,509)	(\$6,849)
103	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
104	DAILY SOCIETAL AIR POLLUTION COST	\$3,497	\$6,827
105	DAILY SOCIETAL CONGESTION COST	\$7,006	\$13,676
106	DAILY SOCIETAL COST	\$10,504	\$20,503
107	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
108	DAILY SOCIETAL CONGESTION BENEFIT	\$0	\$0
109	DAILY SOCIETAL BENEFIT	\$0	\$0
110	NET DAILY SOCIETAL COST/BENEFIT	\$10,504	\$20,503
111	SCENARIO #2 THE NO BUILD SCENARIO		
112	DAILY SOCIETAL AIR POLLUTION COST	\$3,497	\$6,827
113	DAILY SOCIETAL CONGESTION COST	\$7,006	\$13,676
114	DAILY SOCIETAL COST	\$10,504	\$20,503
115	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
116	DAILY SOCIETAL CONGESTION BENEFIT	\$0	\$0
117	DAILY SOCIETAL BENEFIT	\$0	\$0
118	NET DAILY SOCIETAL COST/BENEFIT	\$10,504	\$20,503
119	TOTAL COST/BENEFIT		
120	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
121	TOTAL DAILY COST	\$118,190	\$230,708
122	TOTAL DAILY BENEFIT	\$7,006	\$13,676
123	TOTAL DAILY COST/BENEFIT	\$111,184	\$217,031
124	COST		
125	NET DAILY COST PER TRIP REDUCED	\$6.93	\$6.93
126	NET DAILY COST PER VMT REDUCED	\$0.51	\$0.51
127	NET DAILY COST PER TON OF CO REDUCED	\$23,257	\$23,254
128	NET DAILY COST PER TON OF ROG REDUCED	\$231,745	\$231,634
129	NET DAILY COST PER TON OF NO _x REDUCED	\$414,702	\$414,942
130	NET DAILY COST PER TON OF PM REDUCED	\$23,638,010	\$23,070,764
131	BENEFIT		
132	NET DAILY BENEFIT PER TRIP REDUCED	\$0.41	\$0.41
133	NET DAILY BENEFIT PER VMT REDUCED	\$0.03	\$0.03
134	NET DAILY BENEFIT PER TON OF CO REDUCED	\$1,379	\$1,379
135	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$13,738	\$13,731
136	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$24,584	\$24,598
137	NET DAILY BENEFIT PER TON OF PM REDUCED	\$1,401,270	\$1,367,635

COST-EFFECTIVENESS MODEL

LACMTA

138	COST/BENEFIT		
139	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$6.52	\$6.52
140	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.48	\$0.48
141	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$21,878	\$21,876
142	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$218,007	\$217,903
143	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$390,118	\$390,344
144	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$22,236,740	\$21,703,129
145	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
146	TOTAL DAILY COST	\$125,196	\$244,384
147	TOTAL DAILY BENEFIT	\$0	\$0
148	TOTAL DAILY COST/BENEFIT	\$125,196	\$244,384
149	COST		
150	NET DAILY COST PER TRIP REDUCED	\$7.35	\$7.35
151	NET DAILY COST PER VMT REDUCED	\$0.54	\$0.54
152	NET DAILY COST PER TON OF CO REDUCED	\$24,635	\$24,633
153	NET DAILY COST PER TON OF ROG REDUCED	\$245,483	\$245,365
154	NET DAILY COST PER TON OF NO _x REDUCED	\$439,286	\$439,540
155	NET DAILY COST PER TON OF PM REDUCED	\$25,039,280	\$24,438,399
156	BENEFIT		
157	NET DAILY BENEFIT PER TRIP REDUCED	\$0.00	\$0.00
158	NET DAILY BENEFIT PER VMT REDUCED	\$0.00	\$0.00
159	NET DAILY BENEFIT PER TON OF CO REDUCED	\$0	\$0
160	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$0	\$0
161	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$0	\$0
162	NET DAILY BENEFIT PER TON OF PM REDUCED	\$0	\$0
163	COST/BENEFIT		
164	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$7.35	\$7.35
165	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.54	\$0.54
166	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$24,635	\$24,633
167	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$245,483	\$245,365
168	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$439,286	\$439,540
169	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$25,039,280	\$24,438,399
170	SCENARIO #2 THE NO BUILD SCENARIO		
171	TOTAL DAILY COST	\$794,806	\$839,059
172	TOTAL DAILY BENEFIT	\$146,618	\$268,824
173	TOTAL DAILY COST/BENEFIT	\$648,187	\$570,235
174	COST		
175	NET DAILY COST PER TRIP REDUCED	\$46.63	\$25.22
176	NET DAILY COST PER VMT REDUCED	\$3.41	\$1.84
177	NET DAILY COST PER TON OF CO REDUCED	\$156,396	\$84,574
178	NET DAILY COST PER TON OF ROG REDUCED	\$1,558,443	\$842,428
179	NET DAILY COST PER TON OF NO _x REDUCED	\$2,788,792	\$1,509,098
180	NET DAILY COST PER TON OF PM REDUCED	\$158,961,151	\$83,905,862
181	BENEFIT		
182	NET DAILY BENEFIT PER TRIP REDUCED	\$8.60	\$8.08
183	NET DAILY BENEFIT PER VMT REDUCED	\$0.63	\$0.59
184	NET DAILY BENEFIT PER TON OF CO REDUCED	\$28,851	\$27,096
185	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$287,487	\$269,904
186	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$514,450	\$483,496
187	NET DAILY BENEFIT PER TON OF PM REDUCED	\$29,323,667	\$26,882,395

COST-EFFECTIVENESS MODEL

LACMTA

188	COST/BENEFIT		
189	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$38.03	\$17.14
190	NET DAILY COST/BENEFIT PER VMT REDUCED	\$2.78	\$1.25
191	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$127,546	\$57,478
192	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$1,270,956	\$572,525
193	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$2,274,342	\$1,025,602
194	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$129,637,484	\$57,023,467

COST-EFFECTIVENESS MODEL

LACMTA

TCM # 2 EMPLOYER BASED ALTERNATIVE WORK SCHEDULES

ASSUMPTIONS

1	O&M cost of vehicle	\$0.48	AAA
2	Construction cost of arterial (\$/lane mile)	\$900,000	CALTRANS
3	Construction annualization factor (CAF)	0.09	
4	Bus annualization factor (BAF)	0.13	
5	car annualization factor	0.25	
6	Interest rate	8%	MARKET RATE
7	Lane miles arterial/vehicle trip	0.0018	COMSIS
8	Lane miles freeway/vehicle trip	0.0015	COMSIS
9	O&M cost of arterial (\$/LANE MILE)	\$765	CALTRANS
10	O&M cost of freeway (\$/LANE MILE)	\$2,000	CALTRANS
11	Monthly parking cost for SOV	\$100	MTA
12	Percent of parking paid by employers	90%	SCAQMD
13	Percent of parking paid by employees	10%	SCAQMD
14	Air pollution cost per mile	\$0.015	RUTHERFORD AND WELLANDER, 1986
15	Cost per vehicle-miles of delay	\$0.11	RUTHERFORD AND WELLANDER, 1986
16	Construction cost of freeway (\$/lane mile) not including right of way	\$2,500,000	SANDAG
17	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$12,000,000	CALTRANS (MIN) (IN METROPOLITAN AREA)
18	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$16,000,000	CALTRANS (MAX) (IN METROPOLITAN AREA)
19	Average construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$14,000,000	CALTRANS (AVERAGE) (IN METROPOLITAN AREA)
20	Construction cost of HOV lane (\$/lane mile)	\$2,500,000	MTC
21	Operation cost per transit passenger	\$1.66	MTA
22	Fare box revenue per transit passenger	\$0.62	MTA
23	Average cost of long express trip on buses and rail	\$5	MTA
24	Average cost per commute trip of 11.4 miles	\$5.47	CALCULATED
25	Average cost per rideshare trip	\$2.19	CALCULATED
26	Average saving per rideshare trip	\$3.28	CALCULATED
27	Car annualization factor	0.25	CALCULATED
28	Construction annualization factor	0.09	CALCULATED
29	Capital cost of a passenger car	16,000	AAA
30	Average annual administration cost per employee	\$10	MTA

METHODOLOGY

PUBLIC SECTOR COST

DAILY PUBLIC CAPITAL COST (DPCC) = DPSUC WHERE;
DPSUC = DAILY PUBLIC START-UP COST

DAILY PUBLIC O & M COST (DPOMC) = 0

COST-EFFECTIVENESS MODEL

LACMTA

DAILY PUBLIC COST =
(DPCC + DPOMC) WHERE;

DPCC = DAILY PUBLIC CAPITAL COST
DPOMC = DAILY PUBLIC O & M COST

DAILY PUBLIC REVENUES (DPR) = 0

NET DAILY PUBLIC COST/REVENUE
(DPCOMC) - (DPR) WHERE;

DPCOMC = DAILY PUBLIC CAPITAL AND OPERATION AND MAINTENANCE COST
DPR = DAILY PUBLIC REVENUE

DAILY PUBLIC BENEFITS (DPB) BY AVOIDING HIGHWAY BUILDING =
(DPCB) + (DPOMB) WHERE;

$DPCB = (DPTR) * (LMF/T) * (CCLMF) * (CAF)/260 * (POTOF) +$
 $+ (DPTR) * (LMA/T) * (CCLMA) * (CAF)/260 * (POTOA)$ WHERE;

DPTR = DAILY TRIPS REDUCED
LMF/T = LANE MILES OF FREEWAY PER TRIP
CCLMF = CONSTRUCTION COST OF FREEWAY LANE MILE
CAF = CONSTRUCTION ANNUALIZATION FACTOR
POTOF = PERCENT OF TRIPS ON FREEWAYS
LMA = LANE MILES OF ARTERIAL PER TRIP
CCLMA = CONSTRUCTION COST OF ARTERIAL LANE MILE
POTOA = PERCENT OF PEAK TRIPS ON ARTERIAL

$DPOMB = (DTR) * (LMFA/T) * (OMCLMF)/260 * (POTOF) +$
 $+ (DTR) * (LMA/T) * (OMCLMA)/260 * (POTOA)$ WHERE;

OMCLMF = O & M COST PER LANE MILE OF FREEWAY
OMCLMA = O & M COST PER LANE MILE OF ARTERIAL
POTOF = PERCENT OF TRIPS ON FREEWAY
POTOA = PERCENT OF TRIPS ON ARTERIAL

NET PUBLIC DAILY COST/BENEFIT COUNTING THE AVOIDED COSTS (NDPC/BIAC) =
(NDPC/R) - (DPB)

INDIVIDUAL COST

DAILY INDIVIDUAL CAPITAL COST (DICC) = 0

DAILY INDIVIDUAL OPERATION AND MAINTENANCE COST (DIOMC) = 0

COST-EFFECTIVENESS MODEL

LACMTA

DAILY INDIVIDUAL BENEFIT (DIB) =

(DICB) + (DIOMB) WHERE;

DICB = DAILY INDIVIDUAL CAPITAL BENEFIT (CAR COST)

DIOMB = DAILY INDIVIDUAL O & M COST SAVING (CAR O & M)

DICB = 0

DIOMB = (DOMCPM) * (DVMTR) * (.21) +
+ (.10 * DIPC * DVTR / 2) WHERE;

DIOMCPM = DAILY INDIVIDUAL OPERATION AND MAINTENANCE COST PER MILE

DVNTR = DAILY VEHICLE MILES TRAVELED REDUCED

.21 IS THE PERCENT OF O & M COST ATTRIBUTED TO SAVINGS

DIPB = DAILY INDIVIDUAL PARKING COST SAVING

NET DAILY INDIVIDUAL COST/BENEFIT (NDIC/B) =

(DIC) - (DIB) WHERE;

DIC = DAILY INDIVIDUAL COST

DIB = DAILY INDIVIDUAL BENEFITS

PRIVATE SECTOR COST/BENEFIT

DAILY PRIVATE CAPITAL COST (DPRCC) = 0

DAILY PRIVATE O & M COST (DPROMC) =

(NEP) * (CPE) WHERE;

NEP = NUMBER OF EMPLOYEES PARTICIPATING

CPE = COST PER EMPLOYEE

DAILY PRIVATE CAPITAL BENEFIT (DPRCB) = 0

DAILY PRIVATE O & M BENEFIT (DPROMB) =

(DVTR) / 2 * (MPC) * 12 / 260 * .90 WHERE;

DVTR = DAILY VEHICLE TRIPS REDUCED

MPC = MONTHLY PARKING COST

.90 = PERCENT OF PARKING PROVIDED BY PRIVATE SECTOR

NET DAILY PRIVATE COST/BENEFIT (NDPC/B) =

(DPRC) - (DPRB)

COST-EFFECTIVENESS MODEL

LACMTA

SOCIETAL COST

DAPC = DAILY AIR POLLUTION COST/BENEFIT

DAPC = DVMTR * (APC/M) WHERE;

DVMTR = DAILY VMT REDUCED

APC/M = AIR POLLUTION COST PER MILE

DVMDCB = DAILY VEHICLE MILES OF DELAY COST/BENEFIT

DVMDC = (DVMDS) * (C/VMD) WHERE;

DVMDS = (VMT/NEW SPEED) - (VMT/EXISTING SPEED) * (AVERAGE SPEED)

DVMDS = DAILY VEHICLE MILES OF DELAY SAVED

C/VMD = DAILY COST PER VEHICLE MILES OF DELAY SAVED

DSCB = DAILY SOCIETAL COST/BENEFIT

DSCB = (DAPC) + (DVMDCB)

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 1 THE BUILD SCENARIO

TOTAL DAILY COST (TDC) =

(DPC) + (DIC) + (DPRC) + (DSC) WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DSC = DAILY SOCIETAL COST

TOTAL DAILY BENEFITS (TDB) =

(DPB) + (DIB) + (DPRB) + DSB WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DSB = DAILY SOCIETAL BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

[(DPC) + (DIC) + (DPRC) + (DSC)] - [(DPB) + (DIB) + (DPRB) + (DSB)]

COST-EFFECTIVENESS MODEL

LACMTA

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 2 THE NO BUILD SCENARIO

TOTAL DAILY COST (TDC) =
(DPC) + (DIC) + (DPRC) + (DSC) WHERE;
DPC = DAILY PUBLIC COST
DIC = DAILY INDIVIDUAL COST
DPRC = DAILY PRIVATE COST
DSC = DAILY SOCIETAL COST

TOTAL DAILY BENEFITS (TDB) =
(DPB) + (DIB) + (DPRB) + (DSB) WHERE;
DPB = DAILY PUBLIC BENEFITS
DIB = DAILY INDIVIDUAL BENEFITS
DPRB = DAILY PRIVATE BENEFITS
DSB = DAILY SOCIETAL BENEFIT

TOTAL DAILY COS/BENEFIT (TDC/B) =

$[(DPC) + (DIC) + (DPRC) + (DSC)] - [(DPB) + (DIB) + (DPRB) + (DSB)]$

COST – EFFECTIVENESS MODEL

LACMTA

LIKELY OUTCOMES

PUBLIC SECTOR COST/BENEFIT			
		STANDARD	HIGH
1	DAILY PUBLIC CAPITAL COST	\$3,000	\$3,000
2	DAILY PUBLIC O & M COST	\$0	\$0
3	DAILY PUBLIC COST	\$3,000	\$3,000
4	DAILY PUBLIC REVENUES	\$0	\$0
5	DAILY PUBLIC COST/REVENUE	\$3,000	\$3,000
6	DAILY PUBLIC AVOIDED CAPITAL COST (SCENARIO 2)	\$0	\$0
7	DAILY PUBLIC AVOIDED O & M COST (SCENARIO 2)	\$0	\$0
8	TOTAL DAILY PUBLIC AVOIDED (SCENARIO 2)	\$0	\$0
9	NET DAILY PUBLIC BENEFIT (SCENARIO 2)	\$0	\$0
10	DAILY PUBLIC CAPITAL COST (SCENARIO 1)	\$0	\$0
11	DAILY PUBLIC O & M COST (SCENARIO 1)	\$0	\$0
12	TOTAL DAILY PUBLIC COST (SCENARIO 1)	\$0	\$0
13	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 2)	\$3,000	\$3,000
14	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 1)	\$0	\$0
15	COST		
16	DAILY PUBLIC COST PER TRIP REDUCED	\$0.98	\$0.49
17	DAILY PUBLIC COST PER VMT REDUCED	\$0.09	\$0.04
18	DAILY PUBLIC COST PER TON OF CO REDUCED	\$3,546	\$1,772
19	DAILY PUBLIC COST PER TON OF ROG REDUCED	\$37,037	\$18,405
20	DAILY PUBLIC COST PER TON OF NOx REDUCED	\$66,667	\$33,708
21	DAILY PUBLIC COST PER TON OF PM REDUCED	ERR	\$1,500,000
22	BENEFIT		
23	DAILY PUBLIC BENEFIT PER TRIP REDUCED	\$0.00	\$0.00
24	DAILY PUBLIC BENEFIT PER VMT REDUCED	\$0.00	\$0.00
25	DAILY PUBLIC BENEFIT PER TON OF CO REDUCED	\$0	\$0
26	DAILY PUBLIC BENEFIT PER TON OF ROG REDUCED	\$0	\$0
27	DAILY PUBLIC BENEFIT PER TON OF NOx REDUCED	\$0	\$0
28	DAILY PUBLIC BENEFIT PER TON OF PM REDUCED	ERR	\$0
29	COST/BENEFIT		
30	NET DAILY PUBLIC COST/BENEFIT PER TRIP REDUCED	\$0.98	\$0.49
31	NET DAILY PUBLIC COST/BENEFIT PER VMT REDUCED	\$0.09	\$0.04
32	NET DAILY PUBLIC COST/BENEFIT PER TON OF CO REDUCED	\$3,546.10	\$1,772.00
33	NET DAILY PUBLIC COST/BENEFIT PER TON OF ROG REDUCED	\$37,037.04	\$18,404.91
34	NET DAILY PUBLIC COST/BENEFIT PER TON OF NOx REDUCED	\$66,666.67	\$33,707.87
35	NET DAILY PUBLIC COST/BENEFIT PER TON OF PM REDUCED	ERR	\$1,500,000.00
36	INDIVIDUAL COST/BENEFIT		
37	DAILY INDIVIDUAL CAPITAL COST	\$0	\$0
38	DAILY INDIVIDUAL O & M COST	\$0	\$0
39	DAILY INDIVIDUAL COST	\$0	\$0
40	DAILY INDIVIDUAL CAPITAL BENEFIT	\$0	\$0
41	DAILY INDIVIDUAL O & M BENEFIT	\$4,240	\$8,481
42	DAILY INDIVIDUAL BENEFIT	\$4,240	\$8,481
43	NET DAILY INDIVIDUAL COST/BENEFIT	(\$4,240)	(\$8,481)

COST-EFFECTIVENESS MODEL

LACMTA

44	COST		
45	NET DAILY INDIVIDUAL COST PER TRIP REDUCED	\$0.00	\$0.00
46	NET DAILY INDIVIDUAL COST PER VMT REDUCED	\$0.00	\$0.00
47	NET DAILY INDIVIDUAL COST PER TON OF CO REDUCED	0	0
48	NET DAILY INDIVIDUAL COST PER TON OF ROG REDUCED	0	0
49	NET DAILY INDIVIDUAL COST PER TON OF NOx REDUCED	0	0
50	NET DAILY INDIVIDUAL COST PER TON OF PM REDUCED	ERR	0
51	BENEFIT		
52	NET DAILY INDIVIDUAL BENEFIT PER TRIP REDUCED	\$1.38	\$1.38
53	NET DAILY INDIVIDUAL BENEFIT PER VMT REDUCED	\$0.12	\$0.12
54	NET DAILY INDIVIDUAL BENEFIT PER TON OF CO REDUCED	5012.0567158	5009.2325649
55	NET DAILY INDIVIDUAL BENEFIT PER TON OF ROG REDUCED	52348.14792	52028.409401
56	NET DAILY INDIVIDUAL BENEFIT PER TON OF NOx REDUCED	94226.666256	95287.985756
57	NET DAILY INDIVIDUAL BENEFIT PER TON OF PM REDUCED	ERR	4240315.3662
58	COST/BENEFIT		
59	NET DAILY INDIVIDUAL COST/BENEFIT PER TRIP REDUCED	(\$1.38)	(\$1.38)
60	NET DAILY INDIVIDUAL COST/BENEFIT PER VMT REDUCED	(\$0.12)	(\$0.12)
61	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF CO REDUCED	-5012.0567158	-5009.2325649
62	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF ROG REDUCED	-52348.14792	-52028.409401
63	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF NOx REDUCED	-94226.666256	-95287.985756
64	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF PM REDUCED	ERR	-4240315.3662
65	PRIVATE SECTOR COST/BENEFIT		
66	DAILY PRIVATE CAPITAL COST	\$0	\$0
67	DAILY PRIVATE O & M COST	\$59	\$118
68	DAILY PRIVATE COST	\$59	\$118
69	DAILY PRIVATE CAPITAL BENEFIT	\$0	\$0
70	DAILY PRIVATE O & M BENEFIT	\$6,368	\$12,738
71	DAILY PRIVATE BENEFIT	\$6,368	\$12,738
72	NET DAILY PRIVATE COST/BENEFIT	(\$6,309)	(\$12,620)
73	COST		
74	NET DAILY PRIVATE COST PER TRIP REDUCED	\$0.02	\$0.02
75	NET DAILY PRIVATE COST PER VMT REDUCED	\$0.00	\$0.00
76	NET DAILY PRIVATE COST PER TON OF CO REDUCED	\$69.69	\$69.66
77	NET DAILY PRIVATE COST PER TON OF ROG REDUCED	\$727.92	\$723.57
78	NET DAILY PRIVATE COST PER TON OF NOx REDUCED	\$1,310.26	\$1,325.19
79	NET DAILY PRIVATE COST PER TON OF PM REDUCED	ERR	\$58,971.15
80	BENEFIT		
81	NET DAILY PRIVATE BENEFIT PER TRIP REDUCED	\$2.08	\$2.08
82	NET DAILY PRIVATE BENEFIT PER VMT REDUCED	\$0.18	\$0.18
83	NET DAILY PRIVATE BENEFIT PER TON OF CO REDUCED	\$7,527.00	\$3,761.28
84	NET DAILY PRIVATE BENEFIT PER TON OF ROG REDUCED	\$78,615.38	\$39,066.54
85	NET DAILY PRIVATE BENEFIT PER TON OF NOx REDUCED	ERR	ERR
86	NET DAILY PRIVATE BENEFIT PER TON OF PM REDUCED	ERR	\$0.00
87	COST/BENEFIT		
88	NET DAILY PRIVATE COST/BENEFIT PER TRIP REDUCED	(\$2.06)	(\$2.06)
89	NET DAILY PRIVATE COST/BENEFIT PER VMT REDUCED	(\$0.18)	(\$0.18)
90	NET DAILY PRIVATE COST/BENEFIT PER TON OF CO REDUCED	(\$7,457.31)	(\$7,454.12)
91	NET DAILY PRIVATE COST/BENEFIT PER TON OF ROG REDUCED	(\$77,887.46)	(\$77,422.25)
92	NET DAILY PRIVATE COST/BENEFIT PER TON OF NOx REDUCED	(\$140,197.44)	(\$141,795.81)
93	NET DAILY PRIVATE COST/BENEFIT PER TON OF PM REDUCED	ERR	(\$6,309,913.46)

COST-EFFECTIVENESS MODEL

LACMTA

94	SOCIETAL COST/BENEFIT		
95	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
96	DAILY SOCIETAL AIR POLLUTION COST	\$3,497	\$6,827
97	DAILY SOCIETAL CONGESTION COST	\$0	\$0
98	DAILY SOCIETAL COST	\$3,497	\$6,827
99	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
100	DAILY SOCIETAL CONGESTION BENEFIT	\$7,006	\$13,676
101	DAILY SOCIETAL BENEFIT	\$7,006	\$13,676
102	NET DAILY SOCIETAL COST/BENEFIT	(\$3,509)	(\$6,849)
103	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
104	DAILY SOCIETAL AIR POLLUTION COST	\$3,497	\$6,827
105	DAILY SOCIETAL CONGESTION COST	\$7,006	\$13,676
106	DAILY SOCIETAL COST	\$10,504	\$20,503
107	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
108	DAILY SOCIETAL CONGESTION BENEFIT	\$0	\$0
109	DAILY SOCIETAL BENEFIT	\$0	\$0
110	NET DAILY SOCIETAL COST/BENEFIT	\$10,504	\$20,503
111	SCENARIO #2 THE NO BUILD SCENARIO		
112	DAILY SOCIETAL AIR POLLUTION COST	\$3,497	\$6,827
113	DAILY SOCIETAL CONGESTION COST	\$7,006	\$13,676
114	DAILY SOCIETAL COST	\$10,504	\$20,503
115	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
116	DAILY SOCIETAL CONGESTION BENEFIT	\$0	\$0
117	DAILY SOCIETAL BENEFIT	\$0	\$0
118	NET DAILY SOCIETAL COST/BENEFIT	\$10,504	\$20,503
119	TOTAL COST/BENEFIT		
120	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
121	TOTAL DAILY COST	\$118,190	\$230,708
122	TOTAL DAILY BENEFIT	\$7,006	\$13,676
123	TOTAL DAILY COST/BENEFIT	\$111,184	\$217,031
124	COST		
125	NET DAILY COST PER TRIP REDUCED	\$6.93	\$6.93
126	NET DAILY COST PER VMT REDUCED	\$0.51	\$0.51
127	NET DAILY COST PER TON OF CO REDUCED	\$23,257	\$23,254
128	NET DAILY COST PER TON OF ROG REDUCED	\$231,745	\$231,634
129	NET DAILY COST PER TON OF NOx REDUCED	\$414,702	\$414,942
130	NET DAILY COST PER TON OF PM REDUCED	\$23,638,010	\$23,070,764
131	BENEFIT		
132	NET DAILY BENEFIT PER TRIP REDUCED	\$0.41	\$0.41
133	NET DAILY BENEFIT PER VMT REDUCED	\$0.03	\$0.03
134	NET DAILY BENEFIT PER TON OF CO REDUCED	\$1,379	\$1,379
135	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$13,738	\$13,731
136	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$24,584	\$24,598
137	NET DAILY BENEFIT PER TON OF PM REDUCED	\$1,401,270	\$1,367,635

COST-EFFECTIVENESS MODEL

LACMTA

138	COST/BENEFIT		
139	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$6.52	\$6.52
140	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.48	\$0.48
141	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$21,878	\$21,876
142	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$218,007	\$217,903
143	NET DAILY COST/BENEFIT PER TON OF NOx REDUCED	\$390,118	\$390,344
144	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$22,236,740	\$21,703,129
145	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
146	TOTAL DAILY COST	\$125,196	\$244,384
147	TOTAL DAILY BENEFIT	\$0	\$0
148	TOTAL DAILY COST/BENEFIT	\$125,196	\$244,384
149	COST		
150	NET DAILY COST PER TRIP REDUCED	\$7.35	\$7.35
151	NET DAILY COST PER VMT REDUCED	\$0.54	\$0.54
152	NET DAILY COST PER TON OF CO REDUCED	\$24,635	\$24,633
153	NET DAILY COST PER TON OF ROG REDUCED	\$245,483	\$245,365
154	NET DAILY COST PER TON OF NOx REDUCED	\$439,286	\$439,540
155	NET DAILY COST PER TON OF PM REDUCED	\$25,039,280	\$24,438,399
156	BENEFIT		
157	NET DAILY BENEFIT PER TRIP REDUCED	\$0.00	\$0.00
158	NET DAILY BENEFIT PER VMT REDUCED	\$0.00	\$0.00
159	NET DAILY BENEFIT PER TON OF CO REDUCED	\$0	\$0
160	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$0	\$0
161	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$0	\$0
162	NET DAILY BENEFIT PER TON OF PM REDUCED	\$0	\$0
163	COST/BENEFIT		
164	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$7.35	\$7.35
165	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.54	\$0.54
166	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$24,635	\$24,633
167	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$245,483	\$245,365
168	NET DAILY COST/BENEFIT PER TON OF NOx REDUCED	\$439,286	\$439,540
169	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$25,039,280	\$24,438,399
170	SCENARIO #2 THE NO BUILD SCENARIO		
171	TOTAL DAILY COST	\$794,806	\$839,059
172	TOTAL DAILY BENEFIT	\$146,618	\$268,824
173	TOTAL DAILY COST/BENEFIT	\$648,187	\$570,235
174	COST		
175	NET DAILY COST PER TRIP REDUCED	\$46.63	\$25.22
176	NET DAILY COST PER VMT REDUCED	\$3.41	\$1.84
177	NET DAILY COST PER TON OF CO REDUCED	\$156,396	\$84,574
178	NET DAILY COST PER TON OF ROG REDUCED	\$1,558,443	\$842,428
179	NET DAILY COST PER TON OF NOx REDUCED	\$2,788,792	\$1,509,098
180	NET DAILY COST PER TON OF PM REDUCED	\$158,961,151	\$83,905,862
181	BENEFIT		
182	NET DAILY BENEFIT PER TRIP REDUCED	\$8.60	\$8.08
183	NET DAILY BENEFIT PER VMT REDUCED	\$0.63	\$0.59
184	NET DAILY BENEFIT PER TON OF CO REDUCED	\$28,851	\$27,096
185	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$287,487	\$269,904
186	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$514,450	\$483,496
187	NET DAILY BENEFIT PER TON OF PM REDUCED	\$29,323,667	\$26,882,395

COST – EFFECTIVENESS MODEL

LACMTA

188 COST/BENEFIT			
189	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$38.03	\$17.14
190	NET DAILY COST/BENEFIT PER VMT REDUCED	\$2.78	\$1.25
191	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$127,546	\$57,478
192	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$1,270,956	\$572,525
193	NET DAILY COST/BENEFIT PER TON OF NOx REDUCED	\$2,274,342	\$1,025,602
194	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$129,637,484	\$57,023,467

COST-EFFECTIVENESS MODEL

LACMTA

TCM # 3 EMPLOYER BASED TELECOMMUTING PROGRAM

ASSUMPTIONS

1	O&M cost of vehicle	\$0.48	AAA
2	Construction cost of arterial (\$/lane mile)	\$900,000	CALTRANS
3	Construction annualization factor (CAF)	0.09	CALCULATED
4	car annualization factor	0.25	CALCULATED
5	Interest rate	8%	MARKET RATE
6	Lane miles arterial/vehicle trip	0.0018	COMSIS
7	Lane miles freeway/vehicle trip	0.0015	COMSIS
8	O&M cost of arterial (\$/LANE MILE)	\$765	CALTRANS
9	O&M cost of freeway (\$/LANE MILE)	\$2,000	CALTRANS
10	Monthly parking cost per month for sov users	\$100	MTA
11	Percent of parking paid by private employers	90%	SCAQMD
12	Percent of parking paid by employees	10%	SCAQMD
13	Air pollution cost per mile	\$0.015	RUTHERFORD AND WELLANDER, 1986
14	Cost per vehicle-miles of delay	\$0.11	RUTHERFORD AND WELLANDER, 1986
15	Construction cost of freeway (\$/lane mile) not including right of way	\$2,500,000	SANDAG
16	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$12,000,000	CALTRANS (MIN) (IN METROPOLITAN AREA)
17	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$16,000,000	CALTRANS (MAX) (IN METROPOLITAN AREA)
18	Average construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$14,000,000	CALTRANS (AVERAGE) (IN METROPOLITAN AREA)
19	Construction cost of HOV lane (\$/lane mile)	\$2,500,000	MTC
20	Average cost per commute trip of 11.4 miles	\$5.47	CALCULATED
21	Average cost per commute trip of 20 miles	\$9.60	CALCULATED
22	Average cost per rideshare trip	\$2.19	CALCULATED
23	Average saving per rideshare trip	\$3.28	CALCULATED
24	Car annualization factor	0.25	CALCULATED
25	Construction annualization factor	0.09	CALCULATED
26	Capital cost of a passenger car	\$16,000	AAA
27	Average annual administration cost per employee	\$10	MTA
28	Cost per telecommunication system (computer, fax, etc..)	\$2,000	SIERRA

METHODOLOGY

PUBLIC SECTOR COST

DAILY PUBLIC CAPITAL COST (DPCC) = DPSUC WHERE;
DPSUC = DAILY PUBLIC START-UP COST

DAILY PUBLIC O & M COST (DPOMC) = 0

COST-EFFECTIVENESS MODEL

LACMTA

DAILY PUBLIC COST =
(DPCC + DPOMC) WHERE;

DPCC = DAILY PUBLIC CAPITAL COST

DPOMC = DAILY PUBLIC O & M COST

DAILY PUBLIC REVENUES (DPR) = 0

(DPCOMC) - (DPR) WHERE;

DPCOMC = DAILY PUBLIC CAPITAL AND OPERATION AND MAINTENANCE COST

DPR = DAILY PUBLIC REVENUE

DAILY PUBLIC BENEFITS (DPB) BY AVOIDING HIGHWAY BUILDING =

(DPCB) + (DPOMB) WHERE;

DPCB = (DPTR) * (LMF/T) * (CCLMF) * (CAF)/260*(POTOF) +
+ (DPTR) * (LMA/T) * (CCLMA) * (CAF)/260*(POTOA) WHERE;

DPTR = DAILY TRIPS REDUCED

LMF/T = LANE MILES OF FREEWAY PER TRIP

CCLMF = CONSTRUCTION COST OF FREEWAY LANE MILE

CAF = CONSTRUCTION ANNUALIZATION FACTOR

POTOF = PERCENT OF TRIPS ON FREEWAYS

LMA = LANE MILES OF ARTERIAL PER TRIP

CCLMA = CONSTRUCTION COST OF ARTERIAL LANE MILE

POTOA = PERCENT OF PEAK TRIPS ON ARTERIAL

DPOMB = (DTR) * (LMFA/T) * (OMCLMF)/260 * (POTOF) +
+ (DTR) * (LMA/T) * (OMCLMA)/260*(POTOA) WHERE;

OMCLMF = O & M COST PER LANE MILE OF FREEWAY

OMCLMA = O & M COST PER LANE MILE OF ARTERIAL

POTOF = PERCENT OF TRIPS ON FREEWAY

POTOA = PERCENT OF TRIPS ON ARTERIAL

NET PUBLIC DAILY COST/BENEFIT COUNTING THE AVOIDED COSTS (NDPC/BIAC) =
(NDPC/R) - (DPB)

COST-EFFECTIVENESS MODEL

LACMTA

INDIVIDUAL COST

DAILY INDIVIDUAL CAPITAL COST (DICC) = 0

DAILY INDIVIDUAL OPERATION AND MAINTENANCE COST (DIOMC) = 0

DAILY INDIVIDUAL BENEFIT (DIB) =

(DICB) + (DIOMB) WHERE;

DICB = DAILY INDIVIDUAL CAPITAL BENEFIT (CAR COST)

DIOMB = DAILY INDIVIDUAL O & M COST SAVING (CAR O & M)

DICB = 0

DIOMB = (DOMCPM) * (DVMTR) * (.21) +
+ (.10 * DIPC * DVTR/2) WHERE;

DIOMCPM = DAILY INDIVIDUAL OPERATION AND MAINTENANCE COST PER MILE

DVNTR = DAILY VEHICLE MILES TRAVELED REDUCED

.21 IS THE PERCENT OF O & M COST ATTRIBUTED TO SAVINGS

DIPB = DAILY INDIVIDUAL PARKING COST SAVING

NET DAILY INDIVIDUAL COST/BENEFIT (NDIC/B) =

(DIC) - (DIB) WHERE;

DIC = DAILY INDIVIDUAL COST

DIB = DAILY INDIVIDUAL BENEFITS

PRIVATE SECTOR COST/BENEFIT

DAILY PRIVATE CAPITAL COST (DPRCC) =

DVTR/2 * CPTTE WHERE;

DVTR = DAILY VEHICLE TRIPS REDUCED

CPTTE = COST PER TELECOMMUTING EQUIPMENTS

DAILY PRIVATE O & M COST (DPROMC) =

(NEP) * (CPE) WHERE;

NEP = NUMBER OF EMPLOYEES PARTICIPATING

CPE = COST PER EMPLOYEE

COST-EFFECTIVENESS MODEL

LACMTA

DAILY PRIVATE CAPITAL BENEFIT (DPRCB) = 0

DAILY PRIVATE O & M BENEFIT (DPROMB) =

$(DVTR)/2 * (MPC)*12/260 * .90$ WHERE;

DVTR = DAILY VEHICLE TRIPS REDUCED

MPC = MONTHLY PARKING COST

.90 = PERCENT OF PARKING PROVIDED BY PRIVATE SECTOR

NET DAILY PRIVATE COST/BENEFIT (NDPC/B) =

$(DPRC) - (DPRB)$

SOCIETAL COST

DAPC = DAILY AIR POLLUTION COST/BENEFIT

$DAPC = DVMTR * (APC/M)$ WHERE;

DVMTR = DAILY VMT REDUCED

APC/M = AIR POLLUTION COST PER MILE

DVMDCB = DAILY VEHICLE MILES OF DELAY COST/BENEFIT

$DVMDC = (DVMDS) * (C/VMD)$ WHERE;

$DVMDS = (VMT/NEW SPEED) - (VMT/EXISTING SPEED) * (AVERAGE SPEED)$

DVMDS = DAILY VEHICLE MILES OF DELAY SAVED

C/VMD = DAILY COST PER VEHICLE MILES OF DELAY SAVED

DSCB = DAILY SOCIETAL COST/BENEFIT

$DSCB = (DAPC) + (DVMDCB)$

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 1 THE BUILD SCENARIO

TOTAL DAILY COST (TDC) =

$(DPC) + (DIC) + (DPRC) + (DSC)$ WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DSC = DAILY SOCIETAL COST

COST-EFFECTIVENESS MODEL

LACMTA

TOTAL DAILY BENEFITS (TDB) =
(DPB) + (DIB) + (DPRB) + DSB WHERE;

DPB = DAILY PUBLIC BENEFITS
DIB = DAILY INDIVIDUAL BENEFITS
DPRB = DAILY PRIVATE BENEFITS
DSB = DAILY SOCIETAL BENEFIT

TOTAL DELAY COST/BENEFIT (TDC/B) =

[(DPC) + (DIC) + (DPRC) + (DSC)] - [(DPB) + (DIB) + (DPRB) + (DSB)]

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 2 THE NO BUILD SCENARIO

TOTAL DAILY COST (TDC) =
(DPC) + (DIC) + (DPRC) + (DSC) WHERE;

DPC = DAILY PUBLIC COST
DIC = DAILY INDIVIDUAL COST
DPRC = DAILY PRIVATE COST
DSC = DAILY SOCIETAL COST

TOTAL DAILY BENEFITS (TDB) =
(DPB) + (DIB) + (DPRB) + (DSB) WHERE;

DPB = DAILY PUBLIC BENEFITS
DIB = DAILY INDIVIDUAL BENEFITS
DPRB = DAILY PRIVATE BENEFITS
DSB = DAILY SOCIETAL BENEFIT

TOTAL DIALY COS/BENEFIT (TDC/B) =
[(DPC) + (DIC) + (DPRC) + (DSC)] - [(DPB) + (DIB) + (DPRB) + (DSB)]

COST-EFFECTIVENESS MODEL

LACMTA

LIKELY OUTCOMES

PUBLIC SECTOR COST/BENEFIT		STANDARD	HIGH
1	DAILY PUBLIC CAPITAL COST	\$2,000	\$2,000
2	DAILY PUBLIC O & M COST	\$0	\$0
3	DAILY PUBLIC COST	\$2,000	\$2,000
4	DAILY PUBLIC REVENUES	\$0	\$0
5	DAILY PUBLIC COST/REVENUE	\$2,000	\$2,000
6	DAILY PUBLIC AVOIDED CAPITAL COST (SCENARIO 2)	\$0	\$0
7	DAILY PUBLIC AVOIDED O & M COST (SCENARIO 2)	\$0	\$0
8	TOTAL DAILY PUBLIC AVOIDED (SCENARIO 2)	\$0	\$0
9	NET DAILY PUBLIC BENEFIT (SCENARIO 2)	\$0	\$0
10	DAILY PUBLIC CAPITAL COST (SCENARIO 1)	\$0	\$0
11	DAILY PUBLIC O & M COST (SCENARIO 1)	\$0	\$0
12	TOTAL DAILY PUBLIC COST (SCENARIO 1)	\$0	\$0
13	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 2)	\$2,000	\$2,000
14	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 1)	\$0	\$0
15	COST		
16	DAILY PUBLIC COST PER TRIP REDUCED	\$1.13	\$0.56
17	DAILY PUBLIC COST PER VMT REDUCED	\$0.13	\$0.07
18	DAILY PUBLIC COST PER TON OF CO REDUCED	\$4,535	\$2,265
19	DAILY PUBLIC COST PER TON OF ROG REDUCED	\$51,282	\$25,000
20	DAILY PUBLIC COST PER TON OF NOx REDUCED	\$90,909	\$46,512
21	DAILY PUBLIC COST PER TON OF PM REDUCED	ERR	ERR
22	BENEFIT		
23	DAILY PUBLIC BENEFIT PER TRIP REDUCED	\$0.00	\$0.00
24	DAILY PUBLIC BENEFIT PER VMT REDUCED	\$0.00	\$0.00
25	DAILY PUBLIC BENEFIT PER TON OF CO REDUCED	\$0	\$0
26	DAILY PUBLIC BENEFIT PER TON OF ROG REDUCED	\$0	\$0
27	DAILY PUBLIC BENEFIT PER TON OF NOx REDUCED	\$0	\$0
28	DAILY PUBLIC BENEFIT PER TON OF PM REDUCED	ERR	ERR
29	COST/BENEFIT		
30	NET DAILY PUBLIC COST/BENEFIT PER TRIP REDUCED	\$1.13	\$0.56
31	NET DAILY PUBLIC COST/BENEFIT PER VMT REDUCED	\$0.13	\$0.07
32	NET DAILY PUBLIC COST/BENEFIT PER TON OF CO REDUCED	\$4,535	\$2,265
33	NET DAILY PUBLIC COST/BENEFIT PER TON OF ROG REDUCED	\$51,282	\$25,000
34	NET DAILY PUBLIC COST/BENEFIT PER TON OF NOx REDUCED	\$90,909	\$46,512
35	NET DAILY PUBLIC COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
36	INDIVIDUAL COST/BENEFIT		
37	DAILY INDIVIDUAL CAPITAL COST	\$0	\$0
38	DAILY INDIVIDUAL O & M COST	\$0	\$0
39	DAILY INDIVIDUAL COST	\$0	\$0
40	DAILY INDIVIDUAL CAPITAL BENEFIT	\$0	\$0
41	DAILY INDIVIDUAL O & M BENEFIT	\$1,946	\$3,892
42	DAILY INDIVIDUAL BENEFIT	\$1,946	\$3,892
43	NET DAILY INDIVIDUAL COST/BENEFIT	(\$1,946)	(\$3,892)

COST-EFFECTIVENESS MODEL

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44 COST			
45	NET DAILY INDIVIDUAL COST PER TRIP REDUCED	\$0.00	\$0.00
46	NET DAILY INDIVIDUAL COST PER VMT REDUCED	\$0.00	\$0.00
47	NET DAILY INDIVIDUAL COST PER TON OF CO REDUCED	0	0
48	NET DAILY INDIVIDUAL COST PER TON OF ROG REDUCED	0	0
49	NET DAILY INDIVIDUAL COST PER TON OF NOx REDUCED	0	0
50	NET DAILY INDIVIDUAL COST PER TON OF PM REDUCED	ERR	ERR
51 BENEFIT			
52	NET DAILY INDIVIDUAL BENEFIT PER TRIP REDUCED	\$1.10	\$1.09
53	NET DAILY INDIVIDUAL BENEFIT PER VMT REDUCED	\$0.13	\$0.13
54	NET DAILY INDIVIDUAL BENEFIT PER TON OF CO REDUCED	\$4,412	\$4,408
55	NET DAILY INDIVIDUAL BENEFIT PER TON OF ROG REDUCED	\$49,894	\$48,651
56	NET DAILY INDIVIDUAL BENEFIT PER TON OF NOx REDUCED	\$88,449	\$90,514
57	NET DAILY INDIVIDUAL BENEFIT PER TON OF PM REDUCED	ERR	ERR
58 COST/BENEFIT			
59	NET DAILY INDIVIDUAL COST/BENEFIT PER TRIP REDUCED	(\$1.10)	(\$1.09)
60	NET DAILY INDIVIDUAL COST/BENEFIT PER VMT REDUCED	(\$0.13)	(\$0.13)
61	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF CO REDUCED	(\$4,412)	(\$4,408)
62	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF ROG REDUCED	(\$49,894)	(\$48,651)
63	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF NOx REDUCED	(\$88,449)	(\$90,514)
64	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
65 PRIVATE SECTOR COST/BENEFIT			
66	DAILY PRIVATE CAPITAL COST	\$1,709	\$3,418
67	DAILY PRIVATE O & M COST	\$34	\$68
68	DAILY PRIVATE COST	\$1,743	\$3,487
69	DAILY PRIVATE CAPITAL BENEFIT	\$0	\$0
70	DAILY PRIVATE O & M BENEFIT	\$3,691	\$7,383
71	DAILY PRIVATE BENEFIT	\$3,691	\$7,383
72	NET DAILY PRIVATE COST/BENEFIT	(\$1,948)	(\$3,897)
73 COST			
74	NET DAILY PRIVATE COST PER TRIP REDUCED	\$0.98	\$0.98
75	NET DAILY PRIVATE COST PER VMT REDUCED	\$0.11	\$0.11
76	NET DAILY PRIVATE COST PER TON OF CO REDUCED	\$3,952	\$3,949
77	NET DAILY PRIVATE COST PER TON OF ROG REDUCED	\$44,688	\$43,583
78	NET DAILY PRIVATE COST PER TON OF NOx REDUCED	\$79,219	\$81,085
79	NET DAILY PRIVATE COST PER TON OF PM REDUCED	ERR	ERR
80 BENEFIT			
81	NET DAILY PRIVATE BENEFIT PER TRIP REDUCED	\$2.08	\$2.08
82	NET DAILY PRIVATE BENEFIT PER VMT REDUCED	\$0.24	\$0.24
83	NET DAILY PRIVATE BENEFIT PER TON OF CO REDUCED	\$8,369	\$8,362
84	NET DAILY PRIVATE BENEFIT PER TON OF ROG REDUCED	\$94,633	\$92,293
85	NET DAILY PRIVATE BENEFIT PER TON OF NOx REDUCED	\$167,759	\$171,708
86	NET DAILY PRIVATE BENEFIT PER TON OF PM REDUCED	ERR	ERR
87 COST/BENEFIT			
88	NET DAILY PRIVATE COST/BENEFIT PER TRIP REDUCED	(\$1.10)	(\$1.10)
89	NET DAILY PRIVATE COST/BENEFIT PER VMT REDUCED	(\$0.13)	(\$0.13)
90	NET DAILY PRIVATE COST/BENEFIT PER TON OF CO REDUCED	(\$4,417)	TBD
91	NET DAILY PRIVATE COST/BENEFIT PER TON OF ROG REDUCED	(\$49,945)	TBD
92	NET DAILY PRIVATE COST/BENEFIT PER TON OF NOx REDUCED	(\$4,417)	TBD
93	NET DAILY PRIVATE COST/BENEFIT PER TON OF PM REDUCED	(\$4,417)	TBD

COST-EFFECTIVENESS MODEL

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94	SOCIETAL COST/BENEFIT		
95	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
96	DAILY SOCIETAL AIR POLLUTION COST	\$228	\$456
97	DAILY SOCIETAL CONGESTION COST	\$0	\$0
98	DAILY SOCIETAL COST	\$228	\$456
99	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
100	DAILY SOCIETAL CONGESTION BENEFIT	\$457	\$913
101	DAILY SOCIETAL BENEFIT	\$457	\$913
102	NET DAILY SOCIETAL COST/BENEFIT	(\$229)	(\$457)
103	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
104	DAILY SOCIETAL AIR POLLUTION COST	\$228	\$456
105	DAILY SOCIETAL CONGESTION COST	\$457	\$913
106	DAILY SOCIETAL COST	\$685	\$1,369
107	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
108	DAILY SOCIETAL CONGESTION BENEFIT	\$0	\$0
109	DAILY SOCIETAL BENEFIT	\$0	\$0
110	NET DAILY SOCIETAL COST/BENEFIT	\$685	\$1,369
111	SCENARIO #2 THE NO BUILD SCENARIO		
112	DAILY SOCIETAL AIR POLLUTION COST	\$0	\$0
113	DAILY SOCIETAL CONGESTION COST	\$0	\$0
114	DAILY SOCIETAL COST	\$0	\$0
115	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$228	\$456
116	DAILY SOCIETAL CONGESTION BENEFIT	\$457	\$913
117	DAILY SOCIETAL BENEFIT	\$685	\$1,369
118	NET DAILY SOCIETAL COST/BENEFIT	(\$685)	(\$1,369)
119	TOTAL COST/BENEFIT		
120	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
121	TOTAL DAILY COST	\$5,865	\$11,732
122	TOTAL DAILY BENEFIT	\$457	\$913
123	TOTAL DAILY COST/BENEFIT	\$5,408	\$10,818
124	COST		
125	NET DAILY COST PER TRIP REDUCED	\$3.30	\$3.30
126	NET DAILY COST PER VMT REDUCED	\$0.39	\$0.39
127	NET DAILY COST PER TON OF CO REDUCED	\$13,298	\$13,286
128	NET DAILY COST PER TON OF ROG REDUCED	\$150,374	\$146,645
129	NET DAILY COST PER TON OF NOx REDUCED	\$266,572	\$272,827
130	NET DAILY COST PER TON OF PM REDUCED	ERR	ERR
131	BENEFIT		
132	NET DAILY BENEFIT PER TRIP REDUCED	\$0.26	\$0.26
133	NET DAILY BENEFIT PER VMT REDUCED	\$0.03	\$0.03
134	NET DAILY BENEFIT PER TON OF CO REDUCED	\$1,036	\$1,035
135	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$11,711	\$11,419
136	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$20,761	\$21,244
137	NET DAILY BENEFIT PER TON OF PM REDUCED	ERR	ERR

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138	COST/BENEFIT		
139	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$3.04	\$3.04
140	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.36	\$0.36
141	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$12,263	\$12,252
142	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$138,662	\$135,226
143	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$245,811	\$251,584
144	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
145	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
146	TOTAL DAILY COST	\$6,321	\$12,645
147	TOTAL DAILY BENEFIT	\$0	\$0
148	TOTAL DAILY COST/BENEFIT	\$6,321	\$12,645
149	COST		
150	NET DAILY COST PER TRIP REDUCED	\$3.56	\$3.56
151	NET DAILY COST PER VMT REDUCED	\$0.42	\$0.42
152	NET DAILY COST PER TON OF CO REDUCED	\$14,334	\$14,321
153	NET DAILY COST PER TON OF ROG REDUCED	\$162,085	\$158,063
154	NET DAILY COST PER TON OF NO _x REDUCED	\$287,333	\$294,071
155	NET DAILY COST PER TON OF PM REDUCED	ERR	ERR
156	BENEFIT		
157	NET DAILY BENEFIT PER TRIP REDUCED	\$0.00	\$0.00
158	NET DAILY BENEFIT PER VMT REDUCED	\$0.00	\$0.00
159	NET DAILY BENEFIT PER TON OF CO REDUCED	\$0	\$0
160	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$0	\$0
161	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$0	\$0
162	NET DAILY BENEFIT PER TON OF PM REDUCED	ERR	ERR
163	COST/BENEFIT		
164	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$3.56	\$3.56
165	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.42	\$0.42
166	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$14,334	\$14,321
167	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$162,085	\$158,063
168	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$287,333	\$294,071
169	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
170	SCENARIO #2 THE NO BUILD SCENARIO		
171	TOTAL DAILY COST	\$3,743	\$5,487
172	TOTAL DAILY BENEFIT	\$6,321	\$12,645
173	TOTAL DAILY COST/BENEFIT	(\$2,578)	(\$7,158)
174	COST		
175	NET DAILY COST PER TRIP REDUCED	\$2.11	\$1.54
176	NET DAILY COST PER VMT REDUCED	\$0.25	\$0.18
177	NET DAILY COST PER TON OF CO REDUCED	\$8,487	\$6,214
178	NET DAILY COST PER TON OF ROG REDUCED	\$95,970	\$68,583
179	NET DAILY COST PER TON OF NO _x REDUCED	\$170,128	\$127,596
180	NET DAILY COST PER TON OF PM REDUCED	ERR	ERR
181	BENEFIT		
182	NET DAILY BENEFIT PER TRIP REDUCED	\$3.56	\$3.56
183	NET DAILY BENEFIT PER VMT REDUCED	\$0.42	\$0.42
184	NET DAILY BENEFIT PER TON OF CO REDUCED	\$14,334	\$14,321
185	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$162,085	\$158,063
186	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$287,333	\$294,071
187	NET DAILY BENEFIT PER TON OF PM REDUCED	ERR	ERR

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188	COST/BENEFIT		
189	NET DAILY COST/BENEFIT PER TRIP REDUCED	(\$1.45)	(\$2.01)
190	NET DAILY COST/BENEFIT PER VMT REDUCED	(\$0.17)	(\$0.24)
191	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	(\$5,847)	(\$8,107)
192	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	(\$66,115)	(\$89,480)
193	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	(\$117,204)	(\$166,475)
194	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR

COST-EFFECTIVENESS MODEL

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TCM # 4 EMPLOYER BASED STAGGERED AND FLEXIBLE WORK HC

ASSUMPTIONS

1	Air pollution cost per mile	\$0.015	RUTHERFORD AND WELLANDER, 1986
2	Cost per vehicle-miles of delay	\$0.11	RUTHERFORD AND WELLANDER, 1986
3	Average annual administration cost per employee	\$10	
4	Number of employees shifted (standard)	138,360	
5	Number of employees shifted (high)	230,600	

METHODOLOGY

PUBLIC SECTOR COST

DAILY PUBLIC CAPITAL COST (DPCC) = 0

DAILY PUBLIC O & M COST (DPOMC) = DPAC WHERE;
DPA = DAILY PUBLIC ADMINISTRATIVE COST

DAILY PUBLIC COST =
(DPCC + DPOMC) WHERE;

DPCC = DAILY PUBLIC CAPITAL COST
DPOMC = DAILY PUBLIC O & M COST

DAILY PUBLIC REVENUES (DPR) = 0

(DPCOMC) - (DPR) WHERE;

DPCOMC = DAILY PUBLIC CAPITAL AND OPERATION AND MAINTENANCE COST
DPR = DAILY PUBLIC REVENUE

DAILY PUBLIC BENEFITS (DPB) BY AVOIDING HIGHWAY BUILDING = 0

NET PUBLIC DAILY COST/BENEFIT COUNTING THE AVOIDED COSTS (NDPC/BIAC) =
(NDPC/R) - (DPB)

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INDIVIDUAL COST

DAILY INDIVIDUAL CAPITAL COST (DICC) = 0

DAILY INDIVIDUAL OPERATION AND MAINTENANCE COST (DIOMC) = 0

DAILY INDIVIDUAL BENEFIT (DIB) = 0

NET DAILY INDIVIDUAL COST/BENEFIT (NDIC/B) =

(DIC) - (DIB) WHERE;

DIC = DAILY INDIVIDUAL COST

DIB = DAILY INDIVIDUAL BENEFITS

PRIVATE SECTOR COST/BENEFIT

DAILY PRIVATE CAPITAL COST (DPRCC) = 0

DAILY PRIVATE O & M COST (DPROMC) =

(NEP)*(CPE) WHERE;

NEP = NUMBER OF EMPLOYEES PARTICIPATING

CPE = COST PER EMPLOYEE

DAILY PRIVATE CAPITAL BENEFIT (DPRCB) = 0

DAILY PRIVATE O & M BENEFIT (DPROMB) = 0

NET DAILY PRIVATE COST/BENEFIT (NDPC/B) =

(DPRC) - (DPRB)

SOCIETAL COST

DAPC = DAILY AIR POLLUTION COST/BENEFIT

DAPC = DVMTR * (APC/M) WHERE;

DVMTR = DAILY VMT REDUCED

APC/M = AIR POLLUTION COST PER MILE

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DVMDCB = DAILY VEHICLE MILES OF DELAY COST/BENEFIT

DVMDC = (DVMDS) * (C/VMD) WHERE;

DVMDS = (VMT/NEW SPEED) - (VMT/EXISTING SPEED) * (AVERAGE SPEED)

DVMDS = DAILY VEHICLE MILES OF DELAY SAVED

C/VMD = DAILY COST PER VEHICLE MILES OF DELAY SAVED

DSCB = DAILY SOCIETAL COST/BENEFIT

DSCB = (DAPC) + (DVMDCB)

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 1 THE BUILD SCENARIO

TOTAL DAILY COST (TDC) =

(DPC) + (DIC) + (DPRC) + (DSC) WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DSC = DAILY SOCIETAL COST

TOTAL DAILY BENEFITS (TDB) =

(DPB) + (DIB) + (DPRB) + DSB WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DSB = DAILY SOCIETAL BENEFIT

TOTAL DAILY COS/BENEFIT (TDC/B) =

[(DPC) + (DIC) + (DPRC) + (DSC)] - [(DPB) + (DIB) + (DPRB) + (DSB)]

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 2 THE NO BUILD SCENARIO

TOTAL DAILY COST (TDC) =

(DPC) + (DIC) + (DPRC) + (DSC) WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DSC = DAILY SOCIETAL COST

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TOTAL DAILY BENEFITS (TDB) =
(DPB) + (DIB) + (DPRB) + (DSB) WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DSB = DAILY SOCIETAL BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

[(DPC) + (DIC) + (DPRC) + (DSC)] - [(DPB) + (DIB) + (DPRB) + (DSB)]

COST-EFFECTIVENESS MODEL

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LIKELY OUTCOMES

PUBLIC SECTOR COST/BENEFIT		STANDARD	HIGH
1	DAILY PUBLIC CAPITAL COST	\$0	\$0
2	DAILY PUBLIC O & M COST	\$4,435	\$4,435
3	DAILY PUBLIC COST	\$4,435	\$4,435
4	DAILY PUBLIC REVENUES	\$0	\$0
5	DAILY PUBLIC COST/REVENUE	\$4,435	\$4,435
6	DAILY PUBLIC AVOIDED CAPITAL COST (SCENARIO 2)	\$0	\$0
7	DAILY PUBLIC AVOIDED O & M COST (SCENARIO 2)	\$0	\$0
8	TOTAL DAILY PUBLIC AVOIDED (SCENARIO 2)	\$0	\$0
9	NET DAILY PUBLIC BENEFIT (SCENARIO 2)	\$0	\$0
10	DAILY PUBLIC CAPITAL COST (SCENARIO 1)	\$0	\$0
11	DAILY PUBLIC O & M COST (SCENARIO 1)	\$0	\$0
12	TOTAL DAILY PUBLIC COST (SCENARIO 1)	\$0	\$0
13	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 2)	\$4,435	\$4,435
14	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 1)	\$0	\$0
15	COST		
16	DAILY PUBLIC COST PER TRIP SHIFTED TO OFF-PEAK	\$0.06	\$0.04
17	DAILY PUBLIC COST PER VMT SHIFTED TO OFF-PEAK	\$0.01	\$0.00
18	DAILY PUBLIC COST PER TON OF CO REDUCED	\$2,234	\$1,340
19	DAILY PUBLIC COST PER TON OF ROG REDUCED	\$18,100	\$10,869
20	DAILY PUBLIC COST PER TON OF NOx REDUCED	ERR	ERR
21	DAILY PUBLIC COST PER TON OF PM REDUCED	ERR	ERR
22	BENEFIT		
23	DAILY PUBLIC BENEFIT PER TRIP SHIFTED	\$0.00	\$0.00
24	DAILY PUBLIC BENEFIT PER VMT SHIFTED	\$0.00	\$0.00
25	DAILY PUBLIC BENEFIT PER TON OF CO REDUCED	\$0	\$0
26	DAILY PUBLIC BENEFIT PER TON OF ROG REDUCED	\$0	\$0
27	DAILY PUBLIC BENEFIT PER TON OF NOx REDUCED	ERR	ERR
28	DAILY PUBLIC BENEFIT PER TON OF PM REDUCED	ERR	ERR
29	COST/BENEFIT		
30	NET DAILY PUBLIC COST/BENEFIT PER TRIP SHIFTED	\$0.06	\$0.04
31	NET DAILY PUBLIC COST/BENEFIT PER VMT SHIFTED	\$0.01	\$0.00
32	NET DAILY PUBLIC COST/BENEFIT PER TON OF CO REDUCED	\$2,234	\$1,340
33	NET DAILY PUBLIC COST/BENEFIT PER TON OF ROG REDUCED	\$18,100	\$10,869
34	NET DAILY PUBLIC COST/BENEFIT PER TON OF NOx REDUCED	ERR	ERR
35	NET DAILY PUBLIC COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
36	INDIVIDUAL COST/BENEFIT		
37	DAILY INDIVIDUAL CAPITAL COST	\$0	\$0
38	DAILY INDIVIDUAL O & M COST	\$0	\$0
39	DAILY INDIVIDUAL COST	\$0	\$0
40	DAILY INDIVIDUAL CAPITAL BENEFIT	\$0	\$0
41	DAILY INDIVIDUAL O & M BENEFIT	\$0	\$0
42	DAILY INDIVIDUAL BENEFIT	\$0	\$0
43	NET DAILY INDIVIDUAL COST/BENEFIT	\$0	\$0

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44	COST		
45	DAILY PUBLIC COST PER TRIP SHIFTED TO OFF-PEAK	\$0.00	\$0.00
46	DAILY PUBLIC COST PER VMT SHIFTED TO OFF-PEAK	\$0.00	\$0.00
47	DAILY PUBLIC COST PER TON OF CO REDUCED	\$0.00	\$0.00
48	DAILY PUBLIC COST PER TON OF ROG REDUCED	\$0.00	\$0.00
49	DAILY PUBLIC COST PER TON OF NO _x REDUCED	ERR	ERR
50	DAILY PUBLIC COST PER TON OF PM REDUCED	ERR	ERR
51	BENEFIT		
52	DAILY PUBLIC BENEFIT PER TRIP SHIFTED	\$0.00	\$0.00
53	DAILY PUBLIC BENEFIT PER VMT SHIFTED	\$0.00	\$0.00
54	DAILY PUBLIC BENEFIT PER TON OF CO REDUCED	\$0.00	\$0.00
55	DAILY PUBLIC BENEFIT PER TON OF ROG REDUCED	\$0.00	\$0.00
56	DAILY PUBLIC BENEFIT PER TON OF NO _x REDUCED	ERR	ERR
57	DAILY PUBLIC BENEFIT PER TON OF PM REDUCED	ERR	ERR
58	COST/BENEFIT		
59	NET DAILY INDIVIDUAL COST/BENEFIT PER TRIP SHIFTED	\$0.00	\$0.00
60	NET DAILY INDIVIDUAL COST/BENEFIT PER VMT SHIFTED	\$0.00	\$0.00
61	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF CO REDUCED	0	0
62	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF ROG REDUCED	0	0
63	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF NO _x REDUCED	ERR	ERR
64	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
65	PRIVATE SECTOR COST/BENEFIT		
66	DAILY PRIVATE CAPITAL COST	\$0	\$0
67	DAILY PRIVATE O & M COST	\$5,322	\$8,869
68	DAILY PRIVATE COST	\$5,322	\$8,869
69	DAILY PRIVATE CAPITAL BENEFIT	\$0	\$0
70	DAILY PRIVATE O & M BENEFIT	\$0	\$0
71	DAILY PRIVATE BENEFIT	\$0	\$0
72	NET DAILY PRIVATE COST/BENEFIT	\$5,322	\$8,869
73	COST		
74	NET DAILY PRIVATE COST PER TRIP SHIFTED	\$0.07	\$0.07
75	NET DAILY PRIVATE COST PER VMT SHIFTED	\$0.01	\$0.01
76	NET DAILY PRIVATE COST PER TON OF CO REDUCED	\$2,680.88	\$2,680.34
77	NET DAILY PRIVATE COST PER TON OF ROG REDUCED	\$21,720.57	\$21,738.31
78	NET DAILY PRIVATE COST PER TON OF NO _x REDUCED	ERR	ERR
79	NET DAILY PRIVATE COST PER TON OF PM REDUCED	ERR	ERR
80	BENEFIT		
81	NET DAILY PRIVATE BENEFIT PER TRIP SHIFTED	\$0.00	\$0.00
82	NET DAILY PRIVATE BENEFIT PER VMT SHIFTED	\$0.00	\$0.00
83	NET DAILY PRIVATE BENEFIT PER TON OF CO REDUCED	\$0.00	\$0.00
84	NET DAILY PRIVATE BENEFIT PER TON OF ROG REDUCED	\$0.00	\$0.00
85	NET DAILY PRIVATE BENEFIT PER TON OF NO _x REDUCED	ERR	ERR
86	NET DAILY PRIVATE BENEFIT PER TON OF PM REDUCED	ERR	ERR
87	COST/BENEFIT		
88	NET DAILY PRIVATE COST/BENEFIT PER TRIP SHIFTED	\$0.07	\$0.07
89	NET DAILY PRIVATE COST/BENEFIT PER VMT SHIFTED	\$0.01	\$0.01
90	NET DAILY PRIVATE COST/BENEFIT PER TON OF CO REDUCED	\$2,680.88	\$2,680.34
91	NET DAILY PRIVATE COST/BENEFIT PER TON OF ROG REDUCED	\$21,720.57	\$21,738.31
92	NET DAILY PRIVATE COST/BENEFIT PER TON OF NO _x REDUCED	ERR	ERR
93	NET DAILY PRIVATE COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR

COST-EFFECTIVENESS MODEL

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94	SOCIETAL COST/BENEFIT		
95	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM 1 YEAR)		
96	DAILY SOCIETAL AIR POLLUTION COST	\$12,804	\$21,340
97	DAILY SOCIETAL CONGESTION COST	\$0	\$0
98	DAILY SOCIETAL COST	\$12,804	\$21,340
99	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
100	DAILY SOCIETAL CONGESTION BENEFIT	\$41,039	\$68,398
101	DAILY SOCIETAL BENEFIT	\$41,039	\$68,398
102	NET DAILY SOCIETAL COST/BENEFIT	(\$28,235)	(\$47,058)
103	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
104	DAILY SOCIETAL AIR POLLUTION COST	\$12,804	\$21,340
105	DAILY SOCIETAL CONGESTION COST	\$41,039	\$68,398
106	DAILY SOCIETAL COST	\$53,843	\$89,738
107	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
108	DAILY SOCIETAL CONGESTION BENEFIT	\$0	\$0
109	DAILY SOCIETAL BENEFIT	\$0	\$0
110	NET DAILY SOCIETAL COST/BENEFIT	\$53,843	\$89,738
111	SCENARIO #2 THE NO BUILD SCENARIO		
112	DAILY SOCIETAL AIR POLLUTION COST	\$0	\$0
113	DAILY SOCIETAL CONGESTION COST	\$0	\$0
114	DAILY SOCIETAL COST	\$0	\$0
115	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$12,804	\$21,340
116	DAILY SOCIETAL CONGESTION BENEFIT	\$41,039	\$68,398
117	DAILY SOCIETAL BENEFIT	\$53,843	\$89,738
118	NET DAILY SOCIETAL COST/BENEFIT	(\$53,843)	(\$89,738)
119	TOTAL COST/BENEFIT		
120	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
121	TOTAL DAILY COST	\$686,688	\$1,144,486
122	TOTAL DAILY BENEFIT	\$41,039	\$68,398
123	TOTAL DAILY COST/BENEFIT	\$645,649	\$1,076,088
124	COST		
125	NET DAILY COST PER TRIP SHIFTED	\$9.17	\$9.17
126	NET DAILY COST PER VMT SHIFTED	\$0.80	\$0.80
127	NET DAILY COST PER TON OF CO REDUCED	\$345,938	\$345,871
128	NET DAILY COST PER TON OF ROG REDUCED	\$2,802,808	\$2,805,112
129	NET DAILY COST PER TON OF NOx REDUCED	ERR	ERR
130	NET DAILY COST PER TON OF PM REDUCED	ERR	ERR
131	BENEFIT		
132	NET DAILY BENEFIT PER TRIP SHIFTED	\$0.55	\$0.55
133	NET DAILY BENEFIT PER VMT SHIFTED	\$0.05	\$0.05
134	NET DAILY BENEFIT PER TON OF CO REDUCED	\$20,675	\$20,670
135	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$167,506	\$167,642
136	NET DAILY BENEFIT PER TON OF NOx REDUCED	ERR	ERR
137	NET DAILY BENEFIT PER TON OF PM REDUCED	ERR	ERR

COST – EFFECTIVENESS MODEL

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138	COST/BENEFIT		
139	NET DAILY COST/BENEFIT PER TRIP SHIFTED	\$8.62	\$8.62
140	NET DAILY COST/BENEFIT PER VMT SHIFTED	\$0.76	\$0.76
141	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$325,264	\$325,200
142	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$2,635,302	\$2,637,470
143	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	ERR	ERR
144	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
145	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
146	TOTAL DAILY COST	\$727,727	\$1,212,884
147	TOTAL DAILY BENEFIT	\$0	\$0
148	TOTAL DAILY COST/BENEFIT	\$727,727	\$1,212,884
149	COST		
150	NET DAILY COST PER TRIP SHIFTED	\$9.72	\$9.72
151	NET DAILY COST PER VMT SHIFTED	\$0.85	\$0.85
152	NET DAILY COST PER TON OF CO REDUCED	\$366,613	\$366,541
153	NET DAILY COST PER TON OF ROG REDUCED	\$2,970,313	\$2,972,755
154	NET DAILY COST PER TON OF NO _x REDUCED	ERR	ERR
155	NET DAILY COST PER TON OF PM REDUCED	ERR	ERR
156	BENEFIT		
157	NET DAILY BENEFIT PER TRIP SHIFTED	\$0.00	\$0.00
158	NET DAILY BENEFIT PER VMT SHIFTED	\$0.00	\$0.00
159	NET DAILY BENEFIT PER TON OF CO REDUCED	\$0	\$0
160	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$0	\$0
161	NET DAILY BENEFIT PER TON OF NO _x REDUCED	ERR	ERR
162	NET DAILY BENEFIT PER TON OF PM REDUCED	ERR	ERR
163	COST/BENEFIT		
164	NET DAILY COST/BENEFIT PER TRIP SHIFTED	\$9.72	\$9.72
165	NET DAILY COST/BENEFIT PER VMT SHIFTED	\$0.85	\$0.85
166	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$366,613	\$366,541
167	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$2,970,313	\$2,972,755
168	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	ERR	ERR
169	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
170	SCENARIO #2 THE NO BUILD SCENARIO		
171	TOTAL DAILY COST	\$9,756	\$13,304
172	TOTAL DAILY BENEFIT	\$53,843	\$89,738
173	TOTAL DAILY COST/BENEFIT	(\$44,087)	(\$76,434)
174	COST		
175	NET DAILY COST PER TRIP SHIFTED	\$0.13	\$0.11
176	NET DAILY COST PER VMT SHIFTED	\$0.01	\$0.01
177	NET DAILY COST PER TON OF CO REDUCED	\$4,915	\$4,021
178	NET DAILY COST PER TON OF ROG REDUCED	\$39,821	\$32,607
179	NET DAILY COST PER TON OF NO _x REDUCED	ERR	ERR
180	NET DAILY COST PER TON OF PM REDUCED	ERR	ERR
181	BENEFIT		
182	NET DAILY BENEFIT PER TRIP SHIFTED	\$0.72	\$0.72
183	NET DAILY BENEFIT PER VMT SHIFTED	\$0.06	\$0.06
184	NET DAILY BENEFIT PER TON OF CO REDUCED	\$27,125	\$27,119
185	NET DAILY BENEFIT, PER TON OF ROG REDUCED	\$219,766	\$219,946
186	NET DAILY BENEFIT PER TON OF NO _x REDUCED	ERR	ERR
187	NET DAILY BENEFIT PER TON OF PM REDUCED	ERR	ERR

COST-EFFECTIVENESS MODEL

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188	COST/BENEFIT		
189	NET DAILY COST/BENEFIT PER TRIP REDUCED	(\$0.59)	(\$0.61)
190	NET DAILY COST/BENEFIT PER VMT REDUCED	(\$0.05)	(\$0.05)
191	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	(\$22,210)	(\$23,099)
192	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	(\$179,945)	(\$187,338)
193	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	ERR	ERR
194	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR

COST – EFFECTIVENESS MODEL

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TCM # 5 TRANSPORTATION MANAGEMENT ASSOCIATIONS ASSUMPTIONS

1	Transit ridership on a weekday	1,169,786	MTA
2	Transit ridership on Saturdays	837,722	MTA
3	Transit ridership on Sundays	580,335	MTA
4	Passenger mile/bus mile	18.2	MTA
5	Subsidy per passenger mile	\$0.27	MTA
6	Cost per bus hour	\$109.70	MTA
7	Revenue per passenger mile	\$0.16	MTA
8	Total bus hours	17,726	MTA
9	Operation cost	1944524	MTA
10	Fare box revenue	729,973	MTA
11	Total seat miles	10,800,996	MTA
12	Total passenger miles	4,569,352	MTA
13	Operation cost per revenue mile	\$7.73	MTA
14	Revenue per revenue mile	\$2.90	MTA
15	Amortization period for construction projects	30	MTA
16	Amortization period for equipment purchase	12	MTA
17	Amortization period for vehicles (BUSES)	12	MTA
18	O&M cost of vehicle	\$0.48	AAA
19	Construction cost of arterial (\$/lane mile)	\$900,000	CALTRANS
20	Construction annualization factor (CAF)	0.09	
21	Bus annualization factor (BAF)	0.13	
22	car annualization factor	0.25	
23	Percent of VMT on freeways	50%	LARTS MODEL
24	Interest rate	8%	MARKET RATE
25	Lane miles arterial/vehicle trip	0.0018	COMSIS
26	Lane miles freeway/vehicle trip	0.0015	COMSIS
27	O&M cost of arterial (\$/LANE MILE)	\$765	CALTRANS
28	O&M cost of freeway (\$/LANE MILE)	\$2,000	CALTRANS
29	Monthly parking cost for SOV	\$100	MTA
30	Monthly parking cost for ridesharers	\$40	
31	Monthly parking saving per rideshare employee	\$60	
32	Percent of parking paid by private sector	90%	SCAQMD
33	percent of parking paid by employees	10%	SCAQMD
34	Air pollution cost per mile	\$0.015	RUTHERFORD AND WELLANDER, 1986
35	Cost per vehicle – miles of delay	\$0.11	RUTHERFORD AND WELLANDER, 1986
36	Construction cost of freeway (\$/lane mile) not including right of way	\$2,500,000	SANDAG
37	Construction cost of freeway (\$/lane mile) including	\$12,000,000	CALTRANS (MIN)
38	right of way and connectors to other freeways		(IN METROPOLITAN AREA)
39	Construction cost of freeway (\$/lane mile) including	\$16,000,000	CALTRANS (MAX)
40	right of way and connectors to other freeways		(IN METROPOLITAN AREA)
41	Average construction cost of freeway (\$/lane mile) including	\$14,000,000	CALTRANS (AVERAGE)
42	right of way and connectors to other freeways		(IN METROPOLITAN AREA)
43	Construction cost of HOV lane (\$/lane mile)	\$2,500,000	MTC
44	Average cost of a passenger vehicle	\$16,000	AAA
45	Operation cost per transit passenger	\$1.66	MTA
46	Fare box revenue per transit passenger	\$0.62	MTA
47	Average cost of long express trip on buses and rail	\$5	MTA
48	Average capital cost per parking space including land	\$10,000	MTA
49	Average vanpool occupancy	7.00	REG. XV

COST-EFFECTIVENESS MODEL

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50	Average length of a vanpool trip (miles)	20	REG. XV
51	Average cost per commute trip of 11.4 miles	\$5.47	CALCULATED
52	Average cost per rideshare trip	\$2.19	
53	Average saving per rideshare trip	\$3.28	
54	Average cost of vanpool trip per passenger per month	\$150	
55	Car annualization factor	0.25	
56	Construction annualization factor	0.09	
57	Annual fees for TMA/TMO per employee	\$18	
58	Annual public start-up capital cost per employee	\$3.60	
59	Annual start-up operation and maintenance cost per employee	\$37.60	
60	Number of employees to be served	300,000	

METHODOLOGY

PUBLIC SECTOR COST

DAILY PUBLIC CAPITAL COST (DPCC) =
 (DPSCPE) * (NEA) WHERE;
 DPSCPE = DAILY PUBLIC START-UP COST PER EMPLOYEE
 NEA = NUMBER OF EMPLOYEES AFFECTED

DAILY PUBLIC OPERATION AND MAINTENANCE C
 (DPAC) + (DVTR*.30)* (DASPTT) WHERE;
 DPAC = DAILY PUBLIC ADMINISTRATION COST
 DVTR = DAILY VEHICLE TRIPS REDUCED
 DSPTT = DAILY SUBSIDY PER TRANSIT PASSENGER

DAILY PUBLIC COST =
 (DPCC + DPOMC) WHERE;
 DPCC = DAILY PUBLIC CAPITAL COST
 DPOMC = DAILY PUBLIC O & M COST

DAILY PUBLIC REVENUES (DPR) =
 (DVTR)/2 * (DRPTP)*.30 WHERE;
 DVTR = DAILY VEHICLE TRIPS REDUCED
 DRPTP = DAILY REVENUE PER TRANSIT PASSENGER

DAILY PUBLIC COST/REVENUE (DPC/R) =
 (DPCOMC) - (DPR) WHERE;

DPCOMC = DAILY PUBLIC CAPITAL AND OPERATION AND MAINTENANCE COST
 DPR = DAILY PUBLIC REVENUE

COST-EFFECTIVENESS MODEL

LACMTA

DAILY PUBLIC BENEFITS (DPB) BY AVOIDING HIGHWAY BUILDING =

(DPCB) + (DPOMB) WHERE;

$$\text{DPCB} = (\text{DPTR}) * (\text{LMF/T}) * (\text{CCLMF}) * (\text{CAF})/260 * (\text{POTOF}) + \\ + (\text{DPTR}) * (\text{LMA/T}) * (\text{CCLMA}) * (\text{CAF})/260 * (\text{POTOA}) \text{ WHERE;}$$

DPTR = DAILY TRIPS REDUCED

LMF/T = LANE MILES OF FREEWAY PER TRIP

CCLMF = CONSTRUCTION COST OF FREEWAY LANE MILE

CAF = CONSTRUCTION ANNUALIZATION FACTOR

POTOF = PERCENT OF TRIPS ON FREEWAYS

LMA = LANE MILES OF ARTERIAL PER TRIP

CCLMA = CONSTRUCTION COST OF ARTERIAL LANE MILE

POTOA = PERCENT OF PEAK TRIPS ON ARTERIAL

$$\text{DPOMB} = (\text{DTR}) * (\text{LMFA/T}) * (\text{OMCLMF})/260 * (\text{POTOF}) + \\ + (\text{DTR}) * (\text{LMA/T}) * (\text{OMCLMA})/260 * (\text{POTOA}) \text{ WHERE;}$$

OMCLMF = O & M COST PER LANE MILE OF FREEWAY

OMCLMA = O & M COST PER LANE MILE OF ARTERIAL

POTOF = PERCENT OF TRIPS ON FREEWAY

POTOA = PERCENT OF TRIPS ON ARTERIAL

NET PUBLIC DAILY COST/BENEFIT COUNTING THE AVOIDED COSTS (NDPC/BIAC) =
(NDPC/R) - (DPB)

INDIVIDUAL COST

DAILY INDIVIDUAL CAPITAL COST (DICC) = 0

DAILY INDIVIDUAL OPERATION AND MAINTENANCE COST (DIOMC) =
(DVMTR) * (DOMCPM) * .2105 + (DPCPRE) * (DVTR/2) * .10 WHERE;

DVTR = DAILY VEHICLE TRIPS REDUCED

DOMCPM = DAILY OPERATION AND MAINTENANCE COST PER MILE

DPC = DAILY PARKING COST

DVMTR = DAILY VEHICLE MILES TRAVELED REDUCED

DAILY INDIVIDUAL BENEFIT (DIB) =

(DICB) + (DIOMB) WHERE;

DICB = DAILY INDIVIDUAL CAPITAL BENEFIT (CAR COST)

DIOMB = DAILY INDIVIDUAL O & M COST SAVING (CAR O & M)

COST-EFFECTIVENESS MODEL

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DIOMB =
(DOMBPM) * (DVMTR) +
+ (.10 * DIPS * DVTR / 2) WHERE;
DOMBPM = DAILY OPERATION AND MAINTENANCE BENEFIT PER MILE
DVMTR = DAILY VEHICLE MILES TRAVELED REDUCED
.21 IS THE PERCENT OF O & M COST ATTRIBUTED TO SAVINGS
DIPB = DAILY INDIVIDUAL PARKING COST SAVING

NET DAILY INDIVIDUAL COST/BENEFIT (NDIC/B) =

(DIC) - (DIB) WHERE;
DIC = DAILY INDIVIDUAL COST
DIB = DAILY INDIVIDUAL BENEFITS

PRIVATE SECTOR COST/BENEFIT

DAILY PRIVATE CAPITAL COST (DPRCC) = 0

DAILY PRIVATE O & M COST (DPROMC) =
(NEP) * (CPE) + (PRCPEP) * (NEP) WHERE;
NEP = NUMBER OF EMPLOYEES PARTICIPATING
CPE = COST PER EMPLOYEE
PRCPEP = PRIVATE SECTOR COST PER EMPLOYEE PARTICIPATING

DAILY PRIVATE CAPITAL BENEFIT (DPRCB) = 0

DAILY PRIVATE O & M BENEFIT (DPROMB) =
(DVTR) / 2 * (MPC) * 12 / 260 * .90 WHERE;
DVTR = DAILY VEHICLE TRIPS REDUCED
MPC = MONTHLY PARKING COST
.90 = PERCENT OF PARKING PROVIDED BY PRIVATE SECTOR

NET DAILY PRIVATE COST/BENEFIT (NDPC/B) =
(DPRC) - (DPRB)

SOCIETAL COST

DAPC = DAILY AIR POLLUTION COST/BENEFIT
DAPC = DVMTR * (APC/M) WHERE;

DVMTR = DAILY VMT REDUCED
APC/M = AIR POLLUTION COST PER MILE

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DVMDCB = DAILY VEHICLE MILES OF DELAY COST/BENEFIT

DVMDC = (DVMDS) * (C/VMD) WHERE;

DVMDS = (VMT/NEW SPEED) - (VMT/EXISTING SPEED) * (AVERAGE SPEED)

DVMDS = DAILY VEHICLE MILES OF DELAY SAVED

C/VMD = DAILY COST PER VEHICLE MILES OF DELAY SAVED

DSCB = DAILY SOCIETAL COST/BENEFIT

DSCB = (DAPC) + (DVMDCB)

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 1 THE BUILD SCENARIO

TOTAL DAILY COST (TDC) =

(DPC) + (DIC) + (DPRC) + (DSC) WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DSC = DAILY SOCIETAL COST

TOTAL DAILY BENEFITS (TDB) =

(DPB) + (DIB) + (DPRB) + DSB WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DSB = DAILY SOCIETAL BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

[(DPC) + (DIC) + (DPRC) + (DSC)] - [(DPB) + (DIB) + (DPRB) + (DSB)]

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 2 THE NO BUILD SCENARIO

TOTAL DAILY COST (TDC) =

(DPC) + (DIC) + (DPRC) + (DSC) WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DSC = DAILY SOCIETAL COST

COST-EFFECTIVENESS MODEL

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TOTAL DAILY BENEFITS (TDB) =
(DPB) + (DIB) + (DPRB) + (DSB) WHERE;
DPB = DAILY PUBLIC BENEFITS
DIB = DAILY INDIVIDUAL BENEFITS
DPRB = DAILY PRIVATE BENEFITS
DSB = DAILY SOCIETAL BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

[(DPC) + (DIC) + (DPRC) + (DSC)] - [(DPB) + (DIB) + (DPRB) + (DSB)]

COST – EFFECTIVENESS MODEL

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LIKELY OUTCOMES

PUBLIC SECTOR COST/BENEFIT			
	STANDARD	HIGH	
1	DAILY PUBLIC CAPITAL COST	\$25,846	\$25,846
2	DAILY PUBLIC O & M COST	\$4,384	\$5,464
3	DAILY PUBLIC COST	\$30,230	\$31,310
4	DAILY PUBLIC REVENUES	\$0	\$0
5	DAILY PUBLIC COST/REVENUE	\$30,230	\$31,310
6	DAILY PUBLIC AVOIDED CAPITAL COST (SCENARIO 2)	\$45,968	\$73,547
7	DAILY PUBLIC AVOIDED O & M COST (SCENARIO 2)	\$68	\$108
8	TOTAL DAILY PUBLIC AVOIDED (SCENARIO 2)	\$46,035	\$73,656
9	NET DAILY PUBLIC BENEFIT (SCENARIO 2)	\$46,035	\$73,656
10	DAILY PUBLIC CAPITAL COST (SCENARIO 1)	\$45,968	\$73,547
11	DAILY PUBLIC O & M COST (SCENARIO 1)	\$68	\$108
12	TOTAL DAILY PUBLIC COST (SCENARIO 1)	\$46,035	\$73,656
13	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 2)	(\$15,805)	(\$42,346)
14	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 1)	\$46,035	\$73,656
15	COST		
16	DAILY PUBLIC COST PER TRIP REDUCED	\$4.18	\$2.71
17	DAILY PUBLIC COST PER VMT REDUCED	\$0.31	\$0.20
18	DAILY PUBLIC COST PER TON OF CO REDUCED	\$14,213	\$9,201
19	DAILY PUBLIC COST PER TON OF ROG REDUCED	\$142,596	\$92,360
20	DAILY PUBLIC COST PER TON OF NOx REDUCED	\$256,189	\$165,661
21	DAILY PUBLIC COST PER TON OF PM REDUCED	\$15,115,146	\$10,436,652
22	BENEFIT		
23	DAILY PUBLIC BENEFIT PER TRIP REDUCED	\$6.37	\$6.37
24	DAILY PUBLIC BENEFIT PER VMT REDUCED	\$0.48	\$0.48
25	DAILY PUBLIC BENEFIT PER TON OF CO REDUCED	\$21,643	\$21,644
26	DAILY PUBLIC BENEFIT PER TON OF ROG REDUCED	\$217,149	\$217,273
27	DAILY PUBLIC BENEFIT PER TON OF NOx REDUCED	\$390,131	\$389,712
28	DAILY PUBLIC BENEFIT PER TON OF PM REDUCED	\$23,017,744	\$24,551,836
29	COST/BENEFIT		
30	NET DAILY PUBLIC COST/BENEFIT PER TRIP REDUCED	(\$2.19)	(\$3.66)
31	NET DAILY PUBLIC COST/BENEFIT PER VMT REDUCED	(\$0.16)	(\$0.28)
32	NET DAILY PUBLIC COST/BENEFIT PER TON OF CO REDUCED	(\$7,431)	(\$12,444)
33	NET DAILY PUBLIC COST/BENEFIT PER TON OF ROG REDUCED	(\$74,553)	(\$124,913)
34	NET DAILY PUBLIC COST/BENEFIT PER TON OF NOx REDUCED	(\$133,942)	(\$224,051)
35	NET DAILY PUBLIC COST/BENEFIT PER TON OF PM REDUCED	(\$7,902,598)	(\$14,115,184)
36	INDIVIDUAL COST/BENEFIT		
37	DAILY INDIVIDUAL CAPITAL COST	\$0	\$0
38	DAILY INDIVIDUAL O & M COST	\$10,365	\$16,584
39	DAILY INDIVIDUAL COST	\$10,365	\$16,584
40	DAILY INDIVIDUAL CAPITAL BENEFIT	\$0	\$0
41	DAILY INDIVIDUAL O & M BENEFIT	\$6,820	\$10,911
42	DAILY INDIVIDUAL BENEFIT	\$6,820	\$10,911
43	NET DAILY INDIVIDUAL COST/BENEFIT	\$3,546	\$5,673

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44	COST		
45	NET DAILY INDIVIDUAL COST PER TRIP REDUCED	\$1.43	\$1.43
46	NET DAILY INDIVIDUAL COST PER VMT REDUCED	\$0.11	\$0.11
47	NET DAILY INDIVIDUAL COST PER TON OF CO REDUCED	\$4,873	\$4,873
48	NET DAILY INDIVIDUAL COST PER TON OF ROG REDUCED	\$48,893	\$48,922
49	NET DAILY INDIVIDUAL COST PER TON OF NO _x REDUCED	\$87,842	\$87,749
50	NET DAILY INDIVIDUAL COST PER TON OF PM REDUCED	\$5,182,666	\$5,528,157
51	BENEFIT		
52	NET DAILY INDIVIDUAL BENEFIT PER TRIP REDUCED	\$0.94	\$0.94
53	NET DAILY INDIVIDUAL BENEFIT PER VMT REDUCED	\$0.07	\$0.07
54	NET DAILY INDIVIDUAL BENEFIT PER TON OF CO REDUCED	\$3,206	\$3,206
55	NET DAILY INDIVIDUAL BENEFIT PER TON OF ROG REDUCED	\$32,168	\$32,187
56	NET DAILY INDIVIDUAL BENEFIT PER TON OF NO _x REDUCED	\$57,793	\$57,732
57	NET DAILY INDIVIDUAL BENEFIT PER TON OF PM REDUCED	\$3,409,798	\$3,637,100
58	COST/BENEFIT		
59	NET DAILY INDIVIDUAL COST/BENEFIT PER TRIP REDUCED	\$0.49	\$0.49
60	NET DAILY INDIVIDUAL COST/BENEFIT PER VMT REDUCED	\$0.04	\$0.04
61	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF CO REDUCED	\$1,667	\$1,667
62	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF ROG REDUCED	\$16,725	\$16,735
63	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF NO _x REDUCED	\$30,049	\$30,017
64	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF PM REDUCED	\$1,772,868	\$1,891,057
65	PRIVATE SECTOR COST/BENEFIT		
66	DAILY PRIVATE CAPITAL COST	\$0	\$0
67	DAILY PRIVATE O & M COST	\$20,769	\$20,769
68	DAILY PRIVATE COST	\$20,769	\$20,769
69	DAILY PRIVATE CAPITAL BENEFIT	\$0	\$0
70	DAILY PRIVATE O & M BENEFIT	\$15,010	\$24,015
71	DAILY PRIVATE BENEFIT	\$15,010	\$24,015
72	NET DAILY PRIVATE COST/BENEFIT	\$5,759	(\$3,246)
73	COST		
74	NET DAILY PRIVATE COST PER TRIP REDUCED	\$2.87	\$1.80
75	NET DAILY PRIVATE COST PER VMT REDUCED	\$0.22	\$0.14
76	NET DAILY PRIVATE COST PER TON OF CO REDUCED	\$9,765	\$6,103
77	NET DAILY PRIVATE COST PER TON OF ROG REDUCED	\$97,968	\$61,266
78	NET DAILY PRIVATE COST PER TON OF NO _x REDUCED	\$176,010	\$109,890
79	NET DAILY PRIVATE COST PER TON OF PM REDUCED	\$10,384,615	\$6,923,077
80	BENEFIT		
81	NET DAILY PRIVATE BENEFIT PER TRIP REDUCED	\$2.08	\$2.08
82	NET DAILY PRIVATE BENEFIT PER VMT REDUCED	\$0.16	\$0.16
83	NET DAILY PRIVATE BENEFIT PER TON OF CO REDUCED	\$7,057	\$7,057
84	NET DAILY PRIVATE BENEFIT PER TON OF ROG REDUCED	\$70,802	\$70,842
85	NET DAILY PRIVATE BENEFIT PER TON OF NO _x REDUCED	\$127,203	\$127,066
86	NET DAILY PRIVATE BENEFIT PER TON OF PM REDUCED	\$7,504,962	\$8,005,154
87	COST/BENEFIT		
88	NET DAILY PRIVATE COST/BENEFIT PER TRIP REDUCED	\$0.80	(\$0.28)
89	NET DAILY PRIVATE COST/BENEFIT PER VMT REDUCED	\$0.06	(\$0.02)
90	NET DAILY PRIVATE COST/BENEFIT PER TON OF CO REDUCED	\$2,708	(\$954)
91	NET DAILY PRIVATE COST/BENEFIT PER TON OF ROG REDUCED	\$27,167	(\$9,576)
92	NET DAILY PRIVATE COST/BENEFIT PER TON OF NO _x REDUCED	\$48,808	(\$17,176)
93	NET DAILY PRIVATE COST/BENEFIT PER TON OF PM REDUCED	\$2,879,654	(\$1,082,077)

COST-EFFECTIVENESS MODEL

LACMTA

94	SOCIETAL COST/BENEFIT		
95	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
96	DAILY SOCIETAL AIR POLLUTION COST	\$1,440	\$2,304
97	DAILY SOCIETAL CONGESTION COST	\$0	\$0
98	DAILY SOCIETAL COST	\$1,440	\$2,304
99	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
100	DAILY SOCIETAL CONGESTION BENEFIT	\$2,884	\$4,615
101	DAILY SOCIETAL BENEFIT	\$2,884	\$4,615
102	NET DAILY SOCIETAL COST/BENEFIT	(\$1,444)	(\$2,311)
103	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
104	DAILY SOCIETAL AIR POLLUTION COST	\$1,440	\$2,304
105	DAILY SOCIETAL CONGESTION COST	\$2,884	\$4,615
106	DAILY SOCIETAL COST	\$4,324	\$6,918
107	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
108	DAILY SOCIETAL CONGESTION BENEFIT	\$0	\$0
109	DAILY SOCIETAL BENEFIT	\$0	\$0
110	NET DAILY SOCIETAL COST/BENEFIT	\$4,324	\$6,918
111	SCENARIO #2 THE NO BUILD SCENARIO		
112	DAILY SOCIETAL AIR POLLUTION COST	\$0	\$0
113	DAILY SOCIETAL CONGESTION COST	\$0	\$0
114	DAILY SOCIETAL COST	\$0	\$0
115	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$1,440	\$2,304
116	DAILY SOCIETAL CONGESTION BENEFIT	\$2,884	\$4,615
117	DAILY SOCIETAL BENEFIT	\$4,324	\$6,918
118	NET DAILY SOCIETAL COST/BENEFIT	(\$4,324)	(\$6,918)
119	TOTAL COST/BENEFIT		
120	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
121	TOTAL DAILY COST	\$69,305	\$110,886
122	TOTAL DAILY BENEFIT	\$2,884	\$4,615
123	TOTAL DAILY COST/BENEFIT	\$66,421	\$106,271
124	COST		
125	NET DAILY COST PER TRIP REDUCED	\$9.59	\$9.59
126	NET DAILY COST PER VMT REDUCED	\$0.72	\$0.72
127	NET DAILY COST PER TON OF CO REDUCED	\$32,583	\$32,585
128	NET DAILY COST PER TON OF ROG REDUCED	\$326,909	\$327,097
129	NET DAILY COST PER TON OF NOx REDUCED	\$587,329	\$586,698
130	NET DAILY COST PER TON OF PM REDUCED	\$34,652,383	\$36,961,960
131	BENEFIT		
132	NET DAILY BENEFIT PER TRIP REDUCED	\$0.40	\$0.40
133	NET DAILY BENEFIT PER VMT REDUCED	\$0.03	\$0.03
134	NET DAILY BENEFIT PER TON OF CO REDUCED	\$1,356	\$1,356
135	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$13,605	\$13,613
136	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$24,442	\$24,416
137	NET DAILY BENEFIT PER TON OF PM REDUCED	\$1,442,098	\$1,538,238

COST – EFFECTIVENESS MODEL

LACMTA

138	COST/BENEFIT		
139	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$9.19	\$9.19
140	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.69	\$0.69
141	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$31,227	\$31,229
142	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$313,305	\$313,484
143	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$562,886	\$562,281
144	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$33,210,286	\$35,423,722
145	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
146	TOTAL DAILY COST	\$72,189	\$115,501
147	TOTAL DAILY BENEFIT	\$0	\$0
148	TOTAL DAILY COST/BENEFIT	\$72,189	\$115,501
149	COST		
150	NET DAILY COST PER TRIP REDUCED	\$9.99	\$9.99
151	NET DAILY COST PER VMT REDUCED	\$0.75	\$0.75
152	NET DAILY COST PER TON OF CO REDUCED	\$33,939	\$33,941
153	NET DAILY COST PER TON OF ROG REDUCED	\$340,514	\$340,710
154	NET DAILY COST PER TON OF NO _x REDUCED	\$611,771	\$611,114
155	NET DAILY COST PER TON OF PM REDUCED	\$36,094,481	\$38,500,198
156	BENEFIT		
157	NET DAILY BENEFIT PER TRIP REDUCED	\$0.00	\$0.00
158	NET DAILY BENEFIT PER VMT REDUCED	\$0.00	\$0.00
159	NET DAILY BENEFIT PER TON OF CO REDUCED	\$0	\$0
160	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$0	\$0
161	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$0	\$0
162	NET DAILY BENEFIT PER TON OF PM REDUCED	\$0	\$0
163	COST/BENEFIT		
164	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$9.99	\$9.99
165	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.75	\$0.75
166	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$33,939	\$33,941
167	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$340,514	\$340,710
168	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$611,771	\$611,114
169	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$36,094,481	\$38,500,198
170	SCENARIO #2 THE NO BUILD SCENARIO		
171	TOTAL DAILY COST	\$61,365	\$68,664
172	TOTAL DAILY BENEFIT	\$72,189	\$115,501
173	TOTAL DAILY COST/BENEFIT	(\$10,824)	(\$46,837)
174	COST		
175	NET DAILY COST PER TRIP REDUCED	\$8.49	\$5.94
176	NET DAILY COST PER VMT REDUCED	\$0.64	\$0.45
177	NET DAILY COST PER TON OF CO REDUCED	\$28,850	\$20,177
178	NET DAILY COST PER TON OF ROG REDUCED	\$289,457	\$202,548
179	NET DAILY COST PER TON OF NO _x REDUCED	\$520,041	\$363,300
180	NET DAILY COST PER TON OF PM REDUCED	\$30,682,427	\$22,887,886
181	BENEFIT		
182	NET DAILY BENEFIT PER TRIP REDUCED	\$9.99	\$9.99
183	NET DAILY BENEFIT PER VMT REDUCED	\$0.75	\$0.75
184	NET DAILY BENEFIT PER TON OF CO REDUCED	\$33,939	\$33,941
185	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$340,514	\$340,710
186	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$611,771	\$611,114
187	NET DAILY BENEFIT PER TON OF PM REDUCED	\$36,094,481	\$38,500,198

COST-EFFECTIVENESS MODEL

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188	COST/BENEFIT		
189	NET DAILY COST/BENEFIT PER TRIP REDUCED	(\$1.50)	(\$4.05)
190	NET DAILY COST/BENEFIT PER VMT REDUCED	(\$0.11)	(\$0.30)
191	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	(\$5,089)	(\$13,763)
192	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	(\$51,057)	(\$138,162)
193	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	(\$91,730)	(\$247,814)
194	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	(\$5,412,054)	(\$15,612,312)

COST-EFFECTIVENESS MODEL

LACMTA

TCM # 6 COUNTY-WIDE VANPOOL PROGRAM ASSUMPTIONS

1	Average vanpool occupancy	7.00	REG. XV
2	Average length of a vanpool trip (miles)	20	REG. XV
3	Average cost per mile to drive	\$0.48	AAA
4	Average cost per commute trip of 11.4 miles	\$5.47	CALCULATED
5	Average cost per commute trip of 20 miles	\$9.60	CALCULATED
6	Percent of VMT on freeways	50%	LARTS MODEL
7	Average subsidy per vanpooler	\$1.00	ASSUMED
8	Purchase cost of a van	\$32,000	CTS
9	Amortization period for a van (years)	5	VPSI
10	Average cost per passenger vehicle	\$16,000	AAA
11	Operation and maintenance cost per passenger van mile	\$0.70	AAA
12	Operation and maintenance per passenger car mile	\$0.48	AAA
13	Number of vans needed	1,000	MTA
14	Interest rate	8%	MARKET RATE
15	Average monthly cost of vanpooling to a passenger	\$150	CTS
16	Average cost per parking space (\$/mo)	\$100	MTA
17	Average daily vehicle miles	22.8	CALCULATED
18	Average daily fair for vanpoolers	\$8	CALCULATED
19	Amortization period for a car	5	AAA
20	Interest rate	8%	MARKET RATE
21	Construction cost of arterial (\$/lane mile)	\$900,000	CALTRANS
22	Lane miles arterial/vehicle trip	0.0018	COMSIS
23	Lane miles freeway/vehicle trip	0.0015	COMSIS
24	O&M cost of arterial (\$/LANE MILE)	\$765	CALTRANS
25	O&M cost of freeway (\$/LANE MILE)	\$2,000	CALTRANS
26	Monthly parking cost	\$100	MTA
27	Percent of parking paid by employers	90%	SCAQMD
28	Percent of parking paid by employees	10%	SCAQMD
29	Air pollution cost per mile	\$0.015	RUTHERFORD AND WELLANDER, 1986
30	Cost per vehicle-miles of delay	\$0.11	RUTHERFORD AND WELLANDER, 1986
31	Construction cost of freeway (\$/lane mile) not including right of way	\$2,500,000	SANDAG
32	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$12,000,000	CALTRANS (MIN) (IN METROPOLITAN AREA)
33	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$16,000,000	CALTRANS (MAX) (IN METROPOLITAN AREA)
34	Average construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$14,000,000	CALTRANS (AVERAGE) (IN METROPOLITAN AREA)
35	Construction cost of HOV lane (\$/lane mile)	\$2,500,000	MTC

COST-EFFECTIVENESS MODEL

LACMTA

METHODOLOGY

ANNUALIZATION FACTOR (AF) =

$AF = IR / (1 - (1 + (IR))^{-N})$ WHERE;

IR = INTEREST RATE

N = AMORTIZATION PERIOD FOR BUS/FACILITY LIFETIME

NAF = 0.25
CAF = 0.09
CAF = 0.25

PUBLIC SECTOR COST

DAILY PUBLIC CAPITAL COST (DPCC) =

$(NV) * (CV) * (NAF) / 260$ WHERE;

NV = NUMBER OF VANS PURCHASED

CV = CAPITAL COST OF A VAN

NAF = VAN ANNUALIZATION FACTOR

260 = THE NUMBER OF WORKING DAYS IN A YEAR

DAILY PUBLIC O & M COST (DPOMC) =

$(NODVM) * (NV) * (C/M)$ WHERE;

NODVM = NUMBER OF DAILY VEHICLE MILES

NV = NUMBER OF VANS

C/M = COST PER VEHICLE MILE

(DPAC) = DAILY PUBLIC ADMINISTRATIVE COST (DPAC) = 15% OF TOTAL COST

DAILY PUBLIC COST (DPC) =

$(DPCC + DPOMC)$ WHERE;

DPCC = DAILY PUBLIC CAPITAL COST

DPOMC = DAILY PUBLIC O & M COST

COST-EFFECTIVENESS MODEL

LACMTA

DAILY PUBLIC REVENUES (DPR) =

$(DPA) * (DFP)$ WHERE;

DPA = DAILY PASSENGERS ACCOMODATED

DFP = DAILY FARE PAID

DAILY PUBLIC COST/REVENUE (DPC/R) =

$(DPCOMC) - (DPR)$ WHERE;

DPCOMC = DAILY PUBLIC CAPITAL AND OPERATION AND MAINTENANCE COST

DPR = DAILY PUBLIC REVENUE

DAILY PUBLIC BENEFITS (DPB) BY AVOIDING HIGHWAY BUILDING =

$(DPCB) + (DPOMB)$ WHERE;

$DPCB = (DPTR) * (LMF/T) * (CCLMF) * (CAF)/260 * (POTOF) +$
 $+ (DPTR) * (LMA/T) * (CCLMA) * (CAF)/260 * (POTOA)$ WHERE;

DPTR = DAILY TRIPS REDUCED

LMF/T = LANE MILES OF FREEWAY PER TRIP

CCLMF = CONSTRUCTION COST OF FREEWAY LANE MILE

CAF = CONSTRUCTION ANNUALIZATION FACTOR

POTOF = PERCENT OF TRIPS ON FREEWAYS

LMA = LANE MILES OF ARTERIAL PER TRIP

CCLMA = CONSTRUCTION COST OF ATERIAL LANE MILE

POTOA = PERCENT OF PEAK TRIPS ON ARTERIAL

$DPOMB = (DTR) * (LMFA/T) * (OMCLMF)/260 * (POTOF) +$
 $+ (DTR) * (LMA/T) * (OMCLMA)/260 * (POTOA)$ WHERE;

OMCLMF = O & M COST PER LANE MILE OF FREEWAY

OMCLMA = O & M COST PER LANE MILE OF ARTERIAL

POTOF = PERCENT OF TRIPS ON FREEWAY

POTOA = PERCENT OF TRIPS ON ARTERIAL

NET PUBLIC DAILY COST/BENEFIT COUNTING THE AVOIDED COSTS (NDPC/BIAC) =

$(NDPC/R) - (DPB)$

INDIVIDUAL COST

DAILY INDIVIDUAL COST (DIC) =

$(DCPP) * (DPA) + (DIOMC)$ WHERE;

DCPP = DAILY COST PER PASSENGER

DPA = DAILY PASSENGERS ACCOMODATED

DIOMC = DAILY INDIVIDUAL MAINTENANCE AND OPERATION COST = 0

COST—EFFECTIVENESS MODEL

LACMTA

TOTAL DAILY BENEFITS (TDB) =
(DPB) + (DIB) + (DPRB) WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DVMDB = DAILY VEHICLE MILES OF DELAY BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

[(DPC) + (DIC) + (DPRC) + (DAPC) + (DVMDC)] - [(DPB) + (DIB) + (DPRB)]

COST-EFFECTIVENESS MODEL

LACMTA

LIKELY OUTCOMES

PUBLIC SECTOR COST/BENEFIT			
		STANDARD	HIGH
1	DAILY PUBLIC CAPITAL COST	\$30,825	\$30,825
2	DAILY PUBLIC O & M COST	\$36,800	\$36,800
3	DAILY PUBLIC COST	\$67,625	\$67,625
4	DAILY PUBLIC REVENUES	\$18,111	\$54,339
5	DAILY PUBLIC COST/REVENUE	\$49,515	\$13,286
6	DAILY PUBLIC AVOIDED CAPITAL COST (SCENARIO 2)	\$25,413	\$76,248
7	DAILY PUBLIC AVOIDED O & M COST (SCENARIO 2)	\$49	\$147
8	TOTAL DAILY PUBLIC AVOIDED (SCENARIO 2)	\$25,462	\$76,394
9	NET DAILY PUBLIC BENEFIT (SCENARIO 2)	\$43,572	\$130,734
10	DAILY PUBLIC CAPITAL COST (SCENARIO 1)	\$25,413	\$76,248
11	DAILY PUBLIC O & M COST (SCENARIO 1)	\$49	\$147
12	TOTAL DAILY PUBLIC COST (SCENARIO 1)	\$25,462	\$76,394
13	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 2)	\$24,053	(\$63,108)
14	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 1)	\$25,462	\$76,394
15	COST		
16	DAILY PUBLIC COST PER TRIP REDUCED	\$12.93	\$4.31
17	DAILY PUBLIC COST PER VMT REDUCED	\$0.36	\$0.12
18	DAILY PUBLIC COST PER TON OF CO REDUCED	\$25,356	\$8,450
19	DAILY PUBLIC COST PER TON OF ROG REDUCED	\$208,720	\$69,573
20	DAILY PUBLIC COST PER TON OF NO _x REDUCED	\$229,239	\$76,241
21	DAILY PUBLIC COST PER TON OF PM REDUCED	\$593,205	\$198,898
22	BENEFIT		
23	DAILY PUBLIC BENEFIT PER TRIP REDUCED	\$8.33	\$8.33
24	DAILY PUBLIC BENEFIT PER VMT REDUCED	\$0.23	\$0.23
25	DAILY PUBLIC BENEFIT PER TON OF CO REDUCED	\$16,338	\$16,336
26	DAILY PUBLIC BENEFIT PER TON OF ROG REDUCED	\$134,482	\$134,500
27	DAILY PUBLIC BENEFIT PER TON OF NO _x REDUCED	\$147,703	\$147,389
28	DAILY PUBLIC BENEFIT PER TON OF PM REDUCED	\$382,213	\$384,511
29	COST/BENEFIT		
30	NET DAILY PUBLIC COST/BENEFIT PER TRIP REDUCED	\$4.60	(\$4.02)
31	NET DAILY PUBLIC COST/BENEFIT PER VMT REDUCED	\$0.13	(\$0.11)
32	NET DAILY PUBLIC COST/BENEFIT PER TON OF CO REDUCED	\$9,019	(\$7,886)
33	NET DAILY PUBLIC COST/BENEFIT PER TON OF ROG REDUCED	\$74,238	(\$64,926)
34	NET DAILY PUBLIC COST/BENEFIT PER TON OF NO _x REDUCED	\$81,536	(\$71,148)
35	NET DAILY PUBLIC COST/BENEFIT PER TON OF PM REDUCED	\$210,992	(\$185,612)
36	INDIVIDUAL COST/BENEFIT		
37	DAILY INDIVIDUAL CAPITAL COST	\$0	\$0
38	DAILY INDIVIDUAL O & M COST	\$18,111	\$54,339
39	DAILY INDIVIDUAL COST	\$18,111	\$54,339
40	DAILY INDIVIDUAL CAPITAL BENEFIT	\$0	\$12,097
41	DAILY INDIVIDUAL O & M BENEFIT	\$19,960	\$59,880
42	DAILY INDIVIDUAL BENEFIT	\$19,960	\$71,978
43	NET DAILY INDIVIDUAL COST/BENEFIT	(\$1,849)	(\$17,638)

COST-EFFECTIVENESS MODEL

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44	COST		
45	NET DAILY INDIVIDUAL COST PER TRIP REDUCED	\$3.46	\$3.46
46	NET DAILY INDIVIDUAL COST PER VMT REDUCED	\$0.10	\$0.10
47	NET DAILY INDIVIDUAL COST PER TON OF CO REDUCED	\$6,791	\$6,790
48	NET DAILY INDIVIDUAL COST PER TON OF ROG REDUCED	\$55,897	\$55,905
49	NET DAILY INDIVIDUAL COST PER TON OF NOx REDUCED	\$61,392	\$61,262
50	NET DAILY INDIVIDUAL COST PER TON OF PM REDUCED	\$158,866	\$159,821
51	BENEFIT		
52	NET DAILY INDIVIDUAL BENEFIT PER TRIP REDUCED	\$3.81	\$4.59
53	NET DAILY INDIVIDUAL BENEFIT PER VMT REDUCED	\$0.11	\$0.13
54	NET DAILY INDIVIDUAL BENEFIT PER TON OF CO REDUCED	\$7,484	\$8,994
55	NET DAILY INDIVIDUAL BENEFIT PER TON OF ROG REDUCED	\$61,605	\$74,051
56	NET DAILY INDIVIDUAL BENEFIT PER TON OF NOx REDUCED	\$67,661	\$81,147
57	NET DAILY INDIVIDUAL BENEFIT PER TON OF PM REDUCED	\$175,087	\$211,699
58	COST/BENEFIT		
59	NET DAILY INDIVIDUAL COST/BENEFIT PER TRIP REDUCED	(\$0.35)	(\$1.12)
60	NET DAILY INDIVIDUAL COST/BENEFIT PER VMT REDUCED	(\$0.01)	(\$0.03)
61	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF CO REDUCED	(\$693)	(\$2,204)
62	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF ROG REDUCED	(\$5,707)	(\$18,147)
63	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF NOx REDUCED	(\$6,268)	(\$19,886)
64	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF PM REDUCED	(\$16,220)	(\$51,878)
65	PRIVATE SECTOR COST/BENEFIT		
66	DAILY PRIVATE CAPITAL COST	\$0	\$0
67	DAILY PRIVATE O & M COST	\$0	\$0
68	DAILY PRIVATE COST	\$0	\$0
69	DAILY PRIVATE CAPITAL BENEFIT	\$0	\$0
70	DAILY PRIVATE O & M BENEFIT	\$10,866	\$32,604
71	DAILY PRIVATE BENEFIT	\$10,866	\$32,604
72	NET DAILY PRIVATE COST/BENEFIT	(\$10,866)	(\$32,604)
73	COST		
74	NET DAILY PRIVATE COST PER TRIP REDUCED	\$0.00	\$0.00
75	NET DAILY PRIVATE COST PER VMT REDUCED	\$0.00	\$0.00
76	NET DAILY PRIVATE COST PER TON OF CO REDUCED	\$0.00	\$0.00
77	NET DAILY PRIVATE COST PER TON OF ROG REDUCED	\$0.00	\$0.00
78	NET DAILY PRIVATE COST PER TON OF NOx REDUCED	\$0.00	\$0.00
79	NET DAILY PRIVATE COST PER TON OF PM REDUCED	\$0.00	\$0.00
80	BENEFIT		
81	NET DAILY PRIVATE BENEFIT PER TRIP REDUCED	\$2.08	\$2.08
82	NET DAILY PRIVATE BENEFIT PER VMT REDUCED	\$0.06	\$0.06
83	NET DAILY PRIVATE BENEFIT PER TON OF CO REDUCED	\$4,074	\$4,074
84	NET DAILY PRIVATE BENEFIT PER TON OF ROG REDUCED	\$33,538	\$33,543
85	NET DAILY PRIVATE BENEFIT PER TON OF NOx REDUCED	\$36,835	\$36,757
86	NET DAILY PRIVATE BENEFIT PER TON OF PM REDUCED	\$95,320	\$95,893
87	COST/BENEFIT		
88	NET DAILY PRIVATE COST/BENEFIT PER TRIP REDUCED	(\$2.08)	(\$2.08)
89	NET DAILY PRIVATE COST/BENEFIT PER VMT REDUCED	(\$0.06)	(\$0.06)
90	NET DAILY PRIVATE COST/BENEFIT PER TON OF CO REDUCED	(\$4,074)	(\$4,074)
91	NET DAILY PRIVATE COST/BENEFIT PER TON OF ROG REDUCED	(\$33,538)	(\$33,543)
92	NET DAILY PRIVATE COST/BENEFIT PER TON OF NOx REDUCED	(\$36,835)	(\$36,757)
93	NET DAILY PRIVATE COST/BENEFIT PER TON OF PM REDUCED	(\$95,320)	(\$95,893)

COST-EFFECTIVENESS MODEL

LACMTA

94	SOCIETAL COST/BENEFIT		
95	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
96	DAILY SOCIETAL AIR POLLUTION COST	\$2,784	\$8,352
97	DAILY SOCIETAL CONGESTION COST	\$0	\$0
98	DAILY SOCIETAL COST	\$2,784	\$8,352
99	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
100	DAILY SOCIETAL CONGESTION BENEFIT	\$5,577	\$16,731
101	DAILY SOCIETAL BENEFIT	\$5,577	\$16,731
102	NET DAILY SOCIETAL COST/BENEFIT	(\$2,793)	(\$8,379)
103	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
104	DAILY SOCIETAL AIR POLLUTION COST	\$2,784	\$8,352
105	DAILY SOCIETAL CONGESTION COST	\$5,577	\$16,731
106	DAILY SOCIETAL COST	\$8,361	\$25,082
107	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
108	DAILY SOCIETAL CONGESTION BENEFIT	\$0	\$0
109	DAILY SOCIETAL BENEFIT	\$0	\$0
110	NET DAILY SOCIETAL COST/BENEFIT	\$8,361	\$25,082
111	SCENARIO #2 THE NO BUILD SCENARIO		
112	DAILY SOCIETAL AIR POLLUTION COST	\$0	\$0
113	DAILY SOCIETAL CONGESTION COST	\$0	\$0
114	DAILY SOCIETAL COST	\$0	\$0
115	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$2,784	\$0
116	DAILY SOCIETAL CONGESTION BENEFIT	\$5,577	\$16,731
117	DAILY SOCIETAL BENEFIT	\$8,361	\$16,731
118	NET DAILY SOCIETAL COST/BENEFIT	(\$8,361)	(\$16,731)
119	TOTAL COST/BENEFIT		
120	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
121	TOTAL DAILY COST	\$59,072	\$189,327
122	TOTAL DAILY BENEFIT	\$5,577	\$16,731
123	TOTAL DAILY COST/BENEFIT	\$53,495	\$172,597
124	COST		
125	NET DAILY COST PER TRIP REDUCED	\$11.29	\$12.06
126	NET DAILY COST PER VMT REDUCED	\$0.32	\$0.34
127	NET DAILY COST PER TON OF CO REDUCED	\$22,149	\$23,657
128	NET DAILY COST PER TON OF ROG REDUCED	\$182,321	\$194,781
129	NET DAILY COST PER TON OF NOx REDUCED	\$200,244	\$213,447
130	NET DAILY COST PER TON OF PM REDUCED	\$518,174	\$556,845
131	BENEFIT		
132	NET DAILY BENEFIT PER TRIP REDUCED	\$1.07	\$1.07
133	NET DAILY BENEFIT PER VMT REDUCED	\$0.03	\$0.03
134	NET DAILY BENEFIT PER TON OF CO REDUCED	\$2,091	\$2,091
135	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$17,213	\$17,213
136	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$18,905	\$18,862
137	NET DAILY BENEFIT PER TON OF PM REDUCED	\$48,920	\$49,208
138	COST/BENEFIT		
139	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$10.22	\$10.99
140	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.29	\$0.31
141	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$20,058	\$21,567
142	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$165,108	\$177,569
143	NET DAILY COST/BENEFIT PER TON OF NOx REDUCED	\$181,339	\$194,585
144	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$469,254	\$507,638

COST-EFFECTIVENESS MODEL

LACMTA

145	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
146	TOTAL DAILY COST	\$64,649	\$206,058
147	TOTAL DAILY BENEFIT	\$0	\$0
148	TOTAL DAILY COST/BENEFIT	\$64,649	\$206,058
149	COST		
150	NET DAILY COST PER TRIP REDUCED	\$12.36	\$13.13
151	NET DAILY COST PER VMT REDUCED	\$0.35	\$0.37
152	NET DAILY COST PER TON OF CO REDUCED	\$24,240	\$25,748
153	NET DAILY COST PER TON OF ROG REDUCED	\$199,533	\$211,994
154	NET DAILY COST PER TON OF NOx REDUCED	\$219,148	\$232,309
155	NET DAILY COST PER TON OF PM REDUCED	\$567,094	\$606,053
156	BENEFIT		
157	NET DAILY BENEFIT PER TRIP REDUCED	\$0.00	\$0.00
158	NET DAILY BENEFIT PER VMT REDUCED	\$0.00	\$0.00
159	NET DAILY BENEFIT PER TON OF CO REDUCED	\$0	\$0
160	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$0	\$0
161	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$0	\$0
162	NET DAILY BENEFIT PER TON OF PM REDUCED	\$0	\$0
163	COST/BENEFIT		
164	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$12.36	\$13.13
165	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.35	\$0.37
166	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$24,240	\$25,748
167	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$199,533	\$211,994
168	NET DAILY COST/BENEFIT PER TON OF NOx REDUCED	\$219,148	\$232,309
169	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$567,094	\$606,053
170	SCENARIO #2 THE NO BUILD SCENARIO		
171	TOTAL DAILY COST	\$85,736	\$121,965
172	TOTAL DAILY BENEFIT	\$82,760	\$260,397
173	TOTAL DAILY COST/BENEFIT	\$2,977	(\$138,433)
174	COST		
175	NET DAILY COST PER TRIP REDUCED	\$16.39	\$7.77
176	NET DAILY COST PER VMT REDUCED	\$0.46	\$0.22
177	NET DAILY COST PER TON OF CO REDUCED	\$32,147	\$15,240
178	NET DAILY COST PER TON OF ROG REDUCED	\$264,618	\$125,478
179	NET DAILY COST PER TON OF NOx REDUCED	\$290,631	\$137,502
180	NET DAILY COST PER TON OF PM REDUCED	\$752,072	\$358,720
181	BENEFIT		
182	NET DAILY BENEFIT PER TRIP REDUCED	\$15.82	\$16.59
183	NET DAILY BENEFIT PER VMT REDUCED	\$0.45	\$0.47
184	NET DAILY BENEFIT PER TON OF CO REDUCED	\$31,031	\$32,537
185	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$255,431	\$267,899
186	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$280,541	\$293,571
187	NET DAILY BENEFIT PER TON OF PM REDUCED	\$725,961	\$765,875
188	COST/BENEFIT		
189	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$0.57	(\$8.82)
190	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.02	(\$0.25)
191	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$1,116	(\$17,298)
192	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$9,187	(\$142,421)
193	NET DAILY COST/BENEFIT PER TON OF NOx REDUCED	\$10,090	(\$156,068)
194	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$26,111	(\$407,155)

COST – EFFECTIVENESS MODEL

LACMTA

TCM # 7 INFORMAL RIDESHARING PROGRAM – – CARPOOL AND VANPOOL ONLY ASSUMPTIONS

1	Amortization period for construction projects	30	MTA
2	Amortization period for equipment purchase	12	MTA
3	O&M cost of vehicle	\$0.48	AAA
4	Construction cost of arterial (\$/lane mile)	\$900,000	CALTRANS
5	Construction annualization factor (CAF)	0.09	CALCULATED
6	Bus annualization factor (BAF)	0.13	CALCULATED
7	car annualization factor	0.25	CALCULATED
8	Interest rate	8%	MARKET RATE
9	Lane miles arterial/vehicle trip	0.0018	COMSIS
10	Lane miles freeway/vehicle trip	0.0015	COMSIS
11	O&M cost of arterial (\$/LANE MILE)	\$765	CALTRANS
12	O&M cost of freeway (\$/LANE MILE)	\$2,000	CALTRANS
13	Monthly parking cost for SOV	\$100	MTA
14	Monthly parking cost for ridesharing employee	\$40	CALCULATED
15	Monthly parking saving per ridesharing employee	\$60	CALCULATED
16	Percent of parking paid by private employers	90%	SCAQMD
17	Percent of parking paid by employees	10%	SCAQMD
18	Air pollution cost per mile	\$0.015	RUTHERFORD AND WELLANDER, 1986
19	Cost per vehicle – miles of delay	\$0.11	RUTHERFORD AND WELLANDER, 1986
20	Construction cost of freeway (\$/lane mile) not including right of way	\$2,500,000	SANDAG
21	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$12,000,000	CALTRANS (MIN) (IN METROPOLITAN AREA)
22	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$16,000,000	CALTRANS (MAX) (IN METROPOLITAN AREA)
23	Average construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$14,000,000	CALTRANS (AVERAGE) (IN METROPOLITAN AREA)
24	Construction cost of HOV lane (\$/lane mile)	\$2,500,000	MTC
25	Average cost of a passenger vehicle	\$16,000	AAA
26	Average vanpool occupancy	7.00	REG. XV
27	Average length of a vanpool trip	20	REG. XV
28	Average cost per commute trip of 11.4 miles	\$5.47	CALCULATED
29	Average cost per rideshare trip	\$2.19	CALCULATED
30	Average saving per ridashare trip	\$3.28	CALCULATED
31	Average monthly cost of a vanpool trip per passenger per month	\$150	CTS
32	Car annualization factor	0.25	CALCULATED
33	Construction annualization factor	0.09	CALCULATED
34	Annual cost for ridematching employee	\$5	CTS
35	Annual public start-up capital cost per employee	\$3.60	MTA
36	Annual start-up operation and maintenance cost per employee	\$37.60	MTA
37	Number of employees to be served	922,543	MTA

COST-EFFECTIVENESS MODEL

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METHODOLOGY

PUBLIC SECTOR COST

DAILY PUBLIC CAPITAL COST- START-UP COST (DPCC) =

$(NEA) + (ACPE)/260 + (DPAC)$ WHERE;

NEA = NUMBER OF EMPLOYEES AFFECTED

ACPE = ANNUAL COST PER EMPLOYEE

DPA = DAILY PUBLIC ADMINISTRATIVE COST

DAILY PUBLIC OPERATION AND MAINTENANCE COST =

DPMAEC WHERE;

DPMAEC = DAILY PUBLIC MONITORING AND ENFORCEMENT COST

DAILY PUBLIC COST =

$(DPCC + DPOMC)$ WHERE;

DPCC = DAILY PUBLIC CAPITAL COST

DPOMC = DAILY PUBLIC O & M COST

DAILY PUBLIC REVENUES (DPR) = 0

DAILY PUBLIC COST/REVENUE (DPC/R) =

$(DPCOMC) - (DPR)$ WHERE;

DPCOMC = DAILY PUBLIC CAPITAL AND OPERATION AND MAINTENANCE COST

DPR = DAILY PUBLIC REVENUE

DAILY PUBLIC BENEFITS (DPB) BY AVOIDING HIGHWAY BUILDING =

$(DPCB) + (DPOMB)$ WHERE;

$DPCB = (DPTR) * (LMF/T) * (CCLMF) * (CAF)/260 * (POTOF) +$

$+ (DPTR) * (LMA/T) * (CCLMA) * (CAF)/260 * (POTOA)$ WHERE;

DPTR = DAILY TRIPS REDUCED

LMF/T = LANE MILES OF FREEWAY PER TRIP

CCLMF = CONSTRUCTION COST OF FREEWAY LANE MILE

CAF = CONSTRUCTION ANNUALIZATION FACTOR

POTOF = PERCENT OF TRIPS ON FREEWAYS

LMA = LANE MILES OF ARTERIAL PER TRIP

CCLMA = CONSTRUCTION COST OF ARTERIAL LANE MILE

POTOA = PERCENT OF PEAK TRIPS ON ARTERIAL

COST-EFFECTIVENESS MODEL

LACMTA

$$\text{DPOMB} = (\text{DTR}) * (\text{LMFA/T}) * (\text{OMCLMF})/260 * (\text{POTOF}) + \\ + (\text{DTR}) * (\text{LMA/T}) * (\text{OMCLMA})/260 * (\text{POTOA}) \text{ WHERE;}$$

OMCLMF = O & M COST PER LANE MILE OF FREEWAY

OMCLMA = O & M COST PER LANE MILE OF ARTERIAL

POTOF = PERCENT OF TRIPS ON FREEWAY

POTOA = PERCENT OF TRIPS ON ARTERIAL

$$\text{NET PUBLIC DAILY COST/BENEFIT COUNTING THE AVOIDED COSTS (NDPC/BIAC)} = \\ (\text{NDPC/R}) - (\text{DPB})$$

INDIVIDUAL COST

$$\text{DAILY INDIVIDUAL CAPITAL COST (DICC)} = 0$$

$$\text{DAILY INDIVIDUAL OPERATION AND MAINTENANCE COST (DIOMC)} = \\ (\text{DVMTR}) * (\text{DOMCPM}) * .2105 + (\text{DPCPRE}) * (\text{DVTR}/2) * .10 \text{ WHERE;}$$

DVTR = DAILY VEHICLE TRIPS REDUCED

DOMCPM = DAILY OPERATION AND MAINTENANCE COST PER MILE

DPC = DAILY PARKING COST

DVMTR = DAILY VEHICLE MILES TRAVELED REDUCED

$$\text{DAILY INDIVIDUAL BENEFIT (DIB)} =$$

$$(\text{DICB}) + (\text{DIOMB}) \text{ WHERE;}$$

DICB = DAILY INDIVIDUAL CAPITAL BENEFIT (CAR COST)

DIOMB = DAILY INDIVIDUAL O & M COST SAVING (CAR O & M)

$$\text{DIOMB} =$$

$$(\text{DOMBPM}) * (\text{DVTR}) +$$

$$+ (.10 * \text{DIPS} * \text{DVTR}/2) \text{ WHERE;}$$

DOMBPM = DAILY OPERATION AND MAINTENANCE BENEFIT PER MILE

DVTR = DAILY VEHICLE TRIPS REDUCED

.21 IS THE PERCENT OF O & M COST ATTRIBUTED TO SAVINGS

DIPB = DAILY INDIVIDUAL PARKING COST SAVING

DVMTR = DAILY VEHICLE MILES TRAVELED REDUCED

$$\text{NET DAILY INDIVIDUAL COST/BENEFIT (NDIC/B)} =$$

$$(\text{DIC}) - (\text{DIB}) \text{ WHERE;}$$

DIC = DAILY INDIVIDUAL COST

DIB = DAILY INDIVIDUAL BENEFITS

COST-EFFECTIVENESS MODEL

LACMTA

PRIVATE SECTOR COST/BENEFIT

DAILY PRIVATE CAPITAL COST (DPRCC) = 0

DAILY PRIVATE O & M COST (DPROMC) =

(NEP)*(CPE) WHERE;

NEP = NUMBER OF EMPLOYEES PARTICIPATING

CPE = COST PER EMPLOYEE

DAILY PRIVATE CAPITAL BENEFIT (DPRCB) = 0

DAILY PRIVATE O & M BENEFIT (DPROMB) =

(DVTR)/2 * (MPC)*12/260 * .90 WHERE;

DVTR = DAILY VEHICLE TRIPS REDUCED

MPC = MONTHLY PARKING COST

.90 = PERCENT OF PARKING PROVIDED BY PRIVATE SECTOR

NET DAILY PRIVATE COST/BENEFIT (NDPC/B) =

(DPRC) - (DPRB)

SOCIETAL COST

DAPC = DAILY AIR POLLUTION COST/BENEFIT

DAPC = DVMTR * (APC/M) WHERE;

DVMTR = DAILY VMT REDUCED

APC/M = AIR POLLUTION COST PER MILE

DVMDCB = DAILY VEHICLE MILES OF DELAY COST/BENEFIT

DVMDC = (DVMDS) * (C/VMD) WHERE;

DVMDS = (VMT/NEW SPEED) - (VMT/EXISTING SPEED) * (AVERAGE SPEED)

DVMDS = DAILY VEHICLE MILES OF DELAY SAVED

C/VMD = DAILY COST PER VEHICLE MILES OF DELAY SAVED

DSCB = DAILY SOCIETAL COST/BENEFIT

DSCB = (DAPC) + (DVMDCB)

COST-EFFECTIVENESS MODEL

LACMTA

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 1 THE BUILD SCENARIO

TOTAL DAILY COST (TDC) =

(DPC) + (DIC) + (DPRC) + (DSC) WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DSC = DAILY SOCIETAL COST

TOTAL DAILY BENEFITS (TDB) =

(DPB) + (DIB) + (DPRB) + DSB WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DSB = DAILY SOCIETAL BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

[(DPC) + (DIC) + (DPRC) + (DSC)] - [(DPB) + (DIB) + (DPRB) + (DSB)]

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 2 THE NO BUILD SCENARIO

TOTAL DAILY COST (TDC) =

(DPC) + (DIC) + (DPRC) + (DSC) WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DSC = DAILY SOCIETAL COST

TOTAL DAILY BENEFITS (TDB) =

(DPB) + (DIB) + (DPRB) + (DSB) WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DSB = DAILY SOCIETAL BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

[(DPC) + (DIC) + (DPRC) + (DSC)] - [(DPB) + (DIB) + (DPRB) + (DSB)]

