FINAL Report

Conformity Analysis for the Federally Approved FMATS 2015-2018 Transportation Improvement Program (TIP)

Prepared for:

Fairbanks Metropolitan Area Transportation System

August 12, 2015

FINAL REPORT

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1. EXECUTIVE SUMMARY

This report presents the carbon monoxide (CO) and fine particulate matter ($PM_{2.5}$) Conformity Analysis for the federally approved 2015-2018 FMATS Transportation Improvement Program (2015 TIP). The Fairbanks Metropolitan Area Transportation System (FMATS) is the designated Metropolitan Planning Organization (MPO) for the urbanized portion of the Fairbanks North Star Borough (FNSB), including the cities of Fairbanks and North Pole, Alaska, and is responsible for regional transportation planning. The 2015 TIP is a three-year spending plan for all federal highway funds anticipated for the FMATS Area for Federal Fiscal Years (FFY) 2015-2018. The associated Metropolitan Transportation Plan (MTP) is a 27-year look at transportation needs and potential solutions through FFY 2040 and was approved by the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) on January 30, 2015.

The 2015 TIP and the associated 2040 MTP have been financially constrained in accordance with the requirements of 40 CFR 93.108 and consistent with the U.S. DOT metropolitan planning regulations (23 CFR Part 450). A discussion of financial constraint and funding sources is included in the MTP and 2015 TIP documents. The 2015 TIP was adopted by the Policy Committee of the MPO and a conformity determination was made on August XX, 2015.

The U.S. Environmental Protection Agency (EPA) originally designated a portion of the Fairbanks North Star Borough (FNSB) as a Moderate Nonattainment Area for 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 Nonattainment 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 CO NAAQS. 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. Fairbanks has not recorded an exceedance of the ambient CO standard since 2000. The original ten-year Maintenance Plan has been amended several times since the 2004 submission, including revisions that were adopted by the State on April 4, 2008,[1] that reflected a decision to terminate the Fairbanks I/M Program at the end of 2009. On March 22, 2010, EPA approved[2] this revised version of the Maintenance Plan.

[1] http://www.dec.state.ak.us/air/sip.htm
[2] Federal Register, Vol. 75, No. 54, March 22, 2010.

On April 22, 2013, the State submitted a CO Limited Maintenance Plan (LMP) designed to keep the Fairbanks area in attainment with the CO NAAQS for a second ten-year period beyond re-designation to a Maintenance Area. On August 9, 2013, EPA approved[3] the CO LMP for Fairbanks. As explained further in Section 2.2, areas with approved LMPs no longer require emission budget tests and a regional emissions analysis for the pollutant(s) addressed in the LMP, although conformity requirements still apply. As explained in Section 5, these requirements are met. Therefore, a finding of CO conformity for the 2015 TIP is supported.

EPA designated Fairbanks nonattainment for the 2006 $PM_{2.5}$ standard, effective December 14, 2009. Conformity for the $PM_{2.5}$ standard applies one year after the effective date (December 14, 2010). EPA published the Transportation Conformity Rule $PM_{2.5}$ and PM_{10} Amendments on March 24, 2010; the rule became effective on April 23, 2010.[4] This PM Amendments Final Rule amends the conformity regulation to address the 2006 $PM_{2.5}$ (NAAQS). The analysis presented in this report demonstrates that the criteria specified in the federal transportation conformity rule for a conformity determination are satisfied by the TIP. A finding of conformity for the FMATS 2015 TIP is therefore supported.

Interagency consultation occurred in March and May 2015 on the proposed methodology for the conformity analysis for the 2015 TIP. Issues addressed in those consultations included models, associated methods, and assumptions for use in regional emissions analyses; and the basic steps for completing the conformity demonstration. A key finding during interagency consultation was that the specific projects contained in the 2015 TIP were either consistent with those contained in the earlier 2040 MTP or were found to be exempt from conformity or regional emissions analysis requirements as defined under 40 CFR 93.126 and 93.127. Since all non-exempt projects were consistent with those in the previous plan (the 2040 MTP), 40 CFR 93.122(g)(1) permits reliance on the regional emissions analysis from that plan. As further explained in Section 3.4, each of the criteria under 40 CFR 93.122(g)(1) was met and the 2040 MTP regional emissions analysis was utilized for the conformity determination for this 2015 TIP.

As described in greater detail in the following sub-section, the applicable conformity requirements differed for $PM_{2.5}$ and CO; thus, separate methodologies were developed that addressed the requirements of each test and were approved by the interagency consultation participants.

The applicable federal criteria or requirements for conformity determinations, the conformity tests applied, the results of the conformity assessment, and an overview of the organization of this report are summarized below.

[3] Federal Register, Vol. 78, No. 154, August 9, 2013.
[4] U.S. Environmental Protection Agency, 2010. 40 CFR Part 93. "Transportation Conformity Rule $PM_{2.5}$ and PM_{10} Amendments; Final Rule." Federal Register, March 24, 2010, Vol. 75, No. 56, p. 14260.

FHWA has developed a Conformity Checklist (included in Appendix A) that contains the required items to complete a conformity determination. Appropriate references to these items are noted on the checklist.

1.1 Conformity Tests

The conformity tests specified in the federal transportation conformity regulation are (1) the emissions budget test, and (2) the interim emission test. If there is no approved air quality plan for a pollutant for which the region is in nonattainment or no emission budget has been found to be adequate for transportation conformity purposes, the interim emission test applies. For air quality planning areas with approved Limited Maintenance Plans, no emission tests (budget or interim) are required.

At this time Fairbanks has an approved Limited Maintenance Plan for CO. In December 2014, the State submitted a State Implementation Plan (SIP) for $PM_{2.5}$ to EPA. During interagency consultation, EPA has indicated it will not complete its findings of SIP approvability or emission budget adequacy before submittal of this TIP to FHWA. Thus, there is no emission test required for CO, and the interim emission test applies to $PM_{2.5}$ as described separately below.

CO Conformity – For areas with an approved Limited Maintenance Plan, EPA has concluded that vehicle emissions need not be capped for regional transportation conformity purposes over the course of the maintenance period and a regional emissions analysis and associated budget test (40 CFR 93.118 and 93.119) are not required.

$PM_{2.5}$ Conformity – For areas without an approved air quality plan (and emission budgets), conformity may be demonstrated if the emissions from the proposed transportation system are no greater than baseline year motor vehicle emissions in a given area (see Section 93.119). Conformity may also be demonstrated if the emissions from the proposed transportation system ("build" scenario) are less than or equal to emissions from the existing transportation system ("no-build" scenario).

The rule allows $PM_{2.5}$ nonattainment areas to choose between the two interim emissions tests each time that they determine conformity before adequate or approved $PM_{2.5}$ SIP budgets are established. However, the same test must be used for each analysis year in a given conformity determination.

FMATS chooses to use the "no-greater-than-2008 emissions" test for $PM_{2.5}$ (and precursor emissions of oxides of nitrogen [NOx]) using EPA's MOVES2010b vehicle emissions model.

1.2 Results of the Conformity Analysis

A regional emissions analysis was conducted to meet the $PM_{2.5}$ conformity requirements. Although a regional emissions test was not required for CO since Fairbanks has an approved CO Limited Maintenance Plan in place, regional CO emissions were also estimated for informational purposes to ensure that the 2040 MTP is consistent with the LMP. All analyses were conducted using the latest planning assumptions and emissions models. The major conclusions of the FMATS 2040 MTP Conformity Analysis are outlined below.

- Total regional vehicle-related $PM_{2.5}$ and NOx precursor emissions associated with implementation of the 2040 MTP for the analysis years 2020, 2030, and 2040 have been estimated and are no greater than the 2008 baseline motor vehicle emissions, thus passing the required "not to exceed baseline" interim emissions test. Section 5.2 contains the $PM_{2.5}$ conformity results summary for the Fairbanks nonattainment area and further explains how the $PM_{2.5}$ conformity requirements are met.

- All CO conformity requirements are met. Even though an emissions test is not required since the area has an approved CO LMP in place, other criteria still apply that ensure the MTP is consistent with the projections/assumptions in the LMP. As explained in Section 5.3, each of these criteria has been fulfilled.

- Interagency consultation has been conducted in accordance with federal requirements, which are incorporated into Alaska Department of Environmental Conservation's (ADEC's) Conformity Regulations.[5]

1.3 Report Organization

Following this Executive Summary, Section 2 provides an overview of the applicable $PM_{2.5}$ conformity rule and requirements, including an approach to meet requirements and the conformity analysis years. Section 3 contains a discussion of the latest planning assumptions, transportation modeling, and air quality modeling used to estimate regional emissions. Section 4 provides an overview of the interagency consultation conducted by FMATS. The results of the conformity analysis for the MTP are provided in Section 5.

Consultation documentation and other related information are contained in the appendices. FHWA's checklist for conformity documentation is provided in Appendix A. Appendix B contains a listing of the transportation projects included in the 2015 TIP, and Appendix C contains the transportation modeling documentation. Appendix D provides tables showing key vehicle classification schemes used to develop modeling inputs and spreadsheets documenting the conformity analysis. Appendix E describes the EPA-approved methodology for modeling plug-in emission effects using MOVES2010b.

[5] State of Alaska Environmental Conservation Regulation, Title 18, Chapter 50. Air Quality Control. Article 7. Conformity (18 AAC 50.700 – 18 AAC 50.720)

Appendix F includes copies of interagency consultation correspondence. Appendix G contains public meeting process documentation. Comments received on the conformity analysis and responses made as part of the public involvement process are included in Appendix H.

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2. CONFORMITY REQUIREMENTS

The criteria for determining conformity of transportation programs and plans under the federal transportation conformity rule (40 CFR Parts 51 and 93) and the applicable and CO and $PM_{2.5}$ conformity tests for the Fairbanks nonattainment areas are summarized in this section.

FMATS is the designated Metropolitan Planning Organization for Fairbanks, Alaska. As a result of this designation, FMATS prepares the MTP and associated conformity analyses.

Presented first is a review of the development of the applicable conformity regulation and requirements and the analysis years for this CO and $PM_{2.5}$ Conformity Analysis.

2.1 Background

CO – EPA originally designated a portion of the FNSB as a Moderate Nonattainment Area for 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 Nonattainment 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 CO NAAQS. 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. Fairbanks has not recorded an exceedance of the ambient CO standard since 2000. The original ten-year Maintenance Plan has been amended several times since the 2004 submission, including revisions that were adopted by the State on April 4, 2008,[6] that reflected a decision to terminate the Fairbanks I/M Program at the end of 2009. On March 22, 2010, EPA approved[7] this revised version of the Maintenance Plan.

On April 22, 2013, the State submitted a CO LMP designed to keep the Fairbanks area in attainment with the CO NAAQS for a second ten-year period beyond re-designation to a Maintenance Area. On August 9, 2013, EPA approved[8] the CO LMP for Fairbanks. As explained further in Section 2.2, areas with approved LMPs no longer require emission budget tests and a regional emissions analysis for the pollutant(s) addressed in the LMP.

$PM_{2.5}$ – EPA published the Transportation Conformity Rule $PM_{2.5}$ and PM_{10} Amendments on March 24, 2010; the rule became effective on April 23, 2010.[9] This PM Amendments Final Rule amends the conformity regulation to address the 2006 $PM_{2.5}$

[6] http://www.dec.state.ak.us/air/sip.htm
[7] Federal Register, Vol. 75, No. 54, March 22, 2010.
[8] Federal Register, Vol. 78, No. 154, August 9, 2013.
[9] U.S. Environmental Protection Agency, 2010. op. cit.

NAAQS. The final PM Amendments rule also addresses hot-spot analyses in $PM_{2.5}$, PM_{10}, and carbon monoxide nonattainment and maintenance areas.

EPA's nonattainment area designations for the 2006 $PM_{2.5}$ standard became effective on December 14, 2009. Conformity for a given pollutant and standard applies one year after the effective date of EPA's initial nonattainment designation. Therefore, conformity for the 2006 $PM_{2.5}$ standard began to apply on December 14, 2010, for Fairbanks, Alaska. On June 2, 2014, EPA published in the Federal Register (Vol. 79, No. 105, p. 31566-31782) a new rule that identified those States in nonattainment for $PM_{2.5}$ as 'moderate' areas and proposed a new due date for submittal of moderate nonattainment area Subpart 4 SIPs to EPA. Under the 2014 rule, the $PM_{2.5}$ SIP for the moderate nonattainment area in the Fairbanks North Star Borough is due to the EPA by December 31, 2014.

