

**APPENDIX A. INTERAGENCY AND INTERGOVERNMENTAL AGENCY
COORDINATION AND CONSULTATION**

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**DEPARTMENT OF THE AIR FORCE
56TH FIGHTER WING (AETC)
LUKE AIR FORCE BASE AZ 85309-1629**

Charles J. Rothrock
56 CES/CEIE
Environmental Chief
13970 W Gillespie Drive
Luke AFB AZ 85309-1149

FEB 14 2022

Lindy Bauer
Environmental Director
Maricopa Association of Governments, Environmental Division
302 North 1st Ave.
Suite 300
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Dear Ms. Bauer

The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) for proposed Area Development Plan (ADP) projects in accordance with planning documents for the Northwest Mission District, Munitions Storage District, and Community Support District at Luke Air Force Base (AFB), Arizona (**Attachment 1**). To account for possible environmental concerns, the Air Force is engaging early with all potentially affected resource agencies as it formulates the undertaking. Accordingly, the Air Force seeks consultation with your office.

Proposed Action

The Proposed Action includes a total of three short-term construction and demolition actions on Luke AFB: improvements to the existing Munitions Storage Area (MSA), reconfiguration of the Explosives Ordnance Disposal (EOD) Proficiency Training Range, and installation of pedestrian gates. Overall, the Proposed Action would demolish approximately 30,686 square feet (ft²) of existing building space and construct approximately 63,480 ft² of new building space. The net change in building footprint under the Proposed Action would be an increase of 32,794 ft².

The Air Force proposes to implement the projects from approximately 2023 to 2027. The intent of these projects is to provide improvements necessary to support the mission of Luke AFB and its tenant units. The proposed projects were identified as priorities for the Installation for the improvement of the physical infrastructure and functionality of Luke AFB including current and future mission and facility requirements, development constraints and opportunities, and land use planning.

Purpose and Need

The overall purpose of the Proposed Action is to support Luke AFB's future mission and training requirements associated with next-generation aircraft arrival. The Proposed Action is needed to address deficiencies in facilities at Luke AFB. Left unchecked, deficiencies in

facilities and infrastructure would degrade the Base's ability to meet Air Force current and future mission requirements. The Proposed Action also is needed to provide facilities and infrastructure adequate to meet the mission requirements of the 56th Flight Wing at Luke AFB.

The purpose of the MSA improvement project is to demolish multiple, small, outdated facilities and consolidate the munitions support functions by constructing two new facilities. The MSA improvement project is needed to address the condition and capability of facilities and infrastructure allocated for munitions support functions, which are currently antiquated and discontinuous.

With respect to the EOD training range, the primary purpose of the action is to reconfigure the current range to comply with airfield operational safety criteria. The Proposed Action would also retain the current explosives safety site approval to allow for continual range operations and consolidate EOD mission support functions in one area of the Base. Reconfiguration of the EOD training range is needed to comply with airfield operational safety criteria.

Finally, the purpose of installing pedestrian gates is to aid pedestrian ingress and egress to/from the Community Support District, thereby easing traffic congestion at South Gate and helping to develop communities that are more sustainable and less vehicle dependent. Installation of new pedestrian gates is needed to provide safe and secure pedestrian access for military personnel and their dependents living on or off Base.

Project Location

The Proposed Action would implement three short-term construction and demolition actions on Luke AFB from approximately 2023 to 2027: improvements to the existing MSA, reconfiguration of the EOD Proficiency Training Range, and installation of pedestrian gates (**Attachment 2**). Activities associated with the MSA would involve demolition of five existing buildings totaling 23,361 ft², construction of a new 17,093-ft² munitions support and control facility, construction of a new 16,630-ft² missile and conventional munitions consolidated facility, and construction of parking lots, resulting in a net increase of 4,202 ft² of new structures.

Under the Proposed Action, the current footprint of the EOD Proficiency Training Range would be shifted approximately 5 acres to the north to comply with airfield operational safety criteria. A corresponding 5 acres on the southernmost portion of the existing range would be vacated. Activities associated with the EOD training range would involve consolidation of all EOD activities into the existing detonation area on Base, demolishing or repurposing an existing 7,325-ft² facility within the main industrial portion of the Base, construction of a new 30,000-ft² EOD facility, replacement of the boundary fence at the existing EOD training range, and siting an EOD magazine structure within the fenced area of existing Building 951, resulting in a net increase of 22,675 ft² of impervious surfaces. Finally, two 240-ft² pedestrian access gates and a pedestrian gatehouse would be constructed at the intersection of Litchfield Road and Glendale Avenue.

Environmental Assessment

The EA will assess the potential environmental consequences of the Proposed Action and No Action Alternative. Potential impacts identified during the initial planning stages include effects on air quality, infrastructure/utilities, biological and cultural resources, geological resources, and water resources. The EA will also examine the cumulative effects when combined with past, present, and reasonably foreseeable future actions. In support of this process, we request your input in identifying general or specific issues or areas of concern you believe should be addressed in the EA.

We intend to provide your agency with a copy of the Draft EA when the document is completed. Please inform us if additional copies are needed or if someone else within your agency other than you should receive the Draft EA.

Please reach out to my point of contact, provided below, on any issues or concerns you have in the development of this EA. We ask your assistance in identifying any issues or concerns of which we may be unaware, particularly those that may be affected by this proposal.

So that we remain on schedule to complete the environmental impact analysis process in a timely manner, please provide your response to me not later than 30 days from receipt of this correspondence. Please send your response via postal mail or email (preferred) to:

ATTN: Jeff Rothrock
56 CES/CEIE
Luke AFB, AZ 85309-1149
Email: charles.rothrock@us.af.mil>

The Air Force appreciates your interest in and support of its military mission at Luke AFB. We thank you in advance for your assistance and look forward to your response.

Sincerely

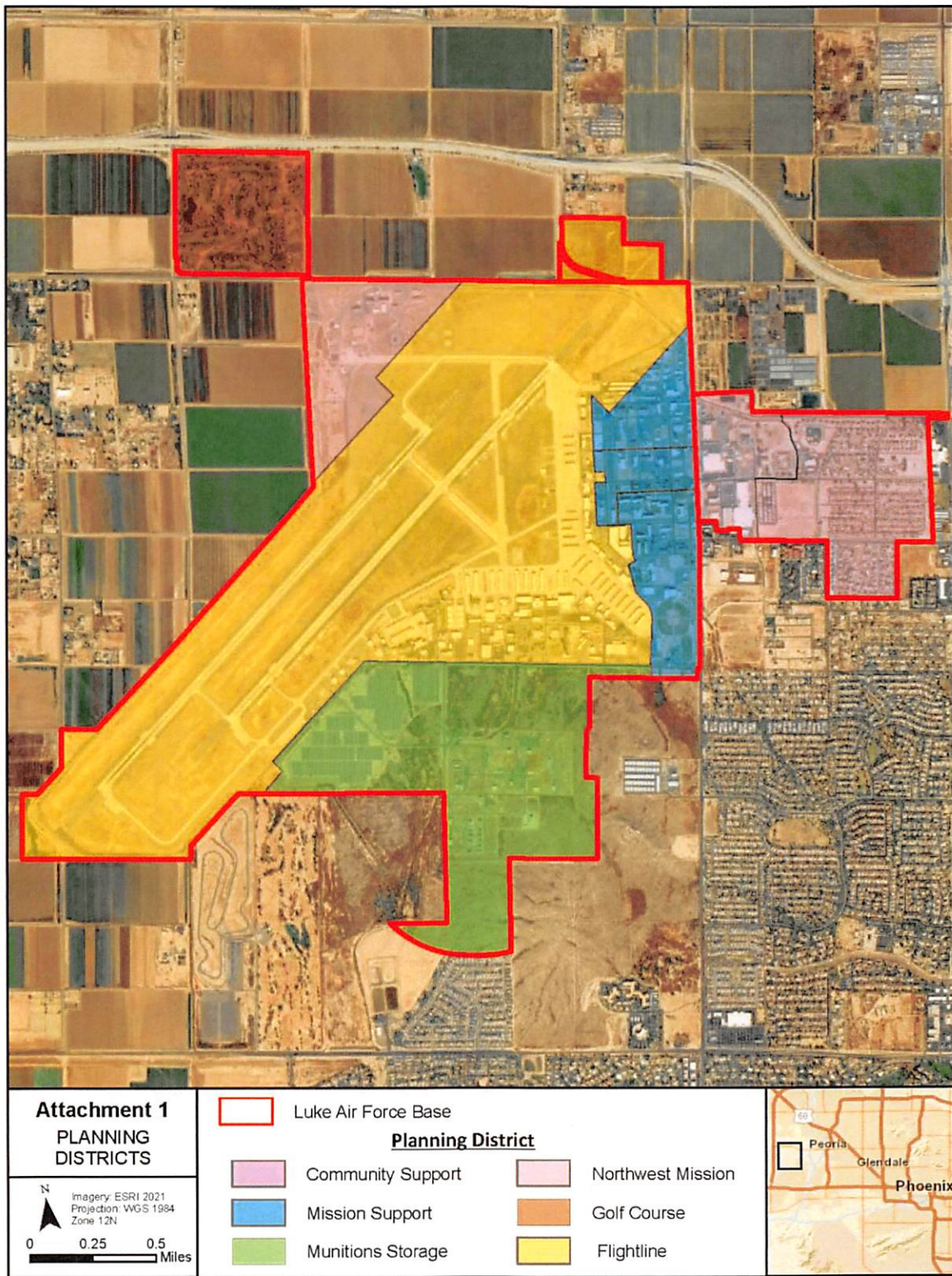


CHARLES J ROTHROCK
Environmental Chief

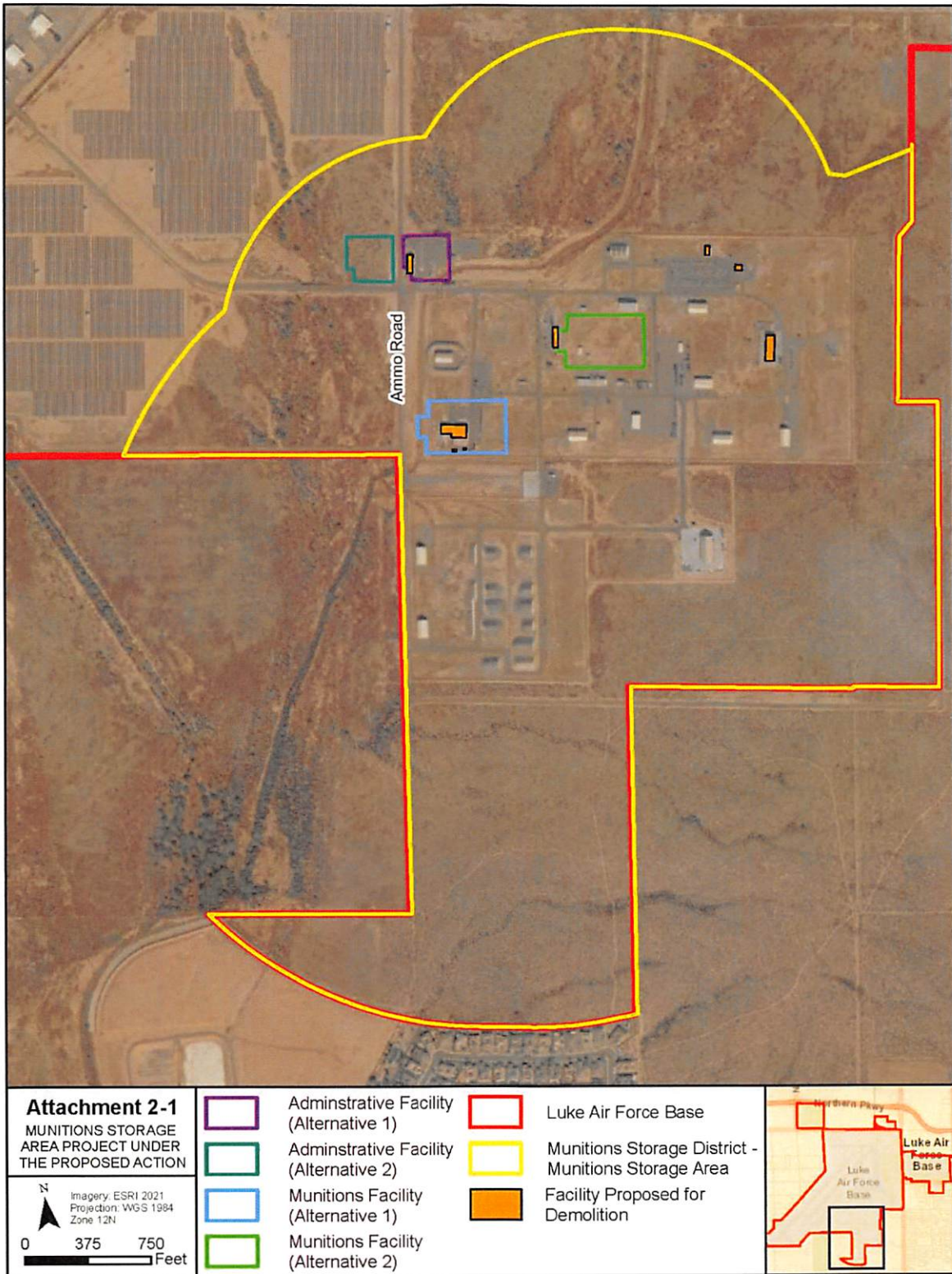
Attachments:

