Appendix A – Air Quality

FHWA Transportation Conformity Finding

ARIZONA DIVISION

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U.S. Department of Transportation
Federal Highway Administration

January 15, 2025

In Reply Refer To:
999-A(561)T
F0534 01L
City of Douglas New Commercial Land
Port of Entry (LPOE) Connector Road Study
Air Quality Conformity Determination

Paul O'Brien, P.E., Environmental Planning
Administrator Environmental Planning
Arizona Department of
Transportation 205 South 17th
Avenue, MD 612E Phoenix, Arizona
85007-3212

Dear Mr. O'Brien:

The Federal Highway Administration (FHWA) received a request from the Arizona Department of Transportation (ADOT) dated January 6, 2025, for a project-level air quality conformity determination for the 999-A(561)T | F0534 01L City of Douglas New Commercial Land Port of Entry (LPOE) Connector Road Study. The recommended alternative alignment of the connector road would consist of constructing a new roadway along the existing James Ranch Road alignment, providing a straight connection from the proposed LPOE to SR 80 (about 1.4 miles).

The project is located in an isolated rural area about 4.5 miles west of the City of Douglas city limits. The project area is also in the Paul Spur / Douglas nonattainment area, which is designated nonattainment for Particulate Matter (PM_{10}) under the National Ambient Air Quality Standards (NAAQS) which is subject to project-level conformity requirements. This project required a regional conformity analysis as it is located in an isolated rural area without an approved State Implementation Plan (SIP). As a regionally significant project a regional conformity analysis was required for this project. Interagency consultation for the regional conformity analysis concluded on April 17, 2024.

Interagency consultation determined that the project is a project of air quality concern for PM10 and requires a quantitative hot-spot analysis for transportation conformity. Interagency consultation for the project level hot-spot analysis concluded October 10, 2024. Both the regional and project level conformity analysis were provided for further public review, as provided to agencies on October 25, 2024. The Public Review period ran through December 9, 2024.

Based on our review of the PM10 air quality analyses and interagency consultation reviews of the information provided by the ADOT regarding this project and scope of work, FHWA is making the determination that this project meets the air quality conformity requirements listed in 40 CFR Part 93. If there are any questions on this determination, please contact Dan Gabiou at 602-382-8966 or Dan.Gabiou@dot.gov.

Sincerely, Karla S. Petty
Division Administrator

ALAN ROBERT HANSEN
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Date: 2025.01.15 06:58:27 -07'00'

By: Alan Hansen

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Andrew Ledezma, EPA Region IX

Final Douglas Connector Road Air Quality Technical Report

PM_{10} Quantitative Hot-Spot Air Quality Technical Report

City of Douglas Land Port of Entry Connector Road

Cochise County, Arizona

Federal Project No. 999-A(561)T
ADOT Project No. F0534 01L

Prepared by:

Kimley»Horn

Prepared for:
Arizona Department of Transportation
Environmental Planning

ADOT

October 2024

Revised December 2024

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Executive Summary

This Air Quality Technical Report supports the City of Douglas Land Port of Entry Connector Road project, which connects the proposed Commercial Land Port of Entry (LPOE) west of the City of Douglas to State Route (SR) 80. The report analyses the project's potential particulate matter (PM_{10}) impacts and evaluates whether the project would contribute to the study area exceeding the National Ambient Air Quality Standards (NAAQS). The report also analyses the project's potential impacts on carbon monoxide (CO), mobile source air toxics (MSAT), and greenhouse gases (GHG). Based on the analysis, the project is not expected to contribute to a violation of the NAAQS for PM_{10}.

Introduction

This Project Level PM_{10} Quantitative Hot-Spot Analysis Technical Report has been developed to support the Design Concept Report (DCR) for a connector road between the proposed City of Douglas Commercial LPOE at the United States (US)-Mexico border and SR 80. The project is in the Arizona Department of Transportation (ADOT) Southeast District in Cochise County west of Douglas, Arizona and is anticipated to open in 2028.The impacts to air quality were evaluated based on traffic data presented in the project's Final Traffic Report (Kimley-Horn, 2024) and additional modeling developed in the Paul Spur / Douglas April 2024 Regional Conformity Analysis.

ADOT prepared an Environmental Assessment (EA) for the project. There are three alignment alternatives currently being considered for the proposed connector road west of United States Route 191 (US 191), two of which intersect SR 80 at James Ranch Road and one of which intersects SR 80 at Brooks Road. The project vicinity is shown in Figure 1, and the three alignment alternatives are shown in Figure 2. For the purposes of this analysis, the preferred alignment alternative (Alternative 1) for the connector road is assumed to intersect SR 80 at the existing SR 80 / James Ranch Road intersection. The results of the analysis at the SR 80 / James Ranch Road intersection are anticipated to be similar at the SR 80 / Brooks Road intersection if the preferred alignment alternative for the connector road intersects SR 80 at Brooks Road instead of James Ranch Road.

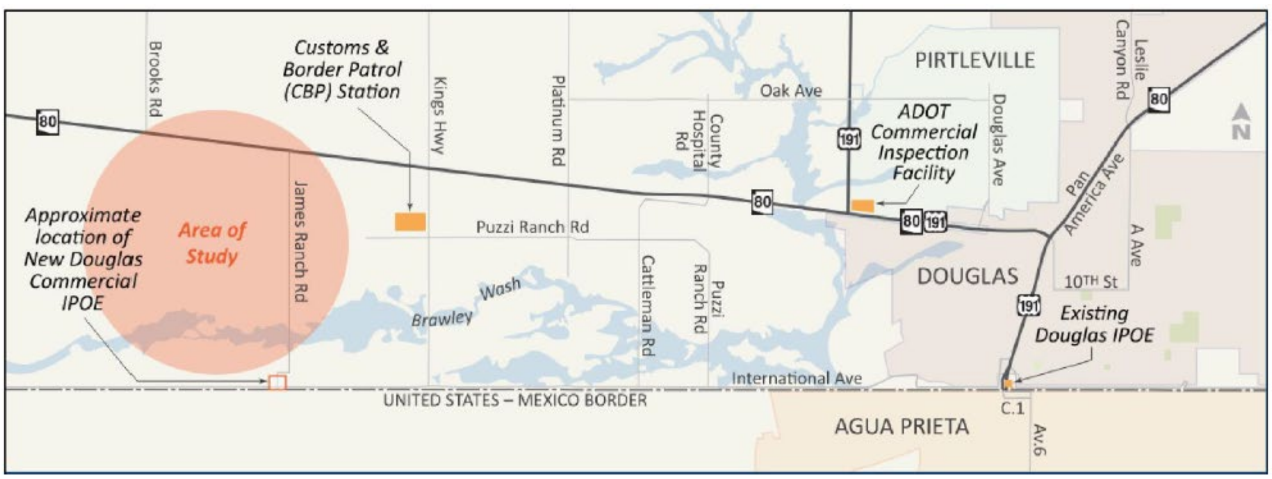

Figure 1: Project Vicinity Map

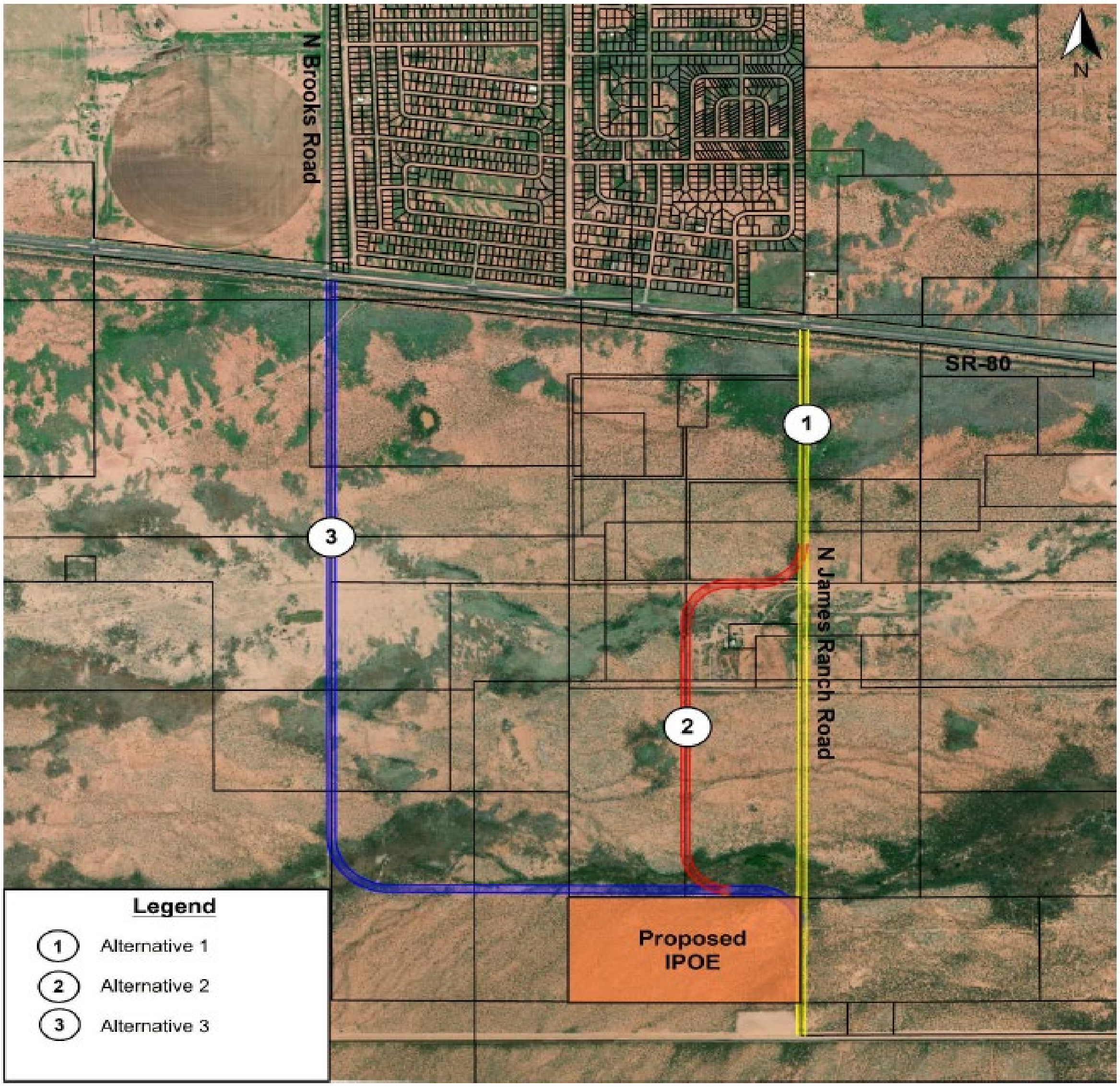

Figure 2: Connector Road Alignment Alternatives Map

The primary goal of the proposed LPOE is to move commercial vehicle traffic away from the existing LPOE in the City of Douglas and US 191 to a location west of the City of Douglas. The proposed LPOE will only accommodate commercial vehicle traffic. This will help to improve operations at the existing LPOE and reduce congestion on US 191 south of SR 80. Commercial Vehicles will still have to stop at the ADOT Commercial Weigh Station on the northeast corner of SR 80 and US 191. after crossing the US-Mexico border, but the new route will allow for fewer impacts of commercial vehicles on the residents of the City of Douglas. The current route has 10 schools, 1 healthcare facility, and 7 parks, as well as numerous playgrounds and civic uses within a one-mile radius. Figure 3 shows the route between the current LPOE and the ADOT Commercial Weigh Station. The proposed connector road falls entirely outside the Douglas municipal limits. One school and one healthcare facility fall within a one-mile radius of the proposed route. Figure

4 shows the route between the proposed connector road and the ADOT Commercial Weigh Station.

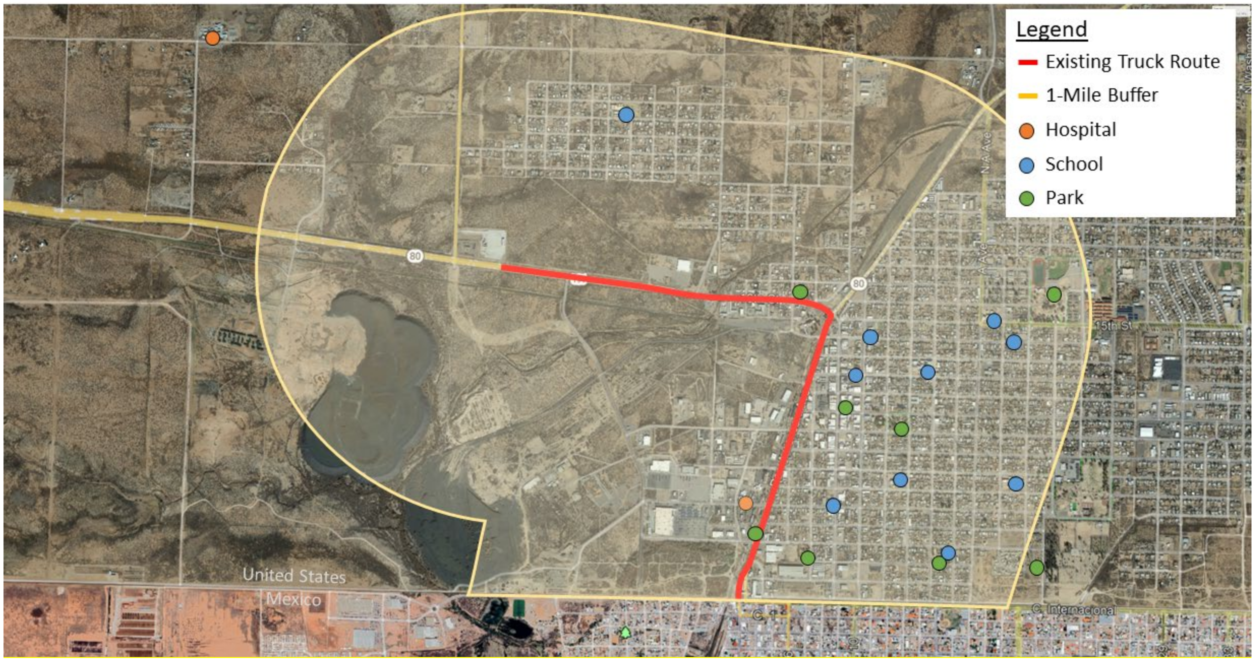

Figure 3: Existing Truck Traffic Route

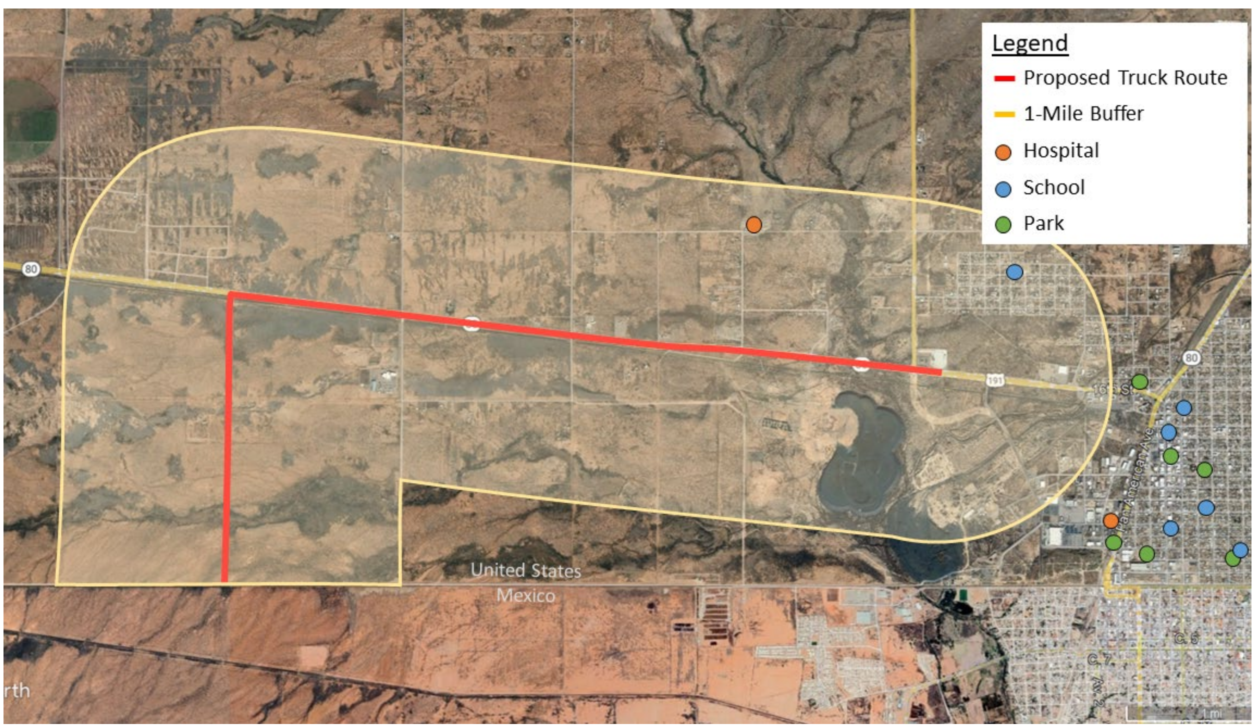

Figure 4: Proposed Truck Traffic Route

On March 10, 2006, the U.S. Environmental Protection Agency (EPA) published a Final Rule (71 FR 12468) that establishes transportation conformity criteria and procedures for determining which transportation projects must be analyzed for local air quality impacts in PM2.5 and PM10 nonattainment and maintenance areas. A quantitative PM hot-spot analysis using EPA's MOVES emission model is required for those projects that are identified as projects of local air quality concern. Quantitative PM hot-spot analyses are not required for other projects. The interagency consultation process plays an important role in evaluating which projects require quantitative hot-spot analyses and determining the methods and procedures for such analyses. An interagency consultation group was established to help guide the development of the air quality analysis, consisting of members from:

- Arizona Department of Transportation (ADOT)
- Arizona Department of Environmental Quality (ADEQ)
- Federal Highway Administration (FHWA)
- Environmental Protection Agency (EPA)
- The City of Douglas
- The Southeastern Arizona Governments Organization (SEAGO)
- General Services Administration (GSA)
- Customs and Border Protection (CBP

This air quality analysis includes modeling techniques to estimate project-specific emission factors from vehicle exhaust and local PM10 concentrations due to project operation. Emissions and dispersion modeling techniques were consistent with the EPA quantitative PM hot-spot analysis guidance, "Transportation Conformity Guidance for Quantitative Hot-spot Analysis in PM2.5 and PM10 Nonattainment and Maintenance Areas" that was released in October 2021.[1]

Affected environment

Regional Climate

The project is located in rural Cochise County in the southeastern corner of the state. A large portion of Arizona is classified as semiarid, and long periods of time often occur with little or no precipitation. The average annual precipitation in Cochise County is 14 inches. The air is generally dry and clear, with low relative humidity and a high percentage of sunshine. Cochise County has a hot desert climate with long, extremely hot summers with temperatures exceeding 90 degrees Fahrenheit and short, mild to warm winters with temperatures ranging from 50 to 60 degrees Fahrenheit.

National Ambient Air Quality Standards

As required by the Clean Air Act (CAA), NAAQS have been established for six major air pollutants: carbon monoxide, nitrogen dioxide, ozone, particulate matter (PM10 and PM2.5), sulfur dioxide, and lead. These standards are summarized in Table 1 along with the current attainment status of Cochise County. "Primary" standards have been established to protect the public health; "secondary" standards are intended to protect the nation's welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the general welfare.

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[1] https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1013C6A.pdf

Brief descriptions of those criteria pollutants relevant to transportation projects (carbon monoxide, particulate matter, nitrogen dioxide, and ozone) are provided in the following sections.

Table 1: National Ambient Air Quality Standards[2]

Pollutant		Primary / Secondary	Averaging Time	Level	Form	Attainment Status
Ozone (O_3)[1]		Primary & Secondary	1-hour	0.070 ppm	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years	Attainment
Carbon Monoxide (CO)		Primary	8 hours	9 ppm	Not to be exceeded more than once per year	Attainment
			1 hour	35 ppm		Attainment
Nitrogen Dioxide (NO_2)		Primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years	Attainment
		Primary & Secondary	1 year	53 ppb	Annual Mean	Attainment
Particulate Pollution (PM)	$PM_{2.5}$	Primary	1 year	12 μg/m^3	Annual Mean, averaged over 3 years	Attainment
		Secondary	Annual	15.0 μg/m^3	Annual Mean, averaged over 3 years	Attainment
		Primary & Secondary	24 hours	35 μg/m^3	98th percentile, averaged over 3 years	Attainment
	PM_{10}	Primary & Secondary	24 hours	150 μg/m^3	Not to be exceeded more than once per year on average over 3 years	Moderate Non-Attainment
Sulfur Dioxide (SO_2)		Primary	1 hour	75 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years	Attainment
		Secondary	3 hour	0.5 ppm	Not to be exceeded more than once per year	Attainment

1. In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 μg/m^3 as a calendar quarter average) also remain in effect.
2. The level of the annual NO_2 standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.
3. Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards are not revoked and remain in effect for designated areas. Additionally, some areas may have certain continuing implementation obligations under the prior revoked 1-hour (1979) and 8-hour (1997) O_3 standards.
4. The previous SO_2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: 1) any area for which it is not yet 1 year since the effective date of designation

[2] https://www.epa.gov/criteria-air-pollutants/naaqs-table

under the current (2010) standards, and 2) any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous SO2 standards or is not meeting the requirements of a SIP call under the previous SO_2 standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required NAAQS.

Carbon Monoxide

EPA defines Carbon Monoxide (CO) as a colorless, odorless gas that is emitted when the carbon in fuel is not burned completely[3]. The largest source of CO is vehicle exhaust from on-road motor vehicles. CO is sensitive to variations in temperature and vehicle speeds. CO emissions are higher in winter months than during the summer. CO emissions also decrease with an increase in speed, so idling and low speeds produce the highest levels of CO. Health issues related to prolonged CO exposure include dizziness, confusion, and unconsciousness due to a reduction of the amount of oxygen being transported to vital organs. The national trend in average CO concentrations shows a substantial improvement over the past 40 years, as seen in Figure 5. Similarly, trends in the Southwest Region show a 34% decrease in CO concentrations since 2010, as seen in Figure 6. This trend is primarily the result of stricter regulations on motor vehicle exhaust.