COST – EFFECTIVENESS MODEL

LACMTA

LIKELY OUTCOMES

PUBLIC SECTOR COST/BENEFIT			
		STANDARD	HIGH
1	DAILY PUBLIC CAPITAL COST	\$163,929	\$163,929
2	DAILY PUBLIC O & M COST	\$16,393	\$16,393
3	DAILY PUBLIC COST	\$180,322	\$180,322
4	DAILY PUBLIC REVENUES	\$0	\$0
5	DAILY PUBLIC COST/REVENUE	\$180,322	\$180,322
6	DAILY PUBLIC AVOIDED CAPITAL COST (SCENARIO 2)	\$68,046	\$136,098
7	DAILY PUBLIC AVOIDED O & M COST (SCENARIO 2)	\$129	\$259
8	TOTAL DAILY PUBLIC AVOIDED (SCENARIO 2)	\$68,176	\$136,356
9	NET DAILY PUBLIC BENEFIT (SCENARIO 2)	\$68,176	\$136,356
10	DAILY PUBLIC CAPITAL COST (SCENARIO 1)	\$68,046	\$136,098
11	DAILY PUBLIC O & M COST (SCENARIO 1)	\$129	\$259
12	TOTAL DAILY PUBLIC COST (SCENARIO 1)	\$68,176	\$136,356
13	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 2)	\$112,146	\$43,965
14	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 1)	\$68,176	\$136,356
15	COST		
16	DAILY PUBLIC COST PER TRIP REDUCED	\$13.04	\$6.52
17	DAILY PUBLIC COST PER VMT REDUCED	\$1.01	\$0.51
18	DAILY PUBLIC COST PER TON OF CO REDUCED	\$44,890	\$22,445
19	DAILY PUBLIC COST PER TON OF ROG REDUCED	\$454,211	\$226,535
20	DAILY PUBLIC COST PER TON OF NOx REDUCED	\$815,935	\$408,893
21	DAILY PUBLIC COST PER TON OF PM REDUCED	\$60,107,225	\$22,540,209
22	BENEFIT		
23	DAILY PUBLIC BENEFIT PER TRIP REDUCED	\$4.93	\$4.93
24	DAILY PUBLIC BENEFIT PER VMT REDUCED	\$0.38	\$0.38
25	DAILY PUBLIC BENEFIT PER TON OF CO REDUCED	\$16,972	\$16,972
26	DAILY PUBLIC BENEFIT PER TON OF ROG REDUCED	\$171,727	\$171,302
27	DAILY PUBLIC BENEFIT PER TON OF NOx REDUCED	\$308,487	\$309,198
28	DAILY PUBLIC BENEFIT PER TON OF PM REDUCED	\$22,725,241	\$17,044,547
29	COST/BENEFIT		
30	NET DAILY PUBLIC COST/BENEFIT PER TRIP REDUCED	\$8.11	\$1.59
31	NET DAILY PUBLIC COST/BENEFIT PER VMT REDUCED	\$0.63	\$0.12
32	NET DAILY PUBLIC COST/BENEFIT PER TON OF CO REDUCED	\$27,918	\$5,472
33	NET DAILY PUBLIC COST/BENEFIT PER TON OF ROG REDUCED	\$282,484	\$55,233
34	NET DAILY PUBLIC COST/BENEFIT PER TON OF NOx REDUCED	\$507,448	\$99,695
35	NET DAILY PUBLIC COST/BENEFIT PER TON OF PM REDUCED	\$37,381,984	\$5,495,662
36	INDIVIDUAL COST/BENEFIT		
37	DAILY INDIVIDUAL CAPITAL COST	\$0	\$0
38	DAILY INDIVIDUAL O & M COST	\$21,197	\$42,395
39	DAILY INDIVIDUAL COST	\$21,197	\$42,395
40	DAILY INDIVIDUAL CAPITAL BENEFIT	\$0	\$0
41	DAILY INDIVIDUAL O & M BENEFIT	\$12,718	\$25,437
42	DAILY INDIVIDUAL BENEFIT	\$12,718	\$25,437
43	NET DAILY INDIVIDUAL COST/BENEFIT	\$8,479	\$16,958

COST-EFFECTIVENESS MODEL

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44	COST		
45	NET DAILY INDIVIDUAL COST PER TRIP REDUCED	\$1.53	\$1.53
46	NET DAILY INDIVIDUAL COST PER VMT REDUCED	\$0.12	\$0.12
47	NET DAILY INDIVIDUAL COST PER TON OF CO REDUCED	\$5,277	\$5,277
48	NET DAILY INDIVIDUAL COST PER TON OF ROG REDUCED	\$53,394	\$53,260
49	NET DAILY INDIVIDUAL COST PER TON OF NO _x REDUCED	\$95,916	\$96,134
50	NET DAILY INDIVIDUAL COST PER TON OF PM REDUCED	\$7,065,829	\$5,299,401
51	BENEFIT		
52	NET DAILY INDIVIDUAL BENEFIT PER TRIP REDUCED	\$0.92	\$0.92
53	NET DAILY INDIVIDUAL BENEFIT PER VMT REDUCED	\$0.07	\$0.07
54	NET DAILY INDIVIDUAL BENEFIT PER TON OF CO REDUCED	\$3,166	\$3,166
55	NET DAILY INDIVIDUAL BENEFIT PER TON OF ROG REDUCED	\$32,037	\$31,956
56	NET DAILY INDIVIDUAL BENEFIT PER TON OF NO _x REDUCED	\$57,550	\$57,681
57	NET DAILY INDIVIDUAL BENEFIT PER TON OF PM REDUCED	\$4,239,498	\$3,179,640
58	COST/BENEFIT		
59	NET DAILY INDIVIDUAL COST/BENEFIT PER TRIP REDUCED	\$0.61	\$0.61
60	NET DAILY INDIVIDUAL COST/BENEFIT PER VMT REDUCED	\$0.05	\$0.05
61	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF CO REDUCED	\$2,111	\$2,111
62	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF ROG REDUCED	\$21,358	\$21,304
63	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF NO _x REDUCED	\$38,366	\$38,454
64	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF PM REDUCED	\$2,826,332	\$2,119,760
65	PRIVATE SECTOR COST/BENEFIT		
66	DAILY PRIVATE CAPITAL COST	\$0	\$0
67	DAILY PRIVATE O & M COST	\$17,741	\$20,769
68	DAILY PRIVATE COST	\$17,741	\$20,769
69	DAILY PRIVATE CAPITAL BENEFIT	\$0	\$0
70	DAILY PRIVATE O & M BENEFIT	\$28,718	\$57,437
71	DAILY PRIVATE BENEFIT	\$28,718	\$57,437
72	NET DAILY PRIVATE COST/BENEFIT	(\$10,976)	(\$36,668)
73	COST		
74	NET DAILY PRIVATE COST PER TRIP REDUCED	\$1.28	\$0.75
75	NET DAILY PRIVATE COST PER VMT REDUCED	\$0.10	\$0.06
76	NET DAILY PRIVATE COST PER TON OF CO REDUCED	\$4,417	\$2,585
77	NET DAILY PRIVATE COST PER TON OF ROG REDUCED	\$44,688	\$26,092
78	NET DAILY PRIVATE COST PER TON OF NO _x REDUCED	\$80,277	\$47,096
79	NET DAILY PRIVATE COST PER TON OF PM REDUCED	\$5,913,737	\$2,596,154
80	BENEFIT		
81	NET DAILY PRIVATE BENEFIT PER TRIP REDUCED	\$2.08	\$2.08
82	NET DAILY PRIVATE BENEFIT PER VMT REDUCED	\$0.16	\$0.16
83	NET DAILY PRIVATE BENEFIT PER TON OF CO REDUCED	\$7,149	\$7,149
84	NET DAILY PRIVATE BENEFIT PER TON OF ROG REDUCED	\$72,337	\$72,157
85	NET DAILY PRIVATE BENEFIT PER TON OF NO _x REDUCED	\$129,944	\$130,243
86	NET DAILY PRIVATE BENEFIT PER TON OF PM REDUCED	\$9,572,538	\$7,179,663
87	COST/BENEFIT		
88	NET DAILY PRIVATE COST/BENEFIT PER TRIP REDUCED	(\$0.79)	(\$1.33)
89	NET DAILY PRIVATE COST/BENEFIT PER VMT REDUCED	(\$0.06)	(\$0.10)
90	NET DAILY PRIVATE COST/BENEFIT PER TON OF CO REDUCED	(\$2,732)	(\$4,564)
91	NET DAILY PRIVATE COST/BENEFIT PER TON OF ROG REDUCED	(\$27,648)	(\$46,065)
92	NET DAILY PRIVATE COST/BENEFIT PER TON OF NO _x REDUCED	(\$49,667)	(\$83,148)
93	NET DAILY PRIVATE COST/BENEFIT PER TON OF PM REDUCED	(\$3,658,801)	(\$4,583,510)

COST-EFFECTIVENESS MODEL

LACMTA

94	SOCIETAL COST/BENEFIT		
95	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
96	DAILY SOCIETAL AIR POLLUTION COST	\$2,673	\$5,346
97	DAILY SOCIETAL CONGESTION COST	\$0	\$0
98	DAILY SOCIETAL COST	\$2,673	\$5,346
99	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
100	DAILY SOCIETAL CONGESTION BENEFIT	\$5,355	\$10,710
101	DAILY SOCIETAL BENEFIT	\$5,355	\$10,710
102	NET DAILY SOCIETAL COST/BENEFIT	(\$2,682)	(\$5,364)
103	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
104	DAILY SOCIETAL AIR POLLUTION COST	\$2,673	\$5,346
105	DAILY SOCIETAL CONGESTION COST	\$5,355	\$10,710
106	DAILY SOCIETAL COST	\$8,028	\$16,057
107	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
108	DAILY SOCIETAL CONGESTION BENEFIT	\$0	\$0
109	DAILY SOCIETAL BENEFIT	\$0	\$0
110	NET DAILY SOCIETAL COST/BENEFIT	\$8,028	\$16,057
111	SCENARIO #2 THE NO BUILD SCENARIO		
112	DAILY SOCIETAL AIR POLLUTION COST	\$0	\$0
113	DAILY SOCIETAL CONGESTION COST	\$0	\$0
114	DAILY SOCIETAL COST	\$0	\$0
115	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$2,673	\$5,346
116	DAILY SOCIETAL CONGESTION BENEFIT	\$5,355	\$10,710
117	DAILY SOCIETAL BENEFIT	\$8,028	\$16,057
118	NET DAILY SOCIETAL COST/BENEFIT	(\$8,028)	(\$16,057)
119	TOTAL COST/BENEFIT		
120	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
121	TOTAL DAILY COST	\$112,285	\$224,577
122	TOTAL DAILY BENEFIT	\$5,355	\$10,710
123	TOTAL DAILY COST/BENEFIT	\$106,930	\$213,867
124	COST		
125	NET DAILY COST PER TRIP REDUCED	\$8.12	\$8.12
126	NET DAILY COST PER VMT REDUCED	\$0.63	\$0.63
127	NET DAILY COST PER TON OF CO REDUCED	\$27,952	\$27,953
128	NET DAILY COST PER TON OF ROG REDUCED	\$282,834	\$282,132
129	NET DAILY COST PER TON OF NOx REDUCED	\$508,077	\$509,245
130	NET DAILY COST PER TON OF PM REDUCED	\$37,428,342	\$28,072,150
131	BENEFIT		
132	NET DAILY BENEFIT PER TRIP REDUCED	\$0.39	\$0.39
133	NET DAILY BENEFIT PER VMT REDUCED	\$0.03	\$0.03
134	NET DAILY BENEFIT PER TON OF CO REDUCED	\$1,333	\$1,333
135	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$13,489	\$13,455
136	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$24,231	\$24,286
137	NET DAILY BENEFIT PER TON OF PM REDUCED	\$1,785,022	\$1,338,766

COST-EFFECTIVENESS MODEL

LACMTA

138	COST/BENEFIT		
139	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$7.73	\$7.73
140	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.60	\$0.60
141	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$26,619	\$26,620
142	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$269,345	\$268,677
143	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$483,846	\$484,959
144	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$35,643,320	\$26,733,383
145	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
146	TOTAL DAILY COST	\$117,640	\$235,287
147	TOTAL DAILY BENEFIT	\$0	\$0
148	TOTAL DAILY COST/BENEFIT	\$117,640	\$235,287
149	COST		
150	NET DAILY COST PER TRIP REDUCED	\$8.51	\$8.51
151	NET DAILY COST PER VMT REDUCED	\$0.66	\$0.66
152	NET DAILY COST PER TON OF CO REDUCED	\$29,286	\$29,286
153	NET DAILY COST PER TON OF ROG REDUCED	\$296,323	\$295,587
154	NET DAILY COST PER TON OF NO _x REDUCED	\$532,308	\$533,531
155	NET DAILY COST PER TON OF PM REDUCED	\$39,213,364	\$29,410,916
156	BENEFIT		
157	NET DAILY BENEFIT PER TRIP REDUCED	\$0.00	\$0.00
158	NET DAILY BENEFIT PER VMT REDUCED	\$0.00	\$0.00
159	NET DAILY BENEFIT PER TON OF CO REDUCED	\$0	\$0
160	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$0	\$0
161	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$0	\$0
162	NET DAILY BENEFIT PER TON OF PM REDUCED	\$0	\$0
163	COST/BENEFIT		
164	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$8.51	\$8.51
165	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.66	\$0.66
166	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$29,286	\$29,286
167	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$296,323	\$295,587
168	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$532,308	\$533,531
169	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$39,213,364	\$29,410,916
170	SCENARIO #2 THE NO BUILD SCENARIO		
171	TOTAL DAILY COST	\$219,260	\$243,486
172	TOTAL DAILY BENEFIT	\$117,640	\$235,287
173	TOTAL DAILY COST/BENEFIT	\$101,620	\$8,199
174	COST		
175	NET DAILY COST PER TRIP REDUCED	\$15.86	\$8.80
176	NET DAILY COST PER VMT REDUCED	\$1.23	\$0.68
177	NET DAILY COST PER TON OF CO REDUCED	\$54,583	\$30,307
178	NET DAILY COST PER TON OF ROG REDUCED	\$552,293	\$305,887
179	NET DAILY COST PER TON OF NO _x REDUCED	\$992,128	\$552,123
180	NET DAILY COST PER TON OF PM REDUCED	\$73,086,791	\$30,435,764
181	BENEFIT		
182	NET DAILY BENEFIT PER TRIP REDUCED	\$8.51	\$8.51
183	NET DAILY BENEFIT PER VMT REDUCED	\$0.66	\$0.66
184	NET DAILY BENEFIT PER TON OF CO REDUCED	\$29,286	\$29,286
185	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$296,323	\$295,587
186	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$532,308	\$533,531
187	NET DAILY BENEFIT PER TON OF PM REDUCED	\$39,213,364	\$29,410,916

COST-EFFECTIVENESS MODEL

LACMTA

188	COST/BENEFIT		
189	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$7.35	\$0.30
190	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.57	\$0.02
191	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$25,298	\$1,021
192	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$255,970	\$10,300
193	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$459,820	\$18,591
194	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$33,873,427	\$1,024,848

COST-EFFECTIVENESS MODEL

LACMTA

TCM # 8 RIDESHARING PASSENGER LOADING AREA

ASSUMPTIONS

1	Amortization period for construction projects	30	MTA
2	Amortization period for equipment purchase	12	MTA
3	O&M cost of vehicle	\$0.48	AAA
4	Construction cost of arterial (\$/lane mile)	\$900,000	CALTRANS
5	Construction annualization factor (CAF)	0.09	CALCULATED
6	Bus annualization factor (BAF)	0.13	CALCULATED
7	car annualization factor	0.25	CALCULATED
8	percent of VMT on freeways	50%	LARTS MODEL
9	Interest rate	8%	MARKET RATE
10	Lane miles arterial/vehicle trip	0.0018	COMSIS
11	Lane miles freeway/vehicle trip	0.0015	COMSIS
12	O&M cost of arterial (\$/LANE MILE)	\$765	CALTRANS
13	O&M cost of freeway (\$/LANE MILE)	\$2,000	CALTRANS
14	Monthly parking cost for sov	\$100	MTA
15	Monthly parking cost per ridesharing employee	\$40	CALCULATED
16	Monthly saving per ridesharing employee	\$60	CALCULATED
17	Percent of parking paid by private sector	90%	SCAQMD
18	Percent of parking paid by employees	10%	SCAQMD
19	Air pollution cost per mile	\$0.015	RUTHERFORD AND WELLANDER, 1986
20	Cost per vehicle—miles of delay	\$0.11	RUTHERFORD AND WELLANDER, 1986
21	Construction cost of freeway (\$/lane mile) not including right of way	\$2,500,000	SANDAG
22	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$12,000,000	CALTRANS (MIN) (IN METROPOLITAN AREA)
23	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$16,000,000	CALTRANS (MAX) (IN METROPOLITAN AREA)
24	Average construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$14,000,000	CALTRANS (AVERAGE) (IN METROPOLITAN AREA)
25	Construction cost of HOV lane (\$/lane mile)	\$2,500,000	MTC
26	Average cost of a passenger car	\$16,000	AAA
27	Average vanpool occupancy	7.00	REG. XV
28	Average cost per commute trip of 11.4 miles	\$5.47	CALCULATED
29	Average cost per mile to drive for rideshare trip	\$0.19	CALCULATED
30	Average saving per mile to drive for ridashare trip	\$0.29	CALCULATED
31	Car annualization factor	0.25	CALCULATED
32	Construction annualization factor	0.09	CALCULATED
33	Construction cost of a loading facility	\$100,000	MTA
34	Operation and maintenance cost per facility	\$20.00	MTA
35	Number of ridesharers per facility	20	MTA
36	Number of facilities needed (high)	332	MTA
37	Number of facilities needed (standard)	166	MTA

METHODOLOGY

PUBLIC SECTOR COST

DAILY PUBLIC CAPITAL COST = 0

DAILY PUBLIC OPERATION AND MAINTENANCE COST =
(NEA) + (ACPE)/260 + (DPAC) WHERE;

NEA = NUMBER OF EMPLOYEES AFFECTED
ACPE = ANNUAL COST PER EMPLOYEE
DPA = DAILY PUBLIC ADMINISTRATIVE COST

DAILY PUBLIC OPERATION AND MAINTENANCE COST = 0

DAILY PUBLIC COST =
(DPCC+DPOMC) WHERE;

DPCC= DAILY PUBLIC CAPITAL COST
DPOMC = DAILY PUBLIC O & M COST

DAILY PUBLIC REVENUES (DPR) = 0

DAILY PUBLIC COST/REVENUE (DPC/R) =
(DPCOMC) - (DPR) WHERE;

DPCOMC = DAILY PUBLIC CAPITAL AND OPERATION AND MAINTENANCE COST
DPR = DAILY PUBLIC REVENUE

DAILY PUBLIC BENEFITS (DPB) BY AVOIDING HIGHWAY BUILDING =
(DPCB) + (DPOMB) WHERE;

DPCB = (DPTR) * (LMF/T) * (CCLMF) * (CAF)/260*(POTOF) +
+ (DPTR) * (LMA/T) * (CCLMA) * (CAF)/260*(POTOA) WHERE;

DPTR = DAILY TRIPS REDUCED
LMF/T = LANE MILES OF FREEWAY PER TRIP
CCLMF = CONSTRUCTION COST OF FREEWAY LANE MILE
CAF = CONSTRUCTION ANNUALIZATION FACTOR
POTOF = PERCENT OF TRIPS ON FREEWAYS
LMA = LANE MILES OF ARTERIAL PER TRIP
CCLMA = CONSTRUCTION COST OF ARTERIAL LANE MILE
POTOA = PERCENT OF PEAK TRIPS ON ARTERIAL

COST-EFFECTIVENESS MODEL

LACMTA

$$\text{DPOMB} = (\text{DTR}) * (\text{LMFA}/\text{T}) * (\text{OMCLMF})/260 * (\text{POTOF}) + \\ + (\text{DTR}) * (\text{LMA}/\text{T}) * (\text{OMCLMA})/260 * (\text{POTOA}) \text{ WHERE;}$$

OMCLMF = O & M COST PER LANE MILE OF FREEWAY

OMCLMA = O & M COST PER LANE MILE OF ARTERIAL

POTOF = PERCENT OF TRIPS ON FREEWAY

POTOA = PERCENT OF TRIPS ON ARTERIAL

$$\text{NET PUBLIC DAILY COST/BENEFIT COUNTING THE AVOIDED COSTS (NDPC/BIAC)} = \\ (\text{NDPC}/\text{R}) - (\text{DPB})$$

INDIVIDUAL COST

$$\text{DAILY INDIVIDUAL CAPITAL COST (DICC)} = 0$$

$$\text{DAILY INDIVIDUAL OPERATION AND MAINTENANCE COST (DIOMC)} = \\ (\text{DVMTR}) * (\text{DOMCPM}) * .2105 * .90 + (\text{DPCPE}) * (\text{DVTR}/2) * .10 \text{ WHERE;}$$

DVMTR = DAILY VEHICLE MILES TRAVELED REDUCED

DOMCPM = DAILY OPERATION AND MAINTENANCE COST PER MILE

DPC = DAILY PARKING COST

$$\text{DAILY INDIVIDUAL BENEFIT (DIB)} =$$

$$(\text{DICB}) + (\text{DIOMB}) \text{ WHERE;}$$

DICB = DAILY INDIVIDUAL CAPITAL BENEFIT (CAR COST)

DIOMB = DAILY INDIVIDUAL O & M COST SAVING (CAR O & M)

$$\text{DIOMB} =$$

$$(\text{DOMBPRT}) * (\text{DVTR}) +$$

$$+ (.10 * \text{DIPS} * \text{DVTR}/2) \text{ WHERE;}$$

DOMBPRT = DAILY OPERATION AND MAINTENANCE BENEFIT PER RIDESHARE TRIP

DVTR = DAILY VEHICLE TRIPS REDUCED

.21 IS THE PERCENT OF O & M COST ATTRIBUTED TO SAVINGS

DIPB = DAILY INDIVIDUAL PARKING COST SAVING

$$\text{NET DAILY INDIVIDUAL COST/BENEFIT (NDIC/B)} =$$

$$(\text{DIC}) - (\text{DIB}) \text{ WHERE;}$$

DIC = DAILY INDIVIDUAL COST

DIB = DAILY INDIVIDUAL BENEFITS

COST-EFFECTIVENESS MODEL

LACMTA

PRIVATE SECTOR COST/BENEFIT

DAILY PRIVATE CAPITAL COST (DPRCC) =

$NRLFN * CCPLF * CAF/260$ WHERE;

NRLFN = NUMBER OF RIDESHARE LOADING FACILITIES NEEDED

CCPLF = CONSTRUCTION COST PER LOADING FACILITY

CAF = CONSTRUCTION ANNUALIZATION FACTOR

DAILY PRIVATE O & M COST (DPROMC) =

$NRLFN * OMCPF/260$ WHERE;

NRLFN = NUMBER OF RIDESHARE LOADING FACILITY NEEDED

OMCPF = OPERATION AND MAINTENANCE COST PER LOADING FACILITY

DAILY PRIVATE CAPITAL BENEFIT (DPRCB) = 0

DAILY PRIVATE O & M BENEFIT (DPROMB) =

$(DVTR)/2 * (MPC)*12/260 * .90$ WHERE;

DVTR = DAILY VEHICLE TRIPS REDUCED

MPC = MONTHLY PARKING COST

.90 = PERCENT OF PARKING PROVIDED BY PRIVATE SECTOR

NET DAILY PRIVATE COST/BENEFIT (NDPC/B) =

$(DPRC) - (DPRB)$

SOCIETAL COST

DAPC = DAILY AIR POLLUTION COST/BENEFIT

$DAPC = DVMTR * (APC/M)$ WHERE;

DVMTR = DAILY VMT REDUCED

APC/M = AIR POLLUTION COST PER MILE

DVMDCB = DAILY VEHICLE MILES OF DELAY COST/BENEFIT

$DVMDC = (DVMDS) * (C/VMD)$ WHERE;

$DVMDS = (VMT/NEW SPEED) - (VMT/EXISTING SPEED) * (AVERAGE SPEED)$

DVMDS = DAILY VEHICLE MILES OF DELAY SAVED

C/VMD = DAILY COST PER VEHICLE MILES OF DELAY SAVED

COST-EFFECTIVENESS MODEL

LACMTA

DSCB = DAILY SOCIETAL COST/BENEFIT

$$DSCB = (DAPC) + (DVMDCB)$$

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 1 THE BUILD SCENARIO

TOTAL DAILY COST (TDC) =

(DPC) + (DIC) + (DPRC) + (DSC) WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DSC = DAILY SOCIETAL COST

TOTAL DAILY BENEFITS (TDB) =

(DPB) + (DIB) + (DPRB) + DSB WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DSB = DAILY SOCIETAL BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

$$[(DPC) + (DIC) + (DPRC) + (DSC)] - [(DPB) + (DIB) + (DPRB) + (DSB)]$$

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 2 THE NO BUILD SCENARIO

TOTAL DAILY COST (TDC) =

(DPC) + (DIC) + (DPRC) + (DSC) WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DSC = DAILY SOCIETAL COST

COST-EFFECTIVENESS MODEL

LACMTA

TOTAL DAILY BENEFITS (TDB) =
(DPB) + (DIB) + (DPRB) + (DSB) WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DSB = DAILY SOCIETAL BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

[(DPC) + (DIC) + (DPRC) + (DSC)] - [(DPB) + (DIB) + (DPRB) + (DSB)]

COST-EFFECTIVENESS MODEL

LACMTA

LIKELY OUTCOMES

PUBLIC SECTOR COST/BENEFIT		STANDARD	HIGH
1	DAILY PUBLIC CAPITAL COST	\$0	\$0
2	DAILY PUBLIC O & M COST	\$574	\$1,149
3	DAILY PUBLIC COST	\$574	\$1,149
4	DAILY PUBLIC REVENUES	\$0	\$0
5	DAILY PUBLIC COST/REVENUE	\$574	\$1,149
6	DAILY PUBLIC AVOIDED CAPITAL COST (SCENARIO 2)	\$16,329	\$32,662
7	DAILY PUBLIC AVOIDED O & M COST (SCENARIO 2)	\$44	\$89
8	TOTAL DAILY PUBLIC AVOIDED (SCENARIO 2)	\$16,373	\$32,751
9	NET DAILY PUBLIC BENEFIT (SCENARIO 2)	\$16,373	\$32,751
10	DAILY PUBLIC CAPITAL COST (SCENARIO 1)	\$16,329	\$32,662
11	DAILY PUBLIC O & M COST (SCENARIO 1)	\$44	\$89
12	TOTAL DAILY PUBLIC COST (SCENARIO 1)	\$16,373	\$32,751
13	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 2)	(\$15,799)	(\$31,603)
14	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 1)	\$16,373	\$32,751
15	COST		
16	DAILY PUBLIC COST PER TRIP REDUCED	\$0.17	\$0.17
17	DAILY PUBLIC COST PER VMT REDUCED	\$0.01	\$0.01
18	DAILY PUBLIC COST PER TON OF CO REDUCED	\$588	\$588
19	DAILY PUBLIC COST PER TON OF ROG REDUCED	\$5,862	\$5,921
20	DAILY PUBLIC COST PER TON OF NOx REDUCED	\$10,638	\$1,679
21	DAILY PUBLIC COST PER TON OF PM REDUCED	\$574,442	\$574,356
22	BENEFIT		
23	DAILY PUBLIC BENEFIT PER TRIP REDUCED	\$4.93	\$4.93
24	DAILY PUBLIC BENEFIT PER VMT REDUCED	\$0.37	\$0.37
25	DAILY PUBLIC BENEFIT PER TON OF CO REDUCED	\$16,759	\$16,770
26	DAILY PUBLIC BENEFIT PER TON OF ROG REDUCED	\$167,074	\$168,821
27	DAILY PUBLIC BENEFIT PER TON OF NOx REDUCED	\$303,208	\$47,882
28	DAILY PUBLIC BENEFIT PER TON OF PM REDUCED	\$16,373,206	\$16,375,674
29	COST/BENEFIT		
30	NET DAILY PUBLIC COST/BENEFIT PER TRIP REDUCED	(\$4.76)	(\$4.76)
31	NET DAILY PUBLIC COST/BENEFIT PER VMT REDUCED	(\$0.36)	(\$0.36)
32	NET DAILY PUBLIC COST/BENEFIT PER TON OF CO REDUCED	(\$16,171)	(\$16,182)
33	NET DAILY PUBLIC COST/BENEFIT PER TON OF ROG REDUCED	(\$161,212)	(\$162,900)
34	NET DAILY PUBLIC COST/BENEFIT PER TON OF NOx REDUCED	(\$292,570)	(\$46,203)
35	NET DAILY PUBLIC COST/BENEFIT PER TON OF PM REDUCED	(\$15,798,764)	(\$15,801,318)
36	INDIVIDUAL COST/BENEFIT		
37	DAILY INDIVIDUAL CAPITAL COST	\$0	\$0
38	DAILY INDIVIDUAL O & M COST	\$5,219	\$10,438
39	DAILY INDIVIDUAL COST	\$5,219	\$10,438
40	DAILY INDIVIDUAL CAPITAL BENEFIT	\$0	\$0
41	DAILY INDIVIDUAL O & M BENEFIT	\$3,131	\$6,263
42	DAILY INDIVIDUAL BENEFIT	\$3,131	\$6,263
43	NET DAILY INDIVIDUAL COST/BENEFIT	\$2,088	\$4,175

COST – EFFECTIVENESS MODEL

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44	COST		
45	NET DAILY INDIVIDUAL COST PER TRIP REDUCED	\$1.57	\$1.57
46	NET DAILY INDIVIDUAL COST PER VMT REDUCED	\$0.12	\$0.12
47	NET DAILY INDIVIDUAL COST PER TON OF CO REDUCED	\$5,342	\$5,345
48	NET DAILY INDIVIDUAL COST PER TON OF ROG REDUCED	\$53,255	\$53,806
49	NET DAILY INDIVIDUAL COST PER TON OF NOx REDUCED	\$96,649	\$15,261
50	NET DAILY INDIVIDUAL COST PER TON OF PM REDUCED	\$5,219,030	\$5,219,146
51	BENEFIT		
52	NET DAILY INDIVIDUAL BENEFIT PER TRIP REDUCED	\$0.94	\$0.94
53	NET DAILY INDIVIDUAL BENEFIT PER VMT REDUCED	\$0.07	\$0.07
54	NET DAILY INDIVIDUAL BENEFIT PER TON OF CO REDUCED	\$3,205	\$3,207
55	NET DAILY INDIVIDUAL BENEFIT PER TON OF ROG REDUCED	\$31,953	\$32,283
56	NET DAILY INDIVIDUAL BENEFIT PER TON OF NOx REDUCED	\$57,989	\$9,156
57	NET DAILY INDIVIDUAL BENEFIT PER TON OF PM REDUCED	\$3,131,418	\$3,131,487
58	COST/BENEFIT		
59	NET DAILY INDIVIDUAL COST/BENEFIT PER TRIP REDUCED	\$0.63	\$0.36
60	NET DAILY INDIVIDUAL COST/BENEFIT PER VMT REDUCED	\$0.05	\$0.03
61	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF CO REDUCED	\$2,137	\$2,138
62	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF ROG REDUCED	\$21,302	\$21,522
63	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF NOx REDUCED	\$38,659	\$6,104
64	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF PM REDUCED	\$2,087,612	\$2,087,658
65	PRIVATE SECTOR COST/BENEFIT		
66	DAILY PRIVATE CAPITAL COST	\$11,487	\$11,487
67	DAILY PRIVATE O & M COST	\$26	\$26
68	DAILY PRIVATE COST	\$11,513	\$11,513
69	DAILY PRIVATE CAPITAL BENEFIT	\$0	\$0
70	DAILY PRIVATE O & M BENEFIT	\$6,891	\$13,785
71	DAILY PRIVATE BENEFIT	\$6,891	\$13,785
72	NET DAILY PRIVATE COST/BENEFIT	\$4,621	(\$2,272)
73	COST		
74	NET DAILY PRIVATE COST PER TRIP REDUCED	\$3.47	\$1.73
75	NET DAILY PRIVATE COST PER VMT REDUCED	\$0.26	\$0.13
76	NET DAILY PRIVATE COST PER TON OF CO REDUCED	\$11,784	\$5,895
77	NET DAILY PRIVATE COST PER TON OF ROG REDUCED	\$117,476	\$59,344
78	NET DAILY PRIVATE COST PER TON OF NOx REDUCED	\$213,197	\$16,831
79	NET DAILY PRIVATE COST PER TON OF PM REDUCED	\$11,512,642	\$5,756,321
80	BENEFIT		
81	NET DAILY PRIVATE BENEFIT PER TRIP REDUCED	\$2.08	\$2.08
82	NET DAILY PRIVATE BENEFIT PER VMT REDUCED	\$0.16	\$0.16
83	NET DAILY PRIVATE BENEFIT PER TON OF CO REDUCED	\$7,053	\$7,058
84	NET DAILY PRIVATE BENEFIT PER TON OF ROG REDUCED	\$70,319	\$71,054
85	NET DAILY PRIVATE BENEFIT PER TON OF NOx REDUCED	\$127,615	\$20,153
86	NET DAILY PRIVATE BENEFIT PER TON OF PM REDUCED	\$6,891,231	\$6,892,269
87	COST/BENEFIT		
88	NET DAILY PRIVATE COST/BENEFIT PER TRIP REDUCED	\$1.39	(\$0.34)
89	NET DAILY PRIVATE COST/BENEFIT PER VMT REDUCED	\$0.10	(\$0.03)
90	NET DAILY PRIVATE COST/BENEFIT PER TON OF CO REDUCED	\$4,730	(\$1,163)
91	NET DAILY PRIVATE COST/BENEFIT PER TON OF ROG REDUCED	\$47,157	(\$11,711)
92	NET DAILY PRIVATE COST/BENEFIT PER TON OF NOx REDUCED	\$85,582	(\$3,321)
93	NET DAILY PRIVATE COST/BENEFIT PER TON OF PM REDUCED	\$4,621,412	(\$1,135,948)

COST-EFFECTIVENESS MODEL

LACMTA

94	SOCIETAL COST/BENEFIT		
95	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
96	DAILY SOCIETAL AIR POLLUTION COST	\$661	\$1,322
97	DAILY SOCIETAL CONGESTION COST	\$0	\$0
98	DAILY SOCIETAL COST	\$661	\$1,322
99	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
100	DAILY SOCIETAL CONGESTION BENEFIT	\$1,324	\$2,649
101	DAILY SOCIETAL BENEFIT	\$1,324	\$2,649
102	NET DAILY SOCIETAL COST/BENEFIT	(\$663)	(\$1,327)
103	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
104	DAILY SOCIETAL AIR POLLUTION COST	\$661	\$1,322
105	DAILY SOCIETAL CONGESTION COST	\$1,324	\$2,649
106	DAILY SOCIETAL COST	\$1,986	\$3,971
107	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
108	DAILY SOCIETAL CONGESTION BENEFIT	\$0	\$0
109	DAILY SOCIETAL BENEFIT	\$0	\$0
110	NET DAILY SOCIETAL COST/BENEFIT	\$1,986	\$3,971
111	SCENARIO #2 THE NO BUILD SCENARIO		
112	DAILY SOCIETAL AIR POLLUTION COST	\$0	\$0
113	DAILY SOCIETAL CONGESTION COST	\$0	\$0
114	DAILY SOCIETAL COST	\$0	\$0
115	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$661	\$1,322
116	DAILY SOCIETAL CONGESTION BENEFIT	\$1,324	\$2,649
117	DAILY SOCIETAL BENEFIT	\$1,986	\$3,971
118	NET DAILY SOCIETAL COST/BENEFIT	(\$1,986)	(\$3,971)
119	TOTAL COST/BENEFIT		
120	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
121	TOTAL DAILY COST	\$27,057	\$54,121
122	TOTAL DAILY BENEFIT	\$1,324	\$2,649
123	TOTAL DAILY COST/BENEFIT	\$25,733	\$51,472
124	COST		
125	NET DAILY COST PER TRIP REDUCED	\$8.15	\$8.15
126	NET DAILY COST PER VMT REDUCED	\$0.61	\$0.61
127	NET DAILY COST PER TON OF CO REDUCED	\$27,694	\$27,712
128	NET DAILY COST PER TON OF ROG REDUCED	\$276,092	\$278,975
129	NET DAILY COST PER TON OF NOx REDUCED	\$501,055	\$79,124
130	NET DAILY COST PER TON OF PM REDUCED	\$27,056,980	\$27,060,555
131	BENEFIT		
132	NET DAILY BENEFIT PER TRIP REDUCED	\$0.40	\$0.40
133	NET DAILY BENEFIT PER VMT REDUCED	\$0.03	\$0.03
134	NET DAILY BENEFIT PER TON OF CO REDUCED	\$1,356	\$1,356
135	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$13,514	\$13,654
136	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$24,526	\$3,873
137	NET DAILY BENEFIT PER TON OF PM REDUCED	\$1,324,403	\$1,324,403

COST – EFFECTIVENESS MODEL

LACMTA

138	COST/BENEFIT		
139	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$7.76	\$7.76
140	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.58	\$0.58
141	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$26,338	\$26,356
142	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$262,577	\$265,321
143	NET DAILY COST/BENEFIT PER TON OF NOx REDUCED	\$476,529	\$75,252
144	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$25,732,577	\$25,736,152
145	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
146	TOTAL DAILY COST	\$28,381	\$56,770
147	TOTAL DAILY BENEFIT	\$0	\$0
148	TOTAL DAILY COST/BENEFIT	\$28,381	\$56,770
149	COST		
150	NET DAILY COST PER TRIP REDUCED	\$8.55	\$8.55
151	NET DAILY COST PER VMT REDUCED	\$0.64	\$0.64
152	NET DAILY COST PER TON OF CO REDUCED	\$29,050	\$29,068
153	NET DAILY COST PER TON OF ROG REDUCED	\$289,606	\$292,628
154	NET DAILY COST PER TON OF NOx REDUCED	\$525,581	\$82,997
155	NET DAILY COST PER TON OF PM REDUCED	\$28,381,383	\$28,384,958
156	BENEFIT		
157	NET DAILY BENEFIT PER TRIP REDUCED	\$0.00	\$0.00
158	NET DAILY BENEFIT PER VMT REDUCED	\$0.00	\$0.00
159	NET DAILY BENEFIT PER TON OF CO REDUCED	\$0	\$0
160	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$0	\$0
161	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$0	\$0
162	NET DAILY BENEFIT PER TON OF PM REDUCED	\$0	\$0
163	COST/BENEFIT		
164	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$8.55	\$8.55
165	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.64	\$0.64
166	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$29,050	\$29,068
167	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$289,606	\$292,628
168	NET DAILY COST/BENEFIT PER TON OF NOx REDUCED	\$525,581	\$82,997
169	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$28,381,383	\$28,384,958
170	SCENARIO #2 THE NO BUILD SCENARIO		
171	TOTAL DAILY COST	\$17,306	\$23,100
172	TOTAL DAILY BENEFIT	\$28,381	\$56,770
173	TOTAL DAILY COST/BENEFIT	(\$11,075)	(\$33,670)
174	COST		
175	NET DAILY COST PER TRIP REDUCED	\$5.22	\$3.48
176	NET DAILY COST PER VMT REDUCED	\$0.39	\$0.26
177	NET DAILY COST PER TON OF CO REDUCED	\$17,714	\$11,828
178	NET DAILY COST PER TON OF ROG REDUCED	\$176,593	\$119,070
179	NET DAILY COST PER TON OF NOx REDUCED	\$320,484	\$33,771
180	NET DAILY COST PER TON OF PM REDUCED	\$17,306,115	\$11,549,823
181	BENEFIT		
182	NET DAILY BENEFIT PER TRIP REDUCED	\$8.55	\$8.55
183	NET DAILY BENEFIT PER VMT REDUCED	\$0.64	\$0.64
184	NET DAILY BENEFIT PER TON OF CO REDUCED	\$29,050	\$29,068
185	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$289,606	\$292,628
186	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$525,581	\$82,997
187	NET DAILY BENEFIT PER TON OF PM REDUCED	\$28,381,383	\$28,384,958

COST-EFFECTIVENESS MODEL

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188	COST/BENEFIT		
189	NET DAILY COST/BENEFIT PER TRIP REDUCED	(\$3.34)	(\$5.07)
190	NET DAILY COST/BENEFIT PER VMT REDUCED	(\$0.25)	(\$0.38)
191	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	(\$11,336)	(\$17,240)
192	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	(\$113,013)	(\$173,558)
193	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	(\$205,098)	(\$49,226)
194	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	(\$11,075,268)	(\$16,835,136)

COST-EFFECTIVENESS MODEL

LACMTA

TCM # 9 CHILDCARE CENTERS

ASSUMPTIONS

1	Amortization period for construction projects	30	MTA
2	Amortization period for equipment purchase	12	MTA
3	O&M cost for a passenger vehicle (\$/mile)	\$0.48	AAA
4	Construction cost of arterial (\$/lane mile)	\$900,000	CALTRANS
5	Construction annualization factor (CAF)	0.09	CALCULATED
6	Bus annualization factor (BAF)	0.13	CALCULATED
7	car annualization factor	0.25	CALCULATED
8	Interst rate	8%	MARKET RATE
9	Lane miles arterial/vehicle trip	0.0018	COMSIS
10	Lane miles freeway/vehicle trip	0.0015	COMSIS
11	O&M cost of arterial (\$/LANE MILE)	\$765	CALTRANS
12	O&M cost of freeway (\$/LANE MILE)	\$2,000	CALTRANS
13	Monthly parking cost for sov	\$100	MTA
14	Monthly parking cost for ridasharing employee	\$40	CALCULATED
15	Monthly parking savings for ridesharing employee	\$60	CALCULATED
16	Percent of parking paid by private sector	90%	SCAQMD
17	Percent of parking paid by employees	10%	SCAQMD
18	Air pollution cost per mile	\$0.015	RUTHERFORD AND WELLANDER, 1986
19	Cost per vehicle--miles of delay	\$0.11	RUTHERFORD AND WELLANDER, 1986
20	Construction cost of freeway (\$/lane mile) not including right of way	\$2,500,000	SANDAG
21	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$12,000,000	CALTRANS (MIN) (IN METROPOLITAN AREA)
22	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$16,000,000	CALTRANS (MAX) (IN METROPOLITAN AREA)
23	Average construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$14,000,000	CALTRANS (AVERAGE) (IN METROPOLITAN AREA)
24	Construction cost of HOV lane (\$/lane mile)	\$2,500,000	MTC
25	Average cost of a passenger vehicle	\$16,000	AAA
26	Average cost per commute trip of 11.4 miles	\$5.47	CALCULATED
27	Average cost per mile to drive for rideshare trip	\$0.19	CALCULATED
28	Average saving per mile to drive for ridashare trip	\$0.29	CALCULATED
29	Car annualization factor	0.25	CALCULATED
30	Construction annualization factor	0.09	CALCULATED
31	Construction and equipment cost of childcare facility (\$/space)	\$22,064	SIERRA
32	Operation and maintenance cost per space	\$353	MTA
33	Number of spaces needed	7909	MTA
34	Utilization rate (standard)	5,932	MTA
35	Utilization rate (high)	7,909	MTA
36	Revenue per space (\$/month)	\$470	MTA

COST-EFFECTIVENESS MODEL

LACMTA

METHODOLOGY

PUBLIC SECTOR COST

DAILY PUBLIC CAPITAL COST = CAPITAL START-UP COST

$NCSN * CCPS * CAF/260$ WHERE;

NCSN = NUMBER OF CHILDECARE SPACES NEEDED

CCPS = CONSTRUCTION COST PER SPACE

CAF = CONSTRUCTION ANNUALIZATION FACTOR

DAILY PUBLIC OPERATION AND MAINTENANCE COST =
(DPAC) WHERE;

DPA = DAILY PUBLIC ADMINISTRATIVE COST

DAILY PUBLIC COST =
(DPCC+DPOMC) WHERE;

DPCC = DAILY PUBLIC CAPITAL COST

DPOMC = DAILY PUBLIC O & M COST

DAILY PUBLIC REVENUES (DPR) = 0

DAILY PUBLIC COST/REVENUE (DPC/R) =
(DPCOMC) - (DPR) WHERE;

DPCOMC = DAILY PUBLIC CAPITAL AND OPERATION AND MAINTENANCE COST

DPR = DAILY PUBLIC REVENUE

DAILY PUBLIC BENEFITS (DPB) BY AVOIDING HIGHWAY BUILDING =
(DPCB) + (DPOMB) WHERE;

$DPCB = (DPTR) * (LMF/T) * (CCLMF) * (CAF)/260 * (POTOF) +$
 $+ (DPTR) * (LMA/T) * (CCLMA) * (CAF)/260 * (POTOA)$ WHERE;

DPTR = DAILY TRIPS REDUCED

LMF/T = LANE MILES OF FREEWAY PER TRIP

CCLMF = CONSTRUCTION COST OF FREEWAY LANE MILE

CAF = CONSTRUCTION ANNUALIZATION FACTOR

POTOF = PERCENT OF TRIPS ON FREEWAYS

LMA = LANE MILES OF ARTERIAL PER TRIP

CCLMA = CONSTRUCTION COST OF ARTERIAL LANE MILE

POTOA = PERCENT OF PEAK TRIPS ON ARTERIAL

COST – EFFECTIVENESS MODEL

LACMTA

$$\text{DPOMB} = (\text{DTR}) * (\text{LMFA}/\text{T}) * (\text{OMCLMF})/260 * (\text{POTOF}) + \\ + (\text{DTR}) * (\text{LMA}/\text{T}) * (\text{OMCLMA})/260 * (\text{POTOA}) \text{ WHERE};$$

OMCLMF = O & M COST PER LANE MILE OF FREEWAY

OMCLMA = O & M COST PER LANE MILE OF ARTERIAL

POTOF = PERCENT OF TRIPS ON FREEWAY

POTOA = PERCENT OF TRIPS ON ARTERIAL

$$\text{NET PUBLIC DAILY COST/BENEFIT COUNTING THE AVOIDED COSTS (NDPC/BIAC)} = \\ (\text{NDPC}/\text{R}) - (\text{DPB})$$

INDIVIDUAL COST

$$\text{DAILY INDIVIDUAL CAPITAL COST (DICC)} = 0$$

$$\text{DAILY INDIVIDUAL OPERATION AND MAINTENANCE COST (DIOMC)} = \\ \text{DNSU} * \text{MCPS} * 12/260 + \text{DNSU} * \text{DCPTT} \text{ WHERE};$$

DNSU = DAILY NUMBER OF SPACES UTILIZED

MCPS = MONTHLY COST PER SPACE

DCPTT = DAILY COST PER TRANSIT TRIP

$$\text{DAILY INDIVIDUAL BENEFIT (DIB)} = \\ (\text{DICB}) + (\text{DIOMB}) \text{ WHERE};$$

DICB = DAILY INDIVIDUAL CAPITAL BENEFIT (CAR COST)

DIOMB = DAILY INDIVIDUAL O & M COST SAVING (CAR O & M)

$$\text{DIOMB} =$$

$$(\text{DOMCPM}) * (\text{DVMTR}) * .2105 * .9 + \\ + (.10 * \text{DIPS} * \text{DNSU}) \text{ WHERE};$$

DOMBPRT = DAILY OPERATION AND MAINTENANCE BENEFIT PER RIDESHARE TRIP

DVTR = DAILY VEHICLE TRIPS REDUCED

.21 IS THE PERCENT OF O & M COST ATTRIBUTED TO SAVINGS

DIPB = DAILY INDIVIDUAL PARKING COST SAVING

$$\text{NET DAILY INDIVIDUAL COST/BENEFIT (NDIC/B)} =$$

$$(\text{DIC}) - (\text{DIB}) \text{ WHERE};$$

DIC = DAILY INDIVIDUAL COST

DIB = DAILY INDIVIDUAL BENEFITS

COST-EFFECTIVENESS MODEL

LACMTA

PRIVATE SECTOR COST/BENEFIT

DAILY PRIVATE CAPITAL COST (DPRCC) = 0

DAILY PRIVATE O & M COST (DPROMC) =
DNSC * OMCP/260 + DPRAC WHERE;

DNSC = DAILY NUMBER OF SPACES CONSTRUCTED
OMCP = OPERATION AND MAINTENANCE COST PER SPACE
DPRAC = DAILY PRIVATE ADMINISTRATIVE COST

DAILY PRIVATE CAPITAL BENEFIT (DPRCB) = 0

DAILY PRIVATE O & M BENEFIT (DPROMB) =
(DNSU) * (MPC) * 12/260 * .90 + (DNSU) * (RPS) WHERE;

DNSU = DAILY NUMBER OF SPACES UTILIZED
MPC = MONTHLY PARKING COST
.90 = PERCENT OF PARKING PROVIDED BY PRIVATE SECTOR
RPS = REVENUE PER SPACE

NET DAILY PRIVATE COST/BENEFIT (NDPC/B) =
(DPRC) - (DPRB)

SOCIETAL COST

DAPC = DAILY AIR POLLUTION COST/BENEFIT

DAPC = DVMTR * (APC/M) WHERE;

DVMTR = DAILY VMT REDUCED
APC/M = AIR POLLUTION COST PER MILE

DVMDCB = DAILY VEHICLE MILES OF DELAY COST/BENEFIT

DVMDC = (DVMDS) * (C/VMD) WHERE;

DVMDS = (VMT/NEW SPEED) - (VMT/EXISTING SPEED) * (AVERAGE SPEED)
DVMDS = DAILY VEHICLE MILES OF DELAY SAVED
C/VMD = DAILY COST PER VEHICLE MILES OF DELAY SAVED

DSCB = DAILY SOCIETAL COST/BENEFIT

DSCB = (DAPC) + (DVMDCB)

COST-EFFECTIVENESS MODEL

LACMTA

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 1 THE BUILD SCENARIO

TOTAL DAILY COST (TDC) =

(DPC) + (DIC) + (DPRC) + (DSC) WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DSC = DAILY SOCIETAL COST

TOTAL DAILY BENEFITS (TDB) =

(DPB) + (DIB) + (DPRB) + DSB WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DSB = DAILY SOCIETAL BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

[(DPC) + (DIC) + (DPRC) + (DSC)] - [(DPB) + (DIB) + (DPRB) + (DSB)]

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 2 THE NO BUILD SCENARIO

TOTAL DAILY COST (TDC) =

(DPC) + (DIC) + (DPRC) + (DSC) WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DSC = DAILY SOCIETAL COST

TOTAL DAILY BENEFITS (TDB) =

(DPB) + (DIB) + (DPRB) + (DSB) WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DSB = DAILY SOCIETAL BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

[(DPC) + (DIC) + (DPRC) + (DSC)] - [(DPB) + (DIB) + (DPRB) + (DSB)]

COST-EFFECTIVENESS MODEL

LACMTA

LIKELY OUTCOMES

PUBLIC SECTOR COST/BENEFIT			
		STANDARD	HIGH
1	DAILY PUBLIC CAPITAL COST	\$60,405	\$60,405
2	DAILY PUBLIC O & M COST	\$6,040	\$6,040
3	DAILY PUBLIC COST	\$66,445	\$66,445
4	DAILY PUBLIC REVENUES	\$0	\$0
5	DAILY PUBLIC COST/REVENUE	\$66,445	\$66,445
6	DAILY PUBLIC AVOIDED CAPITAL COST (SCENARIO 2)	\$29,192	\$38,922
7	DAILY PUBLIC AVOIDED O & M COST (SCENARIO 2)	\$154	\$206
8	TOTAL DAILY PUBLIC AVOIDED (SCENARIO 2)	\$29,346	\$39,128
9	NET DAILY PUBLIC BENEFIT (SCENARIO 2)	\$29,346	\$39,128
10	DAILY PUBLIC CAPITAL COST (SCENARIO 1)	\$29,192	\$38,922
11	DAILY PUBLIC O & M COST (SCENARIO 1)	\$154	\$206
12	TOTAL DAILY PUBLIC COST (SCENARIO 1)	\$29,346	\$39,128
13	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 2)	\$37,099	\$27,317
14	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 1)	\$29,346	\$39,128
15	COST		
16	DAILY PUBLIC COST PER TRIP REDUCED	N/A	N/A
17	DAILY PUBLIC COST PER VMT REDUCED	\$1.49	\$1.12
18	DAILY PUBLIC COST PER TON OF CO REDUCED	\$153,453	\$114,957
19	DAILY PUBLIC COST PER TON OF ROG REDUCED	\$1,006,746	\$755,059
20	DAILY PUBLIC COST PER TON OF NOx REDUCED	\$1,661,130	\$1,230,467
21	DAILY PUBLIC COST PER TON OF PM REDUCED	\$66,445,219	\$66,445,219
22	BENEFIT		
23	DAILY PUBLIC BENEFIT PER TRIP REDUCED	N/A	N/A
24	DAILY PUBLIC BENEFIT PER VMT REDUCED	\$0.66	\$0.66
25	DAILY PUBLIC BENEFIT PER TON OF CO REDUCED	\$67,774	\$67,696
26	DAILY PUBLIC BENEFIT PER TON OF ROG REDUCED	\$444,639	\$444,639
27	DAILY PUBLIC BENEFIT PER TON OF NOx REDUCED	\$733,655	\$724,597
28	DAILY PUBLIC BENEFIT PER TON OF PM REDUCED	\$29,346,181	\$39,128,241
29	COST/BENEFIT		
30	NET DAILY PUBLIC COST/BENEFIT PER TRIP REDUCED	N/A	N/A
31	NET DAILY PUBLIC COST/BENEFIT PER VMT REDUCED	\$0.83	\$0.46
32	NET DAILY PUBLIC COST/BENEFIT PER TON OF CO REDUCED	\$85,679.07	\$47,261.21
33	NET DAILY PUBLIC COST/BENEFIT PER TON OF ROG REDUCED	\$562,106.63	\$310,420.20
34	NET DAILY PUBLIC COST/BENEFIT PER TON OF NOx REDUCED	\$927,475.94	\$505,869.95
35	NET DAILY PUBLIC COST/BENEFIT PER TON OF PM REDUCED	\$37,099,037.56	\$27,316,977.23
36	INDIVIDUAL COST/BENEFIT		
37	DAILY INDIVIDUAL CAPITAL COST	\$0	\$0
38	DAILY INDIVIDUAL O & M COST	\$141,723	\$188,964
39	DAILY INDIVIDUAL COST	\$141,723	\$188,964
40	DAILY INDIVIDUAL CAPITAL BENEFIT	\$0	\$0
41	DAILY INDIVIDUAL O & M BENEFIT	\$7,247	\$9,062
42	DAILY INDIVIDUAL BENEFIT	\$7,247	\$9,062
43	NET DAILY INDIVIDUAL COST/BENEFIT	\$134,476	\$179,902

COST-EFFECTIVENESS MODEL

LACMTA

44	COST		
45	NET DAILY INDIVIDUAL COST PER TRIP REDUCED	N/A	N/A
46	NET DAILY INDIVIDUAL COST PER VMT REDUCED	\$3.18	\$3.18
47	NET DAILY INDIVIDUAL COST PER TON OF CO REDUCED	\$327,305	\$326,928
48	NET DAILY INDIVIDUAL COST PER TON OF ROG REDUCED	\$2,147,321	\$2,147,321
49	NET DAILY INDIVIDUAL COST PER TON OF NO _x REDUCED	\$3,543,080	\$3,499,338
50	NET DAILY INDIVIDUAL COST PER TON OF PM REDUCED	\$141,723,196	\$188,964,262
51	BENEFIT		
52	NET DAILY INDIVIDUAL BENEFIT PER TRIP REDUCED	N/A	N/A
53	NET DAILY INDIVIDUAL BENEFIT PER VMT REDUCED	\$0.16	\$0.15
54	NET DAILY INDIVIDUAL BENEFIT PER TON OF CO REDUCED	\$16,738	\$15,678
55	NET DAILY INDIVIDUAL BENEFIT PER TON OF ROG REDUCED	\$109,808	\$102,976
56	NET DAILY INDIVIDUAL BENEFIT PER TON OF NO _x REDUCED	\$181,184	\$167,813
57	NET DAILY INDIVIDUAL BENEFIT PER TON OF PM REDUCED	\$7,247,348	\$9,061,909
58	COST/BENEFIT		
59	NET DAILY INDIVIDUAL COST/BENEFIT PER TRIP REDUCED	N/A	N/A
60	NET DAILY INDIVIDUAL COST/BENEFIT PER VMT REDUCED	\$3.01	\$3.02
61	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF CO REDUCED	\$310,568	\$311,250
62	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF ROG REDUCED	\$2,037,513	\$2,044,345
63	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF NO _x REDUCED	\$3,361,896	\$3,331,525
64	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF PM REDUCED	\$134,475,848	\$179,902,352
65	PRIVATE SECTOR COST/BENEFIT		
66	DAILY PRIVATE CAPITAL COST	\$0	\$0
67	DAILY PRIVATE O & M COST	\$11,732	\$11,732
68	DAILY PRIVATE COST	\$11,732	\$11,732
69	DAILY PRIVATE CAPITAL BENEFIT	\$0	\$0
70	DAILY PRIVATE O & M BENEFIT	\$128,673	\$171,564
71	DAILY PRIVATE BENEFIT	\$128,673	\$171,564
72	NET DAILY PRIVATE COST/BENEFIT	(\$116,941)	(\$159,833)
73	COST		
74	NET DAILY PRIVATE COST PER TRIP REDUCED	N/A	N/A
75	NET DAILY PRIVATE COST PER VMT REDUCED	\$0.26	\$0.20
76	NET DAILY PRIVATE COST PER TON OF CO REDUCED	\$27,094	\$20,297
77	NET DAILY PRIVATE COST PER TON OF ROG REDUCED	\$177,756	\$133,317
78	NET DAILY PRIVATE COST PER TON OF NO _x REDUCED	\$293,298	\$217,257
79	NET DAILY PRIVATE COST PER TON OF PM REDUCED	\$11,731,905	\$11,731,905
80	BENEFIT		
81	NET DAILY PRIVATE BENEFIT PER TRIP REDUCED	N/A	N/A
82	NET DAILY PRIVATE BENEFIT PER VMT REDUCED	\$2.88	\$2.88
83	NET DAILY PRIVATE BENEFIT PER TON OF CO REDUCED	\$297,167	\$296,824
84	NET DAILY PRIVATE BENEFIT PER TON OF ROG REDUCED	\$1,949,596	\$1,949,596
85	NET DAILY PRIVATE BENEFIT PER TON OF NO _x REDUCED	\$3,216,834	\$3,177,120
86	NET DAILY PRIVATE BENEFIT PER TON OF PM REDUCED	\$128,673,346	\$171,564,462
87	COST/BENEFIT		
88	NET DAILY PRIVATE COST/BENEFIT PER TRIP REDUCED	N/A	N/A
89	NET DAILY PRIVATE COST/BENEFIT PER VMT REDUCED	(\$2.62)	(\$2.69)
90	NET DAILY PRIVATE COST/BENEFIT PER TON OF CO REDUCED	(\$270,073)	(\$276,527)
91	NET DAILY PRIVATE COST/BENEFIT PER TON OF ROG REDUCED	(\$1,771,840)	(\$1,816,279)
92	NET DAILY PRIVATE COST/BENEFIT PER TON OF NO _x REDUCED	(\$2,923,536)	(\$2,959,862)
93	NET DAILY PRIVATE COST/BENEFIT PER TON OF PM REDUCED	(\$116,941,442)	(\$159,832,557)

COST-EFFECTIVENESS MODEL

LACMTA

138	COST/BENEFIT		
139	NET DAILY COST/BENEFIT PER TRIP REDUCED	N/A	N/A
140	NET DAILY COST/BENEFIT PER VMT REDUCED	\$3.69	\$3.68
141	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$380,128	\$378,649
142	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$2,493,867	\$2,487,035
143	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$4,114,881	\$4,052,945
144	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$164,595,221	\$218,859,051
145	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
146	TOTAL DAILY COST	\$167,277	\$222,435
147	TOTAL DAILY BENEFIT	\$0	\$0
148	TOTAL DAILY COST/BENEFIT	\$167,277	\$222,435
149	COST		
150	NET DAILY COST PER TRIP REDUCED	N/A	N/A
151	NET DAILY COST PER VMT REDUCED	\$3.75	\$3.74
152	NET DAILY COST PER TON OF CO REDUCED	\$386,322	\$384,836
153	NET DAILY COST PER TON OF ROG REDUCED	\$2,534,507	\$2,527,676
154	NET DAILY COST PER TON OF NO _x REDUCED	\$4,181,937	\$4,119,175
155	NET DAILY COST PER TON OF PM REDUCED	\$167,277,489	\$222,435,473
156	BENEFIT		
157	NET DAILY BENEFIT PER TRIP REDUCED	N/A	N/A
158	NET DAILY BENEFIT PER VMT REDUCED	\$0.00	\$0.00
159	NET DAILY BENEFIT PER TON OF CO REDUCED	\$0	\$0
160	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$0	\$0
161	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$0	\$0
162	NET DAILY BENEFIT PER TON OF PM REDUCED	\$0	\$0
163	COST/BENEFIT		
164	NET DAILY COST/BENEFIT PER TRIP REDUCED	N/A	N/A
165	NET DAILY COST/BENEFIT PER VMT REDUCED	\$3.75	\$3.74
166	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$386,322	\$384,836
167	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$2,534,507	\$2,527,676
168	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$4,181,937	\$4,119,175
169	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$167,277,489	\$222,435,473
170	SCENARIO #2 THE NO BUILD SCENARIO		
171	TOTAL DAILY COST	\$219,900	\$267,141
172	TOTAL DAILY BENEFIT	\$167,277	\$222,435
173	TOTAL DAILY COST/BENEFIT	\$52,623	\$44,706
174	COST		
175	NET DAILY COST PER TRIP REDUCED	N/A	N/A
176	NET DAILY COST PER VMT REDUCED	\$4.93	\$4.49
177	NET DAILY COST PER TON OF CO REDUCED	\$507,853	\$462,182
178	NET DAILY COST PER TON OF ROG REDUCED	\$3,331,823	\$3,035,698
179	NET DAILY COST PER TON OF NO _x REDUCED	\$5,497,508	\$4,947,063
180	NET DAILY COST PER TON OF PM REDUCED	\$219,900,319	\$267,141,385
181	BENEFIT		
182	NET DAILY BENEFIT PER TRIP REDUCED	N/A	N/A
183	NET DAILY BENEFIT PER VMT REDUCED	\$3.75	\$3.74
184	NET DAILY BENEFIT PER TON OF CO REDUCED	\$386,322	\$384,836
185	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$2,534,507	\$2,527,676
186	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$4,181,937	\$4,119,175
187	NET DAILY BENEFIT PER TON OF PM REDUCED	\$167,277,489	\$222,435,473

COST-EFFECTIVENESS MODEL

LACMTA

188	COST/BENEFIT		
189	NET DAILY COST/BENEFIT PER TRIP REDUCED	N/A	N/A
190	NET DAILY COST/BENEFIT PER VMT REDUCED	\$1.18	\$0.75
191	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$121,531	\$77,346
192	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$797,316	\$508,022
193	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$1,315,571	\$827,887
194	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$52,622,830	\$44,705,912

COST-EFFECTIVENESS MODEL

LACMTA

TCM # 10 BICYCLE IMPROVEMENTS

ASSUMPTIONS

1	Average length of a vanpool trip (miles)	20	REG. XV
2	Average cost per mile to drive	\$0.48	AAA
3	Average cost per commute trip of 11.4 miles	\$5.47	CALCULATED
4	Average cost per commute trip of 20 miles	\$9.60	CALCULATED
5	Percent of VMT on freeways	50%	LARTS MODEL
6	Average subsidy for carpoolers per trip	\$1.00	ASSUMED
7	Amortization period for a car (years)	5	AAA
8	Average cost of a passenger vehicle	\$16,000	AAA
9	Interest rate	8%	
10	Average cost per parking (\$ / month)	\$100	
11	Construction cost of arterials (\$ per lane mile)	\$900,000	CALTRANS
12	Lane miles arterial/vehicle trip	0.0018	COMSIS
13	Lane miles freeway/vehicle trip	0.0015	COMSIS
14	O&M cost of arterial (\$/LANE MILE)	\$765	CALTRANS
15	O&M cost of freeway (\$/LANE MILE)	\$2,000	CALTRANS
16	Percent of parking paid by private sector	90%	SCAQMD
17	Percent of parking paid by individual	10%	SCAQMD
18	Air pollution cost per mile	\$0.015	RUTHERFORD AND WELLANDER, 1986
19	Cost per vehicle-miles of delay	\$0.11	RUTHERFORD AND WELLANDER, 1986
20	Construction cost of freeway (\$/lane mile) not including right of way	\$2,500,000	SANDAG
21	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$12,000,000	CALTRANS (MIN) (IN METROPOLITAN AREA)
22	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$16,000,000	CALTRANS (MAX) (IN METROPOLITAN AREA)
23	Average construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$14,000,000	CALTRANS (AVERAGE) (IN METROPOLITAN AREA)
24	Construction cost of HOV lane (\$/lane mile)	\$2,500,000	MTC
25	Capital cost of bicycle racks (\$/rack)	\$125	MTA
26	Capital cost of shower facilities	\$300.00	ESGVEQG
27	Capital cost of locker	\$750	MTA
28	Operation and Maintenance of shower facilities (\$/SQ.FT.)	\$0.75	ESGVEQG
29	Operation and Maintenance of lockers (\$/per user)	\$5	ESGVEQG
30	Capital cost of bikes (\$/bike)	\$300	ESGVEQG
31	Operation and maintenance of bikes work space (\$/sq. ft.)	\$2	ESGVEQG
32	Capital cost of hamlet (\$/unit)	\$30	MTA
33	Operation and maintenance of bike (\$/user)	\$30	ESGVEQG
34	Construction cost of bikeway including new paving & striping (\$/lane	\$620,000	MTA(PATTI HELM)
35	Construction cost of bikeway including new paving & striping (\$/lane	\$20,000	MTA(PATTI HELM)
36	Capital cost of apparel (shorts, shoes, jersey)	\$115	MTA
37	Operation and maintenance cost per bicycle lane mile	\$200	MTA
38	Class I lane miles	50	MTA
39	Class II lane miles	2,500	MTA

METHODOLOGY

ANNUALIZATION FACTOR (AF) =

$AF = IR / (1 - (1 + IR)^{-N})$ WHERE;

IR = INTEREST RATE

N = AMORTIZATION PERIOD FOR BUS/FACILITY LIFETIME

BAF =	0.25
VAF =	0.25
CAF =	0.09
CAF =	0.25

PUBLIC SECTOR COST

DAILY PUBLIC CAPITAL COST (DPCC)

$DPCC = (LMOCI) * (CPLMI) * CAF / 260 + (LMOCII) * (CPLMII) * CAF / 260 + (DVTR / 2) * (NLPR) * (CPL) / 260 + (DVTR / 20) * (NSFPR) * CAF / 260 * (CPSF) * CAF / 260 + (DVTR / 2) * (NRPR) * (CPR) * CAF / 260$

LMOCI = BICYCLE CLASS I LANE MILES

CPLMI = COST PER CLASS I LANE MILE

CAF = CONSTRUCTION ANNUALIZATION FACTOR

LMOCII = BICYCLE CLASS II LANE MILES

CPLMII = COST PER BICYCLE CLASS II LANE MILE

DVTR = DAILY VEHICLE TRIPS REDUCED

NLPR = NUMBER OF LOCKERS PER RIDER

CPL = COST PER LOCKER

NSF = NUMBER OF SHOWER FACILITIES PER RIDER

CPSF = COST PER SHOWER FACILITY

NRPR = NUMBER OF RACKS PER RIDER

CPR = COST PER RACK

DAILY PUBLIC O & M COST (DPOMC) =

$(BLM) * (OMCPBLM) / 260 + (OMCOSF) * (NSF) / 260 + (OMCOR) * (NR) / 260 + (OMCPL) * (NL) / 260$ WHERE;

BLM = TOTAL BICYCLE LANE MILES

OMCPBLM = O & M COST PER BICYCLE LANE MILE

OMCOSF = O & M COST OF SHOWER FACILITIES

OMCOR = O & M COST OF RACKS

OMCOL = O & M COST OF LOCKERS

NL = NUMBER OF LOCKERS

NR = NUMBER OF RACKS

NSF = NUMBER OF SHOWER FACILITIES

NL, NSF, AND NR IS DETERMINED BASED ON TRIPS REDUCED

(DPAC) = DAILY PUBLIC ADMINISTRATIVE COST (DPAC) = 10% OF TOTAL COST

COST-EFFECTIVENESS MODEL

LACMTA

DAILY PUBLIC COST (DPC) =

(DPCC+DPOMC) WHERE;

