FINAL

Environmental Impact Statement for F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB

Volume II

United States Air Force
Air Force Civil Engineer Center
Air Combat Command

November 2020

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Privacy Advisory

Any personal information provided throughout this process has been used only to identify individuals' desire to make a statement during the public comment period or to fulfill requests for copies of the Final EIS or associated documents. Private addresses were compiled to develop a mailing list for those requesting copies of the Final EIS.

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APPENDIX A
PUBLIC AND AGENCY OUTREACH

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A.1 FEDERAL REGISTER NOTICES

A.1.1 Notice of Intent to Prepare an Environmental Impact Statement (EIS)

64876 Federal Register / Vol. 84, No. 227 / Monday, November 25, 2019 / Notices

Therefore, the USPTO estimates that the total (non-hour) cost burden for this collection in the form of filing fees and postage costs is estimated to be approximately $788,286.60.

IV. Request for Comments

Comments submitted in response to this notice will be summarized and/or included in the request for OMB approval. All comments will become a matter of public record.

USPTO invites public comments on:

(a) Whether the collection of information is necessary for the proper performance of the functions of the agency, including whether the information will have practical utility;

(b) Accuracy of the agency's estimate of the burden (including hours and cost) of the proposed collection of information, including the validity of the methodology and assumptions used;

(c) Ways to enhance the quality, utility, and clarity of the information to be collected; and

(d) Ways to minimize the burden of the collection of information on respondents, *e.g.*, including through the use of appropriate automated, electronic, mechanical, or other technological collection techniques or other forms of information technology, *e.g.*, permitting electronic submission of responses.

Marcie Lovett,

Director, Records and Information Governance Branch, OAS, Office of the Chief Administrative Officer, United States Patent and Trademark Office.

[FR Doc. 2019–25510 Filed 11–22–19; 8:45 am]

BILLING CODE 3510–16–P

DEPARTMENT OF DEFENSE

Department of the Air Force

Notice of Intent To Prepare an Environmental Impact Statement for F–35A Wing Beddown and MQ–9 Wing Beddown

AGENCY: Department of the Air Force, DoD.

ACTION: Notice of intent.

SUMMARY: The United States Air Force (USAF) is issuing this notice of intent to advise the public of its intent to prepare an Environmental Impact Statement (EIS) to evaluate potential environmental consequences associated with two independent proposed actions: (1) The beddown of an F–35A Operational Wing at Tyndall AFB, FL. and (2) The beddown of an MQ–9 Remotely Piloted Aircraft (RPA) Operational Wing at either Tyndall AFB, Florida (FL) or Vandenberg AFB, California (CA).

DATES: The USAF will host two open-house public scoping meetings: Tuesday, December 10, 2019, from 5:30 p.m. to 8:30 p.m., at Gulf Coast State College, Student Union East in Panama City, Florida, and Thursday, December 12, 2019, from 5:30 p.m. to 8:30 p.m., at Allan Hancock College, Lompoc Valley Center in Lompoc, California.

ADDRESSES: Submit scoping comments on the proposed F35–A and MQ–9 Wing Beddowns on the project website: *F–35WingandMQ–9WingEIS.com.* Scoping comments can also be submitted to: F–35/MQ–9 EIS Program Manager, Cynthia Pettit, AFCEC/CZN, Attn: F-35/MQ-9, 2261 Hughes Avenue, Suite 155, JBSA Lackland, TX 78236–9853; 210–925–3367; Email: *afcec.czn.workflow@us.af.mil;* 210–925–3367 or FedEx & UPS Deliveries: AFCEC/CZN, 3515 S General McMullen Drive, Suite 155, San Antonio, TX 78226–2018. For comments submitted by mail, a comment form is available for download on the project website. Comments will be accepted at any time during the environmental impact analysis process. However, to ensure the USAF has sufficient time to consider public input in the preparation of the Draft EIS, scoping comments should be submitted via the project website or to the address listed above by December 23, 2019.

SUPPLEMENTARY INFORMATION: The F–35A Proposed Action is to beddown an F–35A Wing at Tyndall AFB, FL, consisting of three operational squadrons, each with 24 Primary Aerospace Vehicles Authorized Aircraft (PAA) and two Backup Aircraft Inventory (BAI) aircraft. Beddown of the F–35A Wing would include constructing and retrofitting of physical infrastructure and facilities and adding personnel to manage and perform operations, which include maintenance of the aircraft. F–35A flight operations for proficiency training would occur at the base and use existing airspace and ranges. The F–35A Wing beddown alternatives identified for evaluation in the EIS include beddown of the three-squadron F–35A Wing at Tyndall AFB, FL and an alternative with a fourth squadron of fifth generation fighter aircraft in addition to the three-squadron F–35A Wing.

The proposed MQ–9 Wing action is to beddown the MQ–9 remotely piloted aircraft system employed by the USAF in support of the Department of Defense directive to support initiatives of overseas contingency operations. The beddown of 24 MQ–9 aircraft would include a Wing Headquarters, an Operations Group, and Maintenance Group; construction and/or renovation of facilities would support staff and house MQ–9 aircraft. The number of base personnel would be increased to fulfill MQ–9 mission requirements. Flight operations for MQ–9 proficiency training would occur at the selected base and in existing airspace and ranges. MQ–9 Wing beddown alternatives identified for evaluation in the EIS include beddown of the MQ–9 Wing at either Tyndall AFB, FL or Vandenberg AFB, CA. Tyndall AFB, FL was identified as the preferred alternative for this mission.

The EIS will address potential environmental consequences resulting from implementation of each alternative for each of the proposed actions, as well as the combination of F–35A and MQ–9 actions at Tyndall AFB, FL. As required by NEPA, a No-Action Alternative, where the beddown of an F–35A Wing would not occur at Tyndall AFB, FL will also be addressed, as will the No-Action Alternative where the beddown of an MQ–9 Wing would not occur at either location. Bay County, Florida and Panama City, Florida are Cooperating Agencies for this EIS.

Scoping and Agency Coordination: To effectively define the full range of issues to be evaluated in the EIS, the USAF will solicit written comments from interested local, state, and federal agencies and elected officials, Native American tribes, interested members of the public, and others. Public scoping meetings will be held in the local communities near the alternative bases. The scheduled dates, times, locations, and addresses for the public scoping meetings are concurrently being published in local media.

Adriane Paris,

Acting Air Force Federal Register Liaison Officer.

[FR Doc. 2019–25537 Filed 11–22–19; 8:45 am]

BILLING CODE 5001–10–P

DEPARTMENT OF DEFENSE

Department of the Army

Performance Review Board Membership

AGENCY: Department of the Army, DoD.

ACTION: Notice.

SUMMARY: Notice is given of the names of members of a Performance Review Board for the Department of the Army.

DATES: The list of members is effective November 13, 2019.

FOR FURTHER INFORMATION CONTACT: Barbara Smith, Civilian Senior Leader

A.1.2 Notice of Availability of the Draft EIS

Federal Register / Vol. 85, No. 119 / Friday, June 19, 2020 / Notices 37095

20460–0001. As part of the mailing address, include the contact person's name, division, and mail code. The division to contact is listed at the end of each application summary.

SUPPLEMENTARY INFORMATION:

I. General Information

A. Does this action apply to me?

You may be potentially affected by this action if you are an agricultural producer, food manufacturer, or pesticide manufacturer. The following list of North American Industrial Classification System (NAICS) codes is not intended to be exhaustive, but rather provides a guide to help readers determine whether this document applies to them. Potentially affected entities may include:

- Crop production (NAICS code 111).
- Animal production (NAICS code 112).
- Food manufacturing (NAICS code 311).

B. What should I consider as I prepare my comments for EPA?

1. *Submitting CBI.* Do not submit this information to EPA through *regulations.gov* or email. Clearly mark the part or all of the information that you claim to be CBI. For CBI information in a disk or CD–ROM that you mail to EPA, mark the outside of the disk or CD–ROM as CBI and then identify electronically within the disk or CD–ROM the specific information that is claimed as CBI. In addition to one complete version of the comment that includes information claimed as CBI, a copy of the comment that does not contain the information claimed as CBI must be submitted for inclusion in the public docket. Information so marked will not be disclosed except in accordance with procedures set forth in 40 CFR part 2.

2. *Tips for preparing your comments.* When preparing and submitting your comments, see the commenting tips at *https://www.epa.gov/dockets/commenting-epa-dockets.*

II. Registration Applications

EPA has received applications to register new uses for pesticide products containing currently registered active ingredients. Pursuant to the provisions of FIFRA section 3(c)(4) (7 U.S.C. 136a(c)(4)), EPA is hereby providing notice of receipt and opportunity to comment on these applications. Notice of receipt of these applications does not imply a decision by the Agency on these applications.

Notice of Receipts—New Uses

1. *EPA Registration Numbers:* 100–791, 100–1202 and 100–1614. *Docket ID number:* EPA–HQ–OPP–2019–0346. *Applicant:* Syngenta Crop Protection, LLC. P.O. Box 18300, Greensboro, NC 27419. *Active ingredient:* Mefenoxam. *Product type:* Fungicide. *Proposed use:* Tree nut Crop Group 14–12. Contact: RD

2. *EPA Registration Numbers:* 7969–312 and 7969–310. *Docket ID number:* EPA–HQ–OPP–2020–0228. *Applicant:* BASF Corporation, Agricultural Products P.O. Box 13528, 26 Davis Drive, Research Triangle Park, NC 27709. *Product name:* Xemium Fungicide Technical and Merivon Xemium Brand Fungicide. *Active ingredient:* Fluxapyroxad at 99.5% (Xemium Fungicide Technical); Fluxapyroxad at 21.26% and Pyraclostrobin at 21.26% (Merivon Xemium Brand Fungicide). *Proposed use(s):* Pomegranate; Vegetable, fruiting, group 8–10; Fruit, pome, group 11–10; Cottonseed subgroup 20C. Contact: RD.

3. *EPA Registration Numbers:* 7969–446 and 7969–444. *Docket ID number:* EPA–HQ–OPP–2020–0267. *Applicant:* BASF corporation, 26 David Drive, P.O. Box 13528, RTP, NC 27709. *Product name:* Glufosinate-Ammonium Technical and Finale Herbicide. *Active ingredient:* Glufosinate at 95% (Glufosinate-Ammonium Technical) and 11.33% (Finale Herbicide). *Proposed use(s):* Turfgrass Use Pattern to Include All Turf Scenarios, Including Residential, Golf, and Sod farms. Contact: RD.

4. *EPA File Symbol:* 89459–RRT. *Docket ID number:* EPA–HQ–OPP–2020–0269. *Applicant:* Central Garden & Pet, 1501 E Woodfield Rd., Suite 200W, Schaumburg, IL 60173. *Active ingredients:* Acetamiprid and Etofenprox. *Product type:* Insecticide. *Proposed use:* Non-food indoor use on horses. Contact: RD.

Authority: 7 U.S.C. 136 *et seq.*

Dated: June 12, 2020.

Delores Barber,

Director, Information Technology and Resources Management Division, Office of Pesticide Programs.

[FR Doc. 2020–13272 Filed 6–18–20; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[ER–FRL–9051–4]

Environmental Impact Statements; Notice of Availability

Responsible Agency: Office of Federal Activities, General Information 202–564–5632 or *https://www.epa.gov/nepa.*

Weekly receipt of Environmental Impact Statements (EIS)

Filed June 8, 2020, 10 a.m. EST Through June 15, 2020 10 a.m. EST

Pursuant to 40 CFR 1506.9.

Section 309(a) of the Clean Air Act requires that EPA make public its comments on EISs issued by other Federal agencies. EPA's comment letters on EISs are available at: *https://cdxnodengn.epa.gov/cdx-enepa-public/action/eis/search.*

EIS No. 20200124, Final, APHIS, NAT, Southern Gardens Citrus Nursery, LLC Permit to Release Genetically Engineered Citrus tristeza virus, *Review Period Ends:* 07/20/2020, *Contact:* Cindy Eck 301–851–3892.

EIS No. 20200125, Draft, USAF, FL, F–35A Wing Beddown at Tyndall AFB and MQ–9 Wing Beddown at Tyndall AFB or Vandenberg AFB, *Comment Period Ends:* 08/03/2020, *Contact:* Nolan Swick 210–925–3392.

EIS No. 20200126, Final Supplement, USFS, MT, Greater Red Lodge Area Vegetation and Habitat Management Project, *Review Period Ends:* 08/03/2020, *Contact:* Victoria Regula 406–848–7375.

EIS No. 20200127, Final, DHS, SC, Adoption—Navy Base Intermodal Container Transfer Facility, *Review Period Ends:* 07/20/2020, *Contact:* Jennifer DeHart Hass 202–834–4346.

The Department of Homeland Security (DHS) has adopted the U.S. Army Corps of Engineers Final EIS No. 20180148, filed 06/22/2018 with EPA. DHS was not a cooperating agency on this project. Therefore, recirculation of the document is necessary under Section 1506.3(b) of the CEQ Regulations.

EIS No. 20200128, Draft, FHWA, WI, South Bridge Connector, Brown County, Wisconsin, Tier 1 DEIS, *Comment Period Ends:* 08/03/2020, *Contact:* Ian Chidister 608–829–7503.

EIS No. 20200129, Revised Final, USFS, ID, Little Boulder, *Review Period Ends:* 07/20/2020, *Contact:* Amy Boykin 208–476–8205.

Amended Notice

EIS No. 20200054, Draft, BIA, BLM, NM, Farmington Mancos-Gallup Resource Management Plan Amendment and

A.2 EXAMPLE INTERAGENCY/INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING (IICEP) LETTERS

A.2.1 General Agency Letters

A.2.1.1 Tyndall AFB General Agency Letter

DEPARTMENT OF THE AIR FORCE
325TH FIGHTER WING (ACC)
TYNDALL AIR FORCE BASE FLORIDA

Colonel Brian S. Laidlaw
Commander
325th Fighter Wing
501 Airey Avenue, Suite 1
Tyndall AFB FL 32403-5549

Senator Rick Scott
United States Senate
716 Hart Senate Office Building
Washington DC 20510

Dear Senator Scott

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (USAF) intends to prepare an Environmental Impact Statement (EIS) to evaluate potential environmental consequences associated with two independent proposed actions: (1) the beddown of an F-35A Operational Wing at Tyndall Air Force Base (AFB), Florida; and (2) the beddown of an MQ-9 Remotely Piloted Aircraft (RPA) Operational Wing at either Tyndall AFB, Florida or Vandenberg AFB, California.

The proposed F-35A Wing action is to beddown an F-35A Wing at Tyndall AFB. The F-35A Wing would consist of three operational squadrons, each with 24 Primary Aircraft Assigned and two Backup Aircraft Inventory aircraft. The beddown of the F-35A Wing would require construction and/or renovation of facilities to support staff and house 72 F-35A aircraft, including an F-35 Maintenance Squadron Complex, five hangars (maintenance, training, and fuel cell), an F-35 parking apron, an aerospace ground equipment facility, munitions storage, a flight simulator facility, and an aircraft wash rack (Attachment 1). The estimated increase in base personnel would be 1,920. F-35A flight operations for proficiency training would occur at the base and use existing airspace and ranges (Attachment 2).

The proposed MQ-9 Wing action is to beddown the MQ-9 RPA system employed by the USAF in support of the Department of Defense directive to support initiatives of overseas contingency operations. The beddown of 24 MQ-9 aircraft at either Tyndall AFB or Vandenberg AFB would require construction and/or renovation of facilities to support staff and house MQ-9 aircraft, including a Wing Headquarters, Operations Group, Maintenance Group, dormitory, child development center, fitness center, and inert munitions storage (Attachment 3). The estimated increase in base personnel would be 1,940 at the selected base to fulfill MQ-9 mission requirements. Flight operations for MQ-9 proficiency training would occur at the selected base and in existing airspace and ranges (Attachments 3 and 4).

The F-35A Wing beddown alternatives identified for evaluation in the EIS include the proposed beddown of a three-squadron F-35A Wing at Tyndall AFB and an alternative with a fourth squadron of fifth-generation fighter aircraft in addition to the three-squadron F-35A Wing. MQ-9 Wing beddown alternatives identified for evaluation in the EIS include beddown of the MQ-9 Wing at either Tyndall AFB or Vandenberg AFB. Tyndall AFB was preliminarily identified as the preferred alternative for this mission.

The EIS will address potential environmental consequences resulting from implementation of each alternative for each of the proposed actions, as well as the combination of F-35A and MQ-9 actions at Tyndall AFB. As required by NEPA, a No Action Alternative, where the beddown of an F-35A would not occur at Tyndall AFB Wing, will also be addressed, as will the No Action Alternative where the beddown of an MQ-9 Wing would not occur at either location.

The USAF will publish a Notice of Intent to prepare an EIS in the Federal Register on November 22, 2019, initiating the public involvement process. The USAF will host an open-house public scoping meeting on December 10, 2019, from 5:30 p.m. to 8:30 p.m., at Gulf Coast State College in Panama City, Florida, and on December 12, 2019, from 5:30 p.m. to 8:30 p.m., at Allan Hancock College, Lompoc Valley Center, in Lompoc, California. The purpose of the meetings and the scoping period is to solicit comments on the scope of environmental issues to be addressed in the EIS.

We invite your participation at the scoping meetings, but if you cannot attend, you may submit written comments via the project website at www.F-35WingandMQ-9WingEIS.com or via mail as follows:

U.S. Post Office Deliveries:
F-35A/MQ-9 EIS Project Manager
AFCEC/CZN
2261 Hughes Avenue, Suite 155
JBSA Lackland TX 78236-9853

FedEx & UPS Deliveries:
F-35A/MQ-9 EIS Project Manager
AFCEC/CZN
3515 S General McMullen, Suite 155
San Antonio TX 78226-2018

The F-35A Wing beddown alternatives have the potential to affect wetlands at Tyndall AFB, and the MQ-9 Wing beddown alternatives have the potential to affect wetlands at Tyndall AFB and Vandenberg AFB. Consistent with the requirements and objectives of Executive Orders 11988 and 11990, this letter initiates early public review of the alternatives that have the potential to affect wetlands and/or floodplains.

If you have questions or concerns, please contact Tyndall AFB's NEPA Point of Contact, Mr. Edwin Wallace, via email at edwin.wallace.1@us.af.mil, or via telephone at (850) 283-4346. Thank you in advance for your participation in the EIS scoping process.

Sincerely

BRIAN S. LAIDLAW, Colonel, USAF

4 Attachments:
1. F-35 Facilities Projects
2. F-35 Base and Training Airspace
3. MQ-9 Facilities Projects
4. MQ-9 Base and Training Airspace

A.2.1.2 Vandenberg AFB General Agency Letter

DEPARTMENT OF THE AIR FORCE
30TH SPACE WING (AFSPC)

NOV 0 4 2019

Beatrice L. Kephart
30 CES/CEI
1028 Iceland Avenue
Vandenberg AFB CA 93437-6011

Mr. Will Stelle
Regional Administrator
National Marine Fisheries Service
501 W. Ocean Blvd., Suite 4200
Long Beach CA 90802

Dear Mr. Stelle

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (USAF) intends to prepare an Environmental Impact Statement (EIS) to evaluate potential environmental consequences associated with two independent proposed actions: (1) the beddown of an F-35A Operational Wing at Tyndall Air Force Base (AFB), Florida; and (2) the beddown of an MQ-9 Remotely Piloted Aircraft (RPA) Operational Wing at either Tyndall AFB, Florida, or Vandenberg AFB, California.

The proposed F-35A Wing action is to beddown an F-35A Wing at Tyndall AFB. The F-35A Wing would consist of three operational squadrons, each with 24 Primary Aerospace Vehicles Authorized aircraft and two Backup Aircraft Inventory aircraft. The beddown of the F-35A Wing would require construction and/or renovation of facilities to support staff and house 72 F-35A aircraft, including an F-35 Maintenance Squadron Complex, five hangars (maintenance, training, and fuel cell), an F-35 parking apron, an aerospace ground equipment facility, munitions storage, a flight simulator facility, and an aircraft wash rack. The estimated increase in base personnel would be 1,920. F-35A flight operations for proficiency training would occur at the base and use existing airspace and ranges.

The proposed MQ-9 Wing action is to beddown the MQ-9 RPA system employed by the USAF in support of the Department of Defense directive to support initiatives of overseas contingency operations. The beddown of 24 MQ-9 aircraft at either Tyndall AFB or Vandenberg AFB would require construction and/or renovation of facilities to support staff and house MQ-9 aircraft, including a Wing Headquarters, Operations Group, Maintenance Group, dormitory, child development center, fitness center, and inert munitions storage (Attachment 1). The estimated increase in base personnel would be 1,940 at the selected base to fulfill MQ-9 mission requirements. Flight operations for MQ-9 proficiency training would occur at the selected base and in existing airspace and ranges (Attachment 2).

The F-35A Wing beddown alternatives identified for evaluation in the EIS include the proposed beddown of a three-squadron F-35A Wing at Tyndall AFB and an alternative with a fourth squadron of fifth-generation fighter aircraft in addition to the three-squadron F-35A Wing. MQ-9 Wing beddown alternatives identified for evaluation in the EIS include beddown of the MQ-9 Wing at either Tyndall AFB or Vandenberg AFB. Tyndall AFB was preliminarily identified as the preferred alternative for this mission.

GUARDIANS OF THE HIGH FRONTIER

The EIS will address potential environmental consequences resulting from implementation of each alternative for each of the proposed actions, as well as the combination of F-35A and MQ-9 actions at Tyndall AFB. As required by NEPA, a No Action Alternative, where the beddown of an F-35A Wing would not occur at Tyndall AFB, will also be addressed, as will the No Action Alternative where the beddown of an MQ-9 Wing would not occur at either location.

Pursuant to the Endangered Species Act of 1973, as amended, and the Marine Mammal Protection Act, the USAF is requesting information about species protected under the Marine Mammal Protection Act that may be present in the potentially affected area for Vandenberg AFB, including the Pacific harbor seal (*Phoca vitulina richardsi*), California sea lion (*Zalophus californianus*), northern elephant seal (*Mirounga angustirostris*), northern fur seal (*Callorhinus ursinus*), and Stellar sea lion (*Eumetopias jubatus*). If you have any specific items of interest about the proposal, we would like to hear from you within 30 days of receipt of this letter.

The USAF published a Notice of Intent to prepare an EIS in the Federal Register on November 22, 2019, initiating the public involvement process. The USAF will host an open-house public scoping meeting on December 10, 2019, from 5:30 p.m. to 8:30 p.m., at Gulf Coast State College in Panama City, Florida, and on December 12, 2019, from 5:30 p.m. to 8:30 p.m., at Allan Hancock College, Lompoc Valley Center, in Lompoc, California. The purpose of the meetings and the scoping period is to solicit comments on the scope of environmental issues to be addressed in the EIS.

We invite your participation at the scoping meetings, but if you cannot attend, you may submit written comments via the project website at www.F-35WingandMQ-9WingEIS.com or via mail as follows:

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The F-35A Wing beddown alternatives have the potential to affect wetlands at Tyndall AFB, and the MQ-9 Wing beddown alternatives have the potential to affect wetlands at Tyndall AFB and Vandenberg AFB. Consistent with the requirements and objectives of Executive Orders 11988 and 11990, this letter initiates early public review of the alternatives that have the potential to affect wetlands and/or floodplains.

If you have questions or concerns, please contact Vandenberg AFB's NEPA Point of Contact (POC), Ms. Samantha Kaisersatt, via email at samantha.kaisersatt@us.af.mil, or via telephone at (805) 605-0392. Thank you in advance for your participation in the EIS scoping process. If you have a POC to whom we could directly address any future correspondence, their contact information would be appreciated.

Sincerely

BEATRICE L. KEPHART
Chief, Installation Management Flight

Attachments:
1. MQ-9 Facilities Projects
2. MQ-9 Base and Training Airspace

A.2.2 U.S. Fish and Wildlife Service (USFWS) Letters

A.2.2.1 Tyndall AFB USFWS Letter

DEPARTMENT OF THE AIR FORCE
325TH FIGHTER WING (ACC)
TYNDALL AIR FORCE BASE FLORIDA

Colonel Brian S. Laidlaw
Commander
325th Fighter Wing
501 Airey Avenue, Suite 1
Tyndall AFB FL 32403-5549

Ms. Nicole Adimey
Regional Coordinator
U.S. Fish and Wildlife Service
1875 Century Blvd. NE
Atlanta GA 30345

Dear Ms. Adimey

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (USAF) intends to prepare an Environmental Impact Statement (EIS) to evaluate potential environmental consequences associated with two independent proposed actions: (1) the beddown of an F-35A Operational Wing at Tyndall Air Force Base (AFB), Florida; and (2) the beddown of an MQ-9 Remotely Piloted Aircraft (RPA) Operational Wing at either Tyndall AFB, Florida or Vandenberg AFB, California.

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The EIS will address potential environmental consequences resulting from implementation of each alternative for each of the proposed actions, as well as the combination of F-35A and MQ-9 actions at Tyndall AFB. As required by NEPA, a No Action Alternative, where the beddown of an F-35A Wing would not occur at Tyndall AFB, will also be addressed, as will the No Action Alternative where the beddown of an MQ-9 Wing would not occur at either location.

Pursuant to the Endangered Species Act of 1973, as amended, and the Marine Mammal Protection Act, the USAF is requesting information regarding any federally listed species, candidate species, or proposed species that may be present in the potentially affected area or your concerns regarding effects as we move forward from scoping into the analytical stage. If you have any specific items of interest about the proposals, we would like to hear from you within 30 days of receipt of this letter.

The USAF published a Notice of Intent to prepare an EIS in the Federal Register on November 22, 2019, initiating the public involvement process. The USAF will host an open-house public scoping meeting on December 10, 2019, from 5:30 p.m. to 8:30 p.m., at Gulf Coast State College in Panama City, Florida, and on December 12, 2019, from 5:30 p.m. to 8:30 p.m., at Allan Hancock College, Lompoc Valley Center, in Lompoc, California. The purpose of the meetings and the scoping period is to solicit comments on the scope of environmental issues to be addressed in the EIS.

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San Antonio TX 78226-2018

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If you have questions or concerns, please contact Tyndall AFB's NEPA Point of Contact, Mr. Edwin Wallace (POC), via email at edwin.wallace.1@us.af.mil, or via telephone at (850) 283-4346. Thank you in advance for your participation in the EIS scoping process. If you have a POC to whom we could directly address any future correspondence, their contact information would be appreciated.

Sincerely

BRIAN S. LAIDLAW, Colonel, USAF

4 Attachments:
1. F-35 Facilities Projects
2. F-35 Base and Training Airspace
3. MQ-9 Facilities Projects
4. MQ-9 Base and Training Airspace

A.2.2.2 Vandenberg AFB USFWS Letter

DEPARTMENT OF THE AIR FORCE
30TH SPACE WING (AFSPC)

NOV 0 4 2019

Beatrice L. Kephart
30 CES/CEI
1028 Iceland Avenue
Vandenberg AFB CA 93437-6011

Mr. Stephen P. Henry
U.S. Fish and Wildlife Service
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura CA 93003

Dear Mr. Henry

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (USAF) intends to prepare an Environmental Impact Statement (EIS) to evaluate potential environmental consequences associated with two independent proposed actions: (1) the beddown of an F-35A Operational Wing at Tyndall Air Force Base (AFB), Florida; and (2) the beddown of an MQ-9 Remotely Piloted Aircraft (RPA) Operational Wing at either Tyndall AFB, Florida, or Vandenberg AFB, California.

The proposed F-35A Wing action is to beddown an F-35A Wing at Tyndall AFB. The F-35A Wing would consist of three operational squadrons, each with 24 Primary Aerospace Vehicles Authorized aircraft and two Backup Aircraft Inventory aircraft. The beddown of the F-35A Wing would require construction and/or renovation of facilities to support staff and house 72 F-35A aircraft, including an F-35 Maintenance Squadron Complex, five hangars (maintenance, training, and fuel cell), an F-35 parking apron, an aerospace ground equipment facility, munitions storage, a flight simulator facility, and an aircraft wash rack. The estimated increase in base personnel would be 1,920. F-35A flight operations for proficiency training would occur at the base and use existing airspace and ranges.

The proposed MQ-9 Wing action is to beddown the MQ-9 RPA system employed by the USAF in support of the Department of Defense directive to support initiatives of overseas contingency operations. The beddown of 24 MQ-9 aircraft at either Tyndall AFB or Vandenberg AFB would require construction and/or renovation of facilities to support staff and house MQ-9 aircraft, including a Wing Headquarters, Operations Group, Maintenance Group, dormitory, child development center, fitness center, and inert munitions storage (Attachment 1). The estimated increase in base personnel would be 1,940 at the selected base to fulfill MQ-9 mission requirements. Flight operations for MQ-9 proficiency training would occur at the selected base and in existing airspace and ranges (Attachment 2).

The F-35A Wing beddown alternatives identified for evaluation in the EIS include the proposed beddown of a three-squadron F-35A Wing at Tyndall AFB and an alternative with a fourth squadron of fifth-generation fighter aircraft in addition to the three-squadron F-35A Wing. MQ-9 Wing beddown alternatives identified for evaluation in the EIS include beddown of the MQ-9 Wing at either Tyndall AFB or Vandenberg AFB. Tyndall AFB was preliminarily identified as the preferred alternative for this mission.

The EIS will address potential environmental consequences resulting from implementation of each alternative for each of the proposed actions, as well as the combination of F-35A and MQ-9 actions

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at Tyndall AFB. As required by NEPA, a No Action Alternative, where the beddown of an F-35A Wing would not occur at Tyndall AFB, will also be addressed, as will the No Action Alternative where the beddown of an MQ-9 Wing would not occur at either location.

Natural Resources Managers at Vandenberg AFB (30 CES/CEI) of course work with your staff frequently, to determine which Vandenberg AFB actions "may affect" listed species at Vandenberg AFB. We will continue to do so throughout all phases of this project.

If the MQ-9 is based at Vandenberg AFB, it will result in a slight increase in aviation operations; however, all actions will comply with our existing measures to decrease potential impacts to the resources of concern to USFWS (for example, to include adherence to minimum altitudes over sensitive shorebird and seabird habitat). Additional personnel would be stationed at Vandenberg AFB, and certain new facilities would be built within the existing airfield as well as other portions of the base that are already developed for housing and administrative purposes.

The USAF published a Notice of Intent to prepare an EIS in the Federal Register on November 22, 2019, initiating the public involvement process. The USAF will host an open-house public scoping meeting on December 10, 2019, from 5:30 p.m. to 8:30 p.m., at Gulf Coast State College in Panama City, Florida, and on December 12, 2019, from 5:30 p.m. to 8:30 p.m., at Allan Hancock College, Lompoc Valley Center, in Lompoc, California. The purpose of the meetings and the scoping period is to solicit comments on the scope of environmental issues to be addressed in the EIS.

We invite your participation at the scoping meetings, but if you cannot attend, you may submit written comments via the project website at www.F-35WingandMQ-9WingEIS.com or via mail as follows:

U.S. Post Office Deliveries:
F-35A/MQ-9 EIS Project Manager
AFCEC/CZN
2261 Hughes Avenue Suite 155
JBSA Lackland TX 78236-9853

FedEx & UPS Deliveries:
F-35A/MQ-9 EIS Project Manager
AFCEC/CZN
3515 S General McMullen Suite 155
San Antonio TX 78226-2018

The F-35A Wing beddown alternatives have the potential to affect wetlands at Tyndall AFB, and the MQ-9 Wing beddown alternatives have the potential to affect wetlands at Tyndall AFB and Vandenberg AFB. Consistent with the requirements and objectives of Executive Orders 11988 and 11990, this letter initiates early public review of the alternatives that have the potential to affect wetlands and/or floodplains.

If you have questions or concerns, please contact Vandenberg AFB's NEPA Point of Contact (POC), Ms. Samantha Kaisersatt, via email at samantha.kaisersatt@us.af.mil, or via telephone at (805) 605-0392. Thank you in advance for your participation in the EIS scoping process. If you have a POC to whom we could directly address any future correspondence, their contact information would be appreciated.

Sincerely

BEATRICE L. KEPHART
Chief, Installation Management Flight

Attachments:
1. MQ-9 Facilities Projects
2. MQ-9 Base and Training Airspace

A.2.3 National Marine Fisheries Service (NMFS) Letters

A.2.3.1 Tyndall AFB NMFS Letter

DEPARTMENT OF THE AIR FORCE
325TH FIGHTER WING (ACC)
TYNDALL AIR FORCE BASE FLORIDA

Colonel Brian S. Laidlaw
Commander
325th Fighter Wing
501 Airey Avenue, Suite 1
Tyndall AFB FL 32403-5549

Mr. David Bernhart
Assistant Regional Administrator
National Marine Fisheries Service
Southeast Regional Office
263 13th Avenue South
St. Petersburg FL 33701-5505

Dear Mr. Bernhart

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (USAF) intends to prepare an Environmental Impact Statement (EIS) to evaluate potential environmental consequences associated with two independent proposed actions: (1) the beddown of an F-35A Operational Wing at Tyndall Air Force Base (AFB), Florida; and (2) the beddown of an MQ-9 Remotely Piloted Aircraft (RPA) Operational Wing at either Tyndall AFB, Florida or Vandenberg AFB, California.

The proposed F-35A Wing action is to beddown an F-35A Wing at Tyndall AFB. The F-35A Wing would consist of three operational squadrons, each with 24 Primary Aircraft Assigned and two Backup Aircraft Inventory aircraft. The beddown of the F-35A Wing would require construction and/or renovation of facilities to support staff and house 72 F-35A aircraft, including an F-35 Maintenance Squadron Complex, five hangars (maintenance, training, and fuel cell), an F-35 parking apron, an aerospace ground equipment facility, munitions storage, a flight simulator facility, and an aircraft wash rack (Attachment 1). The estimated increase in base personnel would be 1,920. F-35A flight operations for proficiency training would occur at the base and use existing airspace and ranges (Attachment 2).

The proposed MQ-9 Wing action is to beddown the MQ-9 RPA system employed by the USAF in support of the Department of Defense directive to support initiatives of overseas contingency operations. The beddown of 24 MQ-9 aircraft at either Tyndall AFB or Vandenberg AFB would require construction and/or renovation of facilities to support staff and house MQ-9 aircraft, including a Wing Headquarters, Operations Group, Maintenance Group, dormitory, child development center, fitness center, and inert munitions storage (Attachment 3). The estimated increase in base personnel would be 1,940 at the selected base to fulfill MQ-9 mission requirements. Flight operations for MQ-9 proficiency training would occur at the selected base and in existing airspace and ranges (Attachments 3 and 4).

The F-35A Wing beddown alternatives identified for evaluation in the EIS include the proposed beddown of a three-squadron F-35A Wing at Tyndall AFB and an alternative with a fourth squadron of fifth-generation fighter aircraft in addition to the three-squadron F-35A Wing. MQ-9 Wing beddown alternatives identified for evaluation in the EIS include beddown of the MQ-9 Wing at either Tyndall

AFB or Vandenberg AFB. Tyndall AFB was preliminarily identified as the preferred alternative for this mission.

The EIS will address potential environmental consequences resulting from implementation of each alternative for each of the proposed actions, as well as the combination of F-35A and MQ-9 actions at Tyndall AFB. As required by NEPA, a No Action Alternative, where the beddown of an F-35A Wing would not occur at Tyndall AFB, will also be addressed, as will the No Action Alternative where the beddown of an MQ-9 Wing would not occur at either location.

Pursuant to the Endangered Species Act of 1973, as amended, and the Marine Mammal Protection Act, the USAF is requesting information regarding any federally listed species, candidate species, or proposed species that may be present in the potentially affected area for Tyndall AFB or your concerns regarding effects as we move forward from scoping into the analytical stage. If you have any specific items of interest about the proposal, we would like to hear from you within 30 days of receipt of this letter.

The USAF published a Notice of Intent to prepare an EIS in the Federal Register on November 22, 2019, initiating the public involvement process. The USAF will host an open-house public scoping meeting on December 10, 2019, from 5:30 p.m. to 8:30 p.m., at Gulf Coast State College in Panama City, Florida, and on December 12, 2019, from 5:30 p.m. to 8:30 p.m., at Allan Hancock College, Lompoc Valley Center, in Lompoc, California. The purpose of the meetings and the scoping period is to solicit comments on the scope of environmental issues to be addressed in the EIS.

We invite your participation at the scoping meetings, but if you cannot attend, you may submit written comments via the project website at www.F-35WingandMQ-9WingEIS.com or via mail as follows:

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If you have questions or concerns, please contact Tyndall AFB's NEPA Point of Contact (POC), Mr. Edwin Wallace, via email at edwin.wallace.1@us.af.mil, or via telephone at (850) 283-4346. Thank you in advance for your participation in the EIS scoping process. If you have a POC to whom we could directly address any future correspondence, their contact information would be appreciated.

Sincerely

BRIAN S. LAIDLAW, Colonel, USAF

4 Attachments:
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2. F-35 Base and Training Airspace
3. MQ-9 Facilities Projects
4. MQ-9 Base and Training Airspace

A.2.3.2 Vandenberg AFB NMFS Letter

DEPARTMENT OF THE AIR FORCE
30TH SPACE WING (AFSPC)

NOV 0 4 2019

Beatrice L. Kephart
30 CES/CEI
1028 Iceland Avenue
Vandenberg AFB CA 93437-6011

Mr. Will Stelle
Regional Administrator
National Marine Fisheries Service
501 W. Ocean Blvd., Suite 4200
Long Beach CA 90802

Dear Mr. Stelle

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (USAF) intends to prepare an Environmental Impact Statement (EIS) to evaluate potential environmental consequences associated with two independent proposed actions: (1) the beddown of an F-35A Operational Wing at Tyndall Air Force Base (AFB), Florida; and (2) the beddown of an MQ-9 Remotely Piloted Aircraft (RPA) Operational Wing at either Tyndall AFB, Florida, or Vandenberg AFB, California.

The proposed F-35A Wing action is to beddown an F-35A Wing at Tyndall AFB. The F-35A Wing would consist of three operational squadrons, each with 24 Primary Aerospace Vehicles Authorized aircraft and two Backup Aircraft Inventory aircraft. The beddown of the F-35A Wing would require construction and/or renovation of facilities to support staff and house 72 F-35A aircraft, including an F-35 Maintenance Squadron Complex, five hangars (maintenance, training, and fuel cell), an F-35 parking apron, an aerospace ground equipment facility, munitions storage, a flight simulator facility, and an aircraft wash rack. The estimated increase in base personnel would be 1,920. F-35A flight operations for proficiency training would occur at the base and use existing airspace and ranges.

The proposed MQ-9 Wing action is to beddown the MQ-9 RPA system employed by the USAF in support of the Department of Defense directive to support initiatives of overseas contingency operations. The beddown of 24 MQ-9 aircraft at either Tyndall AFB or Vandenberg AFB would require construction and/or renovation of facilities to support staff and house MQ-9 aircraft, including a Wing Headquarters, Operations Group, Maintenance Group, dormitory, child development center, fitness center, and inert munitions storage (Attachment 1). The estimated increase in base personnel would be 1,940 at the selected base to fulfill MQ-9 mission requirements. Flight operations for MQ-9 proficiency training would occur at the selected base and in existing airspace and ranges (Attachment 2).

The F-35A Wing beddown alternatives identified for evaluation in the EIS include the proposed beddown of a three-squadron F-35A Wing at Tyndall AFB and an alternative with a fourth squadron of fifth-generation fighter aircraft in addition to the three-squadron F-35A Wing. MQ-9 Wing beddown alternatives identified for evaluation in the EIS include beddown of the MQ-9 Wing at either Tyndall AFB or Vandenberg AFB. Tyndall AFB was preliminarily identified as the preferred alternative for this mission.

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The EIS will address potential environmental consequences resulting from implementation of each alternative for each of the proposed actions, as well as the combination of F-35A and MQ-9 actions at Tyndall AFB. As required by NEPA, a No Action Alternative, where the beddown of an F-35A Wing would not occur at Tyndall AFB, will also be addressed, as will the No Action Alternative where the beddown of an MQ-9 Wing would not occur at either location.

Pursuant to the Endangered Species Act of 1973, as amended, and the Marine Mammal Protection Act, the USAF is requesting information about species protected under the Marine Mammal Protection Act that may be present in the potentially affected area for Vandenberg AFB, including the Pacific harbor seal (*Phoca vitulina richardsi*), California sea lion (*Zalophus californianus*), northern elephant seal (*Mirounga angustirostris*), northern fur seal (*Callorhinus ursinus*), and Stellar sea lion (*Eumetopias jubatus*). If you have any specific items of interest about the proposal, we would like to hear from you within 30 days of receipt of this letter.

The USAF published a Notice of Intent to prepare an EIS in the Federal Register on November 22, 2019, initiating the public involvement process. The USAF will host an open-house public scoping meeting on December 10, 2019, from 5:30 p.m. to 8:30 p.m., at Gulf Coast State College in Panama City, Florida, and on December 12, 2019, from 5:30 p.m. to 8:30 p.m., at Allan Hancock College, Lompoc Valley Center, in Lompoc, California. The purpose of the meetings and the scoping period is to solicit comments on the scope of environmental issues to be addressed in the EIS.

We invite your participation at the scoping meetings, but if you cannot attend, you may submit written comments via the project website at www.F-35WingandMQ-9WingEIS.com or via mail as follows:

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If you have questions or concerns, please contact Vandenberg AFB's NEPA Point of Contact (POC), Ms. Samantha Kaisersatt, via email at samantha.kaisersatt@us.af.mil, or via telephone at (805) 605-0392. Thank you in advance for your participation in the EIS scoping process. If you have a POC to whom we could directly address any future correspondence, their contact information would be appreciated.

Sincerely

BEATRICE L. KEPHART
Chief, Installation Management Flight

Attachments:
1. MQ-9 Facilities Projects
2. MQ-9 Base and Training Airspace

A.2.4 State Historic Preservation Office (SHPO) Letters

A.2.4.1 Tyndall AFB SHPO Letter

DEPARTMENT OF THE AIR FORCE
325TH FIGHTER WING (ACC)
TYNDALL AIR FORCE BASE FLORIDA

Colonel Brian S. Laidlaw
Commander
325th Fighter Wing
501 Airey Avenue, Suite 1
Tyndall AFB FL 32403-5549

Dr. Timothy Parsons
State Historic Preservation Officer
Florida Department of State
Division of Historical Resources
500 S. Bronough Street
Tallahassee FL 32399-0250

Dear Dr. Parsons

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (USAF) intends to prepare an Environmental Impact Statement (EIS) to evaluate potential environmental consequences associated with two independent proposed actions: (1) the beddown of an F-35A Operational Wing at Tyndall Air Force Base (AFB), Florida; and (2) the beddown of an MQ-9 Remotely Piloted Aircraft (RPA) Operational Wing at either Tyndall AFB, Florida or Vandenberg AFB, California.

The proposed F-35A Wing action is to beddown an F-35A Wing at Tyndall AFB. The F-35A Wing would consist of three operational squadrons, each with 24 Primary Aircraft Assigned and two Backup Aircraft Inventory aircraft. The beddown of the F-35A Wing would require construction and/or renovation of facilities to support staff and house 72 F-35A aircraft, including an F-35 Maintenance Squadron Complex, five hangars (maintenance, training, and fuel cell), an F-35 parking apron, an aerospace ground equipment facility, munitions storage, a flight simulator facility, and an aircraft wash rack (Attachment 1). The estimated increase in base personnel would be 1,920. F-35A flight operations for proficiency training would occur at the base and use existing airspace and ranges (Attachment 2).

The proposed MQ-9 Wing action is to beddown the MQ-9 RPA system employed by the USAF in support of the Department of Defense directive to support initiatives of overseas contingency operations. The beddown of 24 MQ-9 aircraft at either Vandenberg AFB or Tyndall AFB would require construction and/or renovation of facilities to support staff and house MQ-9 aircraft, including a Wing Headquarters, Operations Group, Maintenance Group, dormitory, child development center, fitness center, and inert munitions storage (Attachment 3). The estimated increase in base personnel would be 1,940 at the selected base to fulfill MQ-9 mission requirements. Flight operations for MQ-9 proficiency training would occur at the selected base and in existing airspace and ranges (Attachments 3 and 4).

The F-35A Wing beddown alternatives identified for evaluation in the EIS include the proposed beddown of a three-squadron F-35A Wing at Tyndall AFB and an alternative with a fourth squadron of fifth-generation fighter aircraft in addition to the three-squadron F-35A Wing. MQ-9 Wing beddown alternatives identified for evaluation in the EIS include beddown of the MQ-9 Wing at either Tyndall

AFB or Vandenberg AFB. Tyndall AFB was preliminarily identified as the preferred alternative for this mission.

The EIS will address potential environmental consequences resulting from implementation of each alternative for each of the proposed actions, as well as the combination of F-35A and MQ-9 actions at Tyndall AFB. As required by NEPA, a No Action Alternative, where the beddown of an F-35A Wing would not occur at Tyndall AFB, will also be addressed, as will the No Action Alternative where the beddown of an MQ-9 Wing would not occur at either location.

For Tyndall AFB, the Area of Potential Effects (APE) for this undertaking is defined as the physical boundaries of the project area within Tyndall AFB, including areas where ground disturbance will occur, staging areas, and linear infrastructure improvements, as well as areas that will be indirectly affected (noise, vibration, and aesthetics of aircraft operations). Maps of the APEs for the F-35A Wing and MQ-9 Wing at Tyndall AFB are attached (Attachments 1 and 3). Cultural surveys within the APE will be conducted, and Tyndall AFB will consult with the State Historic Preservation Officer throughout the process of determining effects on cultural resources.

In compliance with the National Historic Preservation Act (NHPA) (54 U.S.C. 300101), specifically Section 106 (54 U.S.C. 306108) and its implementing regulations (36 CFR Part 800), which encourages the consideration of alternatives and early notice and involvement, the USAF is providing this information to the State Historic Preservation Officer regarding the undertaking to beddown an F-35A Wing and/or an MQ-9 Wing at Tyndall AFB. In accordance with 36 CFR Section 800.2(d)(3), the USAF plans to use the EIS public involvement process to also fulfill the mandate to seek public input and comments regarding historic preservation issues and concerns.

The USAF will publish a Notice of Intent to prepare an EIS in the Federal Register on November 22, 2019, initiating the public involvement process. The USAF will host an open-house public scoping meeting on December 10, 2019, from 5:30 p.m. to 8:30 p.m., at Gulf Coast State College in Panama City, Florida, and on December 12, 2019, from 5:30 p.m. to 8:30 p.m., at Allan Hancock College, Lompoc Valley Center, in Lompoc, California. The purpose of the meetings and the scoping period is to solicit comments on the scope of environmental issues to be addressed in the EIS.

