APPENDIX E

FALCON FIELD AIRPORT
AIR QUALITY/CLIMATE ASSESSMENT

Prepared for:
Jviation, Inc.

Prepared by:
KB Environmental Sciences, Inc.

October 2019

KB Environmental Sciences

Table of Contents

1. INTRODUCTION

This report documents the methodologies and presents the results of the air quality and climate assessments that were conducted to support an Environmental Assessment (EA) that is being prepared for the proposed improvements, known as the Mesa Hangars/Davcon Development project (the "Proposed Action"), at Falcon Field Airport (FFZ), in Maricopa County, Arizona.

2. REGULATIONS AND CURRENT CONDITIONS

The following provides an overview of the regulatory framework that drives the need for the air quality and climate assessments and describes existing air quality and climate conditions (i.e., the Affected Environment) within the EA's study area. Potential air quality and climate impacts with the improvements ("Proposed Action") and without the improvements ("No Action") are presented in **Section 3** (i.e., Environmental Consequences).

Regulatory Agencies

At the federal level, under the Clean Air Act (CAA), the U.S. Environmental Protection Agency (EPA) establishes the guiding principles and policies for protecting air quality conditions in the study area (and throughout the nation). EPA's primary responsibility is to promulgate and update National Ambient Air Quality Standards (NAAQS)[1] which define outdoor levels of air pollutants that are considered safe for the health and welfare of the public. The EPA's other responsibilities include the approval of State Implementation Plans (SIPs)—plans that detail how a state will comply with the CAA.

Also, at the federal level, the Federal Aviation Administration (FAA) is the primary agency involved in, and responsible for, ensuring that air quality impacts associated with proposed airport projects adhere to the reporting and disclosure requirements of the National Environmental Policy Act (NEPA) as well as the General Conformity Rule of the CAA. The General Conformity Rule is applicable to non-highway projects that are funded, licensed, permitted, or approved by a federal agency. The rule ensures that project-related air pollutant emissions do not contribute to the degradation of air quality conditions in a project area.

At the state level, the Arizona Department of Environmental Quality (ADEQ) is responsible for enforcing the CAA (including compliance with the NAAQS), issuance of air emission source permits, monitoring of air quality conditions, and assisting in the preparation of Arizona's SIP. In addition to ADEQ, there are local air planning organizations that share in the responsibility of completing SIP requirements. The Maricopa Association of Governments (MAG) and the Pima Association of Governments (PAG) are metropolitan planning organizations that have been delegated the responsibility to complete SIP revisions for their respective county areas.

MAG is the regional air quality planning agency and Metropolitan Planning Organization (MPO) for transportation for Maricopa County. This includes the Phoenix area and the neighboring urbanized area in Pinal County containing the Town of Florence and City of Maricopa. MAG provides regional planning and policy decisions in areas of transportation, air quality, water quality, economic development, and human services.

National Ambient Air Quality Standards

The CAA requires the EPA to establish and periodically review NAAQS. There are NAAQS for six "criteria" air pollutants—carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM), and sulfur dioxide (SO_2). There are standards for two sizes of PM—$PM_{2.5}$ which are particles with a diameter of 2.5 microns or less and PM_{10} which are particles with a diameter of 10 microns or less. There are also two

[1] EPA, National Ambient Air Quality Standards (NAAQS) at https://www.epa.gov/criteria-air-pollutants/naaqs-table, September 2019.

sets of standards. Primary standards provide protection for the health of the public and secondary standards provide public welfare protection. The NAAQS and their averaging periods are provided in **Table 1**.

Table 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	1 year	53 ppb(1)	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	1 year	12 µg/m^3	Annual mean, averaged over 3 years
		Secondary	1 year	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, ppm = parts per million, and µg/m^3 = micrograms per cubic meter of air.
carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM), sulfur dioxide (SO_2).
(1) The level of the annual NO_2 standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of comparison to the 1-hour standard level.
Source: EPA, National Ambient Air Quality Standards (NAAQS) at https://www.epa.gov/criteria-air-pollutants/naaqs-table, September 2019.

Attainment/Nonattainment Designations

The EPA designates areas as having air pollutant levels that are either within or in violation of the NAAQS. An area with measured pollutant concentrations which are meeting the NAAQS is designated as an Attainment area and an area with pollutant concentrations that exceed the NAAQS is designated as a Nonattainment area. After air pollutant concentrations in a Nonattainment area are reduced to levels that meet the NAAQS, the EPA re-designates the area to be a Maintenance area for a period of 20 years. An area is designated as Unclassifiable when there is a lack of sufficient data to determine the status of a pollutant within the area.

Based on air quality data, emissions and emissions-related data, meteorology, geography/topography, and jurisdictional boundaries, the EPA designated Maricopa County to be an Attainment area for Pb, NO_2, $PM_{2.5}$, and SO_2, a Maintenance area for CO, and a Nonattainment area for PM_{10} and O_3. Notably, the area is currently designated Nonattainment for two O_3 standards. The first standard was promulgated by the EPA in 2008 and the second standard, which is lower than the 2008 standard, was promulgated in 2015. Ozone nonattainment

areas are further classified as extreme, severe, serious, moderate, or marginal; and PM are either classified as moderate or serious. The current air quality designations within Maricopa County are presented in **Table 2.**

Table 2 – Air Quality Designation

Area Name	Pollutant (Year)	Designation
Maricopa County	CO (1971)	Maintenance
	8-Hour O_3 (2008)	Nonattainment - Moderate
	8-Hour O_3 (2015)	Nonattainment - Marginal
	PM_{10} (1987)	Nonattainment - Serious

Source: EPA, Greenbook, Arizona Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants at https://www3.epa.gov/airquality/greenbook/anayo_az.html , September 2019.

CAA Conformity Requirements

As previously stated, the General Conformity Rule of the CAA prohibits federal agencies (including the FAA) from permitting or funding non-highway projects that do not conform to a SIP. Because the Proposed Action is within Maricopa County, an area designated as Maintenance for CO and Nonattainment for PM_{10} and O_3, a General Conformity Applicability Analysis is required. This analysis is a comparison of project-related emissions of the pollutant(s) for which an area is designated Nonattainment to prescribed *de minimis* threshold levels. If project-related emissions exceed the thresholds, a Formal Conformity Determination is required to demonstrate that the project conforms to the applicable SIP. Conversely, if project-related emissions are below *de minimis* thresholds the project is assumed to conform to the SIP.

In the case of O_3, this pollutant is not emitted directly by any one source of emissions. Instead, emissions of nitrogen oxides (NO_x) and volatile organic compounds (VOC) combine in the presence of sunlight to form the pollutant. Therefore, the General Conformity *de minimis* thresholds for O_3, are for emissions of NO_x and VOC. The *de minimis* thresholds for all applicable maintenance/nonattainment pollutants (and the precursors) are presented in **Table 3**.

Table 3 – General Conformity *De Minimis* Threshold Levels

Pollutant/Precursors		Tons/Year
CO		100
PM_{10}		70
O_3	NO_x	100
	VOC	100

Source: EPA, General Conformity De Minimis Tables, https://www.epa.gov/general-conformity/de-minimis-tables, September 2019.

The CAA also contains a Transportation Conformity Rule that functions similar to the General Conformity Rule. The Transportation Conformity Rule restricts federal funding to highway or transportation projects that do not conform to a SIP. As with General Conformity, Transportation Conformity regulations apply only to Federal actions located within a Nonattainment or Maintenance area. Because the Proposed Action would not be developed, funded, or approved by the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA), the Transportation Conformity regulations of the CAA do not apply to the Proposed Action.

NEPA Requirements

In addition to the General Conformity Rule requirements, Section 102(2) of the NEPA also requires environmental review of federally-funded projects that have the potential to affect the environment irrespective of location or air quality designation (i.e., Nonattainment/Maintenance areas). The emission inventories presented in **Section 3**, which disclose project-related emissions of criteria pollutants and precursors, as well as greenhouse gases (GHGs), were prepared to meet this criterion of environmental review under NEPA.

Climate

Research has shown that an increase in atmospheric GHG emissions is significantly affecting the Earth's climate. These conclusions are based upon a scientific record that includes substantial contributions from the United States Global Change Research Program (USGCRP)—a program mandated by Congress in the Global Change Research Act to "assist the Nation and the world to understand, assess, predict, and respond to human-induced and natural processes of global change.[2] In 2009, based primarily on the scientific assessments of the USGCRP, as well as the National Research Council (NRC) and the Intergovernmental Panel on Climate Change (IPCC), the EPA issued a finding that it was reasonable to assume that changes in our climate caused by elevated concentrations of GHG in the atmosphere endanger the public health and public welfare of current and future generations.[3] In 2015, EPA acknowledged more recent scientific assessments that "highlight the urgency of addressing the rising concentration of carbon dioxide (CO_2) in the atmosphere".[4]

The EPA and the FAA traditionally work within the standard-setting process of the International Civil Aviation Organization's (ICAO) Committee on Aviation Environmental Protection (CAEP) to establish international emission standards and related requirements, which individual nations later adopt into domestic law. In February of 2016, ICAO/CAEP agreed on the first-ever international standards to regulate CO_2 emissions from aircraft. In July of 2016 the EPA formally announced that GHG emissions from certain classes of aircraft engines contribute to climate change. In March of 2017, the ICAO Council adopted a new aircraft CO_2 emissions standard which will reduce the impact of aviation GHG emissions on the global climate.[5]

Although there are currently no federal standards for aviation-related GHG emissions, it is well-established that GHG emissions can affect climate. The CEQ has indicated that climate should be considered in NEPA analyses and in 2016 released the final guidance titled "Final Guidance for Federal Departments and Agencies on Consideration of GHG Emissions and the Effects of Climate Change in NEPA Reviews," for federal agencies on how to consider the impacts of their actions on global climate change in their NEPA reviews, a Notice of Availability for which was published on August 5, 2016 (81 FR 51866). However, pursuant to Executive Order 13783 of March 28, 2017, "Promoting Energy Independence and Economic Growth," the final guidance was withdrawn effective April 5, 2017 for further consideration. Notably, on June 21, 2019, the CEQ submitted draft guidance titled "Draft NEPA Guidance on Consideration of GHG Emissions," to the Federal Register for publication and public comment. The public comment period was originally set to close on July 26, 2019, but was extended to August 26, 2019. If finalized, this guidance would replace the final guidance CEQ issued in August 2016.[6,7]

[2] Global Change Research Act of 1990, Pub. L. 101–606, Sec. 103 (November 16, 1990), http://www.globalchange.gov.
[3] Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66496 (December 15, 2009).
[4] EPA, Final Rule for Carbon Pollution Emission Guidelines for Existing Stationary Sources Electric Utility Generating Units, 80 Fed. Reg. 64661, 64677 (October 23, 2015).
[5] ICAO, https://www.icao.int/Newsroom/Pages/ICAO-Council-adopts-new-CO2-emissions-standard-for-aircraft.aspx.
[6] Executive Office of the President of the U.S., Council on Environmental Quality Initiatives, Fact Sheet: CEQ'S Draft NEPA Guidance on Consideration of GHG Emissions, https://www.whitehouse.gov/wp-content/uploads/2017/11/20190724-FINAL-GHG-Guidance-Fact-Sheet-FR-Notice-Comment-Extension.pdf.
[7] Council on Environmental Quality, Draft National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions, [Docket No. CEQ-2019-0002], June 26, 2019. Available at: https://www.govinfo.gov/content/pkg/FR-2019-06-26/pdf/2019-13576.pdf.

3. Air Quality and Climate Analysis Results

This section presents and discusses the potential air quality and climate impacts associated with the Proposed Action at FFZ. For the analysis, the emissions associated with project construction in the short term as well operational emissions over the long-term with the Proposed Action were derived.

Construction Emissions

In general, air emissions associated with construction activities are temporary and variable depending on the project location, duration and level of activity. These emissions occur predominantly in engine exhaust from the operation of construction equipment and vehicles at the site (e.g., scrapers, dozers, delivery trucks, etc.) and from transporting construction workers to and from the site. Additionally, fugitive dust emissions result from site preparation, land clearing, material handling, equipment movement on unpaved areas; and from evaporative emissions that occur during the application of asphalt paving.

The construction equipment typically utilized in airport projects is comprised both of on-road vehicles (i.e., on-road-licensed) and non-road equipment (i.e., off-road). The former category of vehicles are used for the transport and delivery of supplies, material and equipment to and from the site and includes construction worker vehicles. The latter category of equipment is operated on-site for activities such as soil/material handling, site clearing and grubbing.

For this analysis, the Airport Construction Emissions Inventory Tool (ACEIT)[8] was used to estimate short-term construction emissions associated with the proposed improvements at FFZ. Project-specific details were used in the ACEIT to estimate construction activities and equipment/vehicle activity data (e.g., equipment mixes/operating times). Because the default emission factors used by ACEIT are outdated and do not reflect the emissin rates from the EPA's MOtor Vehicle Emission Simulator (i.e., MOVES)[9] model, only activity data was extracted from ACEIT. Emission factors were then developed using MOVES, which provides emissions data for both on-road vehicles and off-road construction equipment. Fugitive dust emissions were calculated using emission factors within EPA's Compilation of Air Pollutant Emission Factors (AP-42)[10] and evaporative emissions were developed using EPA guidance on asphalt paving. [11]

The Proposed Action will include the construction elements listed in **Table 4**. As shown, construction is assumed to begin in the year 2020 and continue through the year 2021.

Table 4 – Construction Schedule and Activities

Timeframe	Construction Elements
2020 - 2021	- Aircraft hangar space - Office/administrative space for aviation business - Aircraft staging ramp - Vehicle parking area - Fuel system - Retention basins

Source: Jviation, September 2019.

Estimates of CO, VOC, NO_x, sulfur oxides (SO_x), and $PM_{10/2.5}$ that would be emitted during construction of the proposed improvements are provided in **Table 5**. As shown, it is anticipated that emissions associated with

[8] TRB, ACRP Report 102, Guidance for Estimating Airport Construction Emissions, http://www.trb.org/ACRP/Blurbs/170234.aspx.

[9] EPA's MOVES2014a is the latest version of MOVES, which includes the NONROAD model. Additional information on MOVES2014a is available at https://www.epa.gov/moves/moves2014a-latest-version-motor-vehicle-emission-simulator-moves.

[10] EPA, Emissions Factors & AP-42, Compilation of Air Pollutant Emission Factors, http://www.epa.gov/ttn/chief/ap42/index.html#toc.

[11] EPA, Emission Inventory Improvement Program, Asphalt Paving, Chapter 17, Volume III, April 2001.

this phase of the project will be the greatest in 2020. Importantly, the emission estimates are below the General Conformity Rule *de minimis* threshold of 100 tons per year (tons/yr) for CO, VOC and NO_x; and 70 tons/yr for PM_{10}.

Table 5 – Construction Emissions (tons per year)

Year	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$
2020	15.9	1.7	16.8	0.1	4.8	1.2
2021	2.6	0.3	2.7	<0.1	0.9	0.2
De Minimis Thresholds	*100*	*100*	*100*	--	*70*	--
Exceeds De Minimis?	*No*	*No*	*No*	--	*No*	--

Notes: CO – carbon monoxide, NO_x – nitrogen oxides, SO_x – sulfur oxides, $PM_{10/2.5}$ – particulate matter, VOC – volatile organic compounds. Totals may reflect rounding.

Source: KB Environmental Sciences, Inc., 2019.

Operational Emissions

The operational emissions inventory was prepared for aircraft, auxiliary power units (APUs), and ground support equipment (GSE), as there would be a 1.5% increase in airport operations associated with the Proposed Action. Operational emissions associated with the proposed fuel distribution and storage system were also included in the analysis. Emissions from motor vehicles were not considered in the analysis as they would not change as a result of the Proposed Action.

The aircraft, APU, and GSE-related emissions were computed using the latest version of the FAA's Aviation Environmental Design Tool (AEDT).[12] The inventory was prepared for emissions of CO, VOC, NO_x, SO_x, and $PM_{10/2.5}$. The emissions from the operation of the proposed fuel system at FFZ were computed using AEDT and estimated for VOC. Emissions from the proposed fuel system are a result of evaporative losses during storage and evaporative losses during filling and emptying operations. It was assumed that the tanks would store Jet A fuel and aviation gasoline (Avgas) with an annual throughput of 250,000 gallons and 200,000 gallons, respectively.

Aircraft emissions were calculated for two future years (2021 and 2026) for the No Action and Proposed Action alternatives. The aircraft fleet mix was assumed to remain the same for both conditions. AEDT "default" values were used for APUs and GSE. **Table 6** summarizes the aircraft fleet mix and number of annual aircraft operations modeled in AEDT for the future years 2021 and 2026 conditions.

[12] AEDT 2d is the current release version of AEDT. Additional information on AEDT is available at: https://aedt.faa.gov/.

Table 6 – Aircraft Fleet Mix and Operations						
Airframe ID	Airframe Name	Engine	2021		2026	
			No Action	Proposed Action	No Action	Proposed Action
BEC58P	Raytheon Beech Baron 58	TIO-540-J2B2	10,538	10,538	11,536	11,536
CIT3	Cessna 650 Citation III	TFE731-2-2B	1,054	1,654	1,154	1,754
CL600	Bombardier Challenger 600	CF34-3B	105	165	115	175
CNA208	Cessna 208 Caravan	PT6A-114	1,054	1,654	1,154	1,754
CNA441	Cessna 441 Conquest II	TPE331-8	1,054	1,654	1,154	1,754
CNA55B	Cessna 550 Citation II	JT15D-4series	1,581	2,481	1,730	2,630
CNA750	Cessna 750 Citation X	AE3007C	105	165	115	175
DHC6	DHC Twin Otter	PT6A-27	1,017	1,092	1,113	1,188
GASEPF	Cessna 150 Series	O-200	53,449	53,449	58,510	58,510
GASEPV	Mooney M20-K	TSIO-360C	53,449	53,449	58,510	58,510
GIV	Gulfstream G400	TAY 611-8C	53	83	58	88
GV	Gulfstream G500	BR700-710A1-10	105	165	115	175
LEAR35	Bombardier Learjet 35	TFE731-2-2B	158	248	173	263
B206L	Bell 206 Jet Ranger	250B17B	1,220	1,310	1,336	1,426
B407	Bell 407	250B17B	1,220	1,310	1,336	1,426
H500D	Hughes 500D	250B17B	13,017	13,977	14,250	15,210
S70	Sikorsky UH-60 Black Hawk	T700-GE-700	3,864	4,149	4,230	4,515
GASEPF	Cessna 150 Series	O-200	70,851	70,851	77,561	77,561
GASEPV	Mooney M20-K	TSIO-360C	70,851	70,851	77,561	77,561
BEC58P	Raytheon Beech Baron 58	TIO-540-J2B2	31,615	31,615	34,609	34,609
		Total	**316,360**	**320,860**	**346,320**	**350,820**
Source: Jviation, Inc., 2019.						

Table 7 presents the total operational emission inventories for the 2021 and 2026 No Action and Proposed Action conditions. As shown, with the Proposed Action, operational emissions are estimated to increase from less than 1 ton/year to 8 tons/year, depending on the pollutant and year. This is largely a result of the forecasted increase in operations under the Proposed Action. However, emissions are shown to be below the *de minimis* thresholds of 100 tons for CO, VOC and NO_x, and 70 tons of PM_{10}.

Table 7 – Aircraft Operational Emissions (tons per year)							
Year	**Alternative**	**CO**	**VOC**	**NO_x**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
2021	No Action	1,725	35	9	3	2	2
	Proposed Action	1,733	37	11	3	2	2
	Difference (Project-related)	**8**	**2**	**2**	**<1**	**<1**	**<1**
2026	No Action	1,888	38	10	3	2	2
	Proposed Action	1,896	41	12	3	2	2
	Difference (Project-related)	**8**	**2**	**2**	**<1**	**<1**	**<1**
	De Minimis Thresholds	*100*	*100*	*100*	--	*70*	--
	Exceeds De Minimis?	*No*	*No*	*No*	--	*No*	--

Notes: CO – carbon monoxide, NOx – nitrogen oxides, SOx – sulfur oxides, PM10/2.5 – particulate matter, VOC – volatile organic compounds. Totals may reflect rounding.

Source: KB Environmental Sciences, Inc., 2019.

General Conformity Applicability

As stated above, under the CAA General Conformity Rule, when project-related emissions are below *de minimis* thresholds the project is assumed to conform to the SIP. The emission estimates of CO, VOC, NO_x and PM_{10} presented in **Tables 5 and 7** above demonstrate that during the construction period and with operation of the Proposed Action, the emissions would not exceed the *de minimis t*hresholds. As such, the General Conformity requirements of the CAA are not applicable to the Proposed Action.

Climate

The GHG emissions associated with the construction and operation of the Proposed Action are presented in **Table 8**. GHG emissions are presented in metric tons of CO_2 equivalent (CO_2e). As previously stated, there are no standards by which the emissions of GHG can be evaluated. Therefore, the estimates are provided for disclosure purposes only.

Table 8 – CO_2e Emissions (metric tons)		
Year	**Construction/ Operational**	**CO_2e**
2020	Construction	7,714
2021	Construction/Operation	2,113
2026	Operational	721

Source: KBE Inc., 2019.
Note: Construction emissions modelled using ACEIT and MOVES2014b modeling tools. Operational emissions modelled using AEDT 2d. Table reflects the change in operational emissions due to the proposed project only.

4. CONCLUSION

For the criteria pollutants and pollutant precursors CO, VOC, NOx, and PM_{10}, total operational and construction-related emissions associated with the Mesa Hangars/Davcon Development project are all within the applicable General Conformity *de minimis* threshold levels and meet the requirements of the CAA General Conformity Rule.