DPCC = DAILY PUBLIC CAPITAL COST

DPOMC = DAILY PUBLIC O & M COST

DAILY PUBLIC REVENUES (DPR) = 0

DAILY PUBLIC COST/REVENUE (DPC/R) =

(DPCOMC) - (DPR) WHERE;

DPCOMC = DAILY PUBLIC CAPITAL AND OPERATION AND MAINTENANCE COST

DPR = DAILY PUBLIC REVENUE

DAILY PUBLIC BENEFITS (DPB) BY AVOIDING HIGHWAY BUILDING =

(DPCB) + (DPOMB) WHERE;

$DPCB = (DVTR) * (LMF/T) * (CCLMF) * (CAF)/260 * (POTOF) +$
 $+ (DPTR) * (LMA/T) * (CCLMA) * (CAF)/260 * (POTOA)$ WHERE;

DVTR = DAILY TRIPS REDUCED

LMF/T = LANE MILES OF FREEWAY PER TRIP

CCLMF = CONSTRUCTION COST OF FREEWAY LANE MILE

CAF = CONSTRUCTION ANNUALIZATION FACTOR

POTOF = PERCENT OF TRIPS ON FREEWAYS

LMA = LANE MILES OF ARTERIAL PER TRIP

CCLMA = CONSTRUCTION COST OF ARTERIAL LANE MILE

POTOA = PERCENT OF PEAK TRIPS ON ARTERIAL

$DPOMB = (DTR) * (LMF/T) * (OMCLMF)/260 * (POTOF) +$
 $+ (DTR) * (LMA/T) * (OMCLMA)/260 * (POTOA)$ WHERE;

OMCLMF = O & M COST PER LANE MILE OF FREEWAY

OMCLMA = O & M COST PER LANE MILE OF ARTERIAL

POTOF = PERCENT OF TRIPS ON FREEWAY

POTOA = PERCENT OF TRIPS ON ARTERIAL

NET PUBLIC DAILY COST/BENEFIT COUNTING THE AVOIDED COSTS (NDPC/BIAC) =
(NDPC/R) - (DPB)

INDIVIDUAL COST/BENEFIT

DAILY INDIVIDUAL COST (DIC) =
(DICC) + (DIOMC)

DICC = (CCB)*(DVTR/2)*BAF/260 + (CCH)*(DVTR/2)/260 +
+ (CCA)*(DVTR/2)/260 WHERE;

CCB = CAPITAL COST OF A BICYCLE
DVTR = DAILY VEHICLE TRIPS REDUCED
CCH = CAPITAL COST OF A HELMET
CCA = CAPITAL COST OF APPAREL

DIOMC = (DOMCPB) * (NB)/260 WHERE;

DOMCPM = DAILY O & M COST PER BICYCLE
NB = NUMBER OF BICYCLES = DAILY VEHICLE TRIPS REDUCED/2

DAILY INDIVIDUAL BENEFIT (DIB) =

(DICB) + (DIOMB) WHERE;

DICB = DAILY INDIVIDUAL CAPITAL BENEFIT (CAR COST)
DIOMB = DAILY INDIVIDUAL O & M COST SAVING (CAR O & M)

DIOMC = (DOMCPM) * (DVMTR) * (.21) + (.10 * DIPC) WHERE;

DOMCPM = DAILY O & M CAR COST PER MILE TO DRIVE
DVMTR = DAILY VEHICLE MILES TRAVELED REDUCED
.21 IS THE PERCENT OF O & M COST ATTRIBUTED TO SAVINGS
DIPC = DAILY INDIVIDUAL PARKING COST
DVTR = DAILY VEHICLE TRIPS REDUCED

NET DAILY INDIVIDUAL COST/BENEFIT (NDIC/B) =
(DIC) - (DIB) WHERE;

DIC = DAILY INDIVIDUAL COST
DIB = DAILY INDIVIDUAL BENEFITS

PRIVATE SECTOR COST/BENEFIT

DAILY PRIVATE CAPITAL COST (DPRCC) = 0

DAILY PRIVATE O & M COST (DPROMC) =

$(VTR)/2 * (MPC)*12/260 * .90$

DAILY PRIVATE CAPITAL BENEFIT (DPRCB) = 0

DAILY PRIVATE O & M BENEFIT (DPROMB) =

$(VTR) * (MPC)*12/260 * .90$ WHERE;

VTR = DAILY VEHICLE TRIPS REDUCED

MPC = MONTHLY PARKING COST

.90 = PERCENT OF PARKING PROVIDED BY PRIVATE SECTOR

NET DAILY PRIVATE COST/BENEFIT (NDPC/B) =

$(DPRC) - (DPRB)$

SOCIETAL COST

DAPC = DAILY AIR POLLUTION COST/BENEFIT

DAPC = $DVMTR * (APC/M)$ WHERE;

DVMTR = DAILY VMT REDUCED

APC/M = AIR POLLUTION COST PER MILE

DVMDCB = DAILY VEHICLE MILES OF DELAY COST/BENEFIT

DVMDC = $(DVMDS) * (C/VMD)$ WHERE;

$DVMDS = (VMT/NEW SPEED) - (VMT/EXISTING SPEED) * (AVERAGE SPEED)$

DVMDS = DAILY VEHICLE MILES OF DELAY SAVED

C/VMD = DAILY COST PER VEHICLE MILES OF DELAY SAVED

DSCB = DAILY SOCIETAL COST/BENEFIT

$DSCB = (DAPC) + (DVMDCB)$

COST-EFFECTIVENESS MODEL

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TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 1 THE BUILD SCENARIO

TOTAL DAILY COST (TDC) =
(DPC) + (DIC) + (DPRC) + (DAPC) WHERE;

DPC = DAILY PUBLIC COST
DIC = DAILY INDIVIDUAL COST
DPRC = DAILY PRIVATE COST
DAPC = DAILY AIR POLLUTION COST

TOTAL DAILY BENEFITS (TDB) =
(DPB) + (DIB) + (DPRB) + DVMDB WHERE;

DPB = DAILY PUBLIC BENEFITS
DIB = DAILY INDIVIDUAL BENEFITS
DPRB = DAILY PRIVATE BENEFITS
DVMDB = DAILY VEHICLE MILES OF DELAY BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

$[(DPC) + (DIC) + (DPRC) + (DAPC)] - [(DPB) + (DIB) + (DPRB) + (DVMDB)]$

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 2 THE NO BUILD SCENARIO

TOTAL DAILY COST (TDC) =
(DPC) + (DIC) + (DPRC) + (DAPC) + (DVMDC) WHERE;

DPC = DAILY PUBLIC COST
DIC = DAILY INDIVIDUAL COST
DPRC = DAILY PRIVATE COST
DAPC = DAILY AIR POLLUTION COST
DVMDC = DAILY VEHICLE MILES OF DELAY COST

TOTAL DAILY BENEFITS (TDB) =
(DPB) + (DIB) + (DPRB) WHERE;

DPB = DAILY PUBLIC BENEFITS
DIB = DAILY INDIVIDUAL BENEFITS
DPRB = DAILY PRIVATE BENEFITS
DVMDB = DAILY VEHICLE MILES OF DELAY BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

$[(DPC) + (DIC) + (DPRC) + (DAPC) + (DVMDC)] - [(DPB) + (DIB) + (DPRB)]$

COST-EFFECTIVENESS MODEL

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LIKELY OUTCOMES

PUBLIC SECTOR COST/BENEFIT			
		STANDARD	HIGH
1	DAILY PUBLIC CAPITAL COST	\$62,680	\$70,015
2	DAILY PUBLIC O & M COST	\$1,397	\$1,397
3	DAILY PUBLIC COST	\$64,077	\$71,412
4	DAILY PUBLIC REVENUES	\$0	\$0
5	DAILY PUBLIC COST/REVENUE	\$64,077	\$71,412
6	DAILY PUBLIC AVOIDED CAPITAL COST (SCENARIO 2)	\$21,104	\$42,214
7	DAILY PUBLIC AVOIDED O & M COST (SCENARIO 2)	\$41	\$81
8	TOTAL DAILY PUBLIC AVOIDED (SCENARIO 2)	\$21,145	\$42,295
9	NET DAILY PUBLIC BENEFIT (SCENARIO 2)	\$21,145	\$42,295
10	DAILY PUBLIC CAPITAL COST (SCENARIO 1)	\$21,104	\$42,214
11	DAILY PUBLIC O & M COST (SCENARIO 1)	\$41	\$81
12	TOTAL DAILY PUBLIC COST (SCENARIO 1)	\$21,145	\$42,295
13	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 2)	\$42,932	\$29,118
14	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 1)	\$21,145	\$42,295
15	COST		
16	DAILY PUBLIC COST PER TRIP REDUCED	\$14.75	\$8.22
17	DAILY PUBLIC COST PER VMT REDUCED	\$4.91	\$2.74
18	DAILY PUBLIC COST PER TON OF CO REDUCED	\$4,296	\$3,192
19	DAILY PUBLIC COST PER TON OF ROG REDUCED	\$42,804	\$31,795
20	DAILY PUBLIC COST PER TON OF NO _x REDUCED	\$76,739	\$56,993
21	DAILY PUBLIC COST PER TON OF PM REDUCED	\$4,271,810	\$3,246,018
22	BENEFIT		
23	DAILY PUBLIC BENEFIT PER TRIP REDUCED	\$4.87	\$4.87
24	DAILY PUBLIC BENEFIT PER VMT REDUCED	\$1.62	\$1.62
25	DAILY PUBLIC BENEFIT PER TON OF CO REDUCED	\$26,464	\$26,484
26	DAILY PUBLIC BENEFIT PER TON OF ROG REDUCED	\$352,416	\$352,457
27	DAILY PUBLIC BENEFIT PER TON OF NO _x REDUCED	\$682,096	\$693,357
28	DAILY PUBLIC BENEFIT PER TON OF PM REDUCED	ERR	ERR
29	COST/BENEFIT		
30	NET DAILY PUBLIC COST/BENEFIT PER TRIP REDUCED	\$9.88	\$3.35
31	NET DAILY PUBLIC COST/BENEFIT PER VMT REDUCED	\$3.29	\$1.12
32	NET DAILY PUBLIC COST/BENEFIT PER TON OF CO REDUCED	\$53,732	\$18,233
33	NET DAILY PUBLIC COST/BENEFIT PER TON OF ROG REDUCED	\$715,536	\$242,647
34	NET DAILY PUBLIC COST/BENEFIT PER TON OF NO _x REDUCED	\$1,384,909	\$477,338
35	NET DAILY PUBLIC COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
36	INDIVIDUAL COST/BENEFIT		
37	DAILY INDIVIDUAL CAPITAL COST	\$3,718	\$7,437
38	DAILY INDIVIDUAL O & M COST	\$251	\$501
39	DAILY INDIVIDUAL COST	\$3,969	\$7,939
40	DAILY INDIVIDUAL CAPITAL BENEFIT	\$3,348	\$6,698
41	DAILY INDIVIDUAL O & M BENEFIT	\$2,320	\$4,640
42	DAILY INDIVIDUAL BENEFIT	\$5,668	\$11,338
43	NET DAILY INDIVIDUAL COST/BENEFIT	(\$1,699)	(\$3,399)
44	COST		

COST-EFFECTIVENESS MODEL

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45	NET DAILY INDIVIDUAL COST PER TRIP REDUCED	\$0.91	\$0.91
46	NET DAILY INDIVIDUAL COST PER VMT REDUCED	\$0.30	\$0.30
47	NET DAILY INDIVIDUAL COST PER TON OF CO REDUCED	\$4,967	\$4,971
48	NET DAILY INDIVIDUAL COST PER TON OF ROG REDUCED	\$66,150	\$66,157
49	NET DAILY INDIVIDUAL COST PER TON OF NO _x REDUCED	\$128,032	\$130,146
50	NET DAILY INDIVIDUAL COST PER TON OF PM REDUCED	ERR	ERR
51	BENEFIT		
52	NET DAILY INDIVIDUAL BENEFIT PER TRIP REDUCED	\$1.30	\$1.30
53	NET DAILY INDIVIDUAL BENEFIT PER VMT REDUCED	\$0.43	\$0.43
54	NET DAILY INDIVIDUAL BENEFIT PER TON OF CO REDUCED	\$7,094	\$7,099
55	NET DAILY INDIVIDUAL BENEFIT PER TON OF ROG REDUCED	\$94,474	\$94,482
56	NET DAILY INDIVIDUAL BENEFIT PER TON OF NO _x REDUCED	\$182,854	\$185,866
57	NET DAILY INDIVIDUAL BENEFIT PER TON OF PM REDUCED	ERR	ERR
58	COST/BENEFIT		
59	NET DAILY INDIVIDUAL COST/BENEFIT PER TRIP REDUCED	(\$0.39)	(\$0.39)
60	NET DAILY INDIVIDUAL COST/BENEFIT PER VMT REDUCED	(\$0.13)	(\$0.13)
61	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF CO REDUCED	(\$2,127)	(\$2,128)
62	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF ROG REDUCED	(\$28,325)	(\$28,324)
63	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF NO _x REDUCED	(\$54,822)	(\$55,720)
64	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
65	PRIVATE SECTOR COST/BENEFIT		
66	DAILY PRIVATE CAPITAL COST	\$0	\$0
67	DAILY PRIVATE O & M COST	\$0	\$0
68	DAILY PRIVATE COST	\$0	\$0
69	DAILY PRIVATE CAPITAL BENEFIT	\$0	\$0
70	DAILY PRIVATE O & M BENEFIT	\$9,024	\$18,051
71	DAILY PRIVATE BENEFIT	\$9,024	\$18,051
72	NET DAILY PRIVATE COST/BENEFIT	(\$9,024)	(\$18,051)
73	COST		
74	NET DAILY PRIVATE COST PER TRIP REDUCED	\$0.00	\$0.00
75	NET DAILY PRIVATE COST PER VMT REDUCED	\$0.00	\$0.00
76	NET DAILY PRIVATE COST PER TON OF CO REDUCED	\$0	\$0
77	NET DAILY PRIVATE COST PER TON OF ROG REDUCED	\$0	\$0
78	NET DAILY PRIVATE COST PER TON OF NO _x REDUCED	\$0	\$0
79	NET DAILY PRIVATE COST PER TON OF PM REDUCED	ERR	ERR
80	BENEFIT		
81	NET DAILY PRIVATE BENEFIT PER TRIP REDUCED	\$2.08	\$2.08
82	NET DAILY PRIVATE BENEFIT PER VMT REDUCED	\$0.69	\$0.69
83	NET DAILY PRIVATE BENEFIT PER TON OF CO REDUCED	\$11,294	\$11,303
84	NET DAILY PRIVATE BENEFIT PER TON OF ROG REDUCED	\$150,404	\$150,421
85	NET DAILY PRIVATE BENEFIT PER TON OF NO _x REDUCED	\$291,104	\$295,910
86	NET DAILY PRIVATE BENEFIT PER TON OF PM REDUCED	ERR	ERR
87	COST/BENEFIT		
88	NET DAILY PRIVATE COST/BENEFIT PER TRIP REDUCED	(\$2.08)	(\$2.08)
89	NET DAILY PRIVATE COST/BENEFIT PER VMT REDUCED	(\$0.69)	(\$0.69)
90	NET DAILY PRIVATE COST/BENEFIT PER TON OF CO REDUCED	(\$11,294)	(\$11,303)
91	NET DAILY PRIVATE COST/BENEFIT PER TON OF ROG REDUCED	(\$150,404)	(\$150,421)
92	NET DAILY PRIVATE COST/BENEFIT PER TON OF NO _x REDUCED	(\$291,104)	(\$295,910)
93	NET DAILY PRIVATE COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
94	SOCIETAL COST/BENEFIT		

COST-EFFECTIVENESS MODEL

LACMTA

95	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
96	DAILY SOCIETAL AIR POLLUTION COST	\$196	\$391
97	DAILY SOCIETAL CONGESTION COST	\$0	\$0
98	DAILY SOCIETAL COST	\$196	\$391
99	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
100	DAILY SOCIETAL CONGESTION BENEFIT	\$251	\$501
101	DAILY SOCIETAL BENEFIT	\$251	\$501
102	NET DAILY SOCIETAL COST/BENEFIT	(\$55)	(\$110)
103	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
104	DAILY SOCIETAL AIR POLLUTION COST	\$196	\$391
105	DAILY SOCIETAL CONGESTION COST	\$251	\$501
106	DAILY SOCIETAL COST	\$446	\$893
107	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0.00	\$0.00
108	DAILY SOCIETAL CONGESTION BENEFIT	\$0.00	\$0.00
109	DAILY SOCIETAL BENEFIT	\$0	\$0
110	NET DAILY SOCIETAL COST/BENEFIT	\$446	\$893
111	SCENARIO #2 THE NO BUILD SCENARIO		
112	DAILY SOCIETAL AIR POLLUTION COST	\$0	\$0
113	DAILY SOCIETAL CONGESTION COST	\$0	\$0
114	DAILY SOCIETAL COST	\$0	\$0
115	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$196	\$391
116	DAILY SOCIETAL CONGESTION BENEFIT	\$251	\$501
117	DAILY SOCIETAL BENEFIT	\$446	\$893
118	NET DAILY SOCIETAL COST/BENEFIT	(\$446)	(\$893)
119	TOTAL COST/BENEFIT		
120	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
121	TOTAL DAILY COST	\$36,033	\$72,074
122	TOTAL DAILY BENEFIT	\$251	\$501
123	TOTAL DAILY COST/BENEFIT	\$35,783	\$71,573
124	COST		
125	NET DAILY COST PER TRIP REDUCED	\$8.29	\$8.29
126	NET DAILY COST PER VMT REDUCED	\$2.76	\$2.76
127	NET DAILY COST PER TON OF CO REDUCED	\$45,098	\$45,131
128	NET DAILY COST PER TON OF ROG REDUCED	\$600,554	\$600,619
129	NET DAILY COST PER TON OF NO _x REDUCED	\$1,162,362	\$1,181,546
130	NET DAILY COST PER TON OF PM REDUCED	ERR	ERR
131	BENEFIT		
132	NET DAILY BENEFIT PER TRIP REDUCED	\$0.06	\$0.06
133	NET DAILY BENEFIT PER VMT REDUCED	\$0.02	\$0.02
134	NET DAILY BENEFIT PER TON OF CO REDUCED	\$314	\$314
135	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$4,179	\$4,179
136	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$8,088	\$8,221
137	NET DAILY BENEFIT PER TON OF PM REDUCED	ERR	ERR

COST-EFFECTIVENESS MODEL

LACMTA

138	COST/BENEFIT		
139	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$8.24	\$8.24
140	NET DAILY COST/BENEFIT PER VMT REDUCED	\$2.74	\$2.74
141	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$44,784	\$44,817
142	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$596,375	\$596,440
143	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$1,154,274	\$1,173,325
144	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
145	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
146	TOTAL DAILY COST	\$36,284	\$72,576
147	TOTAL DAILY BENEFIT	\$0	\$0
148	TOTAL DAILY COST/BENEFIT	\$36,284	\$72,576
149	COST		
150	NET DAILY COST PER TRIP REDUCED	\$8.35	\$8.35
151	NET DAILY COST PER VMT REDUCED	\$2.78	\$2.78
152	NET DAILY COST PER TON OF CO REDUCED	\$45,412	\$45,445
153	NET DAILY COST PER TON OF ROG REDUCED	\$604,733	\$604,798
154	NET DAILY COST PER TON OF NO _x REDUCED	\$1,170,450	\$1,189,766
155	NET DAILY COST PER TON OF PM REDUCED	ERR	ERR
156	BENEFIT		
157	NET DAILY BENEFIT PER TRIP REDUCED	\$0.00	\$0.00
158	NET DAILY BENEFIT PER VMT REDUCED	\$0.00	\$0.00
159	NET DAILY BENEFIT PER TON OF CO REDUCED	\$0.00	\$0.00
160	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$0.00	\$0.00
161	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$0.00	\$0.00
162	NET DAILY BENEFIT PER TON OF PM REDUCED	ERR	ERR
163	COST/BENEFIT		
164	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$8.35	\$8.35
165	NET DAILY COST/BENEFIT PER VMT REDUCED	\$2.78	\$2.78
166	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$45,412	\$45,445
167	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$604,733	\$604,798
168	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$1,170,450	\$1,189,766
169	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
170	SCENARIO #2 THE NO BUILD SCENARIO		
171	TOTAL DAILY COST	\$68,046.14	\$79,351.30
172	TOTAL DAILY BENEFIT	\$36,283.96	\$72,575.74
173	TOTAL DAILY COST/BENEFIT	\$31,762.18	\$6,775.55
174	COST		
175	NET DAILY COST PER TRIP REDUCED	\$15.66	\$9.13
176	NET DAILY COST PER VMT REDUCED	\$5.22	\$3.04
177	NET DAILY COST PER TON OF CO REDUCED	\$85,164	\$49,688
178	NET DAILY COST PER TON OF ROG REDUCED	\$1,134,102	\$661,261
179	NET DAILY COST PER TON OF NO _x REDUCED	\$2,195,037	\$1,300,841
180	NET DAILY COST PER TON OF PM REDUCED	ERR	ERR
181	BENEFIT		
182	NET DAILY BENEFIT PER TRIP REDUCED	\$8.35	\$8.35
183	NET DAILY BENEFIT PER VMT REDUCED	\$2.78	\$2.78
184	NET DAILY BENEFIT PER TON OF CO REDUCED	\$45,412	\$45,445
185	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$604,733	\$604,798
186	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$1,170,450	\$1,189,766
187	NET DAILY BENEFIT PER TON OF PM REDUCED	ERR	ERR

COST-EFFECTIVENESS MODEL

LACMTA

188	COST/BENEFIT		
189	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$7.31	\$0.78
190	NET DAILY COST/BENEFIT PER VMT REDUCED	\$2.44	\$0.26
191	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$39,752	\$4,243
192	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$529,370	\$56,463
193	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$1,024,586	\$111,075
194	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR

COST-EFFECTIVENESS MODEL

LACMTA

TCM # 11 EMPLOYEE TRANSIT SUBSIDY

ASSUMPTIONS

1	Transit vehicle miles in LA County	251,410	MTA
2	Transit peak fleet	1,733	MTA
3	Active fleet	2,294	MTA
4	Contingency fleet	87	MTA
5	Capital cost of a bus		
5.1	Diesel	210,000	MTA
5.2	Methanol	220,000	MTA
5.3	CNG	260,000	MTA
6	Additional costs for radio and wheel chair	75,000	MTA
7	Total capital bus cost		
7.1	Diesel	285,000	MTA
7.2	Methanol	295,000	MTA
7.3	CNG	335,000	MTA
8	Average capital cost of a bus	260,500	MTA
9	Capital construction cost per facility per bus	130,250	
10	Transit ridership on a weekday	1,169,786	MTA
11	Transit ridership on Saturdays	837,722	MTA
12	Transit ridership on Sundays	580,335	MTA
13	Passenger mile/bus mile	18.2	MTA
14	Subsidy per passenger mile	\$0.27	MTA
15	Cost per bus hour	\$109.70	MTA
16	Revenue per passenger mile	\$0.16	MTA
17	Total bus hours	17,726	MTA
18	Operation cost	\$1,944,524	MTA
19	Fare box revenue	\$729,973	MTA
20	Total seat miles	10,800,996	MTA
21	Total passenger miles	4,569,352	MTA
22	Operation cost per revenue mile	\$7.73	MTA
23	Revenue per revenue mile	\$2.90	MTA
24	Amortization period for construction projects	30	MTA
25	Amortization period for equipment purchase	12	MTA
26	Amortization period for vehicles (BUSES)	12	MTA
27	O&M cost of vehicle	\$0.48	AAA
28	Construction cost of arterial (\$/lane mile)	\$900,000	CALTRANS
29	Construction annualization factor (CAF)	0.09	
30	Bus annualization factor (BAF)	0.13	
31	car annualization factor	0.25	
32	Amortization period for passenger car	5	
33	Percent of VMT on freeways	50%	LARTS MODEL
34	Interest rate	8%	MARKET RATE
35	Lane miles arterial/vehicle trip	0.0018	COMSIS
36	Lane miles freeway/vehicle trip	0.0015	COMSIS
37	O&M cost of arterial (\$/LANE MILE)	\$765	CALTRANS
38	O&M cost/mile of transit	\$4	MTA
39	O&M cost/passenger of transit	\$1	MTA
40	O&M cost of freeway (\$/LANE MILE)	\$2,000	CALTRANS
41	Monthly parking cost	\$100	MTA
42	Percent of parking paid by the private sector	90%	SCAQMD
43	Percent of parking paid by individuals	10%	SCAQMD
44	Air pollution cost per mile	\$0.015	RUTHERFORD AND WELLANDER, 1986

COST-EFFECTIVENESS MODEL

LACMTA

45	Cost per vehicle-miles of delay	\$0.11	RUTHERFORD AND WELLANDER, 1986
46	Construction cost of freeway (\$/lane mile) not including right of way	\$2,500,000	SANDAG
47	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$12,000,000	CALTRANS (MIN) (IN METROPOLITIAN AREA)
48	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$16,000,000	CALTRANS (MAX) (IN METROPOLITIAN AREA)
49	Average construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$14,000,000	CALTRANS (AVERAGE) (IN METROPOLITIAN AREA)
50	Construction cost of HOV lane (\$/lane mile)	\$2,500,000	MTC
51	Passengers per bus mile	4.65	
52	Average cost of a passanger vehicle	\$16,000	AAA
53	Operation cost per passanger	\$1.66	
54	Fare box revenue per passanger	\$0.62	
55	Average subsidy per passanger	\$1	
56	Monthly employee transit subsidy (\$/MO)	\$30	
57	Monthly fair per passanger	\$60	

METHODOLOGY

ANNUALIZATION FACTOR (AF) =

$AF = IR / (1 - (1 + (IR))^{-N})$ WHERE;

IR = INTEREST RATE

N = AMORTIZATION PERIOD FOR BUS/FACILITY LIFETIME

DAILY PUBLIC CAPITAL COST (DPCC) = 0

In this case all new riders will be accomodated on the existing bus fleet. The marginal capital cost is zero

DAILY PUBLIC O & M COST (DPOMC) =

$DPA * ADOCPP$ WHERE;

DPA = DAILY NEW PASSENGERS ACCOMODATED

ADO CPP = AVERAGE DAILY OPERATION COST PER PASSENGER

DAILY PUBLIC (DPC) =

$(DPCC + DPOMC)$ WHERE;

DPCC = DAILY PUBLIC CAPITAL COST

DPOMC = DAILY PUBLIC O & M COST

DAILY PUBLIC REVENUES (DPR) =

$DPA * DPRPP$ WHERE;

DPA = DAILY PASSENGER ACCOMODATED

DPRPP = DAILY PUBLIC REVENUE PER PASSENGER

COST-EFFECTIVENESS MODEL

LACMTA

DAILY PUBLIC COST/REVENUE (DPC/R) =

(DPCOMC) – (DPR) WHERE;

DPCOMC = DAILY PUBLIC CAPITAL AND OPERATION AND MAINTENANCE COST
DPR = DAILY PUBLIC REVENUE

DAILY PUBLIC BENEFITS (DPB) BY AVOIDING HIGHWAY BUILDING =

(DPCB) + (DPOMB) WHERE;

$DPCB = (DVTR) * (LMF/T) * (CCLMF) * (CAF)/260 * (POTOF) + (DVTR) * (LMA/T) * (CCLMA) * (CAF)/260 * (POTOA)$ WHERE;

DPTR = DAILY TRIPS REDUCED
LMF/T = LANE MILES OF FREEWAY PER TRIP
CCLMF = CONSTRUCTION COST OF FREEWAY LANE MILE
CAF = CONSTRUCTION ANNUALIZATION FACTOR
POTOF = PERCENT OF TRIPS ON FREEWAYS
LMA = LANE MILES OF ARTERIAL PER TRIP
CCLMA = CONSTRUCTION COST OF ARTERIAL LANE MILE
POTOA = PERCENT OF PEAK TRIPS ON ARTERIAL

$DPOMB = (DTR) * (LMF/T) * (OMCLMF)/260 * (POTOF) + (DTR) * (LMA/T) * (OMCLMA)/260 * (POTOA)$ WHERE;

OMCLMF = O & M COST PER LANE MILE OF FREEWAY

OMCLMA = O & M COST PER LANE MILE OF ARTERIAL
POTOF = PERCENT OF TRIPS ON FREEWAY
POTOA = PERCENT OF TRIPS ON ARTERIAL

NET PUBLIC DAILY COST/BENEFIT COUNTING THE AVOIDED COSTS (NDPC/BIAC) =
(NDPC/R) – (DPCB)

INDIVIDUAL COST

DAILY INDIVIDUAL COST (DIC) =

DPA * DFPP WHERE;

DPA = DAILY PASSENGERS ACCOMODATED
DFPP = DAILY FAIR PER PASSENGERS

COST-EFFECTIVENESS MODEL

LACMTA

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 2 THE NO BUILD SCENARIO

TOTAL DAILY COST (TDC) =
(DPC) + (DIC) + (DPRC) + (DAPC) + (DVMD C) WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DAPC = DAILY AIR POLLUTION COST

DVMD C = DAILY VEHICLE MILES OF DELAY COST

TOTAL DAILY BENEFITS (TDB) =
(DPB) + (DIB) + (DPRB) WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DVMD B = DAILY VEHICLE MILES OF DELAY BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =
[(DPC) + (DIC) + (DPRC) + (DAPC) + (DVMD C)] - [(DPB) + (DIB) + (DPRB)]

COST-EFFECTIVENESS MODEL

LACMTA

LIKELY OUTCOMES

PUBLIC SECTOR COST/BENEFIT			
		STANDARD	HIGH
1	DAILY PUBLIC CAPITAL COST	\$0.00	\$0.00
2	DAILY PUBLIC O & M COST	\$41,576	\$62,365
3	DAILY PUBLIC COST	\$41,576	\$62,365
4	DAILY PUBLIC REVENUES	\$15,608	\$23,412
5	DAILY PUBLIC COST/REVENUE	\$25,969	\$38,953
6	DAILY PUBLIC AVOIDED CAPITAL COST (SCENARIO 2)	\$242,969	\$364,456
7	DAILY PUBLIC AVOIDED O & M COST (SCENARIO 2)	\$468	\$702
8	TOTAL DAILY PUBLIC AVOIDED (SCENARIO 2)	\$243,437	\$365,158
9	NET DAILY PUBLIC BENEFIT (SCENARIO 2)	\$259,045	\$388,570
10	DAILY PUBLIC CAPITAL COST (SCENARIO 1)	\$242,969	\$364,456
11	DAILY PUBLIC O & M COST (SCENARIO 1)	\$468	\$702
12	TOTAL DAILY PUBLIC COST (SCENARIO 1)	\$243,437	\$365,158
13	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 2)	(\$217,469)	(\$326,205)
14	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 1)	\$243,437	\$365,158
15	COST		
16	DAILY PUBLIC COST PER TRIP REDUCED	\$0.83	\$0.83
17	DAILY PUBLIC COST PER VMT REDUCED	\$0.06	\$0.06
18	DAILY PUBLIC COST PER TON OF CO REDUCED	\$2,787	\$2,787
19	DAILY PUBLIC COST PER TON OF ROG REDUCED	\$27,773	\$27,767
20	DAILY PUBLIC COST PER TON OF NOx REDUCED	\$49,792	\$49,773
21	DAILY PUBLIC COST PER TON OF PM REDUCED	\$2,771,758	\$2,834,772
22	BENEFIT		
23	DAILY PUBLIC BENEFIT PER TRIP REDUCED	\$5.18	\$5.18
24	DAILY PUBLIC BENEFIT PER VMT REDUCED	\$0.38	\$0.38
25	DAILY PUBLIC BENEFIT PER TON OF CO REDUCED	\$17,366	\$17,367
26	DAILY PUBLIC BENEFIT PER TON OF ROG REDUCED	\$173,043	\$173,005
27	DAILY PUBLIC BENEFIT PER TON OF NOx REDUCED	\$310,234	\$310,112
28	DAILY PUBLIC BENEFIT PER TON OF PM REDUCED	\$17,269,665	\$17,662,275
29	COST/BENEFIT		
30	NET DAILY PUBLIC COST/BENEFIT PER TRIP REDUCED	(\$4.35)	(\$4.35)
31	NET DAILY PUBLIC COST/BENEFIT PER VMT REDUCED	(\$0.32)	(\$0.32)
32	NET DAILY PUBLIC COST/BENEFIT PER TON OF CO REDUCED	(\$14,579)	(\$14,580)
33	NET DAILY PUBLIC COST/BENEFIT PER TON OF ROG REDUCED	(\$145,270)	(\$145,238)
34	NET DAILY PUBLIC COST/BENEFIT PER TON OF NOx REDUCED	(\$260,441)	(\$260,339)
35	NET DAILY PUBLIC COST/BENEFIT PER TON OF PM REDUCED	(\$14,497,907)	(\$14,827,503)
36	INDIVIDUAL COST/BENEFIT		
37	DAILY INDIVIDUAL CAPITAL COST	\$0	\$0
38	DAILY INDIVIDUAL O & M COST	\$69,263	\$103,895
39	DAILY INDIVIDUAL COST	\$69,263	\$103,895
40	DAILY INDIVIDUAL CAPITAL BENEFIT	\$38,479	\$57,719
41	DAILY INDIVIDUAL O & M BENEFIT	\$115,319	\$172,979
42	DAILY INDIVIDUAL BENEFIT	\$153,798	\$230,698
43	NET DAILY INDIVIDUAL COST/BENEFIT	(\$84,535)	(\$126,803)

COST-EFFECTIVENESS MODEL

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44	COST		
45	NET DAILY INDIVIDUAL COST PER TRIP REDUCED	\$1.38	\$1.38
46	NET DAILY INDIVIDUAL COST PER VMT REDUCED	\$0.10	\$0.10
47	NET DAILY INDIVIDUAL COST PER TON OF CO REDUCED	\$4,643	\$4,644
48	NET DAILY INDIVIDUAL COST PER TON OF ROG REDUCED	\$46,268	\$46,258
49	NET DAILY INDIVIDUAL COST PER TON OF NO _x REDUCED	\$82,949	\$82,917
50	NET DAILY INDIVIDUAL COST PER TON OF PM REDUCED	\$4,617,508	\$4,722,483
51	BENEFIT		
52	NET DAILY INDIVIDUAL BENEFIT PER TRIP REDUCED	\$3.07	\$3.07
53	NET DAILY INDIVIDUAL BENEFIT PER VMT REDUCED	\$0.22	\$0.22
54	NET DAILY INDIVIDUAL BENEFIT PER TON OF CO REDUCED	\$10,310	\$10,311
55	NET DAILY INDIVIDUAL BENEFIT PER TON OF ROG REDUCED	\$102,737	\$102,715
56	NET DAILY INDIVIDUAL BENEFIT PER TON OF NO _x REDUCED	\$184,189	\$184,116
57	NET DAILY INDIVIDUAL BENEFIT PER TON OF PM REDUCED	\$10,253,193	\$10,486,261
58	COST/BENEFIT		
59	NET DAILY INDIVIDUAL COST/BENEFIT PER TRIP REDUCED	(\$1.69)	(\$1.69)
60	NET DAILY INDIVIDUAL COST/BENEFIT PER VMT REDUCED	(\$0.12)	(\$0.12)
61	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF CO REDUCED	(\$5,667)	(\$5,667)
62	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF ROG REDUCED	(\$56,470)	(\$56,457)
63	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF NO _x REDUCED	(\$101,240)	(\$101,200)
64	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF PM REDUCED	(\$5,635,686)	(\$5,763,779)
65	PRIVATE SECTOR COST/BENEFIT		
66	DAILY PRIVATE CAPITAL COST	\$0	\$0
67	DAILY PRIVATE O & M COST	\$34,631	\$51,947
68	DAILY PRIVATE COST	\$34,631	\$51,947
69	DAILY PRIVATE CAPITAL BENEFIT	\$0	\$0
70	DAILY PRIVATE O & M BENEFIT	\$103,894	\$155,842
71	DAILY PRIVATE BENEFIT	\$103,894	\$155,842
72	NET DAILY PRIVATE COST/BENEFIT	(\$69,263)	(\$103,895)
73	COST		
74	NET DAILY PRIVATE COST PER TRIP REDUCED	\$0.69	\$0.69
75	NET DAILY PRIVATE COST PER VMT REDUCED	\$0.05	\$0.05
76	NET DAILY PRIVATE COST PER TON OF CO REDUCED	\$2,322	\$2,322
77	NET DAILY PRIVATE COST PER TON OF ROG REDUCED	\$23,134	\$23,129
78	NET DAILY PRIVATE COST PER TON OF NO _x REDUCED	\$41,475	\$41,458
79	NET DAILY PRIVATE COST PER TON OF PM REDUCED	\$2,308,754	\$2,361,241
80	BENEFIT		
81	NET DAILY PRIVATE BENEFIT PER TRIP REDUCED	\$2.08	\$2.08
82	NET DAILY PRIVATE BENEFIT PER VMT REDUCED	\$0.15	\$0.15
83	NET DAILY PRIVATE BENEFIT PER TON OF CO REDUCED	\$6,965	\$6,965
84	NET DAILY PRIVATE BENEFIT PER TON OF ROG REDUCED	\$69,401	\$69,386
85	NET DAILY PRIVATE BENEFIT PER TON OF NO _x REDUCED	\$124,424	\$124,375
86	NET DAILY PRIVATE BENEFIT PER TON OF PM REDUCED	\$6,926,262	\$7,083,724
87	COST/BENEFIT		
88	NET DAILY PRIVATE COST/BENEFIT PER TRIP REDUCED	(\$1.38)	(\$1.38)
89	NET DAILY PRIVATE COST/BENEFIT PER VMT REDUCED	(\$0.10)	(\$0.10)
90	NET DAILY PRIVATE COST/BENEFIT PER TON OF CO REDUCED	(\$4,643)	(\$4,644)
91	NET DAILY PRIVATE COST/BENEFIT PER TON OF ROG REDUCED	(\$46,268)	(\$46,258)
92	NET DAILY PRIVATE COST/BENEFIT PER TON OF NO _x REDUCED	(\$82,949)	(\$82,917)
93	NET DAILY PRIVATE COST/BENEFIT PER TON OF PM REDUCED	(\$4,617,508)	(\$4,722,483)

COST-EFFECTIVENESS MODEL

LACMTA

94	SOCIETAL COST/BENEFIT		
95	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
96	DAILY SOCIETAL AIR POLLUTION COST	\$10,265	\$15,397
97	DAILY SOCIETAL CONGESTION COST		\$0
98	DAILY SOCIETAL COST	\$10,265	\$15,397
99	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
100	DAILY SOCIETAL CONGESTION BENEFIT	\$20,563	\$30,844
101	DAILY SOCIETAL BENEFIT	\$20,563	\$30,844
102	NET DAILY SOCIETAL COST/BENEFIT	(\$10,298)	(\$15,447)
103	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
104	DAILY SOCIETAL AIR POLLUTION COST	\$10,265	\$15,397
105	DAILY SOCIETAL CONGESTION COST	\$20,563	\$30,844
106	DAILY SOCIETAL COST	\$30,828	\$46,242
107	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0.00	\$0.00
108	DAILY SOCIETAL CONGESTION BENEFIT	\$0.00	\$0.00
109	DAILY SOCIETAL BENEFIT	\$0	\$0
110	NET DAILY SOCIETAL COST/BENEFIT	\$30,828	\$46,242
111	SCENARIO #2 THE NO BUILD SCENARIO		
112	DAILY SOCIETAL AIR POLLUTION COST	\$0	\$0
113	DAILY SOCIETAL CONGESTION COST	\$0	\$0
114	DAILY SOCIETAL COST	\$0	\$0
115	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$10,265	\$15,397
116	DAILY SOCIETAL CONGESTION BENEFIT	\$20,563	\$30,844
117	DAILY SOCIETAL BENEFIT	\$30,828	\$46,242
118	NET DAILY SOCIETAL COST/BENEFIT	(\$30,828)	(\$46,242)
119	TOTAL COST/BENEFIT		
120	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
121	TOTAL DAILY COST	\$511,394	\$767,095
122	TOTAL DAILY BENEFIT	\$20,563	\$30,844
123	TOTAL DAILY COST/BENEFIT	\$490,831	\$736,251
124	COST		
125	NET DAILY COST PER TRIP REDUCED	\$10.22	\$10.22
126	NET DAILY COST PER VMT REDUCED	\$0.75	\$0.75
127	NET DAILY COST PER TON OF CO REDUCED	\$34,283	\$34,285
128	NET DAILY COST PER TON OF ROG REDUCED	\$341,612	\$341,538
129	NET DAILY COST PER TON OF NOx REDUCED	\$612,448	\$612,207
130	NET DAILY COST PER TON OF PM REDUCED	\$34,092,923	\$34,867,961
131	BENEFIT		
132	NET DAILY BENEFIT PER TRIP REDUCED	\$0.41	\$0.41
133	NET DAILY BENEFIT PER VMT REDUCED	\$0.03	\$0.03
134	NET DAILY BENEFIT PER TON OF CO REDUCED	\$1,378	\$1,379
135	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$13,736	\$13,733
136	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$24,626	\$24,616
137	NET DAILY BENEFIT PER TON OF PM REDUCED	\$1,370,859	\$1,402,016

COST-EFFECTIVENESS MODEL

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138	COST/BENEFIT		
139	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$9.81	\$9.81
140	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.72	\$0.72
141	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$32,904	\$32,907
142	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$327,876	\$327,805
143	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$587,821	\$587,590
144	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$32,722,063	\$33,465,944
145	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
146	TOTAL DAILY COST	\$531,957	\$797,939
147	TOTAL DAILY BENEFIT	\$0	\$0
148	TOTAL DAILY COST/BENEFIT	\$531,957	\$797,939
149	COST		
150	NET DAILY COST PER TRIP REDUCED	\$10.63	\$10.63
151	NET DAILY COST PER VMT REDUCED	\$0.78	\$0.78
152	NET DAILY COST PER TON OF CO REDUCED	\$35,661	\$35,664
153	NET DAILY COST PER TON OF ROG REDUCED	\$355,349	\$355,271
154	NET DAILY COST PER TON OF NO _x REDUCED	\$637,074	\$636,823
155	NET DAILY COST PER TON OF PM REDUCED	\$35,463,782	\$36,269,977
156	BENEFIT		
157	NET DAILY BENEFIT PER TRIP REDUCED	\$0	\$0
158	NET DAILY BENEFIT PER VMT REDUCED	\$0	\$0
159	NET DAILY BENEFIT PER TON OF CO REDUCED	\$0	\$0
160	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$0	\$0
161	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$0	\$0
162	NET DAILY BENEFIT PER TON OF PM REDUCED	\$0	\$0
163	COST/BENEFIT		
164	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$10.63	\$10.63
165	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.78	\$0.78
166	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$35,661	\$35,664
167	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$355,349	\$355,271
168	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$637,074	\$636,823
169	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$35,463,782	\$36,269,977
170	SCENARIO #2 THE NO BUILD SCENARIO		
171	TOTAL DAILY COST	\$145,470	\$218,207
172	TOTAL DAILY BENEFIT	\$547,564	\$821,351
173	TOTAL DAILY COST/BENEFIT	(\$402,094)	(\$603,144)
174	COST		
175	NET DAILY COST PER TRIP REDUCED	\$2.91	\$2.91
176	NET DAILY COST PER VMT REDUCED	\$0.21	\$0.21
177	NET DAILY COST PER TON OF CO REDUCED	\$9,752	\$9,753
178	NET DAILY COST PER TON OF ROG REDUCED	\$97,175	\$97,154
179	NET DAILY COST PER TON OF NO _x REDUCED	\$174,216	\$174,148
180	NET DAILY COST PER TON OF PM REDUCED	\$9,698,020	\$9,918,496
181	BENEFIT		
182	NET DAILY BENEFIT PER TRIP REDUCED	\$10.95	\$10.95
183	NET DAILY BENEFIT PER VMT REDUCED	\$0.80	\$0.80
184	NET DAILY BENEFIT PER TON OF CO REDUCED	\$36,707	\$36,710
185	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$365,775	\$365,695
186	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$655,766	\$655,508
187	NET DAILY BENEFIT PER TON OF PM REDUCED	\$36,504,298	\$37,334,148

COST-EFFECTIVENESS MODEL

LACMTA

188	COST/BENEFIT		
189	NET DAILY COST/BENEFIT PER TRIP REDUCED	(\$8.04)	(\$8.04)
190	NET DAILY COST/BENEFIT PER VMT REDUCED	(\$0.59)	(\$0.59)
191	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	(\$26,955)	(\$26,957)
192	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	(\$268,600)	(\$268,542)
193	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	(\$481,550)	(\$481,360)
194	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	(\$26,806,278)	(\$27,415,653)

COST-EFFECTIVENESS MODEL

LACMTA

TCM # 12 VANPOOL SUBSIDY

ASSUMPTIONS

1	AVERAGE VANPOOL ACCUPANCY	7.00	REG. XV
2	AVERAGE LENGTH OF A VANPOOL TRIP (MILES)	20	REG. XV
3	AVERAGE COST PER MILE TO DRIVE	\$0.48	AAA
4	AVERAGE COST PER COMMUTE TRIP OF 11.4 MILES	\$5.47	CALCULATED
5	AVERAGE COST PER COMMUTE TRIP OF 20 MILES	\$9.60	CALCULATED
6	PERCENT OF VMT ON FREEWAYS	50%	LARTS MODEL
7	AVERAGE SUBSIDY FOR VANPOOLERS PER TRIP	\$1.00	ASSUMED
8	PURCHASE COST OF A VAN	\$32,000	CTS
9	AMORTIZATION PERIOD FOR A VAN (YEARS)	5	VPSI
10	AVERAGE COST OF A PASSENGER VEHICLE	\$16,000	AAA
11	OPERATION AND MAINTENANCE COST PER PASSENGER VAN (\$/MILE)	\$0.70	AAA
12	OPERATING AND MAINTENANCE COST PER MILE FOR PASSENGER CAR	\$0.48	AAA
13	NUMBER OF VANS NEEDED	2,000	MTA
14	INTEREST RATE	8%	MARKET RATE
15	AVERAGE COST OF A VANPOOL TRIP TO THE PASSENGER (\$/MO)	\$150	CTS
16	AVERAGE COST PER PARKING (\$/MO)	\$100	MTA
17	AVERAGE DAILY VEHICLE MILES	22.8	CALCULATED
18	AVERAGE DAILY FAIR	\$8	CALCULATED
19	AMORTIZATION PERIOD FOR A CAR (YEARS)	5	AAA
20	PERCENT OF VMT ON FREEWAYS	50%	LARTS MODEL
21	INTEREST RATE	8%	MARKET RATE
22	CONSTRUCTION COST OF ARTERIAL (\$/LANE MILE)	\$900,000	CALTRANS
23	LANE MILES ARTERIAL/VEHICLE TRIP	0.0018	COMSIS
24	LANE MILES FREEWAY/VEHICLE TRIP	0.0015	COMSIS
25	O&M COST OF ARTERIAL (\$/LANE MILE)	\$765	CALTRANS
26	O&M COST OF FREEWAY (\$/LANE MILE)	\$2,000	CALTRANS
27	MONTHLY PARKING COST	\$100	MTA
28	PERCENT OF PARKING PAID BY PRIVATE SECTOR	90%	SCAQMD
29	PERCENT OF PARKING PAID BY INDIVIDUAL	10%	SCAQMD
30	AIR POLLUTION COST PER MILE	\$0.015	RUTHERFORD AND WELLANDER, 1986
31	COST PER VEHICLE MILES OF DELAY	\$0.11	RUTHERFORD AND WELLANDER, 1986
32	CONSTRUCTION COST OF FREEWAY NOT INCLUDING RIGHT OF WAY (\$/LANE MILE)	\$2,500,000	SANDAG
33	CONSTRUCTION COST OF FREEWAY INCLUDING RIGHT OF WAY (\$/LANE MILE)	\$12,000,000	CALTRANS (MIN) (IN METROPOLITAN AREA)
34	CONSTRUCTION COST OF FREEWAY INCLUDING RIGHT OF WAY (\$/LANE MILE)	\$16,000,000	CALTRANS (MAX) (IN METROPOLITAN AREA)
35	AVERAGE CONSTRUCTION COST OF FREEWAY INCLUDING RIGHT OF WAY (\$/LANE MILE)	\$14,000,000	CALTRANS (AVERAGE) (IN METROPOLITAN AREA)
36	CONSTRUCTION COST OF HOV LANE (\$/LANE MILE)	\$2,500,000	MTC

COST-EFFECTIVENESS MODEL

LACMTA

METHODOLOGY

ANNUALIZATION FACTOR (AF) =

$AF = IR / (1 - (1 + (IR))^{-N})$ WHERE;

IR = INTEREST RATE

N = AMORTIZATION PERIOD FOR BUS/FACILITY LIFETIME

VAF = 0.25
CAF = 0.09
CAF = 0.25

PUBLIC SECTOR COST

DAILY PUBLIC CAPITAL COST (DPCC) = 0

DAILY PUBLIC O & M COST (DPOMC) =

$DSPT * DVTR + DPAC$ WHERE;

DSPT = DAILY SUBSIDY PER TRIP

DVTR = DAILY VEHICLE TRIPS REDUCED

DPAC = DAILY PUBLIC ADMINISTRATIVE COST

(DPAC) = DAILY PUBLIC ADMINISTRATIVE COST (DPAC) = 10% OF TOTAL COST

DAILY PUBLIC COST (DPC) =

(DPCC + DPOMC) WHERE;

DPCC = DAILY PUBLIC CAPITAL COST

DPOMC = DAILY PUBLIC O & M COST

DAILY PUBLIC REVENUES (DPR) = 0

DAILY PUBLIC COST/REVENUE (DPC/R) =

(DPCOMC) - (DPR) WHERE;

DPCOMC = DAILY PUBLIC CAPITAL AND OPERATION AND MAINTENANCE COST

DPR = DAILY PUBLIC REVENUE

COST-EFFECTIVENESS MODEL

LACMTA

DAILY PUBLIC BENEFITS (DPB) BY AVOIDING HIGHWAY BUILDING =

(DPCB) + (DPOMB) WHERE;

$$\text{DPCB} = (\text{DPTR}) * (\text{LMF/T}) * (\text{CCLMF}) * (\text{CAF})/260 * (\text{POTOF}) + \\ + (\text{DPTR}) * (\text{LMA/T}) * (\text{CCLMA}) * (\text{CAF})/260 * (\text{POTOA}) \text{ WHERE;}$$

DPTR = DAILY TRIPS REDUCED

LMF/T = LANE MILES OF FREEWAY PER TRIP

CCLMF = CONSTRUCTION COST OF FREEWAY LANE MILE

CAF = CONSTRUCTION ANNUALIZATION FACTOR

POTOF = PERCENT OF TRIPS ON FREEWAYS

LMA = LANE MILES OF ARTERIAL PER TRIP

CCLMA = CONSTRUCTION COST OF ARTERIAL LANE MILE

POTOA = PERCENT OF PEAK TRIPS ON ARTERIAL

$$\text{DPOMB} = (\text{DTR}) * (\text{LMFA/T}) * (\text{OMCLMF})/260 * (\text{POTOF}) + \\ + (\text{DTR}) * (\text{LMA/T}) * (\text{OMCLMA})/260 * (\text{POTOA}) \text{ WHERE;}$$

OMCLMF = O & M COST PER LANE MILE OF FREEWAY

OMCLMA = O & M COST PER LANE MILE OF ARTERIAL

POTOF = PERCENT OF TRIPS ON FREEWAY

POTOA = PERCENT OF TRIPS ON ARTERIAL

NET PUBLIC DAILY COST/BENEFIT COUNTING THE AVOIDED COSTS (NDPC/BIAC) =
(NDPC/R) - (DPB)

INDIVIDUAL COST

DAILY INDIVIDUAL COST (DIC)

DIOMC =

(DCPT) * (DVTR) WHERE;

DCPT = DAILY COST PER TRIP

DVTR = DAILY VEHICLE TRIPS REDUCED

DAILY INDIVIDUAL BENEFIT (DIB) =

(DICB) + (DIOMB) WHERE;

DICB = DAILY INDIVIDUAL CAPITAL BENEFIT (CAR COST)

DIOMB = DAILY INDIVIDUAL O & M COST SAVING (CAR O & M)

$$\text{DIOMC} = (\text{DOMCPM}) * (\text{DVMTR}) * (.21) + (.10 * \text{DIPC}) + (\text{DSPT} * \text{DVTR}) \text{ WHERE;}$$

DOMCPM = DAILY O & M CAR COST PER MILE TO DRIVE

DVMTR = DAILY VEHICLE MILES TRAVELED REDUCED

.21 IS THE PERCENT OF O & M COST ATTRIBUTED TO SAVINGS

DIPC = DAILY INDIVIDUAL PARKING COST

DSPT = DAILY SUBSIDY PER TRIP

DVTR = DAILY VEHICLE TRIPS REDUCED

COST-EFFECTIVENESS MODEL

LACMTA

NET DAILY INDIVIDUAL COST/BENEFIT (NDIC/B) =

(DIC) - (DIB) WHERE;

DIC = DAILY INDIVIDUAL COST

DIB = DAILY INDIVIDUAL BENEFITS

PRIVATE SECTOR COST/BENEFIT

DAILY PRIVATE CAPITAL COST (DPRCC) =

(NV) * (CV) * (VAF) / 260 WHERE;

NV = NUMBER OF VANS PURCHASED

CV = CAPITAL COST OF A VAN

VAF = VAN ANNUALIZATION FACTOR

260 = THE NUMBER OF WORKING DAYS IN A YEAR

DAILY PRIVATE O & M COST (DPOMC) =

(NODVM) * (NV) * (C/M) WHERE;

NODVM = NUMBER OF DAILY VEHICLE MILES

NV = NUMBER OF VANS

C/M = COST PER VEHICLE MILE

DAILY PRIVATE COST (DPC) =

(DPRCC + DPOMC) WHERE;

DPCC = DAILY PRIVATE CAPITAL COST

DPOMC = DAILY PRIVATE O & M COST

DAILY PRIVATE REVENUES (DPRR) =

(DVTR) * (DFP) WHERE;

DVTR = DAILY VEHICLE TRIPS REDUCED

DFP = DAILY FARE PAID

DAILY PRIVATE COST/REVENUE (DPC/R) =

(DPRCOMC) - (DPRR) WHERE;

DPCOMC = DAILY PRIVATE CAPITAL AND OPERATION AND MAINTENANCE COST

DPR = DAILY PRIVATE REVENUE

DAILY PRIVATE O & M BENEFIT (DPROMB) =

(VTR) * (MPC) * 12 / 260 * .90 WHERE;

VTR = DAILY VEHICLE TRIPS REDUCED

MPC = MONTHLY PARKING COST

.90 = PERCENT OF PARKING PROVIDED BY PRIVATE SECTOR

COST-EFFECTIVENESS MODEL

LACMTA

NET DAILY PRIVATE COST/BENEFIT (NDPC/B) =
(DPRC) - (DPRB)

SOCIETAL COST

DAPC = DAILY AIR POLLUTION COST/BENEFIT
DAPC = DVMTR * (APC/M) WHERE;

DVMTR = DAILY VMT REDUCED
APC/M = AIR POLLUTION COST PER MILE

DVMDCB = DAILY VEHICLE MILES OF DELAY COST/BENEFIT
DVMDC = (DVMDS) * (C/VMD) WHERE;

DVMDS = (VMT/NEW SPEED) - (VMT/EXISTING SPEED) * (AVERAGE SPEED)
DVMDS = DAILY VEHICLE MILES OF DELAY SAVED
C/VMD = DAILY COST PER VEHICLE MILES OF DELAY SAVED

DSCB = DAILY SOCIETAL COST/BENEFIT

DSCB = (DAPC) + (DVMDCB)

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 1 THE BUILD SCENARIO

TOTAL DAILY COST (TDC) =
(DPC) + (DIC) + (DPRC) + (DAPC) WHERE;
DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST
DPRC = DAILY PRIVATE COST
DAPC = DAILY AIR POLLUTION COST

TOTAL DAILY BENEFITS (TDB) =
(DPB) + (DIB) + (DPRB) + DVMDB WHERE;

DPB = DAILY PUBLIC BENEFITS
DIB = DAILY INDIVIDUAL BENEFITS
DPRB = DAILY PRIVATE BENEFITS
DVMDB = DAILY VEHICLE MILES OF DELAY BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

[(DPC) + (DIC) + (DPRC) + (DAPC)] - [(DPB) + (DIB) + (DPRB) + (DVMDB)]

COST-EFFECTIVENESS MODEL

LACMTA

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 2 THE NO BUILD SCENARIO

TOTAL DAILY COST (TDC) =

(DPC) + (DIC) + (DPRC) + (DAPC) + (DVMD C) WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DAPC = DAILY AIR POLLUTION COST

DVMD C = DAILY VEHICLE MILES OF DELAY COST

TOTAL DAILY BENEFITS (TDB) =

(DPB) + (DIB) + (DPRB) WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DVMD B = DAILY VEHICLE MILES OF DELAY BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

[(DPC) + (DIC) + (DPRC) + (DAPC) + (DVMD C)] - [(DPB) + (DIB) + (DPRB) + (DSB)]

COST-EFFECTIVENESS MODEL

LACMTA

LIKELY OUTCOMES

PUBLIC SECTOR COST/BENEFIT		STANDARD	HIGH
1	DAILY PUBLIC CAPITAL COST	\$0	\$0
2	DAILY PUBLIC O & M COST	\$35,593	\$53,389
3	DAILY PUBLIC COST	\$35,593	\$53,389
4	DAILY PUBLIC REVENUES	\$0	\$0
5	DAILY PUBLIC COST/REVENUE	\$35,593	\$35,593
6	DAILY PUBLIC AVOIDED CAPITAL COST (SCENARIO 2)	\$157,163	\$235,742
7	DAILY PUBLIC AVOIDED O & M COST (SCENARIO 2)	\$303	\$454
8	TOTAL DAILY PUBLIC AVOIDED (SCENARIO 2)	\$157,466	\$236,196
9	NET DAILY PUBLIC BENEFIT (SCENARIO 2)	\$157,466	\$236,196
10	DAILY PUBLIC CAPITAL COST (SCENARIO 1)	\$157,163	\$235,742
11	DAILY PUBLIC O & M COST (SCENARIO 1)	\$303	\$454
12	TOTAL DAILY PUBLIC COST (SCENARIO 1)	\$157,466	\$236,196
13	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 2)	(\$121,873)	(\$200,603)
14	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 1)	\$157,466	\$236,196
15	COST		
16	DAILY PUBLIC COST PER TRIP REDUCED	\$1.10	\$1.10
17	DAILY PUBLIC COST PER VMT REDUCED	\$0.03	\$0.03
18	DAILY PUBLIC COST PER TON OF CO REDUCED	\$2,089	\$2,089
19	DAILY PUBLIC COST PER TON OF ROG REDUCED	\$17,063	\$17,062
20	DAILY PUBLIC COST PER TON OF NOx REDUCED	\$28,914	\$28,921
21	DAILY PUBLIC COST PER TON OF PM REDUCED	\$1,318,248	\$1,334,713
22	BENEFIT		
23	DAILY PUBLIC BENEFIT PER TRIP REDUCED	\$4.87	\$4.87
24	DAILY PUBLIC BENEFIT PER VMT REDUCED	\$0.13	\$0.13
25	DAILY PUBLIC BENEFIT PER TON OF CO REDUCED	\$9,241	\$9,242
26	DAILY PUBLIC BENEFIT PER TON OF ROG REDUCED	\$75,487	\$75,486
27	DAILY PUBLIC BENEFIT PER TON OF NOx REDUCED	\$127,917	\$127,950
28	DAILY PUBLIC BENEFIT PER TON OF PM REDUCED	\$5,832,057	\$5,904,897
29	COST/BENEFIT		
30	NET DAILY PUBLIC COST/BENEFIT PER TRIP REDUCED	(\$3.77)	(\$4.13)
31	NET DAILY PUBLIC COST/BENEFIT PER VMT REDUCED	\$0.13	\$0.13
32	NET DAILY PUBLIC COST/BENEFIT PER TON OF CO REDUCED	(\$7,153)	(\$7,849)
33	NET DAILY PUBLIC COST/BENEFIT PER TON OF ROG REDUCED	(\$58,424)	(\$64,111)
34	NET DAILY PUBLIC COST/BENEFIT PER TON OF NOx REDUCED	(\$99,003)	(\$108,669)
35	NET DAILY PUBLIC COST/BENEFIT PER TON OF PM REDUCED	(\$4,513,809)	(\$5,015,079)
36	INDIVIDUAL COST/BENEFIT		
37	DAILY INDIVIDUAL CAPITAL COST	\$0	\$0
38	DAILY INDIVIDUAL O & M COST	\$112,005	\$168,006
39	DAILY INDIVIDUAL COST	\$112,005	\$168,006
40	DAILY INDIVIDUAL CAPITAL BENEFIT	\$0	\$0
41	DAILY INDIVIDUAL O & M BENEFIT	\$161,444	\$242,166
42	DAILY INDIVIDUAL BENEFIT	\$161,444	\$242,166
43	NET DAILY INDIVIDUAL COST/BENEFIT	(\$49,439)	(\$74,160)

COST-EFFECTIVENESS MODEL

LACMTA

44	COST		
45	NET DAILY INDIVIDUAL COST PER TRIP REDUCED	\$3.46	\$3.46
46	NET DAILY INDIVIDUAL COST PER VMT REDUCED	\$0.09	\$0.09
47	NET DAILY INDIVIDUAL COST PER TON OF CO REDUCED	\$6,573	\$6,574
48	NET DAILY INDIVIDUAL COST PER TON OF ROG REDUCED	\$53,694	\$53,693
49	NET DAILY INDIVIDUAL COST PER TON OF NO _x REDUCED	\$90,987	\$91,011
50	NET DAILY INDIVIDUAL COST PER TON OF PM REDUCED	\$4,148,333	\$4,200,144
51	BENEFIT		
52	NET DAILY INDIVIDUAL BENEFIT PER TRIP REDUCED	\$4.99	\$4.99
53	NET DAILY INDIVIDUAL BENEFIT PER VMT REDUCED	\$0.13	\$0.13
54	NET DAILY INDIVIDUAL BENEFIT PER TON OF CO REDUCED	\$9,475	\$9,476
55	NET DAILY INDIVIDUAL BENEFIT PER TON OF ROG REDUCED	\$77,394	\$77,394
56	NET DAILY INDIVIDUAL BENEFIT PER TON OF NO _x REDUCED	\$131,149	\$131,184
57	NET DAILY INDIVIDUAL BENEFIT PER TON OF PM REDUCED	\$5,979,423	\$6,054,151
58	COST/BENEFIT		
59	NET DAILY INDIVIDUAL COST/BENEFIT PER TRIP REDUCED	(\$1.53)	(\$1.53)
60	NET DAILY INDIVIDUAL COST/BENEFIT PER VMT REDUCED	(\$0.04)	(\$0.04)
61	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF CO REDUCED	(\$2,902)	(\$2,902)
62	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF ROG REDUCED	(\$23,701)	(\$23,701)
63	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF NO _x REDUCED	(\$40,162)	(\$40,173)
64	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF PM REDUCED	(\$1,831,090)	(\$1,854,007)
65	PRIVATE SECTOR COST/BENEFIT		
66	DAILY PRIVATE CAPITAL COST	\$61,651	\$61,651
67	DAILY PRIVATE O & M COST	\$56,000	\$56,000
68	DAILY PRIVATE COST	\$117,651	\$117,651
69	DAILY PRIVATE CAPITAL BENEFIT	\$112,005	\$168,006
70	DAILY PRIVATE O & M BENEFIT	\$67,203	\$100,803
71	DAILY PRIVATE BENEFIT	\$179,208	\$268,809
72	NET DAILY PRIVATE COST/BENEFIT	(\$61,557)	(\$151,158)
73	COST		
74	NET DAILY PRIVATE COST PER TRIP REDUCED	\$3.64	\$2.42
75	NET DAILY PRIVATE COST PER VMT REDUCED	\$0.10	\$0.07
76	NET DAILY PRIVATE COST PER TON OF CO REDUCED	\$6,905	\$4,603
77	NET DAILY PRIVATE COST PER TON OF ROG REDUCED	\$56,400	\$37,600
78	NET DAILY PRIVATE COST PER TON OF NO _x REDUCED	\$95,573	\$63,733
79	NET DAILY PRIVATE COST PER TON OF PM REDUCED	\$4,357,438	\$2,941,270
80	BENEFIT		
81	NET DAILY PRIVATE BENEFIT PER TRIP REDUCED	\$5.54	\$5.54
82	NET DAILY PRIVATE BENEFIT PER VMT REDUCED	\$0.15	\$0.15
83	NET DAILY PRIVATE BENEFIT PER TON OF CO REDUCED	\$10,518	\$10,518
84	NET DAILY PRIVATE BENEFIT PER TON OF ROG REDUCED	\$85,910	\$85,909
85	NET DAILY PRIVATE BENEFIT PER TON OF NO _x REDUCED	\$145,579	\$145,617
86	NET DAILY PRIVATE BENEFIT PER TON OF PM REDUCED	\$6,637,333	\$6,720,231
87	COST/BENEFIT		
88	NET DAILY PRIVATE COST/BENEFIT PER TRIP REDUCED	(\$1.90)	(\$3.11)
89	NET DAILY PRIVATE COST/BENEFIT PER VMT REDUCED	(\$0.05)	(\$0.08)
90	NET DAILY PRIVATE COST/BENEFIT PER TON OF CO REDUCED	(\$3,613)	(\$5,915)
91	NET DAILY PRIVATE COST/BENEFIT PER TON OF ROG REDUCED	(\$29,510)	(\$48,309)
92	NET DAILY PRIVATE COST/BENEFIT PER TON OF NO _x REDUCED	(\$50,006)	(\$81,884)
93	NET DAILY PRIVATE COST/BENEFIT PER TON OF PM REDUCED	(\$2,279,896)	(\$3,778,960)