We invite your participation at the scoping meetings, but if you cannot attend, you may submit written comments via the project website at www.F-35WingandMQ-9WingEIS.com or via mail as follows:

U.S. Post Office Deliveries:
F-35A/MQ-9 EIS Project Manager
AFCEC/CZN
2261 Hughes Avenue, Suite 155
JBSA Lackland TX 78236-9853

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If you have questions or concerns, please contact Tyndall AFB's NEPA Point of Contact (POC), Mr. Edwin Wallace, via email at edwin.wallace.1@us.af.mil, or via telephone at (850) 283-4346. Thank you in advance for your participation in the EIS scoping process. If you have a POC to whom we could directly address any future correspondence, their contact information would be appreciated.

Sincerely

BRIAN S. LAIDLAW, Colonel, USAF

4 Attachments:
1. F-35 Facilities Projects
2. F-35 Base and Training Airspace
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4. MQ-9 Base and Training Airspace

A.2.4.2 Vandenberg AFB SHPO Letter

DEPARTMENT OF THE AIR FORCE
30TH SPACE WING (AFSPC)

NOV 0 4 2019

Beatrice L. Kephart
30 CES/CEI
1028 Iceland Avenue
Vandenberg AFB CA 93437-6011

Ms. Julianne Polanco
State Historic Preservation Officer
Department of Parks and Recreation
Office of Historic Preservation
P.O. Box 942896
Sacramento CA 94296-0001

Dear Ms. Polanco

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (USAF) intends to prepare an Environmental Impact Statement (EIS) to evaluate potential environmental consequences associated with two independent proposed actions: (1) the beddown of an F-35A Operational Wing at Tyndall Air Force Base (AFB), Florida; and (2) the beddown of an MQ-9 Remotely Piloted Aircraft (RPA) Operational Wing at either Tyndall AFB, Florida, or Vandenberg AFB, California.

The proposed F-35A Wing action is to beddown an F-35A Wing at Tyndall AFB. The F-35A Wing would consist of three operational squadrons, each with 24 Primary Aerospace Vehicles Authorized aircraft and two Backup Aircraft Inventory aircraft. The beddown of the F-35A Wing would require construction and/or renovation of facilities to support staff and house 72 F-35A aircraft, including an F-35 Maintenance Squadron Complex, five hangars (maintenance, training, and fuel cell), an F-35 parking apron, an aerospace ground equipment facility, munitions storage, a flight simulator facility, and an aircraft wash rack. The estimated increase in base personnel would be 1,920. F-35A flight operations for proficiency training would occur at the base and use existing airspace and ranges.

The proposed MQ-9 Wing action is to beddown the MQ-9 RPA system employed by the USAF in support of the Department of Defense directive to support initiatives of overseas contingency operations. The beddown of 24 MQ-9 aircraft at either Tyndall AFB or Vandenberg AFB would require construction and/or renovation of facilities to support staff and house MQ-9 aircraft, including a Wing Headquarters, Operations Group, Maintenance Group, dormitory, child development center, fitness center, and inert munitions storage (Attachment 1). The estimated increase in base personnel would be 1,940 at the selected base to fulfill MQ-9 mission requirements. Flight operations for MQ-9 proficiency training would occur at the selected base and in existing airspace and ranges (Attachment 2).

The F-35A Wing beddown alternatives identified for evaluation in the EIS include the proposed beddown of a three-squadron F-35A Wing at Tyndall AFB and an alternative with a fourth squadron of fifth-generation fighter aircraft in addition to the three-squadron F-35A Wing. MQ-9 Wing beddown alternatives identified for evaluation in the EIS include beddown of the MQ-9 Wing at either Tyndall AFB or Vandenberg AFB. Tyndall AFB was preliminarily identified as the preferred alternative for this mission.

The EIS will address potential environmental consequences resulting from implementation of each alternative for each of the proposed actions, as well as the combination of F-35A and MQ-9 actions at Tyndall AFB. As required by NEPA, a No Action Alternative, where the beddown of an F-35A Wing

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would not occur at Tyndall AFB will also be addressed, as will the No Action Alternative where the beddown of an MQ-9 Wing would not occur at either location.

For Vandenberg AFB, the Area of Potential Effects (APE) for this undertaking is defined as the physical boundaries of the project area within Vandenberg AFB, including areas where ground disturbance will occur, staging areas, and linear infrastructure improvements, as well as areas that will be indirectly affected (noise, vibration, and aesthetics of aircraft operations). Indirect impacts are defined by a 0.25-mile boundary around the physical boundaries of the project area (Attachment 1).

In compliance with the National Historic Preservation Act (NHPA) (54 U.S.C. 300101), specifically Section 106 (54 U.S.C. 306108) and its implementing regulations (36 CFR Part 800), which encourages the consideration of alternatives and early notice and involvement, the USAF is providing this information to the State Historic Preservation Officer regarding the undertaking to beddown an MQ-9 Wing at Vandenberg AFB, California. In accordance with 36 CFR Section 800.2(d)(3), the USAF plans to use the EIS public involvement process to also fulfill the mandate to seek public input and comments regarding historic preservation issues and concerns.

The USAF published a Notice of Intent to prepare an EIS in the Federal Register on November 22, 2019, initiating the public involvement process. The USAF will host an open-house public scoping meeting on December 10, 2019, from 5:30 p.m. to 8:30 p.m., at Gulf Coast State College in Panama City, Florida, and on December 12, 2019, from 5:30 p.m. to 8:30 p.m., at Allan Hancock College, Lompoc Valley Center, in Lompoc, California. The purpose of the meetings and the scoping period is to solicit comments on the scope of environmental issues to be addressed in the EIS.

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JBSA Lackland TX 78236-9853

FedEx & UPS Deliveries:
F-35A/MQ-9 EIS Project Manager
AFCEC/CZN
3515 S General McMullen Suite 155
San Antonio TX 78226-2018

The F-35A Wing beddown alternatives have the potential to affect wetlands at Tyndall AFB, and the MQ-9 Wing beddown alternatives have the potential to affect wetlands at Tyndall AFB and Vandenberg AFB. Consistent with the requirements and objectives of Executive Orders 11988 and 11990, this letter initiates early public review of the alternatives that have the potential to affect wetlands and/or floodplains.

If you have questions or concerns, please contact Vandenberg AFB's NEPA Point of Contact (POC), Ms. Samantha Kaisersatt, via email at samantha.kaisersatt@us.af.mil, or via telephone at (805) 605-0392. Thank you in advance for your participation in the EIS scoping process. If you have a POC to whom we could directly address any future correspondence, their contact information would be appreciated.

Sincerely

BEATRICE L. KEPHART
Chief, Installation Management Flight

Attachments:
1. MQ-9 Facilities Projects
2. MQ-9 Base and Training Airspace

A.3 IICEP MAILING LISTS

A.3.1 Notification List - Tyndall AFB

Elected Officials

Senator Rick Scott
United States Senate
716 Hart Senate Office Building
Washington, DC 20510

Senator Rick Scott
111 North Adams Street, Suite 208
Tallahassee, FL 32301

Senator Marco Rubio
United States Senate
284 Russell Senate Office Building
Washington, DC 20510

Senator Marco Rubio
402 South Monroe Street
Suite 2105E
Tallahassee, FL 32399

Representative Matt Gaetz
U.S. House of Representatives
1721 Longworth House Office Building
Washington, DC 20515

Representative Matt Gaetz
1170 Martin Luther King, Jr. Blvd. Bldg. 4, Rm 454
Fort Walton Beach, FL 32547

Representative Neal Dunn
U.S. House of Representatives
316 Cannon House Office Building
Washington, DC 20515

Representative Neal Dunn
840 West 11th Street
Suite 2250
Panama City, FL 32401

Office of Governor Ron DeSantis
State of Florida
The Capitol
400 S. Monroe St.
Tallahassee, FL 32399-0001
Senator George B. Gainer
Florida State District 2
840 West 11th Street
Panama City, FL 32401

Senator Bill Montford
Florida State District 3
404 South Monroe Street
Tallahassee, FL 32399-1100

Representative Jay Trumbull
Florida House of Representatives
450 Magnolia Avenue
Panama City, FL 32401-3127

Tommy Hamm
Bay County Commissioner, District 1
840 W 11th Street
Panama City, FL 32401

Robert Carroll
Bay County Commissioner, District 2
840 W 11th Street
Panama City, FL 32401

William T. Dozier, Chairman
Bay County Commissioner, District 3
840 W 11th Street
Panama City, FL 32401

Keith Baker
Bay County Commissioner, District 4
840 W 11th Street
Panama City, FL 32401

Philip Griffitts, Vice Chairman
Bay County Commissioner, District 5
840 W 11th Street
Panama City, FL 32401

Mayor Greg Brudnicki
City Hall
501 Harrison Ave
Panama City, FL 32401

Mayor Mike Thomas
110 South Arnold Road
Panama City Beach, FL 32413

Ralph Hammond, Mayor
City of Springfield
3529 E 3rd St
Panama City, FL 32401

Pamn Henderson, Mayor
City of Callaway
6601 East Highway 22
Callaway, FL 32404

Richard Musgrave, Mayor
City of Parker
1001 West Park Street
Parker, FL 32404

Al Cathey, Mayor
City of Mexico Beach
P.O. Box 13425
Mexico Beach, FL 32410

Federal Agencies

BIA

Eastern Regional Office
Bureau of Indian Affairs
545 Marriott Drive Suite 700
Nashville, TN 37214

Cherokee Agency
Bureau of Indian Affairs
Highway 441 North
Cherokee, NC 28719

Choctaw Agency
Bureau of Indian Affairs
421 Powell Street
Philadelphia, MS 39350

Seminole Agency
Bureau of Indian Affairs
6100 Hollywood Boulevard Suite 206
Hollywood, FL 33204

FAA

Michael O'Harra, Regional Administrator
Federal Aviation Administration, Southern Region
1701 Columbia Ave.
College Park, GA 30337

NMFS

David Bernhart
Assistant Regional Administrator
National Marine Fisheries Service
Southeast Regional Office
263 13th Avenue South
St. Petersburg FL 33701-5505

NOAA

Noah Silverman, NEPA Coordinator
NOAA Fisheries
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701

USDA

National Forests in Florida
Supervisor's Office
325 John Knox Road
Suite F-100
Tallahassee, FL 32303

Apalachicola Ranger District
11152 NW State Route 20
Bristol, FL 32321

USEPA

Mary S. Walker, Regional Administrator
U.S. Environmental Protection Agency
Region 4
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, GA 30303-8960

USFWS

Nicole Adimey - Regional Coordinator
U.S. Fish and Wildlife Service, Region 4
1875 Century Blvd. NE
Atlanta, GA 30345

Dr. Catherine Phillips, Field Supervisor
Panama City Ecological Services Field Office
U.S. Fish and Wildlife Service
1601 Balboa Ave
Panama City, FL 32405

State Agencies

FL Department of Environmental Protection

Noah Valenstein, Secretary
FL Department of Environmental Protection
3900 Commonwealth Boulevard M.S. 49
Tallahassee, FL 32399

FL Department of Environmental Protection
Division of Air Resource Management
2600 Blair Stone Road, MS 5500
Tallahassee, FL 32399-2400

Alex Reed, Director
FL Department of Environmental Protection
Division of Water Resource Management
2600 Blair Stone Road, MS 3500
Tallahassee, FL 32399

FL Department of Transportation

Phillip Gainer, Secretary
District Three, FL Department of Transportation
Highway 90 East
Chipley, FL 32428-0607

Aaron N. Smith, State Aviation Manager
FL Department of Transportation
605 Suwannee Street, MS 46
Tallahassee, FL 32399

FL Fish and Wildlife

Eric Sutton, Executive Director
Florida Fish and Wildlife Conservation Commission
620 South Meridian Street
Tallahassee, FL 32399-1600

George Warthen, Regional Director
Florida Fish and Wildlife Conservation Commission
3911 Hwy. 2321
Panama City, FL 32409-1658

NW FL Water Management District

George Roberts, Chair
Northwest Florida Water Management District
81 Water Management Drive
Havana, FL 32333-4712

State Clearinghouse

Chris Stahl, Coordinator
Florida State Clearinghouse
3900 Commonwealth Boulevard, M.S. 47
Tallahassee, FL 32399-3000

State Historic Preservation Office

Dr. Timothy Parsons
State Historic Preservation Officer
Florida Department of State
Division of Historical Resources
500 S. Bronough Street
R.A. Gray Building, Room 305
Tallahassee, FL 32399-0250

County

Bay County

Bay County Planning & Zoning
840 W 11th Street
Panama City, FL 32401

Aviation

Parker W. McClellan Jr., Executive Director
Northwest Florida Beaches International Airport
6300 West Bay Parkway, Suite A,
Panama City, FL 32409

Tribal

Muscogee Creek Nation

Mr. James Floyd
Principal Chief
Muscogee Creek Nation
Office of the Administration
P.O. Box 580
Okmulgee, OK 74447

Ms. Corain Lowe-Zepeda
Tribal Historic Preservation Officer
Muscogee (Creek) Nation
Historic and Cultural Preservation Office
Human Development Building
Hwy 75 & Loop 56
P.O. Box 580
Okmulgee, OK 74447

Mr. Emman Spain
NAGPRA Coordinator
Muscogee (Creek) Nation
Historic and Cultural Preservation Office
Human Development Building
Hwy 75 & Loop 56
P.O. Box 580
Okmulgee, OK 74447

Seminole Nation of Oklahoma

Mr. Gregory Paul Chilcoat
Principal Chief
Seminole Nation of Oklahoma
Executive Office
P.O. Box 1498
Wewoka, OK 74884

Mr. Theodore Isham
Seminole Nation of Oklahoma
Historic Preservation Officer
P.O. Box 1498
Seminole, OK 74868

Seminole Tribe of Florida

Mr. Marcellus Osceola Jr.
Chairman
Seminole Tribe of Florida
6300 Stirling Road
Hollywood, FL 33024

Dr. Paul N. Backhouse
Tribal Historic Preservation Officer
Seminole Tribe of Florida
Ah-Ta-Thi-Ki Museum
30290 Josie Billie Hwy, PMB 1004
Clewiston, FL 33440

Ms. Dominique deBeaubien
NAGPRA Coordinator
Seminole Tribe of Florida
Ah-Ta-Thi-Ki Museum
30290 Josie Billie Hwy, PMB 1004
Clewiston, FL 33440

Poarch Band of Creek Indians

Ms. Stephanie A. Bryan
Tribal Chair
Poarch Band of Creek Indians
5811 Jack Spring Road
Atmore, AL 36502

Larry Haikey
Tribal Historic Preservation Officer
Poarch Band of Creek Indians
5811 Jack Springs Road, Building 500
Atmore, AL 36502

Miccosukee Tribe of Indians of Florida

Mr. Billy Cypress
Chairman
Miccosukee Tribe of Indians of Florida
Tamiami Station
P.O. Box 440021
Miami, FL 33144

Mr. Kevin Donaldson
Environmental Specialist
Miccosukee Tribe of Indians of Florida
Tamiami Station
P.O. Box 440021
Miami, FL 33144

Thlopthlocco Tribal Town

Mr. Ryan Morrow
Town King
Thlopthlocco Tribal Town
P.O. Box 188
Okemah, OK 74859-0188

Mr. Terry Clouthier
Tribal Historic Preservation Officer
Thlopthlocco Tribal Town
P.O. Box 188
Okemah, OK 74859-0188

Other

Chamber of Commerce/Economic Development

Sandy Sims, Chair
Bay Economic Development Alliance
5230 West Highway 98
Panama City, FL 32401

Will Cramer, Chair
Bay County Chamber of Commerce
235 W 5th Street
Panama City, FL 32401

Karen Smith, Chairwoman
Panama City Beach Chamber of Commerce
17500 Panama City Beach Pkwy.
Panama City Beach, FL 32413

Austin Mount
Chief Executive Officer
Emerald Coast Regional Council
P.O. Box 11399
Pensacola, FL 32524

Chris Rietow
Executive Director
Apalachee Regional Planning Council
2507 Callaway Road, Suite 200
Tallahassee, FL 32303

A.3.2 Notification List - Vandenberg AFB

Elected Officials

Senator Dianne Feinstein
United States Senate
331 Hart Senate Office Building
Washington, DC 20510

Senator Dianne Feinstein
11111 Santa Monica Blvd., Suite 915
Los Angeles, CA 90025

Senator Kamala D. Harris
United States Senate
112 Hart Senate Office Building
Washington, DC 20510

Senator Kamala D. Harris
11845 West Olympic Boulevard, Suite 1250W
Los Angeles, CA 90064

Representative Salud Carbajal
1431 Longworth HOB
Washington, DC 20515

Representative Salud Carbajal
1619 S. Thornburg Street
Santa Maria, CA 93458

Governor Gavin Newsom
1303 10th Street, Suite 1173
Sacramento, CA 95814

Senator Hannah-Beth Jackson
State of California, District 19
222 East Carrillo, Suite 309
Santa Barbara, CA 93101

Assemblymember Monique Limón
State of California, District 37
101 West Anapamu Street, Suite A
Santa Barbara, CA 93101

Mayor Jenelle Osborne
City of Lompoc
100 Civic Center Plaza
Lompoc, CA 93436

Mayor Alice Patino
City of Santa Maria
110 East Cook Street
Santa Maria, CA 93454-5190

Das Williams, 1st District Supervisor
Santa Barbara County
Board of Supervisors, 4th Floor
105 East Anapamu Street
Santa Barbara, CA 93101

Gregg Hart, 2nd District Supervisor
Santa Barbara County
105 East Anapamu Street
Santa Barbara, CA 93101

Joan Hartmann, 3rd District Supervisor
Santa Barbara County
105 East Anapamu Street
Santa Barbara, CA 93101

Peter Adam, 4th District Supervisor
Santa Barbara County
511 East Lakeside Pkwy, Suite 47
Santa Maria, CA 93455

Steve Lavagnino, 5th District Supervisor
Santa Barbara County
511 E. Lakeside Parkway, Suite 141
Santa Maria CA 93455-1341

Federal Agencies

BIA

Javin Moore, Superintendent
Southern California Agency
Bureau of Indian Affairs
1451 Research Park Drive, Suite 100
Riverside, CA 92507

FAA

Dennis Roberts, Regional Administrator
Federal Aviation Administration
Western-Pacific Region
777 S. Aviation Blvd., Suite 150
El Segundo, CA 90245

NMFS

National Marine Fisheries Service
West Coast Region
501 West Ocean Blvd., Suite 4200
Long Beach, CA 90802

NPS

Park Superintendent
Channel Islands National Park
1901 Spinnaker Dr.
Ventura, CA 93001

USDA

US Forest Service Pacific Southwest Region
Pacific Southwest Region
1323 Club Drive
Vallejo, CA 94592

Los Padres National Forest
Supervisor's Office
6750 Navigator Way, Suite 150
Goleta, CA 93117

USEPA

Mike Stoker, Regional Administrator
US Environmental Protection Agency,
Region 9
75 Hawthorne Street
San Francisco, CA, 94105

EPA Southern California Field Office
600 Wilshire Blvd., Suite 940
Los Angeles, CA 90017

USFWS

Mr. Stephen P. Henry
U.S. Fish and Wildlife Service
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, CA 93003

State Agencies

Cal Air Resources Board

Mary D. Nichols, Chair
California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812

CalEPA

Matthew Rodriquez, Secretary for
Environmental Protection
California Environmental Protection Agency
(CalEPA)
1001 I Street
Sacramento, CA 95812

Barbara A. Lee, Director
CA Department of Toxic Substances
Control
P.O. Box 806
Sacramento, CA 95812-0806

State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812-0100

CA Coastal Commission

Steve Hudson, District Director,
South Central Coast and South Coast, Los
Angeles County
89 S California Street #200
Ventura, CA 93001

CA Dept of Natural Resources

Secretary Wade Crowfoot
California Natural Resources Agency
1416 Ninth Street, Suite 1311
Sacramento, CA 95814

California Department of Conservation
801 K Street, MS 24-01
Sacramento, CA 95814

Ed Pert, Regional Manager
South Coast Region (Region 5)
California Department of Fish and Wildlife
3883 Ruffin Road
San Diego, CA 92123

California Department of Forestry and Fire Protection
P.O. Box 944246
Sacramento, CA 94244-2460

California Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001

CA Department of Transportation

Bob Franzoia, Acting Director
California Department of Transportation
1120 N Street
MS 49
Sacramento, CA 95814

Tim Gubbins, Director
California Department of Transportation
District 5
50 Higuera Street
San Luis Obispo, CA 93401-5415

State Clearinghouse

California State Clearinghouse
Governor's Office of Planning and Research
P.O. Box 3044
Sacramento, CA 95812-3044

State Historic Preservation Office

Ms. Julianne Polanco
State Historic Preservation Officer
Department of Parks and Recreation
Office of Historic Preservation
1725 23rd Street, Suite 100
Sacramento, CA 95816

County

Santa Barbara County

Mark A. Hartwig, Chief
Santa Barbara County Fire Department
4410 Cathedral Oaks Road
Santa Barbara, CA 93110

County of Santa Barbara Planning and Development
123 East Anapamu Street
Santa Barbara, CA 93101-2058

Aviation

Santa Barbara Airport
Airport Administration
601 Firestone Road
Santa Barbara, CA 93117

Santa Maria Public Airport
3217 Terminal Dr
Santa Maria, CA 93455
Lompoc City Airport
1801 N H St
Lompoc, CA 93436

Tribal

Santa Ynez Band of Chumash Indians
P.O. Box 517
Santa Ynez, CA 93460

Other

Chamber of Commerce/Economic Development

Glenn D. Morris
President & Chief Executive Officer
Santa Maria Valley Chamber of Commerce
and Visitor & Convention Bureau
614 S. Broadway
Santa Maria, CA 93454

Lompoc Valley Chamber of Commerce &
Visitors Bureau
111 South I Street
Lompoc, CA 93436

Economic Development Director
100 Civic Center Plaza
Lompoc, CA 93436-8001

A.4 IICEP LETTER RESPONSES

FLORIDA DEPARTMENT *of* STATE

RON DESANTIS
Governor

LAUREL M. LEE
Secretary of State

Chris Stahl, Coordinator
Florida State Clearinghouse
Florida Department of Environmental Protection
3800 Commonwealth Blvd., MS 47
Tallahassee, FL 32399-2400

December 20, 2019

RE: DHR Project File No.: 2019-8147, Received by DHR: November 26, 2019
FL201911268789C, Department of Defense, Department of the Air Force, U.S. Air Force, Environmental Impact Statement (EIS) for the Proposals for F-35A Wing Beddown at Tyndall AFB, Florida and MQ-9 Wind Beddown at Tyndall AFB, Bay County, Florida

Dear Mr. Stahl:

The Florida State Historic Preservation Officer reviewed the referenced project for possible effects on historic properties listed, or eligible for listing, in the *National Register of Historic Places (NRHP)*. The review was conducted in accordance with the *National Environmental Policy Act* and with Section 106 of the *National Historic Preservation Act of 1966*, as amended, and its implementing regulations in *36 CFR Part 800: Protection of Historic Properties.*

Our office reviewed the provided documentation regarding the United States Air Force's intent to prepare an Environmental Impact Statement (EIS) for the beddown of an F-35A Operational Wing and the beddown of an MQ-9 Remotely Piloted Aircraft (RPA) Operational Wing at Tyndall Air Force Base (AFB). We note that at this time there is limited information regarding specific development activities which will accompany the new beddown actions.

In development of the EIS, the USAF will need to address how each undertaking will effect historic properties. Preliminary consultation between our office and Tyndall AFB included discussion of developing a Programmatic Agreement to address Section 106 requirements and to streamline the review of specific development plans once available. We look forward to continuing consultation with the USAF and Tyndall AFB to ensure that historic properties within the project areas are sufficiently considered during development of the EIS and subsequent development activity. If you have any questions, please contact me by email at *Jason.Aldridge@dos.myflorida.com,* or by telephone at 850-245-6344.

Sincerely,

Jason Aldridge

Jason Aldridge
Deputy State Historic Preservation Officer
for Compliance and Review

Division of Historical Resources
R.A. Gray Building • 500 South Bronough Street• Tallahassee, Florida 32399
850.245.6300 • 850.245.6436 (Fax) • FLHeritage.com

Historical Resources

California
Department of Conservation
Division of Oil, Gas, and Geothermal Resources

Gavin Newsom, Governor
David Shabazian, Director

December 11, 2019

VIA MAIL & EMAIL

Beatrice L. Kephart, Installation Management Flight Chief
United States Air Force
30 CES/CEI
1028 Iceland Avenue
Vandenberg AFB, CA 93437-6011

Dear Ms. Kephart:

BEDDOWN OF AN MQ-9 OPERATIONAL WING AT VANDENBERG AIRFORCE BASE (AFB)

The Division of Oil, Gas, and Geothermal Resources (Division) appreciates the opportunity to submit comments on the project referenced above (Project), received December 5, 2019.

The Division's authority is set forth in Division 3 of the Public Resources Code (PRC), and Title 14 of the California Code of Regulations (CCR). PRC § 3208.1 establishes well re-abandonment responsibility when a previously plugged and abandoned well may be impacted by planned property development or construction activities. Local permitting agencies, property owners, and/or developers should be aware of, and fully understand, that significant and potentially dangerous issues may be associated with development near oil, gas, or geothermal wells.

The Division has reviewed the Project, including Attachment 1. MQ-9 Facilities Projects, Figure 1: Vandenberg AFB Facilities Locations Associated with the Proposed MQ-9 Beddown (Site Map). To assist local permitting agencies, property owners, and developers in making wise land use decisions regarding potential development near oil, gas, or geothermal wells, the Division provides the following information.

Our records indicate there are no known oil wells located directly where the proposed facility locations are proposed at Vandenberg AFB as shown on the Site Map. There are oil wells located in other areas of Vandenberg AFB. For comment and well review for future development in areas where wells are located please contact the Division. Records and locations for oil, gas, and geothermal wells located in California are available online at https://www.conservation.ca.gov/dog/Pages/WellFinder.aspx

The Division categorically advises against building over, or in any way impeding access to, oil, gas, or geothermal wells. Access is considered the ability for a well servicing unit and associated necessary equipment to reach a well from a public street or access way, solely over the parcel on which the well is located. A well servicing unit, and any

State of California Natural Resources Agency | Department of Conservation
Coastal District – Orcutt, 195 S. Broadway, Suite 101, Orcutt, CA 93455
conservation.ca.gov | T: (805) 937-7246 | F: (805) 937-0673

RECEIVED
DEC 19 2019

necessary equipment, should be able to pass unimpeded along and over the route, and should be able to access the well without disturbing the integrity of surrounding infrastructure. Items that can affect well access include, but are not limited to, buildings, housing, fencing, hardscape, landscape, trees, pools, patios, sidewalks, roadways, parking lots, waterways or channels, and decking. Impeding access to a well could result in the need to remove any structure or obstacle that prevents or impedes access.

There are no guarantees a well abandoned in compliance with current Division requirements will not start leaking in the future. It always remains a possibility that any well may start to leak oil, gas, and/or water after abandonment, no matter how thoroughly the well was plugged and abandoned. The Division acknowledges wells plugged and abandoned to the most current standards have a lower probability of leaking in the future, however there is no guarantee that such abandonments will not leak.

The Division advises that all wells identified on development parcels prior to, or during, development activities be tested for liquid and gas leakage. Surveyed locations should be provided to the Division in Latitude and Longitude, NAD 83 decimal format. The Division expects any wells found leaking to be reported to it immediately.

PRC § 3208.1 gives the Division the authority to order or permit the re-abandonment of any well where it has reason to question the integrity of the previous abandonment, or if the well is not accessible or visible. Failure to plug and re-abandon a well may result in enforcement action, including an order to perform re-abandonment well work, pursuant to PRC § 3208.1, and 3224. Responsibility for re-abandonment costs may be affected by the choices made by the local permitting agency, property owner, and/or developer in considering the general advice set forth in this letter. The PRC continues to define the person or entity responsible for re-abandonment as:

1. **The property owner** - If the well was plugged and abandoned in conformance with Division requirements at the time of plugging and abandonment, and in its current condition does not pose an immediate danger to life, health, and property, but requires additional work solely because the owner of the property on which the well is located proposes construction on the property that would prevent or impede access to the well for purposes of remedying a currently perceived future problem, then the owner of the property on which the well is located shall obtain all rights necessary to re-abandon the well and be responsible for the re-abandonment.

2. **The person or entity causing construction over or near the well** - If the well was plugged and abandoned in conformance with Division requirements at the time of plugging and abandonment, and the property owner, developer, or local agency permitting the construction failed either to obtain an opinion from the supervisor or district deputy as to whether the previously abandoned well is required to be re-abandoned, or to follow the advice of the supervisor or district deputy not to undertake the construction, then the person or entity causing the

construction over or near the well shall obtain all rights necessary to re-abandon the well and be responsible for the re-abandonment.

3. **The party or parties responsible for disturbing the integrity of the abandonment** - If the well was plugged and abandoned in conformance with Division requirements at the time of plugging and abandonment, and after that time someone other than the operator or an affiliate of the operator disturbed the integrity of the abandonment in the course of developing the property, then the party or parties responsible for disturbing the integrity of the abandonment shall be responsible for the re-abandonment.

To view PRC § 3208.1 in its entirety, please visit:
https://www.conservation.ca.gov/index/Documents/DOGGR-SR-1%20Web%20Copy.pdf

No well work may be performed on any oil, gas, or geothermal well without written approval from the Division. Well work requiring written approval includes, but is not limited to, mitigating leaking gas or other fluids from abandoned wells, modifications to well casings, and/or any other abandonment or re-abandonment work. The Division also regulates the top of a plugged and abandoned well's minimum and maximum depth below final grade. CCR §1723.5 states well casings shall be cut off at least 5 feet but no more than 10 feet below grade. If any well needs to be lowered or raised (i.e., casing cut down or casing riser added) to meet this regulation, a permit from the Division is required before work can start.

The Division makes the following additional recommendations to the local permitting agency, property owner, and developer:

1. To ensure that present and future property owners are aware of (a) the existence of all wells located on the property, and (b) potentially significant issues associated with any improvements near oil or gas wells, the Division recommends that information regarding any identified well(s), and any other pertinent information obtained after the issuance of this letter, be communicated to the appropriate county recorder for inclusion in the title information of the subject real property.

2. The Division recommends that any soil containing hydrocarbons be disposed of in accordance with local, state, and federal laws. Please notify the appropriate authorities if soil containing significant amounts of hydrocarbons is discovered during development.

As indicated in PRC § 3106, the Division has jurisdictional authority over the drilling, operation, maintenance, and abandonment of oil, gas, and geothermal wells, and attendant facilities, to prevent, as far as possible, damage to life, health, property, and natural resources, damage to underground oil, gas, and geothermal deposits, and damage to underground and surface waters suitable for irrigation or domestic purposes. In addition to the Division's authority to order work on wells pursuant to PRC § 3208.1 and 3224, it has authority to issue civil and criminal penalties under PRC

December 11, 2019
Beatrice L. Kephart, Installation Management Flight Chief
United States Air Force

§ 3236, 3236.5, and 3359 for violations within the Division's jurisdictional authority. The Division does not regulate grading, excavations, or other land use issues.

If during development activities any wells are encountered that were not part of this review, a Division engineer in the Coastal District - Orcutt office is to be notified immediately, and an amended site plan with well casing diagrams for Division review shall be filed. After appropriate review, the District office will send a follow-up well evaluation letter to the property owner, applicant, and local permitting agency.

Thank you for considering the Division's comments. If you have any questions, please contact our District office at (805) 937-7246 or via email at DOGGRCoastal@conservation.ca.gov.

Sincerely,

PAAbel

Patricia A. Abel
Coastal District Deputy

JM:kk

cc: Chrono
CSWR
State Clearinghouse
Vanessa Adam
Naveen Habib
Jan Perez

STATE OF CALIFORNIA—CALIFORNIA STATE TRANSPORTATION AGENCY   Gavin Newsom, Governor

DEPARTMENT OF TRANSPORTATION
CALTRANS DISTRICT 5
50 HIGUERA STREET
SAN LUIS OBISPO, CA 93401-5415
PHONE (805) 549-3101
FAX (805) 549-3329
TTY 711
www.dot.ca.gov/dist05/

Making Conservation a California Way of Life.

December 11, 2019

SB-1-29.73
VAFB MQ-9 RPA

F-35A/MQ-9 EIS Project Manager
AFCEC/CZN
2261 Hughes Avenue, Suite 155
JBSA Lackland, TX 78236-9853

COMMENTS FOR THE PREPARATION OF AN ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR THE PROPOSED BEDDOWN OF THE MQ-9 REMOTELY PILOTED AIRCRAFT (RPA) AT VANDENBERG AFB PROJECT

Dear Project Manager:

The California Department of Transportation (Caltrans) appreciates the opportunity to review the intent to prepare an EIS. The comments contained in this letter specifically address the proposed Vandenberg AFB site, which is located within Caltrans District 5 region. Caltrans offers the following comments:

- Caltrans supports local planning efforts that are consistent with State planning priorities intended to promote equity, strengthen the economy, protect the environment, and promote public health and safety. We accomplish this by working with local jurisdictions to achieve a shared vision of how the transportation system should and can accommodate interregional and local travel.

- Projects that support smart growth principles which include improvements to pedestrian, bicycle, and transit infrastructure (or other key Transportation Demand Strategies) are supported by Caltrans and are consistent with our mission, vision, and goals.

- Please be aware that if any work is completed in the State's right-of-way it will require an encroachment permit from Caltrans and must be done to our engineering and environmental standards, and at no cost to the State. The conditions of approval and the requirements for the encroachment permit are issued at the sole discretion of the Permits Office, and nothing in this letter shall be implied as limiting those future conditioned and requirements. For more information regarding the encroachment permit process, please visit our

"Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability"

Encroachment Permit Website at: https://dot.ca.gov/caltrans-near-me/district-5/district-5-programs/d5-encroachment-permits

- Please provide a copy of the Traffic Impact Analysis (TIA) and technical appendices including modeling for this proposed project. The TIA should consider traffic impacts to the State Highway System (SHS) during all phases of this project including construction and permanent site completion at Vandenberg AFB.

- The estimated increase of 1,940 base personnel for the MQ-9 RPA operations, will have traffic impacts on the SHS. This project could also have a regional traffic impact dependent upon where base personnel housing is available. Please refer to the attached Finding of No Significant Impact (FONSI) comment letter, dated August 23, 2019, for the previously proposed United States Space Command Headquarter project. The FONSI addressed housing concerns in the Socioeconomic and Environmental Justice section, please consider the same in the scoping of the MQ-9 RPA EIS.

We look forward to continued coordination with the Department of the Air Force 30th Space Wind (AFSPC) on this project. If you have any questions, or need further clarification on items discussed above, please contact me at (805) 549-3131 or ingrid.mcroberts@dot.ca.gov.

Sincerely,

Ingrid McRoberts

Ingrid McRoberts
Development Review Coordinator
District 5, LD-IGR South Branch

cc: City of Lompoc
City of Santa Maria
Vandenburg Village CSD
County of Santa Barbara
SBCAG

"Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability"

STATE OF CALIFORNIA—CALIFORNIA STATE TRANSPORTATION AGENCY Gavin Newsom, Governor

DEPARTMENT OF TRANSPORTATION
CALTRANS DISTRICT 5
50 HIGUERA STREET
SAN LUIS OBISPO, CA 93401-5415
PHONE (805) 549-3101
FAX (805) 549-3329
TTY 711
www.dot.ca.gov/dist05/

Making Conservation a California Way of Life.

August 23, 2019

SB-1-M29.73
USSPACECOM

Russell Perry
HQ AFSPC/A4C
150 Vandenberg Street, Suite 1105
Peterson AFB, CO 80914-4230

COMMENTS FOR THE DRAFT FINDING OF NO SIGNIFICANT IMPACT (FONSI) ENVIRONMENTAL ASSESSMENT FOR UNITED STATES SPACE COMMAND HEADQUARTERS BASING AND CONSTRUCTION (USSPACECOM) PROJECT

Dear Mr. Perry:

The California Department of Transportation (Caltrans) appreciates the opportunity to review the FONSI FOR THE USSPACECOM. The comments contained in this letter specifically address the proposed Vandenberg AFB site, which is located within Caltrans District 5 region. Caltrans offers the following comments:

- Caltrans supports local planning efforts that are consistent with State planning priorities intended to promote equity, strengthen the economy, protect the environment, and promote public health and safety. We accomplish this by working with local jurisdictions to achieve a shared vision of how the transportation system should and can accommodate interregional and local travel.

- Projects that support smart growth principles which include improvements to pedestrian, bicycle, and transit infrastructure (or other key Transportation Demand Strategies) are supported by Caltrans and are consistent with our mission, vision, and goals.

- Please be aware that if any work is completed in the State's right-of-way it will require an encroachment permit from Caltrans and must be done to our engineering and environmental standards, and at no cost to the State. The conditions of approval and the requirements for the encroachment permit are issued at the sole discretion of the Permits Office, and nothing in this letter shall be implied as limiting those future conditioned and requirements. For more information regarding the encroachment permit process, please visit our

"Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability"

Mr. Russell Perry
August 23, 2019
Page 2

Encroachment Permit Website at: http://www.dot.ca.gov/trafficops/ep/index.html.

- Please provide a copy of the Traffic Impact Analysis (TIA) and technical appendices including modeling. The TIA should consider traffic impacts to the State Highway System (SHS), during all phases of this project including construction, interim site, and permanent site completion.
- Additionally, the Socioeconomic and Environmental Justice section of the FONSI indicates a lack of available housing in the VAFB area for the approximate 1,870 new staff. The increase in traffic impacts will likely impact the SHS on a wider regional scale dependent upon where available housing is located. We acknowledge the mitigations measures included in the FONSI, but additional measures may be necessary and should be addressed in the requested TIA.

We look forward to continued coordination with the US Air Force on this project. If you have any questions, or need further clarification on items discussed above, please contact me at (805) 549-3131 or ingrid.mcroberts@dot.ca.gov.

Sincerely,

Ingrid McRoberts

Ingrid McRoberts
Development Review Coordinator
District 5, LD-IGR South Branch

cc: City of Lompoc
City of Santa Maria
Vandenburg Village CSD
County of Santa Barbara
SBCAG

"Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability"

CITY OF CALLAWAY
CITY HALL
6601 EAST HIGHWAY 22, CALLAWAY, FL 32404
PHONE 850-871-6000 • FAX 850-871-2444
WWW.CITYOFCALLAWAY.COM

MAYOR
PAMN HENDERSON

COMMISSIONERS
SCOTT DAVIS
DAVID GRIGGS
RON FAIRBANKS
MIKE JONES

December 18, 2019

F-35A/MQ-9 EIS Project Manager
AFCEC/CZN
3515 S General McMullen, Suite 155
San Antonio, TX 78226-2018

F-35A/MQ-9 EIS Project Manager:

As Tyndall AFB undergoes the Environmental Impact Statement (EIS) process, it is important for the City of Callaway, Florida to show its full support for Tyndall and the beddown of both an F-35A Operational Wing and an MQ-9 Remotely Piloted Aircraft (RPA) Operational Wing at Tyndall.

The Association of Defense Communities, recognizing Bay County as a region that helps improve the quality of life for service members, military families, and veterans, named Bay County to the 2019 class of Great American Defense Communities. No municipality in the county is more supportive of the military than Callaway.

Callaway is located approximately 6 miles from Tyndall AFB. Due to its proximity to Tyndall, Callaway's population of roughly 15,000 consists of a large percentage of retired and active-duty military members. Callaway's pristine waterways, residential and recreational areas, and the Arts and Conference Center, help make it a diverse community, offering many amenities for its residents.

- Veterans Park offers a walking path, picnic area, and playground;
- John B. Gore Park provides a boat ramp, floating docks, a Community Center with a meeting room and small kitchen, outdoor picnic area, sports practice fields, a playground and tennis courts;
- Brittany Woods has a walking park;
- Patterson and Collinfurst Parks both have beautiful, serene water views with picnic areas; and
- the Recreational Complex offers fields for t-ball, baseball , soccer, and football, along with a fully stocked community fishing pond, a mile-long walking trail with exercise equipment and two playgrounds. Also, at the Recreational Complex is the Arts and Conference Center, which features an auditorium, meeting rooms and a caterer's kitchen available for special events.

All of these serve to make Callaway an attractive home for military personnel stationed at Tyndall.

With 1,000 housing units currently under construction, and more anticipated in the near future, Callaway will be poised to welcome military personnel who choose to live off-base.

The commercial districts in Callaway offer many services and amenities to citizens and visitors, including financial services, dining opportunities, lodging at its hotels, and other commercial entities.

Callaway Elementary School is located within the city limits, and Everitt Middle School and Rutherford High School are in close proximity to the city.

FIRE DEPARTMENT	LEISURE SERVICES	PLANNING / CODE ENFORCEMENT	PUBLIC WORKS	ARTS & CONFERENCE CENTER
P: 850-871-5300	P: 850-874-0031	P: 850-871-4672	P: 850-871-1033	P: 850-874-0035
F: 850-871-5564	F: 850-874-9977	F: 850-871-2404	F: 850-871-2416	F: 850-874-0706

Callaway's City Commission strives to protect the delicate balance between property rights and property values. It has approved legislative requirements, which ensure quality growth within the city. The Public Safety Building houses the city's Fire Department and a substation of the Bay County Sheriff's Office. The city has expanded its water and sewer services outside of the city limits in order to accommodate new growth and business expansion. Public transportation is available through the Bay Town Trolley, which traverses the entire county.

As evidence of Callaway's support of the potential new wings at Tyndall, included with this mailing is a City of Callaway Resolution supporting the beddown of the two new operational wings at Tyndall AFB and 157 letters of support from residents of the area.

The City of Callaway has an excellent working relationship with Tyndall personnel and has always offered its assistance in any way possible. Likewise, if there is any assistance that can be offered as the United States Air Force prepares the EIS, please do not hesitate to contact either me or City Manager Eddie Cook. Our business cards with our contact information are enclosed.

Sincerely,

Pamn Henderson

Pamn Henderson, Mayor
City of Callaway

Enclosures

PH/jlp

"This institution is an equal opportunity provider and employer."

RESOLUTION NO. 19-43

A RESOLUTION OF THE CITY COMMISSION OF THE CITY OF CALLAWAY, FLORIDA, SUPPORTING BEDDOWN OF TWO NEW OPERATIONAL WINGS AT TYNDALL AIR FORCE BASE, FLORIDA; AND PROVIDING AN EFFECTIVE DATE.

WHEREAS, the United States Air Force, pursuant to the National Environmental Policy Act of 1969, intends to prepare an Environmental Impact Statement to evaluate environmental consequences associated with two potential Operational Wings at Tyndall AFB, Florida; and

WHEREAS, the Commission of the City of Callaway takes special pride in the presence and support of Tyndall AFB; and

WHEREAS, the City Commission supports the acquisition of the F-35A Operational Wing and the MQ-9 Remotely Piloted Aircraft Operation Wing at Tyndall AFB.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COMMISSION OF THE CITY OF CALLAWAY, FLORIDA, THAT:

SECTION 1. The foregoing "WHEREAS" clauses are hereby ratified and confirmed as being true and correct and are incorporated herein by this reference.

SECTION 2. The City Commission of the City of Callaway supports the acquisition of the F-35A Operational Wing and the MQ-9 Remotely Piloted Aircraft Operational Wing at Tyndall AFB.

SECTION 3. Transmittal of Resolution - Upon City Commission approval of this Resolution, the adopted Resolution will be forwarded to the EIS Project Managers at Lackland AFB, TX and San Antonio AFB, TX. and any other interested parties.

SECTION 6. Effective Date - This Resolution shall become effective upon adoption by City Commission and signature of the Mayor.

PASSED, APPROVED AND DULY ADOPTED by the City Commission of the City of Callaway, Florida, meeting in regular session this 17th day of December, 2019.

CITY OF CALLAWAY, FLORIDA

Pamn Henderson

Pamn Henderson, Mayor

Attest: Janice L. Peters

Janice L. Peters, MMC, City Clerk

APPROVED AS TO FORM FOR THE CITY OF CALLAWAY ONLY:

Kevin Obos, City Attorney

VOTE OF COMMISSION:

Davis	AYE
Fairbanks	AYE
Griggs	AYE
Henderson	AYE
Jones	ABS

Page 1 of 1

Pamn Henderson
Mayor

CITY OF CALLAWAY
6601 E HWY 22
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www.cityofcallaway.com

PH (850) 871-6000
FAX (850) 871-2444
mayor@cityofcallaway.com
CELL (850) 303-4547

ED COOK
City Manager

CITY OF CALLAWAY
City Hall
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CALLAWAY, FL 32404
www.cityofcallaway.com

PH (850) 871-6000
DIRECT (850) 215-6691
CELL (501) 605-2752
FAX (850) 871-2444
citymanager@cityofcallaway.com

Example Letter of Support Attached:

CITY OF CALLAWAY FLORIDA

LETTER OF SUPPORT

FOR THE

F-35A OPERATIONAL WING & MQ-9 REMOTELY PILOTED AIRCRAFT (RPA) OPERATIONAL WING

TO BE LOCATED AT THE
325TH FIGHTER WING (ACC)
TYNDALL AIR FORCE BASE FLORIDA

NAME: William C. Etchells

ADDRESS: [redacted]

PHONE NO.: [redacted]

I, William C. Etchells, hereby support the beddown of an F-35A Operational Wing and MQ-9 Remotely Piloted Aircraft (RPA) Operational Wing at Tyndall AFB.

ADDITIONAL COMMENTS:

WE NEED ALL THE MILITARY SUPPORT & WEAPONRY IN THE WAR ON TERROR. THE STATIONING OF THESE SQUADRONS AT TYNDALL AFB, FLORIDA WILL GREATLY IMPROVE OUR HUNT FOR THESE TERRORIST BASTARDS!

William C. Etchells
Signature

11 DEC 2019
Date

A.5 STATE COASTAL CONSISTENCY DETERMINATION CORRESPONDENCE

A.5.1 Tyndall AFB Coastal Consistency Determination

The Florida State Clearinghouse indicated in comments on the Draft EIS (Comment A-003) that the project is consistent with the Florida Coastal Management Program (Section A.13.7, page A-211).

