

**AIR QUALITY CONFORMITY DETERMINATION
FOR THE
ANCHORAGE 2023–2026
TRANSPORTATION IMPROVEMENT PLAN**

Prepared By:

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Health Department

Environmental Health Services – Air Quality Program

Final - August 25, 2022

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 Transportation Improvement Plan (TIP) to include transportation projects scheduled for implementation between 2023 through 2026. The 2023-2026 TIP represents the current schedule and fiscal plan that AMATS maintains for implementation of all federally-funded surface transportation projects during calendar years 2023–2026.

The Alaska SIP (State Implementation Plan) contains limited maintenance plans for both carbon monoxide (CO) and PM₁₀ⁱ air pollutants within areas of the Municipality of Anchorage. EPA allows demonstration of conformity in such limited maintenance areas to be based on the probability of continued compliance with Limited Maintenance Plan (LMP) eligibility rules rather than modeling anticipated future network emissions to demonstrate expected compliance with a pre-established emission budget for the air pollutant of concern. Limited maintenance areas do not employ emissions budgets because the US Environmental Protection Agency's (EPA) established the LMP eligibility criteria such that it is highly improbable that a qualifying area would experience enough pollutant emissions growth over the twenty-year planning period sufficient to cause an exceedance of a federal air quality standard.

This document confirms the continued eligibility of Anchorage's Limited Maintenance Area status for CO and PM₁₀, and documents that Transportation Control Measures (TCMs) required by the SIP continue to be implemented.

The US Environmental Protection Agency's (EPA) Limited Maintenance Plan (LMP) option allows for the demonstration of probable future compliance with the NAAQS based on analysis of current air monitoring data rather than a comparison of modeled air pollutant emissions against an established motor vehicle emissions budget. EPA guidance states that emissions budgets in areas meeting established LMP qualification criteria may be treated as essentially not constraining for the length of the maintenance period because it is unreasonable to expect that an area satisfying those criteria will experience sufficient growth in pollutant emissions during that period such that a violation of the NAAQS would result.

This document includes a review of the most current CO and PM₁₀ pollutant design values derived from air monitor data collected within the respective air pollutant maintenance area to confirm that Anchorage continues to maintain LMP eligibility criteria within its CO and PM₁₀ Maintenance Areas. This same form of air monitor data analysis was originally used to establish air quality conformity for the prior 2019-2022 TIP.

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.

ⁱ PM₁₀ is particulate matter consisting of particles that are 10 microns or less in aerodynamic diameter. Such particles are isolated from air by passing a sampled airstream through a size-selective inlet, incorporating a cyclone, an impactor or similar cut point which removes larger than desired particles from the airstream.

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



Interagency Consultation and Public Review

AMATS staff presented to the Interagency Consultation Team (ICT) a draft of this air quality conformity report for the Anchorage 2023-2026 TIP on June 24, 2022. The ICT consists of representatives from the Anchorage Health Department, the Alaska Department of Environmental Conservation, the Alaska Department of Transportation and Public Facilities, the Federal Highway Administration, and the US Environmental Protection Agency. The ICT agreed with this method of regional conformity demonstration for the Anchorage 2023-2026 TIP based upon analysis of most current, EPA-certified pollutant data monitored within the Anchorage CO and the Eagle River PM₁₀ maintenance areas demonstrating that pollutant trends in each area continue to comply with EPA's limited maintenance plan eligibility criteria for CO and PM₁₀ respectively.

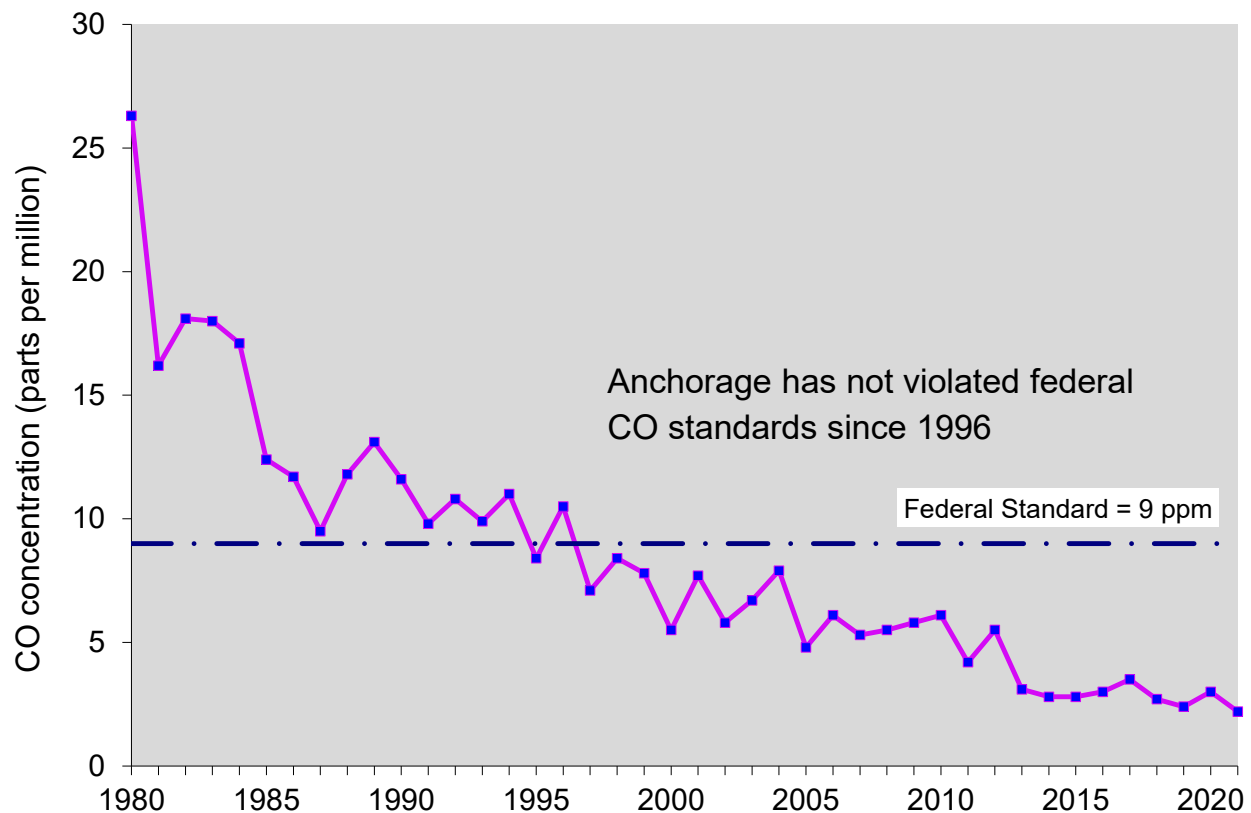
This conformity report was published online for public review from July 1, 2022, through August 1, 2022, with request for comments. No comments were received during that review period.

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 – 2021)



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 34935](#)) 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](#)). 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 requirements for conformity rules concerning use of federal transportation funds. 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 consistent with 23 CFR 450.322(b)(11) and ensure that all transportation plans provide for continued implementation of transportation control measures as committed to in the 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.ⁱⁱ 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](#)).

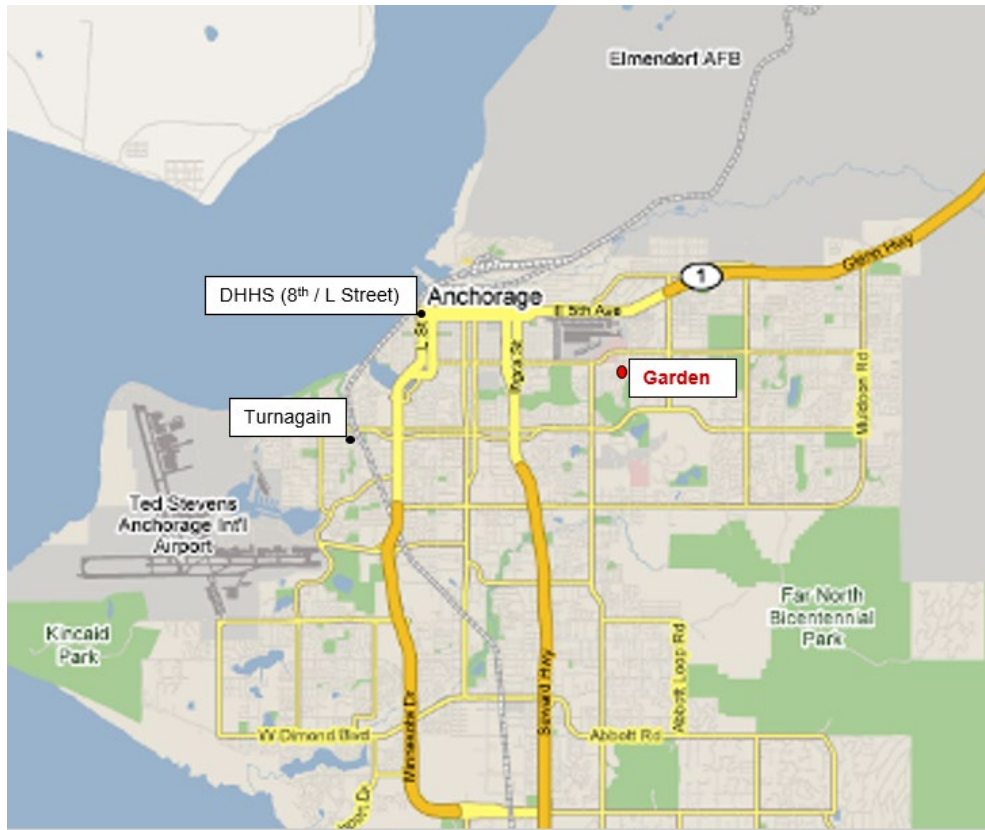
To meet the CO LMP eligibility criteria, the design value for the limited maintenance area must be 7.65 ppm or less. As of December 31, 2021, the Anchorage CO design value is 3.0 ppm CO; hence Anchorage remains compliant with EPA’s CO limited maintenance plan eligibility criteria.

Table 1.1
Anchorage CO Design Values by Year

	Garden Site 20200018	Highest Annual 8-Hr 2 nd Max CO	Area CO DV
2015	2.8	2.8	3.1
2016	3.0	3.0	3.0
2017	3.5	3.5	3.5
2018	2.7	2.7	3.5
2019	2.4	2.4	2.7
2020	3.0	3.0	3.0
2021	2.2	2.2	3.0

ⁱⁱ 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.

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



1.3 Additional Conformity Requirements for CO LMP

1.3.1 Transit Service

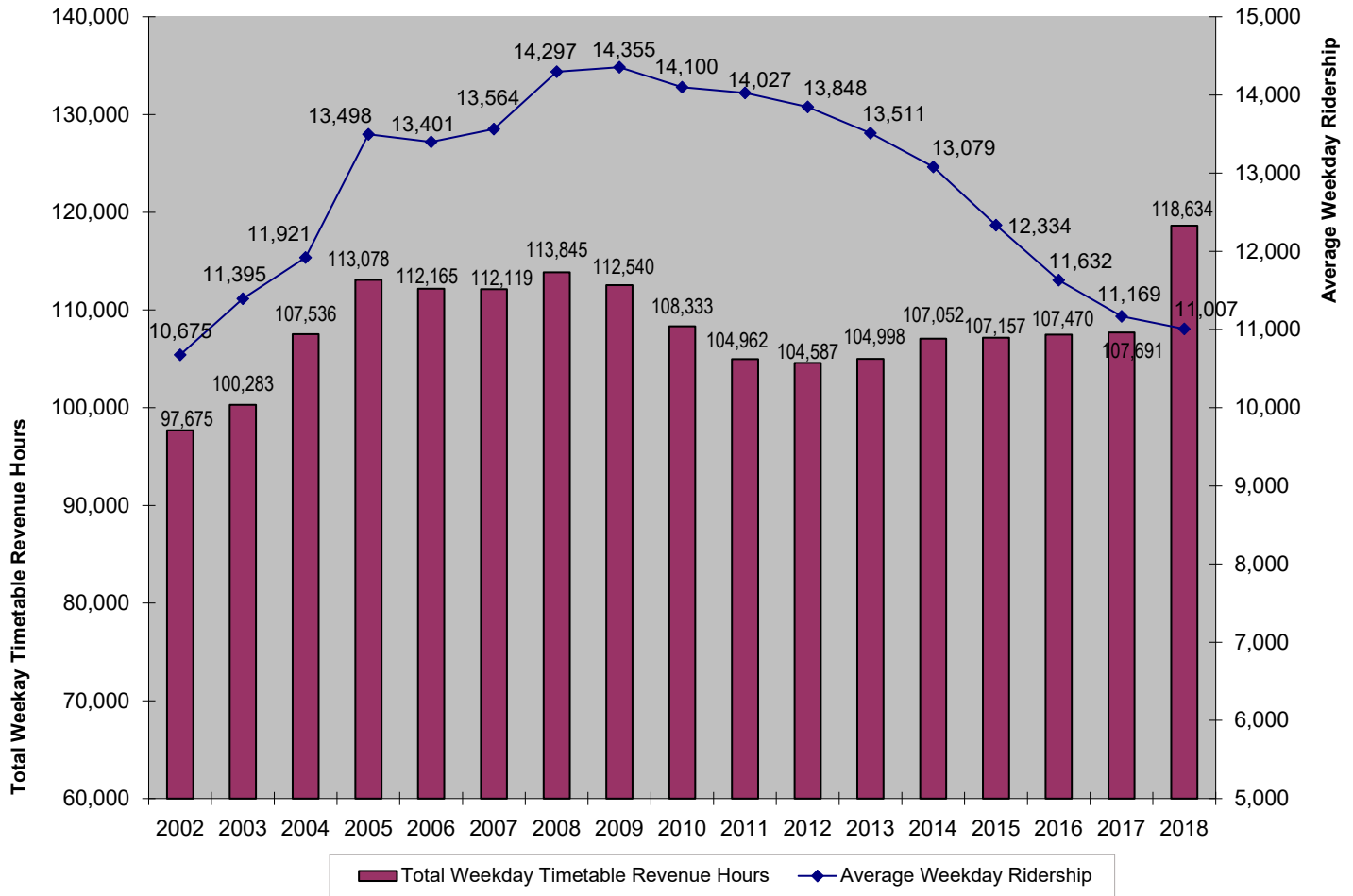
Section 93.110 of the air quality conformity regulations states that the conformity determination for transportation plans must discuss how transit operating policies (including fares and service levels) and assumed transit ridership have changed since the previous transportation plan conformity determination 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 the prior nine 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 TIP. 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 1,000 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
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 have further determined that the 2023–2026 TIP is consistent with the Alaska State Implementation Plan in that no element of the Anchorage 2023–2026 TIP will undermine the objective to reduce ambient CO in Anchorage, nor will it interfere with timely 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

