

**AIR QUALITY / TRANSPORTATION PLAN CONFORMITY
FAIRBANKS MAINTENANCE AREA
FFY06-08 TIP and LRTP**

Approved 17 August, 2005

The Fairbanks Metropolitan Area Transportation System (FMATS) has completed the first Transportation Improvement Program (TIP) and Long Range Transportation Plan (LRTP) for the Fairbanks Metropolitan Planning Area. The TIP is a three-year spending plan for all federal highway funds anticipated for the FMATS Area for Federal Fiscal Years (FFY) 06-08, with an additional three years, FFY09-11, included for informational and planning purposes. The LRTP is a 20-year look at transportation needs and potential solutions through FFY 2025.

A portion of the Fairbanks/North Pole area is a designated Carbon Monoxide Maintenance Area. Therefore, prior to approval of projects in the maintenance area, the State must demonstrate that the projects listed in the LRTP and TIP conform to the requirements and objectives of the most recent State Air Quality Implementation Plan (SIP).

CONFORMITY

The transportation conformity analysis is intended to demonstrate that local transportation plans, programs, and proposed projects for a maintenance area:

- Will support the attainment and maintenance of National Ambient Air Quality Standards (NAAQS) for Carbon Monoxide.
- Will not cause or contribute to any new violations of the NAAQS.
- Will not contribute to an increase in the number or severity of violations of National Ambient Air Quality Standards (NAAQS) for Carbon Monoxide.
- Will provide for expeditious implementation of Transportation Control Measures (TCM's), if any, contained in the State Implementation Plan.
- Will not in any way contradict recommendations of the State Implementation Plan.

STATUS – ATTAINMENT PROGRESS

The U.S. Environmental Protection Agency (EPA) originally designated a portion of the Fairbanks North Star Borough as a "Moderate Non-Attainment Area" for carbon monoxide (CO). This was based on an 8-hour average design value of 10.4 parts per million (ppm) of CO. Fairbanks failed to reach attainment by the end of 1995, and effective March 30, 1998, EPA formally reclassified Fairbanks to a "Serious CO Non-Attainment Area", as mandated by the 1990 Clean Air Act Amendments. Effective April 5, 2002, EPA made a determination that the Fairbanks area had attained the NAAQS for carbon monoxide. The State submitted an Air Quality Maintenance Plan on June 21, 2004 and EPA made a formal "CO Maintenance Area" designation approving this plan on September 27, 2004.

Table 1
Annual Violations / Exceedences
(NAAQS for CO)

Exceedences	2	3	2	5	2	9	1	3	2	3	1	0	0	0
Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Exceedences	0	0*												
Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017

NOTES: EPA allows one exceedence per calendar year of the National Ambient Air Quality Standard for Carbon Monoxide (9.0 ppm for an 8-hour average). Each additional exceedence is a violation.

* Recordings to date for calendar year 2005.

BACKGROUND

Air Quality Planning Authority - The Fairbanks North Star Borough is the designated lead agency that is responsible for development and implementation of an air quality plan for the Fairbanks area. The Borough also oversees the Motor Vehicle Emissions Inspection and Maintenance (I/M) Program. A 2005 Memorandum of Understanding between the Borough and the Alaska Department of Environmental Conservation (ADEC) outlines joint responsibilities to address air pollution in the Fairbanks area.

Transportation Planning Agreement – Based on the results of the 2000 Census, a portion of the Fairbanks and North Pole area was designated as an urbanized area (meets density requirements with total population of 50,000 or more). The U.S. Department of Commerce, Bureau of the Census made this designation effective May 1, 2002. Therefore, the community now falls under the requirements of USC Title 23, Section 34, which required the formation of a Metropolitan Planning Organization (MPO).

On April 14, 2003, the Governor of Alaska, formally designated the Fairbanks Metropolitan Area Transportation System (FMATS). FMATS has completed an Inter-Governmental Operating Agreement and a Memorandum of Understanding for Transportation & Air Quality Planning.

FMATS members include the Fairbanks North Star Borough, the City of Fairbanks, the City of North Pole, the Alaska Department of Transportation & Public Facilities (DOT&PF) and the Alaska Department of Environmental Conservation (DEC). The Fairbanks North Star Borough will continue as the lead agency for developing and implementing the local Air Quality Attainment Plan. FMATS members will provide technical support and review of the transportation elements of the air quality plan. The FMATS structure fulfills the Clean Air Act requirements for local government and state agencies to provide a coordinated or "consultation" process to review the air quality attainment plan and the conformity analysis.

As a newly formed MPO, FMATS is required to develop a TIP and LRTP by FFY06. The conformity analysis included in this report evaluates the air quality impacts from the projects included in the TIP and the LRTP (through 2025). FMATS is producing its first official TIP and LRTP.