A.5.2 Vandenberg AFB Coastal Consistency Determination

DEPARTMENT OF THE AIR FORCE
UNITED STATES SPACE FORCE
30TH SPACE WING

19 May 2020

Beatrice L. Kephart
30 CES/CEI
1028 Iceland Avenue
Vandenberg AFB, CA 93437

Mr. Larry Simon
Federal Consistency Supervisor
California Coastal Commission
45 Fremont Street, Suites 1900 & 2000
San Francisco CA 94105-2219

Dear Mr. Simon

This Negative Determination addresses the beddown of an MQ-9 Remotely Piloted Aircraft (RPA) Wing at Vandenberg Air Force Base (AFB), California. It is submitted to the California Coastal Commission in accordance with the Coastal Zone Management Act (CZMA) Federal Consistency Regulations (15 Code of Federal Regulations [CFR] § 930, et seq.), the California Coastal Management Program (CCMP), and the California Coastal Act (California Public Resources Code § 3000 et seq.).

Negative determinations may be submitted pursuant to 15 CFR § 930.35 if the federal agency's effect test indicates that the coastal effects are not reasonably foreseeable and the federal agency's activity is either: 1) identified on the state's "listed activity" per 15 CFR § 930.34(b), or through case-by-case monitoring of unlisted activities; 2) is the same or similar to activities for which consistency determinations have been prepared in the past; or 3) for which a thorough consistency assessment was prepared with initial findings on the coastal effects of the activity. This Negative Determination is submitted per 15 CFR § 930.35(2): the United States Air Force (USAF) has determined that coastal effects of the activity are not reasonably foreseeable and is similar to activities for which Department of Defense determinations have been prepared in the past. These include the home basing of MV-22B aircraft at Naval Air Station North Island and the home basing of the MQ-4C Triton unmanned aircraft system at Naval Base Ventura County Point Mugu. In addition, determinations have been prepared for aircraft (rocket) operations at Vandenberg AFB including SpaceX Falcon 9. The California Coastal Commission concurred with the negative determination findings for these actions.

In accordance with the CZMA of 1972 as amended, Section 307c(1), the USAF has determined that the Proposed Action, the beddown of an MQ-9 RPA Wing at Vandenberg AFB, will not result in reasonably foreseeable effects on the resources or uses of California's Coastal Zone. As a federal property, Vandenberg AFB is statutorily excluded from the CZMA's definition of the "coastal zone." Therefore, the USAF has concluded that a Coastal Consistency Determination is not required and is requesting concurrence with this Coastal Consistency Negative Determination in compliance with the Ocean and Coastal Resource Management regulations (15 CFR 930.35).

1. PROPOSED FEDERAL AGENCY ACTION

Figure 1. MQ-9 Reaper Aircraft

The USAF proposes to locate an MQ-9 RPA (see Figure 1) Wing at either Tyndall AFB, Florida, or Vandenberg AFB, California. This proposed MQ-9 Wing beddown is to achieve multiple MQ-9 operational requirements for Air Combat Command (ACC) and to ensure the objectives identified in ACC's Culture Process Improvement Program (CPIP) are addressed. The CPIP strives to address concerns identified by Airmen and family members in the USAF RPA communities.

Figure 2 locates and briefly describes the bases and missions of Tyndall AFB, Florida, and Vandenberg AFB, California.

3

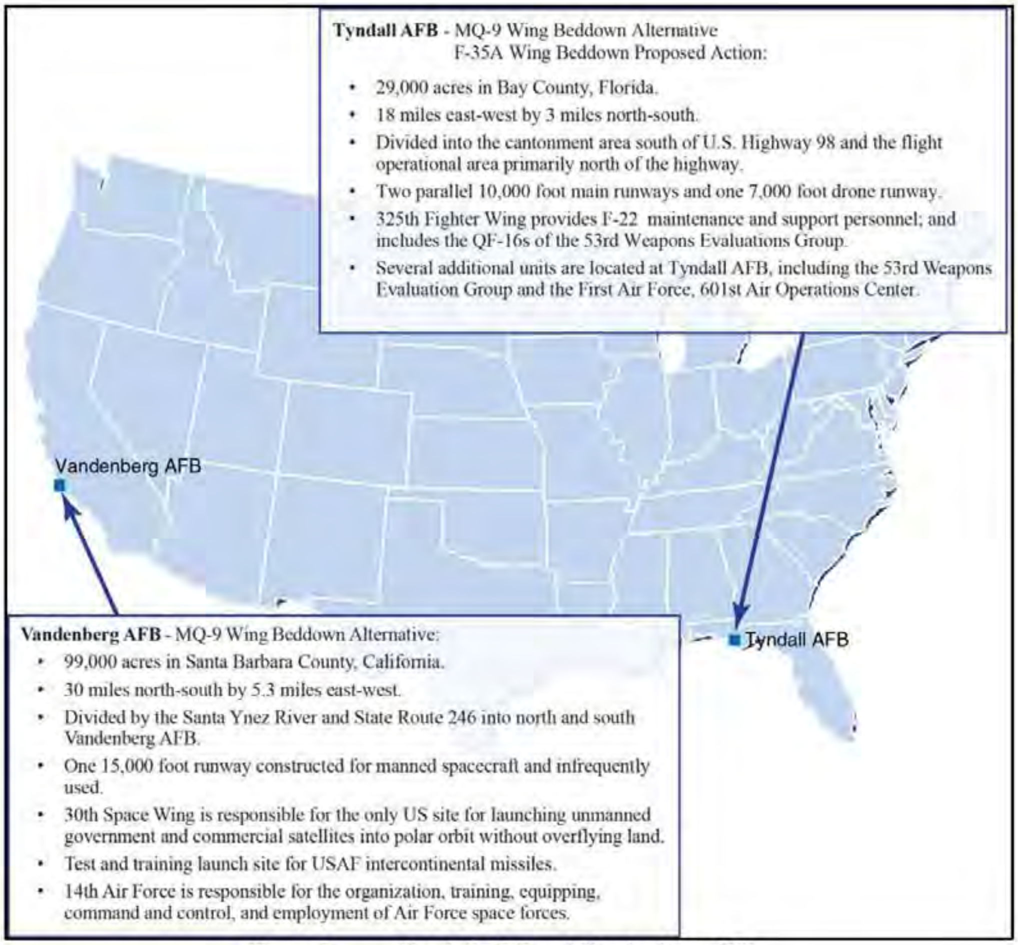


Figure 2. Tyndall AFB and Vandenberg AFB

Tyndall AFB and Vandenberg AFB were identified as alternative MQ-9 Wing beddown locations that could best achieve the mission requirements of the MQ-9 Wing, while meeting CPIP objectives to care for Airmen and provide improvements in work environment and overall quality of life.

This document addresses solely the Vandenberg AFB MQ-9 Wing beddown alternative (herein referred to as the "Proposed Action") as it encompasses all of the possible actions proposed for Vandenberg AFB analyzed in an Environmental Impact Statement (EIS) that is being conducted for this project. EIS documents and schedule are available here:

http://www.f-35wingandmq-9wingeis.com

The Vandenberg AFB MQ-9 Wing beddown Alternative is described in detail in Chapter 2 (Description of Proposed Action and Alternatives) of the Draft EIS. Components of this alternative are included below.

Description of the Vandenberg AFB MQ-9 Wing Beddown Alternative

General Requirements for an MQ-9 Operational Wing

The proposed MQ-9 Wing beddown would entail Wing Headquarters (HQ) with the Operations Group and Maintenance Group.

The Operations Group consists of an Operations Support Squadron and three MQ-9 Operational Squadrons. One assigned MQ-9 squadron would perform flight operations using the 24 MQ-9 aircraft stationed at the selected base, including departures, arrivals, flight in local and regional airspace, and deployment of inert munitions on existing ranges. The other two MQ-9 squadrons would remotely fly overseas combat missions using MQ-9 aircraft that are physically located at the overseas bases.

The Maintenance Group supervises the Aircraft Maintenance Squadron, the Aircraft Maintenance Unit, and the Aircraft Maintenance Communications Unit. Maintenance would be performed on the 24 assigned aircraft to train and to support flight operations in a newly constructed Maintenance Complex. An estimated 1,000 personnel would work at the Maintenance Complex. This complex includes constructing/retrofitting facilities for the Aircraft Maintenance Unit and the Aircraft Maintenance Communications Unit, managing and storing all required parts and supplies, storing MQ-9 aircraft, providing training to load and unload weapons using inert munitions, and maintaining aircraft fuel cells. With typically scheduled 12 hour missions, MQ-9 aircraft would need personnel to perform maintenance during the day and night.

Personnel and Dependents for the MQ-9 Wing Beddown

The beddown of a new MQ-9 Wing would bring an estimated 1,900 additional personnel to the selected base (1,500 active duty USAF personnel, 300 Department of Defense civilians, 100 Base Operating Support personnel).

A portion of the assigned USAF personnel would be accompanied by dependents. The 1,900 total Wing personnel were calculated to have 2,584 dependents, including 1,292 children, of whom approximately 950 would be school aged.

New Facilities and Infrastructure

Table 1 lists the new facilities needed for the MQ-9 beddown at Vandenberg AFB. Figure 3 shows the location of these facilities.

5

Table 1. Vandenberg AFB Proposed Facility Siting for MQ-9 Wing

Building	Description
Operations Complex	Renovate the interior of Building 8401 to house the Wing HQ/Operations Group/Operations Support Squadron/Squadron Operations Center, two Attack Squadrons, and PMATS/dwell space. Two emergency generators would be installed to power the complex during outages.
Maintenance Complex	Construct a new maintenance complex facility on the north side of the runway off the east end of the runway to include the Maintenance Group HQ, Aircraft Maintenance Squadron, Aircraft Maintenance Unit, Aircraft Maintenance Communications Unit, Launch and Recovery Attack Squadron, utilities, and associated parking lot. Up to three emergency generators would be installed.
Ground Data Terminal Foundations and Towers	Construct up to seven Ground Data Terminal foundations and towers along the northeast side of the runway. Includes a one-lane Access Road connecting the three towers that would not be accessible from existing airfield taxiway pavement.
Fitness Center	Construct a 38,700-sf addition to the existing fitness center.
Airmen Dormitory	Construct a 68,200-sf new dormitory. The new dormitory would be sited in the base dormitory complex area.
Infrastructure and Communication Conduit Extensions	Power, base communication, water, and wastewater lines would need to be extended to facilities. Infrastructure capabilities are accessible to all facilities and can normally be extended to the facilities using disturbed corridors.

Key: HQ = Headquarters; PMATS = Predator® Mission Aircrew Training System; sf = square foot

MQ-9 Aircraft Operations

Aircraft operations include proficiency training for the MQ-9 aircrews and maintenance personnel. Table 2 identifies proposed MQ-9 flying sorties for the 24 MQ-9 aircraft. Sorties would normally be conducted 5 days per week during 235 flying days per year, and would last approximately 12 hours. The total number of annual sorties is calculated to be 2,820. The flying schedule includes daytime and nighttime flights, and will require an average daily flying window of 16 hours. With a mission duration of up to 12 hours, as many as 2,200 of the 2,820 total annual sorties could occur, at least partially, during nighttime. Daily proficiency training sorties would typically depart and return to base. During a typical weekday, MQ-9 sorties include flying pattern work at the airfield for an estimated four hours per day. Deviations from this routine proficiency training would occur during exercise scenarios that typically involve ground and/or other aircraft.

Table 2. Proposed MQ-9 Aircraft Sorties

Total MQ-9 RPAs – 24	Daily Sorties	Annual Sorties
Daily sorties	Up to 12	Up to 2,820
Nighttime sorties	From 2 to 10 of the daily sorties	Up to 2,200 of the annual sorties would occur at least partially during nighttime.
Sorties deploying inert munitions at ranges approved for the inert munitions	From 2 to 4 of the daily sorties	200 of the annual sorties

Key: RPA = remotely piloted aircraft

9

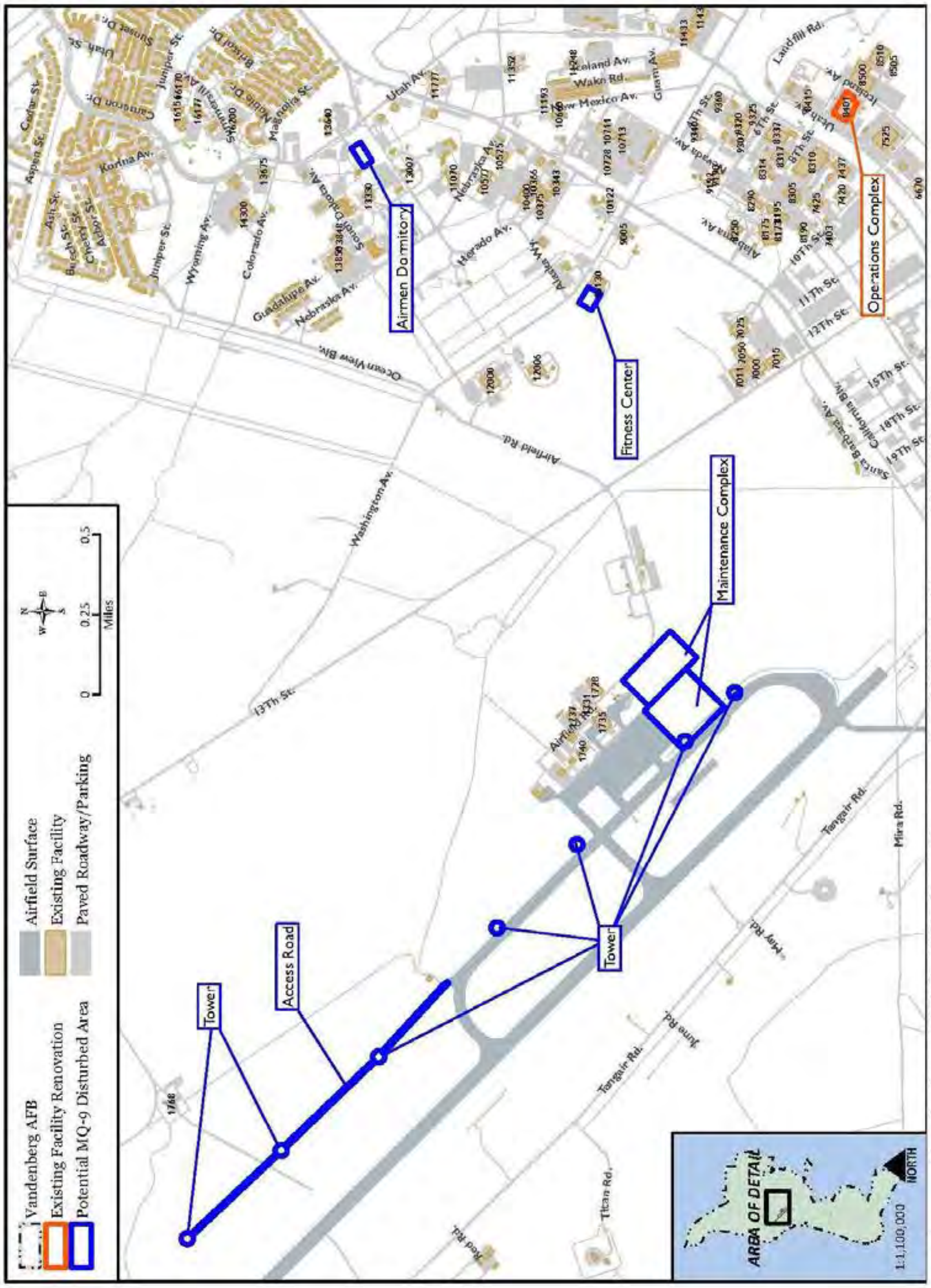


Figure 3. Vandenberg AFB Facilities Locations Associated With the Proposed MQ-9 Beddown

7

Of the proposed 2,820 proficiency training sorties, 200 sorties would involve deploying two inert munitions each on existing ranges approved for the inert munitions. No live weapons would be deployed. Of the 400 total inert munitions, 300 are expected to be inert precision Guided Bomb Units and 100 are expected to be inert Joint Direct Attack Munitions. A Joint Direct Attack Munition is a bomb with a guidance kit to make it an all-weather precision guided munition. The MQ-9 does not deploy defensive countermeasures such as chaff or flares, and no live munitions would be deployed.

Airspace and Ranges

Vandenberg AFB based MQ-9 aircraft would normally conduct four hours of daily pattern work as depicted on Figure 4 to the west and/or east of the base runway. Various factors would determine which pattern was flown, including meteorological conditions, sensitive marine and bird species, and altitude above on-base housing. An estimated up to two thirds of the pattern work could be to either the west or east side of the runway. The pattern work would be within Vandenberg AFB R 2516 restricted airspace or in W 537 restricted airspace and would not require a Federal Aviation Authority (FAA) issued Certificate of Authorization (COA).

MQ-9 aircraft would operate in the approximately 40 by 10 nautical mile restricted airspace, R 2516, above Vandenberg AFB and/or in the warning areas immediately adjacent to Vandenberg AFB to the west and south. To allow for other aircraft or systems using Vandenberg AFB, R 2516 could be divided into R 2516A to the east and R 2516B to the west.

An MQ-9 mission to the Camp Roberts Army Base/Hunter Liggett restricted airspace to the north of Vandenberg would use an FAA issued COA after the MQ-9 climbed to above 18,000 feet mean sea level (MSL) (FL180) in FAA controlled airspace. Transit COAs would be 2 nautical miles wide. Figure 5 depicts the COA between Vandenberg AFB R 2516 and the Hunter Military Operations Areas (MOAs). Alternatively, the MQ-9 could fly from R 2516 into the offshore restricted warning areas (W 537), which parallel the coast and transit from the offshore warning areas to the Hunter MOAs using an FAA issued COA. MQ-9 operations in MOAs/ATCAAs associated with Camp Roberts Army Base/Hunter Liggett would require COAs outside the restricted airspace. An MQ-9 would typically fly from approximately 20,000 feet MSL (FL200) to 22,000 feet MSL (FL220) in the COAs and could operate from 22,000 feet MSL (FL220) to 26,000 feet MSL (FL260) for proficiency training in approved airspace.

For a mission to the Navy San Clemente Range south of Vandenberg AFB, the MQ-9 would fly over open water in W 537 and W 2895 restricted airspace to the R 2535 restricted airspace over the San Clemente Range (Figure 5). FAA COAs would not be required in restricted airspace.

8

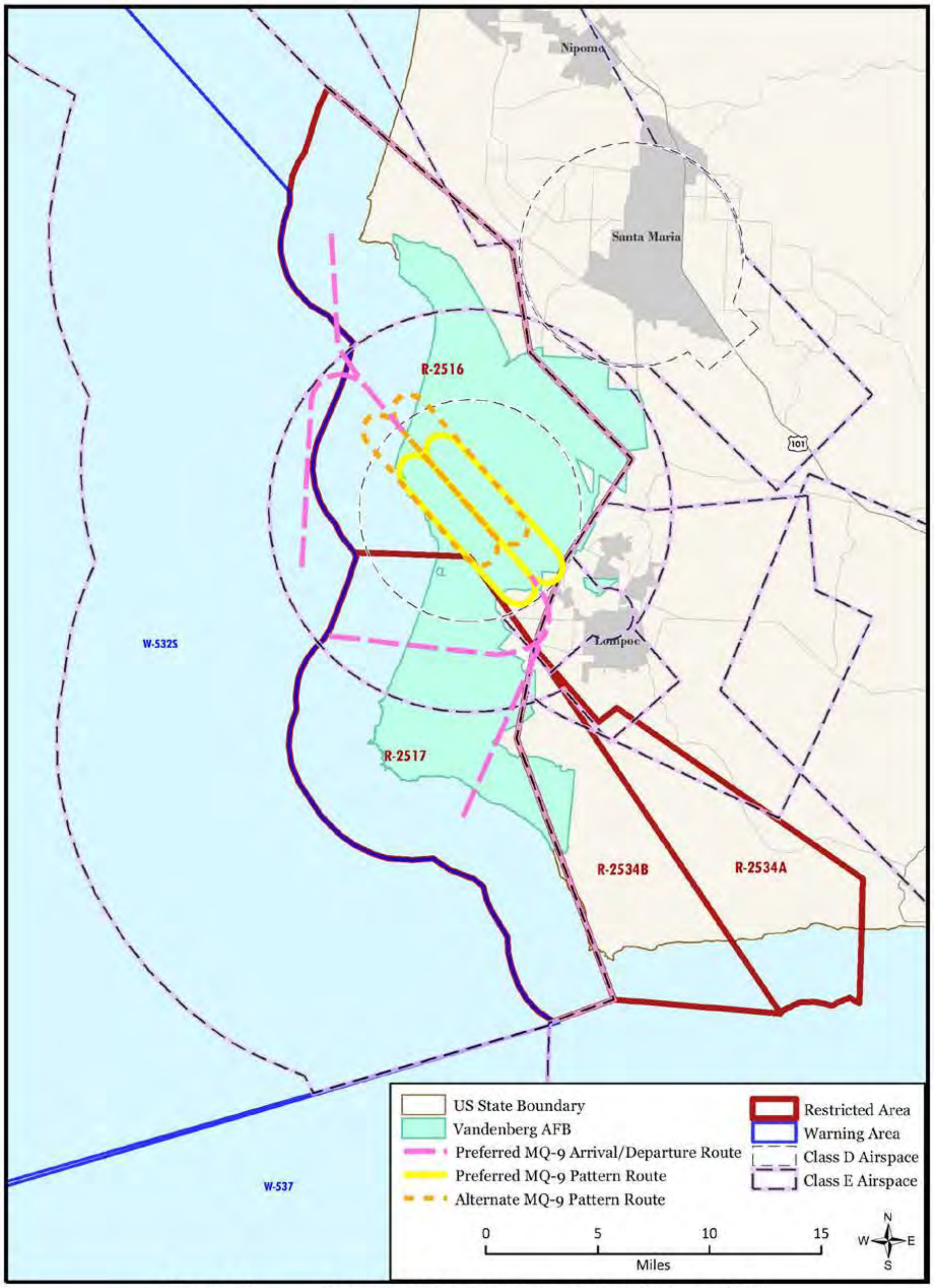


Figure 4. Proposed MQ-9 Pattern at Vandenberg AFB

9

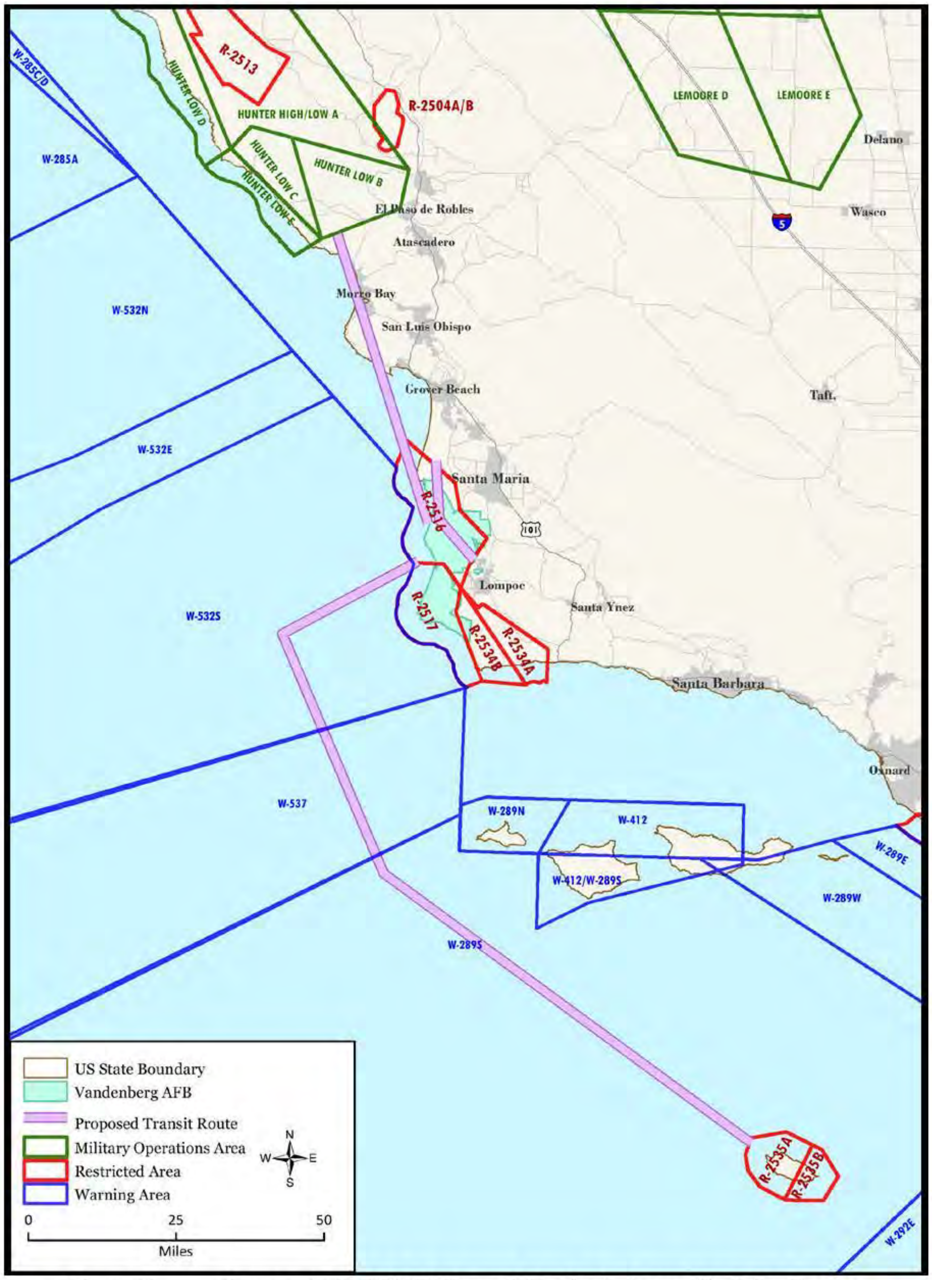


Figure 5. Proposed MQ-9 COA Transit Routes to Access Training Ranges from Vandenberg AFB

2. EFFECTS ANALYSIS

As defined in Section 304 of the CZMA, the term "coastal zone" does not include "lands the use of which is by law subject solely to the discretion of or which is held in trust by the Federal Government." Vandenberg AFB is owned and operated by the USAF and, therefore, is excluded from the coastal zone. The USAF recognizes that actions outside the coastal zone may affect land or water uses or natural resources within the coastal zone and, therefore, are subject to the provisions of CZMA. The USAF analyzed the impacts of the Proposed Action on the coastal zone by looking at reasonable foreseeable direct and indirect effects on the coastal use or resources, and reviewing relevant management program enforceable policies and the Coastal Resources Planning and Management Policies (CRPMP). Note that the County of Santa Barbara has delineated a Coastal Zone Boundary that includes Vandenberg AFB, however as noted, CZMA provisions are not enforceable on federal property, however this CCND analyses distances to that boundary, where applicable, to support the finding of no effects to coastal uses or resources.

Public Access (CRPMP Section 30210 et seq.) and Recreation (CRPMP Sections 30220 et seq.)

Construction activities of the Proposed Action are located at the Vandenberg AFB airfield and cantonment areas. These areas are located on federal property and are at least 0.75 miles from the coastal zone as designated by the County of Santa Barbara. USAF controls the base and access is restricted to military personnel, Department of Defense employees, authorized contractors and official visitors. The Proposed Action would not interfere with access to the coastal zone. There is no public access to the construction sites and no public recreation opportunities are located within the construction sites.

Vandenberg AFB is adjacent to several public coastal recreational areas including beaches and hiking trails that may experience MQ-9 overflights. Noise from MQ-9 operations would not affect recreation. The dominant source of aircraft noise at Vandenberg AFB is generated by rocket launches as well as transient fixed and rotary-winged aircraft including fighters (e.g., F-35, F/A-18), trainers (T-38), maritime surveillance (P-3), aerial refuelers (KC-135), and others. Even with increased overall operations, the comparatively quiet MQ-9 would not appreciably change the noise footprint at Vandenberg AFB. Coastal areas that are overflown by the MQ-9 en route to operational areas would not be affected by noise as the MQ-9 would fly at an altitude high enough to negate any effects. Existing recreation areas would not be subjected to noise levels that would affect use.

Therefore, there will be no effect to public access and recreation within the coastal zone.

Marine Environment (CRPMP Sections 30230 et seq.)

The Proposed Action construction sites are on land within the airfield and cantonment areas of a military installation. All construction sites are far from the Pacific Ocean (over 2 miles), thus no marine species exist within the construction sites. Protective measures for construction of the new facilities and other required infrastructure include implementation of standard construction best management practices, such as a spill prevention and cleanup plan, will avoid or minimize the potential for accidental releases of fuels/oils during construction. A construction general National Pollutant Discharge Elimination System permit would be obtained and a construction Storm Water Pollution Prevention Plan and an Erosion Control Plan would be developed and employed to minimize impacts to water quality. In addition, infrastructure improvements that are over 5,000 square feet would incorporate low impact development best practices into their design, thus maintaining pre-development hydrology at the Proposed Action construction sites. The combination of distance from the ocean, use of protective measures during construction, and incorporation of low impact development would prevent any potential effects to the marine environment.

Therefore, the Proposed Action will have no effect on marine water quality or marine environment.

Land Resources (CRPMP Section 30240 et seq.)

The Proposed Action construction sites are located adjacent to the airfield or in the cantonment area. These sites are on federal property and are over 0.75 miles from the coastal zone boundary as determined by Santa Barbara County. There are no coastal zone environmentally sensitive habitats or archaeological or paleontological resources occurring within the Proposed Action construction sites. There are no lands in agricultural production or timberlands. Wetlands and federal and state-listed threatened and endangered species have been observed at some of the construction sites. However, these sites are over 0.75 miles inland from the coastal zone boundary and are located on federal property and are therefore not in the coastal zone. Due to the distance to the coastal zone boundary, "spill over" effects to coastal zone land resources are not expected from construction activities associated with the Proposed Action.

MQ-9 operations would occur over beach and coastal habitats and would introduce a new source of noise to these habitats. The MQ-9 is considered to be about half as loud as a KC-135R aircraft, a representative transient aircraft at Vandenberg AFB, which has a maximum noise level of 72 A-weighted decibels. The noise from overflights would be minor and short term. In addition wildlife species tend to adjust to aircraft related noise. The USAF has determined that aircraft operations may affect, but are not likely to adversely affect the following Endangered Species Act listed species; southern sea otter, California least tern, and western snowy plover. Similarly the USAF has determined that aircraft operations are unlikely to result in take of marine mammals per Marine Mammal Protection Act military readiness criteria. MQ-9 operations are not likely to significantly alter or cause marine mammals to abandon natural behavior patterns. Instances of seals or sea lions reacting to aircraft have not been observed at Vandenberg AFB. In addition MQ-9s would not operate lower than 1,000 feet (except during take-off and landing). The Proposed Action would not result in significant disruptions of habitat values.

The USAF will conduct surveys as necessary and coordinate with federal, state, and tribal authorities as needed. Coordination includes Clean Water Act Section 404 permitting, Endangered Species Act section 7 consultation and National Historic Preservation Act Section 106 consultations as needed. Any required mitigation actions that result from consultations will be implemented.

Therefore, there would be no effects to land resources in the coastal zone resulting from the Proposed Action.

Development (CRPMP Section 30250 et seq.)

There is no Proposed Action development within the coastal zone. The Proposed Action construction sites are located adjacent to the airfield or in the cantonment area. These sites are on federal property and are over 0.75 miles from the coastal zone boundary as determined by Santa Barbara County. There are no coastal viewing sites in these areas. Construction sites would also not be visible from the coast. Overflights of MQ-9s would not affect coastal viewing as the aircraft are small and gray in color and will be operating at altitudes that make them difficult to see. The Proposed Action would not affect public access to the coast. Protective measures as described above for Marine Environment would be employed to minimize adverse impacts.

Therefore, there would be no effect to coastal resources.

Industrial Development (CRPMP Section 30260 et seq.)

These enforceable policies do not apply to the Proposed Action. The Proposed Action does not include industrial development.

3. CONCLUSION

The USAF has determined that the MQ-9 Wing Beddown at Vandenberg AFB would not affect uses or resources of the California coastal zone. The USAF respectfully requests your concurrence.

If you need additional information or have questions, please call me at (805) 605-7924 or email me at beatrice.kephart@us.af.mil. You can also call Samantha Kaisersatt at (805) 605-0392 or email her at samantha.kaisersatt@us.af.mil.

Sincerely

5/19/2020

X Beatrice L Kephart

Signed by: KEPHART.BEATRICE.LINDA.1166122291
BEATRICE L. KEPHART
Chief, Installation Management Flight

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY

GAVIN NEWSOM, GOVERNOR

CALIFORNIA COASTAL COMMISSION
455 MARKET STREET, SUITE 228
SAN FRANCISCO, CA 94105-2219
VOICE (415) 904-5200
FAX (415) 904-5400

August 7, 2020

Beatrice L. Kephart
Chief, Installation Management Flight
Department of the Air Force
30 CES/CEI
ATTN: Samantha Kaisersatt
1028 Iceland Avenue
Vandenberg AFB, CA 93437

Subject: Negative Determination ND-0022-20 (MQ-9 RPA Wing Basing at Vandenberg Air Force Base, Santa Barbara County)

Dear Ms. Kephart:

The Coastal Commission staff has reviewed the above-referenced negative determination. The Air Force proposes to base an MQ-9 Remotely Piloted Aircraft (RPA) Wing at Vandenberg Air Force Base. This project would include renovations to existing buildings on the base, construction of a new maintenance complex and ground date terminal towers adjacent to the base airfield, installation of new power, water, wastewater, and communication infrastructure, and construction of a new airmen dormitory and fitness center expansion. These improvements would support the basing of and flight operations for the 24 MQ-9 aircraft based at Vandenberg AFB and for MQ-9 aircraft physically located at overseas bases. The total number of annual aircraft operations to be conducted at Vandenberg AFB is calculated to be 2,820 and would occur during both daytime and nighttime hours. Flight operations would take place over the base and in restricted airspace between the base and Camp Roberts Army Base/Hunter Liggett to the north and the Navy San Clemente Island Range to the south. The program would bring an estimated 1,900 additional personnel to Vandenberg AFB and approximately 2,600 dependents.

All construction activities would occur within existing developed areas of Vandenberg AFB, are more than two miles inland from the shoreline, and would not generate any effects to marine or terrestrial habitats or resources. Aircraft operations would be similar to and yet quieter than existing aircraft operations and rocket launches at the base. These new flight operations would not affect marine mammals in adjacent offshore waters or California least tern and Western snowy plover nesting habitat along the shoreline.

In conclusion, the Commission staff **agrees** that the proposed project would not adversely affect coastal resources. We therefore **concur** with your negative determination made pursuant to 15 CFR § 930.35 of the NOAA implementing regulations. Please contact Larry

ND-0022-20 (Department of the Air Force)

Simon at Larry.Simon@coastal.ca.gov should you have any questions regarding this matter.

Sincerely,

LARRY Simon

(for) JOHN AINSWORTH
Executive Director

cc: CCC – South Central Coast District

2

[redacted] [redacted]
Subject: EXTERNAL: FW: ND-0022-20 (USAF)
Date: Tuesday, July 21, 2020 11:55:06 AM

Joe,
FYI
Vandenberg – coastal…determination 15 day extension

v/r

Cindy

CYNTHIA PETTIT, PMP, LEED-AP
AFCEC NEPA Program Manager
[redacted]

[redacted]

From: KAISERSATT, SAMANTHA O CIV USSF SPOC 30 CES/CEIEA [redacted]
Sent: Monday, July 20, 2020 11:43 AM
To: PETTIT, CYNTHIA J GS-13 USAF AFMC AFCEC/CZN [redacted]
[redacted]
Subject: RE: ND-0022-20 (USAF)

Hi Cindy,

See below.

Thanks,
Samantha

From: Simon, Larry@Coastal <Larry.Simon@coastal.ca.gov>
Sent: Monday, July 20, 2020 9:16 AM
To: KAISERSATT, SAMANTHA O CIV USSF SPOC 30 CES/CEIEA <samantha.kaisersatt@us.af.mil>
Subject: [Non-DoD Source] ND-0022-20 (USAF)

Hi Samantha,

Pursuant to 15 CFR Section 930.41(b), I am hereby requesting the automatic 15-day extension to the 60-day time limit for Commission review of the above-referenced negative determination. This will extend the time limit from July 26, 2020, to August 10, 2020, and allow us to complete our analysis of the proposed project. Thank you for your cooperation and please contact me at larry.simon@coastal.ca.gov should you have any questions regarding this matter. Best regards,

Larry

Larry Simon
Manager, Federal Consistency Unit
Energy, Ocean Resources and
Federal Consistency Division
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, CA 94105
(415) 904-5288
larry.simon@coastal.ca.gov
www.coastal.ca.gov

NOTE: Given that the Commission office is closed indefinitely due to the COVID-19 pandemic, all correspondence, including federal consistency submittals, should be conveyed to me via email during this time period.

A.6 U.S. ARMY CORPS OF ENGINEERS WETLANDS JURISDICTIONAL DETERMINATION

A.6.1 Vandenberg AFB Jurisdictional Determination

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT
60 SOUTH CALIFORNIA STREET, SUITE 201
VENTURA, CALIFORNIA 93001-2598

October 5, 2020

SUBJECT: Approved Jurisdictional Determination (Corps File No. SPL-2020-00460-TS)

Darryl York
Vandenberg Air Force Base
30 CES/CEIE 1028 Iceland Ave., Bldg 11146
Vandenberg AFB, California 93437

Dear Mr. York:

I am responding to your request dated July 2020 and resubmitted in August 2020, for an approved Department of the Army jurisdictional determination (JD) for the Vandenberg Air Force Base MQ9 Wing Beddown Project (Corps File No. SPL-2020-00460-TS), located on Vandenberg AFB near the city of Lompoc, Santa Barbara County, California (34.758287, -120.607341).

The Corps' evaluation process for determining whether or not a Department of the Army permit is needed involves two tests. If both tests are met, a permit would likely be required. The first test determines whether or not the proposed project is located within the Corps' geographic jurisdiction (i.e., it is within a water of the United States). The second test determines whether or not the proposed project is a regulated activity under Section 10 of the Rivers and Harbors Act or Section 404 of the Clean Water Act. This evaluation pertains only to geographic jurisdiction.

Based on available information, I have determined waters of the United States do not occur on the project site. The basis for our determination can be found in the enclosed Approved Jurisdictional Determination (JD) form.

The aquatic resources identified as Wetlands A through G and the Unnamed Pond in project documentation you provided are excluded by the Navigable Waters Protection Rule. As such, these aquatic resources are not currently regulated as waters of the U.S. This disclaimer of jurisdiction is only for Section 404 of the Clean Water Act. Other federal, state, and local laws may apply to your activities. In particular, you may need authorization from the California State Water Resources Control Board, the California Department of Fish and Wildlife, and/or the U.S. Fish and Wildlife Service.

This letter includes an approved JD for the Vandenberg Air Force Base MQ9 Wing Beddown Project. If you wish to submit new information regarding this JD, please do so within 60 days. We will consider any new information so submitted and respond within 60 days by either revising the prior determination, if appropriate, or reissuing the prior determination. If you object to this or any revised or reissued JD, you may request an administrative appeal under

Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) and Request for Appeal (RFA) form. If you wish to appeal this decision, you must submit a completed RFA form within 60 days of the date on the NAP to the Corps South Pacific Division Office at the following address:

Tom Cavanaugh
Administrative Appeal Review Officer
U.S. Army Corps of Engineers
South Pacific Division, CESPD-PDO
450 Golden Gate Ave.
San Francisco, CA 94102

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR Part 331.5 (see below), and that it has been received by the Division Office by **December 4, 2020**.

This determination has been conducted to identify the extent of the Corps' Clean Water Act jurisdiction on the particular project site identified in your request, and is valid for five years from the date of this letter, unless new information warrants revision of the determination before the expiration date. This determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service prior to starting work.

Thank you for participating in the regulatory program. If you have any questions, please contact Theresa Stevens at (805) 585-2146 or via e-mail at theresa.stevens@usace.army.mil. Please help me to evaluate and improve the regulatory experience for others by completing the customer survey form at http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey.

Sincerely,

ALLEN.AARON.O.1232270795 Digitally signed by ALLEN.AARON.O.1232270795 Date: 2020.10.05 11:53:28 -07'00'

Aaron O. Allen, Ph.D.
Chief, North Coast Branch
Regulatory Division

Enclosures

Cf: Luanne Lum, VAFB

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: U.S. Air Force, Vandenberg Air Force Base	File Number: SPL-2020-00460-TS	Date: 10/5/2020

Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
X	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/cecw/pages/reg_materials.aspx or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.

- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

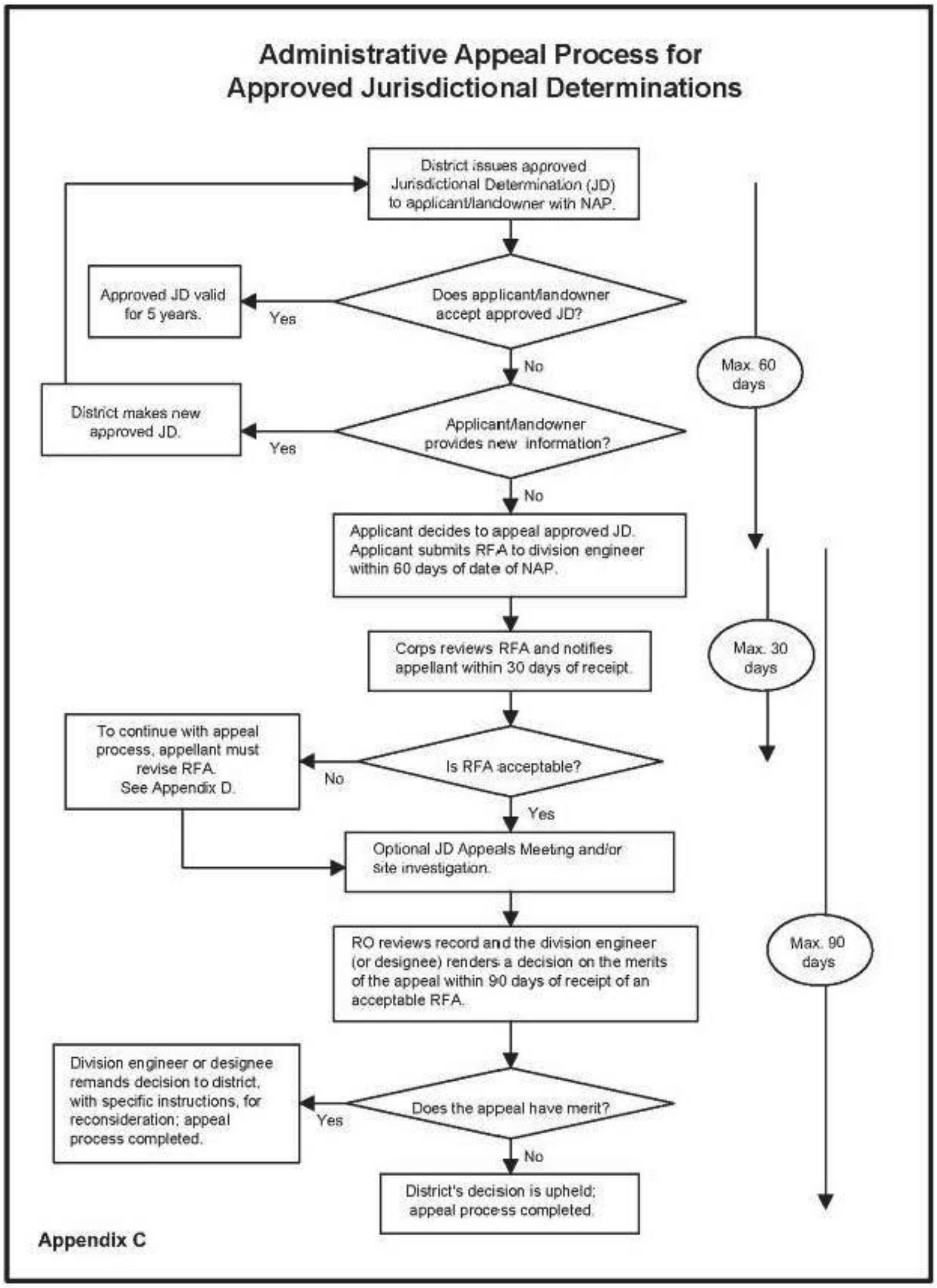
ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact: Theresa Stevens, PhD Senior Project Manager U.S. Army Corps of Engineers Los Angeles District 60 SOUTH CALIFORNIA STREET, SUITE 201 VENTURA, CALIFORNIA 93001-2598 Phone: (805) 585-2146 Email: theresa.stevens@usace.army.mil	If you only have questions regarding the appeal process you may also contact: Thomas J. Cavanaugh Administrative Appeal Review Officer U.S. Army Corps of Engineers South Pacific Division 450 Golden Gate Ave. San Francisco, CA 94102 Phone: (415) 503-6574 Fax: (415) 503-6646 Email: thomas.j.cavanaugh@usace.army.mil

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

Signature of appellant or agent.	Date:	Telephone number:


Administrative Appeal Process for
Approved Jurisdictional Determinations
District issues approved Jurisdictional Determination (JD) to applicant/landowner with NAP.
Does applicant/landowner accept approved JD?
Yes
Approved JD valid for 5 years.
No
Applicant/landowner provides new information?
Yes
District makes new approved JD.
No
Applicant decides to appeal approved JD. Applicant submits RFA to division engineer within 60 days of date of NAP.
Max. 60 days
Corps reviews RFA and notifies appellant within 30 days of receipt.
Max. 30 days
Is RFA acceptable?
No
To continue with appeal process, appellant must revise RFA. See Appendix D.
Yes
Optional JD Appeals Meeting and/or site investigation.
RO reviews record and the division engineer (or designee) renders a decision on the merits of the appeal within 90 days of receipt of an acceptable RFA.
Max. 90 days
Does the appeal have merit?
Yes
Division engineer or designee remands decision to district, with specific instructions, for reconsideration; appeal process completed.
No
District's decision is upheld; appeal process completed.
Appendix C

§ 331.5 Criteria.

(a) *Criteria for appeal* —(1) *Submission of RFA*. The appellant must submit a completed RFA (as defined at §331.2) to the appropriate division office in order to appeal an approved JD, a permit denial, or a declined permit. An individual permit that has been signed by the applicant, and subsequently unilaterally modified by the district engineer pursuant to 33 CFR 325.7, may be appealed under this process, provided that the applicant has not started work in waters of the United States authorized by the permit. The RFA must be received by the division engineer within 60 days of the date of the NAP.

(2) *Reasons for appeal*. The reason(s) for requesting an appeal of an approved JD, a permit denial, or a declined permit must be specifically stated in the RFA and must be more than a simple request for appeal because the affected party did not like the approved JD, permit decision, or the permit conditions. Examples of reasons for appeals include, but are not limited to, the following: A procedural error; an incorrect application of law, regulation or officially promulgated policy; omission of material fact; incorrect application of the current regulatory criteria and associated guidance for identifying and delineating wetlands; incorrect application of the Section 404(b)(1) Guidelines (see 40 CFR Part 230); or use of incorrect data. The reasons for appealing a permit denial or a declined permit may include jurisdiction issues, whether or not a previous approved JD was appealed.

(b) *Actions not appealable*. An action or decision is not subject to an administrative appeal under this part if it falls into one or more of the following categories:

(1) An individual permit decision (including a letter of permission or a standard permit with special conditions), where the permit has been accepted and signed by the permittee. By signing the permit, the applicant waives all rights to appeal the terms and conditions of the permit, unless the authorized work has not started in waters of the United States and that issued permit is subsequently modified by the district engineer pursuant to 33 CFR 325.7;

(2) Any site-specific matter that has been the subject of a final decision of the Federal courts;

(3) A final Corps decision that has resulted from additional analysis and evaluation, as directed by a final appeal decision;

(4) A permit denial without prejudice or a declined permit, where the controlling factor cannot be changed by the Corps decision maker (e.g., the requirements of a binding statute, regulation, state Section 401 water quality certification, state coastal zone management disapproval, etc. (See 33 CFR 320.4(j));

(5) A permit denial case where the applicant has subsequently modified the proposed project, because this would constitute an amended application that would require a new public interest review, rather than an appeal of the existing record and decision;

(6) Any request for the appeal of an approved JD, a denied permit, or a declined permit where the RFA has not been received by the division engineer within 60 days of the date of the NAP;

(7) A previously approved JD that has been superceded by another approved JD based on new information or data submitted by the applicant. The new approved JD is an appealable action;

(8) An approved JD associated with an individual permit where the permit has been accepted and signed by the permittee;

(9) A preliminary JD; or

(10) A JD associated with unauthorized activities except as provided in §331.11.

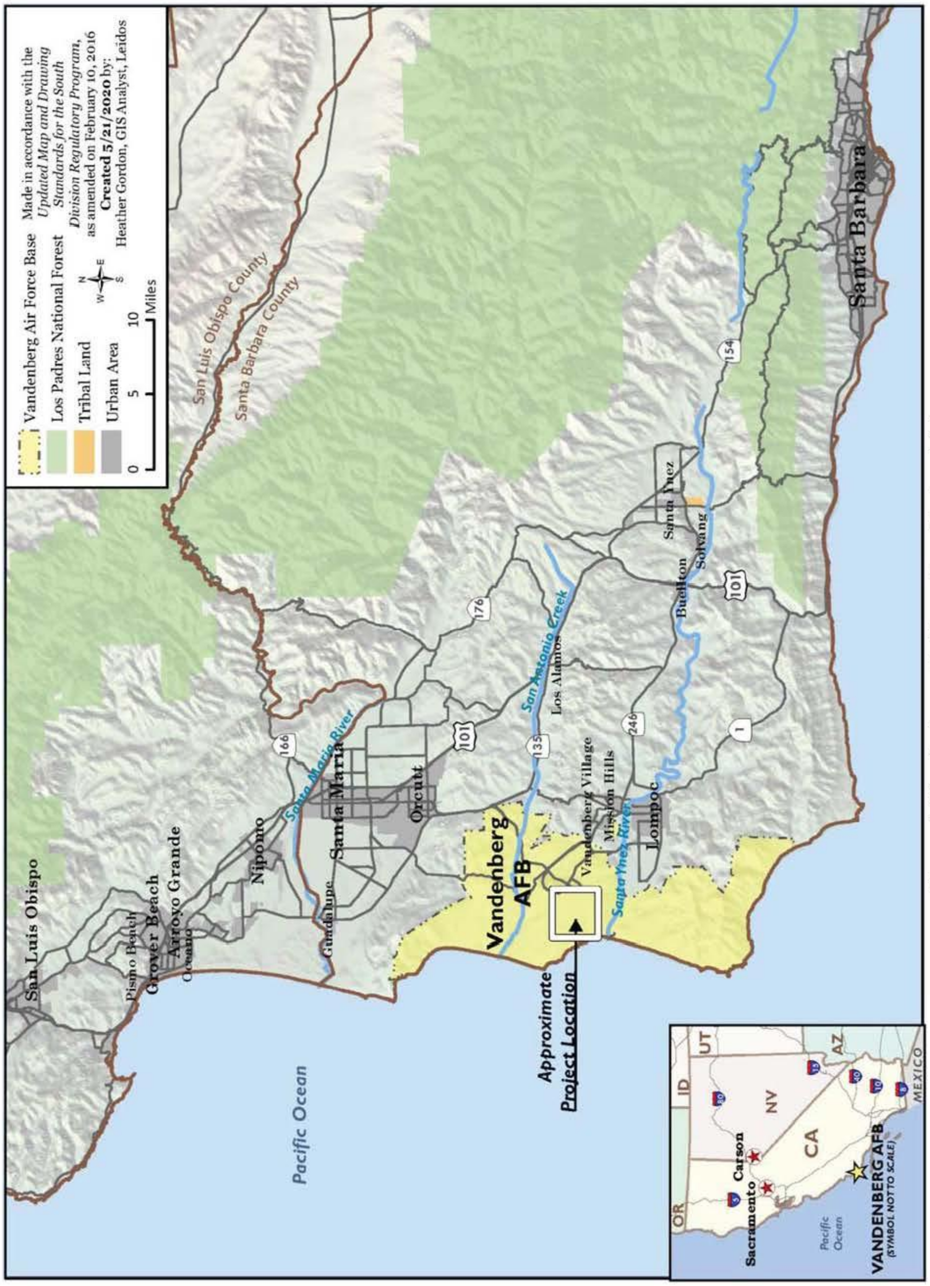


Figure 1. Vandenberg Air Force Base Regional Map

F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing at Tyndall AFB or Vandenberg AFB
Wetland Jurisdictional Determination Report for Vandenberg AFB

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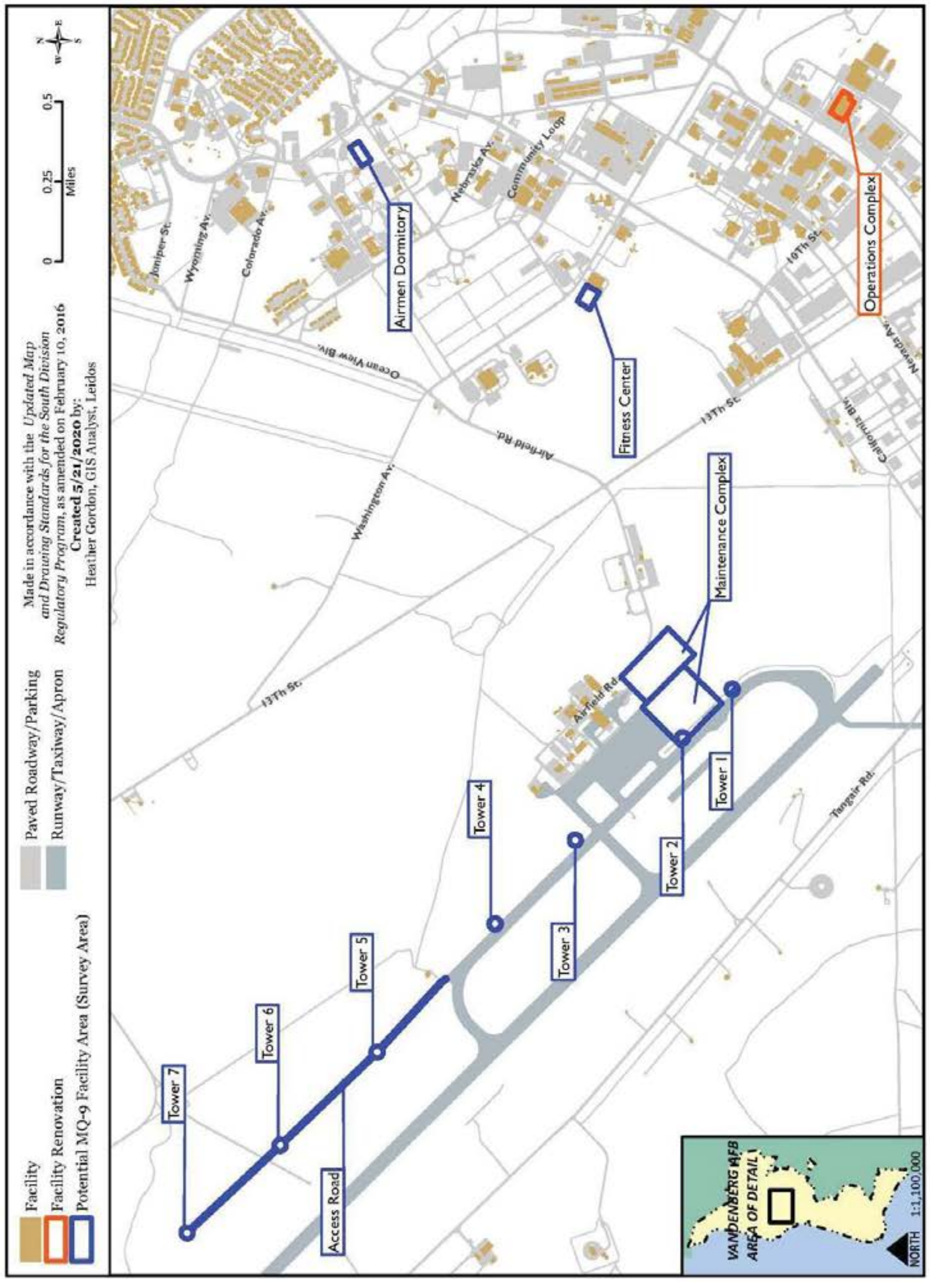

Figure 2. Jurisdictional Delineation Survey Area

F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing at Tyndall AFB or Vandenberg AFB
Wetland Jurisdictional Determination Report for Vandenberg AFB

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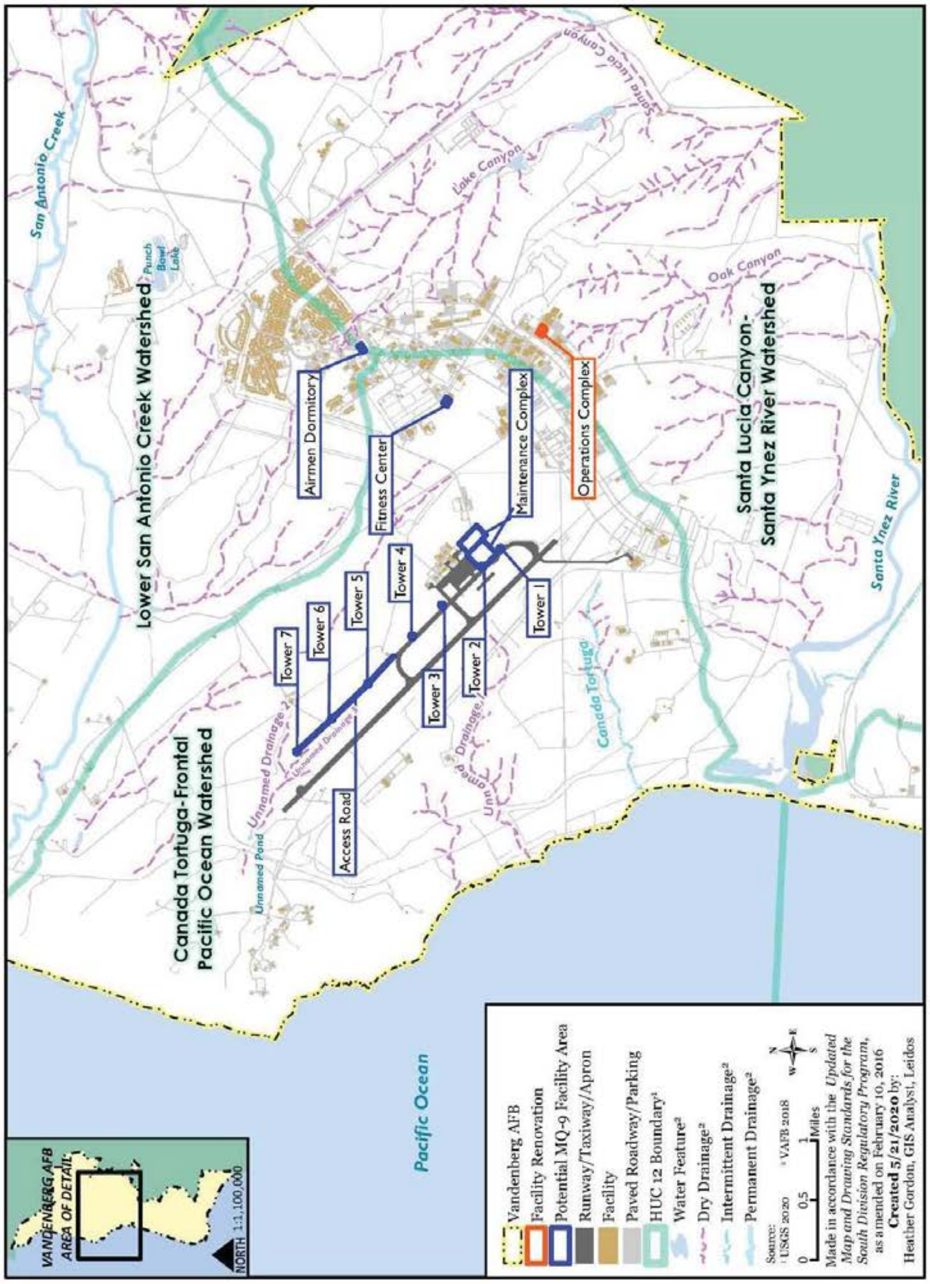

Figure 4. Vandenberg Air Force Base Watersheds

F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing at Tyndall AFB or Vandenberg AFB
Wetland Jurisdictional Determination Report for Vandenberg AFB

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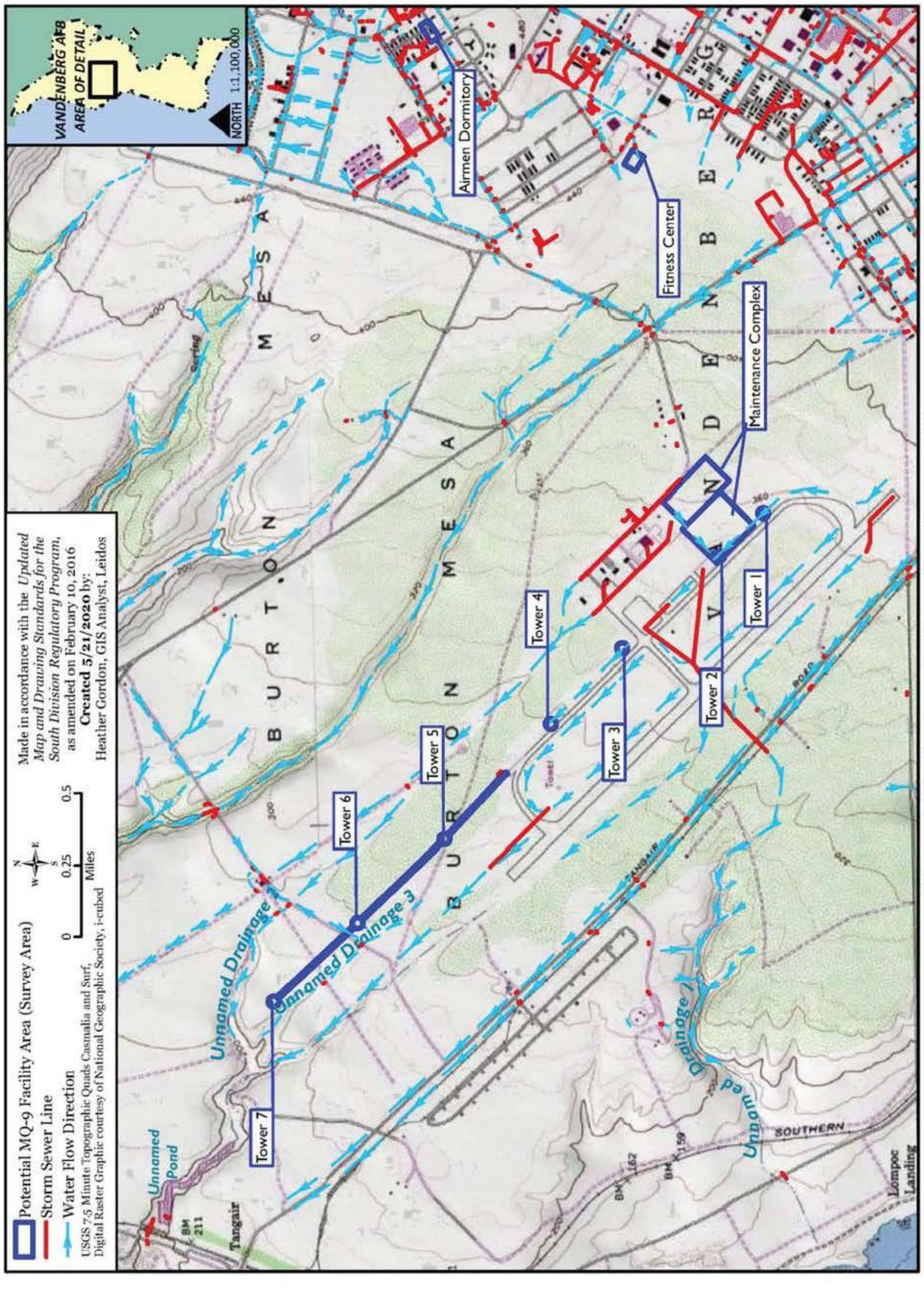

Figure 5. Vandenberg Air Force Base Drainage Map

F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing at Tyndall AFB or Vandenberg AFB
Wetland Jurisdictional Determination Report for Vandenberg AFB

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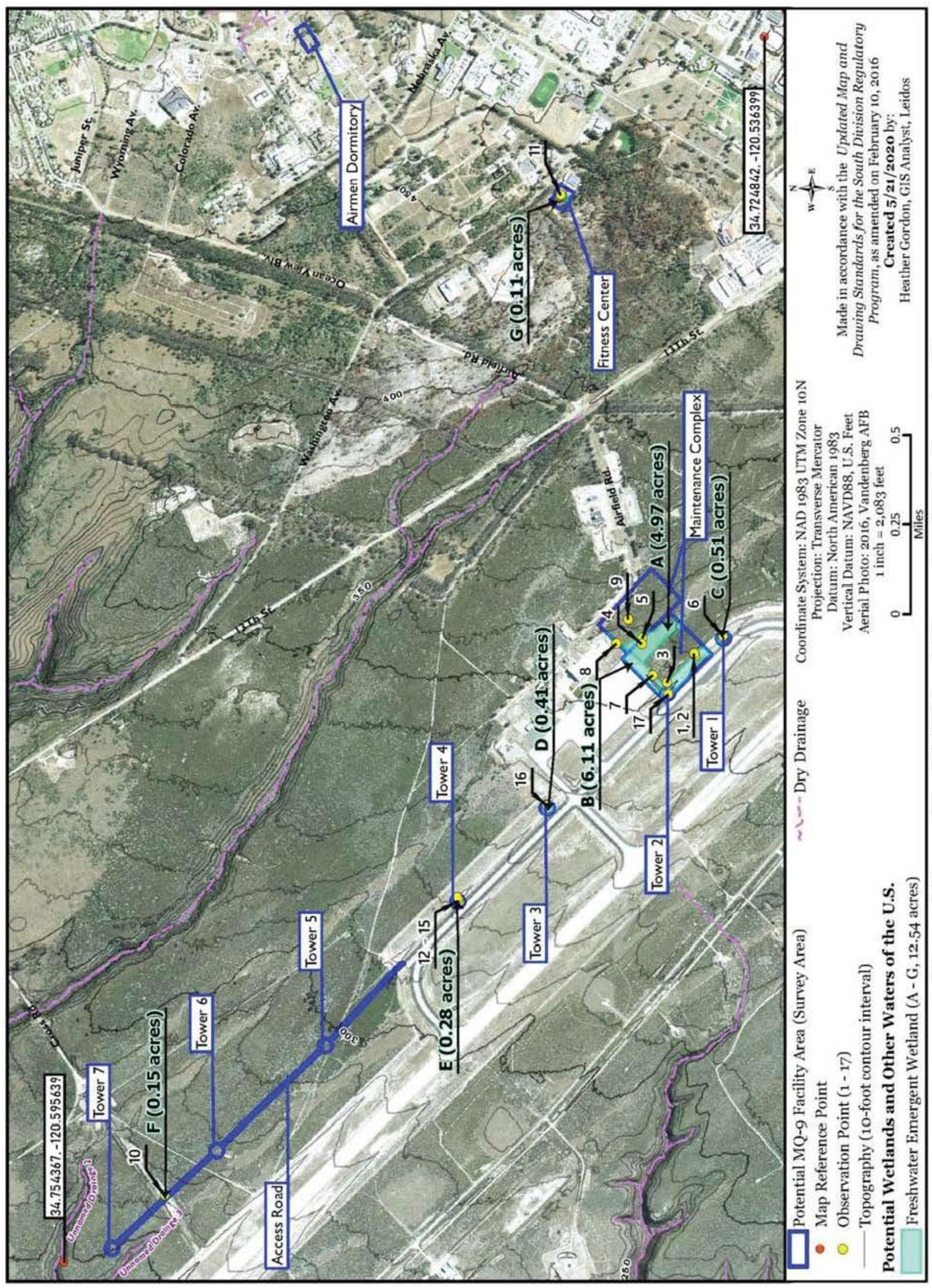

Figure 6. Survey Results Wetland Observation Points Overview Map

F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing at Tyndall AFB or Vandenberg AFB
Wetland Jurisdictional Determination Report for Vandenberg AFB

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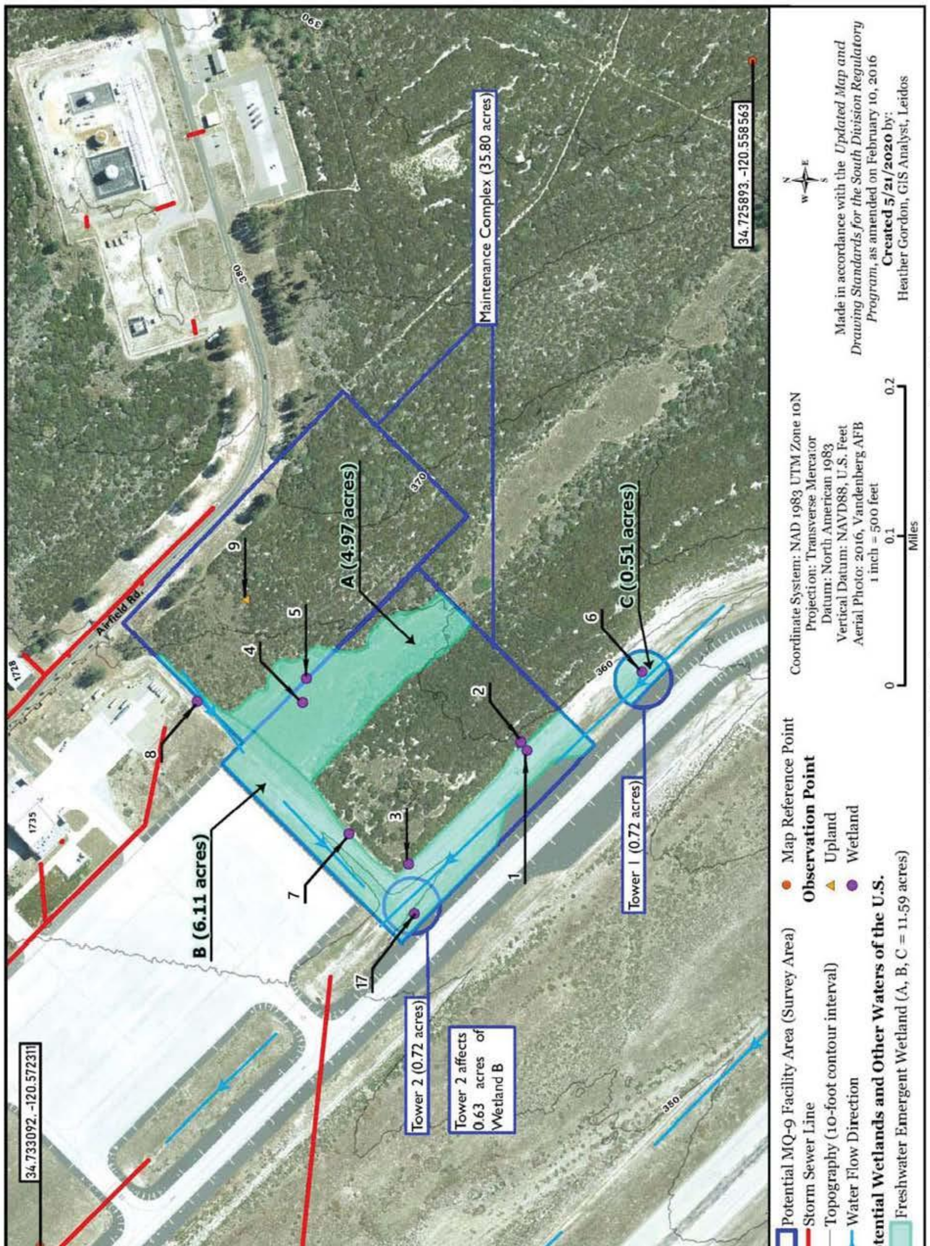

Figure 7. Survey Results Maintenance Complex/Towers 1 and 2

F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing at Tyndall AFB or Vandenberg AFB
Wetland Jurisdictional Determination Report for Vandenberg AFB

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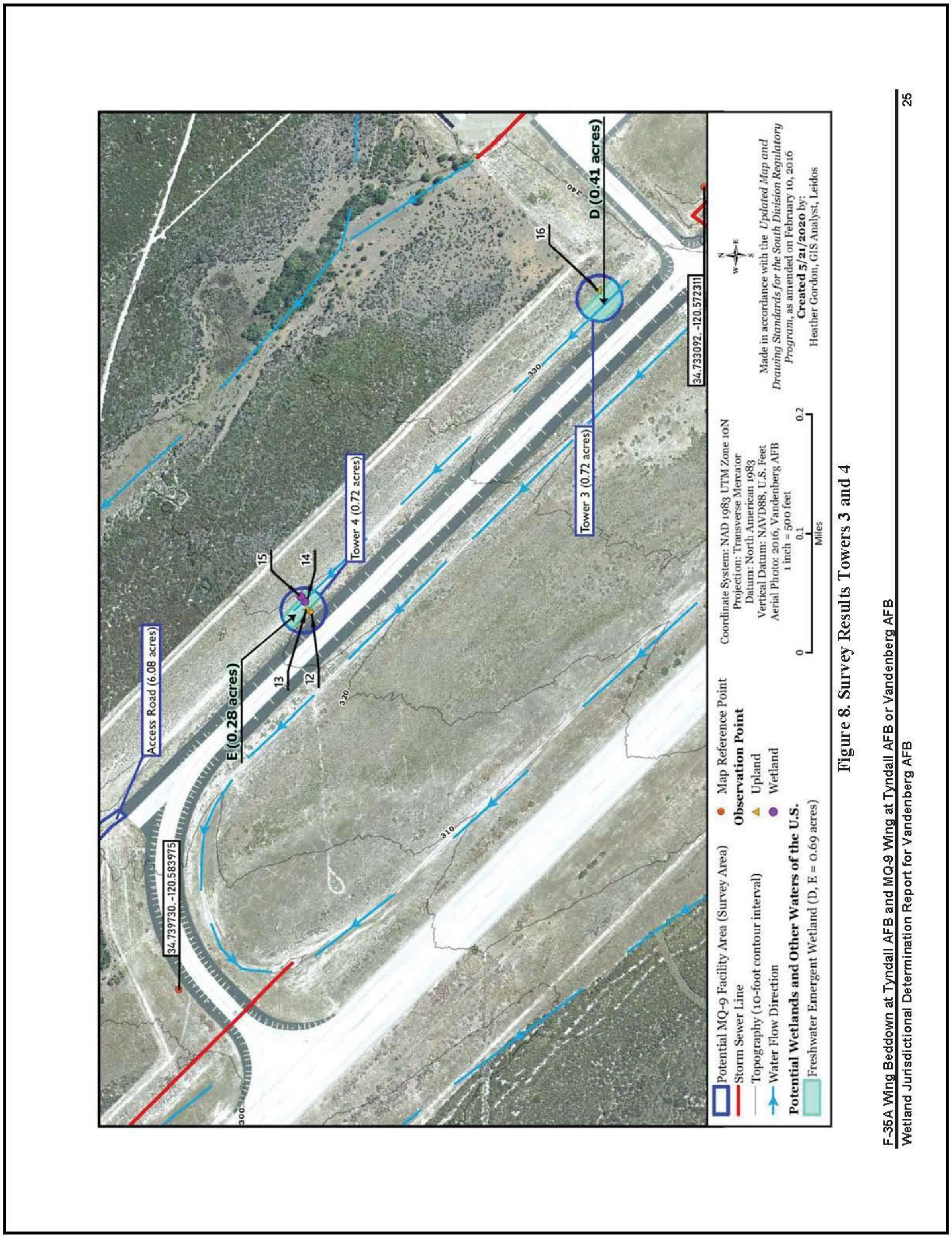

Figure 8. Survey Results Towers 3 and 4

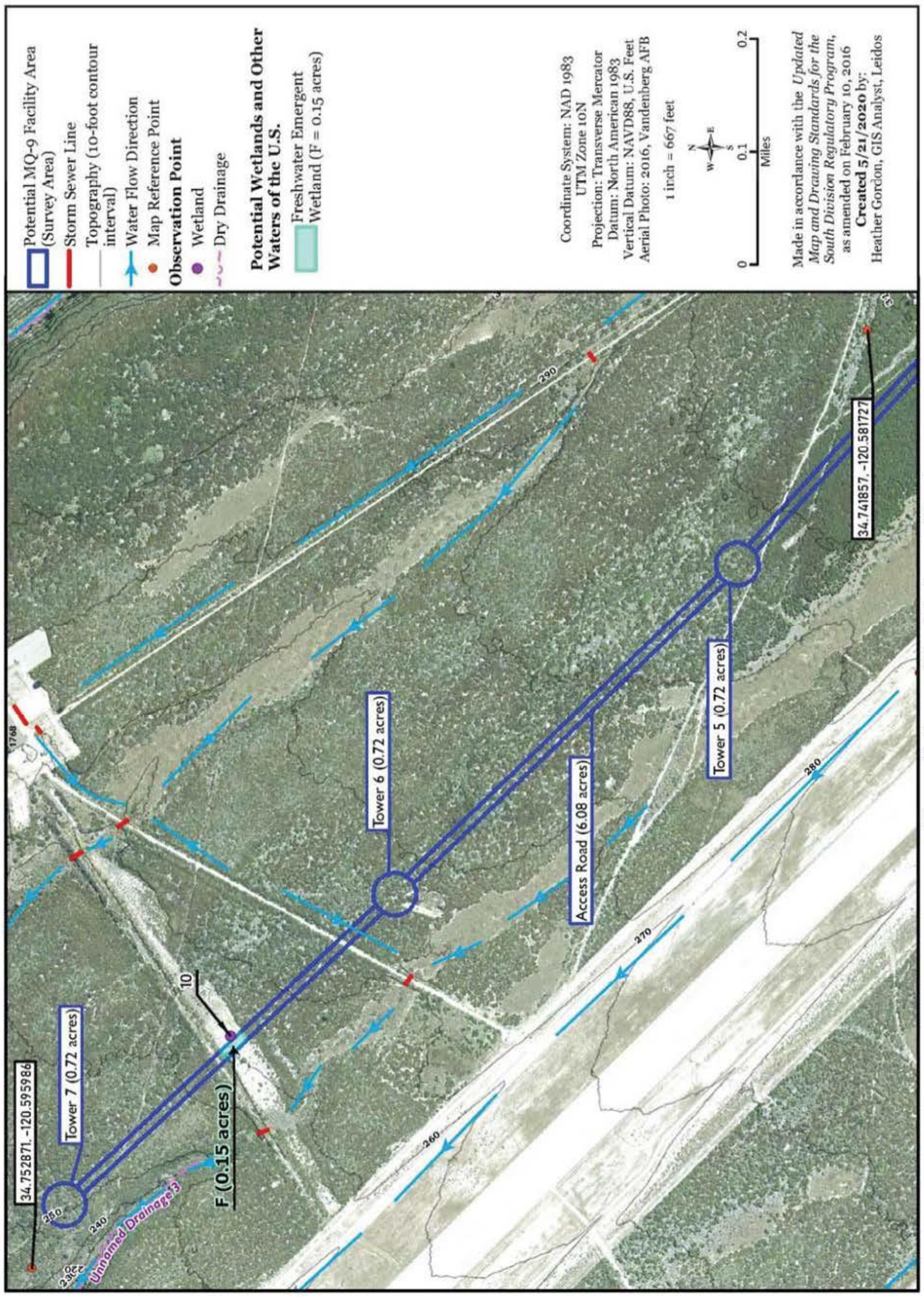

Figure 9. Survey Results Access Road

F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing at Tyndall AFB or Vandenberg AFB
Wetland Jurisdictional Determination Report for Vandenberg AFB

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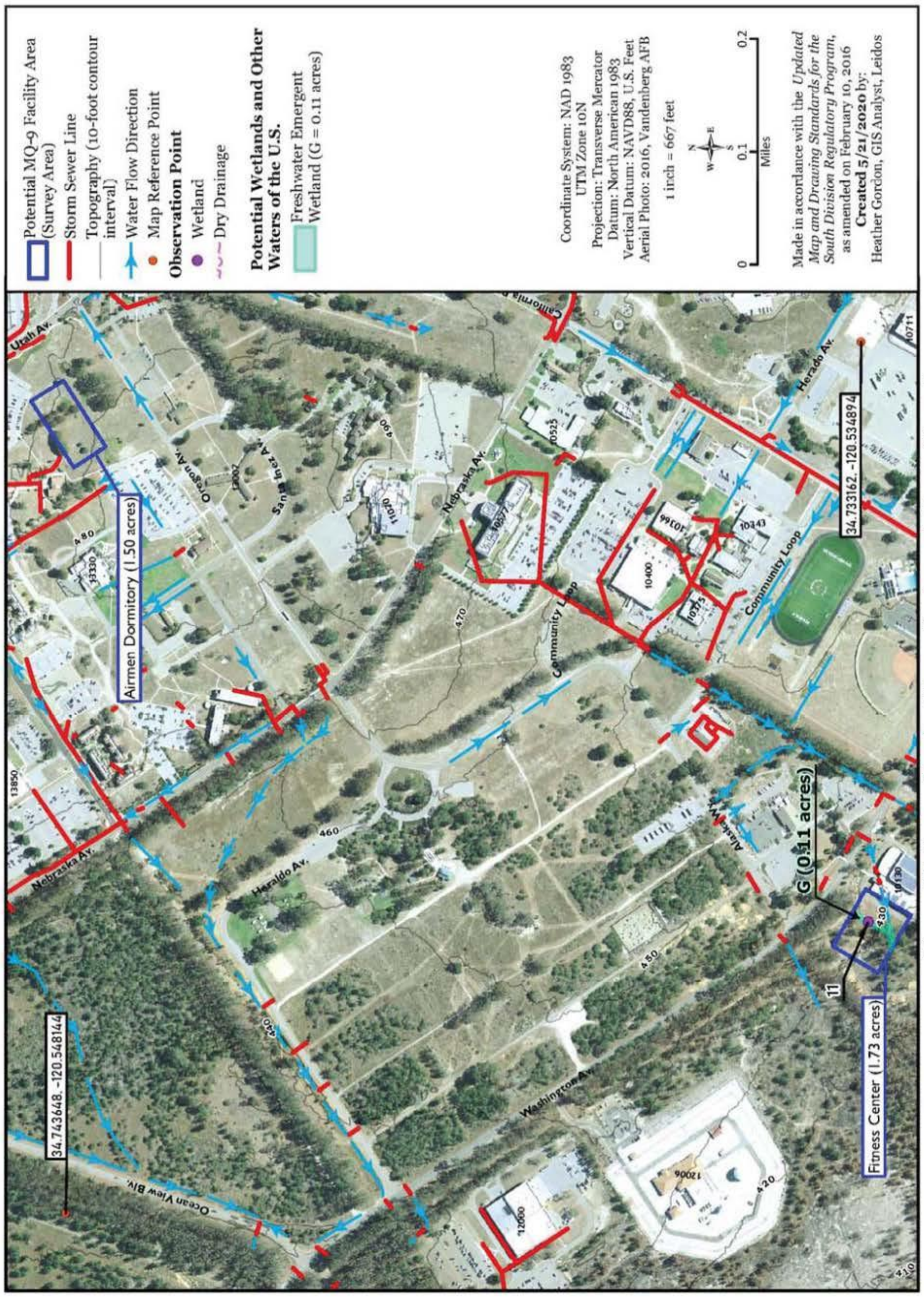

Figure 10. Survey Results Fitness Center and Airmen Dormitory

F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing at Tyndall AFB or Vandenberg AFB
Wetland Jurisdictional Determination Report for Vandenberg AFB

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U.S. ARMY CORPS OF ENGINEERS
REGULATORY PROGRAM
APPROVED JURISDICTIONAL DETERMINATION FORM (INTERIM)
NAVIGABLE WATERS PROTECTION RULE

I. ADMINISTRATIVE INFORMATION

Completion Date of Approved Jurisdictional Determination (AJD): 10/5/2020
ORM Number: SPL-2020-00460-TS
Associated JDs: NA
Review Area Location[1]: State/Territory: California City: Vandenberg AFB County/Parish/Borough: Santa Barbara County
Center Coordinates of Review Area: Latitude 34.72992 Longitude -120.5658

II. FINDINGS

A. Summary: Check all that apply. At least one box from the following list MUST be selected. Complete the corresponding sections/tables and summarize data sources.

- ☐ The review area is comprised entirely of dry land (i.e., there are no waters or water features, including wetlands, of any kind in the entire review area). Rationale: N/A or describe rationale.
- ☐ There are "navigable waters of the United States" within Rivers and Harbors Act jurisdiction within the review area (complete table in Section II.B).
- ☐ There are "waters of the United States" within Clean Water Act jurisdiction within the review area (complete appropriate tables in Section II.C).
- ☒ There are waters or water features excluded from Clean Water Act jurisdiction within the review area (complete table in Section II.D).

B. Rivers and Harbors Act of 1899 Section 10 (§ 10)[2]

§ 10 Name	§ 10 Size		§ 10 Criteria	Rationale for § 10 Determination
N/A.	N/A.	N/A	N/A.	N/A.

C. Clean Water Act Section 404

Territorial Seas and Traditional Navigable Waters ((a)(1) waters):[3]				
(a)(1) Name	(a)(1) Size		(a)(1) Criteria	Rationale for (a)(1) Determination
N/A.	N/A.	N/A.	N/A.	N/A.

Tributaries ((a)(2) waters):				
(a)(2) Name	(a)(2) Size		(a)(2) Criteria	Rationale for (a)(2) Determination
N/A.	N/A.	N/A.	N/A.	N/A.

Lakes and ponds, and impoundments of jurisdictional waters ((a)(3) waters):				
(a)(3) Name	(a)(3) Size		(a)(3) Criteria	Rationale for (a)(3) Determination
N/A.	N/A.	N/A.	N/A.	N/A.

Adjacent wetlands ((a)(4) waters):				
(a)(4) Name	(a)(4) Size		(a)(4) Criteria	Rationale for (a)(4) Determination
N/A.	N/A.	N/A.	N/A.	N/A.

[1] Map(s)/figure(s) are attached to the AJD provided to the requestor.
[2] If the navigable water is not subject to the ebb and flow of the tide or included on the District's list of Rivers and Harbors Act Section 10 navigable waters list, do NOT use this document to make the determination. The District must continue to follow the procedure outlined in 33 CFR part 329.14 to make a Rivers and Harbors Act Section 10 navigability determination.
[3] A stand-alone TNW determination is completed independently of a request for an AJD. A stand-alone TNW determination is conducted for a specific segment of river or stream or other type of waterbody, such as a lake, where upstream or downstream limits or lake borders are established. A stand-alone TNW determination should be completed following applicable guidance and should NOT be documented on the AJD Form.

Page 1 of 6 Form Version 10 June 2020_updated

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D. Excluded Waters or Features

Excluded waters ((b)(1) – (b)(12)):[4]				
Exclusion Name	Exclusion Size		Exclusion[5]	Rationale for Exclusion Determination
Wetland A	4.97	acre(s)	(b)(1) Non-adjacent wetland.	Wetland A appears to be the remnant of a natural drainage swale prior to the construction of the runway system. The wetland is connected to the Pacific Ocean through a series of subsurface stormwater drains and open swales to an unnamed intermittent stream (stream not a part of this AJD). The stormwater drain inlet on the east side of the taxiway runs north about a half mile and then west for about a half mile under the taxiway and runway. This storm drain system discharges to a man-made ditch which is about a half mile in length, then to a naturally occurring unnamed stream. The distance from the upstream end of the naturally occurring stream that discharges to the Pacific Ocean, the nearest (a)(1) water, is over two miles. As such, there exists neither a natural barrier nor a man-made barrier separating the wetland from an (a)(1) - (a)(3) water, and so the wetland is excluded from jurisdiction.
Wetland B	6.11	acre(s)	(b)(1) Non-adjacent wetland	Wetland B appears to be the remnant of a natural drainage swale. The wetland is connected to the Pacific Ocean through a series of subsurface stormwater drains and open swales to an unnamed intermittent stream (stream not a part of this AJD). The stormwater drain inlet on the east side of the taxiway runs north about a half mile and then west for about a half mile under the taxiway and runway. This storm drain system discharges to a man-made ditch which is about a half mile in length, then to a naturally occurring unnamed stream. The distance from the upstream end of the naturally occurring stream connected to the Pacific Ocean, the nearest (a)(1) water, is over two miles. As such, there exists neither a natural barrier nor a man-made barrier separating the wetland from an (a)(1) - (a)(3) water, and so the wetland is excluded from jurisdiction.

[4] Some excluded waters, such as (b)(2) and (b)(4), may not be specifically identified on the AJD form unless a requestor specifically asks a Corps district to do so. Corps districts may, in case-by-case instances, choose to identify some or all of these waters within the review area.
[5] Because of the broad nature of the (b)(1) exclusion and in an effort to collect data on specific types of waters that would be covered by the (b)(1) exclusion, four sub-categories of (b)(1) exclusions were administratively created for the purposes of the AJD Form. These four sub-categories are not new exclusions, but are simply administrative distinctions and remain (b)(1) exclusions as defined by the NWPR.

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Excluded waters ((b)(1) – (b)(12)):[4]				
Exclusion Name	Exclusion Size		Exclusion[5]	Rationale for Exclusion Determination
Wetland C	0.51	acres	(b)(1) Non-adjacent wetland	Wetland C appears to be the remnant of a natural drainage swale. The wetland is connected to the Pacific Ocean through a series of subsurface stormwater drains and open swales to an unnamed intermittent stream (stream not a part of this AJD). The stormwater drain inlet on the east side of the taxiway runs north about a half mile and then west for about a half mile under the taxiway and runway. This storm drain system discharges to a man-made ditch which is about a half mile in length, then to a naturally occurring unnamed stream. The distance from the upstream end of the naturally occurring tributary to the Pacific Ocean, the nearest (a)(1) water, is over two miles. As such, there exists neither a natural barrier nor a man-made barrier separating the wetland from an (a)(1) - (a)(3) water, and so the wetland is excluded from jurisdiction.
Unnamed Pond	2.2	acres	(b)(1) Lake/pond or impoundment that does not contribute surface water flow directly or indirectly to an (a)(1) water and is not inundated by flooding from an (a)(1)-(a)(3) water in a typical year.	In a typical year, the pond has neither a direct surface hydrologic connection to an (a)(1) - (a)(3) water, nor is it inundated by an (a)(1) – (a)(3) water. Therefore, it is not jurisdictional.
Wetland D	0.41	Acres	(b)(1) Non-adjacent wetland	Wetland D is adjacent to ephemeral streams with no direct hydrologic connection to an (a)(1) - (a)(3) water, and therefore is not jurisdictional.
Wetland E	0.28	Acres	(b)(1) Non-adjacent wetland	Wetland E is adjacent to ephemeral streams with no direct hydrologic connection to an (a)(1) - (a)(3) water, and therefore is not jurisdictional.
Wetland F	0.15	Acres	(b)(1) Non-adjacent wetland	Wetland F is adjacent to ephemeral streams with no direct hydrologic connection to an (a)(1) - (a)(3) water, and therefore is not jurisdictional.
Wetland G	0.11	Acres	(b)(1) Non-adjacent wetland	Wetland G has no direct hydrologic connection to an (a)(1) - (a)(3) waters and therefore is not jurisdictional. Wetland G collects stormwater runoff from adjacent buildings and parking lots and this runoff flows overland from these developed areas to undeveloped adjacent land.

U.S. ARMY CORPS OF ENGINEERS
REGULATORY PROGRAM
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NAVIGABLE WATERS PROTECTION RULE

III. SUPPORTING INFORMATION

A. Select/enter all resources that were used to aid in this determination and attach data/maps to this document and/or references/citations in the administrative record, as appropriate.

☒ Information submitted by, or on behalf of, the applicant/consultant: Wetland Jurisdictional Determination Report for the EIS for F-35A Beddown at Tyndall AFB and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB – Final. July 2020

This information is sufficient for purposes of this AJD.

Rationale: N/A or describe rationale for insufficiency (including partial insufficiency).

☐ Data sheets prepared by the Corps: Title(s) and/or date(s).

☐ Photographs: Aerial and Other: 2016 and 2020

☐ Corps site visit(s) conducted on: Date(s).

☐ Previous Jurisdictional Determinations (AJDs or PJDs): ORM Number(s) and date(s).

☒ Antecedent Precipitation Tool: *provide detailed discussion in Section III.B*.

☒ USDA NRCS Soil Survey: 2013

☒ USFWS NWI maps: 2013

☒ USGS topographic maps: Title(s) and/or date(s).

Other data sources used to aid in this determination:

Data Source (select)	Name and/or date and other relevant information
USGS Sources	N/A.
USDA Sources	N/A.
NOAA Sources	N/A.
USACE Sources	N/A.
State/Local/Tribal Sources	N/A.
Other Sources	Vandenberg AFB hydrologic and stormwater maps

B. Typical year assessment(s): The Antecedant Precipitation Tool (APT) was used to evaluate wetlands during the date of the site visit (3/2/2020 and 5/8/2020). The APT demonstrated that site conditions were slightly drier than normal in the month preceeding the site visit on 3/2/2020 and that site conditions were normal during the 5/8/2020 site visit. Overall the APT indicates that the site visit occurred during a typical year.

C. Additional comments to support AJD:
Under the NWPR, wetlands need to be abutting or inundated by flooding by (a)(1) - (a)(3) waters. In this case, the Corps has determined the wetlands described in Section II were sufficiently distant from such waters to disclaim jurisdiction.

Wetland A

A review of historic aerial photography indicates that the wetland was part of a natural drainage swale that originated to the southeast and historically conveyed flow to the northwest. Construction of the runway, associated taxiways and ramps, and the existing maintenance facility along with the construction of the cantonment area to the northeast have altered the natural hydrologic regimes in the area. Stormwater in this portion of the base is conveyed to two different outfalls. Stormwater from Wetland A is primarily collected in the artificial drainage swale (Wetland B) that conveys flow to the southwest and into the constructed drainage that parallels the taxiway. Drainage from this feature is collected in a drop grate inlet

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and conveyed through underground pipes to Unnamed Drainage 1 on the west side of the runway and airfield. Unnamed Drainage 1 is an intermittent stream that flows directly to the Pacific Ocean. Intermittent flow duration was based on the Hydrology Protocol (New Mexico Water Quality Control Commission, 2011). This stream is also mapped by the NWI as an intermittent drainage (note: Unnamed Drainage 1 is not a part of this AJD).

Stormwater runoff also flows into a stormwater inlet located to the north of Wetlands A and B. This inlet conveys flow through underground pipes to an outlet into Unnamed Drainage 2 (note: Unnamed Drainage 2 is not a part of this AJD). This drainage is located on the north side of the existing developed area and is the remnant of the natural drainage associated with Wetland B. Surface water flow in this drainage is conveyed to the north through a series of aboveground natural and artificial conveyances and culverts until it reaches the Unnamed Pond located south of Cross Road. A substantial amount of water was present in the Unnamed Pond during surveys. In a typical year stormwater collects in the Unnamed Pond (APT analysis indicated that the survey did occur in a typical year). There are currently various structures in place that interrupt the natural flow and clear surface hydrologic connection to potential (a)(1) – (a)(3) waters. There is a culvert located approximately 15 to 20 feet above the observed water level in the Unnamed Pond that would serve as a surface hydrologic connection to another series of drainages and culverts located north of Cross Road. This connection would only occur during extreme precipitation events but not in a typical year. These drainages convey flow into the sand dunes. The Unnamed Pond is a perennial feature as evidenced by standing water observed during all the field surveys and descriptions from base personnel. The conveyances that connect Wetlands A and B to the Unnamed Pond are ephemeral. In conclusion, a portion of the flow from Wetland A is conveyed through Wetland B to Unnamed Drainage 1. Flow is also conveyed through Unnamed Drainage 2 to the Unnamed Pond.

Wetland B
The wetland is located in and adjacent to the artificial drainage channels that collect stormwater drainage from the airfield and taxiways as well as from a number of the developed areas to the north and east. Water collected in the drainage is conveyed to the installation stormwater system and into Unnamed Drainage 1 located to the west.

This area is a mosaic wetland intermixed with areas of upland. The site is wetland at the bottom of the drainage channel and then small fingers of wetland extend upgradient into the surrounding scrub shrub. Many of these fingers have vernal pool features with cracked soils and a biotic crust. The wetland/upland line was drawn along the mowed edge where manzanita (Arctostaphylos spp.) become dominant and the areas of bare ground and biotic crust were no longer present. Soils were hydric, characterized by stripped matrix with some areas containing sandy redox. Drainage from this feature is collected in a drop grate inlet and conveyed through underground pipes to Unnamed Drainage 1 on the west side of the airfield. Unnamed Drainage 1 is an intermittent stream that flows directly to the Pacific Ocean.

Wetland C
Wetland C is located upgradient from Wetland B and is part of the same artificial drainage located along the runway taxiway. Flow is conveyed along this drainage through Wetland B and into the drop grate inlet that conveys flow to the intermittent Unnamed Drainage 1 and eventually to the Pacific Ocean.

Wetland D
Flow from Wetland D is eventually conveyed to the ephemeral Unnamed Drainage 3 and the Unnamed

Pond south of Cross Road (note: Unnamed Drainage 3 is not a part of this AJD).

Wetland E
Flow from Wetland E is eventually conveyed to the ephemeral Unnamed Drainage 3 and the Unnamed Pond south of Cross Road.

Wetland F
Flow from the drainage swale is collected in culverts and eventually flows into the ephemeral Unnamed Drainage 3 and the Unnamed Pond near Cross Road. Soils were hydric, characterized by sandy redox.

Wetland G
The wetland is located in an incised channel adjacent to the existing Fitness Center. Approximately 0.11 acre of the feature is located within the proposed project footprint. The wetland continues outside the project footprint for a distance of approximately 100 feet. The channel ends in a disturbed area and no outlet or surface hydrologic connection to other wetlands or surface water features was observed.

The unnamed drainages 1 and 2 (identified numerically above and in the delineation report) described in the discussion above were not delineated in the report because they were not within the survey area; but were assumed to be either intermittent or ephemeral based on arid region (New Mexico) hydrology tools (cited in the delineation report). Therefore no formal decision for the unnamed drainages is included in this approved jurisdictional determination.

A.7 ENDANGERED SPECIES ACT (ESA) SECTION 7 CONSULTATION

A.7.1 Tyndall AFB Consultation Documentation

DEPARTMENT OF THE AIR FORCE
325TH CIVIL ENGINEER SQUADRON (ACC)
TYNDALL AIR FORCE BASE FLORIDA

Mr. José J. Cintron
Chief, Environmental Element
325th Civil Engineer Squadron
540 Mississippi Ave
Tyndall AFB FL 32403-5014

Dr. Sean Blomquist
Acting Project Leader
U.S. Fish and Wildlife Service
1601 Balboa Ave.
Panama City, FL 32405

Dear Dr. Blomquist

This letter is to inform you that Tyndall Air Force Base (AFB) is submitting a Biological Assessment (Attachment 1) and requesting consultation with your office in accordance with Section 7 of the Endangered Species Act. The assessment addresses potential impacts to all federally-listed threatened and endangered (T&E) species associated with the MQ-9 Wing Beddown and F-35A Wing Beddown at Tyndall Air Force Base (AFB).

Under the Proposed Action, beddown of the MQ-9 RPA Operational Wing will include a combination of new construction and renovation to existing facilities and infrastructure to accommodate an Operations Complex, Maintenance Complex, Child Development Center, Airmen Dormitory, Fitness Center, Additional Base Entry Control Gate, Infrastructure and Communication Conduit Extensions, and Munitions Storage (Figure 1). Beddown of the F-35A will include reconstruction of new infrastructure and repair of existing facilities including Hangars, parking apron, Maintenance Complex, Munitions Storage, Aircraft Ground Equipment facility, and Flight Simulator facility.

Surveys for the presence of federally threatened, endangered, candidate species, and species proposed for listing were conducted in January 2020 as part of the Biological Evaluation for the proposed construction projects. During surveys of the proposed **alternative location** of the MQ-9 Wing Beddown Maintenance Complex a population of federally threatened Godfrey's butterwort (*Pinguicula ionantha*) was discovered.

If Tyndall AFB is selected to beddown the MQ-9, impacts to the population of Godfrey's butterwort will likely be avoided because the population was found at the proposed alternative

2

Maintenance Complex site located to the west of the Drone Runway. The preferred site of the MQ-9 Wing Beddown is on the south side of the existing Primary Runway, toward the eastern end of the airfield in a previously developed area. Based on the above analysis, the proposed action is ***Not Likely to Adversely Affect*** the population of the federally threated Godfrey's butterwort.

Should you have any questions, comments, or recommendations, please contact me at (850) 283-4341 or e-mail: jose.cintron.1@us.af.mil.

Sincerely

CINTRON.JOSE.J.1182275146 Digitally signed by CINTRON.JOSE.J.1182275146 Date: 2020.05.01 15:20:53 -05'00'

JOSÉ CINTRON, GS-12, DAF

Attachment:
1. Biological Assessment to Determine Impacts to Federally-Listed Species from MQ-9 Wing Beddown and F-35A Wing Beddown at Tyndall Air AFB

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Panama City Field Office
1601 Balboa Ave
Panama City, FL 32405

Tel: (850) 769-0552
Fax: (850) 763-2177

August 3, 2020

Mr. José J. Cintron
Chief, Environmental Element
325th Civil Engineer Squadron
540 Mississippi Ave
Tyndall AFB FL 32403-5014

Subject: MQ-9 Wing Beddown and F-35A Wing Beddown at Tyndall Air Force Base
FWS Log #: 04EF3000-2020-I-0345

Dear Mr. Cintron:

The U.S. Fish and Wildlife Service evaluated all proposed actions and potential effects to T&E species relating to the F-35A Wing Beddown and MQ-9 Wing Beddown at Tyndall AFB. During surveys of the proposed alternative location of the MQ-9 Wing Beddown Maintenance Complex, a new population of federally threatened Godfrey's butterwort (*Pinguicula ionantha*) consisting of 285 plants was discovered.

You determined that the Action is not likely to adversely affect the new population of *Pinguicula ionantha* because the facilities will be constructed at the preferred site (on the flightline) and not at the alternative site. A *No Effect* determination was made to other T&E species (beach mice, sea turtles, and shorebirds) if allowances are made to avoid impact from lighting disturbance using appropriate lighting.

The Service concurs with your determination of not likely to adversely affect the new population of *Pinguicula ionantha.* This finding fulfills the requirements applicable to the Action for completing consultation under §7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended.

Reinitiating consultation is required if the Tyndall AFB retains discretionary involvement or control over the Action (or is authorized by law) when:

a. the amount or extent of incidental take is exceeded;
b. new information reveals that the Action may affect listed species or designated critical habitat in a manner or to an extent not considered in this BO;
c. the Action is modified in a manner that causes effects to listed species or designated critical habitat not considered in the BE; or

d. a new species is listed or critical habitat designated that the Action may affect.

If you have any questions, please contact Dr. Negrón-Ortiz by phone at 8507690552 ex. 45231or by email at vivian_negronortiz@fws.gov.

Sincerely,

Paul A. Lang

Digitally signed by Paul A. Lang
Date: 2020.08.04 08:38:34 -05'00'

for Dr. Sean Blomquist
Acting Field Supervisor

A.7.2 Vandenberg AFB Consultation Documentation

DEPARTMENT OF THE AIR FORCE
UNITED STATES SPACE FORCE
30TH SPACE WING

5 May 2020

Beatrice L. Kephart
Chief, Installation Management Flight
30 CES/CEI1028 Iceland Avenue
Vandenberg AFB, CA 93437

Stephen P. Henry
U.S. Fish and Wildlife Service
2493 Portola Rd., Suite B
Ventura, CA 93003

Consultation Code: 08EVEN00-2020-SLI-0215
Event Code: 08EVEN00-2020-E-00412

Subject: Request for Formal Consultation for the Biological Assessment for MQ-9 Wing Beddown at Vandenberg Air Force Base, California

Dear Mr. Henry

The U.S. Air Force (USAF) plans to beddown an MQ-9 Remotely Piloted Aircraft (RPA) Operational Wing at Tyndall Air Force Base (AFB), Florida (preferred NEPA alternative) *or* Vandenberg AFB, California. The NEPA Record of Decision and final determination on which base is selected is scheduled for first quarter 2021. If Vandenberg AFB is selected, the action would be located on North Vandenberg AFB between Building 1847 on El Rancho Road (at the intersection of Curly Road and Sun Road) and Building 1967 on Dardo Road, and include a combination of new construction and renovation to existing facilities, as well as ongoing training and operations within existing airspace and ranges.

In accordance with Section 7 of the Endangered Species Act (ESA) (16 U.S.C. §§ 1531–1544, as amended), we request your agency's concurrence with the conclusions for federally listed species at Vandenberg AFB, as described in the enclosed Biological Assessment (BA). Our determination is that this project "may affect, and is likely to adversely affect" the California red-legged frog (*Rana draytonii*), vernal pool fairy shrimp (*Branchinecta lynchi*), and Lompoc yerba santa (*Eriodictyon capitatum*); and, "may affect, not likely to adversely affect Southern Sea Otter (*Enhydra lutris nereis*), California Least Tern (*Sternula antillarum browni*), and Western Snowy Plover (*Charadrius nivosus nivosus*).

Due to the timeline which has been developed for this project, we request formal notification that all necessary materials and information have been received in support of a 135-day consultation. In addition, we would appreciate the opportunity to review the draft Biological Opinion for this project before your office finalizes it. We look forward to cooperatively working with your agency through this Formal Consultation Process. If you have any comments or questions regarding the Draft BA or would like to set up a meeting, please contact me at (805) 605-7924 or Darryl York at (805) 605-8684 if you have any questions.
.

Sincerely

5/5/2020

X Beatrice L Kephart

Signed by: KEPHART.BEATRICE.LINDA.1166122291

BEATRICE L. KEPHART
Chief, Installation Management Flight

Attachment:
Biological Assessment for MQ-9 Wing Beddown at Vandenberg Air Force Base, California

United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE
Ecological Services
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

IN REPLY REFER TO:
08EVEN-2020-F-0423

May 18, 2020

Beatrice L. Kephart
30 CES/CEI
1028 Iceland Avenue
Vandenberg Air Force Base, California 93437

Subject: Acknowledgment of Request to Initiate Formal Consultation for the MQ-9 Wing Beddown Project at Vandenberg Air Force Base, Santa Barbara County, California

This letter acknowledges our receipt of your request, dated and received in our office on May 5, 2020, for initiation of formal consultation, pursuant to section 7(a)(2) of the Endangered Species Act of 1973, as amended (Act). The requested consultation concerns the potential effects of the U.S. Air Force's construction and operation of the MQ-9 Wing Beddown project on the federally endangered California least tern (*Sterna antillarum browni*) and Lompoc yerba santa (*Eriodictyon capitatum*), and the federally threatened California red-legged frog (*Rana draytonii*), southern sea otter (*Enhydra lutris nereis*), western snowy plover (*Charadrius nivosus nivosus*), and vernal pool fairy shrimp (*Branchinecta lynchi)* on north Vandenberg Air Force Base in Santa Barbara County.

All information required of you to initiate consultation was either included with your request letter, the biological assessment, or is otherwise accessible for our consideration and reference. We have assigned file number 2020-F-0423 to this consultation. Please refer to that number in future correspondence on this consultation. The regulations that implement section 7 allow the U.S. Fish and Wildlife Service up to 90 days to conclude formal consultation with your agency and an additional 45 days to prepare our biological opinion (unless we mutually agree to an extension). Therefore, we expect to provide you with our biological opinion on or before September 17, 2020.

As a reminder, the Act requires that, after the initiation of formal consultation, the lead federal agency may make no irreversible or irretrievable commitment of resources that could preclude the formulation or implementation of reasonable and prudent alternatives to avoid jeopardizing the continued existence of endangered or threatened species or destroying or modifying critical habitat [Section 7(d)]. If you have any questions or concerns about this consultation or the consultation process in general, please feel free to contact Jennifer Strotman at (805) 677-3343, or via email at jennifer_strotman@fws.gov.

Sincerely,

CHRISTOPHER DIEL Digitally signed by CHRISTOPHER DIEL Date: 2020.05.18 10:20:48 -07'00'

Christopher J. Diel
Assistant Field Supervisor

cc:
Rhys Evans
Darryl York

United States Department of the Interior
U.S. FISH AND WILDLIFE SERVICE
Ecological Services
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

IN REPLY REFER TO:
08EVEN00-2020-F-0423

September 21, 2020

Beatrice L. Kephart
Chief, Installation Management Flight
30 CES/CEI
1028 Iceland Avenue
Vandenberg Air Force Base, California 93437

Subject: Biological Opinion on the MQ-9 Beddown Project, Vandenberg Air Force Base, Santa Barbara County, California (2020-F-0423)

Dear Beatrice L. Kephart:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the U.S. Air Force's (Air Force) MQ-9 Wing Beddown Project on north Vandenberg Air Force Base (VAFB) and its effects on the federally endangered Lompoc yerba santa (*Eriodictyon capitatum*) and the federally threatened California red-legged frog (*Rana draytonii*), and vernal pool fairy shrimp (*Branchinecta lynchi)*. You also requested our concurrence that the MQ-9 Beddown project may affect, but is not likely to adversely affect the federally endangered California least tern (*Sterna antillarum browni*), and the federally threatened southern sea otter (*Enhydra lutris nereis*) and western snowy plover (*Charadrius nivosus nivosus*). The Air Force has determined that the proposed project will not affect designated critical habitat for any species. Your request and our response are in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 et seq.).

We have based this biological opinion on information that accompanied your May 5, 2020, request for formal consultation (B. Kephart, Air Force, in litt. 2020), including the biological assessment and appendices, information from correspondence with your staff (R. Evans, Air Force, pers. comm. 2020), and information in our records. These documents, and others relating to the consultation, are located at the Ventura Fish and Wildlife Office.

The Service published a final rule on August 27, 2019 (84 Federal Register 44976) that changed the definitions of some of the terms that we use in section 7(a)(2) consultations. The changes became effective on October 28, 2019. We developed this biological opinion in accordance with the changes in the final rule.

Determination for the California Least Tern and Western Snowy Plover

The most consistently used breeding site for California least terns on VAFB is at Purisima Point directly west of the north end of the airfield runway (Kephart] in litt. 2020, pp. 33-34). Typically, the first adult sightings at VAFB occur at the end of April to mid-May. The last sightings at VAFB vary but generally occur from the end of July to mid-August but can occur as late as September. No California least terns remain on VAFB during the nonbreeding season (B. Kephart, Air Force, in litt. 2020, pp. 33-34).

The western snowy plover breeds along approximately 13.8 miles of beaches on VAFB, including segments from Minuteman Beach south to Purisima Point north and west of the airfield and Wall and Surf Beach segments south of the airfield (B. Kephart, Air Force, in litt. 2020, p. 33). VAFB beaches are used by both breeding (March 1 to September 30) and nonbreeding plovers and they can occur year-round (B. Kephart, Air Force, in litt. 2020, p. 33).

Noise from operations and overflights by MQ-9 Reaper aircraft may affect California least tern and western snowy plover in the vicinity of VAFB. Based on surrogate aircraft performance, an MQ-9 is estimated to be 9 decibels (dB) quieter while flying at 1,400 feet (the most common pattern altitude) above mean sea level (MSL) than a representative 'middle-of-the-road' transient aircraft (KC-135R) while flying at 1,900 feet above MSL. Because the surrogate aircraft has a larger engine, the actual noise levels would be lower for MQ-9 flights. The Air Force modeled operation of the MQ-9 aircraft at the overflight point closest to the California least tern breeding habitat at Purisima Point, which is passed during a left-turning closed pattern procedure. These models indicate a maximum noise level (A-weighted decibels; dBA) of 63 dBA at 30 percent engine power and at 1,400 feet above MSL, which is substantially quieter than aircraft currently operating at VAFB.

The Air Force proposes to implement the following measures to avoid adverse effects to California least tern and western snowy plover:

1. No construction or other ground-disturbing activities are proposed within or near any known or potential California least tern or western snowy plover habitat.
2. Operation of the MQ-9 aircraft will adhere to existing programmatic flight restrictions to reduce noise effects (NOAA NMFS 2019, p. 2; Service 2015, pp. 14-15). These restrictions include:
    - Except during takeoff and landing, unmanned aerial systems (UAS) will not be flown below 1,000 feet over Purisima Point.
    - Pilots will climb to 1,900 feet above sea level (ASL) over the Purisima Point area during the California least tern breeding season (typically April 15 to August 15).
    - From March 1 through September 30 (which includes the breeding season for both birds):
        - Circling approaches to the southwest are prohibited unless flight safety dictates otherwise.
        - For air traffic approaching from the right to Runway 12, aircraft conducting rectangular/closed traffic patterns will delay base turn until near Purisima Point.

- For air traffic approaching from the left to Runway 30, aircraft conducting rectangular/closed traffic patterns will execute a crosswind turn prior to the departure end of the runway. If unable to execute a crosswind turn prior to the departure end of the runway, then they will fly runway heading and climb to 1,900 feet above MSL before turning crosswind.

We concur with your determination that the proposed activities may affect, but are not likely to adversely affect, the California least tern and western snowy plover. Our concurrence is based on the following:

1. No California least tern or western snowy plover habitat occurs within the proposed project construction footprints. The closest known occurrences are approximately 2.5 miles away at Purisima Point.
2. The Air Force will implement the aforementioned measures.
3. The MQ-9 aircraft is substantially quieter than existing airfield traffic and launch operations routinely conducted at VAFB. Additionally, operations are restricted during the breeding season; thus, the effects of noise on California least tern and western snowy plover would be insignificant and discountable.

Determination for the Southern Sea Otter

Southern sea otters occur regularly off the coast of VAFB, with animals typically concentrated in the kelp beds offshore of Purisima Point on North VAFB (SRS 2002a, 2002b), and offshore of Sudden Flats on south VAFB. Surveys conducted in 2006, as a monitoring requirement for a Delta IV launch, documented the presence of up to 55 adults in the near shore waters off the Sudden Flats area of south VAFB (SRS 2006a). This subspecies is frequently seen at the Vandenberg Harbor; however, these observations are generally short in duration and the individuals observed could be transient foragers. Southern sea otters are not known to breed at Vandenberg Harbor (R. Evans, United States Air Force, pers. comm. 2014). Southern sea otters have been documented in 2014, 2015, and 2016 at or directly adjacent to all of these locations according to VAFB GIS data, and 2018 density counts range from approximately zero to four individuals per 0.4 square mile of habitat along the coast (Hatfield et al. 2018, p. 7).

Monitoring data during launch activities since 1998 indicate that launch noise and security overflights do not substantially affect the number or activities of southern sea otter in the nearshore marine environments of VAFB (Service 2015, p. 4). No mortality, injury or abnormal behavior has ever been documented as a result of launch-related disturbance. In addition, the MQ-9 is much quieter than other aircraft and launch vehicles associated with the broader launch mission operations at VAFB.

Noise from operations and overflights by MQ-9 Reaper aircraft may affect southern sea otter in the vicinity of VAFB. Based on surrogate aircraft performance, an MQ-9 is estimated to be 9 decibels quieter while flying at 1,400 feet (the most common pattern altitude) above MSL than a representative 'middle-of-the-road' transient aircraft (KC-135R) while flying at 1,900 feet above MSL. Because the surrogate aircraft has a larger engine, the actual noise levels would be lower for MQ-9 flights. The Air Force modeled operation of the MQ-9 aircraft at the overflight point closest to the southern sea otter haulout location at Purisima Point, which is passed during a left-turning closed pattern procedure. These models indicate a maximum noise level of 63 dBA at 30 percent engine power and at 1,400 feet above MSL, which is substantially quieter than aircraft currently operating at VAFB.

The Air Force proposes to implement the following measures to avoid adverse effects to the southern sea otter:

1. No construction or other ground-disturbing activities are proposed within or near any known southern sea otter habitat.
2. Operation of the MQ-9 aircraft will adhere to existing programmatic flight restrictions to reduce noise effects (NOAA NMFS 2019, p. 2; Service 2015, pp. 14-15). These restrictions include:
    - Except during takeoff and landing, UAS will not be flown below 1,000 feet over Purisima Point.
    - From March 1 through September 30:
        - Pilots will climb to 1,900 feet ASL over the Purisima Point area.
        - Circling approaches to the southwest are prohibited unless flight safety dictates otherwise.
        - For air traffic approaching from the right to Runway 12, aircraft conducting rectangular/closed traffic patterns will delay base turn until near Purisima Point.
        - For air traffic approaching from the left to Runway 30, aircraft conducting rectangular/closed traffic patterns will execute a crosswind turn prior to the departure end of the runway. If unable to execute a crosswind turn prior to the departure end of the runway, then they will fly runway heading and climb to 1,900 feet above MSL before turning crosswind.

We concur with your determination that the proposed activities may affect, but are not likely to adversely affect, southern sea otter. Our concurrence is based on monitoring data that indicate operation of the MQ-9 aircraft is unlikely to have more than an insignificant and discountable effect on this subspecies. Additionally, the Air Force will implement the aforementioned measures to further minimize potential effects to the southern sea otter.

Consultation History

We received your May 5, 2020, request for formal consultation in our office on May 5, 2020 (Kephart, in litt. 2020).

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The Air Force proposes development of new infrastructure as well as regular training and operations to support their mission by bringing the MQ-9 project to north Vandenberg Air Force Base. The MQ-9 Reaper is an armed, multi-mission, medium-altitude, long-endurance Remotely

Piloted Aircraft (RPA) employed primarily against dynamic execution targets and secondarily as an intelligence collection asset.

MQ-9 aircraft

The MQ-9 is similar in size to a Cessna 208 Caravan single-engine turboprop and is 36 feet long with 66-foot total wingspan and a cruising speed of 230 miles per hour. The MQ-9 is a propeller-driven aircraft powered by a 950-horsepower turboprop engine and is not capable of supersonic speeds or booms. Because measured MQ-9 noise levels are sensitive information, the T-6 aircraft, which is powered by a 1,100-horsepower turboprop engine, was used as a conservative source-noise-level surrogate. Noise levels presented in Table 1 were modeled to represent a left-turning visual closed pattern on Runway 30 at an overflight distance closest to Purisima Point.

Aircraft	Maximum Noise Level (A-weighted decibels) at Purisima Point	Altitude (feet above mean sea level)	Engine Power Setting (while at pattern altitude)
MQ-9 (Direct departure), single-engine, propeller-driven (proposed mission)	69	1,400	100% Torque
MQ-9 (Left-turning closed pattern procedure), single-engine, propeller-driven (proposed mission)	63	1,400	30% Torque

Table 1 MQ-9 Noise Generation

The Air Force proposes aircraft operations including proficiency training for the MQ-9 aircrews and maintenance personnel. The Air Force proposes sorties (maneuvers) to occur 5 days per week during 235 flying days per year that may last approximately 12 hours in duration within a 16-hour window. Table 2 identifies proposed MQ-9 flying sorties for the 24 MQ-9 aircraft.

Total MQ-9 RPA's- 24	Daily Sorties	Annual Sorties
Daily sorties	Up to 12 hours (within a 16-hour window)	Up to 2,820
Nighttime sorties	From 2-10 of the daily sorties	Up to 2,200 of the annual sorties would occur at least partially during nighttime
Sorties deploying inert munitions at ranges approved for the inert munitions	From 2-4 of the daily sorties	200 of the annual sorties

Table 2 MQ-9 Operations

The Air Force anticipates the total number of annual sorties to be 2,820, with a flying schedule that may include daytime and nighttime flights, and may require an average daily flying window of 16 hours. With a possible mission duration of up to 12 hours, as many as 2,200 of the 2,820 total annual sorties may occur, at least partially, during nighttime. Daily proficiency training sorties would typically depart and return to VAFB. During a typical weekday, MQ-9 aircraft would normally conduct 4 hours of daily pattern work to the west and/or east of the base runway. Various factors would determine which pattern might be flown, including meteorological conditions, seasonal flight restrictions, and altitude above on-base housing. Deviations from this routine proficiency training would occur during exercise scenarios that typically involve ground and/or other aircraft.

New Construction and Renovations

The Air Force proposes the following new construction and renovations to support the MQ-9 operations at VAFB (Table 3):

Building	Description
Operations Complex	Renovation of the interior of Building 8401
Maintenance Complex	Construct a new 20,000-sqare foot (sf) facility on the north side of the runway off the east end of the runway.
Ground Data Terminal Foundations and Tower	Construct up to seven Ground Data Terminal 12-foot by 12-foot concrete foundations and towers (up to 60 feet tall) along the northeast side of the runway. In order to perform maintenance, a 12-foot wide, one-lane Access Road is proposed to connect to the three towers that would not be accessible from existing airfield taxiway pavement.
Fitness Center	Construct a 38,700-sf addition to the existing fitness center within the highly developed cantonment area.
Airman Dormitory	Construct a 68,200-sf new dormitory within the highly developed cantonment area.
Infrastructure and Communications Conduit Extensions	Power, base communication, water, and wastewater lines would need to be extended to facilities. Infrastructure capabilities are accessible to all facilities and can normally be extended to the facilities using disturbed corridors.

Table 3 Proposed New Construction and Renovations

AVOIDANCE AND MINIMIZATION MEASURES

The Air Force will implement the measures described below to avoid and/or minimize adverse effects from the proposed project, including habitat restoration activities at sites where the Lompoc yerba santa, California red-legged frog, and vernal pool fairy shrimp can occur.

1. To avoid or minimize impacts to Lompoc yerba santa localities along the southern project, the Air Force will install and maintain a 100-foot buffer fence around plant occurrences.

2. Project construction activities, primarily habitat removal, will occur during the dry season to the maximum extent possible.
3. Prior to the onset of construction activities each day, a Service-approved biologist will conduct a survey of the active project site if potential suitable California red-legged frog habitat is present. The Service-approved biologist will relocate all life stages of California red-legged frogs found in the proposed project site to the nearest suitable habitat outside of the area but within the same watershed.
4. Equipment maintenance and refueling will be conducted at least 250 feet away from riparian habitats and wetlands.
5. A qualified biological monitor will conduct pre-project training for all workers. At a minimum, the training would include a description of the listed species occurring in the area, and the general and specific measures and restrictions to protect these species during project implementation.
6. Mapped vernal pool fairy shrimp potential habitat and features will be avoided to the extent possible, particularly those within the disturbance boundary but outside of the permanent construction footprint. Sedimentation and downstream contaminant controls of pools in the vicinity of proposed construction will also be implemented using drift fences and possibly small sandbag barriers to block potentially contaminated run-off from getting into a potential pool.
7. The Air Force will update the current Lompoc Yerba Santa Workplan to include additional future enhancement and restoration at the 35th Street Lompoc yerba santa population site and will:
    - Establish a mitigation/restoration program utilizing past restoration planning (MSRS 2012) as a basis and incorporating information collected from the Maintenance Complex site.
    - Offset impacts to occupied habitat through enhancement (primarily invasive species removal) of the existing population at the 35th Street location at a 3:1 ratio (habitat enhanced: habitat affected). The remaining 37.40 acres locations on VAFB may be incorporated into mitigation and restoration planning in coordination with the Service.
8. For all unavoidable occupied habitat removal, include an evaluation of known localities and incorporate information from the recent Santa Barbara Botanic Garden Lompoc Yerba Santa Genetics Program. Seed and samples of vegetative cuttings were gathered from Lompoc yerba santa within the proposed Maintenance Complex site and will be included in the propagation, outplanting, and maintenance program on VAFB.
9. The Air Force previously identified 33 unoccupied pools, primarily in areas south and southwest of the airfield, as opportunities for future enhancement and prioritized/ranked the pools based on their potential for restoration and to function as suitable habitat for vernal pool fairy shrimp. Based on this previous effort, the Air Force will prepare and submit a mitigation and enhancement plan to the Service including, but not limited to, a description of the proposed enhancement activities, identification of success criteria, and a monitoring plan to ensure objectives are met. The plan will prioritize higher-ranked pools for enhancement. Other general planning considerations at VAFB will be considered when determining the prioritization of pools considered for enhancement.
10. As part of the mitigation and enhancement plan, proposed loss of mapped vernal pool fairy shrimp habitat associated with the Maintenance Complex (approximately 5.87

acres), defined as "mowed/managed," will be restored at a ratio of 3:1 (habitat enhanced:habitat affected). The remainder of mapped vernal pool fairy shrimp habitat (not including "mowed/managed," approximately 0.86 acre) will be restored at a 1:1 ratio (habitat enhanced:habitat affected).

ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATION

Section 7(a)(2) of the Endangered Species Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. "Jeopardize the continued existence of" means "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR 402.02).

The jeopardy analysis in this biological opinion relies on four components: (1) the Status of the Species, which describes the range-wide condition of Lompoc yerba santa, California red-legged frog, and vernal pool fairy shrimp, the factors responsible for that condition, and survival and recovery needs; (2) the Environmental Baseline, which analyzes the condition of Lompoc yerba santa, California red-legged frog, and vernal pool fairy shrimp in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of Lompoc yerba santa, California red-legged frog, and vernal pool fairy shrimp; (3) the Effects of the Action, which determines the impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on Lompoc yerba santa, California red-legged frog, and vernal pool fairy shrimp; and (4) the Cumulative Effects, which evaluates the effects of future, non-Federal activities, that are reasonably certain to occur in the action area, on Lompoc yerba santa, California red-legged frog, and vernal pool fairy shrimp.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the current status of Lompoc yerba santa, California red-legged frog, and vernal pool fairy shrimp, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to reduce appreciably the likelihood of both the survival and recovery of these species in the wild by reducing the reproduction, numbers, and distribution of that species.

STATUS OF THE SPECIES

Lompoc yerba santa

<u>Legal Status</u>

Lompoc yerba santa was federally listed as endangered on March 20, 2000 (65 FR 14888). Critical habitat for the species was designated on November 7, 2002 (67 FR 67968). A 5-year review was completed for Lompoc yerba santa by the Service in 2011 and it does not yet have a recovery plan. Lompoc yerba santa was listed as rare by the State of California in 1979 (California Department of Fish and Wildlife [CDFW] 2019a).

Natural History

Lompoc yerba santa is a rhizomatous, perennial and evergreen shrub in the Namaceae (*Nama*) family. It has sticky stems and grows up to approximately three meters (9.8 feet) tall. It has narrow, linear, sessile (attached directly by the base) leaves that are typically between four and nine centimeters (1.5 to 3.5 inches) long. The undersides of the leaves are covered in felty, tomentose (woolly, long) hairs and the margins are strongly rolled under. The head-like inflorescence has lavender, funnel-shaped corollas that are six to 15 millimeters (0.2 to 0.6 inch) long and the flowers typically bloom between April and July. The fruits are capsules with four valves and each fruit produces up to five seeds. Lompoc yerba santa is distinguished from other closely related species by its linear leaves and compact, head-like inflorescences (Jepson Flora Project 2019).

Lompoc yerba santa occurs in maritime chaparral, coastal sage scrub, and bishop pine (*Pinus muricata*) forest habitats. All three of these plant communities are considered to be sensitive by CDFW (2018). Other commonly co-occurring species within these habitat types include: ceanothus (*Ceanothus* spp.), black sage (*Salvia mellifera*), coyote brush (*Baccharis pilularis*), California sagebrush (*Artemisia californica*), bush poppy (*Dendromecon rigida*), California scrub oak (*Quercus berberidifolia*), and manzanita (*Arctostaphylos* spp.). Lompoc yerba santa is most frequently associated with sandstone substrates, however several of the occurrences arealso associated with alluvium and diatomaceous shale. Soils associated with Lompoc yerba santa are highly variable and tend to be high in sandy components, acidic, and well-drained (Service 2011, entire; CDFW 2019, 2019b).

This species is capable of both sexual and asexual reproduction. However, it typically spreads vegetatively via the production of many underground rhizomes. Therefore, what appears to be a colony of individuals is usually a single plant (referred to as a genet) that is composed of many genetically identical above ground stems (called ramets). Lompoc yerba santa is considered an early-successional and edge species. It is often found in disturbed areas, along roadsides and in road cuts, and other more open areas such as rocky terraces and upper hillslopes. It seems to maximize the use of its asexual attributes to readily colonize the outer edges of thicker vegetative stands and other openings in the canopy. Lompoc yerba santa is self-incompatible, meaning that pollen from genetically distinct individuals is required to produce viable seed. The species typically has low seed production and therefore, generally exhibits low genetic diversity. Experimentally self-pollinated flowers produced a mean of 0.03 seed per fruit and cross-pollinated flowers a mean of 1.77 seeds per fruit. Little is known about seed germination rates, length of persistence of the seed bank, and recruitment by sexual reproduction of the species (Service 2011, entire; CDFW 2019). Roof (1988, page 22 and 34) showed that a small percentage of Lompoc yerba santa seed is viable when stratified and that most *Eriodictyon* species likely have low germination in the wild. Seed across the genus is considered refractory, meaning generally difficult to germinate and that they are all species with considerably low germination (Roof 1988, page 19).

Many *Eriodictyon* species are considered fire followers, or fire-resistant, because they have long-lived seed banks that germinate readily during the first spring after a fire event; or because they are able to successfully re-sprout stems from their underground rhizomes post fire (Kofron et al.

2019, page 26; Gamboa-deBuen and Orozco-Segovia 2008, page 20). This is likely also true for Lompoc yerba santa seed given the fire-adapted habitat types that it occurs in. However, these conclusions are largely extrapolated and species specific studies on these topics have not yet been conducted. Similarly, the particular seed germination cues for the species are unknown. Seed germination in other *Eriodictyon* species is triggered by variable combinations of heat from fire, smoke, and exposure to charate, which is charred wood that contains leachable chemicals shown to stimulate germination (Keeley and Nitzberg 1984, page 208-209; Keeley 1987, page 441; Gamboa-deBuen and Orozco-Segovia 2008, page 20-21; Keeley 1991, page 87). Therefore, we presume that seed germination cues for Lompoc yerba santa are similar to those of other species in the genus.

The specific pollination ecology of Lompoc yerba santa has not yet been evaluated. Other species within *Eriodictyon* have long been thought to be pollinated primarily by bees (Moldenke 1976, page 335). Several different species of *Eriodictyon* have been observed interacting in various capacities with a wide diversity of insects including: bees, ants, beetles, butterflies, aphids, and flies (Kofron et al. 2019, page 24; Messinger and Griswold 2002, page 37; Kremen et al. 2002, page 46; Dobson 1993, page 82). Any of these insects, especially bees, are likely effective pollinators for Lompoc yerba santa and may play a role in the sexual reproduction of the species.

<u>Rangewide Status</u>

The species is currently known from six California Natural Diversity Database (CNDDB) element occurrences and two additional localities that are not yet included in the database (CDFW 2019 and Lum 2019a and b). All eight of the known localities occur in western Santa Barbara County. Five of the known Lompoc yerba santa localities occur on Vandenberg Air Force Base (VAFB) and the other three are found on private lands. All of the known occurrences are presumed extant, except for one (CNDDB Element Occurrence No. 10) that is likely extirpated and is mapped within VAFB. There are presently no conservation easements or any other protective agreements established for the species at any of these locations and it is not being actively managed for conservation at any of these sites.

In general, we recognize four geographic populations of Lompoc yerba santa that are based on the known localities and current distribution of the species throughout its range. These geographic populations, from the north to the south, are as follows:

1) Solomon Hills: This geographic population is comprised of two known localities, CNDDB Element Occurrences No. 1 and No. 11. CNDDB Element Occurrence No. 1 is within bishop pine forest habitat. CNDDB Element Occurrence No. 11 is the largest known stand of the species and it occurs within coastal sage scrub and chaparral habitat types. The Solomon Hills geographic population of the species is located south of the town of Orcutt, west of U.S. Route 101, north of San Antonio Creek, and east of State Route 1. The entire property is privately owned and in active oil extraction and production by the Pacific Coast Energy Company.

2) Burton Mesa: There are four known localities within this geographic population including CNDDB Element Occurrences No. 2, No. 9, and No. 10. In addition, there is a fourth known locality within this geographic population, (located further to the north than the other three element occurrences) that has not yet been reported to the CNDDB. Element Occurrence No. 2 occurs within bishop pine forest and maritime chaparral habitat types. Element Occurrences No. 9 and No. 10 and the newest locality all occur within maritime chaparral plant communities. These four known Lompoc yerba santa localities occur within the boundaries of VAFB and are in the northern portion of the base; generally north of the Santa Ynez River, east of State Route 1, south of San Antonio Creek, and east of the Pacific Ocean. The species is included in the VAFB Integrated Natural Resources Management Plan (INRMP), which is a base-wide planning document designed to implement strategies and programs to conserve and protect biological resources within the base. INRMP documents are generally updated every five years.

3) Lompoc Terrace: There is only one known locality of the species within this geographic population and it has not yet been included in the CNDDB. This occurrence is comprised of two known colonies that are located in close proximity (less than 0.4 kilometers or 0.25 mile) to each other. Therefore, they are considered a single occurrence that is located within bishop pine and maritime chaparral habitats. The Lompoc Terrace geographic population also occurs within the boundaries of VAFB and is in the southern portion of the base. It generally occurs west of the City of Lompoc, north of Cañada Honda Creek, east of the Pacific Ocean, and south of the Santa Ynez River.

4) Santa Ynez Mountains: This geographic population is comprised of a single occurrence; CNDDB Element Occurrence No. 5 and it occurs within maritime chaparral habitat. This population is generally located south of Jalama Creek, due east and north of the Pacific Ocean, and west of U.S. Route 101. The property is privately owned and located within the limits of the Hollister Ranch cattle ranch and exclusive residential development.

Recovery

Lompoc yerba santa does not yet have a recovery plan. No conservation easements or other management plans for protection of the species are currently established for any of the properties that support known occurrences. Therefore, at present little is being done for recovery of the species. Potential recovery actions that may benefit Lompoc yerba santa may include: annual census surveys at extant occurrences to assess the status and identify threats, surveys in adjacent areas with suitable habitat for new occurrences, habitat management activities, (such as controlled burns, invasive weed management, and selective thinning of surrounding vegetation), and pursuit of conservation easements and other protective agreements to support recovery of the species with land owners and stakeholders.

California red-legged frog

Legal Status

The California red-legged frog was federally listed as threatened on May 23, 1996 (61 Federal Register (FR) 25813). Revised critical habitat for the California red-legged frog was designated on March 17, 2010 (75 FR 12816). The Service issued a recovery plan for the species on May 28, 2002 (Service 2002).

Natural History

The California red-legged frog uses a variety of habitat types, including various aquatic systems, riparian, and upland habitats. They have been found at elevations ranging from sea level to approximately 5,000 feet. California red-legged frogs use the environment in a variety of ways, and in many cases, they may complete their entire life cycle in a particular area without using other components (i.e., a pond is suitable for each life stage and use of upland habitat or a riparian corridor is not necessary). Populations appear to persist where a mosaic of habitat elements exists, embedded within a matrix of dispersal habitat. Adults are often associated with dense, shrubby riparian or emergent vegetation and areas with deep (greater than 1.6 feet) still or slow-moving water; the largest summer densities of California red-legged frogs are associated with deep-water pools with dense stands of overhanging willows (*Salix* spp.) and an intermixed fringe of cattails (*Typha latifolia*) (Hayes and Jennings 1988, p. 147). Hayes and Tennant (1985, p. 604) found juveniles to seek prey diurnally and nocturnally, whereas adults were largely nocturnal.

California red-legged frogs breed in aquatic habitats; larvae, juveniles, and adult frogs have been collected from streams, creeks, ponds, marshes, deep pools and backwaters within streams and creeks, dune ponds, lagoons, and estuaries. They frequently breed in artificial impoundments such as stock ponds, given the proper management of hydro-period, pond structure, vegetative cover, and control of exotic predators. While frogs successfully breed in streams and riparian systems, high spring flows and cold temperatures in streams often make these sites risky egg and tadpole environments. An important factor influencing the suitability of aquatic breeding sites is the general lack of introduced aquatic predators. Accessibility to sheltering habitat is essential for the survival of California red-legged frogs within a watershed and can be a factor limiting population numbers and distribution.

During periods of wet weather, starting with the first rains of fall, some individual California red-legged frogs may make long-distance overland excursions through upland habitats to reach breeding sites. In Santa Cruz County, Bulger et al. (2003, p. 90) found marked California red-legged frogs moving up to 1.7 miles through upland habitats, via point-to-point, straight-line migrations without regard to topography, rather than following riparian corridors. Most of these overland movements occurred at night and took up to 2 months. Similarly, in San Luis Obispo County, Rathbun and Schneider (2001, p. 1302) documented the movement of a male California red-legged frog between two ponds that were 1.78 miles apart in less than 32 days; however, most California red-legged frogs in the Bulger et al. (2003, p. 93) study were non-migrating frogs and always remained within 426 feet of their aquatic site of residence (half of the frogs always stayed within 82 feet of water). Rathbun et al. (1993, p. 15) radio-tracked three California red-legged frogs near the coast in San Luis Obispo County at various times between July and January; these frogs also stayed close to water and never strayed more than 85 feet into upland vegetation. Scott (2002, p. 2) radio-tracked nine California red-legged frogs in East Las Virgenes Creek in Ventura County from January to June 2001, which remained relatively sedentary as well; the longest within-channel movement was 280 feet and the farthest movement away from the stream was 30 feet.

After breeding, California red-legged frogs often disperse from their breeding habitat to forage and seek suitable dry-season habitat. Cover within dry-season aquatic habitat could include boulders, downed trees, and logs; agricultural features such as drains, watering troughs, spring boxes, abandoned sheds, or hay-ricks, and industrial debris. California red-legged frogs use small mammal burrows and moist leaf litter (Rathbun et al. 1993, p. 15; Jennings and Hayes 1994 p. 64); incised stream channels with portions narrower and deeper than 18 inches may also provide habitat (61 FR 25814). This type of dispersal and habitat use, however, is not observed in all California red-legged frogs and is most likely dependent on the year-to-year variations in climate and habitat suitability and varying requisites per life stage.

Although the presence of California red-legged frogs is correlated with still water deeper than approximately 1.6 feet, riparian shrubbery, and emergent vegetation (Jennings and Hayes 1994, p. 64), California red-legged frogs appear to be absent from numerous locations in its historical range where these elements are well represented. The cause of local extirpations does not appear to be restricted solely to loss of aquatic habitat. The most likely causes of local extirpation are thought to be changes in faunal composition of aquatic ecosystems (i.e., the introduction of non-native predators and competitors) and landscape-scale disturbances that disrupt California red-legged frog population processes, such as dispersal and colonization. The introduction of contaminants or changes in water temperature may also play a role in local extirpations. These changes may also promote the spread of predators, competitors, parasites, and diseases.

<u>Rangewide Status</u>

The historical range of the California red-legged frog extended coastally from southern Mendocino County and inland from the vicinity of Redding, California, southward to northwestern Baja California, Mexico (Storer 1925, p. 235; Jennings and Hayes 1985, p. 95; Shaffer et al. 2004, p. 2673). The California red-legged frog has sustained a 70 percent reduction in its geographic range because of several factors acting singly or in combination (Davidson et al. 2001, p. 465).

Over-harvesting, habitat loss, non-native species introduction, and urban encroachment are the primary factors that have negatively affected the California red-legged frog throughout its range (Jennings and Hayes 1985, pp. 99-100; Hayes and Jennings 1988, p. 152). Habitat loss and degradation, combined with over-exploitation and introduction of exotic predators, were important factors in the decline of the California red-legged frog in the early to mid-1900s. Continuing threats to the California red-legged frog include direct habitat loss due to stream alteration and loss of aquatic habitat, indirect effects of expanding urbanization, competition or predation from non-native species including the bullfrog, catfish (*Ictalurus* spp.), bass

(*Micropterus* spp.), mosquito fish (*Gambusia affinis*), red swamp crayfish (*Procambarus clarkii*), and signal crayfish (*Pacifastacus leniusculus*). Chytrid fungus (*Batrachochytrium dendrobatidis*) is a waterborne fungus that can decimate amphibian populations, and is considered a threat to California red-legged frog populations.

A 5-year review of the status of the California red-legged frog was initiated in May 2011, but has not yet been completed.

Recovery

The 2002 final recovery plan for the California red-legged frog (Service 2002) states that the goal of recovery efforts is to reduce threats and improve the population status of the California red-legged frog sufficiently to warrant delisting. The recovery plan describes a strategy for delisting, which includes: (1) protecting known populations and reestablishing historical populations; (2) protecting suitable habitat, corridors, and core areas; (3) developing and implementing management plans for preserved habitat, occupied watersheds, and core areas; (4) developing land use guidelines; (5) gathering biological and ecological data necessary for conservation of the species; (6) monitoring existing populations and conducting surveys for new populations; and (7) establishing an outreach program. The California red-legged frog will be considered for delisting when:

1. Suitable habitats within all core areas are protected and/or managed for California red-legged frogs in perpetuity, and the ecological integrity of these areas is not threatened by adverse anthropogenic habitat modification (including indirect effects of upstream/downstream land uses).
2. Existing populations throughout the range are stable (i.e., reproductive rates allow for long-term viability without human intervention). Population status will be documented through establishment and implementation of a scientifically acceptable population monitoring program for at least a 15-year period, which is approximately 4 to 5 generations of the California red-legged frog. This 15-year period should coincide with an average precipitation cycle.
3. Populations are geographically distributed in a manner that allows for the continued existence of viable metapopulations despite fluctuations in the status of individual populations (i.e., when populations are stable or increasing at each core area).
4. The species is successfully reestablished in portions of its historical range such that at least one reestablished population is stable/increasing at each core area where California red-legged frog are currently absent.
5. The amount of additional habitat needed for population connectivity, recolonization, and dispersal has been determined, protected, and managed for California red-legged frogs.

The recovery plan identifies eight recovery units based on the assumption that various regional areas of the species' range are essential to its survival and recovery. The recovery status of the California red-legged frog is considered within the smaller scale of recovery units as opposed to the overall range. These recovery units correspond to major watershed boundaries as defined by U.S. Geological Survey hydrologic units and the limits of the range of the California red-legged frog. The goal of the recovery plan is to protect the long-term viability of all extant populations within each recovery unit.

Within each recovery unit, core areas have been delineated and represent contiguous areas of moderate to high California red-legged frog densities that are relatively free of exotic species such as bullfrogs. The goal of designating core areas is to protect metapopulations that combined with suitable dispersal habitat, will support long-term viability within existing populations. This management strategy allows for the recolonization of habitat within and adjacent to core areas that are naturally subjected to periodic localized extinctions, thus assuring the long-term survival and recovery of the California red-legged frog.

Vernal pool fairy shrimp

Legal Status

The Service listed vernal pool fairy shrimp (*Branchinecta lynchi*) as a threatened species on September 19, 1994 (59 FR 48136). We first designated critical habitat for four vernal pool crustaceans (inclusive of vernal pool fairy shrimp) and 11 vernal pool plants in 34 counties in California and one county in southern Oregon on August 6, 2003 (68 FR 46683). We published a revised designation of critical habitat, with a re-evaluation of non-economic exclusions, on August 11, 2005 (70 FR 46924). On February 10, 2006, the Service published a final rule providing species-specific unit descriptions and maps identifying the critical habitat for each of the 15 species. The recovery plan for vernal pool ecosystems of California and southern Oregon also addresses vernal pool fairy shrimp (Service 2005, pp. 11-19 1 to 11-203). The Service published its most recent 5-year review for vernal pool fairy shrimp in 2007 (Service 2007, 75 pp.).

Natural History

The vernal pool fairy shrimp is a small (generally less than 2.54 centimeters/1 inch) freshwater crustacean in the order Anostraca. Like other anostracans, it has stalked compound eyes and eleven pairs of phyllopods (swimming legs that also function as gills). This species is genetically distinct from other *Branchinecta* species and distinguished by the morphology of the male's second antenna and the female's short, pear-shaped brood pouch (Service 2005, p. 11-9 1). It is a non-selective filter-feeder and, like other species of fairy shrimp, serves as a food source for a diversity of wildlife, including insects, tadpoles, frogs, salamanders, shorebirds, ducks, and even other fairy shrimp.

Vernal pool fairy shrimp occur in vernal pools and other seasonally inundated features. It is a short-lived species and, as with other fairy shrimp, spends the majority of its life cycle as a resting egg (often referred to as a cyst) in the dried soils of the seasonally inundated features in which it occurs. The number of eggs produced per clutch and how many clutches can be generated during a female's lifetime is unknown (Erikson and Belk, p. 93). Resting eggs fall to the basin bottom or remain in the brood sac until the female dies and sinks (68 FR 46687). Fairy shrimp resting eggs are capable of withstanding heat, cold, and prolonged desiccation and persist in the soil for an unknown number of years to hatch when conditions are favorable (68 FR 46687).

As a cool-water species, vernal pool fairy shrimp resting eggs hatch when vernal pools or other depressional features fill during winter storms and water temperatures are approximately 100 Centigrade (C)/50° Fahrenheit (F) (Eriksen and Belk 1999, p. 93). The time to maturity and reproduction is dependent on water temperature and varies from as little as 18 days under optimal conditions (20° C/68° F) to 139 days, with 41 days being typical when water temperatures approximate 150 C/59° F (Eriksen and Belk, p. 93). The ability to mature quickly allows vernal pool fairy shrimp to occupy shallow pools that experience short periods of inundation. Immature and adult shrimp typically die when water temperatures rise to 24° C/ 750 F (Helm 1998, p. 137). Vernal pool fairy shrimp may experience more than one hatch in a feature during a single wet season if conditions are appropriate. Not all of the resting eggs hatch simultaneously and this provides a mechanism for survival if an inundation period is interrupted or too short in a given year (Gallagher 1996, p. 326).

Adult shrimp and resting eggs disperse by passively adhering to waterfowl and other migratory birds, domestic animals (e.g., cattle), and native wildlife as well as through water movement between suitable habitat and by adhering to wind-blown dust (Eriksen and Belk 1999, p. 62).

Rangewide Status

The vernal pool fairy shrimp is endemic to California with the exception of a single isolated population in the Agate Desert of Jackson County in southern Oregon. It has the widest geographic range of the federally listed vernal pool crustaceans; however, is seldom abundant when it occurs with other fairy shrimp species (Eriksen and Belk 1999, p. 93). Vernal pool fairy shrimp co-occur with the federally endangered Conservancy fairy shrimp (*Branchinecta conservatio*) and longhorn fairy shrimp (*B. longiantenna*) as well as several unlisted fairy shrimp species (e.g., *B. lindahli, B. mackini, Linderiella occidentalis*) (Eriksen and Belk 1999, p. 45).

The California Department of Fish and Wildlife's California Natural Diversity Database (CNDDB) identifies 769 occurrences for the vernal pool fairy shrimp (CNDDB 2019, unpaginated). The species range in California is discontinuous; however occurrences are known from the following counties: Alameda, Arnador, Butte, Calaveras, Colusa, Contra Costa, El Dorado, Fresno, Glenn, Kings, Los Angeles, Madera, Merced, Monterey, Napa, Placer, Riverside, Sacramento, San Benito, San Joaquin, San Luis Obispo, Santa Barbara, Shasta, Solano, Stanislaus, Sutter, Tehama, and Tulare (CNDDB 2019, unpaginated). In and around California's central coast, vernal pool fairy shrimp occur in vernal pools and other ephemerally ponded features from Monterey County (e.g., Fort Hunter-Liggett, Camp Roberts) south to western Santa Barbara County (e.g., Vandenberg Air Force Base, Santa Maria Airport, Cachuma Canyon), and Los Angeles County (e.g., Cruzan Mesa). To the east it occurs on the Los Padres National Forest in Ventura County, in and around Soda Lake within the Carrizo Plain National Monument and northern portions of San Luis Obispo County (e.g., City of Paso Robles)(Service 2005, pp. 11-94 to 11-95; Service files). Some of these occurrences were unknown or undocumented at the time of the final listing, designations of critical habitat, and completion of the recovery plan.

Maintaining the integrity of surrounding upland habitat is essential to support ecological conditions necessary for vernal pool fairy shrimp to complete their life cycle. Habitat loss and fragmentation represent the largest threats to the survival and recovery of vernal pool fairy shrimp and other species restricted to vernal pools and other ephemerally ponded habitats typically the result of urbanization and habitat conversion to agriculture. Other activities that can degrade habitat include altered hydrology, water contamination, competition from nonnative and invasive species, incompatible grazing regimes, energy development, infrastructure Projects (e.g., roads, utility conveyance), recreational activities (e.g., off-highway vehicles), erosion, mosquito abatement activities, and a changing climate (Service 2007, p. 34). Approximately 75 percent of vernal pool fairy shrimp habitat was in the Central Valley was lost by 1997 (Holland 1998, pp. 7 1-75) and continued habitat loss for vernal pool and other listed fairy shrimp is estimated at a rate of 2 to 12 percent annually, depending on the region (Holland 2003, all).

Recovery

The Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon addressed 33 species, including the vernal pool fairy shrimp (Service 2005, pp. 11-19 1 to 11-203). The goal of this recovery plan is to achieve and protect, in perpetuity, self-sustaining populations of vernal pool fairy shrimp throughout the species' range and to delist the species. Habitat loss and fragmentation resulting from development and agricultural expansion are primary threats to vernal pool fairy shrimp, although normative invasive species and water quality degradation/contamination have also contributed to the species' decline. The overarching strategy for species' recovery is habitat protection and management. (Service 2007, P. 7). The Service's 5-year status review details those delisting criteria for vernal pool fairy shrimp (Service 2007, pp. 7-12). These criteria broadly encompass the following:

1. Habitat protection that promotes vernal pool ecosystem function sufficient to contribute to population viability of the covered species. This includes protection of suitable habitat within each prioritized core area and species occurrences distributed across the geographic and genetic ranges, species re-introductions/introductions, identification of additional occurrences, and monitoring and protection of hydrology essential to ecosystem function for an established length of time;
2. Adaptive habitat management and monitoring to include development of plans to facilitate maintenance of ecosystem function and population viability for protected habitat;
3. Status surveys, inclusive of status reviews and population monitoring and threats assessments;
4. Research that identifies actions necessary for recovery and conservation to include, but not necessarily be limited to, species' biology and ecology, habitat management and restoration, methods to eliminate or ameliorate threats, genetics, methods to measure population viability, and refinement of recovery criteria and actions; and
5. Participation and outreach, inclusive of establishment of a recovery implementation team and vernal pool regional working groups to oversee recovery efforts.

The Service's 5-year status review reports that while criteria relative to habitat protection, management, and monitoring and species introduction/reintroduction have been partially met, most recovery criteria have not been initiated or met (Service 2007, pp. 7-15). We do not have information indicating population or abundance trends for vernal pool fairy shrimp. Species surveys have increased our knowledge of the number of known occurrences including new occurrences in San Luis Obispo and Santa Barbara Counties; however, habitat loss, degradation, and fragmentation continues. The indirect effects of development (e.g., erosion, pesticide use, altered hydrology) on remaining habitat increasingly compound the effects of habitat loss on the species. The status review acknowledges that threats to the species have not decreased since listing and recommends the species maintain its threatened status (Service 2007, p. 47).

ENVIRONMENTAL BASELINE

Action Area

The implementing regulations for section 7(a)(2) of the Act define the "action area" as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 Code of Federal Regulations 402.02). The action area for this biological opinion includes all proposed building sites, proposed locations of temporary and permanent ground disturbance, and lands that occur within the expected 65-dB noise contours associated with noise-generating activities near the airfield (Figure 1).

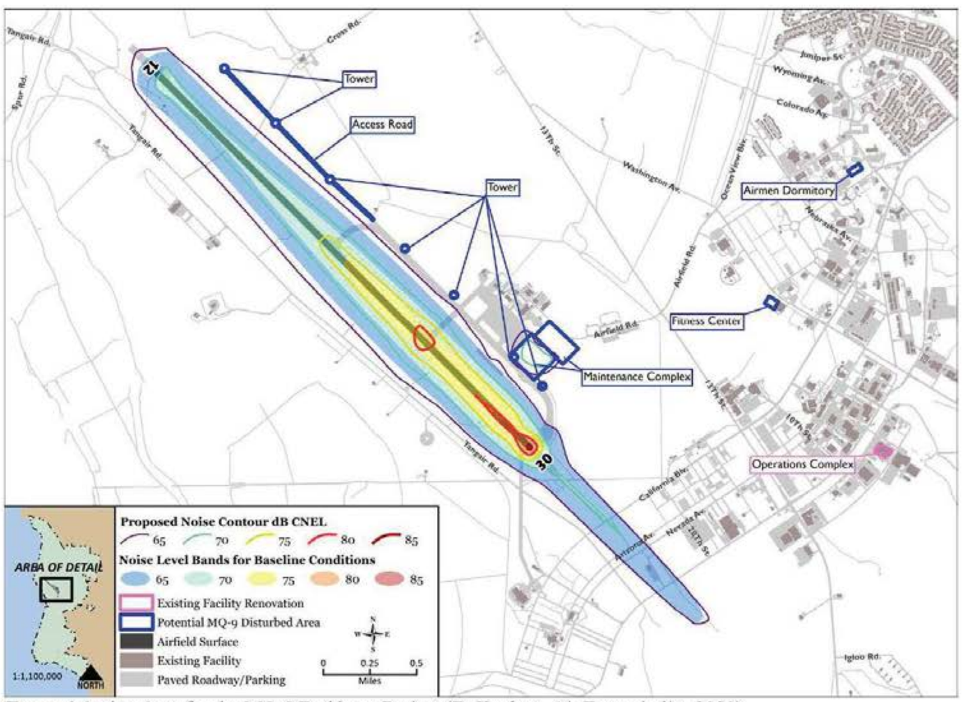

Figure 1 Action Area for the MQ-9 Beddown Project (B. Kephart, Air Force, in litt. 2020)

Habitat Characteristics of the Action Area

The action area for the proposed MQ-9 Beddown project lies within the greater Burton Mesa, which mostly consists of maritime chaparral and coastal dune scrub, intermixed with grassy openings, as well as the highly developed cantonment area on north VAFB.

Existing Conditions in the Action Area

The action area for the proposed MQ-9 Beddown project contains some developed or disturbed lands, existing paved and service roads running through parts of the proposed project site within maritime chaparral habitat. The 1.5-acre proposed site for the Airman Dormitory is in the developed cantonment area and consists of non-native grasses, forbs, and trees with evidence of past mowing and tree trimming. There are no permanent aquatic features and no evidence of past standing water.

The 35.8-acre proposed site for the Maintenance Complex is predominantly maritime chaparral and herb communities with some non-native invasive species present. Lompoc yerba santa was present at this site during project-specific biological surveys. This site also supports large depressional features primarily on the northwest and southwest borders that include indicators of seasonal ponding and standing water and support plant species typical of ephemeral (or intermittent) wetland or vernal pool communities, most of which are subjected to ongoing mowing and management associated with airfield operations. No permanent aquatic features are present at this site. Vernal pool fairy shrimp and California red-legged frogs are not known to occur at this proposed site, but these features are potentially suitable habitat for both species.

The 1.7-acre proposed site for the Fitness Center is located adjacent to an existing building and consists of native and non-native vegetation with saplings intermixed among maritime chaparral. The site has a 4-foot-wide emergent wetland that extends through the site, which appears to be connected to an ephemeral drainage feature on the southeastern edge of the area that could attract the California red-legged frog. California red-legged frog occurrences are approximately 1,000 feet south of the proposed Fitness Center site. Occupied vernal pool fairy shrimp habitat is also present approximately 200 feet northwest of the proposed Fitness Center site boundary.

The proposed tower and road locations consist of Burton Mesa chaparral habitat that is maintained for access purposes. The three northern tower locations are predominantly dense Burton Mesa chaparral habitat, which is considered potentially suitable habitat for Lompoc yerba santa; however, no occurrences of the species were found. The proposed access road site supports large depressional features with evidence of seasonal ponding and standing water, but no permanent aquatic features are present.

Previous Consultations in the Action Area

The Service has previously consulted on the effects of routine operations and maintenance activities at VAFB on the Programmatic Biological Opinion (Service 2015), which includes the action area. The Service concluded that these routine operations and maintenance activities would not jeopardize the continued existence of federally listed species, including Lompoc yerba santa, California red-legged frog, and vernal pool fairy shrimp.

Condition (Status) of the Species in the Action Area

Lompoc yerba santa

Approximately 4.52 acres of Lompoc yerba santa occupied habitat occurs within the proposed Maintenance Complex. Within this portion of the action area, there are approximately 45 plants. Lompoc yerba santa also has potential to occur in three northern tower locations by the presence of suitable habitat.

California Red-legged Frog

California red-legged frogs have not been observed in the action area, and all proposed project sites are outside the 689 feet known breeding dispersal distance observed in VAFB site-specific studies. No permanent aquatic features were present at any of the proposed project sites, but features with evidence of ponding or indicators of emergent wetlands do occur, therefore potential habitat for California red-legged frog could occur, resulting in potential occupancy. The closest known occurrences of California red-legged frog to any project area are approximately 1,000 feet to the south of the proposed Fitness Center site.

Vernal pool fairy shrimp

Suitable potentially occupied habitat has been associated with the Ground Data Terminal Control Tower and Access Road locations and the Maintenance Complex. The Maintenance Complex, Ground Data Terminal Tower and Access Road sites support large areas that include features with evidence of seasonal ponding, including indicators of vernal pool-type habitats (e.g., vernal pool and/or wetland indicator plants, surface soil cracks, biotic crust, evidence of ponding, and hydric soils). Many of these features within the project sites, to varying levels, have been impacted by invasive weed encroachment. In addition, approximately 5.87 acres of mapped vernal pool fairy shrimp habitat adjacent to the flightline is routinely subjected to mowing and grading associated with airfield operations and maintenance. Total occupied habitat for vernal pool fairy shrimp on VAFB is 84.1 acres, and 41.6 acres of potential habitat. The species, if present, is expected to occur in low densities within the action area and an abundant population is located nearby.

Recovery

Lompoc yerba santa

Lompoc yerba santa does not yet have a recovery plan, but the 5-year review lists recovery goals for the species, including developing a species specific survey method, conducting genetic and pollination studies, and conserving occupied habitat.

California red-legged frog

The action area and VAFB in general, are within the Northern Transverse Ranges and Tehachapi Mountains Recovery Unit for the California red-legged frog. The action area is also within the Santa Maria River-Santa Ynez River Core Area defined in the recovery plan (Service 2002). The recovery unit was described in the recovery plan as having a "high recovery status," meaning the unit supports many populations of the species, has many areas of high habitat quality, and threat levels that ranged from low to high.

Some protections are afforded to the California red-legged frog on VAFB due to implementation of the Air Force's Integrated Natural Resources Management Plan developed under the Sikes Act. The Air Force has implemented the following conservation measures to benefit California red-legged frogs on VAFB: (1) public outreach and education; (2) working with researchers from University of California Santa Barbara, the U.S. Geological Survey, and Department of the Navy, including chytridiomycosis studies; (3) surveys for new populations; (4) monitoring of known populations; and other actions. These efforts are consistent with the goals from the recovery plan of protecting known populations; protecting suitable habitat, corridors, and core areas; developing land use guidelines; gathering biological and ecological data necessary for conservation of the species; and monitoring existing populations and conducting surveys for new populations.

Vernal pool fairy shrimp

The Service's 2005 recovery plan for vernal pool species (Service 2005, 606 pp.) does not identify specific recovery goals for the action area, and the action area is not within a core recovery area identified by this plan. However, based on the recovery goals given for other vernal pool fairy shrimp populations identified in the 2005 recovery plan, protection of habitat and reintroduction to extirpated areas would be suitable recovery goals for the species in the action area.

EFFECTS OF THE ACTION

Effects of the Proposed Action on Lompoc yerba santa

The current occupied area on VAFB, using the latest data collected in 2018, encompasses 41.92 acres (41.25 acres on north VAFB and 0.67 acre on south VAFB). Effects to Lompoc yerba santa localities would include potential permanent removal of 4.52 acres of occupied habitat, containing approximately 45 plants, genets, and rhizomes, resulting in mortality of those individuals and an overall reduction in the larger distribution of the species on VAFB. The Air Force would implement measures to minimize the risk of adverse effects to Lompoc yerba santa by installing a buffer (i.e. fencing) around known occurrences where the plants will not be impacted by the construction of the building. Although the fencing would reduce the potential for removal of some plants, due to operations and maintenance of the facility (i.e. mowing), it is anticipated that these individuals could be removed over the life of the project if maintenance workers are unaware or if the protective fencing is not maintained. Because of this, we assume the loss of all 45 individuals known to occur in the project area. The Air Force will update the current Lompoc Yerba Santa Workplan to include additional future enhancement and restoration at the 35th Street Lompoc yerba santa population site, and provide seeds and samples Santa Barbara Botanic Garden Lompoc Yerba Santa Genetics Program.

Effects of the Proposed Action on California red-legged frog

The construction of the MQ-9 Beddown Project may have adverse effects on the California red-legged frog through trampling or crushing by personnel or vehicles. Since the proposed project is outside the locally documented dispersal range of the species, we expect the potential for this to occur is unlikely. The Air Force will minimize these effects by conducting daily surveys and having a Service approved biologist move California red-legged frogs out of harm's way to suitable habitat. The proposed avoidance and minimization measures would be effective at avoiding and minimizing effects on the California red-legged frog from potential trampling and crushing. We do not expect noise from construction or operations of the proposed project to result in effects to California red-legged frogs.

The removal of potential habitat, if occupied at the time of construction, may also cause injury or death of individuals if they are crushed or trapped or forced into adjacent habitat, or temporarily exposed to increased predation or reduced quality of foraging habitat. This habitat, potentially used for dispersal, foraging, and summer refugia, would be permanently removed as part of proposed construction activities.

Capture and relocation of California red-legged frogs could result in injury or death as a result of improper handling, containment, transport, or release into unsuitable habitat. Although survivorship for translocated California red-legged frogs has not been estimated, survivorship of translocated wildlife in general is reduced due to intraspecific competition, lack of familiarity with the location of potential breeding, feeding, and sheltering habitats, and increased risk of predation. Using qualified biologists as proposed, limiting the duration of handling, requiring proper transport of individuals, and identification of suitable relocation sites close to the area of capture should reduce these impacts. The relocation of individuals from work areas is expected to greatly reduce the overall level of injury and mortality, if any, which would otherwise occur if individuals were not removed. We conclude that adverse effects on the California red-legged frog from capture and relocation activities are low.

Effects of the Proposed Action on vernal pool fairy shrimp

Although protocol-level surveys have not been completed, the depressional features in the action area are presumed to be occupied by vernal pool fairy shrimp. The proposed project could affect all vernal pool fairy shrimp in the action area and will permanently remove up to 6.7 acres of suitable habitat for the species. Any individuals present within the features would be subject to trampling, crushing, and mortality of all life stages through permanent removal of habitat.

The Air Force will prepare a mitigation and enhancement plan to restore vernal pool habitat. These areas will provide more suitable habitat for the species on VAFB.

Effects on Recovery

Lompoc yerba santa

The Air Force previously developed a Lompoc Yerba Santa Workplan (MSRS 2012), and completed restoration work and collection in coordination with the Santa Barbara Botanic Garden for later outplanting at the 35th Street Lompoc yerba santa population site. While an updated Workplan is to be developed as part of the proposed project, the Air Force has identified the 35th Street Lompoc yerba santa population and restoration site as suitable for additional future enhancement and restoration activities associated with the proposed project. Other presently unidentified sites may also be proposed for enhancement through invasive species management in coordination with the Service. The current occupied area on VAFB, using the latest data collected in 2018, encompasses 41.92 acres (41.25 acres on north VAFB and 0.67 acre on south VAFB), with potential permanent removal of 4.52 acres (45 plants, genets, and rhizomes), of occupied habitat. The Workplan, once implemented, is expected to result in enhanced occupied habitat through invasive plant removal, as well as increased occurrences in previously unoccupied but suitable habitat.

California red-legged frog

The construction of the MQ-9 Beddown Project may have adverse effects on the California red-legged frog through trampling or crushing by personnel or vehicles however we expect the potential for loss of any individuals to be very low. Given the distance of proposed project activities from California red-legged frog occupied and potentially suitable habitat, and with incorporation of species-specific measures to avoid and/or minimize effects to the species, the potential for effects to recovery is low.

Vernal pool fairy shrimp

The amount and quality of habitat lost (6.7 acres of suitable habitat) relative to the distribution of the species on VAFB (84.1 acres), and within its larger range would not result in a substantial reduction in the sustainability of the species. The Air Force would minimize these effects further by enhancing other vernal pool fairy shrimp habitat that occurs on base. With incorporation of replacement and enhancement actions, the magnitude of effects on the local distribution of the species would be further reduced. Given the amount of remaining and potentially suitable habitat, and with incorporation of species-specific measures to avoid and/or minimize effects to the species, the potential for effects to recovery is low.

Summary of Effects

Lompoc yerba santa

The proposed project would affect Lompoc yerba santa given the occurrence of the species and suitable habitat within the action area. The proposed project would result in a permanent loss of 4.52 acres of occupied habitat (45 plants, genets, and rhizomes), out of the total 41.92 acres of occupied habitat on VAFB. The Air Force would minimize these effects by enhancing the remaining 37.40 acres of occupied habitat, and by developing an updated species level management plan.

California red-legged frog

We do not anticipate the proposed project to have substantial effects to California red-legged frogs given the known proximity of occupied habitat and limited suitable habitat within the action area. Should any California red-legged frog move into the proposed project, the proposed activities could cause temporary disturbance and/or and could result in mortality of some California red-legged frog adults. However, based on the limited spatial and temporal extent of proposed project impacts, and conservation measures to be implemented, we conclude that very few California red-legged frogs are likely to be killed or injured. We do not expect that local populations would be affected to a magnitude that would prevent them from sustaining themselves. We do not expect that the project would affect the ability of the Santa Maria River-Santa Ynez River Core Area to remain occupied by the species, provide connectivity between occupied areas, or provide dispersing individuals to colonize other areas.

Vernal pool fairy shrimp

The total occupied habitat for vernal pool fairy shrimp on VAFB is 84.1 acres, and 41.6 acres of potential habitat. The proposed project could affect all vernal pool fairy shrimp in the action area and will permanently remove up to 6.7 acres of suitable habitat for the species. The Air Force would minimize these effects by enhancing other vernal pool fairy shrimp habitat that occurs on base.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. We do not consider future Federal actions that are unrelated to the proposed action in this section because they require separate consultation pursuant to section 7 of the Act.

CONCLUSION

Lompoc yerba santa

Reproduction

The proposed project would result in a permanent loss of occupied and suitable habitat for Lompoc yerba santa. The Air Force would implement measures to minimize the risk of adverse effects to Lompoc yerba santa by installing a buffer (i.e. fencing) around known occurrences where the plants will not be impacted by the construction of the building. We do expect the permanent loss of approximately 45 plants, genets, and rhizomes, as well as 4.52 acres of suitable habitat, even with protective fencing installed because these plants are not guaranteed protection at this locality into perpetuity due to maintenance and operation of the building.

Numbers

All of the 45 known Lompoc yerba santa (plants, genets, and rhizomes) in the proposed site, as well as any genets or rhizomes, will be lost, as well as any future propagation. The exact number may vary due to densely vegetated proposed project location, and how the species is counted. The number of Lompoc yerba santa we expect to be affected by the proposed activities is small relative to VAFB populations and those in the entirety of the species' range. Therefore, we conclude that the proposed project would reduce the number in the action area but not significantly reduce the rangewide population.

Distribution

The proposed project would result in a permanent loss of 4.52 acres of occupied habitat (45 plants, genets, and rhizomes), out of the total 41.92 acres of occupied habitat on VAFB. The Air Force would minimize these effects by enhancing the remaining 37.40 acres of occupied habitat, and by developing an updated species level management plan, and conducting restoration work and collection of seeds and samples in coordination with the Santa Barbara Botanic Garden for later outplanting at the 35th Street Lompoc yerba santa population site. Therefore, we conclude that the effects of the proposed project would not substantially reduce the species' distribution either on VAFB or rangewide.

Recovery

The proposed action would not result in any substantial change in reproduction, population numbers, or distribution of Lompoc yerba santa and would not greatly impede the Service's ability to implement any of the measures identified in the recovery actions for the species. Therefore, we conclude that the proposed action would not appreciably reduce the likelihood of recovery of Lompoc yerba santa in the action area or rangewide.

Conclusion for the Lompoc yerba santa

After reviewing the current status of the Lompoc yerba santa, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the Air Force's proposal of the MQ-9 Beddown project and related activities on VAFB is not likely to jeopardize the continued existence of the Lompoc yerba santa, because:

1. The Project would not substantially reduce reproduction of the species either locally (on VAFB), or rangewide;
2. The Project would affect a small number of individuals, and would not appreciably reduce numbers of the Lompoc yerba santa at the VAFB level, or rangewide;
3. The Project would not appreciably reduce the species' distribution either locally (on VAFB), or rangewide; and
4. The Project would not cause any effects that would appreciably preclude our ability to recover the species.

California Red-legged Frog

Reproduction

The proposed project would not result in a loss of California red-legged frog breeding habitat and is not expected to adversely affect breeding behavior or effort. In addition, the Air Force would implement measures to minimize the risk of adverse effects to California red-legged during dispersal, breeding season, and during above-average wet conditions. Therefore, we do not expect that breeding efforts for the California red-legged frog would be affected by the proposed activities and conclude that the proposed project would not reduce California red-legged frog reproduction in the action area, in the Northern Transverse Ranges and Tehachapi Mountains Recovery Units, or rangewide.

Numbers

We are unable to determine the number of California red-legged frogs that could occur in the action area and may be affected by proposed project because existing survey data are insufficient to estimate population numbers, and the numbers of individuals in the action area likely vary from year to year. The proposed activities could affect individual California red-legged frogs to the point of injury or death, although we expect injury or mortality to be minimal based on the lack of known occupied habitat, the proximity of known occupied habitat, and the avoidance and minimization measures the Air Force has proposed. The number of California red-legged frogs we expect to be affected by the proposed activities is very small relative to VAFB populations and those in the entirety of the species' range. Therefore, we conclude that the proposed project would not reduce the number of California red-legged frog in the action area, in the Northern Transverse Ranges and Tehachapi Mountains Recovery Units, or rangewide.

Distribution

The proposed project could temporarily displace California red-legged frogs from portions of the action area and could cause injury or mortality; however, the Air Force would implement measures to minimize the risk of adverse effects on California red-legged frogs. Therefore, we conclude that the effects of the proposed project would not reduce the distribution of the California red-legged frog in the action area, in the Northern Transverse Ranges and Tehachapi Mountains Recovery Units, or rangewide.

Recovery

The proposed action would not result in any appreciable change in reproduction, population numbers, or distribution of the California red-legged frog and would not preclude the Service's ability to implement any of the measures identified in the recovery plan for the species. Therefore, we conclude that the proposed action would not appreciably reduce the likelihood of recovery of the California red-legged frog in the Northern Transverse Ranges and Tehachapi Mountains Recovery Units, or rangewide. The species, if present, is expected to occur in low densities within the action area and an abundant population is located nearby.

Conclusion for the California Red-legged Frog

After reviewing the current status of the California red-legged frog, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the Air Force's proposal of the MQ-9 Beddown project and related activities on VAFB is not likely to jeopardize the continued existence of the California red-legged frog, because:

1. The Project would not appreciably reduce reproduction of the species either locally, or rangewide;
2. The Project would affect a very small number of individuals and would not appreciably reduce numbers of the California red-legged frog at the local level, or rangewide;
3. The Project would not appreciably reduce the species' distribution either locally, or rangewide; and
4. The Project would not cause any effects that would appreciably preclude our ability to recover the species.

Vernal pool fairy shrimp

Reproduction

The proposed project would likely have a low effect on the reproductive capacity of the vernal pool fairy shrimp. Although the species would no longer be able to occupy the 6.7 acres of habitat in the action area that acreage is relative to the range of the species and abundant habitat and population is located nearby. The species would still be able to occupy nearby areas, and this reduction would be small relative to the overall range of the species. Total occupied habitat for vernal pool fairy shrimp on VAFB is 84.1 acres, and 41.6 acres of potential habitat.

Numbers

The proposed project would likely have a low effect on the numbers of the vernal pool fairy shrimp. The species, if present, is expected to occur in low densities within the action area and an abundant population is located nearby.

Distribution

The proposed project would have a low effect on the distribution of the vernal pool fairy shrimp. The species would no longer be able to occupy 6.7 acres near the range limit of the species. However, the species would continue to occupy nearby areas and this reduction would be small relative to the overall range of the species. Total occupied habitat for vernal pool fairy shrimp on VAFB is 84.1 acres, and 41.6 acres of potential habitat.

Recovery

The proposed project would likely have a low effect on the recovery of the vernal pool fairy shrimp. The affected area is small relative to the range of the species, if the species is present it is anticipated to occur in low abundance, and the species would continue to occupy permanently preserved habitat nearby and throughout VAFB and its range.

Conclusion for the vernal pool fairy shrimp

After reviewing the current status of the vernal pool fairy shrimp, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the Air Force's proposal of the MQ-9 Beddown project and related activities on VAFB is not likely to jeopardize the continued existence of the vernal pool fairy shrimp, because:

1. The Project would not substantially reduce reproduction of the species either locally (on VAFB), or rangewide;
2. The Project would affect a small number of potentially occupied pools, and would not appreciably reduce numbers of the vernal pool fairy shrimp at the VAFB level, or rangewide; and
3. The Project would not appreciably reduce the species' distribution either locally (on VAFB), or rangewide;
4. The Project would not cause any effects that would appreciably preclude our ability to recover the species.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened wildlife species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not the purpose of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

In June 2015, the Service finalized new regulations implementing the incidental take provisions of section 7(a)(2) of the Act. The new regulations also clarify the standard regarding when the Service formulates an Incidental Take Statement [50 CFR 402.14(g)(7)], from "…if such take may occur" to "…if such take is reasonably certain to occur." This is not a new standard, but merely a clarification and codification of the applicable standard that the Service has been using and is consistent with case law. The standard does not require a guarantee that take will result; only that the Service establishes a rational basis for a finding of take. The Service continues to rely on the best available scientific and commercial data, as well as professional judgment, in reaching these determinations and resolving uncertainties or information gaps.

Regulations adopted in 2015 allow for Incidental Take Statements to rely on the use of "surrogates" for estimating the amount of take that is reasonably certain to occur as a result of the proposed action in certain circumstances. To use a surrogate to estimate take, the following criteria must be met: (1) the Incidental Take Statement must describe the causal link between the surrogate and the take of the listed species; (2) the Incidental Take Statement must explain why it is not practical to express the amount or extent of anticipated take or to monitor take-related impacts in terms of individuals of the listed species; and (3) the Incidental Take Statement must set a clear standard for determining when the level of anticipated take of the listed species has been exceeded.

AMOUNT OR EXTENT OF TAKE

California red-legged frog

We anticipate that some California red-legged frogs could be taken as a result of the proposed action. We expect the incidental take to be in the form of injury and mortality. We cannot quantify the precise number of California red-legged frogs that may be taken as a result of the actions that Air Force has proposed because California red-legged frogs move over time; for example, animals may have entered or departed the action area over time. The protective measures proposed by Air Force are likely to prevent mortality or injury of most individuals during construction. In addition, finding a dead or injured California red-legged frog is unlikely. Consequently, we are unable to reasonably anticipate the actual number of California red-legged frogs that would be taken by the proposed project; however, we must provide a level at which formal consultation would have to be reinitiated. The Environmental Baseline and Effects Analysis sections of this biological opinion indicate that adverse effects to California red-legged frog would likely be low given they have not been regularly observed in the action area, and we, therefore, anticipate that take of California red-legged frogs would also be low. We also recognize that for every California red-legged frog found dead or injured, other individuals may be killed or injured that are not detected, so when we determine an appropriate take level we are anticipating that the actual take would be higher and we set the number below that level. Similarly, for estimating the number of California red-legged frogs that would be taken by capture, we cannot predict how many may be encountered for reasons stated earlier. While the benefits of relocation (i.e., minimizing mortality) outweigh the risk of capture, we must provide a limit for take by capture at which consultation would be reinitiated because high rates of capture may indicate that some important information about the species' in the action area was not apparent (e.g., it is much more abundant than thought). Conversely, because capture and relocation can be highly variable, depending upon the species and the timing of the activity, we do not anticipate a number so low that reinitiation would be triggered before the effects of the activity were greater than what we determined in the Effects Analysis. Therefore, if either 2 adult, subadult, or juvenile California red-legged frogs are found dead or wounded or if 5 adult, subadult, or juvenile California red-legged frogs are captured and relocated, during construction of the MQ-9 Beddown Project, the Air Force must contact our office immediately to reinitiate formal consultation. Project activities that are likely to cause additional take should cease as the exemption provided pursuant to section 7(o)(2) may lapse and any further take could be a violation of section 4(d) or 9.

Vernal pool fairy shrimp

We anticipate that all vernal pool fairy shrimp in the 6.7 acres of vernal pool habitat in the action area will be taken as a result of the proposed action. We expect the incidental take to be in the form of kill. Vernal pool fairy shrimp and their cysts are difficult to detect and thus quantifying mortality of vernal pool fairy shrimp as a result of project activities is unfeasible. Consequently, we are unable to reasonably anticipate the actual number of vernal pool fairy shrimp that would be taken by the proposed project; however, we must provide a level at which formal consultation would have to be reinitiated. The Environmental Baseline and Effects Analysis sections of this biological opinion indicate that adverse effects to the vernal pool fairy shrimp would likely be low given the size of the site and the expected low abundance of the species on the site, and we, therefore, anticipate that take of vernal pool fairy shrimp would also be low. Therefore, because of the difficulty in detecting incidental take of vernal pool fairy shrimp, we quantify take by measuring impacts to their habitat features. We anticipate up to 6.7 acres of vernal pool habitat containing vernal pool fairy shrimp will be removed such that these features can no longer support vernal pool fairy shrimp. Project activities that are likely to cause additional take by removing more than 6.7 acres of habitat should cease as the exemption provided pursuant to section 7(o)(2) may lapse and any further take could be a violation of section 4(d) or 9. We do not anticipate, nor do we exempt, take for any other activities not analyzed in this consultation.

Lompoc yerba santa

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species; however, limited protection of listed plants is provided at section 9(a)(2) to the extent that the Act prohibits the removal and reduction to possession of federally listed plants from areas under Federal jurisdiction, the malicious damage or destruction of such plants on areas under Federal jurisdiction, and the destruction of listed plants on non-Federal areas in violation of State law or regulation or in the course of a violation of a State criminal trespass law.

REASONABLE AND PRUDENT MEASURE

The measure described below are non-discretionary, and must be undertaken by the Air Force or made binding conditions of any grant or permit issued to the Air Force as appropriate, for the exemption in section 7(o)(2) to apply. The Air Force has a continuing duty to regulate the activity covered by this incidental take statement. If the Air Force (1) fails to assume and implement the terms and conditions or (2) fails to require the Air Force to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the Air Force must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR 402.14(i)(3)].

The Service's evaluation of the effects of the proposed action includes consideration of the measures developed by the Air Force, and repeated in the Description of the Proposed Action portion of this biological opinion, to minimize the adverse effects of the proposed action on the vernal pool fairy shrimp and California red-legged frog. Any subsequent changes in the minimization measures proposed by the Air Force may constitute a modification of the proposed action and may warrant re-initiation of formal consultation, as specified at 50 CFR 402.16.

The Service believes the following reasonable and prudent measure is necessary and appropriate to minimize take of the vernal pool fairy shrimp and California red-legged frog during the project activities analyzed in this biological opinion:

> The Air Force must implement measures to minimize the potential for injury or mortality of California red-legged frogs.

TERMS AND CONDITIONS

To be exempt from the prohibitions in section 9 of the Act, the Air Force must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

The following terms and conditions implement the reasonable and prudent measure:

1. The Air Force must request our approval of any biologist who will conduct activities related to this biological opinion at least 30 days prior to any such activities being conducted. A qualified biologist(s) is more likely to reduce adverse effects based on their expertise with the covered species. Please be advised that possession of a 10(a)(1)(A) permit for the covered species does not substitute for the implementation of this measure. Authorization of Service-approved biologists is valid for this consultation only.
2. California red-legged frogs must be relocated from all areas where project activities would occur near riparian or aquatic habitat and that may result in injury or mortality of these individuals. California red-legged frogs may only be captured by hand or dip net and transported in buckets separate from other species. When capturing and removing California red-legged frogs, the Service-approved biologist(s) must minimize the amount of time that animals are held in captivity. To further reduce the time a California red-legged frog is in captivity, the Air Force must identify an area to relocate individuals (receiver site) prior to surveys. California red-legged frogs must be maintained in a manner that does not expose them to temperatures or any other environmental conditions that could cause injury or undue stress.
3. To avoid transferring disease or pathogens between aquatic habitats during the course of surveys and handling of California red-legged frogs, the Service approved biologist(s) must follow the Declining Amphibian Population Task Force's Code of Practice. A copy of this Code of Practice is enclosed. You may substitute a bleach solution (0.5 to 1.0 cup of bleach to 1.0 gallon of water) for the ethanol solution. Care must be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat.

REPORTING REQUIREMENTS

The Air Force must notify the Service within three days of finding an injured or dead California red-legged frog. The Air Force must provide a written report to the Service within 60 days following completion of the proposed project. The report must state the impacts to habitat for the vernal pool fairy shrimp. The report must also disclose the number of Lompoc yerba santa destroyed and the number of California red-legged frog killed or injured, describing the circumstances of the mortalities or injuries if known, during construction. The report must also document the number and size of any California red-legged frogs relocated from the action area, the date and time of relocation, and a description of relocation sites. The report must contain a brief discussion of any problems encountered in implementing minimization measures, results of biological surveys, and any other pertinent information. We encourage you to submit recommendations regarding modification of or additional measures that would improve or maintain protection of listed species, while simplifying compliance with the Act.

DISPOSITION OF DEAD OR INJURED SPECIMENS

Within three working day of locating a dead or injured California red-legged frog the Air Force must make initial notification by telephone and writing to the Ventura Fish and Wildlife Office in Ventura, California, (2493 Portola Road, Suite B, Ventura, California 93003, (805) 644-1766). The notification must include the time and date, location of the carcass, a photograph, cause of death if known, and any other pertinent information.

Care must be taken in handling injured animals to ensure effective treatment and care and in handling dead specimens to preserve biological material in the best possible state for later analysis. Injured animals must be transported to a qualified veterinarian. If any injured California red-legged frog survive, the Air Force should contact us regarding their final disposition.

The remains of California red-legged frog must be placed with educational or research institutions holding the appropriate State and Federal permits, such as the Santa Barbara Natural History Museum (Contact: Paul Collins, Santa Barbara Natural History Museum, Vertebrate Zoology Department 2559 Puesta Del Sol, Santa Barbara, California 93460, (805) 682-471 1, extension 321).

The Service assumes that remains of any vernal pool fairy shrimp killed by project activities will be entombed and therefore inaccessible. If the Air Force comes into possession of any dead or injured vernal pool fairy shrimp, the Air Force must contact the Service regarding further disposition of these specimens.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The Service requests notification of the implementation of any conservation recommendations so we may be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats.

1. We recommend that the Air Force advise Service-approved biologist(s) to relocate other native reptiles or amphibians found within work areas to suitable habitat outside of project areas if such actions are in compliance with State laws.
2. We recommend that dead California red-legged frogs found in areas under the Air Force's jurisdiction be tested for amphibian disease.
3. We recommend that the Air Force investigate the efficacy of capture and moving of California red-legged frogs to determine if use of this minimization measure reduces adverse effects of project actions on the species. As part of this, information on repeat capture and behavior of individuals post-movement should be noted.
4. We recommend that any Lompoc yerba santa rhizomes or plants found within the work area that can be salvaged, be prepared for replanting, and planted in nearby suitable habitat where future disturbance is not anticipated.
5. We recommend that the Air Force install and maintain fencing or similar barriers to discourage the removal, disturbance, or unauthorized vehicle entry into areas of existing or new yerba santa near or within mowed roadsides.
6. We recommend the Air Force develop their proposed Lompoc yerba santa management plan in coordination with the Service to preserve the species into perpetuity.

REINITIATION NOTICE

This concludes formal consultation on the action(s) outlined in the request. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, the exemption issued pursuant to section 7(o)(2) may have lapsed and any further take could be a violation of section 4(d) or 9. Consequently, we recommend that any operations causing such take cease pending reinitiation.

If you have any questions about this biological opinion, please contact Jennifer Strotman of my staff at (805) 677-3343, or by electronic-mail at jennifer_strotman@fws.gov.

Sincerely,

STEPHEN HENRY Digitally signed by STEPHEN HENRY
Date: 2020.09.21 18:09:18 -07'00'

Stephen P. Henry
Field Supervisor

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A.8 GOVERNMENT-TO-GOVERNMENT TRIBAL CONSULTATION

A.8.1 Example Tribal Scoping Letter for Tyndall AFB Area

See Section A.3.1 (Notification List - Tyndall AFB, *Tribal*) for a list of recipients of this letter.

DEPARTMENT OF THE AIR FORCE
325TH FIGHTER WING (ACC)
TYNDALL AIR FORCE BASE FLORIDA

Colonel Brian S. Laidlaw, USAF
Commander
325th Fighter Wing
501 Airey Avenue, Suite 1
Tyndall AFB FL 32403-5549

Mr. James Floyd
Principal Chief
Muscogee (Creek) Nation
Office of the Administration
P.O. Box 580
Okmulgee OK 74447

Dear Mr. Floyd

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (USAF) intends to prepare an Environmental Impact Statement (EIS) to evaluate potential environmental consequences associated with two independent proposed actions: (1) the beddown of an F-35A Operational Wing at Tyndall Air Force Base (AFB), Florida; and (2) the beddown of an MQ-9 Remotely Piloted Aircraft (RPA) Operational Wing at either Tyndall AFB, Florida, or Vandenberg AFB, California.

The proposed F-35A Wing action is to beddown an F-35A Wing at Tyndall AFB. The F-35A Wing would consist of three operational squadrons, each with 24 Primary Aerospace Vehicles Authorized aircraft and two Backup Aircraft Inventory aircraft. The beddown of the F-35A Wing would require construction and/or renovation of facilities to support staff and house 72 F-35A aircraft, including an F-35 Maintenance Squadron Complex, five hangars (maintenance, training, and fuel cell), an F-35 parking apron, an aerospace ground equipment facility, munitions storage, a flight simulator facility, and an aircraft wash rack (Attachment 1). The estimated increase in base personnel would be 1,920. F-35A flight operations for proficiency training would occur at the base and use existing airspace and ranges (Attachment 2).

The proposed MQ-9 Wing action is to beddown the MQ-9 RPA system employed by the USAF in support of the Department of Defense directive to support initiatives of overseas contingency operations. The beddown of 24 MQ-9 aircraft at either Tyndall AFB or Vandenberg AFB would require construction and/or renovation of facilities to support staff and house MQ-9 aircraft, including a Wing Headquarters, Operations Group, Maintenance Group, dormitory, child development center, fitness center, and inert munitions storage (Attachment 3). The estimated increase in base personnel would be 1,940 at the selected base to fulfill MQ-9 mission requirements. Flight operations for MQ-9 proficiency training would occur at the selected base and in existing airspace and ranges (Attachments 3 and 4).

The F-35A Wing beddown alternatives identified for evaluation in the EIS include the proposed beddown of a three-squadron F-35A Wing at Tyndall AFB and an alternative with a fourth squadron of fifth-generation fighter aircraft in addition to the three-squadron F-35A Wing. MQ-9 Wing beddown alternatives identified for evaluation in the EIS include beddown of the MQ-9 Wing at either Tyndall

AFB or Vandenberg AFB. Tyndall AFB was preliminarily identified as the preferred alternative for this mission.

The EIS will address potential environmental consequences resulting from implementation of each alternative for each of the proposed actions, as well as the combination of F-35A and MQ-9 actions at Tyndall AFB. As required by NEPA, a No Action Alternative, where the beddown of an F-35A Wing would not occur at Tyndall AFB, will also be addressed, as will the No Action Alternative where the beddown of an MQ-9 Wing would not occur at either location.

For Tyndall AFB, the Area of Potential Effects (APE) for this undertaking is defined as the physical boundaries of the project area within Tyndall AFB, including areas where ground disturbance will occur, staging areas, and linear infrastructure improvements, as well as areas that will be indirectly affected (noise, vibration, and aesthetics of aircraft operations). Maps of the APEs for the F-35A Wing and MQ-9 Wing at Tyndall AFB are attached (Attachments 1 and 4). Cultural surveys within the APE will be conducted and Tyndall AFB will consult with the State Historic Preservation Officer throughout the process of determining effects on cultural resources.

The National Historic Preservation Act (NHPA) requires that Federal agencies consult with tribes when an agency action might affect historic properties of religious and cultural significance to the tribes. In order to help us fulfill that obligation, I ask for your assistance in identifying any such properties on Tyndall AFB and within the project's APE that are of significance to the Muscogee (Creek) Nation. Historic properties include archeological sites, burial grounds, sacred landscapes or features, ceremonial areas, traditional cultural properties and landscapes, plant and animal communities, and buildings and structures with significant tribal association.

Tyndall AFB does not know of any historic properties of religious and cultural significance to the Muscogee (Creek) Nation on the installation. Nevertheless, we ask for your assistance identifying any historic properties of which we may be unaware, particularly those which may be affected by the proposed undertaking described above.

Please indicate below whether you will be providing information or would like to consult on this undertaking. Your choice applies only to providing information and consultations under the NHPA. It will not affect the handling or disposition of human remains, funerary objects, sacred objects, or objects of cultural patrimony under the Native American Graves Protection and Repatriation Act. In the event such items are discovered, we will contact you regarding their handling and disposition.

The USAF published a Notice of Intent to prepare an EIS in the Federal Register on November 22, 2019, initiating the public involvement process. The USAF will host an open-house public scoping meeting on December 10, 2019, from 5:30 p.m. to 8:30 p.m., at Gulf Coast State College in Panama City, Florida, and on December 12, 2019, from 5:30 p.m. to 8:30 p.m., at Allan Hancock College, Lompoc Valley Center, in Lompoc, California. The purpose of the meetings and the scoping period is to solicit comments on the scope of environmental issues to be addressed in the EIS.

We invite your participation at the scoping meetings, but if you cannot attend, you may submit written comments via the project website at www.F-35WingandMQ-9WingEIS.com or via mail as follows:

U.S. Post Office Deliveries:
F-35A/MQ-9 EIS Project Manager
AFCEC/CZN
2261 Hughes Avenue, Suite 155
JBSA Lackland TX 78236-9853

FedEx & UPS Deliveries:
F-35A/MQ-9 EIS Project Manager
AFCEC/CZN
3515 S General McMullen, Suite 155
San Antonio TX 78226-2018

The F-35A Wing beddown alternatives have the potential to affect wetlands at Tyndall AFB, and the MQ-9 Wing beddown alternatives have the potential to affect wetlands at Tyndall AFB and Vandenberg AFB. Consistent with the requirements and objectives of Executive Orders 11988 and 11990, this letter initiates early public review of the alternatives that have the potential to affect wetlands and/or floodplains.

If you have questions or concerns, please contact Tyndall AFB's NEPA Point of Contact, Mr. Edwin Wallace, via email at edwin.wallace.1@us.af.mil, or via telephone at (850) 283-4346. Thank you in advance for your participation in the EIS scoping process.

Sincerely

BRIAN S. LAIDLAW, Colonel, USAF

4 Attachments:
1. F-35 Facilities Projects
2. F-35 Base and Training Airspace
3. MQ-9 Facilities Projects
4. MQ-9 Base and Training Airspace

The Muscogee (Creek) Nation has determined that:

- ☐ Historic properties of religious and cultural significance to the Muscogee (Creek) Nation are not present on Tyndall AFB or within the project's APE, and therefore consultation is not required at this time.

- ☐ Historic properties of religious and cultural significance to the Muscogee (Creek) Nation are present on Tyndall AFB, but consultation is not required at this time because the properties will not be affected by the F-35A Wing or MQ-9 Wing beddowns.

- ☐ Historic properties of religious and cultural significance to the Muscogee (Creek) Nation are present on Tyndall AFB or within the project's APE, and the tribe desires to consult on these and future projects.

- ☐ Other: ____
____
____
____

____
Signature

____
Position

A.8.1.1 Responses to Tyndall AFB Area Scoping Letters

POARCH BAND OF CREEK INDIANS

5811 Jack Springs Road • Atmore, Alabama 36502
Tribal Offices: (251) 368-9136
www.poarchcreekindians-nsn.gov

December 20, 2020

Colonel Brian S Laidlaw
Commander
325th Fighter Wing
501 Airey Avenue, Suite 1
Tyndall AFB FL 32403-5549

Re: 2019-12-007: Environmental Impact Statement (EIS) to evaluate potential environmental consequences associated with two independent proposed actions: (1) the beddown of an F-35A Operational Wing at Tyndall Air Force Base (AFB), Florida; and (2) the beddown of an MQ-9 Remotely Piloted Aircraft (RPA) Operational Wing at either Tyndall AFB, Florida or Vanderberg AFB, California.

Dear Colonel Laidlaw,

Thank you for your letter of December 9, 2019. The Poarch Band of Creek Indians, Tribal Historic Preservation Office has received and reviewed the documentation submitted for the referenced project at Tyndall AFB, Florida. We look forward to consultation following the cultural resource surveys simultaneously with the Florida SHPO.

Thank you for the opportunity to comment on this project. We look forward to working with you in the future. Should further correspondence pertaining to the project be necessary, please reference the above file number when responding. If you have any questions, please do not hesitate to call 251-368-9136 extension 2072.

Sincerely,

Larry D. Haikey

Larry D. Haikey
Tribal Historic Preservation Officer

Seeking Prosperity and Self Determination

From: WALLACE, EDWIN B GS-12 USAF ACC 325 CES/CEIEC
To: Jimenez, Joseph A. [US-US]
Cc: PETTIT, CYNTHIA J GS-13 USAF AFMC AFCEC/CZN; CINTRON, JOSE J GS-12 USAF ACC 325 CES/CEIE
Subject: EXTERNAL: FW: Tyndall AFB F-35A Operational Wing and MQ-9 Remotely Piloted Aircraft Operational Wing beddown, Bay County FL
Date: Friday, December 20, 2019 1:18:30 PM
Attachments: image003.png
image004.jpg

Joe,

Please see response from the Seminole Tribe of Florida, for your records.

Edwin Wallace, GS-12, DAF
Program Manager LBP/Asbestos,
NEPA
325 CES/CEIEC
540 Mississippi Ave
Tyndall Air Force Base, FL 32403
850-283-4346 DSN 523-4346

**"EXEMPT FROM MANDATORY DISCLOSURE under FOIA,
Exemption 5, deliberative process applies. Further distribution
is prohibited without the approval of AFCEC/CZN or SAF/IEIP."**

From: Victoria Menchaca <VictoriaMenchaca@semtribe.com>
Sent: Friday, December 20, 2019 1:47 PM
To: WALLACE, EDWIN B GS-12 USAF ACC 325 CES/CEIEC <edwin.wallace.1@us.af.mil>
Cc: HARRACH, ILARIA GS-12 USAF AFCEC AFCEC/CZOE <ilaria.harrach@us.af.mil>
Subject: [Non-DoD Source] Tyndall AFB F-35A Operational Wing and MQ-9 Remotely Piloted Aircraft Operational Wing beddown, Bay County FL

December 20, 2019

Edwin Wallace
Tyndall AFB
Phone: 850-283-4346
Email: Edwin.wallace.1@us.af.mil

Subject: Tyndall AFB F-35A Operational Wing and MQ-9 Remotely Piloted Aircraft Operational Wing beddown, Bay County FL
THPO #: 0032027

Dear Mr. Wallace,

Thank you for contacting the Seminole Tribe of Florida – Tribal Historic Preservation Office (STOF-THPO) regarding the Tyndall AFB F-35A Operational Wing and MQ-9 Remotely Piloted Aircraft Operational Wing beddown, Bay County FL. The proposed undertaking does fall within the

STOF Area of Interest. We have reviewed the documents provided and would like to request to be consulted under Section 106 of the National Historic Preservation Act for the facility locations associated with the proposed MQ-9 Beddown and F-35A Beddown.

Respectfully,

Victoria L. Menchaca, MA, Compliance Review Specialist
STOF-THPO, Compliance Review Section
30290 Josie Billie Hwy, PMB 1004
Clewiston, FL 33440
Office: 863-983-6549 ext 12216
Email: victoriamenchaca@semtribe.com
Web: www.stofthpo.com

A.8.2 Tribal Scoping Letter for Vandenberg AFB Area

DEPARTMENT OF THE AIR FORCE
30TH SPACE WING (AFSPC)

Lieutenant Colonel Jason M. Aftanas
Commander, 30th Civil Engineer Squadron
1172 Iceland Avenue
Vandenberg AFB CA 93437-6011

Mr. Freddie Romero
Santa Ynez Band of Chumash Indians
P.O. Box 517
Santa Ynez CA 93460

Dear Mr. Romero

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (USAF) intends to prepare an Environmental Impact Statement (EIS) to evaluate potential environmental consequences associated with two independent proposed actions: (1) the beddown of an F-35A Operational Wing at Tyndall Air Force Base (AFB), Florida; and (2) the beddown of an MQ-9 Remotely Piloted Aircraft (RPA) Operational Wing at either Tyndall AFB, Florida, or Vandenberg AFB, California.

The proposed F-35A Wing action is to beddown an F-35A Wing at Tyndall AFB. The F-35A Wing would consist of three operational squadrons, each with 24 Primary Aerospace Vehicles Authorized aircraft and two Backup Aircraft Inventory aircraft. The beddown of the F-35A Wing would require construction and/or renovation of facilities to support staff and house 72 F-35A aircraft, including an F-35 Maintenance Squadron Complex, five hangars (maintenance, training, and fuel cell), an F-35 parking apron, an aerospace ground equipment facility, munitions storage, a flight simulator facility, and an aircraft wash rack. The estimated increase in base personnel would be 1,920. F-35A flight operations for proficiency training would occur at the base and use existing airspace and ranges.

The proposed MQ-9 Wing action is to beddown the MQ-9 RPA system employed by the USAF in support of the Department of Defense directive to support initiatives of overseas contingency operations. The beddown of 24 MQ-9 aircraft at either Tyndall AFB or Vandenberg AFB would require construction and/or renovation of facilities to support staff and house MQ-9 aircraft, including a Wing Headquarters, Operations Group, Maintenance Group, dormitory, child development center, fitness center, and inert munitions storage (Attachment 1). The estimated increase in base personnel would be 1,940 at the selected base to fulfill MQ-9 mission requirements. Flight operations for MQ-9 proficiency training would occur at the selected base and in existing airspace and ranges (Attachment 2).

The F-35A Wing beddown alternatives identified for evaluation in the EIS include the proposed beddown of a three-squadron F-35A Wing at Tyndall AFB and an alternative with a fourth squadron of fifth-generation fighter aircraft in addition to the three-squadron F-35A Wing. MQ-9 Wing beddown alternatives identified for evaluation in the EIS include beddown of the MQ-9 Wing at either Tyndall AFB or Vandenberg AFB. Tyndall AFB was preliminarily identified as the preferred alternative for this mission.

GUARDIANS OF THE HIGH FRONTIER

The EIS will address potential environmental consequences resulting from implementation of each alternative for each of the proposed actions, as well as the combination of F-35A and MQ-9 actions at Tyndall AFB. As required by NEPA, a No Action Alternative, where the beddown of an F-35A Wing would not occur at Tyndall AFB, will also be addressed, as will the No Action Alternative where the beddown of an MQ-9 Wing would not occur at either location.

For Vandenberg AFB, the Area of Potential Effects (APE) for this undertaking is defined as the physical boundaries of the project area within Vandenberg AFB, including areas where ground disturbance will occur, staging areas, and linear infrastructure improvements, as well as areas that will be indirectly affected (noise, vibration, and aesthetics of aircraft operations). Indirect impacts are defined by a 0.25-mile boundary around the physical boundaries of the project area (Attachment 1).

The National Historic Preservation Act (NHPA) requires that Federal agencies consult with tribes when an agency action might affect historic properties of religious and cultural significance to the tribes. In order to help us fulfill that obligation, I ask for your assistance in identifying any such properties on Vandenberg AFB and within the project's APE that are of significance to the Santa Ynez Band of Chumash Indians. Historic properties include archeological sites, burial grounds, sacred landscapes or features, ceremonial areas, traditional cultural properties and landscapes, plant and animal communities, and buildings and structures with significant tribal association.

Vandenberg AFB is aware of historic properties of religious and cultural significance to the Santa Ynez Band of Chumash Indians on the installation. Nevertheless, we ask for your assistance identifying any historic properties of which we may be unaware, particularly those which may be affected by the proposed undertaking described above.

Please indicate below whether you will be providing information or would like to consult on this undertaking. Your choice applies only to providing information and consultations under the NHPA. It will not affect the handling or disposition of human remains, funerary objects, sacred objects, or objects of cultural patrimony under the Native American Graves Protection and Repatriation Act. In the event such items are discovered, we will contact you regarding their handling and disposition.

The USAF published a Notice of Intent to prepare an EIS in the Federal Register on November 22, 2019, initiating the public involvement process. The USAF will host an open-house public scoping meeting on December 10, 2019, from 5:30 p.m. to 8:30 p.m., at Gulf Coast State College in Panama City, Florida, and on December 12, 2019, from 5:30 p.m. to 8:30 p.m., at Allan Hancock College, Lompoc Valley Center, in Lompoc, California. The purpose of the meetings and the scoping period is to solicit comments on the scope of environmental issues to be addressed in the EIS.

We invite your participation at the scoping meetings, but if you cannot attend, you may submit written comments via the project website at www.F-35WingandMQ-9WingEIS.com or via mail as follows:

U.S. Post Office Deliveries:
F-35A/MQ-9 EIS Project Manager
AFCEC/CZN
2261 Hughes Avenue Suite 155
JBSA Lackland TX 78236-9853

FedEx & UPS Deliveries:
F-35A/MQ-9 EIS Project Manager
AFCEC/CZN
3515 S General McMullen Suite 155
San Antonio TX 78226-2018

The F-35A Wing beddown alternatives have the potential to affect wetlands at Tyndall AFB, and the MQ-9 Wing beddown alternatives have the potential to affect wetlands at Tyndall AFB and Vandenberg AFB. Consistent with the requirements and objectives of Executive Orders 11988 and

11990, this letter initiates early public review of the alternatives that have the potential to affect wetlands and/or floodplains.

If you have questions or concerns, please contact Vandenberg AFB's NEPA Point of Contact, Ms. Samantha Kaisersatt, via email at samantha.kaisersatt@us.af.mil, or via telephone at (805) 605-0392. Thank you in advance for your participation in the EIS scoping process.

Sincerely

JASON M. AFTANAS, Lt Col, USAF
Commander

Attachments:
1. MQ-9 Facilities Projects
2. MQ-9 Base and Training Airspace

The Santa Ynez Band of Chumash Indians has determined that:

- ☐ Historic properties of religious and cultural significance to the Santa Ynez Band of Chumash Indians are not present within the project's APE, and therefore consultation is not required at this time.

- ☐ Historic properties of religious and cultural significance to the Santa Ynez Band of Chumash Indians are present within the project's APE, and the tribe desires to consult on these projects.

- ☐ Other: ______________________________

____
Signature

____
Position

A.8.3 Tyndall AFB – Government-to-Government Consultation Letters (Sent via E-mail on June 2, 2020)

DEPARTMENT OF THE AIR FORCE
325TH FIGHTER WING (ACC)
TYNDALL AIR FORCE BASE FLORIDA

Colonel Brian S. Laidlaw
Commander
325th Fighter Wing
501 Airey Avenue, Suite 1
Tyndall AFB FL 32403-5549

Mr. Billy Cypress
Chairman
Miccosukee Tribe of Indians of Florida
Tamiami Station
P.O. Box 440021
Miami FL 33144

Re: Section 106 Consultation for the Proposed F-35A Wing and MQ-9 Wing Beddowns at Tyndall Air Force Base (AFB), Bay County, Florida

Dear Principal Chief Cypress

In accordance with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations, 36 Code of Federal Regulations (CFR) Part 800, the United States Air Force (USAF) is providing information for your review and inviting your tribe to engage in government-to-government consultation regarding the above-referenced project.

As previously presented in a scoping letter mailed to your office on November 4, 2019, the USAF is preparing an Environmental Impact Statement (EIS) to evaluate potential environmental consequences associated with two independent proposed actions (undertakings): (1) the beddown of an F-35A Operational Wing at Tyndall AFB, Florida; and (2) the beddown of an MQ-9 Remotely Piloted Aircraft (RPA) Operational Wing at either Tyndall AFB, Florida, or Vandenberg AFB, California.

The F-35A Proposed Action is to beddown an F-35A Wing at Tyndall AFB (Attachment 1). The F-35A Wing would consist of three or four operational squadrons, each with 24 Primary Aerospace Vehicles Authorized aircraft and 2 Backup Aircraft Inventory aircraft. The beddown of the F-35A Wing would require construction and/or renovation of facilities to support staff and house 72 or 96 F-35A aircraft, including an F-35A Maintenance Squadron Complex, five hangars (maintenance, training, and fuel cell), F-35A parking apron, aerospace ground equipment facility, munitions storage, a flight simulator facility, and an aircraft wash rack (Attachment 2). F-35A flight operations for proficiency training would occur at the base and use existing airspace and ranges.

The MQ-9 Proposed Action is to beddown the MQ-9 RPA system employed by the USAF in support of the Department of Defense (DoD) directive to support initiatives of overseas contingency operations. The beddown of 24 MQ-9 aircraft at either Tyndall AFB or Vandenberg AFB would require construction of facilities to support staff and house MQ-9 aircraft, including a Wing Headquarters, Operations Group,

Maintenance Group, dormitory, child development center, fitness center, and inert munitions storage (Attachment 3). Flight operations for MQ-9 proficiency training would occur at the selected base and in existing airspace and ranges (Attachment 4).

For Tyndall AFB, the Area of Potential Effects (APE) for this undertaking is defined as the physical boundaries of the project area within Tyndall AFB, including areas where ground disturbance would occur associated with facility construction, staging areas and linear infrastructure improvements, as well as areas that will be indirectly affected (noise and vibration from aircraft operations). Maps of the APEs for the F-35A Wing and MQ-9 Wing at Tyndall AFB are attached (Attachment 5).

A preliminary search of the Florida Site Master File revealed that 78 cultural resources investigations have been conducted within 1.6 kilometers (1 mile) of the selected project survey parcels. These investigations include cultural resources assessments, monitoring reports, historic building inventories and evaluations, and Phase I archaeological surveys similar to the one described in the attached, *Phase I Archaeological Survey for F-35A Wing and MQ-9 Wing Beddowns at Tyndall AFB, Bay County, Florida* (USAF, 2020; Attachment 6). These include a survey of 194 acres on the northeastern edge of the runway (Wheeler, 2016), a historical context of the regional turpentine industry (DoD, 2015), a 2016 survey of a parcel to the southeast of the Munitions Storage Area (URS, Inc., 2016), and a report on archaeological surveys for the Medical Facilities Complex on base (Brown, 2017) that overlaps the proposed MQ-9 Operations Complex survey area.

Per agreement with the National Park Service in 2011, limited testing was conducted of a proposed roadway running through the Munitions Storage Area (SEAC, 2011). There were no cultural artifacts recovered during the survey. Six shovel tests excavated on a ridge northwest of a canal showed a heavily disturbed stratigraphy, most likely resulting from the deposition of sediment when the canal was dug out. A 2016 AMEC study surveyed six different parcels to the northeast of the flight line and overlapped much of the proposed F-35A and MQ-9 Munition Storage Area sites proposed for this project (Wheeler, 2016). The Phase I survey consisted of background research, a pedestrian survey, and the survey shovel tests. Background research revealed that no previously recorded sites were located within or directly adjacent to any of the six survey areas. A total of 268 shovel tests were excavated, and one archaeological site and seven archaeological occurrences were identified. Site 8BY1808 included turpentine cup fragments recovered from the surface, suggesting an early to mid-twentieth century component to the site. This site also contained one lithic flake found during the excavation for a single shovel test, suggesting an indeterminate prehistoric component to the site. The seven archaeological occurrences consisted of turpentine cup fragments found on the surface (IF-1011, IF-1012, IF-1029, IF-1030, and IF-1032) or in a single shovel test (IF-1013 and IF-1031). None of the seven archaeological occurrences nor 8BY1808 were eligible for listing in the National Register of Historic Places (NRHP), and no further work was recommended.

The historical context study of the naval stores industry (DoD, 2015) was a DoD Legacy Program Study designed to produce a historical context for the naval stores industry on the Coastal Plains of South Carolina, Georgia, and Florida. It was meant to be a guideline for identifying the archaeological signatures of naval stores sites and providing a means of assessment that can be used in recommending listing in the NRHP under Sections 106 and 110 of the NHPA. It also suggested program alternatives or standard treatments for these resources in order to streamline compliance with the NHPA.

The 2016 survey evaluated Survey Area TY-0134, which covers an area of approximately 65 acres (URS, Inc., 2016). The purpose of the work was to record undocumented archaeological resources within the survey area. Fieldwork consisted of a combination of pedestrian survey and shovel testing. For shovel testing, 76 survey shovel test pits (STPs) were excavated. No new archaeological sites were identified. Based on the results of the survey, no further archaeological work was recommended for survey area.

The 2017 medical facilities assessment (Brown, 2017) was conducted to document the need for an archaeological survey of the proposed location of a veterinary clinic on Tyndall AFB. To determine the level of survey required to thoroughly identify and evaluate historic resources within the APE, a pedestrian survey and strategic shovel testing were conducted at the proposed location. Disturbed soils were identified throughout the project area, and no cultural resources were recovered from the APE.

The search of the Florida Master Site File revealed the presence of 87 archaeological sites within 1.6 kilometers (1 mile) of the project survey areas. Site types range from prehistoric artifact scatters, middens and campsites, shell middens to historical period artifact scatters, camps, building remains, and historical wells.

Inventory and evaluation of historic buildings and structures were not part of this investigation and will be handled under a separate project led by the USAF, as needed. Subsurface cultural surveys within the APE were conducted between June and December of 2019 at these areas within Tyndall AFB. A total of approximately 825 acres are located within these survey areas, of which 359 acres had not been surveyed to date. The enclosed survey (Attachment 6) consisted of background research, a pedestrian survey, and the excavation of STPs and supplemental auger tests to identify subsurface cultural resources and verify depth of disturbance. Background research revealed that no previously recorded sites are located within or directly adjacent to any of the eight surveyed areas of the F-35A Wing and MQ-9 Wing beddowns APEs. As a result of the survey, a total of 83 STPs were excavated with seven supplemental auger tests. These tests resulted in one isolated find. Twenty-seven planned STPs were not excavated due to water at the surface or manmade obstructions. The study, entitled *Phase I Archaeological Survey for F-35A Wing and MQ-9 Wing Beddowns at Tyndall AFB Bay County, Florida*, is enclosed for your review (USAF, 2020; Attachment 6).

The isolated find (IF-1104 [TY-19-0031]) consisted of one turpentine cup fragment recovered from an STP, suggesting an early to mid-twentieth century component. The isolated find is not eligible for listing in the NRHP, and no further work is recommended. No archaeological sites were identified within the APE. Prior to Hurricane Michael in 2018, there were four historic buildings present on Tyndall AFB that were evaluated as eligible for listing on the NRHP—Building 156 (Hangar 3), a World War II (WWII) hangar; Building 280 (Hangar 4), built in 1955; Building 1476, a WWII structure; and Building 703, the base chapel (USAF, 2019). Building 156 (Hangar 3) was partly within the APE for direct impacts for the proposed F-35A Operations and Maintenance Facilities Complex. All four buildings were heavily damaged by the hurricane and are listed in the "Demolition of Hurricane-damaged Facility" category. Buildings 156, 280, and 1476 have since been removed, and the only extant NRHP-eligible building is the base chapel (703). Building 703 is scheduled to be demolished as part of the Hurricane Recovery projects, for which Section 106 consultation with the State Historical Preservation Office is underway. No other NRHP-eligible or -listed buildings or structures are located within the direct or indirect APEs for either the F-35A or the MQ-9 Wing beddowns (USAF, 2020).

Indirect impacts to historic structures due to aircraft operations would not occur for the Proposed Action. The only two NRHP-eligible architectural resources on Tyndall AFB are identified for demolition because they were heavily damaged by Hurricane Michael. No other NRHP-eligible or -listed buildings or structures are located within the direct or indirect APEs for the F-35A Wing beddown. Therefore, the beddown of three squadrons of F-35A aircraft would have no effect on NRHP-listed or -eligible buildings or structures.

All construction projects of the proposed undertakings at Tyndall AFB are located in areas of the APE that have been determined, through previous and current surveys, to not have archaeological resources or that have been disturbed through prior development of the base. Therefore, Tyndall AFB holds that there will be no historic properties affected by the Proposed Action pursuant to 36 CFR 800.4(d)(1).

Tyndall AFB is not aware of any historic properties of religious or cultural significance located within the APE. However, we request the assistance of the Miccosukee Tribe of Indians of Florida in identifying the presence of these properties within the APE and any effect the undertaking may have on these properties. It is not expected that undiscovered cultural resources would be found during implementation of the proposed undertaking; however, in the event of an inadvertent discovery during ground-disturbing operations, Tyndall AFB will cease work immediately, contact a professional archaeologist, and initiate additional consultation with your office.

Please review the enclosed documentation, in accordance with 36 CFR 800.4(d)(1). To ensure that your responses are incorporated into our planning process for this project, we respectfully request that you provide us with any response based your review within 30 days, though we will accept responses provided after 30 days. If you have any questions or require additional information, please contact Tyndall AFB's Point of Contact, Mr. Edwin Wallace, via email at edwin.wallace.1@us.af.mil, or via telephone at (850) 283-4346. Thank you for your assistance with this undertaking.

Sincerely

LAIDLAW.BRIAN.SCOTT.1070103687 Digitally signed by LAIDLAW.BRIAN.SCOTT.1070103687 Date: 2020.06.02 09:54:44 -05'00'

BRIAN S. LAIDLAW, Colonel, USAF

7 Attachments:
1. Location of Tyndall AFB
2. F-35A Facilities Projects
3. MQ-9 Facilities Projects
4. F-35A Base and Training AirspaceMQ-9 Base and Training Airspace
5. Indirect APE for F-35A and MQ-9 Actions
6. Phase I Archaeological Survey for F-35A Wing and MQ-9 Wing Beddowns at Tyndall AFB Bay County, Florida
7. References

Sent via email to: kevind@miccosukeetribe.com; yalmeida@miccosukeetribe.com; hopel@miccosukeetribe.com

DEPARTMENT OF THE AIR FORCE
325TH FIGHTER WING (ACC)
TYNDALL AIR FORCE BASE FLORIDA

Colonel Brian S. Laidlaw
Commander
325th Fighter Wing
501 Airey Avenue, Suite 1
Tyndall AFB FL 32403-5549

Mr. David J. Proctor
Traditional Cultural Advisor
Muscogee (Creek) Nation
PO Box 580
Okmulgee OK 74447

Re: Section 106 Consultation for the Proposed F-35A Wing and MQ-9 Wing Beddowns at Tyndall Air Force Base (AFB), Bay County, Florida

Dear Mr. Proctor

In accordance with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations, 36 Code of Federal Regulations (CFR) Part 800, the United States Air Force (USAF) is providing information for your review and inviting your tribe to engage in government-to-government consultation regarding the above-referenced project.

As previously presented in a scoping letter mailed to your office on November 4, 2019, the USAF is preparing an Environmental Impact Statement (EIS) to evaluate potential environmental consequences associated with two independent proposed actions (undertakings): (1) the beddown of an F-35A Operational Wing at Tyndall AFB, Florida; and (2) the beddown of an MQ-9 Remotely Piloted Aircraft (RPA) Operational Wing at either Tyndall AFB, Florida, or Vandenberg AFB, California.

The F-35A Proposed Action is to beddown an F-35A Wing at Tyndall AFB (Attachment 1). The F-35A Wing would consist of three or four operational squadrons, each with 24 Primary Aerospace Vehicles Authorized aircraft and 2 Backup Aircraft Inventory aircraft. The beddown of the F-35A Wing would require construction and/or renovation of facilities to support staff and house 72 or 96 F-35A aircraft, including an F-35A Maintenance Squadron Complex, five hangars (maintenance, training, and fuel cell), F-35A parking apron, aerospace ground equipment facility, munitions storage, a flight simulator facility, and an aircraft wash rack (Attachment 2). F-35A flight operations for proficiency training would occur at the base and use existing airspace and ranges.

The MQ-9 Proposed Action is to beddown the MQ-9 RPA system employed by the USAF in support of the Department of Defense (DoD) directive to support initiatives of overseas contingency operations. The beddown of 24 MQ-9 aircraft at either Tyndall AFB or Vandenberg AFB would require construction of facilities to support staff and house MQ-9 aircraft, including a Wing Headquarters, Operations Group,

Maintenance Group, dormitory, child development center, fitness center, and inert munitions storage (Attachment 3). Flight operations for MQ-9 proficiency training would occur at the selected base and in existing airspace and ranges (Attachment 4).

For Tyndall AFB, the Area of Potential Effects (APE) for this undertaking is defined as the physical boundaries of the project area within Tyndall AFB, including areas where ground disturbance would occur associated with facility construction, staging areas and linear infrastructure improvements, as well as areas that will be indirectly affected (noise and vibration from aircraft operations). Maps of the APEs for the F-35A Wing and MQ-9 Wing at Tyndall AFB are attached (Attachment 5).

A preliminary search of the Florida Site Master File revealed that 78 cultural resources investigations have been conducted within 1.6 kilometers (1 mile) of the selected project survey parcels. These investigations include cultural resources assessments, monitoring reports, historic building inventories and evaluations, and Phase I archaeological surveys similar to the one described in the attached, *Phase I Archaeological Survey for F-35A Wing and MQ-9 Wing Beddowns at Tyndall AFB, Bay County, Florida* (USAF, 2020; Attachment 6). These include a survey of 194 acres on the northeastern edge of the runway (Wheeler, 2016), a historical context of the regional turpentine industry (DoD, 2015), a 2016 survey of a parcel to the southeast of the Munitions Storage Area (URS, Inc., 2016), and a report on archaeological surveys for the Medical Facilities Complex on base (Brown, 2017) that overlaps the proposed MQ-9 Operations Complex survey area.

Per agreement with the National Park Service in 2011, limited testing was conducted of a proposed roadway running through the Munitions Storage Area (SEAC, 2011). There were no cultural artifacts recovered during the survey. Six shovel tests excavated on a ridge northwest of a canal showed a heavily disturbed stratigraphy, most likely resulting from the deposition of sediment when the canal was dug out. A 2016 AMEC study surveyed six different parcels to the northeast of the flight line and overlapped much of the proposed F-35A and MQ-9 Munition Storage Area sites proposed for this project (Wheeler, 2016). The Phase I survey consisted of background research, a pedestrian survey, and the survey shovel tests. Background research revealed that no previously recorded sites were located within or directly adjacent to any of the six survey areas. A total of 268 shovel tests were excavated, and one archaeological site and seven archaeological occurrences were identified. Site 8BY1808 included turpentine cup fragments recovered from the surface, suggesting an early to mid-twentieth century component to the site. This site also contained one lithic flake found during the excavation for a single shovel test, suggesting an indeterminate prehistoric component to the site. The seven archaeological occurrences consisted of turpentine cup fragments found on the surface (IF-1011, IF-1012, IF-1029, IF-1030, and IF-1032) or in a single shovel test (IF-1013 and IF-1031). None of the seven archaeological occurrences nor 8BY1808 were eligible for listing in the National Register of Historic Places (NRHP), and no further work was recommended.

The historical context study of the naval stores industry (DoD, 2015) was a DoD Legacy Program Study designed to produce a historical context for the naval stores industry on the Coastal Plains of South Carolina, Georgia, and Florida. It was meant to be a guideline for identifying the archaeological signatures of naval stores sites and providing a means of assessment that can be used in recommending listing in the NRHP under Sections 106 and 110 of the NHPA. It also suggested program alternatives or standard treatments for these resources in order to streamline compliance with the NHPA.

The 2016 survey evaluated Survey Area TY-0134, which covers an area of approximately 65 acres (URS, Inc., 2016). The purpose of the work was to record undocumented archaeological resources within the survey area. Fieldwork consisted of a combination of pedestrian survey and shovel testing. For shovel testing, 76 survey shovel test pits (STPs) were excavated. No new archaeological sites were identified. Based on the results of the survey, no further archaeological work was recommended for survey area.

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The search of the Florida Master Site File revealed the presence of 87 archaeological sites within 1.6 kilometers (1 mile) of the project survey areas. Site types range from prehistoric artifact scatters, middens and campsites, shell middens to historical period artifact scatters, camps, building remains, and historical wells.

Inventory and evaluation of historic buildings and structures were not part of this investigation and will be handled under a separate project led by the USAF, as needed. Subsurface cultural surveys within the APE were conducted between June and December of 2019 at these areas within Tyndall AFB. A total of approximately 825 acres are located within these survey areas, of which 359 acres had not been surveyed to date. The enclosed survey (Attachment 6) consisted of background research, a pedestrian survey, and the excavation of STPs and supplemental auger tests to identify subsurface cultural resources and verify depth of disturbance. Background research revealed that no previously recorded sites are located within or directly adjacent to any of the eight surveyed areas of the F-35A Wing and MQ-9 Wing beddowns APEs. As a result of the survey, a total of 83 STPs were excavated with seven supplemental auger tests. These tests resulted in one isolated find. Twenty-seven planned STPs were not excavated due to water at the surface or manmade obstructions. The study, entitled *Phase I Archaeological Survey for F-35A Wing and MQ-9 Wing Beddowns at Tyndall AFB Bay County, Florida*, is enclosed for your review (USAF, 2020; Attachment 6).

The isolated find (IF-1104 [TY-19-0031]) consisted of one turpentine cup fragment recovered from an STP, suggesting an early to mid-twentieth century component. The isolated find is not eligible for listing in the NRHP, and no further work is recommended. No archaeological sites were identified within the APE. Prior to Hurricane Michael in 2018, there were four historic buildings present on Tyndall AFB that were evaluated as eligible for listing on the NRHP—Building 156 (Hangar 3), a World War II (WWII) hangar; Building 280 (Hangar 4), built in 1955; Building 1476, a WWII structure; and Building 703, the base chapel (USAF, 2019). Building 156 (Hangar 3) was partly within the APE for direct impacts for the proposed F-35A Operations and Maintenance Facilities Complex. All four buildings were heavily damaged by the hurricane and are listed in the "Demolition of Hurricane-damaged Facility" category. Buildings 156, 280, and 1476 have since been removed, and the only extant NRHP-eligible building is the base chapel (703). Building 703 is scheduled to be demolished as part of the Hurricane Recovery projects, for which Section 106 consultation with the State Historical Preservation Office is underway. No other NRHP-eligible or -listed buildings or structures are located within the direct or indirect APEs for either the F-35A or the MQ-9 Wing beddowns (USAF, 2020).

Indirect impacts to historic structures due to aircraft operations would not occur for the Proposed Action. The only two NRHP-eligible architectural resources on Tyndall AFB are identified for demolition because they were heavily damaged by Hurricane Michael. No other NRHP-eligible or -listed buildings or structures are located within the direct or indirect APEs for the F-35A Wing beddown. Therefore, the beddown of three squadrons of F-35A aircraft would have no effect on NRHP-listed or -eligible buildings or structures.

All construction projects of the proposed undertakings at Tyndall AFB are located in areas of the APE that have been determined, through previous and current surveys, to not have archaeological resources or that have been disturbed through prior development of the base. Therefore, Tyndall AFB holds that there will be no historic properties affected by the Proposed Action pursuant to 36 CFR 800.4(d)(1).

Tyndall AFB is not aware of any historic properties of religious or cultural significance located within the APE. However, we request the assistance of the Muscogee (Creek) Nation in identifying the presence of these properties within the APE, and any effect the undertaking may have on these properties. It is not expected that undiscovered cultural resources would be found during implementation of the proposed undertaking; however, in the event of an inadvertent discovery during ground-disturbing operations, Tyndall AFB will cease work immediately, contact a professional archaeologist, and initiate additional consultation with your office.

Please review the enclosed documentation, in accordance with 36 CFR 800.4(d)(1). To ensure that your responses are incorporated into our planning process for this project, we respectfully request that you provide us with any response based your review within 30 days, though we will accept responses provided after 30 days. If you have any questions or require additional information, please contact Tyndall AFB's Point of Contact, Mr. Edwin Wallace, via email at edwin.wallace.1@us.af.mil, or via telephone at (850) 283-4346. Thank you for your assistance with this undertaking.

Sincerely

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BRIAN S. LAIDLAW, Colonel, USAF

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7. References

Sent via email to: Section106@mcn-nsn.gov; djproctor@mcn-nsn.gov; clowe@mcn-nsn.gov

DEPARTMENT OF THE AIR FORCE
325TH FIGHTER WING (ACC)
TYNDALL AIR FORCE BASE FLORIDA

Colonel Brian S. Laidlaw
Commander
325th Fighter Wing
501 Airey Avenue, Suite 1
Tyndall AFB FL 32403-5549

Mr. Greg Chilcoat
Principal Chief
Seminole Nation of Oklahoma
PO Box 1498
Wewoka OK 74884

Re: Section 106 Consultation for the Proposed F-35A Wing and MQ-9 Wing Beddowns at Tyndall Air Force Base (AFB), Bay County, Florida

Dear Principal Chief Chilcoat

In accordance with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations, 36 Code of Federal Regulations (CFR) Part 800, the United States Air Force (USAF) is providing information for your review and inviting your tribe to engage in government-to-government consultation regarding the above-referenced project.

As previously presented in a scoping letter mailed to your office on November 4, 2019, the USAF is preparing an Environmental Impact Statement (EIS) to evaluate potential environmental consequences associated with two independent proposed actions (undertakings): (1) the beddown of an F-35A Operational Wing at Tyndall AFB, Florida; and (2) the beddown of an MQ-9 Remotely Piloted Aircraft (RPA) Operational Wing at either Tyndall AFB, Florida, or Vandenberg AFB, California.

The F-35A Proposed Action is to beddown an F-35A Wing at Tyndall AFB (Attachment 1). The F-35A Wing would consist of three or four operational squadrons, each with 24 Primary Aerospace Vehicles Authorized aircraft and 2 Backup Aircraft Inventory aircraft. The beddown of the F-35A Wing would require construction and/or renovation of facilities to support staff and house 72 or 96 F-35A aircraft, including an F-35A Maintenance Squadron Complex, five hangars (maintenance, training, and fuel cell), F-35A parking apron, aerospace ground equipment facility, munitions storage, a flight simulator facility, and an aircraft wash rack (Attachment 2). F-35A flight operations for proficiency training would occur at the base and use existing airspace and ranges.

The MQ-9 Proposed Action is to beddown the MQ-9 RPA system employed by the USAF in support of the Department of Defense (DoD) directive to support initiatives of overseas contingency operations. The beddown of 24 MQ-9 aircraft at either Tyndall AFB or Vandenberg AFB would require construction of facilities to support staff and house MQ-9 aircraft, including a Wing Headquarters, Operations Group,

Maintenance Group, dormitory, child development center, fitness center, and inert munitions storage (Attachment 3). Flight operations for MQ-9 proficiency training would occur at the selected base and in existing airspace and ranges (Attachment 4).

For Tyndall AFB, the Area of Potential Effects (APE) for this undertaking is defined as the physical boundaries of the project area within Tyndall AFB, including areas where ground disturbance would occur associated with facility construction, staging areas and linear infrastructure improvements, as well as areas that will be indirectly affected (noise and vibration from aircraft operations). Maps of the APEs for the F-35A Wing and MQ-9 Wing at Tyndall AFB are attached (Attachment 5).

A preliminary search of the Florida Site Master File revealed that 78 cultural resources investigations have been conducted within 1.6 kilometers (1 mile) of the selected project survey parcels. These investigations include cultural resources assessments, monitoring reports, historic building inventories and evaluations, and Phase I archaeological surveys similar to the one described in the attached, *Phase I Archaeological Survey for F-35A Wing and MQ-9 Wing Beddowns at Tyndall AFB, Bay County, Florida* (USAF, 2020; Attachment 6). These include a survey of 194 acres on the northeastern edge of the runway (Wheeler, 2016), a historical context of the regional turpentine industry (DoD, 2015), a 2016 survey of a parcel to the southeast of the Munitions Storage Area (URS, Inc., 2016), and a report on archaeological surveys for the Medical Facilities Complex on base (Brown, 2017) that overlaps the proposed MQ-9 Operations Complex survey area.

Per agreement with the National Park Service in 2011, limited testing was conducted of a proposed roadway running through the Munitions Storage Area (SEAC, 2011). There were no cultural artifacts recovered during the survey. Six shovel tests excavated on a ridge northwest of a canal showed a heavily disturbed stratigraphy, most likely resulting from the deposition of sediment when the canal was dug out. A 2016 AMEC study surveyed six different parcels to the northeast of the flight line and overlapped much of the proposed F-35A and MQ-9 Munition Storage Area sites proposed for this project (Wheeler, 2016). The Phase I survey consisted of background research, a pedestrian survey, and the survey shovel tests. Background research revealed that no previously recorded sites were located within or directly adjacent to any of the six survey areas. A total of 268 shovel tests were excavated, and one archaeological site and seven archaeological occurrences were identified. Site 8BY1808 included turpentine cup fragments recovered from the surface, suggesting an early to mid-twentieth century component to the site. This site also contained one lithic flake found during the excavation for a single shovel test, suggesting an indeterminate prehistoric component to the site. The seven archaeological occurrences consisted of turpentine cup fragments found on the surface (IF-1011, IF-1012, IF-1029, IF-1030, and IF-1032) or in a single shovel test (IF-1013 and IF-1031). None of the seven archaeological occurrences nor 8BY1808 were eligible for listing in the National Register of Historic Places (NRHP), and no further work was recommended.

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Inventory and evaluation of historic buildings and structures were not part of this investigation and will be handled under a separate project led by the USAF, as needed. Subsurface cultural surveys within the APE were conducted between June and December of 2019 at these areas within Tyndall AFB. A total of approximately 825 acres are located within these survey areas, of which 359 acres had not been surveyed to date. The enclosed survey (Attachment 6) consisted of background research, a pedestrian survey, and the excavation of STPs and supplemental auger tests to identify subsurface cultural resources and verify depth of disturbance. Background research revealed that no previously recorded sites are located within or directly adjacent to any of the eight surveyed areas of the F-35A Wing and MQ-9 Wing beddowns APEs. As a result of the survey, a total of 83 STPs were excavated with seven supplemental auger tests. These tests resulted in one isolated find. Twenty-seven planned STPs were not excavated due to water at the surface or manmade obstructions. The study, entitled *Phase I Archaeological Survey for F-35A Wing and MQ-9 Wing Beddowns at Tyndall AFB Bay County, Florida*, is enclosed for your review (USAF, 2020; Attachment 6).

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Indirect impacts to historic structures due to aircraft operations would not occur for the Proposed Action. The only two NRHP-eligible architectural resources on Tyndall AFB are identified for demolition because they were heavily damaged by Hurricane Michael. No other NRHP-eligible or -listed buildings or structures are located within the direct or indirect APEs for the F-35A Wing beddown. Therefore, the beddown of three squadrons of F-35A aircraft would have no effect on NRHP-listed or -eligible buildings or structures.

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Tyndall AFB is not aware of any historic properties of religious or cultural significance located within the APE. However, we request the assistance of the Seminole Nation of Oklahoma in identifying the presence of these properties within the APE, and any effect the undertaking may have on these properties. It is not expected that undiscovered cultural resources would be found during implementation of the proposed undertaking; however, in the event of an inadvertent discovery during ground-disturbing operations, Tyndall AFB will cease work immediately, contact a professional archaeologist, and initiate additional consultation with your office.

Please review the enclosed documentation, in accordance with 36 CFR 800.4(d)(1). To ensure that your responses are incorporated into our planning process for this project, we respectfully request that you provide us with any response based your review within 30 days, though we will accept responses provided after 30 days. If you have any questions or require additional information, please contact Tyndall AFB's Point of Contact, Mr. Edwin Wallace, via email at edwin.wallace.1@us.af.mil, or via telephone at (850) 283-4346. Thank you for your assistance with this undertaking.

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Sent via email to: Lincoln.s@sno-nsn.gov, Franks.D@sno-nsn.gov

DEPARTMENT OF THE AIR FORCE
325TH FIGHTER WING (ACC)
TYNDALL AIR FORCE BASE FLORIDA

Colonel Brian S. Laidlaw
Commander
325th Fighter Wing
501 Airey Avenue, Suite 1
Tyndall AFB FL 32403-5549

Larry D. Haikey, MS
Tribal Historic Preservation Officer
Poarch Band of Creek Indians
5811 Jack Springs Road
Atmore AL 36502

Re: Section 106 Consultation for the Proposed F-35A Wing and MQ-9 Wing Beddowns at Tyndall Air Force Base (AFB), Bay County, Florida

Dear Mr. Haikey

Thank you for your response to our prior letter, indicating that your tribe would like to engage in government-to-government consultation on this proposal in accordance with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations, 36 Code of Federal Regulations (CFR) Part 800.

As previously presented in a scoping letter mailed to your office on November 4, 2019, the USAF is preparing an Environmental Impact Statement (EIS) to evaluate potential environmental consequences associated with two independent proposed actions (undertakings): (1) the beddown of an F-35A Operational Wing at Tyndall AFB, Florida; and (2) the beddown of an MQ-9 Remotely Piloted Aircraft (RPA) Operational Wing at either Tyndall AFB, Florida, or Vandenberg AFB, California.

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DEPARTMENT OF THE AIR FORCE
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Colonel Brian S. Laidlaw
Commander
325th Fighter Wing
501 Airey Avenue, Suite 1
Tyndall AFB FL 32403-5549

Paul N. Backhouse, Ph.D.
Tribal Historic Preservation Officer
Seminole Tribe of Florida
30290 Josie Billie Highway, PMB 1004
Clewiston FL 33440

Re: Section 106 Consultation for the Proposed F-35A Wing and MQ-9 Wing Beddowns at Tyndall Air Force Base (AFB), Bay County, Florida

Dear Dr. Backhouse

Thank you for your response to our prior letter, indicating that your tribe would like to engage in government-to-government consultation on this proposal in accordance with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations, 36 Code of Federal Regulations (CFR) Part 800.

As previously presented in a scoping letter mailed to your office on November 4, 2019, the USAF is preparing an Environmental Impact Statement (EIS) to evaluate potential environmental consequences associated with two independent proposed actions (undertakings): (1) the beddown of an F-35A Operational Wing at Tyndall AFB, Florida; and (2) the beddown of an MQ-9 Remotely Piloted Aircraft (RPA) Operational Wing at either Tyndall AFB, Florida, or Vandenberg AFB, California.

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The MQ-9 Proposed Action is to beddown the MQ-9 RPA system employed by the USAF in support of the Department of Defense (DoD) directive to support initiatives of overseas contingency operations. The beddown of 24 MQ-9 aircraft at either Tyndall AFB or Vandenberg AFB would require construction of facilities to support staff and house MQ-9 aircraft, including a Wing Headquarters, Operations Group,

Maintenance Group, dormitory, child development center, fitness center, and inert munitions storage (Attachment 3). Flight operations for MQ-9 proficiency training would occur at the selected base and in existing airspace and ranges (Attachment 4).

For Tyndall AFB, the Area of Potential Effects (APE) for this undertaking is defined as the physical boundaries of the project area within Tyndall AFB, including areas where ground disturbance would occur associated with facility construction, staging areas and linear infrastructure improvements, as well as areas that will be indirectly affected (noise and vibration from aircraft operations). Maps of the APEs for the F-35A Wing and MQ-9 Wing at Tyndall AFB are attached (Attachment 5).

A preliminary search of the Florida Site Master File revealed that 78 cultural resources investigations have been conducted within 1.6 kilometers (1 mile) of the selected project survey parcels. These investigations include cultural resources assessments, monitoring reports, historic building inventories and evaluations, and Phase I archaeological surveys similar to the one described in the attached, *Phase I Archaeological Survey for F-35A Wing and MQ-9 Wing Beddowns at Tyndall AFB, Bay County, Florida* (USAF, 2020; Attachment 6). These include a survey of 194 acres on the northeastern edge of the runway (Wheeler, 2016), a historical context of the regional turpentine industry (DoD, 2015), a 2016 survey of a parcel to the southeast of the Munitions Storage Area (URS, Inc., 2016), and a report on archaeological surveys for the Medical Facilities Complex on base (Brown, 2017) that overlaps the proposed MQ-9 Operations Complex survey area.

Per agreement with the National Park Service in 2011, limited testing was conducted of a proposed roadway running through the Munitions Storage Area (SEAC, 2011). There were no cultural artifacts recovered during the survey. Six shovel tests excavated on a ridge northwest of a canal showed a heavily disturbed stratigraphy, most likely resulting from the deposition of sediment when the canal was dug out. A 2016 AMEC study surveyed six different parcels to the northeast of the flight line and overlapped much of the proposed F-35A and MQ-9 Munition Storage Area sites proposed for this project (Wheeler, 2016). The Phase I survey consisted of background research, a pedestrian survey, and the survey shovel tests. Background research revealed that no previously recorded sites were located within or directly adjacent to any of the six survey areas. A total of 268 shovel tests were excavated, and one archaeological site and seven archaeological occurrences were identified. Site 8BY1808 included turpentine cup fragments recovered from the surface, suggesting an early to mid-twentieth century component to the site. This site also contained one lithic flake found during the excavation for a single shovel test, suggesting an indeterminate prehistoric component to the site. The seven archaeological occurrences consisted of turpentine cup fragments found on the surface (IF-1011, IF-1012, IF-1029, IF-1030, and IF-1032) or in a single shovel test (IF-1013 and IF-1031). None of the seven archaeological occurrences nor 8BY1808 were eligible for listing in the National Register of Historic Places (NRHP), and no further work was recommended.

The historical context study of the naval stores industry (DoD, 2015) was a DoD Legacy Program Study designed to produce a historical context for the naval stores industry on the Coastal Plains of South Carolina, Georgia, and Florida. It was meant to be a guideline for identifying the archaeological signatures of naval stores sites and providing a means of assessment that can be used in recommending listing in the NRHP under Sections 106 and 110 of the NHPA. It also suggested program alternatives or standard treatments for these resources in order to streamline compliance with the NHPA.

The 2016 survey evaluated Survey Area TY-0134, which covers an area of approximately 65 acres (URS, Inc., 2016). The purpose of the work was to record undocumented archaeological resources within the survey area. Fieldwork consisted of a combination of pedestrian survey and shovel testing. For shovel testing, 76 survey shovel test pits (STPs) were excavated. No new archaeological sites were identified. Based on the results of the survey, no further archaeological work was recommended for survey area.

The 2017 medical facilities assessment (Brown, 2017) was conducted to document the need for an archaeological survey of the proposed location of a veterinary clinic on Tyndall AFB. To determine the level of survey required to thoroughly identify and evaluate historic resources within the APE, a pedestrian survey and strategic shovel testing were conducted at the proposed location. Disturbed soils were identified throughout the project area, and no cultural resources were recovered from the APE.

The search of the Florida Master Site File revealed the presence of 87 archaeological sites within 1.6 kilometers (1 mile) of the project survey areas. Site types range from prehistoric artifact scatters, middens and campsites, shell middens to historical period artifact scatters, camps, building remains, and historical wells.

Inventory and evaluation of historic buildings and structures were not part of this investigation and will be handled under a separate project led by the USAF, as needed. Subsurface cultural surveys within the APE were conducted between June and December of 2019 at these areas within Tyndall AFB. A total of approximately 825 acres are located within these survey areas, of which 359 acres had not been surveyed to date. The enclosed survey (Attachment 6) consisted of background research, a pedestrian survey, and the excavation of STPs and supplemental auger tests to identify subsurface cultural resources and verify depth of disturbance. Background research revealed that no previously recorded sites are located within or directly adjacent to any of the eight surveyed areas of the F-35A Wing and MQ-9 Wing beddowns APEs. As a result of the survey, a total of 83 STPs were excavated with seven supplemental auger tests. These tests resulted in one isolated find. Twenty-seven planned STPs were not excavated due to water at the surface or manmade obstructions. The study, entitled *Phase I Archaeological Survey for F-35A Wing and MQ-9 Wing Beddowns at Tyndall AFB Bay County, Florida*, is enclosed for your review (USAF, 2020; Attachment 6).

The isolated find (IF-1104 [TY-19-0031]) consisted of one turpentine cup fragment recovered from an STP, suggesting an early to mid-twentieth century component. The isolated find is not eligible for listing in the NRHP, and no further work is recommended. No archaeological sites were identified within the APE. Prior to Hurricane Michael in 2018, there were four historic buildings present on Tyndall AFB that were evaluated as eligible for listing on the NRHP—Building 156 (Hangar 3), a World War II (WWII) hangar; Building 280 (Hangar 4), built in 1955; Building 1476, a WWII structure; and Building 703, the base chapel (USAF, 2019). Building 156 (Hangar 3) was partly within the APE for direct impacts for the proposed F-35A Operations and Maintenance Facilities Complex. All four buildings were heavily damaged by the hurricane and are listed in the "Demolition of Hurricane-damaged Facility" category. Buildings 156, 280, and 1476 have since been removed, and the only extant NRHP-eligible building is the base chapel (703). Building 703 is scheduled to be demolished as part of the Hurricane Recovery projects, for which Section 106 consultation with the State Historical Preservation Office is underway. No other NRHP-eligible or -listed buildings or structures are located within the direct or indirect APEs for either the F-35A or the MQ-9 Wing beddowns (USAF, 2020).

Indirect impacts to historic structures due to aircraft operations would not occur for the Proposed Action. The only two NRHP-eligible architectural resources on Tyndall AFB are identified for demolition because they were heavily damaged by Hurricane Michael. No other NRHP-eligible or -listed buildings or structures are located within the direct or indirect APEs for the F-35A Wing beddown. Therefore, the beddown of three squadrons of F-35A aircraft would have no effect on NRHP-listed or -eligible buildings or structures.

All construction projects of the proposed undertakings at Tyndall AFB are located in areas of the APE that have been determined, through previous and current surveys, to not have archaeological resources or that have been disturbed through prior development of the base. Therefore, Tyndall AFB holds that there will be no historic properties affected by the Proposed Action pursuant to 36 CFR 800.4(d)(1).

Tyndall AFB is not aware of any historic properties of religious or cultural significance located within the APE. However, we request the assistance of the Seminole Tribe of Florida in identifying the presence of these properties within the APE, and any effect the undertaking may have on these properties. It is not expected that undiscovered cultural resources would be found during implementation of the proposed undertaking; however, in the event of an inadvertent discovery during ground-disturbing operations, Tyndall AFB will cease work immediately, contact a professional archaeologist, and initiate additional consultation with your office.

Please review the enclosed documentation, in accordance with 36 CFR 800.4(d)(1). To ensure that your responses are incorporated into our planning process for this project, we respectfully request that you provide us with any response based your review within 30 days, though we will accept responses provided after 30 days. If you have any questions or require additional information, please contact Tyndall AFB's Point of Contact, Mr. Edwin Wallace, via email at edwin.wallace.1@us.af.mil, or via telephone at (850) 283-4346. Thank you for your assistance with this undertaking.

Sincerely

LAIDLAW.BRIAN.SCOTT.1070103687 Digitally signed by LAIDLAW.BRIAN.SCOTT.1070103687 Date: 2020.06.02 09:53:27 -05'00'

BRIAN S. LAIDLAW, Colonel, USAF

7 Attachments:

1. Location of Tyndall AFB
2. F-35A Facilities Projects
3. MQ-9 Facilities Projects
4. F-35A Base and Training AirspaceMQ-9 Base and Training Airspace
5. Indirect APE for F-35A and MQ-9 Actions
6. Phase I Archaeological Survey for F-35A Wing and MQ-9 Wing Beddowns at Tyndall AFB Bay County, Florida
7. References

Sent via email to: THPOCompliance@semtribe.com; Annemullins@semtribe.com; Victoriamenchaca@semtribe.com

DEPARTMENT OF THE AIR FORCE
325TH FIGHTER WING (ACC)
TYNDALL AIR FORCE BASE FLORIDA

Colonel Brian S. Laidlaw
Commander
325th Fighter Wing
501 Airey Avenue, Suite 1
Tyndall AFB FL 32403-5549

Mr. Galen Cloud
Tribal Historic Preservation Officer
Thlopthlocco Tribal Town
PO Box 188
Okemah OK 74859

Re: Section 106 Consultation for the Proposed F-35A Wing and MQ-9 Wing Beddowns at Tyndall Air Force Base (AFB), Bay County, Florida

Dear Mr. Cloud

In accordance with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations, 36 Code of Federal Regulations (CFR) Part 800, the United States Air Force (USAF) is providing information for your review and inviting your tribe to engage in government-to-government consultation regarding the above-referenced project.

As previously presented in a scoping letter mailed to your office on November 4, 2019, the USAF is preparing an Environmental Impact Statement (EIS) to evaluate potential environmental consequences associated with two independent proposed actions (undertakings): (1) the beddown of an F-35A Operational Wing at Tyndall AFB, Florida; and (2) the beddown of an MQ-9 Remotely Piloted Aircraft (RPA) Operational Wing at either Tyndall AFB, Florida, or Vandenberg AFB, California.

The F-35A Proposed Action is to beddown an F-35A Wing at Tyndall AFB (Attachment 1). The F-35A Wing would consist of three or four operational squadrons, each with 24 Primary Aerospace Vehicles Authorized aircraft and 2 Backup Aircraft Inventory aircraft. The beddown of the F-35A Wing would require construction and/or renovation of facilities to support staff and house 72 or 96 F-35A aircraft, including an F-35A Maintenance Squadron Complex, five hangars (maintenance, training, and fuel cell), F-35A parking apron, aerospace ground equipment facility, munitions storage, a flight simulator facility, and an aircraft wash rack (Attachment 2). F-35A flight operations for proficiency training would occur at the base and use existing airspace and ranges.

The MQ-9 Proposed Action is to beddown the MQ-9 RPA system employed by the USAF in support of the Department of Defense (DoD) directive to support initiatives of overseas contingency operations. The beddown of 24 MQ-9 aircraft at either Tyndall AFB or Vandenberg AFB would require construction of facilities to support staff and house MQ-9 aircraft, including a Wing Headquarters, Operations Group,

Maintenance Group, dormitory, child development center, fitness center, and inert munitions storage (Attachment 3). Flight operations for MQ-9 proficiency training would occur at the selected base and in existing airspace and ranges (Attachment 4).

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A preliminary search of the Florida Site Master File revealed that 78 cultural resources investigations have been conducted within 1.6 kilometers (1 mile) of the selected project survey parcels. These investigations include cultural resources assessments, monitoring reports, historic building inventories and evaluations, and Phase I archaeological surveys similar to the one described in the attached, *Phase I Archaeological Survey for F-35A Wing and MQ-9 Wing Beddowns at Tyndall AFB, Bay County, Florida* (USAF, 2020; Attachment 6). These include a survey of 194 acres on the northeastern edge of the runway (Wheeler, 2016), a historical context of the regional turpentine industry (DoD, 2015), a 2016 survey of a parcel to the southeast of the Munitions Storage Area (URS, Inc., 2016), and a report on archaeological surveys for the Medical Facilities Complex on base (Brown, 2017) that overlaps the proposed MQ-9 Operations Complex survey area.

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All construction projects of the proposed undertakings at Tyndall AFB are located in areas of the APE that have been determined, through previous and current surveys, to not have archaeological resources or that have been disturbed through prior development of the base. Therefore, Tyndall AFB holds that there will be no historic properties affected by the Proposed Action pursuant to 36 CFR 800.4(d)(1).

Tyndall AFB is not aware of any historic properties of religious or cultural significance located within the APE. However, we request the assistance of the Thlopthlocco Tribal Town in identifying the presence of these properties within the APE, and any effect the undertaking may have on these properties. It is not expected that undiscovered cultural resources would be found during implementation of the proposed undertaking; however, in the event of an inadvertent discovery during ground-disturbing operations, Tyndall AFB will cease work immediately, contact a professional archaeologist, and initiate additional consultation with your office.

Please review the enclosed documentation, in accordance with 36 CFR 800.4(d)(1). To ensure that your responses are incorporated into our planning process for this project, we respectfully request that you provide us with any response based your review within 30 days, though we will accept responses provided after 30 days. If you have any questions or require additional information, please contact Tyndall AFB's Point of Contact, Mr. Edwin Wallace, via email at edwin.wallace.1@us.af.mil, or via telephone at (850) 283-4346. Thank you for your assistance with this undertaking.

Sincerely

LAIDLAW.BRIAN.SCOTT.1070103687 Digitally signed by LAIDLAW.BRIAN.SCOTT.1070103687 Date: 2020.06.02 09:55:05 -05'00'

BRIAN S. LAIDLAW, Colonel, USAF

7 Attachments:
1. Location of Tyndall AFB
2. F-35A Facilities Projects
3. MQ-9 Facilities Projects
4. F-35A Base and Training AirspaceMQ-9 Base and Training Airspace
5. Indirect APE for F-35A and MQ-9 Actions
6. Phase I Archaeological Survey for F-35A Wing and MQ-9 Wing Beddowns at Tyndall AFB Bay County, Florida
7. References

Sent via email to: thpo@tttown.org

A.8.3.1 Responses from Tyndall AFB Area Tribes

[redacted]

Subject: EXTERNAL: FW: Tyndall AFB - F-35A and MQ-9 Beddowns Environmental Impact Statement (EIS), Bay County FL
Date: Monday, July 20, 2020 9:37:16 AM
Attachments: image003.png
image004.jpg

[redacted],

Please see response from the Seminole Tribe for the EIS consultation.

Edwin Wallace, GS-12, DAF
Program Manager LBP/Asbestos,
NEPA
325 CES/CEIEC
[redacted]
Tyndall Air Force Base, FL [redacted]
[redacted]

From: Victoria Menchaca <VictoriaMenchaca@semtribe.com>
Sent: Monday, July 20, 2020 10:16 AM
To: WALLACE, EDWIN B GS-12 USAF ACC 325 CES/CEIEC [redacted]>
Subject: [Non-DoD Source] Tyndall AFB - F-35A and MQ-9 Beddowns Environmental Impact Statement (EIS), Bay County FL

July 20, 2020

Edwin Wallace
Tyndall AFB
[redacted]

Subject: Tyndall AFB - F-35A and MQ-9 Beddowns Environmental Impact Statement (EIS), Bay County FL
THPO #: 0032027

Dear Mr. Wallace,

Thank you for contacting the Seminole Tribe of Florida – Tribal Historic Preservation Office (STOF-THPO) regarding the Tyndall AFB - F-35A and MQ-9 Beddowns Environmental Impact Statement (EIS), Bay County FL. We have reviewed the EIS and have no further comments. Please notify us if any archaeological, historical, or burial resources are inadvertently discovered.

Sincerely,

Victoria L. Menchaca MA, RPA
Compliance Review Specialist
STOF-THPO, Compliance Review Section
30290 Josie Billie Hwy, PMB 1004
Clewiston, FL 33440
Office: 863-983-6549 ext 12216
Email: victoriamenchaca@semtribe.com
Web: www.stofthpo.com

DEPARTMENT OF THE AIR FORCE
325TH CIVIL ENGINEER SQUADRON (ACC)
TYNDALL AIR FORCE BASE FLORIDA

MEMORANDUM FOR AFCEC/CZN

FROM: 325 CES/CEIEC

SUBJECT: Section 106 Consultation, F-35/MQ-9 Wing Bed-down Environmental Impact Statement, Tyndall Air Force Base (AFB)

In accordance with the National Historic Preservation Act (NHPA) and its implementing regulations (36 CFR 800), Tyndall AFB initiated consultation for the proposed F-35/MQ-9 Wing Bed-down. Tyndall AFB emailed the consultation letters along with the accompanying attachments to the following on 2 June 2020:

- State Historic Preservation Office (SHPO)
- Miccosukee Tribe of Indians of Florida
- Muscogee (Creek) Nation
- Poarch Band of Creek Indians
- Seminole Nation of Oklahoma
- Seminole Tribe of Florida
- Thlopthlocco Tribal own

Follow up letters were emailed out on 7 July 2020 to see if the project had been reviewed or if there were any questions concerning the documents. On 20 July 2020 the Seminole Tribe of Florida responded with no objections to the proposed action. The SHPO responded on 29 July 2020 with no objections to the proposed action. There have not been any other responses from the remaining five Tribes as of 12 August 2020.

WALLACE.EDWIN.BLAIR.104 7698347 Digitally signed by WALLACE.EDWIN.BLAIR.1047698347 Date: 2020.08.12 09:21:16 -05'00'
EDWIN B. WALLACE, GS-12, DAF

A.8.4 Vandenberg AFB Government-to-Government Consultation Letter

DEPARTMENT OF THE AIR FORCE
UNITED STATES SPACE FORCE
30TH SPACE WING

Christopher Ryan
30 CES/CEIEA
1028 Iceland Avenue
Vandenberg AFB, CA 93437-6010

Mr. Freddie Romero
Santa Ynez Band of Chumash Indians
P.O. Box 517
Santa Ynez, CA 93460

Dear Mr. Romero

The United States Air Force (USAF) is considering beddown options for the MQ-9 Operational Wing at one of two installations across the United States: Tyndall AFB in Florida or Vandenberg Air Force Base (VAFB) in California. The attached study covers only the proposed actions at VAFB.

Beddown of the MQ-9 Operational Wing at VAFB would include adding 24 aircraft and 1,940 personnel consisting of an Operations Support Squadron and three MQ-9 Operational Squadrons. All actions to beddown the MQ-9 Operational Wing at Vandenberg AFB would occur in and near the existing airfield and in the cantonment area of North VAFB. The proposed *MQ-9 Wing Beddown Project* at VAFB would include a remodel of an existing 124,000-square-feet (sq ft) building (Building 8401) for use as an Operations Complex, construction of a 68,200 sq ft Airmen dormitory, addition of 38,700 sq ft to the existing fitness center (Building 10130), construction of a new facility on approximately 43-acres (ac) adjacent to the airstrip for use as a Maintenance Complex, and as many as seven towers and one access road at the Vandenberg Airfield.

VAFB determined the Project is an undertaking subject to compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and will comply with Section 106 using the implementing regulations [36 CFR Part 800]. With this letter and the accompanying report, VAFB is initiating consultation with the Tribe.

VAFB carried out a reasonable and good-faith cultural resources investigation that fulfills federal agency responsibilities pursuant to 36 CFR 800.4(a)-(d) and 36 CFR 800.5(a)-(d). The effort to identify historic properties in the Area of Potential Effects (APE) included a review of previous surveys and cultural resources recorded in the area, historical research, and conducting surveys of the APE for cultural resources.

Included within the Project APE is the Vandenberg Airfield District which comprises a total of 16 buildings and the runway at the Vandenberg Airfield. The District and each of the buildings meets the 45-year age threshold for consideration as potential historic properties. Additionally, Building 8401 in the main cantonment also dates to the historic period. Therefore, these buildings and structures were documented and evaluated as potential historic properties—both individually and as contributors of a district. Building 10130 (existing Fitness Center) was constructed in 2008, and therefore, it does not meet the age-threshold for historic properties. No archaeological sites exist within the APE.

No other cultural resources exist within or immediately adjacent to the Project APE, and the archaeological sensitivity of the APE is low. Details of the investigation are provided in the attachment, however briefly stated VAFB has determined the following:

a. The APE for the *MQ-9 Wing Beddown Project* at VAFB is adequately delineated;

b. None of the buildings or structures of the Vandenberg Airfield District, nor the District itself meet any of the NRHP criteria, and therefore, they are *not eligible* for the NRHP;

c. Building 8401 does not meet any of the NRHP criteria, and therefore, it is *not eligible* for the NRHP; and

d. The undertaking will have *no effect* on any known historic properties.

In summary, VAFB has reached a Section 106 finding of *no historic properties affected* for this undertaking. However, the Base recognizes that the Santa Ynez Band of Chumash Indians may have concerns beyond the purview of the National Historic Preservation Act. Therefore, I am seeking any comments or concerns you may have about cultural resources with regard to the proposed undertaking. I would appreciate receiving any feedback as part of this consultation within the next 30 calendar days. Please feel free to let me know if you require additional time. I can be reached at (805) 605-0748 or via email at Christopher.ryan.7@us.af.mil. Thank you for your assistance with this undertaking.

Sincerely

RYAN.CHRISTOPHER.D.1296630701 Digitally signed by RYAN.CHRISTOPHER.D.1296630701 Date: 2020.06.05 10:03:46 -07'00'

CHRISTOPHER RYAN
Base Archaeologist
Asset Management Flight

Attachment:
Identification of Historic Properties, MQ-9 Wing Beddown Project

2

A.8.4.1 Responses from Vandenberg AFB Area Tribes

[redacted] [redacted]
Subject: EXTERNAL: FW: Continuing consultation: MQ-9 Reaper Beddown at VAFB
Date: Tuesday, August 18, 2020 10:28:55 AM
Attachments: image001.jpg

Joe,
Email response from the tribe

v/r

Cindy

CYNTHIA PETTIT, PMP, LEED-AP

NEPA Program Manager

[redacted]

[redacted]

[redacted]

From: KAISERSATT, SAMANTHA O CIV USSF SPOC 30 CES/CEIEA <samantha.kaisersatt@us.af.mil>
Sent: Tuesday, August 18, 2020 10:38 AM
To: PETTIT, CYNTHIA J GS-13 USAF AFMC AFCEC/CZN <cynthia.pettit.2@us.af.mil>
Subject: RE: Continuing consultation: MQ-9 Reaper Beddown at VAFB

Response from the tribe below.

From: RYAN, CHRISTOPHER D GS-12 USSF SPOC 30 CES/CEANC [redacted]
Sent: Monday, June 08, 2020 11:43 AM
To: Freddie Romero <FRomero@santaynezchumash.org>
[redacted]
Subject: RE: Continuing consultation: MQ-9 Reaper Beddown at VAFB

Greetings Freddie

This area of the Burton Mesa is probably the area of VAFB with the lowest density of cultural resources. My thoughts regarding the reasons why are (1) there was not a reliable source of water in this area and, quite related to that first point, (2) that there were not a whole lot of attractive resources on the Burton Mesa aside from manzanita berries.
That said, you make a very valid point: if the ground was obscured by vegetation, there remains the possibility that a surface archaeological deposit exists. I agree.
If Vandenberg AFB is selected as the preferred alternative for the MQ-9 Reaper Beddown Project, the Tribe would be afforded the opportunity to monitor vegetation clearing in any and all areas where vegetation clearing would occur, should the Tribe be interested in doing so.
It is unclear at this point whether Tyndall AFB in Florida or VAFB will be selected as the preferred alternative. I will keep you apprised of the status of this project as the Air Force moves forward with its selection of the preferred alternative.
Respectfully, Chris

From: Freddie Romero <FRomero@santaynezchumash.org>
Sent: Monday, June 08, 2020 11:25 AM
To: RYAN, CHRISTOPHER D GS-12 USSF SPOC 30 CES/CEANC [redacted]
Subject: [Non-DoD Source] Re: Continuing consultation: MQ-9 Reaper Beddown at VAFB

Chris,

Thank you for the report. I have reviewed the report and I also spoke with Raymond about the area and any concerns that he might have and he seemed to have some of the same concerns that I do with regards to cultural resources.

Given the fact and the statements made by Clay about this being an uplifted marine terrace and only a thin layer of sand, we are still concerned with the amount of area not surveyed, due to heavy vegetation, that was clearly seen in the photos. It is these areas that I am most concerned with, because of the lack of testing available to be accomplished as a result of the heavy vegetation.

It would be for these reasons that I am recommending monitoring of this area in and around the airfield. Please share your thoughts with me.

Freddie Romero
Cultural Resources Coordinator
SYBCI Elders Council
805-688-7997
805-403-2873

**Notice of Privacy: This information is private & confidential. It is intended solely for the person or persons addressed herein. If you have received this communication in error, immediately notify the sender & destroy/delete any copies of this transmission. Thank you for your compliance. **

From: RYAN, CHRISTOPHER D GS-12 USSF SPOC 30 CES/CEANC [redacted]
Sent: Friday, June 5, 2020 10:13 AM
To: Freddie Romero <FRomero@santaynezchumash.org>
[redacted]
Subject: Continuing consultation: MQ-9 Reaper Beddown at VAFB

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

A.9 NATIONAL HISTORIC PRESERVATION ACT SECTION 106 CONSULTATION

A.9.1 Tyndall AFB Section 106 Consultation with Florida SHPO

DEPARTMENT OF THE AIR FORCE
325TH CIVIL ENGINEER (ACC)
TYNDALL AIR FORCE BASE FLORIDA

Mr. José J. Cintron
Chief, Environmental Element
325th Civil Engineer Squadron
540 Mississippi Ave
Tyndall AFB FL 32403-5014

Dr. Timothy Parsons
State Historic Preservation Officer
Florida Department of State
Division of Historical Resources
500 S. Bronough Street
Tallahassee FL 32399 0250

Re: Section 106 Consultation for the Proposed F-35A Wing and MQ-9 Wing Beddowns at Tyndall Air Force Base (AFB), Bay County, Florida

Dear Dr. Parsons

In accordance with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations, 36 Code of Federal Regulations (CFR) Part 800, the United States Air Force (USAF) is providing information for your review and concurrence regarding the above-referenced project.

As previously presented in a scoping letter mailed to your office on November 4, 2019, the USAF is preparing an Environmental Impact Statement (EIS) to evaluate potential environmental consequences associated with two independent proposed actions (undertakings): (1) the beddown of an F-35A Operational Wing at Tyndall AFB, Florida; and (2) the beddown of an MQ-9 Remotely Piloted Aircraft (RPA) Operational Wing at either Tyndall AFB, Florida, or Vandenberg AFB, California.

The F-35A Proposed Action is to beddown an F-35A Wing at Tyndall AFB (Attachment 1). The F-35A Wing would consist of three or four operational squadrons, each with 24 Primary Aerospace Vehicles Authorized aircraft and 2 Backup Aircraft Inventory aircraft. The beddown of the F-35A Wing would require construction and/or renovation of facilities to support staff and house 72 or 96 F-35A aircraft, including an F-35A Maintenance Squadron Complex, five hangars (maintenance, training, and fuel cell), an F-35A parking apron, an aerospace ground equipment facility, munitions storage, a flight simulator facility, and an aircraft wash rack

(Attachment 2). F-35A flight operations for proficiency training would occur at the base and use existing airspace and ranges.

The MQ-9 Proposed Action is to beddown the MQ-9 RPA system employed by the USAF in support of the Department of Defense (DoD) directive to support initiatives of overseas contingency operations. The beddown of 24 MQ-9 aircraft at either Vandenberg AFB or Tyndall AFB would require construction of facilities to support staff and house MQ-9 aircraft, including a Wing Headquarters, Operations Group, Maintenance Group, dormitory, child development center, fitness center, and inert munitions storage (Attachment 3). Flight operations for MQ-9 proficiency training would occur at the selected base and in existing airspace and ranges (Attachment 4).

For Tyndall AFB, the Area of Potential Effects (APE) for this undertaking is defined as the physical boundaries of the project area within Tyndall AFB, including areas where ground disturbance would occur associated with facility construction, including staging areas and linear infrastructure improvements, as well as areas that will be indirectly affected (noise and vibration from aircraft operations). Maps of the APEs for the F-35A Wing and MQ-9 Wing at Tyndall AFB are attached (Attachment 5).

A preliminary search of the Florida Site Master File revealed that 78 cultural resources investigations have been conducted within 1.6 kilometers (1 mile) of the selected project survey parcels. These investigations include cultural resources assessments, monitoring reports, historic building inventories and evaluations, and Phase I archaeological surveys similar to the one described in the attached *Phase I Archaeological Survey for F-35A Wing and MQ-9 Wing Beddowns at Tyndall AFB, Bay County, Florida* (USAF, 2020; Attachment 6). These include a survey of 194 acres on the northeastern edge of the runway (Wheeler, 2016), a historical context of the regional turpentine industry (DoD, 2015), a 2016 survey of a parcel to the southeast of the Munitions Storage Area (URS, Inc., 2016), and a report on archaeological surveys for the Medical Facilities Complex on base (Brown, 2017) that overlaps the proposed MQ-9 Operations Complex survey area.

Per agreement with the National Park Service in 2011, limited testing was conducted of a proposed roadway running through the Munitions Storage Area (SEAC, 2011). There were no cultural artifacts recovered during the survey. Six shovel tests excavated on a ridge northwest of a canal showed a heavily disturbed stratigraphy, most likely resulting from the deposition of sediment when the canal was dug out. A 2016 AMEC study surveyed six different parcels to the northeast of the flight line and overlapped much of the proposed F-35A and MQ-9 Munition Storage Area sites proposed for this project (Wheeler, 2016). The Phase I survey consisted of background research, a pedestrian survey, and the survey shovel tests. Background research revealed that no previously recorded sites were located within or directly adjacent to any of the six survey areas. A total of 268 shovel tests were excavated, and one archaeological site and seven archaeological occurrences were identified. Site 8BY1808 included turpentine cup fragments recovered from the surface, suggesting an early to mid-twentieth century component to the site. This site also contained one lithic flake found during the excavation for a single shovel test, suggesting an indeterminate prehistoric component to the site. The seven archaeological occurrences consisted of turpentine cup fragments found on the surface (IF-1011, IF-1012, IF-1029, IF-1030, and IF-1032) or in a single shovel test (IF-1013 and IF-1031). None of the seven archaeological occurrences nor 8BY1808 were eligible for listing in the National Register of Historic Places (NRHP), and no further work was recommended.

The historical context study of the naval stores industry (DoD, 2015) was a DoD Legacy Program Study designed to produce a historical context for the naval stores industry on the Coastal Plains of South Carolina, Georgia, and Florida. It was meant to be a guideline for identifying the archaeological signatures of naval stores sites and providing a means of assessment that can be used in recommending listing in the NRHP under Sections 106 and 110 of the NHPA. It also suggested program alternatives or standard treatments for these resources in order to streamline compliance with the NHPA.

The 2016 survey evaluated Survey Area TY-0134, which covers an area of approximately 65 acres (URS, Inc., 2016). The purpose of the work was to record undocumented archaeological resources within the survey area. Fieldwork consisted of a combination of pedestrian survey and shovel testing. For shovel testing, 76 survey shovel test pits (STPs) were excavated. No new archaeological sites were identified. Based on the results of the survey, no further archaeological work was recommended for survey area.

The 2017 medical facilities assessment (Brown, 2017) was conducted to document the need for an archaeological survey of the proposed location of a veterinary clinic on Tyndall AFB. To determine the level of survey required to thoroughly identify and evaluate historic resources within the APE, a pedestrian survey and strategic shovel testing were conducted at the proposed location. Disturbed soils were identified throughout the project area, and no cultural resources were recovered from the APE.

The search of the Florida Master Site File revealed the presence of 87 archaeological sites within 1.6 kilometers (1 mile) of the project survey areas. Site types range from prehistoric artifact scatters, middens and campsites, and shell middens to historical period artifact scatters, camps, building remains, and historical wells.

Inventory and evaluation of historic buildings and structures were not part of this investigation and will be handled under a separate project led by the USAF, as needed. Subsurface cultural surveys within the APE were conducted between June and December of 2019 at these areas within Tyndall AFB. A total of approximately 825 aces are located within these survey areas, of which 359 acres had not been surveyed to date. The enclosed survey (Attachment 6) consisted of background research, a pedestrian survey, and the excavation of STPs and supplemental auger tests to identify subsurface cultural resources and verify depth of disturbance. Background research revealed that no previously recorded sites are located within or directly adjacent to any of the eight surveyed areas of the F-35A Wing and MQ-9 Wing Beddowns APEs. As a result of the survey, a total of 83 STPs were excavated with seven supplemental auger tests. These tests resulted in one isolated find. Twenty-seven planned STPs were not excavated due to water at the surface or manmade obstructions. The study, entitled *Phase I Archaeological Survey for F-35A Wing and MQ-9 Wing Beddowns at Tyndall AFB Bay County, Florida*, is enclosed for your review (USAF, 2020; Attachment 6).

The isolated find (IF-1104 [TY-19-0031]) consisted of one turpentine cup fragment recovered from an STP, suggesting an early to mid-twentieth century component. The isolated find is not eligible for listing in the NRHP, and no further work is recommended. No archaeological sites were identified within the APE. Prior to Hurricane Michael in 2018, there were four historic buildings present on Tyndall AFB that were evaluated as eligible for listing on the NRHP—Building 156 (Hangar 3), a World War II (WWII) hangar; Building 280 (Hangar 4), built in 1955; Building 1476, a WWII structure; and Building 703, the base chapel (USAF, 2019). Building 156 (Hangar 3) was partly within the APE for direct impacts for the proposed F-35A Operations and Maintenance Facilities Complex. All four buildings were heavily damaged by the hurricane and are listed in the "Demolition of Hurricane-damaged Facility" category. Buildings 156, 280, and 1476 have since been removed, and the only extant NRHP-eligible building is the base chapel (703). Building 703 is scheduled to be demolished as part of the Hurricane Recovery projects, for which Section 106 consultation with the SHPO is underway. No other NRHP-eligible or -listed buildings or structures are located within the direct or indirect APEs for either the F-35A or the MQ-9 Wing beddowns (USAF, 2020).

Indirect impacts to historic structures due to aircraft operations would not occur for the Proposed Action. The only two NRHP-eligible architectural resources on Tyndall AFB are identified for demolition because they were heavily damaged by Hurricane Michael. No other NRHP-eligible or -listed buildings or structures are located within the direct or indirect APEs for the F-35A Wing beddown. Therefore, the beddown of three squadrons of F-35A aircraft would have no effect on NRHP-listed or -eligible buildings or structures.

All construction projects of the proposed undertakings at Tyndall AFB are located in areas of the APE that have been determined, through previous and current surveys, to not have archaeological resources or that have been disturbed through prior development of the base. Therefore, Tyndall AFB holds that there will be no historic properties affected by the Proposed Action pursuant to 36 CFR 800.4(d)(1). It is not expected that undiscovered cultural resources would be found during implementation of the proposed undertaking; however, in the event of an inadvertent discovery during ground-disturbing operations, Tyndall AFB will cease work immediately, contact a professional archaeologist, and initiate additional consultation with your office.

Please review the enclosed documentation, in accordance with 36 CFR 800.4(d)(1), and respectfully requests your review within the 30-day regulatory time frame. If you have any questions or require additional information, please contact Tyndall AFB's Point of Contact, Mr. Edwin Wallace, via email at edwin.wallace.1@us.af.mil, or via telephone at (850) 283-4346. Thank you for your assistance with this undertaking.

Sincerely

CINTRON.JOSE.J.1182275146 Digitally signed by CINTRON.JOSE.J.1182275146 Date: 2020.05.06 09:57:31 -05'00'

JOSÉ CINTRON, GS-12, DAF

7 Attachments:
1. Location of Tyndall AFB
2. F-35A Facilities Projects

3. MQ-9 Facilities Projects
4. F-35A Base and Training AirspaceMQ-9 Base and Training Airspace
5. Indirect APE for F-35A and MQ-9 Action*s*
6. Phase I Archaeological Survey for F-35A Wing and MQ-9 Wing Beddowns at Tyndall AFB Bay County, Florida
7. References

Sent via email to:
Timothy.Parsons@dos.myflorida.com;
Jason.Aldridge@dos.myflorida.com

FLORIDA DEPARTMENT *of* STATE

RON DESANTIS
Governor

LAUREL M. LEE
Secretary of State

Mr. Jose J. Cintron
Chief, Environmental Element
325th Civil Engineer Squadron
540 Mississippi Road (Building 36270)
Tyndall AFB, Florida 32399

July 29, 2020

RE: DHR Project File No.: 2019-8147-B, Received by DHR: June 1, 2020
Section 106 Consultation for the Proposed F-35A Wing and MQ-9 Wing Beddowns at Tyndall Air Force Base (AFB), Bay County, Florida

Mr. Cintron:

The Florida State Historic Preservation Officer reviewed the referenced project for possible effects on historic properties listed, or eligible for listing, on the *National Register of Historic Places.* The review was conducted in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended, and its implementing regulations in *36 CFR Part 800: Protection of Historic Properties.*

The proposed undertaking includes redeveloping portions of Tyndall AFB to support the beddown of an F-35A Operational Wing and the beddown of an MQ-9 Remotely Piloted Aircraft Operational Wing. Tyndall AFB established an area or potential effect (APE) for the undertaking including areas where ground disturbing activities will occur, including staging areas and linear infrastructure improvements, as well as areas that will be affected by noise and vibrations from aircraft operations.

On behalf of Tyndall AFB, Leidos conducted a cultural resources assessment survey of the project APE, *Phase I Archaeological Survey for F-35A Wing and MQ-9 Wing Beddowns at Tyndall AFB, Bay County, Florida.* This survey included approximately 240 acres of Tyndall AFB property. The survey examined nine separate areas comprising the APE across Tyndall AFB. During the survey, Leidos completed background research, pedestrian survey, and excavated 83 shovel test pits. 27 planned shovel test pits were not excavated due to surface water or manmade obstructions. Leidos identified one isolated find, a turpentine cup fragment, during fieldwork. Leidos recommended no further work within the APE.

As noted in Tyndall AFB's letter, additional surveys also occurred within the APE. These surveys did not identify significant archaeological or historical resources and were previously provided to our office. Tyndall AFB notes that there is currently one historic structure within the APE, the Base Chapel, but that structure is scheduled for demolition due to Hurricane Michael damage. The Base Chapel was addressed during previous consultation with our office.

Division of Historical Resources
R.A. Gray Building • 500 South Bronough Street• Tallahassee, Florida 32399
850.245.6300 • 850.245.6436 (Fax) • FLHeritage.com

Mr. Cintron
DHR Project File No.: 2019-8147-B
July 29, 2020
Page 2

In consideration of the results of the above mentioned archaeological survey, as well as previous surveys, Tyndall AFB has determined that the proposed F-35A Wing and MQ-9 Wing Beddown undertaking will have no effect to historic properties listed, or eligible for listing, in the National Register of Historic Places. Tyndall AFB also stipulates that in the event of inadvertent discoveries during ground disturbing activities, Tyndall AFB will cease work immediately, contact a professional archaeologist, and initiate consultation with our office.

Our office finds the *Phase I Archaeological Survey for F-35A Wing and MQ-9 Wing Beddowns at Tyndall AFB, Bay County, Florida* to be complete and sufficient in accordance with Chapter 1A-46, *Florida Administrative Code.* Based on the results of this survey, as well as previous surveys completed within the APE, our office concurs with Tyndall AFB's determination that the proposed F-35A Wing and MQ-9 Wing Beddown undertaking will have no effect to historic properties listed, or eligible for listing, in the National Register of Historic Places.

If you have any questions, please contact me by email at *Jason.Aldridge@dos.myflorida.com* or by telephone at 850-245-6344.

Sincerely,
Jason Aldridge

Jason Aldridge
Deputy State Historic Preservation Officer
for Compliance and Review

A.9.2 Vandenberg AFB Section 106 Consultation with California SHPO

DEPARTMENT OF THE AIR FORCE
UNITED STATES SPACE FORCE
30TH SPACE WING

Lieutenant Colonel Jason M. Aftanas
Commander, 30th Civil Engineer Squadron
1172 Iceland Ave
Vandenberg AFB CA 93437-6011

Ms. Julianne Polanco
State Historic Preservation Officer
Department of Parks and Recreation
Office of Historic Preservation
P.O. Box 942896
Sacramento CA 94296-0001

Dear Ms. Polanco

The United States Air Force is considering the beddown of an MQ-9 Remotely Piloted Aircraft Operational Wing at either Vandenberg AFB (VAFB), California, or Tyndall AFB, Florida. Tyndall AFB was preliminarily identified as the preferred alternative for this mission. The attached study covers only the proposed actions at VAFB.

Beddown of an MQ-9 Wing at VAFB would include 24 MQ-9 aircraft and 1,900 personnel consisting of an Operations Support Squadron and three MQ-9 Operational Squadrons. All actions to beddown an MQ-9 Wing at VAFB would occur in and near the existing airfield and in the cantonment area of North VAFB. The proposed MQ-9 Wing at VAFB would include remodeling an existing 124,000-square-foot (sq ft) building (Building 8401) for use as an Operations Complex, construction of a 68,200 sq ft Airmen dormitory, construction of a 38,700 sq ft addition to the existing fitness center (Building 10130), construction of a new facility on approximately 43-acres adjacent to the airstrip for use as a Maintenance Complex, and seven towers and one access road at the Vandenberg Airfield.

VAFB carried out a reasonable and good-faith cultural resources investigation that fulfills federal agency responsibilities pursuant to 36 CFR 800.4(a)-(d) and 36 CFR 800.5(a)-(d). The effort to identify historic properties in the Area of Potential Effects (APE) included a review of previous surveys and cultural resources recorded in the area, historical research, and conducting surveys of the APE for cultural resources.

Included within the Project APE is the Vandenberg Airfield District which comprises a total of 16 buildings and the runway at the Vandenberg Airfield. The District and each of the buildings meets the 45-year age threshold for consideration as potential historic properties. Additionally, