

APPENDIX 14

Planning Assumptions for Development of 2009 CHDNGA TPO TransCAD Model 2009 Emissions Results

Memorandum

TO: Chattanooga Interagency Consultation Committee (ICC)

FROM: Melissa Taylor, Chattanooga TPO
Keli Paul, AICP, Cambridge Systematics

DATE: December 21, 2007 (DRAFT - Excludes Georgia Emissions)

RE: Planning Assumptions for Development of 2009 CHCNGA TPO TransCAD Model and 2009 Emissions Results

As agreed upon by the Chattanooga ICC, the TPO developed a 2009 TransCAD travel demand model for the Chattanooga-Hamilton County/North Georgia (CHCNGA) TPO region. The purpose of developing the 2009 model was to provide emissions for the 2009 attainment year required for establishing the State Implementation Plan (SIP) budgets. Documentation of the planning assumptions used to develop the 2009 TransCAD travel demand model are provided below. These planning assumptions were provided to the Chattanooga Interagency Consultation Committee (ICC) for concurrence. The TPO has since completed development of the 2009 model and emission estimates for the 2009 nonattainment year for both Hamilton County, Tennessee and the Jackson County, Alabama donut area. The Georgia Department of Transportation is currently working on the Georgia emissions. As a result, a placeholder for Georgia emissions has been included in this technical memorandum. This technical memorandum includes both the planning assumptions already reviewed, as well as the emissions results.

PLANNING ASSUMPTIONS

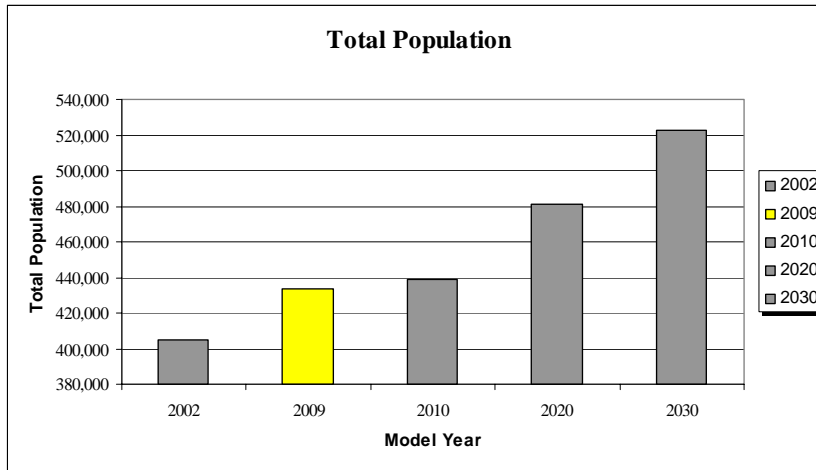
The geographic areas included in the Chattanooga nonattainment region remained the same as those covered in the current CDR, which includes Hamilton County, Tennessee; Walker County, Georgia; Catoosa County, Georgia; and a portion of Jackson County, Alabama. Planning assumptions for all three states are documented within this technical memorandum.

Planning Assumptions That Changed

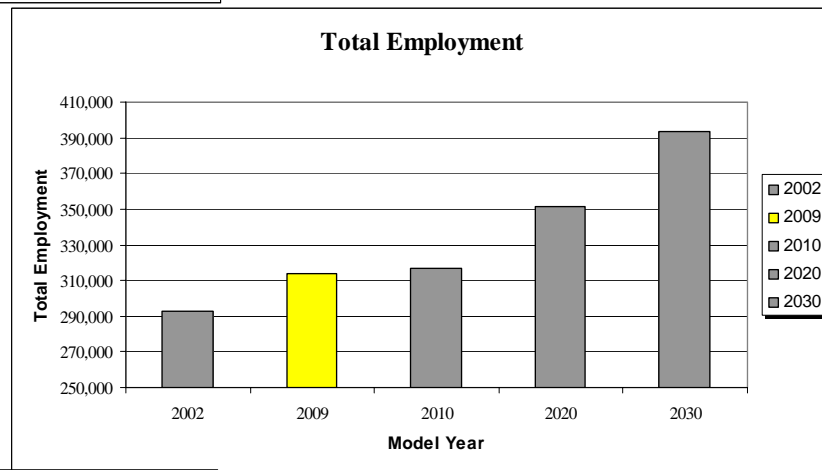
The following assumptions and/or methodologies have changed since the FY '08 TIP Update CDR currently being developed:

- To develop the 2009 model network, the 2010 model network was used as a starting point. The list of non-exempt projects programmed in the TIP for construction during the year of 2010 was reviewed to determine which non-exempt transportation projects should be removed from the 2010 model network to make up the 2009 model network. Only one project is programmed for construction after the year 2009 but before the end

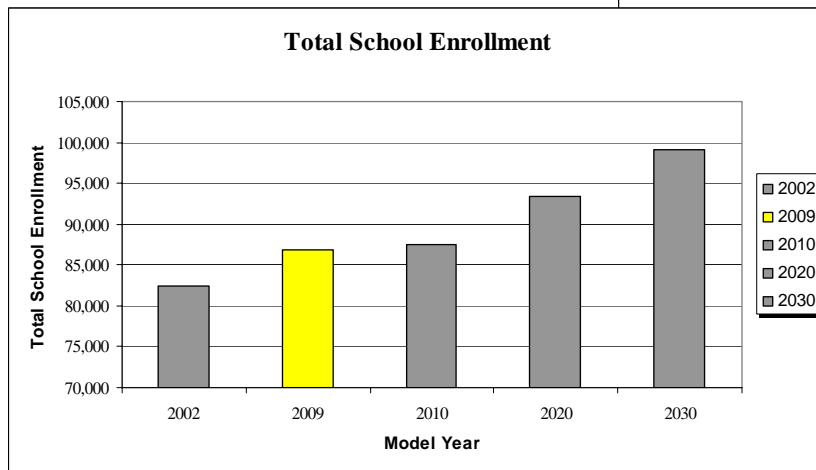
*Figure 1: Comparison of Total Population among Model Years
(Entire TPO Model)*



*Figure 2: Comparison of Total Employment among Model Years
(Entire TPO Model)*



*Figure 3: Comparison of Total School Enrollment among Model Years
(Entire TPO Model)*



2009 EMISSION RESULTS

Emission estimates for the year 2009 for each state are provided below.

Tennessee

Table 1 below demonstrates the model vehicle miles traveled (VMT), speed, and HPMS adjustment factors for Hamilton County, TN in the year 2009.

**Table 1: 2009 Model VMT, Model Speed, Adjustment Factors
Hamilton County**

County	Functional Class(es)	2009 Daily Model VMT	Model Average Speed (MPH)	Daily 2002 HPMS	2002 HPMS Adjustment Factor	2009 Adjusted Daily Model VMT
Hamilton County, Tennessee						
All Local	0 & 9 & 19 ^a	1,092,132	9.5	955,414	0.99	1,081,211
Rural Interstate	1	227,234	36.2	116,769	0.57	129,523
Rural Principal Arterial	2	243,690	40.1	220,514	1.13	275,370
Rural Minor Arterial	6	199,057	42.3	130,096	0.76	151,283
Rural Collector	7 & 8 ^b	139,437	33.0	116,311	0.93	129,676
Urban Interstate	11	2,572,106	41.9	2,516,974	1.13	2,906,480
Urban Freeway	12	910,419	42.6	1,253,803	1.5	1,365,629
Urban Other Arterial	14	2,304,299	36.3	1,789,711	0.87	2,004,740
Urban Minor Arterial	16	2,237,339	31.4	2,381,303	1.15	2,572,940
Urban Collector	17	347,507	32.3	460,260	1.51	524,736
Total		10,273,220	28.2	9,941,155		11,141,587

Table 2 compares the Hamilton County, TN emissions by HPMS functional class by model year. As expected, the difference between emissions in the year 2009 and the year 2010 is minimal.

**Table 2: Summary of Emissions Estimates by Model Year
Hamilton County**

County	Functional Class(es)	2002*		2009		2010*		2020*		2030*	
		Daily Model PM _{2.5} (Grams)	Daily Model NO _x (Grams)	Daily Model PM _{2.5} (Grams)	Daily Model NO _x (Grams)	Daily Model PM _{2.5} (Grams)	Daily Model NO _x (Grams)	Daily Model PM _{2.5} (Grams)	Daily Model NO _x (Grams)	Daily Model PM _{2.5} (Grams)	Daily Model NO _x (Grams)
Hamilton County, Tennessee											
All Local	0 & 9 & 19 ^a	49,255	2,357,512	30,359	1,410,941	25,311	1,184,412	18,693	452,420	20,546	305,265
Rural Interstate	1	5,909	314,225	3,627	165,272	3,379	148,901	2,202	51,417	2,200	30,574
Rural Principal Arterial	2	11,177	562,015	7,711	347,747	7,307	319,521	5,387	126,078	5,988	84,460
Rural Minor Arterial	6	6,583	324,678	4,236	190,010	3,968	172,607	2,905	68,046	3,172	45,809
Rural Collector	7 & 8 ^b	5,952	284,639	3,636	164,207	3,404	149,220	2,245	52,765	2,312	33,356
Urban Interstate	11	127,410	7,200,606	81,382	3,983,643	76,907	3,635,571	51,769	1,285,736	52,628	778,208
Urban Freeway	12	63,487	3,566,929	38,238	1,865,088	35,589	1,678,468	23,881	593,868	23,985	357,652
Urban Other Arterial	14	90,747	4,534,936	56,118	2,528,591	52,309	2,283,606	33,118	776,259	34,976	498,830
Urban Minor Arterial	16	121,398	5,882,864	72,048	3,228,846	67,514	2,929,120	46,074	1,076,903	46,387	661,426
Urban Collector	17	23,771	1,141,960	14,720	683,258	13,814	620,943	8,191	199,349	8,656	125,684
Total		505,689	26,170,366	312,073	14,567,602	289,500	13,122,368	194,466	4,682,840	200,850	2,921,264

* Emission Estimates from Draft FY '08 TIP Update CDR currently under review by the public.

Georgia

(Will be completed once Georgia data is received.)

Alabama

Table 3 provides the VMT and emissions for the entirety of Jackson County, AL and the Jackson County, AL donut area.

**Table 3: 2009 VMT and Emissions Estimates
Jackson County, Alabama & Jackson County Donut Area**

County	Functional Class(es)	Model Average Speed (MPH)	All of Jackson County			Jackson County Donut Area		
			Daily Model VMT	Daily Model PM _{2.5} (Grams)	Daily Model NO _x (Grams)	Daily Model VMT (Grams)	Daily Model PM _{2.5} (Grams)	Daily Model NO _x (Grams)
Jackson County, AL								
Rural Principal Arterial	2	42	694,122	19,644	950,948	7,934	225	10,869
Rural Minor Arterial	6	33	172,369	4,878	228,561	1,970	56	2,612
Rural Collector	7	34	214,980	6,105	307,636	2,457	70	3,516
Rural Collector	8	34	74,482	2,115	106,583	851	24	1,218
Local	9	13	302,536	8,592	432,929	3,458	98	4,948
Urban Other Arterial	14	42	286,902	8,119	393,055	3,279	93	4,493
Urban Minor Arterial	16	36	103,548	2,930	137,512	1,184	33	1,572
Urban Collector	17	35	19,326	549	27,655	221	6	316
Local	19	13	173,800	4,936	248,708	1,987	56	2,843
Total			2,042,064	57,869	2,833,587	23,341	661	32,388

Table 4 compares emissions for the entirety of Jackson County, AL by HPMS functional class by model year. As expected the difference between emissions in the year 2009 and 2010 is minimal.