State Implementation Plan / Vehicle Emissions Budget - The most recent Fairbanks component of the State Implementation Plan (SIP) was adopted April 27, 2004. This action included the approval of the Fairbanks Motor Vehicle CO Emissions Budget. Transportation Control Measures (TCM's) included in the Implementation Plan focus on an electrical plug-in program, an oxygen sensor replacement program, OBD-I/M inspections of heavy-duty gas vehicles, and other measures (e.g., transit). Additionally, an episodic woodstove burning ban was add as a control measure.

Population Estimates - Historical population data used in this report includes the 1990 and 2000 U.S. Census counts for the Borough. The State demographer's estimate for the current 2005 borough population is 85,930. The future year forecasts were developed for the FMATS LRTP. The population census data and forecasts used for this report are summarized in Table 2.

**Table 2
Population: Historical Data / Forecasts**

	1990 Census	1995 Estimate	2000 Census	2025 Forecast
Fairbanks Area	35,600	37,700	37,600	47,800
North Pole Area	1,450	1,530	1,570	2,600
Urban Area Total	37,050	39,230	39,170	50,400

NOTES: The CO Maintenance Area (MA) includes the Fairbanks MA plus the City of North Pole MA.

TRANSPORTATION DEMAND MODEL / ROADWAY NETWORKS

The Traffic Demand Model is the primary planning tool used to develop and compare the area wide roadway travel data that results from both increased travel demands and roadway improvements. Historical 1990-2001 Vehicle-Mile-Travel (VMT) data and projected 2003-2025 VMT data without improvements are summarized in Tables 3 & 4 and following graph.

**Table 3
VMT: Historical Data / Forecasts**

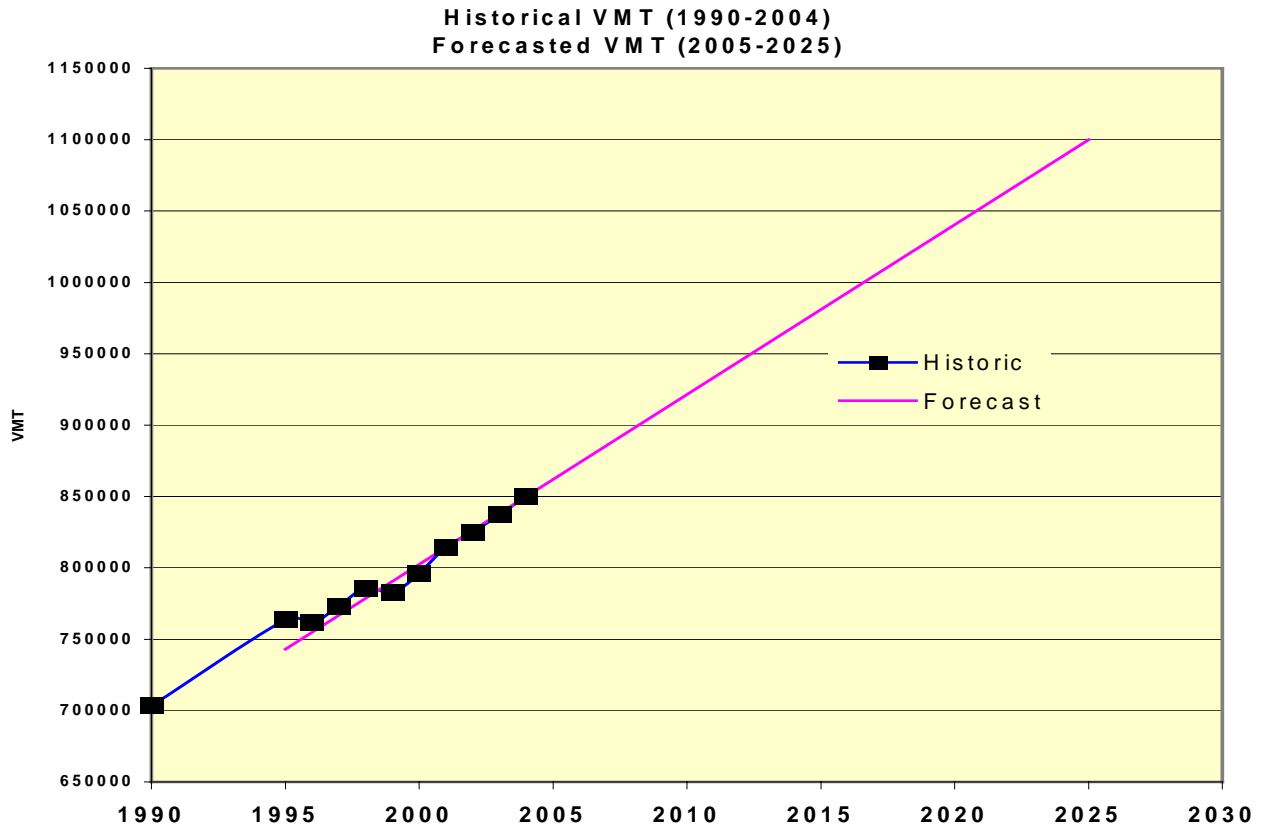
	1990 **	1995 **	2004 **	2025 Forecasts
Maintenance Area	703,381	763,956	814,469	1,100,000
Rural - FMATS Area	482,230	561,776	598,859	873,200
Rural - Outlying	272,536	293,414	311,859	424,300
Total Borough	1,458,147	1,619,147	1,725,186	2,397,500