1. Planning Districts Map of Luke AFB
2. Maps of Project Locations

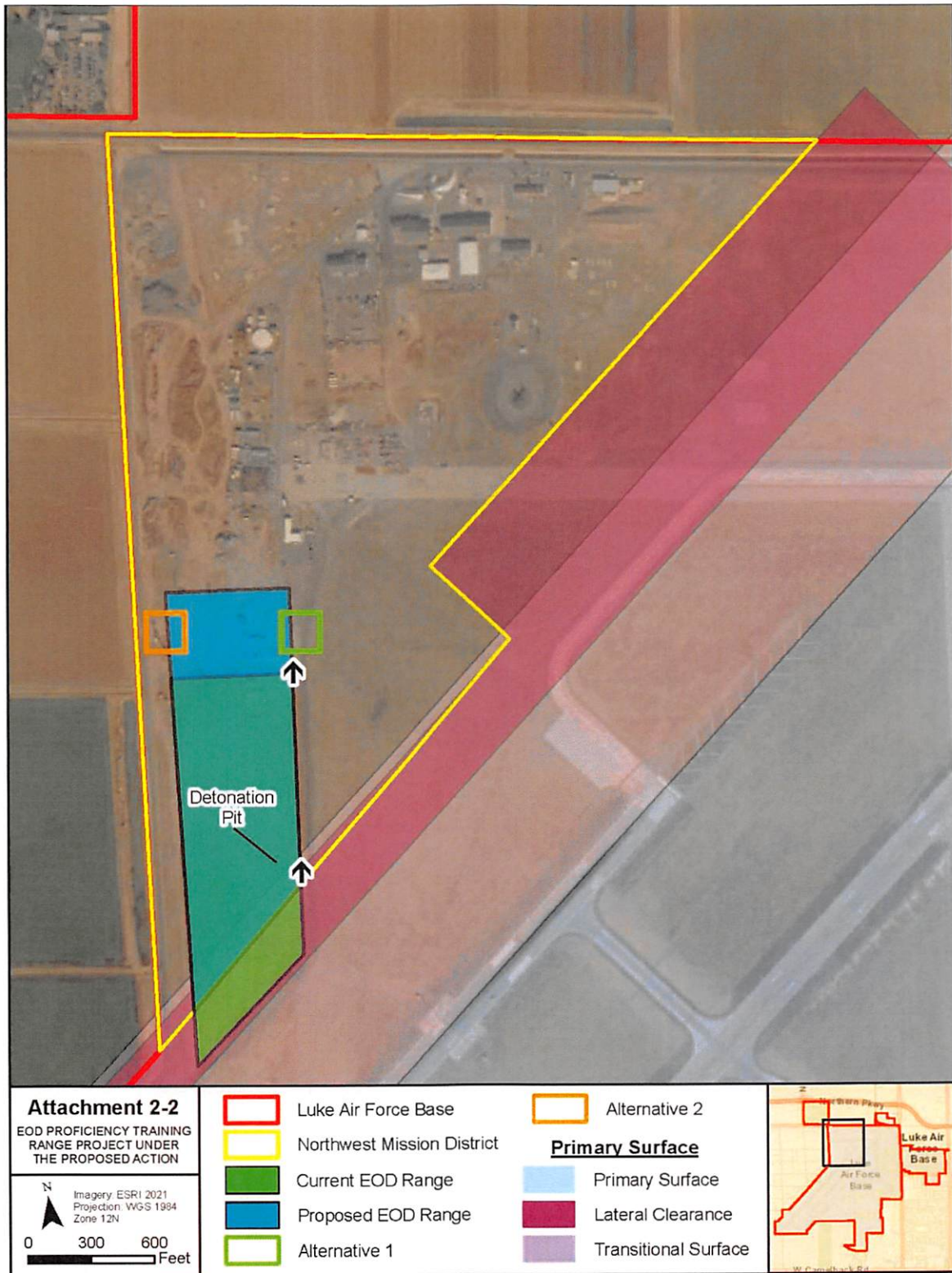
Attachment 1 – Planning Districts Map of Luke AFB



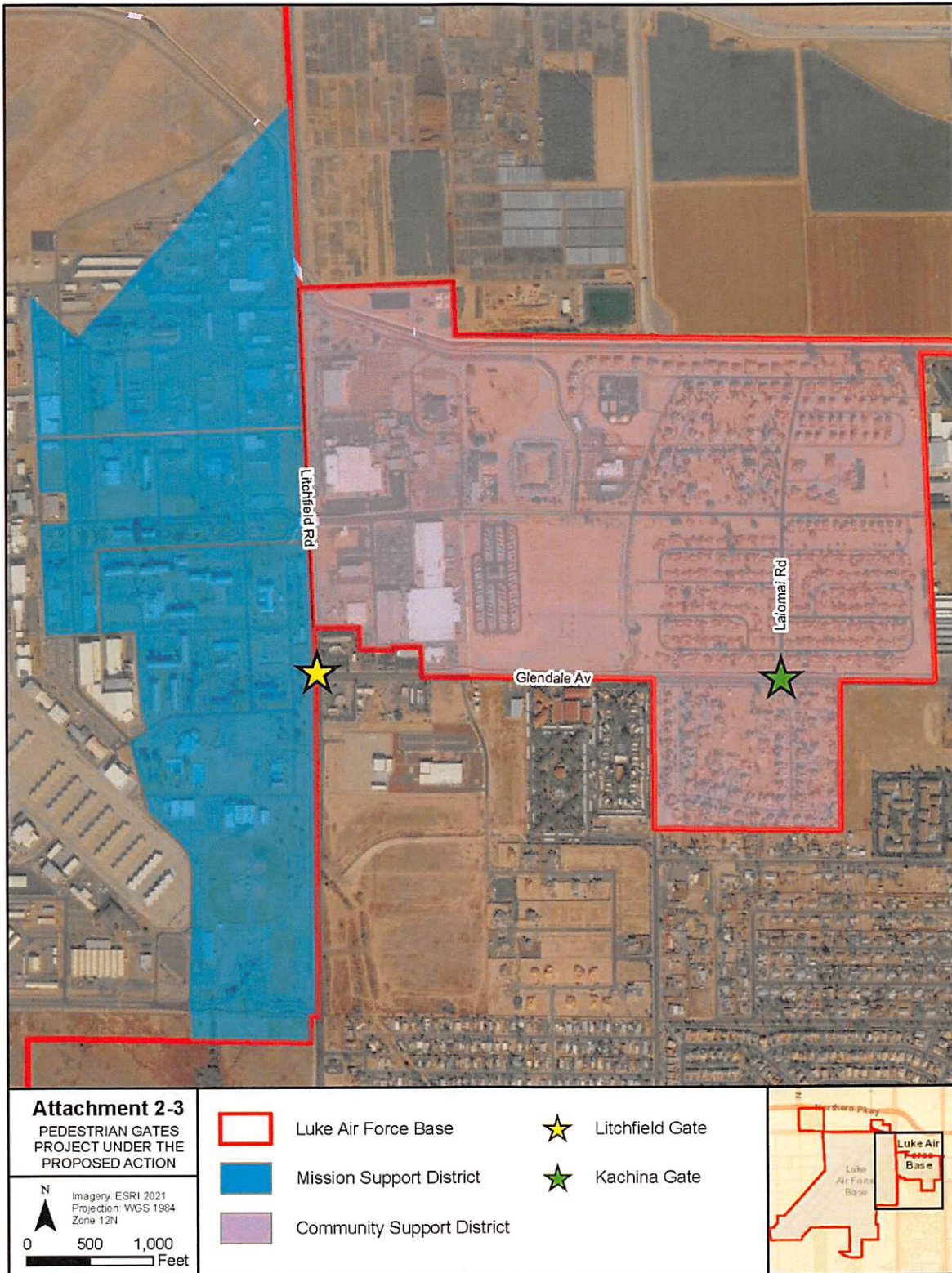
Attachment 2 – Maps of Project Locations



Attachment 2 – Maps of Project Locations



Attachment 2 – Maps of Project Locations



From: [Don Rerick \(FCD\)](#)
To: [ROTHROCK, CHARLES J GS-13 USAF AETC 56 CES/CEIE](#)
Cc: [Don Rerick \(FCD\)](#)
Subject: [Non-DoD Source] Letter to Scott Vogel dated Feb. 14, 2022 - EA for an ADP
Date: Wednesday, March 2, 2022 4:30:16 PM
Attachments: [image001.png](#)

Charles,

The Flood Control District has reviewed the subject letter and has no comments or concerns. Along the north and east side of the base proper is the Dysart Drain Channel which is owned/operated by the LAFB. If any of the proposed activities impact the channel, then we would need to be consulted per the IGA between FCD and the Air Force.

No additional copies of the completed EA are necessary, and you can send the one such document to my attention at my email address.

Thank you,

Don Rerick, P.E.

Manager

Planning and Project Management Division



Flood Control District of Maricopa County

2801 W Durango St, Phoenix, AZ 85009

(O) 602-506-4878 (C) 602-819-1639

don.rerick@maricopa.gov

www.maricopa.gov/floodcontrol



March 30, 2022

Charles J. Rothrock
Environmental Chief
13970 W Gillespie Drive
Luke AFB AZ, 85309-1149

Electronically submitted to: Charles.Rothrock@us.af.mil

RE: Luke Air Force Base Area Development Plan

Dear Mr. Rothrock:

The Arizona Game and Fish Department (Department) appreciates the opportunity to review the Luke Air Force Base (AFB) Area Development Plan (Plan). The description details three short-term construction and demolition actions on Luke AFB that would involve the demolition of 30,686ft² of existing building and the construction of 63,480ft² new building space, resulting in a net gain of 32,794ft² total building area. The Department understands the Plan would involve: demolition, soil disturbance, noise, and the hauling of heavy equipment within an already disturbed/developed area.

Under Title 17 of the Arizona Revised Statutes, the Department, by and through the Arizona Game and Fish Commission (Commission), has jurisdictional authority and public trust responsibilities to protect and conserve the state fish and wildlife resources. In addition, the Department manages threatened and endangered species through authorities of Section 6 of the Endangered Species Act and the Department's 10(a)1(A) permit. It is the mission of the Department to conserve and protect Arizona's diverse fish and wildlife resources and manage for safe, compatible outdoor recreation opportunities for current and future generations. For your consideration, the Department provides the following comments based on the agency's statutory authorities, public trust responsibilities, and special expertise related to wildlife resources and recreation.

Please review the attached project report (HGIS-15647) generated by the Department's [Online Environmental Review Tool \(ERT\)](#)¹ for a list of Species of Greatest Conservation Need (SGCN) and Species of Economic and Recreational Importance (SERI) as identified in the State Wildlife Action Plan, which have been documented or predicted within the buffered footprint of the Plan.

¹ <https://ert.azgfd.gov/>

Multiple special status species have been recorded within 5-miles of the Project area. The Department recommends the following actions be taken prior to any ground disturbing activities:

- The Western burrowing owl (*Athene cunicularia hypugaea*), a special status species regulated under the Migratory Bird Treaty Act (MBTA), has been recorded within 1 mile of the project. If suitable habitat for this species is present within or adjacent to the project area, the Department recommends conducting an occupancy survey for western burrowing owl's to determine if this species occurs within the project footprint. Guidelines for conducting this survey are found in [Burrowing Owl Project Clearance Guidance for Landowners](#)² which can be accessed on-line through the Department's website. Please note the survey should be conducted by a surveyor that is certified by the Department. If an active burrowing owl burrow is detected, please contact the Department and the U.S. Fish and Wildlife Service for direction, in accordance with the above guidance, *Burrowing Owl Project Clearance Guidance for Landowners*.

The Department also offers the following best management practices to consider during planning, development, and implementation of this project.

- Consider minimizing the potential introduction or spread of exotic invasive species, including aquatic and terrestrial plants, animals, insects and pathogens. Precautions can be taken to wash and/or decontaminate all equipment utilized in the project activities before entering and leaving the site. Please review the Arizona Department of Agriculture's website for a list of prohibited and restricted [noxious weeds](#)³ and the [Arizona Native Plant Society](#)⁴ for recommendations on control methods. To view a list of documented invasive species or to report invasive species in or near your project area visit [iMapInvasives](#)⁵ - a national cloud-based application for tracking and managing invasive species.
 - To build a list: zoom to your area of interest, use the identify/measure tool to draw a polygon around your area of interest, and select "See What's Here" for a list of reported species. To export the list, you must have an account and be logged in. You can then use the export tool to draw a boundary and export the records in a csv file.
- To further limit the spread of non-native, invasive plant species, the Department recommends landscaping with drought-tolerant species that are native to Arizona. Landscaping with native plants can help support wildlife and pollinator species that inhabit rural and urbanized areas. Visit the [Arizona Native Plant Society's website](#)⁶ for information on preferred native plants to utilize in landscaping.

² <https://www.azgfd.com/wildlife/speciesofgreatestconservneed/raptor-management/burrowing-owl-mangement/>

³ <https://agriculture.az.gov/pestspest-control/agriculture-pests/noxious-weeds>

⁴ <https://aznps.com/invas>

⁵ <https://imap.natureserve.org/imap/services/page/map.html>

⁶ <http://aznps.com/invasives/GrowNative/invasives.html>

Thank you for the opportunity to provide input on the Luke Air Force Base Area Development Plan. For further coordination, please contact Bobby Lamoureux at RLamoureux@azgfd.gov or 480-262-9427.

Sincerely,

Joshua Hurst

Joshua Hurst

Regional Supervisor, Mesa

Attachment

cc: Ginger Ritter, Project Evaluation Program Manager
Kelly Wolff, Habitat, Lands and Evaluations Program Manager

AZGFD # M22-03015251

Arizona Environmental Online Review Tool Report



Arizona Game and Fish Department Mission

To conserve Arizona's diverse wildlife resources and manage for safe, compatible outdoor recreation opportunities for current and future generations.

Project Name:

Luke Airforce Base Area Development Plan

Project Description:

Three short-term construction and demolition actions on Luke AFB. Construction and demolition will occur, resulting in a net gain of 32,794ft² in property footprint. Additionally, two gates will be installed for public access.

Project Type:

Military Activities, Development (new buildings, roads, etc.)

Contact Person:

Robert Lamoureux

Organization:

Arizona Game and Fish

On Behalf Of:

AZGFD

Project ID:

HGIS-15647

Please review the entire report for project type and/or species recommendations for the location information entered. Please retain a copy for future reference.

Disclaimer:

1. This Environmental Review is based on the project study area that was entered. The report must be updated if the project study area, location, or the type of project changes.
2. This is a preliminary environmental screening tool. It is not a substitute for the potential knowledge gained by having a biologist conduct a field survey of the project area. This review is also not intended to replace environmental consultation (including federal consultation under the Endangered Species Act), land use permitting, or the Departments review of site-specific projects.
3. The Departments Heritage Data Management System (HDMS) data is not intended to include potential distribution of special status species. Arizona is large and diverse with plants, animals, and environmental conditions that are ever changing. Consequently, many areas may contain species that biologists do not know about or species previously noted in a particular area may no longer occur there. HDMS data contains information about species occurrences that have actually been reported to the Department. Not all of Arizona has been surveyed for special status species, and surveys that have been conducted have varied greatly in scope and intensity. Such surveys may reveal previously undocumented population of species of special concern.
4. HabiMap Arizona data, specifically Species of Greatest Conservation Need (SGCN) under our State Wildlife Action Plan (SWAP) and Species of Economic and Recreational Importance (SERI), represent potential species distribution models for the State of Arizona which are subject to ongoing change, modification and refinement. The status of a wildlife resource can change quickly, and the availability of new data will necessitate a refined assessment.

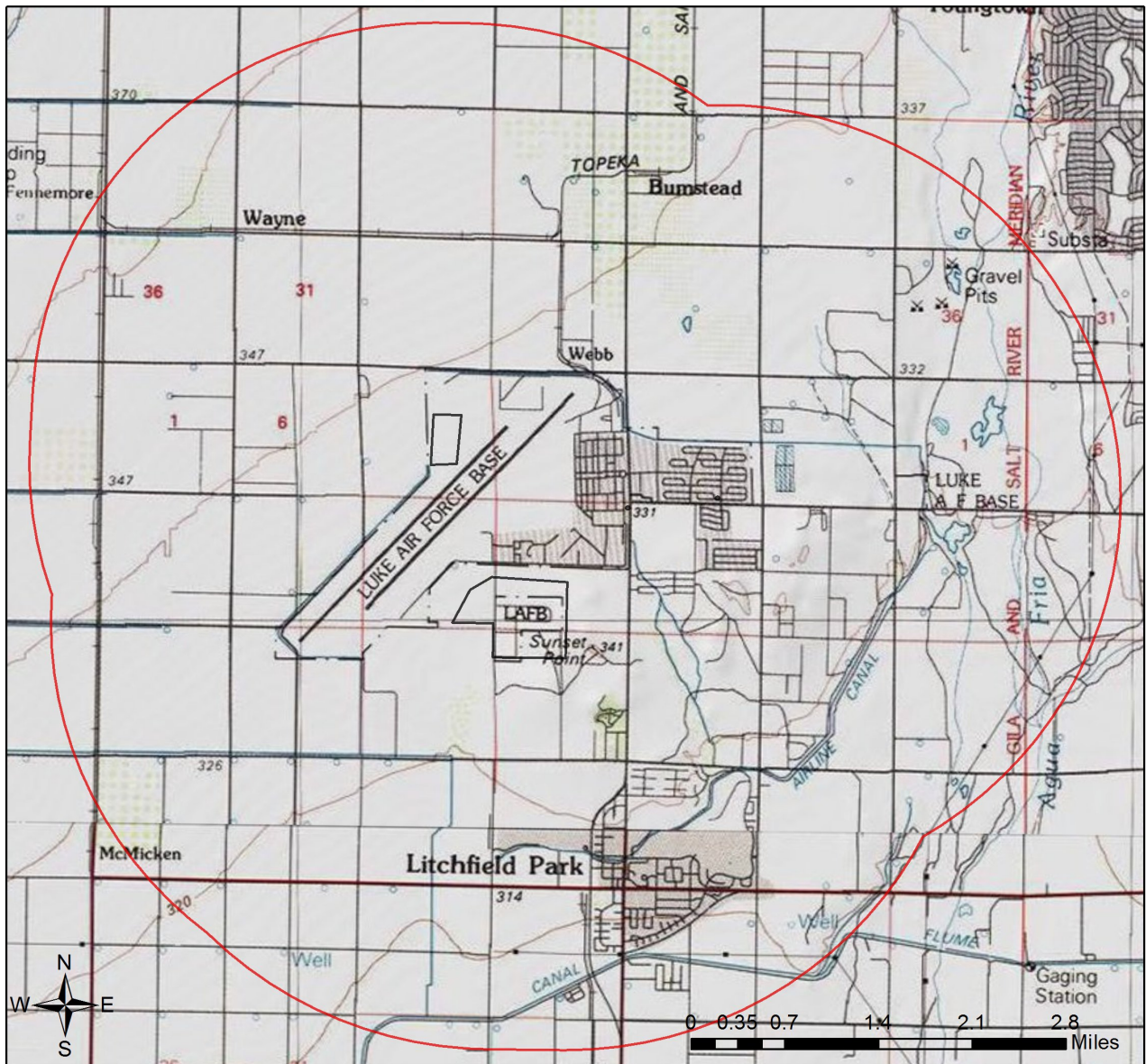
Locations Accuracy Disclaimer:

Project locations are assumed to be both precise and accurate for the purposes of environmental review. The creator/owner of the Project Review Report is solely responsible for the project location and thus the correctness of the Project Review Report content.

