Appendix E – Air Quality

U.S. Environmental Protection Agency
Construction Emission Control Checklist

Diesel emissions and fugitive dust from project construction may pose environmental and human health risks and should be minimized. In 2002, EPA classified diesel emissions as a likely human carcinogen, and in 2012 the International Agency for Research on Cancer concluded that diesel exhaust is carcinogenic to humans. Acute exposures can lead to other health problems, such as eye and nose irritation, headaches, nausea, asthma, and other respiratory system issues. Longer term exposure may worsen heart and lung disease.[3] We recommend the following applicable protective measures become commitments for Ann Arbor Airport improvements.

Mobile and Stationary Source Diesel Controls

Purchase or solicit bids that require the use of vehicles that are equipped with zero-emission technologies or the most advanced emission control systems available. Commit to the best available emissions control technologies for project equipment in order to meet the following standards.

- On-Highway Vehicles: On-highway vehicles should meet, or exceed, the EPA exhaust emissions standards for model year 2010 and newer heavy-duty, on-highway compression-ignition engines (e.g., long-haul trucks, refuse haulers, shuttle buses, etc.).[4]
- Non-road Vehicles and Equipment: Non-road vehicles and equipment should meet, or exceed, the EPA Tier 4 exhaust emissions standards for heavy-duty, non-road compression-ignition engines (e.g., construction equipment, non-road trucks, etc.).[5]
- Low Emission Equipment Exemptions: The equipment specifications outlined above should be met unless: 1) a piece of specialized equipment is not available for purchase or lease within the United States; or 2) the relevant project contractor has been awarded funds to retrofit existing equipment, or purchase/lease new equipment, but the funds are not yet available.

Consider requiring the following best practices through the construction contracting or oversight process:

- Establish and enforce a clear anti-idling policy for the construction site.
- Use onsite renewable electricity generation and/or grid-based electricity rather than diesel-powered generators or other equipment.
- Use electric starting aids such as block heaters with older vehicles to warm the engine.
- Regularly maintain diesel engines to keep exhaust emissions low. Follow the manufacturer's recommended maintenance schedule and procedures. Smoke color can signal the need for maintenance (e.g., blue/black smoke indicates that an engine requires servicing or tuning).
- Where possible, retrofit older-tier or Tier 0 nonroad engines with an exhaust filtration device before it enters the construction site to capture diesel particulate matter.
- Replace the engines of older vehicles and/or equipment with diesel- or alternatively-fueled engines certified to meet newer, more stringent emissions standards (e.g., plug-in hybrid-electric vehicles, battery-electric vehicles, fuel cell electric vehicles, advanced technology locomotives, etc.), or with zero emissions electric systems. Retire older vehicles, given the significant contribution of vehicle emissions to the poor air quality conditions. Implement

[3] Carcinogenicity of diesel-engine and gasoline-engine exhausts and some nitroarenes. *The Lancet.* June 15, 2012
[4] http://www.epa.gov/otaq/standards/heavy-duty/hdci-exhaust.htm
5 https://www.epa.gov/emission-standards-reference-guide/epa-emission-standards-nonroad-engines-and-vehicles

programs to encourage the voluntary removal from use and the marketplace of pre-2010 model year on-highway vehicles (e.g., scrappage rebates) and replace them with newer vehicles that meet or exceed the latest EPA exhaust emissions standards, or with zero emissions electric vehicles and/or equipment.

Fugitive Dust Source Controls

- Stabilize open storage piles and disturbed areas by covering and/or applying water or chemical/organic dust palliative, where appropriate. This applies to both inactive and active sites, during workdays, weekends, holidays, and windy conditions.
- Install wind fencing and phase grading operations where appropriate and operate water trucks for stabilization of surfaces under windy conditions.
- When hauling material and operating non-earthmoving equipment, prevent spillage and limit speeds to 15 miles per hour (mph). Limit speed of earth-moving equipment to 10 mph.

