



A

Public and Stakeholder
Coordination



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Tinker AFB Stakeholder Distribution List

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STATE OF OKLAHOMA, }
COUNTY OF OKLAHOMA } SS.

Affidavit of Publication

Terri Roberts, of lawful age, being first duly sworn, upon oath deposes and says that she/he is the Classified Legal Notice Admin, of GateHouse Media Oklahoma Holdings, Inc, a corporation, which is the publisher of The Oklahoman which is a daily newspaper of general circulation in the State of Oklahoma, and which is a daily newspaper published in Oklahoma County and having paid general circulation therein; that said newspaper has been continuously and uninterruptedly published in said county and state for a period of more than one hundred and four consecutive weeks next prior to the first publication of the notice attached hereto, and that said notice was published in the following issues of said newspaper, namely:

TINKER AFB ENVIRONMENTAL
77177

<u>AdNumber</u>	<u>Publication</u>	<u>Page</u>	<u>Date</u>
0000562966-01	OC- The Oklahoman	C3	03/21/2020

Terri Roberts

Agent: Terri Roberts Date: 03/24/2020

Subscribed and sworn to be me before this date : 03/24/2020

Royce Parkhurst

Notary: Royce Parkhurst Date: 03/24/2020



PUBLIC NOTICE

**NOTICE OF POTENTIAL IMPACT TO FLOODPLAINS AND WETLANDS
AT TINKER AIR FORCE BASE, OKLAHOMA**

To: All interested Agencies, Groups, and Individuals

The United States Air Force (USAF) is issuing this notice to advise the public of the proposal to construct depot maintenance facilities and conduct maintenance operations to support the future B-21 Raider aircraft at Tinker Air Force Base (AFB), Oklahoma. The proposed maintenance facilities and operations would support the future B-21 Raider aircraft that is currently under development. USAF has initiated an Environmental Assessment (EA) under the National Environmental Policy Act to consider the potential impacts of implementing the proposed action at Tinker AFB.

At this early stage of EA preparation, the USAF is considering two potential alternative sites for the development of the approximately 75 acre B-21 depot maintenance campus. Construction of the proposed B-21 depot maintenance campus at site #1 would require development in approximately 36.5 acres of floodplain (Flood Zone AE) and approximately 9 acres of wetlands. Approximately three acres are jurisdictional wetland area, and approximately 6 acres are non-jurisdictional wetland area. Construction of the proposed B-21 maintenance campus at site #2 would require development in approximately 5.5 acres of floodplain (Flood Zone A).

This notice is required by Section 2(a)(4) of Executive Order (EO) 11988 "Floodplain Management" and Section 2(b) of EO 11990, "Protection of Wetlands." This notice has been issued in accordance with 32 Code of Federal Regulations, Part 989.24(c) and USAF Instruction 32-7064 for actions proposed in floodplains or wetlands. As part of the EA process, Tinker AFB will contact state and federal regulatory agencies: US Fish & Wildlife Service, U.S. Army Corps of Engineers, and the State Historic Preservation Office during preparation of the Draft EA for their input and expertise on the Proposed Action with respect to potential floodplain, wetland, and other impacts at the two alternative sites.

The USAF requests advance public comment to determine if there are any public concerns regarding the project's potential to impact floodplain or wetland areas. The USAF is soliciting public input and/or comments on potential project alternatives. The proposed project will be analyzed in a forthcoming EA, which the public will have opportunity to comment on when the draft is released. Comments regarding floodplain or wetland development at Tinker AFB with respect to this proposal may be submitted to Mr. Tim Taylor, 72 ABW/CEIEC; Attn: B-21 Maintenance Depot EA; 7535 5th Street, Building 400, 2nd Floor, Tinker AFB, OK 73145. The public comment period for floodplain and wetland comments ends APRIL 20, 2020.

PRIVACY ADVISORY NOTICE

Letters or other written comments provided during this early public review may be published in the EA and private addresses will be compiled to develop a mailing list for those requesting copies of the EA. Names of private citizens making comments and their personal home addresses and telephone numbers will not be published in the EA.



B

Air Quality Analysis
Supporting Documentation



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1. General Information: The Air Force’s Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance And Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:

Base: TINKER AFB
State: Oklahoma
County(s): Oklahoma
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Tinker B21 Maintenance

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2021

e. Action Description:

Construction and Operation of B21 Maintenance Facilities at Tinker AFB

f. Point of Contact:

Name: TLL
Title: -
Organization: -
Email: -
Phone Number: -

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

applicable
 not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the “worst-case” and “steady state” (net gain/loss upon action fully implemented) emissions.

Consistent with Air Force policy, the ROAA uses the PSD levels of 250 TPY as a significance indicator for NEPA Air Quality Analysis since Tinker AFB is located in an area that is attainment for all criteria pollutants.

Analysis Summary:

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	6.491	250	No
NOx	19.979	250	No
CO	15.167	250	No
SOx	0.047	250	No
PM 10	34.462	250	No
PM 2.5	0.804	250	No
Pb	0.000	250	No
NH3	0.024	250	No
CO2e	4750.0		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	6.357	250	No
NOx	34.4	250	No
CO	30.7	250	No
SOx	1.654	250	No
PM 10	4.326	250	No
PM 2.5	3.006	250	No
Pb	0.000	250	No
NH3	0.111	250	No
CO2e	10732.7		

2023 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	6.357	250	No
NOx	34.4	250	No
CO	32.9	250	No
SOx	1.654	250	No
PM 10	4.326	250	No
PM 2.5	3.006	250	No
Pb	0.000	250	No
NH3	0.111	250	No
CO2e	10732.7		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

1. General Information: The Air Force’s Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance And Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:

Base: TINKER AFB
State: Oklahoma
County(s): Oklahoma
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Tinker B21 Maintenance

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2021

e. Action Description:

Construction and Operation of B21 Maintenance Facilities at Tinker AFB

f. Point of Contact:

Name: TLL
Title: -
Organization: -
Email: -
Phone Number: -

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

applicable
 not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the “worst-case” and “steady state” (net gain/loss upon action fully implemented) emissions.

Consistent with Air Force policy, the ROAA uses the PSD levels of 250 TPY as a significance indicator for NEPA Air Quality Analysis since Tinker AFB is located in an area that is attainment for all criteria pollutants.

Analysis Summary:

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	3.561	250	No
NOx	6.171	250	No
CO	5.987	250	No
SOx	0.016	250	No
PM 10	12.428	250	No
PM 2.5	0.259	250	No
Pb	0.000	250	No
NH3	0.008	250	No
CO2e	1581.9		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	6.272	250	No
NOx	32.9	250	No
CO	29.4	250	No
SOx	1.645	250	No
PM 10	4.209	250	No
PM 2.5	2.889	250	No
Pb	0.000	250	No
NH3	0.111	250	No
CO2e	8879.6		

2023 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	6.272	250	No
NOx	32.9	250	No
CO	29.4	250	No
SOx	1.645	250	No
PM 10	4.209	250	No
PM 2.5	2.889	250	No
Pb	0.000	250	No
NH3	0.111	250	No
CO2e	8879.6		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

1. General Information

- Action Location

Base: TINKER AFB
State: Oklahoma
County(s): Oklahoma
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Tinker B21 Maintenance

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2021

- Action Purpose and Need:

Construction and Operation of B21 Maintenance Facilities at Tinker AFB

- Action Description:

Construction and Operation of B21 Maintenance Facilities at Tinker AFB

- Activity List:

	Activity Type	Activity Title
2.	Construction / Demolition	Construction and Demolition
3.	Aircraft	B-21
4.	Personnel	Personnel
5.	Emergency Generator	Generators
6.	Degreaser	Degreasers
7.	Heating	Heating
8.	Paint Booth	Paint Booth

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location

County: Oklahoma
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construction and Demolition

- Activity Description:

Total Construction 600,000 square feet
Paving 3,200,000 square feet
Imported Fill 300,000 cubic yards

Demolition
Warehouse, Supply Equipment 1990 7,391.00
Solid Waste Disposal Facility 1987 1,000.00

Communications Receiver 1953 2,124.00
 Base Engineering Covered Facility 1986 21,844.00
 Supply Shed, Equipment 1987 16,599.00
 Electrical Power Station Building 1953 231.00
 Supply Shed, Equipment 1955 64,000.00
 Field Training Facility 1997 3,900.00
 Water Pump Station 1969 158.00
 Miscellaneous Outdoor Pavilion -- 739.76
 Security Police Operations 1987 16,788.00
 Air Force Communications Service Maintenance Facility 1962 5,471.00
 Supply Shed, Equipment 1987 18,612.00
 Base Engineering Maintenance Shop 1992 7,376.00
 Hazardous Storage 1990 29,457.00
 Supply Shed, Equipment 1987 12,584.00
 Admin Office, Non-Air Force 1990 2,093.00
 Supply Shed, Equipment 1955 64,000.00
 Exchange 1996 14,230.00
 Base Hazardous Storage 1988 625.00
 Operating Storage, Jet Fuel 1998 631.79
 Animal Clinic 1999 2,402.00
 Non-real property Facility -- 166.63
 Reserve Forces Operational Training 1984 1,800.00
 Non-real property Facility 257.24
 Outdoor Recreation Pavilion 1993 90.00
 Reserve Forces Operational Training 1991 1,241.00
 Fire Training Facility 1997 2,200.00
 Operating Storage, Jet Fuel -- 631.90
 Non-real property Shed -- 129.29
 Non-real property Facility -- 245.76
 Hydrant Fueling Building 1998 3,100.00
 Depot Maintenance Facility 1983 2,104.00
 Base Engineer Maintenance Shop 1998 8,120.00
 Warehouse 2006 3,500.00
 Supply Shed, Equipment 1992 11,999.00
 Base Engineer Ground Facility 1993 10,874.00
 Base Hazardous Storage 1988 625.00
 Base Hazardous Storage 1988 625.00
 Base Hazardous Storage 1988 625.00
 Total Square Feet Demolition 340,590

- Activity Start Date

Start Month: 1
Start Month: 2021

- Activity End Date

Indefinite: False
End Month: 12
End Month: 2021

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	6.491119
SO _x	0.046529
NO _x	19.979027

Pollutant	Total Emissions (TONs)
PM 2.5	0.803612
Pb	0.000000
NH ₃	0.024101

CO	15.166501
PM 10	34.462374

CO _{2e}	4750.0

2.1 Demolition Phase

2.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
 Start Quarter: 1
 Start Year: 2021

- Phase Duration

Number of Month: 12
 Number of Days: 0

2.1.2 Demolition Phase Assumptions

- General Demolition Information

Area of Building to be demolished (ft²): 340590
 Height of Building to be demolished (ft): 24

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	3	8
Rubber Tired Dozers Composite	2	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
 Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0687	0.0013	0.3576	0.5112	0.0158	0.0158	0.0062	119.73
Rubber Tired Dozers Composite								

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.301	000.002	000.232	003.573	000.007	000.006		000.023	00324.314
LDGT	000.380	000.003	000.407	004.987	000.009	000.008		000.024	00417.745
HDGV	000.727	000.005	001.023	015.732	000.020	000.017		000.045	00770.045
LDDV	000.108	000.003	000.133	002.588	000.004	000.004		000.008	00315.123
LDDT	000.245	000.004	000.379	004.410	000.007	000.006		000.008	00447.020
HDDV	000.481	000.013	004.802	001.719	000.167	000.154		000.028	01500.738
MC	002.649	000.003	000.746	013.246	000.026	000.023		000.054	00395.692

2.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (0.00042 * BA * BH) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft³)
BA: Area of Building to be demolished (ft²)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft²)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

- VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
- WD: Number of Total Work Days (days)
- WT: Average Worker Round Trip Commute (mile)
- 1.25: Conversion Factor Number of Construction Equipment to Number of Works
- NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

- V_{POL}: Vehicle Emissions (TONs)
- VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
- 0.002205: Conversion Factor grams to pounds
- EF_{POL}: Emission Factor for Pollutant (grams/mile)
- VM: Worker Trips On Road Vehicle Mixture (%)
- 2000: Conversion Factor pounds to tons

2.2 Site Grading Phase

2.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

- Start Month: 1
- Start Quarter: 1
- Start Year: 2021

- Phase Duration

- Number of Month: 12
- Number of Days: 0

2.2.2 Site Grading Phase Assumptions

- General Site Grading Information

- Area of Site to be Graded (ft²): 266666
- Amount of Material to be Hauled On-Site (yd³): 300000
- Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

- Default Settings Used: Yes
- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rollers Composite	1	8
Rubber Tired Dozers Composite	1	8
Scrapers Composite	5	8
Tractors/Loaders/Backhoes Composite	2	7

- Vehicle Exhaust

- Average Hauling Truck Capacity (yd³): 20 (default)
- Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rollers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0539	0.0007	0.3483	0.3816	0.0205	0.0205	0.0048	67.160
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Scrapers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1814	0.0026	1.2262	0.7745	0.0491	0.0491	0.0163	262.89
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.301	000.002	000.232	003.573	000.007	000.006		000.023	00324.314
LDGT	000.380	000.003	000.407	004.987	000.009	000.008		000.024	00417.745
HDGV	000.727	000.005	001.023	015.732	000.020	000.017		000.045	00770.045
LDDV	000.108	000.003	000.133	002.588	000.004	000.004		000.008	00315.123
LDDT	000.245	000.004	000.379	004.410	000.007	000.006		000.008	00447.020
HDDV	000.481	000.013	004.802	001.719	000.167	000.154		000.028	01500.738
MC	002.649	000.003	000.746	013.246	000.026	000.023		000.054	00395.692

2.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Work Days (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)
HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.3 Trenching/Excavating Phase

2.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1

Start Year: 2021

- Phase Duration

Number of Month: 1
 Number of Days: 0

2.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 10000
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
 Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rollers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0539	0.0007	0.3483	0.3816	0.0205	0.0205	0.0048	67.160
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53

Scrapers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1814	0.0026	1.2262	0.7745	0.0491	0.0491	0.0163	262.89
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.301	000.002	000.232	003.573	000.007	000.006		000.023	00324.314
LDGT	000.380	000.003	000.407	004.987	000.009	000.008		000.024	00417.745
HDGV	000.727	000.005	001.023	015.732	000.020	000.017		000.045	00770.045
LDDV	000.108	000.003	000.133	002.588	000.004	000.004		000.008	00315.123
LDDT	000.245	000.004	000.379	004.410	000.007	000.006		000.008	00447.020
HDDV	000.481	000.013	004.802	001.719	000.167	000.154		000.028	01500.738
MC	002.649	000.003	000.746	013.246	000.026	000.023		000.054	00395.692

2.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Work Days (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

2.4 Building Construction Phase

2.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2021

- Phase Duration

Number of Month: 12

Number of Days: 0

2.4.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial

Area of Building (ft²): 600000

Height of Building (ft): 24

Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	7
Forklifts Composite	3	8
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	3	7
Welders Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

2.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0845	0.0013	0.6033	0.3865	0.0228	0.0228	0.0076	128.82
Forklifts Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0293	0.0006	0.1458	0.2148	0.0056	0.0056	0.0026	54.462
Generator Sets Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0362	0.0006	0.2977	0.2707	0.0130	0.0130	0.0032	61.074
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890
Welders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0280	0.0003	0.1634	0.1787	0.0088	0.0088	0.0025	25.665

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.301	000.002	000.232	003.573	000.007	000.006		000.023	00324.314
LDGT	000.380	000.003	000.407	004.987	000.009	000.008		000.024	00417.745
HDGV	000.727	000.005	001.023	015.732	000.020	000.017		000.045	00770.045
LDDV	000.108	000.003	000.133	002.588	000.004	000.004		000.008	00315.123
LDDT	000.245	000.004	000.379	004.410	000.007	000.006		000.008	00447.020
HDDV	000.481	000.013	004.802	001.719	000.167	000.154		000.028	01500.738
MC	002.649	000.003	000.746	013.246	000.026	000.023		000.054	00395.692

2.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft²)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1000 ft³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft²)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1000 ft³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL}: Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

2.5 Architectural Coatings Phase

2.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
 Start Quarter: 1
 Start Year: 2021

- Phase Duration

Number of Month: 3
 Number of Days: 0

2.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
 Total Square Footage (ft²): 300000
 Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.301	000.002	000.232	003.573	000.007	000.006		000.023	00324.314
LDGT	000.380	000.003	000.407	004.987	000.009	000.008		000.024	00417.745
HDGV	000.727	000.005	001.023	015.732	000.020	000.017		000.045	00770.045
LDDV	000.108	000.003	000.133	002.588	000.004	000.004		000.008	00315.123
LDDT	000.245	000.004	000.379	004.410	000.007	000.006		000.008	00447.020
HDDV	000.481	000.013	004.802	001.719	000.167	000.154		000.028	01500.738
MC	002.649	000.003	000.746	013.246	000.026	000.023		000.054	00395.692

2.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

VMT_{WT} = (1 * WT * PA) / 800

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
 1: Conversion Factor man days to trips (1 trip / 1 man * day)
 WT: Average Worker Round Trip Commute (mile)
 PA: Paint Area (ft²)
 800: Conversion Factor square feet to man days (1 ft² / 1 man * day)

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
 VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL}: Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
 BA: Area of Building (ft²)
 2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)
 0.0116: Emission Factor (lb/ft²)
 2000: Conversion Factor pounds to tons

2.6 Paving Phase

2.6.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
 Start Quarter: 1
 Start Year: 2021

- Phase Duration

Number of Month: 3
 Number of Days: 0

2.6.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft²): 3200000

- Paving Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Pavers Composite	1	8
Paving Equipment Composite	2	8
Rollers Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.6.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rollers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0539	0.0007	0.3483	0.3816	0.0205	0.0205	0.0048	67.160
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Scrapers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1814	0.0026	1.2262	0.7745	0.0491	0.0491	0.0163	262.89
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.301	000.002	000.232	003.573	000.007	000.006		000.023	00324.314
LDGT	000.380	000.003	000.407	004.987	000.009	000.008		000.024	00417.745
HDGV	000.727	000.005	001.023	015.732	000.020	000.017		000.045	00770.045
LDDV	000.108	000.003	000.133	002.588	000.004	000.004		000.008	00315.123
LDDT	000.245	000.004	000.379	004.410	000.007	000.006		000.008	00447.020
HDDV	000.481	000.013	004.802	001.719	000.167	000.154		000.028	01500.738
MC	002.649	000.003	000.746	013.246	000.026	000.023		000.054	00395.692

2.6.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft²)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)
HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_P = (2.62 * PA) / 43560$$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft²)
43560: Conversion Factor square feet to acre (43560 ft² / acre)² / acre)

3. Aircraft

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Oklahoma
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: B-21

- Activity Description:

B-21 - Modeled as B-2A

- Activity Start Date

Start Month: 1
Start Year: 2022

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.331796
SO _x	1.620142
NO _x	28.454869
CO	6.335982
PM 10	4.000269

Pollutant	Emissions Per Year (TONs)
PM 2.5	2.684691
Pb	0.000000
NH ₃	0.000000
CO ₂ e	4568.5

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.192203
SO _x	1.447235
NO _x	25.067979
CO	5.370197
PM 10	3.902260

Pollutant	Emissions Per Year (TONs)
PM 2.5	2.589671
Pb	0.000000
NH ₃	0.000000
CO ₂ e	4421.7

- Activity Emissions [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.139593
SO _x	0.172907
NO _x	3.386890
CO	0.965785
PM 10	0.098009

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.095020
Pb	0.000000
NH ₃	0.000000
CO ₂ e	146.8

3.2 Aircraft & Engines

3.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: B-2A
Engine Model: F118-GE-100
Primary Function: Transport - Bomber
Aircraft has After burn: No
Number of Engines: 4

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

3.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_{2e}
Idle	1097.00	0.29	1.06	4.30	20.98	1.25	1.03	3234
Approach	3773.00	0.05	1.06	11.09	2.02	4.70	2.32	3234
Intermediate	6350.00	0.03	1.06	18.01	0.85	3.05	2.72	3234
Military	10887.00	0.03	1.06	33.12	0.65	1.64	1.48	3234
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3234

3.3 Flight Operations

3.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	12
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft:	54
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft:	0
Number of Annual Trim Test(s) per Aircraft:	4

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi/Idle Out [Idle] (mins):	32.8
Takeoff [Military] (mins):	0.7
Takeoff [After Burn] (mins):	0
Climb Out [Intermediate] (mins):	1.6
Approach [Approach] (mins):	5.2
Taxi/Idle In [Idle] (mins):	14.9

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	31
Approach (mins):	71
Intermediate (mins):	24
Military (mins):	24
AfterBurn (mins):	8

3.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1000pounds

EF: Emission Factor (lb/1000lb fuel)

NE: Number of Engines
LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONS

- Aircraft Emissions for LTOs per Year

$$AE_{LTO} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{LTO} : Aircraft Emissions (TONs)
 AEM_{IDLE_IN} : Aircraft Emissions for Idle-In Mode (TONs)
 AEM_{IDLE_OUT} : Aircraft Emissions for Idle-Out Mode (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000$$

AEM_{POL} : Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONS

- Aircraft Emissions for TGOs per Year

$$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{TGO} : Aircraft Emissions (TONs)
 $AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
 $AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
 $AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONS

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM} : Aircraft Emissions (TONs)
 $AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
 $AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)

AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
 AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
 AEPS_{AFTERBURN}: Aircraft Emissions for After Burner Power Setting (TONs)

3.4 Auxiliary Power Unit (APU)

3.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer
2	4	No	131-3A	

3.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CO _{2e}
131-3A	272.6	0.493	0.289	1.216	3.759	0.131	0.037	910.8

3.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)

APU: Number of Auxiliary Power Units

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

3.5 Aerospace Ground Equipment (AGE)

3.5.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 54

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	1.5	No	Air Compressor	MC-1A - 18.4hp
1	12	No	Air Conditioner	Ace 401
1	2	No	Bomb Lift	MJ-40
1	3	No	Generator Set	A/M32A-86D
1	2	No	Heater	H1
1	1.5	No	Hydraulic Test Stand	MJ-2/TTU-229
1	4	No	Light Cart	NF-2

1	2	No	Start Cart	A/M32A-60A
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3.5.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CO _{2e}
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068	24.8
Ace 401	0.0	0.200	0.408	7.970	1.520	0.211	0.205	313.2
MJ-40	0.0	0.210	0.219	0.340	0.210	0.060	0.055	141.2
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089	147.0
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006	8.9
MJ-2/TTU-229	10.9	0.193	0.077	3.858	2.466	0.083	0.080	246.7
NF-2	0.0	0.010	0.043	0.110	0.080	0.010	0.010	22.1
A/M32A-60A	0.0	0.270	0.306	1.820	5.480	0.211	0.205	221.1

3.5.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

$$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)

AGE: Total Number of Aerospace Ground Equipment

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

4. Personnel

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Oklahoma

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Personnel

- Activity Description:

800 Personnel

- Activity Start Date

Start Month: 1

Start Year: 2022

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	1.802890
SO _x	0.012046
NO _x	1.594188
CO	21.148305
PM 10	0.039289

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.034530
Pb	0.000000
NH ₃	0.110797
CO _{2e}	1753.2

4.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel:	400
Civilian Personnel:	400
Support Contractor Personnel:	0
Air National Guard (ANG) Personnel:	0
Reserve Personnel:	0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel:	5 Days Per Week (default)
Civilian Personnel:	5 Days Per Week (default)
Support Contractor Personnel:	5 Days Per Week (default)
Air National Guard (ANG) Personnel:	4 Days Per Week (default)
Reserve Personnel:	4 Days Per Month (default)

4.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

4.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.301	000.002	000.232	003.573	000.007	000.006		000.023	00324.314
LDGT	000.380	000.003	000.407	004.987	000.009	000.008		000.024	00417.745
HDGV	000.727	000.005	001.023	015.732	000.020	000.017		000.045	00770.045
LDDV	000.108	000.003	000.133	002.588	000.004	000.004		000.008	00315.123
LDDT	000.245	000.004	000.379	004.410	000.007	000.006		000.008	00447.020
HDDV	000.481	000.013	004.802	001.719	000.167	000.154		000.028	01500.738
MC	002.649	000.003	000.746	013.246	000.026	000.023		000.054	00395.692

4.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$$VMT_p = NP * WD * AC$$

VMT_p: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Work Days per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$$

- VMT_{Total}: Total Vehicle Miles Travel (miles)
- VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)
- VMT_C: Civilian Personnel Vehicle Miles Travel (miles)
- VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)
- VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)
- VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$$

- V_{POL}: Vehicle Emissions (TONs)
- VMT_{Total}: Total Vehicle Miles Travel (miles)
- 0.002205: Conversion Factor grams to pounds
- EF_{POL}: Emission Factor for Pollutant (grams/mile)
- VM: Personnel On Road Vehicle Mixture (%)
- 2000: Conversion Factor pounds to tons

5. Emergency Generator

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Oklahoma
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Generators

- Activity Description:

Generators

- Activity Start Date

Start Month: 1
Start Year: 2022

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.010737
SO _x	0.000187
NO _x	0.388402
CO	0.103170
PM 10	0.012131

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.012131
Pb	0.000000
NH ₃	0.000000
CO ₂ e	20.0

5.2 Emergency Generator Assumptions

- **Emergency Generator**
 - Type of Fuel used in Emergency Generator:** Diesel
 - Number of Emergency Generators:** 1
- **Default Settings Used:** No
- **Emergency Generators Consumption**
 - Emergency Generator's Horsepower:** 1000
 - Average Operating Hours Per Year (hours):** 30

5.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
0.000716	0.0000125	0.0259	0.00688	0.000809	0.000809			1.33

5.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year

$$AE_{POL} = (NGEN * HP * OT * EF_{POL}) / 2000$$

AE_{POL}: Activity Emissions (TONs per Year)

NGEN: Number of Emergency Generators

HP: Emergency Generator's Horsepower (hp)

OT: Average Operating Hours Per Year (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

6. Degreaser

6.1 General Information & Timeline Assumptions

- **Add or Remove Activity from Baseline?** Add
- **Activity Location**
 - County:** Oklahoma
 - Regulatory Area(s):** NOT IN A REGULATORY AREA
- **Activity Title:** Degreasers
- **Activity Description:**
 - Degreasers
- **Activity Start Date**
 - Start Month:** 1
 - Start Year:** 2022
- **Activity End Date**
 - Indefinite:** Yes
 - End Month:** N/A
 - End Year:** N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	1.628250
SO _x	0.000000
NO _x	0.000000
CO	0.000000
PM 10	0.000000

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000
CO _{2e}	0.0

6.2 Degreaser Assumptions

- Degreaser

Net solvent usage (total less recycle) (gallons/year): 500

- Default Settings Used: Yes

- Degreaser Consumption

Solvent used: Mineral Spirits CAS#64475-85-0 (default)
 Specific gravity of solvent: 0.78 (default)
 Solvent VOC content (%): 100 (default)
 Efficiency of control device (%): 0 (default)

6.3 Degreaser Formula(s)

- Degreaser Emissions per Year

$$DE_{VOC} = (VOC / 100) * NS * SG * 8.35 * (1 - (CD / 100)) / 2000$$

DE_{VOC}: Degreaser VOC Emissions (TONs per Year)
 VOC: Solvent VOC content (%)
 (VOC / 100): Conversion Factor percent to decimal
 NS: Net solvent usage (total less recycle) (gallons/year)
 SG: Specific gravity of solvent
 8.35: Conversion Factor the density of water
 CD: Efficiency of control device (%)
 (1 - (CD / 100)): Conversion Factor percent to decimal (Not effected by control device)
 2000: Conversion Factor pounds to tons

7. Heating

7.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Oklahoma
 Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Heating

- Activity Description:

Heating

- Activity Start Date

Start Month: 1
Start Year: 2022

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.200829
SO _x	0.021909
NO _x	3.651429
CO	3.067200
PM 10	0.277509

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.277509
Pb	0.000000
NH ₃	0.000000
CO ₂ e	4396.0

7.2 Heating Assumptions

- Heating

Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method

Area of floorspace to be heated (ft²): 600000
Type of fuel: Natural Gas
Type of boiler/furnace: Industrial (10 - 250 MMBtu/hr)
Heat Value (MMBtu/ft³): 0.00105
Energy Intensity (MMBtu/ft²): 0.1278

- Default Settings Used: Yes

- Boiler/Furnace Usage

Operating Time Per Year (hours): 900 (default)

7.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO ₂ e
5.5	0.6	100	84	7.6	7.6			120390

7.4 Heating Formula(s)

- Heating Fuel Consumption ft³ per Year

$$FC_{HER} = HA * EI / HV / 1000000$$

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
 HA: Area of floorspace to be heated (ft²)
 EI: Energy Intensity Requirement (MMBtu/ft²)
 HV: Heat Value (MMBTU/ft³)
 1000000: Conversion Factor

- Heating Emissions per Year

$$HE_{POL} = FC * EF_{POL} / 2000$$

HE_{POL}: Heating Emission Emissions (TONs)
 FC: Fuel Consumption

EF_{POL}: Emission Factor for Pollutant
 2000: Conversion Factor pounds to tons

8. Paint Booth

8.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Oklahoma
 Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Paint Booth

- Activity Description:

Paint Booth

- Activity Start Date

Start Month: 1
 Start Year: 2022

- Activity End Date

Indefinite: Yes
 End Month: N/A
 End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	2.384760
SO _x	0.000000
NO _x	0.000000
CO	0.000000
PM 10	0.000000

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000
CO ₂ e	0.0

8.2 Paint Booth Assumptions

- Paint Booth

Coating throughput (gallons/year): 1500

- Default Settings Used: Yes

- Paint Booth Consumption

Coating used: Quick Dry Enamel (default)
 Specific gravity of coating: 1.19 (default)
 Coating VOC content by weight (%): 32 (default)
 Efficiency of control device (%): 0 (default)

8.3 Paint Booth Formula(s)

- Paint Booth Emissions per Year

$$PBE_{VOC} = (VOC / 100) * CT * SG * 8.35 * (1 - (CD / 100)) / 2000$$

PBE_{VOC} : Paint Booth VOC Emissions (TONs per Year)

VOC: Coating VOC content by weight (%)

$(VOC / 100)$: Conversion Factor percent to decimal

CT: Coating throughput (gallons/year)

SG: Specific gravity of coating

8.35: Conversion Factor the density of water

CD: Efficiency of control device (%)

$(1 - (CD / 100))$: Conversion Factor percent to decimal (Not effected by control device)

2000: Conversion Factor pounds to tons

1. General Information

- Action Location

Base: TINKER AFB
State: Oklahoma
County(s): Oklahoma
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Tinker B21 Maintenance

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2021

- Action Purpose and Need:

Construction and Operation of B21 Maintenance Facilities at Tinker AFB

- Action Description:

Construction and Operation of B21 Maintenance Facilities at Tinker AFB

- Point of Contact

Name: TLL
Title: -
Organization: -
Email: -
Phone Number: -

- Activity List:

	Activity Type	Activity Title
2.	Construction / Demolition	Construction
3.	Aircraft	B21 Ops
4.	Personnel	Personnel
5.	Emergency Generator	Generators
6.	Degreaser	Degreasers
7.	Heating	Heating
8.	Paint Booth	Paint Booth

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location

County: Oklahoma
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construction

- Activity Description:

Total Construction 444,000 square feet

Paving 1,220,000 square feet

- Activity Start Date

Start Month: 1
Start Month: 2021

- Activity End Date

Indefinite: False
End Month: 12
End Month: 2021

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	3.560528
SO _x	0.015749
NO _x	6.171232
CO	5.986520
PM 10	12.427801

Pollutant	Total Emissions (TONs)
PM 2.5	0.258806
Pb	0.000000
NH ₃	0.008180
CO _{2e}	1581.9

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2021

- Phase Duration

Number of Month: 12
Number of Days: 0

2.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 101666
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.301	000.002	000.232	003.573	000.007	000.006		000.023	00324.314
LDGT	000.380	000.003	000.407	004.987	000.009	000.008		000.024	00417.745
HDGV	000.727	000.005	001.023	015.732	000.020	000.017		000.045	00770.045
LDDV	000.108	000.003	000.133	002.588	000.004	000.004		000.008	00315.123
LDDT	000.245	000.004	000.379	004.410	000.007	000.006		000.008	00447.020
HDDV	000.481	000.013	004.802	001.719	000.167	000.154		000.028	01500.738
MC	002.649	000.003	000.746	013.246	000.026	000.023		000.054	00395.692

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Work Days (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)
 H: Hours Worked per Day (hours)
 EF_{POL}: Emission Factor for Pollutant (lb/hour)
 2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
 HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)
 HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
 HC: Average Hauling Truck Capacity (yd³)
 (1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
 HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
 VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL}: Emission Factor for Pollutant (grams/mile)
 VM: Vehicle Exhaust On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
 WD: Number of Total Work Days (days)
 WT: Average Worker Round Trip Commute (mile)
 1.25: Conversion Factor Number of Construction Equipment to Number of Works
 NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
 VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL}: Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

2.2 Trenching/Excavating Phase

2.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2021

- Phase Duration

Number of Month: 3
Number of Days: 0

2.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 1000
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
 Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.301	000.002	000.232	003.573	000.007	000.006		000.023	00324.314
LDGT	000.380	000.003	000.407	004.987	000.009	000.008		000.024	00417.745
HDGV	000.727	000.005	001.023	015.732	000.020	000.017		000.045	00770.045

LDDV	000.108	000.003	000.133	002.588	000.004	000.004		000.008	00315.123
LDDT	000.245	000.004	000.379	004.410	000.007	000.006		000.008	00447.020
HDDV	000.481	000.013	004.802	001.719	000.167	000.154		000.028	01500.738
MC	002.649	000.003	000.746	013.246	000.026	000.023		000.054	00395.692

2.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Work Days (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
 VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL}: Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

2.3 Building Construction Phase

2.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
 Start Quarter: 1
 Start Year: 2021

- Phase Duration

Number of Month: 12
 Number of Days: 0

2.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
 Area of Building (ft²): 444000
 Height of Building (ft): 24
 Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	7
Forklifts Composite	3	8
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	3	7
Welders Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

2.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0845	0.0013	0.6033	0.3865	0.0228	0.0228	0.0076	128.82
Forklifts Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0293	0.0006	0.1458	0.2148	0.0056	0.0056	0.0026	54.462
Generator Sets Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0362	0.0006	0.2977	0.2707	0.0130	0.0130	0.0032	61.074
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890
Welders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0280	0.0003	0.1634	0.1787	0.0088	0.0088	0.0025	25.665

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.301	000.002	000.232	003.573	000.007	000.006		000.023	00324.314
LDGT	000.380	000.003	000.407	004.987	000.009	000.008		000.024	00417.745
HDGV	000.727	000.005	001.023	015.732	000.020	000.017		000.045	00770.045
LDDV	000.108	000.003	000.133	002.588	000.004	000.004		000.008	00315.123
LDDT	000.245	000.004	000.379	004.410	000.007	000.006		000.008	00447.020
HDDV	000.481	000.013	004.802	001.719	000.167	000.154		000.028	01500.738
MC	002.649	000.003	000.746	013.246	000.026	000.023		000.054	00395.692

2.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1000 ft³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft²)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1000 ft³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.4 Architectural Coatings Phase

2.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1
 Start Year: 2021

- Phase Duration

Number of Month: 3
 Number of Days: 0

2.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
 Total Square Footage (ft²): 222000
 Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.301	000.002	000.232	003.573	000.007	000.006		000.023	00324.314
LDGT	000.380	000.003	000.407	004.987	000.009	000.008		000.024	00417.745
HDGV	000.727	000.005	001.023	015.732	000.020	000.017		000.045	00770.045
LDDV	000.108	000.003	000.133	002.588	000.004	000.004		000.008	00315.123
LDDT	000.245	000.004	000.379	004.410	000.007	000.006		000.008	00447.020
HDDV	000.481	000.013	004.802	001.719	000.167	000.154		000.028	01500.738
MC	002.649	000.003	000.746	013.246	000.026	000.023		000.054	00395.692

2.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$$VMT_{WT} = (1 * WT * PA) / 800$$

- VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
- 1: Conversion Factor man days to trips (1 trip / 1 man * day)
- WT: Average Worker Round Trip Commute (mile)
- PA: Paint Area (ft²)
- 800: Conversion Factor square feet to man days (1 ft² / 1 man * day)

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

- V_{POL}: Vehicle Emissions (TONs)
- VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
- 0.002205: Conversion Factor grams to pounds
- EF_{POL}: Emission Factor for Pollutant (grams/mile)
- VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)

BA: Area of Building (ft²)

2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)

0.0116: Emission Factor (lb/ft²)

2000: Conversion Factor pounds to tons

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2021

- Phase Duration

Number of Month: 3

Number of Days: 0

2.5.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft²): 1220000

- Paving Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Pavers Composite	1	8
Paving Equipment Composite	2	8
Rollers Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH₄	CO_{2e}
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH₄	CO_{2e}
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH₄	CO_{2e}
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH₄	CO_{2e}
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH₃	CO_{2e}
LDGV	000.301	000.002	000.232	003.573	000.007	000.006		000.023	00324.314
LDGT	000.380	000.003	000.407	004.987	000.009	000.008		000.024	00417.745
HDGV	000.727	000.005	001.023	015.732	000.020	000.017		000.045	00770.045
LDDV	000.108	000.003	000.133	002.588	000.004	000.004		000.008	00315.123
LDDT	000.245	000.004	000.379	004.410	000.007	000.006		000.008	00447.020
HDDV	000.481	000.013	004.802	001.719	000.167	000.154		000.028	01500.738
MC	002.649	000.003	000.746	013.246	000.026	000.023		000.054	00395.692

2.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

PA: Paving Area (ft²)

0.25: Thickness of Paving Area (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_P = (2.62 * PA) / 43560$$

VOC_P: Paving VOC Emissions (TONs)

2.62: Emission Factor (lb/acre)

PA: Paving Area (ft²)

43560: Conversion Factor square feet to acre (43560 ft² / acre)² / acre)

3. Aircraft

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Oklahoma

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: B21 Ops

- Activity Description:

B21 Ops

- Activity Start Date

Start Month: 1

Start Year: 2022

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
-----------	---------------------------

Pollutant	Emissions Per Year (TONs)
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VOC	0.331796
SO _x	1.620142
NO _x	28.454869
CO	6.335982
PM 10	4.000269

PM 2.5	2.684691
Pb	0.000000
NH ₃	0.000000
CO ₂ e	4568.5

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.192203
SO _x	1.447235
NO _x	25.067979
CO	5.370197
PM 10	3.902260

Pollutant	Emissions Per Year (TONs)
PM 2.5	2.589671
Pb	0.000000
NH ₃	0.000000
CO ₂ e	4421.7

- Activity Emissions [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.139593
SO _x	0.172907
NO _x	3.386890
CO	0.965785
PM 10	0.098009

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.095020
Pb	0.000000
NH ₃	0.000000
CO ₂ e	146.8

3.2 Aircraft & Engines

3.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: B-2A
Engine Model: F118-GE-100
Primary Function: Transport - Bomber
Aircraft has After burn: No
Number of Engines: 4

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

3.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CO ₂ e
Idle	1097.00	0.29	1.06	4.30	20.98	1.25	1.03	3234
Approach	3773.00	0.05	1.06	11.09	2.02	4.70	2.32	3234
Intermediate	6350.00	0.03	1.06	18.01	0.85	3.05	2.72	3234
Military	10887.00	0.03	1.06	33.12	0.65	1.64	1.48	3234
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3234

3.3 Flight Operations

3.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:

12

Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft:	54
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft:	0
Number of Annual Trim Test(s) per Aircraft:	4

- **Default Settings Used:** No

- **Flight Operations TIMs (Time In Mode)**

Taxi/Idle Out [Idle] (mins):	32.8
Takeoff [Military] (mins):	0.7
Takeoff [After Burn] (mins):	0
Climb Out [Intermediate] (mins):	1.6
Approach [Approach] (mins):	5.2
Taxi/Idle In [Idle] (mins):	14.9

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- **Trim Test**

Idle (mins):	31
Approach (mins):	71
Intermediate (mins):	24
Military (mins):	24
AfterBurn (mins):	8

3.3.2 Flight Operations Formula(s)

- **Aircraft Emissions per Mode for LTOs per Year**

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours

FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1000pounds

EF: Emission Factor (lb/1000lb fuel)

NE: Number of Engines

LTO: Number of Landing and Take-off Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- **Aircraft Emissions for LTOs per Year**

$$AE_{LTO} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{LTO}: Aircraft Emissions (TONs)

AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)

AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)

AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- **Aircraft Emissions per Mode for TGOs per Year**

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000$$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)

TIM: Time in Mode (min)

60: Conversion Factor minutes to hours
 FC: Fuel Flow Rate (lb/hr)
 1000: Conversion Factor pounds to 1000pounds
 EF: Emission Factor (lb/1000lb fuel)
 NE: Number of Engines
 TGO: Number of Touch-and-Go Cycles (for all aircraft)
 2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{TGO}: Aircraft Emissions (TONs)
 AEM_{APPROACH}: Aircraft Emissions for Approach Mode (TONs)
 AEM_{CLIMBOUT}: Aircraft Emissions for Climb-Out Mode (TONs)
 AEM_{TAKEOFF}: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$$

AEPS_{POL}: Aircraft Emissions per Pollutant & Power Setting (TONs)
 TD: Test Duration (min)
 60: Conversion Factor minutes to hours
 FC: Fuel Flow Rate (lb/hr)
 1000: Conversion Factor pounds to 1000pounds
 EF: Emission Factor (lb/1000lb fuel)
 NE: Number of Engines
 NA: Number of Aircraft
 NTT: Number of Trim Test
 2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

AE_{TRIM}: Aircraft Emissions (TONs)
 AEPS_{IDLE}: Aircraft Emissions for Idle Power Setting (TONs)
 AEPS_{APPROACH}: Aircraft Emissions for Approach Power Setting (TONs)
 AEPS_{INTERMEDIATE}: Aircraft Emissions for Intermediate Power Setting (TONs)
 AEPS_{MILITARY}: Aircraft Emissions for Military Power Setting (TONs)
 AEPS_{AFTERBURN}: Aircraft Emissions for After Burner Power Setting (TONs)

3.4 Auxiliary Power Unit (APU)

3.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer
2	4	No	131-3A	

3.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CO _{2e}
131-3A	272.6	0.493	0.289	1.216	3.759	0.131	0.037	910.8

3.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)

APU: Number of Auxiliary Power Units

OH: Operation Hours for Each LTO (hour)

LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

3.5 Aerospace Ground Equipment (AGE)

3.5.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 54

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	1.5	No	Air Compressor	MC-1A - 18.4hp
1	12	No	Air Conditioner	Ace 401
1	2	No	Bomb Lift	MJ-40
1	3	No	Generator Set	A/M32A-86D
1	2	No	Heater	H1
1	1.5	No	Hydraulic Test Stand	MJ-2/TTU-229
1	4	No	Light Cart	NF-2
1	2	No	Start Cart	A/M32A-60A

3.5.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CO _{2e}
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068	24.8
Ace 401	0.0	0.200	0.408	7.970	1.520	0.211	0.205	313.2
MJ-40	0.0	0.210	0.219	0.340	0.210	0.060	0.055	141.2
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089	147.0
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006	8.9
MJ-2/TTU-229	10.9	0.193	0.077	3.858	2.466	0.083	0.080	246.7
NF-2	0.0	0.010	0.043	0.110	0.080	0.010	0.010	22.1
A/M32A-60A	0.0	0.270	0.306	1.820	5.480	0.211	0.205	221.1

3.5.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

$$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$$

- AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)
- AGE: Total Number of Aerospace Ground Equipment
- OH: Operation Hours for Each LTO (hour)
- LTO: Number of LTOs
- EF_{POL}: Emission Factor for Pollutant (lb/hr)
- 2000: Conversion Factor pounds to tons

4. Personnel

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Oklahoma
 Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Personnel

- Activity Description:

800 Personnel

- Activity Start Date

Start Month: 1
 Start Year: 2022

- Activity End Date

Indefinite: Yes
 End Month: N/A
 End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	1.802890
SO _x	0.012046
NO _x	1.594188
CO	21.148305
PM 10	0.039289

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.034530
Pb	0.000000
NH ₃	0.110797
CO ₂ e	1753.2

4.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 400
 Civilian Personnel: 400
 Support Contractor Personnel: 0
 Air National Guard (ANG) Personnel: 0
 Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel:	5 Days Per Week (default)
Civilian Personnel:	5 Days Per Week (default)
Support Contractor Personnel:	5 Days Per Week (default)
Air National Guard (ANG) Personnel:	4 Days Per Week (default)
Reserve Personnel:	4 Days Per Month (default)

4.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

4.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.301	000.002	000.232	003.573	000.007	000.006		000.023	00324.314
LDGT	000.380	000.003	000.407	004.987	000.009	000.008		000.024	00417.745
HDGV	000.727	000.005	001.023	015.732	000.020	000.017		000.045	00770.045
LDDV	000.108	000.003	000.133	002.588	000.004	000.004		000.008	00315.123
LDDT	000.245	000.004	000.379	004.410	000.007	000.006		000.008	00447.020
HDDV	000.481	000.013	004.802	001.719	000.167	000.154		000.028	01500.738
MC	002.649	000.003	000.746	013.246	000.026	000.023		000.054	00395.692

4.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$$VMT_p = NP * WD * AC$$

VMT_p: Personnel Vehicle Miles Travel (miles/year)

NP: Number of Personnel

WD: Work Days per Year

AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$$

VMT_{Total}: Total Vehicle Miles Travel (miles)

VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_C: Civilian Personnel Vehicle Miles Travel (miles)

VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)

VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)

VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{Total}: Total Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Personnel On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

5. Emergency Generator

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Oklahoma

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Generators

- Activity Description:

Generators

- Activity Start Date

Start Month: 1

Start Year: 2022

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.010737
SO _x	0.000187
NO _x	0.388402
CO	0.103170
PM 10	0.012131

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.012131
Pb	0.000000
NH ₃	0.000000
CO _{2e}	20.0

5.2 Emergency Generator Assumptions

- Emergency Generator

Type of Fuel used in Emergency Generator: Diesel

Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption

Emergency Generator's Horsepower: 1000

Average Operating Hours Per Year (hours): 30

5.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
0.000716	0.0000125	0.0259	0.00688	0.000809	0.000809			1.33

5.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year

$$AE_{POL} = (NGEN * HP * OT * EF_{POL}) / 2000$$

AE_{POL}: Activity Emissions (TONs per Year)

NGEN: Number of Emergency Generators

HP: Emergency Generator's Horsepower (hp)

OT: Average Operating Hours Per Year (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

6. Degreaser

6.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Oklahoma

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Degreasers

- Activity Description:

Degreasers

- Activity Start Date

Start Month: 1

Start Year: 2022

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	1.628250
SO _x	0.000000
NO _x	0.000000
CO	0.000000
PM 10	0.000000

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000
CO ₂ e	0.0

6.2 Degreaser Assumptions

- Degreaser

Net solvent usage (total less recycle) (gallons/year): 500

- Default Settings Used: Yes

- Degreaser Consumption

Solvent used: Mineral Spirits CAS#64475-85-0 (default)

Specific gravity of solvent: 0.78 (default)

Solvent VOC content (%): 100 (default)

Efficiency of control device (%): 0 (default)

6.3 Degreaser Formula(s)

- Degreaser Emissions per Year

$$DE_{VOC} = (VOC / 100) * NS * SG * 8.35 * (1 - (CD / 100)) / 2000$$

DE_{VOC}: Degreaser VOC Emissions (TONs per Year)

VOC: Solvent VOC content (%)

(VOC / 100): Conversion Factor percent to decimal

NS: Net solvent usage (total less recycle) (gallons/year)

SG: Specific gravity of solvent

8.35: Conversion Factor the density of water

CD: Efficiency of control device (%)

(1 - (CD / 100)): Conversion Factor percent to decimal (Not effected by control device)

2000: Conversion Factor pounds to tons

7. Heating

7.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Oklahoma

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Heating

- Activity Description:

Heating

- Activity Start Date

Start Month: 1

Start Year: 2022

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.116169
SO _x	0.012673
NO _x	2.112171
CO	1.774224
PM 10	0.160525

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.160525
Pb	0.000000
NH ₃	0.000000
CO ₂ e	2542.8

7.2 Heating Assumptions

- Heating

Heating Calculation Type: Heat Energy Requirement Method

- **Heat Energy Requirement Method**
 - Area of floorspace to be heated (ft²): 444000
 - Type of fuel: Natural Gas
 - Type of boiler/furnace: Industrial (10 - 250 MMBtu/hr)
 - Heat Value (MMBtu/ft³): 0.00105
 - Energy Intensity (MMBtu/ft²): 0.0999

- **Default Settings Used:** Yes

- **Boiler/Furnace Usage**
 - Operating Time Per Year (hours): 900 (default)

7.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
5.5	0.6	100	84	7.6	7.6			120390

7.4 Heating Formula(s)

- Heating Fuel Consumption ft³ per Year

$$FC_{HER} = HA * EI / HV / 1000000$$

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method

HA: Area of floorspace to be heated (ft²)

EI: Energy Intensity Requirement (MMBtu/ft²)

HV: Heat Value (MMBTU/ft³)

1000000: Conversion Factor

- Heating Emissions per Year

$$HE_{POL} = FC * EF_{POL} / 2000$$

HE_{POL}: Heating Emission Emissions (TONs)

FC: Fuel Consumption

EF_{POL}: Emission Factor for Pollutant

2000: Conversion Factor pounds to tons

8. Paint Booth

8.1 General Information & Timeline Assumptions

- **Add or Remove Activity from Baseline?** Add

- Activity Location

County: Oklahoma

Regulatory Area(s): NOT IN A REGULATORY AREA

- **Activity Title:** Paint Booth

- Activity Description:

Paint Booth

- Activity Start Date

Start Month: 1
Start Year: 2022

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	2.384760
SO _x	0.000000
NO _x	0.000000
CO	0.000000
PM 10	0.000000

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000
CO ₂ e	0.0

8.2 Paint Booth Assumptions

- Paint Booth

Coating throughput (gallons/year): 1500

- Default Settings Used: Yes

- Paint Booth Consumption

Coating used: Quick Dry Enamel (default)
Specific gravity of coating: 1.19 (default)
Coating VOC content by weight (%): 32 (default)
Efficiency of control device (%): 0 (default)

8.3 Paint Booth Formula(s)

- Paint Booth Emissions per Year

$$PBE_{VOC} = (VOC / 100) * CT * SG * 8.35 * (1 - (CD / 100)) / 2000$$

PBE_{VOC}: Paint Booth VOC Emissions (TONs per Year)

VOC: Coating VOC content by weight (%)

(VOC / 100): Conversion Factor percent to decimal

CT: Coating throughput (gallons/year)

SG: Specific gravity of coating

8.35: Conversion Factor the density of water

CD: Efficiency of control device (%)

(1 - (CD / 100)): Conversion Factor percent to decimal (Not effected by control device)

2000: Conversion Factor pounds to tons



C

Supporting Documentation
for Biological Resources



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Table C-1. Oklahoma County Noxious Weeds

Common Name	Scientific Name
Balloonvine	<i>Cardiospermum halicacabum</i>
Blackspot hornpoppy	<i>Glaucium corniculatum</i>
Bracted plantain	<i>Plantago aristata</i>
Buckhorn plantain*	<i>Plantago lanceolata</i>
Canada thistle*	<i>Cirsium arvense</i>
Cheat or Chess*	<i>Bromus secalinus</i>
Cocklebur	<i>Xanthium</i> spp.
Corn cockle	<i>Agrostemma githago</i>
Darnel	<i>Lolium temulentum</i>
Dock*	<i>Rumex</i> spp.
Dodder	<i>Cuscuta</i> spp.
Eclipta	<i>Eclipta prostrata</i>
Field bindweed	<i>Convolvulus arvensis</i>
Giant foxtail	<i>Setaria faberi</i>
Hedge bindweed	<i>Calystegia sepium</i>
Hoary cress*	<i>Lepidium draba</i>
Horsenettle	<i>Solanum carolinense</i>
Johnson grass*	<i>Sorghum halepense</i>
Jointed goatgrass*	<i>Aegilops cylindrica</i>
Morning-glory	<i>Ipomoea</i> sp.
Musk thistle	<i>Carduus nutans</i>
Red sorrel	<i>Rumex acetosella</i>

Russian knapweed	<i>Rhaponticum repens</i>
Rye brome	<i>Bromus secalinus</i>
Scotch thistle	<i>Onopordium acanthium</i>
Sericea lespedeza*	<i>Lespedeza cuneata</i>
Sicklepod	<i>Senna obtusifolia</i>
Silverleaf nightshade	<i>Solanum elaeagnifolium</i>
Texas blueweed	<i>Helianthus ciliaris</i>
Wild buckwheat	<i>Fallopia convolvulus</i>
Wild oat	<i>Avena fatua</i>

Notes: * Known to currently exist on Tinker AFB
Source: ODA 2020, Tinker AFB 2019a

Table C-2. Species of Concern with the Potential to Occur within the Area of the Alternatives

Species	Status	Habitat	Likelihood of Occurrence
Reptiles and Amphibians			
Chicken turtle (<i>Deirochelys reticularia</i>)	S2	Semi-aquatic basking turtles, found on both water and land. They prefer quiet bodies of water: ponds, lakes, ditches, marshes, cypress swamps and Carolina bays. They bask on logs, rocks, and other emergent structures. Prefers water with plenty of aquatic vegetation and a soft substrate. They have been found at water depths of a few centimeters to more than 2 meters.	Likely
Texas horned lizard (<i>Phrynosoma cornutum</i>)	CS, S2, SG	Texas horned lizards occur in all areas but the southeast corner of Oklahoma, but typically in open areas. These lizards are adaptable to a wide range of conditions. As a general trend, horned lizards seem to be most common in habitats with sandy or loamy soils, and moderate grass or shrub cover (ODWC 2020b).	Likely
Birds			
Alder flycatcher (<i>Empidonax alnorum</i>)	S2N	A common migrant, it is found in willows, alders, brushy swamps, and swales.	Likely
American avocet (<i>Recurvirostra americana</i>)	S2B	Found in mudflats, ponds, wetlands, and freshwater marshes and swamps. They are also common in lakes, rocky/sandy seashores, bay/coastal islands, and tidal flats.	Likely
American bittern (<i>Botaurus lentiginosus</i>)	S1S3	Inhabits areas of freshwater wetlands with tall emergent vegetation, shorelines, and vegetative fringes. The bird prefers beaver-created wetlands to those of glacial origin.	Likely
American golden-plover (<i>Pluvialis dominica</i>)	BCC N	Found in temperate, grassland areas. In winter, found along the Rio de la Plata in the surrounding grasslands. In spring they migrate to arctic tundra regions.	Likely
Bald eagle	BGEPA	Found in areas near large water bodies such as sea coasts, coastal estuaries and inland lakes and rivers, in many areas, these birds	Likely

Species	Status	Habitat	Likelihood of Occurrence
(<i>Haliaeetus leucocephalus</i>)	BCC	are found within 3 kilometers of a water source.	
Baltimore oriole (<i>Icterus galbula</i>)	S2S4	Prefer open woods, with a strong preference for deciduous over coniferous trees. They are very adaptable, however, and can be found breeding in a variety of habitats. They are rare on farmlands but have adapted well to urban parks and suburban landscapes.	Likely
Bank swallow (<i>Riparia riparia</i>)	S2B	They nest in small to large colonies in soft banks or bluffs along rivers, streams, and coastal areas. They prefer the eroding banks of low-gradient, meandering rivers and streams. They also use sandy coastal bluffs or cliffs. Man-made habitats are now also used, including gravel pits, quarries, and road cuts.	Likely
Black-bellied plover (<i>Pluvialis squatarola</i>)	S2N	Migrants favor lowlands over mountains and harvested agricultural fields (both wet and flooded), sod farms, sporting fields, wet prairies, and the muddy or gravelly edges of lakes, ponds, and rivers. Wintering birds use tidal creeks, estuaries, lagoons, and shorelines. They often use nearby agricultural fields as well, especially during high tides, when mudflats are underwater (Cornell University 2019).	Likely
Black vulture (<i>Coragyps atratus</i>)	S2B	Prefers an open habitat and avoids dense forests as much as possible. Such habitats include lowlands with adjacent highlands, open fields, desert terrain, garbage dumps, and urban or rural centers.	Likely
Bobolink (<i>Dolichonyx oryzivorus</i>)	S2N	Found in grassy fields and wetlands. They nest in hay fields, primarily in the eastern and Midwestern portion of the United States. Their winter region includes the grassy fields of Brazil, Uruguay, Paraguay, and northern Argentina. During migration, they stop along the way in rice fields.	Likely
Burrowing owl	S2	Open areas that are open-canopied, with sparse ground vegetation and few trees. Habitats generally include agricultural lands,	Likely

Species	Status	Habitat	Likelihood of Occurrence
<i>(Athene cunicularia)</i>		deserts, grasslands, prairies, and plains. This can also include urban vacant lots, airports, golf courses, and fairgrounds.	
Canada warbler <i>(Wilsonia canadensis)</i>	S1N	Mixed woodland habitat. Nests in areas that contain nearly-mature tree stands and an abundance of wet forest floor-cover and understory. Will often inhabit areas at higher elevations, near open water.	Likely
Chestnut-sided warbler <i>(Denroica pensylvanica)</i>	S2N	Inhabits areas the recently experience the clearing of primeval forests and the subsequent growth of shrubby habitats, the chestnut-sided warbler is one of the most abundant breeding warblers in second growth deciduous woodlands.	Likely
Common poorwill <i>(Phalaenoptilus nuttallii)</i>	S2B	Found in dry, open areas in diverse habitats such as grasslands, forest, hills, and deserts. Vegetation varies, with preference given to short grasses and shrubs or open forest in areas with deciduous or coniferous growth.	Likely
Cooper's hawk <i>(Accipiter cooperii)</i>	S2	Deciduous and mixed forests and open woodland habitats such as woodlots, riparian woodlands, semiarid woodlands of the southwest, and other areas where the woodlands occur in patches.	Likely
Dunlin <i>(Calidris alpina)</i>	S2N	Found in the Arctic tundra during their summer breeding season. Prefer wet marshy areas with sedges and grasses interspersed with dry islands of vegetation for nesting. Nearby lakes, shallow ponds, and river channels are also desirable. After breeding in the tundra areas, dunlins move to coastal estuaries and intertidal regions to take advantage of abundant food sources before migrating south. Their winter habitat is primarily in the intertidal mud flats and estuaries on temperate coast lines.	Likely
Green heron <i>(Butorides virescens)</i>	S2B	Inhabits areas along forested water margins. Their general distribution is limited by the availability of wetlands. They frequent both salt and fresh water, showing great flexibility in habitat choice. Favored habitats are	Likely

Species	Status	Habitat	Likelihood of Occurrence
		mangrove-lined shores and estuaries, and dense, woody vegetation fringing ponds, rivers and lakes.	
Harris's sparrow (<i>Zonotrichia querula</i>)	BCC N	In the breeding season, they occupy mixed forest-tundra zones in northern Canada. They seek out shrubby vegetation to shelter their ground scrape nests. Harris's sparrows overwinter in the southern central United States. They are often found feeding in agricultural fields, pastures or scrubby hedgerows.	Likely
Hooded warbler (<i>Wilsonia citrina</i>)	S2B	Nests in gaps in heavily forested areas, but stays away from the edge of the forest. Picks sites that have a well-developed understory to build the nest in. The male and female prefer different habitats during the winter months. Males still prefer forested areas while females will take up in brushy fields and shrubby areas.	Likely
Horned grebe (<i>Podiceps auritus</i>)	S2N	During the breeding season, found on prairie and boreal freshwater lakes with both open waters and marsh vegetation. They also nest in marshes, small sloughs with weedy margins, ponds, and occasionally on rivers. Overwinter in coastal saltwater habitats such as protected bays and exposed shores, and occasionally on large freshwater lakes.	Likely
Lesser yellowlegs (<i>Tringa flavipes</i>)	BCC	Nests in open and edge boreal forest habitats, usually near wetlands. They are found in open deciduous or coniferous forest mosaics with wet or sedge meadows, marshes, bogs, or muskegs. Foraging areas mainly occur along the shores of lakes, sloughs, estuaries, and marshes. During migration and winter they are found in inland (spring and fall migration) and coastal (fall migration) wetland habitats.	Likely
Loggerhead shrike (<i>Lanius ludovicianus</i>)	S2M, SG	Both sexes of the species prefer to spend time in open places. Prefer a country field bordered with trees or replete with brush / thickets to almost any other.	Likely

Species	Status	Habitat	Likelihood of Occurrence
Long-billed curlew (<i>Numenius americanus</i>)	BCC B	Breeding habitat consists of grasslands, with the most inhabiting shortgrass prairie, followed by pasture grasslands and cultivated cropland. In winter, primarily occur in intertidal areas and mudflats, as well as foraging in nearby pastures.	Likely
Long-eared owl (<i>Asio otus</i>)	S1	Inhabit dense vegetation close to grasslands, as well as open forests shrub lands. They are common in tree belts along streams of plains and even desert oases. They can also be found in shelterbelts, small tree groves, thickets surrounded by wetlands, grasslands, marshes and farmlands.	Likely
Magnolia warbler (<i>Dendroica magnolia</i>)	S2N	Found in damp coniferous forests, including pine trees, red maple, spruce, hemlocks, and balsam firs. It tends to dwell in the lower parts of the trees.	Likely
Marbled godwit (<i>Limosa fedoa</i>)	BCC	Breed in grasslands or wetlands in the northern prairies of the United States and Canada, especially those lacking in dense or tall vegetation. Also found in temporary ponds, as well as pastures and hay fields. During migration and winter, they are found in wetlands and marshes, shallow ponds, coastal estuaries, mudflats, salt marshes, and sandy beaches.	Likely
Mountain bluebird (<i>Sialia currucoides</i>)	S2N	Mountain bluebird occurs in Oklahoma as a non-breeding winter resident, found in meadows, hedgerows, prairies, and flat grasslands with few scattered trees and bushes, pinyon-juniper and oak-juniper woodlands, and agricultural areas (Cornell University 2019).	Likely
Osprey (<i>Pandion haliaetus</i>)	S2N	Ospreys are able to live almost anywhere where there are safe nest sites and shallow water with abundant fish. Nests are generally found within 3 to 5 kilometers of a water body such as a salt marsh, mangrove swamp, cypress swamp, lake, bog, reservoir or river.	Likely

Species	Status	Habitat	Likelihood of Occurrence
Ovenbird (<i>Seiurus aurocapillus</i>)	S2B	Found in mature deciduous or mixed broadleaf-conifer forest with little undergrowth, and occasionally pine forests. Breeding habitats are relatively dry uplands or slopes, although they have been noted to breed in bottomland forests and swampy areas.	Likely
Red-breasted nuthatch (<i>Sitta canadensis</i>)	S2N	Prefers mature, partly open coniferous or mixed conifer-deciduous stands for breeding. They favor stands that have a tall, dense canopy and a dense understory of saplings.	Likely
Red-headed woodpecker (<i>Melanerpes erythrocephalus</i>)	BCC	Prefers open woodlands and forest edges and clearings. Often found in deciduous woodlands, river bottoms, open woods, orchards, parks, open country, savannas and grasslands with scattered trees. Prefers habitat with few tall, large-diameter trees. The winter habitat of this species is similar to the breeding habitat; mature forests containing large, old trees.	Likely
Sandhill crane (<i>Grus canadensis</i>)	S2N	Nests in open grasslands, such as wet meadows, and freshwater marshes or bogs. Sandhill cranes prefer to be far from human habitation. However, during migration, they are commonly seen feeding on crops and crop residue in agricultural fields.	Likely
Semipalmated sandpiper (<i>Calidris pusilla</i>)	BCC N	Breeds along the shores of northern Canada and Alaska on wet sedge or sedge-tundra. Selects open habitats well-suited for breeding displays and scrape nests. Generally found along sandy shorelines. Ideal foraging habitat includes pools close to lakes and rivers, shrubby river deltas, and sandy areas along the shore. Migration stopover habitats may include wetlands, grassy fields, marshes, or edges of lakes and rivers.	Likely
Snowy plover (<i>Charadrius alexandrinus</i>)	SGC B	Primarily found on sand beaches, though they also forage on nearby mud flats, especially after breeding season. Also found on dune systems, coastal lagoons, inland steppes, sand deserts, tidal flats, dry salt flats, and large	Likely

Species	Status	Habitat	Likelihood of Occurrence
		sandy rivers and lakes where there is little vegetation.	
Spotted sandpiper <i>(Actitis macularius)</i>	S1S3	Breeds in a variety of habitats, including sagebrush, grasslands, forests, fields, lawns and parks. During spring and fall migrations, they prefer freshwater habitats, such as lakes, rivers and marshes, but can also be found along coasts and in estuaries. In winter, spotted sandpipers can be found in coastal and interior areas, nearly anywhere where water is present.	Likely
Smith's longspur <i>(Calcarius pictus)</i>	BCC	Prairies, fields, airports; in summer, tundra. Breeds along treeline in the North, where stunted forest gives way to tundra, mainly in areas of grassy or sedgy tundra with scattered low shrubs and short conifers. Winters on shortgrass plains, heavily grazed pastures, airport fields.	Low
Swamp sparrow <i>(Melospiza georgiana)</i>	S2N	Commonly found in open wetlands such as cattail and sedge marshes, shrubby wetlands, and other similar habitats. They can be found occasionally in lake and streamside marshes.	Likely
Townsend's solitaire <i>(Myadestes townsendi)</i>	S2N	Conifer forests in mountains, rocky cliffs; in winter, chaparral, pinyon-juniper, open woods, wooded streams. Breeds mostly in open conifer forest in mountains, where exposed rocky slopes or dirt banks provide nesting sites; in far north, may be in burned areas or open scrub habitat near such banks. In winter, inhabits semi-open woods and brush, especially around junipers. Common migrant in Oklahoma along the Central Flyway.	Likely
Tree swallow <i>(Tachycineta bicolor)</i>	S2N	Found in open areas near water, such as fields, marshes, meadows, shorelines, beaver ponds, and wooded swamps. An important habitat requirement is cavities in which to nest. These can include standing dead trees, sapsucker-excavated holes in live trees, under the eaves of buildings, and in artificial nest boxes.	Likely

Species	Status	Habitat	Likelihood of Occurrence
Virginia rail (<i>Rallus limicola</i>)	S1B	During their breeding season found in freshwater marshlands with an adequate concentration of emergent vegetation such as cattails (<i>Typha</i>) and bulrush (<i>Scirpus</i>). They are found mostly in shallow to intermediate waters and frequent mudflats. They avoid deeper waters, but will inhabit these areas if there is a sufficient amount of fallen or floating vegetation on which they can walk and forage. Their winter habitat is similar to that of their breeding habitat.	Likely
Whimbrel (<i>Numenius phaeopus</i>)	S1N	Shores, mudflats, marshes, tundra. Found on a wide variety of habitats on migration. Most common on mudflats, but also found on rocky shores, sandy beaches, salt marshes, flooded agricultural fields, grassy fields near coast. In summer, breeds on Arctic tundra. Uncommon migrant in the area.	Likely
Whip-poor-will (<i>Caprimulgus vociferous</i>)	S2B	Prefers dry woodlands, but will occasionally nest in wet woods at the edge of a marsh. It breeds in open woods with adjacent fields and open areas that the birds use as foraging sites.	Likely
Willet (<i>Tringa semipalmata</i>)	BCC S3N	Marshes, wet meadows, mudflats, beaches. Western race nests inland, around fresh marshes in open country, especially native grassland. In migration and winter, occur on mudflats, tidal estuaries, and sandy beaches.	Likely
Yellow-bellied flycatcher (<i>Empidonax flaviventris</i>)	S2N	Yellow-bellied flycatchers can be found in forested areas and along foothills. They prefer moist environments such as bogs and the edges of mixed wood and coniferous forests, particularly near water bodies.	Likely
Mammals			
Little brown bat (<i>Myotis lucifugus</i>)	S1	Inhabits forested lands near water, but some subspecies can be found in dry climates where water is not readily available.	Likely
Silver-haired bat	S2	Most commonly found in boreal or coniferous and deciduous forest near bodies of water, such as rivers, lakes, streams, estuaries or	Likely

Species	Status	Habitat	Likelihood of Occurrence
<i>(Lasionycteris noctivagans)</i>		ponds. Summer day roosts are typically under loose bark in trees, willows, maple, and ash trees. They can also be found in dead trees, also called snags that have loose bark to provide cover, and cavities in these trees.	
<p>Notes: S1, S2, S3 - Species of Concern (state ranking). These species have been identified by technical experts as critically imperiled and possibly threatened of extirpation but for which additional information is needed (Oklahoma Natural Heritage Inventory). M = Migrant, B = Breeding, N = Non migrant</p> <p>SG – Species of Greatest Conservation Concern (Tier I) as identified in Oklahoma Comprehensive Wildlife Conservation Strategy (2016).</p> <p>CS - Statewide closed season (state ranking). It is unlawful at any time to possess or to kill individuals of these species or to remove any individuals of these species from their natural habitats.</p> <p>BCC – Birds of Conservation Concern listed by the USFWS IPaC Report 2020 for the project area</p> <p>BGEPA – Bald and Golden Eagle Protection Act list by USFWS IPaC Report 2020</p> <p>Source of list: Tinker AFB 2019a; USFWS 2020b</p> <p>Source of species habitat information: ADW 2020 or NAS 2020</p>			

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Section 106 Consultation
and Government-to-
Government Consultation



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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 72D AIR BASE WING (AFMC)
TINKER AIR FORCE BASE OKLAHOMA

Colonel Paul G. Filcek
Commander
4385 S. Air Depot Blvd, Suite 111
Tinker AFB OK 73145

MAY 20 2020

Ms. Terri Parton
President, Wichita and Affiliated Tribes
P.O. Box 729
Anadarko OK 73005

Dear Ms. Parton

The United States Air Force (USAF) is proposing to construct and activate the B-21 Maintenance Depot at Tinker Air Force Base (AFB), Oklahoma. In accordance with Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, the USAF is accounting for various environmental concerns and engaging early with tribal governments as it formulates the proposed undertaking. The USAF is also preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with the proposed B-21 Maintenance Depot.

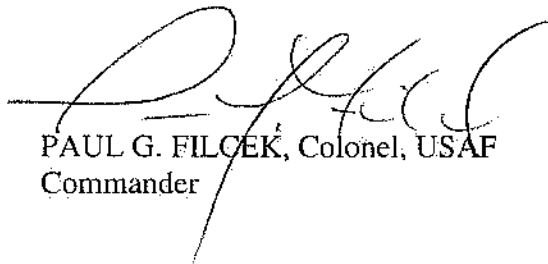
The proposed undertaking would establish the required facilities and logistic support for B-21 depot maintenance operations at Tinker AFB to support maintenance requirements for approximately 100 aircraft that will be established as the USAF B-21 fleet. B-21 aircraft in the USAF inventory would be temporarily relocated to Tinker AFB for scheduled and as needed maintenance. No B-21 aircraft would be permanently based at Tinker AFB. The proposed undertaking would include facility construction, demolition, and renovation; an increase in base personnel and dependents; an increase in aircraft operations and engine test runups; aircraft maintenance; and utilities connections. The B-21 aircraft would operate within Military Training Routes and other existing airspace areas already designated for military flight operations conducted into and out of Tinker AFB. No changes to airspace configurations (e.g., size, shape, or location) are proposed or would be required to support the implementation of the proposed undertaking. The Section 106 Consultation Package (attached), provides a more detailed description of the proposed undertaking at Tinker AFB, defines the area of potential effect (APE), describes historic properties identified in the APE pursuant to 36 CFR §800.4, and provides the finding of effect for the proposed undertaking.

The APE for this proposed undertaking is defined as two alternative site footprints proposed for development, which encompass proposed construction and demolition, and two facilities proposed for renovation. The APE also includes a 0.25 mile radius around the alternative sites proposed for development and facilities undergoing exterior renovations, to include areas where visual or audible effects could extend.

Tinker AFB has previously conducted both archaeological and architectural inventories within the APE. There is one historic property within the APE, Building 1, which is determined individually eligible for NRHP listing. Building 1 is not within the alternative sites proposed for development, or is a facility proposed for demolition or renovation. Additionally, no NRHP-eligible archaeological sites have been identified within the APE. In accordance with the NHPA, the USAF offers to initiate government-to-government consultation regarding this proposed undertaking; prior consultation with your tribe on projects in this APE has not resulted in identification of any properties of traditional cultural or religious significance. The Section 106 Consultation Package provides additional information regarding previous cultural resources inventories and eligibility determinations for Tinker AFB.

In accordance with 36 CFR §800.5, Tinker AFB applied the criteria of adverse effect for historic properties, as described in the Section 106 Consultation Package, for this proposed undertaking. Pursuant to 36 CFR §800.5(b), the USAF proposes a finding that there would be no adverse effect on historic properties by the proposed B-21 Maintenance Depot undertaking at Tinker AFB, Oklahoma.

In accordance with the NHPA, the USAF looks forward to engaging in consultation with you on this undertaking. The Tinker AFB point of contact is Mr. Tim Taylor, Cultural Resources Manager and NEPA Coordinator. He can be reached at (405) 734-4579 or by e-mail at timothy.taylor.5@us.af.mil. Comments can be e-mailed to Mr. Taylor preferably, or mailed to his attention at 72 ABW/CEIEC, 7535 5th Street, Building 400, 2nd Floor, Tinker AFB OK 73145. Thank you in advance for your assistance in this effort.



PAUL G. FILCEK, Colonel, USAF
Commander

Attachment:
Section 106 Consultation Package for the B-21 Maintenance Depot at Tinker Air Force Base,
Oklahoma



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 72D AIR BASE WING (AFMC)
TINKER AIR FORCE BASE OKLAHOMA

Colonel Paul G. Filcek
Commander
4385 S. Air Depot Blvd, Suite 111
Tinker AFB OK 73145

MAY 20 2020

Mr. Greg Chilcoat
Principal Chief, Seminole Nation
P.O. Box 1498
Wewoka OK 74884

Dear Mr. Chilcoat

The United States Air Force (USAF) is proposing to construct and activate the B-21 Maintenance Depot at Tinker Air Force Base (AFB), Oklahoma. In accordance with Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, the USAF is accounting for various environmental concerns and engaging early with tribal governments as it formulates the proposed undertaking. The USAF is also preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with the proposed B-21 Maintenance Depot.

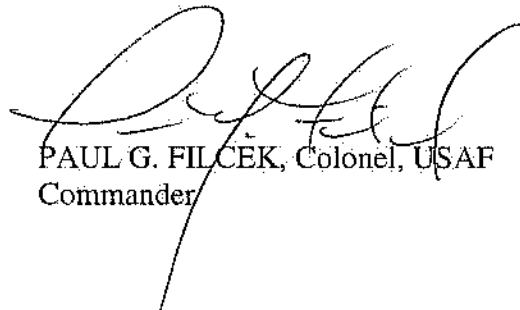
The proposed undertaking would establish the required facilities and logistic support for B-21 depot maintenance operations at Tinker AFB to support maintenance requirements for approximately 100 aircraft that will be established as the USAF B-21 fleet. B-21 aircraft in the USAF inventory would be temporarily relocated to Tinker AFB for scheduled and as needed maintenance. No B-21 aircraft would be permanently based at Tinker AFB. The proposed undertaking would include facility construction, demolition, and renovation; an increase in base personnel and dependents; an increase in aircraft operations and engine test runups; aircraft maintenance; and utilities connections. The B-21 aircraft would operate within Military Training Routes and other existing airspace areas already designated for military flight operations conducted into and out of Tinker AFB. No changes to airspace configurations (e.g., size, shape, or location) are proposed or would be required to support the implementation of the proposed undertaking. The Section 106 Consultation Package (attached), provides a more detailed description of the proposed undertaking at Tinker AFB, defines the area of potential effect (APE), describes historic properties identified in the APE pursuant to 36 CFR §800.4, and provides the finding of effect for the proposed undertaking.

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Tinker AFB has previously conducted both archaeological and architectural inventories within the APE. There is one historic property within the APE, Building 1, which is determined individually eligible for NRHP listing. Building 1 is not within the alternative sites proposed for development, or is a facility proposed for demolition or renovation. Additionally, no NRHP-eligible archaeological sites have been identified within the APE. In accordance with the NHPA, the USAF offers to initiate government-to-government consultation regarding this proposed undertaking; prior consultation with your tribe on projects in this APE has not resulted in identification of any properties of traditional cultural or religious significance. The Section 106 Consultation Package provides additional information regarding previous cultural resources inventories and eligibility determinations for Tinker AFB.

In accordance with 36 CFR §800.5, Tinker AFB applied the criteria of adverse effect for historic properties, as described in the Section 106 Consultation Package, for this proposed undertaking. Pursuant to 36 CFR §800.5(b), the USAF proposes a finding that there would be no adverse effect on historic properties by the proposed B-21 Maintenance Depot undertaking at Tinker AFB, Oklahoma.

In accordance with the NHPA, the USAF looks forward to engaging in consultation with you on this undertaking. The Tinker AFB point of contact is Mr. Tim Taylor, Cultural Resources Manager and NEPA Coordinator. He can be reached at (405) 734-4579 or by e-mail at timothy.taylor.5@us.af.mil. Comments can be e-mailed to Mr. Taylor preferably, or mailed to his attention at 72 ABW/CEIEC, 7535 5th Street, Building 400, 2nd Floor, Tinker AFB OK 73145. Thank you in advance for your assistance in this effort.



PAUL G. FILCEK, Colonel, USAF
Commander

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Oklahoma



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 72D AIR BASE WING (AFMC)
TINKER AIR FORCE BASE OKLAHOMA

Colonel Paul G. Filcek
Commander
4385 S. Air Depot Blvd, Suite 111
Tinker AFB OK 73145

MAY 20 2020

Mr. Geoffrey M. Standing Bear
Principal Chief, Osage Nation
627 Grandview Avenue
Pawhuska OK 74056

Dear Mr. Standing Bear

The United States Air Force (USAF) is proposing to construct and activate the B-21 Maintenance Depot at Tinker Air Force Base (AFB), Oklahoma. In accordance with Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, the USAF is accounting for various environmental concerns and engaging early with tribal governments as it formulates the proposed undertaking. The USAF is also preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with the proposed B-21 Maintenance Depot.

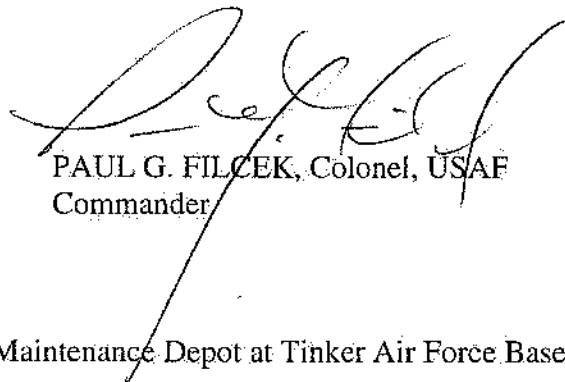
The proposed undertaking would establish the required facilities and logistic support for B-21 depot maintenance operations at Tinker AFB to support maintenance requirements for approximately 100 aircraft that will be established as the USAF B-21 fleet. B-21 aircraft in the USAF inventory would be temporarily relocated to Tinker AFB for scheduled and as needed maintenance. No B-21 aircraft would be permanently based at Tinker AFB. The proposed undertaking would include facility construction, demolition, and renovation; an increase in base personnel and dependents; an increase in aircraft operations and engine test runups; aircraft maintenance; and utilities connections. The B-21 aircraft would operate within Military Training Routes and other existing airspace areas already designated for military flight operations conducted into and out of Tinker AFB. No changes to airspace configurations (e.g., size, shape, or location) are proposed or would be required to support the implementation of the proposed undertaking. The Section 106 Consultation Package (attached), provides a more detailed description of the proposed undertaking at Tinker AFB, defines the area of potential effect (APE), describes historic properties identified in the APE pursuant to 36 CFR §800.4, and provides the finding of effect for the proposed undertaking.

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Tinker AFB has previously conducted both archaeological and architectural inventories within the APE. There is one historic property within the APE, Building 1, which is determined individually eligible for NRHP listing. Building 1 is not within the alternative sites proposed for development, or is a facility proposed for demolition or renovation. Additionally, no NRHP-eligible archaeological sites have been identified within the APE. In accordance with the NHPA, the USAF offers to initiate government-to-government consultation regarding this proposed undertaking; prior consultation with your tribe on projects in this APE has not resulted in identification of any properties of traditional cultural or religious significance. The Section 106 Consultation Package provides additional information regarding previous cultural resources inventories and eligibility determinations for Tinker AFB.

In accordance with 36 CFR §800.5, Tinker AFB applied the criteria of adverse effect for historic properties, as described in the Section 106 Consultation Package, for this proposed undertaking. Pursuant to 36 CFR §800.5(b), the USAF proposes a finding that there would be no adverse effect on historic properties by the proposed B-21 Maintenance Depot undertaking at Tinker AFB, Oklahoma.

In accordance with the NHPA, the USAF looks forward to engaging in consultation with you on this undertaking. The Tinker AFB point of contact is Mr. Tim Taylor, Cultural Resources Manager and NEPA Coordinator. He can be reached at (405) 734-4579 or by e-mail at timothy.taylor.5@us.af.mil. Comments can be e-mailed to Mr. Taylor preferably, or mailed to his attention at 72 ABW/CEIEC, 7535 5th Street, Building 400, 2nd Floor, Tinker AFB OK 73145. Thank you in advance for your assistance in this effort.



PAUL G. FILCEK, Colonel, USAF
Commander

Attachment:
Section 106 Consultation Package for the B-21 Maintenance Depot at Tinker Air Force Base,
Oklahoma



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 72D AIR BASE WING (AFMC)
TINKER AIR FORCE BASE OKLAHOMA

Colonel Paul G. Filcek
Commander
4385 S. Air Depot Blvd, Suite 111
Tinker AFB OK 73145

MAY 20 2020

Mr. James Floyd
Principal Chief, Muscogee (Creek) Nation
P.O. Box 580
Okmulgee OK 74447

Dear Mr. Floyd

The United States Air Force (USAF) is proposing to construct and activate the B-21 Maintenance Depot at Tinker Air Force Base (AFB), Oklahoma. In accordance with Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, the USAF is accounting for various environmental concerns and engaging early with tribal governments as it formulates the proposed undertaking. The USAF is also preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with the proposed B-21 Maintenance Depot.

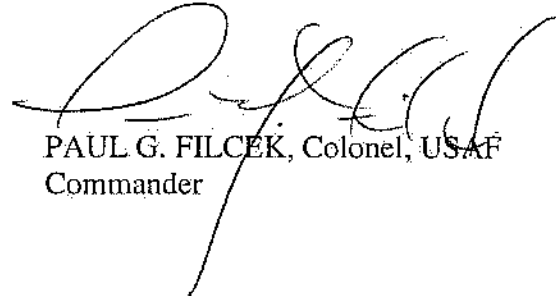
The proposed undertaking would establish the required facilities and logistic support for B-21 depot maintenance operations at Tinker AFB to support maintenance requirements for approximately 100 aircraft that will be established as the USAF B-21 fleet. B-21 aircraft in the USAF inventory would be temporarily relocated to Tinker AFB for scheduled and as needed maintenance. No B-21 aircraft would be permanently based at Tinker AFB. The proposed undertaking would include facility construction, demolition, and renovation; an increase in base personnel and dependents; an increase in aircraft operations and engine test runups; aircraft maintenance; and utilities connections. The B-21 aircraft would operate within Military Training Routes and other existing airspace areas already designated for military flight operations conducted into and out of Tinker AFB. No changes to airspace configurations (e.g., size, shape, or location) are proposed or would be required to support the implementation of the proposed undertaking. The Section 106 Consultation Package (attached), provides a more detailed description of the proposed undertaking at Tinker AFB, defines the area of potential effect (APE), describes historic properties identified in the APE pursuant to 36 CFR §800.4, and provides the finding of effect for the proposed undertaking.

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In accordance with the NHPA, the USAF looks forward to engaging in consultation with you on this undertaking. The Tinker AFB point of contact is Mr. Tim Taylor, Cultural Resources Manager and NEPA Coordinator. He can be reached at (405) 734-4579 or by e-mail at timothy.taylor.5@us.af.mil. Comments can be e-mailed to Mr. Taylor preferably, or mailed to his attention at 72 ABW/CEIEC, 7535 5th Street, Building 400, 2nd Floor, Tinker AFB OK 73145. Thank you in advance for your assistance in this effort.



PAUL G. FILCEK, Colonel, USAF
Commander

Attachment:
Section 106 Consultation Package for the B-21 Maintenance Depot at Tinker Air Force Base, Oklahoma.



