

# **National Capital Region Transportation Planning Board**

777 North Capitol Street, N.E., Suite 300, Washington, D.C. 20002-4290 (202) 962-3310 Fax: (202) 962-3202

## **Memorandum**

November 16, 2005

To: Transportation Planning Board

From: Michael J. Clifford  
Systems Planning Applications Director

Subject: Draft Results of the Fine Particles Standards (PM2.5) Air Quality Conformity Assessment of the 2005 Constrained Long Range Plan (CLRP) and the FY2006-2011 Transportation Improvement Program (TIP)

## **Introduction**

This memo transmits draft summary results of the fine particles (PM2.5) air quality conformity assessment of the 2005 CLRP and the FY2006-2011 TIP (full report is attached). While the CLRP and TIP were subject to an air quality conformity assessment which was approved by the TPB on October 19, 2005, that assessment reflected requirements associated with the 8-hour ozone and Wintertime carbon monoxide standards. On December 17, 2004 EPA designated the Washington, DC-MD-VA area as nonattainment for the PM2.5 standards. On April 5, 2005 EPA published the final set of rules for transportation conformity associated with the new standards (complementing an initial set of conformity rule amendments published on July 1, 2004). EPA requirements include that the TPB demonstrate conformity to the new rule by April 5, 2006 or face a conformity lapse, i.e., limitations on transportation projects which may proceed toward implementation. These additional requirements, which became effective while the 8-hour conformity assessment was in progress, led to this supplemental air quality analysis of the plan and program.

## **Methods**

The scope of work for this analysis, approved by the TPB at its July 20, 2005 meeting, identified methods to address the new PM2.5 requirements which are consistent with the 8-hour air quality assessment. Work tasks utilize the latest models and methods, i.e., COG's Round 7.0 Cooperative Forecasts, TPB's Version 2.1D #50 travel demand model, and EPA's Mobile6.2 emissions factor model.

Conformity assessment criteria for the PM2.5 standards provided in EPA's July 1, 2004 transportation conformity rule amendments include a demonstration that PM2.5 emissions (including both direct PM2.5 and NOx precursors) for each analysis year of the CLRP and TIP are not greater than base year 2002 emissions. EPA has provided these criteria for use during an interim period which will continue only until state air quality implementation plan (SIP) activities determine emissions reduction requirements to attain the fine particles standards, and establish new mobile emissions budgets for inclusion in the air quality plans for meeting the standards.

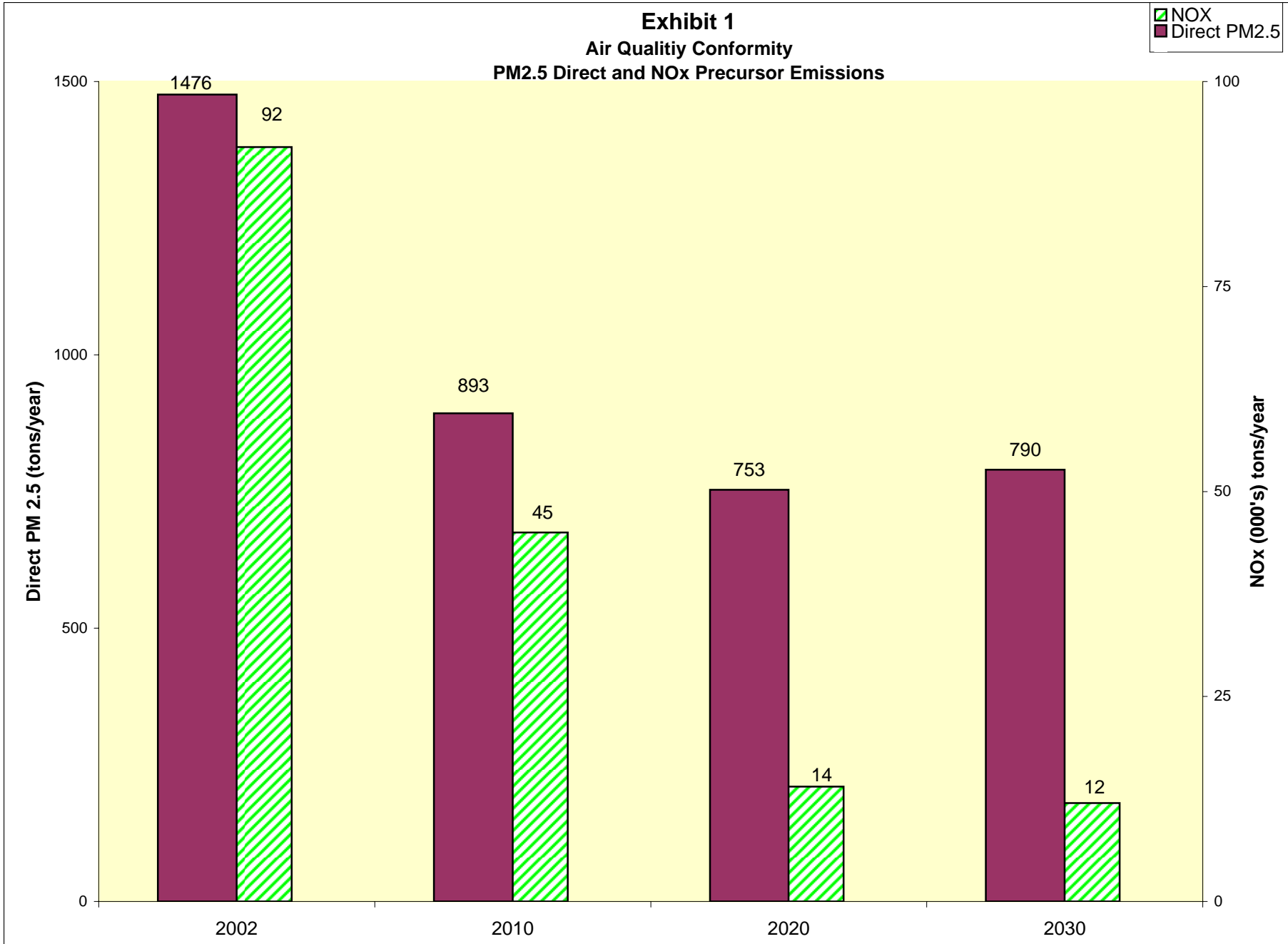
## **Results**

The PM2.5 conformity assessment includes the estimation of direct PM2.5 and NOx precursor emissions for the 2002, 2010, 2020 and 2030 analysis years. The following exhibit presents these emissions for each milestone year. The exhibit shows that mobile emissions are well below the 2002 base year levels for each pollutant. Therefore, the analytical results described in this air quality assessment provide a basis for a determination by the TPB of conformity of the 2005 CLRP and the FY2006-2011 TIP with respect to fine particle standards.

## **Next Steps**

These results are provided for release today for 30 day public comment and interagency consultation. Following receipt of and response to comments, TPB approval action is scheduled for December 21, 2005. This schedule has been established to provide federal agencies with sufficient time to conduct their review and approval process in advance of the conformity lapse deadline of April 5, 2006.

Following:   Exhibit  
                  Attached report



# **FINE PARTICLES (PM 2.5) STANDARDS AIR QUALITY CONFORMITY ASSESSMENT**

**Supplement to the Air Quality Conformity Assessment  
of the 2005 Constrained Long Range Plan Amendments and  
FY2006-2011 Transportation Improvement Program**

November 16, 2005

The preparation of this report was financially aided through grants from the District of Columbia Department of Transportation, the Maryland Department of Transportation, the Virginia Department of Rail & Public Transportation, the Virginia Department of Transportation, Federal Highway Administration, and the U.S. Department of Transportation, Federal Transit Administration, under the Urban Mass Transportation Act of 1964, as amended.

**NATIONAL CAPITAL REGION TRANSPORTATION PLANNING BOARD  
METROPOLITAN WASHINGTON COUNCIL OF GOVERNMENTS**

# TABLE OF CONTENTS

Introduction .....	1
Background .....	1
Work Activities .....	2
< Travel Modeling Process .....	2
< Emissions Factors .....	2
< Emissions Calculations .....	3
Emissions Analyses .....	3
Summary .....	3
Map of Non-Attainment Area .....	4
Exhibits .....	5
Attachments .....	A-E

# LIST OF EXHIBITS

	<u>Page</u>
PM 2.5 Nonattainment Area Map.....	4
1. Travel Demand Summary .....	5
2. 2002 & 2010 Inputs for Mobile6.2 PM2.5 Modeling: Seasonal .....	6
3. 2002 Emission Rates for Direct PM 2.5 (District of Columbia).....	7
4. Direct PM2.5 Emission Rates for District of Columbia .....	8
5. NOx precursor Mobile6.2 Running Emission Rates for DC (Spring Season) .....	9
6. 2002 Seasonal NOx Precursor Mobile6.2 Running Emission Rates for DC.....	10
7. Direct PM2.5 Emissions Summary Table .....	11
8. PM2.5 NOx Precursor Emissions Summary Table.....	12
9. PM2.5 Direct and NOx Precursor Emissions .....	13

# LIST OF ATTACHMENTS

A.	PM2.5 Conformity Scope of Work .....	A1-A8
B.	TPB-MWAQC Correspondence Relating to Analysis Methods .....	B1-B2
C.	Emissions Memo .....	C1-C8
D.	Transit & School Bus Memo .....	D1-D6
E..	Auto Access .....	E1-E12

## **I. INTRODUCTION**

This report documents the results of the fine particles (PM<sub>2.5</sub>) standards air quality conformity assessment of the 2005 Constrained Long Range Plan (CLRP) and the FY2006-2011 Transportation Improvement Program (TIP). This supplements the technical report, Air Quality Conformity Determination Of The 2005 Constrained Long Range Plan And The FY2006-2011 Transportation Improvement Program For The Washington Metropolitan Region (October 19, 2005), which addressed carbon monoxide and the 8-hour ozone standard. As assessment criteria for the fine particles standards include the analysis of the same milestone years previously analyzed for the ozone and carbon monoxide standards (2002, 2010, 2020 and 2030), travel demand technical methods and results developed in that earlier work are applied directly to this analysis. Major differences associated with the fine particles conformity assessment include estimation of direct PM<sub>2.5</sub> emissions and NO<sub>x</sub> precursor emissions, for a revised nonattainment geography (see Figure 1), on a yearly, instead of daily, basis. Tasks for this supplemental analysis included: translation of the previously reported annual average weekday travel (AAWDT) estimates into average daily (ADT) values by season, estimation of environmental inputs and PM<sub>2.5</sub> direct and NO<sub>x</sub> precursor emissions rate outputs for each season, the subsequent calculation of emissions for each season, and tabulation to yearly totals.

## **II. BACKGROUND**

On December 17, 2004 the Environmental Protection Agency (EPA) designated 224 counties, as well as the District of Columbia, that exceeded the health-based standards for fine particles (PM<sub>2.5</sub>) as nonattainment areas. PM<sub>2.5</sub> standards refer to particulate matter less than or equal to 2.5 micrometers in diameter. The Washington, DC-MD-VA area (consisting of the Washington metropolitan statistical area, excluding Stafford County, Virginia, and Calvert County, Maryland) was designated nonattainment for PM<sub>2.5</sub> (see map), and is required to attain clean air as soon as possible but no later than 2010.

As published in the January 5, 2005 Federal Register, these PM<sub>2.5</sub> nonattainment designations became effective on April 5, 2005. Nonattainment areas are required by early 2008 to submit to EPA a state implementation plan (SIP) to define the expected methods for reducing the fine particulate matter level in the air and emissions of PM<sub>2.5</sub> precursors. However, the new standards affect transportation conformity planning requirements immediately: areas have a 1 year grace period starting April 5, 2005 in which to demonstrate conformity of transportation plans and programs to the new standards. If a plan or TIP which conforms to the new standards is not in place (including both TPB and federal approvals) by April 5, 2006, the conformity status lapses.

Since EPA had not issued its necessary second set of PM<sub>2.5</sub> transportation conformity regulations at the time of the TPB's annual plan / program update cycle, staff prepared a draft work scope for the air quality conformity assessment of the 2005 CLRP and FY2006-2011 TIP, to address only ozone season and winter carbon monoxide requirements. This scope was released for public comment in February and adopted by the TPB at its April 20, 2005 meeting. This timing required TPB staff to prepare a "supplemental" scope of work (Attachment A) for the PM<sub>2.5</sub> component of the conformity assessment of the 2005 CLRP and FY2006 – 11 TIP. The TPB released that scope of work for public comment on June 15, 2005, and approved it along with response to comment at its July 20, 2005 meeting. This report documents the results of



performing those work activities and the air quality conformity findings.

### **III. WORK ACTIVITIES**

Technical work activities for the supplemental conformity assessment of the 2005 CLRP and FY2006-2011 TIP included the preparation of direct PM<sub>2.5</sub> and nitrogen oxide (NO<sub>x</sub>) precursor emissions inventories for the 2002, 2010, 2020, and 2030 analysis years. This involved use of the following technical inputs: Round 7.0 Cooperative Forecasts; the Version 2.1D Travel Demand Model utilizing this year's project submissions to the CLRP and TIP; EPA's Mobile6.2 Emissions Factor Model; and a refined Mobile Emissions Post-Processor using latest travel demand and mobile emissions planning assumptions. This report presents the results of the supplemental conformity analysis, as follows.

#### **Travel Modeling Process**

The travel demand estimation for AAWDT prepared in the ozone / carbon monoxide conformity assessment provided the starting point for this work. However, since estimates of annual travel and emissions are required for fine particles assessment, the application of seasonal travel adjustment factors was therefore required. Since seasonal travel totals have to include weekend travel as well as weekday travel, staff prepared adjustment factors to represent ADT occurring in each season of the year. The upper table in Exhibit 1 shows the AAWDT VMT estimates for the PM<sub>2.5</sub> nonattainment area for each of the analysis years; the lower table presents the seasonal adjustment factor necessary to develop ADT VMT for each season.

#### **Emissions Factors**

COG/TPB staff, in conjunction with COG Department of Environmental Programs staff and with the consultant assistance of E.H. Pechan and Associates, developed the PM<sub>2.5</sub> direct and NO<sub>x</sub> precursor motor vehicle emissions factors through the use of EPA's Mobile6.2 emissions factor model. The development of these factors involved interaction with MWAQC's Technical Advisory Committee and its Emissions Inventory Work Group, in a series of meetings and conference calls over the August to October time period, to finalize the emissions factor modeling approach and to develop the necessary environmental inputs to EPA's Mobile6.2 emissions factor model. The basic approach, which initially considered application of hourly inputs of temperature and humidity, involved the use of seasonal average daily minimum / maximum temperatures and associated default humidity values.

Similarly, data periods of analysis under consideration included annual, seasonal and monthly. After a lengthy effort involving tests of different levels of aggregation, including task orders to TPB's consultant to modify the existing software which provides an interface between the Mobile model and TPB's emissions calculation software, it was finally decided to conduct the emissions factor analysis on a seasonal basis, consistent with the travel demand approach. Environmental data inputs to the modeling process are shown in Exhibit 2 for the 2002 and 2010 analysis years.

Exhibit 3 presents Mobile model output emissions rates for direct PM<sub>2.5</sub>, using District of Columbia data as an illustration. This table shows the component pollutants and rates, as well as

the total PM2.5 rates for 2002. Exhibit 4 shows how direct PM2.5 rates vary through time, as well as by season of the year. While Winter rates are noticeably higher than the other seasons, the rates show a significant decrease through time, primarily due to the impacts of having cleaner vehicles in the fleet. These gram / mile rates are shown in a bar chart, unlike the familiar line graphs seen with NOx, since they do not vary by vehicle speed.

Exhibit 5 shows NOx precursor rates through time; these steep reductions in emissions rates in the future are similar to the trends seen with direct PM2.5 and in previous analyses of NOx as a precursor pollutant to ozone. Exhibit 6 shows NOx precursor rates by season, which exhibit similar characteristics to direct PM2.5, i.e., higher Winter season rates.

### **Emissions Calculations**

Emissions calculations are performed in a software package called the emissions ‘postprocessor’, which was modified by TPB staff to accommodate the new PM2.5 pollutants and geography, utilizing the seasonal approach. Once travel demand and emissions factors were developed they were applied in the emissions postprocessor to yield the direct PM2.5 emissions and precursor emissions, shown in Exhibits 7 and 8, respectively. Arrayed to show values by travel component, by season, through time and yearly totals, the tables indicate dramatic reductions through time in each component of travel. Emissions are also seen to vary by season, according to VMT changes and emissions factor changes occurring throughout the year. Documentation of the emissions calculations for each of these travel components is contained in Attachments C – E.

## **IV. EMISSIONS ANALYSES**

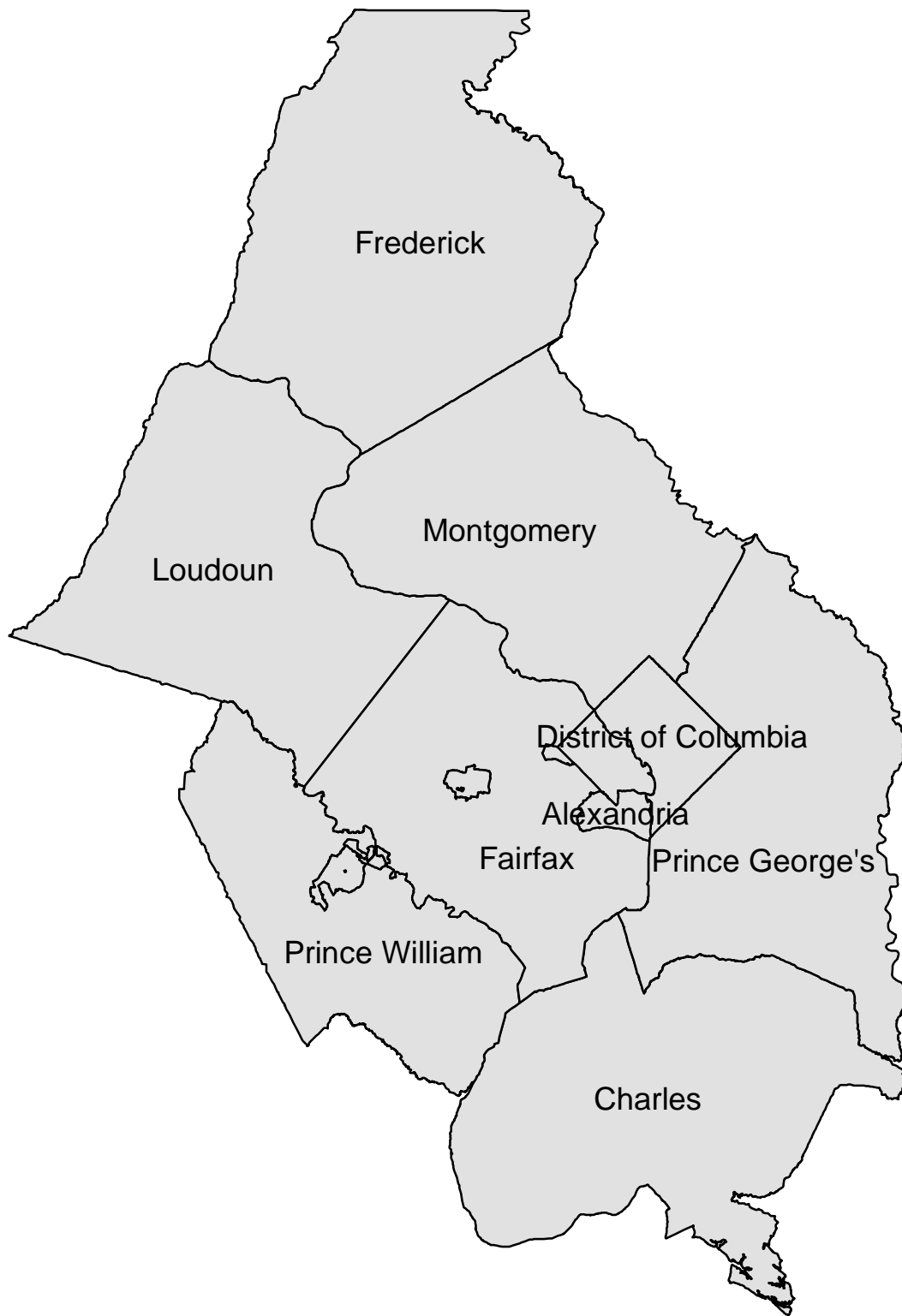
As there are no mobile source emissions budgets for fine particles at this point, the relevant emissions test is that direct PM2.5 and NOx precursor emissions in each plan and program action scenario (forecast year) are not greater than base year 2002 emissions. As shown in the Exhibits 7 and 8 summary tables and graphically in Exhibit 9, this criterion is met handily for each analysis year.