COST-EFFECTIVENESS MODEL

LACMTA

94	SOCIETAL COST/BENEFIT		
95	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
96	DAILY SOCIETAL AIR POLLUTION COST	\$18,055	\$27,083
97	DAILY SOCIETAL CONGESTION COST	\$0	\$0
98	DAILY SOCIETAL COST	\$18,055	\$27,083
99	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
100	DAILY SOCIETAL CONGESTION BENEFIT	\$36,169	\$54,254
101	DAILY SOCIETAL BENEFIT	\$36,169	\$54,254
102	NET DAILY SOCIETAL COST/BENEFIT	(\$18,114)	(\$27,171)
103	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
104	DAILY SOCIETAL AIR POLLUTION COST	\$18,055.29	\$27,082.94
105	DAILY SOCIETAL CONGESTION COST	\$36,169.18	\$54,253.84
106	DAILY SOCIETAL COST	\$54,224	\$81,337
107	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0.00	\$0.00
108	DAILY SOCIETAL CONGESTION BENEFIT	\$0.00	\$0.00
109	DAILY SOCIETAL BENEFIT	\$0	\$0
110	NET DAILY SOCIETAL COST/BENEFIT	\$54,224	\$81,337
111	SCENARIO #2 THE NO BUILD SCENARIO		
112	DAILY SOCIETAL AIR POLLUTION COST	\$0.00	\$0.00
113	DAILY SOCIETAL CONGESTION COST	\$0.00	\$0.00
114	DAILY SOCIETAL COST	\$0	\$0
115	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$18,055	\$27,083
116	DAILY SOCIETAL CONGESTION BENEFIT	\$36,169	\$54,254
117	DAILY SOCIETAL BENEFIT	\$54,224	\$81,337
118	NET DAILY SOCIETAL COST/BENEFIT	(\$54,224.47)	(\$81,336.78)
119	TOTAL COST/BENEFIT		
120	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
121	TOTAL DAILY COST	\$516,173	\$774,254
122	TOTAL DAILY BENEFIT	\$36,169	\$54,254
123	TOTAL DAILY COST/BENEFIT	\$480,004	\$720,000
124	COST		
125	NET DAILY COST PER TRIP REDUCED	\$15.95	\$15.95
126	NET DAILY COST PER VMT REDUCED	\$0.43	\$0.43
127	NET DAILY COST PER TON OF CO REDUCED	\$30,294	\$30,295
128	NET DAILY COST PER TON OF ROG REDUCED	\$247,446	\$247,445
129	NET DAILY COST PER TON OF NOx REDUCED	\$419,312	\$419,423
130	NET DAILY COST PER TON OF PM REDUCED	\$19,117,528	\$19,356,352
131	BENEFIT		
132	NET DAILY BENEFIT PER TRIP REDUCED	\$1.12	\$1.12
133	NET DAILY BENEFIT PER VMT REDUCED	\$0.03	\$0.03
134	NET DAILY BENEFIT PER TON OF CO REDUCED	\$2,123	\$2,123
135	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$17,339	\$17,339
136	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$29,382	\$29,390
137	NET DAILY BENEFIT PER TON OF PM REDUCED	\$1,339,599	\$1,356,346

COST – EFFECTIVENESS MODEL

LACMTA

138	COST/BENEFIT		
139	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$14.83	\$14.83
140	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.40	\$0.40
141	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$28,171	\$28,172
142	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$230,107	\$230,106
143	NET DAILY COST/BENEFIT PER TON OF NOx REDUCED	\$389,930	\$390,033
144	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$17,777,929	\$18,000,006
145	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
146	TOTAL DAILY COST	\$552,342	\$828,508
147	TOTAL DAILY BENEFIT	\$0.00	\$0.00
148	TOTAL DAILY COST/BENEFIT	\$552,342	\$828,508
149	COST		
150	NET DAILY COST PER TRIP REDUCED	\$17.07	\$17.07
151	NET DAILY COST PER VMT REDUCED	\$0.46	\$0.46
152	NET DAILY COST PER TON OF CO REDUCED	\$32,416	\$32,418
153	NET DAILY COST PER TON OF ROG REDUCED	\$264,785	\$264,784
154	NET DAILY COST PER TON OF NOx REDUCED	\$448,694	\$448,813
155	NET DAILY COST PER TON OF PM REDUCED	\$20,457,127	\$20,712,698
156	BENEFIT		
157	NET DAILY BENEFIT PER TRIP REDUCED	\$0.00	\$0.00
158	NET DAILY BENEFIT PER VMT REDUCED	\$0.00	\$0.00
159	NET DAILY BENEFIT PER TON OF CO REDUCED	\$0.00	\$0.00
160	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$0.00	\$0.00
161	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$0.00	\$0.00
162	NET DAILY BENEFIT PER TON OF PM REDUCED	\$0.00	\$0.00
163	COST/BENEFIT		
164	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$17.07	\$17.07
165	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.46	\$0.46
166	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$32,416	\$32,418
167	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$264,785	\$264,784
168	NET DAILY COST/BENEFIT PER TON OF NOx REDUCED	\$448,694	\$448,813
169	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$20,457,127	\$20,712,698
170	SCENARIO #2 THE NO BUILD SCENARIO		
171	TOTAL DAILY COST	\$265,248.52	\$339,045.09
172	TOTAL DAILY BENEFIT	\$552,342.44	\$828,507.91
173	TOTAL DAILY COST/BENEFIT	(\$287,093.92)	(\$489,462.83)
174	COST		
175	NET DAILY COST PER TRIP REDUCED	\$8.20	\$6.99
176	NET DAILY COST PER VMT REDUCED	\$0.22	\$0.19
177	NET DAILY COST PER TON OF CO REDUCED	\$15,567	\$13,266
178	NET DAILY COST PER TON OF ROG REDUCED	\$127,157	\$108,356
179	NET DAILY COST PER TON OF NOx REDUCED	\$215,474	\$183,665
180	NET DAILY COST PER TON OF PM REDUCED	\$9,824,019	\$8,476,127
181	BENEFIT		
182	NET DAILY BENEFIT PER TRIP REDUCED	\$17.07	\$17.07
183	NET DAILY BENEFIT PER VMT REDUCED	\$0.46	\$0.46
184	NET DAILY BENEFIT PER TON OF CO REDUCED	\$32,416	\$32,418
185	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$264,785	\$264,784
186	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$448,694	\$448,813
187	NET DAILY BENEFIT PER TON OF PM REDUCED	\$20,457,127	\$20,712,698

COST-EFFECTIVENESS MODEL

LACMTA

188	COST/BENEFIT		
189	NET DAILY COST/BENEFIT PER TRIP REDUCED	(\$8.87)	(\$10.08)
190	NET DAILY COST/BENEFIT PER VMT REDUCED	(\$0.24)	(\$0.27)
191	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	(\$16,849)	(\$19,152)
192	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	(\$137,629)	(\$156,428)
193	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	(\$233,220)	(\$265,148)
194	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	(\$10,633,108)	(\$12,236,571)

COST – EFFECTIVENESS MODEL

LACMTA

TCM # 13 CARPOOL SUBSIDY

ASSUMPTIONS

1	Average carpool occupancy	2.50	REG. XV
2	Average length of a vanpool trip	20	REG. XV
3	Average cost per mile to drive	\$0.48	AAA
4	Average cost per commute trip of 11.4 miles	\$5.47	CALCULATED
5	Average cost per commute trip of 20 miles	\$9.60	CALCULATED
6	Percent of VMT on freeways	50%	LARTS MODEL
7	Average subsidy per carpooler per trip	\$1.00	ASSUMED
8	Amortization period for a car (years)	5	VPSI
9	Average cost of a passenger vehicle	\$16,000	AAA
10	Total peak VMT	69,449,075	AAA
11	Operation and maintenance cost per mile to drive	\$0.48	AAA
12	Interest rate	8%	MARKET RATE
13	Average cost per parking	\$100	MTA
14	Average daily vehicle miles	22.8	CALCULATED
15	Construction cost of arterial (\$/lane mile)	\$900,000	CALTRANS
16	Lane miles arterial/vehicle trip	0.0018	COMSIS
17	Lane miles freeway/vehicle trip	0.0015	COMSIS
18	O&M cost of arterial (\$/LANE MILE)	\$765	CALTRANS
19	O&M cost of freeway (\$/LANE MILE)	\$2,000	CALTRANS
20	Percent of parking paid by employers	90%	SCAQMD
21	Percent of parking paid by employees	10%	SCAQMD
22	Air pollution cost per mile	\$0.015	RUTHERFORD AND WELLANDER, 1986
23	Cost per vehicle – miles of delay	\$0.11	RUTHERFORD AND WELLANDER, 1986
24	Construction cost of freeway (\$/lane mile) not including right of way	\$2,500,000	SANDAG
25	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$12,000,000	CALTRANS (MIN) (IN METROPOLITAN AREA)
26	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$16,000,000	CALTRANS (MAX) (IN METROPOLITAN AREA)
27	Average construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$14,000,000	CALTRANS (AVERAGE) (IN METROPOLITAN AREA)
28	Construction cost of HOV lane (\$/lane mile)	\$2,500,000	MTC

METHODOLOGY

ANNUALIZATION FACTOR (AF) =

$AF = IR / (1 - (1 + (IR))^{-N})$ WHERE;

IR = INTEREST RATE

N = AMORTIZATION PERIOD FOR BUS/FACILITY LIFETIME

VAF = 0.25
 CAF = 0.09
 CAF = 0.25

COST-EFFECTIVENESS MODEL

LACMTA

PUBLIC SECTOR COST

DAILY PUBLIC CAPITAL COST (DPCC) = 0

DAILY PUBLIC O & M COST (DPOMC) =

DSPT * DVTR + DPAC WHERE;

DSPT = DAILY SUBSIDY PER TRIP

DVTR = DAILY VEHICLE TRIPS REDUCED

DPAC = DAILY PUBLIC ADMINISTRATIVE COST

(DPAC) = DAILY PUBLIC ADMINISTRATIVE COST (DPAC) = 10% OF TOTAL COST

DAILY PUBLIC COST (DPC) =

(DPCC + DPOMC) WHERE;

DPCC = DAILY PUBLIC CAPITAL COST

DPOMC = DAILY PUBLIC O & M COST

DAILY PUBLIC REVENUES (DPR) = 0

DAILY PUBLIC COST/REVENUE (DPC/R) =

(DPCOMC) - (DPR) WHERE;

DPCOMC = DAILY PUBLIC CAPITAL AND OPERATION AND MAINTENANCE COST

DPR = DAILY PUBLIC REVENUE

DAILY PUBLIC BENEFITS (DPB) BY AVOIDING HIGHWAY BUILDING =

(DPCB) + (DPOMB) WHERE;

$DPCB = (DVTR) * (LMF/T) * (CCLMF) * (CAF)/260 * (POTOF) +$
 $+ (DPTR) * (LMA/T) * (CCLMA) * (CAF)/260 * (POTOA) \text{ WHERE;}$

DVTR = DAILY TRIPS REDUCED

LMF/T = LANE MILES OF FREEWAY PER TRIP

CCLMF = CONSTRUCTION COST OF FREEWAY LANE MILE

CAF = CONSTRUCTION ANNUALIZATION FACTOR

POTOF = PERCENT OF TRIPS ON FREEWAYS

LMA = LANE MILES OF ARTERIAL PER TRIP

CCLMA = CONSTRUCTION COST OF ARTERIAL LANE MILE

POTOA = PERCENT OF PEAK TRIPS ON ARTERIAL

$DPOMB = (DTR) * (LMF/T) * (OMCLMF)/260 * (POTOF) +$
 $+ (DTR) * (LMA/T) * (OMCLMA)/260 * (POTOA) \text{ WHERE;}$

OMCLMF = O & M COST PER LANE MILE OF FREEWAY

OMCLMA = O & M COST PER LANE MILE OF ARTERIAL

POTOF = PERCENT OF TRIPS ON FREEWAY

POTOA = PERCENT OF TRIPS ON ARTERIAL

COST-EFFECTIVENESS MODEL

LACMTA

NET PUBLIC DAILY COST/BENEFIT COUNTING THE AVOIDED COSTS (NDPC/BIAC) =
(NDPC/R) - (DPB)

INDIVIDUAL COST

DAILY INDIVIDUAL COST (DIC) =

(DICC) + (DIOMC) WHERE;

DICC = DAILY INDIVIDUAL CAPITAL COST (CAR COST)
DIOMC = DAILY INDIVIDUAL O & M COST (CAR O & M)

DIOMC = (DOMCPM) * (DVMTR) + (.10 * DIPC) WHERE;

DOMCPM = DAILY O & M CAR COST PER MILE TO DRIVE CARPOOLING
DVMTR = DAILY VEHICLE MILES TRAVELED REDUCED
DIPC = DAILY INDIVIDUAL PARKING COST

DAILY INDIVIDUAL BENEFIT (DIB) =
(DICB) + (DIOMB) WHERE;

DICB = DAILY INDIVIDUAL CAPITAL BENEFIT (CAR COST)
DIOMB = DAILY INDIVIDUAL O & M COST SAVING (CAR O & M)

DIOMB = (DOMCPM/2.5) * (DVMTR) + (.10 * DIPC/2.5) WHERE;

DOMCPM = DAILY O & M CAR COST PER MILE TO DRIVE
DVMTR = DAILY VEHICLE MILES TRAVELED REDUCED
DIPC = DAILY INDIVIDUAL PARKING COST
2.5 IS THE AVERAGE CARPOOL OCCUPANCY

NET DAILY INDIVIDUAL COST/BENEFIT (NDIC/B) =
(DIC) - (DIB) WHERE;

DIC = DAILY INDIVIDUAL COST
DIB = DAILY INDIVIDUAL BENEFITS

PRIVATE SECTOR COST/BENEFIT

DAILY PRIVATE CAPITAL COST (DPRCC) = 0

DAILY PRIVATE O & M COST (DPROMC) =
(VTR)/2 * (MPC)*12/260 * .90

DAILY PRIVATE CAPITAL BENEFIT (DPRCB) = 0

COST-EFFECTIVENESS MODEL

LACMTA

DAILY PRIVATE O & M BENEFIT (DPROMB) =

$(VTR) * (MPC) * 12 / 260 * .90$ WHERE;

VTR = DAILY VEHICLE TRIPS REDUCED

MPC = MONTHLY PARKING COST

.90 = PERCENT OF PARKING PROVIDED BY PRIVATE SECTOR

NET DAILY PRIVATE COST/BENEFIT (NDPC/B) =

$(DPRC) - (DPRB)$

SOCIETAL COST

DAPC = DAILY AIR POLLUTION COST/BENEFIT

$DAPC = DVMTR * (APC/M)$ WHERE;

DVMTR = DAILY VMT REDUCED

APC/M = AIR POLLUTION COST PER MILE

DVMDCB = DAILY VEHICLE MILES OF DELAY COST/BENEFIT

$DVMDC = (DVMDS) * (C/VMD)$ WHERE;

$DVMDS = (VMT/NEW\ SPEED) - (VMT/EXISTING\ SPEED) * (AVERAGE\ SPEED)$

DVMDS = DAILY VEHICLE MILES OF DELAY SAVED

C/VMD = DAILY COST PER VEHICLE MILES OF DELAY SAVED

DSCB = DAILY SOCIETAL COST/BENEFIT

$DSCB = (DAPC) + (DVMDCB)$

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 1 THE BUILD SCENARIO

TOTAL DAILY COST (TDC) =

$(DPC) + (DIC) + (DPRC) + (DAPC)$ WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DAPC = DAILY AIR POLLUTION COST

TOTAL DAILY BENEFITS (TDB) =

$(DPB) + (DIB) + (DPRB) + DVMDB$ WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DVMDB = DAILY VEHICLE MILES OF DELAY BENEFIT

COST-EFFECTIVENESS MODEL

LACMTA

TOTAL DAILY COST/BENEFIT (TDC/B) =

$[(DPC) + (DIC) + (DPRC) + (DAPC)] - [(DPB) + (DIB) + (DPRB) + (DVMDDB)]$

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 2 THE NO BUILD SCENARIO

TOTAL DAILY COST (TDC) =

$(DPC) + (DIC) + (DPRC) + (DAPC) + (DVMDC)$ WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DAPC = DAILY AIR POLLUTION COST

DVMDC = DAILY VEHICLE MILES OF DELAY COST

TOTAL DAILY BENEFITS (TDB) =

$(DPB) + (DIB) + (DPRB)$ WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DVMDDB = DAILY VEHICLE MILES OF DELAY BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

$[(DPC) + (DIC) + (DPRC) + (DAPC) + (DVMDC)] - [(DPB) + (DIB) + (DPRB)]$

COST-EFFECTIVENESS MODEL

LACMTA

LIKELY OUTCOMES

PUBLIC SECTOR COST/BENEFIT			
		STANDARD	HIGH
1	DAILY PUBLIC CAPITAL COST	\$0	\$0
2	DAILY PUBLIC O & M COST	\$48,891	\$73,335
3	DAILY PUBLIC COST	\$48,891	\$73,335
4	DAILY PUBLIC REVENUES	\$0	\$0
5	DAILY PUBLIC COST/REVENUE	\$48,891	\$73,335
6	DAILY PUBLIC AVOIDED CAPITAL COST (SCENARIO 2)	\$218,731	\$328,091
7	DAILY PUBLIC AVOIDED O & M COST (SCENARIO 2)	\$416	\$624
8	TOTAL DAILY PUBLIC AVOIDED (SCENARIO 2)	\$219,146	\$328,715
9	NET DAILY PUBLIC BENEFIT (SCENARIO 2)	\$219,146	\$328,715
10	DAILY PUBLIC CAPITAL COST (SCENARIO 1)	\$218,731	\$328,091
11	DAILY PUBLIC O & M COST (SCENARIO 1)	\$416	\$624
12	TOTAL DAILY PUBLIC COST (SCENARIO 1)	\$219,146	\$328,715
13	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 2)	(\$170,256)	(\$255,380)
14	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 1)	\$219,146	\$328,715
15	COST		
16	DAILY PUBLIC COST PER TRIP REDUCED	\$1.10	\$1.10
17	DAILY PUBLIC COST PER VMT REDUCED	\$0.08	\$0.08
18	DAILY PUBLIC COST PER TON OF CO REDUCED	\$3,772	\$2,515
19	DAILY PUBLIC COST PER TON OF ROG REDUCED	\$38,047	\$25,358
20	DAILY PUBLIC COST PER TON OF NOx REDUCED	\$68,474	\$45,607
21	DAILY PUBLIC COST PER TON OF PM REDUCED	\$3,760,815	\$2,573,189
22	BENEFIT		
23	DAILY PUBLIC BENEFIT PER TRIP REDUCED	\$4.93	\$4.93
24	DAILY PUBLIC BENEFIT PER VMT REDUCED	\$0.38	\$0.38
25	DAILY PUBLIC BENEFIT PER TON OF CO REDUCED	\$16,909	\$16,908
26	DAILY PUBLIC BENEFIT PER TON OF ROG REDUCED	\$170,542	\$170,495
27	DAILY PUBLIC BENEFIT PER TON OF NOx REDUCED	\$306,928	\$306,637
28	DAILY PUBLIC BENEFIT PER TON OF PM REDUCED	\$16,857,420	\$17,300,777
29	COST/BENEFIT		
30	NET DAILY PUBLIC COST/BENEFIT PER TRIP REDUCED	(\$3.83)	(\$3.83)
31	NET DAILY PUBLIC COST/BENEFIT PER VMT REDUCED	(\$0.29)	(\$0.29)
32	NET DAILY PUBLIC COST/BENEFIT PER TON OF CO REDUCED	(\$13,137)	(\$13,136)
33	NET DAILY PUBLIC COST/BENEFIT PER TON OF ROG REDUCED	(\$132,495)	(\$132,458)
34	NET DAILY PUBLIC COST/BENEFIT PER TON OF NOx REDUCED	(\$238,454)	(\$238,228)
35	NET DAILY PUBLIC COST/BENEFIT PER TON OF PM REDUCED	(\$13,096,605)	(\$13,441,051)
36	INDIVIDUAL COST/BENEFIT		
37	DAILY INDIVIDUAL CAPITAL COST	\$0	\$0
38	DAILY INDIVIDUAL O & M COST	\$68,638	\$0
39	DAILY INDIVIDUAL COST	\$68,638	\$0
40	DAILY INDIVIDUAL CAPITAL BENEFIT	\$0	\$0
41	DAILY INDIVIDUAL O & M BENEFIT	\$85,629	\$0
42	DAILY INDIVIDUAL BENEFIT	\$85,629	\$0
43	NET DAILY INDIVIDUAL COST/BENEFIT	(\$16,991)	\$0

COST-EFFECTIVENESS MODEL

LACMTA

44	COST		
45	NET DAILY INDIVIDUAL COST PER TRIP REDUCED	\$1.54	\$0.00
46	NET DAILY INDIVIDUAL COST PER VMT REDUCED	\$0.12	\$0.00
47	NET DAILY INDIVIDUAL COST PER TON OF CO REDUCED	\$5,296	\$0
48	NET DAILY INDIVIDUAL COST PER TON OF ROG REDUCED	\$53,415	\$0
49	NET DAILY INDIVIDUAL COST PER TON OF NO _x REDUCED	\$96,132	\$0
50	NET DAILY INDIVIDUAL COST PER TON OF PM REDUCED	\$5,279,868	\$0
51	BENEFIT		
52	NET DAILY INDIVIDUAL BENEFIT PER TRIP REDUCED	\$1.93	\$0.00
53	NET DAILY INDIVIDUAL BENEFIT PER VMT REDUCED	\$0.15	\$0.00
54	NET DAILY INDIVIDUAL BENEFIT PER TON OF CO REDUCED	\$6,607	\$0
55	NET DAILY INDIVIDUAL BENEFIT PER TON OF ROG REDUCED	\$66,637	\$0
56	NET DAILY INDIVIDUAL BENEFIT PER TON OF NO _x REDUCED	\$119,929	\$0
57	NET DAILY INDIVIDUAL BENEFIT PER TON OF PM REDUCED	\$6,586,844	\$0
58	COST/BENEFIT		
59	NET DAILY INDIVIDUAL COST/BENEFIT PER TRIP REDUCED	(\$0.38)	\$0.00
60	NET DAILY INDIVIDUAL COST/BENEFIT PER VMT REDUCED	(\$0.03)	\$0.00
61	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF CO REDUCED	(\$1,311)	\$0
62	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF ROG REDUCED	(\$13,222)	\$0
63	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF NO _x REDUCED	(\$23,796)	\$0
64	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF PM REDUCED	(\$1,306,976)	\$0
65	PRIVATE SECTOR COST/BENEFIT		
66	DAILY PRIVATE CAPITAL COST	\$0	\$0
67	DAILY PRIVATE O & M COST	\$0	\$0
68	DAILY PRIVATE COST	\$0	\$0
69	DAILY PRIVATE CAPITAL BENEFIT	\$0	\$0
70	DAILY PRIVATE O & M BENEFIT	\$92,311	\$138,464
71	DAILY PRIVATE BENEFIT	\$92,311	\$138,464
72	NET DAILY PRIVATE COST/BENEFIT	(\$92,311)	(\$138,464)
73	COST		
74	NET DAILY PRIVATE COST PER TRIP REDUCED	\$0.00	\$0.00
75	NET DAILY PRIVATE COST PER VMT REDUCED	\$0.00	\$0.00
76	NET DAILY PRIVATE COST PER TON OF CO REDUCED	0	0
77	NET DAILY PRIVATE COST PER TON OF ROG REDUCED	0	0
78	NET DAILY PRIVATE COST PER TON OF NO _x REDUCED	0	0
79	NET DAILY PRIVATE COST PER TON OF PM REDUCED	0	0
80	BENEFIT		
81	NET DAILY PRIVATE BENEFIT PER TRIP REDUCED	\$2.08	\$2.08
82	NET DAILY PRIVATE BENEFIT PER VMT REDUCED	\$0.16	\$0.16
83	NET DAILY PRIVATE BENEFIT PER TON OF CO REDUCED	\$7,123	\$7,122
84	NET DAILY PRIVATE BENEFIT PER TON OF ROG REDUCED	\$71,837	\$71,818
85	NET DAILY PRIVATE BENEFIT PER TON OF NO _x REDUCED	\$129,287	\$129,164
86	NET DAILY PRIVATE BENEFIT PER TON OF PM REDUCED	\$7,100,840	\$7,287,595
87	COST/BENEFIT		
88	NET DAILY PRIVATE COST/BENEFIT PER TRIP REDUCED	(\$2.08)	(\$2.08)
89	NET DAILY PRIVATE COST/BENEFIT PER VMT REDUCED	(\$0.16)	(\$0.16)
90	NET DAILY PRIVATE COST/BENEFIT PER TON OF CO REDUCED	(\$7,123)	(\$7,122)
91	NET DAILY PRIVATE COST/BENEFIT PER TON OF ROG REDUCED	(\$71,837)	(\$71,818)
92	NET DAILY PRIVATE COST/BENEFIT PER TON OF NO _x REDUCED	(\$129,287)	(\$129,164)
93	NET DAILY PRIVATE COST/BENEFIT PER TON OF PM REDUCED	(\$7,100,840)	(\$7,287,595)

COST-EFFECTIVENESS MODEL

LACMTA

94	SOCIETAL COST/BENEFIT		
95	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
96	DAILY SOCIETAL AIR POLLUTION COST	\$8,667	\$13,001
97	DAILY SOCIETAL CONGESTION COST	\$0	\$0
98	DAILY SOCIETAL COST	\$8,667	\$13,001
99	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
100	DAILY SOCIETAL CONGESTION BENEFIT	\$17,362	\$26,043
101	DAILY SOCIETAL BENEFIT	\$17,362	\$26,043
102	NET DAILY SOCIETAL COST/BENEFIT	(\$8,695)	(\$13,043)
103	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
104	DAILY SOCIETAL AIR POLLUTION COST	\$8,667.09	\$13,000.64
105	DAILY SOCIETAL CONGESTION COST	\$17,362.29	\$26,043.48
106	DAILY SOCIETAL COST	\$26,029	\$39,044
107	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0.00	\$0.00
108	DAILY SOCIETAL CONGESTION BENEFIT	\$0.00	\$0.00
109	DAILY SOCIETAL BENEFIT	\$0	\$0
110	NET DAILY SOCIETAL COST/BENEFIT	\$26,029	\$39,044
111	SCENARIO #2 THE NO BUILD SCENARIO		
112	DAILY SOCIETAL AIR POLLUTION COST	\$0	\$0
113	DAILY SOCIETAL CONGESTION COST	\$0	\$0
114	DAILY SOCIETAL COST	\$0	\$0
115	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$8,667	\$13,001
116	DAILY SOCIETAL CONGESTION BENEFIT	\$17,362	\$26,043
117	DAILY SOCIETAL BENEFIT	\$26,029	\$39,044
118	NET DAILY SOCIETAL COST/BENEFIT	(\$26,029)	(\$39,044)
119	TOTAL COST/BENEFIT		
120	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
121	TOTAL DAILY COST	\$405,753	\$480,180
122	TOTAL DAILY BENEFIT	\$17,362	\$26,043
123	TOTAL DAILY COST/BENEFIT	\$388,391	\$454,136
124	COST		
125	NET DAILY COST PER TRIP REDUCED	\$9.13	\$7.20
126	NET DAILY COST PER VMT REDUCED	\$0.70	\$0.55
127	NET DAILY COST PER TON OF CO REDUCED	\$31,308	\$24,699
128	NET DAILY COST PER TON OF ROG REDUCED	\$315,761	\$249,056
129	NET DAILY COST PER TON OF NOx REDUCED	\$568,282	\$447,929
130	NET DAILY COST PER TON OF PM REDUCED	\$31,211,804	\$25,272,616
131	BENEFIT		
132	NET DAILY BENEFIT PER TRIP REDUCED	\$0.39	\$0.39
133	NET DAILY BENEFIT PER VMT REDUCED	\$0.03	\$0.03
134	NET DAILY BENEFIT PER TON OF CO REDUCED	\$1,340	\$1,340
135	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$13,512	\$13,508
136	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$24,317	\$24,294
137	NET DAILY BENEFIT PER TON OF PM REDUCED	\$1,335,561	\$1,370,710

COST-EFFECTIVENESS MODEL

LACMTA

138	COST/BENEFIT		
139	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$8.74	\$6.81
140	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.67	\$0.52
141	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$29,968	\$23,360
142	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$302,250	\$235,548
143	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$543,965	\$423,635
144	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$29,876,243	\$23,901,907
145	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
146	TOTAL DAILY COST	\$423,116	\$506,223
147	TOTAL DAILY BENEFIT	\$0	\$0
148	TOTAL DAILY COST/BENEFIT	\$423,116	\$506,223
149	COST		
150	NET DAILY COST PER TRIP REDUCED	\$9.52	\$7.59
151	NET DAILY COST PER VMT REDUCED	\$0.73	\$0.58
152	NET DAILY COST PER TON OF CO REDUCED	\$32,648	\$26,039
153	NET DAILY COST PER TON OF ROG REDUCED	\$329,273	\$262,564
154	NET DAILY COST PER TON OF NO _x REDUCED	\$592,599	\$472,223
155	NET DAILY COST PER TON OF PM REDUCED	\$32,547,365	\$26,643,326
156	BENEFIT		
157	NET DAILY BENEFIT PER TRIP REDUCED	\$0.00	\$0.00
158	NET DAILY BENEFIT PER VMT REDUCED	\$0.00	\$0.00
159	NET DAILY BENEFIT PER TON OF CO REDUCED	\$0.00	\$0.00
160	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$0.00	\$0.00
161	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$0.00	\$0.00
162	NET DAILY BENEFIT PER TON OF PM REDUCED	\$0.00	\$0.00
163	COST/BENEFIT		
164	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$9.52	\$7.59
165	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.73	\$0.58
166	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$32,648	\$26,039
167	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$329,273	\$262,564
168	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$592,599	\$472,223
169	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$32,547,365	\$26,643,326
170	SCENARIO #2 THE NO BUILD SCENARIO		
171	TOTAL DAILY COST	\$117,529	\$73,335
172	TOTAL DAILY BENEFIT	\$371,057	\$428,135
173	TOTAL DAILY COST/BENEFIT	(\$253,528)	(\$354,800)
174	COST		
175	NET DAILY COST PER TRIP REDUCED	\$2.64	\$1.10
176	NET DAILY COST PER VMT REDUCED	\$0.20	\$0.08
177	NET DAILY COST PER TON OF CO REDUCED	\$9,069	\$3,772
178	NET DAILY COST PER TON OF ROG REDUCED	\$91,462	\$38,037
179	NET DAILY COST PER TON OF NO _x REDUCED	\$164,606	\$68,409
180	NET DAILY COST PER TON OF PM REDUCED	\$9,040,684	\$3,859,726
181	BENEFIT		
182	NET DAILY BENEFIT PER TRIP REDUCED	\$8.35	\$6.42
183	NET DAILY BENEFIT PER VMT REDUCED	\$0.64	\$0.49
184	NET DAILY BENEFIT PER TON OF CO REDUCED	\$28,631	\$22,022
185	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$288,760	\$222,062
186	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$519,688	\$399,380
187	NET DAILY BENEFIT PER TON OF PM REDUCED	\$28,542,845	\$22,533,419

COST-EFFECTIVENESS MODEL

LACMTA

188	COST/BENEFIT		
189	NET DAILY COST/BENEFIT PER TRIP REDUCED	(\$5.70)	(\$5.32)
190	NET DAILY COST/BENEFIT PER VMT REDUCED	(\$0.44)	(\$0.41)
191	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	(\$19,562)	(\$18,250)
192	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	(\$197,298)	(\$184,025)
193	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	(\$355,081)	(\$330,970)
194	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	(\$19,502,161)	(\$18,673,692)

COST-EFFECTIVENESS MODEL

LACMTA

TCM # 14 BICYCLE SUBSIDY

ASSUMPTIONS

1	Average length of a vanpool trip (miles)	20	REG. XV
2	Average cost per mile to drive	\$0.48	AAA
3	Average cost per commute trip of 11.4 miles	\$5.47	CALCULATED
4	Average cost per commute trip of 20 miles	\$9.60	CALCULATED
5	Percent of VMT on freeways	50%	LARTS MODEL
6	Average subsidy for carpoolers per trip	\$1.00	ASSUMED
7	Amortization period for a car (years)	5	AAA
8	Average cost of a passenger vehicle	\$16,000	AAA
9	Interest rate	8%	
10	Average cost per parking (\$ per month)	\$100	
11	Construction cost of arterials (\$ per lane mile)	\$900,000	CALTRANS
12	Lane miles arterial/vehicle trip	0.0018	COMSIS
13	Lane miles freeway/vehicle trip	0.0015	COMSIS
14	O&M cost of arterial (\$/LANE MILE)	\$765	CALTRANS
15	O&M cost of freeway (\$/LANE MILE)	\$2,000	CALTRANS
16	Percent of parking paid by private sector	90%	SCAQMD
17	Percent of parking paid by individual	10%	SCAQMD
18	Air pollution cost per mile	\$0.015	RUTHERFORD AND WELLANDER, 1986
19	Cost per vehicle-miles of delay	\$0.11	RUTHERFORD AND WELLANDER, 1986
20	Construction cost of freeway (\$/lane mile) not including right of way	\$2,500,000	SANDAG
21	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$12,000,000	CALTRANS (MIN) (IN METROPOLITAN AREA)
22	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$16,000,000	CALTRANS (MAX) (IN METROPOLITAN AREA)
23	Average construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$14,000,000	CALTRANS (AVERAGE) (IN METROPOLITAN AREA)
24	Construction cost of HOV lane (\$/lane mile)	\$2,500,000	MTC
25	Capital cost of bicycle racks (\$/rack)	\$125	MTA
26	Capital cost of shower facilities	\$300.00	ESGVEQG
27	Capital cost of locker	\$750	MTA
28	Operation and Maintenance of shower facilities (\$/SQ.FT.)	\$0.75	ESGVEQG
29	Operation and Maintenance of lockers (\$/per user)	\$5	ESGVEQG
30	Capital cost of bikes (\$/bike)	\$300	ESGVEQG
31	Operation and maintenance of bikes work space (\$/sq. ft.)	\$2	ESGVEQG
32	Capital cost of hamlet (\$/unit)	\$30	MTA
33	Operation and maintenance of bike (\$/user)	\$30	ESGVEQG
34	Construction cost of bikeway including new paving & striping (\$/lane)	\$620,000	MTA(PATTI HELM)
35	Construction cost of bikeway including new paving & striping (\$/lane)	\$20,000	MTA(PATTI HELM)
36	Capital cost of apparel (shorts, shoes, jersey)	\$115	MTA
37	Operation and maintenance cost per bicycle lane mile	\$200	MTA
38	Class I lane miles	50	MTA
39	Class II lane miles	2,500	MTA
40	Subsidy per trip per day	\$1	
41	Operation and maintenance per rack	\$5	

COST-EFFECTIVENESS MODEL

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DAILY PUBLIC BENEFITS (DPB) BY AVOIDING HIGHWAY BUILDING =

(DPCB) + (DPOMB) WHERE;

$$\text{DPCB} = (\text{DVTR}) * (\text{LMF}/\text{T}) * (\text{CCLMF}) * (\text{CAF})/260 * (\text{POTOF}) + \\ + (\text{DVTR}) * (\text{LMA}/\text{T}) * (\text{CCLMA}) * (\text{CAF})/260 * (\text{POTOA}) \text{ WHERE;}$$

DVTR = DAILY TRIPS REDUCED

LMF/T = LANE MILES OF FREEWAY PER TRIP

CCLMF = CONSTRUCTION COST OF FREEWAY LANE MILE

CAF = CONSTRUCTION ANNUALIZATION FACTOR

POTOF = PERCENT OF TRIPS ON FREEWAYS

LMA = LANE MILES OF ARTERIAL PER TRIP

CCLMA = CONSTRUCTION COST OF ARTERIAL LANE MILE

POTOA = PERCENT OF PEAK TRIPS ON ARTERIAL

$$\text{DPOMB} = (\text{DTR}) * (\text{LMF}/\text{T}) * (\text{OMCLMF})/260 * (\text{POTOF}) + \\ + (\text{DTR}) * (\text{LMA}/\text{T}) * (\text{OMCLMA})/260 * (\text{POTOA}) \text{ WHERE;}$$

OMCLMF = O & M COST PER LANE MILE OF FREEWAY

OMCLMA = O & M COST PER LANE MILE OF ARTERIAL

POTOF = PERCENT OF TRIPS ON FREEWAY

POTOA = PERCENT OF TRIPS ON ARTERIAL

NET PUBLIC DAILY COST/BENEFIT COUNTING THE AVOIDED COSTS (NDPC/BIAC) =
(NDPC/R) - (DPB)

INDIVIDUAL COST/BENEFIT

DAILY INDIVIDUAL COST (DIC)=

(DICC) + (DIOMC)

$$\text{DICC} = (\text{CCB}) * (\text{DVTR}/2) * \text{BAF}/260 + (\text{CCH}) * (\text{DVTR}/2) / 260 + \\ + (\text{CCA}) * (\text{DVTR}/2) / 260 \text{ WHERE;}$$

CCB = CAPITAL COST OF A BICYCLE

DVTR = DAILY VEHICLE TRIPS REDUCED

CCH = CAPITAL COST OF A HELMET

CCA = CAPITAL COST OF APPAREL

DIOMC = (DOMCPB) * (NB)/260 WHERE;

DOMCPM = DAILY O & M COST PER BICYCLE

NB = NUMBER OF BICYCLES = DAILY VEHICLE TRIPS REDUCED/2

DAILY INDIVIDUAL BENEFIT (DIB) =

COST-EFFECTIVENESS MODEL

LACMTA

(DICB) + (DIOMB) WHERE;

DICB = DAILY INDIVIDUAL CAPITAL BENEFIT (CAR COST)

DIOMB = DAILY INDIVIDUAL O & M COST SAVING (CAR O & M)

$DICB = (CCC) * (NC) * (CAF) / 260 * .10$

$CAF = IR / (1 - (1 + (IR)) ^ (-N))$ WHERE;

CAF =

$DIOMB = (DOMCPM) * (DVMTR) * (.21) + (.10 * DIPC) +$
 $+ (DVTR) * (DSPT)$ WHERE;

DOMCPM = DAILY O & M CAR COST PER MILE TO DRIVE

DVMTR = DAILY VEHICLE MILES TRAVELED REDUCED

.21 IS THE PERCENT OF O & M COST ATTRIBUTED TO SAVINGS

DIPC = DAILY INDIVIDUAL PARKING COST

DVTR = DAILY VEHICLE TRIPS REDUCED

DSPT = DAILY SUBSIDY PER TRIP

NET DAILY INDIVIDUAL COST/BENEFIT (NDIC/B) =

(DIC) - (DIB) WHERE;

DIC = DAILY INDIVIDUAL COST

DIB = DAILY INDIVIDUAL BENEFITS

PRIVATE SECTOR COST/BENEFIT

DAILY PRIVATE CAPITAL COST (DPRCC) =

$(DVTR/2) * (NLPR) * (CPL) / 260 + (DVTR/20) * (NSFPR) *$

$* CAF / 260 * (CPSF) * CAF / 260 + (DVTR/2) * (NRPR) * (CPR) * CAF / 260$

CAF = CONSTRUCTION ANNUALIZATION FACTOR

DVTR = DAILY VEHICLE TRIPS REDUCED

NLPR = NUMBER OF LOCKERS PER RIDER

CPL = COST PER LOCKER

NSF = NUMBER OF SHOWER FACILITIES PER RIDER

CPSF = COST PER SHOWER FACILITY

NRPR = NUMBER OF RACKS PER RIDER

CPR = COST PER RACK

COST-EFFECTIVENESS MODEL

LACMTA

DAILY PRIVATE O & M COST (DPROMC) =

$$(OMCOSF) * (NSF) / 260 + \\ + (OMCOR) * (NR) / 260 + (OMCPL) * (NL) / 260 \text{ WHERE;}$$

OMCOSF = O & M COST OF SHOWER FACILITIES

OMCOR = O & M COST OF RACKS

OMCOL = O & M COST OF LOCKERS

NL = NUMBER OF LOCKERS

NR = NUMBER OF RACKS

NSF = NUMBER OF SHOWER FACILITIES

NL, NSF, AND NR IS DETERMINED BASED ON TRIPS REDUCED

DVTR = DAILY VEHICLE TRIPS REDUCED

DAILY PRIVATE COST (DPRC) =

DPRCC + DPROMC WHERE;

DPRCC = DAILY PRIVATE CAPITAL COST

DPROMC = DAILY PRIVATE OPERATION AND MAINTENANCE COST

DAILY PRIVATE O & M BENEFIT (DPROMB) =

(VTR) * (MPC) * 12 / 260 * .90 WHERE;

VTR = DAILY VEHICLE TRIPS REDUCED

MPC = MONTHLY PARKING COST

.90 = PERCENT OF PARKING PROVIDED BY PRIVATE SECTOR

NET DAILY PRIVATE COST/BENEFIT (NDPC/B) =

(DPRC) - (DPRB)

SOCIETAL COST

DAPC = DAILY AIR POLLUTION COST/BENEFIT

DAPC = DVMTR * (APC/M) WHERE;

DVMTR = DAILY VMT REDUCED

APC/M = AIR POLLUTION COST PER MILE

DVMDCB = DAILY VEHICLE MILES OF DELAY COST/BENEFIT

DVMDC = (DVMDS) * (C/VMD) WHERE;

DVMDS = (VMT/NEW SPEED) - (VMT/EXISTING SPEED) * (AVERAGE SPEED)

DVMDS = DAILY VEHICLE MILES OF DELAY SAVED

C/VMD = DAILY COST PER VEHICLE MILES OF DELAY SAVED

DSCB = DAILY SOCIETAL COST/BENEFIT

DSCB = (DAPC) + (DVMDCB)

COST-EFFECTIVENESS MODEL

LACMTA

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 1 THE BUILD SCENARIO

TOTAL DAILY COST (TDC) =
(DPC) + (DIC) + (DPRC) + (DAPC) WHERE;
DPC = DAILY PUBLIC COST
DIC = DAILY INDIVIDUAL COST
DPRC = DAILY PRIVATE COST
DAPC = DAILY AIR POLLUTION COST

TOTAL DAILY BENEFITS (TDB) =
(DPB) + (DIB) + (DPRB) + DVMDB WHERE;
DPB = DAILY PUBLIC BENEFITS
DIB = DAILY INDIVIDUAL BENEFITS
DPRB = DAILY PRIVATE BENEFITS
DVMDB = DAILY VEHICLE MILES OF DELAY BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =
[(DPC) + (DIC) + (DPRC) + (DAPC)] - [(DPB) + (DIB) + (DPRB) + (DVMDB)]

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 2 THE NO BUILD SCENARIO

TOTAL DAILY COST (TDC) =
(DPC) + (DIC) + (DPRC) + (DAPC) + (DVMDC) WHERE;
DPC = DAILY PUBLIC COST
DIC = DAILY INDIVIDUAL COST
DPRC = DAILY PRIVATE COST
DAPC = DAILY AIR POLLUTION COST
DVMDC = DAILY VEHICLE MILES OF DELAY COST

TOTAL DAILY BENEFITS (TDB) =
(DPB) + (DIB) + (DPRB) WHERE;
DPB = DAILY PUBLIC BENEFITS
DIB = DAILY INDIVIDUAL BENEFITS
DPRB = DAILY PRIVATE BENEFITS
DVMDB = DAILY VEHICLE MILES OF DELAY BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =
[(DPC) + (DIC) + (DPRC) + (DAPC) + (DVMDC)] - [(DPB) + (DIB) + (DPRB)]

COST-EFFECTIVENESS MODEL

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LIKELY OUTCOMES

PUBLIC SECTOR COST/BENEFIT

	STANDARD	HIGH
1 DAILY PUBLIC CAPITAL COST	\$55,346	\$55,346
2 DAILY PUBLIC O & M COST	\$11,522	\$21,083
3 DAILY PUBLIC COST	\$66,868	\$76,429
4 DAILY PUBLIC REVENUES	\$0	\$0
5 DAILY PUBLIC COST/REVENUE	\$66,868	\$76,429
6 DAILY PUBLIC AVOIDED CAPITAL COST (SCENARIO 2)	\$42,214	\$84,432
7 DAILY PUBLIC AVOIDED O & M COST (SCENARIO 2)	\$81	\$163
8 TOTAL DAILY PUBLIC AVOIDED (SCENARIO 2)	\$42,295	\$84,594
9 NET DAILY PUBLIC BENEFIT (SCENARIO 2)	\$42,295	\$84,594
10 DAILY PUBLIC CAPITAL COST (SCENARIO 1)	\$42,214	\$84,432
11 DAILY PUBLIC O & M COST (SCENARIO 1)	\$81	\$163
12 TOTAL DAILY PUBLIC COST (SCENARIO 1)	\$42,295	\$84,594
13 NET DAILY PUBLIC COST/BENEFIT (SCENARIO 2)	\$24,573	(\$8,165)
14 NET DAILY PUBLIC COST/BENEFIT (SCENARIO 1)	\$42,295	\$84,594
COST		
15 DAILY PUBLIC COST PER TRIP REDUCED	\$7.69	\$4.40
16 DAILY PUBLIC COST PER VMT REDUCED	\$2.56	\$1.47
17 DAILY PUBLIC COST PER TON OF CO REDUCED	\$39,543	\$22,605
18 DAILY PUBLIC COST PER TON OF ROG REDUCED	\$543,642	\$308,182
19 DAILY PUBLIC COST PER TON OF NOx REDUCED	\$1,114,466	\$626,469
20 DAILY PUBLIC COST PER TON OF PM REDUCED	ERR	\$76,429,162
BENEFIT		
21 DAILY PUBLIC BENEFIT PER TRIP REDUCED	\$4.87	\$4.87
22 DAILY PUBLIC BENEFIT PER VMT REDUCED	\$1.62	\$1.62
23 DAILY PUBLIC BENEFIT PER TON OF CO REDUCED	\$25,012	\$25,021
24 DAILY PUBLIC BENEFIT PER TON OF ROG REDUCED	\$343,860	\$341,107
25 DAILY PUBLIC BENEFIT PER TON OF NOx REDUCED	\$704,913	\$693,397
26 DAILY PUBLIC BENEFIT PER TON OF PM REDUCED	ERR	\$84,594,474
COST/BENEFIT		
27 NET DAILY PUBLIC COST/BENEFIT PER TRIP REDUCED	\$2.83	(\$0.47)
28 NET DAILY PUBLIC COST/BENEFIT PER VMT REDUCED	\$0.94	(\$0.16)
29 NET DAILY PUBLIC COST/BENEFIT PER TON OF CO REDUCED	\$14,532	(\$2,415)
30 NET DAILY PUBLIC COST/BENEFIT PER TON OF ROG REDUCED	\$199,782	(\$32,925)
31 NET DAILY PUBLIC COST/BENEFIT PER TON OF NOx REDUCED	\$409,553	(\$66,929)
32 NET DAILY PUBLIC COST/BENEFIT PER TON OF PM REDUCED	ERR	(\$8,165,312)
INDIVIDUAL COST/BENEFIT		
33 DAILY INDIVIDUAL CAPITAL COST	\$3,679	\$7,359
34 DAILY INDIVIDUAL O & M COST	\$501	\$1,003
35 DAILY INDIVIDUAL COST	\$4,181	\$8,362
36 DAILY INDIVIDUAL CAPITAL BENEFIT	\$0	\$0
37 DAILY INDIVIDUAL O & M BENEFIT	\$13,331	\$26,664
38 DAILY INDIVIDUAL BENEFIT	\$13,331	\$26,664
39 NET DAILY INDIVIDUAL COST/BENEFIT	(\$9,151)	(\$18,302)

COST – EFFECTIVENESS MODEL

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COST			
40	NET DAILY INDIVIDUAL COST PER TRIP REDUCED	\$0.48	\$0.48
41	NET DAILY INDIVIDUAL COST PER VMT REDUCED	\$0.16	\$0.16
	NET DAILY INDIVIDUAL COST PER TON OF CO REDUCED	\$2,472	\$2,473
42	NET DAILY INDIVIDUAL COST PER TON OF ROG REDUCED	\$33,989	\$33,717
43	NET DAILY INDIVIDUAL COST PER TON OF NOx REDUCED	\$69,678	\$68,539
44	NET DAILY INDIVIDUAL COST PER TON OF PM REDUCED	ERR	\$8,361,789
BENEFIT			
45	NET DAILY INDIVIDUAL BENEFIT PER TRIP REDUCED	\$1.53	\$1.53
46	NET DAILY INDIVIDUAL BENEFIT PER VMT REDUCED	\$0.51	\$0.51
	NET DAILY INDIVIDUAL BENEFIT PER TON OF CO REDUCED	\$7,884	\$7,886
47	NET DAILY INDIVIDUAL BENEFIT PER TON OF ROG REDUCED	\$108,384	\$107,515
48	NET DAILY INDIVIDUAL BENEFIT PER TON OF NOx REDUCED	\$222,187	\$218,555
49	NET DAILY INDIVIDUAL BENEFIT PER TON OF PM REDUCED	ERR	\$26,663,698
COST/BENEFIT			
50	NET DAILY INDIVIDUAL COST/BENEFIT PER TRIP REDUCED	(\$1.05)	(\$1.05)
51	NET DAILY INDIVIDUAL COST/BENEFIT PER VMT REDUCED	(\$0.35)	(\$0.35)
	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF CO REDUCED	(\$5,411)	(\$5,413)
52	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF ROG REDUCED	(\$74,395)	(\$73,798)
53	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF NOx REDUCED	(\$152,510)	(\$150,016)
54	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF PM REDUCED	ERR	(\$18,301,908)
PRIVATE SECTOR COST/BENEFIT			
55	DAILY PRIVATE CAPITAL COST	\$14,669	\$29,339
56	DAILY PRIVATE O & M COST	\$187	\$374
57	DAILY PRIVATE COST	\$14,856	\$29,714
58	DAILY PRIVATE CAPITAL BENEFIT	\$0	\$0
59	DAILY PRIVATE O & M BENEFIT	\$18,051	\$36,103
60	DAILY PRIVATE BENEFIT	\$18,051	\$36,103
61	NET DAILY PRIVATE COST/BENEFIT	(\$3,195)	(\$6,389)
COST			
62	NET DAILY PRIVATE COST PER TRIP REDUCED	\$1.71	\$1.71
63	NET DAILY PRIVATE COST PER VMT REDUCED	\$0.57	\$0.57
64	NET DAILY PRIVATE COST PER TON OF CO REDUCED	\$8,785	\$8,788
65	NET DAILY PRIVATE COST PER TON OF ROG REDUCED	\$120,781	\$119,813
66	NET DAILY PRIVATE COST PER TON OF NOx REDUCED	\$247,600	\$243,555
67	NET DAILY PRIVATE COST PER TON OF PM REDUCED	ERR	\$29,713,725
BENEFIT			
68	NET DAILY PRIVATE BENEFIT PER TRIP REDUCED	\$2.08	\$2.08
69	NET DAILY PRIVATE BENEFIT PER VMT REDUCED	\$0.69	\$0.69
70	NET DAILY PRIVATE BENEFIT PER TON OF CO REDUCED	\$10,674	\$10,678
71	NET DAILY PRIVATE BENEFIT PER TON OF ROG REDUCED	\$146,752	\$145,577
72	NET DAILY PRIVATE BENEFIT PER TON OF NOx REDUCED	\$300,842	\$295,927
73	NET DAILY PRIVATE BENEFIT PER TON OF PM REDUCED	ERR	\$36,103,154
COST/BENEFIT			
74	NET DAILY PRIVATE COST/BENEFIT PER TRIP REDUCED	(\$0.37)	(\$0.37)
75	NET DAILY PRIVATE COST/BENEFIT PER VMT REDUCED	(\$0.12)	(\$0.12)
76	NET DAILY PRIVATE COST/BENEFIT PER TON OF CO REDUCED	(\$1,889)	(\$1,890)
77	NET DAILY PRIVATE COST/BENEFIT PER TON OF ROG REDUCED	(\$25,972)	(\$25,764)
78	NET DAILY PRIVATE COST/BENEFIT PER TON OF NOx REDUCED	(\$53,242)	(\$52,372)
79	NET DAILY PRIVATE COST/BENEFIT PER TON OF PM REDUCED	ERR	(\$6,389,428)

COST-EFFECTIVENESS MODEL

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SOCIETAL COST/BENEFIT			
SCENARIO #1 THE BUILD SCENARIO (SHORT TERM 1 YEAR)			
80	DAILY SOCIETAL AIR POLLUTION COST	\$391	\$782
81	DAILY SOCIETAL CONGESTION COST	\$0	\$0
82	DAILY SOCIETAL COST	\$391	\$782
83	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
84	DAILY SOCIETAL CONGESTION BENEFIT	\$784	\$1,567
85	DAILY SOCIETAL BENEFIT	\$784	\$1,567
86	NET DAILY SOCIETAL COST/BENEFIT	(\$392)	(\$785)
SCENARIO #1 THE BUILD SCENARIO (LONG TERM)			
87	DAILY SOCIETAL AIR POLLUTION COST	\$391	\$782
88	DAILY SOCIETAL CONGESTION COST	\$784	\$1,567
89	DAILY SOCIETAL COST	\$1,175	\$2,349
90	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0.00	\$0.00
91	DAILY SOCIETAL CONGESTION BENEFIT	\$0.00	\$0.00
92	DAILY SOCIETAL BENEFIT	\$0	\$0
93	NET DAILY SOCIETAL COST/BENEFIT	\$1,175	\$2,349
SCENARIO #2 THE NO BUILD SCENARIO			
94	DAILY SOCIETAL AIR POLLUTION COST	\$0	\$0
95	DAILY SOCIETAL CONGESTION COST	\$0	\$0
96	DAILY SOCIETAL COST	\$0	\$0
97	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$391	\$782
98	DAILY SOCIETAL CONGESTION BENEFIT	\$784	\$1,567
99	DAILY SOCIETAL BENEFIT	\$1,175	\$2,349
100	NET DAILY SOCIETAL COST/BENEFIT	(\$1,175)	(\$2,349)
TOTAL COST/BENEFIT			
SCENARIO #1 THE BUILD SCENARIO (SHORT TERM 1 YEAR)			
101	TOTAL DAILY COST	\$74,068	\$148,144
102	TOTAL DAILY BENEFIT	\$784	\$1,567
103	TOTAL DAILY COST/BENEFIT	\$73,284	\$146,577
COST			
104	NET DAILY COST PER TRIP REDUCED	\$8.52	\$8.52
105	NET DAILY COST PER VMT REDUCED	\$2.84	\$2.84
106	NET DAILY COST PER TON OF CO REDUCED	\$43,801	\$43,816
107	NET DAILY COST PER TON OF ROG REDUCED	\$602,176	\$597,353
108	NET DAILY COST PER TON OF NOx REDUCED	\$1,234,462	\$1,214,292
109	NET DAILY COST PER TON OF PM REDUCED	ERR	\$148,143,576
BENEFIT			
110	NET DAILY BENEFIT PER TRIP REDUCED	\$0.09	\$0.09
111	NET DAILY BENEFIT PER VMT REDUCED	\$0.03	\$0.03
112	NET DAILY BENEFIT PER TON OF CO REDUCED	\$463	\$463
113	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$6,370	\$6,319
114	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$13,059	\$12,845
115	NET DAILY BENEFIT PER TON OF PM REDUCED	ERR	\$1,567,052

COST-EFFECTIVENESS MODEL

LACMTA

COST/BENEFIT			
116	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$8.43	\$8.43
117	NET DAILY COST/BENEFIT PER VMT REDUCED	\$2.81	\$2.81
118	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$43,338	\$43,353
119	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$595,806	\$591,034
120	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$1,221,403	\$1,201,447
121	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	\$146,576,523
SCENARIO #1 THE BUILD SCENARIO (LONG TERM)			
122	TOTAL DAILY COST	\$74,851	\$149,711
123	TOTAL DAILY BENEFIT	\$0	\$0
124	TOTAL DAILY COST/BENEFIT	\$74,851	\$149,711
COST			
125	NET DAILY COST PER TRIP REDUCED	\$8.61	\$8.61
126	NET DAILY COST PER VMT REDUCED	\$2.87	\$2.87
127	NET DAILY COST PER TON OF CO REDUCED	\$44,264	\$44,280
128	NET DAILY COST PER TON OF ROG REDUCED	\$608,547	\$603,672
129	NET DAILY COST PER TON OF NO _x REDUCED	\$1,247,520	\$1,227,136
130	NET DAILY COST PER TON OF PM REDUCED	ERR	\$149,710,628
BENEFIT			
131	NET DAILY BENEFIT PER TRIP REDUCED	\$0	\$0
132	NET DAILY BENEFIT PER VMT REDUCED	\$0	\$0
133	NET DAILY BENEFIT PER TON OF CO REDUCED	\$0	\$0
134	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$0	\$0
135	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$0	\$0
136	NET DAILY BENEFIT PER TON OF PM REDUCED	ERR	\$0
COST/BENEFIT			
137	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$8.61	\$8.61
138	NET DAILY COST/BENEFIT PER VMT REDUCED	\$2.87	\$2.87
139	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$44,264	\$44,280
140	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$608,547	\$603,672
141	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$1,247,520	\$1,227,136
142	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	\$149,710,628
SCENARIO #2 THE NO BUILD SCENARIO			
143	TOTAL DAILY COST	\$85,904.62	\$114,504.68
144	TOTAL DAILY BENEFIT	\$74,851.23	\$149,710.63
145	TOTAL DAILY COST/BENEFIT	\$11,053.40	(\$35,205.95)
COST			
146	NET DAILY COST PER TRIP REDUCED	\$9.88	\$6.59
147	NET DAILY COST PER VMT REDUCED	\$3.29	\$2.20
148	NET DAILY COST PER TON OF CO REDUCED	\$50,801	\$33,867
149	NET DAILY COST PER TON OF ROG REDUCED	\$698,412	\$461,712
150	NET DAILY COST PER TON OF NO _x REDUCED	\$1,431,744	\$938,563
151	NET DAILY COST PER TON OF PM REDUCED	ERR	\$114,504,677
BENEFIT			
152	NET DAILY BENEFIT PER TRIP REDUCED	\$8.61	\$8.61
153	NET DAILY BENEFIT PER VMT REDUCED	\$0.13	\$0.17
154	NET DAILY BENEFIT PER TON OF CO REDUCED	\$44,264	\$44,280
155	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$608,547	\$603,672
156	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$1,247,520	\$1,227,136
157	NET DAILY BENEFIT PER TON OF PM REDUCED	ERR	\$149,710,628

COST-EFFECTIVENESS MODEL

LACMTA

COST/BENEFIT			
158	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$1.27	(\$2.03)
159	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.42	(\$0.68)
160	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$6,537	(\$10,413)
161	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$89,865	(\$141,959)
162	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$184,223	(\$288,573)
163	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	(\$35,205,951)

COST-EFFECTIVENESS MODEL

LACMTA

TCM # 15 WALKERS SUBSIDY

ASSUMPTIONS

1	Average cost per mile to drive	\$0.48	AAA
2	Average cost per commute trip of 11.4 miles	\$5.47	CALCULATED
3	Percent of VMT on freeways	50%	LARTS MODEL
4	Average subsidy per walkers per trip	\$1.00	ASSUMED
5	Amortization period for a passenger car	5	AAA
6	Average capital cost of a passenger vehicle	\$16,000	AAA
7	Interest rate	8%	
8	Average cost per parking (\$/mo)	\$100	
9	Construction cost of arterial (\$/lane mile)	\$900,000	CALTRANS
10	Lane miles arterial/vehicle trip	0.0018	COMSIS
11	Lane miles freeway/vehicle trip	0.0015	COMSIS
12	O&M cost of arterial (\$/LANE MILE)	\$765	CALTRANS
13	O&M cost of freeway (\$/LANE MILE)	\$2,000	CALTRANS
14	Percent of parking paid by private sector	90%	SCAQMD
15	Percent of parking paid by individuals	10%	SCAQMD
16	Air pollution cost per mile	\$0.015	RUTHERFORD AND WELLANDER, 1986
17	Cost per vehicle-miles of delay	\$0.11	RUTHERFORD AND WELLANDER, 1986
18	Construction cost of freeway (\$/lane mile) not including right of way	\$2,500,000	SANDAG
19	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$12,000,000	CALTRANS (MIN) (IN METROPOLITIAN AREA)
20	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$16,000,000	CALTRANS (MAX) (IN METROPOLITIAN AREA)
21	Average construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$14,000,000	CALTRANS (AVERAGE) (IN METROPOLITIAN AREA)
22	Construction cost of HOV lane (\$/lane mile)	\$2,500,000	MTC
23	Construction cost of sidewalk (\$/sq.ft)	\$325	City of Sacramento
24	Capital cost of shower facilities	\$300.00	ESGVEQG
25	Operation and Maintenance of shower facilities (\$/SQ.FT.)	\$0.75	ESGVEQG
26	Capital cost of apparel (shorts, shoes, jersey)	\$115	MTA
27	Operation and maintenance of sidewalk (\$/sq.ft)	\$0.10	MTA
28	Number of feet of public sidewalk	400,000	MTA
29	Subsidy per trip per day for walkers	\$1	

METHODOLOGY

ANNUALIZATION FACTOR (AF) =

$AF = IR / (1 - (1 + (IR))^{-N})$ WHERE;

IR = INTEREST RATE

N = AMORTIZATION PERIOD FOR BUS/FACILITY LIFETIME

BAF = 0.25
 VAF = 0.25
 CAF = 0.09
 CAF = 0.25

PUBLIC SECTOR COST

DAILY PUBLIC CAPITAL COST (DPCC)

$DPCC = (SWSQFT) * (CPSWSQFT) * CAF / 260$ WHERE;

SWSQFT = SQUARE FEET OF SIDEWALK CONSTRUCTED

CPSWSQFT = COST PER SQUARE FOOT OF SIDEWALK

CAF = CONSTRUCTION ANNUALIZATION FACTOR

DAILY PUBLIC O & M COST (DPOMC) =

$(SWSQFT) * (OMCPSWSQFT) / 260 + (DVTR) * (DSPT) + (DPADMC)$ WHERE;

SWSQFT = SIDEWALK SQUARE FOOT CONSTRUCTED

OMCPSWSQFT = OPERATION AND MAINTENANCE COST PER SQUARE FOOT
OF SIDEWALK CONSTRUCTED

DVTR = DAILY VEHICLE TRIPS REDUCED

DSPT = DAILY SUBSIDY PER TRIP

DPADMC = DAILY PUBLIC ADMINISTRATION COST

DAILY PUBLIC COST (DPC) =

$(DPCC + DPOMC)$ WHERE;

DPCC = DAILY PUBLIC CAPITAL COST

DPOMC = DAILY PUBLIC O & M COST

DAILY PUBLIC REVENUES (DPR) = 0

DAILY PUBLIC COST/REVENUE (DPC/R) =

$(DPCOMC) - (DPR)$ WHERE;

DPCOMC = DAILY PUBLIC CAPITAL AND OPERATION AND MAINTENANCE COST

DPR = DAILY PUBLIC REVENUE

DAILY PUBLIC BENEFITS (DPB) BY AVOIDING HIGHWAY BUILDING =

$(DPCB) + (DPOMB)$ WHERE;

$DPCB = (DVTR) * (LMF/T) * (CCLMF) * (CAF) / 260 * (POTOF) +$
 $+ (DVTR) * (LMA/T) * (CCLMA) * (CAF) / 260 * (POTOA)$ WHERE;

DVTR = DAILY TRIPS REDUCED

LMF/T = LANE MILES OF FREEWAY PER TRIP

CCLMF = CONSTRUCTION COST OF FREEWAY LANE MILE

CAF = CONSTRUCTION ANNUALIZATION FACTOR

POTOF = PERCENT OF TRIPS ON FREEWAYS

LMA = LANE MILES OF ARTERIAL PER TRIP

CCLMA = CONSTRUCTION COST OF ARTERIAL LANE MILE

POTOA = PERCENT OF PEAK TRIPS ON ARTERIAL

COST-EFFECTIVENESS MODEL

LACMTA

$$\text{DPOMB} = (\text{DTR}) * (\text{LMF}/\text{T}) * (\text{OMCLMF})/260 * (\text{POTOF}) + \\ + (\text{DTR}) * (\text{LMA}/\text{T}) * (\text{OMCLMA})/260 * (\text{POTOA}) \text{ WHERE};$$

OMCLMF = O & M COST PER LANE MILE OF FREEWAY

OMCLMA = O & M COST PER LANE MILE OF ARTERIAL

POTOF = PERCENT OF TRIPS ON FREEWAY

POTOA = PERCENT OF TRIPS ON ARTERIAL

$$\text{NET PUBLIC DAILY COST/BENEFIT COUNTING THE AVOIDED COSTS (NDPC/BIAC)} = \\ (\text{NDPC}/\text{R}) - (\text{DPB})$$

INDIVIDUAL COST/BENEFIT

$$\text{DAILY INDIVIDUAL COST (DIC)} = \\ (\text{DICC}) + (\text{DIOMC})$$

DICC = (CCA)*(DVTR/2)/260 WHERE;

CCA = CAPITAL COST OF APPAREL

DVTR = DAILY VEHICLE TRIPS REDUCED

$$\text{DIOMC} = 0$$

$$\text{DAILY INDIVIDUAL BENEFIT (DIB)} = \\ (\text{DICB}) + (\text{DIOMB}) \text{ WHERE};$$

DICB = DAILY INDIVIDUAL CAPITAL BENEFIT (CAR COST)

DIOMB = DAILY INDIVIDUAL O & M COST SAVING (CAR O & M)

$$\text{DICB} = (\text{CCC}) * (\text{NC}) * (\text{CAF})/260 * .10 \\ \text{CAF} = \text{IR}/(1 - (1 + (\text{IR}))^{-\text{N}}) \text{ WHERE};$$

$$\text{DIOMC} = (\text{DOMCPM}) * (\text{DVMTR}) * (.21) + (.10 * \text{DIPC}) + \\ + (\text{DVTR}) * (\text{DSPT}) \text{ WHERE};$$

DOMCPM = DAILY O & M CAR COST PER MILE TO DRIVE

DVMTR = DAILY VEHICLE MILES TRAVELED REDUCED

.21 IS THE PERCENT OF O & M COST ATTRIBUTED TO SAVINGS

DIPC = DAILY INDIVIDUAL PARKING COST

DVTR = DAILY VEHICLE TRIPS REDUCED

DSPT = DAILY SUBSIDY PER TRIP

$$\text{NET DAILY INDIVIDUAL COST/BENEFIT (NDIC/B)} = \\ (\text{DIC}) - (\text{DIB}) \text{ WHERE};$$

DIC = DAILY INDIVIDUAL COST

DIB = DAILY INDIVIDUAL BENEFITS

PRIVATE SECTOR COST/BENEFIT

DAILY PRIVATE CAPITAL COST (DPRCC) =
(DVTR/20)*(NSFPR)*CAF/260*CPSF WHERE;

CAF = CONSTRUCTION ANNUALIZATION FACTOR
DVTR = DAILY VEHICLE TRIPS REDUCED
NSF = NUMBER OF SHOWER FACILITIES PER RIDER
CPSF = COST PER SHOWER FACILITY

DAILY PRIVATE O & M COST (DPROMC) =
(OMCOSF)*(NSF)/260 WHERE;