Interagency Consultation – In accordance with the conformity rule, the interagency consultation process is being used for conducting necessary regional emissions analyses and emission tests and demonstrating conformity for the applicable NAAQS. The draft conformity demonstrations were completed in May 2015. Public review of the conformity findings occurred over a 37-day period from June 17 through July 24, 2015, followed by MPO approval on August 12, 2015. The conformity demonstration for the 2040 MTP was submitted to FHWA/FTA on January 22, 2015 and approved on January 30, 2015.

2.2 Conformity Regulation Requirements

As summarized earlier in Section 1.1, conformity test requirements differ for areas and pollutants with an EPA-approved air quality plan (i.e., a State Implementation Plan or a Maintenance Plan) and those without an approved plan. Fairbanks has an approved Limited Maintenance Plan for CO, but an air quality plan for $PM_{2.5}$ has not yet been completed and approved by EPA.

Separate requirements for areas or pollutants under each category are described in separate sub-sections that follow.

2.2.1 Areas/Pollutants With a Limited Maintenance Plan

Fairbanks is a CO maintenance area with an approved Limited Maintenance Plan. The LMP policy essentially states that vehicle emission budgets test for transportation conformity can be treated as unnecessary because it is not reasonable to expect that an LMP area will experience so much growth during the maintenance period that a violation of the ambient CO standards would occur.

Although CO emission budget tests are not necessary, the following conformity requirements still apply:

- Transportation plans must still meet interagency consultation criteria and implementation of TCMs in the conformity rule (40 CFR 93.112 and 93.113); and

- In addition, projects in CO LMP areas must still meet criteria for CO hot-spots and screening analyses (40 CFR 93.116 and 93.123).

2.2.2 Areas/Pollutants Without SIP-Based Budgets

Before an adequate or approved SIP budget is available, as is currently the case for $PM_{2.5}$ in Fairbanks, conformity is generally demonstrated with interim emission tests. Conformity may be demonstrated if the emissions from the proposed transportation system are no greater than baseline year motor vehicle emissions in a given area (see 40 CFR 93.119).

In the Fairbanks $PM_{2.5}$ SIP scheduled for adoption by the state in December 2014, the baseline year for the attainment demonstration is calendar year 2008. Thus, 2008 is the baseline year for the interim emissions test.

The 2008 baseline year emissions level must be based on the latest planning assumptions available for the year 2008, the latest emissions model, and appropriate methods for estimating travel and speeds as required by the conformity regulation.

$PM_{2.5}$ nonattainment areas may also elect to use the "build-no-greater-than-no-build test." Conformity is demonstrated if the emissions from the proposed transportation system ("build" scenario) are less than or equal to emissions from the existing transportation system ("no-build" scenario).

The rule allows $PM_{2.5}$ nonattainment areas to choose between the two interim emissions tests each time that they determine conformity before adequate or approved $PM_{2.5}$ SIP budgets are established. However, the same test must be used for each analysis year in a given conformity determination. Fairbanks chooses to use the "no-greater-than-2008 emissions test."

The regional emissions analyses in $PM_{2.5}$ nonattainment areas must consider directly emitted $PM_{2.5}$ motor vehicle emissions from tailpipe, brake wear, and tire wear. EPA's on-road mobile source emissions model MOVES quantifies emissions from these sources. Since MOVES was chosen for use in this conformity analysis, this requirement is satisfied.

Prior to adequate or approved $PM_{2.5}$ SIP budgets, re-entrained road dust and construction-related fugitive dust from highway or transit projects will be included in the regional emissions analyses only if EPA or ADEC has determined that it is a "significant contributor" to the $PM_{2.5}$ regional air quality problem. Until a significance finding is made, $PM_{2.5}$ areas can presume that re-entrained road dust is not a significant contributor and not include road dust in the $PM_{2.5}$ transportation conformity analysis prior to the SIP.

In addition, construction-related dust emissions are not to be included in any $PM_{2.5}$ conformity analyses before adequate or approved $PM_{2.5}$ SIP budgets are established. ADEC has indicated the significance determination will be made as part of the SIP process. As a result, the Fairbanks $PM_{2.5}$ conformity analysis will not include re-entrained road dust or construction-related fugitive dust from transportation projects.

In addition, prior to the submission of a SIP, NOx emissions must be considered, unless both ADEC and EPA make a finding that NOx is not a "significant contributor" to the $PM_{2.5}$ air quality problem. Conversely, volatile organic compounds (VOC), sulfur oxides (SOx), and ammonia emissions do not have to be considered in conformity, unless either ADEC or EPA makes a finding that on-road emissions of any of these precursors is a "significant contributor" to the area's $PM_{2.5}$ air quality issues. ADEC will make the significance determinations as part of the SIP process. As a result, the $PM_{2.5}$ conformity analysis will address only the precursor NOx emissions.

Table 2-1 summarizes $PM_{2.5}$ and NOx emission estimates for the 2008 baseline year. These emission estimates were calculated by running EPA's MOVES2010b model as explained in Section 3.4 using transportation modeling outputs for the Fairbanks $PM_{2.5}$ nonattainment area described in Section 3.3.

Table 2-1
2008 Baseline Vehicle Emissions
(tons per average winter day)

$PM_{2.5}$	NOx
0.584	5.478

2.3 Conformity Analysis Years

Nonattainment areas that do not have adequate or approved budgets are not required to demonstrate conformity and perform a regional emissions analysis for their attainment year. Under Section 93.119(g)(1) of the conformity rule, nonattainment areas using interim emission tests are required to perform a regional emissions analysis for the following years:

- A year no more than five years beyond the year in which the conformity determination is made (e.g., 2015);
- The last year of the transportation plan's forecast period (e.g., 2040); and
- Any additional years within the time frame of the transportation plan so that analysis years are no more than ten years apart (e.g., 2030).

Regional emissions were thus estimated for calendar years 2008 (emission test baseline), 2020, 2030, and 2040 in the CO and $PM_{2.5}$ conformity analysis, in accordance with the conformity rule requirements. These years were certified in the Interagency Consultation process.

###

3. LATEST PLANNING ASSUMPTIONS AND MODELING

The Clean Air Act states that "the determination of conformity shall be based on the most recent estimates of emissions, and such estimates shall be determined from the most recent population, employment, travel, and congestion estimates as determined by the MPO or other agency authorized to make such estimates."

According to the conformity regulation, the time the conformity analysis begins is "the point at which the MPO or other designated agency begins to model the impact of the proposed TIP on travel and/or emissions." The transportation modeling began in April 2015 and was completed in early May 2015.

Since conformity applies to the CO and $PM_{2.5}$ nonattainment areas, new transportation projects within the "donut area" have been included. Donut areas are geographic areas outside a metropolitan planning area boundary, but inside the boundary of a nonattainment area that contains any part of the metropolitan area.

3.1 Latest Planning Assumptions

A series of updates developed for the Alaska Department of Transportation and Public Facilities (ADOT&PF) were implemented within the recent 2040 MTP transportation modeling performed by Kittelson and Associates, Inc. (Kittelson). Local travel survey data were collected from roughly 1,300 homes during fall 2013 and data recorders were installed on vehicles from a subset of the Fairbanks households (166), with trip data collected electronically for a week for each vehicle (roughly 300 across the sampled households). In addition, the number of traffic analysis zones (TAZs) was roughly doubled, and the modeling network was revised to include more roadway links.

An updated demographic forecasting methodology was also developed by Kittelson that relies on 2010 Census data, current Alaska Department of Labor and Workforce Development (ADLWD) population and Woods and Poole (W&P) employment projections, and Borough activity forecasts. The methodology employs a three-pronged approach to forecasting growth: (1) identifying accessibility/desirable locations; (2) reviewing regulation-based land ownership to identify areas where growth can occur; and (3) assessing the potential for redevelopment.

Since the 2040 MTP transportation modeling was conducted during fall 2014, no additional planning forecast data have become available. Thus, in accordance with the "latest planning assumptions" section of the federal conformity rule (40 CFR 93.110), the most recent estimates of population and employment projections that have been officially approved by the Metropolitan Planning Organization were used.

3.2 Transportation Modeling

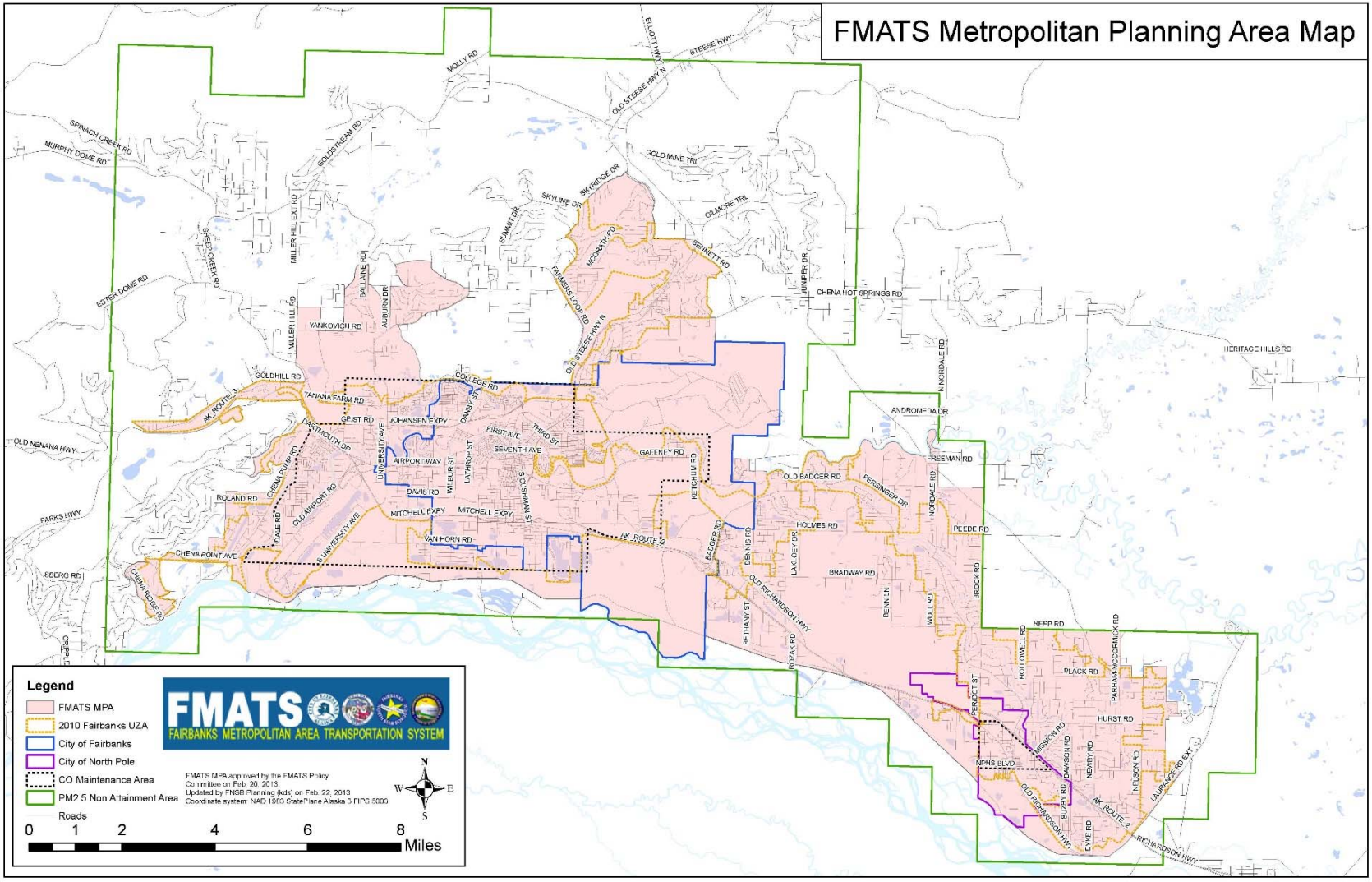
The modeling network for the updated ADOT&PF Fairbanks Regional Travel Demand Model contains the entire extents of the CO and $PM_{2.5}$ nonattainment areas. Figure 3-1 illustrates the differences between the CO and $PM_{2.5}$ nonattainment areas as well as the different urban planning boundaries. The modeling network roughly extends over the area shown in Figure 3-1. As can be seen, the $PM_{2.5}$ nonattainment area is significantly larger than the CO nonattainment area, although both planning areas are entirely encompassed within the travel modeling network.

For the earlier 2040 MTP analysis, the TransCAD model (Version 6.0 r2 Build 9105) was updated to employ these latest socioeconomic data from the 2010 Census and household travel survey data. The base year for these updated runs was set to 2013. The base year model runs were calibrated and validated using 2013 measured traffic volumes collected by ADOT&PF at over 50 screenline stations across the entire modeling domain. Long-range growth and activity forecasts were based on the aforementioned ADLWD, W&P and Borough projections. As explained later in Section 3.5, travel model outputs for 2013 and 2040 were interpolated or extrapolated to the other analysis years.

For the 2015 TIP, Kittelson performed similar TransCAD modeling for a 2040 calendar year forecast based on the list of projects and their phasing under the three-year (FY15-18) period of the TIP. A 2040 modeling run was developed using the same population/employment forecast from the 2040 MTP. However, given the shorter period of funded projects in the TIP, a number of longer-term capacity improvements were excluded from the 2040 TIP modeling run.

Appendix C provides further details on the data sources and growth and activity forecasts used in the travel demand modeling for the 2040 MTP.

Figure 3-1
Fairbanks Metropolitan Area Transportation System (FMATS) Planning Areas



3.3 Traffic Estimates

TransCAD model runs were performed for FMATS in support of the 2015 TIP by Kittelson for the 2013 base year and a 2040 horizon year forecast. Annual growth rates reflected in the 2040 forecast were roughly 1.1% per year for population and 1.4% per year for vehicle miles traveled (VMT).

A summary of the average daily VMT estimates for the 2015 TIP within the FMATS modeling area is presented in Table 3-1. It also shows VMT for the $PM_{2.5}$ and CO nonattainment area subsets of the entire modeling area. Table 3-1 shows that travel between 2013 and 2040 is forecast to increase by 45.6% across the entire modeling area, which corresponds to an annualized VMT growth rate of 1.40%. Evening (PM) peak period travel is forecast to grow more rapidly than any other period of the day. Within the smaller $PM_{2.5}$ and CO nonattainment areas, travel growth from 2013 to 2040 is marginally lower at 41.6% and 28.5%, respectively. This corresponds to annualized long-term VMT growth rates of 1.30% and 0.93% for the $PM_{2.5}$ and CO nonattainment areas. These differences in growth rates, with higher growth in outlying areas, reflect assumptions in the travel modeling regarding where most long-term VMT growth will occur across the modeling network.

Table 3-1
2015 TIP Annual Average Daily VMT in the Travel Model Base and Forecast Years by Analysis Area and Daily Period

Daily Period	Entire Modeling Network			PM Nonattainment Area			CO Nonattainment Area		
	2013	2040	% Change	2013	2040	% Change	2013	2040	% Change
AM Peak	218,482	307,801	40.9%	205,465	282,096	37.3%	101,710	129,272	27.1%
PM Peak	426,257	627,981	47.3%	400,283	573,473	43.3%	215,332	278,419	29.3%
Off-Peak	1,164,347	1,698,367	45.9%	1,092,896	1,549,995	41.8%	585,119	751,511	28.4%
Total VMT	**1,809,086**	**2,634,150**	45.6%	**1,698,644**	**2,405,563**	41.6%	**902,161**	**1,159,202**	28.5%

As stated earlier, the list of projects in the TIP are all contained in the earlier 2040 MTP, with one exception. Table 3-2 presents a comparison of 2040 VMT forecasts from the travel modeling conducted for this 2015 TIP and the earlier MTP.

Table 3-2
Comparison of Forecasted 2040 VMT in MTP and TIP

Daily Period	Entire Modeling Network			PM Nonattainment Area			CO Nonattainment Area		
	MTP	TIP	% Diff.	MTP	TIP	% Diff.	MTP	TIP	% Diff.
AM Peak	308,763	307,801	-0.3%	284,799	282,096	-0.9%	130,144	129,272	-0.7%
PM Peak	631,256	627,981	-0.5%	580,003	573,473	-1.1%	281,222	278,419	-1.0%
Off-Peak	1,706,731	1,698,367	-0.5%	1,567,255	1,549,995	-1.1%	759,088	751,511	-1.0%

Total VMT	**2,646,750**	**2,634,150**	**-0.5%**	**2,432,057**	**2,405,563**	**-1.1%**	**1,170,454**	**1,159,202**	**-1.0%**

As seen in Table 3-2, differences in forecasted 2040 VMT between the TIP and the MTP are roughly within 1% or less, with the forecasted TIP VMT nominally lower across each of the geographic areas and daily periods shown in the table. According to Kittelson, the nominally lower VMT in the TIP forecast is likely due to decreased accessibility (relative to the longer-term capacity improvements in the MTP) that discourages longer trips.

Although not shown, average network speed in the 2040 TIP forecast was also roughly 1% lower than that in the MTP, again likely due to nominal reductions in mobility compared to the full set of longer-term MTP improvements.

The purpose of these comparisons was to demonstrate how close projected travel activity is between the 2040 forecasts in the TIP and MTP, which they do.

3.4 Use of Previous Regional Emissions Modeling from 2040 MTP

Under conditions where the list of projects in a new transportation plan or TIP match those modeled in the prior plan, the regional emissions analysis prepared to satisfy regional conformity requirements in the prior plan can also be applied or used for the new plan or TIP. The specific conditions which must be met are contained in 40 CFR 93.122(g) as follows:

> ***(g) Reliance on previous regional emissions analysis.***
>
> ***(1)*** *Conformity determinations for a new transportation plan and/or TIP may be demonstrated to satisfy the requirements of §§ 93.118 ("Motor vehicle emissions budget") or 93.119 ("Interim emissions in areas without motor vehicle emissions budgets") without new regional emissions analysis if the previous regional emissions analysis also applies to the new plan and/or TIP. This requires a demonstration that:*
> ***(i)*** *The new plan and/or TIP contain all projects which must be started in the plan and TIP's timeframes in order to achieve the highway and transit system envisioned by the transportation plan;*
> ***(ii)*** *All plan and TIP projects which are regionally significant are included in the transportation plan with design concept and scope adequate to determine their contribution to the transportation plan's and/or TIP's regional emissions at the time of the previous conformity determination;*
> ***(iii)*** *The design concept and scope of each regionally significant project in the new plan and/or TIP are not significantly different from that described in the previous transportation plan; and*
> ***(iv)*** *The previous regional emissions analysis is consistent with the requirements of §§ 93.118 (including that conformity to all currently applicable budgets is demonstrated) and/or 93.119, as applicable.*
>
> ***(2)*** *A project which is not from a conforming transportation plan and a conforming TIP may be demonstrated to satisfy the requirements of § 93.118 or § 93.119 without additional regional emissions analysis if allocating funds to the project will not delay the implementation of projects in the transportation plan or TIP which are necessary*

to achieve the highway and transit system envisioned by the transportation plan, the previous regional emissions analysis is still consistent with the requirements of § 93.118 (including that conformity to all currently applicable budgets is demonstrated) and/or § 93.119, as applicable, and if the project is either:
(i) *Not regionally significant; or*
(ii) *Included in the conforming transportation plan (even if it is not specifically included in the latest conforming TIP) with design concept and scope adequate to determine its contribution to the transportation plan's regional emissions at the time of the transportation plan's conformity determination, and the design concept and scope of the project is not significantly different from that described in the transportation plan.*
(3) *A conformity determination that relies on paragraph (g) of this section does not satisfy the frequency requirements of § 93.104(b) or (c).*

Once the list of projects included in the 2015 TIP was finalized, interagency consultation was held to determine whether the TIP projects met each of the conditions of 93.122(g). Lists of the projects in both the 2015 TIP and 2040 MTP were circulated to participants prior to the consultation meeting and then collectively discussed to affirm that the conditions of 93.122(g) were met.

Table 3-3 lists the projects contained in the 2015 TIP and identifies whether they were included or modeled within the preceding 2040 MTP. With the exception of the highlighted projects, all remaining 2015 TIP projects listed in Table 3-3 satisfy each of the four conditions of 93.112(g)(1), which are summarized below.

i. TIP contains all projects that must be started in TIP timeframe to achieve transportation system envisions by the long-range plan (MTP).

ii. All TIP projects which are regionally significant are included in the MTP with design concept and scope adequate to determine their contribution to the MTP's regional emissions at the time of the previous conformity determination.

iii. The design concept and scope of each regionally significant project in the TIP are not significantly different from that described in the previous MTP.

iv. The previous regional emissions analysis is consistent with the requirements of 93.119 (interim emissions test).

The first of the two projects highlighted in Table 3-3—the Margaret/Antoinette realignment—is exempt from regional emissions analysis under 40 CFR 93.127. (Vertical/horizontal realignment projects are exempt from regional emissions analysis.) The second highlighted project—the Richardson Highway Milepost (MP) 351-353 Access Improvements (LR-22)—was included, but not modeled in the 2040 MTP regional emissions analysis. These improvements consist of construction of a grade-separated railroad overcrossing at MP 352 and a grade-separated interchange at the intersection with Old Richardson Highway just to the west, as well as improvements to

the frontage road on the south side of the highway along this section of the Richardson Highway.

Table 3-3
Comparison of 2015 TIP Projects to 2040 MTP

Project	2040 MTP Reference Number	2040 MTP Reference Title	Description	MTP Model Year	MTP Time Frame
Airport Way west improvements	SR-38	Airport Way West Improvements	Revise Hoselton Road connections	2015	Short Range
South Lathrop Street extension	SR-37	Lathrop Street Extension	Extend Lathrop Street to new recreation area	2040	Short Range
Margaret/Antoinette realignment			Realign Margaret Avenue at College Road	2015	NOT LISTED
Barnette Street	SR-8	Barnette Street Improvements	Narrow from 4 to 2 lanes 5th to 11th	2016	Short Range
Cushman Street bridge	MR-1	Fairbanks Cushman Street Bridge Replacement	Narrow from 3 to 2 lanes	2017	Medium Range
Cushman Street	SR-13	Cushman Street Road Reconstruction	Narrow from 3 to 2 lanes 10th to 1st	2015	Short Range
Old Steese Highway widening	SR-43	Old Steese Highway Upgrade	Widen from 2 to 4 lanes Trainor Gate to Johansen	2016	Short Range
Minnie St/Third St widening	SR-40	Steese Highway and 3rd Street Widening	Widen from 2 to 4 lanes Old Steese to Eagle	2017	Short Range
Steese/Johansen interchange	MR-32	Johansen Expressway Interchange (at Steese Expressway)	Construct grade-separated interchange at Johansen Expressway	2030	Medium Range
Richardson Hwy/Old Richardson	LR-29	Old Richardson Highway Interchange	Construct grade separations	2040	Long Range
Richardson Hwy/Davison	SR-39	Richardson Highway: MP 353-357, Safety/Access Improvements	Remove Davison intersection at Richardson Highway	2018	Short Range
Richardson Hwy/Midland	SR-39	Richardson Highway: MP 353-357, Safety/Access Improvements	Extend frontage road connections	2016	Short Range
Richardson Hwy/Rozak/Old Richardson	SR-39	Richardson Highway: MP 353-357, Safety/Access Improvements	Realign intersections and frontage roads	2016	Short Range
Richardson Highway MP 351-353 Access Improvements (phased work)	LR-22	Richardson Highway Access Improvements, Rozak Road to Peridot	Improve and extend South Frontage Road from Levee Way to the Old Richardson Highway (12 Mile). Construct a grade separation for the new railroad overcrossing at MP 352 and a grade separated interchange at 12 mile.	Not modeled	Long Range

The interagency consultation participants reviewed the elements of the Richardson Highway Access Improvements project. Construction of the grade-separated railroad overcrossing was found to be exempt from conformity requirements as it qualifies as a safety improvement under 40 CFR 93.126. The grade-separated interchange at Old Richardson and adjoining frontage road improvements were determined to be not regionally significant[10] by the interagency participants. Thus, this project was exempted from further regional emissions analysis under 40 CFR 93.122(g)(2)(i).

As a result of the detailed interagency review of the 2015 TIP project list and applicable regulations summarized above, the conformity determination for this TIP was based on the regional emissions analysis conducted for the 2040 MTP. The details of the regional emissions modeling from the 2040 MTP are presented in the following sub-section.

3.5 Vehicle Emissions Modeling

EPA's MOVES2010b vehicle emissions model (June 2012 release with "20120410" database) was used to estimate on-road vehicle emissions to support the 2040 MTP conformity analysis.

Section 93.111 of the conformity regulation requires the use of the latest emission estimation model in the development of conformity determinations. EPA released an update of MOVES called MOVES2014 on July 31, 2014, and on October 7, 2014, released a maintenance revision of MOVES2014 in conjunction with a Federal Register notice[11] that triggered the official release of MOVES2014 for use in SIP and transportation conformity analyses. As was the case with earlier MOVES updates, this notice triggered a two-year grace period before MOVES2014 must be used in new regional emissions analyses and new hot-spot analyses for transportation conformity determinations outside of California. This two-year grace period provides MPOs with time to complete existing analyses started with MOVES2010b and transition their modeling workflow to the new MOVES2014 model. Thus, the use of MOVES2010b satisfies this requirement and was selected as the version of MOVES to be used in the 2040 MTP conformity analysis in interagency consultation based largely on the fact that initial modeling input data development preceded the official MOVES2014 release date.

As noted earlier, the conformity analysis requirements differed for the two air quality planning areas within the MPO boundary. For the $PM_{2.5}$ nonattainment area, conformity is determined based on a regional emissions analysis and a "not to exceed 2008 baseline" emissions test. For the CO maintenance area, no regional emissions analysis and emission tests are required since the area has an EPA-approved Limited Maintenance Plan in place covering a second ten-year planning period from its August 2013 approval date through August 2023. Nevertheless, to better inform the overall conformity findings, regional

[10] The Richardson/Old Richardson junction is currently an uncontrolled access point. Construction of a grade-separated interchange is likely to improve flow along this section of Richardson Highway as well as providing safer access. In addition, this entire section of Richardson Highway is an area of low congestion.
[11] Federal Register, Vol. 79, No. 194, October 7, 2014.

emissions were also calculated for the CO nonattainment area using MOVES2010b. Although similar data sources and MOVES modeling workflow were used to estimate emissions within both the larger $PM_{2.5}$ nonattainment and smaller CO maintenance area, there were a couple of key differences. Thus the modeling methodologies for the $PM_{2.5}$ and CO areas are discussed separately below, beginning with the $PM_{2.5}$ nonattainment area.

3.5.1 $PM_{2.5}$ Nonattainment Area Emissions

Modeling Approach – The basic approach in applying MOVES to calculate vehicle emissions associated with the 2040 MTP was based on MOVES technical modeling guidance developed by EPA[12] for use in SIP and regional conformity analyses.

In accordance with that guidance, MOVES was executed for the six-month (October through March) winter season that corresponds to the period in which violations of the ambient $PM_{2.5}$ standard may occur in Fairbanks. Per EPA's guidance, MOVES was also executed on an hourly time-scale to more accurately reflect diurnal variations in travel and ambient conditions that can affect vehicle emissions.

For SIP and conformity analysis, MOVES must be executed using the County Domain/Scale option; this option was used for this conformity analysis. For regional conformity analyses using the MOVES County Scale option, EPA's guidance essentially directs users to input a detailed series of data that replace nationwide-based default values with vehicle fleet, travel activity, and other parameters that represent the county or region being modeled.

MOVES runs were generated using the "Inventory" calculation type, which is the option required for estimating planning area-wide vehicle emissions under a regional transportation conformity analysis.

MOVES was executed for the Fairbanks, Alaska geographic area to produce estimates of $PM_{2.5}$ and NOx crankcase and exhaust emissions (including extended heavy-duty vehicle idling). Brake and tire wear emissions for $PM_{2.5}$ were also included.

Vehicular fugitive road dust and construction dust emissions were assumed to be zero during the winter nonattainment season since roads in Fairbanks are snow-covered and ice-bound during this period. This assumption is consistent with that being used to model vehicle emissions in the Fairbanks $PM_{2.5}$ SIP inventory.[13]

Discussions of the development of the detailed MOVES inputs in accordance with EPA's MOVES regional conformity guidance are presented below.

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12 "Technical Guidance on the Use of MOVES2010 for Emission Inventory Preparation in State Implementation Plans and Transportation Conformity," U.S. Environmental Protection Agency, Office of Transportation and Air Quality, EPA-420-B-10-023, April 2010.

13 The Fairbanks $PM_{2.5}$ SIP is expected to be submitted by the State to EPA for approval by December 31, 2014.

(Beyond the detailed MOVES inputs presented in this sub-section as well as Appendix D, electronic versions of the complete package of MOVES run files, input data files, and outputs can be supplied upon request.)

Vehicle Fleet Inputs – Outputs from the transportation modeling runs described earlier in Section 3.3 as well as data from several other sources were used to develop the vehicle fleet-related inputs to the MOVES model runs. Each of these fleet-related MOVES inputs is described separately below. (The names of the individual inputs within MOVES are listed in parentheses.)

Vehicle Populations (Source Type Population & Age Distribution) − Vehicle registrations from the Alaska Division of Motor Vehicles (DMV) and recent Alaska Parking Lot Survey data conducted by ADEC provided the basis for the vehicle fleet populations and age distributions used to model the Fairbanks vehicle fleet with MOVES. The DMV data were obtained through ADEC from a "dump" of the statewide registration database as of June 2014. The DMV database includes vehicle make, model, model year, Vehicle Identification Number (VIN), vehicle class code, body style, registration status, and expiration date.

Using a VIN decoding tool licensed by ADEC, supplemental information such as vehicle class, gross vehicle weight, vehicle type, body type, and fuel type (e.g., gasoline vs. diesel) was also determined in order to help classify each vehicle into one of the 13 MOVES Source Types. In Appendix D, tables spanning the first 10 pages list each of the key vehicle attribute fields from the DMV database and VIN decoder outputs that were used to categorize each vehicle record into one of the 13 usage-based "Source Type" categories as defined in MOVES to characterize the vehicle fleet.

Table 3-4 lists each of these "Source Type" categories and identifies the primary vehicle attribute fields in either the DMV database itself (DMV) or output from the VIN decoder (Decoder) that were used to determine the Source Type for each vehicle record.

For nearly all the records, the Source Type could be conclusively determined from specific combinations of these attributes. In some cases, such as Source Types 51 (Refuse Trucks) and 54 (Motorhomes), single values of the Body Style field in the DMV database were used to discern the appropriate Source Type. In other cases, Source Types were assigned based on categorical values in several attribute fields as noted in Table 3-4. In a few cases, vehicle make and model fields were also examined and then fed to a web-based search engine to identify whether the vehicle was a single- or combination-unit truck.

Table 3-4
MOVES Vehicle Fleet Source Type Categories

Source Type ID	Source Type Description	Primary Attributes/Sources
11	Motorcycle	Class Code (DMV), Body Style (DMV) – Categories MB and MC, Vehicle Type (Decoder), Vehicle Class (Decoder)
21	Passenger Car	Class Code (DMV), Vehicle Type (Decoder) , Vehicle Class (Decoder)
31	Passenger Truck	Class Code (DMV), Vehicle Type (Decoder) , Vehicle Class (Decoder)
32	Light Commercial Truck	Class Code (DMV), Vehicle Class (Decoder), GVWR Class (Decoder) – up to Class 5 (16,001-19,500 lb)
41	Intercity Bus	Class Code (DMV), Body Style (DMV), Vehicle Type (Decoder) , Vehicle Class (Decoder)
42	Transit Bus	Class Code (DMV), Body Style (DMV), Vehicle Type (Decoder) , Vehicle Class (Decoder)
43	School Bus	Class Code (DMV), Body Style (DMV), Vehicle Type (Decoder) , Vehicle Class (Decoder)
51	Refuse Truck	Body Style (DMV) – Category GG
52	Single-Unit Short-Haul Truck	Class Code (DMV), Body Style (DMV), Vehicle Class (Decoder), GVWR Class (Decoder) – Class 6 and above
53	Single-Unit Long-Haul Truck	Apportioned from MOVES default 52/53 splits
54	Motor Home	Body Style (DMV) – Category MH
61	Combination Short-Haul Truck	Class Code (DMV), Body Style (DMV), Vehicle Class (Decoder) – Category "Truck Tractor", GVWR Class (Decoder), Fuel Type (Decoder)
62	Combination Long-Haul Truck	Apportioned from MOVES default 61/62 splits

As also noted in Table 3-4, the DMV and VIN decoder attribute data were not sufficient to distinguish between short-haul trucks (Source Types 52 and 61) and long-haul trucks (Source Types 53 and 62). All of the single- and combination-unit truck records were assigned a short-haul Source Type category of either 52 or 61. The *SourceTypeYear* table in the MOVES database was then queried to extract nationwide vehicle populations (for calendar year 1999, the closest base year to those modeled) for Source Type categories 52, 53, 61, and 62. Relative splits between short- and long-haul vehicle fractions in these categories were then calculated and used to estimate the populations of long-haul single-unit (53) and combination-unit (62) vehicles in the Fairbanks fleet.

Table 3-5 shows the resulting summation of vehicles by their sourceTypeID as determined from the VIN decoder and DMV data.

Table 3-5 Fairbanks 2014 Vehicle Populations by MOVES Source Type		
Source Type ID	Source Type Description	**Vehicle Population**
11	Motorcycle	**4,806**[a]
21	Passenger Car	**26,682**
31	Passenger Truck	**67,263**
32	Light Commercial Truck	**441**
41	Intercity Bus	**78**
42	Transit Bus	**568**
43	School Bus	**307**
51	Refuse Truck	**25**
52	Single-Unit Short-Haul Truck	**754**
53	Single-Unit Long-Haul Truck	**71**
54	Motor Home	**997**
61	Combination Short-Haul Truck	**489**
62	Combination Long-Haul Truck	**370**
Total Vehicle Fleet		**102,851**

[a] As explained later, motorcycle activity in Fairbanks during the winter months was assumed to be zero.

