

**AIR QUALITY CONFORMITY DETERMINATION
FOR THE
ANCHORAGE 2040
METROPOLITAN TRANSPORTATION PLAN**

Final

Prepared By:

Municipality of Anchorage

Health Department

Environmental Health Services – Air Quality Program

November 26, 2019

INTRODUCTION AND BACKGROUND

Anchorage Metropolitan Area Transportation Solutions (AMATS) is the federally recognized metropolitan planning organization (MPO) which is responsible for planning the transportation network within the Municipality of Anchorage. AMATS is updating the Anchorage Metropolitan Transportation Plan to include projects presently scheduled for implementation during 2020-2024 as well as a list of illustrative projects proposed for future implementation through 2040, should adequate future funds become available. The 2020-2040 Anchorage Metropolitan Transportation Plan (henceforth, 2040 MTP) will maintain compliance with federal regulations requiring that MTPs (transportation plans with a twenty-year outlook) be updated every four years.

Clean Air Act Amendments require that federally funded transportation plans be consistent with the State Implementation Plan (SIP) for maintenance of federal air quality standards. This conformity determination was performed to ensure that plans and projects within the 2040 MTP do not hinder the continued maintenance of National Ambient Air Quality Standards (NAAQS) via the control strategies and commitments specified within the Alaska SIP.

The Alaska SIP contains limited maintenance plans (LMPs) for both carbon monoxide (CO) and PM₁₀ⁱ air pollutants within areas in the Municipality of Anchorage. The US Environmental Protection Agency's (EPA) Limited Maintenance Plan (LMP) option allows that demonstration of conformity with the NAAQS be based on analysis of air monitoring data rather than modeling of air pollutant emissions within the maintenance area to compare against an established motor vehicle emissions budget. Emissions budgets in LMP areas may be treated as essentially not constraining for the length of the maintenance period because it is unreasonable to expect that an area satisfying the LMP criteria will experience so much growth during that period of time such that a violation of the PM₁₀ NAAQS would result.

This document confirms the continued eligibility of Anchorage's Limited Maintenance Area status for CO and PM₁₀, and also confirms that primary Transportation Control Measures (TCMs) specified in the Alaska SIP continue to be implemented and will not be jeopardized by any project or fiscal allocation programmed within the 2040 MTP.

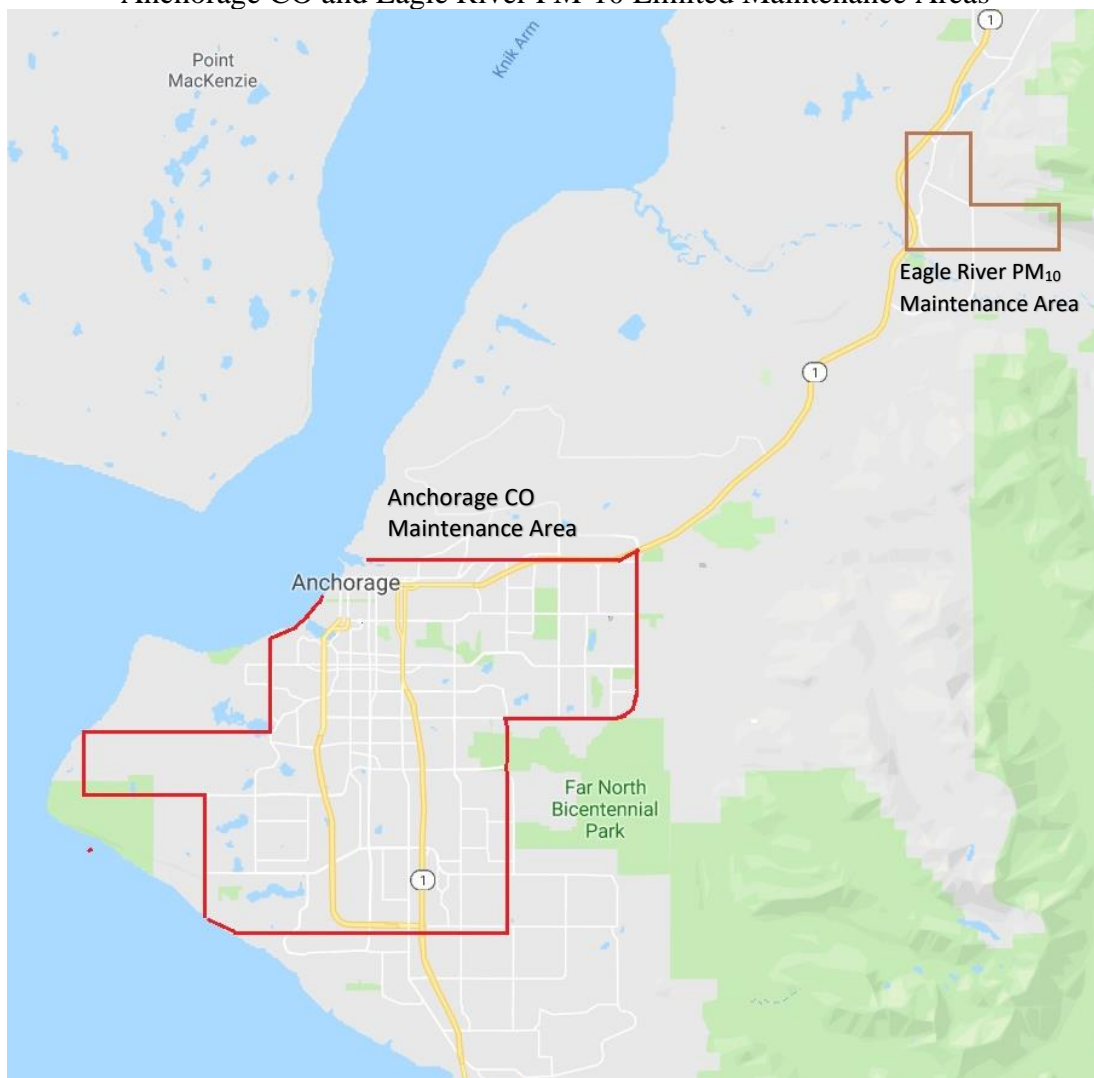
Conformity requirements are outlined in federal regulation 40 CFR parts 51 and 93. These regulations describe who the regulation applies to, when and how conformity determinations are to be performed, and the consultation process required between the MPO, federal, state and local agencies.