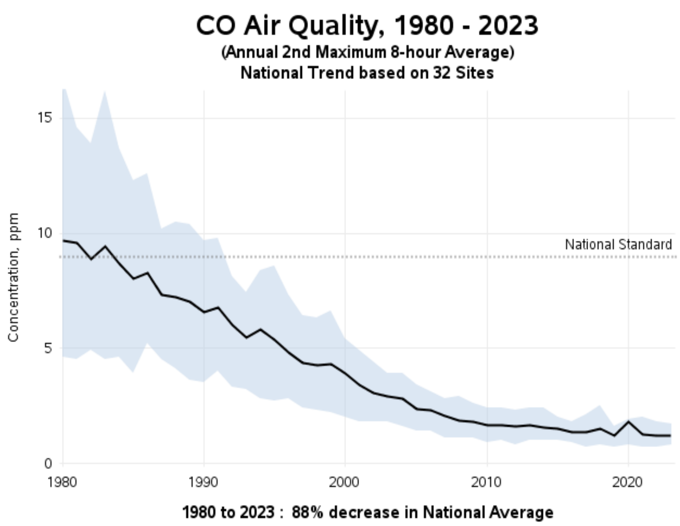

Figure 5: National Trend in CO Concentrations[4]

[3]https://www.epa.gov/co-pollution/basic-information-about-carbon-monoxide-co-outdoor-air-pollution#What%20is%20CO

[4] https://www.epa.gov/air-trends/carbon-monoxide-trends

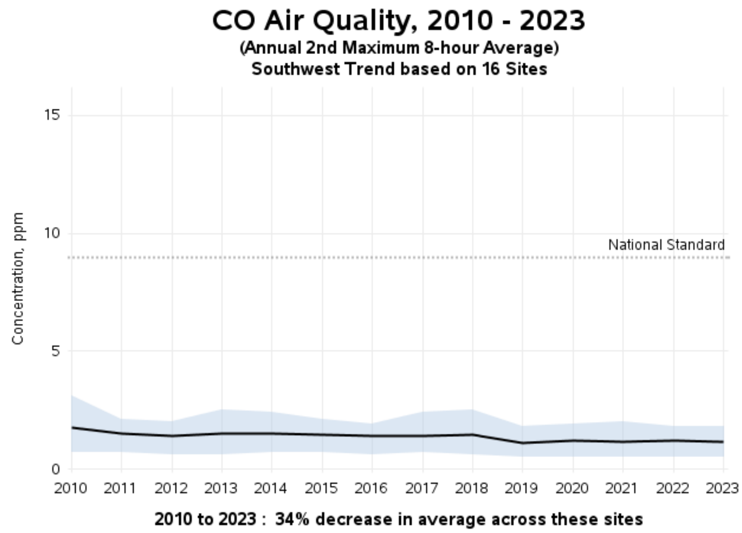

Figure 6: Southwest Regional Trend in CO Concentrations[4]

[1]https://www.epa.gov/co-pollution/basic-information-about-carbon-monoxide-co-outdoor-air-pollution#What%20is%20CO
[1] https://www.epa.gov/air-trends/carbon-monoxide-trends

Particulate Matter

Particle pollution is a term used to describe particles suspended in the air including dust, dirt, soot, smoke, and liquid droplets. Another name for this is particulate matter, or PM. PM can be emitted directly from sources such as motor vehicles, construction activities, and unpaved roads, or it can be formed in the air through reactions involving chemicals, sunlight, and water vapor. There are two main types of PM that are of particular concern: PM_{10}, which includes coarse particles with diameters of 10 micrometers and smaller, and $PM_{2.5}$ which includes fine particles with diameters of 2.5 micrometers and smaller. The size of these particles can be seen in Figure 7 below compared to other small materials[5]. Exposure to PM can cause various health problems because the particles are inhaled during regular breathing and can end up in the lungs. Some of these health problems include decreased lung function, asthma, other respiratory issues, irregular heartbeat, and heart attacks. $PM_{2.5}$ is also one of the leading causes of haze in parts of the U.S. Additionally, wind can carry these particles large distances before they settle on the ground, which could impact various environmental features such as changing nutrients balance in soil and coastal waters, increasing acidity in waterways, harming forests and crops, and contributing to acid rain.[6]

[5] https://www.epa.gov/pm-pollution/particulate-matter-pm-basics
[6] https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm

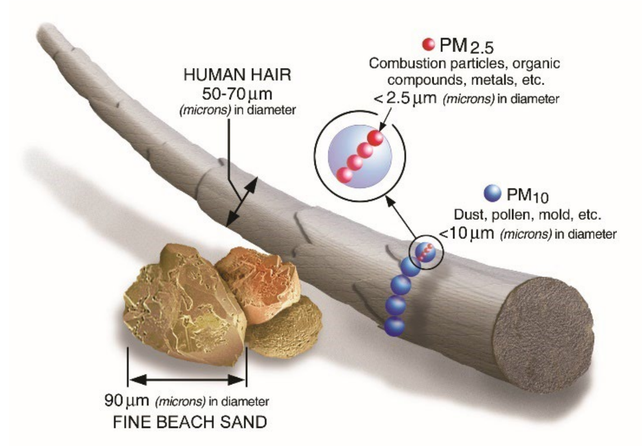

Figure 7: Particulate Matter Size Comparison[5]

National trends in PM show a general decrease in both PM_{10} and $PM_{2.5}$ since 2000 as shown in Figure 8 and Figure 10, respectively. Southwest regional trends show a slightly different situation, however, where PM_{10} has actually increased by 14% and $PM_{2.5}$ has decreased by 14% since 2010 as seen in Figure 9 and Figure 11, respectively. The PM_{10} data shows that there have been a few spikes in concentration between 2011-2013 and in 2018 where it was at or above the national standard. Since the spike in 2018, the PM_{10} concentration has leveled out and the 2023 data reported one of the lowest concentrations during the time frame.

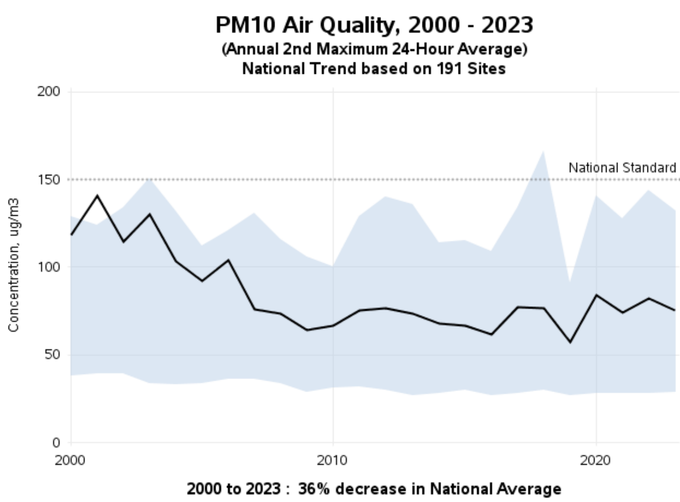

Figure 8: National Trend in PM_{10} Concentrations[7]

[7] https://www.epa.gov/air-trends/particulate-matter-pm10-trends

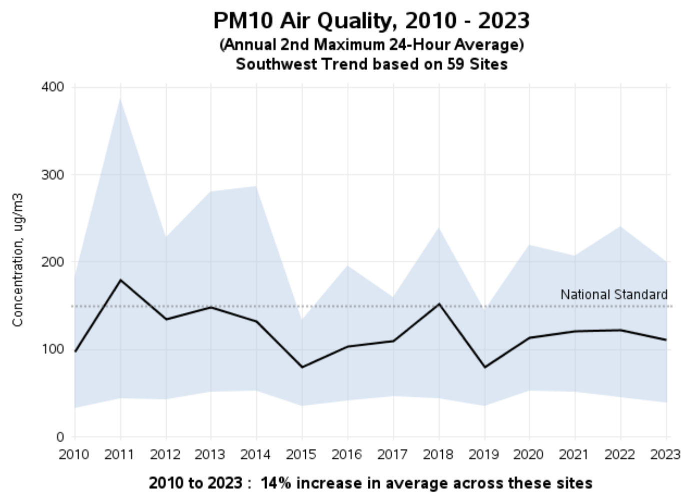

Figure 9: Southwest Regional Trend in PM_{10} Concentrations[7]

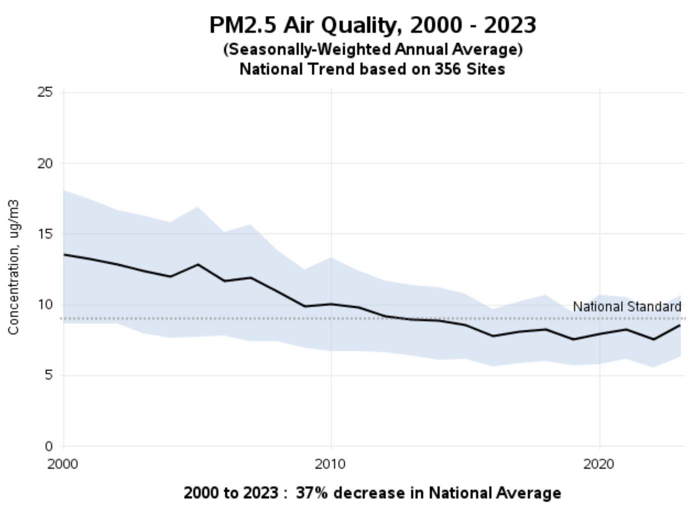

Figure 10: National Trend in $PM_{2.5}$ Concentrations[8]

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[8] https://www.epa.gov/air-trends/particulate-matter-pm25-trends

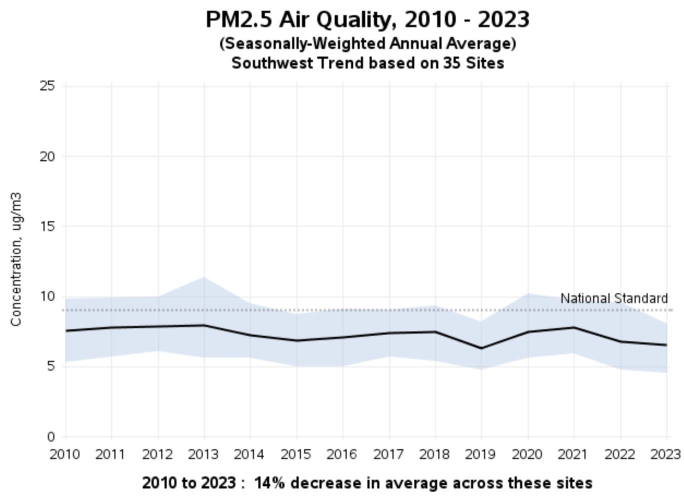


Figure 11: Southwest Regional Trend in $PM_{2.5}$ Concentrations[8]

Nitrogen Dioxide

Nitrogen oxides (NO_x) are a group of highly reactive gases. One of these, Nitrogen Dioxide (NO_2), is emitted from the burning of fuel. The primary sources of NO_2 include motor vehicles, power plants, and industrial and commercial equipment. Respiratory issues like coughing, wheezing, difficulty breathing, and asthma are the primary health issues related to breathing air with high concentrations of NO_2. Ozone and particulate matter are formed when NO_x, specifically NO_2, reacts with other chemicals, so NO_2 is considered a precursor of each criteria pollutant. Environmental effects from high concentrations of NO_2 in the air include the development of acid rain, haze, and nutrient pollution in coastal waters.[9] The national trend in average NO_2 concentrations shows a substantial improvement over the past 40 years, as seen in Figure 12. Similarly, trends in the Southwest Region show a 17% decrease in NO_2 concentrations since 2010, as seen in Figure 13.