## **V. SUMMARY**

This report documents the technical methods and results of plan and program conformity analysis with respect to the fine particles standards. The analytical results described in this air quality assessment provide a basis for a determination by the TPB of conformity of the 2005 CLRP and the FY2006-2011 TIP, with the July 2004 and May 2005 transportation conformity regulations, and all other requirements of the Clean Air Act Amendments of 1990.

Following:   Map  
                  Exhibits 1-9  
                  Attachments A-E

# Washington DC-Maryland-Virginia PM 2.5 Nonattainment Area



## EXHIBIT 1

### Travel Demand Summary PM2.5 NonAttainment Modeled Area AAWDT Vehicle Miles Traveled (millions)

	<u>2002</u>	<u>2010</u>	<u>2020</u>	<u>2030</u>
<b>VMT</b>	107.5	121.0	136.6	147.5

### Adjustment Factors to Convert AAWDT to ADT By Season

<b>Season</b>	<b>Factor</b>
Winter (Dec- Feb)	0.901
Spring (March-May)	0.957
Summer (June-Aug)	0.998
Fall (Sept-Nov)	0.945

## EXHIBIT 2

### 2002 Inputs for Mobile 6.2 Particulate Matter 2.5 Modeling: Seasonal

Fuel program: 4\*

						Sulfur				Oxy. Fuel	
Season	Months	Temperature (°F)		RVP (psi)		Gasoline (ppm)	Diesel (ppm)			Ether. %	Ethanol %
		Min	Max	Regional	Humidity	Regional	DC	MD	Va		
Winter	Dec										
	Jan	27.2	44.1	12.9	Default	279-1000	324	302	330	1.5	3.5
	Feb										
Spring	Mar										
	Apr	45.7	66.1	6.7	Default	129-1000	326	308	344	2.1	N/A
	May										
Summer	Jun										
	Jul	66.7	84.7	6.7	Default	129-1000	329	315	357	2.1	N/A
	Aug										
Fall	Sep										
	Oct	49.5	67.5	12.9	Default	279-1000	326	308	344	1.5	3.5
	Nov										

### 2010 Inputs for Mobile 6.2 Particulate Matter 2.5 Modeling: Seasonal

Fuel Program:4\*

						Sulfur		Oxy. Fuel	
Season	Months	Temperature (°F)		RVP (psi)		Diesel (ppm)	Gasoline (ppm)	Ether. %	Ethanol %
		Min	Max	Regional	Humidity	Regional	Regional		
Winter	Dec								
	Jan	27.2	44.1	12.9	Default	43 ppm	30-80	1.5	3.5
	Feb								
Spring	Mar								
	Apr	45.7	66.1	6.8	Default	43 ppm	30-80	2.1	N/A
	May								
Summer	Jun								
	Jul	66.7	84.7	6.8	Default	11 ppm	30-80	2.1	N/A
	Aug								
Fall	Sep								
	Oct	49.5	67.5	12.9	Default	11 ppm	30-80	1.5	3.5
	Nov								

Temperature values from DEP summarized at National and Dulles Airports

Gasoline Sulfur from EPA guidance

Diesel Sulfur from EPA guidance

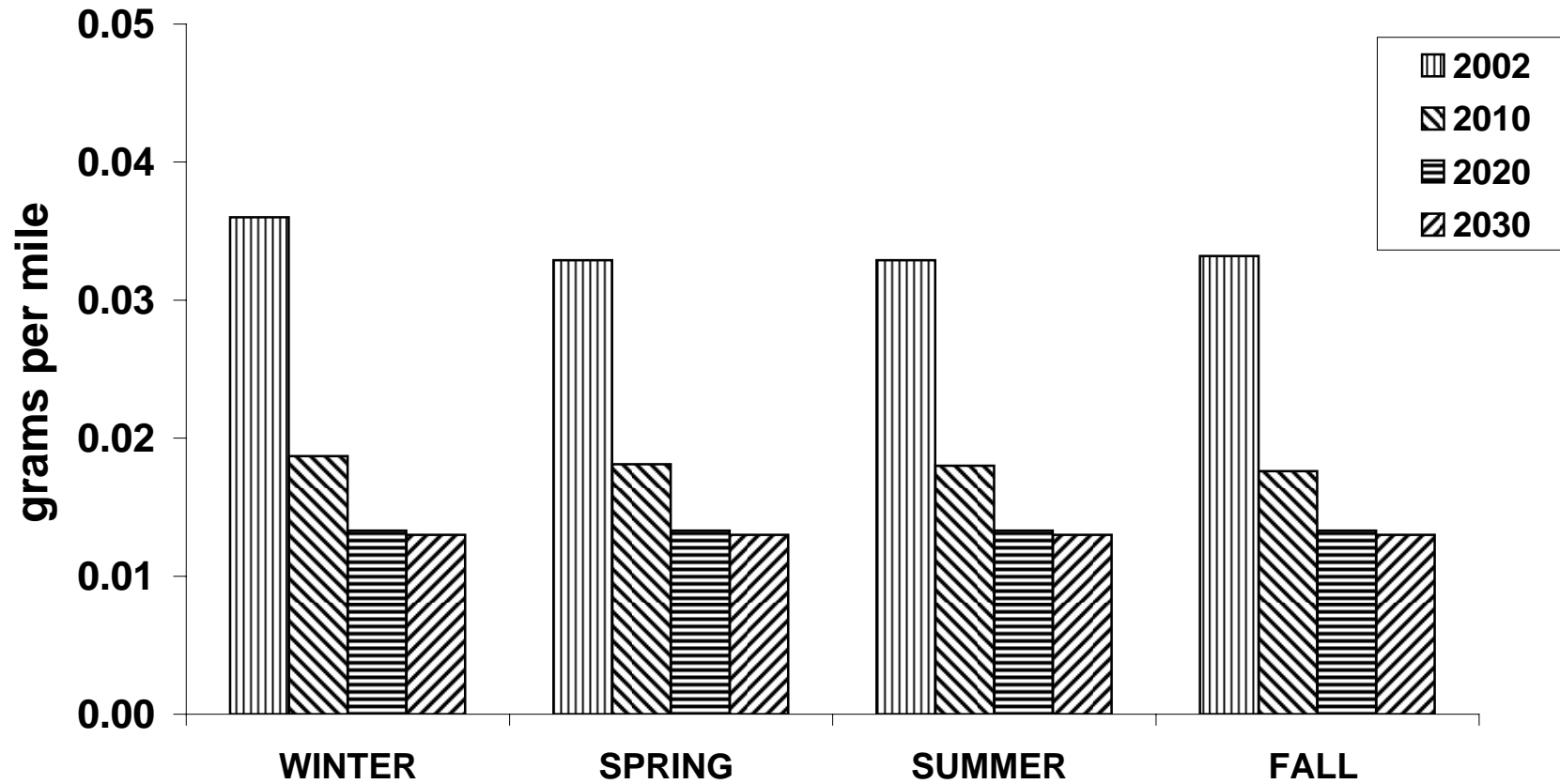
\* Fuel program '4' is used due to Mobile6.2 program bug identified with use of fuel program '2S'

### EXHIBIT 3

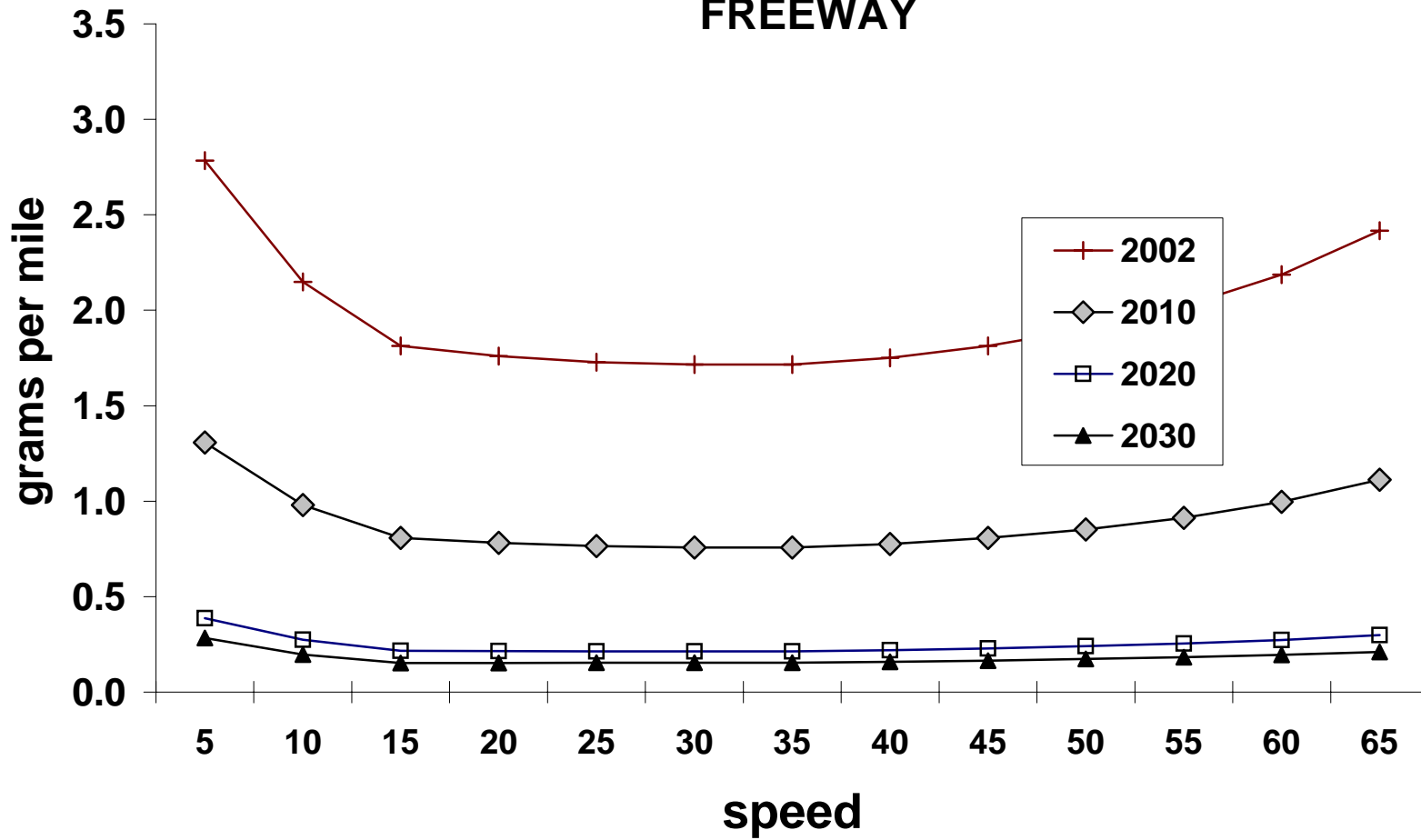
## 2002 Emission Rates for Direct PM for the District of Columbia

Components of PM25	gm/mile
Lead:	0.0000
GASPM:	0.0054
ECARBON:	0.0120
OCARBON:	0.0060
SO4:	0.0050
<b>Total Exhaust PM:</b>	<b>0.0284</b>
Brake:	0.0053
Tire:	0.0023
<b>Total PM:</b>	<b>0.0360</b>

**Exhibit 4**  
**DIRECT PM2.5 EMISSION RATES FOR DISTRICT OF COLUMBIA**  
**(MAJOR ROADS NETWORK)**

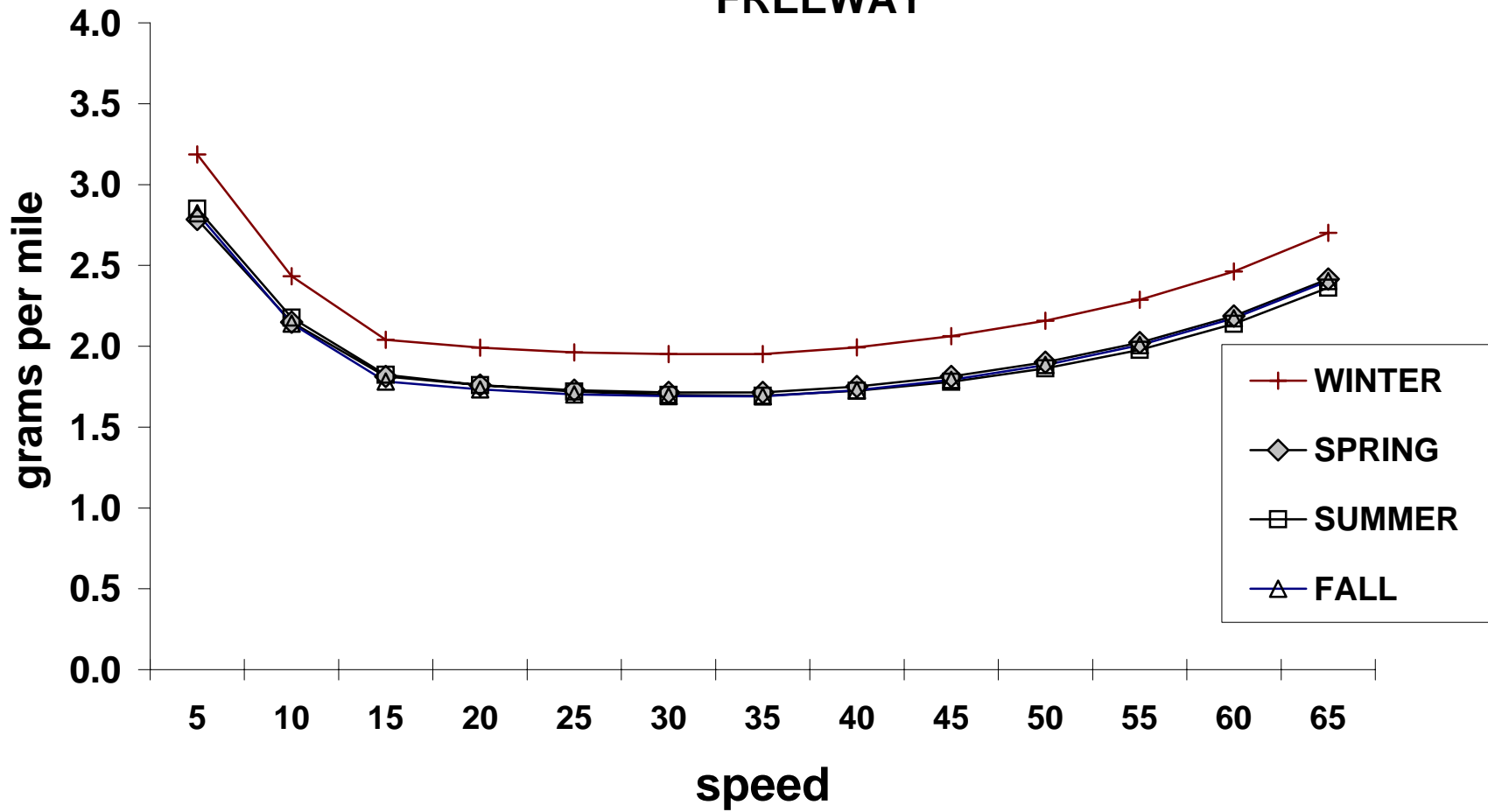


**Exhibit 5**  
**NO<sub>x</sub> PRECURSOR MOBILE6.2 RUNNING EMISSION RATES FOR**  
**DISTRICT OF COLUMBIA (SPRING SEASON)**  
**FREEWAY**





**Exhibit 6**  
**2002 SEASONAL NO<sub>x</sub> PRECURSOR MOBILE6.2 RUNNING EMISSION**  
**RATES FOR DISTRICT OF COLUMBIA**  
**FREEWAY**



**EXHIBIT 7**  
**AIR QUALITY CONFORMITY SUMMARY TABLE**  
**Direct PM2.5 Emissions**  
**Mobile Source Emissions Inventories**  
**for 2005 CLRP and FY 2006-2011 TIP**  
**(Tons)**

	Direct PM2.5				
	2002	2010	2020	2030	
<b>WINTER</b>	Major Roads	3.93	2.30	1.83	1.91
	Local Roads	0.17	0.12	0.12	0.13
	School Buses	0.17	0.03	0.02	0.01
	Transit Buses	0.25	0.04	0.02	0.01
	Auto Access	0.01	0.01	0.01	0.01
	Total (Daily)	4.54	2.50	2.00	2.08
	<b>WINTER SEASON TOTAL ( 90 Days)</b>	369.84	218.38	176.82	184.99

	Direct PM2.5				
	2002	2010	2020	2030	
<b>SPRING</b>	Major Roads	3.84	2.37	1.93	2.03
	Local Roads	0.17	0.13	0.13	0.14
	School Buses	0.16	0.03	0.02	0.01
	Transit Buses	0.24	0.04	0.02	0.01
	Auto Access	0.01	0.01	0.01	0.01
	Total (Daily)	4.43	2.58	2.11	2.21
	<b>SPRING SEASON TOTAL (92 Days)</b>	354.33	230.34	190.64	200.18

	Direct PM2.5				
	2002	2010	2020	2030	
<b>SUMMER</b>	Major Roads	4.02	2.45	2.01	2.11
	Local Roads	0.17	0.13	0.14	0.15
	School Buses	0.16	0.03	0.02	0.01
	Transit Buses	0.25	0.04	0.02	0.01
	Auto Access	0.01	0.01	0.01	0.01
	Total (Daily)	4.61	2.66	2.20	2.30
	<b>SUMMER SEASON TOTAL (92 Days)</b>	386.01	226.26	198.94	209.05

	Direct Pm2.5				
	2002	2010	2020	2030	
<b>FALL</b>	Major Roads	3.84	2.27	1.91	2.00
	Local Roads	0.17	0.13	0.13	0.14
	School Buses	0.14	0.03	0.02	0.01
	Transit Buses	0.22	0.04	0.02	0.01
	Auto Access	0.01	0.01	0.01	0.01
	Total (Daily)	4.39	2.47	2.09	2.18
	<b>FALL SEASON TOTAL (91 Days)</b>	365.46	218.45	186.81	195.35

<b>ANNUAL TOTAL</b>	1,475.64	893.44	753.21	789.58
-------------------------	----------	--------	--------	--------

**EXHIBIT 8**  
**AIR QUALITY CONFORMITY SUMMARY TABLE**  
**PM2.5 NOx Precusor Emissions**  
**Mobile Source Emissions Inventories**  
**for 2005 CLRP and FY 2006-2011 TIP**  
**(Tons)**

	NOx				
	2002	2010	2020	2030	
<b>WINTER</b>	Major Roads-Starts	18.09	11.07	3.56	2.76
	Major Roads-VMT	223.72	107.47	35.14	26.75
	Local Roads	11.06	5.69	2.44	2.06
	School Buses	5.63	3.61	0.69	0.27
	Transit Buses	6.30	4.05	0.96	0.25
	Auto Access	1.94	0.91	0.42	0.37
	Total (Daily)	252.87	132.80	43.21	32.46
	<b>WINTER SEASON TOTAL ( 90 Days)</b>	<b>23,777.17</b>	<b>11,783.50</b>	<b>3,855.77</b>	<b>2,903.08</b>

	NOx				
	2002	2010	2020	2030	
<b>SPRING</b>	Major Roads-Starts	15.34	10.06	3.31	2.62
	Major Roads-VMT	209.27	101.03	33.98	26.43
	Local Roads	9.82	5.25	2.33	2.02
	School Buses	5.56	3.43	0.66	0.27
	Transit Buses	6.24	3.90	0.93	0.25
	Auto Access	1.65	0.82	0.40	0.35
	Total (Daily)	247.88	124.48	41.60	31.95
	<b>SPRING SEASON TOTAL ( 92 Days)</b>	<b>22,572.65</b>	<b>11,314.30</b>	<b>2,795.26</b>	<b>2,919.89</b>