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 72D AIR BASE WING (AFMC)
TINKER AIR FORCE BASE OKLAHOMA

Colonel Paul G. Filcek
Commander
4385 S. Air Depot Blvd, Suite 111
Tinker AFB OK 73145

MAY 20 2020

Ms. Tamara Francis-Fourkiller
Chairman, Caddo Nation of Oklahoma
P.O. Box 487
Binger OK 73009

Dear Ms. Francis-Fourkiller

The United States Air Force (USAF) is proposing to construct and activate the B-21 Maintenance Depot at Tinker Air Force Base (AFB), Oklahoma. In accordance with Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, the USAF is accounting for various environmental concerns and engaging early with tribal governments as it formulates the proposed undertaking. The USAF is also preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with the proposed B-21 Maintenance Depot.

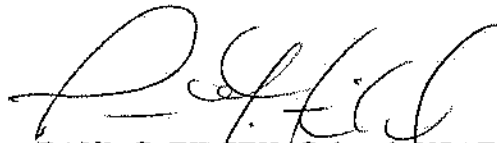
The proposed undertaking would establish the required facilities and logistic support for B-21 depot maintenance operations at Tinker AFB to support maintenance requirements for approximately 100 aircraft that will be established as the USAF B-21 fleet. B-21 aircraft in the USAF inventory would be temporarily relocated to Tinker AFB for scheduled and as needed maintenance. No B-21 aircraft would be permanently based at Tinker AFB. The proposed undertaking would include facility construction, demolition, and renovation; an increase in base personnel and dependents; an increase in aircraft operations and engine test runups; aircraft maintenance; and utilities connections. The B-21 aircraft would operate within Military Training Routes and other existing airspace areas already designated for military flight operations conducted into and out of Tinker AFB. No changes to airspace configurations (e.g., size, shape, or location) are proposed or would be required to support the implementation of the proposed undertaking. The Section 106 Consultation Package (attached), provides a more detailed description of the proposed undertaking at Tinker AFB, defines the area of potential effect (APE), describes historic properties identified in the APE pursuant to 36 CFR §800.4, and provides the finding of effect for the proposed undertaking.

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In accordance with 36 CFR §800.5, Tinker AFB applied the criteria of adverse effect for historic properties, as described in the Section 106 Consultation Package, for this proposed undertaking. Pursuant to 36 CFR §800.5(b), the USAF proposes a finding that there would be no adverse effect on historic properties by the proposed B-21 Maintenance Depot undertaking at Tinker AFB, Oklahoma.

In accordance with the NHPA, the USAF looks forward to engaging in consultation with you on this undertaking. The Tinker AFB point of contact is Mr. Tim Taylor, Cultural Resources Manager and NEPA Coordinator. He can be reached at (405) 734-4579 or by e-mail at timothy.taylor.5@us.af.mil. Comments can be e-mailed to Mr. Taylor preferably, or mailed to his attention at 72 ABW/CEIEC, 7535 5th Street, Building 400, 2nd Floor, Tinker AFB OK 73145. Thank you in advance for your assistance in this effort.



PAUL G. FILCEK, Colonel, USAF
Commander

Attachment:
Section 106 Consultation Package for the B-21 Maintenance Depot at Tinker Air Force Base,
Oklahoma



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 72D AIR BASE WING (AFMC)
TINKER AIR FORCE BASE OKLAHOMA

For Official Use Only

April 20, 2020

72 ABW/CEIEC
7535 5th Street
Tinker AFB, OK 73145-9010

Ms. Lynda Ozan
Deputy State Historic Preservation Officer
Oklahoma Historical Society
800 Nazih Zuhdi Drive
Oklahoma City, OK 73105

Dear Ms. Ozan

The United States Air Force (USAF) is proposing to construct and activate the B-21 Maintenance Depot at Tinker Air Force Base (AFB), Oklahoma. To take into account various environmental concerns, the USAF is engaging with the appropriate resource and regulatory agencies in formulating the proposed undertaking. The USAF is also preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with the proposed B-21 Maintenance Depot.

In accordance with Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 Code of Federal Regulations (CFR) Part 800, Tinker AFB is advising you of a proposed undertaking that has the potential to affect historic properties. The proposed undertaking would establish the required facilities and logistic support for B-21 depot maintenance operations at Tinker AFB to support maintenance requirements for approximately 100 aircraft that will be established as the USAF B-21 fleet. B-21 aircraft in the USAF inventory would be temporarily relocated to Tinker AFB for scheduled and as needed maintenance. No B-21 aircraft would be permanently based at Tinker AFB. The proposed undertaking would include facility construction, demolition, and renovation; an increase in base personnel and dependents; an increase in aircraft operations and engine test runups; aircraft maintenance; and utilities connections. The B-21 aircraft would operate within Military Training Routes and other existing airspace areas already designated for military flight operations conducted into and out of Tinker AFB. No changes to airspace configurations (e.g., size, shape, or location) are proposed or would be required to support the implementation of the proposed undertaking. The Section 106 Consultation Package (attached), provides a more detailed description of the proposed undertaking at Tinker AFB, defines the area of potential effects (APE), describes historic properties identified in the APE pursuant to 36 CFR §800.4, and provides the finding of effect for the proposed undertaking.

The APE for this proposed undertaking is defined as two alternative site footprints proposed for development, which encompass proposed construction and demolition, and two facilities proposed for renovation. The APE also includes a 0.25 mi radius around the alternative

Any Time... Any Place

sites proposed for development and facilities undergoing exterior renovations, to include areas where visual or audible effects could extend.

Tinker AFB has previously conducted both archaeological and architectural inventories within the APE. There is one historic property within the APE, Building 1, which is determined individually eligible for NRHP listing. Building 1 is not within the alternative sites proposed for development, nor is it a facility proposed for demolition or renovation. Additionally, no NRHP-eligible archaeological sites or properties of traditional cultural or religious significance have been identified within the APE. The Section 106 Consultation Package provides additional information regarding previous cultural resources inventories and eligibility determinations for Tinker AFB.

In accordance with 36 CFR §800.5, Tinker AFB applied the criteria of adverse effect for historic properties, as described in the Section 106 Consultation Package, for this proposed undertaking. Pursuant to 36 CFR §800.5(b), the USAF has determined that there would be no adverse effect on historic properties by the proposed B-21 Maintenance Depot undertaking at Tinker AFB, Oklahoma.

The USAF requests your comments regarding and/or concurrence with Tinker AFB's determination of *No Adverse Effect* within the next 30 days. If the USAF does not receive your comments and/or concurrence within the required 30 days, we will assume concurrence and proceed with the proposed undertaking as described. On behalf of the USAF, please contact me, Mr. Tim Taylor, Cultural Resources Manager and NEPA Coordinator, with your comments and/or concurrence. I can be reached at (405) 734-4579 or by e-mail at timothy.taylor.5@us.af.mil. Comments can be e-mailed to me preferably, or mailed to my attention at 72 ABW/CEIEC, 7535 5th Street, Building 400, 2nd Floor, Tinker AFB OK 73145. Thank you in advance for your assistance in this effort.



TIMOTHY TAYLOR
Cultural Resources Manager and NEPA
Coordinator, 72 ABW/CEIEC

Attachment:

Section 106 Consultation Package for the B-21 Maintenance Depot at Tinker Air Force Base, Oklahoma



Oklahoma Historical Society

Founded May 27, 1893

State Historic Preservation Office

Oklahoma History Center • 800 Nazih Zuhdi Drive • Oklahoma City, OK 73105-7917
(405) 521-6249 • Fax (405) 522-0816 • www.okhistory.org/shpo/shpom.htm

May 7, 2020

Mr. Timothy Taylor, Cultural Resources Manager
72 ABW/CEIEC - USAF
7535 5th Street, Bldg. 400 (2nd Floor)
Tinker AFB, OK 73145

RE: File #1607-20; Tinker AFB Proposed B-21 Maintenance Depot Project,
Tinker Air Force Base, Oklahoma County

Dear Mr. Taylor:

We have reviewed the documentation submitted on the referenced project. We find that we are unable to complete the review of your project without the following additional information.

(1) Clarification on the properties to be effected is required:

(a) Building #001 was specifically called out as a property that is in the APE that has been previously determined eligible for listing in the National Register of Historic Places (NRHP), and while this is indeed correct, the previously determined eligible historic district in which it is a contributing resource, Tinker AFB Base Operations Historic District (Consensus DOE, A, 06/27/1995), was not identified. If Tinker AFB considers this historic district to no longer be eligible for listing in the NRHP, please submit documentation to support that argument. Otherwise, the effect that the project will have on the Tinker AFB Base Operations Historic District needs to be taken into consideration.

(b) Building 11 (B11), which is one of the subject properties to be affected, lies within the boundaries of the previously determined eligible Tinker AFB Base Operations Historic District. Please provide a Historic Preservation Resource Identification Form and appropriate photographs and location map for the structure to be effected.

NOTE: For properties that are less than 45 years old, Historic Preservation Resource Identification Forms and photos are not required, but please inform us of when the structure was built. All properties 45 years of age or older require forms, photographs, and map.

(c) The *Proposed Undertaking Site Alternative 2: MROTC Site* partially lies within the boundaries of the previously determined eligible Tinker AFB Douglas Aircraft Plant Historic District (Formal DOE, A, 12/21/1994), which was not indicated. If Tinker AFB considers this historic district to no longer be eligible for listing in the NRHP, please submit documentation to support that argument. Otherwise, the effect that the project will have on the Tinker AFB Douglas Aircraft Plant Historic District needs to be taken into consideration. Please provide a Historic Preservation Resource Identification Form and appropriate photographs and location map for the structure to be effected.

Mr. Taylor
May 7, 2020
Page 2

RE: File #1607-20; Tinker AFB Proposed B-21 Maintenance Depot Project,
Tinker Air Force Base, Oklahoma County

- (d) For information on previously determined eligible properties associated with Tinker AFB, please refer to our Determination of Eligibility (DOE) Search Results page on our website <https://www.okhistory.org/shpo/doesearch.php> and to our Interactive ArcGIS Map by going to www.okhistory.org and select "State Historic Preservation Office," then "Programs," then "Section 106," then click on the top thumbnail on the right that says "View and Interactive NRHP Map (unrestricted location)".
- (2) In addition to our review, you must contact the Oklahoma Archeological Survey (OAS), 111 E. Chesapeake, #102, Norman OK 73019-5111 (#405/325-7211, FAX #405/325-7604), to obtain a determination about the presence of prehistoric resources that may be eligible for the National Register of Historic Places. The OAS may conclude that an on-site investigation of all or part of the project impact area is necessary to determine the presence of archaeological resources. In the event that such an investigation reveals the presence of prehistoric archaeological sites, we will defer to the judgment of the OAS concerning whether or not any of the resources should be considered "historic properties" under the Section 106 review process. If sites dating from the historic period are identified during the survey or are encountered during implementation of the project, additional assessments by the State Historic Preservation Office will be necessary.

If you should have any questions concerning this request, please contact Sara Werneke at 405/522-4478 regarding Item (1) (a-d). Please contact Catharine Wood at 405/521-6381 with any questions regarding Item (2).

Thank you for the opportunity to review this project. Please reference the above underlined file number when responding.

Sincerely,



Lynda Ozan
Deputy State Historic
Preservation Officer

LO:pm



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 72D AIR BASE WING (AFMC)
TINKER AIR FORCE BASE OKLAHOMA

MEMORANDUM FOR STATE HISTORIC PRESERVATION OFFICE
ATTN: MS LYNDA OZAN
800 NAZIH ZUHDI DRIVE
OKLAHOMA CITY, OK 73105

AUG 14 2020

FROM: 72 ABW/CEIE
7535 5th Street
Tinker AFB, OK 73145

SUBJECT: File#1607-20: Tinker AFB Proposed B-21 Maintenance Depot Project, Tinker Air Force Base, Oklahoma County

1. Tinker AFB is submitting the following additional information per your request to complete the Section 106 review.

(1) Clarification on the properties to be effected:


(a) The Tinker AFB Operations Historic District was determined to not be a historic district according to a letter dated 19 June 1995, File #1133-95, signed by Melvena Heisch, Deputy State Historic Preservation Officer (attachment 1).

(b) Building 11 was built in 1 Jan 1992 according to DD Form 1354, Transfer and Acceptance of DoD Real Property (attachment 2). Therefore it does not meet the criteria to be surveyed for determination of eligibility under Section 110.

(c) Proposed Undertaking Site Alternative 2: MROTC Site does not lie within the boundaries of the previously determined eligible Tinker AFB Douglas Aircraft Plant Historic District according to the 1991 Klinger and Smith Survey and the Tinker AFB Integrated Cultural Resource Plan (attachment 3). These documents were concurred upon by your office.

(2) A letter dated July 8 2020 from Oklahoma Archeological Survey (OAS), File # OAS FY20-2615 (attachment 4), states that no sites are listed as occurring within the project area, and based on the topographic and hydrologic setting, no archaeological materials are likely to be encountered.

2. Any questions about the information submitted may be directed to Mr. Tim Taylor, Cultural Resource Program Manager, at 734-4579.


KEITH J. BUEHLER, Chief
Installation Management Division

Attachments:

1. SHPO Letter dated 19 June 1995
2. DD Form 1354
3. Historic District Maps
4. OAS Letter dated July 8 2020



Oklahoma Historical Society *Founded May 27, 1893*

2100 NORTH LINCOLN BLVD. • OKLAHOMA CITY, OKLAHOMA 73105 • (405) 521-2491

June 19, 1995

Mr. Mark Patterson
Tinker Air Force Base
OC/EMX, Environmental Division
7701 2nd Street, Suite #204
Tinker AFB, OK 73145

RE: File #1133-95; Tinker AFB 200 Series Sector District Assessment

Dear Mr. Patterson:

We have reviewed the documentation submitted on the referenced project. It is our opinion that there is not a historic district in this area. This assessment is based on the noncontributing resources and infill construction in the area that destroy its integrity of setting and feeling.

However, there are several buildings in the area that we believe are individually eligible for the National Register of Historic Places. They are as follows:

Depot Supply #1 (Building #1), individually eligible under Criterion A for its importance as the first Base Supply Depot;

Steam Plant (Building #208) individually eligible under Criterion C as an outstanding example of Moderne architecture as applied to an industrial building; and,

Airplane Repair Building (Building #230), individually eligible under Criterion A as one of the earliest hangars on Tinker Air Force Base (Oklahoma City Air Depot) at the time of the building's completion and as the central repair hangar during World War II.

Base Operations Hangar (Building #240), individually eligible under Criterion A as an important center of activity for the Air Depot during World War II.

We find that the following buildings are not individually eligible for the National Register:

Building #24 (Locomotive Shelter);

Building #209 (Oil and Grease Storage);

Building #214 (Engine Test Building);

Building #236 (Inflammable and Cleaning Material Storage); and,

Building #238 (Paint and Dope Storage).

Mr. Patterson
June 19, 1995
Page 2

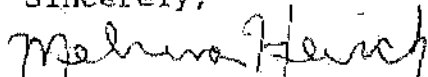
RE: File #1133-95; Tinker AFB 200 Series Sector District Assessment

Because the previous consensus Determinations of Eligibility were based on the assumption of the existence of a proposed district, a new statement attesting to your concurrence of the individual eligibility of Buildings #1, 208, 230, and 240 must be signed by a representative of the Department of the Air Force. If you concur with this opinion on eligibility, please sign and date the attached form and return it to our office.

If you do not concur with this opinion of eligibility, we are willing to review any materials you may wish to submit supporting your position. You may also resolve our disagreement about this opinion by writing directly to Ms. Carol Schull, Keeper of the National Register, P.O. Box 37127, Washington, D.C. 20013-7127, as noted in 36 CFR Part 63.

Future correspondence pertaining to this project must reference the above underlined file number. If you have any questions, please contact Ms. Susan Allen, Architectural Historian, at 405/521-6387. Thank you.

Sincerely,



Melvèna Heisch
Deputy State Historic
Preservation Officer

MH:pm

Attachment

TRANSFER AND ACCEPTANCE OF DOD REAL PROPERTY

Form Approved
OMB No. 0704-0188
PAGE 1 OF 2 PAGES

The public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to the Department of Defense, Washington Headquarters Services, Executive Services Directorate, Information Management Division, 4800 Mark Center Drive, Alexandria, VA 22350-3100 (0704-0188). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE ABOVE ORGANIZATION.

1. FROM (Organization Name) 72nd ABW/CE 7535 5th St. Tinker AFB, OK. 73145	2. DATE PREPARED (YYYYMMDD) 20170802	3. PROJECT/JOB NUMBER Inventory Adjustment FIAR N/A	4. SERIAL NUMBER N/A	
5. TO (Organization - Installation Code and Name) 72nd ABW/CEIA 7535 5th St. Tinker AFB, OK. 73145	6. RPSUID/ITEMNAME/INSTCODE/INSTNAME TAFB WWWWK0001	7. CONTRACT NUMBER(S) N/A	7a. PLACED-IN-SERVICE DATE (YYYYMMDD) 19920101	8. TRANSACTION DETAILS a. METHOD (X all that apply) <input type="checkbox"/> ACQUISITION BY CONSTRUCTION <input type="checkbox"/> TRANSFER BETWEEN SERVICES <input checked="" type="checkbox"/> CAPITAL IMPROVEMENT <input checked="" type="checkbox"/> INVENTORY ADJUSTMENT c. TYPE (X one) <input type="checkbox"/> DRAFT <input checked="" type="checkbox"/> FINAL <input type="checkbox"/> INTERIM
			b. WHEN/EVENT (X one) <input checked="" type="checkbox"/> TOTAL ASSET PLACED-IN-SERVICE <input type="checkbox"/> PARTIAL ASSET PLACED-IN-SERVICE	

9. ITEM NO.	10a. FACILITY NO.	10b. RPUID	11. CATEGORY CODE	12. CATCODE DESCRIPTION	13. TYPE CODE	14. SUST. CODE	AREA		OTHER		19. COST	20. FUND SOURCE	21. FUND ORG	22. INTER-EST CODE	23. ITEM REMARKS
							15. PRIMARY UM	16. PRIMARY QUANTITY	17. SECONDARY UM	18. SECONDARY QUANTITY					
1	11	521055	441758	WHSE SUP EQUIP DEP	P	4	SF	79076			NA				Created KSD in Support of FIAR Review Total SF: 79076

24. STATEMENT OF COMPLETION. The facilities listed hereon are in accordance with maps, drawings, and specifications and change orders approved by the authorized representative of the using agency except for the deficiencies listed on the reverse side.

a. TRANSFERRED BY (Typed Name and Signature)
 Mark E. Young *[Signature]*

b. DATE SIGNED (YYYYMMDD)
 20170807

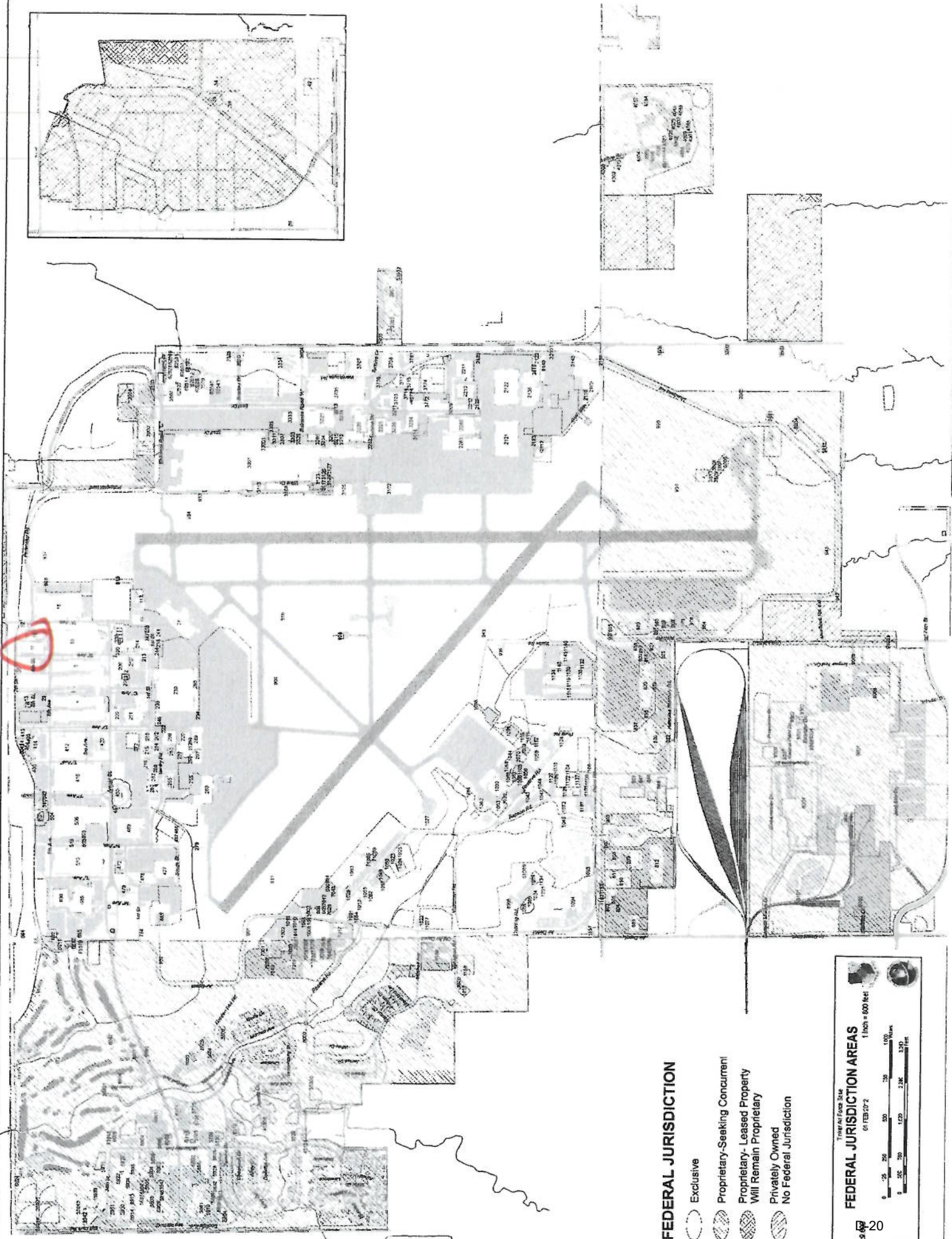
c. TITLE (Area Engr./Base Engr./DPW/Construction Agent)
 Real Property Accountability Officer 72 ABW/CE

25a. ACCEPTED BY (Typed Name and Signature)
 William S. Anderson *[Signature]*

b. DATE SIGNED (YYYYMMDD)
 20170807




c. TITLE (DPW/RPAO)
 Chief, Asset Accountability Branch, 72 ABW/CE

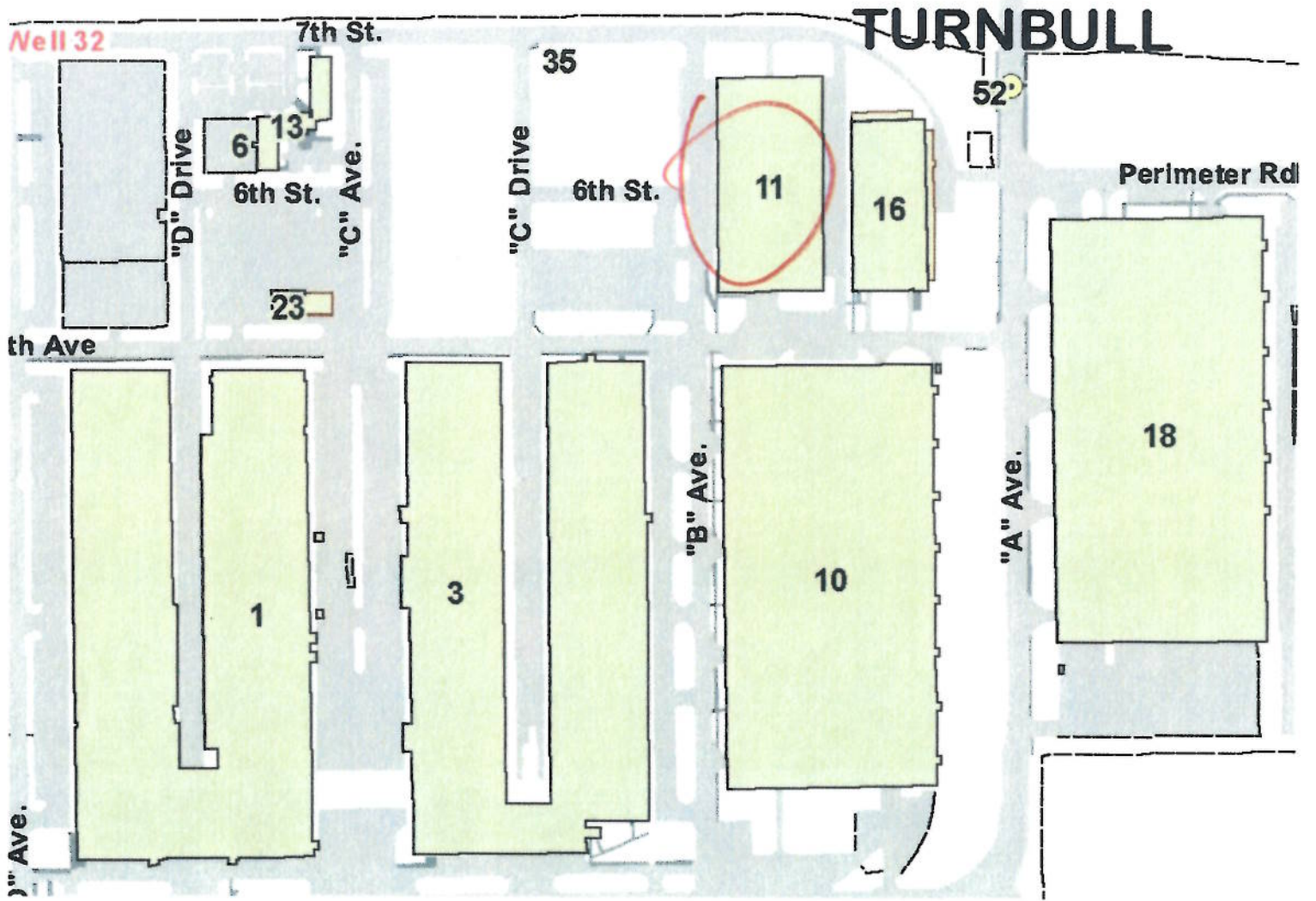
26. PROPERTY VOUCHER NUMBER



FEDERAL JURISDICTION

-  Exclusive
-  Proprietary-Seeking Concurrent
-  Proprietary- Leased Property Will Remain Proprietary
-  Privately Owned
-  No Federal Jurisdiction

 19-62
 0 25 50 100 150 200 250 300 350
 1 inch = 600 feet
 01 FEB 2012
FEDERAL JURISDICTION AREAS




AIR FORCE MATERIEL COMMAND

D SIZE

A

B

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E

5

① ② ③ ④ ⑤ ⑥ ⑦

4

4

3

3

2

2

1

TINKER AFB, OK

Classified Storage Area

BLDG - 11 FLOOR PLAN



TINKER AIR FORCE BASE, OKLAHOMA



AIR FORCE MATERIEL COMMAND
7400 EAST PULASKI ROAD
WRIGHT PATTENSON

SECTION

SHEET NO.	DESCRIPTION	DATE	BY	CHKD BY	REVISION

PROJECT NO.	22544-111-100000
DESIGN CODE	WORLDWIDE
REVISED BY	
DRAWN BY	
CHECKED BY	

D

B

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E



Recommended District for
Douglas Aircraft Assembly Plant

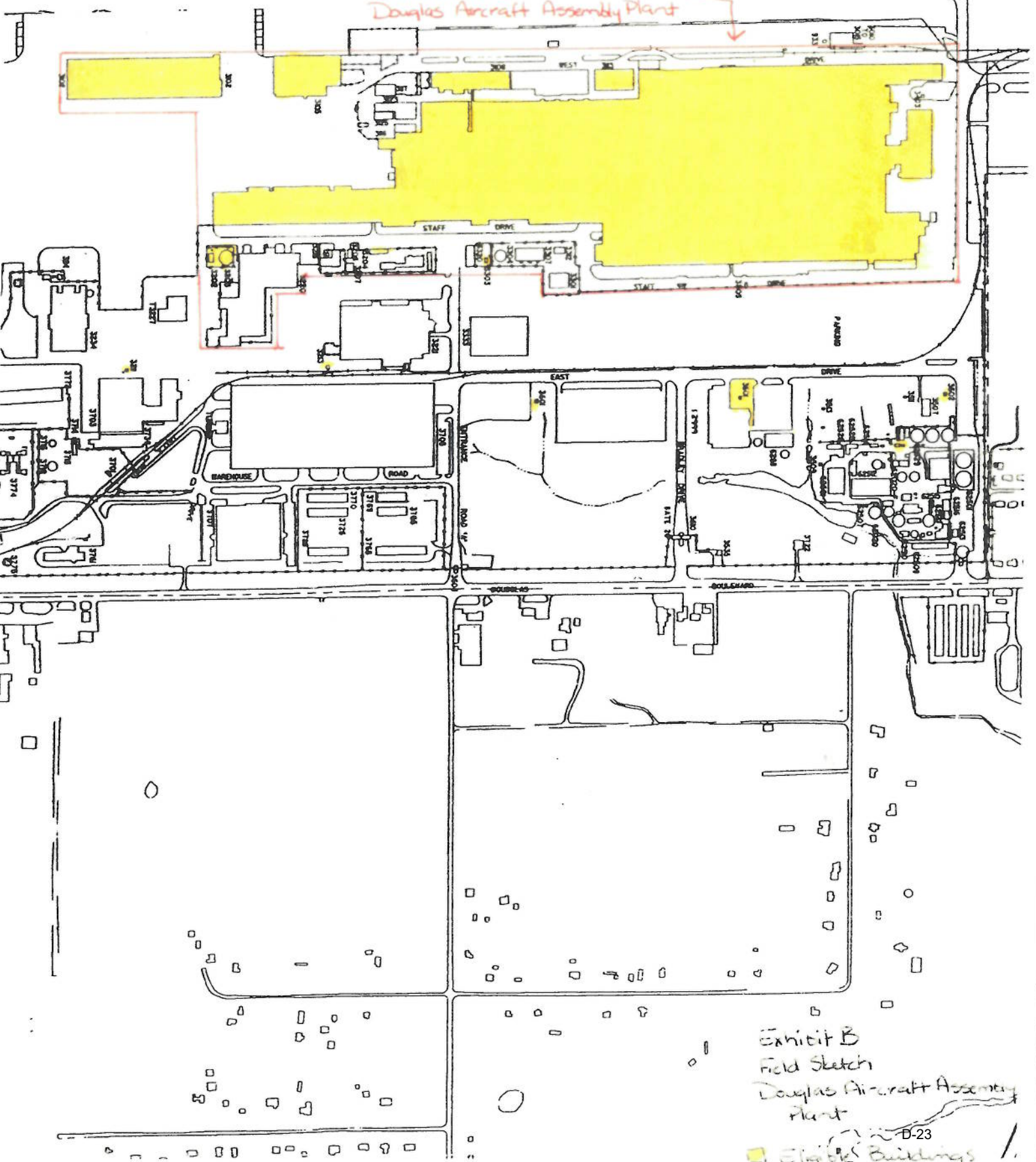
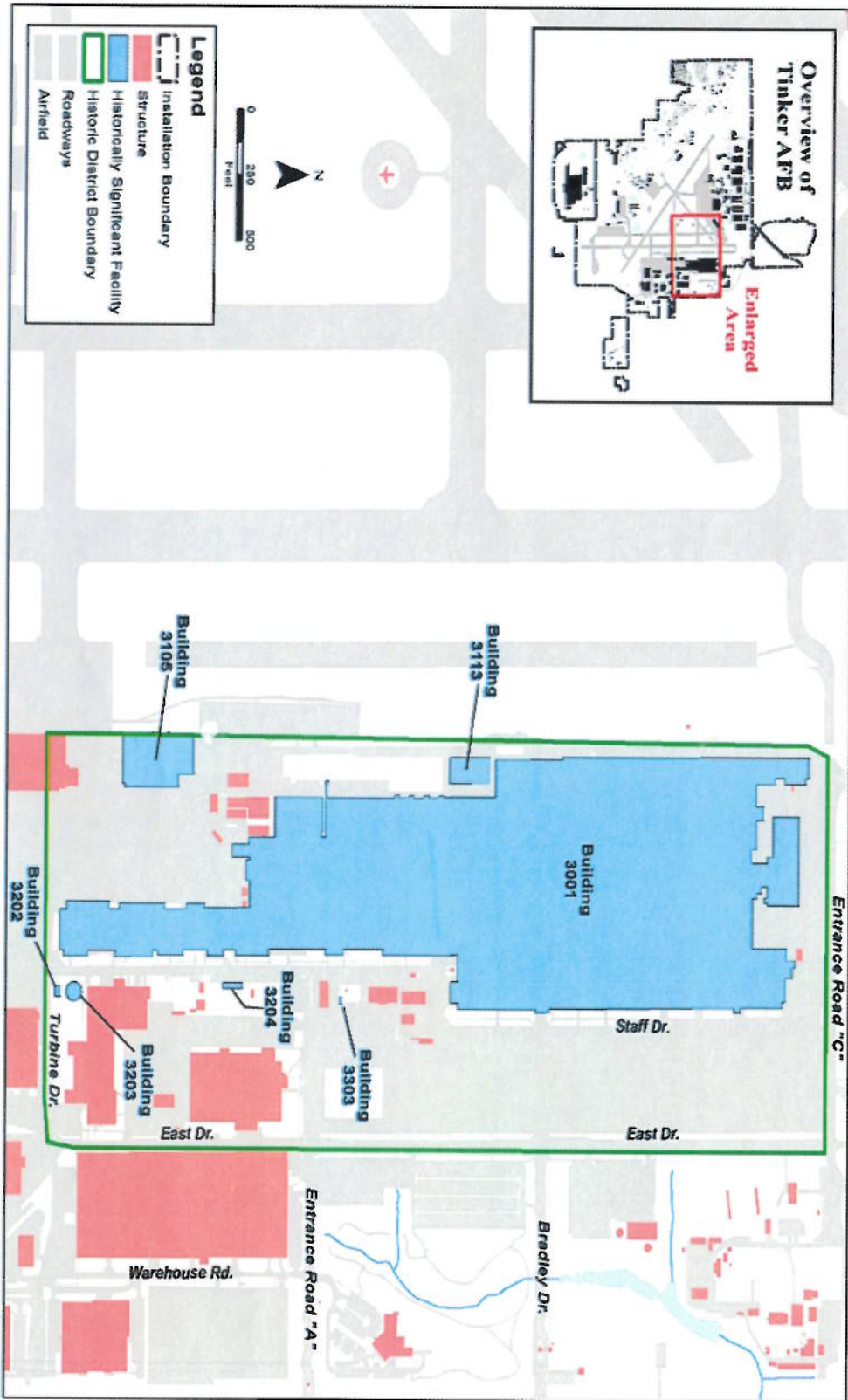


Exhibit B
Field Sketch
Douglas Aircraft Assembly
Plant

Original Buildings

Douglas Cargo Aircraft Manufacturing Plant Historic District





Oklahoma Archeological Survey

THE UNIVERSITY OF OKLAHOMA

July 8, 2020

Department of the Air Force
Headquarters 72D Air Base Wing (AFMC)
Tinker Air Force Base Oklahoma
Attn: Keith J. Buehler
7535 5th Street
Tinker AFB, OK 73145-9100

Re: OAS FY20-2615 Tinker Air Force Base (AFB) Construction of B-21 Maintenance Depot at Tinker AFB.
Legal Description: SE ¼ Section 22 and SW ¼ SW ¼ Section 23, T11N, R2W; SW ¼ Section 19, T11N, R1W, Oklahoma County, Oklahoma.

Dear Mr. Buehler:

The Community Assistance Program staff of the Oklahoma Archeological Survey has reviewed the above referenced project in order to identify areas that may potentially contain prehistoric or historic archeological materials (historic properties). The location of your project has been crosschecked with the state site files containing approximately 26,000 archaeological sites, which are currently recorded for the state of Oklahoma. No Sites are listed as occurring within your project area, and based on the topographic and hydrologic setting, no archaeological materials are likely to be encountered. Thus, an archaeological field inspection is not considered necessary. Please contact this office at (405) 325-7211 if buried archaeological materials such as chipped stone tools, pottery, bone, historic crockery, glass, metal items or building materials are exposed during construction activities.

This environmental review and evaluation is done in cooperation with the State Historic Preservation Office, Oklahoma Historical Society. The responsible federal agency or their official delegate must also have a letter from that office to document consultation pursuant to Section 106 of the National Historic Preservation Act.

In addition to our review comments, under 36CFR Part 800.3 you are reminded of your responsibility to consult with the appropriate Native American tribe/groups to identify any concerns they may have pertaining to this undertaking and potential impacts to properties of traditional and/or ceremonial value.

Sincerely,

Kary L. Stackelbeck

Kary L. Stackelbeck, Ph.D.
State Archaeologist

: dkg
cc: SHPO

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Oklahoma Historical Society

Founded May 27, 1893

State Historic Preservation Office

Oklahoma History Center • 800 Nazih Zuhdi Drive • Oklahoma City, OK 73105-7917
(405) 521-6249 • Fax (405) 522-0816 • www.okhistory.org/shpo/shpom.htm

September 8, 2020

Mr. Tim Taylor, Cultural Resource Program Manager
72 ABW/CEIE
7535 5th Street
Tinker AFB, OK 74135

RE: File #1607-20; Tinker AFB Proposed B-21 Maintenance Depot Project, Oklahoma County

Dear Mr. Taylor:

Thank you for providing the additional documentation submitted on the referenced project. We apologize for the confusion and appreciate your patience in working with us to resolve the issues regarding the Tinker AFB Base Operations Historic District, Building #11, and Tinker AFB Douglas Aircraft Plant Historic District. Based on the information provided on the subject properties, we concur with the following clarifications per your letter dated August 14, 2020:

- 1.1.a. We acknowledge that the Oklahoma State Historic Preservation Office previously determined that the Tinker AFB Base Operations Historic District was not eligible for listing in the National Register of Historic Places (NRHP) on June 19, 1995, and has been incorrectly identified as an official determined eligible property in our list. We will remove the district from our Interactive NRHP Map and official DOE list, but leave the buildings that were identified as individually eligible and concurred on in the Department of the Air Force's response letter dated June 27, 1995. This includes Building #1, which is not within the current project's boundaries.
- 1.1.b. We acknowledge that Building #11, which is a building within the current project boundaries and scope of work, is less than 45 years of age and therefore it is not necessary to document for Section 106 purposes.
- 1.1.c. We acknowledge that while the Tinker AFB Douglas Aircraft Plant Historic District is eligible for listing in the NRHP, the boundaries of the district as indicated in our online Interactive NRHP Map are incorrect. We will redraw the proper boundaries of the district in our online map per what is shown in the approved documentation and make certain that the correct boundary description is in our official DOE list as well. Based on this, the current project, as proposed, does not lie within the official boundaries of the Tinker AFB Douglas Aircraft Plant Historic District.

Therefore, based upon this updated information, we find that there are no historic properties affected by the referenced project.

Mr. Taylor
September 8, 2020
Page 2

RE: File #1607-20; Tinker AFB Proposed B-21 Maintenance Depot Project, Oklahoma County

If you should have any questions concerning this request, please contact Sara Werneke, Historic Preservation Specialist, at 405/522-4478. Thank you for the opportunity to review this project. Please reference the above underlined file number when responding.

Sincerely,

A handwritten signature in black ink, appearing to read 'Lynda Ozan', with a large, stylized flourish extending to the right.

Lynda Ozan
Deputy State Historic
Preservation Officer

LO:pm



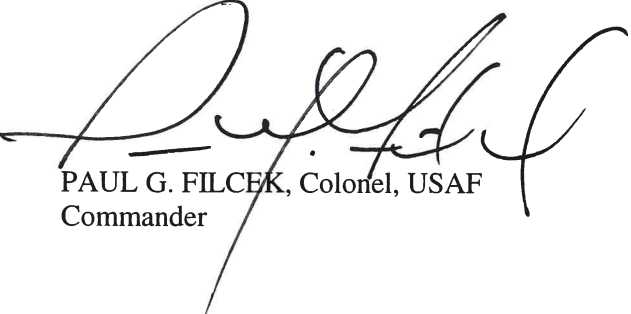
DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 72D AIR BASE WING (AFMC)
TINKER AIR FORCE BASE OKLAHOMA

MEMORANDUM FOR DISTRIBUTION

FROM: 72 ABW/CC

SUBJECT: Draft Environmental Assessment for the Activation of the B-21 Maintenance Depot at Tinker Air Force Base

1. The United States Air Force (USAF) requests your review of the enclosed Draft Environmental Assessment (EA) for the B-21 Maintenance Depot at Tinker Air Force Base (AFB), Oklahoma. The Proposed Action is to construct and activate the B-21 Maintenance Depot at Tinker AFB. Under the Proposed Action, the USAF would establish the required facilities and logistics support for B-21 depot maintenance operations at Tinker AFB to support maintenance requirements for approximately 100 aircraft that would be established as the USAF B-21 fleet. B-21 aircraft would be temporarily relocated to Tinker AFB for scheduled and as-needed maintenance. No B-21 aircraft would be permanently based at Tinker AFB. The Proposed Action would include facility construction, demolition, and renovation; an increase in base personnel and dependents; an increase in aircraft operations and engine test runups; aircraft maintenance; and utility connections. All aircraft operations would occur within existing airspace and would not exceed the number and type of operations currently authorized for the airspace. Therefore, no changes to airspace configurations (i.e., size, shape, or location) are proposed or would be required to support the proposed aircraft operations.
2. The EA describes the Proposed Action and alternatives (Chapter 2). It establishes baseline environmental conditions for the B-21 Maintenance Depot at Tinker AFB and evaluates potential impacts associated with the implementation of the Proposed Action and No Action Alternative (Chapter 3).
3. The EA meets the requirements of the National Environmental Policy Act for the evaluation of impacts of a Proposed Action. If the EA determines that no significant impacts would result from the Proposed Action, then the USAF will sign a Finding of No Significant Impact (FONSI) for the project. The Draft FONSI is provided for review with the Draft EA.
4. In order to maintain our schedule for completion of the EA, we would appreciate receiving your comments within 30 days of receipt of this letter. If you have any questions or comments, please contact Mr. Tim Taylor, NEPA Coordinator, 72 ABW/CEIEC, 7535 5th Street, Building 400, 2nd Floor, Tinker AFB OK 73145; or by email at timothy.taylor.5@us.af.mil. Thank you in advance for your assistance in this effort.



PAUL G. FILCEK, Colonel, USAF
Commander

Attachments:

1. Distribution List
2. Draft Environmental Assessment and Draft FONSI for B-21 Maintenance Depot Activation at Tinker Air Force Base



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 72D AIR BASE WING (AFMC)
TINKER AIR FORCE BASE OKLAHOMA

Colonel Paul G. Filcek
Commander
4385 South Air Depot Blvd., Suite 111
Tinker AFB OK 73145

Caddo Nation of Oklahoma
Cultural Preservation Office
Attention: Mr. Phil Cross
P.O. Box 487
Binger OK 73009

Dear Mr. Cross

This letter follows up on our May 2020 invitation to consult on a United States Air Force (USAF) proposal to construct and activate the B-21 Maintenance Depot at Tinker Air Force Base (AFB), Oklahoma. The USAF has developed the enclosed Draft Environmental Assessment (EA) for the B-21 Depot Maintenance Activation at Tinker AFB for this proposal. Based on previous information received from you, and as indicated in section 3.9.2 on page 3-74 of the EA, we are not aware of any properties of religious and cultural significance on the AFB. However, if such properties are present, we encourage you to share that information so that we can update our analysis.

The EA is intended to meet the requirements of the National Environmental Policy Act (NEPA) for evaluation of the impacts of a Proposed Action. If the EA determines that no significant impacts would result from the Proposed Action, then the USAF will sign a Finding of No Significant Impact (FONSI) for the project. The Draft FONSI is provided for review with the Draft EA.

We would appreciate receiving any questions or comments regarding the attached materials, if possible, within 30 days from receiving this correspondence. Your questions and comments may be directed to Mr. Tim Taylor, Cultural Resources Manager and NEPA Coordinator. He can be reached at (405) 734-4579 or by e-mail at timothy.taylor.5@us.af.mil. Comments may also be mailed to his attention at 72 ABW/CEIEC, 7535 5th Street, Building 400, 2nd Floor, Tinker AFB OK 73145. Thank you in advance for your assistance in this effort.

Sincerely



PAUL G. FILCEK, Colonel, USAF
Commander

Attachment:

Draft Environmental Assessment and Draft FONSI for the B-21 Maintenance Depot at Tinker Air Force Base, Oklahoma



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 72D AIR BASE WING (AFMC)
TINKER AIR FORCE BASE OKLAHOMA

Colonel Paul G. Filcek
Commander
4385 South Air Depot Blvd., Suite 111
Tinker AFB OK 73145

Caddo Nation of Oklahoma
Caddo Nation Chairman
Attention: Tamara Francis-Fourkiller
P.O. Box 487
Binger OK 73009

Dear Ms. Francis-Fourkiller

This letter follows up on our May 2020 invitation to consult on a United States Air Force (USAF) proposal to construct and activate the B-21 Maintenance Depot at Tinker Air Force Base (AFB), Oklahoma. The USAF has developed the enclosed Draft Environmental Assessment (EA) for the B-21 Depot Maintenance Activation at Tinker AFB for this proposal. Based on previous information received from you, and as indicated in section 3.9.2 on page 3-74 of the EA, we are not aware of any properties of religious and cultural significance on the AFB. However, if such properties are present, we encourage you to share that information so that we can update our analysis.

The EA is intended to meet the requirements of the National Environmental Policy Act (NEPA) for evaluation of the impacts of a Proposed Action. If the EA determines that no significant impacts would result from the Proposed Action, then the USAF will sign a Finding of No Significant Impact (FONSI) for the project. The Draft FONSI is provided for review with the Draft EA.

We would appreciate receiving any questions or comments regarding the attached materials, if possible, within 30 days from receiving this correspondence. Your questions and comments may be directed to Mr. Tim Taylor, Cultural Resources Manager and NEPA Coordinator. He can be reached at (405) 734-4579 or by e-mail at timothy.taylor.5@us.af.mil. Comments may also be mailed to his attention at 72 ABW/CEIEC, 7535 5th Street, Building 400, 2nd Floor, Tinker AFB OK 73145. Thank you in advance for your assistance in this effort.

Sincerely

PAUL G. FILCHK, Colonel, USAF
Commander

Attachment:
Draft Environmental Assessment and Draft FONSI for the B-21 Maintenance Depot at Tinker Air Force Base, Oklahoma



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 72D AIR BASE WING (AFMC)
TINKER AIR FORCE BASE OKLAHOMA

Colonel Paul G. Filcek
Commander
4385 South Air Depot Blvd., Suite 111
Tinker AFB OK 73145

Muscogee (Creek) Nation
Principal Chief
Attention: James Floyd
P.O. Box 580
Okmulgee OK 74447

Dear Mr. Floyd

This letter follows up on our May 2020 invitation to consult on a United States Air Force (USAF) proposal to construct and activate the B-21 Maintenance Depot at Tinker Air Force Base (AFB), Oklahoma. The USAF has developed the enclosed Draft Environmental Assessment (EA) for the B-21 Depot Maintenance Activation at Tinker AFB for this proposal. Based on previous information received from you, and as indicated in section 3.9.2 on page 3-74 of the EA, we are not aware of any properties of religious and cultural significance on the AFB. However, if such properties are present, we encourage you to share that information so that we can update our analysis.

The EA is intended to meet the requirements of the National Environmental Policy Act (NEPA) for evaluation of the impacts of a Proposed Action. If the EA determines that no significant impacts would result from the Proposed Action, then the USAF will sign a Finding of No Significant Impact (FONSI) for the project. The Draft FONSI is provided for review with the Draft EA.

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Sincerely

PAUL G. FILCEK, Colonel, USAF
Commander

Attachment:
Draft Environmental Assessment and Draft FONSI for the B-21 Maintenance Depot at Tinker Air Force Base, Oklahoma



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 72D AIR BASE WING (AFMC)
TINKER AIR FORCE BASE OKLAHOMA

Colonel Paul G. Filcek
Commander
4385 South Air Depot Blvd., Suite 111
Tinker AFB OK 73145


Muscogee (Creek) Nation
Culture Preservation Office
Attention: Corian Lowe-Zepeda
P.O. Box 580
Okmulgee OK 74447

Dear Ms. Lowe-Zepeda

This letter follows up on our May 2020 invitation to consult on a United States Air Force (USAF) proposal to construct and activate the B-21 Maintenance Depot at Tinker Air Force Base (AFB), Oklahoma. The USAF has developed the enclosed Draft Environmental Assessment (EA) for the B-21 Depot Maintenance Activation at Tinker AFB for this proposal. Based on previous information received from you, and as indicated in section 3.9.2 on page 3-74 of the EA, we are not aware of any properties of religious and cultural significance on the AFB. However, if such properties are present, we encourage you to share that information so that we can update our analysis.

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HEADQUARTERS 72D AIR BASE WING (AFMC)
TINKER AIR FORCE BASE OKLAHOMA

Colonel Paul G. Filcek
Commander
4385 South Air Depot Blvd., Suite 111
Tinker AFB OK 73145

Osage Nation
Cultural Preservation Office
Attention: Dr. Andrea A. Hunter
P.O. Box 779
Pawhuska OK 74056

Dear Dr. Hunter

This letter follows up on our May 2020 invitation to consult on a United States Air Force (USAF) proposal to construct and activate the B-21 Maintenance Depot at Tinker Air Force Base (AFB), Oklahoma. The USAF has developed the enclosed Draft Environmental Assessment (EA) for the B-21 Depot Maintenance Activation at Tinker AFB for this proposal. Based on previous information received from you, and as indicated in section 3.9.2 on page 3-74 of the EA, we are not aware of any properties of religious and cultural significance on the AFB. However, if such properties are present, we encourage you to share that information so that we can update our analysis.

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Sincerely

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PAUL G. FILCEK, Colonel, USAF
Commander

Attachment:
Draft Environmental Assessment and Draft FONSI for the B-21 Maintenance Depot at Tinker Air Force Base, Oklahoma



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 72D AIR BASE WING (AFMC)
TINKER AIR FORCE BASE OKLAHOMA

Colonel Paul G. Filcek
Commander
4385 South Air Depot Blvd., Suite 111
Tinker AFB OK 73145

Osage Nation
Principal Chief
Attention: Geoffrey M. Standing Bear
P.O. Box 779
Pawhuska OK 74056

Dear Chief Standing Bear

This letter follows up on our May 2020 invitation to consult on a United States Air Force (USAF) proposal to construct and activate the B-21 Maintenance Depot at Tinker Air Force Base (AFB), Oklahoma. The USAF has developed the enclosed Draft Environmental Assessment (EA) for the B-21 Depot Maintenance Activation at Tinker AFB for this proposal. Based on previous information received from you, and as indicated in section 3.9.2 on page 3-74 of the EA, we are not aware of any properties of religious and cultural significance on the AFB. However, if such properties are present, we encourage you to share that information so that we can update our analysis.

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PAUL G. FILCEK, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 72D AIR BASE WING (AFMC)
TINKER AIR FORCE BASE OKLAHOMA

Colonel Paul G. Filcek
Commander
4385 South Air Depot Blvd., Suite 111
Tinker AFB OK 73145

Seminole Nation
Principal Chief
Attention: Greg Chilcoat
P.O. Box 1498
Wewoka OK 74884

Dear Chief Chilcoat

This letter follows up on our May 2020 invitation to consult on a United States Air Force (USAF) proposal to construct and activate the B-21 Maintenance Depot at Tinker Air Force Base (AFB), Oklahoma. The USAF has developed the enclosed Draft Environmental Assessment (EA) for the B-21 Depot Maintenance Activation at Tinker AFB for this proposal. Based on previous information received from you, and as indicated in section 3.9.2 on page 3-74 of the EA, we are not aware of any properties of religious and cultural significance on the AFB. However, if such properties are present, we encourage you to share that information so that we can update our analysis.

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PAUL G. FILCEK, Colonel, USAF
Commander

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Draft Environmental Assessment and Draft FONSI for the B-21 Maintenance Depot at Tinker Air Force Base, Oklahoma



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 72D AIR BASE WING (AFMC)
TINKER AIR FORCE BASE OKLAHOMA

Colonel Paul G. Filcek
Commander
4385 South Air Depot Blvd., Suite 111
Tinker AFB OK 73145

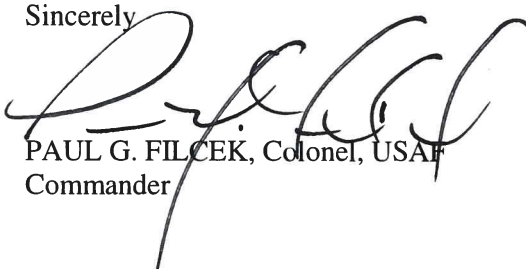
Seminole Nation
Cultural Preservation Office
Attention: Theodore Isham
P.O. Box 1498
Wewoka OK 74884

Dear Mr. Isham

This letter follows up on our May 2020 invitation to consult on a United States Air Force (USAF) proposal to construct and activate the B-21 Maintenance Depot at Tinker Air Force Base (AFB), Oklahoma. The USAF has developed the enclosed Draft Environmental Assessment (EA) for the B-21 Depot Maintenance Activation at Tinker AFB for this proposal. Based on previous information received from you, and as indicated in section 3.9.2 on page 3-74 of the EA, we are not aware of any properties of religious and cultural significance on the AFB. However, if such properties are present, we encourage you to share that information so that we can update our analysis.

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 72D AIR BASE WING (AFMC)
TINKER AIR FORCE BASE OKLAHOMA

Colonel Paul G. Filcek
Commander
4385 South Air Depot Blvd., Suite 111
Tinker AFB OK 73145

Wichita and Affiliated Tribes
Tribal Leader
Attention: Terri Parton
P.O. Box 729
Anadarko OK 73005

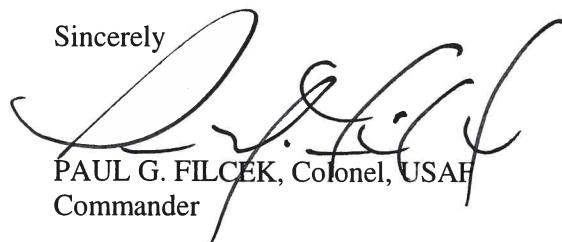
Dear Ms. Parton

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PAUL G. FILCEK, Colonel, USAF
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E

Noise Analysis Supporting
Documentation



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Land-Use Compatibility Guidelines

The USAF guidelines for land use compatibility in aircraft noise zones is shown in the table below and are extracted from **Appendix A** of AFI 32-7063 dated 15 July 2015. These land use compatibility guidelines have been included for reference purposes.

Table E-1. Land Use Compatibility Guidelines

SLUCM NO.	LAND USE NAME	DNL or CNEL 65-69	DNL or CNEL 70-74	DNL or CNEL 75-79	DNL or CNEL 80-84	DNL or CNEL 85+
10	Residential					
11	Household units	N1	N1	N	N	N
11.11	Single units: detached	N1	N1	N	N	N
11.12	Single units: semidetached	N1	N1	N	N	N
11.13	Single units: attached row	N1	N1	N	N	N
11.21	Two units: side-by-side	N1	N1	N	N	N
11.22	Two units: one above the other	N1	N1	N	N	N
11.31	Apartments: walk-up	N1	N1	N	N	N
11.32	Apartment: elevator	N1	N1	N	N	N
12	Group quarters	N1	N1	N	N	N
13	Residential hotels	N1	N1	N	N	N
14	Mobile home parks or courts	N	N	N	N	N
15	Transient lodgings	N1	N1	N1	N	N
16	Other residential	N1	N1	N	N	N
20	Manufacturing					
21	Food and kindred products; manufacturing	Y	Y2	Y3	Y4	N
22	Textile mill products; manufacturing	Y	Y2	Y3	Y4	N
23	Apparel and other finished products; products made from fabrics, leather, and similar materials; manufacturing	Y	Y2	Y3	Y4	N
24	Lumber and wood products (except furniture); manufacturing	Y	Y2	Y3	Y4	N
25	Furniture and fixtures; manufacturing	Y	Y2	Y3	Y4	N
26	Paper and allied products; manufacturing	Y	Y2	Y3	Y4	N
27	Printing, publishing, and allied industries	Y	Y2	Y3	Y4	N
28	Chemicals and allied	Y	Y2	Y3	Y4	N
29	Petroleum refining and related industries	Y	Y2	Y3	Y4	N
30	Manufacturing (continued)					
31	Rubber and misc. plastic products; manufacturing	Y	Y2	Y3	Y4	N
32	Stone, clay and glass products; manufacturing	Y	Y2	Y3	Y4	N

SLUCM NO.	LAND USE NAME	DNL or CNEL 65-69	DNL or CNEL 70-74	DNL or CNEL 75-79	DNL or CNEL 80-84	DNL or CNEL 85+
33	Primary metal products; manufacturing	Y	Y2	Y3	Y4	N
34	Fabricated metal products; manufacturing	Y	Y2	Y3	Y4	N
35	Professional scientific, and controlling instruments; photographic and optical goods; watches and clocks	Y	25	30	N	N
39	Miscellaneous manufacturing	Y	Y2	Y3	Y4	N
40	Transportation, communication and utilities					
41	Railroad, rapid rail transit, and street railway transportation	Y	Y2	Y3	Y4	N
42	Motor vehicle transportation	Y	Y2	Y 3	Y4	N
43	Aircraft transportation	Y	Y2	Y3	Y4	N
44	Marine craft transportation	Y	Y2	Y3	Y4	N
45	Highway and street right-of-way	Y	Y	Y	Y	N
46	Automobile parking	Y	Y	Y	Y	N
47	Communication	Y	255	305	N	N
48	Utilities	Y	Y2	Y3	Y4	N
49	Other transportation, communication and utilities	Y	255	305	N	N
50	Trade					
51	Wholesale trade	Y	Y2	Y3	Y4	N
52	Retail trade – building materials, hardware and farm equipment	Y	25	30	Y4	N
53	Retail trade – including shopping centers, discount clubs, home improvement stores, electronics superstores, etc.	Y	25	30	N	N
54	Retail trade – food	Y	25	30	N	N
55	Retail trade – automotive, marine craft, aircraft and accessories	Y	25	30	N	N
56	Retail trade – apparel and accessories	Y	25	30	N	N
57	Retail trade – furniture, home,	Y	25	30	N	N
58	Retail trade – eating and drinking establishments	Y	25	30	N	N
59	Other retail trade	Y	25	30	N	N
60	Services					
61	Finance, insurance and real estate services	Y	25	30	N	N
62	Personal services	Y	25	30	N	N
62.4	Cemeteries	Y	Y2	Y3	Y4,11	Y6,11
63	Business services	Y	25	30	N	N
63.7	Warehousing and storage	Y	Y2	Y3	Y4	N

SLUCM NO.	LAND USE NAME	DNL or CNEL 65-69	DNL or CNEL 70-74	DNL or CNEL 75-79	DNL or CNEL 80-84	DNL or CNEL 85+
64	Repair services	Y	Y2	Y3	Y4	N
65	Professional services	Y	25	30	N	N
65.1	Hospitals, other medical facilities	25	30	N	N	N
65.16	Nursing homes	N1	N1	N	N	N
66	Contract construction services	Y	25	30	N	N
67	Government services	Y1	25	30	N	N
68	Educational services	25	30	N	N	N
68.1	Child care services, child development centers, and nurseries	25	30	N	N	N
69	Miscellaneous Services	Y	25	30	N	N
69.1	Religious activities (including places of worship)	Y	25	30	N	N
70	Cultural, entertainment and recreational					
71	Cultural activities	25	30	N	N	N
71.2	Nature exhibits	Y1	N	N	N	N
72	Public assembly	Y	N	N	N	N
72.1	Auditoriums, concert halls	25	30	N	N	N
72.11	Outdoor music shells, amphitheaters	N	N	N	N	N
72.2	Outdoor sports arenas, spectator sports	Y	Y	N	N	N
73	Amusements	Y	Y	N	N	N
74	Recreational activities	Y	25	30	N	N
75	Resorts and group camps	Y	25	N	N	N
76	Parks	Y	25	N	N	N
79	Other cultural, entertainment and recreation	Y	25	N	N	N
80	Resource production and extraction					
81	Agriculture (except live- stock)	Y8	Y9	Y10	Y10,11	Y10,11
81.5-81.7	Agriculture-Livestock farming including grazing and feedlots	Y8	Y9	N	N	N
82	Agriculture related activities	Y8	Y9	Y10	Y10,11	Y10,11
83	Forestry activities	Y8	Y9	Y10	Y10,11	Y10,11
84	Fishing activities	Y	Y	Y	Y	Y
85	Mining activities	Y	Y	Y	Y	Y
89	Other resource production or extraction	Y	Y	Y	Y	Y

Table Key:

SLUCM – Standard Land Use Coding Manual, U.S. Department of Transportation

Y (Yes) – Land use and related structures compatible without restrictions.

N (No) – Land use and related structures are not compatible and should be prohibited.

Y^X – Yes, with restrictions. The land use and related structures generally are compatible. However, see note(s) indicated by the superscript.

N^X – No, with exceptions. The land use and related structures are generally incompatible. However, see note(s) indicated by the superscript.

25, 30, or 35 – The numbers refer to noise level reduction (NLR) levels. NLR (outdoor to indoor) is achieved through the incorporation of noise attenuation into the design and construction of a structure. Land use and related structures are generally compatible; however, measures to achieve NLR of 25, 30, or 35 must be incorporated into design and construction of structures. However, measures to achieve an overall noise reduction do not necessarily solve noise difficulties outside the structure and additional evaluation is warranted. Also, see notes indicated by superscripts where they appear with one of these numbers.

DNL – Day-Night Average Sound Level.

CNEL – Community Noise Equivalent Level (typically within a very small decibel difference of DNL)

Ldn – Mathematical symbol for DNL.

Table Notes:

1. General
 - a. Although local conditions regarding the need for housing may require residential use in these zones, residential use is discouraged in DNL 65-69 and strongly discouraged in DNL 70-74. The absence of viable alternative development options should be determined and an evaluation should be conducted locally prior to local approvals indicating that a demonstrated community need for the residential use would not be met if development were prohibited in these zones. Existing residential development is considered as pre-existing, non-conforming land uses.
 - b. Where the community determines that these uses must be allowed, measures to achieve outdoor to indoor noise level reduction (NLR) of at least 25 decibels (dB) in DNL 65-69 and 30 dB in DNL 70-74 should be incorporated into building codes and be considered in individual approvals; for transient housing, an NLR of at least 35 dB should be incorporated in DNL 75-79.
 - c. Normal permanent construction can be expected to provide an NLR of 20 dB, thus the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation, upgraded sound transmission class ratings in windows and doors, and closed windows year round. Additional consideration should be given to modifying NLR levels based on peak noise levels or vibrations.
 - d. NLR criteria will not eliminate outdoor noise problems. However, building location, site planning, design, and use of berms and barriers can help mitigate outdoor noise exposure particularly from ground level sources. Measures that reduce noise at a site should be used wherever practical in preference to measures that only protect interior spaces.
2. Measures to achieve NLR of 25 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
3. Measures to achieve NLR of 30 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
4. Measures to achieve NLR of 35 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
5. If project or proposed development is noise sensitive, use indicated NLR; if not, land use is compatible without NLR.
6. Buildings are not permitted.
7. Land use is compatible provided special sound reinforcement systems are installed.
8. Residential buildings require an NLR of 25 dB.
9. Residential buildings require an NLR of 30 dB.
10. Residential buildings are not permitted.
11. Land use that involves outdoor activities is not recommended, but if the community allows such activities, hearing protection devices should be worn when noise sources are present. Long-term exposure (multiple hours per day over many years) to high noise levels can cause hearing loss in some unprotected individuals.



