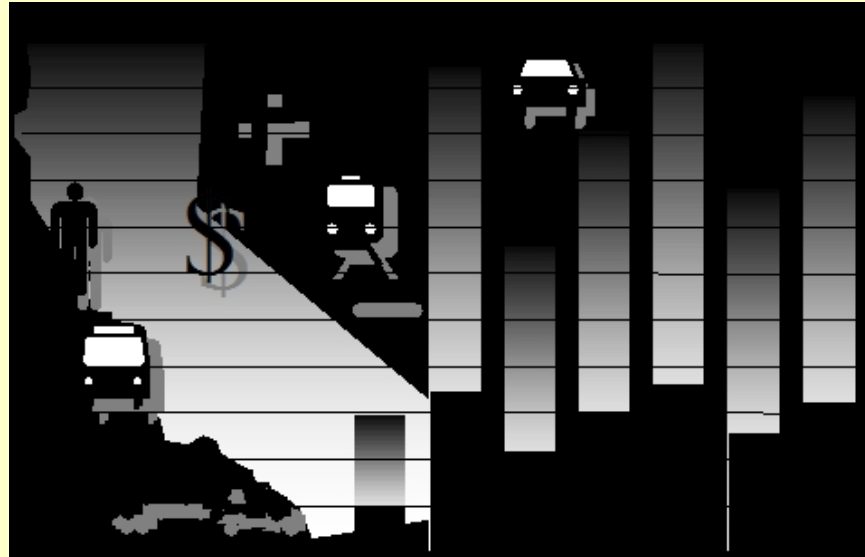




# California Life-Cycle Benefit/Cost Analysis Model (Cal-B/C) Version 4.0 Modified for TIGER Grants



Office of Transportation Economics  
Division of Transportation Planning  
February 2009

For questions and comments, please contact:

Barry Padilla

(916) 653-9248 [barry\\_padilla@dot.ca.gov](mailto:barry_padilla@dot.ca.gov)



District: **City of Anaheim**

PROJECT: **Gene Autry Way & Interstate 5 Interchange Construction Project**

EA: **23**  
PPNO:

Enter all project costs (in today's dollars) in columns 1 to 7. Costs during construction should be entered in the first eight rows. Project costs (including maintenance and operating costs) should be net of costs without project.

1A

**Type of Project** Select project type from list: **HOV Drop Ramp** (Check percent traffic in weave in section 1B)

**Project Location** (enter 1 for So. Cal., 2 for No. Cal., or 3 f): **1**

**Length of Construction Period** (One- or Two-Way Data): **2** years

**Length of Peak Period(s)** (up to 24 hrs): **4** hours

1B

**Highway Design**

|   |          |       |
|---|----------|-------|
| Highway Type (Fwy, Exp, Conv, Hwy)              | No Build | Build |
| F   | F        | F     |
| Number of General Traffic Lanes                 | 8        | 8     |
| Number of HOV/HOT Lanes                         | 2        | 2     |
| HOV Restriction (2 or 3)                        | 2        |       |
| Exclusive ROW for Buses (y/n)                   | N        |       |
| Highway Free-Flow Speed                         | 65       | 65    |
| Ramp Design Speed (if aux. lane/off-ramp proj.) | 35       | 35    |
| Length (in miles) Highway Segment               |          | 0.0   |
| Impacted Length                                 | 0.6      | 0.6   |

**Average Daily Traffic**

|                    |         |
|--------------------|---------|
| Current            | 225,000 |
| Base (Year 1)      | 227,011 |
| Forecast (Year 20) | 246,114 |

**Average Hourly HOV/HOT Lane Traffic**

|                    |       |
|--------------------|-------|
| Current            | 3,026 |
| Base (Year 1)      | 3,047 |
| Forecast (Year 20) | 3,047 |

**Percent Traffic in Weave**: **6.2%** (100%)

**Percent Trucks** (include RVs, if applicable): **10%** (10%)

**Truck Speed**: **10%** (10%)

**On-Ramp Volume**

|   |      |          |
|---|------|----------|
| Hourly Ramp Volume (if aux. lane/on-ramp proj.) | Peak | Non-Peak |
|   | 0    | 0        |

**Queue Formation** (if queuing or grade crossing)

|                                       |        |         |
|---------------------------------------|--------|---------|
| Arrival Rate (in vehicles per hour)   | Year 1 | Year 20 |
|                                       | 0      | 0       |
| Departure Rate (in vehicles per hour) | 0      | 0       |

**Pavement Condition** (if pavement project)

|                   |               |                    |
|-------------------|---------------|--------------------|
| IRI (inches/mile) | Base (Year 1) | Forecast (Year 20) |
|                   |               |                    |

**Average Vehicle Occupancy (AVO)**

|   |          |      |
|---|----------|------|
| General Traffic                           | Non-Peak | Peak |
|   | 1.30     | 1.30 |
| High Occupancy Vehicle (if HOV/HOT lanes) | 2.15     | 2.15 |

1C **PROJECT COSTS (IN TODAY'S DOLLARS)**

**Actual 3-Year Accident Data (from Table B)**

|                                      |             |                        |
|--------------------------------------|-------------|------------------------|
| Total Accidents (Tot)                | Count (No.) | DIRECT PROJECT COSTS   |
| Fatal Accidents (Fat)                | 0.009       | TOTAL COSTS (in \$/yr) |
| Injury Accidents (Inj)               | 0.31        |                        |
| Property Damage Only (PDO) Accidents | 0.65        |                        |

**Statewide Basic Average Accident Rate**

|   |          |       |
|---|----------|-------|
| Rate Group                                | No Build | Build |
| Accident Rate (per million vehicle-miles) |          |       |
| Percent Fatal Accidents (Pct Fat)         |          |       |
| Percent Injury Accidents (Pct Inj)        |          |       |

1D **RAIL AND TRANSIT DATA**

**Annual Person-Trips**

|                    |          |       |
|--------------------|----------|-------|
| Base (Year 1)      | No Build | Build |
| Forecast (Year 20) |          |       |

**Percent Trips during Peak Period**: **34%**

**Percent New Trips from Parallel Highway**: **100%**

**Annual Vehicle-Miles**

|                    |          |       |
|--------------------|----------|-------|
| Base (Year 1)      | No Build | Build |
| Forecast (Year 20) |          |       |

**Average Vehicles/Train** (if rail project):

**Reduction in Transit Accidents**

|                                       |  |
|---------------------------------------|--|
| Percent Reduction (if safety project) |  |
|---------------------------------------|--|

**Average Transit Travel Time**

|                |                       |                   |
|----------------|-----------------------|-------------------|
| In-Vehicle     | Non-Peak (in minutes) | Peak (in minutes) |
|                | 0.0                   | 0.0               |
| Out-of-Vehicle | Non-Peak (in minutes) | Peak (in minutes) |
|                | 0.0                   | 0.0               |

**Highway Grade Crossing**

|                               |                    |                                    |         |
|-------------------------------|--------------------|------------------------------------|---------|
| Annual Number of Trains       | Current            | Year 1                             | Year 20 |
| Avg. Gate Down Time (in min.) | Present Value (\$) | Future Value (in Constant Dollars) |         |
|                               | 0.0                |                                    |         |

**Transit Agency Costs** (if TMS project)

|   |          |       |
|---|----------|-------|
| Annual Capital Expenditure              | No Build | Build |
| Annual Ops. and Maintenance Expenditure | \$0      | \$0   |

**Transit Agency Costs** (if TMS project)

|   |          |       |
|---|----------|-------|
| Annual Capital Expenditure              | No Build | Build |
| Annual Ops. and Maintenance Expenditure | \$0      | \$0   |

Model should be run for both roads for intersection or bypass highway projects, and may be run twice for connectors. Press button below to prepare model to enter data for second road. After data are entered, results reflect total project benefits.

| Year                | Project Support | R / W | Construction | Maint/ Op. | Rehab. | Mitigation | Transit Agency Cost Savings | Constant Dollars |               | Present Value    |               |
|---------------------|-----------------|-------|--------------|------------|--------|------------|-----------------------------|------------------|---------------|------------------|---------------|
|                     |                 |       |              |            |        |            |                             | Constant Dollars | Present Value | Constant Dollars | Present Value |
| Construction Period |                 |       |              |            |        |            |                             |                  |               |                  |               |
| 1                   |                 |       | \$37,500     |            |        |            |                             | \$37,500,000     | \$37,500,000  |                  |               |
| 2                   |                 |       | \$7,500      |            |        |            |                             | \$7,500,000      | \$7,500,000   |                  |               |
| 3                   |                 |       |              |            |        |            |                             | 0                | 0             |                  |               |
| 4                   |                 |       |              |            |        |            |                             | 0                | 0             |                  |               |
| 5                   |                 |       |              |            |        |            |                             | 0                | 0             |                  |               |
| 6                   |                 |       |              |            |        |            |                             | 0                | 0             |                  |               |
| 7                   |                 |       |              |            |        |            |                             | 0                | 0             |                  |               |
| 8                   |                 |       |              |            |        |            |                             | 0                | 0             |                  |               |
| Project Open        |                 |       |              |            |        |            |                             |                  |               |                  |               |
| 9                   |                 |       |              |            |        |            |                             | 0                | 0             |                  |               |
| 10                  |                 |       |              |            |        |            |                             | 0                | 0             |                  |               |
| 11                  |                 |       |              |            |        |            |                             | 0                | 0             |                  |               |
| 12                  |                 |       |              |            |        |            |                             | 0                | 0             |                  |               |
| 13                  |                 |       |              |            |        |            |                             | 0                | 0             |                  |               |
| 14                  |                 |       |              |            |        |            |                             | 0                | 0             |                  |               |
| 15                  |                 |       |              |            |        |            |                             | 0                | 0             |                  |               |
| 16                  |                 |       |              |            |        |            |                             | 0                | 0             |                  |               |
| 17                  |                 |       |              |            |        |            |                             | 0                | 0             |                  |               |
| 18                  |                 |       |              |            |        |            |                             | 0                | 0             |                  |               |
| 19                  |                 |       |              |            |        |            |                             | 0                | 0             |                  |               |
| 20                  |                 |       |              |            |        |            |                             | 0                | 0             |                  |               |
| Total               |                 | \$0   | \$0          | \$75,000   | \$0    | \$0        | \$0                         | \$75,000,000     | \$75,000,000  | \$72,546,729     | \$72,546,729  |

(1 + Real Discount Rate) ^ Year

2A

|                        | Calculated by Model | Changed by User | Used for Proj. Eval. | Reason for Change |
|------------------------|---------------------|-----------------|----------------------|-------------------|
| <b>No Build</b>        |                     |                 |                      |                   |
| <b>Year 1</b>          |                     |                 |                      |                   |
| <i>Peak Period</i>     |                     |                 |                      |                   |
| HOV Volume             | 11,349              | 9,520           | 9,520                |                   |
| Non-HOV Volume         | 57,267              | 59,393          | 59,393               |                   |
| Weaving Volume         | 759                 | 1,154           | 1,154                |                   |
| Truck Volume           | 7,741               | 7,741           | 7,741                |                   |
| HOV Speed              | 51.8                | 51.8            | 51.8                 |                   |
| Non-HOV Speed          | 22.1                | 22.1            | 22.1                 |                   |
| Weaving Speed          | 22.1                | 22.1            | 22.1                 |                   |
| Truck Speed            | 22.1                | 22.1            | 22.1                 |                   |
| <i>Non-Peak Period</i> |                     |                 |                      |                   |
| Non-HOV Volume         | 134,650             | 134,650         | 134,650              |                   |
| Weaving Volume         | 0                   | 0               | 0                    |                   |
| Truck Volume           | 14,980              | 14,980          | 14,980               |                   |
| Non-HOV Speed          | 20.1                | 20.1            | 20.1                 |                   |
| Weaving Speed          | 20.1                | 20.1            | 20.1                 |                   |
| Truck Speed            | 20.1                | 20.1            | 20.1                 |                   |
| <b>Year 20</b>         |                     |                 |                      |                   |
| <i>Peak Period</i>     |                     |                 |                      |                   |
| HOV Volume             | 11,349              | 9,520           | 9,520                |                   |
| Non-HOV Volume         | 63,430              | 65,256          | 65,256               |                   |
| Weaving Volume         | 759                 | 2,480           | 2,480                |                   |
| Truck Volume           | 8,392               | 8,392           | 8,392                |                   |
| HOV Speed              | 51.8                | 51.8            | 51.8                 |                   |
| Non-HOV Speed          | 13.8                | 13.8            | 13.8                 |                   |
| Weaving Speed          | 13.8                | 13.8            | 13.8                 |                   |
| Truck Speed            | 13.8                | 13.8            | 13.8                 |                   |
| <i>Non-Peak Period</i> |                     |                 |                      |                   |
| Non-HOV Volume         | 145,970             | 145,970         | 145,970              |                   |
| Weaving Volume         | 0                   | 0               | 0                    |                   |
| Truck Volume           | 16,219              | 16,219          | 16,219               |                   |
| Non-HOV Speed          | 20.1                | 20.1            | 20.1                 |                   |
| Weaving Speed          | 20.1                | 20.1            | 20.1                 |                   |
| Truck Speed            | 20.1                | 20.1            | 20.1                 |                   |
| <b>Build</b>           |                     |                 |                      |                   |
| <b>Year 1</b>          |                     |                 |                      |                   |
| <i>Peak Period</i>     |                     |                 |                      |                   |
| HOV Volume             | 11,404              | 11,404          | 11,404               |                   |
| Non-HOV Volume         | 57,493              | 57,493          | 57,493               |                   |
| Weaving Volume         | 791                 | 791             | 791                  |                   |
| Truck Volume           | 7,741               | 7,741           | 7,741                |                   |
| HOV Speed              | 53.2                | 53.2            | 53.2                 |                   |
| Non-HOV Speed          | 51.1                | 51.1            | 51.1                 |                   |
| Weaving Speed          | 51.1                | 51.1            | 51.1                 |                   |
| Truck Speed            | 51.1                | 51.1            | 51.1                 |                   |
| <i>Non-Peak Period</i> |                     |                 |                      |                   |
| Non-HOV Volume         | 134,650             | 134,650         | 134,650              |                   |
| Weaving Volume         | 0                   | 0               | 0                    |                   |
| Truck Volume           | 14,980              | 14,980          | 14,980               |                   |
| Non-HOV Speed          | 20.1                | 20.1            | 20.1                 |                   |
| Weaving Speed          | 20.1                | 20.1            | 20.1                 |                   |
| Truck Speed            | 20.1                | 20.1            | 20.1                 |                   |
| <b>Year 20</b>         |                     |                 |                      |                   |
| <i>Peak Period</i>     |                     |                 |                      |                   |
| HOV Volume             | 11,428              | 11,428          | 11,428               |                   |
| Non-HOV Volume         | 63,365              | 63,365          | 63,365               |                   |
| Weaving Volume         | 791                 | 791             | 791                  |                   |
| Truck Volume           | 8,392               | 8,392           | 8,392                |                   |
| HOV Speed              | 53.2                | 53.2            | 53.2                 |                   |
| Non-HOV Speed          | 20.1                | 20.1            | 20.1                 |                   |
| Weaving Speed          | 20.1                | 20.1            | 20.1                 |                   |
| Truck Speed            | 20.1                | 20.1            | 20.1                 |                   |
| <i>Non-Peak Period</i> |                     |                 |                      |                   |
| Non-HOV Volume         | 145,970             | 145,970         | 145,970              |                   |
| Weaving Volume         | 0                   | 0               | 0                    |                   |
| Truck Volume           | 16,219              | 16,219          | 16,219               |                   |
| Non-HOV Speed          | 20.1                | 20.1            | 20.1                 |                   |
| Weaving Speed          | 20.1                | 20.1            | 20.1                 |                   |
| Truck Speed            | 20.1                | 20.1            | 20.1                 |                   |