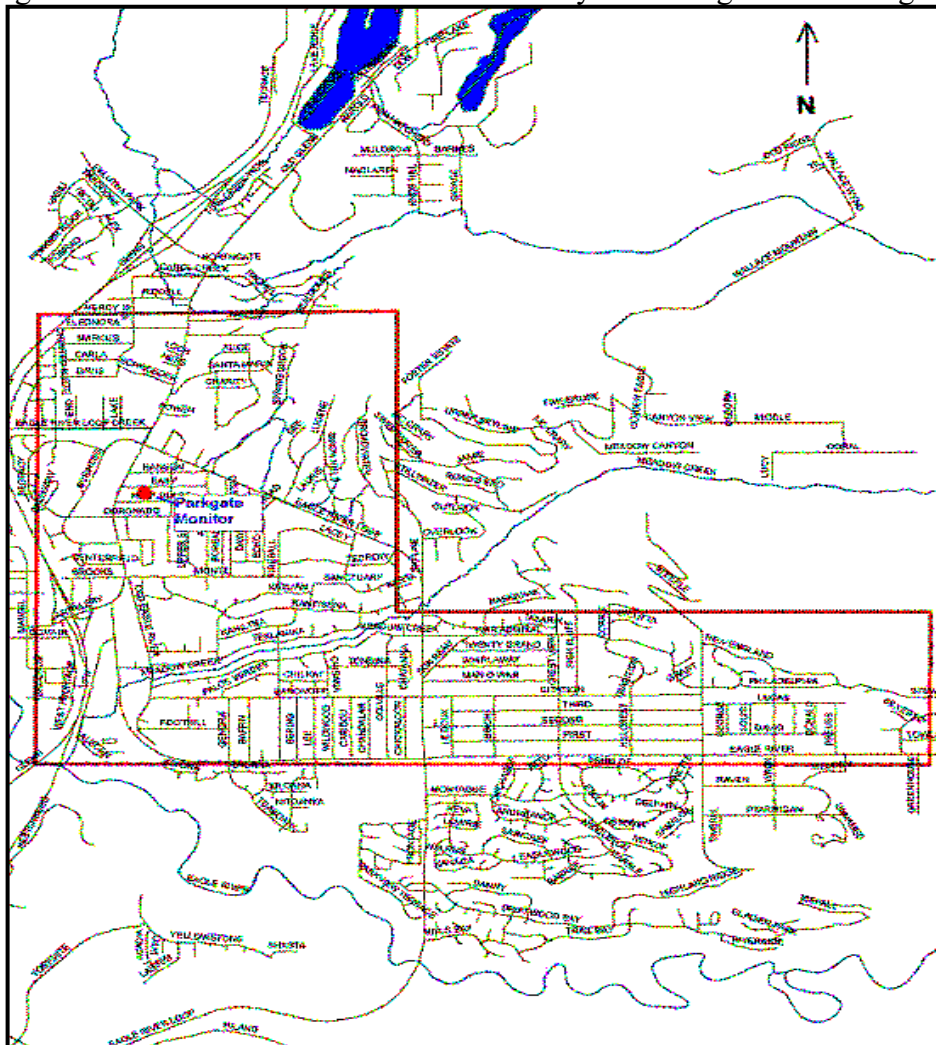
Between 1985 and 1987 Eagle River frequently violated the NAAQS for PM₁₀ (particulate matter air pollution with an aerodynamic diameter less than or equal to 10 μm in size). The main source of this pollution was identified as unpaved roads in the area. As a consequence, in 1991 the EPA designated a nine 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 an 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.ⁱⁱⁱ