**Table 4: Summary of Emissions Estimates by Model Year
Jackson County, Alabama**

County	Functional Class(es)	2002*		2009		2010*		2020*		2030*	
		Daily Model PM _{2.5} (Grams)	Daily Model NO _x (Grams)	Daily Model PM _{2.5} (Grams)	Daily Model NO _x (Grams)	Daily Model PM _{2.5} (Grams)	Daily Model NO _x (Grams)	Daily Model PM _{2.5} (Grams)	Daily Model NO _x (Grams)	Daily Model PM _{2.5} (Grams)	Daily Model NO _x (Grams)
Jackson County, Alabama											
Rural Principal Arterial	2	33,211	1,641,507	19,644	950,948	18,052	868,297	11,290	376,581	11,160	281,450
Rural Minor Arterial	6	8,247	401,762	4,878	228,561	4,483	209,019	2,804	91,445	2,792	68,058
Rural Collector	7	10,550	500,064	6,105	307,636	5,613	281,493	3,497	119,449	3,482	87,169
Rural Collector	8	3,655	173,251	2,115	106,583	1,945	97,526	1,211	41,384	1,206	30,201
Local	9	14,847	703,728	8,592	432,929	7,898	396,138	4,921	168,097	4,900	122,671
Urban Other Arterial	14	13,348	668,480	8,119	393,055	7,491	360,317	4,874	163,564	5,013	127,158
Urban Minor Arterial	16	4,818	233,840	2,930	137,512	2,704	126,063	1,759	57,380	1,809	44,696
Urban Collector	17	922	43,714	549	27,655	507	25,405	328	11,216	340	8,516
Local	19	8,294	393,128	4,936	248,708	4,555	228,475	2,953	100,868	3,059	76,583
Total		97,893	4,759,474	57,869	2,833,587	53,246	2,592,733	33,637	1,129,985	33,759	846,502

* Emission estimates from Draft FY '08 TIP Update CDR currently under review by the public.

Table 5 compares emissions for the Jackson County, AL donut area by HPMS functional class by model year. As expected the difference between emissions in the year 2009 and 2010 is minimal.

**Table 5: Summary of Emissions Estimates by Model Year
Jackson County, Alabama Donut Area**

County	Functional Class(es)	2002*		2009		2010*		2020*		2030*	
		Daily Model PM _{2.5} (Grams)	Daily Model NO _x (Grams)	Daily Model PM _{2.5} (Grams)	Daily Model NO _x (Grams)	Daily Model PM _{2.5} (Grams)	Daily Model NO _x (Grams)	Daily Model PM _{2.5} (Grams)	Daily Model NO _x (Grams)	Daily Model PM _{2.5} (Grams)	Daily Model NO _x (Grams)
Jackson County Donut Area											
Rural Principal Arterial	2	380	18,762	225	10,869	206	9,925	129	4,304	128	3,217
Rural Minor Arterial	6	94	4,592	56	2,612	51	2,389	32	1,045	32	778
Rural Collector	7	121	5,716	70	3,516	64	3,217	40	1,365	40	996
Rural Collector	8	42	1,980	24	1,218	22	1,115	14	473	14	345
Local	9	170	8,044	98	4,948	90	4,528	56	1,921	56	1,402
Urban Other Arterial	14	153	7,641	93	4,493	86	4,118	56	1,870	57	1,453
Urban Minor Arterial	16	55	2,673	33	1,572	31	1,441	20	656	21	511
Urban Collector	17	11	500	6	316	6	290	4	128	4	97
Local	19	95	4,493	56	2,843	52	2,611	34	1,153	35	875
Total		1,119	54,401	661	32,388	609	29,635	384	12,916	386	9,676

* Emission estimates from Draft FY '08 TIP Update CDR currently under review by the public.

Summary

As indicated earlier, the difference in emissions for both PM_{2.5} and NO_x between model years 2009 and 2010 is minimal. Assuming utilization of the less than 2002 baseline test, the Chattanooga nonattainment area still meets conformity in the year 2009 for both PM_{2.5} and NO_x. However, the purpose of developing a 2009 TransCAD travel demand model and calculating emissions for the year 2009 was to assist the States with developing their SIP budgets for the 2009 attainment year. The year 2009 emissions will be provided to the States for comparison to their air quality modeling efforts and will be used to assist with developing their SIP budgets.

Figure 4: Summary of Revised NO_x Emissions for Chattanooga Nonattainment Region
Figure will be inserted once Georgia data is received.

Figure 5: Summary of Revised PM_{2.5} Emissions for Chattanooga Nonattainment Region
Figure will be inserted once Georgia data is received.

Table 6: Summary Emissions Estimates for NO_x (Grams/Day)
Table will be completed once Georgia data is received.

Area	2002	2009	2010	2020	2030
Hamilton County, TN	26,170,366	14,567,602	13,122,368	4,682,840	2,921,264
Catoosa County, GA					
Walker County, GA					
TPO Portion of Walker County					
Walker County Donut Area					
Jackson County, AL Donut Area	54,401	32,388	29,635	12,916	9,676
Total Chattanooga TN-GA-AL Nonattainment Area					

Table 7: Summary Emissions Estimates for PM_{2.5} (Grams/Day)

Table will be completed once Georgia data is received.

Area	2002	2009	2010	2020	2030
Hamilton County, TN	505,689	312,073	289,500	194,466	200,850
Catoosa County, GA					
Walker County, GA					
TPO Portion of Walker County					
Walker County Donut Area					
Jackson County, AL Donut Area	1,119	661	609	384	386
Total Chattanooga TN-GA-AL Nonattainment Area					

Appendix A includes the MOBILE6 input files for the year 2009 for each state. Appendix B includes the MOBILE6 output emission factors for the year 2009 for each state.