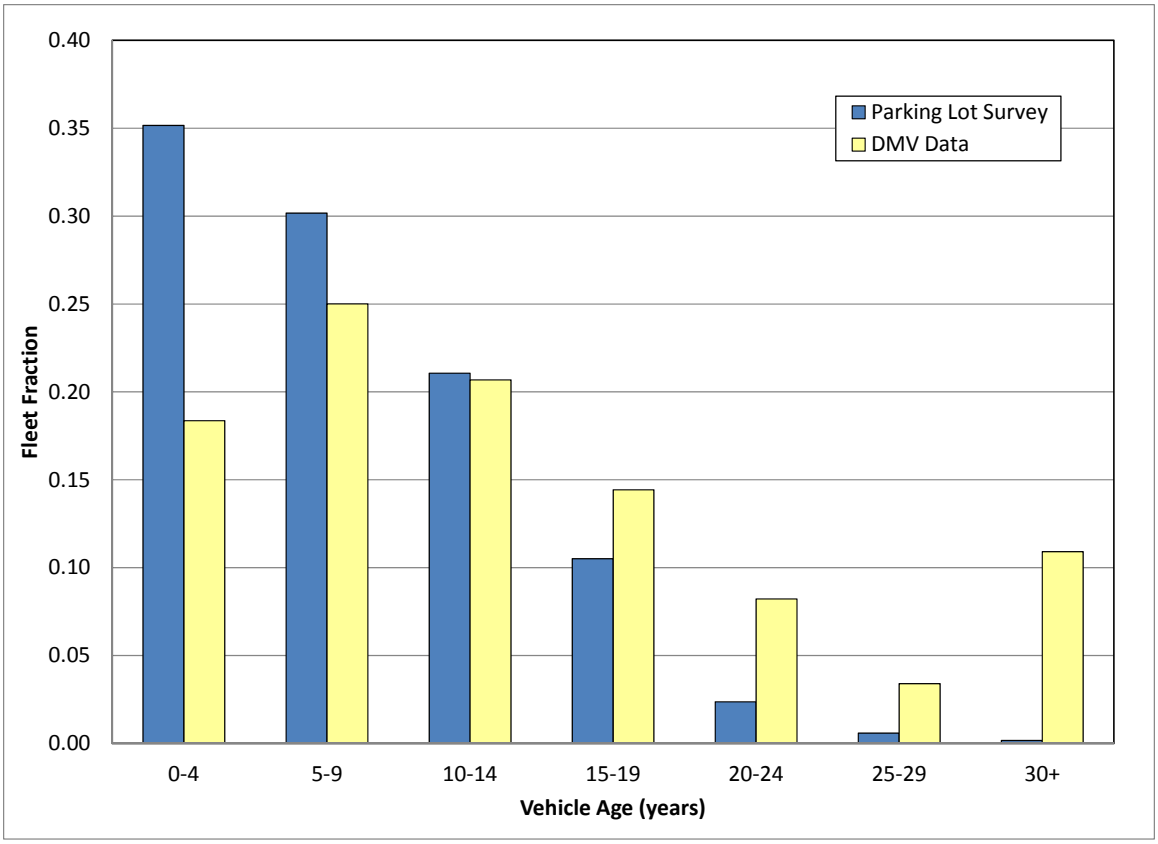
The DMV registration data also identified the model year of the vehicle, which enabled distributions of populations by vehicle age[14] to be calculated for each Source Type and input to MOVES. For the three light-duty passenger vehicle types (11-motorcycles, 21-passenger cars, and 31-passenger trucks), vehicle age distributions from winter parking lot surveys[15] conducted by ADEC in Fairbanks during January and February 2009 were used instead of those based on DMV registrations. This is because it was found in both these 2009 surveys as well as similar parking lot surveys conducted earlier by ADEC in 2005 and 2000 that older passenger vehicles are driven less during harsh winter conditions in Fairbanks.

Figure 3-2 compares the vehicle age fractions (by age group) for light-duty passenger cars in Fairbanks developed from the DMV registrations and the Parking Lot Surveys. As Figure 3-2 clearly shows, vehicle fractions in the newer groups (< 15 years) from the Parking Lot Surveys are distinctly higher than from the DMV registrations. This pattern is reversed for the older vehicle groups (15 or more years old).

[14] Vehicle age in years was calculated simply by subtracting the model year from 2010, the calendar year in which the DMV database was obtained.

[15] The purpose of the surveys was to collect data for assessing the performance of the I/M Program. A review of the location of the surveys found broad representation beyond the boundary of the CO nonattainment area in Fairbanks, North Pole, and Chena Ridge areas. While no data were collected in Goldstream Valley, the results sufficiently represent the $PM_{2.5}$ nonattainment area to be used in the analysis.

Figure 3-2
Comparison of DMV and Survey-Based Vehicle Age Distributions of Passenger Cars in Fairbanks



Another expected finding from the Fairbanks parking lot surveys is that motorcycles are simply not operated during cold wintertime conditions. As shown earlier in Table 3-5, motorcycles make up roughly 5% of the Fairbanks-registered vehicle fleet; however, only a single motorcycle was identified in the entire sample of over 8,500 vehicles from the 2009 Fairbanks surveys (which represents 0.01% of the survey sample).

Thus, for Source Type categories 11 (motorcycles), 21 (passenger cars), and 31 (passenger trucks), vehicle age distributions were based on the Parking Lot Survey data to reflect well-documented winter season shifts toward greater use of newer vehicles in the passenger car and passenger truck fleets as well as non-use of motorcycles during winter months. These survey-based winter seasonal adjustments for Fairbanks have been employed in wintertime emission inventories developed in previous CO SIPs and transportation conformity determinations that have been approved by EPA and FHWA.

For the remaining MOVES source type categories (32 and above), age distributions were based on the DMV registration data for Fairbanks. Appendix D contains a detailed table labeled "MOVES Age Distribution Inputs" showing the vehicle age distributions developed for each of the MOVES source types using either the DMV or Parking Lot Survey data as described above. These age distributions developed for the 2008 Baseline fleet were also assumed to apply for future fleets in the 2020, 2030, and 2040 modeling runs.[16]

Gasoline vs. Diesel-Fueled Vehicle Fractions (AVFT Strategies) – MOVES provides users the ability to override its default nationwide based travel splits between different fuels and technologies. These Alternative Vehicle Fuel and Technology (AVFT) inputs are supplied to MOVES through the Strategies panel in the user interface, not the County Data Manager.

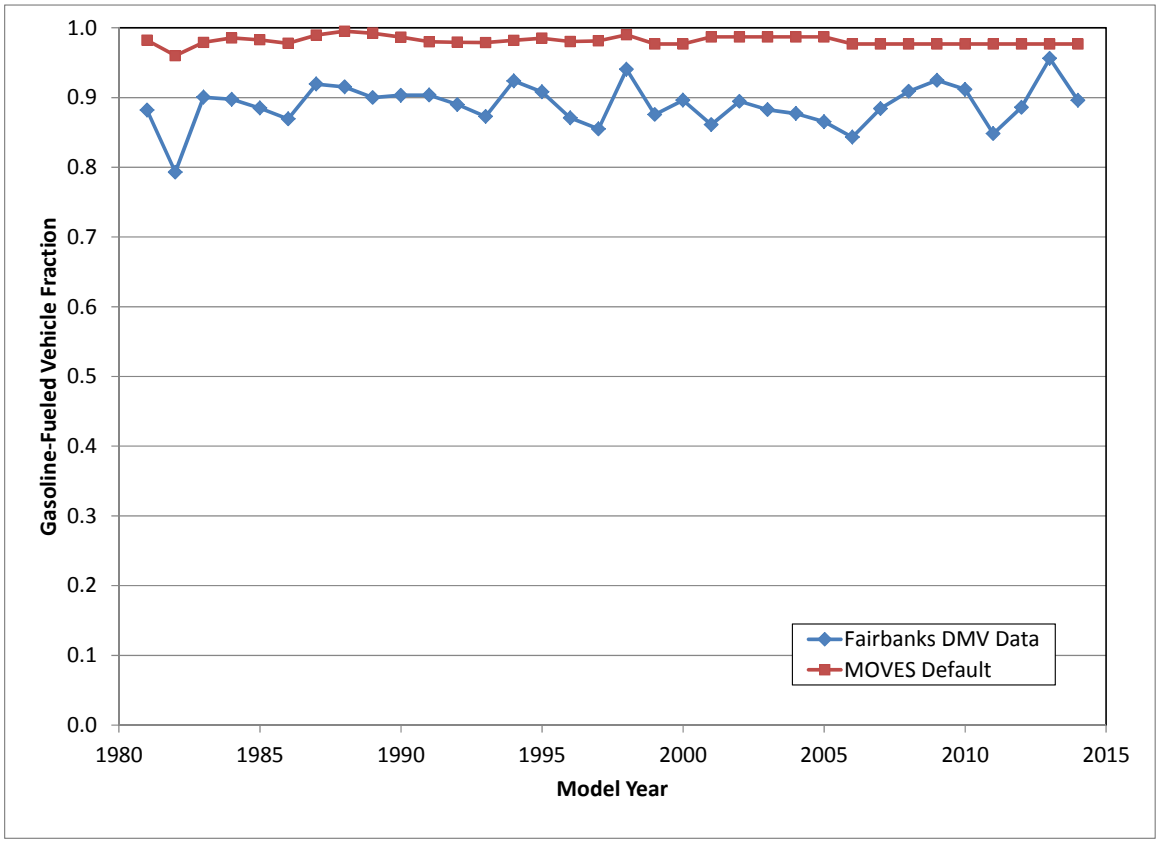
In order to account for differences in splits between gasoline- and diesel-fuel vehicles in the Fairbanks fleet compared to the U.S. as a whole, fuel fraction tables by source type and model year were also constructed using the DMV VIN decoded data described earlier. Not surprisingly, the MOVES default splits between gasoline and diesel vehicles were not representative of the Fairbanks fleet. Generally speaking, gasoline fractions were found to be lower in Fairbanks than the nationwide-based MOVES defaults (and diesel fractions were commensurately higher).

This is illustrated in Figure 3-3, which compares the gasoline vehicle fractions by model year for passenger trucks (MOVES Source Type 31) from the Fairbanks DMV data against the default fractions contained in MOVES. As seen in Figure 3-3, actual gasoline vehicle fractions for passenger trucks in Fairbanks are roughly 10% lower than the MOVES defaults (meaning diesel fractions are roughly 10% higher). Modest differences were also observed for some of the commercial vehicle categories as well.

As illustrated by the range of model years compared in Figure 3-3, DMV VIN decoder-based gasoline vs. diesel vehicle fractions were available only for model years 1981 through 2009 (the VIN decoder operates only on 1981 and later models). In setting up the AVFT fuel split input to MOVES, the fuel fractions must be specified by model year, not vehicle age. For earlier model years prior to 1981, the MOVES default fractions were used. For model years 2014 and later, the DMV-based fuel type fractions from model year 2013 were generally assumed to remain constant in future model years except in the passenger truck category where the MOVES defaults reflect a modest increase in diesel penetration in future model years. For passenger trucks in model years 2014 and later, the MOVES defaults were used.

[16] New model year nationwide vehicle sales have rebounded since sales decreases in 2008-2010 that occurred due to rising fuel prices and the economic recession. It is difficult to forecast how new vehicle sales will change over time, especially beyond a three- to five-year outlook. Thus, it was assumed that the current age distributions reasonably represent future age distributions given the uncertainty in long-term outlooks of fuel prices and overall economic conditions that affect new vehicle sales and age distributions.

Figure 3-3
Comparison of Passenger Truck Gasoline-Fuel Vehicle Fractions by Model Year
Fairbanks DMV Data vs. MOVES Defaults



Travel Activity (Vehicle Type VMT) – Estimates of VMT over the expanded transportation modeling network (covering the entire $PM_{2.5}$ nonattainment area) from the TransCAD travel model link output files were processed and input to MOVES through the "Vehicle Type VMT" input within the County Data Manager. The Vehicle Type VMT input must be in units of VMT per year, not VMT per day. The annual VMT must also be supplied by "HPMS Vehicle Type" which is essentially an aggregated version of the 13-category MOVES Source Type scheme. Since states are required to provide periodic travel (i.e., VMT) estimates to FHWA via the Highway Performance Monitoring System (HPMS), EPA has designed MOVES to accept VMT input by these HPMS Vehicle Type categories.

Table 3-6 below shows the mapping of Source Type to HPMS Vehicle Type categories. It also shows how the Fairbanks baseline vehicle populations shown earlier in Table 3-5 were aggregated into the HPMS Vehicle Type categories.

Table 3-6
MOVES Source Type to HPMS Vehicle Type Mapping

Source Type ID	Source Type Description	HPMS VehType ID	HPMS Vehicle Type Description	2014 Vehicle Population
11	Motorcycle	10	Motorcycles	4,806
21	Passenger Car	20	Passenger Cars	26,682
31	Passenger Truck	30	Other 2 axle-4 tire vehicles	67,263
32	Light Commercial Truck			441
41	Intercity Bus	40	Buses	953
42	Transit Bus			
43	School Bus			
51	Refuse Truck	50	Single Unit Trucks	1,847
52	Single Unit Short-haul Truck			
53	Single Unit Long-haul Truck			
54	Motor Home			
61	Combination Short-haul Truck	60	Combination Trucks	859
62	Combination Long-haul Truck			
Total Vehicle Fleet				**102,851**

Note: Shading denotes allocation of the separate LD VMT (green shading) and HD VMT (tan shading) splits from the 2012 TIP modeling.