This conformity determination builds on the analysis performed for the Interim 2035 Metropolitan Transportation Plan (MTP) as adopted by the AMATS Policy Committee in August of 2014 and approved by FHWA. Air quality data through calendar year 2018 has been obtained from the US-EPA Air Quality System and analyzed for the preparation of this report.

ⁱ PM₁₀ is particulate matter consisting of particles that are 10 microns or less in aerodynamic diameter. Prolonged inhalation of excessive concentrations of such particles can health impacts on susceptible segments of people including infants, children, and elderly

Part 1 of this report will describe the conformity analysis performed for the Anchorage CO Limited Maintenance Area. Part 2 will address conformity for the Eagle River PM₁₀ Limited Maintenance Area.

Figure 1.1
Anchorage CO and Eagle River PM-10 Limited Maintenance Areas



Interagency Consultation

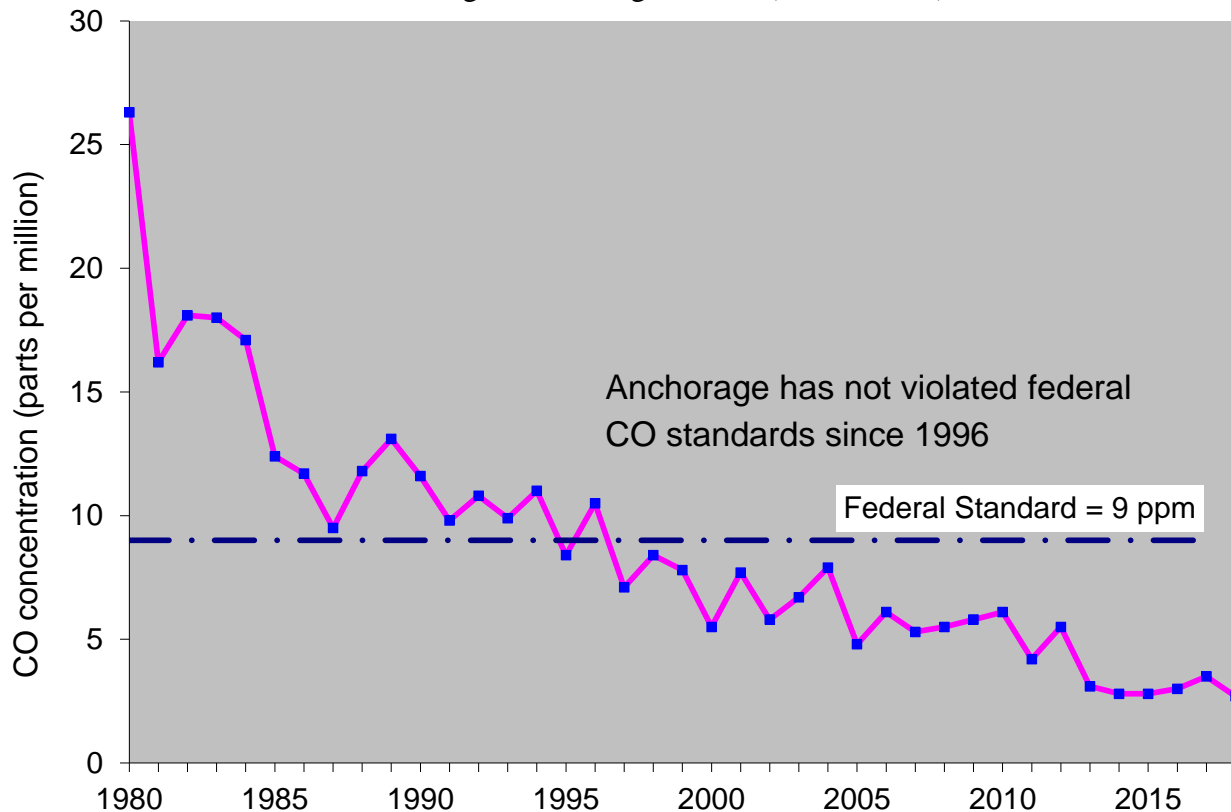
AMATS, state and local air quality officials, and representatives from the Alaska Department of Transportation, the Federal Highway Administration and the US Environmental Protection Agency took part in the consultation process for this current conformity determination in August 2019, consistent with the administrative requirements of the transportation conformity rules. AMATS staff agreed to document continued eligibility for the Anchorage CO and Eagle River PM₁₀ limited maintenance plans to demonstrate maintenance of air quality goals consistent the Alaska State Implementation Plan (SIP), and also affirm that the review process for the Anchorage Metropolitan Transportation Plan has, and will continue to be conducted in a manner consistent with conformity transportation planning requirements. The transportation conformity rules require maintenance of air quality control measures contained in the SIP, an assurance that the transportation plan is fiscally constrained, use of the latest planning assumptions, and adherence to the process of interagency and public review, as outlined in 40 CFR [§93.109](#) Table-1. The 2020-2040 Anchorage Metropolitan Transportation Plan (2040 MTP) and this conformity determination report have been prepared and will be reviewed consistent with these requirements.