Model speed estimates based on Highway Capacity Manual, pavement research, and research on weaving impacts

2B HIGHWAY AND RAMP INPUTS  
(for HOV and HOT lane projects that affect average vehicle occupancy)

|  | Calculated by Model | Changed by User | Used for Proj. Eval. | Reason for Change |
|--|---------------------|-----------------|----------------------|-------------------|
| <b>No Build</b>  |                     |                 |                      |                   |
| Fatal Accidents  | 0.000               |                 | 0.000                |                   |
| Injury Accidents   | 0.31                |                 | 0.31                 |                   |
| PDO Accidents  | 0.65                |                 | 0.65                 |                   |
| Total Accidents  | 0.960               |                 | 0.960                |                   |
| <b>Hwy Safety or Weaving Improvement</b>   |                     |                 |                      |                   |
| Adjustment Factor (Actual/Statewide Avg. Existing) = 0.75 - collision reduction factor (per HSIP Guidelines) |                     |                 |                      |                   |
| Fatal Accidents  | 1.000               |                 | 1.000                |                   |
| Injury Accidents   | 1.000               |                 | 1.000                |                   |
| PDO Accidents  | 1.000               |                 | 1.000                |                   |
| <b>Build</b>   |                     |                 |                      |                   |
| Fatal Accidents  | 0.000               |                 | 0.000                |                   |
| Injury Accidents   | 0.31                |                 | 0.31                 |                   |
| PDO Accidents  | 0.65                |                 | 0.65                 |                   |
| Total Accidents  | 0.960               |                 | 0.960                |                   |

2D

|                        | No Build           | Build              |
|------------------------|--------------------|--------------------|
| <b>Year 1</b>          |                    |                    |
| <i>Peak Period</i>     |                    |                    |
| HOV Trips              | 9,497,300          | 9,497,348          |
| Non-HOV Trips          | 61,163,874         | 61,128,319         |
| Truck Trips            | 2,825,491          | 2,825,491          |
| <i>Non-Peak Period</i> |                    |                    |
| Non-HOV Trips          | 63,886,748         | 63,886,748         |
| Truck Trips            | 8,480,459          | 8,480,459          |
| <b>Total Trips</b>     | <b>105,833,822</b> | <b>105,864,725</b> |
| <b>Year 20</b>         |                    |                    |
| <i>Peak Period</i>     |                    |                    |
| HOV Trips              | 9,497,300          | 9,497,348          |
| Non-HOV Trips          | 26,824,795         | 26,589,225         |
| Truck Trips            | 1,053,321          | 1,053,321          |
| <i>Non-Peak Period</i> |                    |                    |
| Non-HOV Trips          | 69,262,856         | 69,262,856         |
| Truck Trips            | 9,919,900          | 9,919,900          |
| <b>Total Trips</b>     | <b>114,368,026</b> | <b>114,399,022</b> |

2C RAMP AND ARTERIAL INPUTS  
(if detailed information is available for a TMS or an arterial signal management project)

Detailed Information Available? (y/n)

Aggregate Segment Length (estimate as VMT/total volume)

All Ramps  miles

Arterials  miles

|                                    | Entered by User | Used for Proj. Eval. | Source/Notes |
|------------------------------------|-----------------|----------------------|--------------|
| <b>No Build (Peak Period Only)</b> |                 |                      |              |
| Year 1                             |                 |                      |              |
| Aggregate Ramp Volume              |                 | 0                    |              |
| Aggregate Arterial Volume          |                 | 0                    |              |
| Average Ramp Speed                 |                 | 5.0                  |              |
| Average Arterial Speed             |                 | 5.0                  |              |
| Year 20                            |                 |                      |              |
| Aggregate Ramp Volume              |                 | 0                    |              |
| Aggregate Arterial Volume          |                 | 0                    |              |
| Average Ramp Speed                 |                 | 5.0                  |              |
| Average Arterial Speed             |                 | 5.0                  |              |
| <b>Build (Peak Period Only)</b>    |                 |                      |              |
| Year 1                             |                 |                      |              |
| Aggregate Ramp Volume              |                 | 0                    |              |
| Aggregate Arterial Volume          |                 | 0                    |              |
| Average Ramp Speed                 |                 | 5.0                  |              |
| Average Arterial Speed             |                 | 5.0                  |              |
| Year 20                            |                 |                      |              |
| Aggregate Ramp Volume              |                 | 0                    |              |
| Aggregate Arterial Volume          |                 | 0                    |              |
| Average Ramp Speed                 |                 | 5.0                  |              |
| Average Arterial Speed             |                 | 5.0                  |              |

District: **City of Anaheim**

PROJECT: **Gene Autry Way & Interstate 5 Interchange Construction Project**

EA:   
PPNO:

3

### INVESTMENT ANALYSIS SUMMARY RESULTS

|                                      |                                      |
|--------------------------------------|--------------------------------------|
| Life-Cycle Costs (mil. \$)           | <input type="text" value="\$72.5"/>  |
| Life-Cycle Benefits (mil. \$)        | <input type="text" value="\$211.7"/> |
| Net Present Value (mil. \$)          | <input type="text" value="\$139.1"/> |
| <b>Benefit / Cost Ratio:</b>         | <input type="text" value="2.9"/>     |
| <b>Rate of Return on Investment:</b> | <input type="text" value="23.3%"/>   |
| <b>Payback Period:</b>               | <input type="text" value="4 years"/> |

| ITEMIZED BENEFITS (mil. \$)        | Average Annual                         | Total Over 20 Years                     |
|------------------------------------|--|---|
| Travel Time Savings                | <input type="text" value="\$8.3"/>     | <input type="text" value="\$166.8"/>    |
| Veh. Op. Cost Savings              | <input type="text" value="\$1.8"/>     | <input type="text" value="\$36.7"/>     |
| Accident Cost Savings              | <input type="text" value="\$0.2"/>     | <input type="text" value="\$3.2"/>      |
| Emission Cost Savings              | <input type="text" value="\$0.3"/>     | <input type="text" value="\$5.1"/>      |
| <b>TOTAL BENEFITS</b>              | <input type="text" value="\$10.6"/>    | <input type="text" value="\$211.7"/>    |
| Person-Hours of Time Saved         | <input type="text" value="1,474,080"/> | <input type="text" value="29,481,609"/> |
| Additional CO2 Emissions (tons)    | <input type="text" value="-8,544"/>    | <input type="text" value="-170,878"/>   |
| Additional CO2 Emissions (mil. \$) | <input type="text" value="-0.2"/>      | <input type="text" value="-0.2"/>       |

**Should benefit-cost results include:**

1) Induced Travel? (y/n)   
Default = Y

2) Vehicle Operating Costs? (y/n)   
Default = Y

3) Accident Costs? (y/n)   
Default = Y

4) Vehicle Emissions? (y/n)

includes value for CO2e Default = Y

C

**SUMMARY OF TRAVEL TIME BENEFITS (Continued)**

| Year         | Peak HOV             | Peak Non-HOV        | Peak Weaving       | Peak Truck          | Peak Ramp  | Peak Arterial | Non-Peak Non-HOV    | FRIDAY Per-Hrs Non-Peak Weaving | Non-Peak Truck      | Peak In-Vehicle | Peak Out-of-Veh | Non-Peak In-Vehicle | Non-Peak Out-of-Veh | Present Value of Travel Time Benefits | Constant Dollars     | of Time Saved     |
|--------------|----------------------|---------------------|--------------------|---------------------|------------|---------------|---------------------|---------------------------------|---------------------|-----------------|-----------------|---------------------|---------------------|---------------------------------------|----------------------|-------------------|
| 1            | (\$129,447)          | \$3,730,887         | \$92,396           | \$706,056           | \$0        | \$0           | \$6,694,476         | \$0                             | \$924,680           | \$0             | \$0             | \$0                 | \$0                 | \$12,019,047                          | \$13,760,607         | 1,166,281         |
| 20           | (\$35,793)           | \$2,029,038         | \$45,599           | \$377,771           | \$0        | \$0           | \$2,006,848         | \$0                             | \$277,197           | \$0             | \$0             | \$0                 | \$0                 | \$4,700,659                           | \$19,463,373         | 1,646,699         |
| 2            | (\$120,978)          | \$3,592,867         | \$88,502           | \$679,301           | \$0        | \$0           | \$6,284,229         | \$0                             | \$868,014           | \$0             | \$0             | \$0                 | \$0                 | \$11,391,936                          | \$13,955,611         | 1,182,722         |
| 3            | (\$113,064)          | \$3,461,600         | \$84,816           | \$653,877           | \$0        | \$0           | \$5,899,009         | \$0                             | \$814,805           | \$0             | \$0             | \$0                 | \$0                 | \$10,801,043                          | \$14,157,964         | 1,199,782         |
| 4            | (\$105,667)          | \$3,336,783         | \$81,326           | \$629,723           | \$0        | \$0           | \$5,537,295         | \$0                             | \$764,843           | \$0             | \$0             | \$0                 | \$0                 | \$10,244,304                          | \$14,368,166         | 1,217,501         |
| 5            | (\$98,754)           | \$3,218,133         | \$78,022           | \$606,780           | \$0        | \$0           | \$5,197,662         | \$0                             | \$717,931           | \$0             | \$0             | \$0                 | \$0                 | \$9,719,774                           | \$14,586,760         | 1,235,926         |
| 6            | (\$92,294)           | \$3,105,379         | \$74,895           | \$584,994           | \$0        | \$0           | \$4,878,768         | \$0                             | \$673,884           | \$0             | \$0             | \$0                 | \$0                 | \$9,225,626                           | \$14,814,339         | 1,255,107         |
| 7            | (\$86,256)           | \$2,998,268         | \$71,935           | \$564,314           | \$0        | \$0           | \$4,579,353         | \$0                             | \$632,527           | \$0             | \$0             | \$0                 | \$0                 | \$8,760,141                           | \$15,051,553         | 1,275,099         |
| 8            | (\$80,613)           | \$2,896,560         | \$69,136           | \$544,690           | \$0        | \$0           | \$4,298,234         | \$0                             | \$593,697           | \$0             | \$0             | \$0                 | \$0                 | \$8,321,703                           | \$15,299,112         | 1,295,960         |
| 9            | (\$75,339)           | \$2,800,030         | \$66,488           | \$526,078           | \$0        | \$0           | \$4,034,297         | \$0                             | \$557,240           | \$0             | \$0             | \$0                 | \$0                 | \$7,908,794                           | \$15,557,795         | 1,317,758         |
| 10           | (\$70,411)           | \$2,708,468         | \$63,984           | \$508,435           | \$0        | \$0           | \$3,786,499         | \$0                             | \$523,013           | \$0             | \$0             | \$0                 | \$0                 | \$7,519,988                           | \$15,828,462         | 1,340,563         |
| 11           | (\$65,804)           | \$2,621,675         | \$61,618           | \$491,721           | \$0        | \$0           | \$3,553,856         | \$0                             | \$490,879           | \$0             | \$0             | \$0                 | \$0                 | \$7,153,945                           | \$16,112,056         | 1,364,456         |
| 12           | (\$61,499)           | \$2,539,468         | \$59,384           | \$475,897           | \$0        | \$0           | \$3,335,447         | \$0                             | \$460,711           | \$0             | \$0             | \$0                 | \$0                 | \$6,809,409                           | \$16,409,620         | 1,389,524         |
| 13           | (\$57,476)           | \$2,461,676         | \$57,274           | \$460,931           | \$0        | \$0           | \$3,130,405         | \$0                             | \$432,390           | \$0             | \$0             | \$0                 | \$0                 | \$6,485,201                           | \$16,722,311         | 1,415,864         |
| 14           | (\$53,716)           | \$2,388,140         | \$55,284           | \$446,789           | \$0        | \$0           | \$2,937,916         | \$0                             | \$405,802           | \$0             | \$0             | \$0                 | \$0                 | \$6,180,215                           | \$17,051,409         | 1,443,585         |
| 15           | (\$50,202)           | \$2,318,713         | \$53,409           | \$433,442           | \$0        | \$0           | \$2,757,215         | \$0                             | \$380,842           | \$0             | \$0             | \$0                 | \$0                 | \$5,893,420                           | \$17,398,341         | 1,472,805         |
| 16           | (\$46,918)           | \$2,253,264         | \$51,644           | \$420,863           | \$0        | \$0           | \$2,587,583         | \$0                             | \$357,412           | \$0             | \$0             | \$0                 | \$0                 | \$5,623,848                           | \$17,764,696         | 1,503,660         |
| 17           | (\$43,848)           | \$2,191,672         | \$49,984           | \$409,027           | \$0        | \$0           | \$2,428,345         | \$0                             | \$335,417           | \$0             | \$0             | \$0                 | \$0                 | \$5,370,597                           | \$18,152,252         | 1,536,298         |
| 18           | (\$40,980)           | \$2,133,830         | \$48,425           | \$397,912           | \$0        | \$0           | \$2,278,868         | \$0                             | \$314,770           | \$0             | \$0             | \$0                 | \$0                 | \$5,132,826                           | \$18,563,006         | 1,570,887         |
| 19           | (\$38,299)           | \$2,079,645         | \$46,965           | \$387,499           | \$0        | \$0           | \$2,138,555         | \$0                             | \$295,390           | \$0             | \$0             | \$0                 | \$0                 | \$4,909,755                           | \$18,999,201         | 1,607,616         |
| <b>Total</b> | <b>(\$1,467,357)</b> | <b>\$54,866,095</b> | <b>\$1,301,086</b> | <b>\$10,306,101</b> | <b>\$0</b> | <b>\$0</b>    | <b>\$78,344,861</b> | <b>\$0</b>                      | <b>\$10,821,444</b> | <b>\$0</b>      | <b>\$0</b>      | <b>\$0</b>          | <b>\$0</b>          | <b>\$154,172,229</b>                  | <b>\$324,016,633</b> | <b>27,438,093</b> |