In the TransCAD modeling runs conducted for the 2040 MTP, total VMT was not separated by vehicle type. Thus an approach had to be developed that allocated total fleet VMT for all vehicle types into separate estimates by each of the six HPMS vehicle types listed in the center column of Table 3-6. Two approaches were considered. The first involved using statewide estimates of travel by HPMS type available from ADOT&PF. This was rejected in favor of an alternative approach that relied on locally developed VMT splits developed for Fairbanks by ADOT&PF in support of the travel demand modeling conducted for the FMATS 2012-2015 TIP.[17] Under that earlier effort, travel demand modeling outputs included separate vehicle volume and VMT estimates for light-duty (LD) and heavy-duty (HD) vehicles. These separate LD and HD activity estimates were based on volume counts collected at "Vehicle Classification" count stations in the Fairbanks area by ADOT&PF. The LD/HD splits in the 2012-2015 TIP modeling were based on 2009 volumes[18] collected by ADOT&PF. HD percentages ranged from 3% to nearly 20% across the Vehicle Classification counters located within the FMATS area. HD VMT percentages averaged across the entire network in the 2012-2015 TIP modeling runs were 5.8% for the 2010 base year and 4.4% for the 2035 forecast year. ADOT&PF

[17] T. Carlson and R. Dulla, "Final Conformity Analysis for the Federally Approved 2012–2015 FMATS Transportation Improvement Program (TIP)," prepared for Fairbanks Metropolitan Area Transportation System, approved August, 24, 2011.

18 "2008, 2009, 2010 Annual Traffic Volume Report, Northern Region," State of Alaska Department of Transportation and Public Facilities, 2011.

staff[19] reviewed more recently collected Vehicle Classification station counts[20] and found the HD percentages to generally be very similar (within a percentage point or two) to the 2009 volumes upon which the TIP modeling splits were based. Therefore, it was assumed that the same composite 5.8% base year and 4.4% forecast year HD VMT percentages could be applied to the total fleet VMT estimates from the 2040 MTP travel modeling runs.

The green and tan cell shading in Table 3-6 shows where the separate LD VMT and HD VMT splits from the 2012 TIP modeling were allocated. LD VMT was applied to Source Types 11, 21, and 31 (shown in green) and HD VMT was applied to the remainder of the fleet covering Source Types 32 and above (shown in tan).

These allocations were assumed based on a review of the FHWA scheme used by ADOT&PF to collect volume counts at the Vehicle Classification counter stations. This FHWA vehicle classification scheme is outlined below.

Single Unit

- Class 01: Motorcycles
- Class 02: Automobiles, Automobiles with trailers
- Class 03: Pick-up Trucks, Pick-up Trucks with Trailers
- Class 04: Buses (2 or 3 axles)
- Class 05: Delivery Trucks, Recreational Vehicles, Dump Trucks (2 axles, 6 Tires)
- Class 06: Dump Trucks, Recreational Vehicles (3 axles)
- Class 07: Concrete Trucks, Fuel or Propane Delivery Trucks (4 or more axles)

Single Trailer

- Class 08: Tractor/Truck with Trailer (2 axles, 6 tires)
- Class 09: Tractor/Truck with Trailer (3axles)
- Class 10: Tractor/Truck with Trailer (4 or more axles)

Multi- Trailer

- Class 11: Tractor/Truck with 2 Trailers (5 axles)
- Class 12: Tractor/Truck with 2 or more Trailers (6 axles)
- Class 13: Tractor/Truck with 2 or more Trailers (7 or more axles)

The separate HD VMT travel model outputs correspond to FHWA Class 04 and higher vehicles. Comparing this FHWA scheme to the Source Type scheme in MOVES indicates that FHWA Class 04 and higher closely represents MOVES Source Types 32 and higher. (See Table 3-4 for a listing of the Source Type categories.)

[19] Personal communication with Jennifer Anderson, Alaska Department of Transportation and Public Facilities, Northern Region, November 6, 2014.
[20] "2011, 2012, 2013 Annual Traffic Volume Report, Northern Region," State of Alaska Department of Transportation and Public Facilities, 2014.

As highlighted by the different shading in Table 3-6, this split of Passenger and Truck VMT from the travel model outputs falls within HPMS Vehicle Type category 30, which contains both passenger and light commercial trucks. Thus, in developing the HPMS Vehicle Type VMT inputs to MOVES, separate allocations of Source Types 31 and 32 within HPMS Vehicle Type 30 were maintained until the end of the calculations.

The next step in calculating the HPMS Vehicle Type VMT inputs consisted of extracting average annual mileage per vehicle by HPMS Vehicle Type categories from MOVES. This was done by performing a MOVES2010b run using "National" scale default options for calendar year 2014 and retrieving the annual VMT by HPMS Vehicle Type category and vehicle population outputs from this default modeling run and then dividing the annual VMT by the vehicle populations (allocated to the six HPMS types). (Calendar year 2014 was selected to match the year for which DMV registration-based vehicle populations for Fairbanks were available.)

Table 3-7 shows these data from the 2014 default MOVES run and the calculated annual mileage per vehicle by HPMS Vehicle Type category.

Table 3-7
Calculation of Annual Mileage per Vehicle by HPMS Vehicle Type

HPMS Vehicle. Type ID	HPMS Vehicle Type Description	Source Type Categories Contained	Base Year Annual VMT (millions)	Base Year Vehicle Population	**Avg. Annual Mileage (per vehicle)**
10	Motorcycle	11	16,203	10,907,700	**1,485**
20	Passenger Car	21	1,684,120	119,590,000	**14,082**
30	Other 2 axle-4 tire vehicles	31,32	1,170,446	117,141,800	**9,992**
40	Buses	41,42,43	8,199	1,190,161	**6,889**
50	Single-Unit Trucks	51,52,53,54	103,569	8,090,558	**12,801**
60	Combination Trucks	61,62	149,175	2,632,970	**56,656**

It is important to note that the MOVES default data and resulting annual mileage per vehicle by HPMS Vehicle Type are used only to develop relative scaling factors by HPMS Vehicle Type to apply to the actual LD VMT and HD VMT estimates from the Fairbanks travel model runs. The Fairbanks travel model VMT cannot simply be allocated to the HPMS scheme based on vehicle populations because the annual mileage driven per vehicle differs significantly across some of the HPMS Vehicle Type categories (ranging from 1,485 miles/year for motorcycles to 56,656 miles/year for combination trucks). Thus, the relative differences in annual mileage between HPMS Vehicle Type categories were used to scale the 2014 Baseline Fairbanks vehicle populations by HPMS category shown earlier in Table 3-6 to annual VMT values. These values were then normalized so that when summed across HPMS categories, they matched the total VMT from the travel model outputs and preserved the travel model splits between LD and HD VMT.

A detailed table showing these calculations labeled "Calculation of VMT Allocations by HPMS Vehicle Type Category – PM Area" is supplied in Appendix D.
Table 3-8 presents the resulting annual VMT by HPMS Vehicle Type category inputs supplied to MOVES from the 2040 MTP 2013 base year and 2040 forecast travel model outputs in the shaded columns.

Table 3-8
MOVES HPMS Vehicle Type VMT (VMT/year) Inputs by Analysis Year

HPMS Vehicle. Type ID	HPMS Vehicle Type Description	2008	2013	2020	2030	2040
10	Motorcycles	3,622,023	**3,953,745**	4,418,156	5,081,600	**5,745,044**
20	Passenger Cars	190,640,486	**208,100,244**	232,543,907	267,463,424	**302,382,941**
30	Other 2-Axle-4 Tire Vehs	342,845,666	**374,103,852**	417,865,314	480,381,687	**542,898,060**
40	Buses	2,773,682	**2,817,262**	2,878,274	2,965,434	**3,052,595**
50	Single-Unit Trucks	9,988,943	**10,145,890**	10,365,615	10,679,508	**10,993,400**
60	Combination Trucks	20,561,062	**20,884,118**	21,336,396	21,982,507	**22,628,619**
Total Vehicle Fleet – Annual VMT		**570,431,862**	**620,005,111**	689,407,661	788,554,160	**887,700,659**
Total Vehicle Fleet – Daily VMT		**1,562,827**	**1,698,644**	**1,888,788**	**2,160,422**	**2,432,057**

In the absence of travel model outputs for the 2008 baseline and 2020 and 2030 analysis years, MOVES annual VMT inputs for those years were developed by linear interpolation (and extrapolation for 2008) of the 2013 and 2040 travel model-based VMT by HPMS Source Type. Interagency consultation discussions found these interpolation assumptions to be reasonable in the absence of explicit model runs for intervening years due to the fact that the long-term growth reflected in the 2040 forecast is not singularly tied to an explicit project or set of projects for which large deviations from the long-term, area-wide growth rate are expected.

At the bottom of Table 3-8, total fleet VMT is shown on both an annual and average day basis, the latter for comparison to the travel model daily VMT outputs summarized earlier in Table 3-1.

It should also be noted that the SourceType population inputs described earlier for the 2014 DMV base year were calculated for the other analysis years (2008, 2020, and 2030) by scaling the VMT for each analysis year in Table 3-8 against the actual 2014 base year vehicle populations presented earlier in Table 3-3. In other words, the VMT growth over time reflected in Table 3-8 was also applied to future vehicle populations.

In addition the splits between LD and HD VMT for the interpolated years in Table 3-8 (2020 and 2030) reflected linear interpolation of 5.8% and 4.4% HD VMT percentages between 2013 and 2040. (The 5.8% HD VMT split in 2013 was also assumed for 2008.)

Table 3-9 shows these VMT-scaled MOVES vehicle population inputs by analysis year and source type.

Table 3-9
Scaled $PM_{2.5}$ Nonattainment Area Vehicle Populations by Analysis Year and MOVES Source Type

Source Type ID	Source Type Description	Vehicle Populations by Analysis Year			
		2008	2020	2030	2040
11	Motorcycle	4,330[a]	5,282[a]	6,075[a]	6,868[a]
21	Passenger Car	24,040	29,324	33,727	38,131
31	Passenger Truck	60,630	73,896	84,952	96,007
32	Light Commercial Truck	398	484	557	629
41	Intercity Bus	77	79	82	84
42	Transit Bus	557	579	596	614
43	School Bus	301	313	322	332
51	Refuse Truck	25	25	26	27
52	Single Unit Short-haul Truck	740	768	791	814
53	Single Unit Long-haul Truck	70	72	75	77
54	Motor Home	979	1,015	1,046	1,077
61	Combination Short-haul Truck	480	498	513	528
62	Combination Long-haul Truck	363	377	389	400
Total Vehicle Population		**92,989**	**112,713**	**129,151**	**145,588**

[a] Motorcycle activity in Fairbanks during the winter months was assumed to be zero.

This approach assumed that the annual mileage per vehicle was constant across all analysis years. Although one could estimate projected trends of VMT by vehicle type based on a series of MOVES national scale default runs, trends in annual mileage accumulation rates can vary by urban area depending on the growth rate and demographics of each area. Trends in annual mileage rates are probably fairly small for an area like Fairbanks with very mild growth projected in the vehicle fleet and transportation network. Use of national-scale MOVES runs would be based on nationwide projections of per-vehicle annual VMT over time that may or may not track well with Fairbanks; thus, we opted to simply hold annual mileage rates per vehicle constant over time given the mild growth projected for Fairbanks at this time.

Other MOVES Inputs – The remaining MOVES modeling inputs representing the Fairbanks $PM_{2.5}$ nonattainment area included seasonal, daily, and diurnal travel fractions; travel activity by speed range (or bin) and roadway type; freeway ramp fractions; ambient temperature profiles; I/M program inputs; and fuel specifications. Each of these inputs was supplied to MOVES to represent Fairbanks-specific conditions through the model's County Data Manager Importer and is discussed separately below.

Monthly, Day-of-Week, and Hourly VMT Fractions – In conjunction with annual VMT by HPMS Vehicle Type, MOVES also requires inputs of monthly, weekday/weekend,

and hourly travel fractions. Based on data assembled by ADOT&PF from 2009 Permanent Traffic Recorder (PTR) stations, traffic within the FMATS modeling area exhibits a seasonal variation such that roughly 92% of annual average daily travel within the $PM_{2.5}$ nonattainment area occurs on average winter days (with 108% occurring on average summer days). These seasonal variations were incorporated into the MonthVMTFraction input table.[21]

(A cursory review of 2013 vs. 2009 season traffic counts found little difference in monthly volume fractions for a sample of PTR count stations examined. Given the modest changes in travel across Fairbanks over the last several years, it was assumed that the 2009 data were reasonably representative of current variations in monthly travel activity.)