PART 1: CONFORMITY ANALYSIS FOR THE ANCHORAGE CO MAINTENANCE AREA

1.1 Anchorage CO Attainment Status

Anchorage was first identified as experiencing high levels of ambient CO concentrations in the early 1970s. In the early 1980s as many as 50 violations of the national ambient air quality standard (NAAQS) were measured in a single year. However, in the past three decades there has been a steady decline in ambient CO due to improvements in motor vehicle emission control technology. Local control programs such as carpooling and vanpooling programs and public awareness programs that encourage motorists to reduce cold start CO emissions by using engine block heaters prior to starting have also contributed to emission reductions. CO concentrations have declined by over 70% since the 1980s and there have been no violations of the NAAQS since 1996. The trend in CO concentrations is shown in Figure 1.2.

Figure 1.2
Trend in Annual 2nd Maximum 8-hour CO Concentration at Anchorage Monitoring Stations (1980 – 2018)



In February 2004, on behalf of the Municipality of Anchorage, the State of Alaska requested that the EPA re-designate Anchorage from a nonattainment area for CO to an area that has attained the standard. This request was accompanied by a maintenance plan that showed Anchorage should continue to maintain compliance with the NAAQS. The EPA approved that plan in June 2004, and re-designated the nonattainment area as the Anchorage CO Maintenance Area, effective as of July 23, 2004 ([69 FR 3493569](#)) signifying agreement that Anchorage has attained compliance with the CO NAAQS.

The CO Maintenance Plan has been amended several times since 2004. On May 2, 2014 the EPA approved the Anchorage Carbon Monoxide Limited Maintenance Plan which streamlines the air quality conformity demonstration process ([79 FR 11707](#)).ⁱⁱ Under the Limited Maintenance Plan (LMP) option, an emissions budget test is not required because maintenance of the eligibility criteria to qualify for the LMP assures a very low potential to exceed the NAAQS. However, the local metropolitan planning organization (i.e. AMATS) must still adhere to the administrative procedures for conformity with transportation plans and state implementation plans. These include the requirements to complete interagency consultation in accordance with 40 CFR Part 93.112, and to fulfill the public consultation process in accordance with 23 CFR Part 450.316, which requires involvement of interested parties during the development of transportation plans and opportunity for the public to review and comment on a proposed plan. In addition, the MPO must adhere to the requirements for fiscal constraint of transportation plans and improvement plans consistent with 23 CFR 450.322(b)(11) and ensure that all transportation plans provide for the timely implementation of transportation control measures as committed to in the SIP. There are no projects in the 2040 MTP which would interfere with a primary or contingency CO control measure in the Alaska SIP.

1.2 Compliance with CO Limited Maintenance Area Eligibility Criteria

Under the LMP there is no requirement to project emissions over the maintenance period in order to demonstrate conformity with a motor vehicle emissions budget. EPA policy outlined in the Oct 6, 1995 Memorandum by Joseph Paisie titled, Limited Maintenance Plan Option for Nonclassifiable CO Nonattainment Areas, states that if an area is at or below 85 percent of the NAAQS, continuation of transportation control measures already in the SIP should provide adequate assurance of maintenance over the applicable 10-year maintenance period. When EPA approves a limited maintenance plan, the agency is concluding that an emissions budget may be treated as essentially non-constraining for the length of the maintenance period because it is unreasonable to expect that such an area will experience so much growth in that period that a violation of the CO NAAQS would result. In order to qualify for the CO LMP option, a non-attainment or maintenance area must have a design value that is equal to or less than 7.65 ppm (85 percent of the CO NAAQS exceedance level) based on 8 consecutive quarters of data.ⁱⁱⁱ The design value for the area must continue to be at or below 7.65 ppm until the time of final EPA action on the plan. Effective May 2, 2014, the EPA approved an Alaska SIP revision which included a second 10-Year CO Limited Maintenance Plan (LMP) for Anchorage ([79 FR 11707](#)).

The CO design value (DV) for the 8-hour CO NAAQS is the highest annual second maximum non-overlapping 8-hour concentration during the most recent two years. Table 1-1 shows the design values for all active Anchorage monitoring sites. The highest design value recorded within the limited maintenance area must be 7.65 ppm or less. The locations of CO monitoring sites are shown in figure 1.3. The Garden site in the Airport Heights neighborhood of Anchorage is the only CO site operating since 2015; all others have been discontinued.

Analysis of the Anchorage CO data from within the Anchorage CO Limited Maintenance Area demonstrates that Anchorage is in compliance with the eligibility criteria for its CO limited maintenance plan.

ⁱⁱ The Anchorage CO Maintenance Plan is included as part of the Alaska Air Quality Control Plan or SIP. Thus, an amendment of the CO Maintenance Plan requires an amendment of the larger SIP document. All SIP amendments are subject to approval by the EPA.