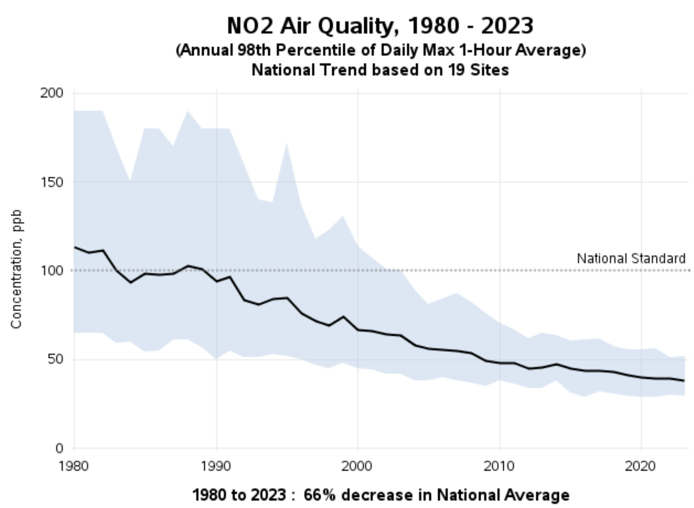


Figure 12. National Trend in NO_2 Concentrations

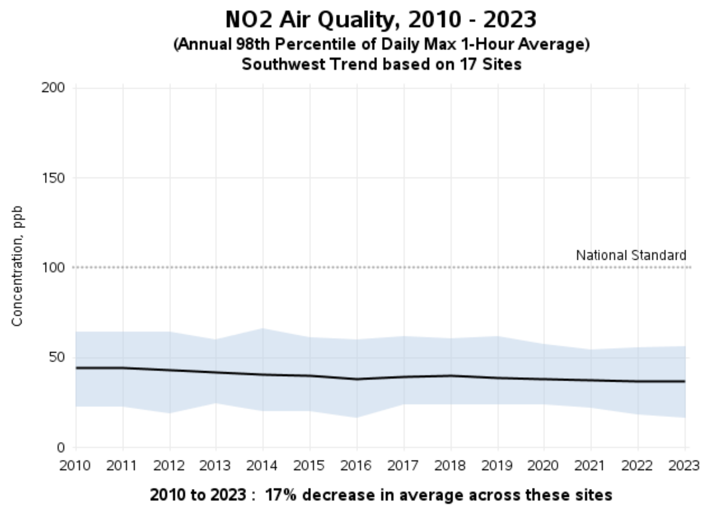


Figure 12: Southwest Regional Trend in NO_2 Concentrations**Error! Bookmark not defined.**

Ozone

Ozone (O_3) is a gas that can be both naturally occurring and human made. O_3 is naturally occurring in the Earth's atmosphere and protects the Earth from the sun's ultraviolet rays. O_3 at the ground-level is a harmful pollutant that is formed through chemical reactions between NO_x and volatile organic compounds (VOC) in the presence of sunlight. NO_x, as mentioned previously, and VOC are pollutants emitted by motor vehicles and industrial sources. O_3 is generally a concern during hot summer months in urban areas due to the steady presence of heat, sunlight, and pollutants[10]. Figure 14 gives a visual representation of how ground-level O_3 is created.

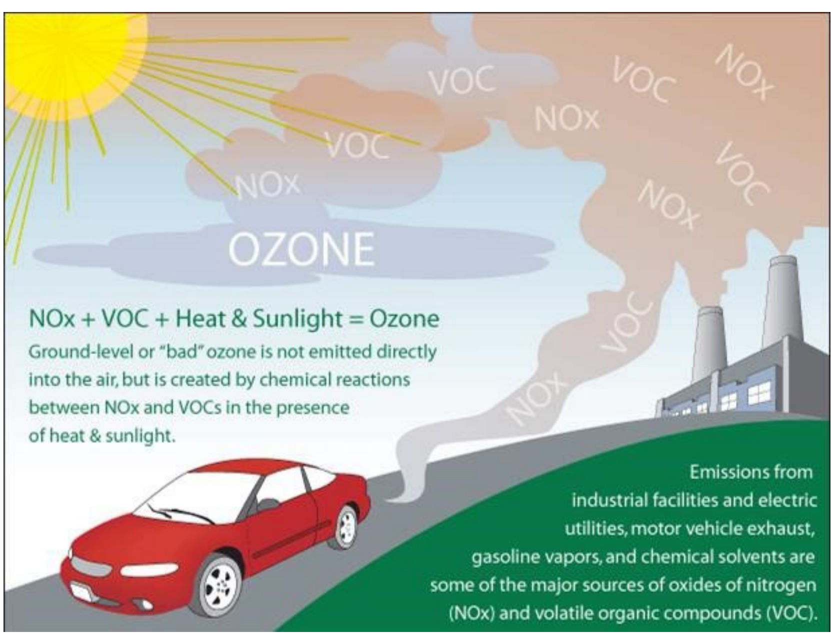


Figure 13: Formation of Ozone[10]

[10] https://www.epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics

O_3 is the primary component of smog. When O_3 reaches unhealthy levels, it can contribute to various health issues such as breathing problems, inflammation in the respiratory system, coughing, sore throat, and can increase or aggravate existing conditions like asthma.[11] O_3 can also have negative effects on sensitive vegetation and ecosystems by slowing plant growth and making them more susceptible to disease and insects.[12] The national trend in average O_3 concentrations shows a gradual improvement over the past 40 years, but has leveled off since 2013 as seen in Figure 15. Similarly, trends in the Southwest Region show a steady level of O_3 concentrations since 2010, as seen in Figure 16.

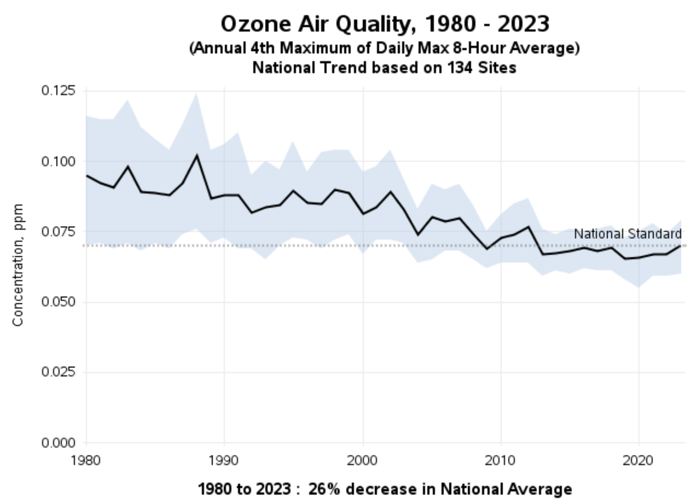


Figure 14: National Trend in O3 Concentrations[13]

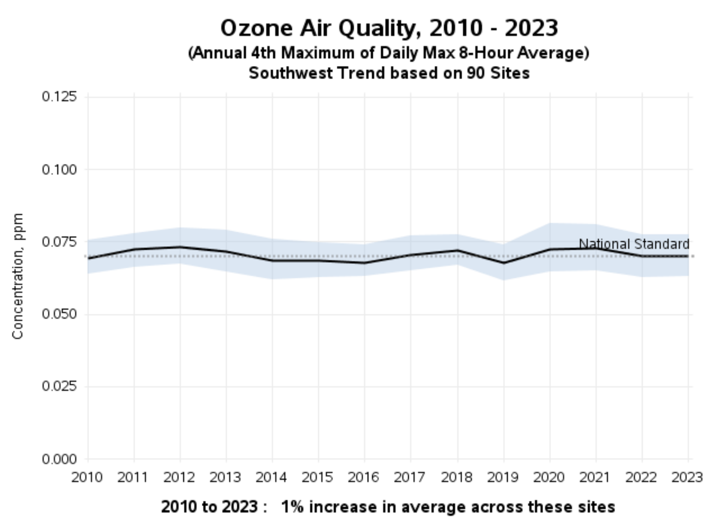


Figure 15: Southwest Regional Trend in O3 Concentrations[13]

[11] https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution
[12] https://www.epa.gov/ground-level-ozone-pollution/ecosystem-effects-ozone-pollution
[13] https://www.epa.gov/air-trends/ozone-trends

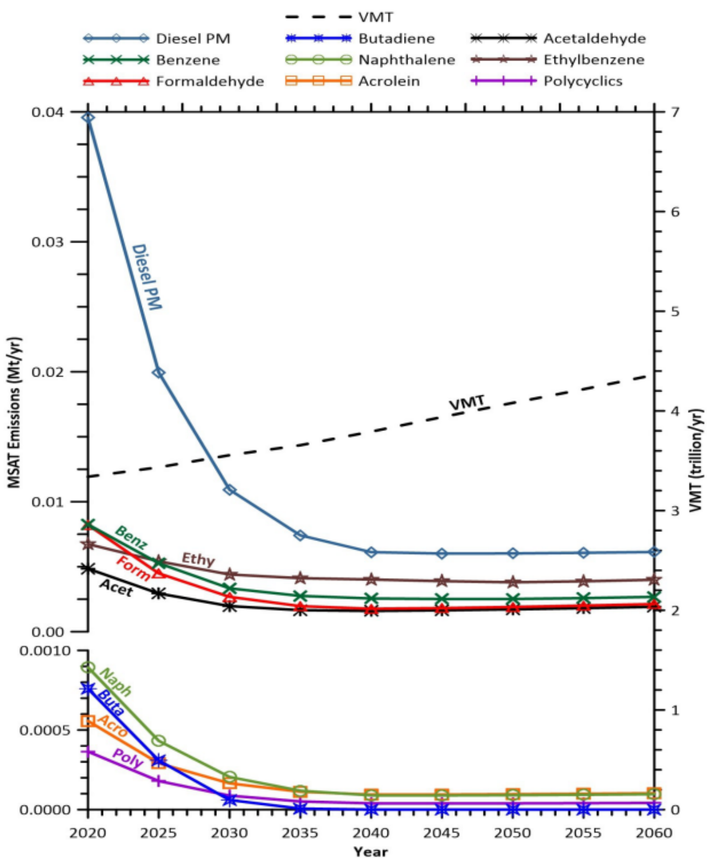
Mobile Source Air Toxics

Although not a criteria pollutant under the NAAQS, mobile source air toxics (MSAT) are also regulated by EPA. Many air toxics are formed from human made sources such as motor vehicles, dry cleaners, and other industrial and commercial sources. Controlling air toxic emissions became a national priority with the passage of the CAAA, whereby Congress mandated that the EPA regulate 188 air toxics, also known as hazardous air pollutants. The EPA assessed this expansive list in its rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol 72, No. 37, page 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are part of EPA's Integrated Risk Information System (IRIS)[14]. In addition, EPA identified nine compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers or contributors and non-cancer hazard contributors from the 2014 National Air Toxics Assessment (NATA)[15]. These are 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority MSAT, the list is subject to change and may be adjusted in consideration of future EPA rules.