Recommendations Disclaimer:

1. The Department is interested in the conservation of all fish and wildlife resources, including those species listed in this report and those that may have not been documented within the project vicinity as well as other game and nongame wildlife.
2. Recommendations have been made by the Department, under authority of Arizona Revised Statutes Title 5 (Amusements and Sports), 17 (Game and Fish), and 28 (Transportation).
3. Potential impacts to fish and wildlife resources may be minimized or avoided by the recommendations generated from information submitted for your proposed project. These recommendations are preliminary in scope, designed to provide early considerations on all species of wildlife.
4. Making this information directly available does not substitute for the Department's review of project proposals, and should not decrease our opportunity to review and evaluate additional project information and/or new project proposals.
5. Further coordination with the Department requires the submittal of this Environmental Review Report with a cover letter and project plans or documentation that includes project narrative, acreage to be impacted, how construction or project activity(s) are to be accomplished, and project locality information (including site map). Once AGFD had received the information, please allow 30 days for completion of project reviews. Send requests to:
Project Evaluation Program, Habitat Branch
Arizona Game and Fish Department
5000 West Carefree Highway
Phoenix, Arizona 85086-5000
Phone Number: (623) 236-7600
Fax Number: (623) 236-7366
Or
PEP@azgfd.gov
6. Coordination may also be necessary under the National Environmental Policy Act (NEPA) and/or Endangered Species Act (ESA). Site specific recommendations may be proposed during further NEPA/ESA analysis or through coordination with affected agencies

Luke Airforce Base Area Development Plan USA Topo Basemap With Locator Map



- Project Boundary
- Buffered Project Boundary

Project Size (acres): 303.77

Lat/Long (DD): 33.5267 / -112.3734

County(s): Maricopa

AGFD Region(s): Mesa

Township/Range(s): T2N, R1W

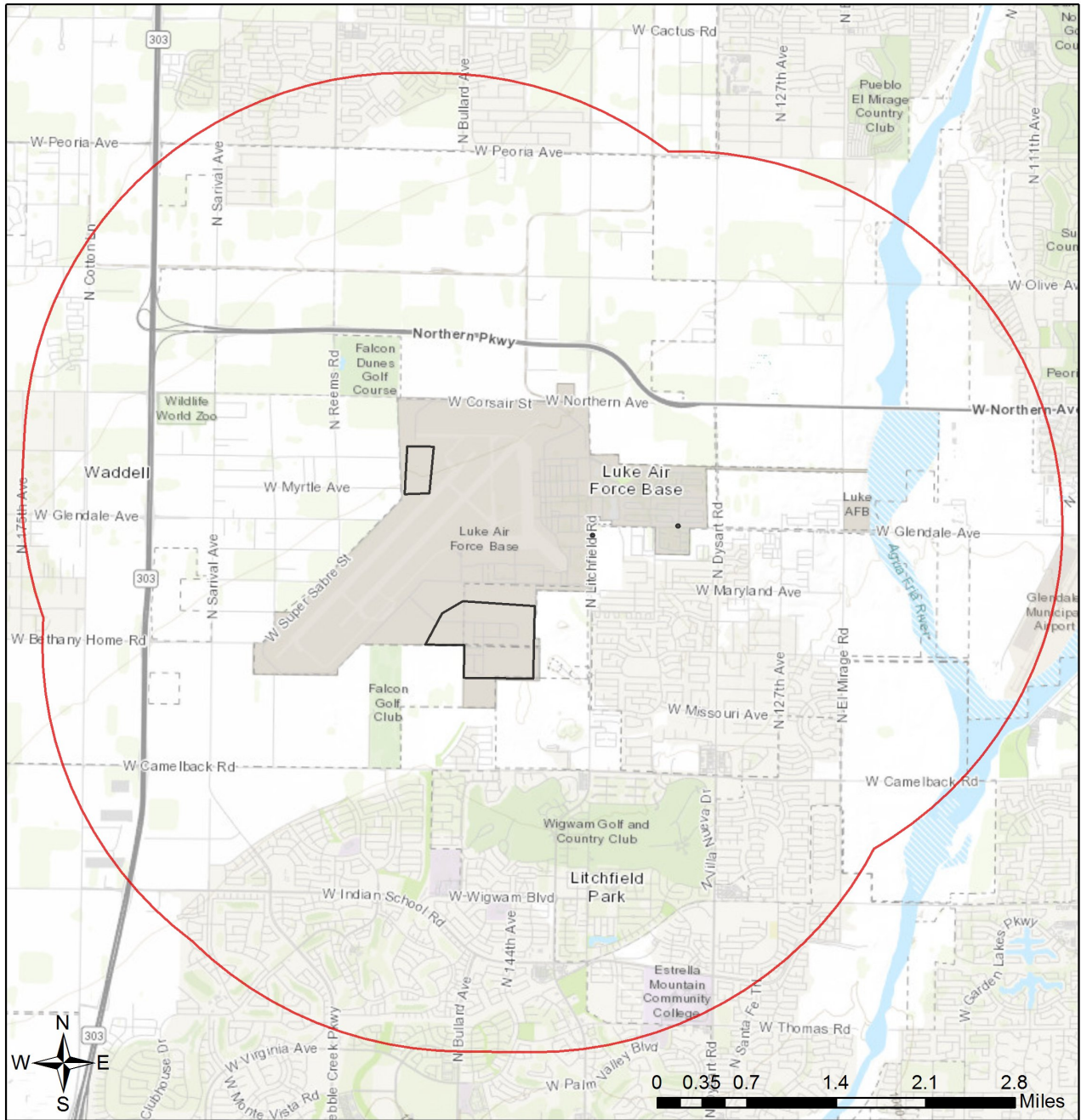
USGS Quad(s): EL MIRAGE; WADDELL

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap



Luke Airforce Base Area Development Plan

Web Map As Submitted By User



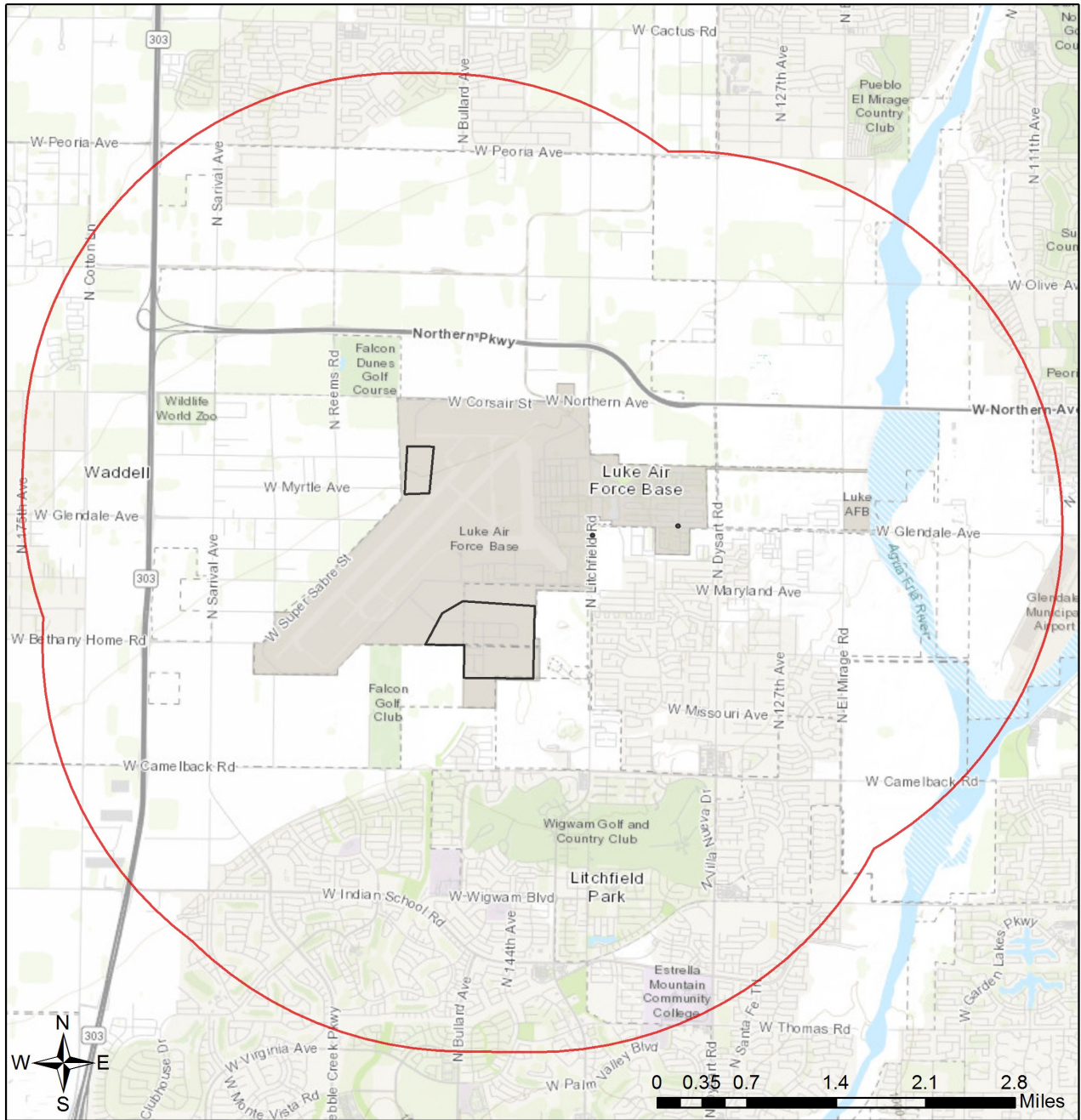
- Project Boundary
- Buffered Project Boundary

Project Size (acres): 303.77
 Lat/Long (DD): 33.5267 / -112.3734
 County(s): Maricopa
 AGFD Region(s): Mesa
 Township/Range(s): T2N, R1W
 USGS Quad(s): EL MIRAGE; WADDELL

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Luke Airforce Base Area Development Plan

Important Areas



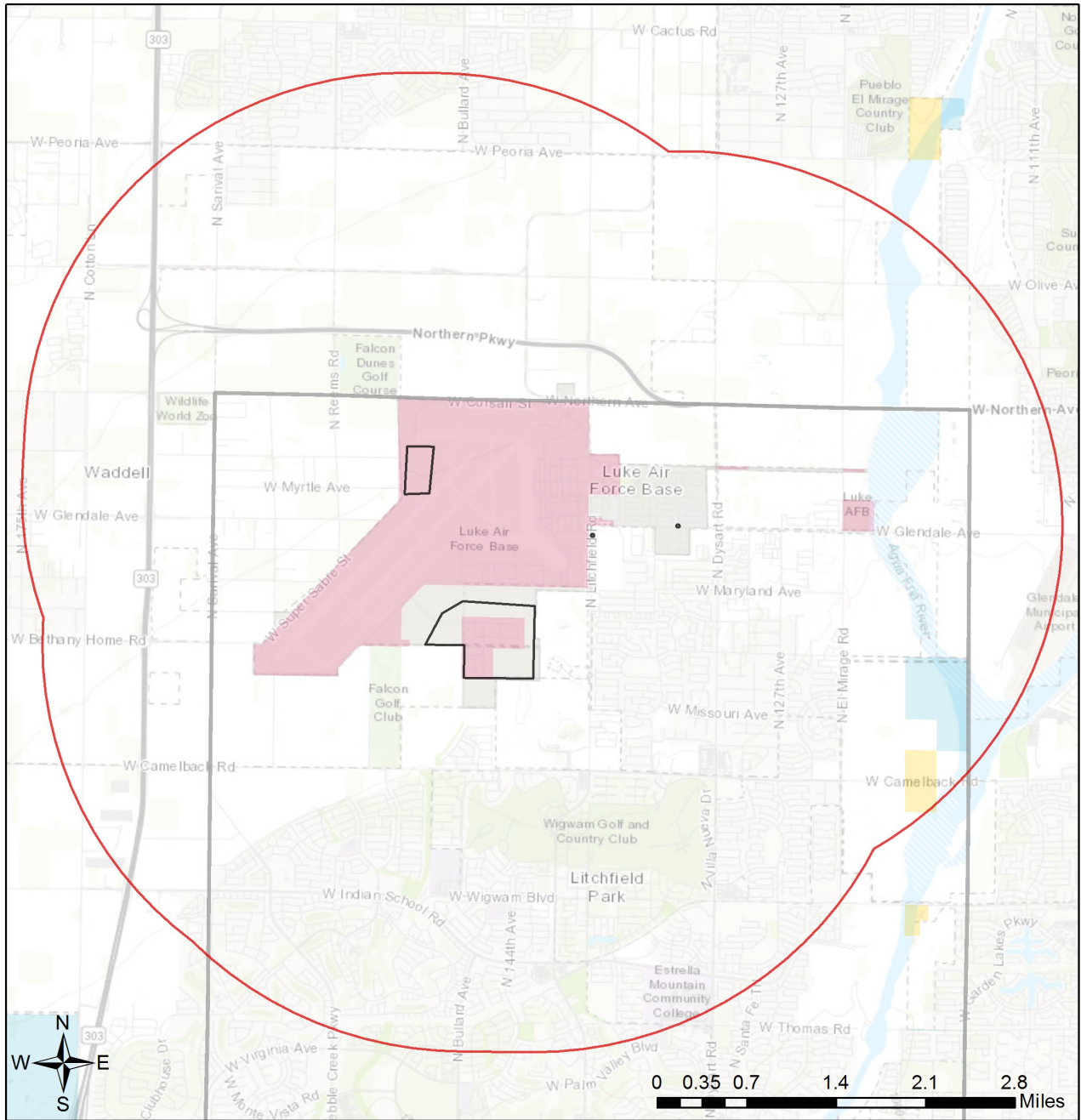
- Project Boundary
- Buffered Project Boundary
- Wildlife Connectivity
- Important Connectivity Zones
- Pinal County Riparian
- Critical Habitat
- Important Bird Areas