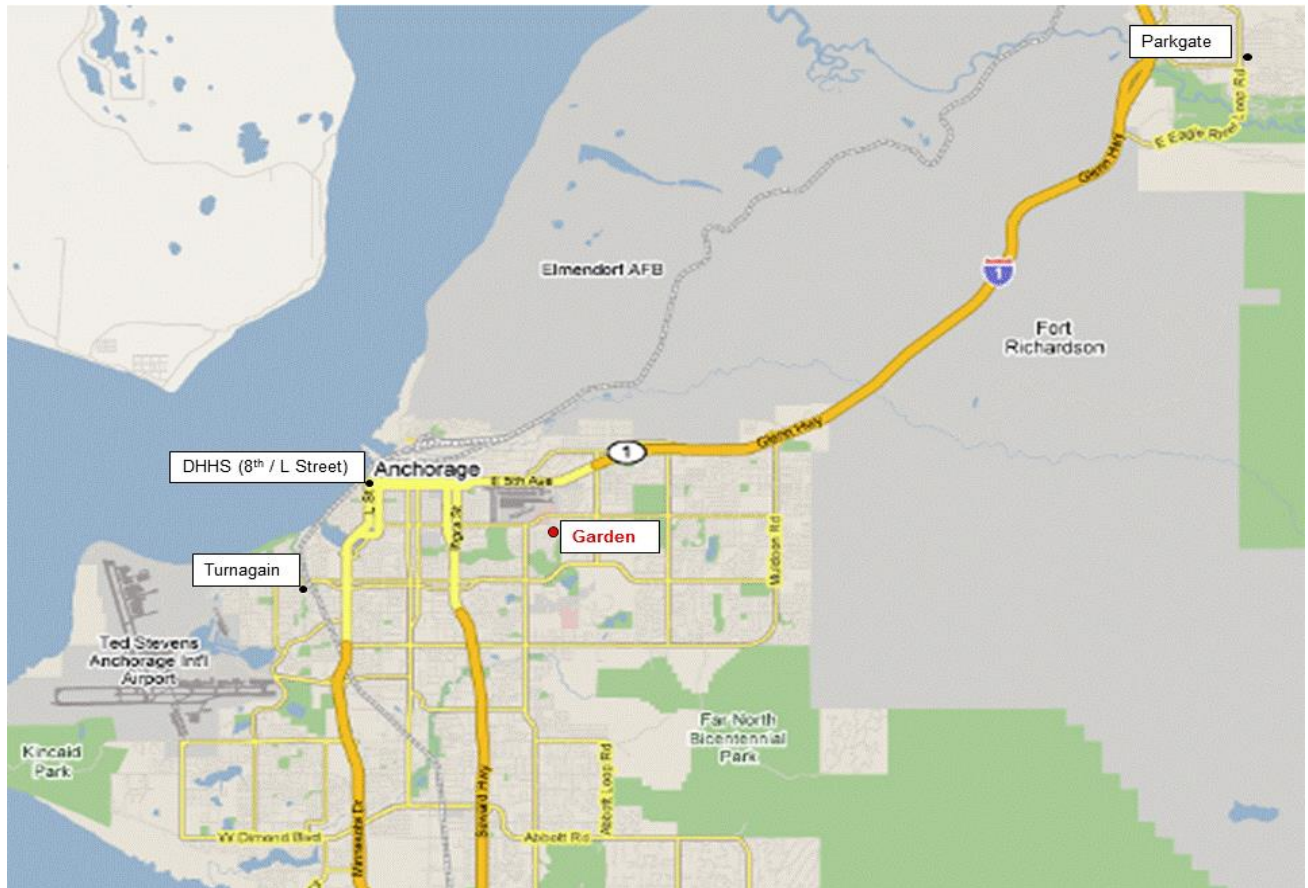
ⁱⁱⁱ A design value is the historical maximum concentration of an air pollutant for an area when determined in the same or commensurate manner as the NAAQS allowing for direct comparison. The 8-hour, CO design value is determined by examining the annual second maximum rolling, 8-hour concentration at each monitoring site over a two-year period. For each site, the higher of the two values is the design value for that site for that two-year period. The highest design value among the individual sites is the design value for the limited maintenance area as a whole.

Table 1.1
Anchorage CO Design Values by Year

	Garden 20200018	Turnagain 20200048	DHHS 20200052	DV
2008	3.8	5.5	3.1	5.5
2009	4.4	5.8	3.6	5.8
2010	4.4	6.1	3.6	6.1
2011	3.6	6.1	2.8	6.1
2012	4.3	5.5	2.8	5.5
2013	3.1	4.0		4.0
2014	3.1	3.1		3.1
2015	2.8			2.8
2016	3.0			3.0
2017	3.5			3.5
2018	2.7			2.7

As of December 31, 2018, the Anchorage CO design value (highest annual measurement via the quantitative measure for compliance with the CO NAAQS) is 3.5 ppm CO, which is well below the CO LMP eligibility criteria of 7.65. Hence Anchorage remains compliant with EPA’s CO limited maintenance plan eligibility criteria.

Figure 1.3
Anchorage CO Monitoring Site Locations with
Garden (active site) in Red.