Using EPA's MOVES3 model, as shown below in Figure 17, FHWA estimates that even if VMT increases by 31 percent from 2020 to 2060 as forecast, a combined reduction of 76 percent in the total annual emissions for the priority MSAT is projected for the same time period. This substantial decrease in emissions is primarily due to the strict regulations on fuels and motor vehicles that were required under the EPA's 2007 rule.

[14] https://www.epa.gov/iris

[15] https://www.epa.gov/national-air-toxics-assessment/2014-nata-assessment-results



Notes: Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors.
Source: EPA MOVES3 model runs conducted by FHWA in March 2021[16]

Figure 16: FHWA Projected National MSAT Emission Trends 2020-2060 for Vehicles Operating on Roadways

Attainment Status

The project is located within the Paul Spur/Douglas planning area, which is currently in nonattainment for large particulates, otherwise known as PM_{10}, and in attainment for all other pollutants as noted previously in Table 1. The Paul Spur/Douglas PM_{10} nonattainment area is located along the Mexico-United States border in Cochise County, as shown in Figure 18. The Paul Spur/Douglas area was designated as a nonattainment area under the 1987 24-hour PM_{10} standard, which was retained under the Environmental Protection Agency's (EPA's) 2006 PM National Ambient Air Quality Standards (NAAQS) review (effective December 18, 2006). The area is classified as a "moderate" nonattainment area. As an isolated rural nonattainment area, the Paul Spur/Douglas planning area is subject to a regional air quality conformity process. Arizona Department of Environmental Quality (ADEQ) is in the process of developing a nonattainment State Implementation Plan (SIP) which will include an emission inventory, modeling demonstration, strategy for Exceptional Events, and requirements for PM_{10} controls. ADEQ identifies six sources of PM_{10} for the area – agricultural activities, unpaved roads, cleared areas/vacant

[16] https://www.fhwa.dot.gov/environMent/air_quality/air_toxics/policy_and_guidance/msat//fhwa_nepa_msat_memorandum_2023.pdf

lots, open burning and wildfires, windblown dust, and emissions coming across the border from areas outside the U.S. border[17].

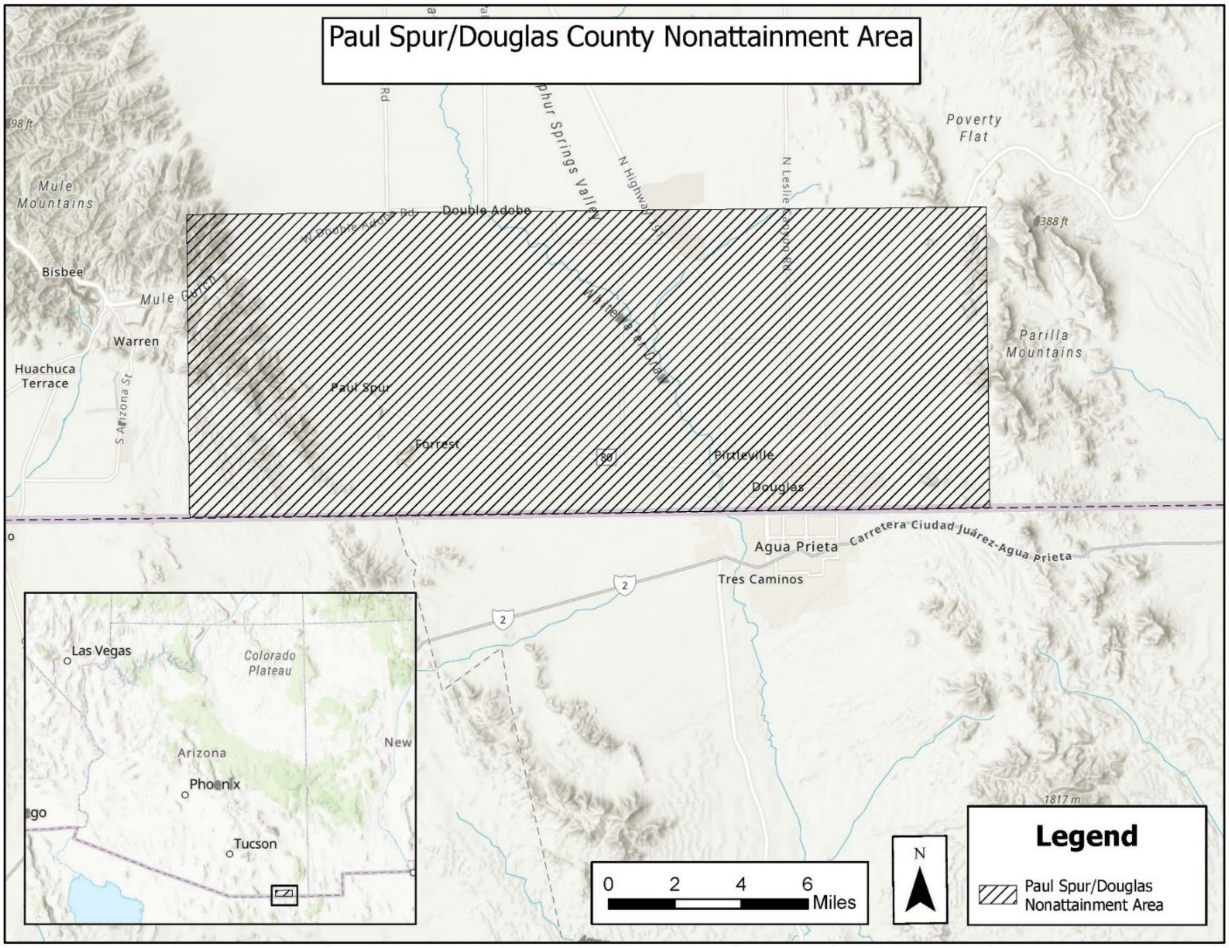


Figure 17: Paul Spur/Douglas Nonattainment Area

PM10 Hot-Spot Analysis

Overview of Analysis Approach

The project study area is located in the Paul Spur/Douglas PM_{10} nonattainment area. The project was presented to the interagency consultation group, which classified it as a project of air quality concern. Therefore, a PM_{10} hot-spot analysis was conducted.

EPA released guidance for quantifying the local air quality impacts of certain transportation projects for the PM2.5 and PM10 NAAQS in October, 2021.[1] This guidance must be used by state and local agencies to conduct quantitative hot-spot analyses for new or expanded highway or transit projects with significant increases in diesel traffic in nonattainment or maintenance areas.

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[17] https://azdeq.gov/paul-spurdouglas-pm-10-nonattainment-area

The steps required to complete a quantitative PM hot-spot analysis are summarized in Figure 19. The hot-spot analysis compares the air quality concentrations with the proposed project PM10 NAAQS. These air quality concentrations are determined by calculating a future design value, which is a statistic that describes a future air quality concentration in the project area that can be compared to a particular NAAQS. This report serves as documentation of the methodology for the PM hot-spot analysis.

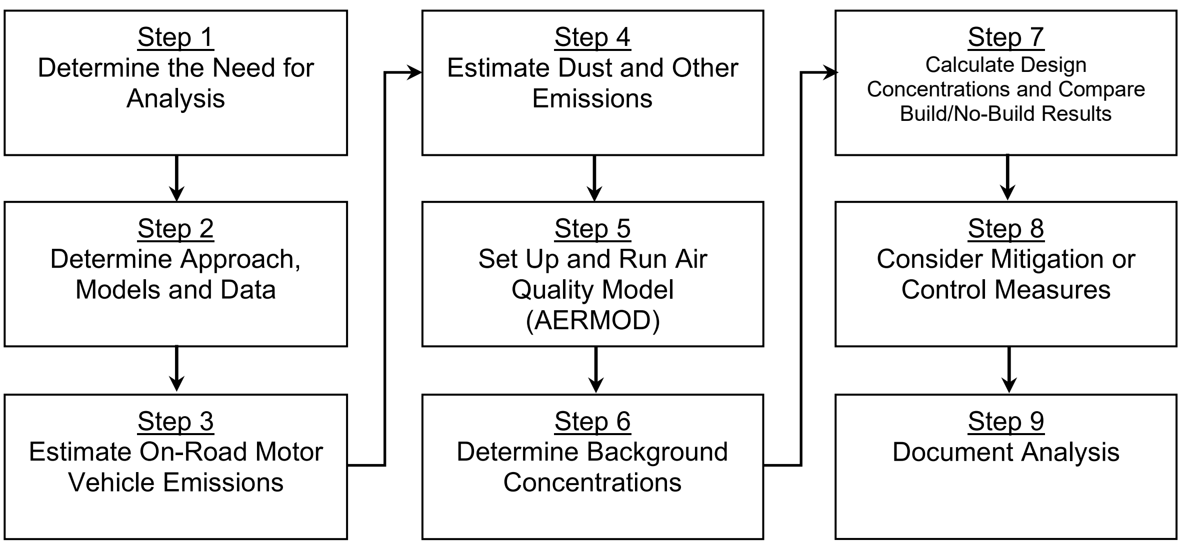

Figure 18: EPA's PM Hot-spot Analysis Process

Determine Need for Hot-spot Analysis

Section 93.109(b) of the conformity rule outlines the requirements for project-level conformity determinations. A PM10 hot-spot analysis is required for projects of local air quality concern, per Section 93.123(b)(1). The need for a quantitative PM10 analysis for the project was discussed by the interagency consultation group. The group agreed that this project is considered a Project of Air Quality Concern (POAQC) due to the increase in diesel truck traffic to the area and therefore a project level hot-spot analysis would be required for the project.

Determine Approach, Model, and Data

The PM_{10} hot-spot analysis methodology and modeling files were presented to the interagency consultation group through multiple meetings over a period ending on September 6, 2024. Based on guidance in Section 3.3.2 of EPA's PM Hot-Spot Guidance document,[1] and in consultation with

FHWA, EPA, and other agencies, the intersection of James Ranch Road and SR 80 was chosen for the purpose of demonstrating conformity. This intersection represents the location with the largest traffic volumes, lowest speeds due to the installation of a traffic signal, and most overall delay along the project. While the focus is on the intersection, the limits of the Connector Road/James Ranch Road extend to the entrance to the proposed LPOE and the limits of SR 80 extend roughly ½ mile in each direction.

The MOVES on-road vehicle emissions model requires a variety of data to accurately develop emission factors for project. This data was gathered from the Paul Spur/Douglas Regional Conformity Analysis and the Final Traffic Report for the project and formed into input files for use in the MOVES software.

The AERMOD dispersion model requires meteorological data to predict pollutant concentrations at receptors within the project area. Five years of meteorological data files were provided by Arizona DEQ based on observed surface data and upper air data from Bisbee-Douglas Airport for the 5-year period from 2015 through 2019. This meteorological data was determined to be representative of the project area conditions because of its proximity to the project site (7 miles), similarity in land use and terrain, and the data meets the completeness requirements of Section 5.3.2 of EPA's Meteorological Monitoring Guidance for Regulatory Modeling Applications.[18] Information from ADEQ that describes the processing steps and summarizes completeness determination is included in Appendix A.

All model inputs and assumptions are included in Appendix A.

Estimate On-Road Vehicle Emissions

On-road vehicle emissions were estimated using EPA's MOVES3.1 software. MOVES uses a variety of input files to determine project level emissions. Thes input files were developed using different sources including data from the Paul Spur/Douglas Regional Conformity Analysis, the Final Traffic Report for the Connector Road, and default data from MOVES. Vehicle age distribution and meteorological data were developed during the Regional Conformity Analysis and were carried over into this analysis. Default fuel specifications from MOVES were used in the absence of any additional local data. MOVES requires link specific data to estimate emissions at the project level. The intersection of the Connector Road/James Ranch Road and SR 80 was broken down into 22 links depending on movement (left turn, though, right turn) and link type (acceleration, cruise, queue). Link specific information was derived from a combination of data from the Traffic Report for the project and information from the Regional Conformity Analysis. Link information included link length, total volume, average speed, and road grade. A unique vehicle mix was also calculated for each link based on the volumes of three vehicle types (passenger, medium vehicle, and heavy vehicle) provided in the traffic data. Within each of the vehicle types, the volumes were allocated to the associated MOVES source types using the distribution of vehicle population

[18] U.S. EPA, *Meteorological Monitoring Guidance for Regulatory Modeling Applications*, February 2002. https://www.epa.gov/sites/default/files/2020-10/documents/mmgrma_0.pdf, accessed June 2024.

from the Regional Conformity Analysis. Each input is described further in Appendix A and the Traffic Report is provided in Appendix B.

PM_{10} emission factors were developed for an analysis year of 2050, which represents the year with the highest vehicle volume along the Connector Road due to the proposed LPOE and potential development in the area. Therefore, 2050 will also contain the highest levels of road dust, which is the largest contributor to PM_{10} emissions. PM_{10} emissions also vary by time of day and month. The Traffic Report contains volumes for the AM and PM peak hours but does not have volumes for midday or overnight time periods. Therefore, to be conservative, the AM volumes were used for both the midday and overnight time periods. Speed data was calculated for each link based on the link's characteristics, including speed limits, average acceleration rate, and factors related to proposed signal timing at the intersection. The Traffic Report did not associate any seasonality with the developed traffic data. A preliminary default MOVES model run was conducted to determine the month of highest emissions rates from each of the four seasons (January, April, July, and October), based on the seasonal fuel specifications. From this model run, the highest emissions occurred in July. MOVES was then run for July for each of the four time periods (AM peak, midday, PM peak, and overnight). These runs resulted in each link having a set of 4 emission factors in units of grams per hour for the year 2050. The project links are shown in Figure 20 and Figure 21.

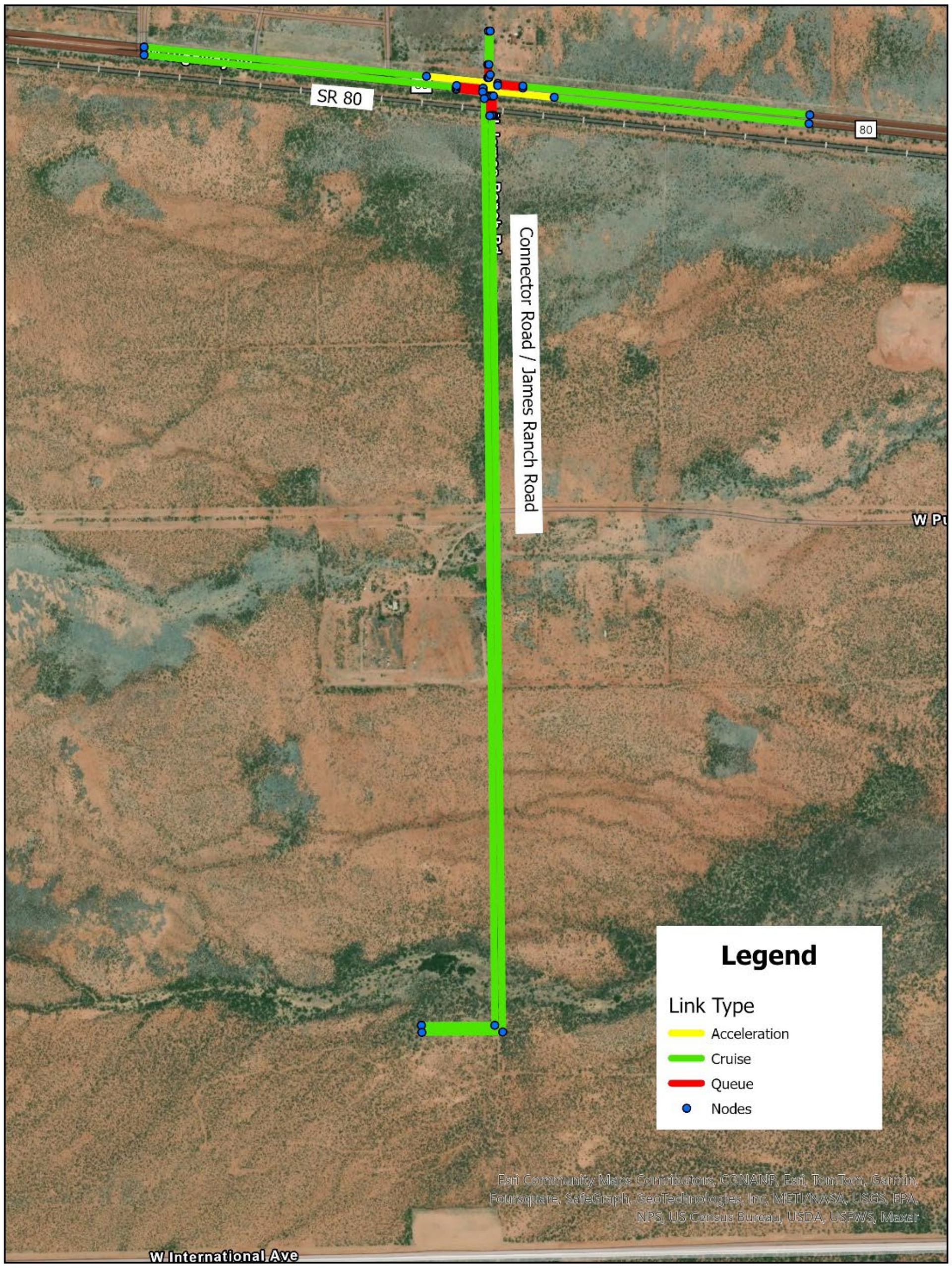

Figure 19: Project Links

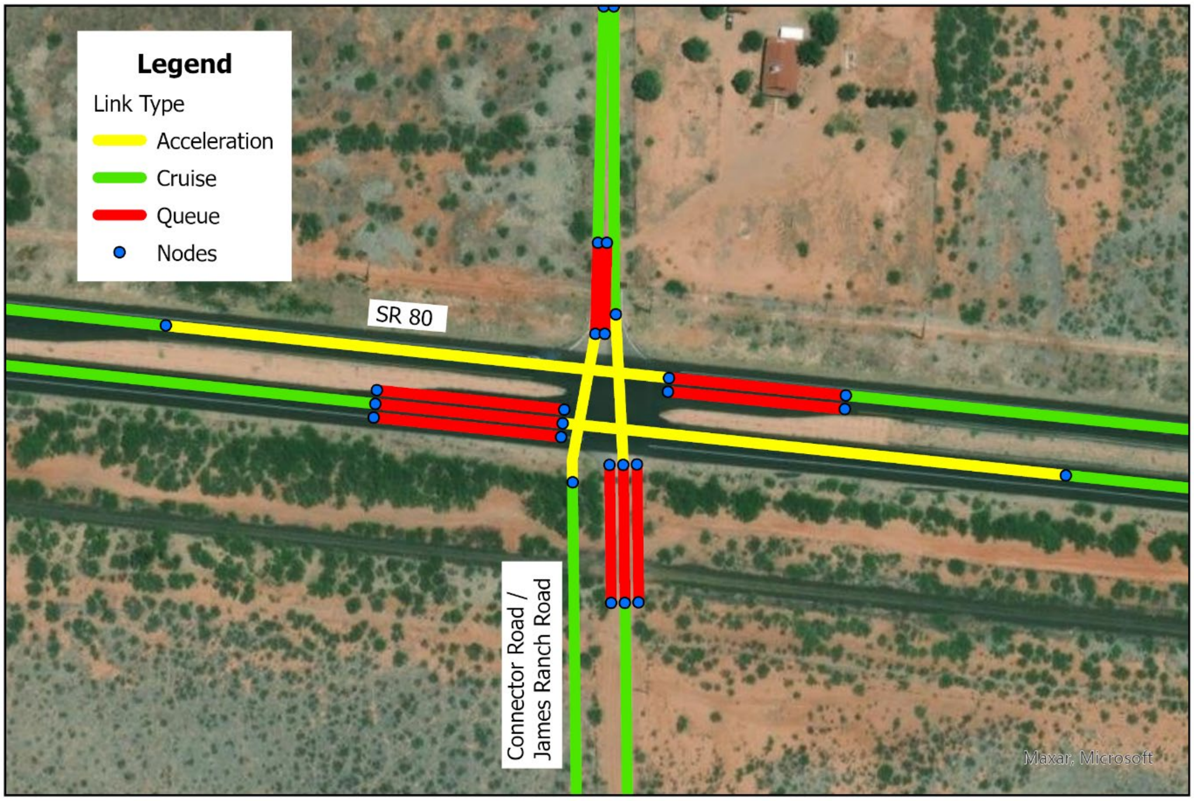

Figure 20: Project Links Intersection Zoom

Estimate Emissions from Road Dust, Construction and Additional Sources

Re-entrained road dust must be included in all PM_{10} hot-spot analyses. Section 13.2.1 of AP-42 provides a method for estimating emissions of re-entrained road dust using local values for precipitation, average vehicle weight, and silt loading.[19] In the Regional Conformity Analysis, re-entrained road dust was calculated based on factors supplied by the 2020 National Emissions Inventory (NEI). The 2020 NEI documentation provides a table for silt loading based on FHWA road type and average daily traffic volumes, as well as a table for average vehicle weights by FHWA vehicle class.[20] Using this same methodology, emission factors for road dust were developed for each segment of the Connector Road/James Ranch Road and SR 80 intersection. This data is provided below in Table 2.

[19] https://www.epa.gov/sites/default/files/2020-10/documents/13.2.1_paved_roads.pdf

[20] https://www.epa.gov/system/files/documents/2023-03/NEI2020_TSD_Section23_Dust_PavedRoads.pdf

Table 2: Road Dust Emissions Factors

Facility	ADT	K	W (tons)	sL (g/m^2)	E (g/VMT)
SR 80 (West of James Ranch Rd)	23,168	1	4.56	0.015	0.102857
SR 80 (East of James Ranch Rd)	49,580	1	5.17	0.015	0.117018
James Ranch Rd (North of SR 80)	1,440	1	1.99	0.2	0.467048
James Ranch Rd (South of SR 80)	38,676	1	6.20	0.03	0.264481

Emission factors for road dust were added to the emission factors generated for each link by MOVES for use in the AERMOD dispersion model.