OMCOSF = O & M COST OF SHOWER FACILITIES
NSF = NUMBER OF SHOWER FACILITIES

DAILY PRIVATE COST (DPRC) =
DPRCC + DPROMC WHERE;

DPRCC = DAILY PRIVATE CAPITAL COST
DPROMC = DAILY PRIVATE OPERATION AND MAINTENANCE COST

DAILY PRIVATE O & M BENEFIT (DPROMB) =
(VTR)/2 * (MPC)*12/260 * .90 WHERE;

VTR = DAILY VEHICLE TRIPS REDUCED
MPC = MONTHLY PARKING COST
.90 = PERCENT OF PARKING PROVIDED BY PRIVATE SECTOR
NET DAILY PRIVATE COST/BENEFIT (NDPC/B) =
(DPRC) - (DPRB)

SOCIETAL COST

DAPC = DAILY AIR POLLUTION COST/BENEFIT
DAPC = DVMTR * (APC/M) WHERE;

DVMTR = DAILY VMT REDUCED
APC/M = AIR POLLUTION COST PER MILE

DVMDCB = DAILY VEHICLE MILES OF DELAY COST/BENEFIT

DVMDC = (DVMDS) * (C/VMD) WHERE;
DVMDS = (VMT/NEW SPEED) - (VMT/EXISTING SPEED) * (AVERAGE SPEED)
DVMDS = DAILY VEHICLE MILES OF DELAY SAVED
C/VMD = DAILY COST PER VEHICLE MILES OF DELAY SAVED

DSCB = DAILY SOCIETAL COST/BENEFIT

DSCB = (DAPC) + (DVMDCB)

COST-EFFECTIVENESS MODEL

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TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 1 THE BUILD SCENARIO

TOTAL DAILY COST (TDC) =
(DPC) + (DIC) + (DPRC) + (DAPC) WHERE;

DPC = DAILY PUBLIC COST
DIC = DAILY INDIVIDUAL COST
DPRC = DAILY PRIVATE COST
DAPC = DAILY AIR POLLUTION COST

TOTAL DAILY BENEFITS (TDB) =
(DPB) + (DIB) + (DPRB) + DVMDB WHERE;

DPB = DAILY PUBLIC BENEFITS
DIB = DAILY INDIVIDUAL BENEFITS
DPRB = DAILY PRIVATE BENEFITS
DVMDB = DAILY VEHICLE MILES OF DELAY BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

$[(DPC) + (DIC) + (DPRC) + (DAPC)] - [(DPB) + (DIB) + (DPRB) + (DVMDB)]$

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 2 THE NO BUILD SCENARIO

TOTAL DAILY COST (TDC) =
(DPC) + (DIC) + (DPRC) + (DAPC) + (DVMDC) WHERE;

DPC = DAILY PUBLIC COST
DIC = DAILY INDIVIDUAL COST
DPRC = DAILY PRIVATE COST
DAPC = DAILY AIR POLLUTION COST
DVMDC = DAILY VEHICLE MILES OF DELAY COST

TOTAL DAILY BENEFITS (TDB) =
(DPB) + (DIB) + (DPRB) WHERE;

DPB = DAILY PUBLIC BENEFITS
DIB = DAILY INDIVIDUAL BENEFITS
DPRB = DAILY PRIVATE BENEFITS
DVMDB = DAILY VEHICLE MILES OF DELAY BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

$[(DPC) + (DIC) + (DPRC) + (DAPC) + (DVMDC)] - [(DPB) + (DIB) + (DPRB)]$

COST-EFFECTIVENESS MODEL

LACMTA

LIKELY OUTCOMES

PUBLIC SECTOR COST/BENEFIT			
		STANDARD	HIGH
1	DAILY PUBLIC CAPITAL COST	\$44,414	\$44,414
2	DAILY PUBLIC O & M COST	\$10,714	\$20,275
3	DAILY PUBLIC COST	\$55,128	\$64,689
4	DAILY PUBLIC REVENUES	\$0	\$0
5	DAILY PUBLIC COST/REVENUE	\$55,128	\$64,689
6	DAILY PUBLIC AVOIDED CAPITAL COST (SCENARIO 2)	\$42,214	\$84,432
7	DAILY PUBLIC AVOIDED O & M COST (SCENARIO 2)	\$81	\$163
8	TOTAL DAILY PUBLIC AVOIDED (SCENARIO 2)	\$42,295	\$84,594
9	NET DAILY PUBLIC BENEFIT (SCENARIO 2)	\$42,295	\$84,594
10	DAILY PUBLIC CAPITAL COST (SCENARIO 1)	\$42,214	\$84,432
11	DAILY PUBLIC O & M COST (SCENARIO 1)	\$81	\$163
12	TOTAL DAILY PUBLIC COST (SCENARIO 1)	\$42,295	\$84,594
13	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 2)	\$12,833	(\$19,906)
14	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 1)	\$42,295	\$84,594
15	COST		
16	DAILY PUBLIC COST PER TRIP REDUCED	\$6.34	\$3.72
17	DAILY PUBLIC COST PER VMT REDUCED	\$3.17	\$1.86
18	DAILY PUBLIC COST PER TON OF CO REDUCED	\$34,326	\$20,140
19	DAILY PUBLIC COST PER TON OF ROG REDUCED	\$496,646	\$291,391
20	DAILY PUBLIC COST PER TON OF NOx REDUCED	\$1,040,145	\$610,272
21	DAILY PUBLIC COST PER TON OF PM REDUCED	ERR	ERR
22	BENEFIT		
23	DAILY PUBLIC BENEFIT PER TRIP REDUCED	\$4.87	\$4.87
24	DAILY PUBLIC BENEFIT PER VMT REDUCED	\$2.43	\$2.43
25	DAILY PUBLIC BENEFIT PER TON OF CO REDUCED	\$26,335	\$26,337
26	DAILY PUBLIC BENEFIT PER TON OF ROG REDUCED	\$381,034	\$381,056
27	DAILY PUBLIC BENEFIT PER TON OF NOx REDUCED	\$798,015	\$798,061
28	DAILY PUBLIC BENEFIT PER TON OF PM REDUCED	ERR	ERR
29	COST/BENEFIT		
30	NET DAILY PUBLIC COST/BENEFIT PER TRIP REDUCED	\$1.48	(\$1.15)
31	NET DAILY PUBLIC COST/BENEFIT PER VMT REDUCED	\$0.74	(\$0.57)
32	NET DAILY PUBLIC COST/BENEFIT PER TON OF CO REDUCED	\$7,991	(\$6,197)
33	NET DAILY PUBLIC COST/BENEFIT PER TON OF ROG REDUCED	\$115,611	(\$89,665)
34	NET DAILY PUBLIC COST/BENEFIT PER TON OF NOx REDUCED	\$242,129	(\$187,789)
35	NET DAILY PUBLIC COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
36	INDIVIDUAL COST/BENEFIT		
37	DAILY INDIVIDUAL CAPITAL COST	\$3,844	\$7,689
38	DAILY INDIVIDUAL O & M COST	\$0	\$0
39	DAILY INDIVIDUAL COST	\$3,844	\$7,689
40	DAILY INDIVIDUAL CAPITAL BENEFIT	\$0	\$0
41	DAILY INDIVIDUAL O & M BENEFIT	\$12,453	\$24,907
42	DAILY INDIVIDUAL BENEFIT	\$12,453	\$24,907
43	NET DAILY INDIVIDUAL COST/BENEFIT	(\$8,609)	(\$17,219)

COST-EFFECTIVENESS MODEL

LACMTA

44	COST		
45	NET DAILY INDIVIDUAL COST PER TRIP REDUCED	\$0.44	\$0.44
46	NET DAILY INDIVIDUAL COST PER VMT REDUCED	\$0.22	\$0.22
47	NET DAILY INDIVIDUAL COST PER TON OF CO REDUCED	\$2,394	\$2,394
48	NET DAILY INDIVIDUAL COST PER TON OF ROG REDUCED	\$34,631	\$34,633
49	NET DAILY INDIVIDUAL COST PER TON OF NO _x REDUCED	\$72,530	\$72,534
50	NET DAILY INDIVIDUAL COST PER TON OF PM REDUCED	ERR	ERR
51	BENEFIT		
52	NET DAILY INDIVIDUAL BENEFIT PER TRIP REDUCED	\$1.43	\$1.43
53	NET DAILY INDIVIDUAL BENEFIT PER VMT REDUCED	\$0.72	\$0.72
54	NET DAILY INDIVIDUAL BENEFIT PER TON OF CO REDUCED	\$7,754	\$7,754
55	NET DAILY INDIVIDUAL BENEFIT PER TON OF ROG REDUCED	\$112,190	\$112,195
56	NET DAILY INDIVIDUAL BENEFIT PER TON OF NO _x REDUCED	\$234,964	\$234,975
57	NET DAILY INDIVIDUAL BENEFIT PER TON OF PM REDUCED	ERR	ERR
58	COST/BENEFIT		
59	NET DAILY INDIVIDUAL COST/BENEFIT PER TRIP REDUCED	(\$0.99)	(\$0.99)
60	NET DAILY INDIVIDUAL COST/BENEFIT PER VMT REDUCED	(\$0.50)	(\$0.50)
61	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF CO REDUCED	(\$5,361)	(\$5,361)
62	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF ROG REDUCED	(\$77,559)	(\$77,562)
63	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF NO _x REDUCED	(\$162,434)	(\$162,440)
64	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
65	PRIVATE SECTOR COST/BENEFIT		
66	DAILY PRIVATE CAPITAL COST	\$445	\$891
67	DAILY PRIVATE O & M COST	\$20	\$40
68	DAILY PRIVATE COST	\$465	\$931
69	DAILY PRIVATE CAPITAL BENEFIT	\$0	\$0
70	DAILY PRIVATE O & M BENEFIT	\$18,051	\$36,103
71	DAILY PRIVATE BENEFIT	\$18,051	\$36,103
72	NET DAILY PRIVATE COST/BENEFIT	(\$17,585)	(\$35,172)
73	COST		
74	NET DAILY PRIVATE COST PER TRIP REDUCED	\$0.05	\$0.05
75	NET DAILY PRIVATE COST PER VMT REDUCED	\$0.03	\$0.03
76	NET DAILY PRIVATE COST PER TON OF CO REDUCED	\$290	\$290
77	NET DAILY PRIVATE COST PER TON OF ROG REDUCED	\$4,193	\$4,193
78	NET DAILY PRIVATE COST PER TON OF NO _x REDUCED	\$8,782	\$8,782
79	NET DAILY PRIVATE COST PER TON OF PM REDUCED	ERR	ERR
80	BENEFIT		
81	NET DAILY PRIVATE BENEFIT PER TRIP REDUCED	\$2.08	\$2.08
82	NET DAILY PRIVATE BENEFIT PER VMT REDUCED	\$1.04	\$1.04
83	NET DAILY PRIVATE BENEFIT PER TON OF CO REDUCED	\$11,239	\$11,240
84	NET DAILY PRIVATE BENEFIT PER TON OF ROG REDUCED	\$162,617	\$162,627
85	NET DAILY PRIVATE BENEFIT PER TON OF NO _x REDUCED	\$340,576	\$340,596
86	NET DAILY PRIVATE BENEFIT PER TON OF PM REDUCED	ERR	ERR
87	COST/BENEFIT		
88	NET DAILY PRIVATE COST/BENEFIT PER TRIP REDUCED	(\$2.02)	(\$2.02)
89	NET DAILY PRIVATE COST/BENEFIT PER VMT REDUCED	(\$1.01)	(\$1.01)
90	NET DAILY PRIVATE COST/BENEFIT PER TON OF CO REDUCED	(\$10,950)	(\$10,950)
91	NET DAILY PRIVATE COST/BENEFIT PER TON OF ROG REDUCED	(\$158,424)	(\$158,433)
92	NET DAILY PRIVATE COST/BENEFIT PER TON OF NO _x REDUCED	(\$331,794)	(\$331,813)
93	NET DAILY PRIVATE COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR

COST-EFFECTIVENESS MODEL

LACMTA

94	SOCIETAL COST/BENEFIT		
95	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
96	DAILY SOCIETAL AIR POLLUTION COST	\$261	\$522
97	DAILY SOCIETAL CONGESTION COST	\$0	\$0
98	DAILY SOCIETAL COST	\$261	\$522
99	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
100	DAILY SOCIETAL CONGESTION BENEFIT	\$522	\$1,045
101	DAILY SOCIETAL BENEFIT	\$522	\$1,045
102	NET DAILY SOCIETAL COST/BENEFIT	(\$262)	(\$523)
103	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
104	DAILY SOCIETAL AIR POLLUTION COST	\$261	\$522
105	DAILY SOCIETAL CONGESTION COST	\$522	\$1,045
106	DAILY SOCIETAL COST	\$783	\$1,566
107	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0.00	\$0.00
108	DAILY SOCIETAL CONGESTION BENEFIT	\$0.00	\$0.00
109	DAILY SOCIETAL BENEFIT	\$0	\$0
110	NET DAILY SOCIETAL COST/BENEFIT	\$783	\$1,566
111	SCENARIO #2 THE NO BUILD SCENARIO		
112	DAILY SOCIETAL AIR POLLUTION COST	\$0	\$0
113	DAILY SOCIETAL CONGESTION COST	\$0	\$0
114	DAILY SOCIETAL COST	\$0	\$0
115	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$261	\$522
116	DAILY SOCIETAL CONGESTION BENEFIT	\$522	\$1,045
117	DAILY SOCIETAL BENEFIT	\$783	\$1,566
118	NET DAILY SOCIETAL COST/BENEFIT	(\$783)	(\$1,566)
119	TOTAL COST/BENEFIT		
120	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
121	TOTAL DAILY COST	\$73,059	\$146,126
122	TOTAL DAILY BENEFIT	\$522	\$1,045
123	TOTAL DAILY COST/BENEFIT	\$72,537	\$145,082
124	COST		
125	NET DAILY COST PER TRIP REDUCED	\$8.41	\$8.41
126	NET DAILY COST PER VMT REDUCED	\$4.20	\$4.20
127	NET DAILY COST PER TON OF CO REDUCED	\$45,491	\$45,494
128	NET DAILY COST PER TON OF ROG REDUCED	\$658,191	\$658,227
129	NET DAILY COST PER TON OF NO _x REDUCED	\$1,378,475	\$1,378,551
130	NET DAILY COST PER TON OF PM REDUCED	ERR	ERR
131	BENEFIT		
132	NET DAILY BENEFIT PER TRIP REDUCED	\$0.06	\$0.06
133	NET DAILY BENEFIT PER VMT REDUCED	\$0.03	\$0.03
134	NET DAILY BENEFIT PER TON OF CO REDUCED	\$325	\$325
135	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$4,706	\$4,706
136	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$9,856	\$9,856
137	NET DAILY BENEFIT PER TON OF PM REDUCED	ERR	ERR

COST-EFFECTIVENESS MODEL

LACMTA

138	COST/BENEFIT		
139	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$8.35	\$8.35
140	NET DAILY COST/BENEFIT PER VMT REDUCED	\$4.17	\$4.17
141	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$45,166	\$45,169
142	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$653,485	\$653,521
143	NET DAILY COST/BENEFIT PER TON OF NOx REDUCED	\$1,368,619	\$1,368,696
144	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
145	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
146	TOTAL DAILY COST	\$73,582	\$147,171
147	TOTAL DAILY BENEFIT	\$0	\$0
148	TOTAL DAILY COST/BENEFIT	\$73,582	\$147,171
149	COST		
150	NET DAILY COST PER TRIP REDUCED	\$8.47	\$8.47
151	NET DAILY COST PER VMT REDUCED	\$4.23	\$4.23
152	NET DAILY COST PER TON OF CO REDUCED	\$45,817	\$45,819
153	NET DAILY COST PER TON OF ROG REDUCED	\$662,897	\$662,933
154	NET DAILY COST PER TON OF NOx REDUCED	\$1,388,331	\$1,388,407
155	NET DAILY COST PER TON OF PM REDUCED	ERR	ERR
156	BENEFIT		
157	NET DAILY BENEFIT PER TRIP REDUCED	\$0	\$0
158	NET DAILY BENEFIT PER VMT REDUCED	\$0	\$0
159	NET DAILY BENEFIT PER TON OF CO REDUCED	\$0	\$0
160	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$0	\$0
161	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$0	\$0
162	NET DAILY BENEFIT PER TON OF PM REDUCED	ERR	ERR
163	COST/BENEFIT		
164	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$8.47	\$8.47
165	NET DAILY COST/BENEFIT PER VMT REDUCED	\$4.23	\$4.23
166	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$45,817	\$45,819
167	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$662,897	\$662,933
168	NET DAILY COST/BENEFIT PER TON OF NOx REDUCED	\$1,388,331	\$1,388,407
169	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
170	SCENARIO #2 THE NO BUILD SCENARIO		
171	TOTAL DAILY COST	\$59,437.20	\$73,308.43
172	TOTAL DAILY BENEFIT	\$73,581.56	\$147,171.14
173	TOTAL DAILY COST/BENEFIT	(\$14,144.36)	(\$73,862.71)
174	COST		
175	NET DAILY COST PER TRIP REDUCED	\$6.84	\$4.22
176	NET DAILY COST PER VMT REDUCED	\$3.42	\$2.11
177	NET DAILY COST PER TON OF CO REDUCED	\$37,009	\$22,823
178	NET DAILY COST PER TON OF ROG REDUCED	\$535,470	\$330,218
179	NET DAILY COST PER TON OF NOx REDUCED	\$1,121,457	\$691,589
180	NET DAILY COST PER TON OF PM REDUCED	ERR	ERR
181	BENEFIT		
182	NET DAILY BENEFIT PER TRIP REDUCED	\$8.47	\$8.47
183	NET DAILY BENEFIT PER VMT REDUCED	\$4.23	\$4.23
184	NET DAILY BENEFIT PER TON OF CO REDUCED	\$45,817	\$45,819
185	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$662,897	\$662,933
186	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$1,388,331	\$1,388,407
187	NET DAILY BENEFIT PER TON OF PM REDUCED	ERR	ERR

COST-EFFECTIVENESS MODEL

LACMTA

COST/BENEFIT			
188	NET DAILY COST/BENEFIT PER TRIP REDUCED	(\$1.63)	(\$4.25)
189	NET DAILY COST/BENEFIT PER VMT REDUCED	(\$0.81)	(\$2.12)
191	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	(\$8,807)	(\$22,996)
192	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	(\$127,427)	(\$332,715)
193	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	(\$266,875)	(\$696,818)
194	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR

COST—EFFECTIVENESS MODEL

LACMTA

TCM # 16 BUSPOOL SUBSIDY ASSUMPTIONS

1	Average buspool occupancy	42.00	MTA
2	Average length of a buspool trip	20	REG. XV
3	Average cost per mile to drive	\$0.48	AAA
4	Average cost per commute trip of 11.4 miles	\$5.47	CALCULATED
5	Average cost per commute trip of 20 miles	\$9.60	CALCULATED
6	Percent of VMT on freeways	90%	LARTS MODEL
7	Average subsidy per buspooler per trip	\$1.00	ASSUMED
8	Purchase cost of a bus	\$260,500	MTA
9	Amortization period for a bus (years)	12	VPSI
10	Average cost of a passenger vehicle	\$16,000	AAA
11	O & M cost per bus mile	\$0.80	MTA
12	O & M cost per passenger car mile	\$0.48	AAA
13	Number of buses needed	374	MTA
14	Interest rate	8%	MARKET RATE
15	Average monthly cost for buspooler	\$150	MTA
16	Average monthly parking cost	\$100	MTA
17	Average daily miles per bus	40	MTA
18	Average daily fare to passengers	\$13	CALCULATED
19	Amortization period for passenger car	5	AAA
22	Construction cost of arterial (\$/lane mile)	\$900,000	CALTRANS
23	Lane miles arterial/vehicle trip	0.0018	COMSIS
24	Lane miles freeway/vehicle trip	0.0015	COMSIS
25	O&M cost of arterial (\$/LANE MILE)	\$765	CALTRANS
26	O&M cost of freeway (\$/LANE MILE)	\$2,000	CALTRANS
27	Percent of parking paid by private sector	90%	SCAQMD
28	Percent of parking paid by employees	10%	SCAQMD
29	Air pollution cost per mile	\$0.015	RUTHERFORD AND WELLANDER, 1986
30	Cost per vehicle—miles of delay	\$0.11	RUTHERFORD AND WELLANDER, 1986
31	Construction cost of freeway (\$/lane mile) not including right of way	\$2,500,000	SANDAG
32	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$12,000,000	CALTRANS (MIN) (IN METROPOLITAN AREA)
33	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$16,000,000	CALTRANS (MAX) (IN METROPOLITAN AREA)
34	Average construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$14,000,000	CALTRANS (AVERAGE) (IN METROPOLITAN AREA)
35	Construction cost of HOV lane (\$/lane mile)	\$2,500,000	MTC
36	Average capital cost per park-and-ride space	\$10,000	MTA
37	Average operation and maintenance cost per space	\$20	MTA
38	Number of parking spaces needed	2000	MTA

METHODOLOGY

ANNUALIZATION FACTOR (AF) =

$AF = IR / (1 - (1 + (IR))^{-N})$ WHERE;

IR = INTEREST RATE

N = AMORTIZATION PERIOD FOR BUS/FACILITY LIFETIME

BAF =	0.13
VAF =	0.25
CAF =	0.09
CAF =	0.25

PUBLIC SECTOR COST

DAILY PUBLIC CAPITAL COST (DPCC) =
 $NPNSN * CPPNRS * PNAF / 260$

DAILY PUBLIC O & M COST (DPOMC) =

$DSPT * DVTR + DPAC + (NPNSN * OMCPNRS)$ WHERE;

DSPT = DAILY SUBSIDY PER TRIP

DVTR = DAILY VEHICLE TRIPS REDUCED

DPAC = DAILY PUBLIC ADMINISTRATIVE COST

NPNSN = NUMBER OF NEEDED PARK-N-RIDE SPACES

CPPNRS = COST PER PARK-N-RIDE SPACE

OMCPNRS = OPERATION AND MAINTENANCE COST PER SPACE

(DPAC) = DAILY PUBLIC ADMINISTRATIVE COST (DPAC) = 10% OF TOTAL COST

DAILY PUBLIC COST (DPC) =

$(DPCC + DPOMC)$ WHERE;

DPCC = DAILY PUBLIC CAPITAL COST

DPOMC = DAILY PUBLIC O & M COST

DAILY PUBLIC REVENUES (DPR) = 0

COST-EFFECTIVENESS MODEL

LACMTA

DAILY PUBLIC COST/REVENUE (DPC/R) =

(DPCOMC) - (DPR) WHERE;

DPCOMC = DAILY PUBLIC CAPITAL AND OPERATION AND MAINTENANCE COST
DPR = DAILY PUBLIC REVENUE

DAILY PUBLIC BENEFITS (DPB) BY AVOIDING HIGHWAY BUILDING =

(DPCB) + (DPOMB) WHERE;

$DPCB = (DPTR) * (LMF/T) * (CCLMF) * (CAF)/260 * (POTOF) +$
 $+ (DPTR) * (LMA/T) * (CCLMA) * (CAF)/260 * (POTOA)$ WHERE;

DPTR = DAILY TRIPS REDUCED
LMF/T = LANE MILES OF FREEWAY PER TRIP
CCLMF = CONSTRUCTION COST OF FREEWAY LANE MILE
CAF = CONSTRUCTION ANNUALIZATION FACTOR
POTOF = PERCENT OF TRIPS ON FREEWAYS
LMA = LANE MILES OF ARTERIAL PER TRIP
CCLMA = CONSTRUCTION COST OF ARTERIAL LANE MILE
POTOA = PERCENT OF PEAK TRIPS ON ARTERIAL

$DPOMB = (DTR) * (LMFA/T) * (OMCLMF)/260 * (POTOF) +$
 $+ (DTR) * (LMA/T) * (OMCLMA)/260 * (POTOA)$ WHERE;

OMCLMF = O & M COST PER LANE MILE OF FREEWAY
OMCLMA = O & M COST PER LANE MILE OF ARTERIAL
POTOF = PERCENT OF TRIPS ON FREEWAY
POTOA = PERCENT OF TRIPS ON ARTERIAL

NET PUBLIC DAILY COST/BENEFIT COUNTING THE AVOIDED COSTS (NDPC/BIAC) =
(NDPC/R) - (DPB)

INDIVIDUAL COST

DAILY INDIVIDUAL COST (DIC) =

DICC = 0

DIOMC =

(DCPT) * (DVTR) WHERE;

DCPT = DAILY COST PER TRIP
DVTR = DAILY VEHICLE TRIPS REDUCED

DAILY INDIVIDUAL BENEFIT (DIB) =

(DICB) + (DIOMB) WHERE;

DICB = DAILY INDIVIDUAL CAPITAL BENEFIT (CAR COST)
DIOMB = DAILY INDIVIDUAL O & M COST SAVING (CAR O & M)

COST-EFFECTIVENESS MODEL

LACMTA

$$DICB = (CCC) * (NC) * (CAF) / 260 * .10$$

$$CAF = IR / (1 - (1 + (IR)) ^ (-N)) \text{ WHERE;}$$

$$DIOMC = (DOMCPM) * (DVMTR) * (.21) + (.10 * DIPC) + (DSPT) * DVTR \text{ WHERE;}$$

DOMCPM = DAILY O & M CAR COST PER MILE TO DRIVE
DVMTR = DAILY VEHICLE MILES TRAVELED REDUCED
.21 IS THE PERCENT OF O & M COST ATTRIBUTED TO SAVINGS
DIPC = DAILY INDIVIDUAL PARKING COST
DVTR = DAILY VEHICLE TRIPS REDUCED
DSPT = DAILY SUBSIDY PER TRIP REDUCED

$$\text{NET DAILY INDIVIDUAL COST/BENEFIT (NDIC/B) =}$$

$$(DIC) - (DIB) \text{ WHERE;}$$

DIC = DAILY INDIVIDUAL COST

DIB = DAILY INDIVIDUAL BENEFITS

PRIVATE SECTOR COST/BENEFIT

$$\text{DAILY PRIVATE CAPITAL COST (DPRCC) =}$$

$$(NB) * (CB) * (BAF) / 260 \text{ WHERE;}$$

NB = NUMBER OF BUSES PURCHASED

CB = CAPITAL COST OF A BUS

BAF = BUS ANNUALIZATION FACTOR

260 = THE NUMBER OF WORKING DAYS IN A YEAR

$$\text{DAILY PRIVATE OPERATION AND MAINTENANCE COST (DPROMC) =}$$

$$NB * DBM * OMCPM \text{ WHERE;}$$

NB = NUMBER OF BUSES

DBM = DAILY BUS MILES

OMCPM = OPERATION AND MAINTENANCE COST PER MILE

$$\text{DAILY PRIVATE COST (DPRC) =}$$

$$DPRCC + DSPROMC \text{ WHERE;}$$

DPRCC = DAILY PRIVATE CAPITAL COST

DSPROMC = DAILY PRIVATE OPERATION AND MAINTENANCE COST

$$\text{DAILY PRIVATE CAPITAL BENEFIT (DPRCB) = 0}$$

$$\text{DAILY PRIVATE O \& M BENEFIT (DPROMB) =}$$

$$(VTR) * (MPC) * 12 / 260 * .90 \text{ WHERE;}$$

VTR = DAILY VEHICLE TRIPS REDUCED

MPC = MONTHLY PARKING COST

.90 = PERCENT OF PARKING PROVIDED BY PRIVATE SECTOR

$$\text{NET DAILY PRIVATE COST/BENEFIT (NDPC/B) =}$$

$$(DPRC) - (DPRB)$$

SOCIETAL COST

DAPC = DAILY AIR POLLUTION COST/BENEFIT

DAPC = DVMTR * (APC/M) WHERE;

DVMTR = DAILY VMT REDUCED

APC/M = AIR POLLUTION COST PER MILE

DVMDCB = DAILY VEHICLE MILES OF DELAY COST/BENEFIT

DVMDC = (DVMDS) * (C/VMD) WHERE;

DVMDS = (VMT/NEW SPEED) - (VMT/EXISTING SPEED) * (AVERAGE SPEED)

DVMDS = DAILY VEHICLE MILES OF DELAY SAVED

C/VMD = DAILY COST PER VEHICLE MILES OF DELAY SAVED

DSCB = DAILY SOCIETAL COST/BENEFIT

DSCB = (DAPC) + (DVMDCB)

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 1 THE BUILD SCENARIO

TOTAL DAILY COST (TDC) =

(DPC) + (DIC) + (DPRC) + (DAPC) WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DAPC = DAILY AIR POLLUTION COST

TOTAL DAILY BENEFITS (TDB) =

(DPB) + (DIB) + (DPRB) + DVMDB WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DVMDB = DAILY VEHICLE MILES OF DELAY BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

[(DPC) + (DIC) + (DPRC) + (DAPC)] - [(DPB) + (DIB) + (DPRB) + (DVMDB)]

COST-EFFECTIVENESS MODEL

LACMTA

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 2 THE NO BUILD SCENARIO

TOTAL DAILY COST (TDC) =

(DPC) + (DIC) + (DPRC) + (DAPC) + (DVMD C) WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DAPC = DAILY AIR POLLUTION COST

DVMD C = DAILY VEHICLE MILES OF DELAY COST

TOTAL DAILY BENEFITS (TDB) =

(DPB) + (DIB) + (DPRB) WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DVMD B = DAILY VEHICLE MILES OF DELAY BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

[(DPC) + (DIC) + (DPRC) + (DAPC) + (DVMD C)] - [(DPB) + (DIB) + (DPRB)]

COST – EFFECTIVENESS MODEL

LACMTA

LIKELY OUTCOMES

PUBLIC SECTOR COST/BENEFIT			
		STANDARD	HIGH
1	DAILY PUBLIC CAPITAL COST	\$6,833	\$6,833
2	DAILY PUBLIC O & M COST	\$23,215	\$34,747
3	DAILY PUBLIC COST	\$30,048	\$41,580
4	DAILY PUBLIC REVENUES	\$0	\$0
5	DAILY PUBLIC COST/REVENUE	\$30,048	\$41,580
6	DAILY PUBLIC AVOIDED CAPITAL COST (SCENARIO 2)	\$150,414	\$225,624
7	DAILY PUBLIC AVOIDED O & M COST (SCENARIO 2)	\$242	\$363
8	TOTAL DAILY PUBLIC AVOIDED (SCENARIO 2)	\$150,656	\$225,987
9	NET DAILY PUBLIC BENEFIT (SCENARIO 2)	\$150,656	\$225,987
10	DAILY PUBLIC CAPITAL COST (SCENARIO 1)	\$150,414	\$225,624
11	DAILY PUBLIC O & M COST (SCENARIO 1)	\$242	\$363
12	TOTAL DAILY PUBLIC COST (SCENARIO 1)	\$150,656	\$225,987
13	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 2)	(\$120,608)	(\$184,408)
14	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 1)	\$150,656	\$225,987
15	COST		
16	DAILY PUBLIC COST PER TRIP REDUCED	\$1.43	\$1.32
17	DAILY PUBLIC COST PER VMT REDUCED	\$0.06	\$0.06
18	DAILY PUBLIC COST PER TON OF CO REDUCED	\$3,660	\$3,376
19	DAILY PUBLIC COST PER TON OF ROG REDUCED	\$32,520	\$30,000
20	DAILY PUBLIC COST PER TON OF NO _x REDUCED	\$56,376	\$51,974
21	DAILY PUBLIC COST PER TON OF PM REDUCED	\$2,731,657	\$2,598,720
22	BENEFIT		
23	DAILY PUBLIC BENEFIT PER TRIP REDUCED	\$7.19	\$7.19
24	DAILY PUBLIC BENEFIT PER VMT REDUCED	\$0.31	\$0.31
25	DAILY PUBLIC BENEFIT PER TON OF CO REDUCED	\$18,348	\$18,351
26	DAILY PUBLIC BENEFIT PER TON OF ROG REDUCED	\$163,047	\$163,050
27	DAILY PUBLIC BENEFIT PER TON OF NO _x REDUCED	\$282,656	\$282,484
28	DAILY PUBLIC BENEFIT PER TON OF PM REDUCED	\$13,695,981	\$14,124,205
29	COST/BENEFIT		
30	NET DAILY PUBLIC COST/BENEFIT PER TRIP REDUCED	(\$5.75)	(\$5.86)
31	NET DAILY PUBLIC COST/BENEFIT PER VMT REDUCED	(\$0.25)	(\$0.25)
32	NET DAILY PUBLIC COST/BENEFIT PER TON OF CO REDUCED	(\$14,689)	(\$14,974)
33	NET DAILY PUBLIC COST/BENEFIT PER TON OF ROG REDUCED	(\$130,528)	(\$133,050)
34	NET DAILY PUBLIC COST/BENEFIT PER TON OF NO _x REDUCED	(\$226,281)	(\$230,510)
35	NET DAILY PUBLIC COST/BENEFIT PER TON OF PM REDUCED	(\$10,964,324)	(\$11,525,484)
36	INDIVIDUAL COST/BENEFIT		
37	DAILY INDIVIDUAL CAPITAL COST	\$0	\$0
38	DAILY INDIVIDUAL O & M COST	\$72,571	\$108,858
39	DAILY INDIVIDUAL COST	\$72,571	\$108,858
40	DAILY INDIVIDUAL CAPITAL BENEFIT	\$0	\$0
41	DAILY INDIVIDUAL O & M BENEFIT	\$75,161	\$112,741
42	DAILY INDIVIDUAL BENEFIT	\$75,161	\$112,741
43	NET DAILY INDIVIDUAL COST/BENEFIT	(\$2,589)	(\$3,883)

COST-EFFECTIVENESS MODEL

LACMTA

44	COST		
45	NET DAILY INDIVIDUAL COST PER TRIP REDUCED	\$3.46	\$3.46
46	NET DAILY INDIVIDUAL COST PER VMT REDUCED	\$0.15	\$0.15
47	NET DAILY INDIVIDUAL COST PER TON OF CO REDUCED	\$8,838	\$8,840
48	NET DAILY INDIVIDUAL COST PER TON OF ROG REDUCED	\$78,540	\$78,541
49	NET DAILY INDIVIDUAL COST PER TON OF NO _x REDUCED	\$136,156	\$136,073
50	NET DAILY INDIVIDUAL COST PER TON OF PM REDUCED	\$6,597,378	\$6,803,654
51	BENEFIT		
52	NET DAILY INDIVIDUAL BENEFIT PER TRIP REDUCED	\$3.59	\$3.59
53	NET DAILY INDIVIDUAL BENEFIT PER VMT REDUCED	\$0.15	\$0.15
54	NET DAILY INDIVIDUAL BENEFIT PER TON OF CO REDUCED	\$9,154	\$9,155
55	NET DAILY INDIVIDUAL BENEFIT PER TON OF ROG REDUCED	\$81,343	\$81,343
56	NET DAILY INDIVIDUAL BENEFIT PER TON OF NO _x REDUCED	\$141,014	\$140,927
57	NET DAILY INDIVIDUAL BENEFIT PER TON OF PM REDUCED	\$6,832,774	\$7,046,336
58	COST/BENEFIT		
59	NET DAILY INDIVIDUAL COST/BENEFIT PER TRIP REDUCED	(\$0.12)	(\$0.12)
60	NET DAILY INDIVIDUAL COST/BENEFIT PER VMT REDUCED	(\$0.01)	(\$0.01)
61	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF CO REDUCED	(\$315)	(\$315)
62	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF ROG REDUCED	(\$2,802)	(\$2,802)
63	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF NO _x REDUCED	(\$4,858)	(\$4,854)
64	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF PM REDUCED	(\$235,396)	(\$242,682)
65	PRIVATE SECTOR COST/BENEFIT		
66	DAILY PRIVATE CAPITAL COST	\$49,774	\$49,774
67	DAILY PRIVATE O & M COST	\$11,980	\$11,980
68	DAILY PRIVATE COST	\$61,754	\$61,754
69	DAILY PRIVATE CAPITAL BENEFIT	\$0	\$0
70	DAILY PRIVATE O & M BENEFIT	\$43,543	\$65,315
71	DAILY PRIVATE BENEFIT	\$43,543	\$65,315
72	NET DAILY PRIVATE COST/BENEFIT	\$18,212	(\$3,561)
73	COST		
74	NET DAILY PRIVATE COST PER TRIP REDUCED	\$2.95	\$1.96
75	NET DAILY PRIVATE COST PER VMT REDUCED	\$0.13	\$0.08
76	NET DAILY PRIVATE COST PER TON OF CO REDUCED	\$7,521	\$5,015
77	NET DAILY PRIVATE COST PER TON OF ROG REDUCED	\$66,834	\$44,556
78	NET DAILY PRIVATE COST PER TON OF NO _x REDUCED	\$115,862	\$77,193
79	NET DAILY PRIVATE COST PER TON OF PM REDUCED	\$5,614,019	\$3,859,638
80	BENEFIT		
81	NET DAILY PRIVATE BENEFIT PER TRIP REDUCED	\$2.08	\$2.08
82	NET DAILY PRIVATE BENEFIT PER VMT REDUCED	\$0.09	\$0.09
83	NET DAILY PRIVATE BENEFIT PER TON OF CO REDUCED	\$5,303	\$5,304
84	NET DAILY PRIVATE BENEFIT PER TON OF ROG REDUCED	\$47,124	\$47,125
85	NET DAILY PRIVATE BENEFIT PER TON OF NO _x REDUCED	\$81,694	\$81,644
86	NET DAILY PRIVATE BENEFIT PER TON OF PM REDUCED	\$3,958,427	\$4,082,192
87	COST/BENEFIT		
88	NET DAILY PRIVATE COST/BENEFIT PER TRIP REDUCED	\$0.87	(\$0.11)
89	NET DAILY PRIVATE COST/BENEFIT PER VMT REDUCED	\$0.04	(\$0.00)
90	NET DAILY PRIVATE COST/BENEFIT PER TON OF CO REDUCED	\$2,218	(\$289)
91	NET DAILY PRIVATE COST/BENEFIT PER TON OF ROG REDUCED	\$19,709	(\$2,569)
92	NET DAILY PRIVATE COST/BENEFIT PER TON OF NO _x REDUCED	\$34,168	(\$4,451)
93	NET DAILY PRIVATE COST/BENEFIT PER TON OF PM REDUCED	\$1,655,593	(\$222,554)

COST-EFFECTIVENESS MODEL

LACMTA

94	SOCIETAL COST/BENEFIT		
95	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
96	DAILY SOCIETAL AIR POLLUTION COST	\$7,327	\$10,991
97	DAILY SOCIETAL CONGESTION COST	\$0	\$0
98	DAILY SOCIETAL COST	\$7,327	\$10,991
99	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
100	DAILY SOCIETAL CONGESTION BENEFIT	\$14,679	\$22,018
101	DAILY SOCIETAL BENEFIT	\$14,679	\$22,018
102	NET DAILY SOCIETAL COST/BENEFIT	(\$7,351)	(\$11,027)
103	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
104	DAILY SOCIETAL AIR POLLUTION COST	\$7,327	\$10,991
105	DAILY SOCIETAL CONGESTION COST	\$14,679	\$22,018
106	DAILY SOCIETAL COST	\$22,006	\$33,009
107	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0.00	\$0.00
108	DAILY SOCIETAL CONGESTION BENEFIT	\$0.00	\$0.00
109	DAILY SOCIETAL BENEFIT	\$0	\$0
110	NET DAILY SOCIETAL COST/BENEFIT	\$22,006	\$33,009
111	SCENARIO #2 THE NO BUILD SCENARIO		
112	DAILY SOCIETAL AIR POLLUTION COST	\$0	\$0
113	DAILY SOCIETAL CONGESTION COST	\$0	\$0
114	DAILY SOCIETAL COST	\$0	\$0
115	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$7,327	\$10,991
116	DAILY SOCIETAL CONGESTION BENEFIT	\$14,679	\$22,018
117	DAILY SOCIETAL BENEFIT	\$22,006	\$33,009
118	NET DAILY SOCIETAL COST/BENEFIT	(\$22,006)	(\$33,009)
119	TOTAL COST/BENEFIT		
120	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
121	TOTAL DAILY COST	\$276,686	\$415,035
122	TOTAL DAILY BENEFIT	\$14,679	\$22,018
123	TOTAL DAILY COST/BENEFIT	\$262,008	\$393,017
124	COST		
125	NET DAILY COST PER TRIP REDUCED	\$13.20	\$13.20
126	NET DAILY COST PER VMT REDUCED	\$0.57	\$0.57
127	NET DAILY COST PER TON OF CO REDUCED	\$33,697	\$33,702
128	NET DAILY COST PER TON OF ROG REDUCED	\$299,444	\$299,448
129	NET DAILY COST PER TON OF NOx REDUCED	\$519,111	\$518,794
130	NET DAILY COST PER TON OF PM REDUCED	\$25,153,309	\$25,939,678
131	BENEFIT		
132	NET DAILY BENEFIT PER TRIP REDUCED	\$0.70	\$0.70
133	NET DAILY BENEFIT PER VMT REDUCED	\$0.24	\$0.23
134	NET DAILY BENEFIT PER TON OF CO REDUCED	\$1,788	\$1,788
135	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$15,886	\$15,886
136	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$27,540	\$27,522
137	NET DAILY BENEFIT PER TON OF PM REDUCED	\$1,334,421	\$1,376,120

COST – EFFECTIVENESS MODEL

LACMTA

138	COST/BENEFIT		
139	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$12.50	\$12.50
140	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.54	\$0.54
141	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$31,909	\$31,914
142	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$283,558	\$283,562
143	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$491,572	\$491,271
144	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$23,818,888	\$24,563,558
145	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
146	TOTAL DAILY COST	\$291,365	\$437,053
147	TOTAL DAILY BENEFIT	\$0	\$0
148	TOTAL DAILY COST/BENEFIT	\$291,365	\$437,053
149	COST		
150	NET DAILY COST PER TRIP REDUCED	\$13.90	\$13.90
151	NET DAILY COST PER VMT REDUCED	\$0.60	\$0.60
152	NET DAILY COST PER TON OF CO REDUCED	\$35,485	\$35,489
153	NET DAILY COST PER TON OF ROG REDUCED	\$315,330	\$315,334
154	NET DAILY COST PER TON OF NO _x REDUCED	\$546,651	\$546,316
155	NET DAILY COST PER TON OF PM REDUCED	\$26,487,730	\$27,315,798
156	BENEFIT		
157	NET DAILY BENEFIT PER TRIP REDUCED	\$0	\$0
158	NET DAILY BENEFIT PER VMT REDUCED	\$0	\$0
159	NET DAILY BENEFIT PER TON OF CO REDUCED	\$0	\$0
160	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$0	\$0
161	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$0	\$0
162	NET DAILY BENEFIT PER TON OF PM REDUCED	\$0	\$0
163	COST/BENEFIT		
164	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$13.90	\$13.90
165	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.60	\$0.60
166	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$35,485	\$35,489
167	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$315,330	\$315,334
168	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$546,651	\$546,316
169	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$26,487,730	\$27,315,798
170	SCENARIO #2 THE NO BUILD SCENARIO		
171	TOTAL DAILY COST	\$164,374	\$212,192
172	TOTAL DAILY BENEFIT	\$291,365	\$437,053
173	TOTAL DAILY COST/BENEFIT	(\$126,991)	(\$224,861)
174	COST		
175	NET DAILY COST PER TRIP REDUCED	\$7.84	\$6.75
176	NET DAILY COST PER VMT REDUCED	\$0.34	\$0.29
177	NET DAILY COST PER TON OF CO REDUCED	\$20,019	\$17,230
178	NET DAILY COST PER TON OF ROG REDUCED	\$177,893	\$153,097
179	NET DAILY COST PER TON OF NO _x REDUCED	\$308,393	\$265,240
180	NET DAILY COST PER TON OF PM REDUCED	\$14,943,054	\$13,262,013
181	BENEFIT		
182	NET DAILY BENEFIT PER TRIP REDUCED	\$13.90	\$13.90
183	NET DAILY BENEFIT PER VMT REDUCED	\$0.60	\$0.60
184	NET DAILY BENEFIT PER TON OF CO REDUCED	\$35,485	\$35,489
185	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$315,330	\$315,334
186	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$546,651	\$546,316
187	NET DAILY BENEFIT PER TON OF PM REDUCED	\$26,487,730	\$27,315,798

COST – EFFECTIVENESS MODEL

LACMTA

188	COST/BENEFIT		
189	NET DAILY COST/BENEFIT PER TRIP REDUCED	(\$6.06)	(\$7.15)
190	NET DAILY COST/BENEFIT PER VMT REDUCED	(\$0.26)	(\$0.31)
191	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	(\$15,466)	(\$18,259)
192	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	(\$137,437)	(\$162,237)
193	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	(\$238,258)	(\$281,076)
194	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	(\$11,544,676)	(\$14,053,785)

COST-EFFECTIVENESS MODEL

LACMTA

TCM # 17 TRANSIT SERVICE INCREASE ASSUMPTIONS

1	Transit vehicle miles in LA County	251,410	MTA
2	Transit peak fleet	1,733	MTA
3	Active fleet	2,294	MTA
4	Contingency fleet	87	MTA
5	Capital cost of a bus		
5.1	Diesel	210,000	MTA
5.2	Methanol	220,000	MTA
5.3	CNG	260,000	MTA
6	Additional costs for radio and wheel chair	75,000	MTA
7	Total capital bus cost		
7.1	Diesel	285,000	MTA
7.2	Methanol	295,000	MTA
7.3	CNG	335,000	MTA
8	Average capital cost of a bus	260,500	MTA
9	Capital construction cost per bus	130,250	MTA
10	Transit ridership on a weekday	1,169,786	MTA
11	Transit ridership on Saturdays	837,722	MTA
12	Transit ridership on Sundays	580,335	MTA
13	Passenger mile/bus mile	18.2	MTA
14	Subsidy per passenger mile	\$0.27	MTA
15	Cost per bus hour	\$109.70	MTA
16	Revenue per passenger mile	\$0.16	MTA
17	Total bus hours	17,726	MTA
18	Operation cost	1944524	MTA
19	Fare box revenue	729,973	MTA
20	Total seat miles	10,800,996	MTA
21	Total passenger miles	4,569,352	MTA
22	Operation cost per revenue mile	\$7.73	MTA
23	Revenue per revenue mile	\$2.90	MTA
24	Amortization period for construction projects	30	MTA
25	Amortization period for equipment purchase	12	MTA
26	Amortization period for vehicles (BUSES)	12	MTA
27	O&M cost of vehicle	\$0.48	AAA
28	Construction cost of arterial (\$/lane mile)	\$900,000	CALTRANS
29	Construction annualization factor (CAF)	0.09	CALCULATED
30	Bus annualization factor (BAF)	0.13	CALCULATED
31	car annualization factor	0.25	CALCULATED
32	Amortization period for cars	5	AAA
33	Percent of VMT on freeways	50%	LARTS MODEL
34	Interest rate	8%	MARKET RATE
35	Lane miles arterial/vehicle trip	0.0018	COMSIS
36	Lane miles freeway/vehicle trip	0.0015	COMSIS
37	O&M cost of arterial (\$/LANE MILE)	\$765	CALTRANS
38	O&M cost/mile of transit	\$4	MTA
39	O&M cost/passenger of transit	\$1	MTA
40	O&M cost of freeway (\$/LANE MILE)	\$2,000	CALTRANS
41	Monthly parking cost	\$100	MTA
42	Percent of parking paid by employers	90%	SCAQMD
43	Percent of parking paid by employees	10%	SCAQMD

COST-EFFECTIVENESS MODEL

LACMTA

44	Air pollution cost per mile	\$0.015	RUTHERFORD AND WELLANDER, 1986
45	Cost per vehicle-miles of delay	\$0.11	RUTHERFORD AND WELLANDER, 1986
46	Construction cost of freeway (\$/lane mile) not including right of way	\$2,500,000	SANDAG
47	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$12,000,000	CALTRANS (MIN) (IN METROPOLITAN AREA)
48	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$16,000,000	CALTRANS (MAX) (IN METROPOLITAN AREA)
49	Average construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$14,000,000	CALTRANS (AVERAGE) (IN METROPOLITAN AREA)
50	Construction cost of HOV lane (\$/lane mile)	\$2,500,000	MTC
51	Passengers per bus miles	4.65	MTA
52	Average cost of a passenger vehicle	\$16,000	AAA

METHODOLOGY

ANNUALIZATION FACTOR (AF) =

$AF = IR / (1 - (1 + (IR))^{-N})$ WHERE;

IR = INTEREST RATE

N = AMORTIZATION PERIOD FOR BUS/FACILITY LIFETIME

DAILY PUBLIC CAPITAL COST (DPCC) =

$(NB) * (CB) * (BAF) / 365 + [(CCF) * (CAF) / 365]$ WHERE;

NB = NUMBER OF BUSES

CB = CAPITAL COST OF A BUS

BAF = BUS ANNUALIZATION FACTOR

CCF = CAPITAL COST OF FACILITY CONSTRUCTION

DAILY PUBLIC O & M COST (DPOMC) =

$(NODRMA) * (OMC/RM)$ WHERE;

NODRMA = NUMBER OF DAILY REVENUE MILES ADDED

OMC/PM = OPERATION AND MAINTENANCE COST PER MILE

DPADMC = DAILY PUBLIC ADMINISTRATIVE COST = 5% OF TOTAL COST

DAILY PUBLIC (DPC) =

$(DPCC + DPOMC)$ WHERE;

DPCC = DAILY PUBLIC CAPITAL COST

DPOMC = DAILY PUBLIC O & M COST

COST-EFFECTIVENESS MODEL

LACMTA

DAILY PUBLIC REVENUES (DPR) =
(DRMFPA)*(DFPRM) WHERE;

DRMFPA = DAILY REVENUE MILES FOR PASSENGERS ACCOMODATED
DFPRM = DAILY FARE PER REVENUE MILE

DAILY PUBLIC COST/REVENUE (DPC/R) =
(DPCOMC) - (DPR) WHERE;

DPCOMC = DAILY PUBLIC CAPITAL AND OPERATION AND MAINTENANCE COST
DPR = DAILY PUBLIC REVENUE

DAILY PUBLIC BENEFITS (DPB) BY AVOIDING HIGHWAY BUILDING =

(DPCB) + (DPOMB) WHERE;

DPCB = (DPTR) * (LMF/T) * (CCLMF) * (CAF)/260*(POTC
+ (DPTR) * (LMA/T) * (CCLMA) * (CAF)/260*(POTOA) WHERE;

DPTR = DAILY TRIPS REDUCED
LMF/T = LANE MILES OF FREEWAY PER TRIP
CCLMF = CONSTRUCTION COST OF FREEWAY LANE MILE
CAF = CONSTRUCTION ANNUALIZATION FACTOR
POTOF = PERCENT OF TRIPS ON FREEWAYS
LMA = LANE MILES OF ARTERIAL PER TRIP
CCLMA = CONSTRUCTION COST OF ATERIAL LANE MILE
POTOA = PERCENT OF PEAK TRIPS ON ARTERIAL

DPOMB = (DTR) * (LMF/T) * (OMCLMF)/260 * (POTOF) +
+ (DTR) * (LMA/T) * (OMCLMA)/260*(POTOA) WHERE;

OMCLMF = O & M COST PER LANE MILE OF FREEWAY
OMCLMA = O & M COST PER LANE MILE OF ARTERIAL
POTOF = PERCENT OF TRIPS ON FREEWAY
POTOA = PERCENT OF TRIPS ON ARTERIAL

NET PUBLIC DAILY COST/BENEFIT COUNTING THE AVOIDED COSTS (NDPC/BIAC) =
(NDPC/R) - (DPCB)

INDIVIDUAL COST

DAILY INDIVIDUAL COST (DIC) =

$(DCPRMPA) * (DPMA) + (DIOMC)$ WHERE;

DCPRMAP = DAILY COST PER REVENUE MILES FOR PASSENGERS ACCOMODATED

DPMA = DAILY PASSENGER MILES ACCOMODATED

DIOMC = DAILY INDIVIDUAL MAINTENANCE AND OPERATION COST = 0

DAILY INDIVIDUAL BENEFIT (DIB) =

$(DICB) + (DIOMB)$ WHERE;

DICB = DAILY INDIVIDUAL CAPITAL BENEFIT (CAR COST)

DIOMB = DAILY INDIVIDUAL O & M COST SAVING (CAR O & M)

$DIOMC = (DOMCPM) * (DVMTR) * (.21) + (.10 * DIPC)$ WHERE;

DOMCPM = DAILY O & M CAR COST PER MILE TO DRIVE

DVMTR = DAILY VEHICLE MILES TRAVELED REDUCED

.21 IS THE PERCENT OF O & M COST ATTRIBUTED TO SAVINGS

DIPC = DAILY INDIVIDUAL PARKING COST

NET DAILY INDIVIDUAL COST/BENEFIT (NDIC/B) =

$(DIC) - (DIB)$ WHERE;

DIC = DAILY INDIVIDUAL COST

DIB = DAILY INDIVIDUAL BENEFITS

PRIVATE SECTOR COST/BENEFIT

DAILY PRIVATE CAPITAL COST (DPRCC) = 0

DAILY PRIVATE O & M COST (DPROMC) =

$(VTR)/2 * (MPC) * 12/260 * .90$

DAILY PRIVATE CAPITAL BENEFIT (DPRCB) = 0

COST-EFFECTIVENESS MODEL

LACMTA

DAILY PRIVATE O & M BENEFIT (DPROMB) =
(VTR) * (MPC)*12/260 * .90 WHERE;

VTR = DAILY VEHICLE TRIPS REDUCED

MPC = MONTHLY PARKING COST

.90 = PERCENT OF PARKING PROVIDED BY PRIVATE SECTOR

NET DAILY PRIVATE COST/BENEFIT (NDPC/B) =
(DPRC) - (DPRB)

SOCIETAL COST

DAPC = DAILY AIR POLLUTION COST/BENEFIT

DAPC = DVMTR * (APC/M) WHERE;

DVMTR = DAILY VMT REDUCED

APC/M = AIR POLLUTION COST PER MILE

DVMDCB = DAILY VEHICLE MILES OF DELAY COST/BENEFIT

DVMDC = (DVMDS) * (C/VMD) WHERE;

DVMDS = (VMT/NEW SPEED) - (VMT/EXISTING SPEED) * (AVERAGE SPEED)

DVMDS = DAILY VEHICLE MILES OF DELAY SAVED

CVMD = DAILY COST PER VEHICLE MILES OF DELAY SAVED

DSCB = DAILY SOCIETAL COST/BENEFIT

DSCB = (DAPC) + (DVMDCB)

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 1 THE BUILD SCENARIO

TOTAL DAILY COST (TDC) =

(DPC) + (DIC) + (DPRC) + (DAPC) WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DAPC = DAILY AIR POLLUTION COST

COST-EFFECTIVENESS MODEL

LACMTA

TOTAL DAILY BENEFITS (TDB) =
(DPB) + (DIB) + (DPRB) + DVMDB WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DVMDB = DAILY VEHICLE MILES OF DELAY BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

[(DPC) + (DIC) + (DPRC) + (DAPC)] - [(DPB) + (DIB) + (DPRB) + (DVMDB)]

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 2 THE NO BUILD SCENARIO

TOTAL DAILY COST (TDC) =
(DPC) + (DIC) + (DPRC) + (DAPC) + (DVMDC) WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DAPC = DAILY AIR POLLUTION COST

DVMDC = DAILY VEHICLE MILES OF DELAY COST

TOTAL DAILY BENEFITS (TDB) =
(DPB) + (DIB) + (DPRB) WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DVMDB = DAILY VEHICLE MILES OF DELAY BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

[(DPC) + (DIC) + (DPRC) + (DAPC) + (DVMDC)] - [(DPB) + (DIB) + (DPRB)]

COST-EFFECTIVENESS MODEL

LACMTA

LIKELY OUTCOMES

PUBLIC SECTOR COST/BENEFIT			
		STANDARD	HIGH
1	DAILY PUBLIC CAPITAL COST	\$28,996.68	\$28,996.68
2	DAILY PUBLIC O & M COST	\$213,898	\$213,898
3	DAILY PUBLIC COST	\$242,894	\$242,894
4	DAILY PUBLIC REVENUES	\$2,372	\$4,744
5	DAILY PUBLIC COST/REVENUE	\$240,523	\$238,150
6	DAILY PUBLIC AVOIDED CAPITAL COST (SCENARIO 2)	\$18,462	\$36,929
7	DAILY PUBLIC AVOIDED O & M COST (SCENARIO 2)	\$36	\$71
8	TOTAL DAILY PUBLIC AVOIDED (SCENARIO 2)	\$18,498	\$37,000
9	NET DAILY PUBLIC BENEFIT (SCENARIO 2)	\$20,869	\$41,744
10	DAILY PUBLIC CAPITAL COST (SCENARIO 1)	\$18,462	\$36,929
11	DAILY PUBLIC O & M COST (SCENARIO 1)	\$36	\$71
12	TOTAL DAILY PUBLIC COST (SCENARIO 1)	\$18,498	\$37,000
13	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 2)	\$222,025	\$201,150
14	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 1)	\$18,498	\$37,000
COST			
15	DAILY PUBLIC COST PER TRIP REDUCED	\$64	\$32
16	DAILY PUBLIC COST PER VMT REDUCED	\$5	\$3
17	DAILY PUBLIC COST PER TON OF CO REDUCED	\$233,755	\$116,883
18	DAILY PUBLIC COST PER TON OF ROG REDUCED	\$2,349,076	\$1,164,403
19	DAILY PUBLIC COST PER TON OF NO _x REDUCED	\$3,962,390	\$1,984,432
20	DAILY PUBLIC COST PER TON OF PM REDUCED	\$242,894,483	\$115,664,039
BENEFIT			
21	DAILY PUBLIC BENEFIT PER TRIP REDUCED	\$5.49	\$5.49
22	DAILY PUBLIC BENEFIT PER VMT REDUCED	\$0.44	\$0.44
23	DAILY PUBLIC BENEFIT PER TON OF CO REDUCED	\$20,084	\$20,088
24	DAILY PUBLIC BENEFIT PER TON OF ROG REDUCED	\$201,833	\$200,117
25	DAILY PUBLIC BENEFIT PER TON OF NO _x REDUCED	\$340,449	\$341,050
26	DAILY PUBLIC BENEFIT PER TON OF PM REDUCED	\$20,869,500	\$19,878,329
COST/BENEFIT			
27	NET DAILY PUBLIC COST/BENEFIT PER TRIP REDUCED	\$58.41	\$26.46
28	NET DAILY PUBLIC COST/BENEFIT PER VMT REDUCED	\$5	\$2
29	NET DAILY PUBLIC COST/BENEFIT PER TON OF CO REDUCED	\$213,670	\$96,795
30	NET DAILY PUBLIC COST/BENEFIT PER TON OF ROG REDUCED	\$2,147,244	\$964,286
31	NET DAILY PUBLIC COST/BENEFIT PER TON OF NO _x REDUCED	\$3,621,941	\$1,643,382
32	NET DAILY PUBLIC COST/BENEFIT PER TON OF PM REDUCED	\$222,024,983	\$95,785,711
INDIVIDUAL COST/BENEFIT			
33	DAILY INDIVIDUAL CAPITAL COST	0	0
34	DAILY INDIVIDUAL O & M COST	\$2,372	\$4,744
35	DAILY INDIVIDUAL COST	\$2,372	\$4,744
36	DAILY INDIVIDUAL CAPITAL BENEFIT	\$0	\$0
37	DAILY INDIVIDUAL O & M BENEFIT	\$4,804	\$9,608
38	DAILY INDIVIDUAL BENEFIT	\$4,804	\$9,608
39	NET DAILY INDIVIDUAL COST/BENEFIT	(\$2,432)	(\$4,864)

COST-EFFECTIVENESS MODEL

LACMTA

COST			
40	NET DAILY INDIVIDUAL COST PER TRIP REDUCED	\$0.62	\$0.62
41	NET DAILY INDIVIDUAL COST PER VMT REDUCED	\$0.05	\$0.05
	NET DAILY INDIVIDUAL COST PER TON OF CO REDUCED	\$2,283	\$2,283
42	NET DAILY INDIVIDUAL COST PER TON OF ROG REDUCED	\$22,939	\$22,744
43	NET DAILY INDIVIDUAL COST PER TON OF NO _x REDUCED	\$38,693	\$38,762
44	NET DAILY INDIVIDUAL COST PER TON OF PM REDUCED	\$2,371,910	\$2,259,259
BENEFIT			
45	NET DAILY INDIVIDUAL BENEFIT PER TRIP REDUCED	\$1.26	\$1.26
46	NET DAILY INDIVIDUAL BENEFIT PER VMT REDUCED	\$0.10	\$0.10
	NET DAILY INDIVIDUAL BENEFIT PER TON OF CO REDUCED	\$4,624	\$4,624
47	NET DAILY INDIVIDUAL BENEFIT PER TON OF ROG REDUCED	\$46,463	\$46,061
48	NET DAILY INDIVIDUAL BENEFIT PER TON OF NO _x REDUCED	\$78,374	\$78,499
49	NET DAILY INDIVIDUAL BENEFIT PER TON OF PM REDUCED	\$4,804,307	\$4,575,359
COST/BENEFIT			
50	NET DAILY INDIVIDUAL COST/BENEFIT PER TRIP REDUCED	(\$0.64)	(\$0.64)
51	NET DAILY INDIVIDUAL COST/BENEFIT PER VMT REDUCED	(\$0.05)	(\$0.05)
	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF CO REDUCED	(\$2,341)	(\$2,341)
52	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF ROG REDUCED	(\$23,524)	(\$23,316)
53	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF NO _x REDUCED	(\$39,680)	(\$39,737)
54	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF PM REDUCED	(\$2,432,397)	(\$2,316,100)
PRIVATE SECTOR COST/BENEFIT			
55	DAILY PRIVATE CAPITAL COST	\$0	\$0
56	DAILY PRIVATE O & M COST	\$0	\$0
57	DAILY PRIVATE COST	\$0	\$0
58	DAILY PRIVATE CAPITAL BENEFIT	\$0	\$0
59	DAILY PRIVATE O & M BENEFIT	\$8,772	\$17,545
60	DAILY PRIVATE BENEFIT	\$8,772	\$17,545
61	NET DAILY PRIVATE COST/BENEFIT	(\$8,772)	(\$17,545)
COST			
62	NET DAILY PRIVATE COST PER TRIP REDUCED	\$0.00	\$0.00
63	NET DAILY PRIVATE COST PER VMT REDUCED	\$0.00	\$0.00
64	NET DAILY PRIVATE COST PER TON OF CO REDUCED	\$0.00	\$0.00
65	NET DAILY PRIVATE COST PER TON OF ROG REDUCED	\$0.00	\$0.00
66	NET DAILY PRIVATE COST PER TON OF NO _x REDUCED	\$0.00	\$0.00
67	NET DAILY PRIVATE COST PER TON OF PM REDUCED	\$0.00	\$0.00
BENEFIT			
68	NET DAILY PRIVATE BENEFIT PER TRIP REDUCED	\$2.31	\$2.31
69	NET DAILY PRIVATE BENEFIT PER VMT REDUCED	\$0.18	\$0.18
70	NET DAILY PRIVATE BENEFIT PER TON OF CO REDUCED	\$8,441	\$8,443
71	NET DAILY PRIVATE BENEFIT PER TON OF ROG REDUCED	\$84,831	\$84,110
72	NET DAILY PRIVATE BENEFIT PER TON OF NO _x REDUCED	\$143,092	\$143,345
73	NET DAILY PRIVATE BENEFIT PER TON OF PM REDUCED	\$8,771,538	\$8,354,945
COST/BENEFIT			
74	NET DAILY PRIVATE COST/BENEFIT PER TRIP REDUCED	(\$2.31)	(\$2.31)
75	NET DAILY PRIVATE COST/BENEFIT PER VMT REDUCED	(\$0.18)	(\$0.18)
76	NET DAILY PRIVATE COST/BENEFIT PER TON OF CO REDUCED	(\$8,441)	(\$8,443)
77	NET DAILY PRIVATE COST/BENEFIT PER TON OF ROG REDUCED	(\$84,831)	(\$84,110)
78	NET DAILY PRIVATE COST/BENEFIT PER TON OF NO _x REDUCED	(\$143,092)	(\$143,345)
79	NET DAILY PRIVATE COST/BENEFIT PER TON OF PM REDUCED	(\$8,771,538)	(\$8,354,945)

COST-EFFECTIVENESS MODEL

LACMTA

SOCIETAL COST/BENEFIT			
SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)			
80	DAILY SOCIETAL AIR POLLUTION COST	\$2,139	\$4,279
81	DAILY SOCIETAL CONGESTION COST	\$0	\$0
82	DAILY SOCIETAL COST	\$2,139	\$4,279
83	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
84	DAILY SOCIETAL CONGESTION BENEFIT	\$306	\$612
85	DAILY SOCIETAL BENEFIT	\$306	\$612
86	NET DAILY SOCIETAL COST/BENEFIT	\$1,833	\$3,667
SCENARIO #1 THE BUILD SCENARIO (LONG TERM)			
87	DAILY SOCIETAL AIR POLLUTION COST	\$2,139	\$4,279
88	DAILY SOCIETAL CONGESTION COST	\$306	\$612
89	DAILY SOCIETAL COST	\$2,446	\$4,891
90	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
91	DAILY SOCIETAL CONGESTION BENEFIT	\$0	\$0
92	DAILY SOCIETAL BENEFIT	\$0	\$0
93	NET DAILY SOCIETAL COST/BENEFIT	\$2,446	\$4,891
SCENARIO #2 THE NO BUILD SCENARIO			
94	DAILY SOCIETAL AIR POLLUTION COST	\$0	\$0
95	DAILY SOCIETAL CONGESTION COST	\$0	\$0
96	DAILY SOCIETAL COST	\$0	\$0
97	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$2,139	\$2,139
98	DAILY SOCIETAL CONGESTION BENEFIT	\$306	\$612
99	DAILY SOCIETAL BENEFIT	\$2,446	\$2,752
100	NET DAILY SOCIETAL COST/BENEFIT	(\$2,446)	(\$2,752)
TOTAL COST/BENEFIT			
SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)			
101	TOTAL DAILY COST	\$34,213	\$68,433
102	TOTAL DAILY BENEFIT	\$306	\$612
103	TOTAL DAILY COST/BENEFIT	\$33,907	\$67,820
COST			
104	NET DAILY COST PER TRIP REDUCED	\$9.00	\$9.00
105	NET DAILY COST PER VMT REDUCED	\$0.72	\$0.72
106	NET DAILY COST PER TON OF CO REDUCED	\$32,926	\$32,930
107	NET DAILY COST PER TON OF ROG REDUCED	\$330,879	\$328,057
108	NET DAILY COST PER TON OF NOx REDUCED	\$558,123	\$559,091
109	NET DAILY COST PER TON OF PM REDUCED	\$34,212,915	\$32,586,995
BENEFIT			
110	NET DAILY BENEFIT PER TRIP REDUCED	\$0.08	\$0.08
111	NET DAILY BENEFIT PER VMT REDUCED	\$0.01	\$0.01
112	NET DAILY BENEFIT PER TON OF CO REDUCED	\$295	\$295
113	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$2,960	\$2,935
114	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$4,994	\$5,002
115	NET DAILY BENEFIT PER TON OF PM REDUCED	\$306,112	\$291,543