	NOx				
	2002	2010	2020	2030	
<b>SUMMER</b>	Major Roads-Starts	13.85	9.25	3.05	2.41
	Major Roads-VMT	214.72	103.20	34.86	27.26
	Local Roads	10.38	5.48	2.49	2.19
	School Buses	5.56	3.43	0.67	0.27
	Transit Buses	6.24	3.90	0.93	0.25
	Auto Access	1.61	0.81	0.39	0.35
	Total (Daily)	252.37	126.06	42.39	32.74
	<b>SUMMER SEASON TOTAL ( 92 Days)</b>	<b>22,886.88</b>	<b>11,398.30</b>	<b>3,854.73</b>	<b>2,987.88</b>

	NOx				
	2002	2010	2020	2030	
<b>FALL</b>	Major Roads-Starts	15.93	9.33	3.10	2.54
	Major Roads-VMT	208.43	91.87	32.43	25.57
	Local Roads	10.27	4.85	2.21	1.96
	School Buses	5.48	3.16	0.56	0.27
	Transit Buses	6.02	3.66	0.86	0.25
	Auto Access	1.75	0.76	0.37	0.34
	Total (Daily)	247.88	113.62	39.54	30.94
	<b>FALL SEASON TOTAL ( 91 Days)</b>	<b>22,330.66</b>	<b>10,215.00</b>	<b>3,570.89</b>	<b>2,796.39</b>

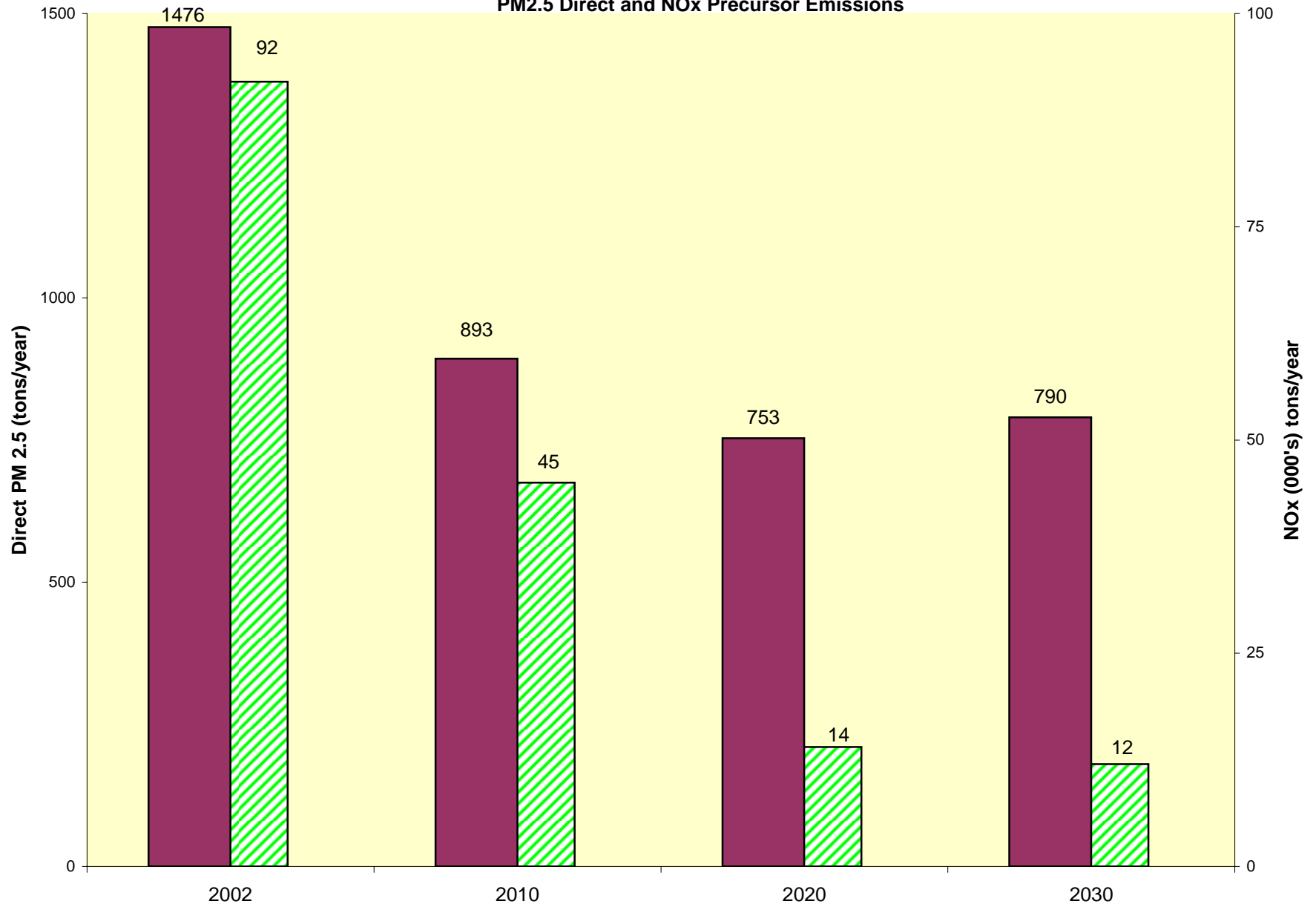
<b>ANNUAL TOTAL</b>	91,567.36	44,711.10	14,076.65	11,607.24
-------------------------	-----------	-----------	-----------	-----------

### Exhibit 9

#### Air Quality Conformity

#### PM2.5 Direct and NOx Precursor Emissions

NOx  
Direct PM2.5



# **ATTACHMENT A**

**FINE PARTICLES (PM2.5) STANDARDS  
AIR QUALITY CONFORMITY ASSESSMENT**

**SCOPE OF WORK**

**Supplement to the Air Quality Conformity Assessment  
of the 2005 Constrained Long Range Plan Amendments and  
FY2006-2011 Transportation Improvement Program**

**I. INTRODUCTION**

On December 17, 2004 the Environmental Protection Agency (EPA) designated 224 counties, as well as the District of Columbia, that exceeded the health-based standards for fine particles (PM2.5) as nonattainment areas. PM2.5 standards refer to particulate matter less than or equal to 2.5 micrometers in diameter. The Washington, DC-MD-VA area (consisting of the Washington metropolitan statistical area, excluding Stafford County, Virginia, and Calvert County, Maryland) was designated nonattainment for PM2.5 and is required to attain clean air as soon as possible but no later than 2010.

As published in the January 5, 2005 Federal Register, these PM2.5 nonattainment designations became effective on April 5, 2005. Nonattainment areas are required by early 2008 to submit to EPA a state implementation plan (SIP) to define the expected methods for reducing the fine particulate matter level in the air and emissions of PM2.5 precursors. However, the new standards affect transportation conformity planning requirements immediately: areas have a one year grace period starting April 5, 2005 in which to demonstrate conformity of transportation plans and programs to the new standards. If a plan and TIP which conform to the new standards are not in place (including both TPB and federal approvals) by April 6, 2006, the conformity status lapses.

This scope of work presents an outline of the work tasks, including preparation of both direct particles and precursors, to address the conformity requirements of the fine particles standards. It supplements the ongoing TPB work activities directed at the 8-hour ozone and Winter carbon monoxide (CO) standards, to ensure that all requirements are addressed in performing the Air Quality Conformity Assessment of the 2005 CLRP and FY2006-2011 TIP.

## **II. REQUIREMENTS AND APPROACH**

### **A. Criteria (See Exhibit 1)**

As described in the 1990 Clean Air Act Amendments, conformity is demonstrated if transportation plans and programs:

1. Are consistent with most recent estimates of mobile source emissions,
2. Provide expeditious implementation of TCMs, and
3. Contribute to annual emissions reductions.

### **B. Approach**

1. Analytical: The analytical approach outlined here supplements the current conformity assessment efforts underway to analyze the 2005 CLRP and FY2006-2011 TIP with respect to 8-hour ozone and Winter CO standards. Specifically, travel demand estimates for each analysis year being prepared as part of that work will be utilized in conjunction with the development and application of PM2.5 emissions rates to yield required PM2.5 emissions levels. (I.E. Round 7 Cooperative Forecasts, and all network inputs and technical methods approved by the TPB at its April 20, 2005 meeting, are therefore relevant to this PM2.5 analysis.) Emissions will be inventoried for yearly totals instead of on a daily basis.
2. Evaluation: Criteria and procedures for demonstrating conformity with respect to PM2.5 in the interim period before state implementation plans (SIPs) are filed differ from ozone or wintertime carbon monoxide assessments in that there are no existing budgets which can be applied. In a case such as this EPA provides two options for regional emissions analysis to be used until motor vehicle emissions budgets are established in the SIP. For both PM2.5 directly emitted particles and precursors, one of the following requirements must be met:

Option 1. “The emissions predicted in the “Action” scenario are not greater than the emissions predicted in the “Baseline” scenario, and this can be reasonably expected to be true in the periods between the analysis years; or

Option 2. The emissions predicted in the “Action” scenario are not greater than 2002 emissions.”

A SIP has not yet been prepared to inventory point, area and mobile categories to define the extent of the problem by source in the Washington area. However, since base year 2002 on-road mobile source direct and precursor PM2.5 emissions are necessary for the SIP, it is recommended that option 2, reductions from the base 2002 inventory, be utilized as the relevant regional emissions test for conformity. The MOBILE6.2 model will be used to generate emissions factors for PM2.5 direct particles and NOx precursors.

### **III. CONSULTATION**

1. Execute TPB consultation procedures as outlined in the consultation procedures report adopted by the TPB on May 20, 1998.
2. Participate in meetings of MWAQC, its Technical Advisory Committee and its Conformity Subcommittee to discuss the scope of work activities, TERM development process, and other elements as needed; discuss at TPB meetings or forums, as needed, the following milestones:
  - Project solicitation
  - Scope of work
  - TERM proposals
  - Project submissions: documentation and comments
  - Analysis of TERMS, list of mitigation measures
  - Conformity assessment: documentation and comments
  - Process: comments and responses

### **IV. WORK TASKS**

1. Prepare 2002 base conditions
  - Develop and apply Mobile6.2 emission factors for PM2.5 direct particles and NOx precursors
  - Calculate yearly (not daily) emissions for total PM2.5 and NOx precursors using latest seasonal traffic adjustments
2. Prepare 2010 emissions estimates
  - Develop and apply Mobile6.2 emission factors
  - Calculate emissions as above
3. Prepare 2020 emissions estimates
  - As in year 2010 tasks
4. Prepare 2030 emissions estimates
  - As in year 2010 tasks
5. Analyze results of above technical analysis



- Reductions from 2002 base
  - With review by the Travel Management Subcommittee, the Technical Committee and the TPB, identify and recommend additional measures should the plan or program fail the regional emissions test in any year and incorporate
6. Assess conformity and document results in a report
- Document methods
  - Draft conformity report
  - Forward to technical committees and policy committees
  - Make available for public and interagency consultation
  - Receive comments
  - Address comments and present to TPB for action
  - Finalize report and forward to FHWA and FTA

## **V. SCHEDULE**

The schedule for the execution of these work activities is shown in Exhibit 2, attached. This schedule shows the adoption of the PM2.5 conformity determination by the TPB in October 2005, which allows sufficient time for distribution, review and final approval by federal agencies in order to meet the April 5, 2006 deadline for avoiding a conformity lapse.

# Exhibit 1

## Conformity Criteria

---

### All Actions at all times:

Sec. 93.110	Latest planning assumptions.
Sec. 93.111	Latest emissions model.
Sec. 93.112	Consultation.

### Transportation Plan:

Sec. 93.113(b)	TCMs.
Sec. 93.118 or Sec. 93.119	Emissions budget or Emission reduction.

### TIP:

Sec. 93.113(c)	TCMs.
Sec. 93.118 or Sec. 93.119	Emissions budget or Emission reduction.

### Project (From a Conforming Plan and TIP):

Sec. 93.114	Currently conforming plan and TIP.
Sec. 93.115	Project from a conforming plan and TIP.
Sec. 93.116	CO and PM10 hot spots.
Sec. 93.117	PM10 control measures.

### Project (Not From a Conforming Plan and TIP):

Sec. 93.113(d)	TCMs.
Sec. 93.114	Currently conforming plan and TIP.
Sec. 93.116	CO and PM10 hot spots.
Sec. 93.117	PM10 control measures.
Sec. 93.119	Interim emissions in areas without motor vehicle emissions budgets

---

### **Sec. 93.110 Criteria and procedures: Latest planning assumptions.**

The conformity determination must be based upon the most recent planning assumptions in force at the time of the conformity determination.

### **Sec. 93.111 Criteria and procedures: Latest emissions model.**

The conformity determination must be based on the latest emission estimation model available.

### **Sec. 93.112 Criteria and procedures: Consultation.**

Conformity must be determined according to the consultation procedures in this subpart and in the applicable implementation plan, and according to the public involvement procedures established in compliance with 23 CFR part 450.

**Sec. 93.113 Criteria and procedures: Timely implementation of TCMs.**

The transportation plan, TIP, or any FHWA/FTA project which is not from a conforming plan and TIP must provide for the timely implementation of TCMs from the applicable implementation plan.

**Sec. 93.114 Criteria and procedures: Currently conforming transportation plan and TIP.**

There must be a currently conforming transportation plan and currently conforming TIP at the time of project approval.

**Sec. 93.115 Criteria and procedures: Projects from a plan and TIP.**

The project must come from a conforming plan and program.

**Sec. 93.116 Criteria and procedures: Localized CO and PM10 violations (hot spots).**

The FHWA/FTA project must not cause or contribute to any new localized CO or PM10 violations or increase the frequency or severity of any existing CO or PM10 violations in CO and PM10 nonattainment and maintenance areas.

**Sec. 93.117 Criteria and procedures: Compliance with PM10 control measures.**

The FHWA/FTA project must comply with PM10 control measures in the applicable implementation plan.

**Sec. 93.119 Criteria and procedures: Interim emissions in areas without motor vehicle budgets**

The FHWA/FTA project must satisfy the interim emissions test(s).

**NOTE:** See EPA's May 6, 2005 conformity regulations for the full text associated with each section's requirements.

**Exhibit 2**

**PROPOSED PM2.5 STANDARD SUPPLEMENT TO THE YEAR  
2005 CLRP AND FY 2006-2011 TIP  
AIR QUALITY CONFORMITY SCHEDULE**

June 3, 2005	TPB Technical Committee Reviews Draft Work Scope for the Air Quality Analysis
*June 15, 2005	TPB Releases Draft Work Scope for Public Comment and Inter-Agency Review
*July 20, 2005	TPB Reviews Public Comments, Approves Draft Scope of Work
September 9, 2005	TPB Technical Committee Reviews Draft Conformity Report
September 15, 2005	Draft Conformity Report Released for Public Comment and Interagency Review
*September 21, 2005	TPB Receives Briefing on Draft Air Quality Conformity Determination
*October 19, 2005	TPB Reviews Public Comments on Draft Document, Approves Responses to Comments, and Adopts the PM 2.5 Air Quality Conformity Determination

\*TPB Meeting

## WORK SCOPE ATTACHMENT A

### POLICY AND TECHNICAL INPUT ASSUMPTIONS PM2.5 STANDARDS CONFORMITY ASSESSMENT

#### 1. Land Activity

- Round 7 Cooperative Forecasts

#### 2. Policy and Project Inputs

- Highway, HOV and transit projects and operating parameters
- Financially constrained project submissions advanced by the TPB on 4/20/2005

#### 3. Travel Demand Modeling Methods

- 'Version 2.1 D #50' Travel Model
- All HOV facilities at HOV-3 in 2010
- Transit "capacity constraint" procedures (2010 constrains later years)

#### 4. Emission Factors

- Emission factors methods as developed and applied in the SIP and in the 2004 CLRP conformity process: MOBILE6.2, 2002 registration data, VMT mix specific to each analysis year
- Enhanced I/M in DC, MD, and VA, using state-specified standards
- Refinements based upon EPA's Mobile6.2 guidance
- PM2.5 factors for total directly emitted particles and NOx precursors

#### 5. Emissions Modeling Methods / Credits

- Updated post-processor methods to reflect EPA guidance associated with Mobile6.2 model release updates for local road speed profiles in rural areas
- Yearly PM2.5 emissions (total PM2.5 and NOx precursors) using latest seasonal traffic adjustments
- Offline emissions analyses

#### 6. Conformity Assessment Criteria

- 5/6/05 EPA's "*Transportation Conformity Rule Amendments for the New PM2.5 National Ambient Air Quality Standard: PM2.5 Precursors*"
- Analysis years: 2010, 2020, 2030

# **ATTACHMENT B**

# **Metropolitan Washington Air Quality Committee**

Suite 300, 777 North Capitol Street, N.E. Washington, D.C. 20002-4239 202-962-3358 Fax: 202-962-3203

July 13, 2005

Honorable Phil Mendelson, Chair  
National Capital Region Transportation Planning Board  
777 North Capitol Street, NE  
Washington, D.C. 20002

Dear Chair Mendelson:

Thank you for soliciting input on the scope of work for the Fine Particles (PM<sub>2.5</sub>) Standards Supplemental Air Quality Conformity Assessment of the 2005 CLRP and the FY2006-2011 TIP. According to EPA guidance, the Washington region is required to conduct a conformity determination for direct emissions and precursors of fine particulate pollution (PM<sub>2.5</sub>) by April 6, 2006 to avoid a conformity lapse. As proposed in TPB's scope of work, the TPB intends to complete the PM<sub>2.5</sub> conformity determination as a supplement to the on-going work to assess conformity for the 8-hour ozone standard in October 2005.

EPA's Transportation Conformity Rule Amendments provide two options for conformity determination during the interim period prior to the SIPs development in the new PM<sub>2.5</sub> non-attainment areas and the establishment of mobile budgets for PM<sub>2.5</sub> pollution and its precursors. The two options are (1) build no greater than no-build, or (2) build no greater than 2002. The TPB proposes to use Option 2, the build no greater than 2002 budget test in this year's conformity analysis. We note that both options provide an interim test until the state air agencies develop mobile emissions budgets for PM<sub>2.5</sub> and its precursor pollutants. For this year's analysis, we support the TPB's choice of interim method because it makes the best use of available resources and supports the budget concept. For any PM<sub>2.5</sub> conformity analysis in the coming years of the interim period, MWAQC urges TPB and the state air agencies to work together to determine which option is most appropriate for conformity analysis.

For the current PM<sub>2.5</sub> conformity cycle, we support the TPB proposed approach of emissions analysis and conformity determination only for direct PM<sub>2.5</sub> and for precursor NO<sub>x</sub>. We are urging the TPB and the three state air agencies to work together to determine which of the other precursors of PM<sub>2.5</sub> (VOCs, SO<sub>x</sub>, ammonia etc.) contribute significantly for possible inclusion in the analysis for the next conformity cycle and beyond.

EPA is expected to release additional guidance on PM<sub>2.5</sub> conformity. The proposed scope of work may change when this new additional guidance becomes available later this year. The MWAQC Technical Advisory Committee is available to work with TPB staff for making any needed changes in the work scope and to develop any other new inputs required to complete the analysis.

Meeting the PM<sub>2.5</sub> standard is expected to require continuation of all mobile and non-mobile emission reduction commitments, and possibly new ones in the near future. States and local governments are urged to maintain their commitments to TERMS and other emission reduction measures, regardless of whether implementation of these measures is currently critical for conformity determination during the interim period.

Thank you for the opportunity to comment on the PM<sub>2.5</sub> conformity assessment scope of work. We look forward to working closely with you on making further improvements to the region's air quality to meet the new PM<sub>2.5</sub> standard.

Sincerely,

A handwritten signature in black ink, appearing to read "Dana Kauffman". The signature is fluid and cursive, with a long horizontal stroke at the end.

Hon. T. Dana Kauffman, Chair  
Metropolitan Washington Air Quality Committee



# **ATTACHMENT C**

## MEMORANDUM

**TO:** Files

**FROM:** Ronald Milone

**DATE:** November 10, 2005

**SUBJECT:** Mobile Emissions PM 2.5 Post Processor Description and Results

### 1.0 Introduction

This memorandum accompanies earlier documentation of the TPB mobile emissions post processor<sup>1</sup> and describes a newly developed process for estimating the amount of fine particulates (PM<sub>2.5</sub>) generated by mobile sources. The PM<sub>2.5</sub> emissions post processor involves a series of TP+ scripts that are quite similar, and in some cases, identical to the existing process used to calculating mobile emissions in the TPB's annual Conformity Determination work. Like the existing post processor, the PM<sub>2.5</sub> post processor combines EPA Mobile6-based emission rates with network link volumes and trip tables generated by the regional travel model. However, the PM<sub>2.5</sub> post processor is different in the pollutants considered, the development of the emission rates, and the treatment of seasonal VMT adjustments.