** Source: Annual Traffic Volume Reports: DOT&PF Northern Region

Table 4
2004 Detailed Summary of Vehicle-Miles-Travel (VMT) **
Fairbanks CO Maintenance Area

Facility Type	(Aver-Annual)		% VMT	Seasonal Factor	(Winter)
	VMT	SPD			(Wk-Day)
					VMT
Expressways	215,441	49.1	26.5	94.6%	203,807
Principal Arterials	163,698	32.0	20.1	94.6%	154,858
Minor Arterials	129,725	33.9	15.9	94.6%	122,720
Urban Collecters	213,601	30.5	26.2	94.6%	202,067
Local	92,004	25.0	11.3	94.6%	87,036
Urban Totals	814,469	35.6	100.0	94.6%	770,488

** Source: 2004 Annual Traffic Volume Report: DOT&PF Northern Region



Analysis Methodology

The winter on-road mobile source emissions for the urban maintenance area of Fairbanks were computed by combining the estimates of warm-up idling and plug-in benefits from AKMOBILE6 with the traveling emission factors from MOBILE6. Both models were used to establish the attainment demonstration and emissions budgets contained in the recently approved Maintenance Plan.¹ The years to be analyzed in this analysis were established via interagency consultation between representatives of FMATS, EPA, DEC, FNSB and DOT&PF,² and include calendar years 2006, 2010, 2015, and 2025. With the exception of the estimates of maintenance area VMT and average area speeds contained in the new TIP and LRTP, all the fleet, travel, I/M, and fuel characteristics employed in the Maintenance Plan were used in this analysis. Similarly, emissions were estimated using the soak time and initial idling time by trip type (home/work, home/other, and other/other) and the trip type distributions used in the Maintenance Plan. Copies of the AKMOBILE6 input files used in this analysis are included in Appendix A.

The emission estimates from AKMOBILE6 were further adjusted to account for the design of the Fairbanks I/M program, which targets 1975 and newer model year vehicles. The design of MOBILE6 does not allow the breakout of emissions from this specific year starting in calendar year 1999, because it assumes all vehicles 25 years old and older are in one group of vehicles that is 25 years old. Thus, I/M program benefits are overstated because they are applied to all vehicles in this category when they should be applied to just a fraction of the vehicles in this category. The same method used to address this issue in the Maintenance Plan was used in this analysis. A copy of the spreadsheet used to make the adjustment, which is minimal (i.e., it shows an increase of 0.066 tons/day in 2006, which declines to 0.001 tons/day in 2025), is presented in Appendix A.

Another adjustment employed in the analysis was to estimate the number of average daily winter trips that will occur in each of the analysis years. Since the only estimate available is for calendar year 2002 (221,845 trips/day), the approach used was to increase them in proportion to the growth rate in VMT between the analysis years and 2002. This is the same method that was employed in the Maintenance Plan. The travel forecasts for the TIP and LRTP were obtained from DOT&PF.³ Total winter daily VMT estimates were supplied for 2003 and 2025. Estimates for the intervening years were developed using interpolation, which showed an annualized growth rate of 1.54%. The total vehicle trips and VMT used in the analysis are shown in Table 5, along with the 2002 values used in the Maintenance Plan. A comparison of the travel estimates used in the Maintenance Plan⁴ and new estimates for the TIP and LRTP the analysis years are shown in Table 6. As can be seen, the new forecasts show a substantial increase in travel relative to the previous estimates.

¹ AKMOBILE6 version 1.9E dated October 28, 2003 and MOBILE version 6.2 .03 dated September 24, 2003, which is the newest version released by EPA.

² Email from Barbara Shepherd, Alaska DEC, July 6, 2005

³ Email from Jeff Roach, Alaska DOT&PF, August 4, 2005.

⁴ Email from Paul Prusak, Alaska DOT&PF, February 12, 2002.