C

**SUMMARY OF VEHICLE OPERATING COST BENEFITS**

| Year         | Peak HOV             | Peak Non-HOV        | Peak Weaving       | Peak Truck         | Peak Arterial | FIREARMS         |                  |                    | Peak Period | Non-Peak Period | Present Value of Veh Op Cost Benefits | Constant Dollars    |
|--------------|----------------------|---------------------|--------------------|--------------------|---------------|------------------|------------------|--------------------|-------------|-----------------|---------------------------------------|---------------------|
|              |                      |                     |                    |                    |               | Non-Peak Non-HOV | Non-Peak Weaving | Non-Peak Truck     |             |                 |                                       |                     |
| 1            | (\$143,994)          | \$1,158,044         | \$54,881           | \$220,225          | \$0           | \$18,283         | \$0              | \$138,141          | -           | -               | \$1,445,579                           | \$1,655,044         |
| 20           | (\$39,816)           | \$711,825           | \$83,613           | \$155,198          | \$0           | \$5,481          | \$0              | \$41,411           | -           | -               | \$957,712                             | \$3,965,467         |
| 2            | (\$134,574)          | \$1,185,197         | \$62,393           | \$225,971          | \$0           | \$17,163         | \$0              | \$129,675          | -           | -               | \$1,485,825                           | \$1,820,199         |
| 3            | (\$125,770)          | \$1,112,601         | \$66,978           | \$210,267          | \$0           | \$16,111         | \$0              | \$121,726          | -           | -               | \$1,401,913                           | \$1,837,622         |
| 4            | (\$117,542)          | \$1,121,324         | \$72,514           | \$213,894          | \$0           | \$15,123         | \$0              | \$114,262          | -           | -               | \$1,419,575                           | \$1,991,028         |
| 5            | (\$109,852)          | \$1,049,608         | \$75,409           | \$199,142          | \$0           | \$14,195         | \$0              | \$107,254          | -           | -               | \$1,335,756                           | \$2,004,610         |
| 6            | (\$102,666)          | \$1,088,550         | \$80,377           | \$213,737          | \$0           | \$13,324         | \$0              | \$100,674          | -           | -               | \$1,393,996                           | \$2,238,453         |
| 7            | (\$95,949)           | \$1,021,902         | \$81,969           | \$200,620          | \$0           | \$12,507         | \$0              | \$94,495           | -           | -               | \$1,315,543                           | \$2,260,347         |
| 8            | (\$89,672)           | \$959,315           | \$83,008           | \$186,954          | \$0           | \$11,739         | \$0              | \$88,694           | -           | -               | \$1,240,038                           | \$2,279,759         |
| 9            | (\$83,806)           | \$983,659           | \$86,088           | \$197,329          | \$0           | \$11,018         | \$0              | \$83,248           | -           | -               | \$1,277,536                           | \$2,513,107         |
| 10           | (\$78,323)           | \$923,421           | \$86,162           | \$185,209          | \$0           | \$10,341         | \$0              | \$78,135           | -           | -               | \$1,204,945                           | \$2,536,230         |
| 11           | (\$73,199)           | \$936,061           | \$88,270           | \$192,524          | \$0           | \$9,706          | \$0              | \$73,334           | -           | -               | \$1,226,696                           | \$2,762,754         |
| 12           | (\$68,411)           | \$874,808           | \$87,533           | \$178,597          | \$0           | \$9,109          | \$0              | \$68,827           | -           | -               | \$1,150,463                           | \$2,772,438         |
| 13           | (\$63,935)           | \$885,888           | \$88,860           | \$185,805          | \$0           | \$8,549          | \$0              | \$64,596           | -           | -               | \$1,169,764                           | \$3,016,276         |
| 14           | (\$59,752)           | \$826,430           | \$87,512           | \$172,535          | \$0           | \$8,024          | \$0              | \$60,624           | -           | -               | \$1,095,372                           | \$3,022,166         |
| 15           | (\$55,843)           | \$770,911           | \$85,960           | \$160,407          | \$0           | \$7,530          | \$0              | \$56,895           | -           | -               | \$1,025,861                           | \$3,028,509         |
| 16           | (\$52,190)           | \$774,217           | \$86,404           | \$163,947          | \$0           | \$7,067          | \$0              | \$53,395           | -           | -               | \$1,032,840                           | \$3,262,551         |
| 17           | (\$48,776)           | \$726,768           | \$84,522           | \$153,858          | \$0           | \$6,632          | \$0              | \$50,109           | -           | -               | \$973,113                             | \$3,289,057         |
| 18           | (\$45,585)           | \$743,634           | \$85,360           | \$160,311          | \$0           | \$6,224          | \$0              | \$47,025           | -           | -               | \$996,968                             | \$3,605,564         |
| 19           | (\$42,603)           | \$690,456           | \$83,071           | \$148,425          | \$0           | \$5,841          | \$0              | \$44,129           | -           | -               | \$929,319                             | \$3,596,170         |
| <b>Total</b> | <b>(\$1,632,258)</b> | <b>\$18,544,619</b> | <b>\$1,610,884</b> | <b>\$3,724,953</b> | <b>\$0</b>    | <b>\$213,968</b> | <b>\$0</b>       | <b>\$1,616,649</b> | <b>-</b>    | <b>-</b>        | <b>\$24,078,815</b>                   | <b>\$53,457,352</b> |

C

### SUMMARY OF ACCIDENT REDUCTION BENEFITS

| Year         | Peak HOV           | Peak Non-HOV     | Peak Weaving     | Peak Truck | Peak Arterial | Non-Peak Non-HOV | Non-Peak Weaving | Non-Peak Truck | All Periods | Present Value of Accident Benefits | Constant Dollars |
|--------------|--------------------|------------------|------------------|------------|---------------|------------------|------------------|----------------|-------------|------------------------------------|------------------|
| 1            | (\$65,109)         | \$65,290         | \$13,413         | \$0        | \$0           | \$0              | \$0              | \$0            | \$0         | \$13,594                           | \$15,563         |
| 20           | (\$18,003)         | \$18,053         | \$20,016         | \$0        | \$0           | \$0              | \$0              | \$0            | \$0         | \$20,066                           | \$83,083         |
| 2            | (\$60,850)         | \$61,019         | \$15,436         | \$0        | \$0           | \$0              | \$0              | \$0            | \$0         | \$15,605                           | \$19,117         |
| 3            | (\$56,869)         | \$57,027         | \$17,138         | \$0        | \$0           | \$0              | \$0              | \$0            | \$0         | \$17,295                           | \$22,671         |
| 4            | (\$53,148)         | \$53,296         | \$18,550         | \$0        | \$0           | \$0              | \$0              | \$0            | \$0         | \$18,698                           | \$26,224         |
| 5            | (\$49,671)         | \$49,809         | \$19,704         | \$0        | \$0           | \$0              | \$0              | \$0            | \$0         | \$19,842                           | \$29,778         |
| 6            | (\$46,422)         | \$46,551         | \$20,628         | \$0        | \$0           | \$0              | \$0              | \$0            | \$0         | \$20,757                           | \$33,332         |
| 7            | (\$43,385)         | \$43,505         | \$21,347         | \$0        | \$0           | \$0              | \$0              | \$0            | \$0         | \$21,468                           | \$36,885         |
| 8            | (\$40,547)         | \$40,659         | \$21,884         | \$0        | \$0           | \$0              | \$0              | \$0            | \$0         | \$21,996                           | \$40,439         |
| 9            | (\$37,894)         | \$37,999         | \$22,258         | \$0        | \$0           | \$0              | \$0              | \$0            | \$0         | \$22,364                           | \$43,993         |
| 10           | (\$35,415)         | \$35,513         | \$22,491         | \$0        | \$0           | \$0              | \$0              | \$0            | \$0         | \$22,589                           | \$47,546         |
| 11           | (\$33,098)         | \$33,190         | \$22,597         | \$0        | \$0           | \$0              | \$0              | \$0            | \$0         | \$22,689                           | \$51,100         |
| 12           | (\$30,933)         | \$31,019         | \$22,593         | \$0        | \$0           | \$0              | \$0              | \$0            | \$0         | \$22,679                           | \$54,654         |
| 13           | (\$28,909)         | \$28,989         | \$22,493         | \$0        | \$0           | \$0              | \$0              | \$0            | \$0         | \$22,574                           | \$58,207         |
| 14           | (\$27,018)         | \$27,093         | \$22,310         | \$0        | \$0           | \$0              | \$0              | \$0            | \$0         | \$22,385                           | \$61,761         |
| 15           | (\$25,250)         | \$25,321         | \$22,054         | \$0        | \$0           | \$0              | \$0              | \$0            | \$0         | \$22,124                           | \$65,314         |
| 16           | (\$23,599)         | \$23,664         | \$21,736         | \$0        | \$0           | \$0              | \$0              | \$0            | \$0         | \$21,802                           | \$68,868         |
| 17           | (\$22,055)         | \$22,116         | \$21,366         | \$0        | \$0           | \$0              | \$0              | \$0            | \$0         | \$21,427                           | \$72,422         |
| 18           | (\$20,612)         | \$20,669         | \$20,951         | \$0        | \$0           | \$0              | \$0              | \$0            | \$0         | \$21,008                           | \$75,975         |
| 19           | (\$19,263)         | \$19,317         | \$20,498         | \$0        | \$0           | \$0              | \$0              | \$0            | \$0         | \$20,552                           | \$79,529         |
| <b>Total</b> | <b>(\$738,050)</b> | <b>\$740,099</b> | <b>\$409,464</b> | <b>\$0</b> | <b>\$0</b>    | <b>\$0</b>       | <b>\$0</b>       | <b>\$0</b>     | <b>\$0</b>  | <b>\$411,513</b>                   | <b>\$986,461</b> |