Project Size (acres): 303.77
 Lat/Long (DD): 33.5267 / -112.3734
 County(s): Maricopa
 AGFD Region(s): Mesa
 Township/Range(s): T2N, R1W
 USGS Quad(s): EL MIRAGE; WADDELL

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Luke Airforce Base Area Development Plan

Township/Ranges and Land Ownership



- | | |
|---------------------------|------------------------|
| Project Boundary | Military |
| Buffered Project Boundary | Mixed/Other |
| Township/Ranges | National Park/Mon. |
| Land Ownership | |
| AZ Game & Fish Dept. | State Trust |
| BLM | US Forest Service |
| BOR | Wildlife Area/Refuge |
| Indian Res. | |
| | State & Regional Parks |
| | Private |

Project Size (acres): 303.77
 Lat/Long (DD): 33.5267 / -112.3734
 County(s): Maricopa
 AGFD Region(s): Mesa
 Township/Range(s): T2N, R1W
 USGS Quad(s): EL MIRAGE; WADDELL

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Special Status Species Documented within 3 Miles of Project Vicinity

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Athene cunicularia hypugaea	Western Burrowing Owl	SC	S	S		1B
Danaus plexippus	Monarch	C		S		
Empidonax traillii extimus	Southwestern Willow Flycatcher	LE				1A
Lithobates yavapaiensis	Lowland Leopard Frog	SC	S	S		1A

Note: Status code definitions can be found at <https://www.azgfd.com/wildlife/planning/wildlifeguidelines/statusdefinitions/>

No Special Areas Detected

No special areas were detected within the project vicinity.

Species of Greatest Conservation Need Predicted that Intersect with Project Footprint as Drawn, based on Predicted Range Models

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Aix sponsa	Wood Duck					1B
Ammospermophilus harrisi	Harris' Antelope Squirrel					1B
Anaxyrus microscaphus	Arizona Toad	SC		S		1B
Athene cunicularia hypugaea	Western Burrowing Owl	SC	S	S		1B
Botaurus lentiginosus	American Bittern					1B
Buteo regalis	Ferruginous Hawk	SC		S		1B
Calypte costae	Costa's Hummingbird					1C
Chilomeniscus stramineus	Variable Sandsnake					1B
Chionactis annulata	Resplendent Shovel-nosed Snake	SC				1C
Cistothorus palustris	Marsh Wren					1C
Colaptes chrysoides	Gilded Flicker			S		1B
Coluber bilineatus	Sonoran Whipsnake					1B
Corynorhinus townsendii pallescens	Pale Townsend's Big-eared Bat	SC	S	S		1B
Crotalus tigris	Tiger Rattlesnake					1B
Empidonax wrightii	Gray Flycatcher					1C
Euderma maculatum	Spotted Bat	SC	S	S		1B
Eumops perotis californicus	Greater Western Bonneted Bat	SC		S		1B
Gopherus morafkai	Sonoran Desert Tortoise	CCA	S	S		1A
Haliaeetus leucocephalus	Bald Eagle	SC, BGA	S	S		1A
Heloderma suspectum	Gila Monster					1A
Incilius alvarius	Sonoran Desert Toad					1B
Kinosternon sonoriense sonoriense	Desert Mud Turtle			S		1B
Lasiurus blossevillii	Western Red Bat		S			1B
Lasiurus xanthinus	Western Yellow Bat		S			1B
Lithobates yavapaiensis	Lowland Leopard Frog	SC	S	S		1A
Macrotus californicus	California Leaf-nosed Bat	SC		S		1B

Species of Greatest Conservation Need Predicted that Intersect with Project Footprint as Drawn, based on Predicted Range Models

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Melanerpes uropygialis	Gila Woodpecker					1B
Melospiza lincolni	Lincoln's Sparrow					1B
Melospiza aberti	Abert's Towhee		S			1B
Micrathene whitneyi	Elf Owl					1C
Micruroides euryxanthus	Sonoran Coralsnake					1B
Myiarchus tyrannulus	Brown-crested Flycatcher					1C
Myotis occultus	Arizona Myotis	SC		S		1B
Myotis velifer	Cave Myotis	SC		S		1B
Myotis yumanensis	Yuma Myotis	SC				1B
Nyctinomops femorosaccus	Pocketed Free-tailed Bat					1B
Oreoscoptes montanus	Sage Thrasher					1C
Oreothlypis luciae	Lucy's Warbler					1C
Passerculus sandwichensis	Savannah Sparrow					1B
Perognathus longimembris	Little Pocket Mouse	No Status				1B
Phrynosoma solare	Regal Horned Lizard					1B
Rallus obsoletus yumanensis	Yuma Ridgway's Rail	LE				1A
Setophaga petechia	Yellow Warbler					1B
Sphyrapicus nuchalis	Red-naped Sapsucker					1C
Spizella breweri	Brewer's Sparrow					1C
Sturnella magna	Eastern Meadowlark					1C
Tadarida brasiliensis	Brazilian Free-tailed Bat					1B
Toxostoma lecontei	LeConte's Thrasher			S		1B
Troglodytes pacificus	Pacific Wren					1B
Vireo bellii arizonae	Arizona Bell's Vireo					1B
Vulpes macrotis	Kit Fox	No Status				1B

Species of Economic and Recreation Importance Predicted that Intersect with Project Footprint as Drawn

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Callipepla gambelii	Gambel's Quail					
Zenaida asiatica	White-winged Dove					
Zenaida macroura	Mourning Dove					

Project Type: Military Activities, Development (new buildings, roads, etc.)

Project Type Recommendations:

Fence recommendations will be dependant upon the goals of the fence project and the wildlife species expected to be impacted by the project. General guidelines for ensuring wildlife-friendly fences include: barbless wire on the top and bottom with the maximum fence height 42", minimum height for bottom 16". Modifications to this design may be considered for fencing anticipated to be routinely encountered by elk, bighorn sheep or pronghorn (e.g., Pronghorn fencing would require 18" minimum height on the bottom). Please refer to the Department's Fencing Guidelines located on Wildlife Friendly Guidelines page, which is part of the Wildlife Planning button at <https://www.azgfd.com/wildlife/planning/wildlifeguidelines/>.

During the planning stages of your project, please consider the local or regional needs of wildlife in regards to movement, connectivity, and access to habitat needs. Loss of this permeability prevents wildlife from accessing resources, finding mates, reduces gene flow, prevents wildlife from re-colonizing areas where local extirpations may have occurred, and ultimately prevents wildlife from contributing to ecosystem functions, such as pollination, seed dispersal, control of prey numbers, and resistance to invasive species. In many cases, streams and washes provide natural movement corridors for wildlife and should be maintained in their natural state. Uplands also support a large diversity of species, and should be contained within important wildlife movement corridors. In addition, maintaining biodiversity and ecosystem functions can be facilitated through improving designs of structures, fences, roadways, and culverts to promote passage for a variety of wildlife. Guidelines for many of these can be found at: <https://www.azgfd.com/wildlife/planning/wildlifeguidelines/>.

Consider impacts of outdoor lighting on wildlife and develop measures or alternatives that can be taken to increase human safety while minimizing potential impacts to wildlife. Conduct wildlife surveys to determine species within project area, and evaluate proposed activities based on species biology and natural history to determine if artificial lighting may disrupt behavior patterns or habitat use. Use only the minimum amount of light needed for safety. Narrow spectrum bulbs should be used as often as possible to lower the range of species affected by lighting. All lighting should be shielded, canted, or cut to ensure that light reaches only areas needing illumination.

Consider tower designs and/or modifications that reduce or eliminate impacts to migratory birds (i.e. free standing, minimally lighted structures).

Minimize the potential introduction or spread of exotic invasive species, including aquatic and terrestrial plants, animals, insects and pathogens. Precautions should be taken to wash and/or decontaminate all equipment utilized in the project activities before entering and leaving the site. See the Arizona Department of Agriculture website for a list of prohibited and restricted noxious weeds at <https://www.invasivespeciesinfo.gov/unitedstates/az.shtml> and the Arizona Native Plant Society <https://aznps.com/invas> for recommendations on how to control. To view a list of documented invasive species or to report invasive species in or near your project area visit iMapInvasives - a national cloud-based application for tracking and managing invasive species at <https://imap.natureserve.org/imap/services/page/map.html>.

- To build a list: zoom to your area of interest, use the identify/measure tool to draw a polygon around your area of interest, and select "See What's Here" for a list of reported species. To export the list, you must have an account and be logged in. You can then use the export tool to draw a boundary and export the records in a csv file.

Minimization and mitigation of impacts to wildlife and fish species due to changes in water quality, quantity, chemistry, temperature, and alteration to flow regimes (timing, magnitude, duration, and frequency of floods) should be evaluated. Minimize impacts to springs, in-stream flow, and consider irrigation improvements to decrease water use. If dredging is a project component, consider timing of the project in order to minimize impacts to spawning fish and other aquatic species (include spawning seasons), and to reduce spread of exotic invasive species. We recommend early direct coordination with Project Evaluation Program for projects that could impact water resources, wetlands, streams, springs, and/or riparian habitats.

The Department recommends that wildlife surveys are conducted to determine if noise-sensitive species occur within the project area. Avoidance or minimization measures could include conducting project activities outside of breeding seasons.

Based on the project type entered, coordination with State Historic Preservation Office may be required (<http://azstateparks.com/SHPO/index.html>).

Vegetation restoration projects (including treatments of invasive or exotic species) should have a completed site-evaluation plan (identifying environmental conditions necessary to re-establish native vegetation), a revegetation plan (species, density, method of establishment), a short and long-term monitoring plan, including adaptive management guidelines to address needs for replacement vegetation.

Project Location and/or Species Recommendations:

HDMS records indicate that **Western Burrowing Owls** have been documented within the vicinity of your project area.

Please review the western burrowing owl resource page at:

<https://www.azgfd.com/wildlife/speciesofgreatestconservneed/burrowingowlmanagement/>.



United States Department of the Interior



FISH AND WILDLIFE SERVICE

Arizona Ecological Services Field Office

9828 North 31st Ave

#c3

Phoenix, AZ 85051-2517

Phone: (602) 242-0210 Fax: (602) 242-2513

<http://www.fws.gov/southwest/es/arizona/>

http://www.fws.gov/southwest/es/EndangeredSpecies_Main.html

In Reply Refer To:

February 23, 2022

Project Code: 2022-0011477

Project Name: EA for Installation Development Plan Projects at Luke Air Force Base, Maricopa County, Arizona

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

To Whom It May Concern:

To Whom it May Concern,

The Fish and Wildlife Service (Service) is providing this list under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). The list you have generated identifies threatened, endangered, proposed, and candidate species, and designated and proposed critical habitat, that *may* occur within the One-Range that has been delineated for the species (candidate, proposed, or listed) and its critical habitat (designated or proposed) with which your project polygon intersects. These range delineations are based on biological metrics, and do not necessarily represent exactly where the species is located. Please refer to the species information found on ECOS to determine if suitable habitat for the species on your list occurs in your project area.

The purpose of the Act is to provide a means whereby threatened and endangered species and the habitats upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of Federal trust resources and to determine whether projects may affect federally listed species and/or designated critical habitat. A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat.

Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If the Federal action agency determines that listed species or critical habitat *may be affected* by a federally funded, permitted or authorized activity, the agency must consult with us pursuant to 50 CFR 402. Note that a "may affect" determination includes effects that may not be adverse and that may be beneficial, insignificant, or discountable. An effect exists even if only one individual or habitat segment may be affected. The effects analysis should include the entire action area, which often extends well outside the project boundary or "footprint." For example, projects that involve streams and river systems should consider downstream affects. If the Federal action agency determines that the action may jeopardize a *proposed* species or may adversely modify *proposed* critical habitat, the agency must enter into a section 7 conference. The agency may choose to confer with us on an action that may affect proposed species or critical habitat.

Candidate species are those for which there is sufficient information to support a proposal for listing. Although candidate species have no legal protection under the Act, we recommend that they be considered in the planning process in the event they become proposed or listed prior to project completion. More information on the regulations (50 CFR 402) and procedures for section 7 consultation, including the role of permit or license applicants, can be found in our Endangered Species Consultation Handbook at: <http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>.

We also advise you to consider species protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712) and the Bald and Golden Eagle Protection Act (Eagle Act) (16 U.S.C. 668 *et seq.*). The MBTA prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when authorized by the Service. The Eagle Act prohibits anyone, without a permit, from taking (including disturbing) eagles, and their parts, nests, or eggs. Currently 1,026 species of birds are protected by the MBTA, including the western burrowing owl (*Athene cunicularia hypugaea*). Protected western burrowing owls can be found in urban areas and may use their nest/burrows year-round; destruction of the burrow may result in the unpermitted take of the owl or their eggs.

If a bald eagle or golden eagle nest occurs in or near the proposed project area, our office should be contacted for Technical Assistance. An evaluation must be performed to determine whether the project is likely to disturb or harm eagles. The National Bald Eagle Management Guidelines provide recommendations to minimize potential project impacts to bald eagles (see <https://www.fws.gov/birds/management/project-assessment-tools-and-guidance/guidance-documents/eagles.php> and <https://www.fws.gov/birds/management/managed-species/eagle-management.php>).

The Division of Migratory Birds (505/248-7882) administers and issues permits under the MBTA and Eagle Act, while our office can provide guidance and Technical Assistance. For more information regarding the MBTA, BGEPA, and permitting processes, please visit the following web site: <https://www.fws.gov/birds/management.php>. Guidance for minimizing impacts to migratory birds for communication tower projects (e.g. cellular, digital television, radio, and emergency broadcast) can be found at <https://www.fws.gov/migratorybirds/pdf/management/usfwscommtowerguidance2016update.pdf>.

The U.S. Army Corps of Engineers (Corps) may regulate activities that involve streams (including some intermittent streams) and/or wetlands. We recommend that you contact the Corps to determine their interest in proposed projects in these areas. For activities within a National Wildlife Refuge, we recommend that you contact refuge staff for specific information about refuge resources, please visit <https://www.fws.gov/southwest/refuges/> to locate the refuge you would be working in or around.

If your action is on tribal land or has implications for off-reservation tribal interests, we encourage you to contact the tribe(s) and the Bureau of Indian Affairs (BIA) to discuss potential tribal concerns, and to invite any affected tribe and the BIA to participate in the section 7 consultation. In keeping with our tribal trust responsibility, we will notify tribes that may be affected by proposed actions when section 7 consultation is initiated. For more information, please contact our Tribal Coordinator, John Nystedt, at 928/556-2160 or John.Nystedt@fws.gov.

We also recommend you seek additional information and coordinate your project with the Arizona Game and Fish Department. Information on known species detections, special status species, and Arizona species of greatest conservation need, such as the western burrowing owl and the Sonoran desert tortoise (*Gopherus morafkai*) can be found by using their Online Environmental Review Tool, administered through the Heritage Data Management System and Project Evaluation Program (<https://www.azgfd.com/wildlife/planning/projevalprogram/>).

We appreciate your concern for threatened and endangered species. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office. If we may be of further assistance, please contact our Flagstaff office at 928/556-2157 for projects in northern Arizona, our general Phoenix number 602/242-0210 for central Arizona, or 520/670-6144 for projects in southern Arizona.

Sincerely,
/s/

Mark A. Lamb
Acting Field Supervisor
Attachment

Attachment(s):

- Official Species List
 - USFWS National Wildlife Refuges and Fish Hatcheries
 - Migratory Birds
 - Wetlands
-

Official Species List

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

This species list is provided by:

Arizona Ecological Services Field Office

9828 North 31st Ave

#c3

Phoenix, AZ 85051-2517

(602) 242-0210

Project Summary

Project Code: 2022-0011477
Event Code: None
Project Name: EA for Installation Development Plan Projects at Luke Air Force Base, Maricopa County, Arizona
Project Type: Military Development
Project Description: The Proposed Action includes a total of three short-term construction and demolition actions on Luke AFB. Overall, the Proposed Action would demolish approximately 30,686 square feet (ft²) of existing building space and construct approximately 63,480 ft² of new building space. The net change in building footprint under the Proposed Action would be an increase of 32,794 ft². All projects would occur within the boundaries of Luke AFB.

1. Munitions Storage Area (MSA)

The MSA project includes the following elements:

- Demolition of five existing buildings totaling 23,361 ft²: Buildings 1234, 1236, 1240, 1242, and 1245;
- Construction of a new 17,093-ft² munitions support and control facility with reinforced concrete foundation and floor slab, structural-steel frames, split-face masonry unit walls, structural sloping metal seam roof, and fire detection and protection system;
- Construction of a new 16,630-ft² missile and conventional munitions consolidated facility with reinforced concrete foundation and concrete floor slab, structural-steel frames, split-face masonry unit walls, structural sloping metal seam roof, and a fire detection and protection system; and
- Construction of parking lots for consolidated munitions support and control facility and missile and conventional munitions facility.

Overall, activities associated with the MSA would result in a net increase of 4,202 ft² of new structures.

2. Explosives Ordnance Disposal (EOD) Proficiency Training Range

The current footprint of the EOD Proficiency Training Range would be shifted approximately 5 acres to the north in compliance with airfield operational safety criteria. Correspondingly, approximately 5 acres of land comprising the southernmost portion of the existing Range would be vacated. The Proposed Action would demolish or repurpose an existing 7,325-ft² facility within the main industrial portion of the Base and construct a new, expanded 30,000-ft² EOD facility in the Northwest Mission District to consolidate EOD administrative and storage functions.

The Proposed Action would also include the replacement of the boundary fence at the existing EOD Range and would site an EOD magazine (EODMAG) structure within the fenced area of existing Building 951, the

administrative building for the 56 EOD. The EODMAG is a deployable explosive storage magazine that provides a minimal quantity-distance (Q-D) arc while storing explosive items found in a typical EOD deployment package. The structure itself is approximately a cube with a footprint of approximately 49 ft².

3. Pedestrian Gates

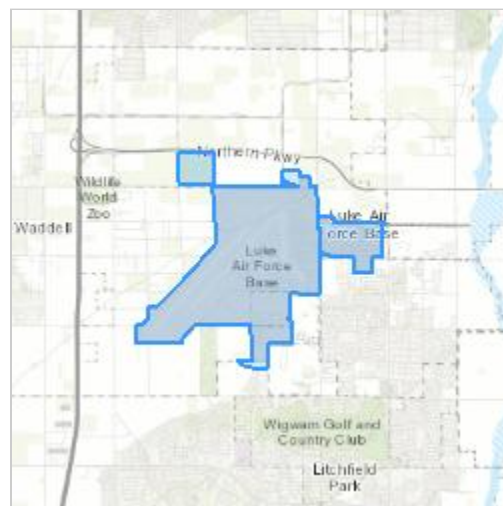
The Proposed Action would construct two new pedestrian access gates and a pedestrian gatehouse. The pedestrian gatehouse would be constructed at the intersection of Litchfield Road and Glendale Avenue, allowing the Base to remotely control access of pedestrians who already have Base access.

The two pedestrian gates would be installed along the eastern boundary of Luke AFB. The first gate, known as the Litchfield Pedestrian Gate, would be constructed just west of North Litchfield Road near the intersection of Litchfield Road and Glendale Avenue. The second gate, known as the Kachina Pedestrian Gate, would be constructed just north of Glendale Avenue near the intersection with Lalomai Street.

Conceptual design for the new pedestrian gates indicates that the approximate footprint for each gate would be 240 ft². Each gate would be equipped with two 36-inch-wide doors compliant with the Americans with Disabilities Act, a 30-inch-diameter turnstile, bollards to prevent vehicular breaching of the gate, four security cameras, an integrated camera and intercom system, and a card reader to scan Base access passes.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@33.53443555,-112.37406199796008,14z>



Counties: Maricopa County, Arizona

Endangered Species Act Species

There is a total of 3 threatened, endangered, or candidate species on this species list.

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

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

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

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

Birds

NAME	STATUS
California Least Tern <i>Sterna antillarum browni</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8104	Endangered
Yellow-billed Cuckoo <i>Coccyzus americanus</i> Population: Western U.S. DPS There is final critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

Insects

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

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

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

-
1. The [Migratory Birds Treaty Act](#) of 1918.
 2. The [Bald and Golden Eagle Protection Act](#) of 1940.
 3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31
Bendire's Thrasher <i>Toxostoma bendirei</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9435	Breeds Mar 15 to Jul 31

NAME	BREEDING SEASON
Costa's Hummingbird <i>Calypte costae</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9470	Breeds Jan 15 to Jun 10
Gila Woodpecker <i>Melanerpes uropygialis</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/5960	Breeds Apr 1 to Aug 31
Lawrence's Goldfinch <i>Carduelis lawrencei</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9464	Breeds Mar 20 to Sep 20
Marbled Godwit <i>Limosa fedoa</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9481	Breeds elsewhere
Willet <i>Tringa semipalmata</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

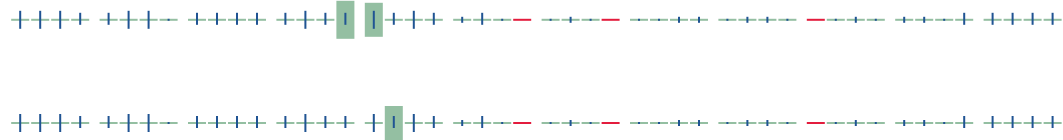
How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

BCC Rangewide
(CON)

Marbled Godwit
BCC Rangewide
(CON)

Willet
BCC Rangewide
(CON)



Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Nationwide conservation measures for birds <http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [AKN Phenology Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides

birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Wetlands

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

RIVERINE

- [R5UBFx](#)
- [R4SBC](#)

FRESHWATER POND

- [PUBF](#)
-

APPENDIX B. AIR QUALITY ANALYSIS BACK-UP

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: LUKE AFB

State: Arizona

County(s): Maricopa

Regulatory Area(s): Phoenix, AZ; Phoenix-Mesa, AZ; NOT IN A REGULATORY AREA

b. Action Title: Proposed Installation Development Plan

c. Project Number/s (if applicable): N/A

d. Projected Action Start Date: 1 / 2023

e. Action Description:

Proposed Action:

- Demolition of five existing buildings totaling 23,361 ft²: Buildings 1234, 1236, 1240, 1242, and 1245;
- Construction of a new 17,000-ft² munitions support and control facility with reinforced concrete foundation and floor slab, structural-steel frames, split-face masonry unit walls, structural sloping metal seam roof, and fire detection and protection system; and
- Construction of a new 16,000-ft² missile and conventional munitions consolidated facility with reinforced concrete foundation and concrete floor slab, structural-steel frames, split-face masonry unit walls, structural sloping metal seam roof, and fire detection and protection system.
- Demolition or repurposing of an existing 7,325-ft² facility within the main industrial portion of the Base;
- Construction of a new 30,000-ft² EOD facility to consolidate EOD administrative and storage functions;
- Replacement of the boundary fence at the existing EOD Range; and
- Siting of an EODMAG structure in proximity to the administrative and storage facilities proposed for construction.
- Construction of two new pedestrian gates along the eastern boundary of Luke AFB, measuring approximately 240 ft² in size;
- Equipping the gates with two 36-inch-wide doors compliant with the Americans with Disabilities Act, a 30-inch-diameter turnstile, bollards to prevent vehicular breaching of the gate, four security cameras, an integrated camera and intercom system, and a card reader to scan Base access passes; and
- Construction of a pedestrian gatehouse allowing for remote control access to the Base.

Alternatives to include:

- New MSA facilities described would be constructed west of Ammo Road opposite the existing facilities.
- The existing EOD Range would be reconfigured and shifted to the north by 5 acres. The proposed EOD administrative and storage facility, measuring 30,000 ft² in size, would be located on the western side of the parcel
- The new pedestrian gates would be installed farther west along the eastern boundary of the Base

f. Point of Contact:

Name: Rebecca Steely
Title: Environmental Planner
Organization: Environmental Assessment Services, LLC
Email: Rebecca.Steely@easbio.com
Phone Number: (585) 410-1110

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

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)
Phoenix, AZ			
VOC	0.996		
NOx	5.796		
CO	6.495	100	No
SOx	0.017		
PM 10	13.817		
PM 2.5	0.231		
Pb	0.000		
NH3	0.002		
CO2e	1684.3		
Phoenix-Mesa, AZ			
VOC	0.996	100	No
NOx	5.796	100	No
CO	6.495		
SOx	0.017		
PM 10	13.817		
PM 2.5	0.231		
Pb	0.000		
NH3	0.002		
CO2e	1684.3		
Phoenix-Mesa, AZ			
VOC	0.996	100	No
NOx	5.796	100	No
CO	6.495		
SOx	0.017		
PM 10	13.817		
PM 2.5	0.231		
Pb	0.000		
NH3	0.002		
CO2e	1684.3		
Phoenix, AZ			
VOC	0.996		
NOx	5.796		
CO	6.495		
SOx	0.017		
PM 10	13.817	70	No
PM 2.5	0.231		
Pb	0.000		
NH3	0.002		

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

CO2e	1684.3		
NOT IN A REGULATORY AREA			
VOC	0.996		
NOx	5.796		
CO	6.495		
SOx	0.017		
PM 10	13.817		
PM 2.5	0.231		
Pb	0.000		
NH3	0.002		
CO2e	1684.3		

2024

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Phoenix, AZ			
VOC	1.234		
NOx	7.245		
CO	8.161	100	No
SOx	0.021		
PM 10	15.947		
PM 2.5	0.282		
Pb	0.000		
NH3	0.004		
CO2e	1988.6		
Phoenix-Mesa, AZ			
VOC	1.234	100	No
NOx	7.245	100	No
CO	8.161		
SOx	0.021		
PM 10	15.947		
PM 2.5	0.282		
Pb	0.000		
NH3	0.004		
CO2e	1988.6		
Phoenix-Mesa, AZ			
VOC	1.234	100	No
NOx	7.245	100	No
CO	8.161		
SOx	0.021		
PM 10	15.947		
PM 2.5	0.282		
Pb	0.000		
NH3	0.004		
CO2e	1988.6		
Phoenix, AZ			
VOC	1.234		
NOx	7.245		
CO	8.161		
SOx	0.021		
PM 10	15.947	70	No
PM 2.5	0.282		
Pb	0.000		

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

NH3	0.004		
CO2e	1988.6		
NOT IN A REGULATORY AREA			
VOC	1.234		
NOx	7.245		
CO	8.161		
SOx	0.021		
PM 10	15.947		
PM 2.5	0.282		
Pb	0.000		
NH3	0.004		
CO2e	1988.6		

2025

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Phoenix, AZ			
VOC	0.883		
NOx	3.070		
CO	3.964	100	No
SOx	0.009		
PM 10	2.753		
PM 2.5	0.119		
Pb	0.000		
NH3	0.002		
CO2e	881.5		
Phoenix-Mesa, AZ			
VOC	0.883	100	No
NOx	3.070	100	No
CO	3.964		
SOx	0.009		
PM 10	2.753		
PM 2.5	0.119		
Pb	0.000		
NH3	0.002		
CO2e	881.5		
Phoenix-Mesa, AZ			
VOC	0.883	100	No
NOx	3.070	100	No
CO	3.964		
SOx	0.009		
PM 10	2.753		
PM 2.5	0.119		
Pb	0.000		
NH3	0.002		
CO2e	881.5		
Phoenix, AZ			
VOC	0.883		
NOx	3.070		
CO	3.964		
SOx	0.009		
PM 10	2.753	70	No
PM 2.5	0.119		

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

Pb	0.000		
NH3	0.002		
CO2e	881.5		
NOT IN A REGULATORY AREA			
VOC	0.883		
NOx	3.070		
CO	3.964		
SOx	0.009		
PM 10	2.753		
PM 2.5	0.119		
Pb	0.000		
NH3	0.002		
CO2e	881.5		

2026

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Phoenix, AZ			
VOC	0.761		
NOx	2.298		
CO	3.199	100	No
SOx	0.007		
PM 10	0.098		
PM 2.5	0.098		
Pb	0.000		
NH3	0.002		
CO2e	733.8		
Phoenix-Mesa, AZ			
VOC	0.761	100	No
NOx	2.298	100	No
CO	3.199		
SOx	0.007		
PM 10	0.098		
PM 2.5	0.098		
Pb	0.000		
NH3	0.002		
CO2e	733.8		
Phoenix-Mesa, AZ			
VOC	0.761	100	No
NOx	2.298	100	No
CO	3.199		
SOx	0.007		
PM 10	0.098		
PM 2.5	0.098		
Pb	0.000		
NH3	0.002		
CO2e	733.8		
Phoenix, AZ			
VOC	0.761		
NOx	2.298		
CO	3.199		
SOx	0.007		
PM 10	0.098	70	No

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

PM 2.5	0.098		
Pb	0.000		
NH3	0.002		
CO2e	733.8		
NOT IN A REGULATORY AREA			
VOC	0.761		
NOx	2.298		
CO	3.199		
SOx	0.007		
PM 10	0.098		
PM 2.5	0.098		
Pb	0.000		
NH3	0.002		
CO2e	733.8		

2027

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Phoenix, AZ			
VOC	0.103		
NOx	0.633		
CO	0.856	100	No
SOx	0.002		
PM 10	0.034		
PM 2.5	0.034		
Pb	0.000		
NH3	0.001		
CO2e	253.3		
Phoenix-Mesa, AZ			
VOC	0.103	100	No
NOx	0.633	100	No
CO	0.856		
SOx	0.002		
PM 10	0.034		
PM 2.5	0.034		
Pb	0.000		
NH3	0.001		
CO2e	253.3		
Phoenix-Mesa, AZ			
VOC	0.103	100	No
NOx	0.633	100	No
CO	0.856		
SOx	0.002		
PM 10	0.034		
PM 2.5	0.034		
Pb	0.000		
NH3	0.001		
CO2e	253.3		
Phoenix, AZ			
VOC	0.103		
NOx	0.633		
CO	0.856		
SOx	0.002		

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

PM 10	0.034	70	No
PM 2.5	0.034		
Pb	0.000		
NH3	0.001		
CO2e	253.3		
NOT IN A REGULATORY AREA			
VOC	0.103		
NOx	0.633		
CO	0.856		
SOx	0.002		
PM 10	0.034		
PM 2.5	0.034		
Pb	0.000		
NH3	0.001		
CO2e	253.3		

2028 - (Steady State)

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Phoenix, AZ			
VOC	0.006		
NOx	0.103		
CO	0.086	100	No
SOx	0.001		
PM 10	0.008		
PM 2.5	0.008		
Pb	0.000		
NH3	0.000		
CO2e	123.9		
Phoenix-Mesa, AZ			
VOC	0.006	100	No
NOx	0.103	100	No
CO	0.086		
SOx	0.001		
PM 10	0.008		
PM 2.5	0.008		
Pb	0.000		
NH3	0.000		
CO2e	123.9		
Phoenix-Mesa, AZ			
VOC	0.006	100	No
NOx	0.103	100	No
CO	0.086		
SOx	0.001		
PM 10	0.008		
PM 2.5	0.008		
Pb	0.000		
NH3	0.000		
CO2e	123.9		
Phoenix, AZ			
VOC	0.006		
NOx	0.103		
CO	0.086		

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

SOx	0.001		
PM 10	0.008	70	No
PM 2.5	0.008		
Pb	0.000		
NH3	0.000		
CO2e	123.9		
NOT IN A REGULATORY AREA			
VOC	0.006		
NOx	0.103		
CO	0.086		
SOx	0.001		
PM 10	0.008		
PM 2.5	0.008		
Pb	0.000		
NH3	0.000		
CO2e	123.9		

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.

Rebecca Steely , Environmental Planner

DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: LUKE AFB

State: Arizona

County(s): Maricopa

Regulatory Area(s): Phoenix, AZ; Phoenix-Mesa, AZ; NOT IN A REGULATORY AREA

- **Action Title:** Proposed Installation Development Plan

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

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

- Action Purpose and Need:

The overall purpose of the Proposed Action is to support Luke AFB's future mission and training requirements associated with next-generation aircraft arrival. The construction of new facilities, renovations and repair of existing facilities, demolition of obsolete facilities, and consolidation of mission support functions would address existing deficiencies in facilities at Luke AFB. Left unchecked, deficiencies in facilities and infrastructure would degrade the Base's ability to meet Air Force current and future mission requirements. The Proposed Action is needed in order to provide facilities and infrastructure that are adequate to meet the mission requirements of the 56 FW at Luke AFB

- Action Description:

Proposed Action:

- Demolition of five existing buildings totaling 23,361 ft²: Buildings 1234, 1236, 1240, 1242, and 1245;
- Construction of a new 17,000-ft² munitions support and control facility with reinforced concrete foundation and floor slab, structural-steel frames, split-face masonry unit walls, structural sloping metal seam roof, and fire detection and protection system; and
- Construction of a new 16,000-ft² missile and conventional munitions consolidated facility with reinforced concrete foundation and concrete floor slab, structural-steel frames, split-face masonry unit walls, structural sloping metal seam roof, and fire detection and protection system.
- Demolition or repurposing of an existing 7,325-ft² facility within the main industrial portion of the Base;
- Construction of a new 30,000-ft² EOD facility to consolidate EOD administrative and storage functions;
- Replacement of the boundary fence at the existing EOD Range; and
- Siting of an EODMAG structure in proximity to the administrative and storage facilities proposed for construction.
- Construction of two new pedestrian gates along the eastern boundary of Luke AFB, measuring approximately 240 ft² in size;
- Equipping the gates with two 36-inch-wide doors compliant with the Americans with Disabilities Act, a 30-inch-diameter turnstile, bollards to prevent vehicular breaching of the gate, four security cameras, an integrated camera and intercom system, and a card reader to scan Base access passes; and
- Construction of a pedestrian gatehouse allowing for remote control access to the Base.