1.3 Conformity Requirements for CO LMP

1.3.1 Transit Service

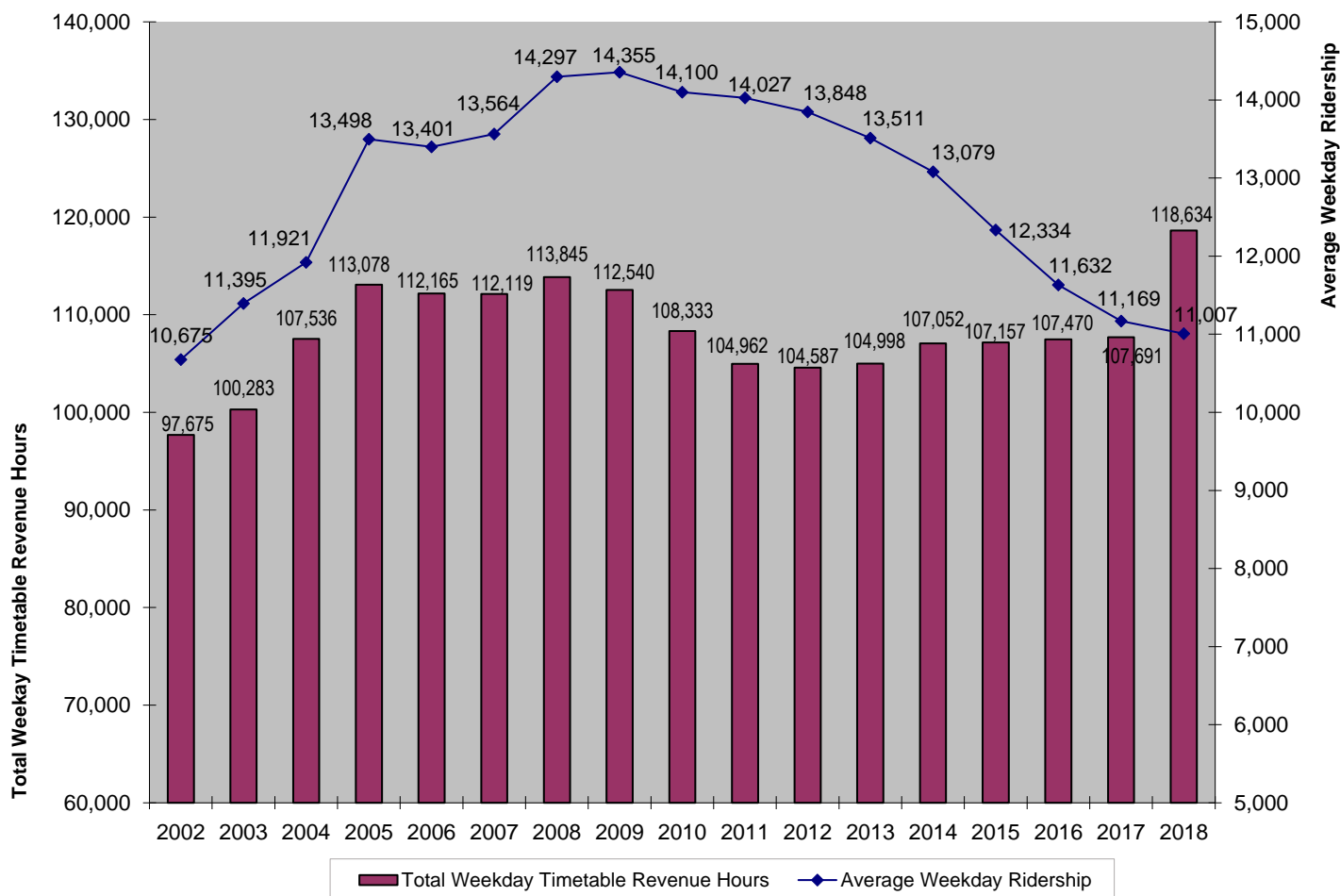
Section 93.110 of the air quality conformity regulations states that the conformity determination for transportation plans must discuss how transit operating policies (including fares and service levels) and assumed transit ridership have changed since the previous transportation plan conformity determination was approved.

On January 1, 2014 Anchorage cash bus fares increased from \$1.75 to \$2.00 and 30-day passes increased from \$55 to \$60; however, at the same time fares for youth, senior and disabled riders dropped to half of the full-fare price. A prior increase in cash fares from \$1.50 to \$1.75 occurred in October 2005. In January 1, 2012, the cost of a monthly pass increased from \$50 to \$55; a day pass increased from \$4 to \$5; a monthly pass for senior/disabled increased from \$15 to \$19.25; and a senior/disabled daily pass increased from \$1.25 to \$1.50.

Figure 1.4 shows how transit service levels, expressed as total annual weekday timetable revenue hours, have varied between 2002 and 2018. On October 23, 2017, the Anchorage Public Transportation Department launched a city-wide revision of bus routes and schedules to provide more frequent and timely service and maximize transfer opportunities for bus riders. As a result, an additional 10% more service hours were provided and are reflected in 2018. Ridership continued to decline during the first full year of the new bus system, but the rate of decline (-1.4%) was significantly reduced from prior 9 years of annual decline (-3.2% annual average).

Figure 1.4

Trend in Transit Service and Ridership (2002-2018)



1.3.2 Transportation Control Measures (TCMs)

In maintenance areas such as the Municipality of Anchorage, priority must be given to the implementation of TCMs included in the SIP. Transportation control measures are defined as any measure that is specifically identified and committed to in the applicable implementation plan or any other measure for the purpose of reducing emissions or concentrations of air pollutants from transportation sources by reducing vehicle use or changing traffic flow or congestion conditions.

Ride-sharing and transit marketing are the only TCMs identified in the CO Maintenance Plan. They are funded in the current Transportation Improvement Program. Although these measures are identified in the Plan, no CO reduction is claimed for them.

Similar to the trend in transit bus usage, the RideShare van-pool program has seen about 30% fewer participants in recent years when compared to the five years of peak participation, 2009 – 2014, which averaged about 1000 participants per year (see Table 1.2).

It is difficult to distinguish the effect that transit and RideShare pricing and promotion have had on ridership because other factors, such as the price of gasoline, socio-economic influences, and changes in service also affect ridership.

Table 1.2
Vanpool Program Participation (2005-2018)

Year	Number of Vanpools	Number of Vanpoolers
2005	24	375
2006	41	569
2007	42	589
2008	52	810
2009	52	917
2010	54	923
2011	66	1152
2012	65	992
2013	65	972
2014	65	972
2015	65	842
2016	65	659
2017	60	664
2018	73	695

1.4 Conclusion regarding Anchorage CO Conformity

This analysis demonstrates that Anchorage is well positioned to maintain the CO NAAQS. Anchorage Air Program staff has also determined that the 2040 Metropolitan Transportation Plan is consistent with the Alaska State Implementation Plan in finding that no element of the Anchorage 2040 MTP will undermine the objective to reduce ambient CO in Anchorage, nor will the MTP interfere with implementation of any CO control measure identified in the Alaska SIP.