C

**SUMMARY OF EMISSIONS REDUCTION BENEFITS (Continued)**

| Year         | Peak HOV           | Peak Non-HOV       | Peak Weaving     | Peak Truck         | Peak Ramp  | Peak Arterial | ADDITIONAL CO2 EMISSIONS |                  |                   | Peak Bus   | Non-Peak Bus | Passenger Rail | Light Rail         | Present Value of Emission Benefits | Constant Dollars | tons/yr              | PV \$/yr    |
|--------------|--------------------|--------------------|------------------|--------------------|------------|---------------|--------------------------|------------------|-------------------|------------|--------------|----------------|--------------------|------------------------------------|------------------|----------------------|-------------|
|              |                    |                    |                  |                    |            |               | Non-Peak Non-HOV         | Non-Peak Weaving | Non-Peak Truck    |            |              |                |                    |                                    |                  |                      |             |
| 1            | (\$10,457)         | \$152,376          | \$5,591          | \$113,348          | \$0        | \$0           | \$0                      | \$16,115         | \$0               | (\$12,203) | \$0          | \$0            | \$0                | \$264,770                          | \$303,135        | (4,689)              | (\$146,007) |
| 20           | (\$2,817)          | \$137,447          | \$10,793         | \$35,702           | \$0        | \$0           | \$6,617                  | \$0              | \$2,816           | \$0        | \$0          | \$0            | \$190,557          | \$789,014                          | (11,011)         | (\$148,775)          |             |
| 2            | (\$9,868)          | \$159,248          | \$6,416          | \$119,540          | \$0        | \$0           | \$15,184                 | \$0              | (\$11,113)        | \$0        | \$0          | \$0            | \$279,406          | \$342,285                          | (5,143)          | (\$153,261)          |             |
| 3            | (\$9,314)          | \$151,898          | \$6,893          | \$112,899          | \$0        | \$0           | \$14,307                 | \$0              | (\$10,103)        | \$0        | \$0          | \$0            | \$266,580          | \$349,433                          | (5,176)          | (\$147,615)          |             |
| 4            | (\$8,792)          | \$156,703          | \$7,581          | \$116,194          | \$0        | \$0           | \$13,482                 | \$0              | (\$9,168)         | \$0        | \$0          | \$0            | \$276,001          | \$387,105                          | (5,601)          | (\$152,870)          |             |
| 5            | (\$8,300)          | \$149,526          | \$7,932          | \$109,724          | \$0        | \$0           | \$12,706                 | \$0              | (\$8,302)         | \$0        | \$0          | \$0            | \$263,287          | \$395,122                          | (5,636)          | (\$147,220)          |             |
| 6            | (\$7,837)          | \$158,814          | \$8,651          | \$124,970          | \$0        | \$0           | \$11,974                 | \$0              | (\$7,501)         | \$0        | \$0          | \$0            | \$289,072          | \$464,187                          | (6,280)          | (\$156,978)          |             |
| 7            | (\$7,400)          | \$151,714          | \$8,898          | \$117,877          | \$0        | \$0           | \$11,286                 | \$0              | (\$6,760)         | \$0        | \$0          | \$0            | \$275,615          | \$473,558                          | (6,326)          | (\$151,341)          |             |
| 8            | (\$5,354)          | \$142,943          | \$8,163          | \$33,230           | \$0        | \$0           | \$13,778                 | \$0              | \$1,889           | \$0        | \$0          | \$0            | \$194,647          | \$357,850                          | (6,384)          | (\$146,153)          |             |
| 9            | (\$5,072)          | \$150,596          | \$8,729          | \$36,197           | \$0        | \$0           | \$12,959                 | \$0              | \$2,056           | \$0        | \$0          | \$0            | \$205,465          | \$404,180                          | (7,045)          | (\$154,349)          |             |
| 10           | (\$4,804)          | \$143,916          | \$8,832          | \$34,576           | \$0        | \$0           | \$12,189                 | \$0              | \$2,202           | \$0        | \$0          | \$0            | \$196,910          | \$414,466                          | (7,095)          | (\$148,758)          |             |
| 11           | (\$4,552)          | \$149,181          | \$9,311          | \$36,841           | \$0        | \$0           | \$11,465                 | \$0              | \$2,329           | \$0        | \$0          | \$0            | \$204,575          | \$460,742                          | (7,720)          | (\$154,909)          |             |
| 12           | (\$4,313)          | \$141,624          | \$9,341          | \$34,915           | \$0        | \$0           | \$10,784                 | \$0              | \$2,437           | \$0        | \$0          | \$0            | \$194,788          | \$469,409                          | (7,718)          | (\$148,220)          |             |
| 13           | (\$4,088)          | \$147,158          | \$9,777          | \$37,076           | \$0        | \$0           | \$10,144                 | \$0              | \$2,529           | \$0        | \$0          | \$0            | \$202,596          | \$522,400                          | (8,408)          | (\$154,530)          |             |
| 14           | (\$3,874)          | \$139,789          | \$9,754          | \$35,163           | \$0        | \$0           | \$9,542                  | \$0              | \$2,606           | \$0        | \$0          | \$0            | \$192,980          | \$532,439                          | (8,410)          | (\$147,910)          |             |
| 15           | (\$3,673)          | \$132,791          | \$9,711          | \$33,345           | \$0        | \$0           | \$8,977                  | \$0              | \$2,669           | \$0        | \$0          | \$0            | \$183,820          | \$542,667                          | (8,410)          | (\$141,561)          |             |
| 16           | (\$3,482)          | \$136,255          | \$10,049         | \$34,861           | \$0        | \$0           | \$8,445                  | \$0              | \$2,720           | \$0        | \$0          | \$0            | \$188,847          | \$596,534                          | (9,058)          | (\$145,918)          |             |
| 17           | (\$3,302)          | \$130,284          | \$9,975          | \$33,306           | \$0        | \$0           | \$7,945                  | \$0              | \$2,759           | \$0        | \$0          | \$0            | \$180,966          | \$611,654                          | (9,118)          | (\$140,559)          |             |
| 18           | (\$3,131)          | \$137,491          | \$10,470         | \$35,476           | \$0        | \$0           | \$7,475                  | \$0              | \$2,787           | \$0        | \$0          | \$0            | \$190,568          | \$689,193                          | (10,025)         | (\$147,899)          |             |
| 19           | (\$2,970)          | \$129,974          | \$10,338         | \$33,497           | \$0        | \$0           | \$7,032                  | \$0              | \$2,806           | \$0        | \$0          | \$0            | \$180,678          | \$699,166                          | (9,979)          | (\$140,892)          |             |
| <b>Total</b> | <b>(\$113,400)</b> | <b>\$2,899,728</b> | <b>\$177,205</b> | <b>\$1,268,735</b> | <b>\$0</b> | <b>\$0</b>    | <b>\$222,404</b>         | <b>\$0</b>       | <b>(\$32,545)</b> | <b>\$0</b> | <b>\$0</b>   | <b>\$0</b>     | <b>\$4,422,127</b> | <b>\$9,804,537</b>                 | <b>(149,231)</b> | <b>(\$2,975,725)</b> |             |





**Parameters**

This page contains all economic values and rate tables.  
To update economic values automatically, change "Economic Update Factor."

General Economic Parameters

Travel Demand Tables

Operating Cost Tables

Accident Tables

Note: For input to base estimates for pricing  
Source: California Air Resources Board  
and the 2007 and 2010 average

Emissions Tables

HIGHWAY EMISSIONS FACTORS (g/mi)  
Model Year 2007

| Mode | Speed | CO     | CO2     | NOX    | PM10   | SOX    | VOC    |
|------|-------|--------|---------|--------|--------|--------|--------|
| Auto | 0     | 7.9768 | 84.89   | 0.5771 | 0.0085 | 0.0000 | 0.9653 |
|      | 5     | 9.1573 | 1326.71 | 0.7543 | 0.1085 | 0.0131 | 1.0373 |
|      | 6     | 8.8380 | 1258.78 | 0.7335 | 0.1023 | 0.0124 | 0.9792 |
|      | 7     | 8.5187 | 1190.85 | 0.7127 | 0.0961 | 0.0118 | 0.9211 |
|      | 8     | 8.1995 | 1122.93 | 0.6918 | 0.0899 | 0.0111 | 0.8631 |
|      | 9     | 7.8802 | 1055.00 | 0.6710 | 0.0837 | 0.0104 | 0.8050 |
|      | 10    | 7.5609 | 987.07  | 0.6501 | 0.0775 | 0.0098 | 0.7469 |
|      | 11    | 7.3231 | 941.40  | 0.6346 | 0.0738 | 0.0093 | 0.7112 |
|      | 12    | 7.0853 | 895.74  | 0.6191 | 0.0702 | 0.0089 | 0.6755 |
|      | 13    | 6.8475 | 850.07  | 0.6036 | 0.0665 | 0.0084 | 0.6397 |
|      | 14    | 6.6098 | 804.40  | 0.5881 | 0.0629 | 0.0080 | 0.6040 |
|      | 15    | 6.3720 | 758.74  | 0.5726 | 0.0592 | 0.0076 | 0.5682 |
|      | 16    | 6.2017 | 728.23  | 0.5613 | 0.0570 | 0.0073 | 0.5464 |
|      | 17    | 6.0314 | 697.73  | 0.5500 | 0.0548 | 0.0070 | 0.5246 |
|      | 18    | 5.8612 | 667.23  | 0.5388 | 0.0526 | 0.0067 | 0.5028 |
|      | 19    | 5.6909 | 636.73  | 0.5275 | 0.0504 | 0.0064 | 0.4810 |
|      | 20    | 5.5206 | 606.23  | 0.5162 | 0.0482 | 0.0061 | 0.4592 |
|      | 21    | 5.3957 | 585.62  | 0.5081 | 0.0468 | 0.0059 | 0.4457 |
|      | 22    | 5.2708 | 565.02  | 0.5000 | 0.0455 | 0.0057 | 0.4321 |
|      | 23    | 5.1459 | 544.41  | 0.4919 | 0.0441 | 0.0055 | 0.4186 |
|      | 24    | 5.0210 | 523.81  | 0.4838 | 0.0427 | 0.0053 | 0.4050 |
|      | 25    | 4.8962 | 503.20  | 0.4757 | 0.0414 | 0.0051 | 0.3915 |
|      | 26    | 4.8037 | 489.32  | 0.4700 | 0.0405 | 0.0049 | 0.3829 |
|      | 27    | 4.7112 | 475.43  | 0.4644 | 0.0396 | 0.0048 | 0.3743 |
|      | 28    | 4.6187 | 461.55  | 0.4587 | 0.0388 | 0.0047 | 0.3657 |
|      | 29    | 4.5262 | 447.66  | 0.4531 | 0.0379 | 0.0045 | 0.3571 |
|      | 30    | 4.4337 | 433.78  | 0.4474 | 0.0370 | 0.0044 | 0.3484 |
|      | 31    | 4.3660 | 424.66  | 0.4437 | 0.0365 | 0.0043 | 0.3431 |
|      | 32    | 4.2983 | 415.55  | 0.4401 | 0.0359 | 0.0042 | 0.3377 |
|      | 33    | 4.2306 | 406.43  | 0.4364 | 0.0354 | 0.0041 | 0.3323 |
|      | 34    | 4.1629 | 397.32  | 0.4327 | 0.0348 | 0.0041 | 0.3269 |
|      | 35    | 4.0952 | 388.20  | 0.4291 | 0.0342 | 0.0040 | 0.3216 |
|      | 36    | 4.0482 | 382.68  | 0.4271 | 0.0339 | 0.0039 | 0.3184 |
|      | 37    | 4.0012 | 377.16  | 0.4251 | 0.0335 | 0.0039 | 0.3153 |
|      | 38    | 3.9542 | 371.63  | 0.4231 | 0.0332 | 0.0038 | 0.3121 |
|      | 39    | 3.9072 | 366.11  | 0.4211 | 0.0328 | 0.0037 | 0.3090 |
|      | 40    | 3.8602 | 360.59  | 0.4191 | 0.0325 | 0.0037 | 0.3058 |
|      | 41    | 3.8324 | 357.97  | 0.4186 | 0.0323 | 0.0037 | 0.3044 |
|      | 42    | 3.8046 | 355.36  | 0.4182 | 0.0321 | 0.0036 | 0.3029 |
|      | 43    | 3.7767 | 352.75  | 0.4177 | 0.0319 | 0.0036 | 0.3015 |
|      | 44    | 3.7489 | 350.14  | 0.4172 | 0.0317 | 0.0036 | 0.3000 |
|      | 45    | 3.7211 | 347.53  | 0.4168 | 0.0315 | 0.0036 | 0.2985 |
|      | 46    | 3.7133 | 347.51  | 0.4177 | 0.0314 | 0.0036 | 0.2985 |
|      | 47    | 3.7055 | 347.50  | 0.4187 | 0.0313 | 0.0036 | 0.2985 |
|      | 48    | 3.6978 | 347.48  | 0.4197 | 0.0313 | 0.0036 | 0.2985 |
|      | 49    | 3.6900 | 347.46  | 0.4207 | 0.0312 | 0.0036 | 0.2985 |
|      | 50    | 3.6822 | 347.44  | 0.4217 | 0.0311 | 0.0036 | 0.2984 |
|      | 51    | 3.6983 | 349.99  | 0.4242 | 0.0311 | 0.0036 | 0.2999 |
|      | 52    | 3.7144 | 352.55  | 0.4267 | 0.0312 | 0.0036 | 0.3013 |
|      | 53    | 3.7304 | 355.10  | 0.4292 | 0.0312 | 0.0036 | 0.3027 |
|      | 54    | 3.7465 | 357.65  | 0.4317 | 0.0312 | 0.0037 | 0.3041 |
|      | 55    | 3.7626 | 360.20  | 0.4343 | 0.0313 | 0.0037 | 0.3055 |
|      | 56    | 3.8105 | 365.59  | 0.4385 | 0.0314 | 0.0038 | 0.3086 |
|      | 57    | 3.8584 | 370.98  | 0.4427 | 0.0315 | 0.0038 | 0.3117 |
|      | 58    | 3.9063 | 376.38  | 0.4469 | 0.0317 | 0.0039 | 0.3147 |
|      | 59    | 3.9542 | 381.77  | 0.4511 | 0.0318 | 0.0039 | 0.3178 |
|      | 60    | 4.0021 | 387.16  | 0.4553 | 0.0320 | 0.0040 | 0.3209 |
|      | 61    | 4.0968 | 396.00  | 0.4616 | 0.0322 | 0.0040 | 0.3262 |
|      | 62    | 4.1916 | 404.84  | 0.4679 | 0.0325 | 0.0041 | 0.3315 |
|      | 63    | 4.2863 | 413.68  | 0.4741 | 0.0328 | 0.0042 | 0.3367 |
|      | 64    | 4.3811 | 422.52  | 0.4804 | 0.0331 | 0.0043 | 0.3420 |
|      | 65    | 4.4758 | 431.36  | 0.4867 | 0.0334 | 0.0044 | 0.3473 |
|      | 66    | 4.5965 | 437.44  | 0.4914 | 0.0336 | 0.0044 | 0.3529 |
|      | 67    | 4.7173 | 443.53  | 0.4962 | 0.0338 | 0.0045 | 0.3585 |
|      | 68    | 4.8380 | 449.62  | 0.5010 | 0.0340 | 0.0046 | 0.3640 |
|      | 69    | 4.9587 | 455.71  | 0.5058 | 0.0343 | 0.0046 | 0.3696 |
|      | 70    | 5.0794 | 461.79  | 0.5106 | 0.0345 | 0.0047 | 0.3752 |
|      | 71    | 5.2254 | 461.91  | 0.5124 | 0.0345 | 0.0047 | 0.3804 |
|      | 72    | 5.3714 | 462.03  | 0.5143 | 0.0346 | 0.0047 | 0.3856 |
|      | 73    | 5.5173 | 462.15  | 0.5162 | 0.0347 | 0.0047 | 0.3908 |
|      | 74    | 5.6633 | 462.27  | 0.5181 | 0.0347 | 0.0047 | 0.3960 |
|      | 75    | 5.8093 | 462.39  | 0.5200 | 0.0348 | 0.0047 | 0.4012 |
|      | 76    | 6.0704 | 462.53  | 0.5227 | 0.0349 | 0.0047 | 0.4097 |
|      | 77    | 6.3316 | 462.67  | 0.5255 | 0.0350 | 0.0047 | 0.4185 |
|      | 78    | 6.5928 | 462.81  | 0.5283 | 0.0351 | 0.0047 | 0.4266 |
|      | 79    | 6.8539 | 462.95  | 0.5310 | 0.0352 | 0.0047 | 0.4350 |
|      | 80    | 7.1151 | 463.10  | 0.5338 | 0.0353 | 0.0047 | 0.4435 |

