# ENVIRONMENTAL ASSESSMENT

FOR THE

# ZIA PARK AREA DEVELOPMENT

AT

# KIRTLAND AIR FORCE BASE, NEW MEXICO

Prepared For:

**Department of the Air Force**

*January 2023*

Letters or other written comments provided may be published in the Final Environmental Assessment (EA). As required by law, substantive comments are addressed in the Final EA and made available to the public. Any personal information provided is kept confidential. Private addresses will be compiled in a mailing list for those requesting copies of the Final EA. However, only the names of the individuals making comments and their specific comments are disclosed in this document. Personal home addresses and phone numbers are not being published in the Final EA.

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**PRIVACY ADVISORY**

This EA was provided for public comment in accordance with the National Environmental Policy Act (NEPA), the President's Council on Environmental Quality (CEQ) NEPA Regulations (40 CFR §§ 1500-1508), and 32 CFR § 989, Environmental Impact Analysis Process (EIAP).

The EIAP provides an opportunity for public input on Air Force decision-making, allows the public to offer inputs on alternative ways for the Air Force to accomplish what it is proposing, and solicits comments on the Air Force's analysis of environmental effects.

Written comments and inquiries regarding this document should be directed by mail to the Kirtland AFB NEPA Program Manager, 377 MSG/CEIEC, 2050 Wyoming Boulevard SE, Suite 116, Kirtland AFB, New Mexico 87117-5270, or via email to kirtlandNEPA@us.af.mil.

Public commenting allows the Air Force to make better, informed decisions. Letters or other written or oral comments provided are published in this EA. As required by law, comments provided are addressed in the EA and made available to the public. Providing personal information is voluntary. Any personal information provided was used only to identify your desire to make a statement during the public comment portion of any public meetings or hearings, or to fulfill requests for copies of the EA or associated documents. Private addresses were compiled to develop a mailing list for those requesting copies of EA; however, only the names of the individuals making comments and specific comments are disclosed. Personal contact information is not published in the EA.

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**Cover Sheet**
**Final Environmental Assessment**
**for the Zia Park Area Development at**
**Kirtland Air Force Base, New Mexico**

**Responsible Agencies:** United States Air Force (Air Force), Air Force Global Strike Command (AFGSC), 377th Air Base Wing (ABW)

**Affected Location:** Kirtland Air Force Base (AFB), New Mexico

**Report Designation:** Final Environmental Assessment

**Abstract:** The Air Force has identified categories of construction projects for consideration in the Zia Park area of Kirtland AFB over the next 20 years. Zia Park is a former housing area encompassing approximately 300 acres of land central to the primary cantonment area of the installation. The intent of the ongoing process of area development is to provide the improvements needed to support the mission of the Air Force and its mission partners. This Area Development Environmental Assessment (ADEA) is being prepared to evaluate the potential environmental impacts of these proposed projects.

The project categories being considered in this ADEA were identified in the Kirtland AFB Zia Park Area Development Plan (ADP) (USAF 2018) and are congruent with the Kirtland AFB Installation Development Plan (IDP) (USAF 2016). These plans identify short- (1-5 years), mid- (5-10 years), and long- (10-20 years) range project requirements for improvement of the physical infrastructure and functionality of the area, including current and future mission, facilities, and infrastructure requirements; development constraints and opportunities; and land use relationships.

Under the No Action Alternative, the Air Force would take no action; no construction activities would occur, and Zia Park would remain undeveloped. Kirtland AFB would continue to use existing facilities that would not meet the future needs of the Air Force.

This ADEA analyzes the potential environmental impacts associated with the Proposed Action and No Action Alternative and aids in determining whether a Finding of No Significant Impact can be prepared, or if an Environmental Impact Statement is required.

Written comments and inquiries regarding this document should be directed by mail to the Kirtland AFB National Environmental Policy Act Program Manager, 377 MSG/CEIC, 2050 Wyoming Boulevard SE, Suite 116, Kirtland AFB, New Mexico 87117-5270, or by email to *KirtlandNEPA@us.af.mil*.

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# FINAL FINDING OF NO SIGNIFICANT IMPACT (FONSI)
# FOR THE
# ENVIRONMENTAL ASSESSMENT
# FOR THE ZIA PARK AREA DEVELOPMENT
# AT KIRTLAND AIR FORCE BASE, NEW MEXICO

Pursuant to provisions of the National Environmental Policy Act, 42 United States Code §§ 4321 to 4347, as amended; implementing Council on Environmental Quality Regulations, 40 Code of Federal Regulations (CFR) §§ 1500–1508; and 32 CFR § 989, Environmental Impact Analysis Process, the United States Air Force (Air Force) prepared an Environmental Assessment (EA) to address proposed construction projects in the Zia Park area of Kirtland Air Force Base (AFB), New Mexico. This EA analyzes the potential impacts of the Proposed Action and the No Action Alternative, as well as the aggregate impacts cause by the Proposed Action and other known projects in the region. The EA is attached to this document and is incorporated by reference.

## PROPOSED ACTION (EA § 2.1)

The Air Force proposes to redevelop Zia Park, an underutilized portion of Kirtland AFB, by implementing short-, mid-, and long-range projects that improve the physical infrastructure and function of the installation. Zia Park is a former housing development that encompasses approximately 300 acres of land central to the primary cantonment area of Kirtland AFB. Repurposing the Zia Park area would allow the Air Force to consolidate and co-locate community facilities and connect the east and west sides of the installation. The Proposed Action includes the demolition of existing, unused and/or underutilized facilities and the construction of community service, medical, and administrative facilities; attached and detached residences and lodging; the provision of outdoor recreation areas; and infrastructure improvements (EA Table 2-1).

## NO ACTION ALTERNATIVE (EA § 2.3)

Under the No Action Alternative, the Air Force would not redevelop the Zia Park area and none of the proposed construction projects under the Proposed Action would occur. The installation would remain unconnected and divided. The No Action Alternative would maintain the current land uses and activities at the site, and the Zia Park area would remain underutilized.

## ALTERNATIVE ACTION REMOVED FROM CONSIDERATION (EA § 2.4)

The following alternative was analyzed and eliminated from consideration.

- Maxwell Housing. This site has been identified in the Kirtland IDP as suitable for redevelopment; however, it is geographically separated from the main installation and does not allow for a strong east/west transportation connection nor a central co-location of community service facilities. The cost to demolish the existing structures in Maxwell Housing could prove to be prohibitive when compared to using the vacant Zia Park area. Therefore, this alternative would not meet the purpose of or need for the Proposed Action and was eliminated from consideration.

## SUMMARY OF FINDINGS

Based upon the scope of the Proposed Action, resource areas with no impacts were identified through a preliminary screening process. The following describes the resource areas that were not carried forward for detailed analysis: airspace management, biological resources, land use, visual resources, and environmental justice and sensitive receptors **(EA § 3.1)**.

- ***Airspace management***. Under the Proposed Action, none of the proposed activities would result in a change to current airspace types, flight activities, or training, and no changes to current aircraft operations would occur. As a result, there would be no anticipated short- or long-term impacts on airspace management.
- ***Biological resources***. No critical habitats or other wildlife habitats exist on or in the general vicinity of the project areas, as all sites have been previously disturbed by industrial/military operations and limited vegetation is available. While it is possible some populations of Gunnison's prairie dog or burrowing owls may reside in or near specific project areas, they would be manageable sizes that would be relocated prior to construction using approved guidance from the State of New Mexico Department of Game & Fish (NMDGF) and U.S. Fish and Wildlife Service (USFWS). The Air Force anticipates no short- or long-term impacts on biological resources at Kirtland AFB.
- ***Land use***. The Proposed Action would not result in changes to the current land use designations within the proposed project areas. Since the project areas consist of previously developed land, the Air Force anticipates no short- or long-term impacts on land use at Kirtland AFB.
- ***Visual resources***. The Proposed Action would not result in a net change to the characteristic features of the proposed project areas. As all new facilities are required to adhere to the design guidelines listed in the Kirtland AFB Architectural Compatibility Plan (ACP), the visual integrity and appeal of the affected areas would be largely unaffected. As a result, the Air Force anticipates no short- or long-term impacts on visual resources.
- ***Environmental justice and sensitive receptors***. Access to Kirtland AFB is limited to military personnel, their families, military retirees, and assigned government and contract workers. The Proposed Action lies entirely within the borders of Kirtland AFB and solely affects employees, military personnel, and residents of the installation. Therefore, disproportionately high environmental or adverse human health impacts to minority, low-income, or child populations would not occur.

**Air Quality (EA § 3.2).** The Proposed Action would result in short-term, minor adverse impacts on air quality, primarily associated with construction operations. Emissions of criteria pollutants and greenhouse gases (GHGs) would be directly produced from activities such as the operation of heavy equipment, heavy-duty diesel vehicles hauling debris to and from the project area, and workers commuting daily to and from the project areas in their personal vehicles. Additionally, heavy equipment moving soil and debris would produce a notable amount of particulate matter if uncontrolled. However, all such emissions would be temporary and produced only when construction activities are occurring. Construction activities would incorporate best management practices (BMPs) and environmental control measures (e.g., wetting the ground surface) to minimize fugitive particulate matter air emissions.

**Cultural Resources (EA § 3.3).** The Proposed Action would not result in any impacts to historic properties. There are no archaeological sites located near of any of the construction areas. At present there are no known Native American burial grounds or sacred areas located on Kirtland AFB (KAFB 2018a). Four of the buildings to be demolished under the Proposed Action are not eligible for inclusion in the National Register of Historic Places (NRHP), and one building is not historic.

**Geological Resources (EA § 3.4).** The Proposed Action would result in both long- and short-term, negligible and short-term, minor adverse impacts to geology, topography, and soil resources depending on the final design of proposed construction activities and soil surveys prior to

construction. All facilities identified for construction projects are located on previously disturbed land, and such plots of land have been designated for future development. Any previously occupied area would be graded to level and receive soil stabilization in the form of seeding and/or placement of gravel.

**Hazardous Materials and Hazardous Wastes (EA § 3.5).** Short-term, minor adverse impacts on hazardous materials and hazardous wastes would occur during construction and demolition activities associated with the Proposed Action. Both construction and demolition activities would require the use of hazardous materials and generate negligible amounts of hazardous wastes. Contractors would be required to adhere to all federal, state and local regulations, to include those instituted by Kirtland AFB. No long-term impacts from the daily operation of the new facilities in Zia Park would exist. Short-term, minor adverse impacts from toxic hazards would occur during demolition processes. All hazardous debris would be disposed of at a facility approved by the United States Environmental Protection Agency (USEPA). The removal of toxic substances (such as asbestos) from Kirtland AFB may be considered a long-term beneficial impact by reducing the likelihood of human and environmental exposure to these materials.

**Infrastructure (EA § 3.6).** The Proposed Action would produce negligible impacts to communications, electrical, natural gas, sanitary sewage, and potable water due to the necessary construction and additional overhead required for new personnel. The Proposed Action would result in a significant positive impact to transportation at Kirtland AFB by improving traffic efficiency when crossing the base or accessing the southern portions of the base. The Proposed Action will provide thoroughfares designed to support large amounts of traffic and multiple means of accessing areas of the base during peak traffic hours. Bicycle lanes and pedestrian walkways would also encourage students residing within Zia Park to seek alternative modes of transportation.

**Noise (EA § 3.7).** The Proposed Action would result in a series of short-term, minor adverse impacts on noise. Construction activities would be conducted during the daytime hours of 0700 to 1700. Use of heavy equipment would cause an increase in sound that is notably above the ambient level in the region. The nearest sensitive receptors are the Wherry Elementary School, the Siesta Hills residential community, and the Raymond G. Murphy VA Medical Center. While construction noise would be audible at some receptors, it would be comparable to that of a noisy restaurant and would be considered a negligible impact. Additionally, the expected increase in traffic noise would be negligible for the Proposed Action.

**Safety (EA § 3.8).** The Proposed Action would result in short-term, negligible adverse impacts on the safety of contractors, military personnel, and members of the public. Construction and demolition activities would slightly increase the health and safety risk to contractor and military personnel within the project areas. Construction and demolition activities associated with the Proposed Action would comply with all applicable safety requirements and installation-specific protocols and procedures, including appropriately marking potentially hazardous area and posting warning signs and barriers to limit access to approved construction and oversight personnel only. Upon completion of the construction and demolition activities, no further safety hazard would remain.

**Socioeconomics (EA § 3.9).** Implementation of the Proposed Action would result in negligible impacts on population and housing; long-term, positive impacts on economic activity, income, and employment; and negligible impacts on public services and social conditions. A transient student population will be housed on base and will not affect local housing availability. The small number of new permanent employees and their families that would be added to the Albuquerque metro population would not significantly impact housing, and it is unlikely that the Proposed Action would result in a need to adjust available housing units. The proposed projects would require contract

construction labor from the local community, which would result in increased employment opportunities and income. The Proposed Action would likely result in a small, long-term, positive impact on income per capita, median household income, and poverty rates. Similarly, the Proposed Action would result in a small, long-term, positive effect on unemployment rates and would have a negligible impact on the existing local labor force. The Proposed Action would have a slight, long-term, positive impact on public services and social conditions and a negligible effect on emergency services and education, given the small numbers being added to the population. Similarly, the Proposed Action would have a negligible impact on public transportation, traffic, and commuter patterns.

**Water Resources (EA § 3.10).** Short-term, minor adverse impacts to groundwater and surface water are anticipated from demolition and construction activities associated with the Proposed Action. No permanent bodies of water are located in the project areas; however, during rain events flowing stormwater has the potential to transport sediment and hazardous materials to drainage ditches. Best practices and planning during construction and demolition activities will minimize this impact by controlling the movement of surface water runoff and ensuring no direct access to groundwater recharge points. No construction or demolition sites associated with the Proposed Action are in the 100-year floodplain, and no impact to floodplains is anticipated.

**Cumulative Impacts (EA § 3.11).** No significant adverse cumulative impacts would result from activities associated with implementation of the Proposed Action when considered with past, present, and reasonably foreseeable future projects at Kirtland AFB and the area of potential effect.

**CONCLUSION**

Based on the description of the Proposed Action as set forth in the EA, all activities were found to comply with the criteria or standards of environmental quality and were coordinated with the appropriate federal, state, and local agencies. The attached EA and this FONSI were made available to the public for a 30-day review period. The EA development process involved coordination with relevant agencies, and their comments were incorporated into the analysis of potential environmental impacts in the EA as appropriate.

**FINDING OF NO SIGNIFICANT IMPACT**

Based on my review of the facts and analyses contained in the attached EA, conducted under the provisions of National Environmental Policy Act, Council on Environmental Quality Regulations, and 32 CFR § 989, I conclude that the Proposed Action would not have a significant environmental impact, either by itself or cumulatively with other known projects. Accordingly, an Environmental Impact Statement is not required. The signing of this Finding of No Significant Impact completes the environmental impact analysis process.

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22 February 2023

JASON F. VATTIONI, Colonel, USAF
Commander, 377th Air Base Wing

Date

Attachment: *Environmental Assessment for the Zia Park Area Development at Kirtland Air Force Base, New Mexico.*

*Final*

# Environmental Assessment

## FOR THE

## ZIA PARK AREA DEVELOPMENT
## AT
## KIRTLAND AIR FORCE BASE, NEW MEXICO

UNITED STATES AIR FORCE

Kirtland Air Force Base, New Mexico

**JANUARY 2023**

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# Acronyms and Abbreviations

| | |
|---|---|
| ABW | Air Base Wing |
| ACAM | Air Conformity Applicability Model |
| AFB | Air Force Base |
| AFGSC | Air Force Global Strike Command |
| AFI | Air Force Instruction |
| AQCR | Air Quality Control Region |
| ABCWUA | Albuquerque Bernalillo County Water Utility Authority |
| AEHD-AQD | Albuquerque Environmental Health Department-Air Quality Division |
| AFR | Albuquerque Fire Rescue |
| AMAFCA | Albuquerque Metropolitan Arroyo Flood Control Authority |
| AMRGI | Albuquerque-Mid Rio Grande Intrastate |
| ARPA | Archaeological Resources Protection Act |
| ACP | Architectural Compatibility Plan |
| ADEA | Area Development Environmental Assessment |
| ADP | Area Development Plan |
| APE | area of potential effect |
| ACM | asbestos-containing material |
| dBA | A-weighted decibel |
| BMP | best management practice |
| CY | calendar year |
| $CO_2e$ | carbon dioxide equivalent |
| CO | carbon monoxide |
| CDC | Child Development Center |
| CAA | Clean Air Act |
| CWA | Clean Water Act |
| CFR | Code of Federal Regulations |
| CGP | Construction General Permit |
| CEQ | Council on Environmental Quality |
| CRM | Cultural Resources Manager |
| DNL | day-night sound level (average) |
| dB | decibel |
| DOD | Department of Defense |
| DFAC | Dining Facility |
| ESA | Endangered Species Act |
| EISA | Energy Independence Security Act |
| ECF | Entry Control Facility |
| EA | Environmental Assessment |
| EIAP | Environmental Impact Analysis Process |
| EIS | Environmental Impact Statement |
| EMS | Environmental Management System |
| ERP | Environmental Restoration Program |
| EO | Executive Order |
| FPPA | Farmland Protection Policy Act |
| FAA | Federal Aviation Administration |
| FEMA | Federal Emergency Management Agency |
| HWMP | Hazardous Waste Management Plan |
| ICRMP | Installation Cultural Resources Management Plan |
| IDP | Installation Development Plan |
| LBP | lead-based paint |
| lf | linear feet |
| LID | low-impact design |
| MBTA | Migratory Bird Treaty Act |
| MMRP | Military Munition Response program |
| mgd | million gallons per day |
| MSGP | Multi-Sector General Permit |
| MS4 | Municipal Separate Storm Sewer System |
| NAAQS | National Ambient Air Quality Standards |
| NEPA | National Environmental Policy Act |
| NHPA | National Historic Preservation Act |
| NPDES | National Pollutant Discharge Elimination System |
| NRHP | National Register of Historic Places |
| NAGPRA | Native American Graves Protection and Repatriation Act |
| NM | New Mexico |
| NMAC | New Mexico Administrative Code |
| NMDGF | New Mexico Department of Game & Fish |
| NMED | New Mexico Environment Department |
| $NO_2$ | nitrogen dioxide |
| $NO_x$ | nitrogen oxides |
| NOA | Notice of Availability |
| OSH | Occupational Safety and Health |
| OSHA | Occupational Safety and Health Administration |
| $O_3$ | ozone |
| $PM_{10}$ | particulate matter (<10µm) |
| $PM_{2.5}$ | particulate matter (<2.5µm) |
| PPE | personal protective equipment |
| PCB | polychlorinated biphenyls |
| ROI | region of interest |
| RTI | Regional Training Institute |
| RCRA | Resource Conservation and Recovery Act |
| SDWA | Safe Drinking Water Act |
| SDS | Safety Data Sheet |
| Sf | square feet |
| SHPO | State Historic Preservation Office |
| SWPPP | Stormwater Pollution Prevention Plan |
| $SO_2$ | sulfur dioxide |
| $SO_x$ | sulfur oxides |
| tpy | tons per year |
| TCLP | toxicity characteristic leaching procedure |
| HHS | U.S. Department of Health and Human Services |
| UXO | unexploded ordnance |
| USGS | United States Geological Survey |
| Air Force | United States Air Force |
| USC | United States Code |
| USEPA | United States Environmental Protection Agency |
| USFWS | United States Fish and Wildlife Service |
| VOC | volatile organic compound |

# 1.0 PURPOSE AND NEED OF THE PROPOSED ACTION

## 1.1 INTRODUCTION

Kirtland Air Force Base (AFB) is located southeast of the city of Albuquerque in New Mexico and occupies 51,585 acres of land, 44,052 acres of which are under United States Air Force (Air Force) control (see **Figure 1-1**). It is a center for research, development, and testing of nonconventional weapons, space and missile technology, and laser warfare, and is host to more than 100 Air Force and non-Air Force mission partners.

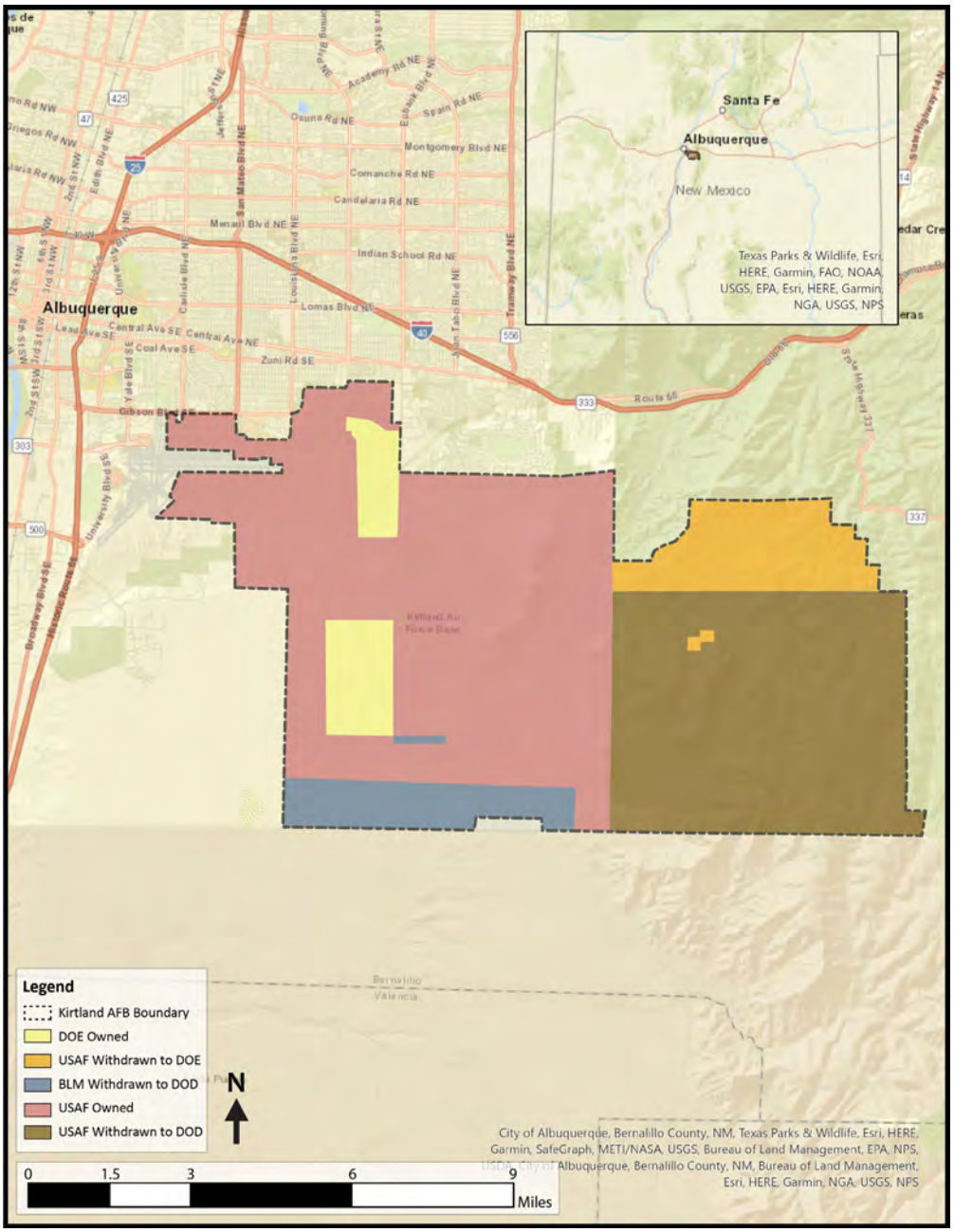


*Figure 1-1: Kirtland AFB Vicinity Map with Land Ownership and Withdrawn Areas*

Zia Park is a former housing area encompassing approximately 300 acres of land central to the primary cantonment area of the installation. It is bounded by Gibson Boulevard, Albuquerque Public School's Wherry Elementary School, and the Albuquerque Metropolitan Arroyo Flood Control Authority's Regional Drainage Facility to the north, Pennsylvania Street to the east, Hardin Boulevard to the south, and Randolph Avenue and Louisiana Boulevard to the west. It is bisected by Ridgecrest Drive, one of the few road connections linking the east and west sides of the installation (see **Figure 1-2**). The Zia Park area is currently vacant except for the3 51 Special


*Figure 1-2: Boundaries and Existing Facilities at Zia Park*

Warfare Training Wing Campus located in the southeast quadrant.

The Air Force has identified categories of construction projects suitable for consideration in the Zia Park area of Kirtland AFB over the next 20 years. The intent of the ongoing process of area development is to provide the improvements necessary to support the mission of the Air Force and its mission partners. This Area Development Environmental Assessment (ADEA) is being prepared to evaluate the potential environmental impacts of these proposed projects.

The project categories being considered in this ADEA were identified in the Kirtland AFB Zia Park Area Development Plan (ADP) (USAF 2018) and are congruent with the Kirtland AFB Installation Development Plan (IDP) (USAF 2016). These plans identify short- (1-5 years), mid- (5-10 years), and long- (10-20 years) range project requirements for the improvement of the physical infrastructure and functionality of the area, including current and future missions, facilities and infrastructure requirements; development constraints and opportunities; and land use relationships. Goals of the ADP include pursuing redevelopment opportunities, enhancing force protection, striving toward state-of-the art facilities, promoting quality of life for users, supporting mission partner success, strengthening community partnerships, developing multimodal transportation, pursuing energy surety options, and protecting and preserving environmental resources.

## 1.2 PURPOSE OF THE PROPOSED ACTION

The purpose of the Proposed Action is to implement several types of construction projects over the next 20+ years, as described in the Kirtland AFB Zia Park Area Development Plan, to meet the current and future needs of Kirtland AFB.

## 1.3 NEED FOR THE PROPOSED ACTION

The need for Zia Park area development at Kirtland AFB is to provide and maintain facilities and infrastructure that meet the requirements of the 377 ABW and its mission partners. This can be accomplished by consolidating and co-locating community facilities, as well as connecting the east and west sides of the installation, in a manner that:

- Supports the Air Force mission requirements and quality of life of units and Airmen hosted by the installation;
- Meets applicable Department of Defense (DOD) installation master planning criteria, consistent with United Facilities Criteria 2-100-01, *Installation Master Planning;* Air Force Instruction 32-1015, *Integrated Installation Planning;* and Air Force Policy Directive 32-10, *Installations and Facilities*;
- Meets all applicable DOD, federal, state, and local laws and regulations such as, but not limited to, the Endangered Species Act (ESA), National Historic Preservation Act (NHPA), Clean Water Act (CWA), Clean Air Act (CAA), Resource Conservation and Recovery Act (RCRA) and Migratory Bird Treaty Act (MBTA). More detailed information regarding resource specific laws and regulations are provided in the resource sections located in Chapter 3.

Per the Kirtland AFB IDP, the Zia Park area consists of the Community District and the Enterprise District. Future planning in these districts allow for the following land uses:

- Administrative: headquarters, offices, operations, research, testing, warehouses, training, and education;

- Infrastructure Improvements: an entry control facility (ECF), roadway extensions, roadway realignments, and utility infrastructure facilities, corridors and updates;
- Medical: base ambulatory surgery center, clinic, dental services, flight medicine, pharmacy;
- Community Services: fitness center, child development center, recreation and community center, youth center, and military dining facility (DFAC);
- Attached and Detached Residential/Lodging: multistory dormitories, unaccompanied housing, single-family homes, and townhomes;
- Outdoor Recreation and Open Space.

These are the project categories under consideration for construction in this ADEA.

## 1.4 DECISION TO BE MADE

The ADEA evaluates whether the Proposed Action and alternatives would result in significant impacts on the human environment. If such impacts are identified, the Air Force would undertake mitigation to reduce impacts to below the level of significance, initiate the preparation of an Environmental Impact Statement addressing the Proposed Action, identify alternative actions to be assessed, or abandon the Proposed Action altogether. If no significant impacts are identified, the Air Force will use the ADEA to make an informed decision on whether to proceed with the Proposed Action. The ADEA is a planning and decision-making tool that will guide implementation of the Proposed Action in a manner that complies with all applicable federal, state, and local environmental laws and regulations and is consistent with Air Force standards for environmental stewardship. It is prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code 4331 et seq.), the regulations of the President's Council on Environmental Quality that implement NEPA procedures (40 Code of Federal Regulations [CFR] 1500-1508), and the Air Force Environmental Impact Assessment Process (EIAP) Regulations (32 CFR Part 989).

## 1.5 INTERGOVERNMENTAL COORDINATION / CONSULTATIONS

### 1.5.1 Interagency Coordination and Consultations

Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, as amended by EO 12416, requires federal agencies to provide opportunities for consultation by elected officials of state and local governments that would be directly affected by a federal proposal. In compliance with NEPA, the Air Force notified relevant stakeholders about the Proposed Action and alternatives (see **Appendix A** for all stakeholder coordination materials). The notification process provided these stakeholders the opportunity to cooperate with the Air Force and offer comments on the Proposed Action and alternatives.

Per the requirements of Section 106 of the NHPA and implementing regulations (36 CFR Part 800), Section 7 of the ESA and implementing regulations (50 CFR Part 17), including the MBTA, findings of effect and a request for concurrence has been transmitted to the State Historic Preservation Officer (SHPO) and the U.S. Fish and Wildlife Service (USFWS). A brief summary of comments received is shown below. All correspondence with the SHPO and USFWS is included in **Appendix A**.

- **SHPO.** Received and concurred with the project.

- **USFWS.** Correspondence was submitted to the USFWS during both the scoping period and public comment period; however, no comments were received. In lieu of comments from the USFWS, those provided from the State of New Mexico Department of Game & Fish (NMDGF) are used to ensure biological resources are adequately evaluated.

Letters were provided during the scoping and public review periods to relevant federal, state, and local agencies. The agencies were requested to provide information regarding impacts of the Proposed Action on the natural environment or other environmental aspects they felt should be included and considered in the preparation of the EA. During the scoping and public review period, the USAF received three responses from state agencies, the Mid-Region Council of Governments (MRCOG), the NMDGF, and the New Mexico Environment Department (NMED). A brief summary of concerns and comments for each agency is shown below. All correspondence with federal, state, and local agencies is included in **Appendix A**.

- **MRCOG.** The MRCOG supports the near, intermediate, and long-term plans for Zia Park.

- **NMDGF.** The NMDGF recommended that the USAF determine if the Gunnison's prairie dog (*Cynomys gunnisoni*) and burrowing owl (*Athene cunicularia*) occur within the proposed construction sites. If their presence is noted, methods for their relocation should be described within this EA.

- **NMED.** The NMED provided comments affecting several resource areas:

    - **Drinking Water.** There are no regulated public groundwater system wells within 500 feet of the proposed site, nor any regulated public surface water system intakes within 10 miles downgradient. Therefore, this project is unlikely to have a significant impact on any regulated public water system. However, the NMED Drinking Water Bureau should be contacted to determine what forms, permits, and approval may be necessary for the project.

    - **Hazardous Waste.** The proposed Zia Park project is located adjacent to areas affected by the Kirtland AFB Bulk Fuels Facility release and is currently downgradient from the release point. There currently are no known impacts to the project site from the Bulk Fuels Facility except for a groundwater treatment system for extracted ethylene dibromide-contaminated groundwater located near the western boundary of the site. The plans indicate that the treatment system building will not be affected by development and will remain at the south end of a proposed parking lot.

    - **Petroleum Storage Tanks.** There are three active petroleum storage tank facilities near the proposed construction site along with three known petroleum releases within a half mile of the site. If an abandoned storage tank system or petroleum contaminated soil or water is discovered, the Petroleum Storage Tank Bureau must be notified.

    - **Surface Water.** The U.S. Environmental Protection Agency (USEPA) may require National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) coverage for storm water discharges from construction activities (such as clearing, grading, excavating, and stockpiling) that disturb (or re-disturb) one or more acres. Prior to discharging storm water, construction operators may need to obtain coverage under an NPDES permit. Among other things, this permit

requires that a Storm Water Pollution Prevention Plan (SWPPP) be prepared for the project.

### 1.5.2 Government to Government Coordination and Consultations

EO 13175, *Consultation and Coordination with Indian Tribal Governments,* directs federal agencies to coordinate and consult with Native American tribal governments whose interests may be directly and substantially affected by activities on federally-administered lands. To comply with legal mandates, federally-recognized tribes that are historically affiliated with the geographic region were invited to consult on all proposed undertakings that may affect properties of cultural, historical, or religious significance to the tribes (see **Appendix A** for all tribal coordination materials). Letters were provided during the scoping and public review periods to Native American tribes whose ancestors were historically affiliated with the land underlying Kirtland AFB, inviting them to consult on the proposed undertakings outlined in this ADEA. A brief summary of concerns and comments for each tribe is shown below.

- **Hopi Tribe.** Received and had no comments on the project.
- **Navajo Nation.** Received and had no comments on the project.
- **Pueblo de San Ildefonso.** Received and had no comments on the project.
- **Pueblo of Pojoaque.** Received and concurred with the project.
- **San Carlos Apache Tribe.** Received and concurred with the project.
- **Southern Ute Indian Tribe.** Received correspondence that the project was being reviewed, but no other correspondence was received during the review period.
- **White Mountain Apache Tibe.** Received and concurred with the project.
- **Wichita and Affiliated Tribes.** Received and had no comments on the project.

## 1.6 PUBLIC AND AGENCY REVIEW OF DRAFT ADEA

A Notice of Availability (NOA) was published in *The Albuquerque Journal* announcing the availability of the Draft ADEA. Letters were provided to relevant federal, state, and local agencies and Native American tribal governments informing them that the Draft ADEA was available for review. The publication of the NOA initiated a 30-day comment period. A copy of the Draft ADEA was available for review at the San Pedro Public Library at 5600 Trumbull Avenue SE, Albuquerque, New Mexico 87108. A copy of the Draft ADEA was also available for review online at *http://www.kirtland.af.mil* under the Environment Information tab. At the closing of the public review period, applicable comments from the general public and interagency and intergovernmental coordination/consultation were incorporated into the analysis of potential environmental impacts and included in **Appendix A**.

# 2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

## 2.1 PROPOSED ACTION

The Air Force proposes to redevelop an underutilized portion of the installation by considering short-, mid-, and long-range project requirements that improve the physical infrastructure and function of the area, while considering current and future mission needs of the Air Force and its mission partners, facilities and infrastructure requirements, development constraints and opportunities, and land use relationships (see **Table 2-1**). Repurposing the Zia Park area would allow the Air Force to consolidate and co-locate community facilities and connect the east and west sides of the installation. A conceptual image is included in **Figure 2-1**.

Table 2-1: Proposed Zia Park Developments

| Project Categories | Design Parameters | Planning Range[1] |
|---|---|---|
| **Administrative:** headquarters, offices, operations, research, testing, warehouses, training, and education | Up to 40 acres of land with up to 480,000 square feet (sf) of facilities, parking lots, and impervious surface; facilities could be up to 5 stories tall | Short-, mid-, and long- term projects |
| **Infrastructure Improvements:** ECF, roadway extensions, roadway realignments, and utility infrastructure facilities, corridors, and updates | Up to 5 acres of land with up to 11,000 linear feet (lf) of impervious surface; any infrastructure facilities could be up to 5,000 sf and 1 story tall; roadways could be up to a divided four-lane road with a landscaped median, dedicated bicycle lanes, correctly sized pedestrian sidewalks, and traffic circles | Short-, mid-, and long- term projects |
| **Medical:** base medical facility, clinic, dental services, flight medicine, pharmacy (drive-up) | Up to 10 acres of land with up to 200,000 sf of facilities, parking lots, and impervious surface; facilities could be up to 5 stories tall | Long-term projects |
| **Community Services:** fitness center including outdoor fields and pool, child development center, recreation and community center, youth center, and DFAC | Up to 10 acres of land with up to 200,000 sf of facilities, parking lots, and impervious surface; facilities could be up to 2 stories tall | Short- and mid-term projects |
| **Attached and Detached Residential/Lodging:** multistory dormitories, single-family homes, townhomes, unaccompanied housing | Up to 10 acres of land with up to 200,000 sf of facilities, parking lots, and impervious surface; facilities between 1 and 5 stories tall | Short- and mid-term projects |
| **Outdoor Recreation and Open Space** | Up to 10 acres of land for common areas, recreation areas near dormitories, or outdoor dining areas. Construction may include pavilions, basketball courts, etc. | Short-, mid-, and long-term projects |
| **Demolition of Existing Facilities:** Existing facilities to be demolished would be outside of the Zia Park area and would be in accordance with Air Force Policy for new construction. | Demolitions could include: Building 585 west side gym (16,370 sf); Building 20228 east side gym (43,155 sf), Building 20221 dormitory (75,756 sf), Building 20350 DFAC (27,023 sf), and Building 1914 Maxwell child development center (26,382 sf). | Short-, mid-, and long-term projects |

1. Short-Term = 1-5 years; Mid-Term = 5-10 years; Long-Term = 10-20 years


Note: This is a conceptual drawing only and actual design and placement of facilities may change.

*Figure 2-1: Zia Park Conceptual Design Drawing*

It is important to note that the proposed projects are funding-dependent and could proceed in any order, and a change in the decision to implement one element would not preclude the rest of the project, or any portion of it, from moving forward. Should the Proposed Action be implemented, the specific design, location, and number of facilities constructed may vary from what is shown in **Figure 2-1** based on the needs of Kirtland AFB and the design parameters shown in **Table 2-1**. All proposed construction projects from the Zia Park ADP were evaluated in this EA even if not shown in **Figure 2-1**. This ADEA reduces duplication of effort by analyzing general aspects of

proposed construction and demolition projects in the ADP and establishing a framework for environmental impact analysis of future site-specific actions. The impacts of future site-specific actions would be addressed in subsequent AF Form 813 EIAP reviews per the Air Force's implementing NEPA regulations (32 CFR Part 989).

## 2.2 SELECTION STANDARDS

Selection standards were developed to assist the Air Force in determining reasonable alternatives and the basis for eliminating any of them. The following selection standards were used to determine the feasibility of each alternative and to decide which of the alternatives would best meet the needs of the project:

- The site should be able to create a strong east/west transportation connection through the center of the base capable of linking flightline operation facilities and Air Force Research Laboratory facilities on the east side of the installation to facilities on the west and southwest sides of the installation. This cohesive transportation corridor also increases functionality by creating a walkable campus;
- The site should be able to consolidate current off-base resources back onto the main base in a centralized location, capable of providing convenient user access and co-located with other community functions. Some of the facilities currently located off-base being considered for relocation include the 377 Medical Group's medical and dental clinics, located within the Veterans Affairs Medical Center Campus, and a child development center, located within Maxwell Housing;
- The site should be able to enhance the quality of life of personnel living and working on the installation by co-locating community functions, such as a new, state-of-the-art physical fitness center, the incorporation of sidewalks for recreational walking and physical training, bicycle paths, and other outdoor recreation amenities. These facilities would be open to use by both military and civilian personnel;
- The site should contain enough land to accommodate future mission beddowns and expansions and be able to promote mixed use areas for campus developments and facility sharing between various DOD users. Some new mission beddowns include the relocation of the New Mexico Army National Guard's 515 Regional Training Institute (RTI) from Santa Fe to Kirtland AFB. Facilities to be shared could include a DFAC, dormitories, unaccompanied housing, and a physical fitness center;
- The site should not be located in a wetland or floodplain;
- The site should not have limiting topographic features or stormwater drainage.

## 2.3 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Air Force would not redevelop the Zia Park area and none of the proposed construction projects as outlined under the Proposed Action would occur. The installation would also continue to remain unconnected and divided. The No Action Alternative would maintain the current land uses and activities at the site, and the land would remain underutilized.

The No Action Alternative would not meet the purpose of and need for the Proposed Action as described in **Sections 1.2** and **1.3**; however, the Air Force EIAP (32 CFR § 989.8[d]) requires consideration of the No Action Alternative. Therefore, this alternative was carried forward for detailed analysis in the EA.

## 2.4 ALTERNATIVE CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

The following alternative was eliminated from further consideration based upon the selection standards stated in **Section 2.2** and other reasons as explained below.

### 2.4.1 Maxwell Housing

Maxwell housing is an 86-acre site located approximately two miles northwest of the Zia Park area across Gibson Boulevard, a principal roadway in southeast Albuquerque. This site is currently developed and includes a 224-unit privatized housing area, a child development center, an emergency operations center complex, and its own ECF. While this site has been identified in the Kirtland IDP as suitable for redevelopment, it is geographically separated from the main installation and does not allow for a strong east/west transportation connection nor a central co-location of community service facilities. The cost to demolish the existing structures in Maxwell housing could also prove to be prohibitive when compared to using the vacant Zia Park area. Therefore, this alternative would not meet the purpose of or need for the Proposed Action and was not carried forward for analysis in the ADEA.

## 2.5 COMPARATIVE SUMMARY OF IMPACTS

The table below presents a summary of the impacts anticipated under the Proposed Action and No Action Alternative. These affected resources are discussed further in **Section 3.0**.

Table 2-2: Summary of Potential Impacts

| Affected Resource | Alternative 1 – Preferred Action | No Action Alternative |
|---|---|---|
| Air Quality | The Proposed Action would result in short-term, minor adverse impacts on air quality, primarily associated with construction operations. Emissions of criteria pollutants and greenhouse gases (GHGs) would be directly produced from activities such as the operation of heavy equipment, heavy-duty diesel vehicles hauling debris to and from the project area, and workers commuting daily to and from the project areas in their personal vehicles. Additionally, heavy equipment moving soil and debris would produce a notable amount of particulate matter if uncontrolled. However, all such emissions would be temporary and produced only when construction activities are occurring. Construction activities would incorporate best management practices (BMPs) and environmental control measures (e.g., wetting the ground surface) to minimize fugitive particulate matter air emissions. | Under the No Action Alternative, the proposed construction and demolition activities associated with the Zia Park development project would not be implemented and the existing conditions discussed in Section 3.2.1 would remain unchanged. Therefore, no air quality impacts would occur with implementation of the No Action Alternative. |
| Airspace Management | Under the Proposed Action, none of the proposed activities would result in a change to current airspace types, flight activities, or training, and no changes to current aircraft operations would occur. As a result, there would be no anticipated short- or long-term impacts on airspace management. | Under the No Action Alternative, the proposed construction and demolition activities associated with the Zia Park development project would not be implemented and no impacts to Airspace Management would occur. |

| Affected Resource | Alternative 1 – Preferred Action | No Action Alternative |
|---|---|---|
| Biological Resources | "The Gunnison's prairie dogs (*Cynomys gunnisoni*) are known to inhabit portions of Kirtland AFB and may reside in the project areas, though no critical habitats are known to exist in the region. However, Zia Park is subject to USDA treatment for prairie dogs, thus reducing the population to a manageable density. Prior to beginning any individual project under the Proposed Action, the project area would be surveyed for the Gunnison's prairie dog and, if found, they would be relocated several miles south and east of Zia Park, but still on Kirtland AFB. Relocation efforts would follow the recommendations found in the Conservation Plan for Gunnison's Prairie Dog in New Mexico (NMDGF 2008).<br><br>Similarly, the burrowing owl (*Athene cunicularia*) is known to occur on Kirtland AFB and may be found within the project areas. Prior to beginning any individual project under the Proposed Action, the project area would be surveyed for burrowing owls and they would be relocated prior to commencing construction. Relocation efforts would follow the procedures found in the Guidelines and Recommendations for Burrowing Owl Surveys and Mitigation (NMDGF 2007)." | Under the No Action Alternative, the proposed construction and demolition activities associated with the Zia Park development project would not be implemented and no impacts to Biological Resources would occur. |
| Cultural Resources | The Proposed Action would not result in any impacts to historic properties. There are no archaeological sites located near of any of the construction sites. At present there are no known Native American burial grounds or sacred areas located on Kirtland AFB (KAFB 2018a). Four of the buildings to be demolished under the Proposed Action are not eligible for inclusion in the National Register of Historic Places (NRHP), and one building is not historic. | Under the No Action Alternative, the proposed construction and demolition activities associated with the Zia Park development project would not be implemented and the existing conditions discussed in Section 3.3.1 would remain unchanged, resulting in no impacts to cultural resources. |
| Environmental Justice and Sensitive Receptors | Access to Kirtland AFB is limited to military personnel, their families, military retirees, and assigned government and contract workers. The Proposed Action lies entirely within the borders of Kirtland AFB and solely affects employees, military personnel, and residents of the installation. Therefore, disproportionately high environmental or adverse human health impacts to minority, low-income, or child populations would not occur. | Under the No Action Alternative, the proposed construction and demolition activities associated with the Zia Park development project would not be implemented and no impacts to Environmental Justice or Sensitive Receptors would occur. |

| Affected Resource | Alternative 1 – Preferred Action | No Action Alternative |
|---|---|---|
| Geological Resources | The Proposed Action would result in both long- and short-term, negligible and short-term, minor adverse impacts to geology, topography, and soil resources depending on the final design of proposed construction activities and soil surveys prior to construction. All facilities identified for construction projects are located on previously disturbed land, and such plots of land have been designated for future development. Any previously occupied area would be graded to level and receive soil stabilization in the form of seeding and/or placement of gravel. | Under the No Action Alternative, the proposed construction and demolition activities associated with the Zia Park development project would not be implemented and the existing conditions discussed in Section 3.4.1 would remain unchanged. Therefore, no new impacts on geology or soils would occur with implementation of the No Action Alternative. |
| Hazardous Materials and Wastes | Short-term, minor adverse impacts on hazardous materials and hazardous wastes would occur during construction and demolition activities associated with the Proposed Action. Both construction and demolition activities would require the use of hazardous materials and generate negligible amounts of hazardous wastes. Contractors would be required to adhere to all federal, state and local regulations, to include those instituted by Kirtland AFB. No long-term impacts from the daily operation of the new facilities in Zia Park would exist. Short-term, minor adverse impacts from toxic hazards would occur during demolition processes. All hazardous debris would be disposed of at a facility approved by the USEPA. The removal of toxic substances (such as asbestos) from Kirtland AFB may be considered a long-term beneficial impact by reducing the likelihood of human and environmental exposure to these materials. | Under the No Action Alternative, the proposed construction and demolition activities associated with the Zia Park development project would not be implemented, and the existing conditions discussed in Section 3.5.1 would remain unchanged, resulting in no impacts to hazardous materials and wastes. |
| Infrastructure | The Proposed Action would produce negligible impacts to communications, electrical, natural gas, sanitary sewage, and potable water due to the necessary construction and additional overhead required for new personnel. The Proposed Action would result in a significant positive impact to transportation at Kirtland AFB by improving traffic efficiency when crossing the base or accessing the southern portions of the base. The Proposed Action will provide thoroughfares designed to support large amounts of traffic and multiple means of accessing areas of the base during peak traffic hours. Bicycle lanes and pedestrian walkways would also encourage students residing within Zia Park to seek alternative modes of transportation. | Under the No Action Alternative, the proposed construction and demolition activities associated with the Zia Park development project would not be implemented, and the existing conditions discussed in Section 3.6.1 would remain unchanged, resulting in no impacts to most infrastructure. However, traffic over the next 20 years is anticipated to increase by 8%, and traffic areas already experiencing congestion would likely be negatively impacted over time. |

| Affected Resource | Alternative 1 – Preferred Action | No Action Alternative |
|---|---|---|
| Land Use | The Proposed Action would not result in changes to the current land use designations within the proposed project areas. Since the project areas consist of previously developed land, the Air Force anticipates no short- or long-term impacts on land use at Kirtland AFB. | Under the No Action Alternative, the proposed construction and demolition activities associated with the Zia Park development project would not be implemented |
| Noise | The Proposed Action would result in a series of short-term, minor adverse impacts on noise. Construction activities would be conducted during the daytime hours of 0700 to 1700. Use of heavy equipment would cause an increase in sound that is notably above the ambient level in the region. The nearest sensitive receptors are the Wherry Elementary School, the Siesta Hills residential community, and the Raymond G. Murphy VA Medical Center. While construction noise would be audible at some receptors, it would be comparable to that of a noisy restaurant and would be considered a negligible impact. Additionally, the expected increase in traffic noise would be negligible for the Proposed Action. | Under the No Action Alternative, the proposed construction activities associated with the Zia Park development project would not be implemented, and the existing conditions discussed in Section 3.7.1 would remain unchanged. No new noises would be introduced to the on- and off-installation noise environments; therefore, no impacts would occur with implementation of the No Action Alternative. |
| Safety | The Proposed Action would result in short-term, negligible adverse impacts on the safety of contractors, military personnel, and members of the public. Construction and demolition activities would slightly increase the health and safety risk to contractor and military personnel within the project areas. Construction and demolition activities associated with the Proposed Action would comply with all applicable safety requirements and installation-specific protocols and procedures, including appropriately marking potentially hazardous area and posting warning signs and barriers to limit access to approved construction and oversight personnel only. Upon completion of the construction and demolition activities, no further safety hazard would remain. | Under the No Action alternative, the Air Force would take no action, and no construction or renovations would occur. The existing conditions described in Section 3.8.1 would remain unchanged, and no new safety concerns would result. |

| Affected Resource | Alternative 1 – Preferred Action | No Action Alternative |
|---|---|---|
| Socioeconomics | Implementation of the Proposed Action would result in negligible impacts on population and housing; long-term, positive impacts on economic activity, income, and employment; and negligible impacts on public services and social conditions. A transient student population will be housed on base and will not affect local housing availability. The small number of new permanent employees and their families that would be added to the Albuquerque metro population would not significantly impact housing, and it is unlikely that the Proposed Action would result in a need to adjust available housing units. The proposed projects would require contract construction labor from the local community, which would result in increased employment opportunities and income. The Proposed Action would likely result in a small, long-term, positive impact on income per capita, median household income, and poverty rates. Similarly, the Proposed Action would result in a small, long-term, positive effect on unemployment rates and would have a negligible impact on the existing local labor force. The Proposed Action would have a slight, long-term, positive impact on public services and social conditions and a negligible effect on emergency services and education, given the small numbers being added to the population. Similarly, the Proposed Action would have a negligible impact on public transportation, traffic, and commuter patterns. | Under the No Action alternative, the Air Force would take no action, and no construction or renovations would occur. The existing conditions described in Section 3.9.1 would remain unchanged, with no resulting socioeconomic consequences or benefits. |
| Visual Resources | The Proposed Action would not result in a net change to the characteristic features of the proposed project areas. As all new facilities are required to adhere to the design guidelines listed in the Kirtland AFB Architectural Compatibility Plan (ACP), the visual integrity and appeal of the affected areas would be largely unaffected. As a result, the Air Force anticipates no short- or long-term impacts on visual resources. | Under the No Action Alternative, the proposed construction and demolition activities associated with the Zia Park development project would not be implemented and no impacts to Visual Resources would occur. |
| Water Resources | Short-term, minor adverse impacts to groundwater and surface water are anticipated from demolition and construction activities associated with the Proposed Action. No permanent bodies of water are located in the project areas; however, during rain events flowing stormwater has the potential to transport sediment and hazardous materials to drainage ditches. Best practices and planning during construction and demolition activities will minimize this impact by controlling the movement of surface water runoff and ensuring no direct access to groundwater recharge points. No construction or demolition sites associated with the Proposed Action are in the 100-year floodplain, and no impact to floodplains is anticipated. | Under the No Action Alternative, the proposed construction and demolition activities associated with the Zia Park development project would not be implemented and the existing conditions discussed in Section 3.10.1 would remain unchanged, resulting in no impacts to water resources. |

# 3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

## 3.1 SCOPE OF THE ANALYSIS

### 3.1.1 Resources Analyzed

The resources in the project area that were analyzed include Air Quality, Cultural Resources, Geological Resources, Hazardous Materials and Hazardous Wastes, Infrastructure, Noise, Socioeconomics, and Water Resources. Proposed future projects in the area surrounding the Proposed Action are listed in **Appendix B**. Their potential aggregate impacts are discussed individually for each resource area.

The significance of an action is measured in terms of its context and intensity. The context and intensity of potential environmental impacts are described in terms of duration, the magnitude of the impact, and whether they are adverse or beneficial as summarized below:

- ***Short-term or long-term*.** In general, short-term impacts are those that would occur only with respect to a particular activity, for a finite period, or only during the time required for construction or installation activities. Long-term impacts are those that are more likely to be persistent and chronic.
- ***Adverse or beneficial*.** An adverse impact is one having unfavorable or undesirable outcomes on the man-made or natural environment. A beneficial impact is one having positive outcomes on the man-made or natural environment.

Impacts are defined as:

- Negligible, the impact is localized and not measurable or at the lowest level of detection;
- Minor, the impact is localized and slight but detectable;
- Moderate, the impact is readily apparent and appreciable; or
- Major, the impact is severe or highly noticeable and considered to be significant.

Major impacts are considered significant and receive the greatest attention in the decision-making process. The significance of an impact is assessed based on the relationship between context and intensity. Major impacts require application of a mitigation measure to achieve a less than significant impact. Moderate impacts may not meet the criteria to be classified as significant, but the degree of change is noticeable and has the potential to become significant if not effectively mitigated. Minor impacts have little to no effect on the environment and are not easily detected; impacts defined as negligible are the lowest level of detection and generally not measurable. Beneficial impacts provide desirable situations or outcomes.

### 3.1.2 Resources Eliminated from Detailed Analysis

Based on the scope of the Proposed Action, environmental resources with few to no impacts were identified and removed from detailed analysis. The following describes those resource areas and why they were eliminated:

- ***Airspace Management.*** Airspace management is not addressed in this EA because none of the proposed activities would result in a change to current airspace types, flight activities, or training, and no changes to current aircraft operations would occur. As a result, the Air Force anticipates no short- or long-term impacts on airspace management at Kirtland AFB. Therefore, airspace management was not carried forward for detailed analysis.

- ***Biological Resources.***

  Biological resources are not addressed in this EA as no critical habitats or other wildlife habitats exist on or in the general vicinity of the project areas, as all sites have been previously disturbed by industrial/military operations and limited vegetation is available. While it is possible some populations of Gunnison's prairie dog or burrowing owls may reside in or near specific project areas, they would be manageable sizes that would be relocated prior to construction using approved guidance from the NMDGF and USFWS. The Air Force anticipates no short- or long-term impacts on biological resources at Kirtland AFB. Therefore, biological resources were not carried forward for detailed analysis.

- ***Land use.*** Land use is not addressed in this EA as none of the proposed activities would result in a change to current land use designations within the proposed project areas. According to the 2016 IDP, the proposed construction and demolition activities areas are located within land designated for development and implementation of the Proposed Action would not change this designation. The lands that are the subject of this EA consist of previously developed land. As a result, the Air Force anticipates no short- or long-term impacts on land use at Kirtland AFB. Therefore, land use was not carried forward for detailed analysis.

- ***Visual Resources.*** Visual resources are not addressed in this EA as none of the proposed activities would result in a net change to the characteristic features of the proposed area. Visual resources are defined as the natural and man-made physical features that give a particular landscape its character and influence the visual appeal of an area for workers, residents, and visitors. Given their location on an active military installation, the visual resources of the project areas would be defined by the architecture of the current facilities and the landscaping around them, all of which is described in detail in the Kirtland AFB Architectural Compatibility Plan (ACP). As all new facilities are required to adhere to the design guidelines listed in the ACP, the visual integrity and appeal of the affected areas would largely be unaffected. As a result, the Air Force anticipates no short- or long-term impacts on visual resources at Kirtland AFB. Therefore, visual resources were not carried forward for detailed analysis.

- ***Environmental Justice and Sensitive Receptors.*** Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* was issued by the President of the United States on February 11, 1994. The objectives of this EO, as it pertains to this EA, include mandating that federal agencies implement strategies to identify low-income and minority populations potentially affected by proposed federal actions. Additionally, potential environmental justice issues regarding children must be addressed pursuant to EO 13405, *Protection of Children from Environmental Health Risks and Safety Risks*. This EO directs federal agencies to identify and assess environmental health and safety risks that may disproportionately affect children.

  Access to Kirtland AFB is limited to military personnel, their families, military retirees, and assigned government and contract workers. The Proposed Action lies entirely within the borders of Kirtland AFB and solely affects current and future installation employees and military personnel by consolidating operations and modernizing common use facilities. Therefore, disproportionately high environmental or adverse human health impacts to minority, low-income, or child populations would not occur.

## 3.2 AIR QUALITY

Air quality is defined by the concentration of various pollutants in the atmosphere at a given location. Under the Clean Air Act (CAA), the six pollutants defining air quality, called "criteria pollutants," include carbon monoxide (CO), sulfur dioxide ($SO_2$), nitrogen dioxide ($NO_2$), ozone ($O_3$), suspended particulate matter (measured less than or equal to 10 microns in diameter [$PM_{10}$] and less than or equal to 2.5 microns in diameter [$PM_{2.5}$]), and lead. CO, $SO_2$, and some particulates are emitted directly into the atmosphere from emissions sources. $NO_2$, $O_3$, and some particulates are formed through atmospheric chemical reactions that are influenced by weather, ultraviolet light, and other atmospheric processes. Volatile organic compounds (VOCs) and nitrogen oxides ($NO_x$) emissions are used to represent $O_3$ generation because they are precursors of $O_3$. Sulfur oxides ($SO_x$) are used to represent $SO_2$ emissions.

The United States Environmental Protection Agency (USEPA) has established National Ambient Air Quality Standards (NAAQS) (40 CFR § 50) for criteria pollutants. NAAQS are classified as primary or secondary. Primary standards protect against adverse health effects, and secondary standards protect against welfare effects, such as damage to farm crops and vegetation and damage to buildings. Some pollutants have short-term and long-term standards. Short-term standards are designed to protect against acute health effects, while long-term standards were established to protect against chronic health effects. The state of New Mexico has established created its own ambient air quality standards for criteria pollutants, which in some cases are more stringent than the NAAQS.

Areas that are and have been historically in compliance with the NAAQS or have not been evaluated for NAAQS compliance are designated as attainment areas. Areas that violate a federal air quality standard are designated as nonattainment areas. Areas that have transitioned from nonattainment to attainment are designated as maintenance areas and are required to adhere to maintenance plans to ensure continued attainment. The maintenance designation can be removed from an area if the area demonstrates to the USEPA it can consistently remain below NAAQS for more than 20 years.

The USEPA General Conformity Rule applies to federal actions occurring in nonattainment or maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds. The emissions thresholds that trigger requirements for a conformity analysis are called de minimis levels. De minimis levels (in tons per year [tpy]) vary by pollutant and also depend on the severity of the nonattainment status for the air quality management area in question.

The NMED Air Quality Bureau oversees programs for permitting the construction and operation of new or modified stationary source air emissions in the state of New Mexico. The NMED Air Quality Bureau has delegated authority over air quality in Bernalillo County to the Albuquerque Environmental Health Department-Air Quality Division (AEHD-AQD).

***Fugitive Dust Control Regulation*.** The AEHD-AQD lists fugitive dust control requirements in 20.11.20 New Mexico Administrative Code (NMAC), *Fugitive Dust Control*. A fugitive dust control construction permit is required for projects disturbing 0.75 acre or more, and the demolition of buildings containing more than 75,000 cubic feet of space. As stated in 20.11.20.12 NMAC, General Provisions, each person shall use reasonably available control measures or any other effective control measure during active operations or on inactive disturbed surface areas, as necessary, to prevent the release of fugitive dust, whether or not the person is required by 20.11.20 NMAC to obtain a fugitive dust control permit.

***Climate Change and Greenhouse Gases.*** Global climate change refers to long-term fluctuations in temperature, precipitation, wind, sea level, and other elements of Earth's climate system. The ways in which the Earth's climate system is influenced by changes in the concentrations of various gases in the atmosphere have been discussed worldwide. Of particular interest, greenhouse gases (GHGs) are gas emissions that trap heat in the atmosphere. These emissions occur from both natural processes and human activities. Scientific evidence indicates a trend of increasing global temperature over the past century because of an increase in GHG emissions from human activities. The climate change associated with this global warming is predicted to produce negative economic and social consequences worldwide.

### 3.2.1 Affected Environment

Kirtland AFB is in Bernalillo County, New Mexico, which is within the Albuquerque-Mid Rio Grande Intrastate (AMRGI) Air Quality Control Region (AQCR) 152. The AMRGI AQCR also includes portions of Sandoval and Valencia counties, New Mexico. As of April 2019, Bernalillo County was no longer subject to a 20-year CO maintenance plan and is in attainment for all criteria pollutants. As a result, conformity applicability analysis is not required (Rocha 2019).

Kirtland AFB manages several air quality permits, including 20.11.41 NMAC Construction permits, 20.11.21 NMAC Open Burn Program permits, 20.11.20 NMAC Fugitive Dust Control permits, and 20.11.40 NMAC Source Registrations, all of which include operating or emissions limits to ensure compliance with the CAA. Kirtland AFB must also comply with 20.11.42 NMAC Title V Operating Permit #527-RN1, which covers most of the permitted stationary emission sources on the installation. These sources include emergency generators, fire pump engines, boilers, water heaters, fuel storage tanks and fuel dispensing systems, gasoline service stations, surface coating operations, aircraft engine testing, fire training, remediation activities, mulching activities, miscellaneous chemical usage, and open detonation of munitions for military training and research and development. Kirtland AFB is also considered a synthetic minor source of Hazardous Air Pollutants under Title I, Section 112 of the CAA.

Best management practices (BMPs) such as watering during ground-disturbing activities, using soil stabilization agents for dust suppression, and decreasing speed limits on unpaved roads are utilized during all construction projects.

***Climate Change and Greenhouse Gases***. Ongoing global climate change has the potential to increase average temperatures and cause more frequent, intense, and prolonged droughts in the southwest United States, including New Mexico (Garfin, et al. 2014). These changes to regional climate patterns could result in changes to flooding frequency, vegetation types, vegetation growth rates, wildfire potential, groundwater depth, and potable water availability.

### 3.2.2 Environmental Consequences

#### *3.2.2.1 Alternative 1 – Preferred Action*

The Proposed Action would result in a short-term, minor adverse impact on air quality, primarily associated with construction operations. Emissions of criteria pollutants and GHGs would be directly produced from activities such as the operation of heavy equipment, heavy duty diesel vehicles hauling debris to and from the project area, and workers commuting daily to and from the project areas in their personal vehicles. Additionally, heavy equipment moving soil and debris would produce a notable amount of particulate matter if uncontrolled. However, all such emissions would be temporary in nature and produced only when construction activities are occurring.

The air pollutant of greatest concern is particulate matter, such as fugitive dust. The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked and the level of activity. Fugitive dust emissions would be produced from the ground disturbances associated with the Proposed Action. Fugitive dust emissions associated with construction would be greatest during the site grading and excavation and would vary daily depending on the work phase, level of activity, and prevailing weather conditions. Particulate matter emissions would also be produced from the combustion of fuels in vehicles and construction equipment.

Construction activities would incorporate BMPs and environmental control measures (e.g., wetting the ground surface) to minimize fugitive particulate matter air emissions. Additionally, work vehicles are assumed to be well maintained and to use diesel particulate filters to reduce particulate matter air emissions. Construction activities would comply with 20.11.20 NMAC, *Fugitive Dust Control*, to prevent the release of fugitive dust. The Air Force contractor(s) would obtain a fugitive dust control permit(s) from AEHD-AQD. Application for the fugitive dust control permit would require each Air Force contractor to develop a fugitive dust control plan, which would outline specific measures that would be implemented during construction. These BMPs and environmental control measures could reduce uncontrolled particulate matter emissions from a construction site by at least 50 percent depending upon the number of BMPs and environmental control measures required and the potential for particulate matter air emissions. Kirtland AFB's existing fugitive dust control programmatic permit for routine heavy equipment activities, Permit No. 8091-P, would provide coverage for future maintenance activities. Per 20.11.20.12 NMAC, the Air Force contractor would also be required to use reasonably available fugitive dust control measures during any construction activity associated with the Proposed Action, regardless of whether a fugitive dust control permit was required.

The Air Force Air Conformity Applicability Model (ACAM) was used to estimate the project air emissions from construction activities associated with the Proposed Action. **Table 3-2** summarizes the anticipated air emissions from activities by construction category, and **Table 3-3** shows the estimated annual emissions by year and the steady state emissions once all construction activities are completed. The complete ACAM reports and other supporting documentation are located in **Appendix C**.

Table 3-1: Estimated Air Emissions from Construction/Demolition Activities by Category

| Construction Activity[1] | $NO_x$ (tons) | VOC (tons) | CO (tons) | $SO_x$ (tons) | $PM_{2.5}$[2] (tons) | $PM_{10}$[2] (tons) | $NH_3$ (tons) | $CO_{2e}$ (tons) |
|---|---|---|---|---|---|---|---|---|
| Administrative | 4.43 | 3.53 | 5.33 | 0.012 | 0.17 | 5.15 | 0.006 | 1188.5 |
| Infrastructure | 2.10 | 0.43 | 2.52 | 0.006 | 0.10 | 8.96 | 0.001 | 543.3 |
| Medical | 3.87 | 1.82 | 4.93 | 0.011 | 0.15 | 2.25 | 0.004 | 1037.5 |
| Community Services | 3.87 | 1.82 | 4.93 | 0.011 | 0.15 | 2.31 | 0.004 | 1037.5 |
| Attached/Detached Residential/Lodging | 3.87 | 1.82 | 4.93 | 0.011 | 0.15 | 2.25 | 0.004 | 1037.5 |
| Outdoor Recreation and Open Space | 0.61 | 0.11 | 0.77 | 0.002 | 0.03 | 4.36 | 0.000 | 150 |

| Construction Activity[1] | $NO_x$ (tons) | VOC (tons) | CO (tons) | $SO_x$ (tons) | $PM_{2.5}$[2] (tons) | $PM_{10}$[2] (tons) | $NH_3$ (tons) | $CO_{2e}$ (tons) |
|---|---|---|---|---|---|---|---|---|
| Demolition of Existing Facilities | 1.60 | 0.23 | 1.46 | 0.004 | 0.06 | 5.48 | 0.003 | 431 |
| Project Total: | 20.36 | 9.76 | 24.88 | 0.056 | 0.82 | 30.76 | 0.023 | 5425.3 |
| Annual Avg[3]: | 1.02 | 0.49 | 1.24 | 0.003 | 0.04 | 1.54 | 0.001 | 271.3 |

1. All calculations were performed using ACAM v5.0.17b. See Appendix C for the complete report. Values are rounded.
2. PM emissions in this table are uncontrolled. Utilizing standard fugitive dust controls would reduce PM emissions by at least 50%.
3. Estimated emissions would take place over a period of 20 years, starting on or about January 2023.

As noted in **Section 3.2.1**, Bernalillo County is designated by the USEPA as unclassified/in attainment for all criteria pollutants. Therefore, the Federal General Conformity Rule does not apply for the Proposed Action and no conformity analysis is required. Fugitive dust emissions would be significantly reduced with BMPs and environmental control measures specified in a fugitive dust control plan.

Table 3-2: Estimated Annual Air Emissions During- and Post-Construction

| Activity[1,2] | $NO_x$ (tpy) | VOC (tpy) | CO (tpy) | $SO_x$ (tpy) | $PM_{2.5}$ (tpy) | $PM_{10}$ (tpy) | $NH_3$ (tpy) | $CO_{2e}$ (tpy) |
|---|---|---|---|---|---|---|---|---|
| 2023 | 1.21 | 0.58 | 1.49 | 0.003 | 0.05 | 1.65 | 0.001 | 323.1 |
| 2024 | 1.21 | 0.58 | 1.49 | 0.003 | 0.05 | 1.65 | 0.001 | 323.1 |
| 2025 | 1.21 | 0.58 | 1.49 | 0.003 | 0.05 | 1.65 | 0.001 | 323.1 |
| 2026 | 1.21 | 0.58 | 1.49 | 0.003 | 0.05 | 1.65 | 0.001 | 323.1 |
| 2027 | 1.21 | 0.58 | 1.49 | 0.003 | 0.05 | 1.65 | 0.001 | 323.1 |
| 2028 | 1.21 | 0.58 | 1.49 | 0.003 | 0.05 | 1.65 | 0.001 | 323.1 |
| 2029 | 1.21 | 0.58 | 1.49 | 0.003 | 0.05 | 1.65 | 0.001 | 323.1 |
| 2030 | 1.21 | 0.58 | 1.49 | 0.003 | 0.05 | 1.65 | 0.001 | 323.1 |
| 2031 | 1.21 | 0.58 | 1.49 | 0.003 | 0.05 | 1.65 | 0.001 | 323.1 |
| 2032 | 1.21 | 0.58 | 1.49 | 0.003 | 0.05 | 1.65 | 0.001 | 323.1 |
| 2033 | 0.82 | 0.40 | 1.00 | 0.002 | 0.03 | 1.42 | 0.001 | 219.4 |
| 2034 | 0.82 | 0.40 | 1.00 | 0.002 | 0.03 | 1.42 | 0.001 | 219.4 |
| 2035 | 0.82 | 0.40 | 1.00 | 0.002 | 0.03 | 1.42 | 0.001 | 219.4 |
| 2036 | 0.82 | 0.40 | 1.00 | 0.002 | 0.03 | 1.42 | 0.001 | 219.4 |
| 2037 | 0.82 | 0.40 | 1.00 | 0.002 | 0.03 | 1.42 | 0.001 | 219.4 |
| 2038 | 0.82 | 0.40 | 1.00 | 0.002 | 0.03 | 1.42 | 0.001 | 219.4 |
| 2039 | 0.82 | 0.40 | 1.00 | 0.002 | 0.03 | 1.42 | 0.001 | 219.4 |

| Activity[1,2] | $NO_x$ (tpy) | VOC (tpy) | CO (tpy) | $SO_x$ (tpy) | $PM_{2.5}$ (tpy) | $PM_{10}$ (tpy) | $NH_3$ (tpy) | $CO_{2e}$ (tpy) |
|---|---|---|---|---|---|---|---|---|
| 2040 | 0.82 | 0.40 | 1.00 | 0.002 | 0.03 | 1.42 | 0.001 | 219.4 |
| 2041 | 0.82 | 0.40 | 1.00 | 0.002 | 0.03 | 1.42 | 0.001 | 219.4 |
| 2042 | 0.82 | 0.40 | 1.00 | 0.002 | 0.03 | 1.42 | 0.001 | 219.4 |
| Steady State Emissions (2043) | 1.89 | 0.54 | 5.62 | 0.073 | 0.17 | 0.17 | 0.024 | 1875.5 |

1. Most calculations were performed using ACAM v5.0.17b. See Appendix C for more details. Values are rounded.
2. Estimated annual emissions once all construction/demolition has been completed, as estimated to begin in 2043.
3. No other notable sources of emissions (e.g. paint booths, incinerators, etc.) are anticipated.

**Table 3-3** also presents the expected change in annual emissions from annual Kirtland AFB operations compared to baseline estimates of current operations. This change is primarily associated with personal vehicle usage by the addition of personnel on base. Based on these calculations, the Proposed Action would not be expected to result in a major impact on air quality.

***Climate Change and Greenhouse Gases***. Construction associated with the Proposed Action would emit approximately 10,000 tons of carbon dioxide equivalent ($CO_2e$) during a given year. By comparison, this amount of $CO_2e$ is comparable to the GHG footprint of 4,400 single family homes for one year (USEPA 2018). As such, this one-time emission of GHGs would not meaningfully contribute to the potential effects of global climate change. Therefore, the Proposed Action would not be expected to result in a major impact on climate change.

Ongoing changes to climate patterns in the southwestern United States are described in **Section 3.2.1**. These climate changes are unlikely to affect the Air Force's ability to implement the Proposed Action, and the Proposed Action would not appreciably contribute to the regional (i.e., southwestern United States) impacts from global climate change due to an insignificant amount of $CO_2e$.

#### *3.2.2.2 No Action Alternative*

Under the No Action Alternative, the proposed construction and demolition activities associated with the Zia Park development project would not be implemented and the existing conditions discussed in **Section 3.2.1** would remain unchanged. Therefore, no air quality impacts would occur with implementation of the No Action Alternative.

## 3.3 CULTURAL RESOURCES

The term 'cultural resource' equates to archaeological resources and more specifically refers to a prehistoric or historic-era building, site, district, structure, or object (36 CFR 60.3; NPS 1997). "Buildings" are defined as a domicile, or a structure intended for human shelter. "Structures" are resources intended for purposes other than habitation such as outbuildings to a larger complex or other infrastructure elements. An "object" is distinguished from buildings and structures as being simpler and/or smaller in scale. A "site" is the location of a significant historic-era event, a prehistoric or historic-era occupation or activity, or a building or structure, whether standing, ruined or vanished, where the location itself possesses historic, cultural, or archaeological value regardless of the value of any existing structure (NPS 1997:5). Lastly, a "district" possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects that are historically or aesthetically united by plan or physical development. The term "historic property"

refers specifically to a cultural resource (building, site, district, or object) that through identification and evaluation efforts has been recommended or determined to be eligible for inclusion on the National Register of Historic Places (NRHP). The significance of an historic property can only be evaluated within its historic context. Historic contexts define patterns and trends important in our understanding of prehistory and history and may cover local, State, or national themes or issues. When evaluated within its historic context a property must be shown to be significant for associative value (Criteria A and B), construction value (Criterion C) or information value (Criterion D). Furthermore, a resource must convey significance through one or more of the seven aspects of integrity: location, design, setting, materials, workmanship, feeling, and association. Once these resources are identified, evaluated, and deemed eligible for the NRHP, they are protected under several federal laws and EOs. Federal laws include the NHPA (1966), the Archaeological and Historic Preservation Act (1974), the American Indian Religious Freedom Act (1978), the Archaeological Resources Protection Act (ARPA) (1979), and the Native American Graves Protection and Repatriation Act (NAGPRA) (1990).

Pursuant to Section 106 of the NHPA, the Air Force is required to assess the effects of proposed actions to historic properties (36 CFR 800). Or if adverse effects are unavoidable, the Air Force must develop a plan on how to mitigate such effects. Under this process, the Air Force evaluates the NRHP eligibility of resources within the proposed undertaking's Area of Potential Effect (APE) and assesses the possible effects of the proposed undertaking on prehistoric and historic resources in consultation with the SHPO and other parties. The APE is defined as the geographic area(s) "within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 CFR § 800.16[d]). Title 36 CFR Section 60.4 defines the criteria used to establish significance and eligibility for the NRHP. Section 110 of the NHPA requires the Air Force to complete an inventory of historic properties located on its land (36 CFR 60, 63, 78, 79, and 800).

### 3.3.1 Affected Environment

Kirtland AFB has conducted an installation-wide archaeological survey to identify and evaluate cultural resources. A total of 740 archaeological sites were recorded within the boundaries of the installation, and 251 have been determined to be eligible for the NRHP. These sites contain artifacts such as pottery, ground stone, flaked stone tools, and historic-era artifacts. In addition to these items many of the archaeological sites on Kirtland AFB contain features which include hearths, prehistoric structures, storage pits, historic-era structures, mines, weapons testing structures, and military training structures. Many of these sites occur within the undeveloped portion of the installation, which is also where many of the training areas exist. It is possible to encounter surface artifacts in these areas, which are protected under ARPA. The exact locations of these sites are safeguarded and not disclosed to the general population. In addition to archaeological sites, a total of 2,189 Kirtland AFB facilities have been evaluated for NRHP eligibility, and 271 were found to be eligible (KAFB 2018a).

Kirtland AFB has an Installation Cultural Resources Management Plan (ICRMP) in place. The ICRMP is an integral part of the installation's comprehensive plan and addresses the cultural resources on the installation. It integrates the Cultural Resources Management Program with ongoing mission activities and the property managed by Kirtland AFB, allows for the identification of conflicts between mission activities and cultural resources management, and provides instructions for mitigating any such conflicts. The ICRMP provides guidelines and standard operating procedures to non-technical managers and planners in order to comply with the installation's legal responsibilities for the preservation of significant archaeological and historic resources (KAFB 2018a).

#### *3.3.1.1 Archaeological and Traditional Cultural Properties*

No archaeological sites are located near any of the buildings proposed for additional construction, renovation, demolition, or divestment (KAFB 2018a, Sullivan, et al. 2002).

Traditional cultural properties and sacred sites are a special class of cultural resources that require specialized expertise in their identification and assessment. Thirty-four federally-recognized tribes—both in- and out-of-state—have been identified as having an interest in protecting cultural resources located on the base. At present, there are no known Native American burial grounds or sacred areas located on Kirtland AFB (KAFB 2018a).

#### *3.3.1.2 Architectural Properties*

Five architectural properties would be impacted by the Proposed Action and are described below.

***Demolition.*** As shown in **Table 3-4**, five properties are proposed for demolition once replacement facilities have been constructed. Four of these buildings are Determined Not Eligible under all Criteria. Building 1914 was constructed in 1997; it is not 50 years old and therefore not historic.

Table 3-3: Properties Proposed for Demolition

| Facility No. | Type | Build Date | NRHP Status and SHPO Concurrence |
|---|---|---|---|
| 585 | West Side Gym | 1968 | Not Eligible (L. Wallace 7/3/18) |
| 1914 | Maxwell Child Development Center | 1997 | Not Eligible (<50 years old) |
| 20228 | East Side Gym | 1950 | Not Eligible (Jim Hare 01/05/03) |
| 20221 | Dormitory | 1950 | Not Eligible (Jim Hare 01/05/03) |
| 20350 | DFAC | 1950 | Not Eligible (Jim Hare 09/23/02) |

### 3.3.2 Environmental Consequences

Adverse impacts or effects to historic properties might include physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's significance; introducing visual or audible elements that are out of character with the property or alter its setting; neglecting the resource to the extent that it deteriorates or is destroyed; or the sale, transfer, or lease of the historic property out of agency ownership (or control) without adequate enforceable restrictions or conditions to ensure preservation of the property's historic significance.

#### *3.3.2.1 Alternative 1 – Preferred Action*

Implementation of the Proposed Action at Kirtland AFB would not result in any impacts to historic or traditional cultural properties.

***Historic and Traditional Cultural Properties.*** There are no historic sites located near any of the construction areas. At present there are no known Native American burial grounds or sacred areas located on Kirtland AFB (KAFB 2018a). If any cultural resources, such as human remains or artifacts, are inadvertently encountered during the project, work in the area shall be halted, the immediate vicinity of the resource shall be secured, and the Kirtland AFB CRM shall be notified.

Work would not continue until the CRM evaluates the site and determines the next appropriate steps, to include engaging with local Native American Tribes and Pueblos if necessary.

***Architectural Properties.*** Under the Proposed Action, the Air Force is proposing to demolish five buildings. Newly planned or constructed facilities in other locations have made these buildings no longer necessary.

Of the structures designated for demolition:

- Buildings 585, 20221, 20228, and 20350 are not eligible for inclusion in the NRHP.
- Building 1914, constructed in 1997, is not historic.

#### *3.3.2.2 No Action Alternative*

Under the No Action Alternative, the proposed construction and demolition activities associated with the Zia Park development project would not be implemented and the existing conditions discussed in **Section 3.3.1** would remain unchanged, resulting in no impacts to cultural resources.

## 3.4 GEOLOGICAL RESOURCES

Geological resources consist of the Earth's surface and subsurface materials. Within a given physiographic province, these resources typically are described in terms of topography and physiography, geology, soils, and, where applicable, geologic hazards. Topography and physiography pertain to the general shape and arrangement of the land surface, including its height and the position of its natural and man-made features. Geology is the study of the Earth's composition and provides information on the structure and configuration of surface and subsurface features.

Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types, in terms of structure, elasticity, strength, shrink-swell potential, and erosion potential, affect the ability to support certain applications or uses. In appropriate cases, soil properties must be examined for their compatibility with particular construction activities or types of land use.

Prime farmland is protected under the Farmland Protection Policy Act (FPPA) of 1981. The intent of the FPPA is to minimize the extent that federal programs contribute to the unnecessary conversion of high-quality farmland to non-agricultural uses. The FPPA also ensures that federal programs are administered in a manner that, as far as practicable, is compatible with private, state, and local government programs and policies to protect farmland. The implementing procedures of the FPPA (7 CFR § 658) require federal agencies to evaluate the adverse effects (direct and indirect) of their activities on farmland, which includes prime farmland, unique farmland, and farmland of statewide or local importance, and to consider alternative actions that could avoid adverse effects.

### 3.4.1 Affected Environment

***Regional Geology.*** The Rio Grande Rift is a zone of faults and sediment-filled basins extending from south-central Colorado across New Mexico and into northern Mexico. The rift is a defining physiographic feature of central New Mexico and the approximately 3,000-square-mile Albuquerque Basin (also referred to as the Middle Rio Grande Basin). This basin is comprised of three discrete sub-basins, each containing more than 14,000 feet of rift-filled valley deposition

accrued over millions of years. Along the margins of the basin, sediment deposits thin out to depths as low as 3,000 feet in areas where tectonic activity formed and uplifted mountains (USGS, 2003).

Kirtland AFB is situated near the east-central edge of the Albuquerque Basin, along the margins of the Sandia and Manzanita Mountains. The geology of Kirtland AFB is defined by the vertical displacement between the rock units exposed at the top of these mountains and areas west and southwest towards the Rio Grande River (hereafter, referred to as Rio Grande) and its tributaries. The subsurface environment underlying Kirtland AFB is complex because of the gradual filling of the basin with sediments deposited by river and stream (fluvial), slopes and mountain fronts (alluvial-colluvial), wind (eolian), and volcanic activity in the form of lava or ash. Sediment deposition was further complicated by the large-scale faulting of the Albuquerque Basin that occurred approximately 5 to 11 million years ago (SNL 2017a).

The portion of the Albuquerque Basin underlying Kirtland AFB is primarily composed of poorly consolidated alluvial-colluvial sediments. The exposed bedrock in the eastern part of the installation generally consists of igneous (i.e., granite) and metamorphic rock, overlain by non-corresponding deposits of marine carbonate rock (i.e., limestone, sandstone, and shale) (KAFB 2018b).

***Topography and Soils.*** The east-central portion of the Albuquerque Basin (locally referred to as East Mesa) extends west and southwest from the steep foothills and slopes of the Sandia and Manzanita Mountains to the gently sloping areas near the Rio Grande. Similarly, the topography of Kirtland AFB ranges from the mountainous terrain of the Cibola National Forest Withdrawn Area in the east to the relatively flat mesa in the west. Elevations range from nearly 8,000 feet above mean sea level in the Manzanita Mountains to approximately 5,200 feet above mean sea level on the mesa. The greatest change in elevation occurs in the centrally located Coyote Canyon and along the far eastern boundary of Kirtland AFB. The ground surface slope across the installation generally occurs in a west to southwest direction.

Regionally, the soils of the Albuquerque Basin vary from fine-grained clays and silts near river channels to well-drained sands and sandy loams on plateaus and highlands. Soils associated with Kirtland AFB predominately consist of sand and loam with varying amounts of gravel, cobble, or stone. Nearly all soils on the installation are well drained, and some are susceptible to erosion, particularly in areas with topographic relief (KAFB 2018b). **Table 3-5** shows the soil characteristics for areas of Kirtland AFB that directly support the Air Force mission, and soils in bold are expected to be found in the project areas of the Proposed Action.

None of the soils listed in **Table 3-5** are classified as prime farmland, unique farmland, or farmland of statewide or local importance pursuant to the FPPA (USDA-NRCS 2018). Additionally, Kirtland AFB is not currently utilized for agriculture, nor is any agricultural use planned in the future. The soils in the project areas on the northwestern edge of the installation are primarily Latine sandy loam and Wink fine sandy loam with low slopes and runoff. Soils present near buildings 57003, 57004, and 57012 are primarily Tijeras gravelly fine sandy loam which also has generally low slope and minimal runoff (USDA-NRCS 2017).

***Geological Hazards.*** Earthquake activity or seismicity is generally caused by displacement across active faults. Earthquakes are more prevalent in areas with a high level of tectonic activity such as volcanic regions and fault zones. Landslides or mudslides are also commonly associated with tectonically active zones. Landslides include a wide range of ground movements and are

typically caused by multiple, overlapping environmental factors (e.g., rockfalls, deep failure of slopes, land modifications, earthquakes, and storms).

Table 3-4: Soil Characteristics of Air Force Controlled Lands at Kirtland AFB

| Soil Series | Slope | Runoff |
|---|---|---|
| Bluepoint loamy fine sand | 1 to 9% | low |
| Embudo gravelly fine sandy loam | 0 to 5% | very low |
| Embudo-Tijeras complex | 0 to 9% | very low to medium |
| Gila fine sandy loam | 0 to 2% | low |
| Ildefonso gravelly sandy loam | 1 to 9% | low |
| Laporte-Rock Outcrop-Escabosa complex | 5 to 20% | medium |
| **Latine sandy loam** | **1 to 5%** | **low** |
| Madurez loamy fine sand | 1 to 5% | low |
| Madurez-Wink association | 1 to 7% | very low to low |
| Nickel-Latene association | 1 to 30% | low to medium |
| Pino-Rock outcrop association | 3 to 15% | very high |
| Rock outcrop (various) | 15 to 80% | high to very high |
| Salas complex | 20 to 80% | high |
| Seis-Silver complex | 10 to 40% | very high |
| Seis very cobbly loam | 0 to 15% | medium |
| Silver and Witt soils | 5 to 9% | high to very high |
| Tesajo-Millet stony sandy loam | 3 to 20% | low to medium |
| **Tijeras gravelly fine sandy loam** | **1 to 5%** | **low** |
| Tome very fine sandy loam | 0 to 2% | medium |
| **Wink fine sandy loam** | **0 to 5%** | **very low** |

Source: United States Department of Agriculture, Natural Resource Conservation Service (USDA-NRCS) "*Web Soil Survey*" (USDA-NRCS 2017)

More commonly known as the Tijeras fault zone, the Tijeras-Cañoncito fault system consists of several northeast-oriented, sub-vertical faults that form the eastern edge of the Albuquerque Basin. The Tijeras fault zone is part of this regionally extensive group of faults. The southern end of the Tijeras fault zone converges with the southern Sandia and Hubbell Spring fault zones beneath Kirtland AFB near Tijeras Arroyo (USGS 2002). Frequent, low magnitude and intensity earthquakes are common occurrences for the Albuquerque region, including Kirtland AFB.

Accordingly, the United States Geological Survey (USGS) rates the seismic hazard of this area as "moderate" based upon a measurement of expected building damage in an earthquake scenario. Similarly, the International Conference of Building Officials Uniform Building Code classifies the region as having a moderate potential for damage to structures from seismic activity (USGS 2014).

### 3.4.2 Environmental Consequences

#### *3.4.2.1 Alternative 1 – Preferred Action*

The Proposed Action would result in both long- and short-term negligible and short-term minor adverse impacts to geology, topography, and soil resources depending on the final design of proposed construction activities and soil surveys prior to construction. All facilities identified in the Proposed Action are located on previously disturbed land and such plots of land have been designated for future development. Any previously occupied area would be graded to level and receive soil stabilization in the form of seeding and/or placement of gravel.

***Regional Geology.*** Long-term, negligible, adverse impacts on geology would occur from construction activities. A geotechnical investigation would be performed prior to any required excavation to determine the final design of the supporting foundation. Grade beams spanning drilled piers at column support locations may be required to support the larger facilities. Depth, location, and number of these piers would be based on geological data of the region, previous surveys for similar construction in the region, and the final design of the facilities. Although impacts to geological features could occur, the proposed construction and demolition would not be substantial o+r deep enough to cause notable adverse impacts to geological features such as those controlling distribution of stormwater to the Sante Fe aquifer or the supporting bedrock.

Short-term, negligible adverse impacts on geology would occur from demolition activities when extracting previously placed utilities, footings, and other subsurface features of affected facilities. Additionally, some short-term impacts on geology will also be experienced as affected utilities (including Telecom) are re-routed to support new facilities.

***Topography.*** Long-term, negligible, adverse impacts on topography would occur from construction and demolition activities. All affected areas were originally graded to level to support existing structures at the time of their construction; however, intermittent settling at some sites is expected. Additionally, as utilities, footings, and other subsurface features of existing structures are extracted from demolition sites, some need for backfill would be expected. After demolition activities are completed for each structure, each site will receive minor grading and backfill as necessary to return the site to the natural topography of the area. Similarly, prior to construction of any new facility the affected site would be graded to level to support the new facility.

***Soils.*** Short-term, minor adverse impacts on soils would occur from construction and demolition activities largely via ground disturbance, erosion, and soil compaction. Under the Proposed Action, erosion and soil compaction would be controlled by using established protocols such as applying water to limit airborne dust in windy environments and employing soil stabilization techniques, such as re-vegetating graded areas, once site construction and/or demolition operations are complete. Since the land disturbance of each individual project would exceed one acre in size, adherence to the 2022 CGP is required, which mandates the preparation and implementation of a site-specific Storm Water Pollution Prevention Plan to minimize potential adverse impacts during construction.

Additionally, as each project would disturb an area greater than 0.75-acres, a fugitive dust control permit from Bernalillo County must be obtained. Each permit would include site-specific measures for dust control and suppression such as watering and the use of soil stabilization agents if necessary. Some activities under the Proposed Action may be subject to the Programmatic Fugitive Dust Control Permit (Permit No. 8091-P) held by Kirtland AFB that includes similar requirements for dust control and suppression. Implementation of the Proposed Action could also result in the accidental release of contaminants into soil media. In such cases, contaminants could be transported in surface runoff, leach into groundwater, or remain in-situ. These impacts would primarily be associated with the construction and demolition phases of the Proposed Action. No impacts would be expected upon project completion.

***Geological Hazards.*** The Proposed Action would be sited in an area where earthquake activity is common. Over the last 10 years, the area around Albuquerque has experienced three earthquakes, with the largest having a magnitude of 2.7, and an average magnitude of 2.5 (USGS 2021). No major earthquake has been recorded in the region, and no federal, state, or local codes require the use of specific construction techniques for new construction in the area, as the risk of significant damage to structures is moderate. The Federal Emergency Management Agency

(FEMA) recommends earthquake-resistant construction in regions with moderate risk via the National Earthquake Hazards Reduction Program (FEMA 2010). Recommended construction resists lateral and vertical movements during an earthquake, and generally features:

- Stable foundations, such as deep anchors and connected foundation segments
- Connected building segments to prevent independent movement
- Even weight and mass of all building components
- Steel construction versus that of masonry or wood

The design of each new facility sited for Zia Park may not specifically include provisions for earthquake resistance; however, the designs should inherently include a stable concrete foundation, largely steel construction, and reinforced concrete masonry unit exterior load-bearing walls. Given the planned construction techniques, the history of relatively high-volume but low-magnitude earthquakes, and the moderate risk rating provided by the USGS, no significant impact is expected.

#### *3.4.2.2 No Action Alternative*

Under the No Action Alternative, the proposed construction and demolition activities associated with the Zia Park development project would not be implemented and the existing conditions discussed in **Section 3.4.1** would remain unchanged. Therefore, no new impacts on geology or soils would occur with implementation of the No Action Alternative.

## 3.5 HAZARDOUS MATERIALS AND WASTES

Hazardous materials are defined by 49 CFR §171.8 as “hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (49 CFR §172.101), and materials that meet the defining criteria for hazard classes and divisions” in 49 CFR §173. Transportation of hazardous materials is regulated by the US Department of Transportation regulations within 49 CFR Parts 105–180.

Hazardous wastes are defined by the RCRA at 42 USC §6903(5), as amended by the Hazardous and Solid Waste Amendments, as: “a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (a) cause, or significantly contribute to an increase in, mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (b) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.” Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called universal wastes and their associated regulatory requirements are specified in 40 CFR § 273. Five types of waste are currently covered under the universal waste regulations: hazardous waste batteries, hazardous waste pesticides that are either recalled or collected as part of waste pesticide collection programs, mercury-containing equipment, hazardous waste lamps, and aerosol cans.

A toxic substance is a chemical or mixture of chemicals that may present an unreasonable risk of injury to health or the environment. These substances include asbestos-containing materials (ACM), polychlorinated biphenyls (PCBs), and lead-based paint (LBP). USEPA regulates these special hazard substances under the Toxic Substances Control Act (15 USC § 53). USEPA has established regulations regarding asbestos abatement and worker safety under 40 CFR § 763, with additional regulations concerning emissions at 40 CFR § 61. The disposal of PCBs is addressed in 40 CFR §§ 750 and 761. Appropriate disposal of LBP-containing debris is

dependent on testing of representative waste streams, typically via the toxicity characteristic leaching procedure (TCLP). If TCLP analysis indicates representative debris meets the toxicity characteristic for lead, it is regulated by RCRA under 40 CFR § 261. The presence of toxic substances, as well as their locations, quantities, and conditions, assist in determining the significance of a proposed action.

The DOD developed the Environmental Restoration Program (ERP) to facilitate thorough investigation and cleanup of contaminated sites on military installations (i.e., active installations, installations subject to Base Realignment and Closure, and Formerly Used Defense Sites). The Installation Restoration Program and Military Munitions Response Program (MMRP) are components of the ERP. The Installation Restoration Program requires each DOD installation to identify, investigate, and clean up hazardous waste disposal or release sites. The MMRP addresses non-operational rangelands that are suspected or known to contain unexploded ordnance (UXO), discarded military munitions, or munitions constituent contamination. A description of ERP activities provides a useful gauge of the condition of soils, water resources, and other resources that might be affected by contaminants. It also aids in the identification of properties and their usefulness for given purposes (e.g., activities dependent on groundwater usage might be restricted until remediation of a groundwater contamination plume has been completed).

Air Force Policy Directive 32-70, *Environmental Quality*, and Air Force Regulation 32-7000 series incorporate the requirements of all federal regulations and other Air Force Instructions (AFI) and DOD Directives for the management of hazardous materials, hazardous wastes, and toxic substances.

### 3.5.1 Affected Environment

***Environmental Management System.*** Kirtland AFB has implemented an Environmental Management System (EMS) program in accordance with the International Organization for Standardization 14001 Standards; EO 13834, *Regarding Efficient Federal Operations*; and AFI 32-7001, *Environmental Management*. The EMS policy prescribes to protect human health, natural resources, and the environment by implementing operational controls, pollution prevention environmental action plans, and training.

All personnel, including contractors, are informed of the Kirtland AFB EMS program. All project-related activities should be conducted in a manner that is consistent with relevant policy and objectives identified in the installation's EMS program. Project Managers shall ensure that all personnel are aware of environmental impacts associated with their activities and reduce those impacts by practicing pollution prevention techniques.

***Hazardous Materials and Petroleum Products***. AFMAN 32-7002, *Environmental Compliance and Pollution Prevention*, establishes procedures and standards that govern management of hazardous materials throughout the Air Force to be in compliance with the Emergency Planning and Community Right to Know Act. AFMAN 32-7002 applies to all Air Force personnel who authorize, procure, issue, use, or dispose of hazardous materials, and to those who manage, monitor, or track any of those activities. Additionally, FED-STD 313F, *Federal Standard, Material Safety Data, Transportation Data and Disposal Data for Hazardous Materials Furnished to Government Activities,* establishes requirements for the preparation and submission of Safety Data Sheets (SDSs) and hazardous warning labels by contractors who provide hazardous materials to government activities.

Kirtland AFB has identified the 377 MSG/CEIEC as the entity responsible for overseeing hazardous material tracking on the installation. These responsibilities include controlling the procurement and use of hazardous materials to support Air Force missions, ensure the safety and health of personnel and surrounding communities, and minimize Air Force dependence on hazardous materials. Contractors who bring hazardous materials onto the installation must notify the 377 MSG/CEIEC Hazardous Material Management Program by submitting a completed Contractor Hazardous Material Worksheet and supply the manufacturer-specific SDS for each material. For kits, the contractor must supply the SDSs for all components and identify each component as a single line item on the hazardous material inventory sheet.

The Kirtland AFB Spill Prevention, Control, and Countermeasures Plan provides operating procedures to prevent the occurrence of spills, control measures to prevent spills from entering surface waters, and countermeasures to contain and clean up the effects of an oil spill that could impact surface waters (KAFB 2018c).

Contractors, including construction workers, who transport hazardous materials to Kirtland AFB must get prior approval by submitting associated SDSs and a Contractor Hazardous Material Worksheet to the 377 MSG/CEIEC Hazardous Material Management Program.

***Hazardous and Petroleum Wastes***. The Air Force maintains a Hazardous Waste Management Plan (HWMP) as directed by AFMAN 32-7002, *Environmental Compliance and Pollution Prevention*. This plan describes the roles and responsibilities of all entities at Kirtland AFB with respect to the waste stream inventory, waste analysis plan, hazardous waste management procedures, training, emergency response, and pollution prevention. 377 MSG/CEIEC is charged with managing hazardous materials to reduce the amount of hazardous waste generated on the installation in accordance with the Kirtland HWMP (KAFB 2021). The HWMP establishes the procedures to comply with applicable federal, state, and local standards for solid waste and hazardous waste management.

Kirtland AFB is a large-quantity generator of hazardous waste (USEPA ID #NM9570024423) and maintains a RCRA permit for all current operations that generate hazardous waste.

***Toxic Substances.*** Facilities constructed prior to 1990 are likely to contain ACM, and those constructed prior to 1978 could contain LBP and PCBs. Given the age of Kirtland AFB, for many facilities there is a high potential for encountering these toxic substances during demolition and renovation processes.

***Environmental Restoration Program.*** Kirtland AFB has 58 active ERP sites that include known and suspected soil and groundwater contamination associated with landfills, oil/water separators, drainage areas, septic systems, fire training areas, and spill areas. Kirtland AFB is working to clean most sites to meet residential standards and to obtain a “no further action required” approval from NMED. Once sites achieve the “no further action required” approval, they no longer represent constraints for land use and are closed. Active ERP sites are in various stages of remediation and some sites, such as former landfills, may require more than 30 years of monitoring before closure can be obtained (KAFB 2016).

Kirtland AFB has seven active MMRP sites that are former impact areas primarily located along the outer perimeter of the installation. The size, type of munitions debris, and potential for UXO presence varies by location.

The DOE actively manages 11 open remediation sites on Kirtland AFB that require or may require corrective action. These sites are on DOE-leased lands and include three groundwater areas of concern and eight solid waste management units. When such sites are no longer active, DOE personnel determine if a site meets NMED criteria for acceptable levels of risk to human health and the environment. If the criteria are met, DOE submits a Corrective Action Complete proposal to NMED to modify its RCRA permit accordingly. As necessary, remediation is performed to meet NMED criteria for Corrective Action Complete status (SNL 2017b). **Figure 3-1** presents the location of active sites near Zia Park.

### 3.5.1 Environmental Consequences

Implementation of the Proposed Action would result in short-term, minor adverse impacts on hazardous materials, hazardous waste, petroleum products, petroleum wastes, and toxic materials. The removal of toxic substances such as asbestos and lead-based paints from Kirtland AFB may be considered a long-term, beneficial impact.

#### *3.5.1.1 Alternative 1 – Preferred Action*

***Hazardous Materials/Wastes and Petroleum Products/Wastes***. Short-term, minor adverse impacts on hazardous materials and hazardous wastes would occur during construction and demolition activities associated with the Proposed Action. Both construction and demolition activities would require the use of hazardous materials (in the form of structural coatings, adhesives, solvents, welding materials, etc.) and petroleum products (fuels, lubricants, hydraulic fluids, etc.). Negligible amounts of hazardous wastes would be generated from the same processes. Construction equipment would be well maintained, and absorbent materials would be placed under them when parked if a leak hazard exists. Additional hazardous wastes would be generated in the form of debris from demolition processes. The contractors performing the work would be responsible for containing, storing, managing, and coordinating the disposal of all hazardous wastes generated during the Proposed Action. Contractors would be required to adhere to all federal, state and local regulations, including those instituted by Kirtland AFB.

No long-term impacts from daily operation of the new facilities in Zia Park would exist as future operations would not significantly differ from those currently performed at Kirtland AFB. No new hazardous materials or wastes are expected to be used. All facilities would continue to operate in accordance with the Kirtland AFB HWMP to manage any generated wastes.

***Toxic Substances.*** Short-term, minor adverse impacts from toxic hazards would occur during demolition processes as structures containing LBP, ACM, and PCBs are likely to be encountered. Surveys would be performed by certified personnel to determine the presence and extent of such materials prior to demolition. Plans would be generated based on the results of the exploratory surveys to identify any areas where controls may be necessary to reduce the hazards to workers and prevent the release of toxic materials from the site. Per NMAC 20.11.20.22, AEHD-AQD would be notified if abatement of ACM is anticipated to exceed 75,000 cubic feet. All hazardous debris would be disposed of at a USEPA-approved facility.

The removal of toxic substances from Kirtland AFB may be considered a long-term beneficial impact by reducing the likelihood of human and environmental exposure to these materials.

***Environmental Restoration Program.*** No construction activity or soil disturbance at any MMRP, DOE ER, or DOD ERP site would occur as the Proposed Action is not located in any such area.

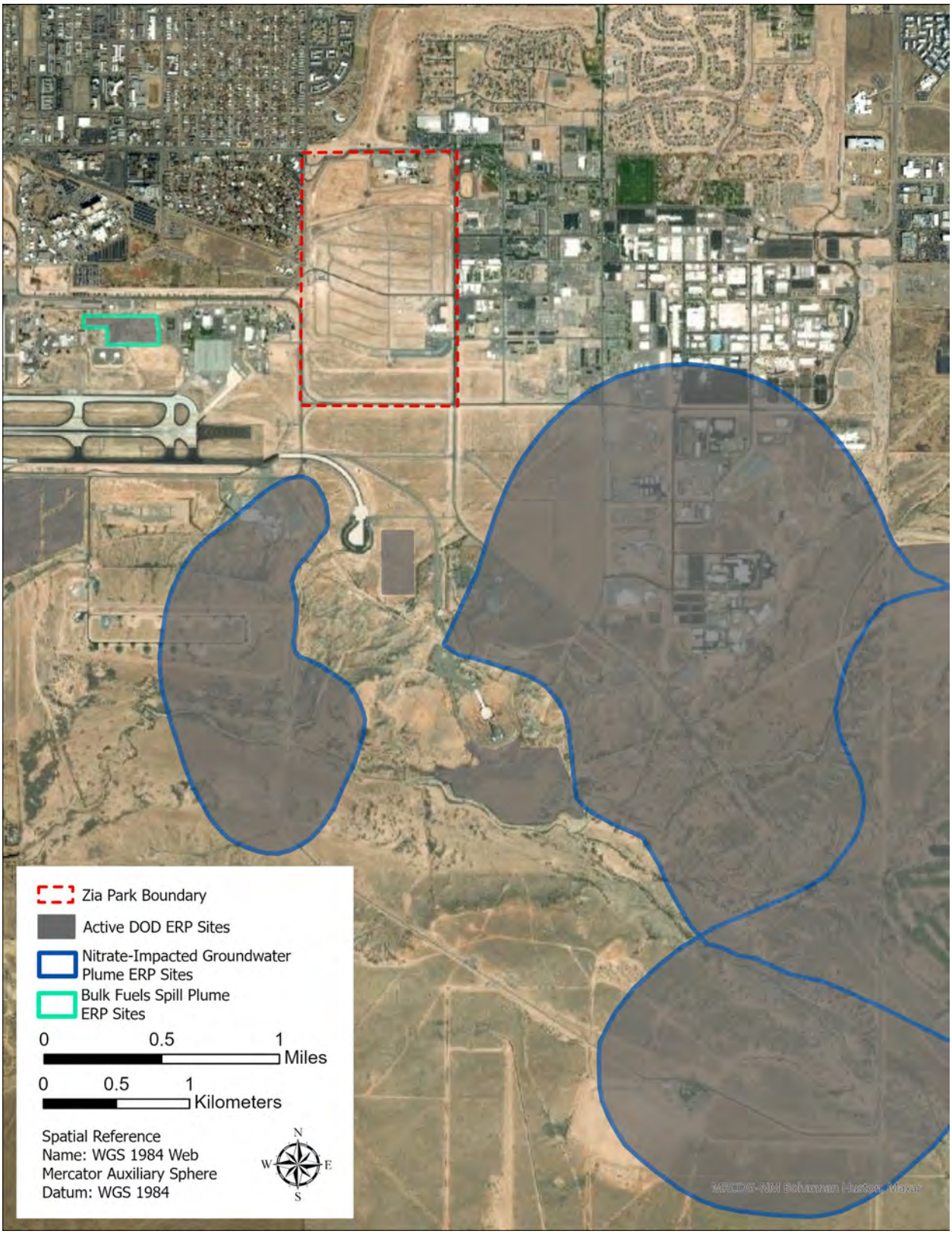


*Figure 3-1: Active ERP Sites in the Vicinity of Zia Park*

#### *3.5.1.2 No Action Alternative*

Under the No Action Alternative, the proposed construction and demolition activities associated with the Zia Park development project would not be implemented, and the existing conditions discussed in **Section 3.5.1** would remain unchanged, resulting in no impacts to hazardous materials and wastes.

## 3.6 INFRASTRUCTURE

Infrastructure consists of structures (facilities, wiring, pipes, etc.) designed to ensure users in distinct areas have the utilities they need in order to operate comfortably in a given environment.

### 3.6.1 Affected Environment

***Communications.*** The communication network on Kirtland AFB was constructed as two separate systems that were later connected to provide redundancy. The main information transfer node is located on the west side of the installation. The Communication Main Switch Facility is located on the east side of the installation.

***Electrical.*** Kirtland AFB purchases electrical power from the Western Area Power Administration. Electric lines are placed above and below ground, feeding the 20 substations on the installation. The installation's 2021 consumption was approximately 438,146,827 kilowatts.

***Liquid Fuel.*** Liquid fuels are supplied to Kirtland AFB by contractors. The primary liquid fuels supplied include Jet A (aviation fuel), diesel, and unleaded gasoline. Fuels are purchased in bulk, delivered to the installation by tanker truck, and stored in various-sized storage tanks across the installation. Liquid fuels at Kirtland AFB are primarily used to power military aircraft and ground-based vehicles.

***Natural Gas and Propane.*** Natural gas is supplied by Symmetry Energy and delivered in New Mexico Gas Company pipelines to the industrial complex, family housing, and heating plants on the installation. There are approximately 501,534 linear feet of natural gas mains. Rural portions of the installation do not receive natural gas service and rely on propane, which is delivered to and stored in local propane storage tanks.

***Sanitary Sewer/Wastewater System.*** Approximately 491,000 linear feet of sanitary system mains transport wastewater to the Albuquerque Bernalillo County Water Utility Authority (ABCWUA) treatment facility. The permissible discharge rate for Kirtland AFB is fixed at 698,764,000 gallons yearly. The installation discharges an average of approximately 58,230 gallons per month. Some facilities in remote areas and other portions of the installation are not serviced by the sanitary sewer system; these facilities use isolated, onsite septic systems to dispose of wastewater.

***Solid Waste Management.*** Kirtland AFB operates a construction and demolition waste-only landfill on the installation. This landfill accepts only construction and demolition waste from permitted contractors working on the installation and has a net waste capacity of 7.2 million cubic yards. As of 31 December 2020, the remaining capacity of this landfill was 2.11 million cubic yards. In 2019 and 2020, an average of 134,000 cubic yards of construction and demolition waste per year was deposited in this landfill.

***Transportation***. Numerous modes of transportation are available at Kirtland AFB, including air, mass transit, and federal and state highway access. The Sunport, located along the western boundary of the installation, provides commercial and public aviation and military support,

particularly for the Air Force and Air Force Reserve units. The Albuquerque Transit Department, ABQ RIDE, operates public bus services throughout the city. Several bus routes regularly service Kirtland AFB (City of Albuquerque 2021a). There are currently seven gated entrances from the city of Albuquerque to Kirtland AFB including a Contractor's Gate used for truck inspections. There are approximately 430 miles of paved roads and 230 miles of unpaved roads on Kirtland AFB.

***Water Supply.*** Water is supplied to Kirtland AFB by six groundwater wells and two distribution systems that have a collective water-pumping maximum capacity of 8.1 million gallons per day (mgd). The installation pumps an average of 2,180,000 of treated, potable water through 160 miles of distribution mains. There are also approximately 50 miles of non-potable water pipeline serving the Tijeras Golf Course and providing water for fire protection. In 2021, Kirtland AFB pumped a total of 798,877 gallons of water from these wells. The installation can also purchase water from the ABCWUA to meet demand during peak periods; however, the amount of water purchased from the city has been negligible since 1998.

### 3.6.2 Environmental Consequences

#### *3.6.2.1 Alternative 1 – Preferred Action*

Medical and Community Service functions will largely be replacing existing facilities. Overall infrastructure (such as sanitary sewer/wastewater use, communications, etc.) would be unaffected since the replacement facilities would require similar capacity to existing facilities being demolished or divested. Only new construction (i.e., that which is not replacing old facilities) was assessed in this section. The Proposed Action would have negligible impacts on communications, electricity, natural gas, sanitary sewage, and potable water. The Proposed Action would result in a significant positive impact on transportation at Kirtland AFB.

***Communications.*** The installation contains sufficient overhead to support communications for new dormitories and training facilities, however new lines would be installed along a utility corridor that follows the new construction of Ridgecrest Drive. The impact of the Proposed Action would be negligible.

***Electrical.*** Substation 10 is currently located at the intersection of Ridgecrest Avenue and Randolph Avenue. In its existing location, Substation 10 is redundant to Substation 3, which is located by the Mountain View Club. Substation 10 also has inadequate capacity for the proposed construction; therefore, a new and upgraded substation would be constructed at the corner of Texas Street and B Avenue, which would also support new development at Zia Park. The removal of Substation 10 also clears the way for the Ridgecrest Drive realignment.

***Natural Gas.*** Natural gas lines would need to be installed along a new utility corridor along Ridgecrest Drive to all new construction projects. Natural gas usage at Kirtland AFB would increase slightly in response to water heater use at the dormitories and training facilities and boiler or furnace use during winter months. Existing natural gas lines within Zia Park have been capped and removed.

***Sanitary Sewer / Wastewater System.*** Sewage/wastewater lines would need to be installed in a new utility corridor along Ridgecrest Drive to all new construction projects. While discharge of sanitary waste would rise slightly due to the new permanent personnel and students at Kirtland AFB, this would not impact the permissible discharge rates at the installation.

***Transportation.*** Ridgecrest Avenue is a legacy road that originally serviced the Zia Park housing area and is now being used as a thoroughfare. Given that flightline and community service functions are on the western side of the installation and remaining functions are to the east, this

road serves as one of the only ways to cross the base. A cohesive connection is needed to facilitate effective access and use of the installation by military and civilian personnel.

Up to 11,000 linear feet (approximately two miles) of new roads would be constructed within Zia Park, culminating in what would be a four-lane road with landscaped median, dedicated bicycle lanes, and pedestrian sidewalk that would replace Ridgecrest Road and connect Randolph Road and G Avenue. Roundabouts would be located at the intersection with Randolph Road and at the center of the new thoroughfare, providing a new north-south access to Hardin Boulevard. This extension would likewise be equipped with bicycle lanes and pedestrian walkways.

The Proposed Action would significantly improve traffic efficiency when crossing the base or accessing the southern portions of the base by providing thoroughfares designed to support large amounts of traffic and providing multiple means of access during peak traffic hours. Such improvements would also provide easy access to new community service-related facilities located within Zia Park (such as the base gym, DFAC, and Child Development Center [CDC]). Bicycle lanes and pedestrian walkways would also encourage students residing within Zia Park to seek alternative modes of transportation.

***Water Supply.*** The Proposed Action would require adding new water mains along Ridgecrest Drive to provide potable water to new construction located within Zia Park. While water usage across the installation would increase due to new permanent personnel and transient students at Kirtland AFB, such usage would be negligible compared to the installation's overall usage and would not result in any need to purchase additional water from the ABCWUA.

#### *3.6.2.2 No Action Alternative*

Under the No Action Alternative, the proposed construction and demolition activities associated with the Zia Park development project would not be implemented, and the existing conditions discussed in **Section 3.6.1** would remain unchanged, resulting in no impacts to most infrastructure. However, traffic over the next 20 years is anticipated to increase by 8%, and traffic areas already experiencing congestion would likely be negatively impacted over time.

## 3.7 NOISE

Sound is defined as a particular auditory impact produced by a given source, for example the sound of rain on a rooftop. Noise and sound share the same physical aspects, but noise is considered a disturbance while sound is defined as an auditory impact. Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise considered an irritant. Noise can be intermittent or continuous, steady or impulsive, and can involve any number of sources and frequencies. Noise can be readily identifiable or generally nondescript. Human response to increased sound levels varies according to the source type, characteristics of the sound source, distance between the source and receptor, receptor sensitivity, and time of day. Affected receptors are specific (e.g., residential areas, schools, churches, or hospitals) or broad (e.g., nature preserves or designated districts) areas in which occasional or persistent sensitivity to noise above ambient levels exists. These are generally referred to as sensitive noise receptors.

Sound levels vary with time. For example, the sound increases as an aircraft approaches, then falls and blends into the ambient, or background, as the aircraft recedes into the distance. Because of this variation, it is often convenient to describe a given noise "event" by its highest or maximum sound level ($L_{max}$). It should be noted that $L_{max}$ describes only one dimension of an event; it provides no information on the cumulative noise exposure generated by a sound source. In fact, two events with identical $L_{max}$ levels may produce very different total noise exposures. One may be of very short duration, while the other may last much longer.

Human perception of sound and noise is variable and is largely dependent on the frequency or frequencies an event produces. Several different scales are used to quantify sound depending on the purpose of the measurement. Sound can be quantified with instrumentation that records instantaneous sound level in decibels (dBs). The A-weighted decibel (dBA) is the unit used to characterize sound levels that can be detected by the human ear. “A-weighted” denotes the adjustment of the frequency range to the sensitivity of the average human ear. The threshold of audibility is generally within the range of 10 to 25 dBA for normal hearing. The threshold of pain occurs at the upper boundary of audibility, which is normally in the region of 135 dBA (United State Environmental Protection Agency [USEPA], 1981a).

**Table 3-6** compares common sounds and shows how they correspond in terms of auditory impacts. As shown, a whisper is normally 30 dBA and considered to be very quiet while an air conditioning unit 20 feet away is considered an intrusive noise at 60 dBA. Noise levels can become annoying at 80 dBA and very annoying at 90 dBA. As sound pressure level is measured on a logarithmic scale, every increase of 3 dB is twice as loud (e.g., 80 dBA is twice as loud as 77 dBA). However, humans do not typically perceive sound to be twice as loud until an increase of at least 10 dB, which can result in inadvertent exposure to hazardous noise levels (USEPA 1981b).

Table 3-5: Sound Levels and Human Response

| Noise Level (dBA) | Common Sounds | Effect[1] | $T_{Max}$ Prior to Hearing Damage[2] |
|---|---|---|---|
| 10 | Just audible | Negligible | n/a |
| 30 | Soft whisper (15 feet) | Very quiet | n/a |
| 50 | Light auto traffic (100 feet) | Quiet | n/a |
| 60 | Air conditioning unit (20 feet) | Intrusive | n/a |
| 70 | Noisy restaurant or freeway traffic | Telephone use difficult | n/a |
| 80 | Alarm clock (2 feet) | Annoying | n/a |
| 90 | Heavy truck (50 feet) or city traffic | Very annoying | 8 hours |
| 100 | Garbage truck | Very annoying | 2 hours |
| 110 | Pile drivers | Strained vocal effort | 30 minutes |
| 120 | Jet takeoff (200 feet) or auto horn (3 feet) | Maximum vocal effort | 7.5 minutes |
| 140 | Carrier deck jet operation | Painfully loud | 28 seconds |

*1. Noise and its Measurement* (USEPA 1981b)
*2. OSHA Technical Manual TED 01-00-015* (OSHA 2017)

Under the Noise Control Act of 1972, the Occupational Safety and Health Administration (OSHA) established workplace standards for noise. The minimum requirement states that constant noise exposure must not exceed 90 dBA over an 8-hour period. The highest allowable sound level to which workers can be constantly exposed is 115 dBA, and exposure to this level must not exceed 15 minutes within an 8-hour period. These standards limit instantaneous exposure, such as impact noise, to 140 dBA. If noise levels exceed these standards, employers are required to provide hearing protection equipment that will reduce sound levels to acceptable limits.

The average day/night sound level (DNL) metric is a measure of the total community noise environment. DNL is the average A-weighted sound level over a 24-hour period, with a 10 dB adjustment added to the nighttime levels (between 2200 and 0700 hours). This adjustment is an effort to account for increased human sensitivity to nighttime noise events. DNL was endorsed by the USEPA for use by federal agencies and was adopted by the US Department of Housing and Urban Development. DNL is an accepted unit for quantifying annoyance to humans from general environmental noise, including construction noise. Land use compatibility and incompatibility are determined by comparing the predicted DNL at a site with the recommended land uses. Noise

levels occurring at night generally produce a greater annoyance than those of the same levels occurring during the day. It is generally agreed that people perceive intrusive noise at night as being 10 dBA louder than that occurring during the day, at least in terms of its potential for causing community annoyance.

The federal government established noise guidelines and regulations for the purpose of protecting citizens from potential hearing damage and from various other adverse physiological, psychological, and social effects associated with noise. According to the US Army, Federal Aviation Administration (FAA), and US Department of Housing and Urban Development criteria, residential units and other noise-sensitive land uses are “clearly unacceptable” in areas where noise exposure exceeds 75 dBA, “normally unacceptable” in regions exposed to noise between 65 and 75 dBA, and “normally acceptable” in areas exposed to noise of 65 dBA or less. For outdoor activities, USEPA recommends 55 dBA as the sound level below which there is no reason to suspect that the general population would be at risk from any noise effects (USEPA 1974).

### 3.7.1 Affected Environment

The ambient sound environment at Kirtland AFB is affected mainly by Air Force and civilian aircraft operations, automotive vehicles, and live-fire weapons. In the heavily developed northwestern portion of the installation, the commercial and military aircraft operations at the Sunport are the primary source of noise. **Figure 3-2** presents the existing DNL noise contours for the Sunport plotted in 5-dB increments, ranging from 65 to 75 dBA DNL. Secondary sources of noise, such as vehicle travel, industrial activities, and military training, also contribute to the louder ambient sound environment of the northwestern portion of the installation compared to other portions of Kirtland AFB. The ambient sound environment of the remaining portions of the installation is quieter because development is less concentrated. Intermittent noises from military training, mainly military vehicles, live-fire weapons, and explosives training, dominate the ambient sound environment of these portions of Kirtland AFB.

Most sensitive noise receptors that could potentially be exposed to noise from installation activities are on or proximate to the northwestern and northern portions of Kirtland AFB. For example, several schools for the city of Albuquerque are on or proximate to the northwestern portion of the installation. There are also several medical centers and hospitals in this region. All Kirtland AFB housing and community functions are within the northeastern portion of the installation, and several residential neighborhoods in the city of Albuquerque are near the northwest and northern boundaries of the installation. No other portions of Kirtland AFB contain or are adjacent to sensitive noise receptors (KAFB 2016).

***Traffic Noise.*** A noise study was conducted to capture the existing noise environment and develop knowledge and understanding of existing traffic conditions within Zia Park. Measurement data represented existing traffic noise levels in terms of the 1-hour average sound levels along major roads in the study area over a period of several business days. Existing sound levels at nearby sensitive receptors (including residential and commercial facilities) resulted in a baseline $L_{eq}$ ranging from 67-72 dBA at a distance of 50 feet from the curb (Bohannan Huston 2021).

### 3.7.2 Environmental Consequences

#### *3.7.2.1 Alternative 1 – Preferred Action*

***Construction.*** The Proposed Action would result in a series of short-term, minor adverse impacts on noise. Construction and demolition activities would be conducted during the daytime hours of 0700 to 1700. Use of heavy equipment would cause an increase in sound that is notably above

the ambient level in the region. A variety of sounds are emitted from loaders, trucks, graders, and other common construction equipment. **Table 3-7** presents noise levels associated with common types of construction equipment, which can exceed the ambient sound levels by 20 to 25 dBA in an urban environment. Unobstructed sound pressure levels decrease according to the inverse square law, or approximately 6 dB for every doubling of distance from the source of noise; therefore, adverse impacts from construction noise are typically confined to within 0.5 miles of a given project area.

As seen in **Table 3-8**, the nearest sensitive receptors would be the Wherry Elementary School, immediately adjacent to and approximately 300 feet north of the project area, the Siesta Hills


*Figure 3-2: Noise Contours at Kirtland AFB*

residential community, just west of the project area opposite Louisiana Blvd and as near as 400 feet away, and the Raymond G. Murphy VA Medical Center, over half a mile away.

Construction activities would only take place within the Zia Park boundaries. As indicated in **Table 3-8**, the loudest possible noise from these work sites would be attenuated to 85 dBA at 300 feet, with all others being 74 dBA or lower. While such noise would be audible at Wherry Elementary School, the loudness would be comparable to that of a noisy restaurant and would be considered a negligible impact. Such noise would be further attenuated inside the school itself. Noise levels at the nearby Siesta Hills Residential Community would be similar in magnitude, and those of the Raymond G. Murphy VA Medical Center significantly reduced.

***Demolition.*** Demolition of facilities 585, 1914, 20221, 20228, and 20350 are located further within Kirtland AFB and therefore are further away from all sensitive receptors. Based on the location of these activities, there would be no impact from demolition.

Table 3-6: Estimated Noise Levels for Common Construction Equipment

| Construction Equipment | $L_{max}$[a] 50 ft *(dBA)* | $L_{max}$[b] 150 ft *(dBA)* | $L_{max}$[b] 300 ft *(dBA)* | $L_{max}$[b] 400 ft *(dBA)* | $L_{max}$[b] 800 ft *(dBA)* | $L_{max}$[b] 1,600 ft *(dBA)* | $L_{max}$[b] 0.5 mi *(dBA)* |
|---|---|---|---|---|---|---|---|
| Backhoe | 78 | 68 | 62 | 60 | 54 | 48 | 44 |
| Chain Saw | 84 | 74 | 68 | 66 | 60 | 54 | 50 |
| Ground Compactor | 83 | 73 | 67 | 65 | 59 | 53 | 49 |
| Concrete Mixer Truck | 79 | 69 | 63 | 61 | 55 | 49 | 45 |
| Concrete Pump Truck | 81 | 71 | 65 | 63 | 57 | 51 | 47 |
| Concrete Saw | 90 | 80 | 74 | 72 | 66 | 60 | 56 |
| Crane | 81 | 71 | 65 | 63 | 57 | 51 | 47 |
| Dozer | 82 | 72 | 66 | 64 | 58 | 52 | 48 |
| Excavator | 81 | 71 | 65 | 63 | 57 | 51 | 47 |
| Front End Loader | 79 | 69 | 63 | 61 | 55 | 49 | 45 |
| Grapple (Backhoe) | 87 | 77 | 71 | 69 | 63 | 57 | 53 |
| Impact Pile Driver | 101 | 91 | 85 | 83 | 77 | 71 | 67 |
| Jack Hammer | 89 | 79 | 73 | 71 | 65 | 59 | 55 |
| Pavement Scarifier | 90 | 80 | 74 | 72 | 66 | 60 | 56 |
| Pneumatic Tools | 85 | 75 | 69 | 67 | 61 | 55 | 51 |
| Vacuum Excavator | 85 | 75 | 69 | 67 | 61 | 55 | 51 |

1. Measured values at $L_{50}$ taken from the United States Department of Transportation (USDOT) Federal Highway Administration (FHWA) *Construction Noise Handbook* (USDOT 2006).
2. Derived values utilizing the inverse square law $\left\{L_{p2} = L_{p1} + 20log_{10}\left(\frac{r_1}{r_2}\right)\right\}$ and published values at $L_{p1}$=$L_{50}$ from the FHWA.

***Traffic Noise (Post-Construction).*** Traffic volumes are anticipated to increase by 8% over the next 20 years. Additionally, new traffic patterns will be created as construction is completed within Zia Park, causing an inflow of traffic to community service-related facilities. Based on modeling of anticipated traffic patterns and increases over time, the expected rise in noise would be no higher than 0.5 dBA for the Proposed Action. For reference, studies have shown that an increase of 3 dBA is barely perceptible to the human ear (Bohannan Huston 2021).

***Daily Operation (Post-Construction).*** Use and maintenance of the new facilities would result in a minor increase in noise. An increase in vehicular and foot traffic would be expected once each phase of construction is complete. However, such noise would be negligible post-construction.

A corresponding decrease in noise would be anticipated in the vicinity of demolished facilities as fewer personnel would commute to these regions of Kirtland AFB. The anticipated changes in noise would not be expected to impact any sensitive noise receptor.

Table 3-7: Estimated Noise Levels at Nearest Sensitive Receptors

| Nearest Sensitive Receptor | Approximate Distance[1] *(feet)* | Loudest Noise Possible[2] *(dBA)* | Loudest Expected Noise[3] *(dBA)* |
|---|---|---|---|
| Wherry Elementary School | 300 | 85 | 74 |
| Siesta Hills Residential Community | 400 | 83 | 72 |
| Raymond G. Murphy VA Medical Center | 2,640+ | 67 | 56 |

1. Distances were approximated using Google Earth and measured from the center of the listed facility to the nearest boundary for each sensitive receptor.
2. All noise levels are estimated based on the values in Table 3-7. Values provided are for unobstructed noises.
3. Values exclude the loudest sound in Table 3-7 (Pile Driver) as this equipment is unlikely to be used during construction.

#### *3.7.2.2 No Action Alternative*

Under the No Action Alternative, the proposed construction activities associated with the Zia Park development project would not be implemented, and the existing conditions discussed in **Section 3.7.1** would remain unchanged. No new noises would be introduced to the on- and off-installation noise environments; therefore, no impacts would occur with implementation of the No Action Alternative.

## 3.8 SAFETY

A safe environment is one in which there is no, or an optimally reduced, potential for death, serious bodily injury or illness, or property damage. This section addresses the health and safety of both workers' and the public during and following construction and demolition.

Site safety requires adherence to the regulatory requirements imposed for the benefit of employees and the public. Site safety includes implementation of engineering and administrative practices that aim to reduce the risks of illness, injury, death, and property damage. The health and safety of onsite military and civilian workers are safeguarded by numerous DOD and military branch-specific requirements designed to comply with standards issued by federal OSHA, USEPA, and state occupational safety and health agencies. These standards specify health and safety requirements, the amount and type of training required for workers, the use of personal protective equipment (PPE), administrative controls, engineering controls, and permissible exposure limits for workplace stressors.

Health and safety hazards can often be identified and reduced or eliminated before an activity begins. An accident-prone situation or environment includes the presence of the hazard itself and the exposed (and possibly susceptible) population or public. The degree of exposure depends primarily on the proximity of the hazard to the population. Hazards include transportation, maintenance, and repair activities, and the creation of a noisy environment or a potential fire hazard. The proper operation, maintenance, and repair of vehicles and equipment carry important safety implications. Any facility or human-use area with potentially explosive or other rapid oxidation processes creates unsafe environments due to noise or fire hazards for nearby populations. Noisy environments can also mask verbal or mechanical warning signals such as sirens, bells, or horns.

### 3.8.1 Affected Environment

***Contractor Safety.*** All contractors performing construction and demolition activities are responsible for following federal and state of New Mexico safety regulations. Contractors must conduct construction and demolition activities in a manner that does not increase risk to workers or the public.

New Mexico administers its own Occupational Safety and Health (OSH) program, as permitted by the federal OSHA of 1970, provided that all federal requirements are met regarding the program's structure and operations. The New Mexico Occupational Health and Safety Bureau program is responsible for enforcing Occupational Health and Safety Regulations within the state. Its jurisdiction includes all private and public entities such as city, county, and state government employees. Federal employees are excluded as they are covered by federal OSHA regulations.

OSH programs address the health and safety of people at work. OSH regulations cover potential exposure to a wide range of chemical, physical, and biological hazards, as well as ergonomic stressors. The regulations are designed to mitigate hazard risks by eliminating exposure to the hazards via administrative or engineering controls, substitution, or use of PPE. Occupational health and safety is the responsibility of each employer, as applicable. Employer responsibilities include reviewing potentially hazardous workplace conditions; monitoring exposure to workplace chemicals (e.g., asbestos, lead, hazardous substances), physical (e.g., noise propagation, falls), and biological (e.g., infectious waste, wildlife, poisonous plants) agents, and ergonomic stressors; recommending and evaluating controls (e.g., prevention, administrative, engineering, PPE) to ensure personnel exposure is eliminated or adequately controlled; and ensuring a medical surveillance program is in place to perform occupational health physicals for those workers required to use respiratory protection or exposed to hazardous waste, asbestos, lead, or other work requiring medical monitoring.

***Military Personnel Safety.*** Each branch of the military has its own policies and regulations that act to protect its workers, regardless of their work location. AFI 91-202, *The US Air Force Mishap Prevention Program,* "establishes mishap prevention program requirements, assigns responsibilities for program elements, and contains program management information." In order to meet the goals of minimizing the loss of Air Force resources and protecting military personnel, mishap prevention programs should address: groups at increased risk for mishaps, injury, or illness; a process for tracking incidents; funding for safety programs; metrics for measuring performance; safety goals; and methods to identify safety BMPs.

***Public Safety.*** Kirtland AFB has its own emergency services department. The emergency services department provides the installation with fire suppression, crash response, rescue, emergency medical response, hazardous substance protection, and emergency response planning and community health and safety education through the dissemination of public safety information. The Veterans Affairs Medical Center hospital and the 377th Medical Groups' Outpatient Clinic are the primary military medical facilities at Kirtland AFB. Several other hospitals and clinics, which are devoted to the public, are located off-installation in the city of Albuquerque. These facilities include the Heart Hospital of New Mexico, the University of New Mexico Hospital, and Kaseman Presbyterian Hospital.

Albuquerque Fire Rescue (AFR) provides fire suppression, crash response, rescue, emergency medical response, and hazardous substance response to the nearby city of Albuquerque. The AFR has 704 full-time, uniformed firefighter/emergency medical technicians; 23 fire engine companies; seven fire ladder companies; five wildland task force stations; two hazardous materials task forces; one mobile command unit, one technical rescue task force; and 20 frontline

rescue and seven rescue reserve medical response ambulances (AFR 2020, City of Albuquerque 2021b). The city of Albuquerque also has approximately 853 sworn police officers available to provide law enforcement services (APD 2019). The Southeast Area Command (Phil Chacon Memorial Substation) borders the northwest corner of Kirtland AFB. A mutual service agreement is in place between the city of Albuquerque and Kirtland AFB.

### 3.8.2 Environmental Consequences

#### *3.8.2.1 Alternative 1 – Preferred Action*

The Proposed Action would result in short-term, negligible adverse impacts on the safety of contractors, military personnel, and members of the public.

***Contractor Safety.*** The Proposed Action would result in a short-term, negligible adverse impact on the health and safety of contract personnel working on this project. Construction and demolition activities associated with the Proposed Action would slightly increase the health and safety risk to personnel within the project areas. The selected company performing the work would be required to develop a comprehensive health and safety plan detailing all potential hazards and site-specific guidance to ensure potential safety risks are minimized. The plan would include, at a minimum, emergency response and evacuation procedures; operating manuals; PPE recommendations; procedures for handling, storing, and disposing of hazardous materials and wastes; information on the effects and symptoms of potential exposures; and guidance with respect to hazard identification. Contracted personnel would be responsible for compliance with applicable federal, state, and local safety regulations and would be educated though daily safety briefings to review upcoming work activities and associated hazards. Only certified contractors would be allowed to perform remediation for toxic materials such as ACM or LBP. Contractors would always wear appropriate PPE and be required to adhere to all federal, state, and local regulations during abatement. Therefore, the Proposed Action would not be expected to result in a significant impact on contractor safety.

***Military Personnel Safety.*** The Proposed Action would result in a short-term, negligible adverse impact on the health and safety of military personnel that work near the construction and demolition sites. Construction and demolition activities associated with the Proposed Action would comply with all applicable safety requirements and installation-specific protocols and procedures, including appropriately marking potentially hazardous areas and posting warning signs and barriers to limit access to approved construction and oversight personnel only. Upon completion of construction and demolition activities, no further safety hazards would remain. Therefore, the Proposed Action is not expected to result in a significant impact on the safety of military personnel.

***Public Safety.*** The Proposed Action would result in a short-term, negligible, adverse impact on the health and safety of the public. Construction and demolition activities associated with the Proposed Action would comply with all applicable safety requirements and installation-specific protocols and procedures, including appropriately marking potentially hazardous areas and posting warning signs and barriers to limit access to approved construction and oversight personnel only. Upon completion of construction and demolition activities, no further safety hazards would remain. Therefore, the Proposed Action is not expected to result in a significant impact on public safety.

#### *3.8.2.2 No Action Alternative*

Under the No Action alternative, the Air Force would take no action, and no construction or renovations would occur. The existing conditions described in **Section 3.8.1** would remain unchanged, and no new safety concerns would result.

## 3.9 SOCIOECONOMICS

Socioeconomics describes the aspects of an area potentially affected by the Proposed Action that are social and/or economic in nature. A socioeconomics analysis evaluates how the Proposed Action and Alternatives may affect the surrounding human environment, including population, employment, housing, public services, and social conditions.

Section 1508.14 of the Council on Environmental Quality (CEQ) Regulations states that the requirements to prepare a socioeconomic analysis in an EA are determined by the nature of the Proposed Action and are indicated when a relationship exists between the natural and physical environmental effects and the potential socioeconomic effects. Furthermore, CEQ Regulations state that "economic or social effects are not intended by themselves to require preparation of an environmental impact statement" (FAA 2020).

The primary statutes governing socioeconomic impacts for NEPA reviews are the Uniform Relocation Assistance and Real Property Acquisitions Policy Act of 1970 (42 U.S.C. § 61 et seq.) and implementing regulations 49 CFR part 24. Per these regulations, if acquisition of real property or displacement of people would occur when executing the Preferred Action, then provisions of this Act must be implemented (FAA 2020). For the Proposed Action of this EA, there is no anticipated real property acquisition or population displacement, and therefore no need to implement the provisions of this Act.

It is anticipated that any potential effects would occur in the community immediately adjacent and surrounding Zia Park; therefore, the region of interest (ROI) for this socioeconomic analysis includes the nearest municipality, Albuquerque, and the surrounding county, Bernalillo County. The following factors are analyzed for the affected environment: population and housing; economic activity, income, and employment; and public services and social conditions.

### 3.9.1 Affected Environment

***Population and Housing.*** The Albuquerque metropolitan area is centered on the city of Albuquerque and spans four counties: Bernalillo, Sandoval, Torrance, and Valencia. The metropolitan area has a total population of 928,930, which has, on average, increased by 1-2 percent annually (Albuquerque Economic Development 2021). The City of Albuquerque has a population of 560,513 (U.S. Census Bureau 2019a). Albuquerque is a culturally diverse city, and 22.9 percent of the population is bilingual, with 74 percent of that population speaking both Spanish and English. Demographically, 48.5 percent of the metro population is Hispanic or Latino, 39.8 percent is white, 5.2 percent is Indigenous, 2.3 percent is Black, 2.1 percent is Asian, and 1.9 percent is two or more races. The average age of a metro resident is 39 years, and those 65 and older represent 14.5 percent of the population (Albuquerque Economic Development 2021).

There are an estimated 254,635 housing units in the city of Albuquerque, with 237,826 occupied and 16,809 vacant for a 93 percent occupancy rate. Over 59 percent of houses are owner-occupied. For renters, the median monthly rent is $873. Eighty-four percent of residents have lived in the same house for at least a year, and households average 2.5 people per residence (U.S. Census Bureau 2019a).

Bernalillo County has an estimated population of 681,137. Demographically, 38.3 percent is white, 50.3 percent is Hispanic or Latino, 3.6 percent is Black, 6.3 percent is Indigenous, 2.9 percent is Asian, and 3.1 percent represents two or more races. Persons 65 and older represent 16.9 percent of the population, and 21.4 percent are under 18 years old.

There are 296,404 housing units in Bernalillo County with an average of 2.5 persons per household. Over 84 percent have lived in the same house for at least one year. Sixty-three percent of housing units are owner-occupied, and Bernalillo County's fraction of renters, at approximately 37%, is higher than the New Mexico average of around 32%. The median monthly rental rate is $874 (U.S. Census Bureau 2019b).

In Albuquerque, rent is anticipated to increase, with rental rates rising to an estimated $932 in 2021 and $961 by 2022. Housing occupancy decreased to 96 percent in 2021 due to a slow economic recovery from the effects of the COVID-19 pandemic but is expected to rebound to 96.2 percent by the end of 2022 (Berkadia 2021). Over the past year, Albuquerque has had a competitive housing market, with increased demand for luxury homes, higher selling prices, and more buyers than sellers (Hamway 2021).

***Economic Activity, Income, and Employment.*** The median household income in Albuquerque is $54,072. Education levels are generally high. Thirty-two percent of the population has a bachelor's degree or higher, and 12.2 percent have graduate or professional degrees. Albuquerque's poverty rate, at 16.9 percent, is lower than the overall state poverty rate of 18.2 percent. The civilian labor force in Albuquerque numbers 435,200 with just over 26,000 unemployed. The unemployment rate in August 2021 was six percent and had decreased from 7.4 percent in the previous month. It is just slightly higher than the state unemployment rate of 5.8 percent (U.S. Bureau of Labor Statistics 2021).

Median household income for Bernalillo County is $53,329, with a 15.5 percent poverty rate. Bernalillo County ranks fourth in highest average income for New Mexico counties. Residents with a high school level or higher education represent 88.9 percent of the population, and 34.4 percent have bachelor's degrees or higher. Bernalillo County has an unemployment rate of 5.4 percent with a labor force of 311,833 (New Mexico Department of Workforce Solutions 2021).

The Albuquerque metro area contributes nearly half of all economic activity in New Mexico. The city of Albuquerque is the 32$^{nd}$ largest city in the U.S. and is home to companies like Netflix, NBC Universal, CareNet, with emerging markets in space and smart community technologies as well as in film and digital media (City of Albuquerque 2021c). However, Albuquerque experienced negative revenue growth starting in late 2020 and extending into 2021 resulting from state-wide measures to control the COVID-19 pandemic. In 2022, economic growth is expected to rebound at 3%, and revenue from internet sales is expected to boost revenue by $18 million (City of Albuquerque 2021, January).

***Public Services and Social Conditions.*** Albuquerque Public Schools is the largest school district in New Mexico and serves nearly one-third of students in the state. Around 82,000 students attend 142 schools in the Albuquerque metro area, and the school district employs 14,000 workers (City of Albuquerque 2021d). There are additionally 58 private schools in the metro area (New Mexico Public Education Department 2020). Albuquerque is also home to New Mexico's largest community college with extensive distance learning options. The University of New Mexico is located in Albuquerque, where 25,441 full- and part-time students are enrolled for Fall 2021 (University of New Mexico n.d.).

Bernalillo County has 203 public schools with 98,354 students in attendance. There is considerable overlap in these numbers with the Albuquerque metro area, as Albuquerque schools

are counted in Bernalillo County. Seventy-eight percent of students are Hispanic/Latino, which is just slightly higher than the state average of 77%. The top five ranked schools in Bernalillo County are all located in the Albuquerque metro area (Public School Review 2021).

Albuquerque employs a two-tier Emergency Medical Services program. Private contractors provide transportation to emergency hospitals, and AFR provides initial emergency response, including patient triage and stabilization and emergency management. The AFR has 704 full-time, uniformed firefighter/emergency medical technicians; 23 fire engine companies; seven fire ladder companies; four wildland task force stations; three hazardous materials task forces; one mobile command unit; and 20 frontline rescue and seven rescue reserve medical response ambulances (AFR 2020, City of Albuquerque 2021b). There are ten private ambulance services in the Albuquerque according to a Google search.

Albuquerque has nine major hospitals and one VA hospital, totaling over 1,900 beds (Albuquerque Economic Development n.d.). Eight hospitals reported their hospital bed capacity to the U.S. Department of Health and Human Services (HHS) in October 2021.

Overall, New Mexico's hospital occupancy rates are in the highest percentile when compared to other states, at 76 percent occupancy for inpatient hospital beds, and over 92 percent occupancy for ICU beds (HHS 2021).

The Albuquerque hospital system continues to face capacity and staffing concerns resulting from the COVID-19 pandemic. In addition to meeting the needs of sick COVID-19 patients, hospitals also face backlogs of patients whose care has been delayed (Kent 2021).

Table 3-8: Albuquerque Hospital Bed Availability, October 2021

| Hospital | Inpatient Beds (%) | ICU Beds (%) |
|---|---|---|
| Lovelace Medical Center | 37.6 | 20.0 |
| Kindred Hospital | 9.8 | 0 |
| Presbyterian Hospital | 10.8 | 15.8 |
| UNM Hospital | 8.3 | 2.9 |
| AMG Specialty | 15.6 | NA |
| Lovelace Women's Hospital | 46.2 | 12.5 |
| Lovelace Westside Hospital | 45.4 | 25.0 |
| UNM Sandoval Regional Medical Center | 32.5 | 16.6 |

Source: HHS, 2021. https://protect-public.hhs.gov/pages/hospital-utilization

Bernalillo County is made up of 12 fire districts that employ 5-6 emergency personnel per station. In 2019, Bernalillo County responded to 18,732 emergencies, of which around 80% were medical emergencies. Response capacity includes ten engine companies, two ladder companies, 11 rescue companies, and six water tankers for fire response (Bernalillo County n.d.). There are 13 private ambulance companies listed for Bernalillo County according to a Google search.

Bernalillo County has relatively high numbers of primary care medical providers, with around two providers per 1,000 residents, and 71.5 percent of residents have a primary care provider (New Mexico Department of Health n.d.).

Albuquerque and Bernalillo County acquire drinking water from two sources: groundwater from the Santa Fe Group Aquifer and surface water from the San Juan-Chama Drinking Water Project. Around 32 billion gallons of drinking water are used from these sources annually. The Bernalillo County Water Authority also employs strategies such as aquifer storage and recovery, non-potable water for irrigation, reuse of irrigation water, and stormwater capture to expand available water supplies (ABCWUA 2021). In the interest of resource conservation, ABCWUA has set a water use goal of 110 gallons per capita per day. Currently, residents of Albuquerque and Bernalillo County use 128 gallons per capita per day (ABCWUA, 2018).

The city of Albuquerque has committed to 25 percent renewable energy sources by 2025. By 2020, the city had added 7.5 kilowatts of solar energy to available energy resources, as well as reduced city energy costs and added local employment opportunities (City of Albuquerque 2021f). Residential electricity prices have increased by around five percent from 2020 to 2021, and Albuquerque metro residents pay four percent more than the U.S. average rate of 13.90 cents per kilowatt hour. Natural gas prices have increased by 56 percent from 2020 to 2021, but are still significantly lower, by 17 percent, than the national average (Utilities Local 2021).

Average weekday traffic is highest on highways, where more than 50,000 vehicles pass daily. This is followed by main connecting streets and boulevards, with 35,000-49,999 vehicles passing through on an average weekday (Mid-Region Council of Governments 2017). Albuquerque metro area residents experience an average commute time of 23 minutes, and 69 percent of residents have commute times of 29 minutes or less. For Bernalillo County, average travel time to work is 22 minutes (U.S. Census Bureau 2019b). Both the Albuquerque metro area and Bernalillo County have lower average commute times than the U.S. average of 27.6 minutes (U.S. Census Bureau 2021). Albuquerque offers two public transit systems, the ABQ Ride bus system and the New Mexico Rail Runner, a north-south commuter rail service. Based on most recently published ridership data from 2018, ABQ Ride Rapid Ride routes reported weekday and weekend combined ridership of over 1.6 million, and local routes reported an annual total ridership of 7.8 million. Commuter routes provided additional ridership of around 9.7 million (One Albuquerque Transit 2018). New Mexico Rail Runner ridership has been declining since 2010, and consists mainly of around 1,200 regular, long-distance commuters (New Mexico Legislative Finance Committee 2019).

### 3.9.2 Environmental Consequences

#### *3.9.2.1 Alternative 1 – Preferred Action*

Implementation of the Proposed Action would result in negligible impacts on population and housing; long-term, positive impacts on economic activity, income, and employment; and negligible impacts on public services and social conditions.

***Population and Housing.*** The Proposed Action would result in a negligible impact on the permanent Albuquerque metro and Bernalillo County population and a slight, short-term impact on the transient population. As a result of the Proposed Action, approximately 100 new permanent base employees and their families would join the population. These small numbers are unlikely to yield any noticeable effects. The Proposed Action would also add around 1000 transient students to the population. While this would slightly increase local transient populations, students would be housed on base and receive most, if not all, of their services through the base. Thus, overall impacts on the population of Albuquerque and Bernalillo County would be negligible.

The Proposed Action would have a negligible impact on housing and availability in the Albuquerque metro area and Bernalillo County. The transient student population will be housed

on base and will not affect housing availability. The small number of new permanent employees and their families will not significantly impact housing. At a housing occupancy rate of 96 percent (see **Section 3.9.1**, Population and Housing), the Albuquerque metro area would be able to provide housing opportunities for around 100 families. The housing occupancy rate in Albuquerque decreased in 2021, but is rebounding, and the influx of families may slightly contribute to this continued rebound. However, it is unlikely that the Proposed Action would result in a need to adjust available housing units. There is a great demand for new homes for sale in Albuquerque, and the influx of new families seeking to buy homes may put some pressure on the housing market from the buyer's perspective, but overall, the effects will be negligible due to the small number of permanent personnel being added to the population.

***Economic Activity, Income, and Employment.*** The Proposed Action would result in a long-term, positive impact on economic activity, income and employment in the Albuquerque metro area and Bernalillo County. The proposed projects would require contract construction labor from the local community to complete, which would result in increased employment opportunities and income for construction. With the availability of additional contracts, construction companies will have additional sources of employment and wages for current personnel and may need to expand their current employee base to meet the needs of the proposed projects. Thus, the Proposed Action would likely result in a small, long-term positive impact on income per capita, median household income, and poverty rates. Similarly, the Proposed Action would result in a small, long-term positive effect on unemployment rates.

The Proposed Action would additionally result in a long-term positive impact on economic activity by adding a population of approximately 1000 transient students. Although housing for this population will be located on base, these students will add to the local economy by purchasing groceries and other necessities, eating at restaurants, and taking advantage of local shopping and entertainment opportunities.

The Proposed Action would have a negligible impact on regional growth and development. There will be a small influx of approximately 150 new permanent employees on the base, who will work as instructors and in other roles once the proposed school is completed. The small number of new permanent employees are unlikely to affect local employment or income and would add positively to economic activity by purchasing goods and services within the community.

The Proposed Action would have a negligible impact on the existing local labor force. New permanent employees will be employed on base and thus not affect the labor force. Family members of new employees may seek work within the Albuquerque metro area and Bernalillo County and will likely result in a negligible rise in the available labor force.

***Public Services and Social Conditions.*** The Proposed Action would have overall a slight, long-term positive impact on public services and social conditions. The proposed projects include the construction of a new medical facility to provide for the medical needs of the base population. However, the proposed medical facility would also provide care to veterans in the Albuquerque metro area and Bernalillo County, which would ease some of the patient load currently carried by metro hospitals. The Proposed Action would have a negligible impact on emergency services and education, as the student population would receive medical and educational services on base, and the addition of approximately 100 new residents and their families to the local community would not increase the need for additional emergency services or schools.

The Proposed Action would have a negligible impact on public transportation. The transient student population may result in some increased usage of public transit systems but is unlikely to result in significant crowding, prolonged wait times, or a need to expand the transit system. The Proposed Action would also have a negligible impact on traffic and commuter patterns.

Employees working on base may commute from other locations in the Albuquerque metro area, but these numbers are small and unlikely to add significant impact. Family members of employees may also commute to work in the metro area or in Bernalillo County, but again, these small numbers are unlikely to noticeably increase current commuter traffic or add to traffic congestion. The transient student population may slightly increase non-commuter traffic for shopping and entertainment, but they are not likely to impact current traffic patterns. Additionally, the proposed campus has been designed with convenience and resource conservation in mind, and students can easily access whatever they need on foot or by bicycle, thus negating the need for frequent trips off-campus.

For the Proposed Action's impact on infrastructure such as water usage, utilities, and energy, please see **Section 3.6**.

The Proposed Action would have a negligible impact on social conditions such as community cohesion. While the influx of a significant transient population into the community can affect community cohesion in both positive and negative ways, in this case the population of transient students is so small that it is unlikely to result in any noticeable effects on the community's social conditions. The Proposed Action would have a long-term, positive impact on social and religious organizations, if the small number of new employees and transient students participate in these local organizations and community activities.

#### *3.9.2.2 No Action Alternative*

Under the No Action alternative, the Air Force would take no action, and no construction or renovations would occur. The existing conditions described in **Section 3.9.1** would remain unchanged, with no resulting socioeconomic consequences or benefits.

## 3.10 WATER RESOURCES

Water resources are natural and man-made sources of water that are available for use by, and for the benefit of, humans and the environment. Water resources relevant to Kirtland AFB's location in New Mexico include groundwater, surface water, floodplains, and wetlands. Evaluation of water resources examines the quantity and quality of the resource and its demand for various purposes and ensures compliance with CWA, 33 U.S.C. §1251 et seq. (1972).

***Groundwater.*** Groundwater exists in the saturated zone beneath the Earth's surface that collects and flows through aquifers. Groundwater is an essential resource that functions to recharge surface water and is used for drinking, irrigation, and industrial purposes. Groundwater typically can be described in terms of depth from the surface, aquifer or well capacity, water quality, recharge rate, and surrounding geologic formations. The state of New Mexico passed ground and surface water protection objectives subject to the Water Quality Act, New Mexico Statutes Annotated (NMSA) 74-6, under 20.6.2 NMAC.

Groundwater quality and quantity are regulated under several federal and state programs. The federal Underground Injection Control regulations, authorized under the Safe Drinking Water Act (SDWA), require a permit for the discharge or disposal of fluids into a well. The federal Sole Source Aquifer regulations, also authorized under the SDWA, protect aquifers that are critical to water supply. The state of New Mexico passed state drinking water rules, which incorporate the federal SDWA regulations, under 20.7.10 NMAC and regulates water rights under NMSA 72-1.

***Surface Water.*** Surface water includes natural, modified, and man-made water confinement and conveyance features above groundwater that may or may not have a defined channel and discernable water flow. These features are generally classified as streams, springs, wetlands,

natural and artificial impoundments (e.g., ponds, lakes), and constructed drainage canals and ditches. Stormwater is surface water generated by precipitation events that may percolate into permeable surficial sediments or flow across the top of impervious or saturated surficial areas, a condition known as runoff. Stormwater is an important component of surface water systems because of its potential to introduce sediments and other contaminants that could degrade surface waters, such as lakes, rivers, or streams. Proper management of stormwater flows, which can be intensified by high proportions of impervious surfaces associated with buildings, roads, and parking lots, is important to the management of surface water quality and natural flow characteristics.

The CWA establishes federal limits, through the NPDES permit process, for regulating point (end of pipe) and non-point (e.g., stormwater) discharges of pollutants into the Waters of the United States and determines quality standards for surface waters. The term “Waters of the United States” has a broad meaning under the CWA and incorporates deep water aquatic habitats and special aquatic habitats (including wetlands). Sections 401 and 404 of the CWA regulate the discharge of dredged or fill materials into the Waters of the United States.

USEPA’s Municipal Separate Storm Sewer System (MS4) program addresses pollution from stormwater runoff conveyed by an MS4 and discharged into rivers and streams. Common pollutants include oil and grease from roadways, pesticides from lawns, sediment from construction sites, and trash and other inappropriately disposed of waste materials. In compliance with provisions of the CWA, operators of stormwater discharges associated with industrial activities are authorized to discharge to Waters of the United States in accordance with the eligibility and Notice of Intent requirements, effluent limitations, inspection requirements, and other conditions set forth in the 2022 Multi-Sector General Permit (MSGP). USEPA currently regulates large (equal to or greater than one acre) construction activity through the 2022 CGP, which provides coverage for a period of five years.

The Energy Independence Security Act (EISA) Section 438 (42 USC § 17094) establishes stormwater design requirements for federal development projects that disturb a footprint greater than 5,000 square feet. EISA Section 438 requirements are independent of stormwater requirements under the CWA. The project footprint consists of all horizontal hard surface and disturbed areas associated with project development. Under these requirements, pre-development site hydrology must be maintained or restored to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow. Pre-development hydrology would be modeled or calculated using recognized tools and must include site-specific factors, such as soil type, ground cover, and ground slope.

Additionally, Low Impact Design (LID) features need to be incorporated into new construction activities to comply with the restrictions on stormwater management promulgated by EISA Section 438. LID is a stormwater management strategy designed to maintain site hydrology and mitigate the adverse impacts of stormwater runoff and non-point source pollution. LIDs can manage the increase in runoff between pre- and post-development conditions on the project site through interception, infiltration, storage, and evapotranspiration processes before the runoff is conveyed to receiving waters. Examples of LID methods include bio-retention, permeable pavements, cisterns/recycling, and green roofs (DOD 2010).

***Floodplains***. Floodplains are areas of low, level ground along rivers, stream channels, or coastal waters that are subject to periodic or infrequent inundation because of rain or melting snow. Floodplain ecosystem functions include natural moderation of floods, flood storage and conveyance, groundwater recharge, nutrient cycling, water quality maintenance, and provision of

habitat for a diversity of plants and animals. Flood potential is evaluated by FEMA, which defines the 100-year floodplain as an area within which there is a one percent chance of inundation by a flood event in a given year, or a flood event in the area once every 100 years. The risk of flooding is influenced by local topography, the frequencies of precipitation events, the size of the watershed above the floodplain, and upstream development. Federal, state, and local regulations often limit floodplain development to passive uses, such as recreation and conservation activities, to reduce the risks to human health and safety. EO 11988, *Floodplain Management*, requires federal agencies to determine whether a proposed action would occur within a floodplain and directs them to avoid floodplains to the maximum extent possible wherever there is a practicable alternative.

### 3.10.1 Affected Environment

***Groundwater.*** Kirtland AFB is within the limits of the Rio Grande Underground Water Basin, which is defined as a natural resources area and designated as a "declared underground water basin" by the state of New Mexico. The average depth to groundwater beneath Kirtland AFB is 450 to 550 feet below ground surface. The Rio Grande Basin's source of groundwater is the Santa Fe Aquifer, which has an estimated 2.3 billion acre-feet of recoverable water. This aquifer is most likely recharged east of the installation in the Manzanita Mountains where the sediment soil materials favor rapid infiltration (KAFB 2018b). The regional aquifer is used for the installation's water supply. Kirtland AFB has a water right that allows it to divert approximately 6,400 acre-feet of water, or approximately 2 billion gallons, per year from the underground aquifer (KAFB 2016).

***Surface Water.*** Kirtland AFB is within the Rio Grande watershed. The Rio Grande is the major surface hydrologic feature in central New Mexico, flowing north to south through Albuquerque, approximately five miles west of the installation. Surface water resources on Kirtland AFB reflect its dry climate. The average annual rainfall in Albuquerque is nine inches, with half of the average annual rainfall occurring from July to October during heavy thunderstorms. Surface water generally occurs in the form of stormwater sheet flow that drains into small gullies during heavy rainfall events (KAFB 2018b). Surface water generally flows across the installation in a westerly direction toward the Rio Grande.

The two main surface water drainage channels on Kirtland AFB are the Tijeras Arroyo and the smaller Arroyo del Coyote, which joins the Tijeras Arroyo approximately 1 mile west of the Tijeras Arroyo Golf Course. The Tijeras Arroyo and Arroyo del Coyote are tributaries to the Rio Grande. They flow intermittently during heavy thunderstorms and the spring snowmelt, but most of the water percolates into alluvial deposits or is lost to the atmosphere via evapotranspiration. The Tijeras Arroyo, which is dry for most of the year, is the primary surface channel that drains surface water from Kirtland AFB to the Rio Grande. Precipitation reaches the Tijeras Arroyo through a series of storm drains, flood canals, and small, mostly unnamed arroyos. Nearly 95 percent of the precipitation that flows through the Tijeras Arroyo evaporates before it reaches the Rio Grande. The remaining five percent is equally divided between groundwater recharge and runoff (KAFB 2018b).

In the developed area of the installation, stormwater drains into small culverts towards Gibson Boulevard along the installation boundary. There are also four detention ponds in the area. Stormwater in the industrial/laboratory areas discharges through surface runoff or three large culverts that drain toward the Tijeras Arroyo in the south (KAFB 2018b).

Kirtland AFB operates under three NPDES Permits: the MSGP for industrial activities, the MS4 permit for stormwater conveyances from installation development, and the CGP for construction

projects. Stormwater runoff on the installation predominantly flows through the drainage patterns created by natural terrain and paved surfaces. In some areas, runoff is directed through ditches and piping, with direct discharges into a receiving stream or surface water body. Issued in March 2021, the MSGP, Permit No. NMR050001, focuses on facilities and industry sector-specific BMP requirements. It requires the installation to have a SWPPP and includes specific requirements for implementing control measures (e.g., minimize exposure, good housekeeping, maintenance, spill prevention and response), conducting self-inspections and visual assessments of discharges, taking corrective actions, and conducting training, as appropriate.

Kirtland AFB is a co-permittee to the city of Albuquerque, Bernalillo County, for compliance with the Middle Rio Grande Watershed Based MS4 General Permit No. NMR04A000. The MS4 permit, issued in September 2015, regulates stormwater sediment and pollutant discharges from the municipality sources of the installation. The MS4 collects and conveys stormwater from storm drains, pipes, and ditches and discharges it into the Tijeras Arroyo and the city of Albuquerque's MS4. Kirtland AFB has developed a Stormwater Management Plan as required by the MS4 permit.

Finally, Kirtland AFB operates under a 2022 CGP (#NMR100000), which expires 16 February 2027. It includes several guidelines to implement erosion and sedimentation control, pollution prevention, and stabilization on construction sites of one or more acres. If a project at Kirtland AFB is subject to the CGP requirements, the contractor must develop a site-specific SWPPP and provide the plan to the 377 MSG/CEIEC for review and approval. Upon approval, both the contractor and Kirtland AFB must submit Notices of Intent and be granted approval from USEPA before work begins. When construction projects are not subject to NPDES CGP requirements (i.e., due to the size of the project or a waiver granted), the contractor must still implement appropriate BMPs to minimize stormwater pollutants.

***Floodplains***. Floodplains are typically low-lying areas that are subject to inundation during significant rainfall events. Flooding potential is evaluated by FEMA and is often related to the 100-year floodplain, based on the worst flood that could be expected in a given region during a 100-year period. The 100-year floodplain for Kirtland AFB is associated with the Arroyo del Coyote and Tijeras Arroyo. Arroyo del Coyote and Tijeras Arroyo floods occur infrequently and are characterized by high peak flows, small volumes, and short durations (KAFB 2018b). As stated previously, various portions of the stormwater drainage and arroyo systems on the installation are owned and maintained by either Kirtland AFB or Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA).

***Wetlands.*** Wetlands are considered "Waters of the United States" if they are determined to be jurisdictional by the U.S. Army Corps of Engineers and USEPA. There are 10 wetlands supplied by at least 15 naturally occurring springs on Kirtland AFB; however, no Jurisdictional Determinations have been made concerning these water features. There are no natural lakes or rivers on Kirtland AFB, but six man-made ponds have been created on the Tijeras Arroyo Golf Course.

### 3.10.2 Environmental Consequences

#### *3.10.2.1 Alternative 1 – Preferred Action*

***Ground water.*** Short-term, minor adverse impacts would be expected during construction and demolition activities due to ground disturbances that are inherently part of grading, excavating, and other uses of heavy equipment. These soil disturbances could lead to increased surface water runoff during rainfall events, thus causing increased sediment transportation that could be

transferred to ground water resources. Best practices and planning during construction and demolition activities can minimize this impact by controlling the movement of surface water runoff and ensuring no direct access to ground water recharge points. The work areas identified in the Proposed Action feature low slopes due to prior construction disturbances and minimal controls are expected. Drainage control measures can include utilizing temporary barriers such as fiber logs or silt fences, which would be placed based on site-specific evaluations on an as-needed basis.

Vehicles and equipment used during the Proposed Action may increase the potential for petroleum or hazardous material spills, typically due to leaks or accidents at the work site. Heavy equipment contains a variety of oils, lubricants, hydraulic fluids, and fuels which may leak. These same materials also may be stored on site to maintain and operate the equipment in use, and may be subject to leaks or spills via accidents like being punctured with a forklift. Any such leaks or spills could be transported to ground water either by runoff of surface water during rain events or by leaching through the soil. Proper maintenance of equipment and good housekeeping of storage sites can both minimize the potential for leaking equipment and identify a potential leak before a significant spill can occur. Any work area that requires hazardous materials to be stored on site must also have a spill kit present to contain, control, and clean up any spills that occur.

***Surface Water.*** Short-term, minor adverse impacts would be expected during the construction and demolition activities of the Proposed Action. No permanent bodies of water are located in the project areas; however, during rain events flowing stormwater has the potential to transport sediment and hazardous materials to drainage ditches. As previously discussed, the use of best practices and controls can minimize these impacts. Additionally, construction areas of at least one acre must adhere to specific requirements under the Kirtland AFB CGP and are subject to inspections by base personnel to ensure compliance.

***Floodplains.*** No construction or demolition site associated with the Proposed Action is located in the 100-year floodplain, therefore there is no anticipated impact.

***Wetlands.*** No construction or demolition site associated with the Proposed Action is located within a wetland, therefore there is no anticipated impact.

#### *3.10.2.2 No Action Alternative*

Under the No Action Alternative, the proposed construction and demolition activities associated with the Zia Park development project would not be implemented and the existing conditions discussed in **Section 3.10.1** would remain unchanged, resulting in no impacts to water resources.

## 3.11 CUMULATIVE IMPACTS

CEQ defines impacts or effects as “changes to the human environment from the proposed action or alternatives that are reasonably foreseeable and have a reasonably close causal relationship to the proposed action or alternatives, including those effects that occur at the same time and place as the proposed action or alternatives and may include effects that are later in time or farther removed in distance from the proposed action or alternatives” (40 CFR §1508.1). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time by various agencies (i.e., federal, state, and local) or individuals. Informed decision-making is served by consideration of all impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future. Reasonably foreseeable future actions consist of activities that have been approved and can be evaluated with regard to their impacts.

This section briefly summarizes past, present, and reasonably foreseeable future projects within the same general geographic scope as the Proposed Action. The geographic scope of the analysis varies by resource area. For example, the geographic scope of cumulative impacts on cultural resources, geological resources, and safety is narrow and focused on the specific location of the resource. The geographic scope of air quality, infrastructure, and socioeconomics is broader and considers more county- or region-wide activities.

The past, present, and reasonably foreseeable future projects, identified below, make up the cumulative impact scenario for the Proposed Action. The Proposed Action's impacts on the individual resource areas analyzed in **Sections 3.1** through **3.10** are added to the cumulative impact scenario to determine the total impacts of the Proposed Action. In accordance with CEQ guidance, the impacts of past actions are considered in aggregate as appropriate for each resource area without delving into the historical details of individual past actions.

### 3.11.1 Past Actions

Kirtland AFB has been used for military missions since the 1930s and has continuously been developed as DOD missions, organizations, needs, and strategies have evolved. Development and operation of training ranges have impacted thousands of acres with cumulative impacts on soil, wildlife habitats, water quality, and noise. Beneficial impacts also have resulted from the operation and management of the installation including increased employment and income for Bernalillo County, the city of Albuquerque, and its surrounding communities; restoration and enhancement of sensitive resources such as Coyote Springs wetland areas; consumptive and non-consumptive recreation opportunities; and increased knowledge of the history and pre-history of the region through numerous cultural resources surveys and studies.

### 3.11.2 Present and Reasonably Foreseeable Future Actions

Kirtland AFB is a large military installation that is continually evolving. Projects that were examined are included in **Appendix B**. Resource areas that were excluded in **Section 3.1.2** are likewise excluded in this section as no impacts are anticipated from the Proposed Action. Each resource area described below assesses the potential for cumulative impacts from the Proposed Action and those actions detailed in **Appendix B**.

***Air Quality.*** Additional construction and demolition activities that coincide with the Proposed Action may contribute to slightly increased airborne dust (primarily PM10), however all such occurrences would be temporary in nature and cease upon completion of construction and demolition activities. No emissions from the Proposed Action would be considered significant for the region. Therefore, the Proposed Action, in conjunction with other foreseeable actions both on and off-base, would not result in major cumulative impacts to air quality.

***Cultural Resources.*** There are no impacts from the Proposed Action. Projects listed in **Appendix B** occurring in the same region, which have the potential to impact NRHP-eligible places, would be required to undergo separate, project-specific, SHPO consultations. Therefore, the Proposed Action, in conjunction with other foreseeable actions both on and off-base, would not result in major cumulative impacts to Cultural Resources.

***Geological Resources.*** The Proposed Action would result in short-term minor adverse impacts on geography and topography, and long-term negligible adverse impacts on soils. Any such impacts by the Proposed Action on geological resources would be constrained within project boundaries and minimized by best management practices where possible. Additionally, none of the projects listed in **Table 4-1** and **Table 4-2** occur in the same area. Therefore, the Proposed

Action, in conjunction with other foreseeable actions both on and off-base, would not result in major cumulative impacts to geological resources.

***Hazardous Materials and Waste.*** Short-term, minor, adverse impacts on hazardous materials, hazardous waste, petroleum products, petroleum wastes, and toxic materials would occur during the Proposed Action. The removal of toxic substances from Kirtland AFB may be considered a long-term beneficial impact. Potential adverse impacts from hazardous materials and wastes and special hazards would be minimized or eliminated by following standard Kirtland AFB policies regarding use of hazardous materials and generation of hazardous and toxic wastes. Present and reasonably foreseeable projects would likewise incorporate measures to limit or control hazardous materials and wastes in their construction and operation plans. Therefore, the Proposed Action, in conjunction with other foreseeable actions both on and off-base, would not result in major cumulative impacts to hazardous materials and waste.

***Noise.*** Construction and demolition activities associated with the Proposed Action are anticipated to incur short-term, negligible, adverse impacts to noise for the duration of the project. Noise impacts are generated by the heavy equipment and tools required to perform these activities. Several other construction and demolition projects are planned on Kirtland AFB, some of which are located in the vicinity of the Proposed Action, that would also produce noise impacts from similar activities. Any noise generated would result in only temporary increases in ambient noise levels, during construction and demolition activities, and would largely be unnoticed by non-workers given the location of these actions. Therefore, the Proposed Action, in conjunction with other foreseeable actions both on and off-base, would not result in major cumulative impacts to noise.

***Safety.*** Short-term, negligible, adverse impacts on safety would occur for the duration of construction and demolition associated with the Proposed Action. All appropriate safety requirements, including use of PPE, would be adhered to during such activities to minimize the potential for safety impacts. Applicable safety standards would also be applied to present and foreseeable projects. Therefore, the Proposed Action, in conjunction with other foreseeable actions both on and off-base, would not result in major cumulative impacts to safety.

***Water Resources.*** Short-term, minor, adverse impacts would be expected to ground water and surface water during construction and demolition activities during implementation of the Proposed Action due to ground disturbances and potential leaks from heavy equipment. Impacts can be minimized through use of best management practices and controls such as temporary barriers and absorbent pads. Present and future construction projects conducted in the same region would also be held to the same standard with minimal expected impacts. Therefore, the Proposed Action, in conjunction with other foreseeable actions both on and off-base, would not result in major cumulative impacts to water resources.

## 3.12 UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts would result from implementation of the Proposed Action, however none of these impacts would be considered significant. Non-renewable resources in the form of fuels would be consumed by heavy equipment during construction and demolition tasks. Construction would necessitate use of a variety of materials such on concrete, steel, wiring, etc. Use of any such material would not significantly decrease the availability of these resources to other projects.

## 3.13 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

The relationship between short-term uses and enhancement of long-term productivity from implementation of the Proposed Action is evaluated from the standpoint of short-term effects and long-term effects. Short-term effects would be those associated with construction and demolition activities. Long-term enhancement of productivity and morale would be those effects associated with operation and maintenance of new community service facilities, training facilities, and transportation routes.

The Proposed Action represents an enhancement to long-term productivity and morale. The negative effects of short-term impacts from construction and demolition activities would be minor compared to the long-term positive impacts by constructing modern facilities and improving traffic flow.

## 3.14 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible and irretrievable resource commitments are related to the use of non-renewable resources and the impacts that the use of these resources will have on future generations. Irreversible impacts primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable timeframe (e.g., energy and minerals). The irreversible and irretrievable commitments of resources that would result from implementation of the Proposed Action involve the consumption of material resources used for construction, energy resources, biological resources, and human labor resources. The use of these resources is considered to be permanent.

**Material Resources.** Material resources used for the Proposed Action would potentially include building materials, concrete and asphalt, and various construction materials and supplies. The materials that would be consumed are not in short supply, would not limit other unrelated construction activities, and would not be considered major.

**Energy Resources.** Energy resources used for the Proposed Action would be irretrievably lost. This includes petroleum-based products (e.g., gasoline and diesel). During construction and maintenance activities, gasoline and diesel would be used for the operation of vehicles and construction equipment. Consumption of these energy resources would not place a significant demand on their availability in the region; therefore, less than significant impacts would be expected.

**Human Resources.** The use of human resources for construction and maintenance activities is considered an irretrievable loss only in that it would preclude such personnel from engaging in other work activities. However, the use of human resources for the Proposed Action represents employment opportunities and is considered beneficial.

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# Appendix A - Interagency and Intergovernmental Coordination for Environmental Planning and Public Involvement Materials

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# State Historic Preservation Office (SHPO) Correspondence

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

23 March 2022

Colonel Jason F. Vattioni, USAF
Commander
377th Air Base Wing
2000 Wyoming Boulevard SE
Kirtland Air Force Base NM 87117

Jeff Pappas, PhD
State Historic Preservation Officer and Director
New Mexico Historic Preservation Division
Department of Cultural Affairs
Bataan Memorial Building
407 Galisteo Street Suite 236
Santa Fe NM 87501

Dear Dr. Pappas

In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the United States Air Force (USAF) NEPA regulations, the USAF is preparing an Environmental Assessment (EA) to evaluate the proposal for multiple construction projects for the Zia Park area development over the next 20 years at Kirtland Air Force Base (AFB). Zia Park is a former housing area covering approximately 300 acres. The Proposed Action includes multiple short- (1-5 years), mid- (5-10 years), and long- (10-20 years) range project requirements for the improvement of the physical infrastructure and functionality of the area, including current and future mission, facilities, and infrastructure requirements; development constraints and opportunities; and land use relationships. These projects include the development of training and education facilities, medical facilities, a fitness center, a child development center, dormitories, a dining center, outdoor recreation and open space, an entry control facility, roadway extensions, as well as improvements to utility infrastructure.

The purpose of the Proposed Action is to facilitate the area development process by evaluating in one integrated document the potential impacts on the human environment of proposed land use projects in the Zia Park area. The Proposed Action is needed because currently available facilities and infrastructure are incapable of supporting the 377th Air Base Wing and its mission partners.

Pursuant to Section 106 of the National Historic Preservation Act (36 Code of Federal Regulations Part 800), the USAF would like to initiate consultation concerning the Proposed Action to offer you the opportunity to identify any comments, concerns, and suggestions you might have. A copy of the Final Description of the Proposed Action and Alternatives for the EA addressing the Zia Park Area Development Plan at Kirtland AFB, New Mexico is available at

*http://www.kirtland.af.mil/Home/Environment* under the heading "Environmental Assessments." As we move forward through this process, we welcome your participation and input.

Please send your written responses to the NEPA Program Manager, 377 MSG/CEIEC, 2050 Wyoming Boulevard SE, Suite 116, Kirtland AFB NM 87117, or via email to KirtlandNEPA@us.af.mil.

Sincerely

VATTIONI.JASON.F.1170028640
Digitally signed by VATTIONI.JASON.F.1170028640
Date: 2022.03.23 07:09:17 -06'00'

JASON F. VATTIONI, Colonel, USAF
Commander

**DEPARTMENT OF THE AIR FORCE**
**377TH AIR BASE WING (AFGSC)**

31 October 2022

Colonel Jason F. Vattioni, USAF
Commander
377th Air Base Wing
2000 Wyoming Boulevard SE
Kirtland Air Force Base NM 87117

Jeff Pappas, PhD
State Historic Preservation Officer and Director
New Mexico Historic Preservation Division
Department of Cultural Affairs
Bataan Memorial Building
407 Galisteo Street, Suite 236
Santa Fe NM 87501

Dear Dr. Pappas

In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the United States Air Force (USAF) NEPA regulations, the USAF prepared an Environmental Assessment (EA) to evaluate the proposal for multiple construction projects for the Zia Park area development over the next 20 years at Kirtland Air Force Base (AFB). Zia Park is a former housing area covering approximately 300 acres. The Proposed Action includes multiple short- (1-5 years), mid- (5-10 years), and long- (10-20 years) range project requirements for the improvement of the physical infrastructure and functionality of the area, including current and future mission, facilities, and infrastructure requirements; development constraints and opportunities; and land use relationships. These projects may include the development of training and education facilities, medical facilities, a fitness center, a child development center, dormitories, a dining center, outdoor recreation and open space projects, an entry control facility, and roadway extensions, as well as improvements to utility infrastructure.

The purpose of the Proposed Action is to provide area development at Kirtland AFB involving infrastructure improvements necessary to support the mission of the 377th Air Base Wing (377 ABW) and tenant units. The Proposed Action is needed for the improvement of the physical infrastructure and functionality of Kirtland AFB, including current and future mission, facilities and infrastructure requirements, development constraints and opportunities, and land use relationships.

In accordance with Section 106 of the National Historic Preservation Act of 1966 (36 Code of Federal Regulations Part 800), as amended, Kirtland AFB transmitted a letter to the SHPO to initiate consultation.

While the Proposed Action would have no impact on known cultural resources, any ground-disturbing activities would take into consideration the potential for the discovery of previously undiscovered cultural resources. Should an inadvertent discovery of human or cultural remains occur during construction, all project activities would stop, the Kirtland AFB Cultural Resources Program Manager would be notified, and operational procedures outlined in the Installation Cultural Resources Management Plan would be followed.

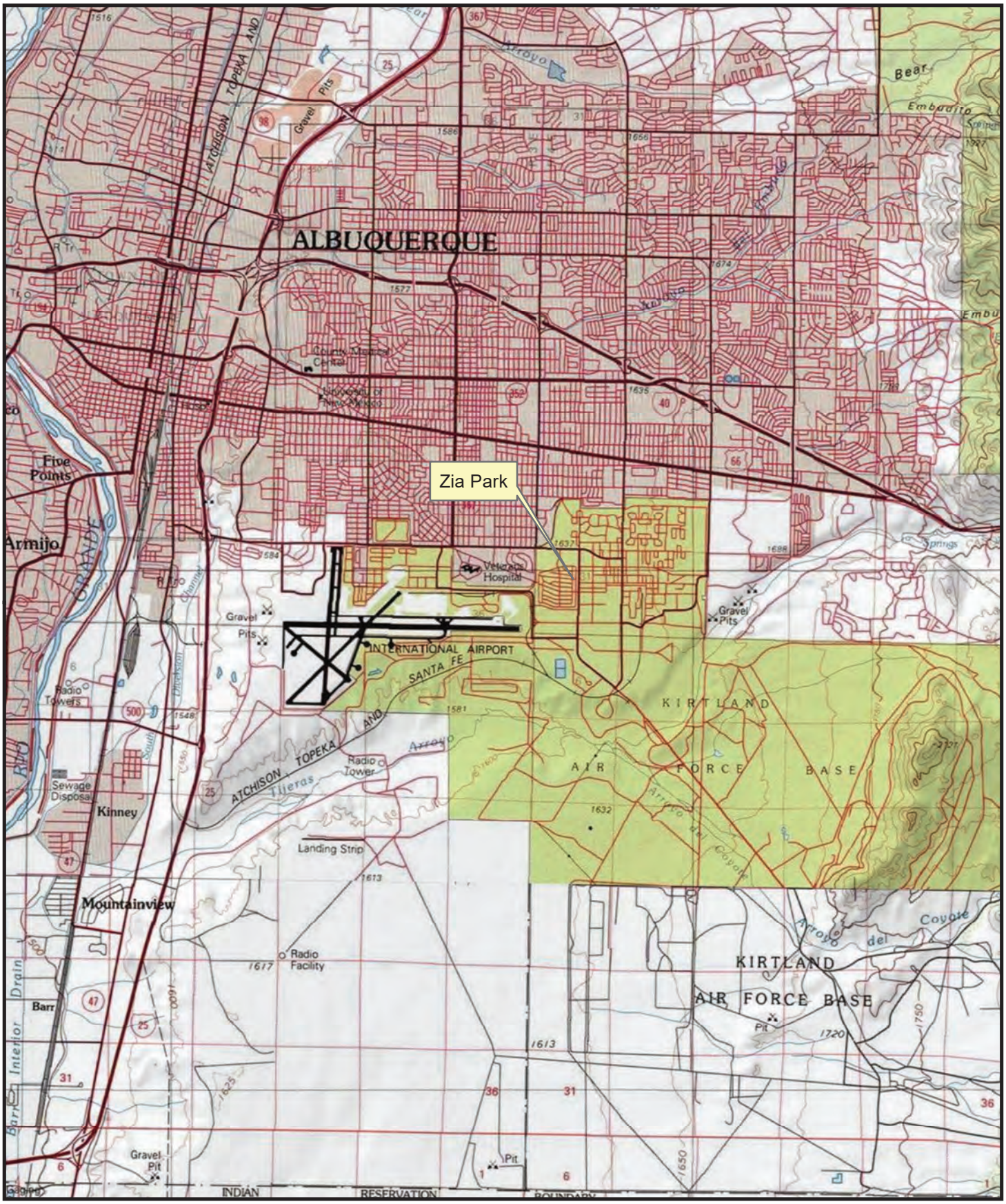
A copy of the Draft EA and the proposed Finding of No Significant Impact (FONSI) is available at *http://www.kirtland.af.mil* under the "Environment" button at the bottom of the webpage. If, after review of the Draft EA and proposed FONSI, you have additional information regarding impacts of the Proposed Action on the natural environment or other environmental aspects of which we are unaware, we would appreciate receiving such information for inclusion and consideration during the NEPA process. Please respond within 30 days of receipt of this letter to ensure your concerns are adequately addressed in the EA.

Please send your written responses to Ms. Brianne Sisneros, 377 MSG/CEIEC, 2050 Wyoming Boulevard SE, Suite 116, Kirtland AFB NM 87117, or via email to *KirtlandNEPA@us.af.mil*.

Sincerely

VATTIONI.JASON.F.1170028640
Digitally signed by VATTIONI.JASON.F.1170028640
Date: 2022.10.31 19:59:36 -06'00'

JASON F. VATTIONI, Colonel, USAF
Commander


ALBUQUERQUE
Zia Park
Five Points
Armijo
Veterans Hospital
Gravel Pits
INTERNATIONAL AIRPORT
SANTA FE
ATCHISON, TOPEKA AND
KIRTLAND
AIR FORCE BASE
Radio Towers
Sewage Disposal
Kinney
Radio Tower
Landing Strip
Mountainview
Radio Facility
Barr
Interior Drain
Gravel Pit
Pit
INDIAN RESERVATION BOUNDARY
Bear
Embudito
Arroyo
Coyote
Tijeras
0 1 2 4 Miles
0 1 2 4 Kilometers
N


Area of Potential Effects

0 375 750 1,500 Feet

0 100 200 400 Meters

N

Michelle Lujan Grisham
Governor

STATE OF NEW MEXICO
**DEPARTMENT OF CULTURAL AFFAIRS**
**HISTORIC PRESERVATION DIVISION**

BATAAN MEMORIAL BUILDING
407 GALISTEO STREET, SUITE 236
SANTA FE, NEW MEXICO 87501
PHONE (505) 827-6320 – NM.SHPO@state.nm.us

December 1, 2022

Brianne Sisneros
377 MSG/CEIEC
2050 Wyoming Blvd SE, Suite 116
Kirtland Air Force Base, NM 87117

Dear Colonel Vattioni:

Thank you for your submission dated October 31, 2022, for development projects associated with Zia Park at Kirtland Air Force base.

New Mexico State Historic Preservation Office concurs that this project will have no effect on historic properties.

Please let me know if you have any questions.

Best regards,
Steven

Steven Moffson
State and National Register Coordinator
New Mexico Historic Preservation Division
407 Galisteo Street, Suite 236
Santa Fe, New Mexico 87501
(505) 476-0444

Please note new email:
steven.moffson@dca.nm.gov

# United States Fish and Wildlife Services (USFWS) Correspondence

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

23 March 2022

Colonel Jason F. Vattioni, USAF
Commander
377th Air Base Wing
2000 Wyoming Boulevard SE
Kirtland Air Force Base NM 87117

Ms. Amy Leuders, Regional Director
US Fish & Wildlife Service
Southwest Regional Office
PO Box 1306
Albuquerque NM 87103-1306

Dear Ms. Leuders

In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the United States Air Force (USAF) NEPA regulations, the USAF is preparing an Environmental Assessment (EA) to evaluate the proposal for multiple construction projects for the Zia Park area development over the next 20 years at Kirtland Air Force Base (AFB). Zia Park is a former housing area covering approximately 300 acres. The Proposed Action includes multiple short- (1-5 years), mid- (5-10 years), and long- (10-20 years) range project requirements for the improvement of the physical infrastructure and functionality of the area, including current and future mission, facilities, and infrastructure requirements; development constraints and opportunities; and land use relationships. These projects include the development of training and education facilities, medical facilities, a fitness center, a child development center, dormitories, a dining center, outdoor recreation and open space, an entry control facility, roadway extensions, as well as improvements to utility infrastructure.

The purpose of the Proposed Action is to facilitate the area development process by evaluating in one integrated document the potential impacts on the human environment of proposed land use projects in the Zia Park area. The Proposed Action is needed because currently available facilities and infrastructure are incapable of supporting the 377th Air Base Wing and its mission partners.

Pursuant to Section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 United States Code 1531 et seq.), the USAF is requesting concurrence from the United States Fish and Wildlife Service that the Proposed Action is not likely to adversely affect any species or critical habitat. We carefully reviewed your agency's Section 7 Consultation website for a list of species and critical habitat that "may be present" within the project area and have found none. For these reasons, we conclude that the Proposed Action is not likely to adversely affect any species or critical habitat and we request your concurrence with our determination.

A copy of the Final Description of the Proposed Action and Alternatives for the EA addressing the Zia Park Area Development Plan at Kirtland AFB, New Mexico is available at *http://www.kirtland.af.mil/Home/Environment* under the heading "Environmental Assessments." As we move forward through this process, we welcome your participation and input. Please respond within 30 days of receipt of this letter to ensure your concerns are adequately addressed in the EA.

Please send your written responses to the NEPA Program Manager, 377 MSG/CEIEC, 2050 Wyoming Boulevard SE, Suite 116, Kirtland AFB NM 87117, or via email to KirtlandNEPA@us.af.mil.

Sincerely

VATTIONI.JASON.F.1170028640
Digitally signed by VATTIONI.JASON.F.1170028640
Date: 2022.03.23 07:07:55 -06'00'

JASON F. VATTIONI, Colonel, USAF
Commander

**DEPARTMENT OF THE AIR FORCE**
**377TH AIR BASE WING (AFGSC)**

31 October 2022

Colonel Jason F. Vattioni, USAF
Commander
377th Air Base Wing
2000 Wyoming Blvd SE
Kirtland Air Force Base NM 87117

Ms. Amy Leuders, Regional Director
US Fish & Wildlife Service
Southwest Regional Office
PO Box 1306
Albuquerque NM 87103-1306

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Pursuant to Section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 United States Code 1531 et seq.), Kirtland AFB conducted an effect determination for this project. All interrelated and interdependent actions were analyzed during that review. The US Fish & Wildlife Service (USFWS) Information for Planning and Consultation Official Species and Habitat List was received on 16 September 2021 under Consultation Code 02ENNM00-2021-SLI-1643. It was determined that there are no federally listed threatened or endangered species or critical habitat and no state-listed threatened or endangered species occurring within the project area. However, to ensure no impact, an updated species list from the USFWS would

be obtained within 90 days of the start of construction activities. There are no wetlands within the project area.

In accordance with Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, as amended by EO 12416, *Intergovernmental Review of Federal Programs*, I am requesting your participation in the NEPA document review and comment process. A copy of the Draft EA and the proposed Finding of No Significant Impact (FONSI) is available at *http://www.kirtland.af.mil* under the "Environment" button at the bottom of the webpage. If, after review of the Draft EA and proposed FONSI, you have additional information regarding impacts of the Proposed Action on the natural environment or other environmental aspects of which we are unaware, we would appreciate receiving such information for inclusion and consideration during the NEPA process. Please respond within 30 days of receipt of this letter to ensure your concerns are adequately addressed in the EA.

Please send your written responses to Ms. Brianne Sisneros, 377 MSG/CEIEC NEPA Program Manager, 2050 Wyoming Boulevard SE, Suite 116, Kirtland AFB NM 87117, or via email to *KirtlandNEPA@us.af.mil*.

Sincerely

VATTIONI.JASON.F.1170028640
Digitally signed by VATTIONI.JASON.F.1170028640
Date: 2022.10.31 20:00:17 -06'00'

JASON F. VATTIONI, Colonel, USAF
Commander

# Tribal Correspondence and Distribution List

**DEPARTMENT OF THE AIR FORCE**
**377TH AIR BASE WING (AFGSC)**

23 March 2022

Colonel Jason F. Vattioni, USAF
Commander
377th Air Base Wing
2000 Wyoming Blvd SE
Kirtland Air Force Base NM 87117

Governor E. Michael Silvas
Ysleta del Sur Pueblo
117 S Old Pueblo Road
PO Box 17579
El Paso TX 79907

Dear Governor Silvas

In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the United States Air Force (USAF) NEPA regulations, the USAF is preparing an Environmental Assessment (EA) to evaluate the proposal for multiple construction projects for the Zia Park area development over the next 20 years at Kirtland Air Force Base (AFB). Zia Park is a former housing area covering approximately 300 acres. The Proposed Action includes multiple short- (1-5 years), mid- (5-10 years), and long- (10-20 years) range project requirements for the improvement of the physical infrastructure and functionality of the area, including current and future mission, facilities, and infrastructure requirements; development constraints and opportunities; and land use relationships. These projects include the development of training and education facilities, medical facilities, a fitness center, a child development center, dormitories, a dining center, outdoor recreation and open space, an entry control facility, roadway extensions, as well as improvements to utility infrastructure.

The purpose of the Proposed Action is to facilitate the area development process by evaluating in one integrated document the potential impacts on the human environment of proposed land use projects in the Zia Park area. The Proposed Action is needed because currently available facilities and infrastructure are incapable of supporting the 377th Air Base Wing and its mission partners.

Pursuant to Section 106 of the National Historic Preservation Act (36 Code of Federal Regulations Part 800) and Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments*, the USAF would like to initiate government-to-government consultation to offer you and your designee the opportunity to identify any comments, concerns, and suggestions relevant to the NEPA compliance process concerning the Proposed Action. As we move forward through this process, we welcome your participation and input.

Kirtland AFB has determined that the Area of Potential Effects (APE) for direct effects would be defined as the approximately 300 acres at Zia Park where the developments discussed above could be constructed. The APE for indirect effects is defined as a 0.25-mile (1,320-foot) radius around the boundary of the proposed site. As a result of previous cultural resource surveys conducted within the APE no historic properties have been identified.

A copy of the Final Description of the Proposed Action and Alternatives for the EA addressing the Zia Park Area Development Plan at Kirtland AFB, New Mexico is available at *http://www.kirtland.af.mil/Home/Environment* under the heading "Environmental Assessments." We look forward to and welcome your participation in this process. For technical information, please contact my Natural and Cultural Program Manager, Mr. David Reynolds, by email at david.reynolds.37@us.af.mil.

As noted above, the USAF would like to initiate government-to-government consultation pursuant to Section 106 of the NHPA concerning this Undertaking, and is seeking concurrence on the APE for Kirtland AFB, as defined. Please contact my office at (505) 846-7377 if you would like to meet to discuss the proposed project or proceed with the Section 106 consultation.

Sincerely

VATTIONI.JASON.F.1170028640
Digitally signed by VATTIONI.JASON.F.1170028640
Date: 2022.03.23 07:11:55 -06'00'

JASON F. VATTIONI, Colonel, USAF
Commander

Attachment:
Maps of the Proposed Location of Undertaking at Kirtland Air Force Base

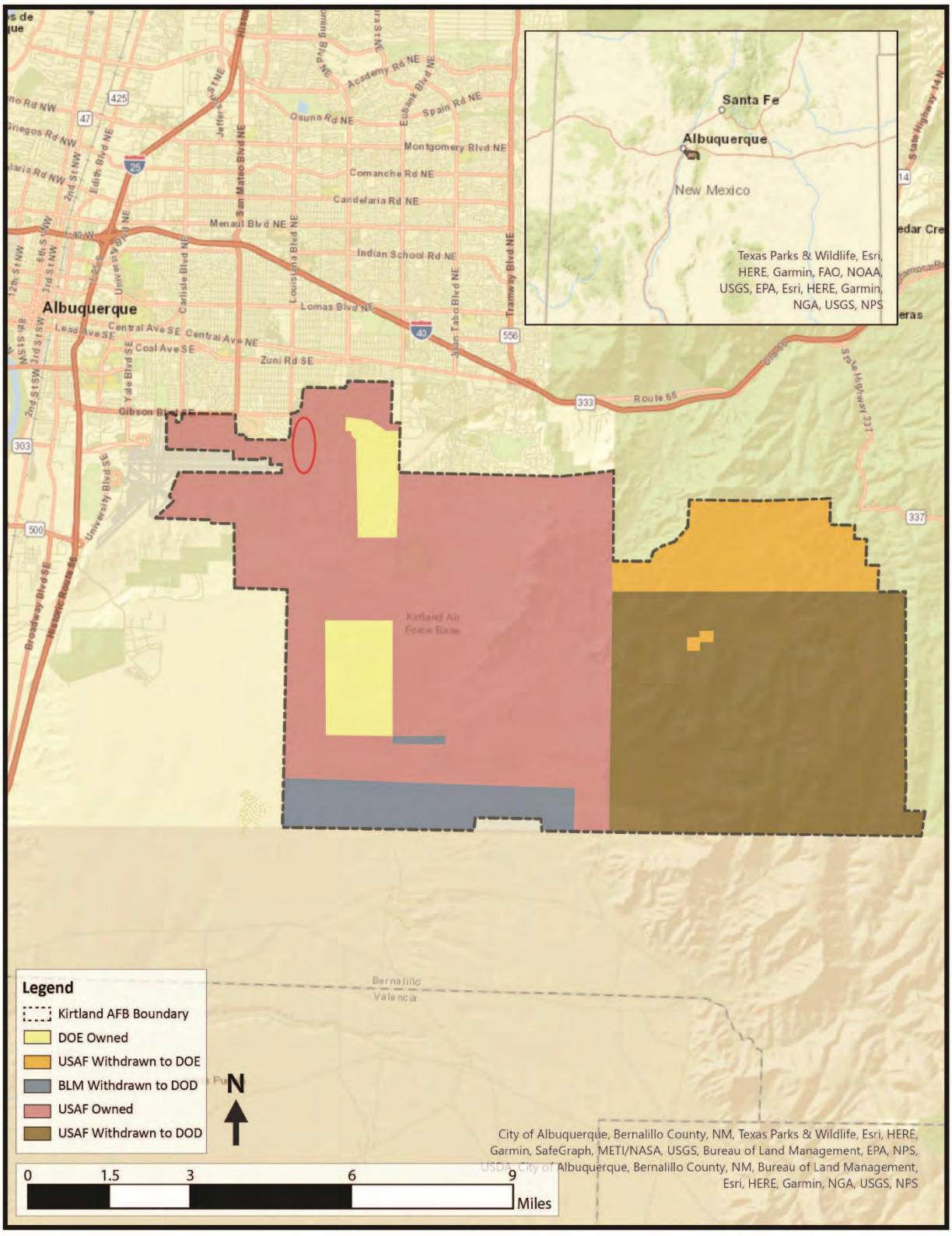


*Figure 1: Kirtland AFB Vicinity Map with Land Ownership and Withdrawn Areas*


*Figure 2: Boundaries and Existing Facilities at Zia Park*


Note: This is a conceptual drawing only and actual design and placement of facilities may change.

*Figure 3: Zia Park Conceptual Design Drawing*

DISTRIBUTION LIST
**Native American Tribes**

Governor Ray Vicente
Pueblo of Acoma
PO Box 309
Acoma Pueblo NM 87034

Governor Phillip Quintana
Pueblo of Cochiti
PO Box 70
Cochiti Pueblo NM 87072

Chairman Timothy L. Nuvangyaoma
Hopi Tribal Council
PO Box 123
Kykotsmovi AZ 86039

Governor Vernon B. Abeita
Pueblo of Isleta
PO Box 1270
Isleta NM 87022

Governor Raymond Loretto
Pueblo of Jemez
PO Box 100
Jemez Pueblo NM 87024

President Edward Velarde
Jicarilla Apache Nation
PO Box 507
Dulce NM 87528

Governor Martin Kowemy, Jr.
Pueblo of Laguna
PO Box 194
Laguna NM 87026

President Eddy Martinez
Mescalero Apache Tribe
PO Box 227
Mescalero NM 88340

Governor Nathaniel Porter
Pueblo of Nambe
15A NP102 West
Santa Fe NM 87506

President Jonathan Nez
Navajo Nation
PO Box 7440
Window Rock AZ 86515

Governor Patrick Aguino
Ohkay Owingeh Pueblo
PO Box 1099
San Juan Pueblo NM 87566

Governor Craig Quanchello
Pueblo of Picuris
PO Box 127
Peñasco NM 87553

Governor Jenelle Roybal
Pueblo of Pojoaque
78 Cities of Gold
Santa Fe NM 87506

Governor Stuart Paisano
Pueblo of Sandia
481 Sandia Loop
Bernalillo NM 87004

Governor Carl Valencia
Pueblo of San Felipe
PO Box 4339
San Felipe Pueblo NM 87001

Governor Christopher Moquino
Pueblo of San Ildefonso
02 Tunyo Po
Santa Fe NM 87506

Governor Joseph Sanchez
Pueblo of Santa Ana
2 Dove Road
Santa Ana Pueblo NM 87004

Governor J. Michael Chavarria
Pueblo of Santa Clara
PO Box 580
Española NM 87532

Governor Sidelio Tenorio
Pueblo of Santo Domingo
PO Box 99
Santo Domingo Pueblo NM 87052

Governor Clyde M. Romero, Sr.
Pueblo of Taos
PO Box 1846
Taos NM 87571

Governor Roberto Mora, Sr.
Pueblo of Tesuque
Route 42 Box 360-T
Santa Fe NM 87506

Chairwoman Gwendena Lee-Gatewood
White Mountain Apache Tribe
PO Box 700
Whiteriver AZ 85941

Governor E. Michael Silvas
Ysleta Del Sur Pueblo
117 S Old Pueblo Road
PO Box 17579
El Paso TX 79907

Chairman Manual Heart
Ute Mountain Ute Tribe
PO Box JJ
Towaoc CO 81334-0248

President Walter Echo-Hawk
Pawnee Nation of Oklahoma
PO Box 470
Pawnee OK 74058

Chairman Melvin J. Baker
Southern Ute Indian Tribe
PO Box 737
Ignacio CO 81137

Chairman Matthew Komalty
Kiowa Tribe of Oklahoma
PO Box 369
Carnegie OK 73015

Governor Gabriel Galvan
Pueblo of Zia
135 Capitol Square Drive
Zia Pueblo NM 87053-6013

Governor Val R. Panteah, Sr.
Pueblo of Zuni
PO Box 339
Zuni NM 87327

Chairwoman Lori Gooday-Ware
Fort Still Apache Tribe of Oklahoma
Rt 2, Box 121
Apache OK 73006

President Terri Parton
Wichita & Affiliated Tribes
Wichita Executive Committee
PO Box 729
Anadarko OK 73005

Chairman Terry Rambler
San Carlos Apache Tribe
PO Box 0
San Carlos AZ 85550

Chairman Mark Woommavovah
Comanche Nation of Oklahoma
PO Box 908
Lawton OK 73502

Chairman Bobby Komardely
Apache Tribe of Oklahoma
PO Box 1220
Anadarko OK 73005

07/21/21
11/09/21 VN
11/09/21 VN

SAN CARLOS APACHE TRIBE
Historic Preservation & Archaeology Department
P.O. Box 0
San Carlos Arizona 85550
Tel. (928) 475-5797, apachevern@yahoo.com

# Tribal Consultation Response Letter

**Date:** July 21, 2021
**Contact Name:** Steven T. Rose (505) 846-7377
**Company:** Department of Defense kirtlandnepa@us.af.mil
**Address:** US Space Command Logistics and Engineering Peterson AFB, CO 80914
**Project Name/#:** The USAF is preparing an EA to evaluate the potential environmental impacts resulting from construction and operation of a permanent United States Space Command Headquarters facility at one of the six alternative sites in the Unites States (Proposed Actions).

**Dear Sir or Madam:**

Under Section 106 and 110 of the National Historic Preservation Act, we are replying to the above referenced project. Please see the appropriate marked circle, including the signatures of Vernelda Grant, Tribal Historic Preservation Officer (THPO), and the concurrence of the Chairman of the San Carlos Apache Tribe:

- O **NO INTEREST/NO FURTHER CONSULTATION/NO FUTURE UPDATES**
  We defer to the Tribe located nearest to the project area.
- X **CONCURRENCE WITH REPORT FINDINGS & THANK YOU** – we defer to the Tucson + Mescalero Apache Tribe.
- O **REQUEST ADDITIONAL INFORMATION**
  I require additional information in order to provide a finding of effect for this proposed undertaking, i.e.
  Project description ___ Map ___ Photos ___ Other _____
- X **NO EFFECT**
  I have determined that there are no properties of religious and cultural significance to the San Carlos Apache Tribe that are listed on the National Register within the area of potential effect or that the proposed project will have no effect on any such properties that may be present.
- O **NO ADVERSE EFFECT**
  Properties of cultural and religious significance within the area of effect have been identified that are eligible for listing in the National Register for which there would be no adverse effect as a result of the proposed project.
- O **ADVERSE EFFECT**
  I have identified properties of cultural and religious significance within the area of potential effect that are eligible for listing in the National Register. I believe the proposed project would cause an adverse effect on these properties. Please contact the THPO for further discussion.

We were taught traditionally not to disturb the natural world in a significant way, and that to do so may cause harm to oneself or one's family. Apache resources can be best protected by managing the land to be as natural as it was in pre-1870s settlement times. Please contact the THPO, if there is a change in any portion of the project, especially if Apache cultural resources are found at any phase of planning and construction. Thank you for contacting the San Carlos Apache Tribe, your time and effort is greatly appreciated.

**DIRECTOR/THPO:** _____ 11/04/21
Vernelda J. Grant, Tribal Historic Preservation Officer — Date

**CONCURRENCE:** Terry Rambler 11/8/21
Terry Rambler, Tribal Chairman — Date

**From:** REYNOLDS, DAVID H GS-12 USAF AFGSC 377 MSG/CEIEC
**To:** Danny Taylor; Jessie Moore; CLARK, MELISSA B GS-14 USAF AFGSC 377 MSG/CEI
**Subject:** FW: [Non-DoD Source] Southern Ute Indian Tribe - Zia Park Upcoming Projects Project Notification Received
**Date:** Friday, May 27, 2022 6:58:54 AM
**Importance:** Low

---

-----Original Message-----
From: Watts, Xavier <xwatts@southernute-nsn.gov>
Sent: Thursday, May 26, 2022 9:32 PM
To: REYNOLDS, DAVID H GS-12 USAF AFGSC 377 MSG/CEIEC <david.reynolds.37@us.af.mil>
Cc: Watts, Xavier <xwatts@southernute-nsn.gov>
Subject: [Non-DoD Source] Southern Ute Indian Tribe - Zia Park Upcoming Projects Project Notification Received
Importance: Low

Maykh,

We have received the Zia Park Upcoming Projects project packet on 05-27-2022. The project is currently being reviewed and a response letter will be issued before or on the due date, which is noted as 5/13/2022.

If you have any questions, comments, or would like to send a reminder, please follow-up with Shelly Thompson and Xavier Watts at sthompson@southernute-nsn.gov and xwatts@southernute-nsn.gov..

Toghoyaqh,

Tribal Historic Preservation Office

**DEPARTMENT OF THE AIR FORCE**
**377TH AIR BASE WING (AFGSC)**

Colonel Jason F. Vattioni, USAF
Commander
377th Air Base Wing
2000 Wyoming Blvd SE
Kirtland Air Force Base NM 87117



23 March 2022



The Hopi Tribe
Chairman Timothy L. Nuvangyaoma
PO Box 123
Kykotsmovi AZ 86039

Dear Chairman Nuvangyaoma

In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the United States Air Force (USAF) NEPA regulations, the USAF is preparing an Environmental Assessment (EA) to evaluate the proposal for multiple construction projects for the Zia Park area development over the next 20 years at Kirtland Air Force Base (AFB). Zia Park is a former housing area covering approximately 300 acres. The Proposed Action includes multiple short- (1-5 years), mid- (5-10 years), and long- (10-20 years) range project requirements for the improvement of the physical infrastructure and functionality of the area, including current and future mission, facilities, and infrastructure requirements; development constraints and opportunities; and land use relationships. These projects include the development of training and education facilities, medical facilities, a fitness center, a child development center, dormitories, a dining center, outdoor recreation and open space, an entry control facility, roadway extensions, as well as improvements to utility infrastructure.

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Kirtland AFB has determined that the Area of Potential Effects (APE) for direct effects would be defined as the approximately 300 acres at Zia Park where the developments discussed

above could be constructed. The APE for indirect effects is defined as a 0.25-mile (1,320-foot) radius around the boundary of the proposed site. As a result of previous cultural resource surveys conducted within the APE no historic properties have been identified.

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As noted above, the USAF would like to initiate government-to-government consultation pursuant to Section 106 of the NHPA concerning this Undertaking, and is seeking concurrence on the APE for Kirtland AFB, as defined. Please contact my office at (505) 846-7377 if you would like to meet to discuss the proposed project or proceed with the Section 106 consultation.

4-18-22

Concur

for

Sincerely

JASON F. VATTIONI, Colonel, USAF
Commander

Attachment:
Maps of the Proposed Location of Undertaking at Kirtland Air Force Base

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

31 October 2022

Colonel Jason F. Vattioni, USAF
Commander
377th Air Base Wing
2000 Wyoming Boulevard SE
Kirtland Air Force Base NM 87117

Governor E. Michael Silvas
Ysleta Del Sur Pueblo
P119 S Old Pueblo Road
Ysleta del Sur TX 79917

Dear Governor Silvas

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Pursuant to Section 106 of the National Historic Preservation Act (36 Code of Federal Regulations Part 800), the USAF would like to continue government-to-government consultation to allow you and your designee the opportunity to identify any comments, concerns, and

suggestions relevant to the NEPA compliance process concerning the Proposed Action. A copy of the Draft EA and proposed Finding of No Significant Impact (FONSI) is available at *http://www.kirtland.af.mil* under the "Environment" button at the bottom of the webpage. For technical information, please contact my Natural and Cultural Program Manager, Mr. David Reynolds, by email at david.reynolds.37@us.af.mil.

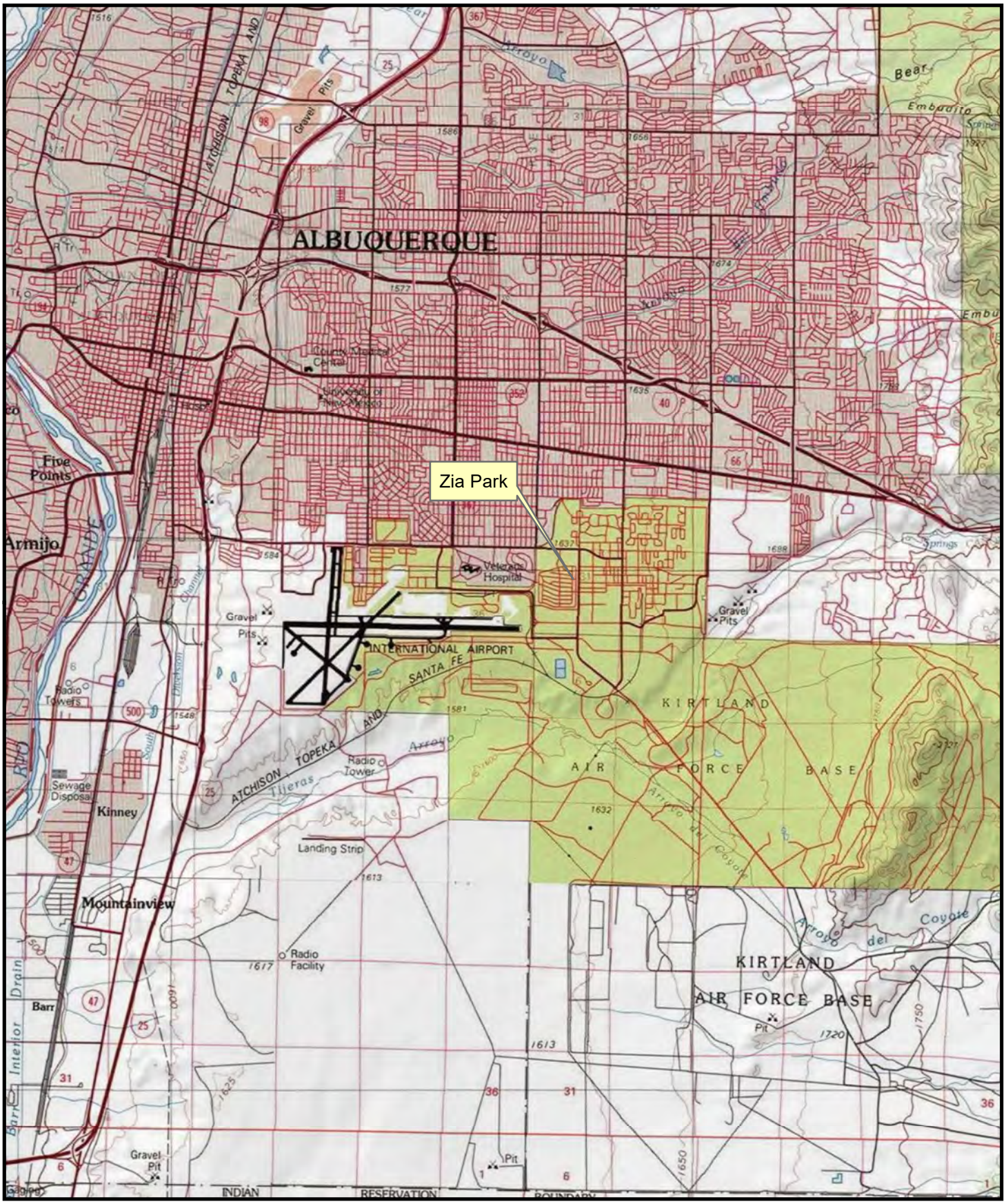
Please contact my office at (505) 846-7377 if you would like to meet to discuss the proposed project or proceed with Section 106 consultation.

Sincerely

VATTIONI.JASON.F.1170028640

Digitally signed by VATTIONI.JASON.F.1170028640
Date: 2022.10.31 20:00:51 -06'00'

JASON F. VATTIONI, Colonel, USAF
Commander




0 1 2 4 Miles

0 1 2 4 Kilometers

N


Area of Potential Effects

0 375 750 1,500 Feet

0 100 200 400 Meters

N

DISTRIBUTION LIST
**Native American Tribes**

Governor Ray Vicente
Pueblo of Acoma
PO Box 309
Acoma Pueblo NM 87034

Governor Phillip Quintana
Pueblo of Cochiti
PO Box 70
Cochiti Pueblo NM 87072

Chairman Timothy L. Nuvangyaoma
The Hopi Tribe
PO Box 123
Kykotsmovi AZ 86039

Governor Vernon B. Abeita
Pueblo of Isleta
PO Box 1270
Isleta NM 87022

Governor Raymond Loretto
Pueblo of Jemez
PO Box 100
Jemez Pueblo NM 87024

President Edward Velarde
Jicarilla Apache Nation
PO Box 507
Dulce NM 87528

Governor Martin Kowemy, Jr.
Pueblo of Laguna
PO Box 194
Laguna NM 87026

President Eddy Martinez
Mescalero Apache Tribe
PO Box 227
Mescalero NM 88340

Governor Nathaniel Porter
Pueblo of Nambe
15A NP102 West
Santa Fe NM 87506

President Jonathan Nez
Navajo Nation
PO Box 7440
Window Rock AZ 86515

Governor Patrick Aguino
Ohkay Owingeh
PO Box 1099
San Juan Pueblo NM 87566

Governor Craig Quanchello
Pueblo of Picuris
PO Box 127
Peñasco NM 87553

Governor Jenelle Roybal
Pueblo of Pojoaque
78 Cities of Gold
Santa Fe NM 87506

Governor Stuart Paisano
Pueblo of Sandia
481 Sandia Loop
Bernalillo NM 87004

Governor Carl Valencia
Pueblo of San Felipe
PO Box 4339
San Felipe Pueblo NM 87001

Governor Christopher Moquino
Pueblo of San Ildefonso
02 Tunyo Po
Santa Fe NM 87506

Governor Joseph Sanchez
Pueblo of Santa Ana
2 Dove Road
Santa Ana Pueblo NM 87004

Governor J. Michael Chavarria
Pueblo of Santa Clara
PO Box 580
Española NM 87532

Governor Sidelio Tenorio
Pueblo of Santo Domingo
PO Box 99
Santo Domingo Pueblo NM 87052

Governor Clyde M. Romero, Sr.
Pueblo of Taos
PO Box 1846
Taos NM 87571

Governor Robert Mora, Sr.
Pueblo of Tesuque
Route 42 Box 360-T
Santa Fe NM 87506

Chairwoman Gwendena Lee-Gatewood
White Mountain Apache Tribe
PO Box 700
Whiteriver AZ 85941

Governor E. Michael Silvas
Ysleta Del Sur Pueblo
P119 S Old Pueblo Road
Ysleta del Sur TX 79917

President Walter Echo-Hawk
Pawnee Nation of Oklahoma
PO Box 470
Pawnee OK 74058

Chairman Melvin J. Baker
Southern Ute Indian Tribe
PO Box 737
Ignacio CO 81137

Chairman Matthew Komalty
Kiowa Tribe of Oklahoma
PO Box 369
Carnegie OK 73015

Chairman Bobby Komardley
Apache Tribe of Oklahoma
PO Box 1220
Anadarko OK 73005

Governor Gabriel Galvan
Pueblo of Zia
135 Capitol Square Drive
Zia Pueblo NM 87053-6013

Governor Val R. Panteah, Sr.
Pueblo of Zuni
PO Box 339
Zuni NM 87327

Chairwoman Lori Gooday-Ware
Fort Still Apache Tribe of Oklahoma
Rt 2, Box 121
Apache OK 73006

President Terri Parton
Wichita & Affiliated Tribes
Wichita Executive Committee
PO Box 729
Anadarko OK 73005

Chairman Terry Rambler
San Carlos Apache Tribe
PO Box 0
San Carlos AZ 85550

Chairman Mark Woommavovah
Comanche Nation of Oklahoma
PO Box 908
Lawton OK 73502

# White Mountain Apache Tribe

**Office of Historic Preservation**
**PO Box 1032**
**Fort Apache, AZ 85926**
**Ph: (928) 338-3033 Fax: (928) 338-6055**


**To:** Jason F. Vattioni, Colonel, USAF Commander

**Date:** December 13, 2022

**Re:** *Proposal for multiple Construction Projects at Zia Park, Kirkland Air Force Base*

The White Mountain Apache Tribe Historic Preservation Office appreciates receiving information on the project dated; October 31, 2022. In regards to this, please refer to the following statement(s) below.

Thank you for allowing the White Mountain Apache tribe the opportunity to review and respond to the above proposal to develop and/or construct multiple projects at Zia Park, on the Kirkland Air Force Base, in New Mexico.

Please be advised, we reviewed the consultation letter and the information provided, and we've determined the proposed project plans will have ***"No Adverse Effect"*** on the tribe's cultural heritage resources and/or historic properties. Further consultation is not necessary or required.

Thank you for your continued collaborations in protecting and preserving places of cultural and historical importance.

Sincerely,

Mark T. Altaha

White Mountain Apache Tribe – THPO
Historic Preservation Office

-----Original Message-----
From: Randy Teboe <thpo@sanipueblo.org>
Sent: Thursday, December 29, 2022 8:34 AM
To: REYNOLDS, DAVID H GS-12 USAF AFGSC 377 MSG/CEIEC <david.reynolds.37@us.af.mil>
Subject: [URL Verdict: Neutral][Non-DoD Source] RE: Kirtland AFB Zia Park Area Development Draft Environmental Assessment

Mr. Reynolds,
Please be advised that the Pueblo de San Ildefonso has no comment regarding your project. As the area has been previously disturbed, and no cultural materials were found.

Thank you,
Randy Teboe
Tribal Historic Preservation Officer
Pueblo de San Ildefonso
Cell 505-231-6375
Office 505-455-4141
thpo@sanipueblo.org

-----Original Message-----
From: REYNOLDS, DAVID H GS-12 USAF AFGSC 377 MSG/CEIEC <david.reynolds.37@us.af.mil>
Sent: Saturday, December 24, 2022 7:43 AM
To: sanip227 <thpo@sanipueblo.org>
Subject: Kirtland AFB Zia Park Area Development Draft Environmental Assessment

Dear Mr. Teboe,

Col Vattioni sent a NEPA & NHPA consultation letter for the draft of the Zia Park Area Development at Kirtland Air Force Base Environmental Assessment to

Governor Moquino on 31 Oct 2022, the project scoping letter was sent on 23 March 2022. Copies of the Draft environmental assessment and the proposed Finding of No Significant Impact (FONSI) are available at: http://www.kirtland.af.mil by clicking the "Environment" button at the bottom of the webpage. I have attached a PDF of the letter in case you do not have a hardcopy yet.

The entire project area was previously used for base housing which was demolished during the early 2000s. Zia Park was surveyed for historic properties and none were encountered.

Please let me know if there are any other individuals that I should send electronic copies of these correspondences to and feel free to contact me if you have any technical questions. We look forward to working with you to address any concerns you may have with this proposed project.

Respectfully,

David Reynolds, GS-12, 377 MSG/CEIEC
Cultural/Natural Resources Program Manager
Comm (505) 846-0226
DSN 246-0226

-----Original Message-----
From: Bernstein, Bruce <bbernstein@pojoaque.org>
Sent: Monday, January 2, 2023 8:07 AM
To: REYNOLDS, DAVID H GS-12 USAF AFGSC 377 MSG/CEIEC <david.reynolds.37@us.af.mil>
Subject: [Non-DoD Source] Re: Kirtland AFB Zia Park Area Development Draft Environmental Assessment

Received, thank you.

The Pueblo of Pojoaque appreciates your efforts in surveying and making the determination of no historic properties and therefore no cultural impacts for the project.

Bruce Bernstein, PhD

Tribal Historic Preservation Officer

P'osuwaegeh Owingeh - Pueblo of Pojoaque

O: 505-455-5505

C: 505-795-6152

-----Original Message-----
From: Gary McAdams <gary.mcadams@wichitatribe.com>
Sent: Tuesday, December 27, 2022 11:30 AM
To: REYNOLDS, DAVID H GS-12 USAF AFGSC 377 MSG/CEIEC <david.reynolds.37@us.af.mil>
Cc: Mary Botone <mary.botone@wichitatribe.com>; Robin Williams <robin.williams@wichitatribe.com>
Subject: [URL Verdict: Neutral][Non-DoD Source] RE: Kirtland AFB Zia Park Area Development Draft Environmental Assessment

Dear Mr. Reynolds,

Kirtland AFB is outside our area of interest. Therefore we decline consultation on the EA for multiple construction projects at the Zia Park area development. I am attaching the list of counties within our area of interest for your future reference.

Gary McAdams

THPO

Wichita and Affiliated Tribes

From: Mary Botone <mary.botone@wichitatribe.com>
Sent: Tuesday, December 27, 2022 10:28 AM
To: Gary McAdams <gary.mcadams@wichitatribe.com>; Robin Williams <robin.williams@wichitatribe.com>
Cc: Sylvester Luther <sylvester.luther@wichitatribe.com>
Subject: Fw: Kirtland AFB Zia Park Area Development Draft Environmental Assessment

To Whom It May Concern:

I received this in my email box Saturday, they are asking for clearance on an EA throught NEPA & NHPA, could someone please reply. Kirtland AFB is not in our area of concern being it's in Bernalillo County, New Mexico. Thank you.

---

From: REYNOLDS, DAVID H GS-12 USAF AFGSC 377 MSG/CEIEC <david.reynolds.37@us.af.mil <mailto:david.reynolds.37@us.af.mil> >
Sent: Saturday, December 24, 2022 9:29 AM
To: Mary Botone <mary.botone@wichitatribe.com <mailto:mary.botone@wichitatribe.com> >
Subject: Kirtland AFB Zia Park Area Development Draft Environmental Assessment

Dear Ms. Botone,

Col Vattioni sent a NEPA & NHPA consultation letter for the draft of the Zia Park Area Development at Kirtland Air Force Base Environmental Assessment to President Parton on 31 Oct 2022, the project scoping letter was sent on 23 March 2022. Copies of the Draft environmental assessment and the proposed Finding of No Significant Impact (FONSI) are available at: http://www.kirtland.af.mil by clicking the "Environment" button at the bottom of the webpage. I have attached a PDF of the letter in case you do not have a hardcopy yet.

The entire project area was previously used for base housing which was demolished during the early 2000s. Zia Park was surveyed for historic properties and none were encountered.

Please let me know if there are any other individuals that I should send electronic copies of these correspondences to and feel free to contact me if you have any technical questions. We look forward to working with you to address any concerns you may have with this proposed project.

Respectfully,

David Reynolds, GS-12, 377 MSG/CEIEC
Cultural/Natural Resources Program Manager Comm (505) 846-0226 DSN 246-0226

# Wichita and Affiliated Tribes

**Wichita Waco Keechi Tawakoni**

*Terri Parton President*
*Jesse Jones Vice President*
*Myles Stephenson Jr Secretary*
*Vanessa Vance Treasurer*

*Committee Members*
*Shirley Davila*
*Nahusheah Mandujano*
*Matt Roberson*


## List of Counties of Importance to the Wichita and Affiliated Tribes

In **Oklahoma**, the following counties are of importance to the Wichita and Affiliated Tribes:

Adair, Alfalfa, Atoka, Beaver, Beckham, Blaine, Bryan, Caddo, Canadian, Carter, Cherokee, Choctaw, Cimarron, Cleveland, Coal, Comanche, Cotton, Craig, Creek, Custer, Delaware, Dewey, Ellis, Garfield, Garvin, Grady, Grant, Greer, Harmon, Harper, Haskell, Hughes, Jackson, Jefferson, Johnston, Kay, Kingfisher, Kiowa, Latimer, LeFlore, Lincoln, Logan, Love, Major, Marshall, Mayes, McClain, McIntosh, Murray, Muskogee, Noble, Nowata, Okfuskee, Oklahoma, Okmulgee, Osage, Ottawa, Pawnee, Payne, Pittsburg, Pontotoc, Pottawatomie, Pushmataha, Roger Mills, Rogers, Seminole, Sequoyah, Stephens, Texas, Tillman, Tulsa, Wagoner, Washington, Washita, Woods and Woodward

In **Kansas**, the following counties are of importance to the Wichita and Affiliated Tribes:

Allen, Anderson, Barber, Barton, Bourbon, Butler, Chase, Chautauqua, Cherokee, Clark, Clay, Cloud, Coffey, Comanche, Cowley, Crawford, Dickinson, Edwards, Elk, Ellis, Ellsworth, Finney, Ford, Franklin, Geary, Gove, Graham, Grant, Gray, Greeley, Greenwood, Hamilton, Harper, Harvey, Haskell, Hodgeman, Kearny, Kingman, Kiowa, Labette, Lane, Lincoln, Linn, Logan, Lyon, Marion, McPherson, Meade, Mitchell, Montgomery, Morris, Morton, Neosho, Ness, Osage, Osborne, Ottawa, Pawnee, Pratt, Reno, Rice, Riley, Rooks, Rush, Russell, Saline, Scott, Sedgwick, Seward, Sheridan, Stafford, Stanton, Stevens, Sumner, Thomas, Trego, Wabaunsee, Wallace, Wichita, Wilson and Woodson

In **Texas**, the following counties are of importance to the Wichita and Affiliated Tribes:

Andrews, Archer, Armstrong, Bailey, Baylor, Bell, Borden, Bosque, Briscoe, Brown, Burnet, Callahan, Carson, Castro, Childress, Clay, Cocharan, Coke, Coleman, Collin, Collinsworth, Comanche, Concho, Cooke, Coryell, Cottle, Crane, Crockett, Crosby, Culberson, Dallam, Dallas, Dawson, Deaf Smith, Delta, Denton, Dickens, Donley, Eastland, Ector, Ellis, Erath, Falls, Fannin, Fisher, Floyd, Foard, Freestone, Gaines, Garza, Glasscock, Gray, Grayson, Greg, Hale, Hall, Hamilton, Hansford, Hardeman,




*PO Box 729*
*Anadarko, Oklahoma 73005*

*Phone* *405.247.8667*
*Fax* *405.247.2167*

# Wichita and Affiliated Tribes

**Wichita Waco Keechi Tawakoni**

*Terri Parton President*
*Jesse Jones Vice President*
*Myles Stephenson Jr Secretary*
*Vanessa Vance Treasurer*

*Committee Members*
*Shirley Davila*
*Nahusheah Mandujano*
*Matt Roberson*


Hartley, Haskell, Hemphill, Henderson, Hill, Hockley, Hopkins, Hood, Howard, Hunt, Hutchinson, Irion, Jack, Johnson, Jones, Kaufman, Kent, Kimble, King, Knox, Lamar, Lamb, Lampasas, Leon, Limestone, Lipscomb, Llano, Loving, Lubbock, Lynn, Martin, Mason, McCulloch, McLennan, Menard, Midland, Milam, Mills, Mitchell, Moore, Montague, Motley, Navarro, Nolan, Ochiltree, Oldham, Palo Pinto, Parker, Parmer, Pecos, Potter, Raines, Randall, Reagan, Reeves, Roberts, Robertson, Rockwall, Runnels, San Saba, Schleicher, Scurry, Shackleford, Sherman, Smith, Somervell, Stephens, Sterling, Stonewall, Sutton, Swisher, Tarrant, Taylor, Terry, Throckmorton, Tom Green, Upton, Van Zandt, Ward, Wheeler, Wichita, Wilbarger, Williamson, Winkler, Wise, Yoakum and Young

In **Missouri**, the following counties are of importance to the Wichita and Affiliated Tribes:

Barry, Barton, Bates, Cedar, Christian, Dade, Greene, Jasper, Lawrence, McDonald, Newton, Polk, St. Clair, and Vernon

In **Arkansas**, the following counties are of importance to the Wichita and Affiliated Tribes:

Benton, Boone, Carroll, Crawford, Franklin, Johnson, Logan, Madison, Newton, Scott, Sebastian and Washington

In **Colorado**, the following counties are of importance to the Wichita and Affiliated Tribes:

Baca, Bent, Cheyenne, Crowley, Elbert, Huefano, Kiowa, Kit Carson, Las Animas, Lincoln, Otero and Prowers

In **New Mexico**, the following counties are of importance to the Wichita and Affiliated Tribes:

Chaves, Colfax, Curry, Carlsbad, DeBaca, Eddy, Guadalupe, Harding, Lea, Lincoln, Mora, Quay, Roosevelt, San Miguel and Union




Gary McAdams
Acting Tribal Historic Preservation Officer
Wichita and Affiliated Tribes

*PO Box 729*
*Anadarko, Oklahoma 73005*

*Phone 405.247.8667*
*Fax 405.247.2167*

-----Original Message-----
From: Richard M. Begay <r.begay@navajo-nsn.gov>
Sent: Monday, December 26, 2022 1:06 PM
To: REYNOLDS, DAVID H GS-12 USAF AFGSC 377 MSG/CEIEC <david.reynolds.37@us.af.mil>
Subject: [Non-DoD Source] RE: Kirtland AFB Zia Park Area Development Draft Environmental Assessment

Good afternoon

I do not have any questions or concerns regarding the Zia Park area development projects. Please proceed without further consultation with the NNHHPD.

Thank you,
Richard M. Begay, THPO
Navajo Nation

-----Original Message-----
From: REYNOLDS, DAVID H GS-12 USAF AFGSC 377 MSG/CEIEC <david.reynolds.37@us.af.mil>
Sent: Friday, December 23, 2022 12:49 PM
To: Richard M. Begay <r.begay@navajo-nsn.gov>
Subject: Kirtland AFB Zia Park Area Development Draft Environmental Assessment

# Pawnee Nation

Friday, February 03, 2023

David Reynolds
Natural and Cultural Program Manager
377th Air Base Wing
Department of the Air Force
Kirtland Air Force Base

RE: Section 106 Consultation and Review on-
*Re: Multiple Construction Projects for Zia Park*
*Kirtland Air Force Base*
*Albuquerque, Bernalillo County, New Mexico*

The Pawnee Nation Office of Historic Preservation has received the information and materials requested for our Section 106 Review and Consultation. Consultation with the Pawnee Nation is required by Section 106 of the National Historic Preservation Act of 1966 (NHPA), and 36 CFR Part 800.

Given the information provided, you are hereby notified that the proposed project/s should not affect the cultural landscape of the Pawnee Nation.

However, be advised that additional undiscovered properties could be encountered, and they must be immediately reported to us under both the National Historic Preservation Act and the Native American Graves Protection and Repatriation Act regulations.

This information is provided to assist you in complying with 36 CFR Part 800 for Section 106 Consultation procedures. Should you have questions, please do not hesitate to contact me at jreed@pawneenation.org or by phone at 918-762-2180 ext. 220. Thank you for your time and consideration.

Sincerely,

Joseph M. Reed

Matt Reed
Historic Preservation Officer
Pawnee Nation of Oklahoma

Historic Preservation Office
Matt Reed
Phone: 918.762.2180
E-mail: jreed@pawneenation.org
P.O. Box 470
Pawnee, Oklahoma 74058

# Government Agency Correspondence and Distribution List

**DEPARTMENT OF THE AIR FORCE**
**377TH AIR BASE WING (AFGSC)**

23 March 2022

Colonel Jason F. Vattioni, USAF
Commander
377th Air Base Wing
2000 Wyoming Blvd SE
Kirtland Air Force Base NM 87117

Mr. Mark Matthews, Acting District Manager
Bureau of Land Management
Albuquerque District Office
100 Sun Avenue NE
Pan American Building Suite 330
Albuquerque NM 87109-4676

Dear Mr. Matthews

In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the United States Air Force (USAF) NEPA regulations, the USAF is preparing an Environmental Assessment (EA) to evaluate the proposal for multiple construction projects for the Zia Park area development over the next 20 years at Kirtland Air Force Base (AFB). Zia Park is a former housing area covering approximately 300 acres. The Proposed Action includes multiple short- (1-5 years), mid- (5-10 years), and long- (10-20 years) range project requirements for the improvement of the physical infrastructure and functionality of the area, including current and future mission, facilities, and infrastructure requirements; development constraints and opportunities; and land use relationships. These projects may include the development of training and education facilities, medical facilities, a fitness center, a child development center, dormitories, a dining center, outdoor recreation and open space, an entry control facility, roadway extensions, as well as improvements to utility infrastructure.

The purpose of the Proposed Action is to facilitate the area development process by evaluating in one integrated document the potential impacts on the human environment of proposed land use projects in the Zia Park area. The Proposed Action is needed because currently available facilities and infrastructure are incapable of supporting the 377th Air Base Wing and its mission partners.

If you have additional information regarding impacts of the Proposed Action on the natural environment or other environmental aspects of which we are unaware, we would appreciate receiving such information for inclusion and consideration during the NEPA compliance process. A copy of the Final Description of the Proposed Action and Alternatives for the EA addressing the Zia Park Area Development Plan at Kirtland AFB, New Mexico is available at *http://www.kirtland.af.mil/Home/Environment* under the heading “Environmental

Assessments." Please respond within 30 days of receipt of this letter to ensure your concerns are adequately addressed in the EA.

Please send your written responses to the NEPA Program Manager, 377 MSG/CEIEC, 2050 Wyoming Boulevard SE, Suite 116, Kirtland AFB NM 87117 or via email to KirtlandNEPA@us.af.mil.

Sincerely

VATTIONI.JASON.F.1170028640

Digitally signed by VATTIONI.JASON.F.1170028640
Date: 2022.03.23 07:06:46 -06'00'

JASON F. VATTIONI, Colonel, USAF
Commander

AGENCY DISTRIBUTION LIST

## Federal, State, and Local Agencies

Ms. Patricia Mattingly, Regional Director
Bureau of Indian Affairs
Southwest Regional Office
1001 Indian School Road SW
Albuquerque NM 87104

Mr. Mark Matthews, District Manager
Bureau of Land Management
New Mexico State Office
Albuquerque District Office
Pan American Building
100 Sun Avenue NE, Suite 330
Albuquerque NM 87109-4676

Ms. Susan King, Regional
Environmental Officer
U.S. Department of Interior
Office of Environmental Policy and
Compliance, Albuquerque Region
1001 Indian School Road NW, Suite 348
Albuquerque NM 87104

Mr. Rob Lowe, Regional Administrator
Federal Aviation Administration
Southwest Region
10101 Hillwood Parkway
Fort Worth TX 76177-1524

Mr. Martin Meairs, District Conservationist
Natural Resources Conservation Service
Los Lunas Service Center
2600 Palmilla Road NE
Los Lunas NM 87031

Mr. George MacDonell, Chief
Environmental Resources Section
U.S. Army Corps of Engineers
4101 Jefferson Plaza NE
Albuquerque NM 87109

Mr. David Gray, Regional Administrator
U.S. Environmental Protection Agency,
Region 6
1201 Elm Street, Suite 500
Dallas TX 75202

Ms. Cheryl Prewitt, Regional Environmental
Coordinator
U.S. Forest Service
Southwestern Region
333 Broadway Boulevard SE
Albuquerque NM 87102-3407

Ms. Jessica Small
DOE/NNSA Sandia Field Office
PO Box 5400
Albuquerque NM 87187

Mr. John Weckerle
DOE/NNSA Office of General Counsel
PO Box 5400
Albuquerque NM 87187

The Honorable Martin Heinrich
United States Senate
303 Hart Senate Office Building
Washington DC 20510

The Honorable Ben R. Luján
United States Senate
Dirksen Senate Building, Suite B40C
Washington DC 20510

The Honorable Yvette Herrell
United States House of Representatives
1305 Langworth House Office Building
Washington DC 20515

The Honorable Debra Haaland
United States House of Representatives
1421 Langworth House Office Building
Washington DC 20515

The Honorable Teresa Legar Fernandez
United States House of Representatives
1432 Langworth House Office Building
Washington DC 20515

Commissioner of Public Lands Stephanie Garcia Richard
New Mexico State Land Office
310 Old Santa Fe Trail
Santa Fe NM 87501

Mr. Jeff M. Witte, Director/Secretary
New Mexico Department of Agriculture
MSC 3189, Box 30005
Las Cruces NM 88003-8005

Cabinet Secretary Sarah Cottrell Propst
New Mexico Energy, Minerals and Natural Resources Department
Wendell Chino Building
1220 South St Francis Drive
Santa Fe NM 87505

Mr. James C. Kenney
Office of General Counsel & Environmental Policy
New Mexico Environment Department
PO Box 5469
Santa Fe NM 87502-5469

Mr. Matt Wunder, Chief
Ecological & Environmental Planning
New Mexico Department of Game and Fish
PO Box 25112
Santa Fe NM 87504

Board of Directors
Mid-Region Council of Governments
809 Copper Avenue NW
Albuquerque NM 87102

Ms. Julie Morgas Baca, Bernalillo County Manager
Bernalillo County Manager's Office
One Civic Plaza NW, 10th Floor
Albuquerque NM 87102

Mr. Matthew Ross, Director of Communications
City of Albuquerque Office of the Mayor
PO Box 1293
Albuquerque NM 87103

Commissioners
Bernalillo County Board of Commissioners
One Civic Plaza NW, 10th Floor
Albuquerque NM 87102

Albuquerque City Councilmembers
PO Box 1293
Albuquerque NM 87103

GOVERNOR
Michelle Lujan Grisham

DIRECTOR AND SECRETARY
TO THE COMMISSION
Michael B. Sloane

# STATE OF NEW MEXICO
# DEPARTMENT OF GAME & FISH

One Wildlife Way, Santa Fe, NM 87507

Post Office Box 25112, Santa Fe, NM 87504

Tel: (505) 476-8000 | Fax: (505) 476-8123

For information call: (888) 248-6866

www.wildlife.state.nm.us



6 April 2022

NEPA Program Manager
377 MSG/CEIEC
2050 Wyoming Blvd. SE, Suite 116
Kirtland Air Force Base, NM 87117

Re: Kirtland Air Force Base Zia Park Development Environmental Assessment Scoping
NMERT 1777

Dear Sirs:

The Department of Game and Fish (Department) has reviewed the 23 March 2022 letter regarding the above-referenced project. The letter states that an Environmental Assessment (EA) is being prepared to evaluate the proposal for multiple construction projects for the Zia Park area over the next 20 years. Zia Park is a former housing area covering approximately 300 acres. It is not clear from the letter what the current level of development is at Zia Park, and no photos were included.

The Department is aware of Gunnison's prairie dog (*Cynomys gunnisoni*) and burrowing owl (*Athene cunicularia*) populations on Kirtland Air Force Base. The Department recommends that the EA process determine if prairie dogs and/or burrowing owls occur at the proposed construction sites, and if so, describe methods to implement their relocation. The Department recommends inclusion in the EA of our 2007 Guidelines and Recommendations for Burrowing Owl Surveys and Mitigation and that that these guidelines be followed should burrowing owls be determined to occur within the project area. These guidelines are available on our website at https://www.wildlife.state.nm.us/download/conservation/habitat-handbook/project-guidelines/Burrowing-Owl-Surveys-and-Mitigation-2007.pdf.

We appreciate the opportunity to comment on this project. Should you have any questions regarding our comments, please contact Mark Watson, Terrestrial Habitat Specialist at (505) 476-8115, or mark.watson@state.nm.us.

Sincerely,

Matt Wunder, Ph.D.
Chief, Ecological and Environmental Planning Division

May 4, 2022

NEPA Program Manager
377 MSG/CEIEC
2050 Wyoming Blvd SE, Suite 116
Kirtland AFB, New Mexico 87117

Submitted electronically to: KirtlandNEPA@us.af.mil

RE: Kirtland Air Force Base Zia Park Construction Projects

Dear NEPA Program Manager,

On behalf of the New Mexico Environment Department (NMED), attached please find our comments on the letter from Mr. Jason F. Vattioni regarding the request for review and comment on Kirtland Air Force Base (KAFB) Zia Park Construction Projects.

Strong intergovernmental coordination, as required by the National Environmental Policy Act (NEPA), is essential to ensure protection of human health and the environment.

NMED offers a few areas of potential environmental impacts in the attachment for you to evaluate as it continues the NEPA compliance review.

Thank you for providing the opportunity to review the project materials. Please don't hesitate to reach out to us with any further questions or concerns you may have. In the future, please send all comment requests to env.review@state.nm.us. This will help expedite a timely review of your request.

Sincerely,

Michael Chacón
Science Coordinator

Attachment (1)

**Attachment**

**Introduction**

Kirtland Air Force Base has requested review and comment on Zia Park Construction Projects.

**Comments**

Drinking Water

The project as described will likely require either approval from or written notice to the NMED Drinking Water Bureau (DWB). Please review 20.7.10.200 New Mexico Administrative Code (NMAC) or contact the DWB to determine which option is appropriate. In either case, the water system should submit an Application for Construction or Modification of Public Water Supply System if it has not already done so. Please review the complete application requirements at: https://www.env.nm.gov/forms/. Note that the application serves as written notice in the case that the project does not require DWB approval (20.7.10.200.C NMAC).

There are no regulated public groundwater system wells within five hundred (500) feet of the proposed site, nor any regulated public surface water system intakes within ten (10) miles downgradient. Therefore, this project is unlikely to have a significant impact on any regulated public water system.

Hazardous Waste

The proposed KAFB Zia Park project is located adjacent to areas affected by the KAFB Bulk Fuels Facility Spill (BFFS). The area is currently downgradient (east) from the BFFS. If pumping from the Ridgecrest well field by the Albuquerque Bernalillo County Water Utility Authority (ABCWUA) resumes in the future, the gradient will shift northward. There currently are no known impacts to the project site from the BFFS with the exception of a groundwater treatment system for extracted ethylene dibromide (EDB)-contaminated groundwater located near the western boundary of the site. The plans indicate that the treatment system building will not be affected by development and will remain at the south end of a proposed parking lot. If remediation of the BFFS source area is undertaken by the Air Force, potential effects on the project area from the BFFS will be eliminated.

Petroleum Storage Tank

There are three active petroleum storage tank facilities near the proposed site:

1. Albuquerque LOC (FID 26444), address listed as Runway 26, Kirtland AFB, with one active underground storage tank;
2. Veteran Affairs Hospital Bldg. T 38 (FID 54956), address listed as 1501 San Pedro Dr. SE, Albuquerque, with one active above ground storage tank; and
3. Diamond Gas & Food Mart (FID 1091), address listed as 1200 San Pedro SE, Albuquerque, with two active underground storage tanks.

There are three sites where storage tanks released petroleum into the environment within a half mile of the project area. No further action (NFA) is currently required at any of these sites:

1. ATEX 351 (Facility ID 26751 Release ID 510), 6431 Gibson Blvd SE, Albuquerque, granted NFA on January 25, 1991;
2. Cortez III Site (Facility ID 27533 Release ID 2473), H and Pennsylvania NE, Albuquerque, granted NFA on January 31, 1995; and
3. ATEX/T-Gas #129 (Facility ID 26698 Release ID 2127), 5749 Gibson Blvd SE, Albuquerque, granted NFA on November 30, 1994.

If an abandoned storage tank system or petroleum contaminated soil or water is discovered, the Petroleum Storage Tank Bureau must be notified. Contact the Leak of the Week here during business hours: https://www.env.nm.gov/petroleum_storage_tank/ (see box to the right, Report a Leak or Spill) or call 505-476-4397. During non-business hours, call 505-827-9329.

Surface Water Quality

NMED reviewed the above-referenced request for modification as requested, focusing specifically on the potential effect to surface water resources in the area of the proposed project.

A Construction General Permit (CGP) is not required if the disturbing activities are part of the normal day-to-day operation of a completed facility (e.g., daily cover for landfills, maintenance of gravel roads or parking areas, landscape maintenance. If work performed is routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the facility. If the KAFB Zia Park Construction goes beyond routine maintenance, see below.

**Clean Water Act, Section 402 NPDES Industrial Storm Water Construction General Permit (CGP)**

The U.S. Environmental Protection Agency (USEPA) may require National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) coverage for storm water discharges from construction activities (such as clearing, grading, excavating, and stockpiling) that disturb (or re-disturb) one or more acres. Prior to discharging storm water, construction operators may need to obtain coverage under an NPDES permit.

Among other things, this permit requires that a Storm Water Pollution Prevention Plan (SWPPP) be prepared for the project, including support and staging areas, and that appropriate Best Management Practices (BMPs) be installed and maintained both during and after construction to prevent, to the extent practicable, pollutants (primarily sediment, oil & grease and construction materials from construction sites) in storm water runoff from entering waters of the U.S. This permit also requires that permanent stabilization measures (re-vegetation, paving, etc.), and permanent storm water management measures (storm water detention/retention structures, velocity dissipation devices, etc.) be implemented post construction to minimize, in the long term, pollutants in storm water runoff from entering these waters.

Part 9 of the 2017 CGP includes permit conditions applicable to specific states, Indian country lands, or territories. In the State of New Mexico, except on tribal land, permittees must ensure that there is no increase in sediment yield and flow velocity from the construction site (both during and after construction) compared to pre-construction, undisturbed conditions (see Subpart 9.4.1 of the 2017 CGP).

USEPA requires that all "operators" (see Appendix A of the 2017 CGP) obtain NPDES permit coverage by submitting a Notice of Intent (NOI) for construction projects. Generally, this means that at least two parties will require permit coverage. The owner/developer of this construction project who has operational control over project specifications, the general contractor who has day-to-day operational control of those activities at the site, which are necessary to ensure compliance with the SWPPP and other permit conditions, and possibly other "operators" will require appropriate NPDES permit coverage for this project. The CGP, NOI, deadlines for submitting an NOI, Fact Sheet, and Federal Register notice are available at: https://www.epa.gov/npdes/stormwater-discharges-construction-activities

**Clean Water Act, Section 404 USACE/Section 401 Certification**

Information is provided below if the project (or associated construction support areas, if any) during construction requires discharge of dredged/fill material into Waters of the U.S., including wetlands. Section 404 of the Clean Water Act requires approval from the U.S. Army Corp of Engineers (USACE) prior to discharging dredged or fill material into waters of the United States (U.S.).

Any person, firm, or agency (including Federal, state, tribal and local governmental agencies) planning to work in waters of the United States should first contact the USACE regarding the need to obtain a permit from the Regulatory Division. Failure to receive and implement proper permit coverage would be a violation of the Clean Water Act.

More information on the §404 permitting process, including applicability of Nationwide Permits, mitigation requirements, requirements for certification for any discharges on state, private or tribal land, can be obtained from the USACE at:

http://www.spa.usace.army.mil/Missions/RegulatoryProgramandPermits.aspx

For additional information, including permitting procedures and jurisdictional water determination, contact the USACE, Albuquerque District, 4101 Jefferson Plaza NE, Albuquerque, New Mexico 87109-343, 505-342-3262.

**NPDES Small Municipal Separate Storm Sewer Systems**

The proposed project is within the Albuquerque urbanized area and is under the permit coverage of the Middle Rio Grande Municipal Separate Storm Sewer Systems (sMS4) NPDES permit NMR04A000 (https://www.epa.gov/sites/default/files/2018-10/documents/r6-npdes-middle-rio-grande-ms4-nmr04a000-final-permit-2014.pdf). Construction activities should follow the stormwater management requirement laid out in the permit.

**DEPARTMENT OF THE AIR FORCE**
**377TH AIR BASE WING (AFGSC)**

31 October 2022

Colonel Jason F. Vattioni, USAF
Commander
377th Air Base Wing
2000 Wyoming Blvd SE
Kirtland Air Force Base NM 87117

Ms. Sabrina Flores, District Manager
Bureau of Land Management
New Mexico State Office
Albuquerque District Office
Pan American Building
100 Sun Avenue NE, Suite 330
Albuquerque NM 87109-4676

Dear Ms. Flores

In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the United States Air Force (USAF) NEPA regulations, the USAF prepared an Environmental Assessment (EA) to evaluate the proposal for multiple construction projects for the Zia Park area development over the next 20 years at Kirtland Air Force Base (AFB). Zia Park is a former housing area covering approximately 300 acres. The Proposed Action includes multiple short- (1-5 years), mid- (5-10 years), and long- (10-20 years) range project requirements for the improvement of the physical infrastructure and functionality of the area, including current and future mission, facilities, and infrastructure requirements; development constraints and opportunities; and land use relationships. These projects may include the development of training and education facilities, medical facilities, a fitness center, a child development center, dormitories, a dining center, outdoor recreation and open space projects, an entry control facility, and roadway extensions, as well as improvements to utility infrastructure.

The purpose of the Proposed Action is to facilitate the area development process by evaluating in one integrated document the potential impacts on the human environment of proposed land use projects in the Zia Park area. The Proposed Action is needed because currently available facilities and infrastructure are incapable of supporting the 377th Air Base Wing and its mission partners.

In accordance with Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, as amended, by EO 12416, *Intergovernmental Review of Federal Programs*, I am requesting your participation in the NEPA document review and comment process. A copy of the Draft EA and the proposed Finding of No Significant Impact (FONSI) is available at *http://www.kirtland.af.mil* under the "Environment" button at the bottom of the webpage. If, after review of the Draft EA and proposed FONSI, you have additional information regarding

impacts of the Proposed Action on the natural environment or other environmental aspects of which we are unaware, we would appreciate receiving such information for inclusion and consideration during the NEPA process. Please respond within 30 days of receipt of this letter to ensure your concerns are adequately addressed in the EA.

Please send your written responses to Ms. Brianne Sisneros, 377 MSG/CEIEC NEPA Program Manager, 2050 Wyoming Boulevard SE, Suite 116, Kirtland AFB NM 87117, or via email to KirtlandNEPA@us.af.mil.

Sincerely

VATTIONI.JASON.F.1170028640 Digitally signed by VATTIONI.JASON.F.1170028640 Date: 2022.10.31 20:01:58 -06'00'

JASON F. VATTIONI, Colonel, USAF
Commander

AGENCY DISTRIBUTION LIST

## Federal, State, and Local Agencies

Ms. Patricia Mattingly, Acting Regional Director and Regional Environmental Specialist
Bureau of Indian Affairs
Southwest Regional Office
1001 Indian School Road SW
Albuquerque NM 87104

Ms. Sabrina Flores, District Manager
Bureau of Land Management
Albuquerque District Office
Pan American Building
100 Sun Avenue NE, Suite 330
Albuquerque NM 87109-4676

Ms. Courtney Hoover, Acting Regional Environmental Officer
U.S. Department of Interior
Office of Environmental Policy and Compliance, Albuquerque Region
1001 Indian School Road NW, Suite 348
Albuquerque NM 87104

Mr. Rob Lowe, Regional Administrator
Federal Aviation Administration
Southwest Region
10101 Hillwood Parkway
Fort Worth TX 76177-1524

Ms. Roxann Moore, Acting District Conservationist
Natural Resources Conservation Service
Albuquerque Service Center
100 Sun Avenue NE, Suite 160
Albuquerque NM 87109

Mr. George MacDonell, Chief
Environmental Resources Section
U.S. Army Corps of Engineers
4101 Jefferson Plaza NE
Albuquerque NM 87109

Dr. Earthea Nance, Regional Administrator
U.S. Environmental Protection Agency, Region 6
1201 Elm Street, Suite 500
Dallas TX 75202

Ms. Cheryl Prewitt, Regional Environmental Coordinator
U.S. Forest Service
Southwestern Region
333 Broadway Boulevard SE
Albuquerque NM 87102-3407

Ms. Jessica Small
DOE/NNSA Sandia Field Office
PO Box 5400
Albuquerque NM 87187

Mr. John Weckerle
DOE/NNSA Office of General Counsel
PO Box 5400
Albuquerque NM 87187

The Honorable Martin Heinrich
United States Senate
303 Hart Senate Office Building
Washington DC 20510

The Honorable Ben R. Luján
United States Senate
498 Russell Senate Building
Washington DC 20510

The Honorable Yvette Herrell
United States House of Representatives
1305 Longworth House Office Building
Washington DC 20515

The Honorable Melanie Stansbury
United States House of Representatives
1421 Longworth House Office Building
Washington DC 20515

The Honorable Teresa Leger Fernandez
United States House of Representatives
1432 Longworth House Office Building
Washington DC 20515

Commissioner of Public Lands Stephanie Garcia Richard
New Mexico State Land Office
310 Old Santa Fe Trail
Santa Fe NM 87501

Mr. Jeff M. Witte, Director/Secretary
New Mexico Department of Agriculture
MSC 3189, Box 30005
Las Cruces NM 88003-8005

Cabinet Secretary Sarah Cottrell Propst
New Mexico Energy, Minerals and Natural Resources Department
Wendell Chino Building
1220 South St Francis Drive
Santa Fe NM 87505

Mr. Bruce Baizel, Legal Director
Office of General Counsel & Environmental Policy
New Mexico Environment Department
PO Box 5469
Santa Fe NM 87502-5469

Mr. Matt Wunder, Chief
Ecological & Environmental Planning
New Mexico Department of Game and Fish
PO Box 25112
Santa Fe NM 87504

Board of Directors
Mid-Region Council of Governments
809 Copper Avenue NW
Albuquerque NM 87102

Ms. Julie Morgas Baca, Bernalillo County Manager
Bernalillo County Manager's Office
415 Silver SW, 8th Floor
Albuquerque NM 87102

Mr. Daniel Jiron, Interim Director of Communications
City of Albuquerque Office of the Mayor
400 Marquette NW
Albuquerque NM 87103

Commissioners
Bernalillo County Board of Commissioners
One Civic Plaza NW, 10th Floor
Albuquerque NM 87102

Albuquerque City Councilmembers
PO Box 1293
Albuquerque NM 87103

# Mid-Region Council of Governments



November 28, 2022

Ms. Brianne Sisneros
377th MSG/CEIEC NEPA Program Manager
2050 Wyoming Boulevard SE, Suite 116
Kirtland AFB, NM 87117

Dear Ms. Sisneros:

Many thanks for providing the Mid-Region Council of Governments (MRCOG) an opportunity to submit a comment on the Draft Environmental Assessment for future projects pertaining to the area on Kirtland AFB identified as the Zia Park area development. As you are aware, MRCOG has hosted—and participated in—the Kirtland Community Sustainability Committee for the last eight years. During this time, we have worked closely with many state, municipal government, federal agency, and Air Force partners in identifying and pursuing issues which are essential to the long-term viability of Kirtland AFB.

MRCOG also hosts The Metropolitan Transportation Board (MTB), which is the governing body for the Mid-Region Metropolitan Planning Organization (MRMPO). A variety of committees (including the Transportation Coordinating Committee) and subcommittees operate under the rules and structure established by the MTB and serve to advise the Board and the MRMPO staff on specific areas such as congestion, active transportation, and freight.

MRCOG fully supports the near, intermediate, and long-term plans for Zia Park. We also are aware that Air Force projects planned for the Zia Park area might positively impact Base population growth. Further, the relocation of various support services outlined in the Draft Environmental Assessment to the Zia Park area might increase the amount of traffic using the Gibson/Louisiana entrance—traffic that was originally using the Wyoming and Eubank gate entrances. Accordingly, in fulfilling our transportation planning responsibilities, we are interested in any potential increase in traffic along Gibson Boulevard because of the projects planned for the Zia Park area.

Again, thanks for including MRCOG in the review of the Draft Environmental Assessment. If the Kirtland NEPA staff has any questions on our comments, please let me know. My contact information: dcave@mrcog-nm.gov, (505) 724-3624.

Sincerely,

Dewey V. Cave

Dewey V. Cave
Executive Director

DC/BB

809 Copper Ave. NW, Albuquerque, NM 87102
Phone: (505) 247-1750 Fax (505) 247-1753 Web: www.mrcog-nm.gov

# Joint Land Use Study (JLUS) Correspondence and Distribution List

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

23 March 2022

Colonel Jason F. Vattioni, USAF
Commander
377th Air Base Wing
2000 Wyoming Boulevard SE
Kirtland Air Force Base NM 87117

Mr. Steve Vierck
Assistant Commissioner for Commercial Resources
New Mexico State Land Office
PO Box 1148
Santa Fe NM 87504

Dear Mr. Vierck

As set forth in the Kirtland Air Force Base (AFB) – New Mexico State Land Office Joint Land Use Study Memorandum of Understanding, and as required by the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the United States Air Force (USAF) NEPA regulations, the USAF is preparing an Environmental Assessment (EA) to evaluate the proposal for multiple construction projects for the Zia Park area development over the next 20 years at Kirtland AFB. Zia Park is a former housing area covering approximately 300 acres. The Proposed Action includes multiple short- (1-5 years), mid- (5-10 years), and long- (10-20 years) range project requirements for the improvement of the physical infrastructure and functionality of the area, including current and future mission, facilities, and infrastructure requirements; development constraints and opportunities; and land use relationships. These projects include the development of training and education facilities, medical facilities, a fitness center, a child development center, dormitories, a dining center, outdoor recreation and open space, an entry control facility, roadway extensions, as well as improvements to utility infrastructure.

The purpose of the Proposed Action is to facilitate the area development process by evaluating in one integrated document the potential impacts on the human environment of proposed land use projects in the Zia Park area. The Proposed Action is needed because currently available facilities and infrastructure are incapable of supporting the 377th Air Base Wing and its mission partners.

In accordance with Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, as amended, by EO 12416, *Intergovernmental Review of Federal Programs*, I am requesting your participation in the NEPA document review and comment process. A copy of the Final Description of the Proposed Action and Alternatives for the EA addressing the Zia Park Area Development Plan at Kirtland AFB, New Mexico is available at

*http://www.kirtland.af.mil/Home/Environment* under the heading "Environmental Assessments." If you have additional information regarding impacts of the Proposed Action on the natural environment or other environmental aspects of which we are unaware, we would appreciate receiving such information for inclusion and consideration during the NEPA process. Please respond within 30 days of receipt of this letter to ensure your concerns are adequately addressed in the EA.

Please send your written responses to the NEPA Program Manager, 377 MSG/CEIEC, 2050 Wyoming Boulevard SE, Suite 116, Kirtland AFB NM 87117, or via email to KirtlandNEPA@us.af.mil.

Sincerely

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Date: 2022.03.23 07:10:37 -06'00'

JASON F. VATTIONI, Colonel, USAF
Commander

AGENCY DISTRIBUTION LIST

## JLUS

Mr. Steve Vierk
Assistant Commissioner for Commercial Resources
New Mexico State Land Office
PO Box 1148
Santa Fe NM 87504

Mr. Brennon Williams
Director
City of Albuquerque Planning Department
PO Box 1293
Albuquerque NM 87103

Bernalillo County Planning Section
111 Union Square SE, Suite 100
Albuquerque NM 87103

**DEPARTMENT OF THE AIR FORCE**
**377TH AIR BASE WING (AFGSC)**

31 October 2022

Colonel Jason F. Vattioni, USAF
Commander
377th Air Base Wing
2000 Wyoming Blvd SE
Kirtland Air Force Base NM 87117

Mr. Craig Johnson
Assistant Commissioner for Commercial Resources
New Mexico State Land Office
PO Box 1148
Santa Fe NM 87504

Dear Mr. Johnson

As set forth in the Kirtland Air Force Base (AFB) – New Mexico State Land Office Joint Land Use Study Memorandum of Understanding, and as required by the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the United States Air Force (USAF) NEPA regulations, the USAF has prepared an Environmental Assessment (EA) to evaluate the proposal for multiple construction projects for the Zia Park area development over the next 20 years at Kirtland Air Force Base (AFB). Zia Park is a former housing area covering approximately 300 acres. The Proposed Action includes multiple short- (1-5 years), mid- (5-10 years), and long- (10-20 years) range project requirements for the improvement of the physical infrastructure and functionality of the area, including current and future mission, facilities, and infrastructure requirements; development constraints and opportunities; and land use relationships. These projects may include the development of training and education facilities, medical facilities, a fitness center, a child development center, dormitories, a dining center, outdoor recreation and open space projects, an entry control facility, and roadway extensions, as well as improvements to utility infrastructure.

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impacts of the Proposed Action on the natural environment or other environmental aspects of which we are unaware, we would appreciate receiving such information for inclusion and consideration during the NEPA process. Please respond within 30 days of receipt of this letter to ensure your concerns are adequately addressed in the EA.

Please send your written responses to Ms. Brianne Sisneros, 377 MSG/CEIEC NEPA Program Manager, 2050 Wyoming Boulevard SE, Suite 116, Kirtland AFB NM 87117, or via email to *KirtlandNEPA@us.af.mil*.

Sincerely

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JASON F. VATTIONI, Colonel, USAF
Commander

AGENCY DISTRIBUTION LIST

**JLUS**

Mr. Craig Johnson
Assistant Commissioner for Commercial Resources
New Mexico State Land Office
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Mr. Alan Varela
Director
City of Albuquerque Planning Department
600 2nd Street NW
Albuquerque NM 87102

Bernalillo County Planning Section
111 Union Square SE, Suite 100
Albuquerque NM 87102

# Notice of Availability

# PUBLIC NOTICE

**DRAFT ENVIRONMENTAL ASSESSMENT**
**for the Zia Park Area Development**
**at Kirtland Air Force Base, New Mexico**

A Draft Environmental Assessment (EA) was developed to evaluate the proposal for multiple construction projects for the Zia Park area development over the next 20 years at Kirtland Air Force Base. The Proposed Action includes multiple short- (1-5 years), mid- (5-10 years) and long- (10-20 years) range project requirements for the improvement of the physical infrastructure and functionality of the area. These projects may include training and education facilities, medical facilities, a fitness center, a child development center, dormitories, and dining center, outdoor recreation projects, roadway extensions, and entry control facility, as well as improvements to utility infrastructure. The purpose of the Proposed Action is to facilitate the area development process by evaluating the potential impacts on the human environment of proposed land use projects in the Zia Park area. The Proposed Action is needed because currently available facilities and infrastructure are incapable of supporting the 377th Air Base Wing and its mission partners.

Copies of the Draft EA and the proposed Finding of No Significant Impact (FONSI) are available now at http://www.kirtland.af.mil/Home/Environment/ or at the San Pedro Public Library located at 5600 Trumbull Avenue SE, Albuquerque, NM 87108.

The comment period is from **20 November 2022** through **20 December 2022**. All comments must be received by 20 December 2022. Individuals wishing further information, or to contribute comments, should contact the NEPA Program Manager, 377 MSG/CEIEC, 2050 Wyoming Boulevard SE, Suite 118, Kirtland AFB, NM 87117 or send an email to KirtlandNEPA@us.af.mil.

# Appendix B – Regional Military and non-Military Projects

## Present and Reasonably Foreseeable Future Military Action at Kirtland AFB

| Project Name / Implementation Date(s) | Description | Potential Relevance to the Proposed Action |
|---|---|---|
| New Military Training Activities | The 210 RED HORSE Squadron (RHS) would conduct monthly training activities on the Base Exercise Evaluation and Skills Training Area. Monthly training activities involve the disturbance of up to 40 acres of ground and include the use of the abandoned dirt airstrip to practice demolishing, denying access to, and reconstructing airstrips; construction of forward operating bases to allow other units to train with the 210 RHS tearing them down; and dirt movement for heavy-equipment training. This recurring training could last up to 5 days and involve approximately 120 personnel.<br><br>The Pararescue/Combat Rescue Officer (PJ/CRO) school is proposing to construct an Urban Training Compound (UTC) on 25 acres within the Coyote Canyon Training Area. The UTC would consist of the placement of connexes on a gravel base to simulate a mock village similar to those found in the Middle East. Training activities would include helicopter pararescue and insertion/extraction operations. Other training activities would include small team tactics, climbing, and emergency medical. During training activities at the UTC, personnel would use smokes, ground burst simulators, trip flares, flash-bang pyrotechnics, booby trap simulators, and blanks/simunitions. When the UTC is not scheduled for use by PJ/CRO, it would be open for use by other groups. Therefore, it is anticipated that the UTC could be used on a monthly basis.<br><br>The Air Force is proposing to begin firing .50-caliber M107 Barrett sniper rifles and M2 machine guns at Small Arms Range (SAR) East. An existing building south of Forest Road 44 would be demolished in order to provide line of sight from the firing point to the target array. Approximately 240 acres would be cleared by tree removal and thinning to create firebreaks along FRs 40, 40B, 530B, and 53. SAR East would continue to be available for training operations and deployment qualification 24 hours a day, 7 days a week.<br><br>The 377th Security Forces Group (SFG) would begin using the M583A1 parachute illumination round at the M203 Range. This round has a burst height of 500 to 700 feet above ground surface when fired vertically, a candle burn rate of approximately 40 seconds, and an average candlepower of 90,000. The average class using the illumination round would consist of 15 to 30 students, once per month. It is anticipated that an average of 250 to 500 rounds would be dispensed per year. Training would occur during early morning hours, approximately 0300 to 0500, dependent upon coordination with the FAA and air traffic scheduling. Prior to initial use of this round, firebreaks consisting of cleared paths totaling approximately 8 acres would need to be created. The cleared paths would also be used for emergency vehicle access in case of an accidental fire. | Not in the project area. |
| New Mexico Army National Guard (NMArmyNG) 515th Regional Training Institute | The NMArmyNG proposes to relocate their 515th RTI from the Onate Training Complex in Santa Fe to Kirtland AFB. Construction includes a 40-acre maneuver and driver's training course with motor pool and classrooms near the Tijeras Arroyo Golf Course. | Not in the project area. Construction could potentially overlap, slightly impacting the generation of basewide emissions. |
| Demolition and Construction of Military Support Facilities | The Air Force proposes to demolish and construct, operate, and maintain several military personnel support facilities in the northwestern portion of the installation. The areas include the Visiting Officer Quarters, the Main Enlisted Dormitory Campus, the Noncommissioned Officer Academy, and Dormitory Campus 2. This project would include the demolition of facilities totaling approximately 498,000 square feet and construction of facilities totaling approximately 389,000 square feet, resulting in a net decrease of approximately 109,000 square feet of building space on the installation. Approximately 36 acres would be impacted by construction and demolition activities. | Not in the project area. Construction could potentially overlap, slightly impacting the generation of basewide emissions. |

| Project Name / Implementation Date(s) | Description | Potential Relevance to the Proposed Action |
|---|---|---|
| Construction, Operation, and Maintenance of a New Fire Station | The Air Force proposes to construct, operate, and maintain a new Fire Station south of the intersection of Pennsylvania Street and Powerline Road. The proposed structure would be approximately 7,300 square feet in size and one story high with three high-bay drive-through apparatus stalls. | South of the project area. Construction could potentially overlap, slightly impacting the generation of basewide emissions. |
| Building Demolition at Kirtland AFB | The Air Force is in the process of demolishing 23 buildings totaling approximately 105,000 square feet to make space available for future construction and to fulfill its mission as installation host through better site utilization. None of the buildings proposed for demolition are currently occupied or used by installation personnel. | Not in the project area. Demolition could potentially overlap, slightly impacting the generation of basewide emissions. |
| Security Forces Complex | The Air Force proposes to construct, operate, and maintain a 42,500-square-foot security forces complex to provide adequate space and modern facilities to house all 377 SFG administrative and support functions in a consolidated location. The 377 SFG functions that would be transferred to the new security forces complex include a base operations center with command and control facility, administration and office space, training rooms, auditorium or assembly room, guard mount, hardened armory for weapons and ammunition storage, confinement facilities, law enforcement, logistics warehouse, general storage, vehicle garage with maintenance area, and associated communications functions. One existing building (879 square feet) within the footprint of the proposed security forces complex would be demolished. This project would result in an increase of 41,621 square feet of building space on the installation. | Not in the project area. Construction and demolition could potentially overlap, slightly impacting the generation of basewide emissions. |
| Construct New Military Working Dog Facility | The Air Force proposes to construct, operate, and maintain a new military working dog facility that consists of 14 indoor/outdoor kennels, four isolation kennels, storage and staff space, restrooms, food storage room, a covered walkway, and a veterinarian examining room, totaling 8,000 square feet. A parking area with 25 spaces and new access roads would also be constructed as part of the project. Demolition of facilities totaling 2,520 square feet would also be included in this project, resulting in a net increase of 5,480 square feet of building space on the installation. | Not in the project area. Construction and demolition could potentially overlap, slightly impacting the generation of basewide emissions. |
| 21st Explosive Ordnance Division Expansion | The 21st Explosive Ordnance Division proposes facility expansion and site improvements for the Weapons of Mass Destruction Company Complex. This unit currently operates from a 90-acre property leased by the US Army within Kirtland AFB. The current site has seven structures, six of which are substandard and do not have adequate fire protection. The 21st Explosive Ordnance Division proposes to expand this site to a total of 280 acres, add three permanent structures totaling 40,000 square feet, demolish five of the six substandard structures (75,000 square feet), add two temporary storage containers, tie into nearby utilities, construct water tanks for fire suppression, and construct several concrete pads for training activities. This project would result in a decrease of 35,000 square feet of building space on the installation. | Not in the project area. Construction and demolition could potentially overlap, slightly impacting the generation of basewide emissions. |
| New Deployable Structures Laboratory | AFRL is proposing to construct a new 4,125-square-foot high-bay addition to the southeast corner of Building 472. Proposed new construction would include structural pads on columns and trusses for anchoring active gravity off-load support frame; high precision environmental controls (temperature and humidity with low air currents); Gantry crane; and optically-diffuse wall coatings for high precision optical motion metrology system (videogrammetry). | Not in the project area. Construction could potentially overlap, slightly impacting the generation of basewide emissions. |

| Project Name / Implementation Date(s) | Description | Potential Relevance to the Proposed Action |
|---|---|---|
| Enhanced Use Lease | Kirtland AFB has leased approximately 70 acres of Air Force property along Gibson Boulevard to Thunderbird Kirtland Development Partners (TKD) to develop the area into a mixed-use development that could include office, retail/commercial, corporate apartments, hotel, gasoline station, and restaurant space uses. Roadways for access and vehicular movement through the development, parking, and landscape areas would be constructed as well as utility infrastructure to support activities at the Environmental Impact Analysis Process (EIAP) Study Area. TKD would demolish the existing recreation facilities including a concession stand/storage building (Building 2555). | Not in the project area. Construction and demolition operations could potentially overlap, slightly impacting the generation of basewide emissions. |
| Navigation Technology Satellite Integration Laboratory | AFRL is proposing to construct a 10,000-square-foot high bay laboratory south of Building 590. The facility would contain office space; Near Field Antenna Range and control room; vault; security vestibule; restrooms; loading dock; and conference, break, storage, communications, and mechanical rooms. | Not in the project area. Construction could potentially overlap, slightly impacting the generation of basewide emissions. |
| Kirtland Exhaust Helium Gas Recovery Facility | AFRL is proposing to construct a 3,700-square-foot facility between Buildings 580 and 581 to recover helium gas exhaust from experiments occurring within these buildings. The recovered gas would be reliquefied for reuse in the laboratories. | Not in the project area. Construction could potentially overlap, slightly impacting the generation of basewide emissions. |
| Renewable Energy Projects | The Air Force proposes to develop renewable energy projects at Kirtland AFB. The proposed project would include the installation of various renewable energy technologies installation-wide, up to a 20-megawatt solar photovoltaic array, and rooftop/carport solar photovoltaic systems. | May occur near the project area. Construction could potentially overlap, slightly impacting the generation of basewide emissions. |
| Upgrade, Stormwater Drainage System and Arroyo Repair Activities | The Air Force proposes to develop, upgrade, and maintain storm drainage systems and conduct arroyo erosion repair and damage avoiding measures across the installation. Storm drainage system activities could include constructing stormwater system upgrades and components including cleaning, regrading, ditching, trenching, trench lining, backfilling, bedding, reinforced concrete pipe, culverts, vegetation, rip-rap, drop inlets, and retention and outlet structures. Arroyo repair could include excavating, filling, and lining arroyo banks and constructing and repairing box culverts, bank protection, and grade control structures to assist in stabilizing the arroyo bed towards a stable slope. | Unlikely to occur near the project area but may affect location of project stormwater controls during construction and demolition. |
| Combat Rescue Helicopter Recapitalization | The Air Force proposes a one-to-one replacement of the existing HH-60G helicopter fleet at Kirtland AFB with the new HH-60W model. Associated projects include construction of a two-story 11,000 square foot addition to Building 957, and demolition of Buildings 954 and 960 (8,277 square feet) to construct a new 35,973 square foot flight simulator facility. | Not in the project area. Construction could potentially overlap, slightly impacting the generation of basewide emissions. |
| Additional Development, Testing, Use, and Training at the Technical Evaluation Assessment Monitor Site (TEAMS) | The Defense Threat Reduction Agency and Air Force propose to enhance the testing and training capabilities and use, as well as the functionality, of the TEAMS. Specifically, the proposed facilities and activities include: a new radiological source storage facility, a mock train station, in-kind replacement of current TEAMS temporary buildings with permanent buildings, and potential increase in testing and training event personnel levels by up to 50 percent. Approximately 2.7 acres would be affected during construction activities. | Not in the project area. |

| Project Name / Implementation Date(s) | Description | Potential Relevance to the Proposed Action |
|---|---|---|
| AFRL High-Powered Electromagnetic Laboratory (HPEM) | AFRL is proposing to construct a modern, flexible HPEM laboratory space for development of advanced High-Power Microwave (HPM) and High Energy Density Physics (HEDP) research. Construction includes a 48,000 $ft^2$ addition to the north side of Building 323 and renovation of 19,970 $ft^2$ of existing laboratory space in Building 322 and 323. The efforts would be undertaken to modernize, expand, and consolidate AFRL HPEM operations. This project would also include demolition of 15 facilities and divestment of two more in order to offset the space created by new construction. | Not in the project area. Construction and demolition could potentially overlap, slightly impacting the generation of basewide emissions. |

## Present and Reasonably Foreseeable Non-Military Action at/near Kirtland AFB

| Project Name / Implementation Date(s) | Description | Potential Relevance to the Proposed Action |
|---|---|---|
| Sunport South Business Park (formerly Valle del Sol) | Sunport South Business Park is a proposed 330-acre business park expected to attract manufacturing, fabrication, warehousing, and distribution centers. It will be multi-modal to include access to the Sunport and an active rail spur. An additional 200 acres will be reserved for bike trails and walking paths. The site is south of the Sunport. | Not in the project area. No anticipated impacts. |
| Albuquerque International Sunport Projects | The Sunport began the Terminal Improvement Project in February 2017. This project will refurbish and upgrade the ticketing, baggage claim, and exterior areas of the terminal. It is anticipated to take approximately 15 months to complete.<br><br>Development began on the Destination Sunport project in March 2017. The project will transform decommissioned Runway 17/35, approximately 80 acres, into space for aviation and aerospace businesses, high tech companies, and retail. The Aviation Center of Excellence is the centerpiece of the development, which also features "The Landing" a 10-acre strip along Gibson Boulevard that will contain retail businesses.<br><br>Future projects planned for the Sunport over the next 20 years include rehabilitation of various runways, taxiways, and aprons; installation/expansion of aprons and taxiways; removal/closure of taxiways; construction of an Aircraft Rescue Firefighting Facility; removal of the Belly Freight Building; construction of an addition to Concourse B; and construction of a Federal Inspection Services/International Terminal. | Runway 17/35 is west of the of KAFB and shares a fence line. Construction could potentially overlap, slightly impacting the generation of basewide emissions. |
| Interstate 25 (I-25) and Rio Bravo Interchange | The New Mexico Department of Transportation (NMDOT) recently reconstructed the I-25 and Rio Bravo Interchange and the Rio Bravo roadway corridor from University to the AMAFCA channel. Improvements include a new intersection layout at I-25/Rio Bravo and new roadway pavement and features within the right-of-way infrastructure including multi-modal improvements. | Not in the project area. No anticipated impacts. |
| Sunport Boulevard Extension | NMDOT has proposed an expansion project for Sunport Boulevard from Broadway Boulevard to I-25, consisting of constructing a four-lane median divided urban arterial roadway. The roadway is approximately 0.5 mile in length and would contain twin bridges over both the existing AMAFCA South Diversion Channel and twin bridges over Edmunds Street. | Not in the project area. No anticipated impacts. |
| Albuquerque-Bernalillo County Water Utility Authority (ABCWUA) Water Treatment Facility on Kirtland AFB | To accommodate future growth in Bernalillo County, ABCWUA proposes to construct a wastewater treatment plant on Kirtland AFB. This project is proposed to occur between 2027 and 2037 on approximately 60 acres of land near the western boundary of the installation, south of Tijeras Arroyo. | Not in the project area. Construction could potentially overlap, slightly impacting the generation of basewide emissions. |
| Juan Tabo Hills West | Juan Tabo Hills West is Phase 4 of the Voltera Village community and sits on approximately 25 acres near Juan Tabo Boulevard and the Tijeras Arroyo. Phase 4 would consist of 250 single-family lots. | Not in the project area. No anticipated impacts. |
| AMAFCA Louisiana-Gibson Regional Drainage Facility | AMAFCA constructed a 30-acre-foot drainage facility on Kirtland AFB at the southeast quadrant of the Louisiana/Gibson intersection in order to collect and limit stormwater runoff. Currently, stormwater flow off Kirtland AFB is not controlled and causes damage downstream of the installation, contributing to flooding in the San Pedro/Gibson area. Proposed to begin in the fourth quarter of Fiscal Year 2018. | This project is directly to the north of the Zia Park project area. However, this project is complete. |

| Project Name / Implementation Date(s) | Description | Potential Relevance to the Proposed Action |
|---|---|---|
| Valle de Oro Phase II | USFWS is proposing to conduct restoration, development, and management activities on Valle de Oro National Wildlife Refuge (NWR) in Bernalillo County. The refuge is 570 acres primarily located between 2nd Street SW and the Rio Grande in the South Valley, approximately 3.5 miles southwest of the Sunport and Kirtland AFB. Proposed activities include habitat restoration; construction of a visitor's center, a parking lot, trails, and roads; vegetation and wildlife management; construction and management of AMAFCA stormwater drainage facilities, including a swale and water quality structures; and in partnership with Mid-Rio Grande Conservancy District align the Barr Interior Drain. | Not in the project area. No anticipated impacts. |
| Mesa del Sol Master Plan | Mesa del Sol is a 12,900-acre, mixed-use master planned community. It is bound by the Sunport along the northwestern edge, Kirtland AFB on the north and east, the Isleta reservation to the south, and I-25 to the west. The community would be built over 40 years and would cover 9,000 of the 12,900 acres. It is proposed to include 3,200 acres for park and open space; 4,400 acres for residential and supporting retail; 413 acres of office space; and 800 acres for schools, including university branches. | Not in the project area. No anticipated impacts. |
| Prescribed Endemic Refuge Connected Habitat Areas (PERCHAs) Project | USFWS, through the Valle de Oro NWR, in cooperation with Bernalillo County, is proposing to develop native habitat areas on County properties within existing County-owned and –maintained drainage facilities. The County and Valle de Oro NWR are working together to establish forage and habitat areas for wildlife with the goal of linking County properties and the Albuquerque South Valley with the Valle de Oro NWR, so the PERCHAs are viewed as one whole system of habitat areas. There are approximately 15 PERCHA properties on lands owned by the County, but the initial phase of this project focuses on habitat improvements at the following four properties: approximately 8 acres at Los Padillas Community Center, 2 acres at McEwen Pond, 5 acres at Mountain View Community Center, and 14 acres at Sanchez Farms. Habitat improvements include removal of nonnative and invasive vegetation; replanting native wetland and upland grass species; installing songbird and pollinator habitat areas; creating appealing recreation space for Albuquerque residents; increasing existing drainage basins; and installing erosion control measures to include revegetation of slopes. Work at the properties is proposed to begin in June 2019 and continue for approximately 5 years. | Not in the project area. No anticipated impacts. |

# Appendix C - Air Quality Support Documentation

## Introduction

This Appendix includes all calculations performed supporting the values seen in **Table 3-2** and **Table 3-3** found in **Section 3.2.2.1** of the EA. Such calculations are a complex endeavor as they range from dust generated from moving soils to emissions from personal vehicles to and from the work sites. To standardize the process the Air Force created the Air Conformity Applicability Model (ACAM), a piece of software designed to assist air quality professionals in estimating emissions from any number of projects. However, ACAM does not natively handle projects with unknown temporal quantities, such as this ADP. For example, while construction and size of certain facilities are known, it can only be estimated when construction will begin within the designated 20-year period. This being the case, ACAM was used to estimate emissions of each individual project area, which were then imported into Microsoft Excel for additional manipulation to determine the estimated emissions for any given year of the 20-year period. An example of this is shown below.

ACAM calculated the emissions for Community Service projects as the second column of **Table C-1** below. Based on the ADP itself, it is known that Community Service projects are designated as short- to mid-term – meaning they would take place during the first 10 years of the 20-year project period. Microsoft Excel was used to divide the ACAM result by 10 (third column of **Table C-1**). This was done for all project types (infrastructure, medical, etc) and then plotted in large tables for each air emission to determine what each individual annual impact would be. See **Tables C-2** through **C-11** at the end of this introduction for more information.

Table C-1: Community Service Emissions

| Emission | ACAM Result | Annual Emissions |
|---|---|---|
| VOC | 1.819956 | 0.1819956 |
| $SO_x$ | 0.010716 | 0.0010716 |
| $NO_x$ | 3.871059 | 0.3871059 |
| CO | 4.93105 | 0.493105 |
| $PM_{10}$ | 2.310554 | 0.2310554 |
| $PM_{2.5}$ | 0.154543 | 0.0154543 |
| Pb | 0 | 0 |
| $NH_3$ | 0.004124 | 0.0004124 |
| $CO_2e$ | 1037.5 | 103.75 |

The documents found in this section include summary reports that show emissions of the project, detailed reports that show all calculations to achieve these numbers, and a final report showing the estimated 'steady state' emissions generated from all operating facilities would look like post-construction. The detail reports include individual emission estimates for a number of different sources given the type of construction, demolition, or any other project activity.

In order to use the software several inputs must be provided. For example, a building construction project requires the total building area (square footage), building height, associated parking lot size, footprint on the ground, and several more. A typical project might have at the ready many of these details if blueprints are complete, but for Zia Park the project is more fluid to account for necessary changes in design over the next 20 years. Accordingly, several assumptions were made to estimate emissions:

- Each category of construction has a set square footage allotted that includes both facilities and parking lots, as shown in **Table 2-1** of the EA. It was determined that many facilities often have parking lots roughly equal to the size of the facility they support, so parking lots were set to one-half the total square footage for each construction category. The remaining square footage was designated for facility usage.

- Building heights were determined by using the maximum allotted stories for given project. As an example, if the ADP indicated a specific facility may be 1-3 stories in height, it was assumed to be three stories as this is the most conservative calculation in ACAM. Please see ADP Page 4-10 for the source of this information.

- For road construction, the ADP provided the linear footage (11,000 feet) necessary for construction and described the primary roads as being four lanes with a landscaped median, bicycle lanes, and sidewalks. Given these conditions, it was assumed that all roads would be constructed in this fashion. The average street lane in the United States (including a bicycle path) was determined to be 10 feet wide, so a four-lane thoroughfare was assumed to be 40 feet wide.

- For steady-state calculations it was determined that all facilities will use gas furnaces or boilers for comfort heating as this accounts for the most conservative calculations. It is possible some of the smaller facilities would use electric furnaces for comfort heating.

- For steady-state calculations it was determined that only three facilities would need emergency power available: the medical facility, CDC, and DFAC.

- For steady state calculations it was determined that emissions for several replacement facilities would be negligible compared to the existing facilities they would replace. For example, the base gym would replace two existing gyms and, while larger, would likely utilize much more efficient utilities, making future emissions similar to existing emissions. Such facilities were not included in the steady-state calculations as the difference in emissions would approximately be zero.

## Table C-2: ACAM Emission Estimates By Project Type

| | Administrative | Infrastructure | Medical | Community Service | Lodging | Outdoor Rec | Total Demo |
|---|---|---|---|---|---|---|---|
| VOC | 3.525131 | 0.434571 | 1.819956 | 1.819956 | 1.819956 | 0.109491 | 0.234585 |
| Sox | 0.012134 | 0.005547 | 0.010716 | 0.010716 | 0.010716 | 0.00154 | 0.004169 |
| Nox | 4.432463 | 2.1008 | 3.871057 | 3.871059 | 3.871057 | 0.612699 | 1.599597 |
| CO | 5.329711 | 2.522365 | 4.931049 | 4.93105 | 4.931049 | 0.768654 | 1.464937 |
| PM10 | 5.149753 | 8.957523 | 2.254179 | 2.310554 | 2.254179 | 4.362606 | 5.475177 |
| PM2.5 | 0.174475 | 0.096256 | 0.154543 | 0.154543 | 0.154543 | 0.029248 | 0.058139 |
| Pb | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NH3 | 0.005672 | 0.00145 | 0.004124 | 0.004124 | 0.004124 | 0.000448 | 0.00306 |
| CO2e | 1188.5 | 543.3 | 1037.5 | 1037.5 | 1037.5 | 150 | 431 |
| Period (years) | 20 | 20 | 10 | 10 | 10 | 20 | 20 |
| Term | Short/mid/long | Short/mid/long | Long | Short/mid | Short/mid | Short/mid/long | Short/mid/long |

## Table C-3: Annual Emissions Based on Period and Term

| | Administrative | Infrastructure | Medical | Community Service | Lodging | Outdoor Rec | Total Demo |
|---|---|---|---|---|---|---|---|
| VOC | 0.17625655 | 0.02172855 | 0.1819956 | 0.1819956 | 0.1819956 | 0.00547455 | 0.01172925 |
| Sox | 0.0006067 | 0.00027735 | 0.0010716 | 0.0010716 | 0.0010716 | 0.000077 | 0.00020845 |
| Nox | 0.22162315 | 0.10504 | 0.3871057 | 0.3871059 | 0.3871057 | 0.03063495 | 0.07997985 |
| CO | 0.26648555 | 0.12611825 | 0.4931049 | 0.493105 | 0.4931049 | 0.0384327 | 0.07324685 |
| PM10 | 0.25748765 | 0.44787615 | 0.2254179 | 0.2310554 | 0.2254179 | 0.2181303 | 0.27375885 |
| PM2.5 | 0.00872375 | 0.0048128 | 0.0154543 | 0.0154543 | 0.0154543 | 0.0014624 | 0.00290695 |
| Pb | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NH3 | 0.0002836 | 0.0000725 | 0.0004124 | 0.0004124 | 0.0004124 | 0.0000224 | 0.000153 |
| CO2e | 59.425 | 27.165 | 103.75 | 103.75 | 103.75 | 7.5 | 21.55 |
| VOC | 0.17625655 | 0.02172855 | 0.1819956 | 0.1819956 | 0.1819956 | 0.00547455 | 0.01172925 |

## Table C-4: VOC Emissions (2023-2042)

| VOC | Administrative | Infrastructure | Medical | Community Service | Lodging | Outdoor Rec | Demo | Total |
|---|---|---|---|---|---|---|---|---|
| 2023 | 0.17625655 | 0.02172855 | | 0.1819956 | 0.1819956 | 0.00547455 | 0.01172925 | 0.5791801 |
| 2024 | 0.17625655 | 0.02172855 | | 0.1819956 | 0.1819956 | 0.00547455 | 0.01172925 | 0.5791801 |
| 2025 | 0.17625655 | 0.02172855 | | 0.1819956 | 0.1819956 | 0.00547455 | 0.01172925 | 0.5791801 |
| 2026 | 0.17625655 | 0.02172855 | | 0.1819956 | 0.1819956 | 0.00547455 | 0.01172925 | 0.5791801 |
| 2027 | 0.17625655 | 0.02172855 | | 0.1819956 | 0.1819956 | 0.00547455 | 0.01172925 | 0.5791801 |
| 2028 | 0.17625655 | 0.02172855 | | 0.1819956 | 0.1819956 | 0.00547455 | 0.01172925 | 0.5791801 |
| 2029 | 0.17625655 | 0.02172855 | | 0.1819956 | 0.1819956 | 0.00547455 | 0.01172925 | 0.5791801 |
| 2030 | 0.17625655 | 0.02172855 | | 0.1819956 | 0.1819956 | 0.00547455 | 0.01172925 | 0.5791801 |
| 2031 | 0.17625655 | 0.02172855 | | 0.1819956 | 0.1819956 | 0.00547455 | 0.01172925 | 0.5791801 |
| 2032 | 0.17625655 | 0.02172855 | | 0.1819956 | 0.1819956 | 0.00547455 | 0.01172925 | 0.5791801 |
| 2033 | 0.17625655 | 0.02172855 | 0.1819956 | | | 0.00547455 | 0.01172925 | 0.3971845 |
| 2034 | 0.17625655 | 0.02172855 | 0.1819956 | | | 0.00547455 | 0.01172925 | 0.3971845 |
| 2035 | 0.17625655 | 0.02172855 | 0.1819956 | | | 0.00547455 | 0.01172925 | 0.3971845 |
| 2036 | 0.17625655 | 0.02172855 | 0.1819956 | | | 0.00547455 | 0.01172925 | 0.3971845 |
| 2037 | 0.17625655 | 0.02172855 | 0.1819956 | | | 0.00547455 | 0.01172925 | 0.3971845 |
| 2038 | 0.17625655 | 0.02172855 | 0.1819956 | | | 0.00547455 | 0.01172925 | 0.3971845 |
| 2039 | 0.17625655 | 0.02172855 | 0.1819956 | | | 0.00547455 | 0.01172925 | 0.3971845 |
| 2040 | 0.17625655 | 0.02172855 | 0.1819956 | | | 0.00547455 | 0.01172925 | 0.3971845 |
| 2041 | 0.17625655 | 0.02172855 | 0.1819956 | | | 0.00547455 | 0.01172925 | 0.3971845 |
| 2042 | 0.17625655 | 0.02172855 | 0.1819956 | | | 0.00547455 | 0.01172925 | 0.3971845 |
| | | | | | | | Total | 9.763646 |
| | | | | | | | Average | 0.4881823 |

Table C-5: $SO_x$ Emissions (2023-2042)

| VOC | Administrative | Infrastructure | Medical | Community Service | Lodging | Outdoor Rec | Demo | Total |
|---|---|---|---|---|---|---|---|---|
| 2023 | 0.0006067 | 0.00027735 | | 0.0010716 | 0.0010716 | 0.000077 | 0.00020845 | 0.0033127 |
| 2024 | 0.0006067 | 0.00027735 | | 0.0010716 | 0.0010716 | 0.000077 | 0.00020845 | 0.0033127 |
| 2025 | 0.0006067 | 0.00027735 | | 0.0010716 | 0.0010716 | 0.000077 | 0.00020845 | 0.0033127 |
| 2026 | 0.0006067 | 0.00027735 | | 0.0010716 | 0.0010716 | 0.000077 | 0.00020845 | 0.0033127 |
| 2027 | 0.0006067 | 0.00027735 | | 0.0010716 | 0.0010716 | 0.000077 | 0.00020845 | 0.0033127 |
| 2028 | 0.0006067 | 0.00027735 | | 0.0010716 | 0.0010716 | 0.000077 | 0.00020845 | 0.0033127 |
| 2029 | 0.0006067 | 0.00027735 | | 0.0010716 | 0.0010716 | 0.000077 | 0.00020845 | 0.0033127 |
| 2030 | 0.0006067 | 0.00027735 | | 0.0010716 | 0.0010716 | 0.000077 | 0.00020845 | 0.0033127 |
| 2031 | 0.0006067 | 0.00027735 | | 0.0010716 | 0.0010716 | 0.000077 | 0.00020845 | 0.0033127 |
| 2032 | 0.0006067 | 0.00027735 | | 0.0010716 | 0.0010716 | 0.000077 | 0.00020845 | 0.0033127 |
| 2033 | 0.0006067 | 0.00027735 | 0.0010716 | | | 0.000077 | 0.00020845 | 0.0022411 |
| 2034 | 0.0006067 | 0.00027735 | 0.0010716 | | | 0.000077 | 0.00020845 | 0.0022411 |
| 2035 | 0.0006067 | 0.00027735 | 0.0010716 | | | 0.000077 | 0.00020845 | 0.0022411 |
| 2036 | 0.0006067 | 0.00027735 | 0.0010716 | | | 0.000077 | 0.00020845 | 0.0022411 |
| 2037 | 0.0006067 | 0.00027735 | 0.0010716 | | | 0.000077 | 0.00020845 | 0.0022411 |
| 2038 | 0.0006067 | 0.00027735 | 0.0010716 | | | 0.000077 | 0.00020845 | 0.0022411 |
| 2039 | 0.0006067 | 0.00027735 | 0.0010716 | | | 0.000077 | 0.00020845 | 0.0022411 |
| 2040 | 0.0006067 | 0.00027735 | 0.0010716 | | | 0.000077 | 0.00020845 | 0.0022411 |
| 2041 | 0.0006067 | 0.00027735 | 0.0010716 | | | 0.000077 | 0.00020845 | 0.0022411 |
| 2042 | 0.0006067 | 0.00027735 | 0.0010716 | | | 0.000077 | 0.00020845 | 0.0022411 |
| | | | | | | | Total | 0.055538 |
| | | | | | | | Average | 0.0027769 |

Table C-6: $NO_x$ Emissions (2023-2042)

| VOC | Administrative | Infrastructure | Medical | Community Service | Lodging | Outdoor Rec | Demo | Total |
|---|---|---|---|---|---|---|---|---|
| 2023 | 0.22162315 | 0.10504 | | 0.3871059 | 0.3871057 | 0.03063495 | 0.07997985 | 1.21148955 |
| 2024 | 0.22162315 | 0.10504 | | 0.3871059 | 0.3871057 | 0.03063495 | 0.07997985 | 1.21148955 |
| 2025 | 0.22162315 | 0.10504 | | 0.3871059 | 0.3871057 | 0.03063495 | 0.07997985 | 1.21148955 |
| 2026 | 0.22162315 | 0.10504 | | 0.3871059 | 0.3871057 | 0.03063495 | 0.07997985 | 1.21148955 |
| 2027 | 0.22162315 | 0.10504 | | 0.3871059 | 0.3871057 | 0.03063495 | 0.07997985 | 1.21148955 |
| 2028 | 0.22162315 | 0.10504 | | 0.3871059 | 0.3871057 | 0.03063495 | 0.07997985 | 1.21148955 |
| 2029 | 0.22162315 | 0.10504 | | 0.3871059 | 0.3871057 | 0.03063495 | 0.07997985 | 1.21148955 |
| 2030 | 0.22162315 | 0.10504 | | 0.3871059 | 0.3871057 | 0.03063495 | 0.07997985 | 1.21148955 |
| 2031 | 0.22162315 | 0.10504 | | 0.3871059 | 0.3871057 | 0.03063495 | 0.07997985 | 1.21148955 |
| 2032 | 0.22162315 | 0.10504 | | 0.3871059 | 0.3871057 | 0.03063495 | 0.07997985 | 1.21148955 |
| 2033 | 0.22162315 | 0.10504 | 0.3871057 | | | 0.03063495 | 0.07997985 | 0.82438365 |
| 2034 | 0.22162315 | 0.10504 | 0.3871057 | | | 0.03063495 | 0.07997985 | 0.82438365 |
| 2035 | 0.22162315 | 0.10504 | 0.3871057 | | | 0.03063495 | 0.07997985 | 0.82438365 |
| 2036 | 0.22162315 | 0.10504 | 0.3871057 | | | 0.03063495 | 0.07997985 | 0.82438365 |
| 2037 | 0.22162315 | 0.10504 | 0.3871057 | | | 0.03063495 | 0.07997985 | 0.82438365 |
| 2038 | 0.22162315 | 0.10504 | 0.3871057 | | | 0.03063495 | 0.07997985 | 0.82438365 |
| 2039 | 0.22162315 | 0.10504 | 0.3871057 | | | 0.03063495 | 0.07997985 | 0.82438365 |
| 2040 | 0.22162315 | 0.10504 | 0.3871057 | | | 0.03063495 | 0.07997985 | 0.82438365 |
| 2041 | 0.22162315 | 0.10504 | 0.3871057 | | | 0.03063495 | 0.07997985 | 0.82438365 |
| 2042 | 0.22162315 | 0.10504 | 0.3871057 | | | 0.03063495 | 0.07997985 | 0.82438365 |
| | | | | | | | Total | 20.358732 |
| | | | | | | | Average | 1.0179366 |

Table C-7: CO Emissions (2023-2042)

| VOC | Administrative | Infrastructure | Medical | Community Service | Lodging | Outdoor Rec | Demo | Total |
|---|---|---|---|---|---|---|---|---|
| 2023 | 0.26648555 | 0.12611825 | | 0.493105 | 0.4931049 | 0.0384327 | 0.07324685 | 1.49049325 |
| 2024 | 0.26648555 | 0.12611825 | | 0.493105 | 0.4931049 | 0.0384327 | 0.07324685 | 1.49049325 |
| 2025 | 0.26648555 | 0.12611825 | | 0.493105 | 0.4931049 | 0.0384327 | 0.07324685 | 1.49049325 |
| 2026 | 0.26648555 | 0.12611825 | | 0.493105 | 0.4931049 | 0.0384327 | 0.07324685 | 1.49049325 |
| 2027 | 0.26648555 | 0.12611825 | | 0.493105 | 0.4931049 | 0.0384327 | 0.07324685 | 1.49049325 |
| 2028 | 0.26648555 | 0.12611825 | | 0.493105 | 0.4931049 | 0.0384327 | 0.07324685 | 1.49049325 |
| 2029 | 0.26648555 | 0.12611825 | | 0.493105 | 0.4931049 | 0.0384327 | 0.07324685 | 1.49049325 |
| 2030 | 0.26648555 | 0.12611825 | | 0.493105 | 0.4931049 | 0.0384327 | 0.07324685 | 1.49049325 |
| 2031 | 0.26648555 | 0.12611825 | | 0.493105 | 0.4931049 | 0.0384327 | 0.07324685 | 1.49049325 |
| 2032 | 0.26648555 | 0.12611825 | | 0.493105 | 0.4931049 | 0.0384327 | 0.07324685 | 1.49049325 |
| 2033 | 0.26648555 | 0.12611825 | 0.4931049 | | | 0.0384327 | 0.07324685 | 0.99738825 |
| 2034 | 0.26648555 | 0.12611825 | 0.4931049 | | | 0.0384327 | 0.07324685 | 0.99738825 |
| 2035 | 0.26648555 | 0.12611825 | 0.4931049 | | | 0.0384327 | 0.07324685 | 0.99738825 |
| 2036 | 0.26648555 | 0.12611825 | 0.4931049 | | | 0.0384327 | 0.07324685 | 0.99738825 |
| 2037 | 0.26648555 | 0.12611825 | 0.4931049 | | | 0.0384327 | 0.07324685 | 0.99738825 |
| 2038 | 0.26648555 | 0.12611825 | 0.4931049 | | | 0.0384327 | 0.07324685 | 0.99738825 |
| 2039 | 0.26648555 | 0.12611825 | 0.4931049 | | | 0.0384327 | 0.07324685 | 0.99738825 |
| 2040 | 0.26648555 | 0.12611825 | 0.4931049 | | | 0.0384327 | 0.07324685 | 0.99738825 |
| 2041 | 0.26648555 | 0.12611825 | 0.4931049 | | | 0.0384327 | 0.07324685 | 0.99738825 |
| 2042 | 0.26648555 | 0.12611825 | 0.4931049 | | | 0.0384327 | 0.07324685 | 0.99738825 |
| | | | | | | | Total | 24.878815 |
| | | | | | | | Average | 1.24394075 |

Table C-8: $PM_{10}$ Emissions (2023-2042)

| VOC | Administrative | Infrastructure | Medical | Community Service | Lodging | Outdoor Rec | Demo | Total |
|---|---|---|---|---|---|---|---|---|
| 2023 | 0.25748765 | 0.44787615 | | 0.2310554 | 0.2254179 | 0.2181303 | 0.27375885 | 1.65372625 |
| 2024 | 0.25748765 | 0.44787615 | | 0.2310554 | 0.2254179 | 0.2181303 | 0.27375885 | 1.65372625 |
| 2025 | 0.25748765 | 0.44787615 | | 0.2310554 | 0.2254179 | 0.2181303 | 0.27375885 | 1.65372625 |
| 2026 | 0.25748765 | 0.44787615 | | 0.2310554 | 0.2254179 | 0.2181303 | 0.27375885 | 1.65372625 |
| 2027 | 0.25748765 | 0.44787615 | | 0.2310554 | 0.2254179 | 0.2181303 | 0.27375885 | 1.65372625 |
| 2028 | 0.25748765 | 0.44787615 | | 0.2310554 | 0.2254179 | 0.2181303 | 0.27375885 | 1.65372625 |
| 2029 | 0.25748765 | 0.44787615 | | 0.2310554 | 0.2254179 | 0.2181303 | 0.27375885 | 1.65372625 |
| 2030 | 0.25748765 | 0.44787615 | | 0.2310554 | 0.2254179 | 0.2181303 | 0.27375885 | 1.65372625 |
| 2031 | 0.25748765 | 0.44787615 | | 0.2310554 | 0.2254179 | 0.2181303 | 0.27375885 | 1.65372625 |
| 2032 | 0.25748765 | 0.44787615 | | 0.2310554 | 0.2254179 | 0.2181303 | 0.27375885 | 1.65372625 |
| 2033 | 0.25748765 | 0.44787615 | 0.2254179 | | | 0.2181303 | 0.27375885 | 1.42267085 |
| 2034 | 0.25748765 | 0.44787615 | 0.2254179 | | | 0.2181303 | 0.27375885 | 1.42267085 |
| 2035 | 0.25748765 | 0.44787615 | 0.2254179 | | | 0.2181303 | 0.27375885 | 1.42267085 |
| 2036 | 0.25748765 | 0.44787615 | 0.2254179 | | | 0.2181303 | 0.27375885 | 1.42267085 |
| 2037 | 0.25748765 | 0.44787615 | 0.2254179 | | | 0.2181303 | 0.27375885 | 1.42267085 |
| 2038 | 0.25748765 | 0.44787615 | 0.2254179 | | | 0.2181303 | 0.27375885 | 1.42267085 |
| 2039 | 0.25748765 | 0.44787615 | 0.2254179 | | | 0.2181303 | 0.27375885 | 1.42267085 |
| 2040 | 0.25748765 | 0.44787615 | 0.2254179 | | | 0.2181303 | 0.27375885 | 1.42267085 |
| 2041 | 0.25748765 | 0.44787615 | 0.2254179 | | | 0.2181303 | 0.27375885 | 1.42267085 |
| 2042 | 0.25748765 | 0.44787615 | 0.2254179 | | | 0.2181303 | 0.27375885 | 1.42267085 |
| | | | | | | | Total | 30.763971 |
| | | | | | | | Average | 1.53819855 |

Table C-9: $PM_{2.5}$ Emissions (2023-2042)

| VOC | Administrative | Infrastructure | Medical | Community Service | Lodging | Outdoor Rec | Demo | Total |
|---|---|---|---|---|---|---|---|---|
| 2023 | 0.00872375 | 0.0048128 | | 0.0154543 | 0.0154543 | 0.0014624 | 0.00290695 | 0.0488145 |
| 2024 | 0.00872375 | 0.0048128 | | 0.0154543 | 0.0154543 | 0.0014624 | 0.00290695 | 0.0488145 |
| 2025 | 0.00872375 | 0.0048128 | | 0.0154543 | 0.0154543 | 0.0014624 | 0.00290695 | 0.0488145 |
| 2026 | 0.00872375 | 0.0048128 | | 0.0154543 | 0.0154543 | 0.0014624 | 0.00290695 | 0.0488145 |
| 2027 | 0.00872375 | 0.0048128 | | 0.0154543 | 0.0154543 | 0.0014624 | 0.00290695 | 0.0488145 |
| 2028 | 0.00872375 | 0.0048128 | | 0.0154543 | 0.0154543 | 0.0014624 | 0.00290695 | 0.0488145 |
| 2029 | 0.00872375 | 0.0048128 | | 0.0154543 | 0.0154543 | 0.0014624 | 0.00290695 | 0.0488145 |
| 2030 | 0.00872375 | 0.0048128 | | 0.0154543 | 0.0154543 | 0.0014624 | 0.00290695 | 0.0488145 |
| 2031 | 0.00872375 | 0.0048128 | | 0.0154543 | 0.0154543 | 0.0014624 | 0.00290695 | 0.0488145 |
| 2032 | 0.00872375 | 0.0048128 | | 0.0154543 | 0.0154543 | 0.0014624 | 0.00290695 | 0.0488145 |
| 2033 | 0.00872375 | 0.0048128 | 0.0154543 | | | 0.0014624 | 0.00290695 | 0.0333602 |
| 2034 | 0.00872375 | 0.0048128 | 0.0154543 | | | 0.0014624 | 0.00290695 | 0.0333602 |
| 2035 | 0.00872375 | 0.0048128 | 0.0154543 | | | 0.0014624 | 0.00290695 | 0.0333602 |
| 2036 | 0.00872375 | 0.0048128 | 0.0154543 | | | 0.0014624 | 0.00290695 | 0.0333602 |
| 2037 | 0.00872375 | 0.0048128 | 0.0154543 | | | 0.0014624 | 0.00290695 | 0.0333602 |
| 2038 | 0.00872375 | 0.0048128 | 0.0154543 | | | 0.0014624 | 0.00290695 | 0.0333602 |
| 2039 | 0.00872375 | 0.0048128 | 0.0154543 | | | 0.0014624 | 0.00290695 | 0.0333602 |
| 2040 | 0.00872375 | 0.0048128 | 0.0154543 | | | 0.0014624 | 0.00290695 | 0.0333602 |
| 2041 | 0.00872375 | 0.0048128 | 0.0154543 | | | 0.0014624 | 0.00290695 | 0.0333602 |
| 2042 | 0.00872375 | 0.0048128 | 0.0154543 | | | 0.0014624 | 0.00290695 | 0.0333602 |
| | | | | | | | Total | 0.821747 |
| | | | | | | | Average | 0.04108735 |

Table C-10: $NH_3$ Emissions (2023-2042)

| VOC | Administrative | Infrastructure | Medical | Community Service | Lodging | Outdoor Rec | Demo | Total |
|---|---|---|---|---|---|---|---|---|
| 2023 | 0.0002836 | 0.0000725 | | 0.0004124 | 0.0004124 | 0.0000224 | 0.000153 | 0.0013563 |
| 2024 | 0.0002836 | 0.0000725 | | 0.0004124 | 0.0004124 | 0.0000224 | 0.000153 | 0.0013563 |
| 2025 | 0.0002836 | 0.0000725 | | 0.0004124 | 0.0004124 | 0.0000224 | 0.000153 | 0.0013563 |
| 2026 | 0.0002836 | 0.0000725 | | 0.0004124 | 0.0004124 | 0.0000224 | 0.000153 | 0.0013563 |
| 2027 | 0.0002836 | 0.0000725 | | 0.0004124 | 0.0004124 | 0.0000224 | 0.000153 | 0.0013563 |
| 2028 | 0.0002836 | 0.0000725 | | 0.0004124 | 0.0004124 | 0.0000224 | 0.000153 | 0.0013563 |
| 2029 | 0.0002836 | 0.0000725 | | 0.0004124 | 0.0004124 | 0.0000224 | 0.000153 | 0.0013563 |
| 2030 | 0.0002836 | 0.0000725 | | 0.0004124 | 0.0004124 | 0.0000224 | 0.000153 | 0.0013563 |
| 2031 | 0.0002836 | 0.0000725 | | 0.0004124 | 0.0004124 | 0.0000224 | 0.000153 | 0.0013563 |
| 2032 | 0.0002836 | 0.0000725 | | 0.0004124 | 0.0004124 | 0.0000224 | 0.000153 | 0.0013563 |
| 2033 | 0.0002836 | 0.0000725 | 0.0004124 | | | 0.0000224 | 0.000153 | 0.0009439 |
| 2034 | 0.0002836 | 0.0000725 | 0.0004124 | | | 0.0000224 | 0.000153 | 0.0009439 |
| 2035 | 0.0002836 | 0.0000725 | 0.0004124 | | | 0.0000224 | 0.000153 | 0.0009439 |
| 2036 | 0.0002836 | 0.0000725 | 0.0004124 | | | 0.0000224 | 0.000153 | 0.0009439 |
| 2037 | 0.0002836 | 0.0000725 | 0.0004124 | | | 0.0000224 | 0.000153 | 0.0009439 |
| 2038 | 0.0002836 | 0.0000725 | 0.0004124 | | | 0.0000224 | 0.000153 | 0.0009439 |
| 2039 | 0.0002836 | 0.0000725 | 0.0004124 | | | 0.0000224 | 0.000153 | 0.0009439 |
| 2040 | 0.0002836 | 0.0000725 | 0.0004124 | | | 0.0000224 | 0.000153 | 0.0009439 |
| 2041 | 0.0002836 | 0.0000725 | 0.0004124 | | | 0.0000224 | 0.000153 | 0.0009439 |
| 2042 | 0.0002836 | 0.0000725 | 0.0004124 | | | 0.0000224 | 0.000153 | 0.0009439 |
| | | | | | | | Total | 0.023002 |
| | | | | | | | Average | 0.0011501 |

Table C-11: $CO_2e$ Emissions (2023-2042)

| VOC | Administrative | Infrastructure | Medical | Community Service | Lodging | Outdoor Rec | Demo | Total |
|---|---|---|---|---|---|---|---|---|
| 2023 | 59.425 | 27.165 | | 103.75 | 103.75 | 7.5 | 21.55 | 323.14 |
| 2024 | 59.425 | 27.165 | | 103.75 | 103.75 | 7.5 | 21.55 | 323.14 |
| 2025 | 59.425 | 27.165 | | 103.75 | 103.75 | 7.5 | 21.55 | 323.14 |
| 2026 | 59.425 | 27.165 | | 103.75 | 103.75 | 7.5 | 21.55 | 323.14 |
| 2027 | 59.425 | 27.165 | | 103.75 | 103.75 | 7.5 | 21.55 | 323.14 |
| 2028 | 59.425 | 27.165 | | 103.75 | 103.75 | 7.5 | 21.55 | 323.14 |
| 2029 | 59.425 | 27.165 | | 103.75 | 103.75 | 7.5 | 21.55 | 323.14 |
| 2030 | 59.425 | 27.165 | | 103.75 | 103.75 | 7.5 | 21.55 | 323.14 |
| 2031 | 59.425 | 27.165 | | 103.75 | 103.75 | 7.5 | 21.55 | 323.14 |
| 2032 | 59.425 | 27.165 | | 103.75 | 103.75 | 7.5 | 21.55 | 323.14 |
| 2033 | 59.425 | 27.165 | 103.75 | | | 7.5 | 21.55 | 219.39 |
| 2034 | 59.425 | 27.165 | 103.75 | | | 7.5 | 21.55 | 219.39 |
| 2035 | 59.425 | 27.165 | 103.75 | | | 7.5 | 21.55 | 219.39 |
| 2036 | 59.425 | 27.165 | 103.75 | | | 7.5 | 21.55 | 219.39 |
| 2037 | 59.425 | 27.165 | 103.75 | | | 7.5 | 21.55 | 219.39 |
| 2038 | 59.425 | 27.165 | 103.75 | | | 7.5 | 21.55 | 219.39 |
| 2039 | 59.425 | 27.165 | 103.75 | | | 7.5 | 21.55 | 219.39 |
| 2040 | 59.425 | 27.165 | 103.75 | | | 7.5 | 21.55 | 219.39 |
| 2041 | 59.425 | 27.165 | 103.75 | | | 7.5 | 21.55 | 219.39 |
| 2042 | 59.425 | 27.165 | 103.75 | | | 7.5 | 21.55 | 219.39 |
| | | | | | | | Total | 5425.3 |
| | | | | | | | Average | 271.265 |

# AIR CONFORMITY APPLICABILITY MODEL REPORT
# RECORD OF CONFORMITY ANALYSIS (ROCA)

**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:** KIRTLAND AFB
**State:** New Mexico
**County(s):** Bernalillo
**Regulatory Area(s):** Albuquerque, NM

**b. Action Title:** Zia Park EA

**c. Project Number/s (if applicable):**

**d. Projected Action Start Date:** 1 / 2023

**e. Action Description:**

The Air Force proposes to redevelop Zia Park, an underutilized portion of Kirtland AFB, by implementing short-, mid-, and long-range projects that improve the physical infrastructure and function of the installation. Zia Park is a former housing development that encompasses approximately 300 acres of land central to the primary cantonment area of Kirtland AFB. Repurposing the Zia Park area would allow the Air Force to consolidate and co-locate community facilities and connect the east and west sides of the installation. The Proposed Action includes the demolition of existing, unused and/or underutilized facilities and the construction of community service, medical, and administrative facilities; attached and detached residences and lodging; the provision of outdoor recreation areas; and infrastructure improvements

**f. Point of Contact:**


**Name:** Jessie Moore
**Title:** Environmental Scientist
**Organization:** HazAir
**Email:** jessie.moore@hazair.com
**Phone Number:** 505-702-5632


**2. Analysis:** 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. General Conformity under the Clean Air Act, Section 1.76 has been evaluated for the action described above according to the requirements of 40 CFR 93, Subpart B.

Based on the analysis, the requirements of this rule are: _____ applicable
__X__ not applicable

**Conformity Analysis Summary:**

**2023**

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| Albuquerque, NM | | | |
| **VOC** | 8.712 | | |
| **NOx** | 14.058 | | |

# AIR CONFORMITY APPLICABILITY MODEL REPORT
# RECORD OF CONFORMITY ANALYSIS (ROCA)

| | | | |
|---|---|---|---|
| **CO** | 16.936 | 100 | No |
| **SOx** | 0.038 | | |
| **PM 10** | 30.521 | | |
| **PM 2.5** | 0.580 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.015 | | |
| **CO2e** | 3722.5 | | |

**2024**

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| Albuquerque, NM | | | |
| **VOC** | 1.052 | | |
| **NOx** | 6.300 | | |
| **CO** | 7.943 | 100 | No |
| **SOx** | 0.018 | | |
| **PM 10** | 0.243 | | |
| **PM 2.5** | 0.241 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.008 | | |
| **CO2e** | 1702.6 | | |

**2025**

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| Albuquerque, NM | | | |
| **VOC** | 0.000 | | |
| **NOx** | 0.000 | | |
| **CO** | 0.000 | 100 | No |
| **SOx** | 0.000 | | |
| **PM 10** | 0.000 | | |
| **PM 2.5** | 0.000 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.000 | | |
| **CO2e** | 0.0 | | |

**2026**

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| Albuquerque, NM | | | |
| **VOC** | 0.000 | | |
| **NOx** | 0.000 | | |
| **CO** | 0.000 | 100 | No |
| **SOx** | 0.000 | | |
| **PM 10** | 0.000 | | |
| **PM 2.5** | 0.000 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.000 | | |
| **CO2e** | 0.0 | | |

**2027**

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |

# AIR CONFORMITY APPLICABILITY MODEL REPORT
# RECORD OF CONFORMITY ANALYSIS (ROCA)

| Albuquerque, NM | | | |
|---|---|---|---|
| **VOC** | 0.000 | | |
| **NOx** | 0.000 | | |
| **CO** | 0.000 | 100 | No |
| **SOx** | 0.000 | | |
| **PM 10** | 0.000 | | |
| **PM 2.5** | 0.000 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.000 | | |
| **CO2e** | 0.0 | | |

## 2028

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| Albuquerque, NM | | | |
| **VOC** | 0.000 | | |
| **NOx** | 0.000 | | |
| **CO** | 0.000 | 100 | No |
| **SOx** | 0.000 | | |
| **PM 10** | 0.000 | | |
| **PM 2.5** | 0.000 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.000 | | |
| **CO2e** | 0.0 | | |

## 2029

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| Albuquerque, NM | | | |
| **VOC** | 0.000 | | |
| **NOx** | 0.000 | | |
| **CO** | 0.000 | 100 | No |
| **SOx** | 0.000 | | |
| **PM 10** | 0.000 | | |
| **PM 2.5** | 0.000 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.000 | | |
| **CO2e** | 0.0 | | |

## 2030

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| Albuquerque, NM | | | |
| **VOC** | 0.000 | | |
| **NOx** | 0.000 | | |
| **CO** | 0.000 | 100 | No |
| **SOx** | 0.000 | | |
| **PM 10** | 0.000 | | |
| **PM 2.5** | 0.000 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.000 | | |
| **CO2e** | 0.0 | | |

# AIR CONFORMITY APPLICABILITY MODEL REPORT
# RECORD OF CONFORMITY ANALYSIS (ROCA)

## 2031

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| Albuquerque, NM | | | |
| **VOC** | 0.000 | | |
| **NOx** | 0.000 | | |
| **CO** | 0.000 | 100 | No |
| **SOx** | 0.000 | | |
| **PM 10** | 0.000 | | |
| **PM 2.5** | 0.000 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.000 | | |
| **CO2e** | 0.0 | | |

## 2032

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| Albuquerque, NM | | | |
| **VOC** | 0.000 | | |
| **NOx** | 0.000 | | |
| **CO** | 0.000 | 100 | No |
| **SOx** | 0.000 | | |
| **PM 10** | 0.000 | | |
| **PM 2.5** | 0.000 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.000 | | |
| **CO2e** | 0.0 | | |

## 2033

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| Albuquerque, NM | | | |
| **VOC** | 0.000 | | |
| **NOx** | 0.000 | | |
| **CO** | 0.000 | 100 | No |
| **SOx** | 0.000 | | |
| **PM 10** | 0.000 | | |
| **PM 2.5** | 0.000 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.000 | | |
| **CO2e** | 0.0 | | |

## 2034

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| Albuquerque, NM | | | |
| **VOC** | 0.000 | | |
| **NOx** | 0.000 | | |
| **CO** | 0.000 | 100 | No |
| **SOx** | 0.000 | | |
| **PM 10** | 0.000 | | |
| **PM 2.5** | 0.000 | | |
| **Pb** | 0.000 | | |

# AIR CONFORMITY APPLICABILITY MODEL REPORT
# RECORD OF CONFORMITY ANALYSIS (ROCA)

| | | | |
|---|---|---|---|
| **NH3** | 0.000 | | |
| **CO2e** | 0.0 | | |

## 2035

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| Albuquerque, NM | | | |
| **VOC** | 0.000 | | |
| **NOx** | 0.000 | | |
| **CO** | 0.000 | 100 | No |
| **SOx** | 0.000 | | |
| **PM 10** | 0.000 | | |
| **PM 2.5** | 0.000 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.000 | | |
| **CO2e** | 0.0 | | |

## 2036

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| Albuquerque, NM | | | |
| **VOC** | 0.000 | | |
| **NOx** | 0.000 | | |
| **CO** | 0.000 | 100 | No |
| **SOx** | 0.000 | | |
| **PM 10** | 0.000 | | |
| **PM 2.5** | 0.000 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.000 | | |
| **CO2e** | 0.0 | | |

## 2037

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| Albuquerque, NM | | | |
| **VOC** | 0.000 | | |
| **NOx** | 0.000 | | |
| **CO** | 0.000 | 100 | No |
| **SOx** | 0.000 | | |
| **PM 10** | 0.000 | | |
| **PM 2.5** | 0.000 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.000 | | |
| **CO2e** | 0.0 | | |

## 2038

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| Albuquerque, NM | | | |
| **VOC** | 0.000 | | |
| **NOx** | 0.000 | | |
| **CO** | 0.000 | 100 | No |
| **SOx** | 0.000 | | |

# AIR CONFORMITY APPLICABILITY MODEL REPORT
# RECORD OF CONFORMITY ANALYSIS (ROCA)

| | | | |
|---|---|---|---|
| **PM 10** | 0.000 | | |
| **PM 2.5** | 0.000 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.000 | | |
| **CO2e** | 0.0 | | |

**2039**

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| Albuquerque, NM | | | |
| **VOC** | 0.000 | | |
| **NOx** | 0.000 | | |
| **CO** | 0.000 | 100 | No |
| **SOx** | 0.000 | | |
| **PM 10** | 0.000 | | |
| **PM 2.5** | 0.000 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.000 | | |
| **CO2e** | 0.0 | | |

**2040**

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| Albuquerque, NM | | | |
| **VOC** | 0.000 | | |
| **NOx** | 0.000 | | |
| **CO** | 0.000 | 100 | No |
| **SOx** | 0.000 | | |
| **PM 10** | 0.000 | | |
| **PM 2.5** | 0.000 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.000 | | |
| **CO2e** | 0.0 | | |

**2041**

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| Albuquerque, NM | | | |
| **VOC** | 0.000 | | |
| **NOx** | 0.000 | | |
| **CO** | 0.000 | 100 | No |
| **SOx** | 0.000 | | |
| **PM 10** | 0.000 | | |
| **PM 2.5** | 0.000 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.000 | | |
| **CO2e** | 0.0 | | |

**2042**

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| Albuquerque, NM | | | |
| **VOC** | 0.000 | | |

# AIR CONFORMITY APPLICABILITY MODEL REPORT
# RECORD OF CONFORMITY ANALYSIS (ROCA)

| | | | |
|---|---|---|---|
| **NOx** | 0.000 | | |
| **CO** | 0.000 | 100 | No |
| **SOx** | 0.000 | | |
| **PM 10** | 0.000 | | |
| **PM 2.5** | 0.000 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.000 | | |
| **CO2e** | 0.0 | | |

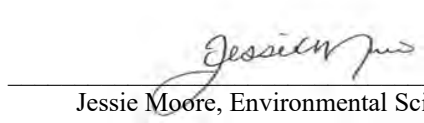
**2043**

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| Albuquerque, NM | | | |
| **VOC** | 0.538 | | |
| **NOx** | 1.885 | | |
| **CO** | 5.623 | 100 | No |
| **SOx** | 0.073 | | |
| **PM 10** | 0.169 | | |
| **PM 2.5** | 0.168 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.024 | | |
| **CO2e** | 1875.5 | | |

**2044 - (Steady State)**

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| Albuquerque, NM | | | |
| **VOC** | 0.538 | | |
| **NOx** | 1.885 | | |
| **CO** | 5.623 | 100 | No |
| **SOx** | 0.073 | | |
| **PM 10** | 0.169 | | |
| **PM 2.5** | 0.168 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.024 | | |
| **CO2e** | 1875.5 | | |

None of estimated emissions associated with this action are above the conformity threshold values established at 40 CFR 93.153 (b); Therefore, the requirements of the General Conformity Rule are not applicable.



Jessie Moore, Environmental Scientist

7/25/2022
DATE

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

## 1. General Information

**- Action Location**

**Base:** KIRTLAND AFB
**State:** New Mexico
**County(s):** Bernalillo
**Regulatory Area(s):** Albuquerque, NM

**- Action Title:** Zia Park EA

**- Project Number/s (if applicable):**

**- Projected Action Start Date:** 1 / 2023

**- Action Purpose and Need:**

The purpose of the Proposed Action is to implement several types of construction projects over the next 20+ years, as described in the Kirtland AFB Zia Park Area Development Plan, to meet the current and future needs of Kirtland AFB.

**- Action Description:**

The Air Force proposes to redevelop Zia Park, an underutilized portion of Kirtland AFB, by implementing short-, mid-, and long-range projects that improve the physical infrastructure and function of the installation. Zia Park is a former housing development that encompasses approximately 300 acres of land central to the primary cantonment area of Kirtland AFB. Repurposing the Zia Park area would allow the Air Force to consolidate and co-locate community facilities and connect the east and west sides of the installation. The Proposed Action includes the demolition of existing, unused and/or underutilized facilities and the construction of community service, medical, and administrative facilities; attached and detached residences and lodging; the provision of outdoor recreation areas; and infrastructure improvements

**- Point of Contact**


**Name:** Jessie Moore
**Title:** Environmental Scientist
**Organization:** HazAir
**Email:** jessie.moore@hazair.com
**Phone Number:** 505-702-5632


**- Activity List:**

| | Activity Type | Activity Title |
|---|---|---|
| 2. | Construction / Demolition | Administrative |
| 3. | Construction / Demolition | Infrastructure Improvements |
| 4. | Construction / Demolition | Medical |
| 5. | Construction / Demolition | Community Service |
| 6. | Construction / Demolition | Attached and Detached Residential/Lodging |
| 7. | Construction / Demolition | Outdoor Recreation and Open Space |
| 8. | Construction / Demolition | Demolition of B 585 |
| 9. | Construction / Demolition | Demolition of B 20228 |
| 10. | Construction / Demolition | Demolition of B 20221 |
| 11. | Construction / Demolition | Demolition of B 20350 |
| 12. | Construction / Demolition | Demolition of B 1914 |
| 13. | Heating | Dormitory Heating |
| 14. | Heating | Admin Heating |
| 15. | Personnel | Additional Personnel |
| 16. | Emergency Generator | Emergency Generators for Zia Park |

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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:** Bernalillo
**Regulatory Area(s):** Albuquerque, NM

**- Activity Title:** Administrative

**- Activity Description:**
Up to 40 acres of land with up to 480,000 square feet (sf) of facilities, parking lots, and impervious surfaces; facilities could be up to 4 stories tall.

**- Activity Start Date**
**Start Month:** 1
**Start Month:** 2023

**- Activity End Date**
**Indefinite:** False
**End Month:** 11
**End Month:** 2024

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 3.525131 |
| $SO_x$ | 0.012134 |
| $NO_x$ | 4.432463 |
| CO | 5.329711 |
| PM 10 | 5.149753 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.174475 |
| Pb | 0.000000 |
| $NH_3$ | 0.005672 |
| $CO_2e$ | 1188.5 |
| | |

### 2.1 Site Grading Phase

### 2.1.1 Site Grading Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 5
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

### 2.1.2 Site Grading Phase Assumptions

**- General Site Grading Information**
**Area of Site to be Graded ($ft^2$):** 480000

**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 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 |
|---|---|---|
| Excavators Composite | 1 | 8 |
| Graders Composite | 1 | 8 |
| Other Construction Equipment Composite | 1 | 8 |
| Rubber Tired Dozers Composite | 1 | 8 |
| Scrapers Composite | 2 | 8 |
| Tractors/Loaders/Backhoes Composite | 3 | 8 |

**- Vehicle Exhaust**
**Average Hauling Truck Capacity ($yd^3$):** 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)**

| **Excavators Composite** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0614 | 0.0013 | 0.2820 | 0.5096 | 0.0117 | 0.0117 | 0.0055 | 119.71 |
| **Graders Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Scrapers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1640 | 0.0026 | 1.0170 | 0.7431 | 0.0406 | 0.0406 | 0.0148 | 262.85 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 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 ($yd^3$)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site ($yd^3$)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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:** 6
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

### 2.2.2 Trenching / Excavating Phase Assumptions

**- General Trenching/Excavating Information**
**Area of Site to be Trenched/Excavated ($ft^2$):** 20000
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 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 ($yd^3$):** 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)**

| **Excavators Composite** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0614 | 0.0013 | 0.2820 | 0.5096 | 0.0117 | 0.0117 | 0.0055 | 119.71 |
| **Graders Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Scrapers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1640 | 0.0026 | 1.0170 | 0.7431 | 0.0406 | 0.0406 | 0.0148 | 262.85 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 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 ($yd^3$)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site ($yd^3$)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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:** 2023

**- Phase Duration**
**Number of Month:** 23
**Number of Days:** 0

### 2.3.2 Building Construction Phase Assumptions

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

**- General Building Construction Information**

**Building Category:** Office or Industrial
**Area of Building ($ft^2$):** 60000
**Height of Building (ft):** 76
**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 | 6 |
| Forklifts Composite | 2 | 6 |
| Generator Sets Composite | 1 | 8 |
| Tractors/Loaders/Backhoes Composite | 1 | 8 |
| Welders Composite | 3 | 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 | 0.0754 | 0.0013 | 0.5027 | 0.3786 | 0.0181 | 0.0181 | 0.0068 | 128.79 |
| **Forklifts Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0258 | 0.0006 | 0.1108 | 0.2145 | 0.0034 | 0.0034 | 0.0023 | 54.454 |
| **Generator Sets Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0320 | 0.0006 | 0.2612 | 0.2683 | 0.0103 | 0.0103 | 0.0028 | 61.065 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |
| **Welders Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0242 | 0.0003 | 0.1487 | 0.1761 | 0.0067 | 0.0067 | 0.0021 | 25.657 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 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 ($ft^2$)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor $ft^3$ to trips (0.42 trip / 1000 $ft^3$)
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 ($ft^2$)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor $ft^3$ to trips (0.38 trip / 1000 $ft^3$)
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:** 7
**Start Quarter:** 1
**Start Year:** 2023

**- 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 ($ft^2$):** 240000
**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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 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 ($ft^2$)
800: Conversion Factor square feet to man days ( 1 $ft^2$ / 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 ($ft^2$)
2.0: Conversion Factor total area to coated area (2.0 $ft^2$ coated area / total area)
0.0116: Emission Factor ($lb/ft^2$)
2000: Conversion Factor pounds to tons

## 2.5 Paving Phase

### 2.5.1 Paving Phase Timeline Assumptions

**- Phase Start Date**

**Start Month:** 8
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**

**Number of Month:** 3
**Number of Days:** 0

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### 2.5.2 Paving Phase Assumptions

**- General Paving Information**
**Paving Area ($ft^2$):** 240000

**- 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 |
|---|---|---|
| Cement and Mortar Mixers Composite | 4 | 6 |
| Pavers Composite | 1 | 8 |
| Paving Equipment Composite | 2 | 6 |
| Rollers Composite | 2 | 6 |
| Tractors/Loaders/Backhoes Composite | 1 | 7 |

**- 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)**

| **Excavators Composite** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0614 | 0.0013 | 0.2820 | 0.5096 | 0.0117 | 0.0117 | 0.0055 | 119.71 |
| **Graders Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Scrapers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1640 | 0.0026 | 1.0170 | 0.7431 | 0.0406 | 0.0406 | 0.0148 | 262.85 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 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 ($ft^2$)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ( 1 $yd^3$ / 27 $ft^3$)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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 ($ft^2$)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)$^2$ / acre)

## 3. Construction / Demolition

### 3.1 General Information & Timeline Assumptions

**- Activity Location**
**County:** Bernalillo
**Regulatory Area(s):** Albuquerque, NM

**- Activity Title:** Infrastructure Improvements

**- Activity Description:**
Up to 5 acres of land with up to 11,000 linear feet (lf) of impervious surface; any infrastructure facilities could be up to 5,000 sf and 1 story tall; roadways could be up to a divided four-lane road with a landscaped median, dedicated bicycle lanes, correctly sized pedestrian sidewalks, and traffic circles.

**- Activity Start Date**
**Start Month:** 1
**Start Month:** 2023

**- Activity End Date**
**Indefinite:** False
**End Month:** 1
**End Month:** 2024

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.434571 |
| $SO_x$ | 0.005547 |
| $NO_x$ | 2.100800 |
| CO | 2.522365 |
| PM 10 | 8.957523 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.096256 |
| Pb | 0.000000 |
| $NH_3$ | 0.001450 |
| $CO_2e$ | 543.3 |
| | |

### 3.1 Site Grading Phase

#### 3.1.1 Site Grading Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 5
**Start Quarter:** 1

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**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 2
**Number of Days:** 0

### 3.1.2 Site Grading Phase Assumptions

**- General Site Grading Information**
**Area of Site to be Graded ($ft^2$):** 445000
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 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 |
|---|---|---|
| Excavators Composite | 1 | 8 |
| Graders Composite | 1 | 8 |
| Other Construction Equipment Composite | 1 | 8 |
| Rubber Tired Dozers Composite | 1 | 8 |
| Scrapers Composite | 2 | 8 |
| Tractors/Loaders/Backhoes Composite | 3 | 8 |

**- Vehicle Exhaust**
**Average Hauling Truck Capacity ($yd^3$):** 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 |

### 3.1.3 Site Grading 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 | 0.0614 | 0.0013 | 0.2820 | 0.5096 | 0.0117 | 0.0117 | 0.0055 | 119.71 |
| **Graders Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |

| Rubber Tired Dozers Composite | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Scrapers Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.1640 | 0.0026 | 1.0170 | 0.7431 | 0.0406 | 0.0406 | 0.0148 | 262.85 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 3.1.4 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 ($yd^3$)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site ($yd^3$)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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

## 3.2 Trenching/Excavating Phase

### 3.2.1 Trenching / Excavating Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 6
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

### 3.2.2 Trenching / Excavating Phase Assumptions

**- General Trenching/Excavating Information**
**Area of Site to be Trenched/Excavated ($ft^2$):** 750
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 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 ($yd^3$):** 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 |

### 3.2.3 Trenching / Excavating 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 | 0.0614 | 0.0013 | 0.2820 | 0.5096 | 0.0117 | 0.0117 | 0.0055 | 119.71 |
| **Graders Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Scrapers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1640 | 0.0026 | 1.0170 | 0.7431 | 0.0406 | 0.0406 | 0.0148 | 262.85 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 3.2.4 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 ($yd^3$)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site ($yd^3$)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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

## 3.3 Building Construction Phase

### 3.3.1 Building Construction Phase Timeline Assumptions

**- Phase Start Date**

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

**Start Month:** 1
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 3.3.2 Building Construction Phase Assumptions

**- General Building Construction Information**
**Building Category:** Office or Industrial
**Area of Building ($ft^2$):** 5000
**Height of Building (ft):** 19
**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 | 4 |
| Forklifts Composite | 2 | 6 |
| Tractors/Loaders/Backhoes 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 |

### 3.3.3 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 | 0.0754 | 0.0013 | 0.5027 | 0.3786 | 0.0181 | 0.0181 | 0.0068 | 128.79 |
| **Forklifts Composite** | | | | | | | | |

| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Emission Factors | 0.0258 | 0.0006 | 0.1108 | 0.2145 | 0.0034 | 0.0034 | 0.0023 | 54.454 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 3.3.4 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 ($ft^2$)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor $ft^3$ to trips (0.42 trip / 1000 $ft^3$)
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 ($ft^2$)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor $ft^3$ to trips (0.38 trip / 1000 $ft^3$)
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

### 3.4 Architectural Coatings Phase

#### 3.4.1 Architectural Coatings Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 7
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

#### 3.4.2 Architectural Coatings Phase Assumptions

**- General Architectural Coatings Information**
**Building Category:** Non-Residential
**Total Square Footage ($ft^2$):** 5000
**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 |

### 3.4.3 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 3.4.4 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 ($ft^2$)
800: Conversion Factor square feet to man days ( 1 $ft^2$ / 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 ($ft^2$)
2.0: Conversion Factor total area to coated area (2.0 $ft^2$ coated area / total area)
0.0116: Emission Factor ($lb/ft^2$)
2000: Conversion Factor pounds to tons

## 3.5 Paving Phase

### 3.5.1 Paving Phase Timeline Assumptions

**- Phase Start Date**

**Start Month:** 8
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**

**Number of Month:** 6

**Number of Days:** 0

### 3.5.2 Paving Phase Assumptions

**- General Paving Information**
**Paving Area ($ft^2$):** 264000

**- 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 |
|---|---|---|
| Cement and Mortar Mixers Composite | 4 | 6 |
| Pavers Composite | 1 | 8 |
| Paving Equipment Composite | 2 | 6 |
| Rollers Composite | 2 | 6 |
| Tractors/Loaders/Backhoes Composite | 1 | 7 |

**- 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 |

### 3.5.3 Paving 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 | 0.0614 | 0.0013 | 0.2820 | 0.5096 | 0.0117 | 0.0117 | 0.0055 | 119.71 |
| **Graders Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Scrapers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1640 | 0.0026 | 1.0170 | 0.7431 | 0.0406 | 0.0406 | 0.0148 | 262.85 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 3.5.4 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 ($ft^2$)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ( 1 $yd^3$ / 27 $ft^3$)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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 ($ft^2$)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)$^2$ / acre)

## 4. Construction / Demolition

### 4.1 General Information & Timeline Assumptions

**- Activity Location**
**County:** Bernalillo
**Regulatory Area(s):** Albuquerque, NM

**- Activity Title:** Medical

**- Activity Description:**
Up to 10 acres of land with up to 200,000 sf of facilities, parking lots, and impervious surfaces; facilities could be up to 3 stories tall.

**- Activity Start Date**
**Start Month:** 1
**Start Month:** 2023

**- Activity End Date**
**Indefinite:** False
**End Month:** 11
**End Month:** 2024

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 1.819956 |
| $SO_x$ | 0.010716 |
| $NO_x$ | 3.871057 |
| CO | 4.931049 |
| PM 10 | 2.254179 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.154543 |
| Pb | 0.000000 |
| $NH_3$ | 0.004124 |
| $CO_2e$ | 1037.5 |
| | |

### 4.1 Site Grading Phase

#### 4.1.1 Site Grading Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 5
**Start Quarter:** 1

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**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

### 4.1.2 Site Grading Phase Assumptions

**- General Site Grading Information**
**Area of Site to be Graded ($ft^2$):** 200000
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 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 |
| Rubber Tired Dozers Composite | 1 | 8 |
| Tractors/Loaders/Backhoes Composite | 2 | 7 |

**- Vehicle Exhaust**
**Average Hauling Truck Capacity ($yd^3$):** 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 |

### 4.1.3 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 | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 4.1.4 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 ($yd^3$)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site ($yd^3$)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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

## 4.2 Trenching/Excavating Phase

### 4.2.1 Trenching / Excavating Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 6
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

### 4.2.2 Trenching / Excavating Phase Assumptions

**- General Trenching/Excavating Information**
**Area of Site to be Trenched/Excavated ($ft^2$):** 11000
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 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 ($yd^3$):** 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 |

### 4.2.3 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 | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 4.2.4 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 ($yd^3$)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site ($yd^3$)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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

## 4.3 Building Construction Phase

### 4.3.1 Building Construction Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 1
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 23
**Number of Days:** 0

### 4.3.2 Building Construction Phase Assumptions

**- General Building Construction Information**
**Building Category:** Office or Industrial
**Area of Building ($ft^2$):** 33333
**Height of Building (ft):** 57

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**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 | 6 |
| Forklifts Composite | 2 | 6 |
| Generator Sets Composite | 1 | 8 |
| Tractors/Loaders/Backhoes Composite | 1 | 8 |
| Welders Composite | 3 | 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 |

### 4.3.3 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 | 0.0754 | 0.0013 | 0.5027 | 0.3786 | 0.0181 | 0.0181 | 0.0068 | 128.79 |
| **Forklifts Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0258 | 0.0006 | 0.1108 | 0.2145 | 0.0034 | 0.0034 | 0.0023 | 54.454 |
| **Generator Sets Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0320 | 0.0006 | 0.2612 | 0.2683 | 0.0103 | 0.0103 | 0.0028 | 61.065 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |
| **Welders Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0242 | 0.0003 | 0.1487 | 0.1761 | 0.0067 | 0.0067 | 0.0021 | 25.657 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 4.3.4 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 ($ft^2$)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor $ft^3$ to trips (0.42 trip / 1000 $ft^3$)
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 ($ft^2$)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor $ft^3$ to trips (0.38 trip / 1000 $ft^3$)
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

## 4.4 Architectural Coatings Phase

### 4.4.1 Architectural Coatings Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 7
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 4.4.2 Architectural Coatings Phase Assumptions

**- General Architectural Coatings Information**
**Building Category:** Non-Residential
**Total Square Footage ($ft^2$):** 100000
**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 |

### 4.4.3 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 4.4.4 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 ($ft^2$)
800: Conversion Factor square feet to man days ( 1 $ft^2$ / 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 ($ft^2$)
2.0: Conversion Factor total area to coated area (2.0 $ft^2$ coated area / total area)
0.0116: Emission Factor ($lb/ft^2$)
2000: Conversion Factor pounds to tons

## 4.5 Paving Phase

### 4.5.1 Paving Phase Timeline Assumptions

**- Phase Start Date**

**Start Month:** 8
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**

**Number of Month:** 3
**Number of Days:** 0

### 4.5.2 Paving Phase Assumptions

**- General Paving Information**

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

**Paving Area ($ft^2$):** 100000

**- 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 |
|---|---|---|
| Cement and Mortar Mixers Composite | 4 | 6 |
| Pavers Composite | 1 | 7 |
| Paving Equipment Composite | 2 | 6 |
| Rollers Composite | 1 | 7 |
| Tractors/Loaders/Backhoes Composite | 1 | 7 |

**- 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 |

### 4.5.3 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** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 4.5.4 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 ($ft^2$)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ( 1 $yd^3$ / 27 $ft^3$)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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 ($ft^2$)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)$^2$ / acre)

## 5. Construction / Demolition

### 5.1 General Information & Timeline Assumptions

**- Activity Location**
**County:** Bernalillo
**Regulatory Area(s):** Albuquerque, NM

**- Activity Title:** Community Service

**- Activity Description:**
Up to 10 acres of land with up to 200,000 sf of facilities, parking lots, and impervious surfaces; facilities could be up to 2 stories tall

**- Activity Start Date**
**Start Month:** 1
**Start Month:** 2023

**- Activity End Date**
**Indefinite:** False
**End Month:** 11
**End Month:** 2024

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 1.819956 |
| $SO_x$ | 0.010716 |
| $NO_x$ | 3.871059 |
| CO | 4.931050 |
| PM 10 | 2.310554 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.154543 |
| Pb | 0.000000 |
| $NH_3$ | 0.004124 |
| $CO_2e$ | 1037.5 |
| | |

### 5.1 Site Grading Phase

#### 5.1.1 Site Grading Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 5
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

#### 5.1.2 Site Grading Phase Assumptions

**- General Site Grading Information**
**Area of Site to be Graded ($ft^2$):** 200000
**Amount of Material to be Hauled On-Site ($yd^3$):** 0

**Amount of Material to be Hauled Off-Site ($yd^3$):** 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 |
| Rubber Tired Dozers Composite | 1 | 8 |
| Tractors/Loaders/Backhoes Composite | 2 | 7 |

**- Vehicle Exhaust**
**Average Hauling Truck Capacity ($yd^3$):** 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 |

### 5.1.3 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 | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 5.1.4 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 ($yd^3$)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site ($yd^3$)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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

## 5.2 Trenching/Excavating Phase

### 5.2.1 Trenching / Excavating Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 6
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

### 5.2.2 Trenching / Excavating Phase Assumptions

**- General Trenching/Excavating Information**
**Area of Site to be Trenched/Excavated ($ft^2$):** 16667
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 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 ($yd^3$):** 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 |

### 5.2.3 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 | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 5.2.4 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 ($yd^3$)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site ($yd^3$)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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

## 5.3 Building Construction Phase

### 5.3.1 Building Construction Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 1
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 23
**Number of Days:** 0

### 5.3.2 Building Construction Phase Assumptions

**- General Building Construction Information**
**Building Category:** Office or Industrial
**Area of Building ($ft^2$):** 50000
**Height of Building (ft):** 38
**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 | 6 |
| Forklifts Composite | 2 | 6 |

| | | |
|---|---|---|
| Generator Sets Composite | 1 | 8 |
| Tractors/Loaders/Backhoes Composite | 1 | 8 |
| Welders Composite | 3 | 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 |

### 5.3.3 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 | 0.0754 | 0.0013 | 0.5027 | 0.3786 | 0.0181 | 0.0181 | 0.0068 | 128.79 |
| **Forklifts Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0258 | 0.0006 | 0.1108 | 0.2145 | 0.0034 | 0.0034 | 0.0023 | 54.454 |
| **Generator Sets Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0320 | 0.0006 | 0.2612 | 0.2683 | 0.0103 | 0.0103 | 0.0028 | 61.065 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |
| **Welders Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0242 | 0.0003 | 0.1487 | 0.1761 | 0.0067 | 0.0067 | 0.0021 | 25.657 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 5.3.4 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 ($ft^2$)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor $ft^3$ to trips (0.42 trip / 1000 $ft^3$)
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 ($ft^2$)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor $ft^3$ to trips (0.38 trip / 1000 $ft^3$)

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

## 5.4 Architectural Coatings Phase

### 5.4.1 Architectural Coatings Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 7
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

### 5.4.2 Architectural Coatings Phase Assumptions

**- General Architectural Coatings Information**
**Building Category:** Non-Residential
**Total Square Footage ($ft^2$):** 100000
**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 |

### 5.4.3 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 5.4.4 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 ($ft^2$)
800: Conversion Factor square feet to man days ( 1 $ft^2$ / 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 ($ft^2$)
2.0: Conversion Factor total area to coated area (2.0 $ft^2$ coated area / total area)
0.0116: Emission Factor ($lb/ft^2$)
2000: Conversion Factor pounds to tons

## 5.5 Paving Phase

### 5.5.1 Paving Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 8
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 5.5.2 Paving Phase Assumptions

**- General Paving Information**
**Paving Area ($ft^2$):** 100000

**- 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 |
|---|---|---|
| Cement and Mortar Mixers Composite | 4 | 6 |

| | | |
|---|---|---|
| Pavers Composite | 1 | 7 |
| Paving Equipment Composite | 2 | 6 |
| Rollers Composite | 1 | 7 |
| Tractors/Loaders/Backhoes Composite | 1 | 7 |

**- 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 |

### 5.5.3 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** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 5.5.4 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 ($ft^2$)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ( 1 $yd^3$ / 27 $ft^3$)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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 ($ft^2$)
43560: Conversion Factor square feet to acre (43560 ft2 / $acre)^2$ / acre)

## 6. Construction / Demolition

### 6.1 General Information & Timeline Assumptions

**- Activity Location**

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

**County:** Bernalillo
**Regulatory Area(s):** Albuquerque, NM

**- Activity Title:** Attached and Detached Residential/Lodging

**- Activity Description:**
Up to 10 acres of land with up to 200,000 sf of facilities, parking lots, and impervious surfaces; facilities between 1 and 3 stories tall

**- Activity Start Date**
**Start Month:** 1
**Start Month:** 2023

**- Activity End Date**
**Indefinite:** False
**End Month:** 11
**End Month:** 2024

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 1.819956 |
| $SO_x$ | 0.010716 |
| $NO_x$ | 3.871057 |
| CO | 4.931049 |
| PM 10 | 2.254179 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.154543 |
| Pb | 0.000000 |
| $NH_3$ | 0.004124 |
| $CO_2e$ | 1037.5 |
| | |

## 6.1 Site Grading Phase

### 6.1.1 Site Grading Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 5
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

### 6.1.2 Site Grading Phase Assumptions

**- General Site Grading Information**
**Area of Site to be Graded ($ft^2$):** 200000
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 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 |

| | | |
|---|---|---|
| Rubber Tired Dozers Composite | 1 | 8 |
| Tractors/Loaders/Backhoes Composite | 2 | 7 |

**- Vehicle Exhaust**

**Average Hauling Truck Capacity ($yd^3$):** 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 |

### 6.1.3 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 | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 6.1.4 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 ($yd^3$)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site ($yd^3$)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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

## 6.2 Trenching/Excavating Phase

### 6.2.1 Trenching / Excavating Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 6
**Start Quarter:** 1

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

### 6.2.2 Trenching / Excavating Phase Assumptions

**- General Trenching/Excavating Information**
**Area of Site to be Trenched/Excavated ($ft^2$):** 11000
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 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 ($yd^3$):** 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 |

### 6.2.3 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 | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 6.2.4 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 ($yd^3$)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site ($yd^3$)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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

## 6.3 Building Construction Phase

### 6.3.1 Building Construction Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 1
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 23
**Number of Days:** 0

### 6.3.2 Building Construction Phase Assumptions

**- General Building Construction Information**
**Building Category:** Office or Industrial
**Area of Building ($ft^2$):** 33333
**Height of Building (ft):** 57
**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 | 6 |
| Forklifts Composite | 2 | 6 |
| Generator Sets Composite | 1 | 8 |
| Tractors/Loaders/Backhoes Composite | 1 | 8 |
| Welders Composite | 3 | 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 |

### 6.3.3 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 | 0.0754 | 0.0013 | 0.5027 | 0.3786 | 0.0181 | 0.0181 | 0.0068 | 128.79 |
| **Forklifts Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0258 | 0.0006 | 0.1108 | 0.2145 | 0.0034 | 0.0034 | 0.0023 | 54.454 |
| **Generator Sets Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0320 | 0.0006 | 0.2612 | 0.2683 | 0.0103 | 0.0103 | 0.0028 | 61.065 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |
| **Welders Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0242 | 0.0003 | 0.1487 | 0.1761 | 0.0067 | 0.0067 | 0.0021 | 25.657 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 6.3.4 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

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**- 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 ($ft^2$)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor $ft^3$ to trips (0.42 trip / 1000 $ft^3$)
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 ($ft^2$)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor $ft^3$ to trips (0.38 trip / 1000 $ft^3$)
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

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## 6.4 Architectural Coatings Phase

### 6.4.1 Architectural Coatings Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 7
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 6.4.2 Architectural Coatings Phase Assumptions

**- General Architectural Coatings Information**
**Building Category:** Non-Residential
**Total Square Footage ($ft^2$):** 100000
**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 |

### 6.4.3 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 6.4.4 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 ($ft^2$)
800: Conversion Factor square feet to man days ( 1 $ft^2$ / 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 ($ft^2$)
2.0: Conversion Factor total area to coated area (2.0 $ft^2$ coated area / total area)
0.0116: Emission Factor ($lb/ft^2$)
2000: Conversion Factor pounds to tons

## 6.5 Paving Phase

### 6.5.1 Paving Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 8
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 6.5.2 Paving Phase Assumptions

**- General Paving Information**
**Paving Area ($ft^2$):** 100000

**- 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 |
|---|---|---|
| Cement and Mortar Mixers Composite | 4 | 6 |
| Pavers Composite | 1 | 7 |
| Paving Equipment Composite | 2 | 6 |
| Rollers Composite | 1 | 7 |
| Tractors/Loaders/Backhoes Composite | 1 | 7 |

**- 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 |

### 6.5.3 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** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 6.5.4 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 ($ft^2$)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ( 1 $yd^3$ / 27 $ft^3$)
HC: Average Hauling Truck Capacity ($yd^3$)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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 ($ft^2$)
43560: Conversion Factor square feet to acre (43560 ft2 / $acre)^2$ / acre)

## 7. Construction / Demolition

### 7.1 General Information & Timeline Assumptions

**- Activity Location**
**County:** Bernalillo
**Regulatory Area(s):** Albuquerque, NM

**- Activity Title:** Outdoor Recreation and Open Space

**- Activity Description:**
Up to 10 acres of land for common areas, recreation areas near dormitories, or outdoor dining areas. Construction may include pavilions, basketball courts, etc.

**- Activity Start Date**
**Start Month:** 5

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**Start Month:** 2023

**- Activity End Date**
**Indefinite:** False
**End Month:** 10
**End Month:** 2023

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.109491 |
| $SO_x$ | 0.001540 |
| $NO_x$ | 0.612699 |
| CO | 0.768654 |
| PM 10 | 4.362606 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.029248 |
| Pb | 0.000000 |
| $NH_3$ | 0.000448 |
| $CO_2e$ | 150.0 |
| | |

## 7.1 Site Grading Phase

### 7.1.1 Site Grading Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 5
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

### 7.1.2 Site Grading Phase Assumptions

**- General Site Grading Information**
**Area of Site to be Graded ($ft^2$):** 435600
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 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 |
|---|---|---|
| Excavators Composite | 1 | 8 |
| Graders Composite | 1 | 8 |
| Other Construction Equipment Composite | 1 | 8 |
| Rubber Tired Dozers Composite | 1 | 8 |
| Tractors/Loaders/Backhoes Composite | 3 | 8 |

**- Vehicle Exhaust**
**Average Hauling Truck Capacity ($yd^3$):** 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 |

### 7.1.3 Site Grading 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 | 0.0614 | 0.0013 | 0.2820 | 0.5096 | 0.0117 | 0.0117 | 0.0055 | 119.71 |
| **Graders Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 7.1.4 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 ($yd^3$)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site ($yd^3$)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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

## 7.2 Paving Phase

### 7.2.1 Paving Phase Timeline Assumptions

**- Phase Start Date**

**Start Month:** 8
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**

**Number of Month:** 3
**Number of Days:** 0

### 7.2.2 Paving Phase Assumptions

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

**- General Paving Information**
**Paving Area ($ft^2$):** 43000

**- 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 |
|---|---|---|
| Cement and Mortar Mixers Composite | 4 | 6 |
| Pavers Composite | 1 | 7 |
| Paving Equipment Composite | 1 | 8 |
| Rollers Composite | 1 | 7 |
| Tractors/Loaders/Backhoes Composite | 1 | 7 |

**- 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 |

### 7.2.3 Paving 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 | 0.0614 | 0.0013 | 0.2820 | 0.5096 | 0.0117 | 0.0117 | 0.0055 | 119.71 |
| **Graders Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 7.2.4 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 ($ft^2$)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ( 1 $yd^3$ / 27 $ft^3$)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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 ($ft^2$)
43560: Conversion Factor square feet to acre (43560 ft2 / $acre)^2$ / acre)

## 8. Construction / Demolition

### 8.1 General Information & Timeline Assumptions

**- Activity Location**
**County:** Bernalillo
**Regulatory Area(s):** Albuquerque, NM

**- Activity Title:** Demolition of B 585

**- Activity Description:**
Demolition of B 585

**- Activity Start Date**
**Start Month:** 3
**Start Month:** 2023

**- Activity End Date**
**Indefinite:** False
**End Month:** 5
**End Month:** 2023

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.039051 |
| $SO_x$ | 0.000668 |
| $NO_x$ | 0.249694 |
| CO | 0.258834 |
| PM 10 | 0.627724 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.009548 |
| Pb | 0.000000 |
| $NH_3$ | 0.000303 |
| $CO_2e$ | 67.6 |
| | |

### 8.1 Demolition Phase

#### 8.1.1 Demolition Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 3
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

#### 8.1.2 Demolition Phase Assumptions

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

**- General Demolition Information**
**Area of Building to be demolished ($ft^2$):** 16370
**Height of Building to be demolished (ft):** 38

**- Default Settings Used:** Yes

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

**- Construction Exhaust (default)**

| Equipment Name | Number Of Equipment | Hours Per Day |
|---|---|---|
| Concrete/Industrial Saws Composite | 1 | 8 |
| Rubber Tired Dozers Composite | 1 | 1 |
| Tractors/Loaders/Backhoes Composite | 2 | 6 |

**- Vehicle Exhaust**
**Average Hauling Truck Capacity ($yd^3$):** 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 |

### 8.1.3 Demolition Phase Emission Factor(s)

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

| **Concrete/Industrial Saws Composite** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0382 | 0.0006 | 0.2766 | 0.3728 | 0.0127 | 0.0127 | 0.0034 | 58.549 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 8.1.4 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 ($lb/ft^3$)
BA: Area of Building to be demolished ($ft^2$)
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 ($ft^2$)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ( $1 yd^3 / 27 ft^3$)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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

## 8.2 Site Grading Phase

### 8.2.1 Site Grading Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 5
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

### 8.2.2 Site Grading Phase Assumptions

**- General Site Grading Information**
**Area of Site to be Graded ($ft^2$):** 49000
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 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 ($yd^3$):** 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 |

### 8.2.3 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 | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 8.2.4 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 ($yd^3$)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site ($yd^3$)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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

## 9. Construction / Demolition

### 9.1 General Information & Timeline Assumptions

**- Activity Location**
**County:** Bernalillo
**Regulatory Area(s):** Albuquerque, NM

**- Activity Title:** Demolition of B 20228

**- Activity Description:**
Demolition of B 20228

**- Activity Start Date**
**Start Month:** 3
**Start Month:** 2023

**- Activity End Date**
**Indefinite:** False
**End Month:** 5
**End Month:** 2023

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.053564 |
| $SO_x$ | 0.000940 |
| $NO_x$ | 0.361275 |
| CO | 0.336144 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.013264 |
| Pb | 0.000000 |
| $NH_3$ | 0.000629 |
| $CO_2e$ | 96.6 |

| | | | |
|---|---|---|---|
| PM 10 | 1.641168 | | |

### 9.1 Demolition Phase

#### 9.1.1 Demolition Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 3
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

#### 9.1.2 Demolition Phase Assumptions

**- General Demolition Information**
**Area of Building to be demolished ($ft^2$):** 43155
**Height of Building to be demolished (ft):** 38

**- Default Settings Used:** Yes

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

**- Construction Exhaust (default)**

| Equipment Name | Number Of Equipment | Hours Per Day |
|---|---|---|
| Concrete/Industrial Saws Composite | 1 | 8 |
| Rubber Tired Dozers Composite | 1 | 1 |
| Tractors/Loaders/Backhoes Composite | 2 | 6 |

**- Vehicle Exhaust**
**Average Hauling Truck Capacity ($yd^3$):** 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 |

#### 9.1.3 Demolition Phase Emission Factor(s)

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

| Concrete/Industrial Saws Composite | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0382 | 0.0006 | 0.2766 | 0.3728 | 0.0127 | 0.0127 | 0.0034 | 58.549 |
| **Rubber Tired Dozers Composite** | | | | | | | | |

| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 9.1.4 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 ($lb/ft^3$)
BA: Area of Building to be demolished ($ft^2$)
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 ($ft^2$)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ( $1\ yd^3 / 27\ ft^3$)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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

## 9.2 Site Grading Phase

### 9.2.1 Site Grading Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 5
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

### 9.2.2 Site Grading Phase Assumptions

**- General Site Grading Information**
**Area of Site to be Graded ($ft^2$):** 129000
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 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 |
| Rubber Tired Dozers Composite | 1 | 8 |
| Tractors/Loaders/Backhoes Composite | 2 | 7 |

**- Vehicle Exhaust**
**Average Hauling Truck Capacity ($yd^3$):** 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 |

### 9.2.3 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 | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 9.2.4 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 ($yd^3$)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site ($yd^3$)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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

## 10. Construction / Demolition

### 10.1 General Information & Timeline Assumptions

**- Activity Location**

**County:** Bernalillo
**Regulatory Area(s):** Albuquerque, NM

**- Activity Title:** Demolition of B 20221

**- Activity Description:**

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Demolition of B 20221

**- Activity Start Date**
**Start Month:** 3
**Start Month:** 2023

**- Activity End Date**
**Indefinite:** False
**End Month:** 5
**End Month:** 2023

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.062210 |
| $SO_x$ | 0.001188 |
| $NO_x$ | 0.472804 |
| CO | 0.346733 |
| PM 10 | 1.676820 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.015780 |
| Pb | 0.000000 |
| $NH_3$ | 0.001435 |
| $CO_2e$ | 127.3 |
| | |

## 10.1 Demolition Phase

### 10.1.1 Demolition Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 3
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

### 10.1.2 Demolition Phase Assumptions

**- General Demolition Information**
**Area of Building to be demolished ($ft^2$):** 75756
**Height of Building to be demolished (ft):** 57

**- Default Settings Used:** Yes

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

**- Construction Exhaust (default)**

| Equipment Name | Number Of Equipment | Hours Per Day |
|---|---|---|
| Concrete/Industrial Saws Composite | 1 | 8 |
| Rubber Tired Dozers Composite | 1 | 1 |
| Tractors/Loaders/Backhoes Composite | 2 | 8 |

**- Vehicle Exhaust**
**Average Hauling Truck Capacity ($yd^3$):** 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 |

### 10.1.3 Demolition Phase Emission Factor(s)

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

| **Concrete/Industrial Saws Composite** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0382 | 0.0006 | 0.2766 | 0.3728 | 0.0127 | 0.0127 | 0.0034 | 58.549 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 10.1.4 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 ($lb/ft^3$)
BA: Area of Building to be demolished ($ft^2$)
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 ($ft^2$)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ( 1 $yd^3$ / 27 $ft^3$)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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

## 10.2 Site Grading Phase

### 10.2.1 Site Grading Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 5
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

### 10.2.2 Site Grading Phase Assumptions

**- General Site Grading Information**
**Area of Site to be Graded ($ft^2$):** 75756

**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 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 ($yd^3$):** 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 |

### 10.2.3 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 | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 10.2.4 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 ($yd^3$)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site ($yd^3$)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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

## 11. Construction / Demolition

### 11.1 General Information & Timeline Assumptions

**- Activity Location**
**County:** Bernalillo
**Regulatory Area(s):** Albuquerque, NM

**- Activity Title:** Demolition of B 20350

**- Activity Description:**
Demolition of B 20350

**- Activity Start Date**
**Start Month:** 3
**Start Month:** 2023

**- Activity End Date**
**Indefinite:** False
**End Month:** 5
**End Month:** 2023

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.041415 |
| $SO_x$ | 0.000721 |
| $NO_x$ | 0.273121 |
| CO | 0.266756 |
| PM 10 | 0.628880 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.010192 |
| Pb | 0.000000 |
| $NH_3$ | 0.000427 |
| $CO_2e$ | 73.8 |
| | |

### 11.1 Demolition Phase

#### 11.1.1 Demolition Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 3
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

#### 11.1.2 Demolition Phase Assumptions

**- General Demolition Information**
**Area of Building to be demolished ($ft^2$):** 27023
**Height of Building to be demolished (ft):** 38

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**- Default Settings Used:** Yes

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

**- Construction Exhaust (default)**

| Equipment Name | Number Of Equipment | Hours Per Day |
|---|---|---|
| Concrete/Industrial Saws Composite | 1 | 8 |
| Rubber Tired Dozers Composite | 1 | 1 |
| Tractors/Loaders/Backhoes Composite | 2 | 6 |

**- Vehicle Exhaust**

**Average Hauling Truck Capacity ($yd^3$):** 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 |

### 11.1.3 Demolition Phase Emission Factor(s)

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

| **Concrete/Industrial Saws Composite** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0382 | 0.0006 | 0.2766 | 0.3728 | 0.0127 | 0.0127 | 0.0034 | 58.549 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 11.1.4 Demolition Phase Formula(s)

**- Fugitive Dust Emissions per Phase**

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

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor ($lb/ft^3$)
BA: Area of Building to be demolished ($ft^2$)
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 ($ft^2$)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ( $1\ yd^3 / 27\ ft^3$)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

## 11.2 Site Grading Phase

### 11.2.1 Site Grading Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 5
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

### 11.2.2 Site Grading Phase Assumptions

**- General Site Grading Information**
**Area of Site to be Graded ($ft^2$):** 40500
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 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 ($yd^3$):** 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 |

### 11.2.3 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 | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |

| Other Construction Equipment Composite | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 11.2.4 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 ($yd^3$)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site ($yd^3$)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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

## 12. Construction / Demolition

### 12.1 General Information & Timeline Assumptions

**- Activity Location**
**County:** Bernalillo
**Regulatory Area(s):** Albuquerque, NM

**- Activity Title:** Demolition of B 1914

**- Activity Description:**
Demolition of B 1914

**- Activity Start Date**
**Start Month:** 1
**Start Month:** 2023

**- Activity End Date**
**Indefinite:** False
**End Month:** 5
**End Month:** 2023

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.038345 |
| $SO_x$ | 0.000652 |
| $NO_x$ | 0.242703 |
| CO | 0.256470 |
| PM 10 | 0.900585 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.009355 |
| Pb | 0.000000 |
| $NH_3$ | 0.000266 |
| $CO_2e$ | 65.7 |
| | |

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

## 12.1 Demolition Phase

### 12.1.1 Demolition Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 1
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

### 12.1.2 Demolition Phase Assumptions

**- General Demolition Information**
**Area of Building to be demolished ($ft^2$):** 26382
**Height of Building to be demolished (ft):** 19

**- Default Settings Used:** Yes

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

**- Construction Exhaust (default)**

| Equipment Name | Number Of Equipment | Hours Per Day |
|---|---|---|
| Concrete/Industrial Saws Composite | 1 | 8 |
| Rubber Tired Dozers Composite | 1 | 1 |
| Tractors/Loaders/Backhoes Composite | 2 | 6 |

**- Vehicle Exhaust**
**Average Hauling Truck Capacity ($yd^3$):** 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 |

### 12.1.3 Demolition Phase Emission Factor(s)

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

| Concrete/Industrial Saws Composite | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0382 | 0.0006 | 0.2766 | 0.3728 | 0.0127 | 0.0127 | 0.0034 | 58.549 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |

| Tractors/Loaders/Backhoes Composite | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 12.1.4 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 ($lb/ft^3$)
BA: Area of Building to be demolished ($ft^2$)
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 ($ft^2$)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ( $1\ yd^3 / 27\ ft^3$)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips ($1\ trip / HC\ yd^3$)
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

## 12.2 Site Grading Phase

### 12.2.1 Site Grading Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 5
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

### 12.2.2 Site Grading Phase Assumptions

**- General Site Grading Information**
**Area of Site to be Graded ($ft^2$):** 79000
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 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 ($yd^3$):** 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 |

### 12.2.3 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 | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

### 12.2.4 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 ($yd^3$)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site ($yd^3$)
HC: Average Hauling Truck Capacity ($yd^3$)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC $yd^3$)
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

## 13. Heating

### 13.1 General Information & Timeline Assumptions

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

**- Activity Location**
**County:** Bernalillo
**Regulatory Area(s):** Albuquerque, NM

**- Activity Title:** Dormitory Heating

**- Activity Description:**

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Heating for the proposed new medical center of Zia Park

**- Activity Start Date**
**Start Month:** 1
**Start Year:** 2043

**- Activity End Date**
**Indefinite:** Yes
**End Month:** N/A
**End Year:** N/A

**- Activity Emissions:**

| Pollutant | Emissions Per Year (TONs) |
|---|---|
| VOC | 0.017705 |
| $SO_x$ | 0.001931 |
| $NO_x$ | 0.321905 |
| CO | 0.270400 |
| PM 10 | 0.024465 |

| Pollutant | Emissions Per Year (TONs) |
|---|---|
| PM 2.5 | 0.024465 |
| Pb | 0.000000 |
| $NH_3$ | 0.000000 |
| $CO_2e$ | 387.5 |
| | |

## 13.2 Heating Assumptions

**- Heating**
**Heating Calculation Type:** Heat Energy Requirement Method

**- Heat Energy Requirement Method**
**Area of floorspace to be heated ($ft^2$):** 100000
**Type of fuel:** Natural Gas
**Type of boiler/furnace:** Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
**Heat Value ($MMBtu/ft^3$):** 0.00105
**Energy Intensity ($MMBtu/ft^2$):** 0.0676

**- Default Settings Used:** Yes

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

## 13.3 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 |

## 13.4 Heating Formula(s)

**- Heating Fuel Consumption $ft^3$ per Year**
$FC_{HER} = HA * EI / HV / 1000000$

$FC_{HER}$: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated ($ft^2$)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
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

# 14. Heating

## 14.1 General Information & Timeline Assumptions

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

**- Activity Location**
**County:** Bernalillo
**Regulatory Area(s):** Albuquerque, NM

**- Activity Title:** Admin Heating

**- Activity Description:**

**- Activity Start Date**
**Start Month:** 1
**Start Year:** 2043

**- Activity End Date**
**Indefinite:** Yes
**End Month:** N/A
**End Year:** N/A

**- Activity Emissions:**

| Pollutant | Emissions Per Year (TONs) |
|---|---|
| VOC | 0.049091 |
| $SO_x$ | 0.005355 |
| $NO_x$ | 0.892571 |
| CO | 0.749760 |
| PM 10 | 0.067835 |

| Pollutant | Emissions Per Year (TONs) |
|---|---|
| PM 2.5 | 0.067835 |
| Pb | 0.000000 |
| $NH_3$ | 0.000000 |
| $CO_2e$ | 1074.6 |
| | |

## 14.2 Heating Assumptions

**- Heating**
**Heating Calculation Type:** Heat Energy Requirement Method

**- Heat Energy Requirement Method**
**Area of floorspace to be heated ($ft^2$):** 240000
**Type of fuel:** Natural Gas
**Type of boiler/furnace:** Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
**Heat Value ($MMBtu/ft^3$):** 0.00105
**Energy Intensity ($MMBtu/ft^2$):** 0.0781

**- Default Settings Used:** Yes

**- Boiler/Furnace Usage**

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

### 14.3 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 |

### 14.4 Heating Formula(s)

**- Heating Fuel Consumption $ft^3$ per Year**

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

$FC_{HER}$: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated ($ft^2$)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
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

## 15. Personnel

### 15.1 General Information & Timeline Assumptions

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

**- Activity Location**

**County:** Bernalillo
**Regulatory Area(s):** Albuquerque, NM

**- Activity Title:** Additional Personnel

**- Activity Description:**

Additional personnel will be assigned to Kirtland AFB as a result of construction operations at Zia Park. Some of this may be due to new jobs, but most would result from new or expanded units moving into the area.

**- Activity Start Date**

**Start Month:** 1
**Start Year:** 2043

**- Activity End Date**

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

**- Activity Emissions:**

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| Pollutant | Emissions Per Year (TONs) |
|---|---|
| VOC | 0.395397 |
| $SO_x$ | 0.002635 |
| $NO_x$ | 0.359942 |
| CO | 4.395937 |
| PM 10 | 0.008614 |

| Pollutant | Emissions Per Year (TONs) |
|---|---|
| PM 2.5 | 0.007553 |
| Pb | 0.000000 |
| $NH_3$ | 0.024256 |
| $CO_2e$ | 377.5 |
| | |

## 15.2 Personnel Assumptions

**- Number of Personnel**

**Active Duty Personnel:** 1000
**Civilian Personnel:** 150
**Support Contractor Personnel:** 0
**Air National Guard (ANG) Personnel:** 0
**Reserve Personnel:** 0

**- Default Settings Used:** No

**- Average Personnel Round Trip Commute (mile):** 10

**- Personnel Work Schedule**

**Active Duty Personnel:** 1 Days Per Week
**Civilian Personnel:** 5 Days Per Week
**Support Contractor Personnel:** 5 Days Per Week
**Air National Guard (ANG) Personnel:** 4 Days Per Week
**Reserve Personnel:** 4 Days Per Month

## 15.3 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 |

## 15.4 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 | 000.309 | 000.002 | 000.239 | 003.421 | 000.007 | 000.006 | | 000.023 | 00318.896 |
| LDGT | 000.374 | 000.003 | 000.418 | 004.700 | 000.009 | 000.008 | | 000.024 | 00411.188 |
| HDGV | 000.696 | 000.005 | 001.076 | 015.187 | 000.021 | 000.019 | | 000.044 | 00758.535 |
| LDDV | 000.115 | 000.003 | 000.139 | 002.492 | 000.004 | 000.004 | | 000.008 | 00309.094 |
| LDDT | 000.250 | 000.004 | 000.394 | 004.238 | 000.007 | 000.006 | | 000.008 | 00438.938 |
| HDDV | 000.572 | 000.013 | 005.669 | 001.917 | 000.170 | 000.156 | | 000.030 | 01506.304 |
| MC | 002.734 | 000.003 | 000.845 | 013.302 | 000.027 | 000.023 | | 000.055 | 00396.858 |

## 15.5 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

## 16. Emergency Generator

### 16.1 General Information & Timeline Assumptions

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

**- Activity Location**
**County:** Bernalillo
**Regulatory Area(s):** Albuquerque, NM

**- Activity Title:** Emergency Generators for Zia Park

**- Activity Description:**
The medical facility, CDC, and dining facility all require emergency generators to be permanently installed. It is unknown what size/number of generators would be used. It is assume three units would be in place for the medical facility, two for the DFAC, and one for the CDC. All are assumed to be 300 horsepower.

**- Activity Start Date**
**Start Month:** 1
**Start Year:** 2043

**- Activity End Date**
**Indefinite:** Yes
**End Month:** N/A
**End Year:** N/A

**- Activity Emissions:**

| Pollutant | Emissions Per Year (TONs) |
|---|---|
| VOC | 0.075330 |
| $SO_x$ | 0.063450 |
| $NO_x$ | 0.310500 |
| CO | 0.207360 |

| Pollutant | Emissions Per Year (TONs) |
|---|---|
| PM 2.5 | 0.067770 |
| Pb | 0.000000 |
| $NH_3$ | 0.000000 |
| $CO_2e$ | 35.9 |

| | | | |
|---|---|---|---|
| PM 10 | 0.067770 | | |

### 16.2 Emergency Generator Assumptions

**- Emergency Generator**
**Type of Fuel used in Emergency Generator:** Diesel
**Number of Emergency Generators:** 6

**- Default Settings Used:** No

**- Emergency Generators Consumption**
**Emergency Generator's Horsepower:** 300
**Average Operating Hours Per Year (hours):** 30

### 16.3 Emergency Generator Emission Factor(s)

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

| VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | Pb | $NH_3$ | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 0.00279 | 0.00235 | 0.0115 | 0.00768 | 0.00251 | 0.00251 | | | 1.33 |

### 16.4 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)