COST-EFFECTIVENESS MODEL

LACMTA

COST/BENEFIT			
116	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$8.92	\$8.92
117	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.71	\$0.71
118	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$32,631	\$32,636
119	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$327,919	\$325,122
120	NET DAILY COST/BENEFIT PER TON OF NOx REDUCED	\$553,129	\$554,089
121	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$33,906,803	\$32,295,452
SCENARIO #1 THE BUILD SCENARIO (LONG TERM)			
122	TOTAL DAILY COST	\$34,519	\$69,045
123	TOTAL DAILY BENEFIT	\$0	\$0
124	TOTAL DAILY COST/BENEFIT	\$34,519	\$69,045
COST			
125	NET DAILY COST PER TRIP REDUCED	\$9.08	\$9.08
126	NET DAILY COST PER VMT REDUCED	\$0.73	\$0.73
127	NET DAILY COST PER TON OF CO REDUCED	\$33,220	\$33,225
128	NET DAILY COST PER TON OF ROG REDUCED	\$333,840	\$330,992
129	NET DAILY COST PER TON OF NOx REDUCED	\$563,116	\$564,093
130	NET DAILY COST PER TON OF PM REDUCED	\$34,519,027	\$32,878,538
BENEFIT			
131	NET DAILY BENEFIT PER TRIP REDUCED	\$0	\$0
132	NET DAILY BENEFIT PER VMT REDUCED	\$0	\$0
133	NET DAILY BENEFIT PER TON OF CO REDUCED	\$0.00	\$0.00
134	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$0.00	\$0.00
135	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$0.00	\$0.00
136	NET DAILY BENEFIT PER TON OF PM REDUCED	\$0.00	\$0.00
COST/BENEFIT			
137	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$9.08	\$9.08
138	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.73	\$1.45
139	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$33,220	\$33,225
140	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$333,840	\$330,992
141	NET DAILY COST/BENEFIT PER TON OF NOx REDUCED	\$563,116	\$564,093
142	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$34,519,027	\$32,878,538
SCENARIO #2 THE NO BUILD SCENARIO			
143	TOTAL DAILY COST	\$245,266	\$247,639
144	TOTAL DAILY BENEFIT	\$36,891	\$71,650
145	TOTAL DAILY COST/BENEFIT	\$208,375	\$175,989
COST			
146	NET DAILY COST PER TRIP REDUCED	\$64.53	\$32.57
147	NET DAILY COST PER VMT REDUCED	\$5.16	\$2.60
148	NET DAILY COST PER TON OF CO REDUCED	\$236,037	\$119,166
149	NET DAILY COST PER TON OF ROG REDUCED	\$2,372,015	\$1,167,147
150	NET DAILY COST PER TON OF NOx REDUCED	\$4,001,083	\$2,023,194
151	NET DAILY COST PER TON OF PM REDUCED	\$245,266,393	\$117,923,299
BENEFIT			
152	NET DAILY BENEFIT PER TRIP REDUCED	\$9.71	\$9.42
153	NET DAILY BENEFIT PER VMT REDUCED	\$0.78	\$0.75
154	NET DAILY BENEFIT PER TON OF CO REDUCED	\$35,503	\$34,479
155	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$356,779	\$343,480
156	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$601,810	\$585,375
157	NET DAILY BENEFIT PER TON OF PM REDUCED	\$36,890,938	\$34,118,976

COST-EFFECTIVENESS MODEL

LACMTA

COST/BENEFIT			
158	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$54.82	\$23.15
159	NET DAILY COST/BENEFIT PER VMT REDUCED	\$4.38	\$1.85
160	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$200,535	\$84,687
161	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$2,015,237	\$843,668
162	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$3,399,273	\$1,437,819
163	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$208,375,455	\$83,804,323

COST-EFFECTIVENESS MODEL

LACMTA

TCM # 18 FEEDER SERVICES TO OR FROM FIXED ROUTE RAIL TRANSIT

ASSUMPTIONS

1	Average shuttle occupancy	12	MTA
2	Average length of a shuttle trip	5	MTA
3	Average cost per mile to drive for passenger vehicles	\$0.48	AAA
4	Average cost of commute trip of 11.4 miles	\$5.47	CALCULATED
5	Average cost of commute trip of 20 miles	\$9.60	CALCULATED
6	Percent of VMT on freeways	50%	LARTS MODEL
7	Purchase cost of a shuttle	\$32,000	CTS
8	Amortization period for a shuttle	5	VPSI
9	Average cost of a passenger vehicle	\$16,000	AAA
10	O & M cost per shuttle mile	\$0.70	AAA
11	O & M cost per passenger car mile	\$0.48	AAA
12	Number of shuttles needed	160	MTA
13	Average cost of a shuttle trip to a passenger	\$0	MTA
14	Average parking monthly cost	\$100	MTA
15	Average daily shuttle miles	80	MTA
16	Average daily fare	\$0	MTA
17	Interest rate	8%	MARKET RATE
18	Construction cos of arterial (\$/lane mile)	\$900,000	CALTRANS
19	Lane miles arterial/vehicle trip	0.0018	COMSIS
20	Lane miles freeway/vehicle trip	0.0015	COMSIS
21	O&M cost of arterial (\$/LANE MILE)	\$765	CALTRANS
22	O&M cost of freeway (\$/LANE MILE)	\$2,000	CALTRANS
23	Percent of parking paid by private sector	90%	SCAQMD
24	Percent of parking paid by individuals	10%	SCAQMD
25	Air pollution cost per mile	\$0.015	RUTHERFORD AND WELLANDER, 1986
26	Cost per vehicle-miles of delay	\$0.11	RUTHERFORD AND WELLANDER, 1986
27	Construction cost of freeway (\$/lane mile) not including right of way	\$2,500,000	SANDAG
28	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$12,000,000	CALTRANS (MIN) (IN METROPOLITIAN AREA)
29	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$16,000,000	CALTRANS (MAX) (IN METROPOLITIAN AREA)
30	Average construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$14,000,000	CALTRANS (AVERAGE) (IN METROPOLITIAN AREA)
31	Construction cost of HOV lane (\$/lane mile)	\$2,500,000	MTC
32	Average daily rail and bus fair per rider	\$5	MTA

METHODOLOGY

ANNUALIZATION FACTOR (AF) =

$AF = IR / (1 - (1 + (IR))^{-N})$ WHERE;

IR = INTEREST RATE

N = AMORTIZATION PERIOD FOR BUS/FACILITY LIFETIME

SAF =	0.25
CAF =	0.09
CAF =	0.25

PUBLIC SECTOR COST

DAILY PUBLIC CAPITAL COST (DPCC) =

$(NS) * (CS) * (SAF) / 260$ WHERE;

NV = NUMBER OF SHUTTLES PURCHASED

CS = CAPITAL COST OF A SHUTTLE

SAF = SHUTTLE ANNUALIZATION FACTOR

260 = THE NUMBER OF WORKING DAYS IN A YEAR

DAILY PUBLIC O & M COST (DPOMC) =

$(NODVM) * (NS) * (C/M)$ WHERE;

NODVM = NUMBER OF DAILY VEHICLE MILES

NV = NUMBER OF SHUTTLES

C/M = COST PER VEHICLE MILE

DPOMC =

(DPAC) = DAILY PUBLIC ADMINISTRATIVE COST (DPAC) = 15% OF TOTAL COST

DAILY PUBLIC COST (DPC) =

$(DPCC + DPOMC)$ WHERE;

DPCC = DAILY PUBLIC CAPITAL COST

DPOMC = DAILY PUBLIC O & M COST

DAILY PUBLIC REVENUES (DPR) =

$DPA * DTFPR$ WHERE;

DPA = DAILY PASSENGER ACCOMODATED

DTFPR = DAILY TRANSIT FAIR PER RIDER

ALL SHUTTLE PASSENGERS ARE ASSUMED A RAIL OR EXPRESS BUS COMMUTERS

COST-EFFECTIVENESS MODEL

LACMTA

DAILY PUBLIC COST/REVENUE (DPC/R) =

(DPCOMC) - (DPR) WHERE;

DPCOMC = DAILY PUBLIC CAPITAL AND OPERATION AND MAINTENANCE COST
DPR = DAILY PUBLIC REVENUE

DAILY PUBLIC BENEFITS (DPB) BY AVOIDING HIGHWAY BUILDING =

(DPCB) + (DPOMB) WHERE;

DPCB =

+ (DPTR) * (LMA/T) * (CCLMA) * (CAF)/260*(POTOA) WHERE;

DPTR = DAILY TRIPS REDUCED
LMF/T = LANE MILES OF FREEWAY PER TRIP
CCLMF = CONSTRUCTION COST OF FREEWAY LANE MILE
CAF = CONSTRUCTION ANNUALIZATION FACTOR
POTOF = PERCENT OF TRIPS ON FREEWAYS
LMA = LANE MILES OF ARTERIAL PER TRIP
CCLMA = CONSTRUCTION COST OF ARTERIAL LANE MILE
POTOA = PERCENT OF PEAK TRIPS ON ARTERIAL (100% IN THIS CASE)

DPOMB =

+ (DTR) * (LMA/T) * (OMCLMA)/260*(POTOA) + (DVTR*DMPC) WHERE;

OMCLMF = O & M COST PER LANE MILE OF FREEWAY
OMCLMA = O & M COST PER LANE MILE OF ARTERIAL
POTOF = PERCENT OF TRIPS ON FREEWAY
POTOA = PERCENT OF TRIPS ON ARTERIAL (100% IN THIS CASE)

NET PUBLIC DAILY COST/BENEFIT COUNTING THE AVOIDED COSTS (NDPC/BIAC) =
(NDPC/R) - (DPB)

INDIVIDUAL COST

DAILY INDIVIDUAL COST (DIC) =

(DCPP)*(DPA) + (DIOMC) WHERE;

DCPP = DAILY COST PER PASSENGER
DPA = DAILY PASSENGERS ACCOMMODATED
DIOMC = DAILY INDIVIDUAL MAINTENANCE AND OPERATION COST = 0

DAILY INDIVIDUAL BENEFIT (DIB) =

(DICB) + (DIOMB) WHERE;

DICB = DAILY INDIVIDUAL CAPITAL BENEFIT (CAR COST)
DIOMB = DAILY INDIVIDUAL O & M COST SAVING (CAR O & M)

COST-EFFECTIVENESS MODEL

LACMTA

$$DICB = (CCC) * (NC) * (CAF) / 260 * .10$$

$$CAF = IR / (1 - (1 + (IR)) ^ (-N)) \text{ WHERE;}$$

$$DIOMC = (DOMCPM) * (DVMTR) * (.21) + (.10 * DPC) \text{ WHERE;}$$

DOMCPM = DAILY O & M CAR COST PER MILE TO DRIVE

DVMTR = DAILY VEHICLE MILES TRAVELED REDUCED

.21 IS THE PERCENT OF O & M COST ATTRIBUTED TO SAVINGS

DPC = DAILY PARKING COST

$$\text{NET DAILY INDIVIDUAL COST/BENEFIT (NDIC/B) =}$$

$$(DIC) - (DIB) \text{ WHERE;}$$

DIC = DAILY INDIVIDUAL COST

DIB = DAILY INDIVIDUAL BENEFITS

PRIVATE SECTOR COST/BENEFIT

DAILY PRIVATE CAPITAL COST (DPRCC) = 0

DAILY PRIVATE CAPITAL BENEFIT (DPRCB) = 0

DAILY PRIVATE O & M BENEFIT (DPRMB) =

$$(VTR) * (MPC) * 12 / 260 * .90 \text{ WHERE;}$$

VTR = DAILY VEHICLE TRIPS REDUCED

MPC = MONTHLY PARKING COST

.90 = PERCENT OF PARKING PROVIDED BY PRIVATE SECTOR

$$\text{NET DAILY PRIVATE COST/BENEFIT (NDPC/B) =}$$

$$(DPRC) - (DPRB)$$

SOCIETAL COST

DAPC = DAILY AIR POLLUTION COST/BENEFIT

$$DAPC = DVMTR * (APC/M) \text{ WHERE;}$$

DVMTR = DAILY VMT REDUCED

APC/M = AIR POLLUTION COST PER MILE

DVMDCB = DAILY VEHICLE MILES OF DELAY COST/BENEFIT

$$DVMDC = (DVMDS) * (C/VMD) \text{ WHERE;}$$

$$DVMDS = (VMT/NEW SPEED) - (VMT/EXISTING SPEED) * (AVERAGE SPEED)$$

DVMDS = DAILY VEHICLE MILES OF DELAY SAVED

C/VMD = DAILY COST PER VEHICLE MILES OF DELAY SAVED

DSCB = DAILY SOCIETAL COST/BENEFIT

$$DSCB = (DAPC) + (DVMDCB)$$

COST-EFFECTIVENESS MODEL

LACMTA

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 1 THE BUILD SCENARIO

TOTAL DAILY COST (TDC) =
(DPC) + (DIC) + (DPRC) + (DAPC) WHERE;

DPC = DAILY PUBLIC COST
DIC = DAILY INDIVIDUAL COST
DPRC = DAILY PRIVATE COST
DAPC = DAILY AIR POLLUTION COST

TOTAL DAILY BENEFITS (TDB) =
(DPB) + (DIB) + (DPRB) + DVMDB WHERE;

DPB = DAILY PUBLIC BENEFITS
DIB = DAILY INDIVIDUAL BENEFITS
DPRB = DAILY PRIVATE BENEFITS
DVMDB = DAILY VEHICLE MILES OF DELAY BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

$[(DPC) + (DIC) + (DPRC) + (DAPC)] - [(DPB) + (DIB) + (DPRB) + (DVMDB)]$

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 2 THE NO BUILD SCENARIO

TOTAL DAILY COST (TDC) =
(DPC) + (DIC) + (DPRC) + (DAPC) + (DVMDC) WHERE;

DPC = DAILY PUBLIC COST
DIC = DAILY INDIVIDUAL COST
DPRC = DAILY PRIVATE COST
DAPC = DAILY AIR POLLUTION COST
DVMDC = DAILY VEHICLE MILES OF DELAY COST

TOTAL DAILY BENEFITS (TDB) =
(DPB) + (DIB) + (DPRB) WHERE;

DPB = DAILY PUBLIC BENEFITS
DIB = DAILY INDIVIDUAL BENEFITS
DPRB = DAILY PRIVATE BENEFITS
DVMDB = DAILY VEHICLE MILES OF DELAY BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

$[(DPC) + (DIC) + (DPRC) + (DAPC) + (DVMDC)] - [(DPB) + (DIB) + (DPRB)]$

COST-EFFECTIVENESS MODEL

LACMTA

LIKELY OUTCOMES

PUBLIC SECTOR COST/BENEFIT			
		STANDARD	HIGH
1	DAILY PUBLIC CAPITAL COST	\$4,932	\$4,932
2	DAILY PUBLIC O & M COST	\$8,960	\$8,960
3	DAILY PUBLIC COST	\$13,892	\$13,892
4	DAILY PUBLIC REVENUES	\$4,630	\$9,260
5	DAILY PUBLIC COST/REVENUE	\$9,262	\$4,632
6	DAILY PUBLIC AVOIDED CAPITAL COST (SCENARIO 2)	\$1,025	\$2,050
7	DAILY PUBLIC AVOIDED O & M COST (SCENARIO 2)	\$4,284	\$8,567
8	TOTAL DAILY PUBLIC AVOIDED (SCENARIO 2)	\$5,309	\$10,617
9	NET DAILY PUBLIC BENEFIT (SCENARIO 2)	\$9,939	\$19,877
10	DAILY PUBLIC CAPITAL COST (SCENARIO 1)	\$1,025	\$2,050
11	DAILY PUBLIC O & M COST (SCENARIO 1)	\$4,284	\$8,567
12	TOTAL DAILY PUBLIC COST (SCENARIO 1)	\$5,309	\$10,617
13	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 2)	\$3,953	(\$5,985)
14	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 1)	\$5,309	\$10,617
15	COST		
16	DAILY PUBLIC COST PER TRIP REDUCED	\$7.50	\$3.75
17	DAILY PUBLIC COST PER VMT REDUCED	\$1.50	\$0.74
18	DAILY PUBLIC COST PER TON OF CO REDUCED	\$35,081	\$17,518
19	DAILY PUBLIC COST PER TON OF ROG REDUCED	\$434,127	\$217,064
20	DAILY PUBLIC COST PER TON OF NOx REDUCED	\$868,254	\$420,972
21	DAILY PUBLIC COST PER TON OF PM REDUCED	ERR	ERR
22	BENEFIT		
23	DAILY PUBLIC BENEFIT PER TRIP REDUCED	\$5.37	\$5.37
24	DAILY PUBLIC BENEFIT PER VMT REDUCED	\$1.07	\$1.06
25	DAILY PUBLIC BENEFIT PER TON OF CO REDUCED	\$25,098	\$25,066
26	DAILY PUBLIC BENEFIT PER TON OF ROG REDUCED	\$310,583	\$310,583
27	DAILY PUBLIC BENEFIT PER TON OF NOx REDUCED	\$621,167	\$602,344
28	DAILY PUBLIC BENEFIT PER TON OF PM REDUCED	ERR	ERR
29	COST/BENEFIT		
30	NET DAILY PUBLIC COST/BENEFIT PER TRIP REDUCED	\$2.13	(\$1.62)
31	NET DAILY PUBLIC COST/BENEFIT PER VMT REDUCED	\$0.43	(\$0.32)
32	NET DAILY PUBLIC COST/BENEFIT PER TON OF CO REDUCED	\$9,983	(\$7,548)
33	NET DAILY PUBLIC COST/BENEFIT PER TON OF ROG REDUCED	\$123,544	(\$93,520)
34	NET DAILY PUBLIC COST/BENEFIT PER TON OF NOx REDUCED	\$247,087	(\$181,372)
35	NET DAILY PUBLIC COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
36	INDIVIDUAL COST/BENEFIT		
37	DAILY INDIVIDUAL CAPITAL COST	\$0	\$0
38	DAILY INDIVIDUAL O & M COST	\$0	\$0
39	DAILY INDIVIDUAL COST	\$0	\$0
40	DAILY INDIVIDUAL CAPITAL BENEFIT	\$1,427	\$2,854
41	DAILY INDIVIDUAL O & M BENEFIT	\$1,363	\$2,756
42	DAILY INDIVIDUAL BENEFIT	\$2,790	\$5,611
43	NET DAILY INDIVIDUAL COST/BENEFIT	(\$2,790)	(\$5,611)

COST-EFFECTIVENESS MODEL

LACMTA

44	COST		
45	NET DAILY INDIVIDUAL COST PER TRIP REDUCED	\$0	\$0
46	NET DAILY INDIVIDUAL COST PER VMT REDUCED	\$0	\$0
47	NET DAILY INDIVIDUAL COST PER TON OF CO REDUCED	\$0	\$0
48	NET DAILY INDIVIDUAL COST PER TON OF ROG REDUCED	\$0	\$0
49	NET DAILY INDIVIDUAL COST PER TON OF NO _x REDUCED	\$0	\$0
50	NET DAILY INDIVIDUAL COST PER TON OF PM REDUCED	ERR	ERR
51	BENEFIT		
52	NET DAILY INDIVIDUAL BENEFIT PER TRIP REDUCED	\$1.51	\$1.51
53	NET DAILY INDIVIDUAL BENEFIT PER VMT REDUCED	\$0.30	\$0.30
54	NET DAILY INDIVIDUAL BENEFIT PER TON OF CO REDUCED	\$7,046	\$7,075
55	NET DAILY INDIVIDUAL BENEFIT PER TON OF ROG REDUCED	\$87,195	\$87,667
56	NET DAILY INDIVIDUAL BENEFIT PER TON OF NO _x REDUCED	\$174,389	\$170,020
57	NET DAILY INDIVIDUAL BENEFIT PER TON OF PM REDUCED	ERR	ERR
58	COST/BENEFIT		
59	NET DAILY INDIVIDUAL COST/BENEFIT PER TRIP REDUCED	(\$1.51)	(\$1.51)
60	NET DAILY INDIVIDUAL COST/BENEFIT PER VMT REDUCED	(\$0.30)	(\$0.30)
61	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF CO REDUCED	(\$7,046)	(\$7,075)
62	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF ROG REDUCED	(\$87,195)	(\$87,667)
63	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF NO _x REDUCED	(\$174,389)	(\$170,020)
64	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
65	PRIVATE SECTOR COST/BENEFIT		
66	DAILY PRIVATE CAPITAL COST	\$0	\$0
67	DAILY PRIVATE O & M COST	\$0	\$0
68	DAILY PRIVATE COST	\$0	\$0
69	DAILY PRIVATE CAPITAL BENEFIT	\$0	\$0
70	DAILY PRIVATE O & M BENEFIT	\$3,846	\$7,693
71	DAILY PRIVATE BENEFIT	\$3,846	\$7,693
72	NET DAILY PRIVATE COST/BENEFIT	(\$3,846)	(\$7,693)
73	COST		
74	NET DAILY PRIVATE COST PER TRIP REDUCED	\$0	\$0
75	NET DAILY PRIVATE COST PER VMT REDUCED	\$0	\$0
76	NET DAILY PRIVATE COST PER TON OF CO REDUCED	\$0	\$0
77	NET DAILY PRIVATE COST PER TON OF ROG REDUCED	\$0	\$0
78	NET DAILY PRIVATE COST PER TON OF NO _x REDUCED	\$0	\$0
79	NET DAILY PRIVATE COST PER TON OF PM REDUCED	ERR	ERR
80	BENEFIT		
81	NET DAILY PRIVATE BENEFIT PER TRIP REDUCED	\$2.08	\$2.08
82	NET DAILY PRIVATE BENEFIT PER VMT REDUCED	\$0.42	\$0.41
83	NET DAILY PRIVATE BENEFIT PER TON OF CO REDUCED	\$9,713	\$9,701
84	NET DAILY PRIVATE BENEFIT PER TON OF ROG REDUCED	\$120,202	\$120,202
85	NET DAILY PRIVATE BENEFIT PER TON OF NO _x REDUCED	\$240,404	\$233,119
86	NET DAILY PRIVATE BENEFIT PER TON OF PM REDUCED	ERR	ERR
87	COST/BENEFIT		
88	NET DAILY PRIVATE COST/BENEFIT PER TRIP REDUCED	(\$2.08)	(\$2.08)
89	NET DAILY PRIVATE COST/BENEFIT PER VMT REDUCED	(\$0.42)	(\$0.41)
90	NET DAILY PRIVATE COST/BENEFIT PER TON OF CO REDUCED	(\$9,713)	(\$9,701)
91	NET DAILY PRIVATE COST/BENEFIT PER TON OF ROG REDUCED	(\$120,202)	(\$120,202)
92	NET DAILY PRIVATE COST/BENEFIT PER TON OF NO _x REDUCED	(\$240,404)	(\$233,119)
93	NET DAILY PRIVATE COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR

COST-EFFECTIVENESS MODEL

LACMTA

94	SOCIETAL COST/BENEFIT		
95	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
96	DAILY SOCIETAL AIR POLLUTION COST	\$139	\$282
97	DAILY SOCIETAL CONGESTION COST	\$0	\$0
98	DAILY SOCIETAL COST	\$139	\$282
99	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
100	DAILY SOCIETAL CONGESTION BENEFIT	\$278	\$557
101	DAILY SOCIETAL BENEFIT	\$278	\$557
102	NET DAILY SOCIETAL COST/BENEFIT	(\$139)	(\$274)
103	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
104	DAILY SOCIETAL AIR POLLUTION COST	\$139	\$282
105	DAILY SOCIETAL CONGESTION COST	\$278	\$557
106	DAILY SOCIETAL COST	\$417	\$839
107	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0.00	\$0.00
108	DAILY SOCIETAL CONGESTION BENEFIT	\$0.00	\$0.00
109	DAILY SOCIETAL BENEFIT	\$0	\$0
110	NET DAILY SOCIETAL COST/BENEFIT	\$417	\$839
111	SCENARIO #2 THE NO BUILD SCENARIO		
112	DAILY SOCIETAL AIR POLLUTION COST	\$0	\$0
113	DAILY SOCIETAL CONGESTION COST	\$0	\$0
114	DAILY SOCIETAL COST	\$0	\$0
115	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$139	\$282
116	DAILY SOCIETAL CONGESTION BENEFIT	\$278	\$557
117	DAILY SOCIETAL BENEFIT	\$417	\$839
118	NET DAILY SOCIETAL COST/BENEFIT	(\$417)	(\$839)
119	TOTAL COST/BENEFIT		
120	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
121	TOTAL DAILY COST	\$12,084	\$24,203
122	TOTAL DAILY BENEFIT	\$278	\$557
123	TOTAL DAILY COST/BENEFIT	\$11,806	\$23,647
124	COST		
125	NET DAILY COST PER TRIP REDUCED	\$6.52	\$6.53
126	NET DAILY COST PER VMT REDUCED	\$1.30	\$1.29
127	NET DAILY COST PER TON OF CO REDUCED	\$30,516	\$30,521
128	NET DAILY COST PER TON OF ROG REDUCED	\$377,633	\$378,175
129	NET DAILY COST PER TON OF NO _x REDUCED	\$755,266	\$733,431
130	NET DAILY COST PER TON OF PM REDUCED	ERR	ERR
131	BENEFIT		
132	NET DAILY BENEFIT PER TRIP REDUCED	\$0.15	\$0.15
133	NET DAILY BENEFIT PER VMT REDUCED	\$0.03	\$0.03
134	NET DAILY BENEFIT PER TON OF CO REDUCED	\$703	\$702
135	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$8,695	\$8,695
136	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$17,389	\$16,864
137	NET DAILY BENEFIT PER TON OF PM REDUCED	ERR	ERR

COST-EFFECTIVENESS MODEL

LACMTA

138	COST/BENEFIT		
139	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$6.37	\$6.38
140	NET DAILY COST/BENEFIT PER VMT REDUCED	\$1.27	\$1.26
141	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$29,813	\$29,819
142	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$368,939	\$369,480
143	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$737,877	\$716,567
144	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
145	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
146	TOTAL DAILY COST	\$12,362	\$24,760
147	TOTAL DAILY BENEFIT	\$0	\$0
148	TOTAL DAILY COST/BENEFIT	\$12,362	\$24,760
149	COST		
150	NET DAILY COST PER TRIP REDUCED	\$6.68	\$6.68
151	NET DAILY COST PER VMT REDUCED	\$1.34	\$1.32
152	NET DAILY COST PER TON OF CO REDUCED	\$31,218	\$31,223
153	NET DAILY COST PER TON OF ROG REDUCED	\$386,328	\$386,871
154	NET DAILY COST PER TON OF NO _x REDUCED	\$772,656	\$750,295
155	NET DAILY COST PER TON OF PM REDUCED	ERR	ERR
156	BENEFIT		
157	NET DAILY BENEFIT PER TRIP REDUCED	\$0	\$0
158	NET DAILY BENEFIT PER VMT REDUCED	\$0	\$0
159	NET DAILY BENEFIT PER TON OF CO REDUCED	\$0	\$0
160	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$0	\$0
161	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$0	\$0
162	NET DAILY BENEFIT PER TON OF PM REDUCED	ERR	ERR
163	COST/BENEFIT		
164	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$6.68	\$6.68
165	NET DAILY COST/BENEFIT PER VMT REDUCED	\$1.34	\$1.32
166	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$31,218	\$31,223
167	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$386,328	\$386,871
168	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$772,656	\$750,295
169	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
170	SCENARIO #2 THE NO BUILD SCENARIO		
171	TOTAL DAILY COST	\$13,892	\$13,892
172	TOTAL DAILY BENEFIT	\$16,992	\$34,020
173	TOTAL DAILY COST/BENEFIT	(\$3,100)	(\$20,128)
174	COST		
175	NET DAILY COST PER TRIP REDUCED	\$7.50	\$3.75
176	NET DAILY COST PER VMT REDUCED	\$1.50	\$0.74
177	NET DAILY COST PER TON OF CO REDUCED	\$35,081	\$17,518
178	NET DAILY COST PER TON OF ROG REDUCED	\$434,127	\$217,064
179	NET DAILY COST PER TON OF NO _x REDUCED	\$868,254	\$420,972
180	NET DAILY COST PER TON OF PM REDUCED	ERR	ERR
181	BENEFIT		
182	NET DAILY BENEFIT PER TRIP REDUCED	\$9.18	\$9.18
183	NET DAILY BENEFIT PER VMT REDUCED	\$1.84	\$1.81
184	NET DAILY BENEFIT PER TON OF CO REDUCED	\$42,910	\$42,900
185	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$531,015	\$531,558
186	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$1,062,031	\$1,030,901
187	NET DAILY BENEFIT PER TON OF PM REDUCED	ERR	ERR

COST-EFFECTIVENESS MODEL

LACMTA

188	COST/BENEFIT		
189	NET DAILY COST/BENEFIT PER TRIP REDUCED	(\$1.67)	(\$5.43)
190	NET DAILY COST/BENEFIT PER VMT REDUCED	(\$0.33)	(\$1.07)
191	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	(\$7,829)	(\$25,382)
192	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	(\$96,888)	(\$314,495)
193	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	(\$193,776)	(\$609,929)
194	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR

COST-EFFECTIVENESS MODEL

LACMTA

TCM # 19 SUBSCRIPTION SERVICES FOR LONG C

ASSUMPTIONS

1	Average buspool occupancy	42.00	REG. XV
2	Average length of a buspool trip (miles)	20	REG. XV
3	Average cost per mile to drive	\$0.48	AAA
4	Average cost per commute trip of 11.4 miles	\$5.47	CALCULATED
5	Average cost per commute trip of 20 miles	\$9.60	CALCULATED
6	Percent of VMT on freeways	50%	LARTS MODEL
8	Purchase cost of a bus	\$260,500	MTA
9	Amortization period for a bus	12	VPSI
10	Average cost of a passenger vehicle	\$16,000	AAA
11	Operation and maintenance cost per passenger bus (\$/mile)	\$0.80	AAA
12	Operating and maintenance cost per mile for passenger car	\$0.48	AAA
13	Number of buses needed	83	MTA
14	Interest rate	8%	
15	Average cost of a buspool trip to the passenger (\$/month)	\$150	
16	Average cost per parking (\$/month)	\$100	
17	Average daily vehicle miles	40	
18	Average daily fare	\$13	
19	Amortization period for a car (years)	5	
22	Construction cost of arterials (\$ per lane mile)	\$900,000	CALTRANS
23	Lane miles arterial/vehicle trip	0.0018	COMSIS
24	Lane miles freeway/vehicle trip	0.0015	COMSIS
25	O&M cost of arterial (\$/LANE MILE)	\$765	CALTRANS
26	O&M cost of freeway (\$/LANE MILE)	\$2,000	CALTRANS
28	Percent of parking paid by private sector	90%	SCAQMD
29	Percent of parking paid by individual	10%	SCAQMD
30	Air pollution cost per mile	\$0.015	RUTHERFORD AND WELLANDER, 1986
31	Cost per vehicle-miles of delay	\$0.11	RUTHERFORD AND WELLANDER, 1986
32	Construction cost of freeway (\$/lane mile) not including right of way	\$2,500,000	SANDAG
33	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$12,000,000	CALTRANS (MIN) (IN METROPOLITAN AREA)
34	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$16,000,000	CALTRANS (MAX) (IN METROPOLITAN AREA)
35	Average construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$14,000,000	CALTRANS (AVERAGE) (IN METROPOLITAN AREA)
36	Construction cost of HOV lane (\$/lane mile)	\$2,500,000	MTC
37	Construction cost of a parking space including land	\$1,000	
38	Average park-n-ride capital cost (\$/space)	\$10,000	
39	Average operation and maintenance cost per park-n-ride space	\$20	
40	Park-and-ride spaces needed	1747	

COST-EFFECTIVENESS MODEL

LACMTA

METHODOLOGY

ANNUALIZATION FACTOR (AF) =
 $AF = IR / (1 - (1 + (IR))^{-N})$ WHERE;

IR = INTEREST RATE

N = AMORTIZATION PERIOD FOR BUS/FACILITY LIFETIME

BAF =	0.13
VAF =	0.25
CAF =	0.09
CAF =	0.25

PUBLIC SECTOR COST

DAILY PUBLIC CAPITAL COST (DPCC) =

$PRSN * PRSC * PSAF$ WHERE;

PRSN = PARK AND RIDE SPACES NEEDED

PRSC = COST OF PARK AND RIDE SPACE

PAF = PARKING SPACE ANNUALIZATION FACTOR

DAILY PUBLIC O & M COST (DPOMC) =

$PRSN * OMCPPS$ WHERE;

PRSN = PARK AND RIDE SPACES NEEDED

OMCPPS = OPERATION AND MAINTENANCE COST PER PARK AND RIDE SPACE

DAILY PUBLIC COST (DPC) =

$(DPCC + DPOMC)$ WHERE;

DPCC = DAILY PUBLIC CAPITAL COST

DPOMC = DAILY PUBLIC O & M COST

DAILY PUBLIC REVENUES (DPR) = 0

DAILY PUBLIC COST/REVENUE (DPC/R) =

$(DPCOMC) - (DPR)$ WHERE;

DPCOMC = DAILY PUBLIC CAPITAL AND OPERATION AND MAINTENANCE COST

DPR = DAILY PUBLIC REVENUE

COST-EFFECTIVENESS MODEL

LACMTA

DAILY PUBLIC BENEFITS (DPB) BY AVOIDING HIGHWAY BUILDING =
(DPCB) + (DPOMB) WHERE;

$$DPCB = (DPTR) * (LMF/T) * (CCLMF) * (CAF)/260 * (POTOF) + \\ + (DPTR) * (LMA/T) * (CCLMA) * (CAF)/260 * (POTOA) \text{ WHERE;}$$

DPTR = DAILY TRIPS REDUCED

LMF/T = LANE MILES OF FREEWAY PER TRIP

CCLMF = CONSTRUCTION COST OF FREEWAY LANE MILE

CAF = CONSTRUCTION ANNUALIZATION FACTOR

POTOF = PERCENT OF TRIPS ON FREEWAYS

LMA = LANE MILES OF ARTERIAL PER TRIP

CCLMA = CONSTRUCTION COST OF ARTERIAL LANE MILE

POTOA = PERCENT OF PEAK TRIPS ON ARTERIAL

$$DPOMB = (DTR) * (LMFA/T) * (OMCLMF)/260 * (POTOF) + \\ + (DTR) * (LMA/T) * (OMCLMA)/260 * (POTOA) \text{ WHERE;}$$

OMCLMF = O & M COST PER LANE MILE OF FREEWAY

OMCLMA = O & M COST PER LANE MILE OF ARTERIAL

POTOF = PERCENT OF TRIPS ON FREEWAY

POTOA = PERCENT OF TRIPS ON ARTERIAL

NET PUBLIC DAILY COST/BENEFIT COUNTING THE AVOIDED COSTS (NDPC/BIAC) =
(NDPC/R) - (DPB)

INDIVIDUAL COST

DAILY INDIVIDUAL COST (DIC) =

DICC = 0

DIOMC =

(DCPT) * (DVTR) WHERE;

DCPT = DAILY COST PER TRIP

DVTR = DAILY VEHICLE TRIPS REDUCED

DAILY INDIVIDUAL BENEFIT (DIB) =

(DICB) + (DIOMB) WHERE;

DICB = DAILY INDIVIDUAL CAPITAL BENEFIT (CAR COST)

DIOMB = DAILY INDIVIDUAL O & M COST SAVING (CAR O & M)

$$DICB = (CCC) * (NC) * (CAF)/260 * .10$$

CAF = $IR / (1 - (1 + (IR))^{-N})$ WHERE;

$$CAF = \quad \quad \quad 0.30$$

DIOMC = (DOMCPM) * (DVMTR) * (.21) + (.10 * DIPC) WHERE;

DOMCPM = DAILY O & M CAR COST PER MILE TO DRIVE

DVMTR = DAILY VEHICLE MILES TRAVELED REDUCED

.21 IS THE PERCENT OF O & M COST ATTRIBUTED TO SAVINGS

DIPC = DAILY INDIVIDUAL PARKING COST

COST-EFFECTIVENESS MODEL

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NET DAILY INDIVIDUAL COST/BENEFIT (NDIC/B) =

(DIC) - (DIB) WHERE;

DIC = DAILY INDIVIDUAL COST

DIB = DAILY INDIVIDUAL BENEFITS

PRIVATE SECTOR COST/BENEFIT

DAILY PRIVATE CAPITAL COST (DPRCC) =

(NB)*(CB)*(BAF)/260 WHERE;

NB = NUMBER OF BUSES PURCHASED

CB = CAPITAL COST OF A BUS

BAF = BUS ANNUALIZATION FACTOR

260 = THE NUMBER OF WORKING DAYS IN A YEAR

DAILY PRIVATE OPERATION AND MAINTENANCE COST (DPROMC) =

NB * DBM * OMCPM WHERE;

NB = NUMBER OF BUSES

DBM = DAILY BUS MILES

OMCPM = OPERATION AND MAINTENANCE COST PER MILE

DAILY PRIVATE COST (DPRC) =

DPRCC + DSPROMC WHERE;

DPRCC = DAILY PRIVATE CAPITAL COST

DPROMC = DAILY PRIVATE OPERATION AND MAINTENANCE COST

DAILY PRIVATE CAPITAL BENEFIT (DPRCB) = 0

DAILY PRIVATE O & M BENEFIT (DPROMB) =

(VTR) * (MPC)*12/260 * .90 + (DVTR*CPT) WHERE;

VTR = DAILY VEHICLE TRIPS REDUCED

MPC = MONTHLY PARKING COST

.90 = PERCENT OF PARKING PROVIDED BY PRIVATE SECTOR

NET DAILY PRIVATE COST/BENEFIT (NDPC/B) =

(DPRC) - (DPRB)

SOCIETAL COST

DAPC = DAILY AIR POLLUTION COST/BENEFIT

DAPC = DVMTR * (APC/M) WHERE;

DVMTR = DAILY VMT REDUCED

APC/M = AIR POLLUTION COST PER MILE

DVMDCB = DAILY VEHICLE MILES OF DELAY COST/BENEFIT

DVMDC = (DVMDS) * (C/VMD) WHERE;

DVMDS = (VMT/NEW SPEED) - (VMT/EXISTING SPEED) * (AVERAGE SPEED)

DVMDS = DAILY VEHICLE MILES OF DELAY SAVED

C/VMD = DAILY COST PER VEHICLE MILES OF DELAY SAVED

DSCB = DAILY SOCIETAL COST/BENEFIT

DSCB = (DAPC) + (DVMDCB)

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 1 THE BUILD SCENARIO

TOTAL DAILY COST (TDC) =
(DPC) + (DIC) + (DPRC) + (DAPC) WHERE;
DPC = DAILY PUBLIC COST
DIC = DAILY INDIVIDUAL COST
DPRC = DAILY PRIVATE COST
DAPC = DAILY AIR POLLUTION COST

TOTAL DAILY BENEFITS (TDB) =
(DPB) + (DIB) + (DPRB) + DVMDB WHERE;
DPB = DAILY PUBLIC BENEFITS
DIB = DAILY INDIVIDUAL BENEFITS
DPRB = DAILY PRIVATE BENEFITS
DVMDB = DAILY VEHICLE MILES OF DELAY BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

$[(DPC) + (DIC) + (DPRC) + (DAPC)] - [(DPB) + (DIB) + (DPRB) + (DVMDB)]$

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 2 THE NO BUILD SCENARIO

TOTAL DAILY COST (TDC) =
(DPC) + (DIC) + (DPRC) + (DAPC) + (DVMDC) WHERE;
DPC = DAILY PUBLIC COST
DIC = DAILY INDIVIDUAL COST
DPRC = DAILY PRIVATE COST
DAPC = DAILY AIR POLLUTION COST
DVMDC = DAILY VEHICLE MILES OF DELAY COST

TOTAL DAILY BENEFITS (TDB) =
(DPB) + (DIB) + (DPRB) WHERE;
DPB = DAILY PUBLIC BENEFITS
DIB = DAILY INDIVIDUAL BENEFITS
DPRB = DAILY PRIVATE BENEFITS
DVMDB = DAILY VEHICLE MILES OF DELAY BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

$[(DPC) + (DIC) + (DPRC) + (DAPC) + (DVMDC)] - [(DPB) + (DIB) + (DPRB)]$

COST-EFFECTIVENESS MODEL

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LIKELY OUTCOMES

PUBLIC SECTOR COST/BENEFIT

	STANDARD	HIGH
1 DAILY PUBLIC CAPITAL COST	\$5,969	\$5,969
2 DAILY PUBLIC O & M COST	\$731	\$731
3 DAILY PUBLIC COST	\$6,700	\$6,700
4 DAILY PUBLIC REVENUES	\$0	\$0
5 DAILY PUBLIC COST/REVENUE	\$6,700	\$6,700
6 DAILY PUBLIC AVOIDED CAPITAL COST (SCENARIO 2)	\$25,068	\$50,136
7 DAILY PUBLIC AVOIDED O & M COST (SCENARIO 2)	\$40	\$81
8 TOTAL DAILY PUBLIC AVOIDED (SCENARIO 2)	\$25,108	\$50,216
9 NET DAILY PUBLIC BENEFIT (SCENARIO 2)	\$25,108	\$50,216
10 DAILY PUBLIC CAPITAL COST (SCENARIO 1)	\$25,068	\$50,136
11 DAILY PUBLIC O & M COST (SCENARIO 1)	\$40	\$81
12 TOTAL DAILY PUBLIC COST (SCENARIO 1)	\$25,108	\$50,216
13 NET DAILY PUBLIC COST/BENEFIT (SCENARIO 2)	(\$18,408)	(\$43,516)
14 NET DAILY PUBLIC COST/BENEFIT (SCENARIO 1)	\$25,108	\$50,216
COST		
15 DAILY PUBLIC COST PER TRIP REDUCED	\$1.92	\$0.96
16 DAILY PUBLIC COST PER VMT REDUCED	\$0.10	\$0.05
17 DAILY PUBLIC COST PER TON OF CO REDUCED	\$5,326	\$2,664
18 DAILY PUBLIC COST PER TON OF ROG REDUCED	\$48,904	\$24,363
19 DAILY PUBLIC COST PER TON OF NOx REDUCED	\$85,895	\$42,674
20 DAILY PUBLIC COST PER TON OF PM REDUCED	\$3,349,902	\$2,233,268
BENEFIT		
21 DAILY PUBLIC BENEFIT PER TRIP REDUCED	\$7.19	\$7.19
22 DAILY PUBLIC BENEFIT PER VMT REDUCED	\$0.36	\$0.36
23 DAILY PUBLIC BENEFIT PER TON OF CO REDUCED	\$19,959	\$19,967
24 DAILY PUBLIC BENEFIT PER TON OF ROG REDUCED	\$183,271	\$182,604
25 DAILY PUBLIC BENEFIT PER TON OF NOx REDUCED	\$321,899	\$319,848
26 DAILY PUBLIC BENEFIT PER TON OF PM REDUCED	\$12,554,050	\$16,738,734
COST/BENEFIT		
27 NET DAILY PUBLIC COST/BENEFIT PER TRIP REDUCED	(\$5.27)	(\$6.23)
28 NET DAILY PUBLIC COST/BENEFIT PER VMT REDUCED	(\$0.26)	(\$0.31)
29 NET DAILY PUBLIC COST/BENEFIT PER TON OF CO REDUCED	(\$14,633)	(\$17,303)
30 NET DAILY PUBLIC COST/BENEFIT PER TON OF ROG REDUCED	(\$134,367)	(\$158,241)
31 NET DAILY PUBLIC COST/BENEFIT PER TON OF NOx REDUCED	(\$236,004)	(\$277,174)
32 NET DAILY PUBLIC COST/BENEFIT PER TON OF PM REDUCED	(\$9,204,148)	(\$14,505,465)
INDIVIDUAL COST/BENEFIT		
33 DAILY INDIVIDUAL CAPITAL COST	\$0	\$0
34 DAILY INDIVIDUAL O & M COST	\$12,095	\$24,189
35 DAILY INDIVIDUAL COST	\$12,095	\$24,189
36 DAILY INDIVIDUAL CAPITAL BENEFIT	\$2,693	\$5,385
37 DAILY INDIVIDUAL O & M BENEFIT	\$7,881	\$15,763
38 DAILY INDIVIDUAL BENEFIT	\$10,574	\$21,148
39 NET DAILY INDIVIDUAL COST/BENEFIT	\$1,521	\$3,041

COST-EFFECTIVENESS MODEL

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COST			
40	NET DAILY INDIVIDUAL COST PER TRIP REDUCED	\$3.46	\$3.46
41	NET DAILY INDIVIDUAL COST PER VMT REDUCED	\$0.17	\$0.17
	NET DAILY INDIVIDUAL COST PER TON OF CO REDUCED	\$9,614	\$9,618
42	NET DAILY INDIVIDUAL COST PER TON OF ROG REDUCED	\$88,282	\$87,961
43	NET DAILY INDIVIDUAL COST PER TON OF NO _x REDUCED	\$155,059	\$154,072
44	NET DAILY INDIVIDUAL COST PER TON OF PM REDUCED	\$6,047,308	\$8,063,077
BENEFIT			
45	NET DAILY INDIVIDUAL BENEFIT PER TRIP REDUCED	\$3.03	\$3.03
46	NET DAILY INDIVIDUAL BENEFIT PER VMT REDUCED	\$0.15	\$0.15
	NET DAILY INDIVIDUAL BENEFIT PER TON OF CO REDUCED	\$8,405	\$8,409
47	NET DAILY INDIVIDUAL BENEFIT PER TON OF ROG REDUCED	\$77,183	\$76,902
48	NET DAILY INDIVIDUAL BENEFIT PER TON OF NO _x REDUCED	\$135,565	\$134,701
49	NET DAILY INDIVIDUAL BENEFIT PER TON OF PM REDUCED	\$5,287,016	\$7,049,354
COST/BENEFIT			
50	NET DAILY INDIVIDUAL COST/BENEFIT PER TRIP REDUCED	\$0.44	\$0.44
51	NET DAILY INDIVIDUAL COST/BENEFIT PER VMT REDUCED	\$0.02	\$0.02
	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF CO REDUCED	\$1,209	\$1,209
52	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF ROG REDUCED	\$11,099	\$11,059
53	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF NO _x REDUCED	\$19,495	\$19,370
54	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF PM REDUCED	\$760,292	\$1,013,723
PRIVATE SECTOR COST/BENEFIT			
55	DAILY PRIVATE CAPITAL COST	\$11,060	\$11,060
56	DAILY PRIVATE O & M COST	\$2,662	\$2,662
57	DAILY PRIVATE COST	\$13,722	\$13,722
58	DAILY PRIVATE CAPITAL BENEFIT	\$0	\$0
59	DAILY PRIVATE O & M BENEFIT	\$19,351	\$38,703
60	DAILY PRIVATE BENEFIT	\$19,351	\$38,703
61	NET DAILY PRIVATE COST/BENEFIT	(\$5,629)	(\$24,980)
COST			
62	NET DAILY PRIVATE COST PER TRIP REDUCED	\$3.93	\$1.96
63	NET DAILY PRIVATE COST PER VMT REDUCED	\$0.20	\$0.10
64	NET DAILY PRIVATE COST PER TON OF CO REDUCED	\$10,908	\$5,456
65	NET DAILY PRIVATE COST PER TON OF ROG REDUCED	\$100,163	\$49,899
66	NET DAILY PRIVATE COST PER TON OF NO _x REDUCED	\$175,927	\$87,403
67	NET DAILY PRIVATE COST PER TON OF PM REDUCED	\$6,861,143	\$4,574,095
BENEFIT			
68	NET DAILY PRIVATE BENEFIT PER TRIP REDUCED	\$5.54	\$5.54
69	NET DAILY PRIVATE BENEFIT PER VMT REDUCED	\$0.28	\$0.28
70	NET DAILY PRIVATE BENEFIT PER TON OF CO REDUCED	\$15,383	\$15,389
71	NET DAILY PRIVATE BENEFIT PER TON OF ROG REDUCED	\$141,251	\$140,737
72	NET DAILY PRIVATE BENEFIT PER TON OF NO _x REDUCED	\$248,095	\$246,514
73	NET DAILY PRIVATE BENEFIT PER TON OF PM REDUCED	\$9,675,692	\$12,900,923
COST/BENEFIT			
74	NET DAILY PRIVATE COST/BENEFIT PER TRIP REDUCED	(\$1.61)	(\$3.57)
75	NET DAILY PRIVATE COST/BENEFIT PER VMT REDUCED	(\$0.08)	(\$0.18)
76	NET DAILY PRIVATE COST/BENEFIT PER TON OF CO REDUCED	(\$4,475)	(\$9,933)
77	NET DAILY PRIVATE COST/BENEFIT PER TON OF ROG REDUCED	(\$41,088)	(\$90,838)
78	NET DAILY PRIVATE COST/BENEFIT PER TON OF NO _x REDUCED	(\$72,168)	(\$159,111)
79	NET DAILY PRIVATE COST/BENEFIT PER TON OF PM REDUCED	(\$2,814,549)	(\$8,326,828)

COST-EFFECTIVENESS MODEL

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SOCIETAL COST/BENEFIT			
SCENARIO #1 THE BUILD SCENARIO (SHORT TERM 1 YEAR)			
80	DAILY SOCIETAL AIR POLLUTION COST	\$1,050	\$2,101
81	DAILY SOCIETAL CONGESTION COST	\$0	\$0
82	DAILY SOCIETAL COST	\$1,050	\$2,101
83	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
84	DAILY SOCIETAL CONGESTION BENEFIT	\$2,104	\$4,208
85	DAILY SOCIETAL BENEFIT	\$2,104	\$4,208
86	NET DAILY SOCIETAL COST/BENEFIT	(\$1,054)	(\$2,108)
SCENARIO #1 THE BUILD SCENARIO (LONG TERM)			
87	DAILY SOCIETAL AIR POLLUTION COST	\$1,050	\$2,101
88	DAILY SOCIETAL CONGESTION COST	\$2,104	\$4,208
89	DAILY SOCIETAL COST	\$3,154	\$6,309
90	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0.00	\$0.00
91	DAILY SOCIETAL CONGESTION BENEFIT	\$0.00	\$0.00
92	DAILY SOCIETAL BENEFIT	\$0	\$0
93	NET DAILY SOCIETAL COST/BENEFIT	\$3,154	\$6,309
SCENARIO #2 THE NO BUILD SCENARIO			
94	DAILY SOCIETAL AIR POLLUTION COST	\$0	\$0
95	DAILY SOCIETAL CONGESTION COST	\$0	\$0
96	DAILY SOCIETAL COST	\$0	\$0
97	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$1,050	\$2,101
98	DAILY SOCIETAL CONGESTION BENEFIT	\$2,104	\$4,208
99	DAILY SOCIETAL BENEFIT	\$3,154	\$6,309
100	NET DAILY SOCIETAL COST/BENEFIT	(\$3,154)	(\$6,309)
TOTAL COST/BENEFIT			
SCENARIO #1 THE BUILD SCENARIO (SHORT TERM 1 YEAR)			
101	TOTAL DAILY COST	\$56,084	\$112,168
102	TOTAL DAILY BENEFIT	\$2,104	\$4,208
103	TOTAL DAILY COST/BENEFIT	\$53,980	\$107,960
COST			
104	NET DAILY COST PER TRIP REDUCED	\$16.05	\$16.05
105	NET DAILY COST PER VMT REDUCED	\$0.80	\$0.80
106	NET DAILY COST PER TON OF CO REDUCED	\$44,582	\$44,599
107	NET DAILY COST PER TON OF ROG REDUCED	\$409,371	\$407,883
108	NET DAILY COST PER TON OF NOx REDUCED	\$719,024	\$714,444
109	NET DAILY COST PER TON OF PM REDUCED	\$28,041,931	\$37,389,241
BENEFIT			
110	NET DAILY BENEFIT PER TRIP REDUCED	\$0.60	\$0.60
111	NET DAILY BENEFIT PER VMT REDUCED	\$0.03	\$0.03
112	NET DAILY BENEFIT PER TON OF CO REDUCED	\$1,673	\$1,673
113	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$15,358	\$15,303
114	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$26,975	\$26,804
115	NET DAILY BENEFIT PER TON OF PM REDUCED	\$1,052,042	\$1,402,738

COST-EFFECTIVENESS MODEL

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COST/BENEFIT			
116	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$15.45	\$15.45
117	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.77	\$0.77
118	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$42,909	\$42,926
119	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$394,013	\$392,580
120	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$692,048	\$687,640
121	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$26,989,889	\$35,986,503
SCENARIO #1 THE BUILD SCENARIO (LONG TERM)			
122	TOTAL DAILY COST	\$58,188	\$116,376
123	TOTAL DAILY BENEFIT	\$0	\$0
124	TOTAL DAILY COST/BENEFIT	\$58,188	\$116,376
COST			
125	NET DAILY COST PER TRIP REDUCED	\$16.65	\$16.65
126	NET DAILY COST PER VMT REDUCED	\$0.83	\$0.83
127	NET DAILY COST PER TON OF CO REDUCED	\$46,254	\$46,273
128	NET DAILY COST PER TON OF ROG REDUCED	\$424,730	\$423,185
129	NET DAILY COST PER TON OF NO _x REDUCED	\$745,999	\$741,248
130	NET DAILY COST PER TON OF PM REDUCED	\$29,093,972	\$38,791,979
BENEFIT			
131	NET DAILY BENEFIT PER TRIP REDUCED	\$0.00	\$0.00
132	NET DAILY BENEFIT PER VMT REDUCED	\$0.00	\$0.00
133	NET DAILY BENEFIT PER TON OF CO REDUCED	\$0	\$0
134	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$0	\$0
135	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$0	\$0
136	NET DAILY BENEFIT PER TON OF PM REDUCED	\$0	\$0
COST/BENEFIT			
137	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$16.65	\$16.65
138	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.83	\$0.83
139	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$46,254	\$46,273
140	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$424,730	\$423,185
141	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$745,999	\$741,248
142	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$29,093,972	\$38,791,979
SCENARIO #2 THE NO BUILD SCENARIO			
143	TOTAL DAILY COST	ERR	ERR
144	TOTAL DAILY BENEFIT	\$58,188	\$116,376
145	TOTAL DAILY COST/BENEFIT	ERR	ERR
COST			
146	NET DAILY COST PER TRIP REDUCED	ERR	ERR
147	NET DAILY COST PER VMT REDUCED	ERR	ERR
148	NET DAILY COST PER TON OF CO REDUCED	ERR	ERR
149	NET DAILY COST PER TON OF ROG REDUCED	ERR	ERR
150	NET DAILY COST PER TON OF NO _x REDUCED	ERR	ERR
151	NET DAILY COST PER TON OF PM REDUCED	ERR	ERR
BENEFIT			
152	NET DAILY BENEFIT PER TRIP REDUCED	\$16.65	\$16.65
153	NET DAILY BENEFIT PER VMT REDUCED	\$0.83	\$0.83
154	NET DAILY BENEFIT PER TON OF CO REDUCED	\$46,254	\$46,273
155	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$424,730	\$423,185
156	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$745,999	\$741,248
157	NET DAILY BENEFIT PER TON OF PM REDUCED	\$29,093,972	\$38,791,979

COST-EFFECTIVENESS MODEL

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	COST/BENEFIT		
158	NET DAILY COST/BENEFIT PER TRIP REDUCED	ERR	ERR
159	NET DAILY COST/BENEFIT PER VMT REDUCED	ERR	ERR
160	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	ERR	ERR
161	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	ERR	ERR
162	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	ERR	ERR
163	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR

COST – EFFECTIVENESS MODEL

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TCM # 20 PARK AND RIDE LOTS ASSUMPTIONS

1	Transit vehicle miles in LA County	251,410	MTA
2	Transit peak fleet	1,733	MTA
3	Active fleet	2,294	MTA
4	Contingency fleet	87	MTA
5	Capital cost of a bus		
5.1	Diesel	210,000	MTA
5.2	Methanol	220,000	MTA
5.3	CNG	260,000	MTA
6	Additional costs for radio and wheel chair	75,000	MTA
7	Total capital bus cost		
7.1	Diesel	285,000	MTA
7.2	Methanol	295,000	MTA
7.3	CNG	335,000	MTA
8	Average capital cost of a bus	260,500	MTA
9	Capital construction cost per bus	130,250	
10	Transit ridership on a weekday	1,169,786	MTA
11	Transit ridership on Saturdays	837,722	MTA
12	Transit ridership on Sundays	580,335	MTA
13	Passenger mile/bus mile	18.2	MTA
14	Subsidy per passenger mile	\$0.27	MTA
15	Cost per bus hour	\$109.70	MTA
16	Revenue per passenger mile	\$0.16	MTA
17	Total bus hours	17,726	MTA
18	Operation cost	1944524	MTA
19	Fare box revenue	729,973	MTA
20	Total seat miles	10,800,996	MTA
21	Total passenger miles	4,569,352	MTA
22	Operation cost per revenue mile	\$7.73	MTA
23	Revenue per revenue mile	\$2.90	MTA
24	Amortization period for construction projects	30	MTA
25	Amortization period for equipment purchase	12	MTA
26	Amortization period for vehicles (BUSES)	12	MTA
27	O&M cost of vehicle	\$0.48	AAA
28	Construction cost of arterial (\$/lane mile)	\$900,000	CALTRANS
29	Construction annualization factor (CAF)	0.09	CALCULATED
30	Bus annualization factor (BAF)	0.13	CALCULATED
31	car annualization factor	0.25	CALCULATED
32	Interest rate	8%	MARKET RATE
33	Lane miles arterial/vehicle trip	0.0018	COMSIS
34	Lane miles freeway/vehicle trip	0.0015	COMSIS
35	O&M cost of arterial (\$/LANE MILE)	\$765	CALTRANS
36	O&M cost of freeway (\$/LANE MILE)	\$2,000	CALTRANS
37	Monthly parking cost	\$100	MTA
38	Percent of parking paid by private sector	90%	SCAQMD
39	Percent of parking paid by employees	10%	SCAQMD
40	Air pollution cost per mile	\$0.015	RUTHERFORD AND WELLANDER, 1986
41	Cost per vehicle – miles of delay	\$0.11	RUTHERFORD AND WELLANDER, 1986
42	Construction cost of freeway (\$/lane mile) not including right of way	\$2,500,000	SANDAG
43	Construction cost of freeway (\$/lane mile) including	\$12,000,000	CALTRANS (MIN)
44	right of way and connectors to other freeways		(IN METROPOLITAN AREA)
45	Construction cost of freeway (\$/lane mile) including	\$16,000,000	CALTRANS (MAX)

COST-EFFECTIVENESS MODEL

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46	right of way and connectors to other freeways		(IN METROPOLITIAN AREA)
47	Average construction cost of freeway (\$/lane mile) including	\$14,000,000	CALTRANS (AVERAGE)
48	right of way and connectors to other freeways		(IN METROPOLITIAN AREA)
49	Construction cost of HOV lane (\$/lane mile)	\$2,500,000	MTA
50	Passengers per bus mile	4.65	
51	Average cost per passenger car	\$16,000	AAA
52	Passengers per bus mile	252.98	MTA
53	Operation cost per passenger	\$1.66	MTA
54	Fare box revenue per passenger	\$0.62	MTA
55	Average cost of long express trip on buses and rail	\$5	MTA
56	Average capital cost per parking space including land	\$10,000	MTA
57	Average annual O & M cost per space	\$20	MTA
58	Number of parking spaces needed	3000	
59	Utilized spaces (standard)	2225	
60	Utilized spaces (high)	3000	
61	Average private subsidy per trip	\$2.50	

METHODOLOGY

ANNUALIZATION FACTOR (AF) =

$AF = IR / (1 - (1 + (IR))^{-N})$ WHERE;

IR = INTEREST RATE

N = AMORTIZATION PERIOD FOR BUS/FACILITY LIFETIME

DAILY PUBLIC CAPITAL COST (DPCC) =

$(NPS) * (CPPS) * (CAF) / 365$ WHERE;

NPS = NUMBER OF PARKING SPACES

CPPS = COST PER PARKING SPACE

CAF = CONSTRUCTION ANNUALIZATION FACTOR

DAILY PUBLIC O & M COST (DPOMC) =

$(NPS) * (OMC/PS) + (DPA) * (SPP) + (DPADMC)$ WHERE;

NPS = NUMBER OF PARKING SPACES

OMCPS = OPERATION AND MAINTENANCE COST PER PARKING SPACE

DPADMC = DAILY PUBLIC ADMINISTRATIVE COST = 2% OF TOTAL COST

DPA = DAILY PASSENGERS ACCOMMODATED

SPP = SUBSIDY PER PASSENGER

COST-EFFECTIVENESS MODEL

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DAILY PUBLIC COST (DPC) =

(DPCC + DPOMC) WHERE;

DPCC = DAILY PUBLIC CAPITAL COST
DPOMC = DAILY PUBLIC O & M COST

DAILY PUBLIC REVENUES (DPR) =
(DPA) * (RPP) WHERE;

DPA = DAILY PASSENGERS ACCOMMODATED
RPP = REVENUE PER PASSENGER

DAILY PUBLIC COST/REVENUE (DPC/R) =

(DPCOMC) - (DPR) WHERE;

DPCOMC = DAILY PUBLIC CAPITAL AND OPERATION AND MAINTENANCE COST
DPR = DAILY PUBLIC REVENUE

DAILY PUBLIC BENEFITS (DPB) BY AVOIDING HIGHWAY BUILDING =

(DPCB) + (DPOMB);
WHERE

DPCB = (DVTR) * (LMF/T) * (CCLMF) * (CAF)/260*(POTOF) +
+ (DVTR) * (LMA/T) * (CCLMA) * (CAF)/260*(POTOA) WHERE;

DVTR = DAILY VEHICLE TRIPS REDUCED
LMF/T = LANE MILES OF FREEWAY PER TRIP
CCLMF = CONSTRUCTION COST OF FREEWAY LANE MILE
CAF = CONSTRUCTION ANNUALIZATION FACTOR
POTOF = PERCENT OF TRIPS ON FREEWAYS
LMA = LANE MILES OF ARTERIAL PER TRIP
CCLMA = CONSTRUCTION COST OF ARTERIAL LANE MILE
POTOA = PERCENT OF PEAK TRIPS ON ARTERIAL

DPOMB = (DTR) * (LMF/T) * (OMCLMF)/260 * (POTOF) +
+ (DTR) * (LMA/T) * (OMCLMA)/260*(POTOA) WHERE;

OMCLMF = O & M COST PER LANE MILE OF FREEWAY
OMCLMA = O & M COST PER LANE MILE OF ARTERIAL
POTOF = PERCENT OF TRIPS ON FREEWAY
POTOA = PERCENT OF TRIPS ON ARTERIAL

NET PUBLIC DAILY COST/BENEFIT COUNTING THE AVOIDED COSTS
(NPDC/BCAC) = (NDPC/R) - (DPCB)

COST-EFFECTIVENESS MODEL

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INDIVIDUAL COST

DAILY INDIVIDUAL CAPITAL COST (DIC) = 0

DIOMC = DAILY INDIVIDUAL MAINTENANCE AND OPERATION COST

DIOMC =

DCPP * NPA + (DVMR)*(OMCPM)*(.2105) WHERE;

DVMT = DAILY VEHICLE MILES TRAVELED

DCPP = DAILY COST PER PASSENGER

NPA = NUMBER OF DAILY PASSENGERS ACCOMODATED

OMCPM = OPERATION AND MAINTENANCE COST PER MILE

DAILY INDIVIDUAL BENEFIT (DIB) =

(DICB) + (DIOMB) WHERE;

DICB = DAILY INDIVIDUAL CAPITAL BENEFIT (CAR COST)

DIOMB = DAILY INDIVIDUAL O & M COST SAVING (CAR O & M)

DIOMC = (DOMCPM) * (DVMTR) * (.21) + (.10 * DIPC) + (DSPP)* (DPA) WHERE;

DOMCPM = DAILY O & M CAR COST PER MILE TO DRIVE

DVMTR = DAILY VEHICLE MILES TRAVELED REDUCED

0.21 IS THE PERCENT OF O & M COST ATTRIBUTED TO SAVINGS

DIPC = DAILY INDIVIDUAL PARKING COST

DSPP = DAILY SUBSIDY PER PASSENGER

DPA = DAILY PASSENGERS ACCOMODATED

NET DAILY INDIVIDUAL COST/BENEFIT (NDIC/B) =

(DIC) - (DIB) WHERE;

DIC = DAILY INDIVIDUAL COST

DIB = DAILY INDIVIDUAL BENEFITS

PRIVATE SECTOR COST/BENEFIT

DAILY PRIVATE CAPITAL COST (DPRCC) = 0

DAILY PRIVATE O & M COST (DPROMC) =

(DPA) * (DSPP) WHERE;

DPA = DAILY PASSENGERS ACCOMODATED

DSPP = DAILY SUBSIDY PER PASSENGER

DAILY PRIVATE CAPITAL BENEFIT (DPRCB) = 0

DAILY PRIVATE O & M BENEFIT (DPROMB) =

COST-EFFECTIVENESS MODEL

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$(VTR) * (MPC) * 12/260 * .90$ WHERE;

VTR = DAILY VEHICLE TRIPS REDUCED

MPC = MONTHLY PARKING COST

.90 = PERCENT OF PARKING PROVIDED BY PRIVATE SECTOR

NET DAILY PRIVATE COST/BENEFIT (NDPC/B) =
(DPRC) - (DPRB)

SOCIETAL COST

DAPC = DAILY AIR POLLUTION COST/BENEFIT

DAPC = $DVMTR * (APC/M)$ WHERE;

DVMTR = DAILY VMT REDUCED

APC/M = AIR POLLUTION COST PER MILE

DVMDCB = DAILY VEHICLE MILES OF DELAY COST/BENEFIT

DVMDC = $(DVMDS) * (C/VMD)$ WHERE;

$DVMDS = (VMT/NEW\ SPEED) - (VMT/EXISTING\ SPEED) * (AVERAGE\ SPEED)$

DVMDS = DAILY VEHICLE MILES OF DAILY SAVED

C/VMD = DAILY COST PER VEHICLE MILES OF DAILY SAVED

DSCB = DAILY SOCIETAL COST/BENEFIT

DSCB = (DAPC) + (DVMDCB)