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.^{iv} 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 are not required to perform an emission budget test so long as the area continues to meet EPA’s LMP eligibility criteria. Areas with a PM₁₀ LMP are required to annually re-compute their 5-year average PM₁₀ design value (DV) to determine whether it is below 98 µg/m³ and therefore still meets that initial PM₁₀ LMP eligibility criterion.^v 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)
2005-2009	81
2010-2015	92
2017-2021	75
LMP Qualification Criteria	≤ 98 µg/m³

ⁱⁱⁱ PM₁₀ concentrations have exceeded the 150 µg/m³ NAAQS on a few 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.

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

^v 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 still apply to maintenance areas which have LMPs that the EPA has approved 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 and/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 conditions have been met. The 2023-2026 TIP will provide for continued support and promotion of the transit bus and rideshare programs in Anchorage and Eagle River; and, there are no projects or constraints in the TIP that would interfere with the continued implementation of TCMs as identified in the Anchorage CO maintenance plan.

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 in 1993 when 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 PM₁₀ 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 two percent (2%) or less. These measures were implemented in 1989 and have are still maintained. The fact that Eagle River has remained in compliance with the NAAQS since 1989 attests to the effectiveness of these implemented control strategies.

2.3 Conclusions regarding Anchorage CO and Eagle River PM-10 Air Quality Conformity

This analysis demonstrates that the Municipality of Anchorage and the State of Alaska, working in cooperation, continue to successfully control PM₁₀ pollution in Eagle River and adhere to long-term PM₁₀ source reduction measures for the Eagle River Maintenance Area as prescribed in the Alaska State Implementation Plan. The proposed Anchorage 2023-2026 TIP will also allow AMATS to comply with conformity rules established in 40 CFR 93 through adoption of a fiscally constrained transportation plan that applies the most current planning assumptions. AMATS confirms that no project or element of the Anchorage 2023-2026 TIP will jeopardize continue implementation of any provided PM₁₀ control strategies for the Eagle River PM₁₀ Maintenance Area nor will it undermine objectives or successful practices to manage PM₁₀ emissions in the area. Further, review of current PM₁₀ trends monitored within the Eagle River maintenance area demonstrates a high probability of continued compliance with the PM₁₀ NAAQS over the remaining ten years of the Eagle River PM₁₀ Maintenance Plan.

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, 2017-2021, 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 1811. These concentrations were arranged in order of magnitude and were assigned rank where the highest concentration was rank = 1, and lowest was rank = 1811. An abbreviated version of this table is shown below. During this period, the lowest PM₁₀ concentration measured was 0 µg/m³ (rank = 1811) and the highest was 168 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
4/3/2019	168	1	0.0005
4/23/2021	125	2	0.0011
4/3/2019	105	3	0.0016
4/1/2019	79	4	0.0022
3/25/2019	73	5	0.0027
8/29/2019	70	6	0.0033
4/2/2019	69	7	0.0038
3/26/2019	68	8	0.0044
4/4/2019	67	9	0.0049
8/19/2019	66	10	0.0055
12/30/2019	0	1807	0.9978
12/31/2019	0	1808	0.9983
2/8/2020	0	1809	0.9989
2/18/2020	0	1810	0.9995
2/19/2020	0	1811	1