Alternatives to include:

- New MSA facilities described would be constructed west of Ammo Road opposite the existing facilities.
- The existing EOD Range would be reconfigured and shifted to the north by 5 acres. The proposed EOD administrative and storage facility, measuring 30,000 ft² in size, would be located on the western side of the parcel
- The new pedestrian gates would be installed farther west along the eastern boundary of the Base

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Point of Contact

Name: Rebecca Steely
Title: Environmental Planner
Organization: Environmental Assessment Services, LLC
Email: Rebecca.Steely@easbio.com
Phone Number: (585) 410-1110

- Activity List:

	Activity Type	Activity Title
2.	Construction / Demolition	Proposed ADP Projects
3.	Heating	Heating for 63,480 square feet of new construction
4.	Construction / Demolition	Install 6,000 linear feet of fence
5.	Heating	Remove heating for 30,686 square feet of demolished building

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: Maricopa
Regulatory Area(s): Phoenix, AZ; Phoenix, AZ; Phoenix-Mesa, AZ; Phoenix-Mesa, AZ; NOT IN A REGULATORY AREA

- Activity Title: Proposed ADP Projects

- Activity Description:

Proposed Action:

- Demolition of five existing buildings totaling 23,361 ft²: Buildings 1234, 1236, 1240, 1242, and 1245;
- Construction of a new 17,000-ft² munitions support and control facility with reinforced concrete foundation and floor slab, structural-steel frames, split-face masonry unit walls, structural sloping metal seam roof, and fire detection and protection system; and
- Construction of a new 16,000-ft² missile and conventional munitions consolidated facility with reinforced concrete foundation and concrete floor slab, structural-steel frames, split-face masonry unit walls, structural sloping metal seam roof, and fire detection and protection system.
- Demolition or repurposing of an existing 7,325-ft² facility within the main industrial portion of the Base;
- Construction of a new 30,000-ft² EOD facility to consolidate EOD administrative and storage functions;
- Replacement of the boundary fence at the existing EOD Range; and
- Siting of an EODMAG structure in proximity to the administrative and storage facilities proposed for construction.
- Construction of two new pedestrian gates along the eastern boundary of Luke AFB, measuring approximately 240 ft² in size;
- Equipping the gates with two 36-inch-wide doors compliant with the Americans with Disabilities Act, a 30-inch-diameter turnstile, bollards to prevent vehicular breaching of the gate, four security cameras, an integrated camera and intercom system, and a card reader to scan Base access passes; and
- Construction of a pedestrian gatehouse allowing for remote control access to the Base.

- Activity Start Date

Start Month: 1
Start Month: 2023

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity End Date

Indefinite: False
End Month: 5
End Year: 2027

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	3.774349
SO _x	0.050724
NO _x	17.899774
CO	21.045660
PM 10	32.061823

Pollutant	Total Emissions (TONs)
PM 2.5	0.713829
Pb	0.000000
NH ₃	0.010778
CO _{2e}	4987.5

2.1 Demolition Phase

2.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2023

- Phase Duration

Number of Month: 36
Number of Days: 0

2.1.2 Demolition Phase Assumptions

- General Demolition Information

Area of Building to be demolished (ft²): 30686
Height of Building to be demolished (ft): 14

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

2.1.3 Demolition Phase Emission Factor(s)

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

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	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

0.00042: Emission Factor (lb/ft³)

BA: Area of Building to be demolished (ft²)

BH: Height of Building to be demolished (ft)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

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

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

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

2000: Conversion Factor pounds to tons

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- Vehicle Exhaust Emissions per Phase

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

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

BA: Area of Building being demolish (ft²)

BH: Height of Building being demolish (ft)

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

0.25: Volume reduction factor (material reduced by 75% to account for air space)

HC: Average Hauling Truck Capacity (yd³)

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

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

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

V_{POL}: Vehicle Emissions (TONs)

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

0.002205: Conversion Factor grams to pounds

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

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

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

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

WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)

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

NE: Number of Construction Equipment

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

V_{POL}: Vehicle Emissions (TONs)

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

0.002205: Conversion Factor grams to pounds

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

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

2.2 Site Grading Phase

2.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 3

Start Quarter: 1

Start Year: 2023

- Phase Duration

Number of Month: 24

Number of Days: 0

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2.2.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 130867
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
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	2	7

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

2.2.3 Site Grading Phase Emission Factor(s)

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

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

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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	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)
 20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
 ACRE: Total acres (acres)
 WD: Number of Total Work Days (days)
 2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

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- Worker Trips Emissions per Phase

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

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

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

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

2.3 Trenching/Excavating Phase

2.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

- Start Month: 5
- Start Quarter: 1
- Start Year: 2024

- Phase Duration

- Number of Month: 2
- Number of Days: 15

2.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

- Area of Site to be Trenched/Excavated (ft²): 500
- Amount of Material to be Hauled On-Site (yd³): 0
- Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

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

- Construction Exhaust (default)

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

- Vehicle Exhaust

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

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- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

2.3.3 Trenching / Excavating Phase Emission Factor(s)

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

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	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

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

ACRE: Total acres (acres)

WD: Number of Total Work Days (days)

2000: Conversion Factor pounds to tons

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- Construction Exhaust Emissions per Phase

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

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

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

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

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

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

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

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

HC: Average Hauling Truck Capacity (yd³)

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

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

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

V_{POL}: Vehicle Emissions (TONs)

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

0.002205: Conversion Factor grams to pounds

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

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

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

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

WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)

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

NE: Number of Construction Equipment

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

V_{POL}: Vehicle Emissions (TONs)

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

0.002205: Conversion Factor grams to pounds

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

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

2.4 Building Construction Phase

2.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2024

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- Phase Duration

Number of Month: 36

Number of Days: 0

2.4.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial

Area of Building (ft²): 63480

Height of Building (ft): 14

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

2.4.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}

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Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH₄	CO_{2e}
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH₄	CO_{2e}
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH₄	CO_{2e}
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- 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	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

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

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

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

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

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1000 ft³)

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

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

V_{POL}: Vehicle Emissions (TONs)

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

0.002205: Conversion Factor grams to pounds

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

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

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- Worker Trips Emissions per Phase

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

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

WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)

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

NE: Number of Construction Equipment

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

V_{POL}: Vehicle Emissions (TONs)

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

0.002205: Conversion Factor grams to pounds

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

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase

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

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1000 ft³)

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

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

V_{POL}: Vehicle Emissions (TONs)

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

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

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

2.5 Architectural Coatings Phase

2.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2025

- Phase Duration

Number of Month: 24

Number of Days: 0

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2.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
Total Square Footage (ft²): 63480
Number of Units: N/A

- Architectural Coatings Default Settings

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

2.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

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

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

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

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

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- Off-Gassing Emissions per Phase

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

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

BA: Area of Building (ft²)

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

0.0116: Emission Factor (lb/ft²)

2000: Conversion Factor pounds to tons

2.6 Paving Phase

2.6.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 6

Start Quarter: 1

Start Year: 2026

- Phase Duration

Number of Month: 12

Number of Days: 0

2.6.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft²): 45576

- 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

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2.6.3 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	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.6.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

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

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

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

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

PA: Paving Area (ft²)

0.25: Thickness of Paving Area (ft)

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

HC: Average Hauling Truck Capacity (yd³)

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

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

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

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

- Worker Trips Emissions per Phase

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

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

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

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

- Off-Gassing Emissions per Phase

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

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

3. Heating

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Maricopa

Regulatory Area(s): NOT IN A REGULATORY AREA; Phoenix, AZ; Phoenix, AZ; Phoenix-Mesa, AZ; Phoenix-Mesa, AZ

- Activity Title: Heating for 63,480 square feet of new construction

- Activity Description:

Heating for 63,480 square feet of new construction

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- Activity Start Date

Start Month: 6
Start Year: 2025

- Activity End Date

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

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.011239
SO _x	0.001226
NO _x	0.204345
CO	0.171650
PM 10	0.015530

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.015530
Pb	0.000000
NH ₃	0.000000
CO _{2e}	246.0

3.2 Heating Assumptions

- Heating

Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method

Area of floorspace to be heated (ft²): 63480
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft³): 0.00105
Energy Intensity (MMBtu/ft²): 0.0676

- Default Settings Used: Yes

- Boiler/Furnace Usage

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

3.3 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

3.4 Heating Formula(s)

- Heating Fuel Consumption ft³ per Year

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

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

HA: Area of floorspace to be heated (ft²)

EI: Energy Intensity Requirement (MMBtu/ft²)

HV: Heat Value (MMBTU/ft³)

1000000: Conversion Factor

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- 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

4. Construction / Demolition

4.1 General Information & Timeline Assumptions

- Activity Location

County: Maricopa

Regulatory Area(s): Phoenix, AZ; Phoenix, AZ; Phoenix-Mesa, AZ; Phoenix-Mesa, AZ; NOT IN A REGULATORY AREA

- Activity Title: Install 6,000 linear feet of fence

- Activity Description:

Installation of fence will be represented as "trenching" in ACAM.

- Activity Start Date

Start Month: 1

Start Month: 2023

- Activity End Date

Indefinite: False

End Month: 9

End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.194486
SO _x	0.003876
NO _x	0.986337
CO	1.498326
PM 10	0.575426

Pollutant	Total Emissions (TONs)
PM 2.5	0.038214
Pb	0.000000
NH ₃	0.000505
CO _{2e}	366.2

4.1 Trenching/Excavating Phase

4.1.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2023

- Phase Duration

Number of Month: 9

Number of Days: 0

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

4.1.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 6000
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

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

- Construction Exhaust (default)

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

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

4.1.3 Trenching / Excavating Phase Emission Factor(s)

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

- 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	000.486	000.008	000.543	004.349	000.013	000.011		000.034	00390.447
LDGT	000.632	000.010	000.931	006.791	000.015	000.013		000.034	00521.358
HDGV	001.506	000.016	003.054	027.300	000.033	000.029		000.047	00805.286
LDDV	000.245	000.003	000.309	003.564	000.006	000.006		000.008	00397.486
LDDT	000.577	000.006	000.833	007.381	000.008	000.008		000.008	00620.049
HDDV	000.638	000.014	007.539	002.571	000.405	000.372		000.026	01567.085
MC	002.634	000.008	000.735	014.249	000.027	000.024		000.047	00394.816

4.1.4 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)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

- Worker Trips Emissions per Phase

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

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

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

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

5. Heating

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location

County: Maricopa

Regulatory Area(s): Phoenix, AZ; Phoenix, AZ; Phoenix-Mesa, AZ; Phoenix-Mesa, AZ; NOT IN A REGULATORY AREA

- Activity Title: Remove heating for 30,686 square feet of demolished building

- Activity Description:

Remove heating for 30,686 square feet of demolished building

- Activity Start Date

Start Month: 5

Start Year: 2024

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	-0.005578
SO _x	-0.000608
NO _x	-0.101410
CO	-0.085184
PM 10	-0.007707

Pollutant	Emissions Per Year (TONs)
PM 2.5	-0.007707
Pb	0.000000
NH ₃	0.000000
CO _{2e}	-122.1

5.2 Heating Assumptions

- Heating

Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method

Area of floorspace to be heated (ft²): 30686

Type of fuel: Natural Gas

Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)

Heat Value (MMBtu/ft³): 0.00105

Energy Intensity (MMBtu/ft²): 0.0694

- Default Settings Used: Yes

- Boiler/Furnace Usage

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

5.3 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

5.4 Heating Formula(s)

- Heating Fuel Consumption ft³ per Year

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

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

HA: Area of floorspace to be heated (ft²)

EI: Energy Intensity Requirement (MMBtu/ft²)

HV: Heat Value (MMBTU/ft³)

1000000: Conversion Factor

- Heating Emissions per Year

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

HE_{POL}: Heating Emission Emissions (TONs)

FC: Fuel Consumption

EF_{POL}: Emission Factor for Pollutant

2000: Conversion Factor pounds to tons