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 1 THE BUILD SCENARIO

TOTAL DAILY COST (TDC) =

$(DPC) + (DIC) + (DPRC) + (DSC)$ WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DSC = DAILY SOCIETAL COST

TOTAL DAILY BENEFITS (TDB) =

$(DPB) + (DIB) + (DPRB) + DSB$ WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DSB = DAILY SOCIETAL BENEFIT

DPRB = DAILY PRIVATE BENEFIT

COST-EFFECTIVENESS MODEL

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TOTAL DAILY COS/BENEFIT (TDC/B) =

$$[(DPC) + (DIC) + (DPRC) + (DSC)] - [(DPB) + (DIB) + (DPRB) + (DSB)]$$

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 2 THE NO BUILD SCENARIO

TOTAL DAILY COST (TDC) =

(DPC) + (DIC) + (DPRC) + (DSC) WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DAPC = DAILY AIR POLLUTION COST

DSC = DAILY SOCIETAL COST

TOTAL DAILY BENEFITS (TDB) =

(DPB) + (DIB) + (DPRB) + (DSB) WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DSB = DAILY SOCIETAL BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

$$[(DPC) + (DIC) + (DPRC) + (DSC)] - [(DPB) + (DIB) + (DPRB) + (DSB)]$$

COST-EFFECTIVENESS MODEL

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LIKELY OUTCOMES

PUBLIC SECTOR COST/BENEFIT			
		STANDARD	HIGH
1	DAILY PUBLIC CAPITAL COST	\$5,414.82	\$5,414.82
2	DAILY PUBLIC O & M COST	\$4,785	\$4,771
3	DAILY PUBLIC COST	\$10,200	\$10,185
4	DAILY PUBLIC REVENUES	\$11,125	\$15,000
5	DAILY PUBLIC COST/REVENUE	(\$925)	(\$4,815)
6	DAILY PUBLIC AVOIDED CAPITAL COST (SCENARIO 2)	\$33,272	\$44,840
7	DAILY PUBLIC AVOIDED O & M COST (SCENARIO 2)	\$64	\$69
8	TOTAL DAILY PUBLIC AVOIDED (SCENARIO 2)	\$33,336	\$44,909
9	NET DAILY PUBLIC BENEFIT (SCENARIO 2)	\$44,461	\$59,909
10	DAILY PUBLIC CAPITAL COST (SCENARIO 1)	\$33,272	\$44,840
11	DAILY PUBLIC O & M COST (SCENARIO 1)	\$64	\$69
12	TOTAL DAILY PUBLIC COST (SCENARIO 1)	\$33,336	\$44,909
13	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 2)	(\$34,261)	(\$49,723)
14	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 1)	\$33,336	\$44,909
15	COST		
16	DAILY PUBLIC COST PER TRIP REDUCED	\$2.29	\$1.70
17	DAILY PUBLIC COST PER VMT REDUCED	\$0.20	\$0.15
18	DAILY PUBLIC COST PER TON OF CO REDUCED	\$22,667	\$16,976
19	DAILY PUBLIC COST PER TON OF ROG REDUCED	\$204,000	\$154,324
20	DAILY PUBLIC COST PER TON OF NOx REDUCED	\$351,724	\$268,037
21	DAILY PUBLIC COST PER TON OF PM REDUCED	ERR	ERR
22	BENEFIT		
23	DAILY PUBLIC BENEFIT PER TRIP REDUCED	\$9.99	\$9.98
24	DAILY PUBLIC BENEFIT PER VMT REDUCED	\$0.88	\$0.88
25	DAILY PUBLIC BENEFIT PER TON OF CO REDUCED	\$98,802	\$99,848
26	DAILY PUBLIC BENEFIT PER TON OF ROG REDUCED	\$889,215	\$907,710
27	DAILY PUBLIC BENEFIT PER TON OF NOx REDUCED	\$1,533,130	\$1,576,549
28	DAILY PUBLIC BENEFIT PER TON OF PM REDUCED	ERR	ERR
29	COST/BENEFIT		
30	NET DAILY PUBLIC COST/BENEFIT PER TRIP REDUCED	(\$7.70)	(\$8.29)
31	NET DAILY PUBLIC COST/BENEFIT PER VMT REDUCED	(\$0.68)	(\$0.73)
32	NET DAILY PUBLIC COST/BENEFIT PER TON OF CO REDUCED	(\$76,135)	(\$82,872)
33	NET DAILY PUBLIC COST/BENEFIT PER TON OF ROG REDUCED	(\$685,215)	(\$753,386)
34	NET DAILY PUBLIC COST/BENEFIT PER TON OF NOx REDUCED	(\$1,181,405)	(\$1,308,512)
35	NET DAILY PUBLIC COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
36	INDIVIDUAL COST/BENEFIT		
37	DAILY INDIVIDUAL CAPITAL COST	\$0	\$0
38	DAILY INDIVIDUAL O & M COST	\$13,717	\$18,456
39	DAILY INDIVIDUAL COST	\$13,717	\$18,456
40	DAILY INDIVIDUAL CAPITAL BENEFIT	\$3,309	\$4,461
41	DAILY INDIVIDUAL O & M BENEFIT	\$15,409	\$20,776
42	DAILY INDIVIDUAL BENEFIT	\$18,717	\$25,237
43	NET DAILY INDIVIDUAL COST/BENEFIT	(\$5,001)	(\$6,781)

COST-EFFECTIVENESS MODEL

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44	COST		
45	NET DAILY INDIVIDUAL COST PER TRIP REDUCED	\$3.08	\$3.08
46	NET DAILY INDIVIDUAL COST PER VMT REDUCED	\$0.27	\$0.27
47	NET DAILY INDIVIDUAL COST PER TON OF CO REDUCED	\$30,482	\$30,759
48	NET DAILY INDIVIDUAL COST PER TON OF ROG REDUCED	\$274,334	\$279,630
49	NET DAILY INDIVIDUAL COST PER TON OF NOx REDUCED	\$472,989	\$485,673
50	NET DAILY INDIVIDUAL COST PER TON OF PM REDUCED	ERR	ERR
51	BENEFIT		
52	NET DAILY INDIVIDUAL BENEFIT PER TRIP REDUCED	\$4.21	\$4.21
53	NET DAILY INDIVIDUAL BENEFIT PER VMT REDUCED	\$0.37	\$0.37
54	NET DAILY INDIVIDUAL BENEFIT PER TON OF CO REDUCED	\$41,594	\$42,061
55	NET DAILY INDIVIDUAL BENEFIT PER TON OF ROG REDUCED	\$374,345	\$382,375
56	NET DAILY INDIVIDUAL BENEFIT PER TON OF NOx REDUCED	\$645,422	\$664,124
57	NET DAILY INDIVIDUAL BENEFIT PER TON OF PM REDUCED	ERR	ERR
58	COST/BENEFIT		
59	NET DAILY INDIVIDUAL COST/BENEFIT PER TRIP REDUCED	(\$1.12)	(\$1.13)
60	NET DAILY INDIVIDUAL COST/BENEFIT PER VMT REDUCED	(\$0.10)	(\$0.10)
61	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF CO REDUCED	(\$11,112)	(\$11,302)
62	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF ROG REDUCED	(\$100,011)	(\$102,745)
63	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF NOx REDUCED	(\$172,433)	(\$178,451)
64	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
65	PRIVATE SECTOR COST/BENEFIT		
66	DAILY PRIVATE CAPITAL COST	\$0	\$0
67	DAILY PRIVATE O & M COST	\$5,563	\$7,500
68	DAILY PRIVATE COST	\$5,563	\$7,500
69	DAILY PRIVATE CAPITAL BENEFIT	\$0	\$0
70	DAILY PRIVATE O & M BENEFIT	\$9,242	\$12,462
71	DAILY PRIVATE BENEFIT	\$9,242	\$12,462
72	NET DAILY PRIVATE COST/BENEFIT	(\$3,680)	(\$4,962)
73	COST		
74	NET DAILY PRIVATE COST PER TRIP REDUCED	\$1.25	\$1.25
75	NET DAILY PRIVATE COST PER VMT REDUCED	\$0.11	\$0.11
76	NET DAILY PRIVATE COST PER TON OF CO REDUCED	\$12,361	\$12,500
77	NET DAILY PRIVATE COST PER TON OF ROG REDUCED	\$111,250	\$113,636
78	NET DAILY PRIVATE COST PER TON OF NOx REDUCED	\$191,810	\$197,368
79	NET DAILY PRIVATE COST PER TON OF PM REDUCED	ERR	ERR
80	BENEFIT		
81	NET DAILY PRIVATE BENEFIT PER TRIP REDUCED	\$2.08	\$2.08
82	NET DAILY PRIVATE BENEFIT PER VMT REDUCED	\$0.18	\$0.18
83	NET DAILY PRIVATE BENEFIT PER TON OF CO REDUCED	\$20,538	\$20,769
84	NET DAILY PRIVATE BENEFIT PER TON OF ROG REDUCED	\$184,846	\$188,811
85	NET DAILY PRIVATE BENEFIT PER TON OF NOx REDUCED	\$318,700	\$327,935
86	NET DAILY PRIVATE BENEFIT PER TON OF PM REDUCED	ERR	ERR
87	COST/BENEFIT		
88	NET DAILY PRIVATE COST/BENEFIT PER TRIP REDUCED	(\$0.83)	(\$0.83)
89	NET DAILY PRIVATE COST/BENEFIT PER VMT REDUCED	(\$0.07)	(\$0.07)
90	NET DAILY PRIVATE COST/BENEFIT PER TON OF CO REDUCED	(\$8,177)	(\$8,269)
91	NET DAILY PRIVATE COST/BENEFIT PER TON OF ROG REDUCED	(\$73,596)	(\$75,175)
92	NET DAILY PRIVATE COST/BENEFIT PER TON OF NOx REDUCED	(\$126,890)	(\$130,567)
93	NET DAILY PRIVATE COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
94	SOCIETAL COST/BENEFIT		
95	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		

COST-EFFECTIVENESS MODEL

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96	DAILY SOCIETAL AIR POLLUTION COST	\$761	\$1,026
97	DAILY SOCIETAL CONGESTION COST	\$0	\$0
98	DAILY SOCIETAL COST	\$761	\$1,026
99	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
100	DAILY SOCIETAL CONGESTION BENEFIT	\$1,707	\$2,302
101	DAILY SOCIETAL BENEFIT	\$1,707	\$2,302
102	NET DAILY SOCIETAL COST/BENEFIT	(\$946)	(\$1,276)
103	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
104	DAILY SOCIETAL AIR POLLUTION COST	\$761	\$1,026
105	DAILY SOCIETAL CONGESTION COST	\$1,707	\$2,302
106	DAILY SOCIETAL COST	\$2,468	\$3,328
107	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
108	DAILY SOCIETAL CONGESTION BENEFIT	\$0	\$0
109	DAILY SOCIETAL BENEFIT	\$0	\$0
110	NET DAILY SOCIETAL COST/BENEFIT	\$2,468	\$3,328
111	SCENARIO #2 THE NO BUILD SCENARIO		
112	DAILY SOCIETAL AIR POLLUTION COST	\$0	\$0
113	DAILY SOCIETAL CONGESTION COST	\$0	\$0
114	DAILY SOCIETAL COST	\$0	\$0
115	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$761	\$1,026
116	DAILY SOCIETAL CONGESTION BENEFIT	\$1,707	\$2,302
117	DAILY SOCIETAL BENEFIT	\$2,468	\$3,328
118	NET DAILY SOCIETAL COST/BENEFIT	(\$2,468)	(\$3,328)
119	TOTAL COST/BENEFIT		
120	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
121	TOTAL DAILY COST	\$62,056	\$83,633
122	TOTAL DAILY BENEFIT	\$1,707	\$2,302
123	TOTAL DAILY COST/BENEFIT	\$60,349	\$81,331
124	COST		
125	NET DAILY COST PER TRIP REDUCED	\$13.95	\$13.94
126	NET DAILY COST PER VMT REDUCED	\$1.22	\$1.22
127	NET DAILY COST PER TON OF CO REDUCED	\$137,903	\$139,389
128	NET DAILY COST PER TON OF ROG REDUCED	\$1,241,125	\$1,267,169
129	NET DAILY COST PER TON OF NOx REDUCED	\$2,139,871	\$2,200,872
130	NET DAILY COST PER TON OF PM REDUCED	ERR	ERR
131	BENEFIT		
132	NET DAILY BENEFIT PER TRIP REDUCED	\$0.38	\$0.38
133	NET DAILY BENEFIT PER VMT REDUCED	\$0.03	\$0.03
134	NET DAILY BENEFIT PER TON OF CO REDUCED	\$3,794	\$3,837
135	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$34,146	\$34,878
136	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$58,872	\$60,578
137	NET DAILY BENEFIT PER TON OF PM REDUCED	ERR	ERR

COST-EFFECTIVENESS MODEL

LACMTA

138	COST/BENEFIT		
139	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$13.56	\$13.56
140	NET DAILY COST/BENEFIT PER VMT REDUCED	\$1.19	\$1.19
141	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$134,109	\$135,552
142	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$1,206,979	\$1,232,290
143	NET DAILY COST/BENEFIT PER TON OF NOx REDUCED	\$2,080,998	\$2,140,293
144	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
145	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
146	TOTAL DAILY COST	\$63,764	\$85,935
147	TOTAL DAILY BENEFIT	\$0	\$0
148	TOTAL DAILY COST/BENEFIT	\$63,764	\$85,935
149	COST		
150	NET DAILY COST PER TRIP REDUCED	\$14.33	\$14.32
151	NET DAILY COST PER VMT REDUCED	\$1.26	\$1.26
152	NET DAILY COST PER TON OF CO REDUCED	\$141,697	\$143,225
153	NET DAILY COST PER TON OF ROG REDUCED	\$1,275,271	\$1,302,047
154	NET DAILY COST PER TON OF NOx REDUCED	\$2,198,743	\$2,261,450
155	NET DAILY COST PER TON OF PM REDUCED	ERR	ERR
156	BENEFIT		
157	NET DAILY BENEFIT PER TRIP REDUCED	\$0	\$0
158	NET DAILY BENEFIT PER VMT REDUCED	\$0	\$0
159	NET DAILY BENEFIT PER TON OF CO REDUCED	\$0.00	\$0.00
160	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$0.00	\$0.00
161	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$0.00	\$0.00
162	NET DAILY BENEFIT PER TON OF PM REDUCED	ERR	ERR
163	COST/BENEFIT		
164	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$14.33	\$14.32
165	NET DAILY COST/BENEFIT PER VMT REDUCED	\$1.26	\$1.26
166	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$141,697	\$143,225
167	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$1,275,271	\$1,302,047
168	NET DAILY COST/BENEFIT PER TON OF NOx REDUCED	\$2,198,743	\$2,261,450
169	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR
170	SCENARIO #2 THE NO BUILD SCENARIO		
171	TOTAL DAILY COST	\$29,479	\$36,141
172	TOTAL DAILY BENEFIT	\$74,889	\$100,935
173	TOTAL DAILY COST/BENEFIT	(\$45,409)	(\$64,794)
174	COST		
175	NET DAILY COST PER TRIP REDUCED	\$6.62	\$6.02
176	NET DAILY COST PER VMT REDUCED	\$0.58	\$0.53
177	NET DAILY COST PER TON OF CO REDUCED	\$65,509	\$60,235
178	NET DAILY COST PER TON OF ROG REDUCED	\$589,584	\$547,591
179	NET DAILY COST PER TON OF NOx REDUCED	\$1,016,524	\$951,078
180	NET DAILY COST PER TON OF PM REDUCED	ERR	ERR
181	BENEFIT		
182	NET DAILY BENEFIT PER TRIP REDUCED	\$16.83	\$16.82
183	NET DAILY BENEFIT PER VMT REDUCED	\$1.48	\$1.48
184	NET DAILY BENEFIT PER TON OF CO REDUCED	\$166,419	\$168,225
185	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$1,497,771	\$1,529,320
186	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$2,582,364	\$2,656,187
187	NET DAILY BENEFIT PER TON OF PM REDUCED	ERR	ERR

COST – EFFECTIVENESS MODEL

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188	COST/BENEFIT		
189	NET DAILY COST/BENEFIT PER TRIP REDUCED	(\$10.20)	(\$10.80)
190	NET DAILY COST/BENEFIT PER VMT REDUCED	(\$0.90)	(\$0.95)
191	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	(\$100,910)	(\$107,990)
192	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	(\$908,187)	(\$981,729)
193	NET DAILY COST/BENEFIT PER TON OF NOx REDUCED	(\$1,565,840)	(\$1,705,108)
194	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	ERR

COST-EFFECTIVENESS MODEL

LACMTA

TCM # 21 PREFERENTIAL PARKING FOR CARPOOLS AND VANPOOLS

ASSUMPTIONS

1	Average vanpool occupancy	7.00	REG. XV
2	Average length of a vanpool trip	20	REG. XV
3	Average cost per mile to drive	\$0.48	AAA
4	Average cost per commute trip of 11.4 miles	\$5.47	CALCULATED
5	Average cost per commute trip of 20 miles	\$9.60	CALCULATED
6	Percent of VMT on freeways	50%	LARTS MODEL
7	Purchase cost of a van	\$32,000	CTS
8	Average cost per passenger car	\$16,000	AAA
9	Interest rate	8%	MARKET RATE
10	Average monthly cost for vanpoolers	\$150	CTS
11	Average cost per parking space (\$/mo)	\$100	MTA
12	Construction cost of arterial (\$/lane mile)	\$900,000	CALTRANS
13	Lane miles arterial/vehicle trip	0.0018	COMSIS
14	Lane miles freeway/vehicle trip	0.0015	COMSIS
15	O&M cost of arterial (\$/LANE MILE)	\$765	CALTRANS
16	O&M cost of freeway (\$/LANE MILE)	\$2,000	CALTRANS
17	PERCENT OF PARKING PAID BY PRIVATE SECTOR	90%	SCAQMD
18	PERCENT OF PARKING PAID BY INDIVIDUAL	10%	SCAQMD
19	Air pollution cost per mile	\$0.015	RUTHERFORD AND WELLANDER, 1986
20	Cost per vehicle-miles of delay	\$0.11	RUTHERFORD AND WELLANDER, 1986
21	Construction cost of freeway (\$/lane mile) not including right of way	\$2,500,000	SANDAG
22	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$12,000,000	CALTRANS (MIN) (IN METROPOLITAN AREA)
23	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$16,000,000	CALTRANS (MAX) (IN METROPOLITAN AREA)
24	Average construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$14,000,000	CALTRANS (AVERAGE) (IN METROPOLITAN AREA)
25	Construction cost of HOV lane (\$/lane mile)	\$2,500,000	MTC
26	Operation and maintenance cost per parking space	\$10	MTA
27	Daily enforcement cost per trip reduced	\$0.20	MTA
28	Car annualization factor	0.25	CALCULATED
29	Construction annualization factor	0.09	CALCULATED

METHODOLOGY

PUBLIC SECTOR COST

DAILY PUBLIC CAPITAL COST (DPCC) = 0

DAILY PUBLIC O & M COST (DPOMC) =

DCOE WHERE;

DCOE = DAILY COST OF ENFORCEMENT

DAILY PUBLIC COST (DPC) =

COST-EFFECTIVENESS MODEL

LACMTA

(DPCC+DPOMC);

WHERE

DPCC= DAILY PUBLIC CAPITAL COST, DPOMC = DAILY PUBLIC O & M COST

DAILY PUBLIC REVENUES (DPR) = 0

DAILY PUBLIC COST/REVENUE (DPC/R) =

(DPCOMC) – (DPR) WHERE;

DPCOMC = DAILY PUBLIC CAPITAL AND OPERATION AND MAINTENANCE COST

DPR = DAILY PUBLIC REVENUE

DAILY PUBLIC BENEFITS (DPB) BY AVOIDING HIGHWAY BUILDING =

(DPCB) + (DPOMB) WHERE;

$DPCB = (DPTR) * (LMF/T) * (CCLMF) * (CAF)/260*(POTOF) +$
 $+ (DPTR) * (LMA/T) * (CCLMA) * (CAF)/260*(POTOA)$ WHERE;

DPTR = DAILY TRIPS REDUCED

LMF/T = LANE MILES OF FREEWAY PER TRIP

CCLMF = CONSTRUCTION COST OF FREEWAY LANE MILE

CAF = CONSTRUCTION ANNUALIZATION FACTOR

POTOF = PERCENT OF TRIPS ON FREEWAYS

LMA = LANE MILES OF ARTERIAL PER TRIP

CCLMA = CONSTRUCTION COST OF ARTERIAL LANE MILE

POTOA = PERCENT OF PEAK TRIPS ON ARTERIAL

$DPOMB = (DTR) * (LMFA/T) * (OMCLMF)/260 * (POTOF) +$
 $+ (DTR) * (LMA/T) * (OMCLMA)/260*(POTOA)$ WHERE;

OMCLMF = O & M COST PER LANE MILE OF FREEWAY

OMCLMA = O & M COST PER LANE MILE OF ARTERIAL

POTOF = PERCENT OF TRIPS ON FREEWAY

POTOA = PERCENT OF TRIPS ON ARTERIAL

NET PUBLIC DAILY COST/BENEFIT COUNTING THE AVOIDED COSTS

(NDPC/BIAC) = (NDPC/R) – (DPB)

COST-EFFECTIVENESS MODEL

LACMTA

INDIVIDUAL COST

DAILY INDIVIDUAL CAPITAL COST (DICC) = 0

DAILY INDIVIDUAL OPERATION AND MAINTENANCE COST (DIOMC) =
(DVMTR) * (DOMCPM) * .2105 + (DPC) * (DVTR/2) * .10 WHERE;

DVMTR = DAILY VEHICLE MILES TRAVELED REDUCED

DOMCPM = DAILY OPERATION AND MAINTENANCE COST PER MILE

DPC = DAILY PARKING COST

DVTR = DAILY VEHICLE TRIPS REDUCED

DAILY INDIVIDUAL BENEFIT (DIB) =

(DICB) + (DIOMB) WHERE;

DICB = DAILY INDIVIDUAL CAPITAL BENEFIT (CAR COST)

DIOMB = DAILY INDIVIDUAL O & M COST SAVING (CAR O & M)

DIOMB = (DOMCPM) * (DVMTR) * (.21) * (1 - 1/2.5) +
+ (.10 * DIPC * DVTR/2 * (1 - 1/2.5) WHERE;

DOMCPM = DAILY O & M CAR COST PER MILE TO DRIVE

DVMTR = DAILY VEHICLE MILES TRAVELED REDUCED

.21 IS THE PERCENT OF O & M COST ATTRIBUTED TO SAVINGS

DIPC = DAILY INDIVIDUAL PARKING COST

(1 - 1/2.5) = SAVING PER PERSON DUE TO COST SHARING

NET DAILY INDIVIDUAL COST/BENEFIT (NDIC/B) =

(DIC) - (DIB) WHERE;

DIC = DAILY INDIVIDUAL COST

DIB = DAILY INDIVIDUAL BENEFITS

PRIVATE SECTOR COST/BENEFIT

DAILY PRIVATE CAPITAL COST (DPRCC) = 0

DAILY PRIVATE O & M COST (DPROMC) =
(DVTR)/2/2.5 * (OMCPPPS) * .90 WHERE;

DVTR = DAILY VEHICLE TRIPS REDUCED

OMCPPPS = DAILY OPERATION AND MAINTENANCE COST PER PREFERENTIAL
PARKING SPACE

COST – EFFECTIVENESS MODEL

LACMTA

DAILY PRIVATE CAPITAL BENEFIT (DPRCB) = 0

DAILY PRIVATE O & M BENEFIT (DPROMB) =

$(DVTR)/2 * (MPC)*12/260 * .90$ WHERE;

DVTR = DAILY VEHICLE TRIPS REDUCED

MPC = MONTHLY PARKING COST

.90 = PERCENT OF PARKING PROVIDED BY PRIVATE SECTOR

NET DAILY PRIVATE COST/BENEFIT (NDPC/B) =

$(DPRC) - (DPRB)$

SOCIETAL COST

DAPC = DAILY AIR POLLUTION COST/BENEFIT

$DAPC = DVMTR * (APC/M)$ WHERE;

DVMTR = DAILY VMT REDUCED

APC/M = AIR POLLUTION COST PER MILE

DVMDCB = DAILY VEHICLE MILES OF DELAY COST/BENEFIT

$DVMDC = (DVMDS) * (C/VMD)$ WHERE;

$DVMDS = (VMT/NEW SPEED) - (VMT/EXISTING SPEED) * (AVERAGE SPEED)$

DVMDS = DAILY VEHICLE MILES OF DAILY SAVED

C/VMD = DAILY COST PER VEHICLE MILES OF DAILY SAVED

DSCB = DAILY SOCIETAL COST/BENEFIT

$DSCB = (DAPC) + (DVMDCB)$

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 1 THE BUILD SCENARIO

TOTAL DAILY COST (TDC) =

$(DPC) + (DIC) + (DPRC) + (DSC)$ WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DSC = DAILY SOCIETAL COST

TOTAL DAILY BENEFITS (TDB) =

$(DPB) + (DIB) + (DPRB) + DSB$ WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DSB = DAILY SOCIETAL BENEFIT

COST-EFFECTIVENESS MODEL

LACMTA

TOTAL DAILY COS/BENEFIT (TDC/B) =

$$[(DPC) + (DIC) + (DPRC) + (DSC)] - [(DPB) + (DIB) + (DPRB) + (DSB)]$$

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 2 THE NO BUILD SCENARIO

TOTAL DAILY COST (TDC) =

$$(DPC) + (DIC) + (DPRC) + (DSC) \text{ WHERE;}$$

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DSC = DAILY SOCIETAL COST

TOTAL DAILY BENEFITS (TDB) =

$$(DPB) + (DIB) + (DPRB) + (DSB) \text{ WHERE;}$$

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DSB = DAILY SOCIETAL BENEFIT

TOTAL DAILY COST/BENEFIT (TDC/B) =

$$[(DPC) + (DIC) + (DPRC) + (DSC)] - [(DPB) + (DIB) + (DPRB) + (DSB)]$$

COST – EFFECTIVENESS MODEL

LACMTA

LIKELY OUTCOMES

PUBLIC SECTOR COST/BENEFIT			
		STANDARD	HIGH
1	DAILY PUBLIC CAPITAL COST	\$0	\$0
2	DAILY PUBLIC O & M COST	\$444	\$889
3	DAILY PUBLIC COST	\$444	\$889
4	DAILY PUBLIC REVENUES	\$0	\$0
5	DAILY PUBLIC COST/REVENUE	\$444	\$889
6	DAILY PUBLIC AVOIDED CAPITAL COST (SCENARIO 2)	\$10,935	\$21,870
7	DAILY PUBLIC AVOIDED O & M COST (SCENARIO 2)	\$21	\$42
8	TOTAL DAILY PUBLIC AVOIDED (SCENARIO 2)	\$10,956	\$21,912
9	NET DAILY PUBLIC BENEFIT (SCENARIO 2)	\$10,956	\$21,912
10	DAILY PUBLIC CAPITAL COST (SCENARIO 1)	\$10,935	\$21,870
11	DAILY PUBLIC O & M COST (SCENARIO 1)	\$21	\$42
12	TOTAL DAILY PUBLIC COST (SCENARIO 1)	\$10,956	\$21,912
13	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 2)	(\$10,511)	(\$21,023)
14	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 1)	\$10,956	\$21,912
15	COST		
16	DAILY PUBLIC COST PER TRIP REDUCED	\$0.20	\$0.20
17	DAILY PUBLIC COST PER VMT REDUCED	\$0.02	\$0.02
18	DAILY PUBLIC COST PER TON OF CO REDUCED	\$724	\$723
19	DAILY PUBLIC COST PER TON OF ROG REDUCED	\$7,407	\$7,532
20	DAILY PUBLIC COST PER TON OF NOx REDUCED	\$13,467	\$13,674
21	DAILY PUBLIC COST PER TON OF PM REDUCED	ERR	\$888,800
22	BENEFIT		
23	DAILY PUBLIC BENEFIT PER TRIP REDUCED	\$4.93	\$4.93
24	DAILY PUBLIC BENEFIT PER VMT REDUCED	\$0.43	\$0.43
25	DAILY PUBLIC BENEFIT PER TON OF CO REDUCED	\$17,843	\$17,829
26	DAILY PUBLIC BENEFIT PER TON OF ROG REDUCED	\$182,597	\$185,692
27	DAILY PUBLIC BENEFIT PER TON OF NOx REDUCED	\$331,995	\$337,103
28	DAILY PUBLIC BENEFIT PER TON OF PM REDUCED	ERR	\$21,911,688
29	COST/BENEFIT		
30	NET DAILY PUBLIC COST/BENEFIT PER TRIP REDUCED	(\$4.73)	(\$4.73)
31	NET DAILY PUBLIC COST/BENEFIT PER VMT REDUCED	(\$0.41)	(\$0.41)
32	NET DAILY PUBLIC COST/BENEFIT PER TON OF CO REDUCED	(\$17,120)	(\$17,106)
33	NET DAILY PUBLIC COST/BENEFIT PER TON OF ROG REDUCED	(\$175,191)	(\$178,160)
34	NET DAILY PUBLIC COST/BENEFIT PER TON OF NOx REDUCED	(\$318,529)	(\$323,429)
35	NET DAILY PUBLIC COST/BENEFIT PER TON OF PM REDUCED	ERR	(\$21,022,888.10)
36	INDIVIDUAL COST/BENEFIT		
37	DAILY INDIVIDUAL CAPITAL COST	\$0	\$0
38	DAILY INDIVIDUAL O & M COST	\$3,072	\$6,144
39	DAILY INDIVIDUAL COST	\$3,072	\$6,144
40	DAILY INDIVIDUAL CAPITAL BENEFIT	\$0	\$0
41	DAILY INDIVIDUAL O & M BENEFIT	\$1,843	\$3,687
42	DAILY INDIVIDUAL BENEFIT	\$1,843	\$3,687
43	NET DAILY INDIVIDUAL COST/BENEFIT	\$1,229	\$2,458

COST-EFFECTIVENESS MODEL

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44	COST		
45	NET DAILY INDIVIDUAL COST PER TRIP REDUCED	\$1.38	\$1.38
46	NET DAILY INDIVIDUAL COST PER VMT REDUCED	\$0.12	\$0.12
47	NET DAILY INDIVIDUAL COST PER TON OF CO REDUCED	\$5,004	\$5,000
48	NET DAILY INDIVIDUAL COST PER TON OF ROG REDUCED	\$51,204	\$52,071
49	NET DAILY INDIVIDUAL COST PER TON OF NO _x REDUCED	\$93,097	\$94,530
50	NET DAILY INDIVIDUAL COST PER TON OF PM REDUCED	ERR	\$6,144,426.94
51	BENEFIT		
52	NET DAILY INDIVIDUAL BENEFIT PER TRIP REDUCED	\$0.83	\$0.83
53	NET DAILY INDIVIDUAL BENEFIT PER VMT REDUCED	\$0.07	\$0.07
54	NET DAILY INDIVIDUAL BENEFIT PER TON OF CO REDUCED	\$3,002	\$3,000
55	NET DAILY INDIVIDUAL BENEFIT PER TON OF ROG REDUCED	\$30,722	\$31,243
56	NET DAILY INDIVIDUAL BENEFIT PER TON OF NO _x REDUCED	\$55,858	\$56,718
57	NET DAILY INDIVIDUAL BENEFIT PER TON OF PM REDUCED	ERR	3686656.1649
58	COST/BENEFIT		
59	NET DAILY INDIVIDUAL COST/BENEFIT PER TRIP REDUCED	\$0.55	\$0.55
60	NET DAILY INDIVIDUAL COST/BENEFIT PER VMT REDUCED	\$0.05	\$0.05
61	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF CO REDUCED	\$2,001	\$2,000
62	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF ROG REDUCED	\$20,481	\$20,829
63	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF NO _x REDUCED	\$37,239	\$37,812
64	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF PM REDUCED	ERR	2457770.7766
65	PRIVATE SECTOR COST/BENEFIT		
66	DAILY PRIVATE CAPITAL COST	\$0	\$0
67	DAILY PRIVATE O & M COST	\$17	\$34
68	DAILY PRIVATE COST	\$17	\$34
69	DAILY PRIVATE CAPITAL BENEFIT	\$0	\$0
70	DAILY PRIVATE O & M BENEFIT	\$4,615	\$9,230
71	DAILY PRIVATE BENEFIT	\$4,615	\$9,230
72	NET DAILY PRIVATE COST/BENEFIT	(\$4,598)	(\$9,196)
73	COST		
74	NET DAILY PRIVATE COST PER TRIP REDUCED	\$0.01	\$0.01
75	NET DAILY PRIVATE COST PER VMT REDUCED	\$0.00	\$0.00
76	NET DAILY PRIVATE COST PER TON OF CO REDUCED	\$28	\$28
77	NET DAILY PRIVATE COST PER TON OF ROG REDUCED	\$285	\$290
78	NET DAILY PRIVATE COST PER TON OF NO _x REDUCED	\$518	\$526
79	NET DAILY PRIVATE COST PER TON OF PM REDUCED	ERR	\$34,184.62
80	BENEFIT		
81	NET DAILY PRIVATE BENEFIT PER TRIP REDUCED	\$2.08	\$2.08
82	NET DAILY PRIVATE BENEFIT PER VMT REDUCED	\$0.18	\$0.18
83	NET DAILY PRIVATE BENEFIT PER TON OF CO REDUCED	\$7,516	\$7,510
84	NET DAILY PRIVATE BENEFIT PER TON OF ROG REDUCED	\$76,915	\$78,219
85	NET DAILY PRIVATE BENEFIT PER TON OF NO _x REDUCED	\$139,846	\$141,998
86	NET DAILY PRIVATE BENEFIT PER TON OF PM REDUCED	ERR	\$9,229,846.15
87	COST/BENEFIT		
88	NET DAILY PRIVATE COST/BENEFIT PER TRIP REDUCED	(\$2.07)	(\$2.07)
89	NET DAILY PRIVATE COST/BENEFIT PER VMT REDUCED	(\$0.18)	(\$0.18)
90	NET DAILY PRIVATE COST/BENEFIT PER TON OF CO REDUCED	(\$7,488)	(\$7,482)
91	NET DAILY PRIVATE COST/BENEFIT PER TON OF ROG REDUCED	(\$76,631)	(\$77,929)
92	NET DAILY PRIVATE COST/BENEFIT PER TON OF NO _x REDUCED	(\$139,328)	(\$141,472)
93	NET DAILY PRIVATE COST/BENEFIT PER TON OF PM REDUCED	ERR	(\$9,195,661.54)
94	SOCIETAL COST/BENEFIT		
95	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		

COST – EFFECTIVENESS MODEL

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96	DAILY SOCIETAL AIR POLLUTION COST	\$380	\$760
97	DAILY SOCIETAL CONGESTION COST	\$0	\$0
98	DAILY SOCIETAL COST	\$380	\$760
99	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
100	DAILY SOCIETAL CONGESTION BENEFIT	\$767	\$1,535
101	DAILY SOCIETAL BENEFIT	\$767	\$1,535
102	NET DAILY SOCIETAL COST/BENEFIT	(\$387)	(\$775)
103	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
104	DAILY SOCIETAL AIR POLLUTION COST	\$380	\$760
105	DAILY SOCIETAL CONGESTION COST	\$767	\$1,535
106	DAILY SOCIETAL COST	\$1,147	\$2,295
107	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
108	DAILY SOCIETAL CONGESTION BENEFIT	\$0	\$0
109	DAILY SOCIETAL BENEFIT	\$0	\$0
110	NET DAILY SOCIETAL COST/BENEFIT	\$1,147	\$2,295
111	SCENARIO #2 THE NO BUILD SCENARIO		
112	DAILY SOCIETAL AIR POLLUTION COST	\$0	\$0
113	DAILY SOCIETAL CONGESTION COST	\$0	\$0
114	DAILY SOCIETAL COST	\$0	\$0
115	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$380	\$380
116	DAILY SOCIETAL CONGESTION BENEFIT	\$767	\$1,535
117	DAILY SOCIETAL BENEFIT	\$1,147	\$1,915
118	NET DAILY SOCIETAL COST/BENEFIT	(\$1,147)	(\$1,915)
119	TOTAL COST/BENEFIT		
120	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
121	TOTAL DAILY COST	\$17,794	\$35,588
122	TOTAL DAILY BENEFIT	\$767	\$1,535
123	TOTAL DAILY COST/BENEFIT	\$17,027	\$34,053
124	COST		
125	NET DAILY COST PER TRIP REDUCED	\$8.01	\$8.01
126	NET DAILY COST PER VMT REDUCED	\$0.70	\$0.70
127	NET DAILY COST PER TON OF CO REDUCED	\$28,981	\$28,957
128	NET DAILY COST PER TON OF ROG REDUCED	\$296,568	\$301,594
129	NET DAILY COST PER TON OF NOx REDUCED	\$539,214	\$547,510
130	NET DAILY COST PER TON OF PM REDUCED	ERR	\$35,588,120
131	BENEFIT		
132	NET DAILY BENEFIT PER TRIP REDUCED	\$0.35	\$0.35
133	NET DAILY BENEFIT PER VMT REDUCED	\$0.03	\$0.03
134	NET DAILY BENEFIT PER TON OF CO REDUCED	\$1,250	\$1,249
135	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$12,789	\$13,005
136	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$23,252	\$23,610
137	NET DAILY BENEFIT PER TON OF PM REDUCED	ERR	\$1,534,648

COST-EFFECTIVENESS MODEL

LACMTA

138	COST/BENEFIT		
139	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$7.66	\$7.66
140	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.67	\$0.67
141	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$27,731	\$27,708
142	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$283,779	\$288,589
143	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$515,962	\$523,900
144	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	\$34,053,472
145	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
146	TOTAL DAILY COST	\$18,561	\$37,123
147	TOTAL DAILY BENEFIT	\$0	\$0
148	TOTAL DAILY COST/BENEFIT	\$18,561	\$37,123
149	COST		
150	NET DAILY COST PER TRIP REDUCED	\$8.35	\$8.35
151	NET DAILY COST PER VMT REDUCED	\$0.73	\$0.73
152	NET DAILY COST PER TON OF CO REDUCED	\$30,230	\$30,206
153	NET DAILY COST PER TON OF ROG REDUCED	\$309,356	\$314,600
154	NET DAILY COST PER TON OF NO _x REDUCED	\$562,466	\$571,120
155	NET DAILY COST PER TON OF PM REDUCED	ERR	\$37,122,768
156	BENEFIT		
157	NET DAILY BENEFIT PER TRIP REDUCED	\$0.00	\$0.00
158	NET DAILY BENEFIT PER VMT REDUCED	\$0.00	\$0.00
159	NET DAILY BENEFIT PER TON OF CO REDUCED	\$0	\$0
160	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$0	\$0
161	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$0	\$0
162	NET DAILY BENEFIT PER TON OF PM REDUCED	ERR	\$0
163	COST/BENEFIT		
164	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$8.35	\$8.35
165	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.73	\$0.73
166	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$30,230	\$30,206
167	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$309,356	\$314,600
168	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	\$562,466	\$571,120
169	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	\$37,122,768
170	SCENARIO #2 THE NO BUILD SCENARIO		
171	TOTAL DAILY COST	\$3,534	\$7,067
172	TOTAL DAILY BENEFIT	\$18,561	\$37,123
173	TOTAL DAILY COST/BENEFIT	(\$15,028)	(\$30,055)
174	COST		
175	NET DAILY COST PER TRIP REDUCED	\$1.59	\$1.59
176	NET DAILY COST PER VMT REDUCED	\$0.14	\$0.14
177	NET DAILY COST PER TON OF CO REDUCED	\$5,755	\$5,751
178	NET DAILY COST PER TON OF ROG REDUCED	\$58,895	\$59,893
179	NET DAILY COST PER TON OF NO _x REDUCED	\$107,082	\$108,729
180	NET DAILY COST PER TON OF PM REDUCED	ERR	\$7,067,412
181	BENEFIT		
182	NET DAILY BENEFIT PER TRIP REDUCED	\$8.35	\$8.35
183	NET DAILY BENEFIT PER VMT REDUCED	\$0.73	\$0.73
184	NET DAILY BENEFIT PER TON OF CO REDUCED	\$30,230	\$30,206
185	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$309,356	\$314,600
186	NET DAILY BENEFIT PER TON OF NO _x REDUCED	\$562,466	\$571,120
187	NET DAILY BENEFIT PER TON OF PM REDUCED	ERR	\$37,122,768

COST-EFFECTIVENESS MODEL

LACMTA

188	COST/BENEFIT		
189	NET DAILY COST/BENEFIT PER TRIP REDUCED	(\$6.76)	(\$6.76)
190	NET DAILY COST/BENEFIT PER VMT REDUCED	(\$0.59)	(\$0.59)
191	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	(\$24,475)	(\$24,455)
192	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	(\$250,461)	(\$254,706)
193	NET DAILY COST/BENEFIT PER TON OF NO _x REDUCED	(\$455,384)	(\$462,390)
194	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	ERR	(\$30,055,357)

COST-EFFECTIVENESS MODEL

LACMTA

TCM # 22 FREE PREFERENTIAL PARKING FOR CARPOOLS AND VANPOOLS

ASSUMPTIONS

1	Average vanpool occupancy	7.00	REG. XV
2	Average cost per mile to drive	\$0.48	AAA
3	Average cost per commute trip of 11.4 miles	\$5.47	CALCULATED
4	Percent of VMT on freeways	50%	LARTS MODEL
5	Average cost of a passenger car	\$16,000	AAA
6	Operation and maintenance cost per mile to drive	\$0.48	AAA
7	Interest rate	8%	MARKET RATE
8	Average monthly cost for vanpoolers	\$150	CTS
9	Average cost per parking (\$/mo)	\$100	MTA
10	Average daily vehicle miles	22.8	CALCULATED
11	Construction cost of arterial (\$/lane mile)	\$900,000	CALTRANS
12	Lane miles arterial/vehicle trip	0.0018	COMSIS
13	Lane miles freeway/vehicle trip	0.0015	COMSIS
14	O&M cost of arterial (\$/LANE MILE)	\$765	CALTRANS
15	O&M cost of freeway (\$/LANE MILE)	\$2,000	CALTRANS
16	Percent of parking paid by employers	90%	SCAQMD
17	Percent of parking paid by employees	10%	SCAQMD
18	Air pollution cost per mile	\$0.015	RUTHERFORD AND WELLANDER, 1986
19	Cost per vehicle-miles of delay	\$0.11	RUTHERFORD AND WELLANDER, 1986
20	Construction cost of freeway (\$/lane mile) not including right of way	\$2,500,000	SANDAG
21	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$12,000,000	CALTRANS (MIN) (IN METROPOLITAN AREA)
22	Construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$16,000,000	CALTRANS (MAX) (IN METROPOLITAN AREA)
23	Average construction cost of freeway (\$/lane mile) including right of way and connectors to other freeways	\$14,000,000	CALTRANS (AVERAGE) (IN METROPOLITAN AREA)
24	Construction cost of HOV lane (\$/lane mile)	\$2,500,000	MTC
25	Operation and maintenance cost per parking space	\$10	MTA
26	daily enforcement cost per trip reduced	\$0.20	MTA
27	Car annualization factor	0.25	CALCULATED
28	Construction annualization factor	0.09	CALCULATED

METHODOLOGY

PUBLIC SECTOR COST

DAILY PUBLIC CAPITAL COST (DPCC) = 0

DAILY PUBLIC O & M COST (DPOMC) =

DCOE WHERE;

DCOE = DAILY COST OF ENFORCEMENT

DAILY PUBLIC COST (DPC) =

COST-EFFECTIVENESS MODEL

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(DPCC+DPOMC) WHERE;

DPCC= DAILY PUBLIC CAPITAL COST
DPOMC = DAILY PUBLIC O & M COST

DAILY PUBLIC REVENUES (DPR) = 0

DAILY PUBLIC COST/REVENUE (DPC/R) =

(DPCOMC) – (DPR) WHERE;

DPCOMC = DAILY PUBLIC CAPITAL AND OPERATION AND MAINTENANCE COST
DPR = DAILY PUBLIC REVENUE

DAILY PUBLIC BENEFITS (DPB) BY AVOIDING HIGHWAY BUILDING =
(DPCB) + (DPOMB) WHERE;

$DPCB = (DPTR) * (LMF/T) * (CCLMF) * (CAF)/260*(POTOF) +$
 $+ (DPTR) * (LMA/T) * (CCLMA) * (CAF)/260*(POTOA)$ WHERE;

DPTR = DAILY TRIPS REDUCED
LMF/T = LANE MILES OF FREEWAY PER TRIP
CCLMF = CONSTRUCTION COST OF FREEWAY LANE MILE
CAF = CONSTRUCTION ANNUALIZATION FACTOR
POTOF = PERCENT OF TRIPS ON FREEWAYS
LMA = LANE MILES OF ARTERIAL PER TRIP
CCLMA = CONSTRUCTION COST OF ARTERIAL LANE MILE
POTOA = PERCENT OF PEAK TRIPS ON ARTERIAL

$DPOMB = (DTR) * (LMFA/T) * (OMCLMF)/260 * (POTOF) +$
 $+ (DTR) * (LMA/T) * (OMCLMA)/260*(POTOA)$ WHERE;

OMCLMF = O & M COST PER LANE MILE OF FREEWAY
OMCLMA = O & M COST PER LANE MILE OF ARTERIAL
POTOF = PERCENT OF TRIPS ON FREEWAY
POTOA = PERCENT OF TRIPS ON ARTERIAL

NET PUBLIC DAILY COST/BENEFIT COUNTING THE AVOIDED COSTS (NDPC/BIAC) =
(NDPC/R) – (DPB)

INDIVIDUAL COST

DAILY INDIVIDUAL CAPITAL COST (DICC) = 0

DAILY INDIVIDUAL OPERATION AND MAINTENANCE COST (DIOMC) =

(DVMTR) * (DOMCPM) * .2105 WHERE;

DVMTR = DAILY VEHICLE MILES TRAVELED REDUCED

DOMCPM = DAILY OPERATION AND MAINTENANCE COST PER MILE

DAILY INDIVIDUAL BENEFIT (DIB) =

(DICB) + (DIOMB) WHERE;

DICB = DAILY INDIVIDUAL CAPITAL BENEFIT (CAR COST)

DIOMB = DAILY INDIVIDUAL O & M COST SAVING (CAR O & M)

DIOMB = (DOMCPM) * (DVMTR) * (.21) * (1 - 1/2.5) +
+ (.10 * DIPC * DVTR/2) WHERE;

DOMCPM = DAILY O & M CAR COST PER MILE TO DRIVE

DVMTR = DAILY VEHICLE MILES TRAVELED REDUCED

.21 IS THE PERCENT OF O & M COST ATTRIBUTED TO SAVINGS

DIPC = DAILY INDIVIDUAL PARKING COST

NET DAILY INDIVIDUAL COST/BENEFIT (NDIC/B) =

(DIC) - (DIB) WHERE;

DIC = DAILY INDIVIDUAL COST

DIB = DAILY INDIVIDUAL BENEFITS

PRIVATE SECTOR COST/BENEFIT

DAILY PRIVATE CAPITAL COST (DPRCC) = 0

DAILY PRIVATE O & M COST (DPROMC) =

(DVTR)/2/2.5 * (OMCPPPS) * .90 + (DVTR)/2/2.5 * (MPC) * (.10) WHERE;

DVTR = DAILY VEHICLE TRIPS REDUCED

OMCPPPS = DAILY OPERATION AND MAINTENANCE COST PER PREFERENTIAL
PARKING SPACE

MPC = MONTHLY PARKING COST

DAILY PRIVATE CAPITAL BENEFIT (DPRCB) = 0

DAILY PRIVATE O & M BENEFIT (DPROMB) =

(DVTR)/2 * (MPC) * 12/260 * .90 WHERE;

DVTR = DAILY VEHICLE TRIPS REDUCED

MPC = MONTHLY PARKING COST

.90 = PERCENT OF PARKING PROVIDED BY PRIVATE SECTOR

NET DAILY PRIVATE COST/BENEFIT (NDPC/B) =

COST-EFFECTIVENESS MODEL

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(DPRC) - (DPRB)

SOCIETAL COST

DAPC = DAILY AIR POLLUTION COST/BENEFIT

DAPC = DVMTR * (APC/M) WHERE;

DVMTR = DAILY VMT REDUCED

APC/M = AIR POLLUTION COST PER MILE

DVMDCB = DAILY VEHICLE MILES OF DELAY COST/BENEFIT

DVMDC = (DVMDS) * (C/VMD) WHERE;

DVMDS = (VMT/NEW SPEED) - (VMT/EXISTING SPEED) * (AVERAGE SPEED)

DVMDS = DAILY VEHICLE MILES OF DAILY SAVED

C/VMD = DAILY COST PER VEHICLE MILES OF DAILY SAVED

DSCB = DAILY SOCIETAL COST/BENEFIT

DSCB = (DAPC) + (DVMDCB)

TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 1 THE BUILD SCENARIO

TOTAL DAILY COST (TDC) =

(DPC) + (DIC) + (DPRC) + (DSC) WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DSC = DAILY SOCIETAL COST

TOTAL DAILY BENEFITS (TDB) =

(DPB) + (DIB) + (DPRB) + DSB WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DSB = DAILY SOCIETAL BENEFIT

TOTAL DIALY COS/BENEFIT (TDC/B) =

[(DPC) + (DIC) + (DPRC) + (DSC)] - [(DPB) + (DIB) + (DPRB) + (DSB)]

COST-EFFECTIVENESS MODEL

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TOTAL COST (PUBLIC, PRIVATE, INDIVIDUAL, AND SOCIETAL)

SCENARIO # 2 THE NO BUILD SCENARIO

TOTAL DAILY COST (TDC) =

(DPC) + (DIC) + (DPRC) + (DSC) WHERE;

DPC = DAILY PUBLIC COST

DIC = DAILY INDIVIDUAL COST

DPRC = DAILY PRIVATE COST

DSC = DAILY SOCIETAL COST

TOTAL DAILY BENEFITS (TDB) =

(DPB) + (DIB) + (DPRB) + (DSB) WHERE;

DPB = DAILY PUBLIC BENEFITS

DIB = DAILY INDIVIDUAL BENEFITS

DPRB = DAILY PRIVATE BENEFITS

DSB = DAILY SOCIETAL BENEFIT

TOTAL DIALY COS/BENEFIT (TDC/B) =

[(DPC) + (DIC) + (DPRC) + (DSC)] - [(DPB) + (DIB) + (DPRB) + (DSB)]

COST-EFFECTIVENESS MODEL

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LIKELY OUTCOMES

PUBLIC SECTOR COST/BENEFIT			
		STANDARD	HIGH
1	DAILY PUBLIC CAPITAL COST	\$0	\$0
2	DAILY PUBLIC O & M COST	\$1,177	\$1,569
3	DAILY PUBLIC COST	\$1,177	\$1,569
4	DAILY PUBLIC REVENUES	\$0	\$0
5	DAILY PUBLIC COST/REVENUE	\$1,177	\$1,569
6	DAILY PUBLIC AVOIDED CAPITAL COST (SCENARIO 2)	\$28,962	\$38,617
7	DAILY PUBLIC AVOIDED O & M COST (SCENARIO 2)	\$55	\$73
8	TOTAL DAILY PUBLIC AVOIDED (SCENARIO 2)	\$29,017	\$38,691
9	NET DAILY PUBLIC BENEFIT (SCENARIO 2)	\$29,017	\$38,691
10	DAILY PUBLIC CAPITAL COST (SCENARIO 1)	\$28,962	\$38,617
11	DAILY PUBLIC O & M COST (SCENARIO 1)	\$55	\$73
12	TOTAL DAILY PUBLIC COST (SCENARIO 1)	\$29,017	\$38,691
13	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 2)	(\$27,840)	(\$37,121)
14	NET DAILY PUBLIC COST/BENEFIT (SCENARIO 1)	\$29,017	\$38,691
15	COST		
16	DAILY PUBLIC COST PER TRIP REDUCED	\$0.20	\$0.20
17	DAILY PUBLIC COST PER VMT REDUCED	\$0.02	\$0.02
18	DAILY PUBLIC COST PER TON OF CO REDUCED	\$686	\$686
19	DAILY PUBLIC COST PER TON OF ROG REDUCED	\$6,924	\$6,914
20	DAILY PUBLIC COST PER TON OF NOx REDUCED	\$12,521	\$12,456
21	DAILY PUBLIC COST PER TON OF PM REDUCED	\$588,500	\$784,700
22	BENEFIT		
23	DAILY PUBLIC BENEFIT PER TRIP REDUCED	\$4.93	\$4.93
24	DAILY PUBLIC BENEFIT PER VMT REDUCED	\$0.38	\$0.38
25	DAILY PUBLIC BENEFIT PER TON OF CO REDUCED	\$16,910	\$16,903
26	DAILY PUBLIC BENEFIT PER TON OF ROG REDUCED	\$170,687	\$170,443
27	DAILY PUBLIC BENEFIT PER TON OF NOx REDUCED	\$308,688	\$307,068
28	DAILY PUBLIC BENEFIT PER TON OF PM REDUCED	\$14,508,358	\$19,345,299
29	COST/BENEFIT		
30	NET DAILY PUBLIC COST/BENEFIT PER TRIP REDUCED	(\$4.73)	(\$4.73)
31	NET DAILY PUBLIC COST/BENEFIT PER VMT REDUCED	(\$0.36)	(\$0.36)
32	NET DAILY PUBLIC COST/BENEFIT PER TON OF CO REDUCED	(\$16,224)	(\$16,217)
33	NET DAILY PUBLIC COST/BENEFIT PER TON OF ROG REDUCED	(\$163,763)	(\$163,530)
34	NET DAILY PUBLIC COST/BENEFIT PER TON OF NOx REDUCED	(\$296,167)	(\$294,613)
35	NET DAILY PUBLIC COST/BENEFIT PER TON OF PM REDUCED	(\$13,919,858)	(\$18,560,599)
36	INDIVIDUAL COST/BENEFIT		
37	DAILY INDIVIDUAL CAPITAL COST	\$0	\$0
38	DAILY INDIVIDUAL O & M COST	\$7,731	\$10,307
39	DAILY INDIVIDUAL COST	\$7,731	\$10,307
40	DAILY INDIVIDUAL CAPITAL BENEFIT	\$0	\$0
41	DAILY INDIVIDUAL O & M BENEFIT	\$5,996	\$7,995
42	DAILY INDIVIDUAL BENEFIT	\$5,996	\$7,995
43	NET DAILY INDIVIDUAL COST/BENEFIT	\$1,734	\$2,312

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44	COST		
45	NET DAILY INDIVIDUAL COST PER TRIP REDUCED	\$1.31	\$1.31
46	NET DAILY INDIVIDUAL COST PER VMT REDUCED	\$0.10	\$0.10
47	NET DAILY INDIVIDUAL COST PER TON OF CO REDUCED	\$4,505	\$4,503
48	NET DAILY INDIVIDUAL COST PER TON OF ROG REDUCED	\$45,474	\$45,407
49	NET DAILY INDIVIDUAL COST PER TON OF NO _x REDUCED	\$82,240	\$81,805
50	NET DAILY INDIVIDUAL COST PER TON OF PM REDUCED	\$3,865,285	\$5,153,697
51	BENEFIT		
52	NET DAILY INDIVIDUAL BENEFIT PER TRIP REDUCED	\$1.02	\$1.02
53	NET DAILY INDIVIDUAL BENEFIT PER VMT REDUCED	\$0.08	\$0.08
54	NET DAILY INDIVIDUAL BENEFIT PER TON OF CO REDUCED	\$3,494	\$3,493
55	NET DAILY INDIVIDUAL BENEFIT PER TON OF ROG REDUCED	\$35,273	\$35,222
56	NET DAILY INDIVIDUAL BENEFIT PER TON OF NO _x REDUCED	\$63,792	\$63,455
57	NET DAILY INDIVIDUAL BENEFIT PER TON OF PM REDUCED	\$2,998,210	\$3,997,641
58	COST/BENEFIT		
59	NET DAILY INDIVIDUAL COST/BENEFIT PER TRIP REDUCED	\$0.29	\$0.29
60	NET DAILY INDIVIDUAL COST/BENEFIT PER VMT REDUCED	\$0.02	\$0.02
61	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF CO REDUCED	\$1,011	\$1,010
62	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF ROG REDUCED	\$10,201	\$10,186
63	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF NO _x REDUCED	\$18,448	\$18,350
64	NET DAILY INDIVIDUAL COST/BENEFIT PER TON OF PM REDUCED	\$867,076	\$1,156,056
65	PRIVATE SECTOR COST/BENEFIT		
66	DAILY PRIVATE CAPITAL COST	\$0	\$0
67	DAILY PRIVATE O & M COST	\$1,403	\$1,871
68	DAILY PRIVATE COST	\$1,403	\$1,871
69	DAILY PRIVATE CAPITAL BENEFIT	\$0	\$0
70	DAILY PRIVATE O & M BENEFIT	\$12,223	\$16,298
71	DAILY PRIVATE BENEFIT	\$12,223	\$16,298
72	NET DAILY PRIVATE COST/BENEFIT	(\$10,819)	(\$14,426)
73	COST		
74	NET DAILY PRIVATE COST PER TRIP REDUCED	\$0.24	\$0.24
75	NET DAILY PRIVATE COST PER VMT REDUCED	\$0.02	\$0.02
76	NET DAILY PRIVATE COST PER TON OF CO REDUCED	\$818	\$817
77	NET DAILY PRIVATE COST PER TON OF ROG REDUCED	\$8,255	\$8,243
78	NET DAILY PRIVATE COST PER TON OF NO _x REDUCED	\$14,929	\$14,851
79	NET DAILY PRIVATE COST PER TON OF PM REDUCED	\$701,673	\$935,604
80	BENEFIT		
81	NET DAILY PRIVATE BENEFIT PER TRIP REDUCED	\$2.08	\$2.08
82	NET DAILY PRIVATE BENEFIT PER VMT REDUCED	\$0.16	\$0.16
83	NET DAILY PRIVATE BENEFIT PER TON OF CO REDUCED	\$7,123	\$7,120
84	NET DAILY PRIVATE BENEFIT PER TON OF ROG REDUCED	\$71,898	\$71,796
85	NET DAILY PRIVATE BENEFIT PER TON OF NO _x REDUCED	\$130,029	\$129,346
86	NET DAILY PRIVATE BENEFIT PER TON OF PM REDUCED	\$6,111,346	\$8,148,808
87	COST/BENEFIT		
88	NET DAILY PRIVATE COST/BENEFIT PER TRIP REDUCED	(\$1.84)	(\$1.84)
89	NET DAILY PRIVATE COST/BENEFIT PER VMT REDUCED	(\$0.14)	(\$0.14)
90	NET DAILY PRIVATE COST/BENEFIT PER TON OF CO REDUCED	(\$6,305)	(\$6,302)
91	NET DAILY PRIVATE COST/BENEFIT PER TON OF ROG REDUCED	(\$63,643)	(\$63,552)
92	NET DAILY PRIVATE COST/BENEFIT PER TON OF NO _x REDUCED	(\$115,099)	(\$114,495)
93	NET DAILY PRIVATE COST/BENEFIT PER TON OF PM REDUCED	(\$5,409,673)	(\$7,213,204)
94	SOCIETAL COST/BENEFIT		
95	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		

COST-EFFECTIVENESS MODEL

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96	DAILY SOCIETAL AIR POLLUTION COST	\$1,148	\$1,530
97	DAILY SOCIETAL CONGESTION COST	\$0	\$0
98	DAILY SOCIETAL COST	\$1,148	\$1,530
99	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
100	DAILY SOCIETAL CONGESTION BENEFIT	\$2,299	\$3,065
101	DAILY SOCIETAL BENEFIT	\$2,299	\$3,065
102	NET DAILY SOCIETAL COST/BENEFIT	(\$1,151)	(\$1,535)
103	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
104	DAILY SOCIETAL AIR POLLUTION COST	\$1,148	\$1,530
105	DAILY SOCIETAL CONGESTION COST	\$2,299	\$3,065
106	DAILY SOCIETAL COST	\$3,447	\$4,596
107	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$0	\$0
108	DAILY SOCIETAL CONGESTION BENEFIT	\$0	\$0
109	DAILY SOCIETAL BENEFIT	\$0	\$0
110	NET DAILY SOCIETAL COST/BENEFIT	\$3,447	\$4,596
111	SCENARIO #2 THE NO BUILD SCENARIO		
112	DAILY SOCIETAL AIR POLLUTION COST	\$0	\$0
113	DAILY SOCIETAL CONGESTION COST	\$0	\$0
114	DAILY SOCIETAL COST	\$0	\$0
115	DAILY SOCIETAL AIR POLLUTION BENEFIT	\$1,148	\$1,530
116	DAILY SOCIETAL CONGESTION BENEFIT	\$2,299	\$3,065
117	DAILY SOCIETAL BENEFIT	\$3,447	\$4,596
118	NET DAILY SOCIETAL COST/BENEFIT	(\$3,447)	(\$4,596)
119	TOTAL COST/BENEFIT		
120	SCENARIO #1 THE BUILD SCENARIO (SHORT TERM)		
121	TOTAL DAILY COST	\$48,383	\$64,514
122	TOTAL DAILY BENEFIT	\$2,299	\$3,065
123	TOTAL DAILY COST/BENEFIT	\$46,084	\$61,448
124	COST		
125	NET DAILY COST PER TRIP REDUCED	\$8.22	\$8.22
126	NET DAILY COST PER VMT REDUCED	\$0.63	\$0.63
127	NET DAILY COST PER TON OF CO REDUCED	\$28,195	\$28,184
128	NET DAILY COST PER TON OF ROG REDUCED	\$284,609	\$284,201
129	NET DAILY COST PER TON OF NOx REDUCED	\$514,718	\$512,013
130	NET DAILY COST PER TON OF PM REDUCED	\$24,191,739	\$32,256,845
131	BENEFIT		
132	NET DAILY BENEFIT PER TRIP REDUCED	\$0.39	\$0.39
133	NET DAILY BENEFIT PER VMT REDUCED	\$0.03	\$0.03
134	NET DAILY BENEFIT PER TON OF CO REDUCED	\$1,340	\$1,339
135	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$13,523	\$13,504
136	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$24,457	\$24,328
137	NET DAILY BENEFIT PER TON OF PM REDUCED	\$1,149,496	\$1,532,677

COST-EFFECTIVENESS MODEL

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138	COST/BENEFIT		
139	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$7.83	\$7.83
140	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.60	\$0.60
141	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$26,856	\$26,845
142	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$271,085	\$270,698
143	NET DAILY COST/BENEFIT PER TON OF NOx REDUCED	\$490,260	\$487,685
144	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$23,042,243	\$30,724,168
145	SCENARIO #1 THE BUILD SCENARIO (LONG TERM)		
146	TOTAL DAILY COST	\$50,682	\$67,579
147	TOTAL DAILY BENEFIT	\$0	\$0
148	TOTAL DAILY COST/BENEFIT	\$50,682	\$67,579
149	COST		
150	NET DAILY COST PER TRIP REDUCED	\$8.61	\$8.61
151	NET DAILY COST PER VMT REDUCED	\$0.66	\$0.66
152	NET DAILY COST PER TON OF CO REDUCED	\$29,535	\$29,523
153	NET DAILY COST PER TON OF ROG REDUCED	\$298,132	\$297,705
154	NET DAILY COST PER TON OF NOx REDUCED	\$539,175	\$536,342
155	NET DAILY COST PER TON OF PM REDUCED	\$25,341,234	\$33,789,522
156	BENEFIT		
157	NET DAILY BENEFIT PER TRIP REDUCED	\$0.00	\$0.00
158	NET DAILY BENEFIT PER VMT REDUCED	\$0.00	\$0.00
159	NET DAILY BENEFIT PER TON OF CO REDUCED	\$0	\$0
160	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$0	\$0
161	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$0	\$0
162	NET DAILY BENEFIT PER TON OF PM REDUCED	\$0	\$0
163	COST/BENEFIT		
164	NET DAILY COST/BENEFIT PER TRIP REDUCED	\$8.61	\$8.61
165	NET DAILY COST/BENEFIT PER VMT REDUCED	\$0.66	\$0.66
166	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	\$29,535	\$29,523
167	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	\$298,132	\$297,705
168	NET DAILY COST/BENEFIT PER TON OF NOx REDUCED	\$539,175	\$536,342
169	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	\$25,341,234	\$33,789,522
170	SCENARIO #2 THE NO BUILD SCENARIO		
171	TOTAL DAILY COST	\$10,311	\$13,748
172	TOTAL DAILY BENEFIT	\$50,682	\$67,579
173	TOTAL DAILY COST/BENEFIT	(\$40,372)	(\$53,831)
174	COST		
175	NET DAILY COST PER TRIP REDUCED	\$1.75	\$1.75
176	NET DAILY COST PER VMT REDUCED	\$0.13	\$0.13
177	NET DAILY COST PER TON OF CO REDUCED	\$6,009	\$6,006
178	NET DAILY COST PER TON OF ROG REDUCED	\$60,652	\$60,564
179	NET DAILY COST PER TON OF NOx REDUCED	\$109,691	\$109,111
180	NET DAILY COST PER TON OF PM REDUCED	\$5,155,458	\$6,874,001
181	BENEFIT		
182	NET DAILY BENEFIT PER TRIP REDUCED	\$8.61	\$8.61
183	NET DAILY BENEFIT PER VMT REDUCED	\$0.66	\$0.66
184	NET DAILY BENEFIT PER TON OF CO REDUCED	\$29,535	\$29,523
185	NET DAILY BENEFIT PER TON OF ROG REDUCED	\$298,132	\$297,705
186	NET DAILY BENEFIT PER TON OF NOx REDUCED	\$539,175	\$536,342
187	NET DAILY BENEFIT PER TON OF PM REDUCED	\$25,341,234	\$33,789,522

COST-EFFECTIVENESS MODEL

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188	COST/BENEFIT		
189	NET DAILY COST/BENEFIT PER TRIP REDUCED	(\$6.86)	(\$6.86)
190	NET DAILY COST/BENEFIT PER VMT REDUCED	(\$0.53)	(\$0.53)
191	NET DAILY COST/BENEFIT PER TON OF CO REDUCED	(\$23,527)	(\$23,517)
192	NET DAILY COST/BENEFIT PER TON OF ROG REDUCED	(\$237,480)	(\$237,141)
193	NET DAILY COST/BENEFIT PER TON OF NOx REDUCED	(\$429,485)	(\$427,230)
194	NET DAILY COST/BENEFIT PER TON OF PM REDUCED	(\$20,185,776)	(\$26,915,521)

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Los Angeles County
Metropolitan Transportation

TDM Phase II program

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