Occupational Health

- Reduce exposure through work practices and training, such as maintaining filtration devices and training diesel-equipment operators to perform routine inspections.
- Position the exhaust pipe so that diesel fumes are directed away from the operator and nearby workers, reducing the fume concentration to which personnel are exposed.
- Use enclosed, climate-controlled cabs pressurized and equipped with high-efficiency particulate air (HEPA) filters to reduce the operators' exposure to diesel fumes. Pressurization ensures that air moves from inside to outside. HEPA filters ensure that any incoming air is filtered first.
- Use respirators, which are only an interim measure to control exposure to diesel emissions. In most cases, an N95 respirator is adequate. Workers must be trained and fit-tested before they wear respirators. Depending on the type of work being conducted, and if oil is present, concentrations of particulates present will determine the efficiency and type of mask and respirator. Personnel familiar with the selection, care, and use of respirators must perform the fit testing. Respirators must bear a NIOSH approval number.

Kalamazoo Air Quality and Climate APPENDIX

AIR QUALITY

I. Air Quality Summary

In preparing this air quality evaluation, consideration was given to both the requirements of the Clean Air Act (CAA) and the National Environmental Policy Act (NEPA). The CAA sets the overall policy for managing air quality across the nation. Through the NEPA process, environmental effects are assessed early in the project definition process to evaluate the air quality impacts that would result from proposed projects involving a federal action. While the U.S. Environmental Project Agency (USEPA) overseas air quality in the United States, the management of air quality conditions in Michigan, including the area around the Kalamazoo Airport (AZO), is the responsibility of the Michigan Department of Environment, Great Lakes, and Energy (MEGLE).

II. Air Quality Regulatory Context

At the federal level, under the CAA, the USEPA establishes the guiding principles and policies for protecting air quality conditions in this area (and throughout the nation). USEPA's primary responsibility is to promulgate and update National Ambient Air Quality Standards (NAAQS)[1] which define outdoor levels of air pollutants that are defined to protect public health and public welfare.

The following regulations guide the consideration of air quality issues:

- **Federal Clean Air Act and Clean Air Act Amendments (CAA) (42 USC Chapter 85)**. The CAA authorized the USEPA to develop health-based ambient air quality standards. Areas where measurements exceed the standards for a specific pollutant are required to develop a plan for meeting the standard, SIP. Important elements of the Clean Air Act that could relate to federal actions addressed in this EA, described in Order 1050.1F Desk Reference, are:
  - National Ambient Air Quality Standards (NAAQS)
  - Air Quality Conformity Regulations, 42 USC §7506(c).

  In addition to the USEPA, several state agencies address air quality in the area: the Michigan Department of Environment, Great Lakes, and Energy (MEGLE), and Southeast Michigan Council of Governments (SEMCOG). USEPA has delegated authority to MEGLE to implement federal air quality requirements in Michigan. SEMCOG is the metropolitan planning organization (MPO) responsible for tracking requirements under the state and federal transportation conformity regulations.

  USEPA has established ambient air quality standards (see **Table 1-1**). These standards are designed to protect public health and welfare.

1 USEPA, National Ambient Air Quality Standards (NAAQS) at https://www.epa.gov/criteria-air-pollutants/naaqs-table.

FAA Order 1050.1F identifies FAA's NEPA thresholds of significance for use in NEPA evaluations. The FAA's air quality threshold of significance is triggered if "The action would cause pollutant concentrations to exceed one or more of the National Ambient Air Quality Standards (NAAQS), as established by the USEPA under the CAA, for any of the time periods analyzed, or to increase the frequency or severity of any such existing violations."[2]

TABLE 1-1:
NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant		Primary/ Secondary	Averaging Period	Standards	Form
CO		Primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Pb		Primary and Secondary	Rolling 3-month average	0.15 µg/m^3	Not to be exceeded
NO_2		Primary	1-hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Primary and Secondary	Annual	53 ppb	Annual mean
O_3		Primary and Secondary	8-hour	0.070 ppm	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
PM	$PM_{2.5}$	Primary	Annual	12 µg/m^3	Annual mean, averaged over 3 years
		Secondary	Annual	15 µg/m^3	Annual mean, averaged over 3 years
		Primary and Secondary	24-hour	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	Primary and Secondary	24-hour	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
SO_2		Primary	1-hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

Notes: ppb – parts per billion, µg/m^3 – micrograms per cubic meter of air, and ppm – parts per million.
Source: EPA, National Ambient Air Quality Standards (NAAQS) at https://www.epa.gov/criteria-air-pollutants/naaqs-table, April 2019.

The USEPA designates areas as having air pollutant levels that either meet/are lower than the NAAQS or exceed the NAAQS. An area with measured pollutant concentrations which meets the NAAQS is designated as an attainment area , whereas an area with pollutant concentrations that exceed the NAAQS is designated as a nonattainment area. After air pollutant

[2] FAA Order 1050.1F, Para 4-3.3.

concentrations in a nonattainment area are reduced to levels that meet or are below the NAAQS, the USEPA re-designates the area to be a maintenance area. The USEPA's other responsibilities include the approval of State Implementation Plans (SIPs). SIPs are plans developed by a state that identify how an area would be brought into attainment if a specific area exceeds the NAAQS. **Table 1-2** below shows the status of Kalamazoo County relative to each of the criteria pollutants.

- **General/Transportation Conformity:** The CAA prohibits federal agencies from approving projects that occur in a nonattainment or maintenance area if they do not conform with the SIP. There are two forms of conformity: a) transportation conformity, which applies to roadway and transit projects, and b) general conformity, which applies to all other federal actions. The General Conformity Rule of the CAA prohibits the FAA from permitting or funding projects located in a nonattainment or maintenance area that do not conform to a SIP. It is important to note that areas that have been within two consecutive 10-year period maintenance designations are no longer subject to General Conformity. Finally, areas are designated as unclassifiable when there is a lack of sufficient data to determine the status of air quality conditions.

TABLE 1-2
Clean Air Act Criteria Pollutant Designation

Pollutant	Designation (Kalamazoo County)
Ozone (8-hour)	
2015 Standard (7 county area)	Attainment
2008 Standard	Attainment
1997 Standard (revoked)	Not applicable
Ozone (1-hour) – 1979 (revoked)	Not Applicable
Carbon Monoxide	Attainment
PM2.5	Attainment
PM10	Attainment
Sulfur Dioxide	Attainment
Nitrogen Dioxide	Attainment
Lead	Attainment

As of December 31, 2021 (USEPA Greenbook) - https://www.epa.gov/green-book/green-book-8-hour-ozone-2008-area-information

III. Air Quality Affected Environment

Kalamazoo Airport (AZO) is in Kalamazoo County which is part of the USEPAs Kalamazoo-Battle Creek airshed. **Table 1-2** shows the status of Kalamazoo County relative to each of the criteria pollutants. As a result, the General Conformity rule does not apply as the airport is in an attainment area for all pollutants.

MELGE conducts measurement throughout the state to ensure movement toward attainment. Measurements in the Kalamazoo-Battle Creek Area are conducted in Kalamazoo Fairgrounds

(1400 Olmstead Rd – site 260770008) in 2019-2020[3] The State measures Ozone and PM2.5 at this site.[4] Ozone data for this site in 2020 showed the highest value was 70 parts per billion (ppb), below the maximum allowable level of 79 ppb. Within the state measurement system violations of the 2015 ozone standard were noted at Coloma, Holland, and Muskegon.[5] A review of measurement results from 1992 through 2020 indicate that in Kalamazoo, the last noted ozone exceedance was in 2018.[6] Measurements of PM2.5 between 2019 and 2020 indicate concentrations ranging from 7.1 to 7.7 annual mean micrograms per cubic meter (µg/m3), in comparison to the NAAQS of 12 µg/m3.

An operational emissions inventory for aviation sources was prepared for AZO using the FAA's current Aviation Environmental Design Tool (AEDT) Version 3e. **Table III-1** lists the emissions for each of the criteria pollutants. The operational emissions inventory represents the sources of equipment operating based upon the activity occurring at the Airport during 2019. This includes aircraft, auxiliary power units (APU), and ground support equipment (GSE). AEDT does not generate an emissions inventory for Lead. However, as AEDT quantifies fuel use, the lead content in AvGas was used to quantify lead emissions using information from ACRP Web-Only Report 21 *Quantifying Aircraft Lead Emissions at Airports*.

TABLE III-1
EXISTING (2019) AIRPORT OPERATIONS EMISSIONS INVENTORY (TONS/YEAR)

Source	Carbon Monoxide (CO)	Volatile Organic Compounds (VOC)	Nitrogen Oxides (NOX)	Sulfur Oxides (SOX)	PM10	PM2.5	Lead| (Pb)
Aircraft in LTO	365.5	9.2	14.0	2.2	0.5	0.5	0.9
APU	2.3	0.1	1.0	0.2	0.2	0.2	NA
GSE	6.6	0.2	0.6	0.0	<0.1	<0.1	NA
Total	374.4	9.6	15.6	2.4	0.7	0.7	0.9

NA: Not applicable. Note may not add due to rounding.
Source: Mead & Hunt, February 2023

As reflected in **Table III-1**, the greatest amount of NAAQS emissions was of carbon monoxide at 374.4 tons. Aircraft in the landing and takeoff cycle (operating to and from the airport until reaching 3,000 feet about ground), result in nearly 98% of the carbon monoxide emissions. NOx emissions were 15.6 tons, whole VOC was slightly less than 10 tons and SOx was 2.4 tons. Emissions of PM10 (coarse particles), PM2.5 (fine particles), and lead were less than 1 ton each.

[3] Table 11, Michigan's 2020 Annual Ambient Air Monitoring Network Review.
[4] MEGLE, Air Quality Annual Report 2020, https://www.michigan.gov/documents/egle/air-quality-2020_733675_7.pdf
[5] https://www.michigan.gov/documents/deq/deq-aqd-mm-ozone-8hrhighestcurrent_256060_7.pdf.
[6] https://www.michigan.gov/documents/deq/deq-aqd-mm-ozone-8hrhighestprevious_256065_7.pdf

IV. Air Quality Future No Action and With Proposed Action Emissions Inventory

Emissions inventories were also prepared for the future conditions under the No Action and the Proposed Action condition. Emissions were separated by construction (emissions by vehicles necessary to construct Proposed Action) and operational emissions (emissions once proposed construction is completed).

a. Construction Emissions

No project-related construction emissions would be expected with the No Action, as the Proposed Action development would not occur.

Construction emissions for the Proposed Action were calculated using the USEPA MOVES3 model[7] emission factors and construction equipment use estimates from the Airport Cooperative Research Program (ACRP) Report 102 *Guidance for Estimating Airport Construction Emissions*. Obstruction removal and rail line relocation construction would occur during 2024, with the runway extension being completed in 2025.

TABLE IV-1 Proposed Action Construction Emissions by Construction Year (tons per year)

Construction Year	Carbon Monoxide (CO)	Volatile Organic Compounds (VOC)	Nitrogen Oxides (NO_X)	Sulfur Oxides (SO_X)	PM_{10}	$PM_{2.5}$	Lead| (Pb)
2024	7.4	1.6	11.2	<0.1	1.1	1.1	NA
2025	8.6	1.7	11.9	<0.1	1.1	1.0	NA

Note construction emissions capture on-road and off-road vehicles as well as fugitive emissions. NA=Not applicable.
Source: Synergy, February 2022.

Construction emissions would be greatest during 2025 due to the earthmoving associated with the runway and taxiway project. Peak project-related construction emissions would be associated with NO_x emissions, as 11.9 tons in 2025 and 11.2 tons in 2024. CO emissions would be the second most dominant emissions at 8.6 tons in 2025 and 7.4 tons in 2024. Emissions of other pollutants would individually be less than 2 tons per year. Construction emissions would be less than the de minimis threshold (100 tons for maintenance areas) and thus not significant in each year, or if the construction process was completed in a 12 month period.[8]

b. Operational Emissions

Aircraft, APU, and ground support equipment emissions were estimated using the FAA's Aviation Environmental Design Tool (AEDT) Version 3e. Input data used for the noise analysis was also used for estimating emissions. Both the No Action (the existing airport facilities with forecast activity levels in 2024 and 2029 were considered). Impacts of the Proposed Action were assessed using the same activity levels but reflecting the proposed improvements. The runway extension would alter aircraft taxi distance, and thus time traveled.

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7 https://www.epa.gov/moves/latest-version-motor-vehicle-emission-simulator-moves as well as the USEPA AFLEET2020 tool for on-road vehicles.

8 While the general conformity rule does not apply, the maintenance area de minimis thresholds were used to place the resultant project-related emissions in context.

The relocation of the Grand Elk Railroad line – Upjohn Industrial Spur (a class III line) would cause a slight increase in the distance travelled by rail cars. To estimate the change in rail emissions,[9] estimates were made for the added distance the relocated line would experience (about 600 additional feet), and the number of daily trains that use the line (estimated at 3 trains per day, with 10 cars per train).[10] It was estimated that the added distance would increase the locomotive fuel consumed by about 114 gallons annually, resulting in additional criteria pollutant emissions. The predominant emissions from the added distance rail related diesel emissions would be less than 0.1 ton per pollutant per year; emissions of NOx would be the dominant diesel pollutant at less than 0.03 ton per year.

TABLE IV-2
AIRPORT OPERATIONAL EMISSIONS INVENTORY
(TONS/YEAR)

Alternative	Carbon Monoxide (CO)	Volatile Organic Compounds (VOC)	Nitrogen Oxides (NO_X)	Sulfur Oxides (SO_X)	PM_{10}	$PM_{2.5}$	Lead| (Pb)
2024 No Action							
Rail Relocation	NA	NA	NA	NA	NA	NA	NA
Aircraft, APU, and GSE	378.5	10.8	18.2	2.9	0.8	0.8	1.2
Subtotal	378.5	10.8	18.2	2.9	0.8	0.8	1.2
Proposed Action							
Rail Relocation	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Aircraft, APU, and GSE[11]	388.0	11.7	18.5	3.0	0.9	0.9	1.2
Subtotal	388.0	11.7	18.5	3.0	0.9	0.9	1.2
2024 ***Project-related***	***9.5***	***0.9***	***0.3***	***0.1***	***<0.1***	***<0.1***	***<0.1***
2029							
No Action							
Rail Relocation	NA	NA	NA	NA	NA	NA	NA
Aircraft, APU, and GSE	370.8	10.4	17.1	2.8	0.9	0.9	1.1
Subtotal	370.8	10.4	17.1	2.8	0.9	0.9	1.1
Proposed Action							
Rail Relocation	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Aircraft, APU, and GSE	380.1	11.3	17.4	2.9	0.9	0.9	1.2
Subtotal	380.1	11.3	17.4	2.9	0.9	0.9	1.2
2029 Project-related	**9.3**	***0.9***	***0.3***	***0.1***	***<0.1***	***<0.1***	***<0.1***

Note: Project-related reflects the difference between the Proposed Action and the No Action. May not add due to rounding. NA= Not applicable.

9 USEPA *2021 SmartWay Rail Carrier Partner Tool: Technical Documentation*; USEPA, EPA-420-B-21-016, https://www.epa.gov/sites/default/files/2021-04/documents/420b21016.pdf (for NOx, and PM), 2004 Revised Guidance for Locomotive Emissions by Sierra Research, http://www.csun.edu/~lcaretto/paper/railroadInventoryGuidanceFinal.pdf for CO, VOC, and SO2.

10 The Watco web site notes 22,000 carloads per year for 55 customers are served by the Grand Elk Railroad. As this spur is the end of the line, the analysis assumes half of this traffic would occur on the Upjohn Industrial Spur.

11 For conservative evaluation purposes, the 2024 operational emissions assume that the runway extension has been completed to identify the project-related emissions change.

Source: Aircraft emissions: Mead & Hunt, February 2023; Rail emissions: Synergy Consultants, 2022.

c. Air Quality Conclusion

Adding the construction emissions in 2024 to the 2024 airport operating emissions would increase the project-related emissions. This total project-related emissions would increase from the data shown in **Table IV-2** to 16.9 tons of carbon monoxide (7.4 tons of construction and 9.5 tons of airport operating emissions); VOC at 2.5 tons (1.6 tons from construction and 0.9 tons from airport operations); NOx at 11.5 tons (11.2 tons from construction and 0.3 tons from airport operations); SOx would remain at 0.1 ton (<0.1 ton from construction and 0.1 ton from airport operations); and PM emission (both PM_{10} and $PM_{2.5}$) would each remain at 1.1 ton and lead at less than 0.1 ton.

Construction would be completed in 2025, and thus, airport operations emissions would be the project-related emissions as noted in **Table IV-2**.

When contrasting the project-related emissions in 2024 and 2029 with the General Conformity de minimis thresholds for a maintenance area (100 tons per year), the project-related emissions would not be signfiicant as they would all be below the de minimis.

V. CLIMATE

Greenhouse gases are those that trap heat in the earth's atmosphere. Greenhouse gases are produced both naturally and through anthropogenic sources, and they include water vapor (H_2O), carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and ozone (O_3). Research has shown that there is a direct correlation between fuel combustion and greenhouse gas emissions. Therefore, sources that require fuel or power at an airport are the primary sources that would generate greenhouse gases.

The primary source of greenhouse gas emissions at an airport are associated with aircraft operation and the short-term emissions from construction equipment activity. **Table V-1** summarizes the CO2 emissions in 2019 from aircraft operations at AZO, as well as a forecast of emissions in 2024 and 2029.

TABLE V-1
SUMMARY OF AIRPORT-RELATED GREENHOUSE GAS EMISSIONS (CO_2)

Condition/year	Greenhouse Gas Emissions (CO_2) (metric tons per year)
Existing (2019)	5,366.9
Year 2024 Aircraft Operations	
No Action	6,358.1
Proposed Action	6,610.1
Subtotal Project Related	252.0
Project Construction (2024)	5,661.3
Project Related (2024)	12,271.4
Year 2029 Aircraft Operations	
No Action	6,111.3
Proposed Action	
Aircraft	6,357.5
Relocated rail (annually)	1.2
Subtotal Proposed Action	6,358.7
Project Related (2029)	247.4

Source: Synergy Consultants for construction, Mead & Hunt for aircraft operations, February 2023

V.1 Regulatory Setting

Although there are no federal standards for aviation-related greenhouse gas emissions, it is well established that greenhouse gas emissions affect climate.[12] According to FAA Order 1050.1F, the discussion of potential climate impacts should be documented in a separate section of the NEPA

[12] FAA, An Environmental Desk Reference for Airport Actions, October 2007. https://www.faa.gov/airports/environmental/environmental_desk_ref/.

document, distinct from air quality. Where the proposed action would result in an increase in greenhouse gases emissions, the emissions should be assessed either qualitatively or quantitatively. There are no significance thresholds for aviation greenhouse gas emissions, and it is not required for the NEPA analysis to attempt to link specific climate impacts to the proposed action or alternative(s) given the small percentage of emissions that aviation projects contribute.

Following procedures detailed in FAA's 1050.1F Desk Reference, FAA's policy is that greenhouse gas emissions should be quantified in a NEPA document when there is a reason to quantify emissions for air quality purposes or when changes in the amount of aircraft fuel used are computed/reported. The FAA does not have a threshold of significance for climate, and thus, the information presented in this section is for information purposes.

V.2 Affected Environment

In terms of relative U.S. contribution, the U.S. General Accounting Office (GAO) reports that aviation accounts "for about 3% of total U.S. greenhouse gas emissions from human sources, according to USEPA data" compared with other industrial sources, including the remainder of the transportation sector (20%) and power generation (41%).[13] The International Civil Aviation Organization (ICAO) estimates that greenhouse emissions from aircraft account for roughly 3 percent of all anthropogenic greenhouse gas emissions globally. Climate change due to greenhouse gas emissions is a global phenomenon, so the affected environment is the global climate.[14]

The most recent greenhouse gas inventory prepared by the USEPA for the United States is for the year 2020.[15] In 2020, the U. S. emitted about 5,215.6 million metric tons of CO_2 equivalent. Aviation emissions represented 189 million metric tons of the U.S. inventory, or about 3.6% of all greenhouse gas emissions.

The FAA's AEDT model was used to quantify aircraft emissions CO_2 emissions for 2019. That quantification found that aircraft emissions from operations at AZO represented 5,366.9 metric tons of CO_2. In the context of total U.S. emissions (5,215.6 million metric tons), the total aircraft emissions in at AZO were less than 0.01% of the total US emissions.

V.3 Environmental Consequences

No Action Emissions

The No Action Alternative would retain the Airport as it exists today, as activity increases in the future. The following greenhouse gas emissions were identified.

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[13] IPCC Report as referenced in U.S. General Accounting Office (GAO) *Environment: Aviation's Effects on the Global Atmosphere Are Potentially Significant and Expected to Grow*; GAO/RCED-00-57, February 2000, p. 14; GAO cites available USEPA data from 1997.

[14] As explained by the U.S. Environmental Protection Agency, "greenhouse gases, once emitted, become well mixed in the atmosphere, meaning U.S. emissions can affect not only the U.S. population and environment but other regions of the world as well; likewise, emissions in other countries can affect the United States." Climate Change Division, Office of Atmospheric Programs, U.S. Environmental Protection Agency, *Technical Support Document for Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act* 2-3 (2009), available at http:// USEPA.gov /climatechange/endangerment.html.

[15] https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks . See page 2-36 for aviation emissions (Commercial and other aviation).

Construction Impacts: No construction would occur with this alternative.

Operational Impacts: The Airport would continue to operate as it does today, but over time, activity would be expected to increase as reflected in the forecast. As is shown in **Table V-1**, with this alternative, CO_2 emissions would increase over the existing conditions from 5,367 metric tons in 2019 to 6,358 metric tons per year by 2024 and 6,111.3 metric tons in 2029 This change is due to the slight increase in aircraft operations that are expected between the timeframes.

V.4 Proposed Action Emissions

With the Proposed Action, construction emissions would be generated to construct the proposed projects. Once operational, slight changes in aircraft taxi distances would occur, altering the fuel use of aircraft.

Construction Impacts: Using the same methodology deployed to calculate criteria pollutant emissions during construction (USEPA's MOVES3 model) using the same assumptions used to calculate criteria pollutant emissions, CO_2 emissions were calculated. Construction emissions to complete the proposed development would generate about 5,661.3 metric tons of CO_2 during the construction phase.

Operational Impacts: **Table V-1** lists the aircraft operational emissions with the Proposed Action at 6,610.1 metric tons in 2024 and 6,357.5 metric tons by 2029. This would be an increase of 252 metric tons over the No Action in 2024, and 246 metric tons over the No Action in 2029. The increased travel distance associated with the rail line would result in the consumption of 114 additional gallons of diesel fuel each year, generating 1.2 metric tons of CO_2. The added rail emissions would increase operational project-related emissions to 247.4 metric tons per year.

Because construction of the Proposed Action is expected to occur in 2024 and 2025, the project-related emissions from construction were added together and then added to the 2024 operational emissions such that airport-related emissions would reach 12,271.4 metric tons in 2024 but decrease after construction is completed to 6,357.5 metric tons per year. As total airport-related emissions would be below 0.02% of total US greenhouse gas emissions (12,271 metric tons out of 5,215.6 million metric tons) using the conservatively high project-related emissions, the Proposed Action is not expected to result in significant climate forcing emissions based upon the information noted above.