Construction emissions were not included because construction will not occur at any individual location for more than five years. EPA guidance requires nearby sources of PM_{10} emissions to be included in air quality modeling when those sources are not appropriately reflected in the background data or would be affected by the project. The potential PM_{10} impacts associated with the idling activities at the LPOE were analyzed in detail in the PM_{10} Hot Spot Air Quality Memorandum – City of Douglas Commercial Land Port of Entry (POE) (Kimley-Horn, 2024), which is provided in Appendix E. Figure 22 displays the PM_{10} concentrations at the LPOE respective to the proposed Connector Road with the receptor with the 6th highest concentration denoted by a star. From this gradient, the total concentrations for the LPOE have a de minimis impact to the background emissions along the proposed Connector Road. The maximum predicted 24-hour concentrations for this receptor and the receptor at the driveway from the LPOE to the proposed Connector Road are shown in Table 3 relative to the background concentration in the area.

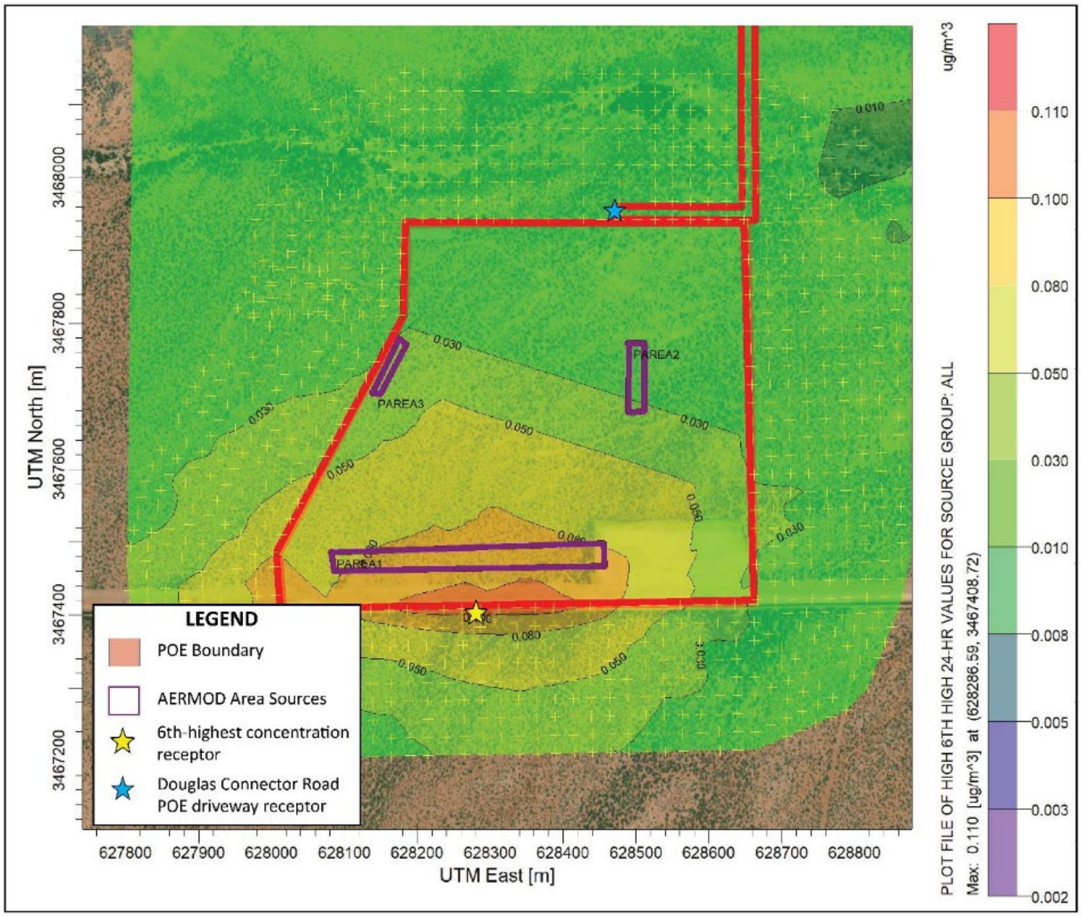

Figure 21: PM10 Concentrations at the LPOE

Table 3: Predicted PM10 Concentrations from the LPOE

Location	6th Highest PM^{10} Value (µg/m³)	Background PM^{10} Value (µg/m³)[1]	Total Concentration (µg/m³)
6th-highest maximum concentration receptor	0.11	107	107.11
Driveway at the Proposed Connector Road receptor	0.02	107	107.02

Notes:

1. Background values taken from the fourth highest concentration from three years of monitoring data from the Douglas Red Cross monitor (discussed further in this section).
2. PM_{10} concentrations at the receptors decrease with increasing distance from the source, as PM_{10} disperses and dilutes with distance.

It is assumed that PM_{10} concentrations due to any other nearby emissions sources are included in the ambient monitor values used for background concentrations. In addition, this project is not expected to result in changes to emissions from nearby sources.

Set Up and Run Air Dispersion Model (AERMOD)

EPA's AERMOD (version 23132) air dispersion model was used to estimate concentrations of PM_{10} due to the project. The model uses traffic data, emission factor data, and meteorological data to estimate ground-level concentrations of PM_{10} at a series of receptors. The model setup included a series of sources representing the roadway links provided by MOVES. The links were represented in AERMOD using a series of line sources. Link specific inputs included source location, source length and width, emission rate, release height, and initial vertical dimension.

AERMOD was run using five years of meteorological data provided by ADEQ, based on observed surface data and upper air data from Bisbee-Douglas Airport for the 5-year period from 2015 through 2019. This data meets EPA completeness criteria for dispersion modeling and is considered representative of the project area.

Receptors were placed to estimate the highest concentrations of PM_{10} in the study area to determine any possible violations of the NAAQS. The highest concentrations are expected to occur near the links with the highest estimated daily volume. Receptors were placed starting five meters from the roadway edge, extending up to 105 meters away with a spacing of 25 meters. Receptors were placed at a height of 1.8 meters. Locations where the public does not have access cannot be determined at this time because the proposed roadway is located in a rural, undeveloped area. As a result, receptors were placed at all possible locations. The receptor grid is shown below in Figure 23.

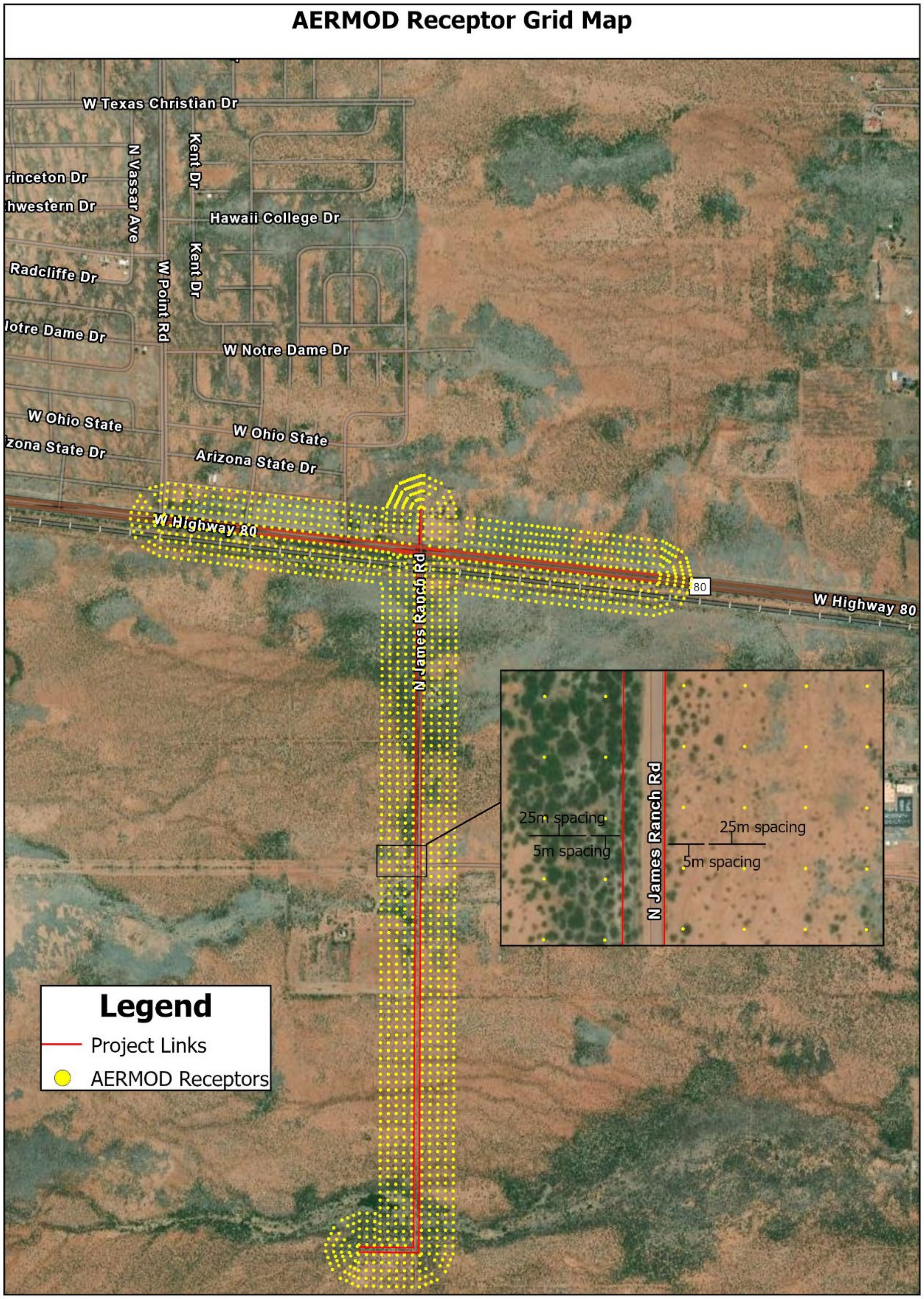

Figure 22: AERMOD Receptor Locations

Determine Background Concentrations

The Arizona Department of Environmental Quality (ADEQ) maintains two active air quality monitoring stations in the Paul Spur/Douglas PM_{10} nonattainment area:

- AQS Site ID 04-003-0011 – Paul Spur Chemical Lime Plant
- AQS Site ID 04-003-1005 – Douglas Red Cross

The locations of the two PM_{10} monitoring stations are shown in Figure 24. Table 4 shows the 24-hour PM_{10} monitoring data for the last three full years for 2021 through 2023.