Day-of-week fractions were similarly developed based on day of week traffic counts from the 2009 PTR data. (Separate fractions were developed by road type based on the type of roadway where each count station was located.) Weekday travel fractions ranged from 77-88% (with weekend fractions commensurately ranging from 22-23%). These splits indicate that weekday travel in Fairbanks is marginally higher than on weekends, since constant daily travel over a seven-day week reflects a 71% vs. 29% weekday/weekend split (5/7 vs. 2/7).

Hourly VMT fractions were developed from a combination of the travel model runs and hourly count averages from the 2009 PTR data. First AM peak (7-9 AM), PM peak (3-6 PM), and Off-peak (all other hours) travel model VMT outputs were used to reflect relative travel fractions across each of these three travel modeling periods. The hourly PTR data were then used to apportion VMT fractions by hour within each travel modeling period.

Travel by Speed Bin and Roadway Type (Average Speed Distribution & Road Type Distribution) – Link-level travel model outputs were processed to prepare these two sets of MOVES inputs for each analysis year.

The roadway type classification scheme employed in MOVES consists of the following five categories:

1. Off-Network;
2. Rural, Restricted Access;
3. Rural, Unrestricted Access;
4. Urban, Restricted Access; and
5. Urban, Unrestricted Access.

[21] As noted earlier, motorcycle activity was assumed to be zero during winter monthly. Initially this was handled by setting the monthly VMT fractions to zero for October through March in this MonthVMTFraction input table. However, it was discovered that MOVES produced inconsistent activity and emissions outputs when these values were zeroed. As a workaround until EPA releases an updated version of the model that corrects this apparent bug, monthly activity for motorcycle was set to the same values of the rest of the fleet, but the motorcycle emissions were simply excluded from tabulations of the MOVES output results.

The "Off-Network" category is used by MOVES to represent engine-off evaporative or starting emissions that occur off of the travel network. For SIP and regional conformity analysis, EPA's MOVES guidance indicated that the user must supply Average Speed Distribution and Road Type Distribution inputs for the remaining on-network road types (2 through 5), but direct MOVES to calculate emissions over all five road types. In this manner, starting and evaporative emissions are properly calculated and output.

The first of the two sets of inputs, Average Speed Distributions, consists of time-based[22] (not distance-based) tabulations of the fractions of travel within each of MOVES' 16 speed bins (at 5 mph-wide intervals) by road type and hour of the day. These inputs were calculated from the TransCAD link outputs by time of day. The TransCAD outputs consisted of travel times, average speeds, and vehicle volumes for each link within the $PM_{2.5}$ nonattainment area portion of the modeling network for each of three daily periods:

1. AM Peak (7-9 AM);
2. PM Peak (3-6 PM); and
3. Off-Peak (9 AM-3 PM, plus 6 PM-7 AM).

Spreadsheet calculations were performed on the TransCAD link outputs to calculate time-based travel (multiplying link travel time by vehicle volume to get vehicle hours traveled [VHT]) across all links. The link VHT was then allocated by MOVES road type and average speed bin. (The link classification scheme employed in the TransCAD modeling was easily translated to the MOVES Rural/Urban and Limited/Unlimited Access road types.) Normalized speed distributions (across all 16 bins) were then calculated for each road type and time of day period and formatted for input into MOVES.

Although MOVES allows these Average Speed Distribution inputs to be specified separately by Source Type (i.e., vehicle category), the same speed distributions were assumed to apply to all vehicle categories since the travel model activity outputs were not vehicle category specific.

Appendix D contains tabular summaries of the normalized average speed distribution inputs developed from the 2013 and 2040 TransCAD outputs. (Distributions for 2020 and 2030 were interpolated from the 2013 and 2040 outputs. 2008 distributions were extrapolated back from 2008 using the modest trends in speed distributions between the 2013 and 2040 TransCAD outputs.)

Similar spreadsheet calculations were also performed to tabulate distance-based (i.e., VMT-based) Road Type Distribution inputs to MOVES. The resulting tabulations and normalized Road Type distributions are also provided in Appendix D. (Road type

[22] MOVES requires Average Speed Distribution inputs on a time-weighted basis and Road Type Distribution inputs on a distance-weighted basis.

distributions for 2020 and 2030 were similarly interpolated and road type distributions for 2008 were extrapolated from the 2013 and 2040 TransCAD outputs.)

Freeway Ramp Fractions (Ramp Fraction) – MOVES uses default values of 8% (or 0.08) to represent the fraction of time-based limited access roadway travel (Road Types 2 and 4) that occur on freeway ramps. Fairbanks-specific ramp fraction values were tabulated from the TransCAD link level outputs and were supplied to MOVES in the Ramp Fraction input section of the County Data Manager to override the nationwide-based defaults.

These Fairbanks ramp travel fractions are presented in Table 3-10 as tabulated from the 2013 and 2040 travel model outputs. As shown in Table 3-10, the Fairbanks ramp fractions in urbanized areas are higher than the default values in MOVES, reflecting the fact that shorter freeway lengths (with resulting higher ramp fractions) are driven in Fairbanks compared to the nationwide-based defaults.

Table 3-10
Fairbanks Ramp Fraction Inputs

	Fraction of Time-Based Limited Access Travel on Ramps			
	2013 Base Year		2040 Forecast	
Daily Ramp Travel Fractions	Rural	Urban	Rural	Urban
	0.073	0.244	0.082	0.207

Ambient Temperature Profiles (Meteorology Data) – Rather than use monthly average diurnal (i.e., hour-by-hour) ambient temperature and humidity profiles compiled by EPA for each county in the U.S. and contained in MOVES, a decision was made to use the same ambient temperature and humidity profile that was utilized in the Fairbanks $PM_{2.5}$ SIP inventory. The intent here was to maximize consistency with the methodology in the impending SIP. The SIP temperature and humidity profiles were developed based on hourly data from Fairbanks International Airport for 35 specific winter days in 2008 corresponding to the historical modeling episodes used to evaluate attainment in the SIP. The SIP temperature profile has an average temperature (across all 24 hours) of -11.8°F and ranged from -14.1°F (Hour 8) to -6.4°F (Hour 15). Relative humidity (used in the NOx emission calculations) ranged from 81% to 86% across the 24-hour diurnal profile. The use of these SIP-based ambient temperature and humidity profiles was agreed upon through interagency consultation.

These SIP-based temperature and humidity profiles were then applied to each of the six winter months modeled (October through March).

I/M Program Data (I/M Programs) – Since the Fairbanks I/M program was terminated at the end of 2009, the "Use I/M Program" input element to MOVES for the 2008 baseline analysis year was set to "Yes." The default I/M compliance rate of 93% assigned within MOVES for the Fairbanks I/M program was overridden using a locally developed 96%

compliance rate. For analysis years 2020, 2030, and 2040, the "Use I/M Program" inputs was set to "No" to account for the elimination of the program at the end of 2009.

According to EPA's MOVES documentation, I/M emission benefits are assumed only for HC, CO, and NOx. No I/M benefits for particulate emissions are assumed in MOVES.

Fuel Specifications (Fuel Supply) – EPA has developed detailed fuel specifications (e.g., RVP, oxygen content, sulfur content, etc.) for different gasoline and diesel fuel blends used in each county of the U.S. and has loaded these specifications into the *FuelFormulation* and *FuelSupply* tables in the MOVES default database. (The first of these tables identifies the detailed properties of a specific fuel blend, the second table identifies that state and county of the U.S. and the calendar year to which it applies.) Semi-annual fuel survey data collected by the Alliance of Automobile Manufacturers (AAM) were reviewed to confirm whether the default fuel properties for Fairbanks defined in MOVES were correct. Retail gasoline data for the 2008 winter for Fairbanks from the AAM surveys indicated that sulfur and oxygen contents in MOVES reasonably matched measured levels.

Fairbanks diesel blends, however, are not included in the AAM surveys. MOVES assumed diesel fuel sulfur content of 43 ppm in 2008 through 2011 and 11 ppm in 2012 and later years. These sulfur levels are believed to be reasonably representative of those required under Alaska's Ultra Low-Sulfur Diesel (ULSD) regulation.

Thus, MOVES default gasoline and diesel fuel specifications for Fairbanks were used in the analysis.

State Implementation Plan Measures/Vehicle Plug-Ins – At this point, the $PM_{2.5}$ SIP has not been completed and no vehicle-related $PM_{2.5}$ control measures have been adopted. This analysis does, however, account for all committed CO control measures and their impact on $PM_{2.5}$ and precursor emissions.

The key measure that was explicitly modeled using MOVES was the use of vehicle engine block heaters (referred to as "plug-ins") to keep engines (and catalysts) warmer than the surrounding ambient temperature when vehicles are parked outdoors for extended periods during winter. Emission testing measurements in Fairbanks[23] have shown plug-ins provide significant reductions in warm-up or starting exhaust emissions, reducing these emissions by roughly 70% for PM and HC and 65% for CO from long, overnight parked periods relative to not using plug-ins. Analysis of these testing measurements and in-use vehicle instrumented data collected in Fairbanks (using ambient and coolant temperature measurements as surrogates to identify plug-in events) found that daily averaged plug-in benefits for $PM_{2.5}$ range from a 16.4% reduction in starting emissions at temperatures below -40°F to no reduction at temperatures above 20°F (which is essentially the ambient threshold above which motorists stop plugging in).

[23] F. Di Genova, et al., "Characterizing Vehicular Contributions to PM2.5 in Fairbanks, Alaska, Volume 1: Dynamometer-Based Emissions Measurements, Vehicle Keep-warm Activities and MOVES Analysis," prepared for Alaska Department of Environmental Conservation, December 2012.

At the average daily temperature of -11.8°F used for the conformity modeling, daily averaged starting emission reductions from plug-ins are 12.5% for $PM_{2.5}$ and 11.4% for CO. (The testing measurements found no statistically significant plug-in emission reductions for NOx.)

Appendix E describes an EPA-accepted approach that was used to apply these relative reductions in starting exhaust emissions for light-duty gasoline vehicles (the portion of the fleet for which testing was conducted) within MOVES. This approach was used to run MOVES2010b in a manner that resulted in the equivalent relative starting emission reductions reflecting an average daily temperature of -11.8°F.

These 12.5% and 11.4% reductions in $PM_{2.5}$ and CO light-duty gasoline vehicle starting emissions resulted in fleet-wide emission reductions (across all vehicle types, fuels, and emission processes), ranging across all analysis years, of 5.3% to 5.8% for $PM_{2.5}$ and 9.2% to 10.0% for CO.

3.4.2 CO Maintenance Area Emissions

Vehicle emissions within the smaller CO maintenance area were also estimated using MOVES2010b. As noted earlier, although a regional analysis of CO emissions was not required due to the presence of an approved CO LMP, CO emissions were also estimated using MOVES to more completely inform the CO conformity determination.

As a result, a CO modeling approach was developed that could efficiently utilize elements of the workflow used to model emissions within the $PM_{2.5}$ nonattainment area. For example, the same meteorology profile used for the $PM_{2.5}$ area modeling was also used to estimate CO emissions. Since an emission budget test was not being performed, it was unnecessary to make the CO modeling elements perfectly match assumptions and inputs used in the CO LMP.

Thus, the same data sources and similar processing methods that were used to develop modeling inputs for the larger $PM_{2.5}$ nonattainment area were also utilized to generate CO area emissions. However, VMT inputs from the link-level travel modeling runs were developed based only on those roadway links contained within the boundaries of the CO maintenance area. In turn, the vehicle population inputs were then scaled based on the ratios of CO area to $PM_{2.5}$ area VMT (multiplied by the $PM_{2.5}$ area population inputs).

As seen from the area-specific VMT summaries shown earlier in Table 3-1, CO area VMT in the 2013 base year was 53% of $PM_{2.5}$ area VMT (902,161 vs. 1,698,644 VMT per day). Similarly, as shown in Table 3-2, 2040 MTP forecast year VMT in the CO area was 48% of that for the $PM_{2.5}$ area (1,170,454 vs. 2,432,457).