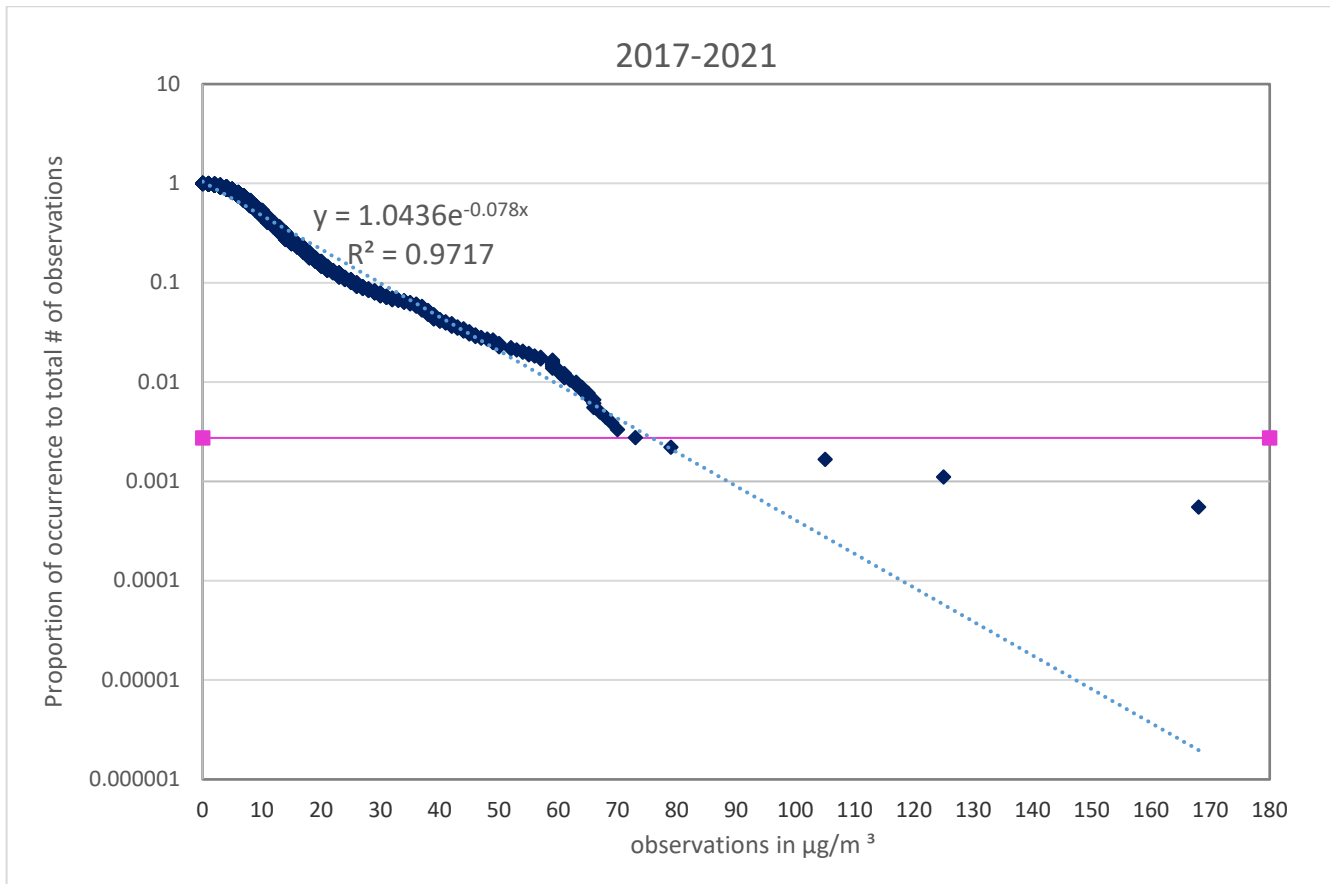
The Eagle River PM₁₀ Design Value for comparison to the PM₁₀ LMP eligibility criteria was determined from the empirical frequency plot of 24-hour PM₁₀ data and was calculated as the concentration that corresponds to $P = 1/365$. This resulting concentration represents the highest expected concentration 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 $y = 1.04362 e^{-0.0845x}$

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

$$y = 1/365 = 0.00274 = 1.04362 e^{-0.07845x}$$

Solving for x yields $x = 75.7 \mu\text{g}/\text{m}^3$



Inputting the value of 0.00274 (equivalent to 1/365) into the best-fit line equation and solving for the corresponding concentration, yields a PM_{10} concentration of $75.7 \mu\text{g}/\text{m}^3$.

Per EPA data handling rules for PM_{10} data, decimal values are truncated. Hence, the Eagle River PM_{10} DV for 2015-2019 is properly truncated to $75 \mu\text{g}/\text{m}^3$.

This design value is compliant with EPA's primary, PM_{10} LMP Qualification Criteria: $\leq 98 \mu\text{g}/\text{m}^3$.