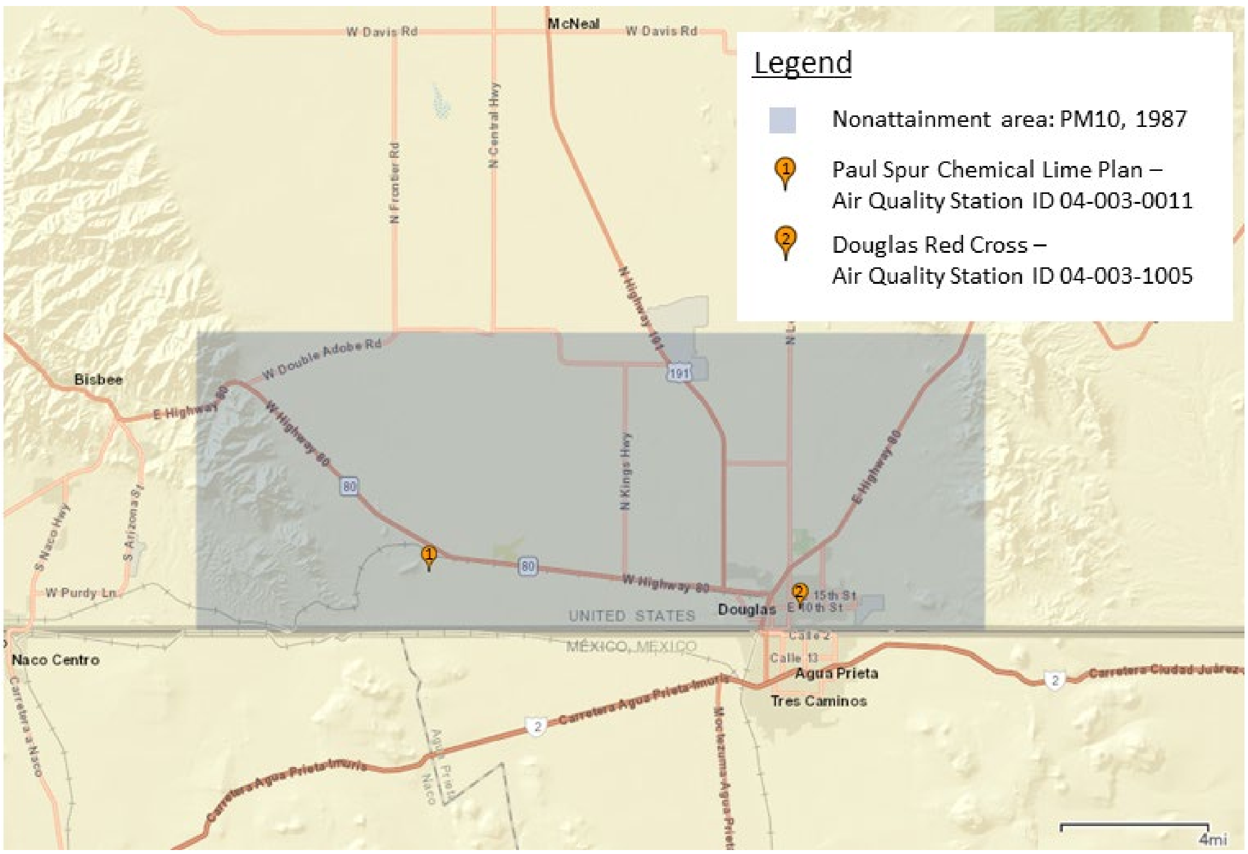

Figure 23: PM_{10} Air Quality Monitor Locations

Table 4: Paul Spur/Douglas PM_{10} Monitoring Data (2021-2023)[21]

Year	PM_{10} Maximum Concentration (µg/m^3)		Number of Days Exceeding NAAQS	
	Paul Spur	Douglas	Paul Spur	Douglas
2021	161	107	1	0
2022	91	130	0	0
2023	99	155	0	1

[21] https://www.epa.gov/outdoor-air-quality-data/interactive-map-air-quality-monitors

Annual mean PM10 concentrations for both the Paul Spur Chemical Lime Plant (ID 04-003-0011) and the Douglas Red Cross (ID 04-003-1005) monitoring stations have followed a similar trend with concentrations decreasing from 2021 to 2022 and then increasing slightly from 2022 to 2023. Each monitoring station had one day of exceedance of the National Ambient Air Quality Standards (NAAQS) for PM10 over the three-year period with max concentrations of 161 $\mu g/m^3$ at the Paul Spur station in 2021 and 155 $\mu g/m^3$ at the Douglas Red Cross station in 2023.
The fourth highest concentrations from three years of monitoring data for each monitor is 107 $\mu g/m^3$ for the Douglas Red Cross monitor and 93 $\mu g/m^3$ for the Paul Spur monitor. The proposed Connector Road is roughly halfway between the two monitors, so to be conservative, the fourth highest concentration at the Douglas Red Cross monitor was chosen as the background concentration and approved during the interagency consultation process.

The background value was added to the AERMOD modeled values for comparison to the PM_{10} NAAQS of 150 $\mu g/m^3$. The background values are conservative, because it is expected that ambient PM concentrations will be lower in future years as a result of the State Implementation Plan currently in development and the general trend in declining vehicle emissions due to technological advances. It is assumed that emissions from other nearby sources are already included in the ambient monitoring data.

Calculate Design Values and Determine Conformity

The model results were added to the background concentrations to calculate the design values. To determine the 24-hour PM_{10} design value, the following steps were used, as outlined in the guidance:

1. From the air quality modeling results from the build scenario, identify the sixth highest 24-hour concentration for each receptor. AERMOD output provides the sixth-highest modeled concentration from the 5-year period for each receptor.
2. Identify the receptor with the highest sixth-highest 24-hour concentration.
3. Identify the appropriate 24-hour background concentration from the three most recent years of air quality monitoring data. This value is 107 $\mu g/m^3$, as described above.
4. For the receptor identified in Step 2, add the sixth-highest 24-hour modeled concentration to the appropriate 24-hour background concentration (from Step 3).
5. Round to the nearest 10 $\mu g/m^3$. The result is the highest 24-hour PM_{10} design value in the build scenario. The final results are summarized in Table 5.

Consider Mitigation or Control Measures

If the total concentration of the highest 24-hour PM_{10} design value is greater than the PM_{10} NAAQS, mitigation or control measures would need to be considered to reduce emissions in the project area.

Document Analysis

This Air Quality Report documents the PM hot-spot results from the project.

PM10 Modeling Results

The modeled concentrations, including background, were compared to the PM_{10} NAAQS. The receptor with the 6th-highest maximum concentration was located along the proposed Douglas Connector Road. Figure 25 shows the receptor concentrations at the intersection with the maximum value denoted by a star.

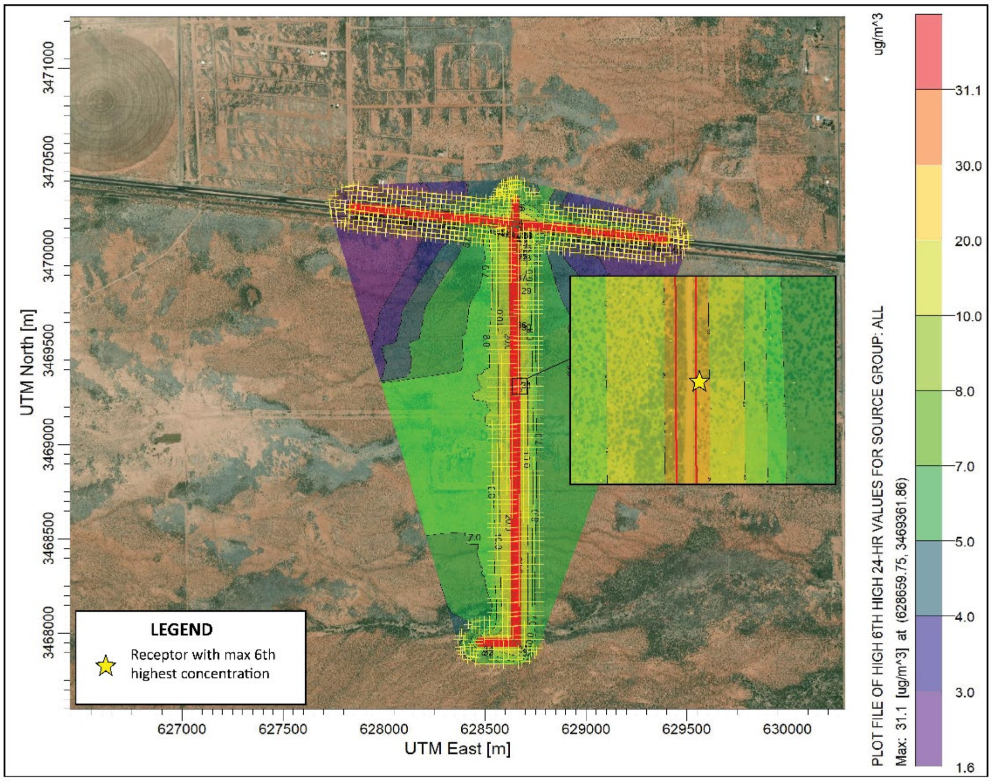

Figure 24: AERMOD PM_{10} Model Results

Table 5 presents the values used to determine the maximum predicted 24-hour PM_{10} concentrations for the intersection. The total concentrations for the project do not exceed the PM_{10} NAAQS when rounded to the nearest 10 µg/m³. Therefore, the project meets conformity requirements. Mitigation or control measures to reduce emissions in the project area do not need to be considered by the project sponsors. Modeling files are available by request.

Table 5: Predicted Project PM_{10} Concentration

Modeled Group	6th Highest PM_{10} Value (µg/m³)	Background PM_{10} Value[1] (µg/m³)	Total Concentration (µg/m³)	Total Concentration Rounded to the nearest 10 µg/m³	PM_{10} NAAQS (µg/m³)
All Project Level Links	31.06	107	138.06	140	150

Notes:

1. Background values taken from the fourth high concentration from three years of monitoring data from the Douglas Red Cross monitor.

Conformity

Section 176c of the CAA requires that transportation projects conform to the approved air quality State Implementation Plan (SIP) for meeting federal air quality standards. Conformity requirements were made substantially more rigorous in the CAA Amendments. The conformity determinations for federal actions related to transportation projects must meet the requirements of 40 CFR Parts 51 and 93. This project is not likely to cause or contribute to the severity or number of violations of the NAAQS. As an isolated rural nonattainment area, the Paul Spur/Douglas planning area is subject to a regional air quality conformity process. The planned Douglas Commercial Port of Entry Connector Road is likely to be classified as regionally significant and is not within a conforming Transportation Improvement Program (TIP). This project is included in the Southeastern Arizona Governments Organization (SEAGO) FY 2024-2028 Transportation Improvement Program.

Public Involvement

Public meetings were held on April 27 and August 3, 2023, to provide information on the project's purpose and need and to present the alternatives being evaluated, respectively. The study timeline of 24 months was also presented to inform the meeting attendees of how long it would take to prepare a Design Concept Report and an Environmental Assessment to gain project approval by ADOT. Approximately 75 comments were received at these meetings. No comments were received regarding air quality.

The Draft Air Quality Report was published on ADOT's website on October 25, 2024, with the latest modeling assumptions in force on October 25th, with no additional modeling change. Comments from the Interagency Consultation group and the public were welcome through December 9, 2024. The Interagency Consultation group was notified by email with a link to the Draft Air Quality Report for their review. Four comments were received during the review period and were addressed in this report.