Table 3-11 and Table 3-12 present the resulting VMT by HPMS Vehicle Type and scaled vehicle population inputs to MOVES, respectively, for the CO maintenance area. (Although 2013 is not an analysis year, it is shown in Table 3-11 since travel model-

based VMT outputs for 2013 and 2040 were linearly interpolated/extrapolated to the analysis years shown.)

Table 3-11
CO Area MOVES HPMS Vehicle Type VMT (VMT/year) Inputs by Analysis Year

HPMS Vehicle. Type ID	HPMS Vehicle Type Description	2008	2013	2020	2030	2040
10	Motorcycles	1,976,710	2,099,859	2,272,269	2,518,568	2,764,866
20	Passenger Cars	104,041,566	110,523,378	119,597,916	132,561,540	145,525,164
30	Other 2-Axle-4 Tire Vehs	186,755,895	198,347,190	214,575,003	237,757,593	260,940,183
40	Buses	990,358	987,039	982,392	975,753	969,115
50	Single-Unit Trucks	3,566,606	3,554,652	3,537,917	3,514,010	3,490,103
60	Combination Trucks	13,822,912	13,776,584	13,711,726	13,619,070	13,526,415
Total Vehicle Fleet – Annual VMT		**311,154,047**	**329,288,703**	**354,677,222**	**390,946,534**	**427,215,847**
Total Vehicle Fleet – Daily VMT		**852,477**	**902,161**	**971,718**	**1,071,086**	**1,170,454**

Table 3-12
CO Area Vehicle Populations by Analysis Year and MOVES Source Type

Source Type ID	Source Type Description	Vehicle Populations by Analysis Year			
		2008	2020	2030	2040
11	Motorcycle	2,375[a]	2,730[a]	3,026[a]	3,322[a]
21	Passenger Car	13,185	15,157	16,800	18,442
31	Passenger Truck	33,248	38,200	42,327	46,454
32	Light Commercial Truck	218	250	278	305
41	Intercity Bus	42	41	41	41
42	Transit Bus	303	300	298	296
43	School Bus	164	162	161	160
51	Refuse Truck	13	13	13	13
52	Single Unit Short-haul Truck	402	399	396	393
53	Single Unit Long-haul Truck	38	38	37	37
54	Motor Home	532	527	524	520
61	Combination Short-haul Truck	261	259	257	255
62	Combination Long-haul Truck	197	196	195	193
Total Vehicle Population		**50,977**	**58,273**	**64,353**	**70,433**

[a] Motorcycle activity in Fairbanks during the winter months was assumed to be zero.

Finally, average speed and VMT by road type distribution inputs were also separately calculated based on those travel model links (and their speeds) within the CO area and are presented in Appendix D.

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4. CONSULTATION PROCEDURES

The requirements for consultation procedures are listed in section 93.105 of the transportation conformity rule. Consultation is necessary to ensure communication and coordination among air and transportation agencies at the local, state, and federal levels on issues that would affect the conformity analysis, such as the underlying assumptions and methodologies used to prepare the analysis. Section 93.105 of the conformity rule notes that there is a requirement to develop a conformity SIP that includes procedures for interagency consultation, resolution of conflicts, and public consultation as described in paragraphs (a) through (e). Section 93.105(a)(2) states that prior to EPA approval of the conformity SIP, "MPOs and State departments of transportation must provide reasonable opportunity for consultation with State air agencies, local air quality and transportation agencies, DOT and EPA, including consultation on the issues described in paragraph (c)(1) of this section, before making conformity determinations."

Section 93.112 of the conformity regulation requires documentation of the interagency and public consultation requirements according to Section 93.105. A summary of the interagency consultation and public consultation conducted to comply with these requirements is provided below. Interagency consultation on the Conformity Analysis for the 2012-2015 TIP is documented in Appendix F. The responses to comments received as part of the public comment process are included in Appendix H.

4.1 Interagency Consultation

On March 23, 2015, an interagency consultation meeting (and conference call) was conducted to review the $PM_{2.5}$ conformity requirements, latest planning assumptions, and schedule. A second interagency consultation meeting (and conference call) was conducted on May 14, 2015 to review the list of projects included in the TIP and make a determination as to whether these projects met criteria under which a new regional emissions analysis would not be required and that TIP conformity would be based on the regional emissions analysis from the earlier 2040 MTP. Interagency call notes are included as part of the consultation record in Appendix F.

The Draft Conformity Analysis for the FMATS 2015 TIP was released on June 17, 2015 for a 37-day public comment period, followed by Board adoption scheduled for August 12, 2015. Federal approval of the 2015 TIP Conformity Analysis is anticipated by September 30, 2015.

4.2 Public Consultation

In general, agencies making conformity determinations shall establish a proactive public involvement process that provides the opportunity for public review and comment on a

conformity determination for an MTP or a TIP. In addition, all public comments must be addressed in writing.

On May 19, 2010, FMATS approved its Public Participation Plan (PPP). The purpose of this revision was to ensure that FMATS meets the requirements of SAFETEA-LU (Safe, Accountable, Flexible, Efficient, Transportation Equity Act, A Legacy for Users). On July 6, 2012, P.L. 112-141, the Moving Ahead for Progress in the 21st Century Act (MAP-21) was signed into law. Funding surface transportation programs at over $105 billion for fiscal years (FY) 2013 and 2014, MAP-21 is the first long-term highway authorization enacted since 2005 and creates a streamlined, performance-based, and multimodal program to address the many challenges facing the U.S. transportation system. One of the requirements is that government spending on transportation becomes more transparent to state and local officials, as well as the public.

On October 18, 2013, FMATS approved the newest version of the Public Participation Plan in anticipation of the 2040 MTP. While there were many small updates from 2010 to 2013, the most significant was the inclusion of the new MAP-21 Surface Transportation Bill. MAP-21 has a requirement to include and report on performance measures concerning the effectiveness of changes to the transportation system. Another notable addition in this new PPP was the inclusion of the FMATS Planning Boundaries Map, which was updated in 2013 to reflect the new urbanized area as defined by the 2010 U.S. Census. For further outreach, FMATS now produces a quarterly newsletter to continue to address stakeholders, other organizations, and the community. As always, there are additional acronyms, terms, executive orders, and participation definitions as well.

The Plan defines a process for providing citizens, affected public agencies, representatives of public transportation employees, freight shippers and transportation services, representatives of users of pedestrian walkways and bicycle transportation facilities, representatives of the disabled, and other interested parties with meaningful and measurable opportunities to be involved in the transportation planning process. For the 2015 TIP and associated conformity determination, FMATS has developed an outline of its public involvement efforts.

In general, the MTP and corresponding conformity analysis is the subject of a public notice and 30-day review period prior to adoption. A public meeting is also conducted prior to adoption and all public comments are responded to in writing. Appendix G contains documentation of the public meeting process for the MTP conformity determination. The responses to comments are provided in Appendix H.

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5. TIP CONFORMITY

The principal requirements of the federal transportation conformity rule for MTP/TIP assessments are as follows:

1. For pollutants for which applicable SIP emission budgets have been established, vehicle emissions from the transportation plan represented in the MTP/TIP must not exceed the SIP-based budgets;

2. For pollutants for which emission budgets are not yet available, the MTP/TIP must pass an interim emissions budget (FMATS chose to use the "no-greater-than-2008 emissions test");

3. The latest planning assumptions and emission models must be employed;

4. The MTP/TIP must provide for the timely implementation of transportation control measures (TCMs) specified in the applicable air quality implementation plans; and

5. Consultation procedures must be followed.

The final determination of conformity for the MTP/TIP is the responsibility of the Federal Highway Administration and the Federal Transit Administration (FTA).

The previous sections and the appendices present the documentation for all of the remaining requirements listed above for conformity determinations except for the conformity test results and timely implementation of TCM requirement. Prior sections have also addressed the updated documentation required under the federal transportation conformity rule for the latest planning assumptions.

The remainder of this section discusses the TCM implementation requirements and presents the results of the $PM_{2.5}$ and CO and conformity tests, satisfying the remaining requirements of the federal transportation conformity regulation. The applicable conformity tests were reviewed in Section 2. For each test, the required emissions estimates were developed using the transportation and emission modeling approaches required under the federal transportation conformity rule and documented in Section 3. The results are summarized and discussed separately for each pollutant below.

5.1 TCM Implementation Requirements

Since an air quality plan for $PM_{2.5}$ has not yet been finalized and approved by EPA, the applicable plan for satisfying the requirements for timely implementation of TCMs under

40 CFR 93.113 is the Fairbanks CO Limited Maintenance Plan, which was adopted by the state on February 22, 2013, and approved by EPA on August 9, 2013.

The applicable TCMs in the CO LMP are (1) expanded availability of plug-ins to promote use of engine block heaters to reduce CO cold start emissions; and (2) transit system improvements (although the LMP also includes additional transportation-related contingency measures that could be implemented in the event Fairbanks fails to meet the CO NAAQS). These measures have already been funded and implemented. Thus, the programs and projects contained in the FMATS 2040 MTP will not affect their timely implementation and therefore the MTP fulfills the applicable TCM implementation requirements under 40 CFR 93.113.

5.2 $PM_{2.5}$ Conformity

Table 5-1 presents results for $PM_{2.5}$ and NOx (for the 2006 24-hour standard $PM_{2.5}$ standard) in tons per winter day for each of the analysis years considered.

Table 5-1
$PM_{2.5}$ Conformity Test Results

Analysis Year	$PM_{2.5}$ (tons per day)	$PM_{2.5}$ Emissions ≤ Base Year?	NOx (tons per day)	NOx Emissions ≤ Base Year?
2008 Baseline	**0.584**	-	**5.478**	-
2020	0.327	**Yes**	2.207	**Yes**
2030	0.292	**Yes**	1.702	**Yes**
2040	0.314	**Yes**	1.771	**Yes**

In accordance with the Transportation Conformity Rule, if a 2006 $PM_{2.5}$ area does not have adequate or approved budgets, it must use one of the interim tests. Conformity may be demonstrated if the emissions from the proposed transportation system are no greater than the 2008 motor vehicle emissions in a given area. For the $PM_{2.5}$ conformity determination, FMATS chose to use the "no-greater-than-2008 emissions test" for the analysis years 2020, 2030, and 2040.

Emissions were estimated using the latest emissions model consistent with the conformity methodology. Both $PM_{2.5}$ exhaust and NOx exhaust were estimated for a winter average day, which was used for the 24-hour standard. The modeling results for all analysis years indicated that $PM_{2.5}$ and NOx exhaust emissions for each MTP "build" analysis year are no greater than the 2008 base year emissions estimates. The TIP therefore satisfies the interim conformity emissions tests for the 2006 $PM_{2.5}$ standard.

As all requirements of the Transportation Conformity Rule have been satisfied, a finding of conformity for the new 2006 $PM_{2.5}$ standard is supported for the 2015-2015 Transportation Improvement Program.

5.3 CO Conformity

As noted earlier, Fairbanks is a CO maintenance area with an approved Limited Maintenance Plan. The LMP policy essentially states that vehicle emission budgets test for transportation conformity can be treated as unnecessary because it is not reasonable to expect that an LMP area will experience so much growth during the maintenance period that a violation of the ambient CO standards would occur.

Although CO emission budget tests are not necessary, the conformity requirements listed below still apply.

- Transportation plans must still meet interagency consultation criteria and implementation of TCMs in the conformity rule (40 CFR 93.112 and 93.113).

- In addition, projects in CO LMP areas must still meet criteria for CO hot-spots and screening analyses (40 CFR 93.116 and 93.123).

- It must be affirmed that ambient CO monitoring is continuing and that there have been no exceedances of the CO NAAQS.

- Any major changes in planning assumptions that could affect CO must be identified.

Each of these requirements has been met. The conformity determination for this TIP included interagency consultation on both the PM and CO elements. TCMs contained in the LMP (such as availability of plug-ins) are still in place. Ambient CO monitoring is still continuing in Fairbanks and peak concentrations remain well under the applicable NAAQS with no exceedances; the highest ambient CO levels measure over the most recent three year period have been less than 40% of their applicable standards. In addition there are currently no significant changes anticipated in the modest long-term population growth rate in Fairbanks (which is roughly 1% per year).

Therefore, a finding of conformity for CO is supported for the 2015-2018 Transportation Improvement Program.

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