Calendar Year	Vehicle Trips	VMT
2002	221,845	761,418
2006	251,367	862,743
2010	267,212	917,126
2015	288,430	989,950
2025	336,054	1,153,406

Calendar Year	Maintenance Plan	2005 TIP/LRTP	% Difference
2006	799,455	862,743	7.9%
2010	839,393	917,126	9.3%
2015	892,132	989,950	11.0%
2025	1,007,760	1,153,406	14.5%

Estimates of speeds and VMT fractions by roadway facility for 2003 and 2025 were also obtained from DOT&PF. As the analysis was based on trip types and not facility type, an average network speed was computed by weighting facility specific speeds by their travel fractions for each of the analysis years. The average areawide speeds for 2006, 2010 and 2015 were then estimated by interpolating between the 2003 and 2025 speeds. This is an improvement over the Maintenance Plan where only one average network speed (35.4 mph) was available to characterize activity for each of the calendar years analyzed. The interpolation between the 2003 and 2025 speed data from DOT&PF resulted in the areawide average speeds shown in Table 7. Each calendar year model run reflected the average speed shown in the table.

Calendar Year	Average Speed (mph)
2003	35.6
2006	35.7
2010	35.7
2015	35.8
2025	36.0

AKMOBILE6 runs were generated for each analysis year using the 2-year I/M exemption reflected in the current Maintenance Plan and the 4-year I/M exemption that will be implemented starting in calendar year 2006.⁵ A summary of the resulting on-road CO emission inventories, along with the adjustments for local controls estimated outside of the models is shown in Table

⁵ A revision to the Maintenance Plan to reflect the change from the 2-year exemption to the 4-year exemption is currently being developed. By developing emission estimates for both options, an assessment of conformity can be demonstrated for both so that no revisions to this analysis will be needed once the Maintenance Plan is updated.

8.

The control measures and related emission benefit estimates are the same as those employed in the Maintenance Plan and include: heavy-duty gasoline vehicle (HDGV) OBD I/M, oxygen sensor replacement and other (transit).

Table 8				
Fairbanks Urban Area Winter On-Road CO Emissions				
Source Component	CO Emissions by Calendar Year in Tons/Day			
	2006	2010	2015	2025
Modeling With 2-Year I/M Exemption				
Extended Idle Emissions	6.66	5.38	4.87	4.18
Travel Emissions	17.85	14.23	12.70	16.67
Total Emissions	<i>24.51</i>	<i>19.62</i>	<i>17.56</i>	<i>20.86</i>
Additional Local Controls*				
	<i>1.04</i>	<i>0.29</i>	<i>0.40</i>	<i>0.00</i>
<i>Total CO Inventory</i>	<i>23.47</i>	<i>19.33</i>	<i>17.16</i>	<i>20.86</i>
Modeling With 4-Year I/M Exemption				
Extended Idle Emissions	6.66	5.38	4.87	4.18
Travel Emissions	17.92	14.30	12.77	16.67
Total Emissions	<i>24.58</i>	<i>19.69</i>	<i>17.64</i>	<i>20.86</i>
Additional Local Controls*				
	<i>1.04</i>	<i>0.29</i>	<i>0.40</i>	<i>0.00</i>
<i>Total CO Inventory</i>	<i>23.54</i>	<i>19.40</i>	<i>17.24</i>	<i>20.86</i>

* Includes HDGV OBD I/M, oxygen sensor replacement and other (transit).

Findings of Conformity

A comparison of the emission estimates for the 2005 TIP/LRTP under both the 2- and 4-year I/M exemption options with the emission budgets established in the Maintenance Plan is presented in Table 9. It shows that emissions for the TIP/LRTP are lower than the Maintenance Plan budgets for all of the analysis years. Since no budget was established for calendar year 2006, the first year of the TIP/LRTP specified for analysis by interagency consultation, the emission estimate for that year was contrasted with budget established for 2004. It should be noted that even if a budget value for 2006 was established by interpolation between the 2004 and 2010 values, the TIP/LRTP value would still conform as it is below the interpolated value of 25.34 tons/day in 2006.

Table 9				
Comparison of Maintenance Plan Budgets and 2005 TIP/LRTP Winter CO Emissions (tons/day)				
Emission Estimate	Analysis Year			
	2004	2010	2015	2025
Budget	26.77	22.95	22.57	22.57
TIP/LRTP 2-year exemption	23.47*	19.33	17.16	20.86
TIP/LRTP 4-year exemption	23.54*	19.40	17.24	20.86
Conformity Finding	Yes	Yes	Yes	Yes

*The values presented are for calendar year 2006, the first year specified for analysis by interagency consultation.

Based on these findings, Fairbanks demonstrates the conformity of its transportation program in accordance with Sections 93.109 – 93.118 of the Final Conformity Rule and parallel State of Alaska requirements in the Air Quality Control Plan and the Alaska Administrative Code Title 18, Chapter 50. This conformity determination uses the latest planning assumptions for current and future population, employment, travel and congestion. The final conformity determination is made according to the consultation procedures set out in the State regulations and federal guidelines.