The existing post processor addresses VOC, CO, and NO<sub>x</sub> pollutants. The Mobile6 based emission rates associated with these pollutants are developed on the basis of average seasonal conditions. VOC and NO<sub>x</sub> rates are reflective of a 'worst-case' condition during the ozone (summertime) season while CO rates are associated with a 'worst-case' wintertime condition. Since the network VMT generated by the travel model reflects average annual weekday traffic (AAWDT), network link volumes are factored to reflect weekday conditions for the time of year that is appropriate for the emissions calculation. The post processor is designed to calculate emissions using average *seasonal* weekday travel (ASWDT). With that said, the following distinguishing features of the PM<sub>2.5</sub> post processor can be made.

- 1) Mobile6-based emission rates supporting the PM<sub>2.5</sub> post processor relate to PM<sub>2.5</sub> and NO<sub>x</sub> emissions only. NO<sub>x</sub> emissions are considered in the overall PM<sub>2.5</sub> calculation since they indirectly contribute to particulate levels in the atmosphere. The PM<sub>2.5</sub> rates currently generated by the Mobile model are VMT-based while NO<sub>x</sub> emissions are associated with trip-starts as well as miles traveled.
- 2) The PM<sub>2.5</sub> post processor ultimately produces an *annualized* estimate of PM<sub>2.5</sub> and NO<sub>x</sub> emissions for the Washington, D.C. MSA. The annual tonnage is estimated by first computing the *average daily* emissions on a seasonal basis. The daily emission result is then multiplied by the number of days of each respective season. Calculating emissions on a seasonal basis therefore requires the provision of seasonal PM<sub>2.5</sub>/NO<sub>x</sub> emission

---

<sup>1</sup> See 9/16/05 Memorandum from Milone to Files on the subject: Mobile Emissions Post Processor Description and Results.

rates from Mobile6, and network link VMT that reflects average seasonal travel for each season of the year. Table 1 lists VMT factors that are used to convert AAWDT volume to average daily seasonal traffic (ASDT). The number of days in each season is also displayed.

**Table 1: Seasonal Parameters Used in the PM2.5 Emission Calculation**

Season	Months	AAWDT to ASDT Factor	No. of Days
Winter	December – February	0.9028	90
Spring	March – May	0.9570	92
Summer	June-August	0.9984	92
Fall	September– November	0.9445	91

- 3) The PM2.5 reporting is based on a modified definition of the Washington MSA area with respect to earlier reporting. The PM2.5 MSA report is based on a ten-jurisdiction area comprised of the District of Columbia, Montgomery County, Prince George’s County, Arlington County, the City of Alexandria, Fairfax County, Loudoun County, Prince William County, Frederick County, and Charles County. Previous MSA reports included the above jurisdictions with Stafford and Calvert Counties added.

## 2.0 Mobile6 Emission Rate Processing

PM2.5 and NOx emission rates used in the PM2.5 post processor are prepared on a county-specific basis, as shown Table 2. The table indicates that emission rates are explicitly modeled (using Mobile6) for 16 of the 27 jurisdictions. The remaining 11 jurisdictions are assigned ‘borrowed’ rates from neighboring modeled jurisdictions.

The Mobile6 model generates PM2.5 and NOx rates by jurisdiction in separate batch executions. PM2.5 Mobile6 listing files are produced for each of the 16 modeled jurisdictions. Each listing contains emission rate summaries for 8 scenarios: stabilized network rates by season (Winter, Spring, Summer, and Fall), and stabilized local road rates by season. The PM2.5 emission rates generated by Mobile6 do not vary by speed, in contrast to NOx rates which are sensitive to highway speed. The emission rate listings are processed by a Fortran program (M6RATESPM.EXE) so that PM rates are consolidated onto a machine readable text file. A single file is created for each jurisdiction and is assigned a special name that is referenced by the batch file (Seasonal\_Emiss.bat) that executes the post processor.

Since NOx emission rates vary by operating mode and by speed, the number of Mobile6 seasonal emission scenarios is considerably larger than the PM2.5 scenarios. Table 3 indicates that 716 Mobile6 scenarios are executed, resulting in a lengthy listing file for each modeled jurisdiction. Another program named M6RATESS.EXE is used to convert each listing into six machine readable files containing seasonal NOx rates for stabilized network arterials, stabilized network freeway non-ramps, stabilized freeway ramps, local hot and cold starting rates, local stabilized rates, and stabilized/local arterial rates. All files contain per-mile rates by speed (if relevant) that are arrayed by season (Winter, Spring, Summer, and Fall). The cold/hot starting rates, however, are converted into per-trip rates. The six files are assigned special names that are referenced by

the batch file that executes the post processor. The reader should consult the above referenced 9/16/05 memorandum for computation details of the M6RATESS program (which are identical to those of the documented M6RATES program).

**Table 2: Jurisdictional Emission Areas**

<b>Emission Area System Number</b>	<b>Jurisdiction / External Area</b>	<b>File-name code</b>	<b>MSA Member Yes/No</b>	<b>Mobile Rates Modeled/Borrowed</b>
1	Washington, DC	Dc	Yes	Modeled
2	Montgomery County	Mc	Yes	Modeled
3	Prince George's County	Pg	Yes	Modeled
4	Howard County	-	No	Borrowed (Prince George's Co.)
5	Anne Arundel County	-	No	Borrowed (Prince George's Co.)
6	Carroll County	-	No	Borrowed (Prince George's Co.)
7	Baltimore Area Externals	-	No	Borrowed (Prince George's Co.)
8	Calvert County	Ca	Yes	Modeled
9	Charles County	Ch	Yes	Modeled
10	Frederick County	Fr	Yes	Modeled
11	Frederick Co. Externals	-	No	Borrowed (Frederick Co.)
12	Arlington	Ar	Yes	Modeled
13	Fairfax County	Fx	Yes	Modeled
14	Loudoun County	Ld	Yes	Modeled
15	Prince William County	Pw	Yes	Modeled
16	Stafford County	St	Yes	Modeled
17	City of Alexandria	Al	Yes	Modeled
18	St. Mary's County	Sm	No	Modeled
19	Washington Co. Externals	We	No	Modeled
20	Clarke County	Cl	No	Modeled
21	Fauquier County	-	No	Borrowed (Clarke Co.)
22	Jefferson Co, WVA	-	No	Borrowed (Clarke Co.)
23	Western External Area	-	No	Borrowed (Clarke Co.)
24	Spotsylvania County	Sp	No	Modeled
25	King George County	-	No	Borrowed (Spotsylvania Co.)
26	City of Fredericksburg	-	No	Borrowed (Spotsylvania Co.)
27	Southern External Area	-	No	Borrowed (Spotsylvania Co.)

**Table 3: Sequence of NOx Emission Mobile Scenarios Generated for each Jurisdiction**

<b>MOBILE6 ‘Scenarios’</b>	<b>Operating Mode</b>	<b>Facility Type</b>	<b>Speed Specifications</b>
<b>Winter:</b> 1- 65	Stabilized	Arterial	1 to 65 mph in 1 mph increments
66-130	Stabilized	Freeway, Non-Ramp	1 to 65 mph in 1 mph increments
131	Stabilized	Freeway Ramp	Single speed / 35.0 mph
132	Cold	Local	Single speed / 12.9 mph
133	Hot	Local	Single speed / 12.9 mph
134	Stabilized	Local	Single speed / 12.9 mph
135-179	Stabilized	Arterial(w/ Rural VMT Mix)	1 to 45 mph in 1 mph increments
<b>Spring:</b> 180-244	Stabilized	Arterial	1 to 65 mph in 1 mph increments
245-309	Stabilized	Freeway, Non-Ramp	1 to 65 mph in 1 mph increments
310	Stabilized	Freeway Ramp	Single speed / 35.0 mph
311	Cold	Local	Single speed / 12.9 mph
312	Hot	Local	Single speed / 12.9 mph
313	Stabilized	Local	Single speed / 12.9 mph
314-358	Stabilized	Arterial(w/ Rural VMT Mix)	1 to 45 mph in 1 mph increments
<b>Summer:</b> 359-423	Stabilized	Arterial	1 to 65 mph in 1 mph increments
424-488	Stabilized	Freeway, Non-Ramp	1 to 65 mph in 1 mph increments
489	Stabilized	Freeway Ramp	Single speed / 35.0 mph
490	Cold	Local	Single speed / 12.9 mph
491	Hot	Local	Single speed / 12.9 mph
492	Stabilized	Local	Single speed / 12.9 mph
493-537	Stabilized	Arterial(w/ Rural VMT Mix)	1 to 45 mph in 1 mph increments
<b>Fall :</b> 538-602	Stabilized	Arterial	1 to 65 mph in 1 mph increments
603-667	Stabilized	Freeway, Non-Ramp	1 to 65 mph in 1 mph increments
668	Stabilized	Freeway Ramp	Single speed / 35.0 mph
669	Cold	Local	Single speed / 12.9 mph
670	Hot	Local	Single speed / 12.9 mph
671	Stabilized	Local	Single speed / 12.9 mph
672-716	Stabilized	Arterial(w/ Rural VMT Mix)	1 to 45 mph in 1 mph increments

Thus, the PM2.5 post processor requires 112 emission rate files containing seasonal emission rates: 16 PM2.5 emission rate files (one for each modeled jurisdiction) and 96 NOx emission rate files (6 rate files for each of the 16 jurisdictions). Table 4 describes the files that are developed for each jurisdiction as inputs to the PM2.5 post processor.

**Table 4: Emission Rates PM2.5 Post Processor Input File Descriptions**

Filename	File Description	Notes
M6<Yr>PM<Jr>.N_L	Stabilized/PM Network/Local rates	A one-line text file containing nine items: a speed value and 8 PM2.5 rate values(gm./mi): network rates by season (Win.,Spr.,Sum.,Fall) and local rates by season (Win.,Spr.,Sum.,Fall)
M6<Yr>Nx<Jr>.R_A	Stabilized/Arterial Running NOx rates	A 65-line text file containing five items: speed, NOx rates (all gm/mi) by season (Win.,Spr.,Sum.,Fall).
M6<Yr>Nx<Jr>.R_F	Stabilized/Freeway non-ramp Running NOx rates	A 65-line text file containing five items: speed, NOx rates (all gm/mi) by season (Win.,Spr.,Sum.,Fall).
M6<Yr>Nx<Jr>.RAM	Stabilized/Freeway ramp Running NOx rates	A one-line text file containing five items: speed, NOx rates (all gm/mi) by season (Win.,Spr.,Sum.,Fall).
M6<Yr>Nx<Jr>.STT	Cold/Hot start rates	A one-line text file containing five items: speed, NOx Cold start rates rates (all gm/trip) by season (Win.,Spr.,Sum.,Fall), and Hot start rates by season (Win.,Spr.,Sum.,Fall).
M6<Yr>Nx<Jr>.LCL	Stabilized/Local Running NOx rates	A one-line text file containing five items: speed, NOx rates (all gm/mi) by season (Win.,Spr.,Sum.,Fall).
M6<Yr>Nx<Jr>.R_R	Stabilized/Arterial Running/Rural NOx rates	A 45-line text file containing five items: speed, NOx rates (all gm/mi) by season (Win.,Spr.,Sum.,Fall).

Note: <Yr> relates to year, e.g., '02', '10', '30' etc./ <Jr> relates to a two-digit juris code(see Table 2)

### 5.0 PM2.5 Post-Processor Program Steps

The PM2.5 post processor may be executed with the provision of: 1) travel demand output files, 2) emission rate files by jurisdiction as described above, and 3) a small text file containing jurisdiction level VMT information. The travel demand output files include the final iteration loaded highway network (I6HWY.NET) and three vehicle trip tables corresponding to the AM, PM, and off peak periods (I6AM.VTT, I6PM.VTT, I6OP.VTT). The jurisdictional VMT file (Base\_Juris\_VMT.txt) is a pre-existing file containing base year estimates of network-based VMT, local (or off-network) VMT, and the estimated proportion of network VMT that is urban and rural. This information is used to develop future year local VMT that is urban and local. All VMT information corresponds only to jurisdictions within the MSA as defined above.

The TP+ scripts used to execute the PM2.5 post-processor are described below in order of execution. The computations are identical to those documented in the above referenced 9/16/05 memorandum, except that:

- VOC and CO emissions generation has been removed
- PM emissions generation has been added
- The batch file executing the post processor has been modified so that it executes four times, for each modeled season

- The summary routines have been modified so that *seasonal* emission totals are listed out at jurisdiction level and at the MSA level, in addition to *daily* emission totals.

The five steps are summarized below. (Associated TP+ script names are in parenthesis):

1) Trip Table Formatting (AQTRIPS.S): AM, PM, and off-peak trip tables produced by the travel demand model are read. The program produces zonal trip-ends for each of the three time periods. It also produces a file containing the proportion of daily vehicle trips from/to each of the 27 emission areas. Since the trip proportions are developed with daily trips, the proportion in the *i/j* direction is generally the same as that in the *j/i* direction.

2) Time-of-Day Trip-Ends Program (ZONESPRD.S): The program reads the zonal origins and destinations, described above, and apportions them among discrete hourly periods.

3) VMT Formating Program (Pre\_Local.S): The program summarizes modeled VMT at the jurisdiction level and writes a summary file to be used in the LOCAL.S program.

4) Time-of-Day VMT and speeds program (PEAK\_SPREAD\_Seasonal\_Nx.S): The program reads the AM, PM, and off-peak network link volumes produced by the travel demand model. It produces hourly volumes, VMT, and restrained speed for each highway link. The hourly VMT and highway speeds are sensitive to seasonal adjustment factors.

5) Running Emissions Program (RUNNING\_Seasonal\_Nx.S): The program computes hot stabilized emissions on a link-by-link and hour-by-hour basis. It reads 1) the hourly link VMT and highway speed files developed above, 2) MOBILE6-based running emission rates which are provided on the basis of speed, and 3) the county level trip proportions file. PM2.5 and NOx running emissions result from the program.

6) Start/Soak Emissions Program (STRT\_SKR\_Seasonal\_Nx.S): The program applies emission rates to the trip- ends to compute start-up and soaking emissions on a zone-by-zone and hour-by-hour basis. The program reads: 1) hourly trip-ends, 2) the MOBILE6-generated cold/hot starting rates, and 3) the county-level trip proportions file. NOx starting emissions result from the program. Note that trip tables are not affected by seasonal adjustments.

7) Local Emissions Program (LOCAL\_Seasonal\_Nx.S): The program computes hot stabilized emissions on a link-by-link and hour-by-hour basis. It reads 1) a file containing forecasted local/urban and local/rural VMT at the jurisdiction level and 2) PM2.5 and Arterial NOx stabilized rates specially developed for local roads. PM2.5 and NOx rates are produced.

A batch file (Seasonal\_Emiss.Bat) is normally used to facilitate the execution the above scripts in a 'command prompt' window. The batch file defines the input file locations, defines global environment variables that are referenced by the scripts (the modeled year, the seasonal VMT adjustment, the number of days in each season, and text labels), and then executes the scripts. After executing steps 1-3, steps 4-7 are executed four times, i.e., for each of the four seasons. The batch file ultimately produces three small text files containing jurisdiction level running,

starting, and local emissions at the jurisdiction and MSA levels, by season (Winter, Spring, Summer, and Fall). The files are named:

- <year>\_running.txt
- <year>\_strt\_skr.txt
- <year>\_local.txt

The following attachments include program and script listings for the procedures discussed above.

#### Attachment 1

- M6RatesS Program Files
- M6RatesS.f90
- M6RateS.ctl

#### Attachment 2

- M6RatesPM Program Files
- M6RatesPM.f90
- Run\_M6RatesPM.bat

#### Attachment 3

- Post Processor Batch File & TP+ Scripts
- Seasonal\_Emiss.Bat
- AQTRIP.S
- ZONESPRD.S
- Pre\_Local.S
- Peak\_Spread\_Seasonal\_Nx.S
- Running\_Seasonal\_Nx.S
- Strt\_Skr\_Seasonal\_Nx.S
- Local\_Seasonal\_Nx.S

#### Attachment 4

- Example Post Processor Output Listings
- 2002\_Strt\_Skr.txt
- 2002\_Running.txt
- 2002\_Local.txt



# **ATTACHMENT D**

**D1. Transit Bus**

**D2. School Bus**

# MEMORANDUM

November 15, 2005

**To:** Air Quality Conformity File

**From:** Daivamani Sivasailam

**Subject:** Transit Bus Emissions for PM 2.5 Conformity Assessment of the 2005 CLRP and FY 2006 – FY 2011 TIP

This memo discusses the development of direct fine particles (PM 2.5), and NOx precursors emissions estimates for transit buses for the conformity analysis years.

## **Approach**

This effort pivots from previously collected transit data (survey and emissions estimation are described in the 8-hour Ozone and Winter CO conformity assessment report), where the data were analyzed on a daily basis, annual statistics were also available from that effort and were applied in the PM 2.5 assessment.

The annual VMT from the survey was divided by the number of service days for each provider to calculate a daily VMT for the 2002 base year. Using the appropriate emissions factor, based on the average operating speed for each provider and the season, staff calculated the daily direct PM 2.5 and NOx precursor emissions for transit buses for each season. From the daily estimates, seasonal total, based on the number of days per season and the annual total emissions were estimated. The following table shows year 2002 estimation of transit bus emissions. Similar methods were used to estimate emissions for 2010, 2020 and 2030 analysis years.