PART 2: CONFORMITY ANALYSIS FOR THE EAGLE RIVER PM-10 AREA

2.1 Eagle River PM₁₀ Attainment Status - Qualification as a Limited Maintenance Area for Conformity Purposes

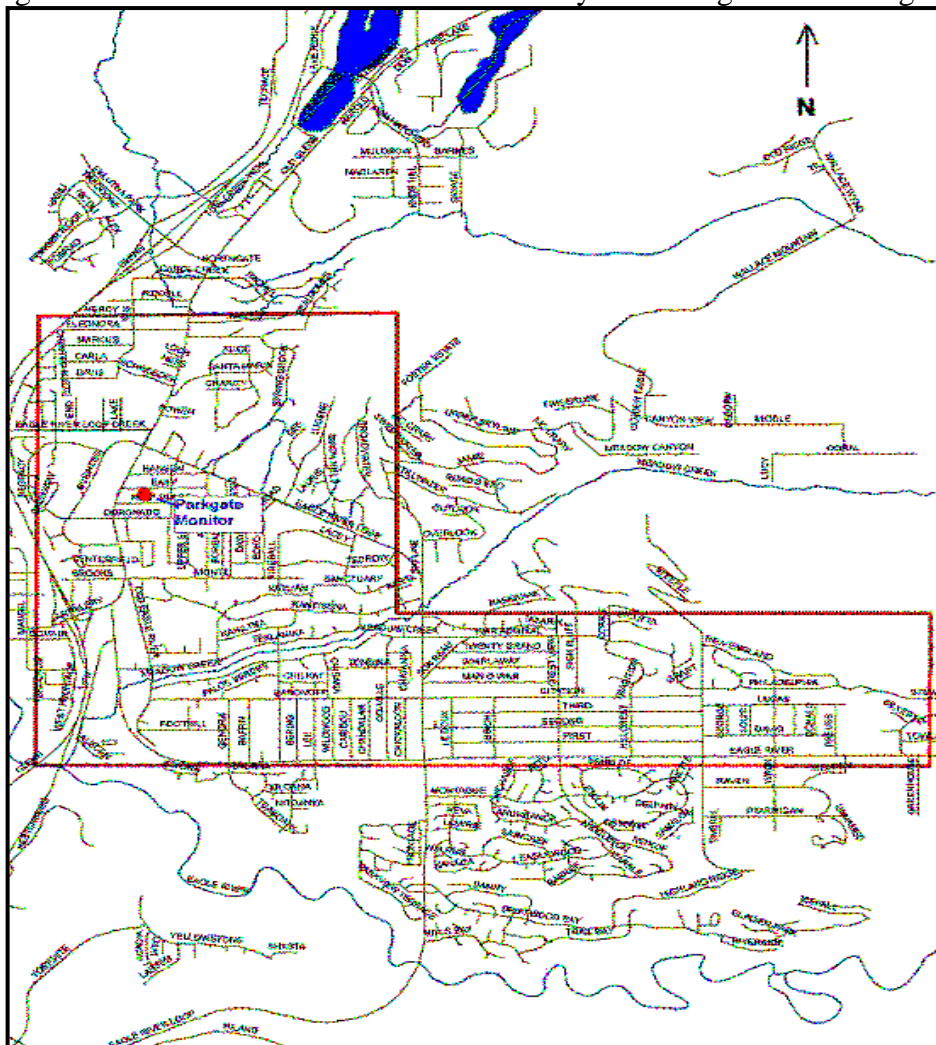
Between 1985 and 1987 Eagle River frequently violated the NAAQS for PM₁₀ (particulate matter air pollution with an aerodynamic diameter less than or equal to 10 μm in size). The main source of this pollution was identified as unpaved roads in the area. As a consequence, in 1991 the EPA designated a nine square kilometer area in Eagle River as a moderate nonattainment area for PM₁₀ and required the submission of an air quality attainment plan to bring the area into compliance with the PM₁₀ NAAQS.

In 1991, the Municipality of Anchorage and the Alaska Department of Environmental Conservation prepared the *Eagle River PM₁₀ Control Plan*, which was submitted to the EPA as amendment to the Alaska SIP to address the PM₁₀ problem in Eagle River. The plan outlined an ambitious road paving program to reduce emissions from this source. The EPA approved the plan as an amendment to the SIP in 1993 (58 FR 43084).

By 1993 most of the 22 miles of unpaved local roads in the 9 km² PM₁₀ problem area were either surfaced with recycled asphalt or paved. By 2007 there were no unpaved local roads within the problem zone.

Figure 2.1

Eagle River Limited Maintenance Area Boundary with Parkgate Monitoring Site



The road paving and recycled asphalt surfacing program has dramatically reduced PM₁₀ concentrations in Eagle River. The last violations of the PM₁₀ NAAQS occurred in 1987.^{iv}

In October 2010, the EPA made a determination that Eagle River had attained the PM₁₀ NAAQS (75 FR 64162). However, before Eagle River could be officially re-designated as an attainment area, a maintenance plan had to be submitted to EPA to demonstrate that the air quality control measures in place in Eagle River are sufficient to ensure continued maintenance of the PM₁₀ NAAQS.

The EPA offers a streamlined process of gaining re-designation to attainment to areas that can demonstrate they have a low risk of violating the PM₁₀ NAAQS. This is known as the Limited Maintenance Plan (LMP) option. When EPA approves a limited maintenance plan, the agency is concluding that an emissions budget may be treated as essentially non constraining for the length of the maintenance period because it is unreasonable to expect that such an area will experience so much growth in that period that a violation of the PM₁₀ NAAQS would result.

Nonattainment areas that wish to qualify for this streamlined process must show that: (1) their average design value (DV) over the past five years is below 98 µg/m³ and therefore have a low probability of violating the NAAQS, and (2) that PM₁₀ emissions anticipated from growth in motor vehicle travel in the area are unlikely to cause a future violation.^v Eagle River met both of these criteria. In September 2010, on behalf of the Municipality of Anchorage, the State submitted the *Eagle River PM₁₀ Limited Maintenance Plan* to EPA as a proposed amendment to the SIP.

EPA approved the Eagle River PM₁₀ LMP, effective March 8, 2013 ([78 FR 900](#)). Areas that have been designated as “limited maintenance areas” or have had their LMPs approved for conformity purposes have a simplified conformity procedure. This simplified LMP procedure is used in this analysis.