F

Section 7 Informal
Consultation documentation



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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 72D AIR BASE WING (AFMC)
TINKER AIR FORCE BASE OKLAHOMA

26 October 2020

John Krupovage, USAF
Environmental Compliance Section
7535 5th Street, Building 400
Tinker Air Force Base, OK 73145-9010

Mr. Ken Collins
U.S. Fish and Wildlife Service
Oklahoma Ecological Services Field Office
9014 East 21st Street
Tulsa, OK 7419-1428

Dear Mr. Collins,

The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) to evaluate potential environmental impacts associated with proposed B-21 Depot Maintenance Activation at Tinker Air Force Base (AFB), Oklahoma County, Oklahoma. Pursuant to Section 7 of the Endangered Species Act (ESA) of 1973 (16 USC 1531-1544), the USAF has determined that the B-21 Depot Maintenance Activation construction at Tinker AFB *will not affect* federally listed species. Furthermore, the B-21 aircraft operations will be covered under the Programmatic Biological Opinion currently being developed (USFWS Programmatic Consultation #09E3000-2019-F0005).

Proposed Action

The Proposed Action includes construction/demolition/renovation of facilities, additional personnel, aircraft operations, and aircraft maintenance operations at Tinker AFB. The purpose of the Proposed Action is to establish the specialized facilities and logistics support required to conduct B-21 depot maintenance operations for the approximately 100 aircraft that will be established as the USAF B-21 fleet. Depot-level maintenance is defined as material maintenance or repair requiring the overhaul, upgrading, or rebuilding of parts, assemblies, or subassemblies, and the testing and reclamation of equipment as necessary (10 United States Code § 2460). The Proposed Action is needed because there are currently no facilities at Tinker AFB that support B-21 depot maintenance operations. Although Tinker AFB's mission includes a depot maintenance program for B-1, B-2, and B-52 aircraft, existing depot maintenance facilities are inadequate to meet the maintenance needs of the B-21. Further, these facilities are needed to continue B-1 and B-2 depot maintenance operations until B-21 aircraft are sufficiently operational and those airframes are retired.

Two alternative sites have been selected for analysis: the Defense Logistics Agency (DLA) Site and Maintenance Repair and Overhaul Technology Center (MROTC) Site.

DLA Site

Construction – The DLA site is currently used as a DLA storage area and would be redeveloped to support of the B-21 depot maintenance mission. Alternative 1 would also include construction of a new

DLA warehouse storage building that is being displaced by the proposed B-21 maintenance facilities. Construction could disturb approximately 78 acres.

Demolition – Demolition of existing facilities would occur to make space for the newly proposed B-21 maintenance depot support facilities. Demolition could include existing pavements, hangars, and other buildings.

Renovation – Two existing buildings on Tinker AFB would be renovated to create administrative office space and a warehouse.

Personnel – An estimated increase of 800 personnel would support B-21 depot maintenance operations at full end state. It is assumed that there would be an increase of up to 1,200 personnel during any overlap in the B-1 and B-21 missions. Each personnel would be accompanied by approximately 1.5 dependents who would live off-installation in existing available housing. Approximately 175 construction workers would be needed for the maintenance depot campus construction.

Aircraft Operations – An estimated 12 B-21 aircraft would be serviced at Tinker AFB per year based on fleet size. Alternative 1 would include up to five takeoffs and landings (i.e., 10 operations) per month during the daytime hours of 7 a.m. to 10 p.m. In addition, engine test run-ups would occur at a newly constructed engine test area for approximately 11 hours per month based on the expected monthly throughput of B-21 aircraft.

The B-21 fleet would operate within Military Training Routes and other existing airspace areas already designated for military flight operations conducted into and out of Tinker AFB. No changes to airspace configurations (i.e., size, shape, or location) are proposed or would be required to support the implementation of the Proposed Action.

Aircraft Maintenance Operations – Aircraft maintenance operations would include the overhaul, upgrading, or rebuilding of parts, assemblies, or subassemblies, and the testing and reclamation of equipment as necessary.

Utilities – Because a majority of the Proposed Action elements would be implemented in areas of Tinker AFB that are already built up and used for similar purposes, all required utility connections already exist. Minor trenching and/or rerouting of existing utilities may be required based on site-specific layouts. However, such trenching and rerouting would occur in areas already disturbed with pavements, maintained open space (i.e., grassy medians or other open areas), or existing buildings. A 750-kilowatt generator would be installed to supply backup power in case of power outage.

MROTC Site

Construction – Existing hangars and other facilities would be reused to the extent possible. Aircraft parking ramp space would be expanded and new space connected to the MROTC site would be constructed for an engine test run-up area that would be located on what is now Douglas Boulevard. The exact site layout is not currently available. However, up to approximately 28 acres of new impervious surface would be developed at the MROTC site, resulting in up to approximately 76 developed acres of impervious surface.

Demolition – No demolition would be required other than the incidental demolition of existing pavements that might be needed to accommodate site reconfiguration.

Renovation – Renovation would be the same as described for the DLA Site.

Personnel – Personnel increases or changes would be the same as described under Alternative 1.

Aircraft Operations – Aircraft operations would be the same as described for the DLA Site.

Aircraft Maintenance Operations – Aircraft maintenance operations would be the same as described for the DLA Site.

Utilities – Utilities would be the same as described for the DLA Site.

Existing Conditions

Tinker AFB and the surrounding suburban area outside of Oklahoma City are heavily urbanized with limited unimproved open space. As classified within the 2019 Tinker AFB Integrated Natural Resources Management Plan (INRMP) (USAF 2019), the airfield and adjacent areas of Tinker AFB are covered mostly by fescue (*Festuca* spp.) and other nonnative grasses. Within areas that have been converted to urban and industrial use, the plant community is comprised primarily of turf grasses and ornamental trees and shrubs. The predominant turfgrass on Tinker AFB is exotic Bermudagrass (*Cynodon dactylon*). Native buffalograss (*Buchloe dactyloides*) is often found mixed with Bermudagrass. Other more rural areas are typically a mixture of nonnative and native plants. Other common vegetation community types are mixed native prairie, old world bluestem (*Bothriochloa bladhii*) nonnative grassland, and mixed native shrubland (USAF 2014).

The proposed DLA site is approximately 41.5 acres and is largely composed of urban paved or developed land. However, the DLA site also has areas of Broomsedge Bluestem (*Andropogon virginicus*) - Annual Ragweed (*Ambrosia artemisiifolia*) - Canadian Horseweed (*Conyza canadensis*) Eastern Ruderal Grassland Alliance, improved turf, and mixed non-native vegetation with a 12-acre stand of Pecan- Cedar elm - sugarberry mixed forest. Within the mixed forest is a jurisdictional wetland that is forested, dry most of the year, and only inundated during flood events. The DLA site also contains a perennial stream, as well as a vegetated, dry floodwater detention basin on the western portion of the site. The warehouse site included in Alternative 1 is composed of urban paved or developed land, and Silver Bluestem (*Bothriochloa laguroides*) - Canada Goldenrod (*Solidago canadensis*) - Sunflower Ruderal Herbaceous Alliance.

The 133-acre MROTC Site contains 48 acres of developed area. The remaining 85 acres of undeveloped land at the MROTC site is mapped as warm-season open lawn and recreational open lawn vegetation. This area is comprised of semi-improved non-native and native grass species such as crabgrass (*Digitaria* sp.) and bluegrass (*Poa* sp.). There are an additional 80 acres adjacent to the site proposed for acquisition that is composed of mixed nonnative and native grasslands and mixed forested areas. The analysis of the land acquisition was covered under a separate action.

Vegetation community types found on the DLA and MROTC alternative sites are described in **Table 1. Attachment A** shows the identified vegetation communities on Tinker AFB and the proposed alternative site areas.

Table 1. Vegetation Communities within the DLA and MROTC Sites

Vegetation Type	Area (Acres)	Percent Cover
DLA and Warehouse Site		
Urban	33.05	42.5
Broomsedge Bluestem - Annual Ragweed - Canadian Horseweed Eastern Ruderal Grassland Alliance	20.73	26.6
Pecan - Cedar Elm - Sugarberry Floodplain Forest Alliance	12.11	15.6
Warm-Season Open Lawn Cultural Subgroup	8.66	11.1
Silver bluestem - Canada Goldenrod - Sunflower Ruderal Herbaceous Alliance	3.26	4.2
Total:	77.81	100
MROTC Site		
Urban	46.89	59.8
Warm-Season Open Lawn Cultural Subgroup	28.73	36.6
Recreational Open Lawn	2.81	3.6
Total:	133*	100

Notes: * Total acreage includes the land acquisition on the eastern boundary of the installation.

Threatened, Endangered, and Candidate Species and Critical Habitat

Six federally listed endangered or threatened species have the potential to occur on Tinker AFB within the vicinity of the two alternative sites. A list of federally listed species was obtained from the USFWS Information for Planning and Consultation (IPaC) system (**Attachment B**) and the 2019 Tinker AFB INRMP (USAF 2019). The USFWS IPaC reports list four federally listed species including endangered least tern (*Sterna antillarum*) and whooping crane (*Grus americana*), and the threatened piping plover (*Charadrius melodus*) and red knot (*Calidris canutus rufa*) (USFWS 2020). The 2019 INRMP lists, in addition to the four aforementioned species, and the endangered black-capped vireo (*Vireo atricapillus*) (USAF 2019). **Table 2** provides the federally listed endangered or threatened species with the potential to occur on Tinker AFB within the vicinity of the two alternatives sites.

Table 2. Federally Listed Species with the Potential to Occur within the Vicinity of the Alternative Sites

Species	Federal Status	Habitat	Likelihood of Occurrence
Birds			
Black-capped vireo (<i>Vireo atricapilla</i>)	E	Prefers low thickets in scrub-oak woodlands, arid hilly regions and ledges on steep hills near water.	Low
Least tern (<i>Sterna antillarum</i>)	E	Terns use a wide array of habitat types for foraging, including large rivers, lakes, ponds, and shallow wetlands. Nests on the ground and requires open areas of sand and gravel that are largely devoid of vegetation. Historically, interior least terns nested along all of the large, sandy prairie river systems in Oklahoma. This included the Cimarron, Canadian, Arkansas, and Red Rivers (ODWC 2020a).	Low
Piping plover (<i>Charadrius melodus</i>)	T	Nests above the high tide line on coastal beaches, sand flats at the ends of sandpits and barrier islands, gently sloping fore dunes, blowout areas behind primary dunes, sparsely vegetated dunes, and wash over areas cut into or between dunes. Feeding areas include inter-tidal portions of ocean beaches, wash over areas, mudflats, sand flats, wrack lines, and shorelines of coastal ponds, lagoons or salt marshes. Plovers also occur in grasslands with scattered trees or scattered clumps of trees, a type of community intermediate between grassland and forest.	Low
Red knot (<i>Calidris canutus rufa</i>)	T	Breeding habitat consists of slightly vegetated land in the tundra where it is sunny and windy. The nests are built about 50 kilometers offshore and less than 150 meters above sea level near wetlands. Wintering and migration habitats consist of large, sandy tidal flats and coastlines near inlets of bays and estuaries that have remained undeveloped.	Low
Whooping crane (<i>Grus americana</i>)	E	Nesting habitat consists of open areas close to large amounts of water and vegetation. Whooping cranes nest in wetland and marsh areas or close to shallow ponds or lakes. The habitats chosen typically include willow, sedge meadows, mudflats, and bulrush and cattail (<i>Typha latifolia</i>) marshes. During migration, whooping cranes seek similar habitats in wetlands, submerged sandbars and agricultural fields. In the winter, wet habitats are also sought out in the form of brackish bays and coastal marshes.	Low

Notes: E = Endangered, T = Threatened
 Source of species list: USFWS 2020, USAF 2019
 Source of Habitat Descriptions: ADW 2020

Piping Plover. Only one piping plover has been documented on Tinker AFB. The plover was found dead on Runway 36/18 on 11 May 2009, the result of a bird-aircraft strike. No others have been observed since 2009.

Analysis

The Proposed Action at the Alternative 1 or Alternative 2 sites will have **no effect** on federally listed species. There are no recorded sightings of federally- or state-protected species on the DLA or MROTC sites, and they lack suitable habitat to support these species.

DLA Site Alternative. There are no recorded sightings of federally- or state-protected species on the DLA site. The DLA site lacks suitable habitat for any listed species. Approximately 30 acres of open area would be converted into impervious surfaces, removing turf maintained areas, a forested area that contains a wetland, and an intermittent stream. No effects would be expected as no listed individuals would occur in or near the DLA Site.

MROTC Site Alternative. There are no recorded sightings of federally- or state-protected species on the MROTC site. The MROTC site lacks suitable habitat for any listed species. Approximately 28 acres of open area would be converted into impervious surfaces, removing turf maintained grasslands. No effects would be expected as no listed individuals would occur in or near the MROTC Site.

Aircraft Operations – Both Alternatives. Federally-protected avian species and other avian species of special concern could be involved in a bird/aircraft strike with the additional B-21 aircraft. However, the activities associated with the aircraft operations would be covered under the Programmatic Biological Opinion currently being developed between Tinker AFB and USFWS.

Conclusion

Therefore, the USAF has determined the B-21 Depot Maintenance Activation will have no effect on federally listed species on Tinker AFB. We request written concurrence with our determination as part of the informal consultation process. If you have any questions or concerns, please contact the undersigned at (405)739-7074; john.krupovage@us.af.mil or 7535 5th Street, Tinker AFB, OK 73145-9010. Thank you for your assistance in this effort.

Sincerely,

KRUPOVAGE.JOH Digitally signed by
KRUPOVAGE.JOH.NR.123218430
N.R.123218430 Date: 2020.10.26 15:10:10 -0500

JOHN R. KRPOVAGE, USAF
Natural Resources Manager
Environmental Compliance Section
Civil Engineering Directorate

Attachments:

1. Vegetation Communities within the Project Area
2. USFWS IPaC Species List (Consultation Code: 02EKOK00-2020-SLI-1381)

Attachment 1: Vegetation Communities in the Project Area

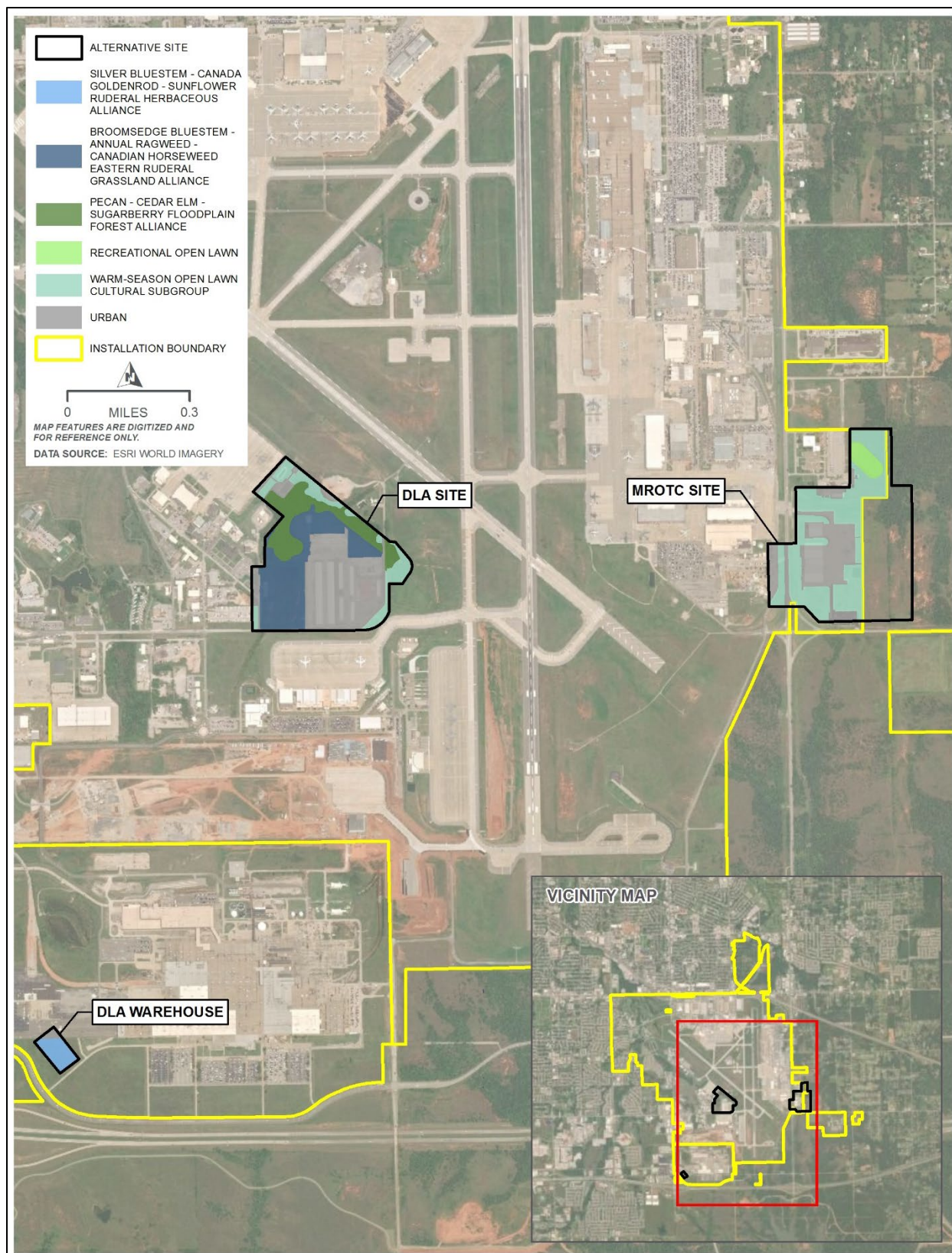


Figure 1. Vegetation Communities within the DLA and MROTC Sites

Attachment 2: USFWS IPaC Species List



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Oklahoma Ecological Services Field Office
9014 East 21st Street
Tulsa, OK 74129-1428
Phone: (918) 581-7458 Fax: (918) 581-7467
<http://www.fws.gov/southwest/es/Oklahoma/>

In Reply Refer To:
Consultation Code: 02EKOK00-2020-SLI-1381
Event Code: 02EKOK00-2020-E-03395
Project Name: B-21 Depot Maintenance Activatio

April 01, 2020

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Non-federal entities conducting activities that may result in take of listed species should consider seeking coverage under section 10 of the ESA, either through development of a Habitat Conservation Plan (HCP) or, by becoming a signatory to the General Conservation Plan (GCP) currently under development for the American burying beetle. Each of these mechanisms provides the means for obtaining a permit and coverage for incidental take of listed species during otherwise lawful activities.

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit through our Project Review step-wise process <http://www.fws.gov/southwest/es/oklahoma/OKESFO%20Permit%20Home.htm>.

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Oklahoma Ecological Services Field Office

9014 East 21st Street
Tulsa, OK 74129-1428
(918) 581-7458

Project Summary

Consultation Code: 02EKOK00-2020-SLI-1381

Event Code: 02EKOK00-2020-E-03395

Project Name: B-21 Depot Maintenance Activatio

Project Type: DEVELOPMENT

Project Description: The purpose of the Proposed Action is to establish the specialized facilities and logistics support required to conduct B-21 depot maintenance operations for the approximately 100 aircraft that will be established as the USAF B-21 fleet. Depot-level maintenance is defined as material maintenance or repair requiring the overhaul, upgrading, or rebuilding of parts, assemblies, or subassemblies, and the testing and reclamation of equipment as necessary (10 United States Code § 2460). The Proposed Action is needed because there are currently no facilities at Tinker AFB that support B-21 depot maintenance operations. Although Tinker AFB's mission includes a depot maintenance program for B-1, B-2, and B-52 aircraft, existing depot maintenance facilities are inadequate to meet the maintenance needs of the B-21. Further, these facilities are needed to continue B-1 and B-2 depot maintenance operations until B-21 aircraft are sufficiently operational and those airframes are retired.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/35.409830082918205N97.39066838592235W>



Endangered Species Act Species

There is a total of 4 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 1 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Birds

NAME	STATUS
Least Tern <i>Sterna antillarum</i> Population: interior pop. No critical habitat has been designated for this species. This species only needs to be considered under the following conditions: <ul style="list-style-type: none"> ▪ Wind Turbines and Wind Farms ▪ Towers (i.e. radio, television, cellular, microwave, meterological) Species profile: https://ecos.fws.gov/ecp/species/8505	Endangered
Piping Plover <i>Charadrius melodus</i> Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Red Knot <i>Calidris canutus rufa</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened
Whooping Crane <i>Grus americana</i> Population: Wherever found, except where listed as an experimental population There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/758	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

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