## 2002 TRANSIT BUS CHARACTERISTICS / EMISSIONS (PM 2.5 - FALL)

Jurisdiction	Operator	2002 Weekday VMT	2002 Annual VMT	2002 Daily VMT	Remove Stafford/ Calvert	Average Speed	PM 2.5			NOx		
							factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
District of Columbia	Metrobus	50,552	18,451,480	50,552	50,552	10	0.8176	41331	0.0456	24.0030	1213400	1.3375
District of Columbia	MTA Commuter buses	2,510	916,150	2,510	2,510	45	0.8176	2052	0.0023	17.5280	43995	0.0485
District of Columbia	Peter Pan / Trailways	200	50,000	137	137	55	0.8176	112	0.0001	22.0800	3025	0.0033
District of Columbia	Carolina Trailways	20	5,000	14	14	55	0.8176	11	0.0000	22.0800	302	0.0003
District of Columbia	Capitol Trailways	100	25,000	68	68	55	0.8176	56	0.0001	22.0800	1512	0.0017
District of Columbia	Martz / Grey Line sightseeing	500	125,000	342	342	55	0.8176	280	0.0003	22.0800	7562	0.0083
District of Columbia	New World Tours	100	25,000	83	83	20	0.8176	68	0.0001	18.3610	1530	0.0017
District of Columbia	Georgetown U. shuttle	100	25,000	83	83	15	0.8176	68	0.0001	20.6230	1719	0.0019
District of Columbia	American U. shuttle	83	30,000	100	100	20	0.8176	82	0.0001	18.3610	1836	0.0020
District of Columbia	George Washington U shuttle	100	25,000	83	83	15	0.8176	68	0.0001	20.6230	1719	0.0019
District of Columbia	EPA Shuttle	200	50,000	200	200	15	0.8176	164	0.0002	20.6230	4125	0.0045
District of Columbia	USDOT Shuttle	200	50,000	200	200	15	0.8176	164	0.0002	20.6230	4125	0.0045
District of Columbia	Gallaudet Shuttle	100	25,000	83	83	15	0.8176	68	0.0001	20.6230	1719	0.0019
District of Columbia	Metro Access - paratransit	5,000	1,250,000	3,425	3,425	15	0.8176	2800	0.0031	20.6230	70627	0.0779
Maryland	Corridor Transit (CTC)	1,265	459,130	1,837	1,837	18	0.8176	1502	0.0017	19.1150	35105	0.0387
Maryland	Peter Pan / Trailways	1,800	450,000	1,233	1,233	55	0.8176	1008	0.0011	22.0800	27222	0.0300
Maryland	Carolina Trailways	225	56,250	154	154	55	0.8176	126	0.0001	22.0800	3403	0.0038
Maryland	Capitol Trailways	400	100,000	274	274	55	0.8176	224	0.0002	22.0800	6049	0.0067
Maryland	Martz / Grey Line sightseeing	2,250	562,500	1,541	1,541	55	0.8176	1260	0.0014	22.0800	34027	0.0375
Maryland	New World Tours	100	25,000	68	68	20	0.8176	56	0.0001	18.3610	1258	0.0014
Montgomery	Metrobus	17,262	6,300,630	17,262	17,262	15	0.8176	14113	0.0156	20.6230	355994	0.3924
Montgomery	MTA Commuter buses	2,180	795,700	3,183	3,183	45	0.8176	2602	0.0029	17.5280	55788	0.0615
Montgomery	Mont. Co. Ride-On	35,616	13,000,000	35,616	35,616	15	0.8176	29120	0.0321	20.6230	734518	0.8097
Prince George's	Metrobus	24,660	9,000,900	24,660	24,660	15	0.8176	20162	0.0222	20.6230	508563	0.5606
Prince George's	MTA Commuter buses	6,840	2,496,600	9,986	9,986	45	0.8176	8165	0.0090	17.5280	175042	0.1930
Prince George's	PG Co. The Bus	9,723	2,460,000	6,740	6,740	15	0.8176	5510	0.0061	20.6230	138993	0.1532
Prince George's	ShuttleUM (U. of MD)	1,864	652,482	2,175	2,175	11	0.8176	1778	0.0020	23.0810	50200	0.0553
Prince George's	P.G. Co. paratransit	3,000	750,000	2,055	2,055	15	0.8176	1680	0.0019	20.6230	42376	0.0467
Frederick	MTA Commuter buses	370	135,050	540	540	45	0.8176	442	0.0005	17.5280	9469	0.0104
Frederick	Fredrick Co. TransIT	3,082	847,666	2,322	2,322	12	0.8176	1899	0.0021	22.3130	51819	0.0571
Charles	MTA Commuter buses	2,290	572,500	2,290	2,290	45	0.8176	1872	0.0021	17.5280	40139	0.0442
Virginia	Metrobus	30,825	11,251,125	30,825	30,825	15	0.8176	25203	0.0278	20.6230	635704	0.7007
Virginia	Lee Coaches	70	17,500	70	49	45	0.8176	40	0.0000	17.5280	859	0.0009
Virginia	Brooks Transit	750	187,500	750	750	45	0.8176	613	0.0007	17.5280	13146	0.0145

## 2002 TRANSIT BUS CHARACTERISTICS / EMISSIONS (PM 2.5 - FALL)

Jurisdiction	Operator	2002 Weekday VMT	2002 Annual VMT	2002 Daily VMT	Remove Stafford/ Calvert	Average Speed	PM 2.5			NOx		
							factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
Virginia	Quicks Commuter Service	1,320	330,000	1,320	924	45	0.8176	755	0.0008	17.5280	16196	0.0179
Virginia	National Coach Works	1,650	412,500	1,650	1,155	45	0.8176	944	0.0010	17.5280	20245	0.0223
Virginia	Greyhound / Trailways (VA)	5,000	1,250,000	3,425	2,397	55	0.8176	1960	0.0022	22.0800	52932	0.0583
Virginia	Carolina Trailways	225	56,250	154	108	55	0.8176	88	0.0001	22.0800	2382	0.0026
Virginia	Martz / Grey Line sightseeing	2,250	562,500	1,541	1,079	55	0.8176	882	0.0010	22.0800	23819	0.0263
Virginia	New World Tours	185	67,525	185	130	20	0.8176	106	0.0001	18.3610	2378	0.0026
Alexandria	Alexandria DASH	3,454	1,215,746	3,331	3,331	13	0.8176	2723	0.0030	21.6630	72155	0.0795
Alexandria	Old Town "trolley" buses	300	75,000	205	205	20	0.8176	168	0.0002	18.3610	3773	0.0042
Alexandria	Alexandria DOT-paratransit	924	231,033	633	633	15	0.8176	518	0.0006	20.6230	13054	0.0144
Arlington	Arlington Co. ART	794	289,800	794	794	16	0.8176	649	0.0007	20.0580	15926	0.0176
Arlington	Crystal City Express	96	24,000	80	80	15	0.8176	65	0.0001	20.6230	1650	0.0018
Arlington	Skyline Crystal Express	144	36,000	120	120	15	0.8176	98	0.0001	20.6230	2475	0.0027
Arlington	Arlington STAR-paratransit	3,245	811,271	2,223	2,223	15	0.8176	1817	0.0020	20.6230	45838	0.0505
Fairfax	Fairfax Connector	18,036	6,348,531	17,393	17,393	15	0.8176	14221	0.0157	20.6230	358701	0.3954
Fairfax	Washington Flyer Coach Service	1,370	500,000	1,370	1,370	65	0.8176	1120	0.0012	32.0620	43921	0.0484
Fairfax	Fairfax Co. Fastran- paratransit	11,427	2,845,372	7,796	7,796	15	0.8176	6374	0.0070	20.6230	160767	0.1772
Fairfax	City of Fairfax CUE	1,483	522,000	1,430	1,430	15	0.8176	1169	0.0013	20.6230	29494	0.0325
Fairfax	City of Ffx, City Wheels- paratransit.	100	25,000	68	68	15	0.8176	56	0.0001	20.6230	1413	0.0016
Fairfax	City of Falls Ch. Fare Wheels- paratransit	100	25,000	68	68	15	0.8176	56	0.0001	20.6230	1413	0.0016
Prince William	PRTC Omnalink	4,038	1,009,500	4,038	4,038	15	0.8176	3301	0.0036	20.6230	83276	0.0918
Prince William	PRTC OmniRide	5,700	1,425,000	5,700	5,700	27	0.8176	4660	0.0051	16.6090	94671	0.1044
Loudoun	Loudoun Transportation Assc.	4,532	1,132,884	4,532	4,532	15	0.8176	3705	0.0041	20.6230	93454	0.1030
Loudoun	Loudoun Commuter Service	1,866	671,600	2,686	2,686	25	0.8176	2196	0.0024	16.9400	45508	0.0502
Loudoun	Loudoun Transit (LCTA)- paratransit	100	25,000	68	68	15	0.8176	56	0.0001	20.6230	1413	0.0016
<b>TOTAL</b>		272,676	91,064,675	262,274	259,771			212389	0.2341		5463717	6.0227

## Notes:

- 1) Used WMATA percent VMT by jurisdiction from FY03-08 AQC, Appendix I (page I-3)
- 2) Assumed average freeway speed of 55 mph where higher than 55 speed limit is available, and 45 mph where speed limit is 55

November 15, 2005

**Memorandum**

To: Air Quality Conformity Files

From: Daivamani Sivasailam  
Principal Transportation Engineer

Subject: PM 2.5 Emissions Inventory of School Buses

This memorandum outlines the procedure that staff followed to develop the fine particulate matter (PM 2.5) emissions inventory from the school bus fleet in the region as part of the conformity analysis of the 2005 Constrained Long Range Plan (CLRP) and FY 2006- FY 2011 Transportation Improvement Program (TIP).

In calendar 2001, staff compiled annual vehicle miles of travel (VMT) from the school systems in the region; this annual VMT was used to develop the 2002 base year emissions inventory. As the first step, the daily VMT by school system was estimated by dividing the annual VMT by number of days the different school systems operate, which varies from 190 days to 220 days. The average operating speed of the buses was also obtained from the 2001 survey; and speeds vary from a low of 14 mph to a high of 30 mph. Using the emissions rates for the appropriate speed and season, and the daily VMT, staff estimated direct PM 2.5 and NOx precursor emissions for each of the school systems. Using the daily emissions and the number of days the school buses operate each season, the emissions for the four seasons were estimated. As a final step the annual emissions for direct PM 2.5 and NOx precursors, were estimated by adding up the emissions for the four seasons.

Similarly, emissions inventories for 2010, 2020, and 2030 were estimated assuming a 0.5% growth rate per year applied to the VMT reported in the base year. The following two pages show the tables depicting the daily and seasonal emissions inventories for 2002 base year.

FY2006-2011 TIP / 2005 CLRP AIR QUALITY CONFORMITY ANALYSIS  
**2002 SCHOOL BUS CHARACTERISTICS / EMISSIONS**  
**(PM 2.5)**

Jurisdiction	2002 Weekday VMT	2002 Annual VMT	Average Speed	WINTER						SPRING					
				PM 2.5			NOx			PM 2.5			NOx		
				factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
District of Columbia	12,696	2,800,000	14	0.6640	8430	0.0093	13.9310	176868	0.1950	0.6389	8111	0.0089	13.7990	175192	0.1931
Montgomery	100,000	19,000,000	30	0.6640	66400	0.0732	10.9410	1094100	1.2060	0.6389	63890	0.0704	10.8150	1081500	1.1921
Prince George's	129,967	21,000,000	30	0.6640	86298	0.0951	10.9410	1421969	1.5675	0.6389	83036	0.0915	10.8150	1405593	1.5494
Frederick	33,684	6,400,000	30	0.6640	22366	0.0247	10.9410	368539	0.4062	0.6389	21521	0.0237	10.8150	364295	0.4016
Charles	20,801	3,950,000	30	0.6640	13812	0.0152	10.9410	227584	0.2509	0.6389	13290	0.0146	10.8150	224963	0.2480
Alexandria	2,028	446,264	25	0.6640	1347	0.0015	11.3790	23077	0.0254	0.6389	1296	0.0014	11.2530	22821	0.0252
Arlington	2,600	571,986	25	0.6640	1726	0.0019	11.3790	29585	0.0326	0.6389	1661	0.0018	11.2530	29258	0.0323
Fairfax	96,524	18,200,000	30	0.6640	64092	0.0706	10.9410	1056069	1.1641	0.6389	61669	0.0680	10.8150	1043907	1.1507
Prince William	36,114	6,900,000	30	0.6640	23980	0.0264	10.9410	395123	0.4355	0.6389	23073	0.0254	10.8150	390573	0.4305
Loudoun	28,347	6,100,000	30	0.6640	18822	0.0207	10.9410	310145	0.3419	0.6389	18111	0.0200	10.8150	306573	0.3379
<b>TOTAL</b>	462,761	85,368,250			307273	0.3387		5103059	5.6252		295658	0.3259		5044674	5.5608

FY2006-2011 TIP / 2005 CLRP AIR QUALITY CONFORMITY ANALYSIS  
**2002 SCHOOL BUS CHARACTERISTICS / EMISSIONS**  
**(PM 2.5)**

Jurisdiction	2002 Weekday VMT	2002 Annual VMT	Average Speed	SUMMER						FALL					
				PM 2.5			NOx			PM 2.5			NOx		
				factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
District of Columbia	12,696	2,800,000	14	0.6397	8122	0.0090	13.7970	175167	0.1931	0.5581	7086	0.0078	13.6730	173592	0.1914
Montgomery	100,000	19,000,000	30	0.6397	63970	0.0705	10.8130	1081300	1.1919	0.5581	55810	0.0615	10.6610	1066100	1.1752
Prince George's	129,967	21,000,000	30	0.6397	83140	0.0916	10.8130	1405333	1.5491	0.5581	72535	0.0800	10.6610	1385578	1.5273
Frederick	33,684	6,400,000	30	0.6397	21548	0.0238	10.8130	364227	0.4015	0.5581	18799	0.0207	10.6610	359107	0.3958
Charles	20,801	3,950,000	30	0.6397	13306	0.0147	10.8130	224921	0.2479	0.5581	11609	0.0128	10.6610	221759	0.2444
Alexandria	2,028	446,264	25	0.6397	1297	0.0014	11.2510	22817	0.0252	0.5581	1132	0.0012	11.1060	22523	0.0248
Arlington	2,600	571,986	25	0.6397	1663	0.0018	11.2510	29253	0.0322	0.5581	1451	0.0016	11.1060	28876	0.0318
Fairfax	96,524	18,200,000	30	0.6397	61746	0.0681	10.8130	1043714	1.1505	0.5581	53870	0.0594	10.6610	1029042	1.1343
Prince William	36,114	6,900,000	30	0.6397	23102	0.0255	10.8130	390501	0.4305	0.5581	20155	0.0222	10.6610	385011	0.4244
Loudoun	28,347	6,100,000	30	0.6397	18134	0.0200	10.8130	306516	0.3379	0.5581	15820	0.0174	10.6610	302207	0.3331
<b>TOTAL</b>	462,761	85,368,250			296028	0.3263		5043749	5.5598		258267	0.2847		4973797	5.4827

Jurisdiction	Winter		Spring		Summer		Fall		Annual	
	PM	NOx	PM	NOx	PM	NOx	PM	NOx	PM	NOx
District of Columbia	0.539	11.308	0.519	11.201	0.358	7.724	0.453	11.098	1.869	41.331
Montgomery	4.245	69.950	4.085	69.145	2.821	47.677	3.568	68.160	14.719	254.932
Prince George's	5.517	90.912	5.309	89.865	3.666	61.965	4.637	88.586	19.129	331.328
Frederick	1.430	23.562	1.376	23.291	0.950	16.060	1.202	22.959	4.958	85.872
Charles	0.883	14.550	0.850	14.383	0.587	9.917	0.742	14.178	3.062	53.028
Alexandria	0.086	1.475	0.083	1.459	0.057	1.006	0.072	1.440	0.298	5.380
Arlington	0.110	1.892	0.106	1.871	0.073	1.290	0.093	1.846	0.383	6.898
Fairfax	4.098	67.519	3.943	66.741	2.723	46.020	3.444	65.791	14.207	246.071
Prince William	1.533	25.262	1.475	24.971	1.019	17.218	1.289	24.615	5.316	92.066
Loudoun	1.203	19.829	1.158	19.600	0.800	13.515	1.011	19.321	4.172	72.266
<b>Total</b>	<b>19.645</b>	<b>326.259</b>	<b>18.903</b>	<b>322.526</b>	<b>13.053</b>	<b>222.391</b>	<b>16.512</b>	<b>317.995</b>	<b>68.113</b>	<b>1189.172</b>

## Assumptions

Number of days = 214

3 seasons with 58 days and Summer with 40 days

Winter	58
Spring	58
Summer	40
Fall	58

# **ATTACHMENT E**



# Memorandum

**To:** Air Quality Files

**From:** Eulalie G. Lucas  
Transportation Engineer

**Date:** 11/16/2005

**Re:** Auto Access to Transit Emissions Calculations: PM2.5 and NOx Precursor

---

## **Introduction:**

The Environmental Protection Agency (EPA) in 2004 designated the District of Columbia, four counties in Maryland and five in northern Virginia as the Washington Metropolitan non-attainment area due to violation of health standards for fine particles PM2.5. Non-attainment areas were given one year from April 2005 to demonstrate conformity or face a lapse. In response to this federal requirement COG/TPB staff calculated PM2.5 direct and NOx precursor emission estimates associated with travel from the region's 2005 Constrained Long Range Plan (CLRP) and the FY2006-2011 Transportation Improvement Plan (TIP). Procedures used for these calculations required changes to the approach used in ozone season emission estimates since these emissions are reported on an annual not daily basis. The following paragraphs describe these procedures and updates and serve as documentation for PM2.5 and NOx emissions associated with travel to transit and park and ride lots in the PM2.5 non-attainment area.

## **Vehicle Mix and travel data:**

VMT Mix percent associated with auto access to transit includes only passenger cars and light duty trucks, (not heavy duty trucks as with network VMT mix percents), used by commuters to access transit and park and ride lots. Because travel estimates to transit and 'park and ride' lots reflect commuting traffic only, the conversion from daily to annual reporting included only five days per week unlike network travel where staff assumed seven days.

## **Methodology:**

The procedure used in the calculation of emissions associated with auto access to transit is an off-line process like transit and school bus emissions calculations. The approach is very simple: it involves the application of an emissions rate to each of the various components of travel, i.e., start up, running (35 mph for arterials and 45 mph for freeways) and hot soak. For trips originating outside the MSA, only those miles within the MSA are used in the calculation. Forecasting for 'out years' is based on growth trends for total internal modeled transit trips applied to the MWCOG/DTP 2002 Park and Ride Utilization inventory data.

Separate emissions rates are applied by components of a trip cycle, i.e., a start up rate for trip origins, a running rate for the running component, and a hot soak rate for trip destinations. These three rates represent an average of the ten composite rates for jurisdictions in the non-attainment area and for all light duty vehicle types (HDD fractions were zeroed out of the VMT Mix). This

adjustment was made based on the assumption that heavy duty vehicles such as tractor trailers are not used by commuters for trips to and from transit locations or to park and ride lots.

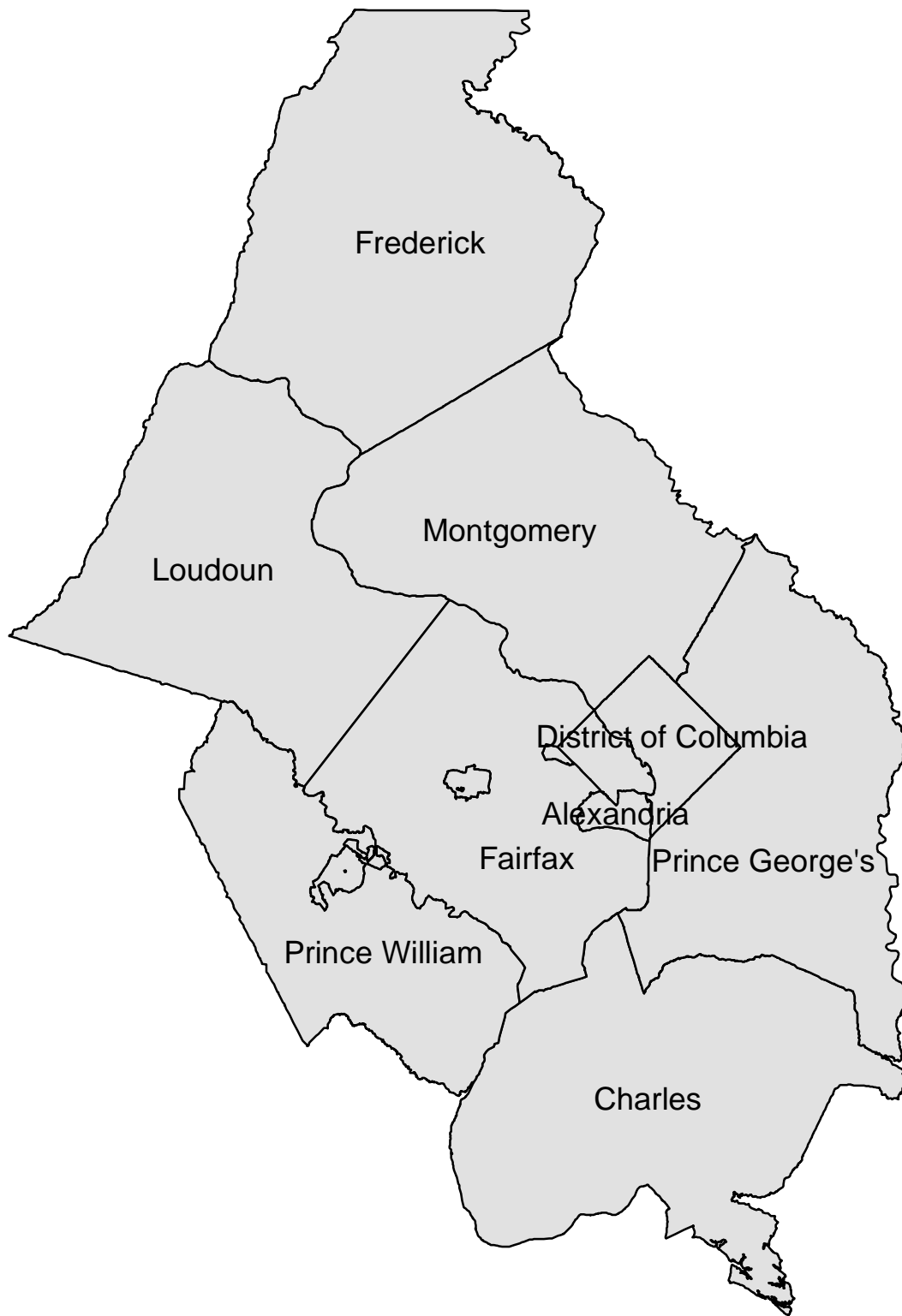
**Updates:**

The travel demand data used for the PM2.5 analysis are consistent with the 2005 CLRP ozone season analysis: travel demand model runs used Version 2.1D #50; the land activity forecasts are from Co-operative Forecasts Round 7; and the Mobile emissions were generated from Mobile model version 6.2. The seasonal adjustments in the table below were applied (see Mike Clifford and Daivamani Sivasailmani’s memo dated May 5<sup>th</sup>, 2005) to convert AAWDT travel demand to AWDT for each season of the year; travel days and emissions were then developed for each season according to the number of commuting days in each season of the year. The table below lists these percents; also included is a map of the non-attainment area.