2.2 PM₁₀ LMP Conformity Criteria

Areas with approved LMPs or areas that have had them approved for conformity determinations are not required to perform an emission budget test as long as the area continues to meet the LMP criteria. Areas with an LMP are required to annually re-compute their 5-year average DV to determine whether it is below 98 µg/m³ and therefore still meets this LMP criterion.^{vi} Table 2.1 shows that the 5-year average DV in Eagle River continues to meet this requirement. The method used to compute these 5-year average DVs is explained in detail in the Appendix of this document.

Table 2.1
5-Year Average Eagle River PM₁₀ Design Values

5-Year Period	Average DV (µg/m ³)
2004-2008	85
2009-2013	87
2014-2018	96
LMP Qualification Criteria	≤ 98 µg/m³

^{iv} PM₁₀ concentrations have exceeded the 150 µg/m³ NAAQS on a number of occasions since 1987, but all of these “exceedances” have been attributed to natural events. These include glacial river dust transported by high winds from the Matanuska River and volcanic ash resulting from the eruption of the Mt. Spurr volcano in August 1992. EPA excludes these events when considering whether an area has met the NAAQS.

^v PM₁₀ LMP guidance is outlined in a memorandum from Lydia Wegman, Director, Air Quality Standards and Strategies Division, EPA, August 9, 2001.

^{vi} This requirement is found in the Wegman PM₁₀ LMP guidance. Although it is not a requirement of the transportation conformity rule, AMATS agreed to include the Eagle River PM₁₀ Limited Maintenance Area design value analysis in this conformity determination as an outcome of interagency consultation.

The following conformity requirements from [§93.109](#) Table-1 are still applicable to maintenance areas that have had their LMPs approved by the EPA for conformity purposes:

TABLE 1 – CONFORMITY CRITERIA from 40 CFR §93.109

All Actions at all times:	
§ 93.110	Latest planning assumptions
§ 93.111	Latest emissions model
§ 93.112	Consultation
Transportation Plan:	
§ 93.113(b)	TCMs
§ 93.118 or § 93.119	Emissions budget and/or Interim emissions
TIP:	
§ 93.113(c)	TCMs
§ 93.118 or § 93.119	Emissions budget and/or Interim emissions
Project (From a Conforming Plan and TIP):	
§ 93.114	Currently conforming plan and TIP
§ 93.115	Project from a conforming plan and TIP
§ 93.116	CO, PM10, and PM2.5 hot-spots.
§ 93.117	PM10 and PM2.5 control measures
Project (Not From a Conforming Plan and TIP):	
§ 93.113(d)	TCMs
§ 93.114	Currently conforming plan and TIP
§ 93.116	CO, PM10, and PM2.5 hot-spots.
§ 93.117	PM10 and PM2.5 control measures
§ 93.118 or § 93.119	Emissions budget and/or Interim emissions

As per 40 CFR 93.113(b), the transportation plan must: (1) provide for timely implementation of the TCMs in the applicable SIP; and (2) nothing in the transportation plan should interfere with a TCM in the SIP. Both these conditions have been met. When the *Eagle River PM₁₀ Control Plan* was submitted to EPA in 1991, 6.6 miles of the 22 miles of unpaved road in the problem zone had already been paved or surfaced with recycled asphalt product (RAP). The plan assumed that an additional 8.6 miles of paving or recycled asphalt surfacing would be completed by 1993. This was accomplished; by 1993 over 15 miles of the 22 miles of unpaved roads in the problem zone had been paved or RAP-treated. By 2007, there were no unpaved roads in the problem zone.

The *Eagle River PM₁₀ Control Plan* also called for changes in winter traction sanding practices to reduce PM-10 emissions during the spring break-up period. These included reductions in the amount of sand applied and new specifications that limited the silt content in the sand to 2% or less. These measures were implemented in 1989 and continue to be implemented today. The fact that Eagle River has been in compliance with the NAAQS since 1989 attests to the effectiveness of the implemented control strategies. There are no projects or constraints in the Anchorage 2040 Metropolitan Transportation Plan that would interfere with the continued implementation of these TCMs.

2.3 Conclusion regarding Eagle River PM-10 Conformity

This analysis demonstrates that the 2040 Anchorage Metropolitan Transportation Plan is in conformance with the Alaska State Implementation Plan for air quality and meets conformity requirements outlined in 40 CFR 93 for PM₁₀. Furthermore, it has been determined that no element of the 2040 MTP will undermine the ability for Eagle River to maintain compliance with the PM₁₀ NAAQS.

APPENDIX

Computation of PM₁₀ Design Value Concentration for Eagle River

Computation of PM₁₀ Design Value Concentrations for Eagle River

Computational methods for determining the 24-hour design value (DV) are outlined in the *PM₁₀ SIP Development Guideline (EPA-450/2-86-001, June 1987)*. The empirical frequency distribution approach (see Section 6.3.3 of the guideline) was used to determine the site-specific PM₁₀ concentration that would be expected to be exceeded at a frequency of once every 365 days.

The empirical frequency distribution method was used to compute the Eagle River PM₁₀ DV for the most recent five-year period, 2014-2018, in accordance with EPA's Wegman memo guidance to determine qualification for the PM₁₀ limited maintenance plan option (Lydia Wegman, Director EPA-AQSSD, Aug 9, 2001). During this period, the number of valid 24-hour average PM₁₀ measurements (n) was 1762. These concentrations were arranged in order of magnitude and were assigned rank where the highest concentration was rank = 1, and lowest was rank = 1762. An abbreviated version of this table is shown below. During this period, the lowest PM₁₀ concentration measured was 1 µg/m³ (rank = 1762); the highest was 111 µg/m³ (rank = 1).