| Mode | Speed | CO     | CO2     | NOX    | PM10   | SOX    | VOC    |
|------|-------|--------|---------|--------|--------|--------|--------|
| Auto | 0     | 1.9386 | 81.72   | 0.1143 | 0.0098 | 0.0000 | 0.2697 |
|      | 5     | 1.8543 | 1311.41 | 0.1593 | 0.1307 | 0.0128 | 0.2336 |
|      | 6     | 1.8184 | 1244.19 | 0.1551 | 0.1226 | 0.0121 | 0.2228 |
|      | 7     | 1.7825 | 1176.96 | 0.1508 | 0.1145 | 0.0115 | 0.2121 |
|      | 8     | 1.7467 | 1109.73 | 0.1466 | 0.1063 | 0.0108 | 0.2013 |
|      | 9     | 1.7108 | 1042.50 | 0.1423 | 0.0982 | 0.0102 | 0.1906 |
|      | 10    | 1.6750 | 975.27  | 0.1380 | 0.0901 | 0.0095 | 0.1798 |
|      | 11    | 1.6417 | 929.97  | 0.1347 | 0.0854 | 0.0091 | 0.1730 |
|      | 12    | 1.6084 | 884.67  | 0.1314 | 0.0808 | 0.0087 | 0.1662 |
|      | 13    | 1.5751 | 839.37  | 0.1281 | 0.0761 | 0.0082 | 0.1594 |
|      | 14    | 1.5418 | 794.07  | 0.1248 | 0.0715 | 0.0078 | 0.1526 |
|      | 15    | 1.5085 | 748.77  | 0.1215 | 0.0668 | 0.0074 | 0.1458 |
|      | 16    | 1.4808 | 718.53  | 0.1191 | 0.0641 | 0.0071 | 0.1418 |
|      | 17    | 1.4532 | 688.29  | 0.1166 | 0.0613 | 0.0068 | 0.1377 |
|      | 18    | 1.4255 | 658.05  | 0.1141 | 0.0586 | 0.0065 | 0.1337 |
|      | 19    | 1.3979 | 627.81  | 0.1116 | 0.0558 | 0.0062 | 0.1297 |
|      | 20    | 1.3702 | 597.57  | 0.1091 | 0.0530 | 0.0059 | 0.1257 |
|      | 21    | 1.3471 | 577.16  | 0.1073 | 0.0514 | 0.0057 | 0.1232 |
|      | 22    | 1.3239 | 556.75  | 0.1054 | 0.0497 | 0.0055 | 0.1207 |
|      | 23    | 1.3008 | 536.34  | 0.1036 | 0.0480 | 0.0053 | 0.1183 |
|      | 24    | 1.2777 | 515.93  | 0.1017 | 0.0463 | 0.0051 | 0.1158 |
|      | 25    | 1.2545 | 495.52  | 0.0998 | 0.0446 | 0.0049 | 0.1134 |
|      | 26    | 1.2352 | 481.77  | 0.0985 | 0.0435 | 0.0048 | 0.1119 |
|      | 27    | 1.2158 | 468.03  | 0.0971 | 0.0425 | 0.0047 | 0.1104 |
|      | 28    | 1.1964 | 454.29  | 0.0958 | 0.0414 | 0.0045 | 0.1089 |
|      | 29    | 1.1771 | 440.55  | 0.0944 | 0.0404 | 0.0044 | 0.1074 |
|      | 30    | 1.1577 | 426.80  | 0.0931 | 0.0393 | 0.0043 | 0.1059 |
|      | 31    | 1.1417 | 417.79  | 0.0921 | 0.0387 | 0.0042 | 0.1050 |
|      | 32    | 1.1256 | 408.77  | 0.0912 | 0.0380 | 0.0041 | 0.1041 |
|      | 33    | 1.1095 | 399.75  | 0.0902 | 0.0373 | 0.0040 | 0.1032 |
|      | 34    | 1.0935 | 390.74  | 0.0893 | 0.0367 | 0.0039 | 0.1023 |
|      | 35    | 1.0774 | 381.72  | 0.0883 | 0.0360 | 0.0038 | 0.1015 |
|      | 36    | 1.0645 | 376.27  | 0.0878 | 0.0356 | 0.0038 | 0.1010 |
|      | 37    | 1.0515 | 370.81  | 0.0872 | 0.0352 | 0.0037 | 0.1006 |
|      | 38    | 1.0385 | 365.36  | 0.0866 | 0.0348 | 0.0037 | 0.1001 |
|      | 39    | 1.0255 | 359.91  | 0.0860 | 0.0344 | 0.0036 | 0.0997 |
|      | 40    | 1.0126 | 354.45  | 0.0854 | 0.0340 | 0.0036 | 0.0993 |
|      | 41    | 1.0027 | 351.89  | 0.0851 | 0.0337 | 0.0035 | 0.0992 |
|      | 42    | 0.9928 | 349.32  | 0.0848 | 0.0335 | 0.0035 | 0.0991 |
|      | 43    | 0.9829 | 346.76  | 0.0845 | 0.0333 | 0.0035 | 0.0990 |
|      | 44    | 0.9730 | 344.20  | 0.0843 | 0.0331 | 0.0035 | 0.0990 |
|      | 45    | 0.9631 | 341.63  | 0.0840 | 0.0328 | 0.0034 | 0.0989 |
|      | 46    | 0.9567 | 341.64  | 0.0840 | 0.0327 | 0.0034 | 0.0992 |
|      | 47    | 0.9502 | 341.64  | 0.0840 | 0.0327 | 0.0034 | 0.0995 |
|      | 48    | 0.9437 | 341.65  | 0.0840 | 0.0326 | 0.0034 | 0.0997 |
|      | 49    | 0.9373 | 341.65  | 0.0840 | 0.0325 | 0.0034 | 0.1000 |
|      | 50    | 0.9308 | 341.66  | 0.0841 | 0.0324 | 0.0034 | 0.1003 |
|      | 51    | 0.9286 | 344.21  | 0.0844 | 0.0324 | 0.0035 | 0.1010 |
|      | 52    | 0.9263 | 346.77  | 0.0847 | 0.0325 | 0.0035 | 0.1016 |
|      | 53    | 0.9241 | 349.32  | 0.0850 | 0.0325 | 0.0035 | 0.1023 |
|      | 54    | 0.9218 | 351.88  | 0.0853 | 0.0326 | 0.0035 | 0.1030 |
|      | 55    | 0.9196 | 354.44  | 0.0857 | 0.0326 | 0.0036 | 0.1036 |
|      | 56    | 0.9231 | 359.81  | 0.0863 | 0.0328 | 0.0036 | 0.1048 |
|      | 57    | 0.9266 | 365.18  | 0.0870 | 0.0330 | 0.0037 | 0.1060 |
|      | 58    | 0.9302 | 370.55  | 0.0876 | 0.0332 | 0.0037 | 0.1072 |
|      | 59    | 0.9337 | 375.92  | 0.0883 | 0.0334 | 0.0038 | 0.1084 |
|      | 60    | 0.9372 | 381.29  | 0.0889 | 0.0335 | 0.0038 | 0.1095 |
|      | 61    | 0.9496 | 390.09  | 0.0899 | 0.0339 | 0.0039 | 0.1115 |
|      | 62    | 0.9619 | 398.89  | 0.0910 | 0.0342 | 0.0040 | 0.1134 |
|      | 63    | 0.9742 | 407.68  | 0.0920 | 0.0346 | 0.0041 | 0.1153 |
|      | 64    | 0.9865 | 416.48  | 0.0930 | 0.0349 | 0.0042 | 0.1172 |
|      | 65    | 0.9988 | 425.28  | 0.0940 | 0.0353 | 0.0042 | 0.1191 |
|      | 66    | 1.0285 | 431.39  | 0.0949 | 0.0355 | 0.0043 | 0.1219 |
|      | 67    | 1.0582 | 437.51  | 0.0957 | 0.0358 | 0.0044 | 0.1246 |
|      | 68    | 1.0879 | 443.62  | 0.0966 | 0.0361 | 0.0044 | 0.1274 |
|      | 69    | 1.1176 | 449.74  | 0.0975 | 0.0363 | 0.0045 | 0.1301 |
|      | 70    | 1.1473 | 455.85  | 0.0983 | 0.0366 | 0.0045 | 0.1329 |
|      | 71    | 1.2045 | 456.12  | 0.0988 | 0.0366 | 0.0045 | 0.1369 |
|      | 72    | 1.2617 | 456.39  | 0.0992 | 0.0366 | 0.0045 | 0.1410 |
|      | 73    | 1.3189 | 456.66  | 0.0997 | 0.0367 | 0.0045 | 0.145  |

Emissions Tables

|       |    |         |         |         |        |        |        |       |    |        |         |        |        |        |        |
|-------|----|---------|---------|---------|--------|--------|--------|-------|----|--------|---------|--------|--------|--------|--------|
| Truck | 0  | 11.9473 | 30.38   | 1.3921  | 0.0019 | 0.0000 | 1.0193 | Truck | 0  | 2.6933 | 28.33   | 0.8788 | 0.0015 | 0.0000 | 0.2027 |
|       | 5  | 22.5401 | 2812.55 | 26.1291 | 1.8338 | 0.0273 | 7.6294 |       | 5  | 5.2205 | 2931.21 | 5.2336 | 0.1930 | 0.0281 | 1.6681 |
|       | 6  | 21.8297 | 2753.56 | 25.2987 | 1.7745 | 0.0267 | 7.2931 |       | 6  | 5.0216 | 2869.86 | 5.1121 | 0.1899 | 0.0275 | 1.5942 |
|       | 7  | 21.1194 | 2694.58 | 24.4683 | 1.7151 | 0.0261 | 6.9568 |       | 7  | 4.8228 | 2808.52 | 4.9906 | 0.1868 | 0.0269 | 1.5204 |
|       | 8  | 20.4090 | 2635.59 | 23.6380 | 1.6557 | 0.0256 | 6.6206 |       | 8  | 4.6239 | 2747.17 | 4.8691 | 0.1837 | 0.0263 | 1.4465 |
|       | 9  | 19.6986 | 2576.61 | 22.8076 | 1.5964 | 0.0250 | 6.2843 |       | 9  | 4.4251 | 2685.83 | 4.7476 | 0.1806 | 0.0257 | 1.3727 |
|       | 10 | 18.9882 | 2517.62 | 21.9772 | 1.5370 | 0.0244 | 5.9480 |       | 10 | 4.2263 | 2624.48 | 4.6261 | 0.1775 | 0.0251 | 1.2988 |
|       | 11 | 17.9389 | 2424.07 | 20.7639 | 1.4411 | 0.0235 | 5.4372 |       | 11 | 3.9378 | 2526.50 | 4.4341 | 0.1725 | 0.0242 | 1.1891 |
|       | 12 | 16.8896 | 2330.52 | 19.5506 | 1.3451 | 0.0226 | 4.9264 |       | 12 | 3.6493 | 2428.51 | 4.2421 | 0.1674 | 0.0233 | 1.0794 |
|       | 13 | 15.8403 | 2236.96 | 18.3373 | 1.2492 | 0.0217 | 4.4156 |       | 13 | 3.3608 | 2330.52 | 4.0501 | 0.1624 | 0.0223 | 0.9697 |
|       | 14 | 14.7910 | 2143.41 | 17.1240 | 1.1532 | 0.0207 | 3.9048 |       | 14 | 3.0723 | 2232.53 | 3.8580 | 0.1574 | 0.0214 | 0.8599 |
|       | 15 | 13.7417 | 2049.86 | 15.9107 | 1.0573 | 0.0198 | 3.3940 |       | 15 | 2.7838 | 2134.54 | 3.6660 | 0.1523 | 0.0205 | 0.7502 |
|       | 16 | 13.0390 | 1980.50 | 15.2844 | 0.9910 | 0.0191 | 3.0871 |       | 16 | 2.6152 | 2061.31 | 3.5406 | 0.1486 | 0.0198 | 0.6902 |
|       | 17 | 12.3362 | 1911.15 | 14.6582 | 0.9247 | 0.0185 | 2.7803 |       | 17 | 2.4467 | 1988.07 | 3.4152 | 0.1449 | 0.0191 | 0.6301 |
|       | 18 | 11.6335 | 1841.80 | 14.0320 | 0.8585 | 0.0178 | 2.4734 |       | 18 | 2.2781 | 1914.83 | 3.2897 | 0.1411 | 0.0184 | 0.5700 |
|       | 19 | 10.9308 | 1772.44 | 13.4057 | 0.7922 | 0.0172 | 2.1665 |       | 19 | 2.1096 | 1841.59 | 3.1643 | 0.1374 | 0.0177 | 0.5100 |
|       | 20 | 10.2280 | 1703.09 | 12.7795 | 0.7259 | 0.0165 | 1.8597 |       | 20 | 1.9410 | 1768.36 | 3.0388 | 0.1337 | 0.0170 | 0.4499 |
|       | 21 | 9.8116  | 1667.41 | 12.6268 | 0.6982 | 0.0162 | 1.7695 |       | 21 | 1.8755 | 1730.96 | 2.9808 | 0.1315 | 0.0166 | 0.4359 |
|       | 22 | 9.3951  | 1631.72 | 12.4741 | 0.6705 | 0.0158 | 1.6793 |       | 22 | 1.8099 | 1693.56 | 2.9227 | 0.1292 | 0.0163 | 0.4219 |
|       | 23 | 8.9786  | 1596.04 | 12.3214 | 0.6428 | 0.0155 | 1.5891 |       | 23 | 1.7443 | 1656.17 | 2.8647 | 0.1270 | 0.0159 | 0.4079 |
|       | 24 | 8.5622  | 1560.35 | 12.1687 | 0.6151 | 0.0152 | 1.4989 |       | 24 | 1.6788 | 1618.77 | 2.8066 | 0.1248 | 0.0156 | 0.3939 |
|       | 25 | 8.1457  | 1524.67 | 12.0160 | 0.5874 | 0.0148 | 1.4086 |       | 25 | 1.6132 | 1581.37 | 2.7486 | 0.1226 | 0.0152 | 0.3799 |
|       | 26 | 7.8695  | 1504.48 | 11.9390 | 0.5708 | 0.0146 | 1.3627 |       | 26 | 1.5789 | 1560.26 | 2.7118 | 0.1213 | 0.0150 | 0.3728 |
|       | 27 | 7.5933  | 1484.29 | 11.8621 | 0.5542 | 0.0144 | 1.3167 |       | 27 | 1.5445 | 1539.14 | 2.6750 | 0.1201 | 0.0148 | 0.3657 |
|       | 28 | 7.3172  | 1464.09 | 11.7851 | 0.5377 | 0.0142 | 1.2707 |       | 28 | 1.5102 | 1518.03 | 2.6382 | 0.1188 | 0.0146 | 0.3585 |
|       | 29 | 7.0410  | 1443.90 | 11.7082 | 0.5211 | 0.0140 | 1.2247 |       | 29 | 1.4758 | 1496.92 | 2.6014 | 0.1175 | 0.0144 | 0.3514 |
|       | 30 | 6.7648  | 1423.71 | 11.6312 | 0.5045 | 0.0138 | 1.1787 |       | 30 | 1.4415 | 1475.80 | 2.5646 | 0.1162 | 0.0142 | 0.3442 |
|       | 31 | 6.5648  | 1408.67 | 11.5829 | 0.4924 | 0.0136 | 1.1449 |       | 31 | 1.4197 | 1459.94 | 2.5359 | 0.1156 | 0.0140 | 0.3384 |
|       | 32 | 6.3648  | 1393.63 | 11.5345 | 0.4802 | 0.0135 | 1.1112 |       | 32 | 1.3979 | 1444.09 | 2.5072 | 0.1150 | 0.0139 | 0.3325 |
|       | 33 | 6.1648  | 1378.58 | 11.4862 | 0.4681 | 0.0133 | 1.0774 |       | 33 | 1.3761 | 1428.23 | 2.4785 | 0.1145 | 0.0137 | 0.3267 |
|       | 34 | 5.9648  | 1363.54 | 11.4378 | 0.4560 | 0.0132 | 1.0436 |       | 34 | 1.3543 | 1412.38 | 2.4498 | 0.1139 | 0.0136 | 0.3208 |
|       | 35 | 5.7648  | 1348.50 | 11.3895 | 0.4438 | 0.0130 | 1.0098 |       | 35 | 1.3326 | 1396.52 | 2.4211 | 0.1133 | 0.0134 | 0.3150 |
|       | 36 | 5.6235  | 1337.56 | 11.3686 | 0.4360 | 0.0130 | 0.9866 |       | 36 | 1.3202 | 1384.95 | 2.4003 | 0.1132 | 0.0133 | 0.3103 |
|       | 37 | 5.4823  | 1326.62 | 11.3477 | 0.4281 | 0.0129 | 0.9634 |       | 37 | 1.3078 | 1373.39 | 2.3795 | 0.1132 | 0.0132 | 0.3056 |
|       | 38 | 5.3410  | 1315.68 | 11.3269 | 0.4202 | 0.0128 | 0.9402 |       | 38 | 1.2954 | 1361.83 | 2.3588 | 0.1132 | 0.0131 | 0.3009 |
|       | 39 | 5.1997  | 1304.75 | 11.3060 | 0.4124 | 0.0128 | 0.9170 |       | 39 | 1.2830 | 1350.26 | 2.3380 | 0.1131 | 0.0130 | 0.2962 |
|       | 40 | 5.0584  | 1293.81 | 11.2852 | 0.4045 | 0.0127 | 0.8938 |       | 40 | 1.2706 | 1338.70 | 2.3172 | 0.1131 | 0.0129 | 0.2915 |
|       | 41 | 4.9665  | 1286.55 | 11.2922 | 0.4009 | 0.0126 | 0.8801 |       | 41 | 1.2659 | 1330.95 | 2.3044 | 0.1136 | 0.0128 | 0.2878 |
|       | 42 | 4.8746  | 1279.29 | 11.2993 | 0.3973 | 0.0125 | 0.8664 |       | 42 | 1.2611 | 1323.20 | 2.2915 | 0.1141 | 0.0127 | 0.2841 |
|       | 43 | 4.7827  | 1272.03 | 11.3064 | 0.3936 | 0.0124 | 0.8528 |       | 43 | 1.2563 | 1315.45 | 2.2787 | 0.1146 | 0.0127 | 0.2803 |
|       | 44 | 4.6908  | 1264.77 | 11.3135 | 0.3900 | 0.0123 | 0.8391 |       | 44 | 1.2515 | 1307.70 | 2.2659 | 0.1151 | 0.0126 | 0.2766 |
|       | 45 | 4.5989  | 1257.51 | 11.3205 | 0.3864 | 0.0122 | 0.8254 |       | 45 | 1.2467 | 1299.96 | 2.2531 | 0.1156 | 0.0125 | 0.2729 |
|       | 46 | 4.5523  | 1253.73 | 11.3572 | 0.3869 | 0.0122 | 0.8208 |       | 46 | 1.2488 | 1295.81 | 2.2485 | 0.1166 | 0.0125 | 0.2702 |
|       | 47 | 4.5057  | 1249.96 | 11.3938 | 0.3874 | 0.0121 | 0.8161 |       | 47 | 1.2508 | 1291.67 | 2.2439 | 0.1176 | 0.0124 | 0.2674 |
|       | 48 | 4.4591  | 1246.19 | 11.4304 | 0.3879 | 0.0121 | 0.8114 |       | 48 | 1.2529 | 1287.52 | 2.2393 | 0.1186 | 0.0124 | 0.2647 |
|       | 49 | 4.4125  | 1242.42 | 11.4671 | 0.3884 | 0.0120 | 0.8068 |       | 49 | 1.2550 | 1283.38 | 2.2348 | 0.1196 | 0.0123 | 0.2620 |
|       | 50 | 4.3659  | 1238.64 | 11.5037 | 0.3889 | 0.0120 | 0.8021 |       | 50 | 1.2570 | 1279.24 | 2.2302 | 0.1206 | 0.0123 | 0.2592 |
|       | 51 | 4.3647  | 1238.29 | 11.5735 | 0.3935 | 0.0120 | 0.8060 |       | 51 | 1.2658 | 1278.69 | 2.2344 | 0.1220 | 0.0123 | 0.2574 |
|       | 52 | 4.3636  | 1237.93 | 11.6434 | 0.3980 | 0.0120 | 0.8099 |       | 52 | 1.2746 | 1278.15 | 2.2387 | 0.1235 | 0.0123 | 0.2556 |
|       | 53 | 4.3624  | 1237.58 | 11.7132 | 0.4026 | 0.0121 | 0.8137 |       | 53 | 1.2833 | 1277.61 | 2.2429 | 0.1250 | 0.0123 | 0.2538 |
|       | 54 | 4.3612  | 1237.22 | 11.7830 | 0.4072 | 0.0121 | 0.8176 |       | 54 | 1.2921 | 1277.07 | 2.2472 | 0.1265 | 0.0123 | 0.2519 |
|       | 55 | 4.3600  | 1236.87 | 11.8528 | 0.4118 | 0.0121 | 0.8215 |       | 55 | 1.3009 | 1276.53 | 2.2514 | 0.1279 | 0.0123 | 0.2501 |
|       | 56 | 4.4085  | 1240.28 | 11.9617 | 0.4204 | 0.0121 | 0.8339 |       | 56 | 1.3169 | 1279.82 | 2.2654 | 0.1299 | 0.0123 | 0.2491 |
|       | 57 | 4.4570  | 1243.70 | 12.0705 | 0.4290 | 0.0121 | 0.8462 |       | 57 | 1.3329 | 1283.12 | 2.2794 | 0.1318 | 0.0124 | 0.2482 |
|       | 58 | 4.5055  | 1247.12 | 12.1793 | 0.4376 | 0.0121 | 0.8585 |       | 58 | 1.3489 | 1286.41 | 2.2934 | 0.1338 | 0.0124 | 0.2472 |
|       | 59 | 4.5540  | 1250.53 | 12.2882 | 0.4462 | 0.0121 | 0.8709 |       | 59 | 1.3649 | 1289.70 | 2.3074 | 0.1357 | 0.0124 | 0.2462 |
|       | 60 | 4.6025  | 1253.95 | 12.3970 | 0.4548 | 0.0121 | 0.8832 |       | 60 | 1.3809 | 1292.99 | 2.3214 | 0.1377 | 0.0124 | 0.2452 |
|       | 61 | 4.7103  | 1261.59 | 12.5545 | 0.4675 | 0.0122 | 0.9039 |       | 61 | 1.4056 | 1300.78 | 2.3466 | 0.1401 | 0.0125 | 0.2452 |
|       | 62 | 4.8181  | 1269.23 | 12.7120 | 0.4801 | 0.0122 | 0.9245 |       | 62 | 1.4303 | 1308.56 | 2.3719 | 0.1425 | 0.0126 | 0.2451 |
|       | 63 | 4.9258  | 1276.87 | 12.8695 | 0.4928 | 0.0123 | 0.9451 |       | 63 | 1.4551 | 1316.34 | 2.3972 | 0.1449 | 0.0127 | 0.2450 |
|       | 64 | 5.0336  | 1284.51 | 13.0270 | 0.5054 | 0.0124 | 0.9658 |       | 64 | 1.4798 | 1324.12 | 2.4225 | 0.1472 | 0.0128 | 0.2450 |
|       | 65 | 5.1414  | 1292.15 | 13.1845 | 0.5181 | 0.0125 | 0.9864 |       | 65 | 1.5045 | 1331.90 | 2.4477 | 0.1496 | 0.0129 | 0.2449 |
|       | 66 | 5.3265  | 1305.25 | 13.4060 | 0.5347 | 0.0126 | 1.0154 |       | 66 | 1.5406 | 1345.12 | 2.4868 | 0.1525 | 0.0130 | 0.2457 |
|       | 67 | 5.5117  | 1318.34 | 13.6275 | 0.5514 | 0.0127 | 1.0445 |       | 67 | 1.5767 | 1358.34 | 2.5258 | 0.1553 | 0.0131 | 0.2465 |
|       | 68 | 5.6968  | 1331.44 | 13.8490 | 0.5681 | 0.0129 | 1.0735 |       | 68 | 1.6128 | 1371.56 | 2.5648 | 0.1581 | 0.0133 | 0.2473 |
|       | 69 | 5.8819  | 1344.54 | 14.0704 | 0.5848 | 0.0130 | 1.1025 |       | 69 | 1.6489 | 1384.77 | 2.6039 | 0.1609 | 0.0134 | 0.2482 |
|       | 70 | 6.0670  | 1357.63 | 14.2919 | 0.6015 | 0.0132 | 1.1315 |       | 70 | 1.6850 | 1397.99 | 2.6429 | 0.1637 | 0.0135 | 0.2490 |
|       | 71 | 6.3619  | 1377.97 | 14.6022 | 0.6222 | 0.0134 | 1.1690 |       | 71 | 1.7373 | 1418.60 | 2.6996 | 0.1670 | 0.0137 | 0.2506 |
|       | 72 | 6.6568  | 1398.30 | 14.9124 | 0.6429 | 0.0136 | 1.2065 |       | 72 | 1.7897 | 1439.21 | 2.7564 | 0.1703 | 0.0139 | 0.2523 |
|       | 73 | 6.9517  | 1418.63 | 15.2226 | 0.6636 | 0.0138 | 1.2440 |       | 73 | 1.8421 | 1459.81 | 2.8131 | 0.1736 | 0.0141 | 0.2539 |
|       | 74 | 7.2466  | 1438.97 | 15.5328 | 0.6843 | 0.0140 | 1.2815 |       | 74 | 1.8945 | 1480.42 | 2.8698 | 0.1770 | 0.0142 | 0.2556 |
|       | 75 | 7.5415  | 1459.30 | 15.8430 | 0.7050 | 0.0142 | 1.3190 |       | 75 | 1.9468 | 1501.03 | 2.9265 | 0.1803 | 0.0144 | 0.2573 |
|       | 76 | 8.0049  | 1490.48 | 16.2826 | 0.7298 | 0.0145 | 1.3652 |       | 76 | 2.0240 | 1532.35 | 3.0074 | 0.1840 | 0.0147 | 0.2598 |
|       | 77 | 8.4683  | 1521.66 | 16.7221 | 0.7546 | 0.0148 | 1.4115 |       | 77 | 2.1012 | 1563.67 | 3.0883 | 0.1878 | 0.0150 | 0.2624 |
|       | 78 | 8.9317  | 1552.83 | 17.1616 | 0.7794 | 0.0151 | 1.4578 |       | 78 | 2.1784 | 1594.99 | 3.1692 | 0.1916 | 0.0153 | 0.2650 |
|       | 79 | 9.3951  | 1584.01 | 17.6011 | 0.8042 | 0.0154 | 1.5040 |       | 79 | 2.2556 | 1626.31 | 3.2502 | 0.1953 | 0.0157 |        |



Emissions Tables

|     |    |         |         |         |        |        |        |
|-----|----|---------|---------|---------|--------|--------|--------|
| Bus | 0  | 14.6727 | 28.69   | 1.5687  | 0.0000 | 0.0000 | 1.1095 |
|     | 5  | 28.3191 | 2218.86 | 20.8161 | 0.7388 | 0.0210 | 2.9203 |
|     | 6  | 27.2371 | 2191.74 | 20.3513 | 0.7197 | 0.0210 | 2.8212 |
|     | 7  | 26.1550 | 2164.62 | 19.8865 | 0.7005 | 0.0210 | 2.7220 |
|     | 8  | 25.0729 | 2137.50 | 19.4217 | 0.6813 | 0.0210 | 2.6229 |
|     | 9  | 23.9908 | 2110.37 | 18.9569 | 0.6622 | 0.0210 | 2.5238 |
|     | 10 | 22.9088 | 2083.25 | 18.4921 | 0.6430 | 0.0210 | 2.4246 |
|     | 11 | 21.4549 | 2046.78 | 17.8182 | 0.6135 | 0.0206 | 2.2853 |
|     | 12 | 20.0011 | 2010.30 | 17.1444 | 0.5841 | 0.0201 | 2.1459 |
|     | 13 | 18.5473 | 1973.83 | 16.4705 | 0.5546 | 0.0196 | 2.0066 |
|     | 14 | 17.0934 | 1937.35 | 15.7967 | 0.5251 | 0.0192 | 1.8672 |
|     | 15 | 15.6396 | 1900.88 | 15.1229 | 0.4957 | 0.0187 | 1.7279 |
|     | 16 | 14.7703 | 1879.37 | 14.6884 | 0.4760 | 0.0187 | 1.6404 |
|     | 17 | 13.9010 | 1857.86 | 14.2540 | 0.4564 | 0.0187 | 1.5530 |
|     | 18 | 13.0317 | 1836.35 | 13.8196 | 0.4368 | 0.0187 | 1.4655 |
|     | 19 | 12.1624 | 1814.84 | 13.3852 | 0.4171 | 0.0187 | 1.3781 |
|     | 20 | 11.2930 | 1793.33 | 12.9508 | 0.3975 | 0.0187 | 1.2906 |
|     | 21 | 10.7586 | 1779.77 | 12.6781 | 0.3839 | 0.0182 | 1.2336 |
|     | 22 | 10.2241 | 1766.20 | 12.4055 | 0.3704 | 0.0178 | 1.1765 |
|     | 23 | 9.6896  | 1752.64 | 12.1329 | 0.3568 | 0.0173 | 1.1195 |
|     | 24 | 9.1551  | 1739.08 | 11.8603 | 0.3432 | 0.0168 | 1.0624 |
|     | 25 | 8.6206  | 1725.52 | 11.5876 | 0.3297 | 0.0164 | 1.0054 |
|     | 26 | 8.2867  | 1717.10 | 11.4324 | 0.3194 | 0.0164 | 0.9675 |
|     | 27 | 7.9528  | 1708.69 | 11.2771 | 0.3091 | 0.0164 | 0.9296 |
|     | 28 | 7.6189  | 1700.27 | 11.1219 | 0.2988 | 0.0164 | 0.8918 |
|     | 29 | 7.2851  | 1691.85 | 10.9666 | 0.2885 | 0.0164 | 0.8539 |
|     | 30 | 6.9512  | 1683.44 | 10.8114 | 0.2782 | 0.0164 | 0.8160 |
|     | 31 | 6.7445  | 1678.29 | 10.7497 | 0.2708 | 0.0164 | 0.7903 |
|     | 32 | 6.5378  | 1673.15 | 10.6879 | 0.2633 | 0.0164 | 0.7646 |
|     | 33 | 6.3311  | 1668.00 | 10.6262 | 0.2558 | 0.0164 | 0.7388 |
|     | 34 | 6.1244  | 1662.86 | 10.5645 | 0.2483 | 0.0164 | 0.7131 |
|     | 35 | 5.9177  | 1657.72 | 10.5028 | 0.2408 | 0.0164 | 0.6874 |
|     | 36 | 5.7971  | 1654.91 | 10.5247 | 0.2357 | 0.0164 | 0.6706 |
|     | 37 | 5.6765  | 1652.11 | 10.5467 | 0.2305 | 0.0164 | 0.6537 |
|     | 38 | 5.5558  | 1649.30 | 10.5687 | 0.2254 | 0.0164 | 0.6369 |
|     | 39 | 5.4352  | 1646.49 | 10.5907 | 0.2202 | 0.0164 | 0.6201 |
|     | 40 | 5.3145  | 1643.69 | 10.6127 | 0.2151 | 0.0164 | 0.6032 |
|     | 41 | 5.2589  | 1642.29 | 10.7197 | 0.2114 | 0.0164 | 0.5920 |
|     | 42 | 5.2032  | 1640.88 | 10.8268 | 0.2076 | 0.0164 | 0.5808 |
|     | 43 | 5.1476  | 1639.48 | 10.9339 | 0.2039 | 0.0164 | 0.5696 |
|     | 44 | 5.0919  | 1638.08 | 11.0410 | 0.2001 | 0.0164 | 0.5583 |
|     | 45 | 5.0363  | 1636.67 | 11.1481 | 0.1964 | 0.0164 | 0.5471 |
|     | 46 | 5.0339  | 1637.14 | 11.3552 | 0.1945 | 0.0164 | 0.5396 |
|     | 47 | 5.0316  | 1637.61 | 11.5624 | 0.1927 | 0.0164 | 0.5322 |
|     | 48 | 5.0293  | 1638.08 | 11.7696 | 0.1908 | 0.0164 | 0.5247 |
|     | 49 | 5.0269  | 1638.54 | 11.9767 | 0.1889 | 0.0164 | 0.5172 |
|     | 50 | 5.0246  | 1639.01 | 12.1839 | 0.1870 | 0.0164 | 0.5097 |
|     | 51 | 5.0770  | 1639.95 | 12.5201 | 0.1856 | 0.0164 | 0.5060 |
|     | 52 | 5.1293  | 1640.88 | 12.8563 | 0.1842 | 0.0164 | 0.5022 |
|     | 53 | 5.1817  | 1641.82 | 13.1925 | 0.1828 | 0.0164 | 0.4985 |
|     | 54 | 5.2341  | 1642.75 | 13.5287 | 0.1814 | 0.0164 | 0.4947 |
|     | 55 | 5.2865  | 1643.69 | 13.8650 | 0.1800 | 0.0164 | 0.4910 |
|     | 56 | 5.4020  | 1646.96 | 14.3831 | 0.1796 | 0.0164 | 0.4896 |
|     | 57 | 5.5175  | 1650.23 | 14.9012 | 0.1791 | 0.0164 | 0.4882 |
|     | 58 | 5.6330  | 1653.51 | 15.4193 | 0.1786 | 0.0164 | 0.4868 |
|     | 59 | 5.7485  | 1656.78 | 15.9375 | 0.1782 | 0.0164 | 0.4854 |
|     | 60 | 5.8640  | 1660.05 | 16.4556 | 0.1777 | 0.0164 | 0.4840 |
|     | 61 | 6.0646  | 1666.13 | 17.2487 | 0.1777 | 0.0164 | 0.4859 |
|     | 62 | 6.2652  | 1672.21 | 18.0418 | 0.1777 | 0.0164 | 0.4877 |
|     | 63 | 6.4658  | 1678.29 | 18.8348 | 0.1777 | 0.0164 | 0.4896 |
|     | 64 | 6.6664  | 1684.37 | 19.6279 | 0.1777 | 0.0164 | 0.4915 |
|     | 65 | 6.8670  | 1690.45 | 20.4210 | 0.1777 | 0.0164 | 0.4933 |
|     | 66 | 7.1920  | 1699.33 | 21.6452 | 0.1796 | 0.0164 | 0.4980 |
|     | 67 | 7.5170  | 1708.22 | 22.8695 | 0.1814 | 0.0164 | 0.5027 |
|     | 68 | 7.8420  | 1717.10 | 24.0937 | 0.1833 | 0.0164 | 0.5074 |
|     | 69 | 8.1670  | 1725.99 | 25.3179 | 0.1852 | 0.0164 | 0.5120 |
|     | 70 | 8.4920  | 1734.87 | 26.5422 | 0.1870 | 0.0164 | 0.5167 |
|     | 71 | 9.0134  | 1749.37 | 28.4753 | 0.1894 | 0.0168 | 0.5247 |
|     | 72 | 9.5348  | 1763.87 | 30.4085 | 0.1917 | 0.0173 | 0.5326 |
|     | 73 | 10.0562 | 1778.36 | 32.3416 | 0.1941 | 0.0178 | 0.5406 |
|     | 74 | 10.5776 | 1792.86 | 34.2747 | 0.1964 | 0.0182 | 0.5485 |
|     | 75 | 11.0990 | 1807.36 | 36.2079 | 0.1987 | 0.0187 | 0.5565 |
|     | 76 | 11.9477 | 1831.67 | 39.3526 | 0.2025 | 0.0187 | 0.5686 |
|     | 77 | 12.7964 | 1855.99 | 42.4974 | 0.2062 | 0.0187 | 0.5808 |
|     | 78 | 13.6452 | 1880.30 | 45.6421 | 0.2100 | 0.0187 | 0.5929 |
|     | 79 | 14.4939 | 1904.62 | 48.7869 | 0.2137 | 0.0187 | 0.6051 |
|     | 80 | 15.3426 | 1928.94 | 51.9317 | 0.2174 | 0.0187 | 0.6173 |

|     |    |         |           |         |        |        |        |
|-----|----|---------|-----------|---------|--------|--------|--------|
| Bus | 0  | 5.3553  | 8.37      | 0.7447  | 0.0000 | 0.0000 | 0.3598 |
|     | 5  | 13.1281 | 2053.23   | 12.3032 | 0.5882 | 0.0197 | 1.5475 |
|     | 6  | 12.6328 | 2031.71   | 12.0271 | 0.5735 | 0.0197 | 1.4984 |
|     | 7  | 12.1375 | 2010.19   | 11.7509 | 0.5588 | 0.0197 | 1.4493 |
|     | 8  | 11.6422 | 1988.67   | 11.4747 | 0.5441 | 0.0197 | 1.4001 |
|     | 9  | 11.1469 | 1967.15   | 11.1986 | 0.5294 | 0.0197 | 1.3510 |
|     | 10 | 10.6517 | 1945.63   | 10.9224 | 0.5147 | 0.0197 | 1.3019 |
|     | 11 | 9.9839  | 1916.94   | 10.5229 | 0.4921 | 0.0190 | 1.2323 |
|     | 12 | 9.3161  | 1888.25   | 10.1234 | 0.4695 | 0.0183 | 1.1627 |
|     | 13 | 8.6483  | 1859.56   | 9.7239  | 0.4469 | 0.0176 | 1.0931 |
|     | 14 | 7.9805  | 1830.87   | 9.3243  | 0.4243 | 0.0169 | 1.0236 |
|     | 15 | 7.3127  | 1802.18   | 8.9248  | 0.4017 | 0.0161 | 0.9540 |
|     | 16 | 6.9114  | 1785.32   | 8.6669  | 0.3863 | 0.0161 | 0.9092 |
|     | 17 | 6.5101  | 1768.46   | 8.4091  | 0.3708 | 0.0161 | 0.8643 |
|     | 18 | 6.1087  | 1751.61   | 8.1512  | 0.3554 | 0.0161 | 0.8195 |
|     | 19 | 5.7074  | 1734.75   | 7.8934  | 0.3400 | 0.0161 | 0.7747 |
|     | 20 | 5.3061  | 1717.89   | 7.6355  | 0.3246 | 0.0161 | 0.7298 |
|     | 21 | 5.0583  | 1707.49   | 7.4741  | 0.3135 | 0.0161 | 0.7001 |
|     | 22 | 4.8105  | 1697.09   | 7.3127  | 0.3023 | 0.0161 | 0.6703 |
|     | 23 | 4.5626  | 1686.69   | 7.1513  | 0.2912 | 0.0161 | 0.6405 |
|     | 24 | 4.3148  | 1676.29   | 6.9899  | 0.2801 | 0.0161 | 0.6108 |
|     | 25 | 4.0670  | 1665.89   | 6.8285  | 0.2690 | 0.0161 | 0.5810 |
|     | 26 | 3.9117  | 1658.72   | 6.7360  | 0.2611 | 0.0158 | 0.5609 |
|     | 27 | 3.7564  | 1651.55   | 6.6435  | 0.2532 | 0.0154 | 0.5408 |
|     | 28 | 3.6011  | 1644.37   | 6.5510  | 0.2453 | 0.0151 | 0.5207 |
|     | 29 | 3.4458  | 1637.20   | 6.4584  | 0.2374 | 0.0147 | 0.5007 |
|     | 30 | 3.2905  | 1630.03   | 6.3659  | 0.2295 | 0.0143 | 0.4806 |
|     | 31 | 3.1930  | 1626.44   | 6.3290  | 0.2238 | 0.0143 | 0.4670 |
|     | 32 | 3.0954  | 1622.85   | 6.2920  | 0.2181 | 0.0143 | 0.4533 |
|     | 33 | 2.9979  | 1619.27   | 6.2551  | 0.2123 | 0.0143 | 0.4397 |
|     | 34 | 2.9003  | 1615.68   | 6.2181  | 0.2066 | 0.0143 | 0.4261 |
|     | 35 | 2.8028  | 1612.10   | 6.1812  | 0.2008 | 0.0143 | 0.4124 |
|     | 36 | 2.7450  | 1609.58   | 6.1934  | 0.1965 | 0.0143 | 0.4028 |
|     | 37 | 2.6873  | 1607.07   | 6.2056  | 0.1922 | 0.0143 | 0.3931 |
|     | 38 | 2.6296  | 1604.56   | 6.2178  | 0.1879 | 0.0143 | 0.3834 |
|     | 39 | 2.5718  | 1602.05   | 6.2300  | 0.1836 | 0.0143 | 0.3737 |
|     | 40 | 2.5141  | 1599.54   | 6.2422  | 0.1793 | 0.0143 | 0.3640 |
|     | 41 | 2.4850  | 1598.11   | 6.3046  | 0.1765 | 0.0143 | 0.3576 |
|     | 42 | 2.4560  | 1596.67   | 6.3670  | 0.1736 | 0.0143 | 0.3511 |
|     | 43 | 2.4269  | 1595.24   | 6.4294  | 0.1707 | 0.0143 | 0.3447 |
|     | 44 | 2.3979  | 1593.80   | 6.4918  | 0.1678 | 0.0143 | 0.3382 |
|     | 45 | 2.3688  | 1592.37   | 6.5542  | 0.1650 | 0.0143 | 0.3317 |
|     | 46 | 2.3649  | 1593.09   | 6.6754  | 0.1632 | 0.0143 | 0.3278 |
|     | 47 | 2.3609  | 1593.80   | 6.7966  | 0.1614 | 0.0143 | 0.3239 |
|     | 48 | 2.3570  | 1594.52   | 6.9178  | 0.1596 | 0.0143 | 0.3199 |
|     | 49 | 2.3530  | 1595.24   | 7.0391  | 0.1578 | 0.0143 | 0.3160 |
|     | 50 | 2.3491  | 1595.96   | 7.1603  | 0.1560 | 0.0143 | 0.3120 |
|     | 51 | 2.3685  | 1597.03   | 7.3579  | 0.1549 | 0.0143 | 0.3099 |
|     | 52 | 2.3878  | 1598.11   | 7.5555  | 0.1539 | 0.0143 | 0.3077 |
|     | 53 | 2.4072  | 1599.18   | 7.7531  | 0.1528 | 0.0143 | 0.3056 |
|     | 54 | 2.4266  | 1600.26   | 7.9507  | 0.1517 | 0.0143 | 0.3034 |
|     | 55 | 2.4459  | 1601.34   | 8.1483  | 0.1506 | 0.0143 | 0.3013 |
|     | 56 | 2.4922  | 1603.85   | 8.4535  | 0.1503 | 0.0143 | 0.3005 |
|     | 57 | 2.5385  | 1606.36   | 8.7588  | 0.1499 | 0.0143 | 0.2998 |
|     | 58 | 2.5847  | 1608.87   | 9.0640  | 0.1496 | 0.0143 | 0.2991 |
|     | 59 | 2.6310  | 1611.38   | 9.3692  | 0.1492 | 0.0143 | 0.2984 |
|     | 60 | 2.6773  | 1613.89   | 9.6744  | 0.1488 | 0.0143 | 0.2977 |
|     | 61 | 2.7594  | 1618.55   | 10.1424 | 0.1492 | 0.0147 | 0.2987 |
|     | 62 | 2.8415  | 1623.21   | 10.6104 | 0.1496 | 0.0151 | 0.2998 |
|     | 63 | 2.9236  | 1627.88   | 11.0784 | 0.1499 | 0.0154 | 0.3009 |
|     | 64 | 3.0058  | 1632.54   | 11.5465 | 0.1503 | 0.0158 | 0.3020 |
|     | 65 | 3.0879  | 1637.20   | 12.0145 | 0.1506 | 0.0161 | 0.3031 |
|     | 66 | 3.2217  | 1644.37   | 12.7397 | 0.1513 | 0.0161 | 0.3056 |
|     | 67 | 3.3555  | 1651.55   | 13.4649 | 0.1521 | 0.0161 | 0.3081 |
|     | 68 | 3.4892  | 1658.72   | 14.1900 | 0.1528 | 0.0161 | 0.3106 |
|     | 69 | 3.6230  | 1665.89   | 14.9152 | 0.1535 | 0.0161 | 0.3131 |
|     | 70 | 3.7568  | 1673.06   | 15.6404 | 0.1542 | 0.0161 | 0.3156 |
|     | 71 | 3.9702  | 1684.54   | 16.7880 | 0.1560 | 0.0161 | 0.3203 |
|     | 72 | 4.1836  | 1696.02   | 17.9357 | 0.1578 | 0.0161 | 0.3249 |
|     | 73 | 4.3969  | 1707.49</ |         |        |        |        |

**Pavement Adjustments** (used only for pavement projects)

**Weaving Adjustments** (used only for freeway connector, HOV connector, and HOV drop ramp projects)

**TMS Adjustments** (used only for ramp metering, ramp metering signal coordination, incident management, traveler information projects, ALV, transit priority, and BRT projects)

| Area           | Proj Loc | CO | CO2e   | NOx     | PM10    | SOx     | VOC     |
|----------------|----------|----|--------|---------|---------|---------|---------|
| LA South Coast | 1        | 12 | 14,100 | 117,000 | 116,600 | 181,200 | 181,200 |
| CA Urban Area  | 2        | 51 | 51,400 | 414,000 | 414,600 | 617,200 | 617,200 |
| CA Rural Area  | 3        | 10 | 10,400 | 84,000  | 83,700  | 126,600 | 126,600 |

CO2e Updater: 1.03 increase in value per year

Sources: McCubbin and Deluchi, 1986 for emissions other than CO2e  
United Kingdom Department for Environment Food and Rural Affairs (DEFRA) for CO2e

| Mode            | Year | CO    | CO2 | NOx    | PM10  | SOx | VOC   |
|-----------------|------|-------|-----|--------|-------|-----|-------|
| Passenger Train | 2002 | 45.07 |     | 583.04 | 62.00 |     | 19.73 |
|                 | 2022 | 45.07 |     | 250.11 | 31.01 |     | 19.73 |

| Mode       | Year | CO   | CO2 | NOx  | PM10 | SOx | VOC  |
|------------|------|------|-----|------|------|-----|------|
| Light Rail | 2002 | 0.14 |     | 1.15 | 0.17 |     | 0.08 |
|            | 2022 | 0.14 |     | 0.14 | 0.17 |     | 0.05 |

Source: California Air Resources Board

| Year 0 | Light | Medium | Heavy |
|--------|-------|--------|-------|
| 0      | 125   | 150    | 350   |
| 25     | 150   | 200    | 600   |
| 50     | 175   | 250    | 675   |
| 75     | 200   | 300    | 750   |
| 100    | 275   | 400    | 750   |
| 125    | 325   | 475    | 750   |
| 150    | 400   | 575    | 750   |
| 175    | 500   | 700    | 750   |
| 200    | 575   | 750    | 750   |
| 225    | 650   | 750    | 750   |
| 250    | 750   | 750    | 750   |
| 275    | 750   | 750    | 750   |
| 300    | 750   | 750    | 750   |
| 325    | 750   | 750    | 750   |
| 350    | 750   | 750    | 750   |
| 375    | 750   | 750    | 750   |
| 400    | 750   | 750    | 750   |
| 425    | 750   | 750    | 750   |
| 450    | 750   | 750    | 750   |

Source: Paterson, 1987

| IRI | Auto | Truck |
|-----|------|-------|
| 0   | 1.00 | 1.02  |
| 25  | 1.00 | 1.02  |
| 50  | 1.00 | 1.02  |
| 75  | 1.00 | 1.02  |
| 100 | 1.00 | 1.02  |
| 125 | 1.00 | 1.02  |
| 150 | 1.00 | 1.01  |
| 175 | 1.00 | 1.00  |
| 200 | 1.00 | 0.98  |
| 225 | 1.00 | 0.95  |
| 250 | 1.00 | 0.92  |
| 275 | 0.97 | 0.83  |
| 300 | 0.96 | 0.81  |
| 325 | 0.94 | 0.78  |
| 350 | 0.94 | 0.76  |
| 375 | 0.93 | 0.73  |
| 400 | 0.92 | 0.71  |
| 425 | 0.91 | 0.69  |
| 450 | 0.90 | 0.67  |

Source: Bobenil, 1996 and 1997

| IRI | Auto | Truck |
|-----|------|-------|
| 0   | 0.97 | 0.98  |
| 25  | 0.98 | 0.97  |
| 50  | 0.98 | 0.97  |
| 75  | 0.98 | 0.98  |
| 100 | 0.98 | 0.98  |
| 125 | 0.98 | 0.98  |
| 150 | 1.00 | 0.99  |
| 175 | 1.00 | 1.00  |
| 200 | 1.01 | 1.01  |
| 225 | 1.01 | 1.02  |
| 250 | 1.02 | 1.02  |
| 275 | 1.03 | 1.04  |
| 300 | 1.03 | 1.05  |
| 325 | 1.04 | 1.06  |
| 350 | 1.05 | 1.07  |
| 375 | 1.06 | 1.08  |
| 400 | 1.07 | 1.10  |
| 425 | 1.08 | 1.11  |
| 450 | 1.09 | 1.13  |

Source: Texas Transportation Institute, 1994

| IRI | Auto | Truck |
|-----|------|-------|
| 0   | 1.00 | 1.00  |
| 25  | 1.00 | 1.00  |
| 50  | 1.00 | 1.00  |
| 75  | 1.00 | 1.00  |
| 100 | 1.00 | 1.00  |
| 125 | 1.00 | 1.00  |
| 150 | 1.00 | 1.00  |
| 175 | 1.00 | 1.00  |
| 200 | 1.00 | 1.00  |
| 225 | 1.07 | 1.08  |
| 250 | 1.08 | 1.10  |
| 275 | 1.11 | 1.12  |
| 300 | 1.13 | 1.14  |
| 325 | 1.14 | 1.16  |
| 350 | 1.16 | 1.18  |
| 375 | 1.18 | 1.20  |
| 400 | 1.19 | 1.22  |
| 425 | 1.21 | 1.24  |
| 450 | 1.23 | 1.26  |

Source: ARRB Research Board TR VOC Model

| Percent Weaving | Freeway |         | HOV Project |
|-----------------|---------|---------|-------------|
|                 | Conn.   | Project |             |
| 0.000           | 1.00    | 1.00    |             |
| 0.002           | 0.98    | 0.99    |             |
| 0.004           | 0.96    | 0.98    |             |
| 0.006           | 0.95    | 0.96    |             |
| 0.008           | 0.93    | 0.95    |             |
| 0.010           | 0.91    | 0.94    |             |
| 0.012           | 0.89    | 0.93    |             |
| 0.014           | 0.87    | 0.92    |             |
| 0.016           | 0.85    | 0.90    |             |
| 0.018           | 0.84    | 0.89    |             |
| 0.020           | 0.79    | 0.88    |             |
| 0.022           | 0.75    | 0.87    |             |
| 0.024           | 0.71    | 0.85    |             |
| 0.026           | 0.66    | 0.84    |             |
| 0.028           | 0.62    | 0.82    |             |
| 0.030           | 0.58    | 0.79    |             |
| 0.032           | 0.54    | 0.76    |             |
| 0.034           | 0.50    | 0.73    |             |
| 0.036           | 0.48    | 0.71    |             |
| 0.038           | 0.47    | 0.68    |             |
| 0.040           | 0.47    | 0.65    |             |
| 0.042           | 0.47    | 0.62    |             |
| 0.044           | 0.47    | 0.60    |             |
| 0.046           | 0.46    | 0.57    |             |
| 0.048           | 0.46    | 0.54    |             |
| 0.050           | 0.46    | 0.51    |             |
| 0.052           | 0.46    | 0.48    |             |
| 0.054           | 0.45    | 0.48    |             |
| 0.056           | 0.45    | 0.47    |             |
| 0.058           | 0.45    | 0.47    |             |
| 0.060           | 0.45    | 0.47    |             |
| 0.062           | 0.45    | 0.47    |             |
| 0.064           | 0.45    | 0.47    |             |
| 0.066           | 0.45    | 0.47    |             |
| 0.068           | 0.45    | 0.46    |             |
| 0.070           | 0.45    | 0.46    |             |
| 0.072           | 0.45    | 0.46    |             |
| 0.074           | 0.45    | 0.46    |             |
| 0.076           | 0.45    | 0.46    |             |
| 0.078           | 0.45    | 0.46    |             |
| 0.080           | 0.45    | 0.45    |             |

Source: Fitzpatrick, Brewer, and Venglar, 2003

| TMS Strategy | Speed | Volume | Speed | Volume | TT    | VOC   | Em    | Total Benefit |
|--------------|-------|--------|-------|--------|-------|-------|-------|---------------|
| AMov         | 1.02  | 0.95   | 1.02  | 0.95   | -0.05 | 12.81 | 1.37  | 0.74          |
| AMov         | 1.53  | 0.94   | 1.53  | 0.94   | 1.21  | 1.38  | -0.37 | 1.90          |
| Mov          | 0.88  | 1.18   | 0.98  | 0.95   | 0.51  | 0.15  | 0.06  | 0.24          |
| IMov         | 1.01  | 0.97   | 1.01  | 0.95   | 0.30  | 0.31  | 0.30  | 1.00          |
| Nokd         | 1.00  | 1.00   | 1.00  | 1.00   | 0.00  | 0.00  | 0.00  | 1.00          |
| ORov         | 0.98  | 1.03   | 1.00  | 1.00   | -0.07 | -0.03 | -0.07 | 0.00          |
| ORov         | 0.95  | 1.03   | 1.00  | 1.00   | 0.00  | 0.00  | 0.00  | 5.67          |
| RMov         | 1.00  | 1.00   | 1.03  | 0.97   | -0.07 | -0.03 | -0.07 | 1.00          |
| RNov         | 1.00  | 1.00   | 1.05  | 0.97   | 0.00  | 0.00  | 5.67  | 1.00          |
| Tov          | 1.00  | 1.00   | 1.02  | 0.97   | -0.11 | -0.12 | 0.35  | 1.00          |
| Tov          | 1.00  | 1.00   | 1.01  | 0.97   | -0.39 | -0.39 | 0.35  | 1.00          |

Source: California Department of Transportation TMS Master Plan, 2003  
19) Chauthry and Messer, 2000

| TMS Strategy                    | Travel | Capital | O&M |
|---------------------------------|--------|---------|-----|
| Transit Vehicle Location (AVL)  | 10%    | 2%      | 8%  |
| Transit Vehicle Signal Priority | 10%    | -       | -   |
| Bus Rapid Transit (BRT)         | 20%    | -       | -   |

Sources: FHWA ITS Deployment Analysis System (IDAS), California PATH