Results for 2002 for the winter season are shown in Exhibits 1 and 2; the other analysis years 2002, 2020 and 2030 are available in the full technical report.

<b>Season</b>	<b>Adjustment Factor AAWDT to AWDT season</b>	<b>Number of Commuting Days Per Season</b>
Winter	.97	65
Spring	1.02	66
Summer	1.05	66
Fall	1.00	65

# Washington DC-Maryland-Virginia PM 2.5 Nonattainment Area



**Exhibit 1**  
**Winter**  
**2002 NOx Precursor**  
**AUTO ACCESS TO TRANSIT**  
**FY2006-2011 TIP AND 2005 CLRP AIR QUALITY CONFORMITY**

LOCATION	OUTSIDE MSA (%)	INSIDE MSA	2002		AVERAGE TRIP LENGTH	2002 VMT	ARTERIAL		FREEWAY		E M I S S I O N S		COLD START Rate (gm/mile)	RUNNING		Total Running Emission (tons/day)	TOTAL (tons/day)	
			OUTSIDE MSA	Total			%	VMT	Adj.Art VMT	FREEWAY VMT	Adj.Fwy VMT	Arterial Rate (gm/mile)		Freeway Rate (gm/mile)				
							Wk Days =		65				1.7666	1.0072	1.0635			
							Seasonal adj =		0.97									
<b>COMMUTER RAIL LOTS</b>																		
BRUNSWICK 25%	25	305	102	407	7.5	3,053	57	43	1,740	1,688	1,313	1,273	0.0014	0.0037	0.0030	0.0067	0.0081	
PT OF ROCKS 25%	25	204	68	272	7.5	2,040	57	43	1,163	1,128	877	851	0.0009	0.0025	0.0020	0.0045	0.0054	
DICKERSON	0	15	0	15	7.5	113	57	43	64	62	48	47	0.0001	0.0001	0.0001	0.0002	0.0003	
BARNESVILLE	0	46	0	46	7.5	345	57	43	197	191	148	144	0.0002	0.0004	0.0003	0.0008	0.0009	
GERMANTOWN	0	386	0	386	7.5	2,895	57	43	1,650	1,601	1,245	1,208	0.0015	0.0036	0.0028	0.0064	0.0079	
MET GROVE	0	352	0	352	7.5	2,640	57	43	1,505	1,460	1,135	1,101	0.0014	0.0032	0.0026	0.0058	0.0072	
WAS GROVE	0	15	0	15	7.5	113	57	43	64	62	48	47	0.0001	0.0001	0.0001	0.0002	0.0003	
GARRETT PARK	0	22	0	22	7.5	165	57	43	94	91	71	69	0.0001	0.0002	0.0002	0.0004	0.0004	
BOWIE 50%	50	188	188	375	7.5	2,813	57	43	1,603	1,555	1,209	1,173	0.0011	0.0035	0.0028	0.0062	0.0073	
SEABROOK 15%	15	224	40	264	7.5	1,980	57	43	1,129	1,095	851	826	0.0010	0.0024	0.0019	0.0044	0.0053	
KENSINGTON	0	45	0	45	7.5	338	57	43	192	187	145	141	0.0002	0.0004	0.0003	0.0007	0.0009	
LAUREL 30%	30	209	90	299	7.5	2,243	57	43	1,278	1,240	964	935	0.0010	0.0028	0.0022	0.0049	0.0059	
GAITHESBURG	0	280	0	280	7.5	2,100	57	43	1,197	1,161	903	876	0.0011	0.0026	0.0021	0.0046	0.0057	
BERWYN HEIGHTS	0	30	0	30	4.5	135	57	43	77	75	58	56	0.0001	0.0002	0.0001	0.0003	0.0004	
RIVERDALE	0	65	0	65	4.5	293	57	43	167	162	126	122	0.0003	0.0004	0.0003	0.0006	0.0009	
<b>METRO RAIL LOTS</b>																		
ADDISON ROAD	40	791	527	1318	7.5	9,885	57	43	5,634	5,465	4,251	4,123	0.0041	0.0121	0.0097	0.0218	0.0259	
ARCHIVES	0	12	0	12	4.5	54	57	43	31	30	23	23	0.0000	0.0001	0.0001	0.0001	0.0002	
ARLING	0	10	0	10	4.5	45	57	43	26	25	19	19	0.0000	0.0001	0.0000	0.0001	0.0001	
BALLSTON	0	1175	0	1175	4.5	5,288	57	43	3,014	2,923	2,274	2,205	0.0046	0.0065	0.0052	0.0117	0.0162	
BENN RD	0	520	0	520	4.5	2,340	57	43	1,334	1,294	1,006	976	0.0020	0.0029	0.0023	0.0052	0.0072	
BETH	0	395	0	395	4.5	1,778	57	43	1,013	983	764	741	0.0015	0.0022	0.0017	0.0039	0.0055	
BRADD RD	0	10	0	10	4.5	45	57	43	26	25	19	19	0.0000	0.0001	0.0000	0.0001	0.0001	
BROOKLAND	0	27	0	27	4.5	122	57	43	69	67	52	51	0.0001	0.0001	0.0001	0.0003	0.0004	
CHEVERLY	0	557	0	557	4.5	2,507	57	43	1,429	1,386	1,078	1,045	0.0022	0.0031	0.0025	0.0055	0.0077	
CLARENDON	0	554	0	554	4.5	2,493	57	43	1,421	1,378	1,072	1,040	0.0022	0.0031	0.0024	0.0055	0.0077	
CLEVELAND PK	0	366	0	366	4.5	1,647	57	43	939	911	708	687	0.0014	0.0020	0.0016	0.0036	0.0051	
COURT HOUSE	0	256	0	256	4.5	1,152	57	43	657	637	495	480	0.0010	0.0014	0.0011	0.0025	0.0035	
CRYSTAL CITY	0	347	0	347	4.5	1,562	57	43	890	863	671	651	0.0014	0.0019	0.0015	0.0034	0.0048	
DEANWOOD	0	194	0	194	4.5	873	57	43	498	483	375	364	0.0008	0.0011	0.0009	0.0019	0.0027	
DUN LORING 10	10	1220	136	1355	4.5	6,098	57	43	3,476	3,371	2,622	2,543	0.0050	0.0075	0.0060	0.0134	0.0185	
DUPONT CIRCLE	0	165	0	165	4.5	743	57	43	423	411	319	310	0.0006	0.0009	0.0007	0.0016	0.0023	
EASTERN MKT	0	178	0	178	4.5	801	57	43	457	443	344	334	0.0007	0.0010	0.0008	0.0018	0.0025	
EAST FALLS CH	0	442	0	442	4.5	1,989	57	43	1,134	1,100	855	830	0.0017	0.0024	0.0019	0.0044	0.0061	
EIS	0	352	0	352	4.5	1,584	57	43	903	876	681	661	0.0014	0.0019	0.0015	0.0035	0.0049	
FARRAGUT NORTH	0	102	0	102	4.5	459	57	43	262	254	197	191	0.0004	0.0006	0.0004	0.0010	0.0014	
FARRAGUT WEST	0	221	0	221	4.5	995	57	43	567	550	428	415	0.0009	0.0012	0.0010	0.0022	0.0031	
FEDERAL CENTER	0	75	0	75	4.5	338	57	43	192	187	145	141	0.0003	0.0004	0.0003	0.0007	0.0010	
FEDERAL TRI	0	54	0	54	4.5	243	57	43	139	134	104	101	0.0002	0.0003	0.0002	0.0005	0.0007	
FOGGY	0	102	0	102	4.5	459	57	43	262	254	197	191	0.0004	0.0006	0.0004	0.0010	0.0014	
FORT TROTTEEN	0	445	0	445	4.5	2,003	57	43	1,141	1,107	861	835	0.0017	0.0025	0.0020	0.0044	0.0061	
FRH HEIGHTS	0	679	0	679	4.5	3,056	57	43	1,742	1,689	1,314	1,274	0.0026	0.0038	0.0030	0.0067	0.0094	
GALLERY PLACE	0	124	0	124	4.5	558	57	43	318	309	240	233	0.0005	0.0007	0.0005	0.0012	0.0017	
GROSVENOR	0	716	0	716	4.5	3,222	57	43	1,837	1,781	1,385	1,344	0.0028	0.0040	0.0032	0.0071	0.0099	

**Exhibit 1**  
**Winter**  
**2002 NOx Precursor**  
**AUTO ACCESS TO TRANSIT**  
**FY2006-2011 TIP AND 2005 CLRP AIR QUALITY CONFORMITY**

HUNT NORTH 40	40	1873	1249	3122	7.5	23,415	57	43	13,347	12,946	10,068	9,766	0.0097	0.0287	0.0229	0.0516	0.0614
JUD SQUARE	0	110	0	110	4.5	495	57	43	282	274	213	206	0.0004	0.0006	0.0005	0.0011	0.0015
KING ST	0	30	0	30	4.5	135	57	43	77	75	58	56	0.0001	0.0002	0.0001	0.0003	0.0004
						0											
						0											
LANDOVER 25%	25	1410	470	1880	7.5	14,100	57	43	8,037	7,796	6,063	5,881	0.0064	0.0173	0.0138	0.0311	0.0375
L'ENFANT PLAZA	0	296	0	296	4.5	1,332	57	43	759	736	573	556	0.0012	0.0016	0.0013	0.0029	0.0041
MCPHERSON SQ	0	52	0	52	4.5	234	57	43	133	129	101	98	0.0002	0.0003	0.0002	0.0005	0.0007
MEDICAL CENTER	0	14	0	14	4.5	63	57	43	36	35	27	26	0.0001	0.0001	0.0001	0.0001	0.0002
METRO CENTER	0	177	0	177	4.5	797	57	43	454	440	342	332	0.0007	0.0010	0.0008	0.0018	0.0024
MINNES	0	353	0	353	4.5	1,589	57	43	905	878	683	663	0.0014	0.0020	0.0016	0.0035	0.0049
NAT AIR	0	87	0	87	4.5	392	57	43	223	216	168	163	0.0003	0.0005	0.0004	0.0009	0.0012
NEW CARROL 50	50	1049	1049	2097	7.5	15,728	57	43	8,965	8,696	6,763	6,560	0.0061	0.0193	0.0154	0.0347	0.0408
PRNTAGON	0	561	0	561	4.5	2,525	57	43	1,439	1,396	1,086	1,053	0.0022	0.0031	0.0025	0.0056	0.0078
PENTAGON CITY	0	381	0	381	4.5	1,715	57	43	977	948	737	715	0.0015	0.0021	0.0017	0.0038	0.0053
POTOMAC AVE	0	533	0	533	4.5	2,399	57	43	1,367	1,326	1,031	1,000	0.0021	0.0029	0.0023	0.0053	0.0074
ROCKVILLE	0	667	0	667	4.5	3,002	57	43	1,711	1,660	1,291	1,252	0.0026	0.0037	0.0029	0.0066	0.0092
ROSSLYN	0	356	0	356	4.5	1,602	57	43	913	886	689	668	0.0014	0.0020	0.0016	0.0035	0.0049
SHADY GROVE 10	10	3903	434	4337	7.5	32,528	57	43	18,541	17,984	13,987	13,567	0.0160	0.0399	0.0318	0.0717	0.0878
SILVER SPRING	0	44	0	44	4.5	198	57	43	113	109	85	83	0.0002	0.0002	0.0002	0.0004	0.0006
SMITH MALL	0	120	0	120	4.5	540	57	43	308	299	232	225	0.0005	0.0007	0.0005	0.0012	0.0017
STADIUM ARM	0	976	0	976	4.5	4,392	57	43	2,503	2,428	1,889	1,832	0.0038	0.0054	0.0043	0.0097	0.0135
TAKOMA PK	0	146	0	146	4.5	657	57	43	374	363	283	274	0.0006	0.0008	0.0006	0.0014	0.0020
TENLEYTON	0	17	0	17	4.5	77	57	43	44	42	33	32	0.0001	0.0001	0.0001	0.0002	0.0002
TWINBROOK	0	1136	0	1136	4.5	5,112	57	43	2,914	2,826	2,198	2,132	0.0044	0.0063	0.0050	0.0113	0.0157
UNION STAT	0	378	0	378	4.5	1,701	57	43	970	940	731	709	0.0015	0.0021	0.0017	0.0038	0.0052
VAN NESS	0	343	0	343	4.5	1,544	57	43	880	853	664	644	0.0013	0.0019	0.0015	0.0034	0.0047
VIENNA 25%	25	2798	933	3731	7.5	27,983	57	43	15,950	15,472	12,032	11,672	0.0127	0.0344	0.0274	0.0617	0.0744
VA SQUARE	0	642	0	642	4.5	2,889	57	43	1,647	1,597	1,242	1,205	0.0025	0.0035	0.0028	0.0064	0.0089
WEST FALLS CHUR	0	2183	0	2183	4.5	9,824	57	43	5,599	5,431	4,224	4,097	0.0085	0.0121	0.0096	0.0217	0.0302
WHITE FLINT	0	1633	0	1633	4.5	7,349	57	43	4,189	4,063	3,160	3,065	0.0064	0.0090	0.0072	0.0162	0.0226
WOODLEY	0	68	0	68	4.5	306	57	43	174	169	132	128	0.0003	0.0004	0.0003	0.0007	0.0009
RHODE ISLAND 30%	30	266	114	380	7.5	2,850	57	43	1,625	1,576	1,226	1,189	0.0013	0.0035	0.0028	0.0063	0.0075
BUS & CAR POOL LOTS																	
CARTER BARRON	0	798	0	798	4.5	3,591	57	43	2,047	1,985	1,544	1,498	0.0031	0.0044	0.0035	0.0079	0.0110
PG PLAZA	0	47	0	47	4.5	212	57	43	121	117	91	88	0.0002	0.0003	0.0002	0.0005	0.0006
PENN MAR SHOPP.	0	100	0	100	4.5	450	57	43	257	249	194	188	0.0004	0.0006	0.0004	0.0010	0.0014
CAP PLAZA	0	100	0	100	4.5	450	57	43	257	249	194	188	0.0004	0.0006	0.0004	0.0010	0.0014
EASTOVER	0	100	0	100	4.5	450	57	43	257	249	194	188	0.0004	0.0006	0.0004	0.0010	0.0014
FOUR MILE RUN	0	28	0	28	4.5	126	57	43	72	70	54	53	0.0001	0.0002	0.0001	0.0003	0.0004
SPRINGFIELD MALL	0	580	0	580	4.5	2,610	57	43	1,488	1,443	1,122	1,089	0.0023	0.0032	0.0026	0.0058	0.0080
SPRINGFIELD METH	0	48	0	48	4.5	216	57	43	123	119	93	90	0.0002	0.0003	0.0002	0.0005	0.0007
FRED ARMORY	0	33	0	33	7.5	248	57	43	141	137	106	103	0.0001	0.0003	0.0002	0.0005	0.0007
MYERSVILLE	0	65	0	65	7.5	488	57	43	278	270	210	203	0.0003	0.0006	0.0005	0.0011	0.0013
ROSEMONT	0	45	0	45	7.5	338	57	43	192	187	145	141	0.0002	0.0004	0.0003	0.0007	0.0009
URBANA	0	193	0	193	7.5	1,448	57	43	825	800	622	604	0.0008	0.0018	0.0014	0.0032	0.0039
JEFFERSON	0	40	0	40	7.5	300	57	43	171	166	129	125	0.0002	0.0004	0.0003	0.0007	0.0008
NORBECK RD	0	248	0	248	7.5	1,860	57	43	1,060	1,028	800	776	0.0010	0.0023	0.0018	0.0041	0.0051

**Exhibit 1**  
**Winter**  
**2002 NOx Precursor**  
**AUTO ACCESS TO TRANSIT**  
**FY2006-2011 TIP AND 2005 CLRP AIR QUALITY CONFORMITY**

MONTROSE RD	0	650	0	650	7.5	4,875	57	43	2,779	2,695	2,096	2,033	0.0025	0.0060	0.0048	0.0108	0.0133
BRIGG CHENNY 5	50	215	215	430	7.5	3,225	57	43	1,838	1,783	1,387	1,345	0.0013	0.0040	0.0032	0.0071	0.0084
COMUS ROAD	0	30	0	30	7.5	225	57	43	128	124	97	94	0.0001	0.0003	0.0002	0.0005	0.0006
LAKEFOREST MALL	0	300	0	300	7.5	2,250	57	43	1,283	1,244	968	938	0.0012	0.0028	0.0022	0.0050	0.0061
BURTONSVILLE	0	500	0	500	7.5	3,750	57	43	2,138	2,073	1,613	1,564	0.0019	0.0046	0.0037	0.0083	0.0102
FORCEY MEM.	0	200	0	200	7.5	1,500	57	43	855	829	645	626	0.0008	0.0018	0.0015	0.0033	0.0041
TECH ROAD	0	155	0	155	7.5	1,163	57	43	663	643	500	485	0.0006	0.0014	0.0011	0.0026	0.0032
BELTWAY	0	265	0	265	7.5	1,988	57	43	1,133	1,099	855	829	0.0010	0.0024	0.0019	0.0044	0.0054
LAUREL VAN DUSE	0	62	0	62	7.5	465	57	43	265	257	200	194	0.0002	0.0006	0.0005	0.0010	0.0013
ACCOKEEK	0	450	0	450	7.5	3,375	57	43	1,924	1,866	1,451	1,408	0.0018	0.0041	0.0033	0.0074	0.0092
ABC DRIVE IN	0	100	0	100	7.5	750	57	43	428	415	323	313	0.0004	0.0009	0.0007	0.0017	0.0020
BOWIE 20%	20	526	131	657	7.5	4,928	57	43	2,809	2,724	2,119	2,055	0.0023	0.0060	0.0048	0.0109	0.0132
CLINTON 50%	50	212	212	424	7.5	3,180	57	43	1,813	1,758	1,367	1,326	0.0012	0.0039	0.0031	0.0070	0.0083
OXON HILL 20%	20	519	130	649	7.5	4,868	57	43	2,774	2,691	2,093	2,030	0.0023	0.0060	0.0048	0.0107	0.0130
EQUESTRIAN CENT	50	150	150	300	7.5	2,250	57	43	1,283	1,244	968	938	0.0009	0.0028	0.0022	0.0050	0.0058
BOWIE MARKET PL	0	50	0	50	7.5	375	57	43	214	207	161	156	0.0002	0.0005	0.0004	0.0008	0.0010
FT WASHINGTON	0	412	0	412	7.5	3,090	57	43	1,761	1,708	1,329	1,289	0.0016	0.0038	0.0030	0.0068	0.0084
MONTPELIER REC #	0	70	0	70	7.5	525	57	43	299	290	226	219	0.0003	0.0006	0.0005	0.0012	0.0014
RESTON	0	1547	0	1547	7.5	11,603	57	43	6,613	6,415	4,989	4,839	0.0060	0.0142	0.0113	0.0256	0.0316
GREENBRIAR	0	55	0	55	7.5	413	57	43	235	228	177	172	0.0002	0.0005	0.0004	0.0009	0.0011
FAIR OAKS	0	150	0	150	7.5	1,125	57	43	641	622	484	469	0.0006	0.0014	0.0011	0.0025	0.0031
ROLLING VALLEY	0	628	0	628	7.5	4,710	57	43	2,685	2,604	2,025	1,965	0.0024	0.0058	0.0046	0.0104	0.0128
SPRINGFIELD PLAZ	0	230	0	230	7.5	1,725	57	43	983	954	742	719	0.0009	0.0021	0.0017	0.0038	0.0047
FAIRLANES BOWL	0	35	0	35	7.5	263	57	43	150	145	113	109	0.0001	0.0003	0.0003	0.0006	0.0007
NOTTOWAY PARK	0	14	0	14	7.5	105	57	43	60	58	45	44	0.0001	0.0001	0.0001	0.0002	0.0003
HORNER RD	0	2397	0	2397	7.5	17,978	57	43	10,247	9,940	7,730	7,498	0.0093	0.0221	0.0176	0.0397	0.0490
LAKE RIDGE	0	555	0	555	7.5	4,163	57	43	2,373	2,301	1,790	1,736	0.0022	0.0051	0.0041	0.0092	0.0113
MINNIEVILLE RD 4	40	336	224	560	7.5	4,200	57	43	2,394	2,322	1,806	1,752	0.0017	0.0052	0.0041	0.0093	0.0110
GORDON BLVD	0	156	0	156	7.5	1,170	57	43	667	647	503	488	0.0006	0.0014	0.0011	0.0026	0.0032
HILLENDALE	0	248	0	248	7.5	1,860	57	43	1,060	1,028	800	776	0.0010	0.0023	0.0018	0.0041	0.0051
POTOMAC MILLS	0	946	0	946	7.5	7,095	57	43	4,044	3,923	3,051	2,959	0.0037	0.0087	0.0069	0.0156	0.0193
<b>List of new lots to be added in Conformity Document list</b>																	
<b>PARK-AND-RIDE LOTS - MARYLAND</b>																	
<b>PARK-AND-RIDE LOTS - MARYLAND</b>																	
<b>CHARLES COUNTY</b>																	
301 Park & Ride	25	287	96	383	7.5	2,873	57	43	1,637	1,588	1,235	1,198	0.0013	0.0035	0.0028	0.0063	0.0076
Charles County Gove	25	26	9	35	7.5	263	57	43	150	145	113	109	0.0001	0.0003	0.0003	0.0006	0.0007
Food Lion Shopping C	25	38	13	50	7.5	375	57	43	214	207	161	156	0.0002	0.0005	0.0004	0.0008	0.0010
La Plata Armory	25	15	5	20	7.5	150	57	43	86	83	65	63	0.0001	0.0002	0.0001	0.0003	0.0004
Laurel Springs Regio	25	38	13	50	7.5	375	57	43	214	207	161	156	0.0002	0.0005	0.0004	0.0008	0.0010
Life Wesleyan Church	25	38	13	50	7.5	375	57	43	214	207	161	156	0.0002	0.0005	0.0004	0.0008	0.0010
Mattawoman-Beantov	25	435	145	580	7.5	4,350	57	43	2,480	2,405	1,871	1,814	0.0020	0.0053	0.0043	0.0096	0.0116
Smallwood Village	25	75	25	100	7.5	750	57	43	428	415	323	313	0.0003	0.0009	0.0007	0.0017	0.0020
St. Charles Towne	25	263	88	350	7.5	2,625	57	43	1,496	1,451	1,129	1,095	0.0012	0.0032	0.0026	0.0058	0.0070
<b>PARK-AND-RIDE LOTS - MARYLAND</b>																	
<b>FREDERICK COUNTY</b>																	
Frederick (north)	25	123	41	164	7.5	1,230	57	43	701	680	529	513	0.0006	0.0015	0.0012	0.0027	0.0033
Frederick (south)	25	173	58	230	7.5	1,725	57	43	983	954	742	719	0.0006	0.0021	0.0017	0.0038	0.0046
Monacacy Marcst	25	600	200	800	7.5	6,000	57	43	3,420	3,317	2,580	2,503	0.0027	0.0074	0.0059	0.0132	0.0160