Table 1

Date	PM-10 (µg/m ³)	<i>i</i> rank	$P = i/n$ Proportion of observations with equal or higher concentration
02/11/2014	111	2	0.0006
03/24/2016	110	3	0.0011
01/31/2014	109	4	0.0017
03/01/2016	105	4	0.0023
02/01/2014	105	5	0.0028
02/07/2014	97	6	0.0034
11/07/2014	97	7	0.0040
02/06/2015	97	8	0.0045
03/02/2016	90	9	0.0051
11/14/2014	86	10	0.0057
12/29/2015	2	1758	0.9977
01/26/2017	1	1759	0.9983
01/30/2017	1	1760	0.9989
01/31/2017	1	1761	0.9994
01/24/2018	1	1762	1

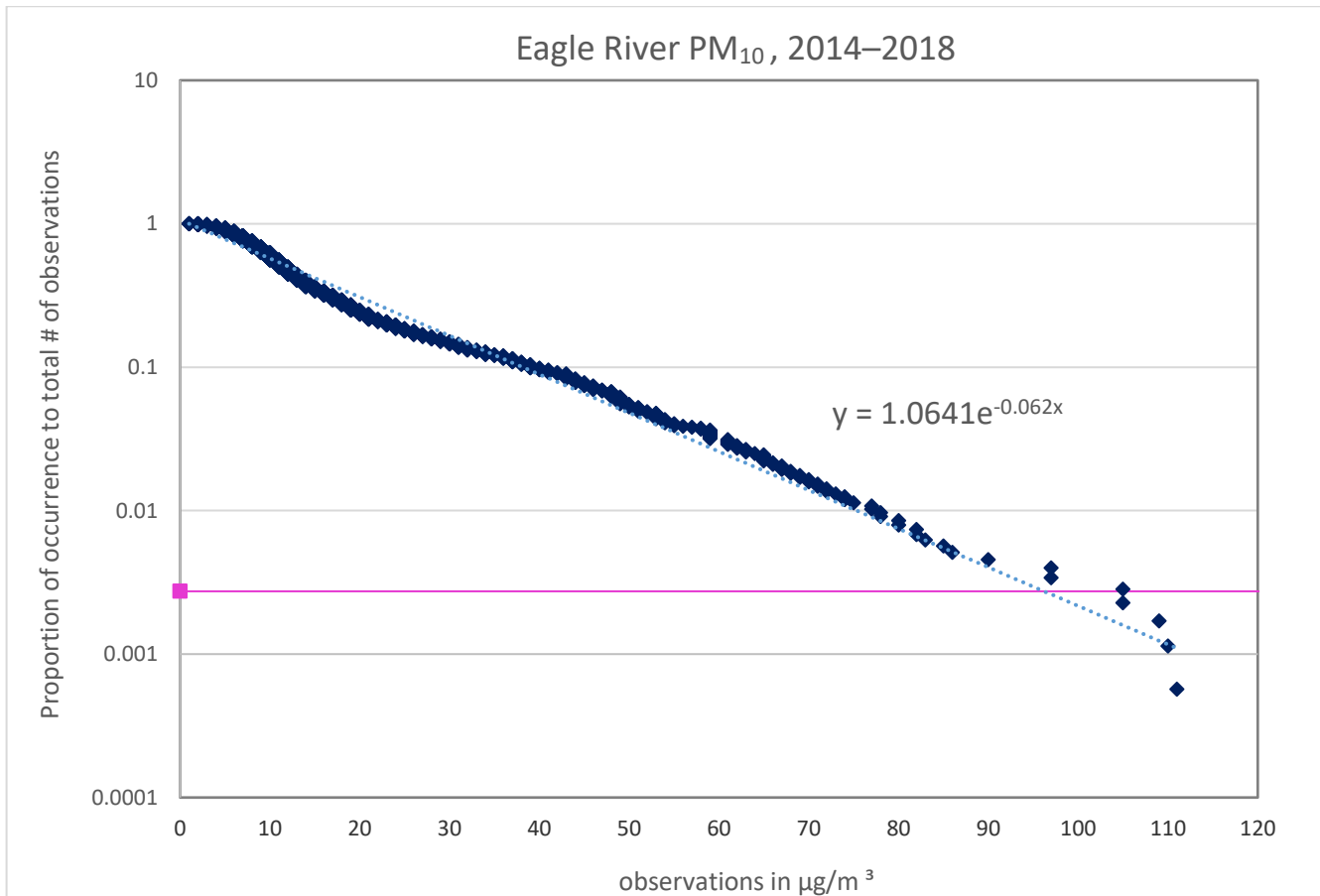
The Eagle River PM₁₀ Design Value for comparison to the PM₁₀ LMP eligibility criteria was determined from the empirical frequency plot of 24-hour PM₁₀ data, and was calculated as the concentration that corresponds to $P = 1/365$. This resulting concentration represents the highest expected concentration during a one-year or 365-day period. The design value concentration can be computed directly from the equation of the best-fit line as follows:

The best-fit, natural logarithm plot is $y = 1.0641 e^{-0.06197x}$

For expected concentration (x) at a given probability of once per year:

$$y = 1/365 = 0.00274 = 1.0641 e^{-0.06197x}$$

Solving for x yields $x = 96.2 \mu\text{g}/\text{m}^3$



Inputting the value of 0.00274 (equivalent to 1/365) into the best-fit line equation and solving for the corresponding concentration, yields a PM₁₀ concentration of 96.2 µg/m³.

Per EPA data handling rules for PM₁₀ data, decimal values are truncated. Hence, the Eagle River PM₁₀ DV for 2014-2018 is properly truncated to 96µg/m³.

This design value is compliant with EPA's primary, PM₁₀ LMP Qualification Criteria: $\leq 98 \mu\text{g}/\text{m}^3$.