Appendix A: MOBILE6 Inputs for 2009

Tennessee - Arterials/Collectors, Ramps and Local Roads

```
*
* 7-1-09, Chattanooga arterials/collectors, default reg. dist., default VMT mix
(09AchaTN.in)
*
MOBILE6 INPUT FILE :
>
POLLUTANTS          : NOx
PARTICULATES        :

RUN DATA
>
* next lines show average annual hourly temp. for Chattanooga, 2000-2002
HOURLY TEMPERATURES: 54 55 58 61 64 66 68 69 70 70 70 68
                    66 63 61 59 58 57 56 56 55 54 54 53

* see "Chattanooga_average_annual_sulfur and_rvp2.xls" for information on average
annual RVP
FUEL RVP            : 9.8

I/M DESCRIPT FILE   : HaCoIM.d

ANTI-TAMP PROG      :
05 75 95 22222 21111111 1 11 099 12211112
*
*
SCENARIO REC        : arterial, Chattanooga, 2009, 2.5 mph
> 7-1-09, default reg. dist., default VMT mix (09AchaTN.in)
CALENDAR YEAR       : 2009
EVALUATION MONTH    : 7
* next lines show average annual hourly rel. humidity for Chattanooga, 2000-2002
RELATIVE HUMIDITY   : 85 82 76 69 62 58 55 52 50 50 51 54
                    60 66 71 75 78 80 82 83 84 85 86 86

* next line shows average annual daily barometric pressure for Chattanooga, 2000-
2002
BAROMETRIC PRES     : 29.36
PARTICLE SIZE       : 2.5
PARTICULATE EF      : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV
PMDDR2.CSV
DIESEL SULFUR       : 43.0
AVERAGE SPEED      : 2.5 Arterial 0.0 100.0 0.0 0.0
```

Tennessee - Freeways

```
*
* 7-1-09, Chattanooga freeways, default reg. dist., default VMT mix (09FchaTN.in)
*
MOBILE6 INPUT FILE :
>
POLLUTANTS          : NOx
PARTICULATES        :

RUN DATA
>
* next lines show average annual hourly temp. for Chattanooga, 2000-2002
HOURLY TEMPERATURES: 54 55 58 61 64 66 68 69 70 70 70 68
                    66 63 61 59 58 57 56 56 55 54 54 53

* see "Chattanooga_average_annual_sulfur and_rvp2.xls" for information on average
```

```

annual RVP
FUEL RVP          : 9.8

I/M DESCRIPT FILE : HaCoIM.d

ANTI-TAMP PROG   :
05 75 95 22222 21111111 1 11 099 12211112
*
*
SCENARIO REC     : freeway, Chattanooga, 2009, 2.5 mph
> 7-1-09, default reg. dist., default VMT mix (09FchaTN.in)
CALENDAR YEAR    : 2009
EVALUATION MONTH : 7
* next lines show average annual hourly rel. humidity for Chattanooga, 2000-2002
RELATIVE HUMIDITY : 85 82 76 69 62 58 55 52 50 50 51 54
                   60 66 71 75 78 80 82 83 84 85 86 86
* next line shows average annual daily barometric pressure for Chattanooga, 2000-
2002
BAROMETRIC PRES  : 29.36
PARTICLE SIZE    : 2.5
PARTICULATE EF   : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV
PMDDR2.CSV
DIESEL SULFUR    : 43.0
AVERAGE SPEED   : 2.5 Non-Ramp 100.0 0.0 0.0 0.0

```

Alabama - Arterials/Collectors, Ramps and Local Roads

```

*
* 7-1-09, Chattanooga arterials/collectors in Alabama, default reg. dist., default
VMT mix (09AchaAL.in)
*
MOBILE6 INPUT FILE :
>
POLLUTANTS          : NOx
PARTICULATES        :

RUN DATA
>
* next lines show average annual hourly temp. for Chattanooga, 2000-2002
HOURLY TEMPERATURES: 54 55 58 61 64 66 68 69 70 70 70 68
                   66 63 61 59 58 57 56 56 55 54 54 53

* see "Chattanooga_average_annual_sulfur_and_rvp2.xls" for information on average
annual RVP
FUEL RVP          : 9.8

*No I/M program in Alabama
*I/M DESCRIPT FILE : HaCoIM.d

*ANTI-TAMP PROG   :
*05 75 95 22222 21111111 1 11 099 12211112
*
*
SCENARIO REC     : arterial, Chattanooga, 2009, 2.5 mph
> 7-1-09, default reg. dist., default VMT mix (09AchaAL.in)
CALENDAR YEAR    : 2009
EVALUATION MONTH : 7
* next lines show average annual hourly rel. humidity for Chattanooga, 2000-2002
RELATIVE HUMIDITY : 85 82 76 69 62 58 55 52 50 50 51 54
                   60 66 71 75 78 80 82 83 84 85 86 86
* next line shows average annual daily barometric pressure for Chattanooga, 2000-

```

```

2002
BAROMETRIC PRES      : 29.36
PARTICLE SIZE       : 2.5
PARTICULATE EF      : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV
PMDDR2.CSV
DIESEL SULFUR       : 43.0
AVERAGE SPEED      : 2.5 Arterial 0.0 100.0 0.0 0.0

```

Alabama - Freeways

```

*
* 7-1-09, Chattanooga freeways in Alabama, default reg. dist., default VMT mix
(09FchaAL.in)
*
MOBILE6 INPUT FILE :
>
POLLUTANTS          : NOx
PARTICULATES        :

RUN DATA
>
* next lines show average annual hourly temp. for Chattanooga, 2000-2002
HOURLY TEMPERATURES: 54 55 58 61 64 66 68 69 70 70 70 68
                    66 63 61 59 58 57 56 56 55 54 54 53

* see "Chattanooga_average_annual_sulfur and_rvp2.xls" for information on average
annual RVP
FUEL RVP             : 9.8

* no I/M program in AL
*I/M DESCRIPT FILE  : HaCoIM.d

*ANTI-TAMP PROG      :
*05 75 95 22222 21111111 1 11 099 12211112
*
*-----*
SCENARIO REC         : freeway, Chattanooga, 2009, 2.5 mph
> 7-1-09, default reg. dist., default VMT mix (09FchaAL.in)
CALENDAR YEAR        : 2009
EVALUATION MONTH     : 7
* next lines show average annual hourly rel. humidity for Chattanooga, 2000-2002
RELATIVE HUMIDITY    : 85 82 76 69 62 58 55 52 50 50 51 54
                    60 66 71 75 78 80 82 83 84 85 86 86

* next line shows average annual daily barometric pressure for Chattanooga, 2000-
2002
BAROMETRIC PRES      : 29.36
PARTICLE SIZE       : 2.5
PARTICULATE EF      : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV
PMDDR2.CSV
DIESEL SULFUR       : 43.0
AVERAGE SPEED      : 2.5 Non-Ramp 100.0 0.0 0.0 0.0

```

Georgia - Arterials/Collectors, Ramps and Local Roads

```

*
* 7-1-09, Chattanooga arterials/collectors, '02 Chattanooga MSA reg. dist. (default
for Class 8b), default VMT mix (09AchaGA.in)
*
MOBILE6 INPUT FILE :
>

```

POLLUTANTS : NOx
PARTICULATES :

RUN DATA

>
* next lines show average annual hourly temp. for Chattanooga, 2000-2002
HOURLY TEMPERATURES: 54 55 58 61 64 66 68 69 70 70 70 68
66 63 61 59 58 57 56 56 55 54 54 53

* see "Chattanooga_average_annual_sulfur and_rvp2.xls" for information on average annual RVP
FUEL RVP : 9.8

* registration distribution for Catoosa, Dade, and Walker counties
REG DIST : 02chamsa.d

*
*

SCENARIO REC : arterial, Chattanooga, 2009, 2.5 mph
> 7-1-09, '02 Chattanooga MSA reg. dist. (default for Class 8b), default VMT mix (09AchaGA.in)

CALENDAR YEAR : 2009
EVALUATION MONTH : 7

* next lines show average annual hourly rel. humidity for Chattanooga, 2000-2002
RELATIVE HUMIDITY : 85 82 76 69 62 58 55 52 50 50 51 54
60 66 71 75 78 80 82 83 84 85 86 86

* next line shows average annual daily barometric pressure for Chattanooga, 2000-2002

BAROMETRIC PRES : 29.36
PARTICLE SIZE : 2.5
PARTICULATE EF : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV
PMDDR2.CSV
DIESEL SULFUR : 43.0
AVERAGE SPEED : 2.5 Arterial 0.0 100.0 0.0 0.0

Georgia - Freeways

*
* 7-1-09, Chattanooga freeways, '02 Chattanooga MSA reg. dist. (default for Class 8b), default VMT mix (09FchaGA.in)

*

MOBILE6 INPUT FILE :

>
POLLUTANTS : NOx
PARTICULATES :

RUN DATA

>
* next lines show average annual hourly temp. for Chattanooga, 2000-2002
HOURLY TEMPERATURES: 54 55 58 61 64 66 68 69 70 70 70 68
66 63 61 59 58 57 56 56 55 54 54 53

* see "Chattanooga_average_annual_sulfur and_rvp2.xls" for information on average annual RVP
FUEL RVP : 9.8

* registration distribution for Catoosa, Dade, and Walker counties
REG DIST : 02chamsa.d

*
*

SCENARIO REC : freeway, Chattanooga, 2009, 2.5 mph
> 7-1-09, '02 Chattanooga MSA reg. dist. (default for Class 8b), default VMT mix (09FchaGA.in)

CALENDAR YEAR : 2009
EVALUATION MONTH : 7
* next lines show average annual hourly rel. humidity for Chattanooga, 2000-2002
RELATIVE HUMIDITY : 85 82 76 69 62 58 55 52 50 50 51 54
60 66 71 75 78 80 82 83 84 85 86 86
* next line shows average annual daily barometric pressure for Chattanooga, 2000-2002
BAROMETRIC PRES : 29.36
PARTICLE SIZE : 2.5
PARTICULATE EF : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV
PMDDR2.CSV
DIESEL SULFUR : 43.0
AVERAGE SPEED : 2.5 Non-Ramp 100.0 0.0 0.0 0.0

Appendix B: MOBILE6 Output Emission Factors for 2009

Tennessee

Speed	Composite Arterial (All Veh)		Composite Freeway (All Veh)		Composite Local (All Veh)		Composite Ramp (All Veh)	
	direct PM	NOx	direct PM	NOx	direct PM	NOx	direct PM	NOx
2.50	0.0281	2.203	0.0281	2.27	0.0281	1.313	0.028	1.283
3.00	0.0281	2.126	0.0281	2.194	0.0281	1.313	0.028	1.283
4.00	0.0281	2.03	0.0281	2.098	0.0281	1.313	0.028	1.283
5.00	0.0281	1.973	0.0281	2.04	0.0281	1.313	0.028	1.283
6.00	0.0281	1.866	0.0281	1.898	0.0281	1.313	0.028	1.283
7.00	0.0281	1.79	0.0281	1.796	0.0281	1.313	0.028	1.283
8.00	0.0281	1.733	0.0281	1.72	0.0281	1.313	0.028	1.283
9.00	0.0281	1.689	0.0281	1.66	0.0281	1.313	0.028	1.283
10.00	0.0281	1.653	0.0281	1.613	0.0281	1.313	0.028	1.283
11.00	0.0281	1.596	0.0281	1.549	0.0281	1.313	0.028	1.283
12.00	0.0281	1.549	0.0281	1.496	0.0281	1.313	0.028	1.283
13.00	0.0281	1.509	0.0281	1.451	0.0281	1.313	0.028	1.283
14.00	0.0281	1.475	0.0281	1.412	0.0281	1.313	0.028	1.283
15.00	0.0281	1.445	0.0281	1.379	0.0281	1.313	0.028	1.283
16.00	0.0281	1.415	0.0281	1.364	0.0281	1.313	0.028	1.283
17.00	0.0281	1.389	0.0281	1.352	0.0281	1.313	0.028	1.283
18.00	0.0281	1.365	0.0281	1.34	0.0281	1.313	0.028	1.283
19.00	0.0281	1.344	0.0281	1.33	0.0281	1.313	0.028	1.283
20.00	0.0281	1.325	0.0281	1.321	0.0281	1.313	0.028	1.283
21.00	0.0281	1.308	0.0281	1.313	0.0281	1.313	0.028	1.283
22.00	0.0281	1.292	0.0281	1.305	0.0281	1.313	0.028	1.283
23.00	0.0281	1.278	0.0281	1.298	0.0281	1.313	0.028	1.283
24.00	0.0281	1.264	0.0281	1.292	0.0281	1.313	0.028	1.283
25.00	0.0281	1.252	0.0281	1.286	0.0281	1.313	0.028	1.283
26.00	0.028	1.243	0.028	1.282	0.0281	1.313	0.028	1.283
27.00	0.028	1.234	0.028	1.279	0.0281	1.313	0.028	1.283
28.00	0.028	1.226	0.028	1.276	0.0281	1.313	0.028	1.283
29.00	0.028	1.219	0.028	1.273	0.0281	1.313	0.028	1.283
30.00	0.028	1.212	0.028	1.27	0.0281	1.313	0.028	1.283
31.00	0.028	1.209	0.028	1.27	0.0281	1.313	0.028	1.283
32.00	0.028	1.207	0.028	1.27	0.0281	1.313	0.028	1.283
33.00	0.028	1.206	0.028	1.27	0.0281	1.313	0.028	1.283
34.00	0.028	1.204	0.028	1.27	0.0281	1.313	0.028	1.283
35.00	0.028	1.202	0.028	1.27	0.0281	1.313	0.028	1.283
36.00	0.028	1.208	0.028	1.276	0.0281	1.313	0.028	1.283
37.00	0.028	1.213	0.028	1.281	0.0281	1.313	0.028	1.283
38.00	0.028	1.219	0.028	1.286	0.0281	1.313	0.028	1.283
39.00	0.028	1.224	0.028	1.291	0.0281	1.313	0.028	1.283
40.00	0.028	1.228	0.028	1.296	0.0281	1.313	0.028	1.283
41.00	0.028	1.239	0.028	1.307	0.0281	1.313	0.028	1.283
42.00	0.028	1.25	0.028	1.317	0.0281	1.313	0.028	1.283
43.00	0.028	1.259	0.028	1.327	0.0281	1.313	0.028	1.283
44.00	0.028	1.269	0.028	1.336	0.0281	1.313	0.028	1.283

45.00	0.028	1.278	0.028	1.345	0.0281	1.313	0.028	1.283
46.00	0.028	1.293	0.028	1.361	0.0281	1.313	0.028	1.283
47.00	0.028	1.309	0.028	1.376	0.0281	1.313	0.028	1.283
48.00	0.028	1.323	0.028	1.391	0.0281	1.313	0.028	1.283
49.00	0.028	1.337	0.028	1.405	0.0281	1.313	0.028	1.283
50.00	0.028	1.351	0.028	1.418	0.0281	1.313	0.028	1.283
51.00	0.028	1.373	0.028	1.441	0.0281	1.313	0.028	1.283
52.00	0.028	1.395	0.028	1.462	0.0281	1.313	0.028	1.283
53.00	0.028	1.416	0.028	1.483	0.0281	1.313	0.028	1.283
54.00	0.028	1.436	0.028	1.503	0.0281	1.313	0.028	1.283
55.00	0.028	1.455	0.028	1.522	0.0281	1.313	0.028	1.283
56.00	0.028	1.486	0.028	1.554	0.0281	1.313	0.028	1.283
57.00	0.028	1.516	0.028	1.584	0.0281	1.313	0.028	1.283
58.00	0.028	1.546	0.028	1.613	0.0281	1.313	0.028	1.283
59.00	0.028	1.574	0.028	1.641	0.0281	1.313	0.028	1.283
60.00	0.028	1.601	0.028	1.668	0.0281	1.313	0.028	1.283
61.00	0.028	1.645	0.028	1.712	0.0281	1.313	0.028	1.283
62.00	0.028	1.687	0.028	1.754	0.0281	1.313	0.028	1.283
63.00	0.028	1.728	0.028	1.795	0.0281	1.313	0.028	1.283
64.00	0.028	1.768	0.028	1.835	0.0281	1.313	0.028	1.283
65.00	0.028	1.806	0.028	1.874	0.0281	1.313	0.028	1.283

Alabama

Speed	Composite Arterial (All Veh)		Composite Freeway (All Veh)		Composite Local (All Veh)		Composite Ramp (All Veh)	
	direct PM	NOx	direct PM	NOx	direct PM	NOx	direct PM	NOx
2.50	0.0284	2.418	0.0284	2.485	0.0284	1.431	0.0283	1.418
3.00	0.0284	2.331	0.0284	2.399	0.0284	1.431	0.0283	1.418
4.00	0.0284	2.223	0.0284	2.291	0.0284	1.431	0.0283	1.418
5.00	0.0284	2.158	0.0284	2.226	0.0284	1.431	0.0283	1.418
6.00	0.0284	2.042	0.0284	2.069	0.0284	1.431	0.0283	1.418
7.00	0.0284	1.959	0.0284	1.956	0.0284	1.431	0.0283	1.418
8.00	0.0284	1.896	0.0284	1.872	0.0284	1.431	0.0283	1.418
9.00	0.0284	1.848	0.0284	1.806	0.0284	1.431	0.0283	1.418
10.00	0.0284	1.809	0.0284	1.753	0.0284	1.431	0.0283	1.418
11.00	0.0284	1.748	0.0284	1.684	0.0284	1.431	0.0283	1.418
12.00	0.0284	1.696	0.0284	1.626	0.0284	1.431	0.0283	1.418
13.00	0.0284	1.653	0.0284	1.577	0.0284	1.431	0.0283	1.418
14.00	0.0284	1.616	0.0284	1.535	0.0284	1.431	0.0283	1.418
15.00	0.0284	1.584	0.0284	1.498	0.0284	1.431	0.0283	1.418
16.00	0.0284	1.551	0.0284	1.484	0.0284	1.431	0.0283	1.418
17.00	0.0284	1.523	0.0284	1.471	0.0284	1.431	0.0283	1.418
18.00	0.0284	1.498	0.0284	1.460	0.0284	1.431	0.0283	1.418
19.00	0.0284	1.475	0.0284	1.450	0.0284	1.431	0.0283	1.418
20.00	0.0284	1.455	0.0284	1.441	0.0284	1.431	0.0283	1.418
21.00	0.0284	1.436	0.0284	1.433	0.0284	1.431	0.0283	1.418
22.00	0.0283	1.419	0.0283	1.425	0.0284	1.431	0.0283	1.418
23.00	0.0283	1.404	0.0283	1.418	0.0284	1.431	0.0283	1.418
24.00	0.0283	1.390	0.0283	1.412	0.0284	1.431	0.0283	1.418
25.00	0.0283	1.377	0.0283	1.406	0.0284	1.431	0.0283	1.418
26.00	0.0283	1.367	0.0283	1.402	0.0284	1.431	0.0283	1.418
27.00	0.0283	1.357	0.0283	1.399	0.0284	1.431	0.0283	1.418
28.00	0.0283	1.349	0.0283	1.396	0.0284	1.431	0.0283	1.418
29.00	0.0283	1.340	0.0283	1.393	0.0284	1.431	0.0283	1.418
30.00	0.0283	1.333	0.0283	1.390	0.0284	1.431	0.0283	1.418
31.00	0.0283	1.330	0.0283	1.390	0.0284	1.431	0.0283	1.418
32.00	0.0283	1.328	0.0283	1.390	0.0284	1.431	0.0283	1.418
33.00	0.0283	1.326	0.0283	1.390	0.0284	1.431	0.0283	1.418
34.00	0.0283	1.324	0.0283	1.390	0.0284	1.431	0.0283	1.418
35.00	0.0283	1.322	0.0283	1.390	0.0284	1.431	0.0283	1.418
36.00	0.0283	1.328	0.0283	1.396	0.0284	1.431	0.0283	1.418
37.00	0.0283	1.334	0.0283	1.401	0.0284	1.431	0.0283	1.418
38.00	0.0283	1.339	0.0283	1.406	0.0284	1.431	0.0283	1.418
39.00	0.0283	1.344	0.0283	1.411	0.0284	1.431	0.0283	1.418
40.00	0.0283	1.349	0.0283	1.416	0.0284	1.431	0.0283	1.418
41.00	0.0283	1.360	0.0283	1.427	0.0284	1.431	0.0283	1.418
42.00	0.0283	1.370	0.0283	1.438	0.0284	1.431	0.0283	1.418
43.00	0.0283	1.380	0.0283	1.447	0.0284	1.431	0.0283	1.418
44.00	0.0283	1.389	0.0283	1.457	0.0284	1.431	0.0283	1.418
45.00	0.0283	1.398	0.0283	1.466	0.0284	1.431	0.0283	1.418
46.00	0.0283	1.414	0.0283	1.482	0.0284	1.431	0.0283	1.418

47.00	0.0283	1.430	0.0283	1.497	0.0284	1.431	0.0283	1.418
48.00	0.0283	1.444	0.0283	1.512	0.0284	1.431	0.0283	1.418
49.00	0.0283	1.458	0.0283	1.526	0.0284	1.431	0.0283	1.418
50.00	0.0283	1.472	0.0283	1.539	0.0284	1.431	0.0283	1.418
51.00	0.0283	1.495	0.0283	1.562	0.0284	1.431	0.0283	1.418
52.00	0.0283	1.516	0.0283	1.584	0.0284	1.431	0.0283	1.418
53.00	0.0283	1.537	0.0283	1.605	0.0284	1.431	0.0283	1.418
54.00	0.0283	1.558	0.0283	1.625	0.0284	1.431	0.0283	1.418
55.00	0.0283	1.577	0.0283	1.645	0.0284	1.431	0.0283	1.418
56.00	0.0283	1.608	0.0283	1.676	0.0284	1.431	0.0283	1.418
57.00	0.0283	1.639	0.0283	1.706	0.0284	1.431	0.0283	1.418
58.00	0.0283	1.668	0.0283	1.736	0.0284	1.431	0.0283	1.418
59.00	0.0283	1.697	0.0283	1.764	0.0284	1.431	0.0283	1.418
60.00	0.0283	1.724	0.0283	1.792	0.0284	1.431	0.0283	1.418
61.00	0.0283	1.768	0.0283	1.836	0.0284	1.431	0.0283	1.418
62.00	0.0283	1.810	0.0283	1.878	0.0284	1.431	0.0283	1.418
63.00	0.0283	1.852	0.0283	1.919	0.0284	1.431	0.0283	1.418
64.00	0.0283	1.892	0.0283	1.959	0.0284	1.431	0.0283	1.418
65.00	0.0283	1.930	0.0283	1.998	0.0284	1.431	0.0283	1.418

Georgia

Speed	Composite Arterial (All Veh)		Composite Freeway (All Veh)		Composite Local (All Veh)		Composite Ramp (All Veh)	
	direct PM	NOx	direct PM	NOx	direct PM	NOx	direct PM	NOx
2.50	0.0326	3.322	0.0326	3.41	0.0326	1.969	0.0325	2.006
3.00	0.0326	3.202	0.0326	3.29	0.0326	1.969	0.0325	2.006
4.00	0.0326	3.053	0.0326	3.141	0.0326	1.969	0.0325	2.006
5.00	0.0326	2.963	0.0326	3.051	0.0326	1.969	0.0325	2.006
6.00	0.0326	2.808	0.0326	2.838	0.0326	1.969	0.0325	2.006
7.00	0.0326	2.696	0.0326	2.686	0.0326	1.969	0.0325	2.006
8.00	0.0326	2.613	0.0326	2.572	0.0326	1.969	0.0325	2.006
9.00	0.0326	2.548	0.0326	2.483	0.0326	1.969	0.0325	2.006
10.00	0.0326	2.497	0.0326	2.412	0.0326	1.969	0.0325	2.006
11.00	0.0326	2.415	0.0326	2.32	0.0326	1.969	0.0325	2.006
12.00	0.0326	2.348	0.0326	2.243	0.0326	1.969	0.0325	2.006
13.00	0.0326	2.291	0.0326	2.178	0.0326	1.969	0.0325	2.006
14.00	0.0326	2.242	0.0326	2.122	0.0326	1.969	0.0325	2.006
15.00	0.0326	2.199	0.0326	2.073	0.0326	1.969	0.0325	2.006
16.00	0.0326	2.157	0.0326	2.056	0.0326	1.969	0.0325	2.006
17.00	0.0326	2.12	0.0326	2.041	0.0326	1.969	0.0325	2.006
18.00	0.0326	2.087	0.0326	2.028	0.0326	1.969	0.0325	2.006
19.00	0.0326	2.058	0.0326	2.016	0.0326	1.969	0.0325	2.006
20.00	0.0326	2.031	0.0326	2.006	0.0326	1.969	0.0325	2.006
21.00	0.0326	2.007	0.0326	1.996	0.0326	1.969	0.0325	2.006
22.00	0.0326	1.985	0.0326	1.987	0.0326	1.969	0.0325	2.006
23.00	0.0326	1.965	0.0326	1.979	0.0326	1.969	0.0325	2.006
24.00	0.0326	1.947	0.0326	1.972	0.0326	1.969	0.0325	2.006
25.00	0.0326	1.93	0.0326	1.965	0.0326	1.969	0.0325	2.006
26.00	0.0326	1.917	0.0326	1.961	0.0326	1.969	0.0325	2.006
27.00	0.0326	1.905	0.0326	1.957	0.0326	1.969	0.0325	2.006
28.00	0.0326	1.893	0.0326	1.953	0.0326	1.969	0.0325	2.006
29.00	0.0326	1.882	0.0326	1.95	0.0326	1.969	0.0325	2.006
30.00	0.0326	1.872	0.0326	1.947	0.0326	1.969	0.0325	2.006
31.00	0.0326	1.869	0.0326	1.947	0.0326	1.969	0.0325	2.006
32.00	0.0326	1.866	0.0326	1.947	0.0326	1.969	0.0325	2.006
33.00	0.0325	1.863	0.0325	1.946	0.0326	1.969	0.0325	2.006
34.00	0.0325	1.861	0.0325	1.946	0.0326	1.969	0.0325	2.006
35.00	0.0325	1.858	0.0325	1.946	0.0326	1.969	0.0325	2.006
36.00	0.0325	1.865	0.0325	1.953	0.0326	1.969	0.0325	2.006
37.00	0.0325	1.872	0.0325	1.96	0.0326	1.969	0.0325	2.006
38.00	0.0325	1.879	0.0325	1.967	0.0326	1.969	0.0325	2.006
39.00	0.0325	1.885	0.0325	1.973	0.0326	1.969	0.0325	2.006
40.00	0.0325	1.891	0.0325	1.978	0.0326	1.969	0.0325	2.006
41.00	0.0325	1.904	0.0325	1.992	0.0326	1.969	0.0325	2.006
42.00	0.0325	1.916	0.0325	2.004	0.0326	1.969	0.0325	2.006
43.00	0.0325	1.928	0.0325	2.016	0.0326	1.969	0.0325	2.006
44.00	0.0325	1.94	0.0325	2.028	0.0326	1.969	0.0325	2.006
45.00	0.0325	1.951	0.0325	2.039	0.0326	1.969	0.0325	2.006
46.00	0.0325	1.97	0.0325	2.058	0.0326	1.969	0.0325	2.006

47.00	0.0325	1.989	0.0325	2.077	0.0326	1.969	0.0325	2.006
48.00	0.0325	2.006	0.0325	2.094	0.0326	1.969	0.0325	2.006
49.00	0.0325	2.023	0.0325	2.111	0.0326	1.969	0.0325	2.006
50.00	0.0325	2.04	0.0325	2.128	0.0326	1.969	0.0325	2.006
51.00	0.0325	2.067	0.0325	2.155	0.0326	1.969	0.0325	2.006
52.00	0.0325	2.093	0.0325	2.181	0.0326	1.969	0.0325	2.006
53.00	0.0325	2.119	0.0325	2.206	0.0326	1.969	0.0325	2.006
54.00	0.0325	2.143	0.0325	2.231	0.0326	1.969	0.0325	2.006
55.00	0.0325	2.166	0.0325	2.254	0.0326	1.969	0.0325	2.006
56.00	0.0325	2.204	0.0325	2.292	0.0326	1.969	0.0325	2.006
57.00	0.0325	2.241	0.0325	2.329	0.0326	1.969	0.0325	2.006
58.00	0.0325	2.276	0.0325	2.364	0.0326	1.969	0.0325	2.006
59.00	0.0325	2.31	0.0325	2.398	0.0326	1.969	0.0325	2.006
60.00	0.0325	2.343	0.0325	2.431	0.0326	1.969	0.0325	2.006
61.00	0.0325	2.396	0.0325	2.484	0.0326	1.969	0.0325	2.006
62.00	0.0325	2.447	0.0325	2.535	0.0326	1.969	0.0325	2.006
63.00	0.0325	2.496	0.0325	2.584	0.0326	1.969	0.0325	2.006
64.00	0.0325	2.544	0.0325	2.632	0.0326	1.969	0.0325	2.006
65.00	0.0325	2.591	0.0325	2.678	0.0326	1.969	0.0325	2.006