**Exhibit 1**  
**Winter**  
**2002 NOx Precursor**  
**AUTO ACCESS TO TRANSIT**  
**FY2006-2011 TIP AND 2005 CLRP AIR QUALITY CONFORMITY**

<b>PARK-AND-RIDE LOTS - MARYLAND</b>																	
<b>MONTGOMERY COUNTY</b>																	
Colesville	0	190	0	190	7.5	1,425	57	43	812	788	613	594	0.0007	0.0017	0.0014	0.0031	0.0039
Damascus	50	0	0		7.5	0	57	43	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000
Gaithersburg	50	259	259	517	7.5	3,878	57	43	2,210	2,144	1,667	1,617	0.0015	0.0048	0.0038	0.0086	0.0101
Gaithersburg	50	175	175	350	7.5	2,625	57	43	1,496	1,451	1,129	1,095	0.0010	0.0032	0.0026	0.0058	0.0068
Germantown Town	50	0	0		7.5	0	57	43	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000
Greencastle	50	75	75	150	7.5	1,125	57	43	641	622	484	469	0.0004	0.0014	0.0011	0.0025	0.0029
Milestone Shopping	50	88	88	175	7.5	1,313	57	43	748	726	564	547	0.0005	0.0016	0.0013	0.0029	0.0034
<b>PARK-AND-RIDE LOTS - MAYLAND</b>																	
<b>PRINCE GEORGE'S COUNTY</b>																	
Hampton Mall	0	100	0	100	4.5	450	57	43	257	249	194	188	0.0004	0.0006	0.0004	0.0010	0.0014
Laurel (south)	25	513	171	684	7.5	5,130	57	43	2,924	2,836	2,206	2,140	0.0023	0.0063	0.0050	0.0113	0.0136
						0				0		0	0.0000	0.0000	0.0000		
<b>PARK-AND-RIDE LOTS - VIRGINIA</b>																	
<b>ARLINGTON COUNTY</b>																	
Ballston Public Parkir	25	375	125	500	7.5	3,750	57	43	2,138	2,073	1,613	1,564	0.0017	0.0046	0.0037	0.0083	0.0100
Washington-Lee	50	178	178	356	7.5	2,670	57	43	1,522	1,476	1,148	1,114	0.0010	0.0033	0.0026	0.0059	0.0069
						0				0		0	0.0000	0.0000	0.0000		
<b>PARK-AND-RIDE LOTS - VIRGINIA</b>																	
<b>FAIRFAX COUNTY</b>																	
American Legion	50	50	50	100	7.5	750	57	43	428	415	323	313	0.0003	0.0009	0.0007	0.0017	0.0019
Canterbury Woods P	50	17	17	34	7.5	255	57	43	145	141	110	106	0.0001	0.0003	0.0002	0.0006	0.0007
Centreville	50	185	185	370	7.5	2,775	57	43	1,582	1,534	1,193	1,157	0.0011	0.0034	0.0027	0.0061	0.0072
Centreville United Me	50	74	74	147	7.5	1,103	57	43	628	610	474	460	0.0004	0.0014	0.0011	0.0024	0.0029
Fairfax County Gover	50	85	85	170	7.5	1,275	57	43	727	705	548	532	0.0005	0.0016	0.0012	0.0028	0.0033
Greenbriar Park	50	28	28	55	7.5	413	57	43	235	228	177	172	0.0002	0.0005	0.0004	0.0009	0.0011
Herndon-Monroe	50	873	873	1,745	7.5	13,088	57	43	7,460	7,236	5,628	5,459	0.0051	0.0161	0.0128	0.0289	0.0340
Michael's	50	100	100	200	7.5	1,500	57	43	855	829	645	626	0.0006	0.0018	0.0015	0.0033	0.0039
Parkwood Baptist	50	9	9	18	7.5	135	57	43	77	75	58	56	0.0001	0.0002	0.0001	0.0003	0.0004
South Run District Pk	50	170	170	340	7.5	2,550	57	43	1,454	1,410	1,097	1,064	0.0010	0.0031	0.0025	0.0056	0.0066
St Paul Chung Catho	50	50	50	100	7.5	750	57	43	428	415	323	313	0.0003	0.0009	0.0007	0.0017	0.0019
Stringfellow Rd	50	181	181	361	7.5	2,708	57	43	1,543	1,497	1,164	1,129	0.0011	0.0033	0.0026	0.0060	0.0070
Sully Station	50	70	70	140	7.5	1,050	57	43	599	581	452	438	0.0004	0.0013	0.0010	0.0023	0.0027
Sydenstricker Rd	50	84	84	167	7.5	1,253	57	43	714	693	539	522	0.0005	0.0015	0.0012	0.0028	0.0033
Wakefield Chapel Pk	50	25	25	50	7.5	375	57	43	214	207	161	156	0.0001	0.0005	0.0004	0.0008	0.0010
<b>PARK-AND-RIDE LOTS - VIRGINIA</b>																	
<b>LOUDOUN COUNTY</b>																	
Ashburn Farm	50	10	10	20	7.5	150	57	43	86	83	65	63	0.0001	0.0002	0.0001	0.0003	0.0004
Ashburn Village	50	20	20	40	7.5	300	57	43	171	166	129	125	0.0001	0.0004	0.0003	0.0007	0.0008
Cascades	50	28	28	55	7.5	413	57	43	235	228	177	172	0.0002	0.0005	0.0004	0.0009	0.0011
Dulles North Transi	50	375	375	750	7.5	5,625	57	43	3,206	3,110	2,419	2,346	0.0022	0.0069	0.0055	0.0124	0.0146
Hamilton	50	25	25	50	7.5	375	57	43	214	207	161	156	0.0001	0.0005	0.0004	0.0008	0.0010
Innovation Avenue	50	38	38	75	7.5	563	57	43	321	311	242	235	0.0002	0.0007	0.0006	0.0012	0.0015
Leesburg	50	25	25	50	7.5	375	57	43	214	207	161	156	0.0001	0.0005	0.0004	0.0008	0.0010
Leesburg Kohls	50	600	600	1200	7.5	9,000	57	43	5,130	4,976	3,870	3,754	0.0035	0.0110	0.0088	0.0199	0.0234
Purcellville	50	18	18	35	7.5	263	57	43	150	145	113	109	0.0001	0.0003	0.0003	0.0006	0.0007
Sterling Park SC	50	23	23	45	7.5	338	57	43	192	187	145	141	0.0001	0.0004	0.0003	0.0007	0.0009
Sterling Shaw Rd	50	24	24	48	7.5	360	57	43	205	199	155	150	0.0001	0.0004	0.0004	0.0008	0.0009

**Exhibit 1  
Winter  
2002 NOx Precursor  
AUTO ACCESS TO TRANSIT  
FY2006-2011 TIP AND 2005 CLRP AIR QUALITY CONFORMITY**

<b>PARK-AND-RIDE LOTS - VIRGINIA</b>																	
<b>PRINCE WILLIAM COUNTY</b>																	
Brittany	50	48	48	95	7.5	713	57	43	406	394	306	297	0.0003	0.0009	0.0007	0.0016	0.0018
Dale City	50	294	294	587	7.5	4,403	57	43	2,509	2,434	1,893	1,836	0.0017	0.0054	0.0043	0.0097	0.0114
Harbor Drive	50	100	100	200	7.5	1,500	57	43	855	829	645	626	0.0006	0.0018	0.0015	0.0033	0.0039
Lindendale	50	108	108	216	7.5	1,620	57	43	923	896	697	676	0.0006	0.0020	0.0016	0.0036	0.0042
Montclair	50	25	25	50	7.5	375	57	43	214	207	161	156	0.0001	0.0005	0.0004	0.0008	0.0010
PRTC Transit Center	50	93	93	185	7.5	1,388	57	43	791	767	597	579	0.0005	0.0017	0.0014	0.0031	0.0036
Tackett's Mill	50	85	85	169	7.5	1,268	57	43	722	701	545	529	0.0005	0.0016	0.0012	0.0028	0.0033
Triangle	50	15	15	29	7.5	218	57	43	124	120	94	91	0.0001	0.0003	0.0002	0.0005	0.0006
I-95 / Rt 123	50	282	282	563	7.5	4,223	57	43	2,407	2,335	1,816	1,761	0.0016	0.0052	0.0041	0.0093	0.0110
US 1 / VA 234	50	137	137	274	7.5	2,055	57	43	1,171	1,136	884	857	0.0008	0.0025	0.0020	0.0045	0.0053
<b>MARC TRAIN COMMUTER LOTS</b>																	
College Park	25	431	144	574	7.5	4,305	57	43	2,454	2,380	1,851	1,796	0.0020	0.0053	0.0042	0.0095	0.0115
Frederick	0	0	0	0	7.5	0	57	43	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000
Greenbelt	60	1346	2018	3364	7.5	25,230	57	43	14,381	13,950	10,848	10,523	0.0092	0.0310	0.0247	0.0556	0.0648
Harpers Ferry	0	98	0	98	7.5	735	57	43	419	406	316	307	0.0004	0.0009	0.0007	0.0016	0.0020
Muirkirk	60	260	390	650	7.5	4,875	57	43	2,779	2,695	2,096	2,033	0.0018	0.0060	0.0048	0.0108	0.0125
Seabrook	0	264	0	264	4.5	1,188	57	43	677	657	511	496	0.0010	0.0015	0.0012	0.0026	0.0036
Silver Spring	0	0	0	0	4.5	0	57	43	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000
Union Station	0	781	0	781	7.5	5,858	57	43	3,339	3,239	2,519	2,443	0.0030	0.0072	0.0057	0.0129	0.0160
<b>VIRGINIA RAILWAY EXPRESS COMMUTER LOTS</b>																	
Backlick Road	50	110	110	220	7.5	1,650	57	43	941	912	710	688	0.0006	0.0020	0.0016	0.0036	0.0043
Brook Run	50	198	198	396	7.5	2,970	57	43	1,693	1,642	1,277	1,239	0.0012	0.0036	0.0029	0.0066	0.0077
Brooke	50	150	150	300	7.5	2,250	57	43	1,283	1,244	968	938	0.0009	0.0028	0.0022	0.0050	0.0058
Burke Center	50	275	275	550	7.5	4,125	57	43	2,351	2,281	1,774	1,721	0.0016	0.0051	0.0040	0.0091	0.0107
Franconia/Springfield	50	1900	1900	3800	7.5	28,500	57	43	16,245	15,758	12,255	11,887	0.0111	0.0350	0.0279	0.0629	0.0740
Leeland Road	50	326	326	652	7.5	4,890	57	43	2,787	2,704	2,103	2,040	0.0019	0.0060	0.0048	0.0108	0.0127
Lorton	50	100	100	200	7.5	1,500	57	43	855	829	645	626	0.0006	0.0018	0.0015	0.0033	0.0039
Manassas	50	187	187	374	7.5	2,805	57	43	1,599	1,551	1,206	1,170	0.0011	0.0034	0.0027	0.0062	0.0073
Manassas Park	50	150	150	300	7.5	2,250	57	43	1,283	1,244	968	938	0.0009	0.0028	0.0022	0.0050	0.0058
Quantico	50	109	109	217	7.5	1,628	57	43	928	900	700	679	0.0006	0.0020	0.0016	0.0036	0.0042
Rippon	50	150	150	300	7.5	2,250	57	43	1,283	1,244	968	938	0.0009	0.0028	0.0022	0.0050	0.0058
Rolling Road	50	185	185	370	7.5	2,775	57	43	1,582	1,534	1,193	1,157	0.0011	0.0034	0.0027	0.0061	0.0072
Woodbridge	50	294	294	588	7.5	4,410	57	43	2,514	2,438	1,896	1,839	0.0017	0.0054	0.0043	0.0097	0.0114
<b>METRO RAIL PARKING LOTS</b>																	
Anacostia	25	861	287	1148	7.5	8,610	57	43	4,908	4,760	3,702	3,591	0.0039	0.0106	0.0084	0.0190	0.0229
Branch Avenue	50	1611	1611	3222	7.5	24,165	57	43	13,774	13,361	10,391	10,079	0.0094	0.0297	0.0236	0.0533	0.0627
Capitol Heights	50	194	194	387	7.5	2,903	57	43	1,654	1,605	1,248	1,211	0.0011	0.0036	0.0028	0.0064	0.0075
College Park	25	465	155	620	7.5	4,650	57	43	2,651	2,571	2,000	1,940	0.0021	0.0057	0.0045	0.0103	0.0124
Congress Heights	0	66	0	66	4.5	297	57	43	169	164	128	124	0.0003	0.0004	0.0003	0.0007	0.0009
Deanwood	0	194	0	194	7.5	1,455	57	43	829	804	626	607	0.0008	0.0018	0.0014	0.0032	0.0040
East Falls Church	50	221	221	442	7.5	3,315	57	43	1,890	1,833	1,425	1,383	0.0013	0.0041	0.0032	0.0073	0.0086
Forest Glen	50	329	329	658	7.5	4,935	57	43	2,813	2,729	2,122	2,058	0.0019	0.0061	0.0048	0.0109	0.0128
Franconia - Springfield	50	1987	1987	3973	4.5	17,879	57	43	10,191	9,885	7,688	7,457	0.0116	0.0219	0.0175	0.0394	0.0510
Glenmont	50	925	925	1850	4.5	8,325	57	43	4,745	4,603	3,580	3,472	0.0054	0.0102	0.0081	0.0184	0.0238
Greenbelt	50	1783	1783	3565	7.5	26,738	57	43	15,240	14,783	11,497	11,152	0.0104	0.0328	0.0261	0.0590	0.0694
Naylor Road	50	216	216	431	7.5	3,233	57	43	1,843	1,787	1,390	1,348	0.0013	0.0040	0.0032	0.0071	0.0084
Prince George's Plaza	25	927	309	1236	7.5	9,270	57	43	5,284	5,125	3,986	3,867	0.0042	0.0114	0.0091	0.0204	0.0247
Southern Avenue	50	1090	1090	2180	4.5	9,810	57	43	5,592	5,424	4,218	4,092	0.0064	0.0120	0.0096	0.0216	0.0280
Suitland	50	1033	1033	2065	4.5	9,293	57	43	5,297	5,138	3,996	3,876	0.0060	0.0114	0.0091	0.0205	0.0265
Van Dorn Street	50	204	204	407	4.5	1,832	57	43	1,044	1,013	788	764	0.0012	0.0022	0.0018	0.0040	0.0052
West Hyattsville	25	453	151	604	7.5	4,530	57	43	2,582	2,505	1,948	1,889	0.0021	0.0056	0.0044	0.0100	0.0120
Wheaton	25	759	253	1012	7.5	7,590	57	43	4,326	4,197	3,264	3,166	0.0034	0.0093	0.0074	0.0167	0.0202
				108,749		715,007							0.3651	0.8778	0.6992	1.5771	1.9421

Seasonal Total (tons/season) = 126.24

Bold figures: New numbers taken from P & R directory  
 Figures in bracket: Carry forward figures from conformity doc.



**Exhibit 2**  
**WINTER**  
**2002 PM AIR QUALITY EMISSIONS INVENTORY**  
**AUTO ACCESS TO TRANSIT**  
**FY2006-2011 TIP AND 2005 CLR P AIR QUALITY CONFORMITY**

LOCATION	OUTSIDE MSA (%)	2002			AVERAGE TRIP LENGTH	2002 VMT	ADJ	RUNNING	TOTAL
		INSIDE MSA	OUTSIDE MSA	Total			WINTER	Rate (gm/mile)	(tons/day)
							VMT		
						Wk Days =	65		
						Seasonal adj =	0.97	0.0169	
<b>COMMUTER RAIL LOTS</b>									
BRUNSWICK 25%	25	305	102	407	7.5	3,053	2,961	50	0.0001
PT OF ROCKS 25%	25	204	68	272	7.5	2,040	1,979	33	0.0000
DICKERSON	0	15	0	15	7.5	113	109	2	0.0000
BARNESVILLE	0	46	0	46	7.5	345	335	6	0.0000
GERMANTOWN	0	386	0	386	7.5	2,895	2,808	47	0.0001
MET GROVE	0	352	0	352	7.5	2,640	2,561	43	0.0000
WAS GROVE	0	15	0	15	7.5	113	109	2	0.0000
GARRETT PARK	0	22	0	22	7.5	165	160	3	0.0000
BOWIE 50%	50	188	188	375	7.5	2,813	2,728	46	0.0001
SEABROOK 15%	15	224	40	264	7.5	1,980	1,921	32	0.0000
KENSINGTON	0	45	0	45	7.5	338	327	6	0.0000
LAUREL 30%	30	209	90	299	7.5	2,243	2,175	37	0.0000
GAITHESBURG	0	280	0	280	7.5	2,100	2,037	34	0.0000
BERWYN HEIGHTS	0	30	0	30	4.5	135	131	2	0.0000
RIVERDALE	0	65	0	65	4.5	293	284	5	0.0000
<b>METRO RAIL LOTS</b>									
ADDISON ROAD 40%	40	791	527	1318	7.5	9,885	9,588	162	0.0002
ARCHIVES	0	12	0	12	4.5	54	52	1	0.0000
ARLING	0	10	0	10	4.5	45	44	1	0.0000
BALLSTON	0	1175	0	1175	4.5	5,288	5,129	87	0.0001
BENN.RD	0	520	0	520	4.5	2,340	2,270	38	0.0000
BETH	0	395	0	395	4.5	1,778	1,724	29	0.0000
BRADD RD	0	10	0	10	4.5	45	44	1	0.0000
BROOKLAND	0	27	0	27	4.5	122	118	2	0.0000
CHEVERLY	0	557	0	557	4.5	2,507	2,431	41	0.0000
CLARENDON	0	554	0	554	4.5	2,493	2,418	41	0.0000
CLEVELAND PK	0	366	0	366	4.5	1,647	1,598	27	0.0000
COURT HOUSE	0	256	0	256	4.5	1,152	1,117	19	0.0000
CRYSTAL CITY	0	347	0	347	4.5	1,562	1,515	26	0.0000
DEANWOOD	0	194	0	194	4.5	873	847	14	0.0000
DUN LORING 10%	10	1220	136	1355	4.5	6,098	5,915	100	0.0001
DUPONT CIRCLE	0	165	0	165	4.5	743	720	12	0.0000
EASTERN MKT	0	178	0	178	4.5	801	777	13	0.0000
EAST FALLS CH	0	442	0	442	4.5	1,989	1,929	33	0.0000
EIS	0	352	0	352	4.5	1,584	1,536	26	0.0000
FARRAGUT NORTH	0	102	0	102	4.5	459	445	8	0.0000
FARRAGUT WEST	0	221	0	221	4.5	995	965	16	0.0000
FEDERAL CENTER	0	75	0	75	4.5	338	327	6	0.0000
FEDERAL TRI	0	54	0	54	4.5	243	236	4	0.0000
FOGGY	0	102	0	102	4.5	459	445	8	0.0000
FORT TROTTON	0	445	0	445	4.5	2,003	1,942	33	0.0000
FRH.HEIGHTS	0	679	0	679	4.5	3,056	2,964	50	0.0001
GALLERY PLACE	0	124	0	124	4.5	558	541	9	0.0000
GROSVENOR	0	716	0	716	4.5	3,222	3,125	53	0.0001
HUNT NORTH 40%	40	1873	1249	3122	7.5	23,415	22,713	384	0.0004
JUD SQUARE	0	110	0	110	4.5	495	480	8	0.0000
KING ST	0	30	0	30	4.5	135	131	2	0.0000
<b>LANDOVER 25%</b>									
L'ENFANT PLAZA	0	296	0	296	4.5	1,332	1,292	22	0.0000
MCPHERSON SQ	0	52	0	52	4.5	234	227	4	0.0000
MEDICAL CENTER	0	14	0	14	4.5	63	61	1	0.0000
METRO CENTER	0	177	0	177	4.5	797	773	13	0.0000
MINNES	0	353	0	353	4.5	1,589	1,541	26	0.0000
NAT AIR	0	87	0	87	4.5	392	380	6	0.0000
NEW CARROL 50%	50	1049	1049	2097	7.5	15,728	15,256	258	0.0003
PRNTAGON	0	561	0	561	4.5	2,525	2,449	41	0.0000

**Exhibit 2**  
**WINTER**  
**2002 PM AIR QUALITY EMISSIONS INVENTORY**  
**AUTO ACCESS TO TRANSIT**  
**FY2006-2011 TIP AND 2005 CLRP AIR QUALITY CONFORMITY**

LOCATION	2002				AVERAGE TRIP LENGTH	2002 VMT	ADJ WINTER VMT	RUNNING Rate (gm/mile)	TOTAL (tons/day)
	OUTSIDE MSA (%)	INSIDE MSA	OUTSIDE MSA	Total					
						65	0.0169		
<b>COMMUTER RAIL LOTS</b>									
PENTAGON CITY	0	381	0	381	4.5	1,715	1,663	28	0.0000
POTOMAC AVE	0	533	0	533	4.5	2,399	2,327	39	0.0000
ROCKVILLE	0	667	0	667	4.5	3,002	2,911	49	0.0001
ROSSLYN	0	356	0	356	4.5	1,602	1,554	26	0.0000
SHADY GROVE 10%	10	3903	434	4337	7.5	32,528	31,552	533	0.0006
SILVER SPRING	0	44	0	44	4.5	196	192	3	0.0000
SMITH MALL	0	120	0	120	4.5	540	524	9	0.0000
STADIUM ARM	0	976	0	976	4.5	4,392	4,260	72	0.0001
TAKOMA PK	0	146	0	146	4.5	657	637	11	0.0000
TENLEYTON	0	17	0	17	4.5	77	74	1	0.0000
TWINBROOK	0	1136	0	1136	4.5	5,112	4,959	84	0.0001
UNION STAT	0	378	0	378	4.5	1,701	1,650	28	0.0000
VAN NESS	0	343	0	343	4.5	1,544	1,497	25	0.0000
VIENNA 25%	25	2798	933	3731	7.5	27,983	27,143	459	0.0005
VA SQUARE	0	642	0	642	4.5	2,889	2,802	47	0.0001
WEST FALLS CHURCH	0	2183	0	2183	4.5	9,824	9,529	161	0.0002
WHITE FLINT	0	1633	0	1633	4.5	7,349	7,128	120	0.0001
WOODLEY	0	68	0	68	4.5	306	297	5	0.0000
RHODE ISLAND 30%	30	266	114	380	7.5	2,850	2,765	47	0.0001
<b>BUS &amp; CAR POOL LOTS</b>									
CARTER BARRON	0	798	0	798	4.5	3,591	3,483	59	0.0001
PG PLAZA	0	47	0	47	4.5	212	205	3	0.0000
PENN MAR SHOPP.	0	100	0	100	4.5	450	437	7	0.0000
CAP PLAZA	0	100	0	100	4.5	450	437	7	0.0000
EASTOVER	0	100	0	100	4.5	450	437	7	0.0000
FOUR MILE RUN	0	28	0	28	4.5	126	122	2	0.0000
SPRINGFIELD MALL	0	580	0	580	4.5	2,610	2,532	43	0.0000
SPRINGFIELD METH CH	0	48	0	48	4.5	216	210	4	0.0000
FRED ARMORY	0	33	0	33	7.5	248	240	4	0.0000
MYERSVILLE	0	65	0	65	7.5	488	473	8	0.0000
ROSEMONT	0	45	0	45	7.5	338	327	6	0.0000
URBANA	0	193	0	193	7.5	1,448	1,404	24	0.0000
JEFFERSON	0	40	0	40	7.5	300	291	5	0.0000
NORBECK RD	0	248	0	248	7.5	1,860	1,804	30	0.0000
MONTROSE RD	0	650	0	650	7.5	4,875	4,729	80	0.0001
BRIGG CHENNY 50%	50	215	215	430	7.5	3,225	3,128	53	0.0001
COMUS ROAD	0	30	0	30	7.5	225	218	4	0.0000
LAKEFOREST MALL	0	300	0	300	7.5	2,250	2,183	37	0.0000
BURTONSVILLE	0	500	0	500	7.5	3,750	3,638	61	0.0001
FORCEY MEM.	0	200	0	200	7.5	1,500	1,455	25	0.0000
TECH ROAD	0	155	0	155	7.5	1,163	1,128	19	0.0000
BELTWAY	0	265	0	265	7.5	1,988	1,928	33	0.0000
LAUREL VAN DUSEN	0	62	0	62	7.5	465	451	8	0.0000
ACCOKEEK	0	450	0	450	7.5	3,375	3,274	55	0.0001
ABC DRIVE IN	0	100	0	100	7.5	750	728	12	0.0000
BOWIE 20%	20	526	131	657	7.5	4,928	4,780	81	0.0001
CLINTON 50%	50	212	212	424	7.5	3,180	3,085	52	0.0001
OXON HILL 20%	20	519	130	649	7.5	4,868	4,721	80	0.0001
EQUESTRIAN CENTER 50%	50	150	150	300	7.5	2,250	2,183	37	0.0000
BOWIE MARKET PLACE	0	50	0	50	7.5	375	364	6	0.0000
FT WASHINGTON	0	412	0	412	7.5	3,090	2,997	51	0.0001
MONTPELIER REC PARK	0	70	0	70	7.5	525	509	9	0.0000
RESTON	0	1547	0	1547	7.5	11,603	11,254	190	0.0002
GREENBRIAR	0	55	0	55	7.5	413	400	7	0.0000
FAIR OAKS	0	150	0	150	7.5	1,125	1,091	18	0.0000
ROLLING VALLEY	0	628	0	628	7.5	4,710	4,569	77	0.0001
SPRINGFIELD PLAZA	0	230	0	230	7.5	1,725	1,673	28	0.0000
FAIRLANES BOWL	0	35	0	35	7.5	263	255	4	0.0000
NOTTOWAY PARK	0	14	0	14	7.5	105	102	2	0.0000
HORNER RD	0	2397	0	2397	7.5	17,978	17,438	295	0.0003
LAKE RIDGE	0	555	0	555	7.5	4,163	4,038	68	0.0001
MINNIEVILLE RD 40%	40	336	224	560	7.5	4,200	4,074	69	0.0001
GORDON BLVD	0	156	0	156	7.5	1,170	1,135	19	0.0000
HILLEDALE	0	248	0	248	7.5	1,860	1,804	30	0.0000
POTOMAC MILLS	0	946	0	946	7.5	7,095	6,882	116	0.0001

**Exhibit 2**  
**WINTER**  
**2002 PM AIR QUALITY EMISSIONS INVENTORY**  
**AUTO ACCESS TO TRANSIT**  
**FY2006-2011 TIP AND 2005 CLRP AIR QUALITY CONFORMITY**

LOCATION	2002			Total	AVERAGE TRIP LENGTH	2002 VMT	ADJ	RUNNING	TOTAL (tons/day)
	OUTSIDE MSA (%)	INSIDE MSA	OUTSIDE MSA				WINTER	Rate (gm/mile)	
							Wk Days = 65	0.0169	
							Seasonal adj = 0.97		
<b>COMMUTER RAIL LOTS</b>									
<b>List of new lots to be added in Conformity Document list</b>									
<b>PARK-AND-RIDE LOTS - MARYLAND</b>									
<b>PARK-AND-RIDE LOTS - MARYLAND</b>									
						0	0	0	0.0000
<b>CHARLES COUNTY</b>									
301 Park & Ride	25	287	96	383	7.5	2,873	2,786	47	0.0001
Charles County Government Bldg	25	26	9	35	7.5	263	255	4	0.0000
Food Lion Shopping Center	25	38	13	50	7.5	375	364	6	0.0000
La Plata Armory	25	15	5	20	7.5	150	146	2	0.0000
Laurel Springs Regional Park	25	38	13	50	7.5	375	364	6	0.0000
Life Wesleyan Church	25	38	13	50	7.5	375	364	6	0.0000
Mattawoman-Beantown Rd	25	435	145	580	7.5	4,350	4,220	71	0.0001
Smallwood Village	25	75	25	100	7.5	750	728	12	0.0000
St. Charles Towne	25	263	88	350	7.5	2,625	2,546	43	0.0000
<b>PARK-AND-RIDE LOTS - MARYLAND</b>									
<b>FREDERICK COUNTY</b>									
Frederick (north)	25	123	41	164	7.5	1,230	1,193	20	0.0000
Frederick (south)	25	173	58	230	7.5	1,725	1,673	28	0.0000
Monacacy Marcsat	25	600	200	800	7.5	6,000	5,820	98	0.0001
<b>PARK-AND-RIDE LOTS - MARYLAND</b>									
<b>MONTGOMERY COUNTY</b>									
Colesville	0	190	0	190	7.5	1,425	1,382	23	0.0000
Damascus	50	0	0	0	7.5	0	0	0	0.0000
Gaithersburg	50	259	259	517	7.5	3,878	3,761	64	0.0001
Gaithersburg	50	175	175	350	7.5	2,625	2,546	43	0.0000
Germantown Town	50	0	0	0	7.5	0	0	0	0.0000
Greencastle	50	75	75	150	7.5	1,125	1,091	18	0.0000
Milestone Shopping	50	88	88	175	7.5	1,313	1,273	22	0.0000
<b>PARK-AND-RIDE LOTS - MARYLAND</b>									
<b>PRINCE GEORGE'S COUNTY</b>									
Hampton Mall	0	100	0	100	4.5	450	437	7	0.0000
Laurel (south)	25	513	171	684	7.5	5,130	4,976	84	0.0001
<b>PARK-AND-RIDE LOTS - VIRGINIA</b>									
<b>ARLINGTON COUNTY</b>									
Ballston Public Parking Garage	25	375	125	500	7.5	3,750	3,638	61	0.0001
Washington-Lee	50	178	178	356	7.5	2,670	2,590	44	0.0000
<b>PARK-AND-RIDE LOTS - VIRGINIA</b>									
<b>FAIRFAX COUNTY</b>									
American Legion	50	50	50	100	7.5	750	728	12	0.0000
Canterbury Woods Pk	50	17	17	34	7.5	255	247	4	0.0000
Centreville	50	185	185	370	7.5	2,775	2,692	45	0.0001
Centreville United Methodist Ch	50	74	74	147	7.5	1,103	1,069	18	0.0000
Fairfax County Government Ce	50	85	85	170	7.5	1,275	1,237	21	0.0000
Greenbriar Park	50	28	28	55	7.5	413	400	7	0.0000
Herdon-Monroe	50	873	873	1,745	7.5	13,088	12,695	215	0.0002
Michael's	50	100	100	200	7.5	1,500	1,455	25	0.0000
Parkwood Baptist	50	9	9	18	7.5	135	131	2	0.0000
South Run District Pk	50	170	170	340	7.5	2,550	2,474	42	0.0000
St Paul Chung Catholic Church	50	50	50	100	7.5	750	728	12	0.0000
Stringfellow Rd	50	181	181	361	7.5	2,708	2,626	44	0.0000
Sully Station	50	70	70	140	7.5	1,050	1,019	17	0.0000
Sydenstricker Rd	50	84	84	167	7.5	1,253	1,215	21	0.0000
Wakefield Chapel Pk	50	25	25	50	7.5	375	364	6	0.0000

**Exhibit 2**  
**WINTER**  
**2002 PM AIR QUALITY EMISSIONS INVENTORY**  
**AUTO ACCESS TO TRANSIT**  
**FY2006-2011 TIP AND 2005 CLRP AIR QUALITY CONFORMITY**

LOCATION	2002				AVERAGE TRIP LENGTH	2002 VMT	ADJ	RUNNING	TOTAL
	OUTSIDE MSA (%)	INSIDE MSA	OUTSIDE MSA	Total			WINTER VMT	Rate (gm/mile)	
<b>COMMUTER RAIL LOTS</b>							65	0.0169	
							Seasonal adj =	0.97	
<b>PARK-AND-RIDE LOTS - VIRGINIA</b>									
<b>LOUDOUN COUNTY</b>									
Ashburn Farm	50	10	10	20	7.5	150	146	2	0.0000
Ashburn Village	50	20	20	40	7.5	300	291	5	0.0000
Cascades	50	28	28	55	7.5	413	400	7	0.0000
Dulles North Transit	50	375	375	750	7.5	5,625	5,456	92	0.0001
Hamilton	50	25	25	50	7.5	375	364	6	0.0000
Innovation Avenue	50	38	38	75	7.5	563	546	9	0.0000
Leesburg	50	25	25	50	7.5	375	364	6	0.0000
Leesburg Kohls	50	600	600	1200	7.5	9,000	8,730	148	0.0002
Purcellville	50	18	18	35	7.5	263	255	4	0.0000
Sterling Park SC	50	23	23	45	7.5	338	327	6	0.0000
Sterling Shaw Rd	50	24	24	48	7.5	360	349	6	0.0000
<b>PARK-AND-RIDE LOTS - VIRGINIA</b>									
<b>PRINCE WILLIAM COUNTY</b>									
Brittany	50	48	48	95	7.5	713	691	12	0.0000
Dale City	50	294	294	587	7.5	4,403	4,270	72	0.0001
Harbor Drive	50	100	100	200	7.5	1,500	1,455	25	0.0000
Lindendale	50	108	108	216	7.5	1,620	1,571	27	0.0000
Montclair	50	25	25	50	7.5	375	364	6	0.0000
PRTC Transit Center	50	93	93	185	7.5	1,389	1,346	23	0.0000
Tackett's Mill	50	85	85	169	7.5	1,268	1,229	21	0.0000
Triangle	50	15	15	29	7.5	218	211	4	0.0000
I-95 / Rt 123	50	282	282	563	7.5	4,223	4,096	69	0.0001
US 1 / VA 234	50	137	137	274	7.5	2,055	1,993	34	0.0000
<b>MARC TRAIN COMMUTER LOTS</b>									
College Park	25	431	144	574	7.5	4,305	4,176	71	0.0001
Frederick	0	0	0	0	7.5	0	0	0	0.0000
Greenbelt	60	1346	2018	3364	7.5	25,230	24,473	414	0.0005
Harpers Ferry		98	0	98	7.5	735	713	12	0.0000
Muirkirk	60	260	390	650	7.5	4,875	4,729	80	0.0001
Seabrook	0	264	0	264	4.5	1,188	1,152	19	0.0000
Silver Spring	0	0	0	0	4.5	0	0	0	0.0000
Union Station	0	781	0	781	7.5	5,858	5,682	96	0.0001
<b>VIRGINIA RAILWAY EXPRESS COMMUTER LOTS</b>									
Backlick Road	50	110	110	220	7.5	1,650	1,601	27	0.0000
Broad Run	50	198	198	396	7.5	2,970	2,881	49	0.0001
Brooke	50	150	150	300	7.5	2,250	2,183	37	0.0000
Burke Center	50	275	275	550	7.5	4,125	4,001	68	0.0001
Franconia/Springfield (operated)	50	1900	1900	3800	7.5	28,500	27,645	467	0.0005
Leeland Road	50	326	326	652	7.5	4,890	4,743	80	0.0001
Lorton	50	100	100	200	7.5	1,500	1,455	25	0.0000
Manassas	50	187	187	374	7.5	2,805	2,721	46	0.0001
Manassas Park	50	150	150	300	7.5	2,250	2,183	37	0.0000
Quantico	50	109	109	217	7.5	1,628	1,579	27	0.0000
Rippon	50	150	150	300	7.5	2,250	2,183	37	0.0000
Rolling Road	50	185	185	370	7.5	2,775	2,692	45	0.0001
Woodbridge	50	294	294	588	7.5	4,410	4,278	72	0.0001
<b>METRORAIL PARKING LOTS</b>									
Anacostia	25	861	287	1148	7.5	8,610	8,352	141	0.0002
Branch Avenue	50	1611	1611	3222	7.5	24,165	23,440	396	0.0004
Capitol Heights	50	194	194	387	7.5	2,903	2,815	48	0.0001
College Park	25	465	155	620	7.5	4,650	4,511	76	0.0001
Congress Heights	0	66	0	66	4.5	297	288	5	0.0000
Deanwood	0	194	0	194	7.5	1,455	1,411	24	0.0000
East Falls Church	50	221	221	442	7.5	3,315	3,216	54	0.0001
Forest Glen	50	329	329	658	7.5	4,935	4,787	81	0.0001
Franconia - Springfield	50	1987	1987	3973	4.5	17,879	17,342	293	0.0003
Glenmont	50	925	925	1850	4.5	8,325	8,075	136	0.0002
Greenbelt	50	1783	1783	3565	7.5	26,738	25,935	438	0.0005
Naylor Road	50	216	216	431	7.5	3,233	3,136	53	0.0001
Prince George's Plaza	25	927	309	1236	7.5	9,270	8,992	152	0.0002
Southern Avenue	50	1090	1090	2180	4.5	9,810	9,516	161	0.0002
Sutland	50	1033	1033	2065	4.5	9,293	9,014	152	0.0002
Van Dom Street	50	204	204	407	4.5	1,832	1,777	30	0.0000
West Hyattsville	25	453	151	604	7.5	4,530	4,394	74	0.0001
Wheaton	25	759	253	1012	7.5	7,590	7,362	124	0.0001
				108,749		715,007		11,721.1016	0.0129
							Seasonal Total (tons/season)		0.8398

Bold figures: New numbers taken from P & R directory  
 Figures in bracket: Carry forward figures from conformity doc.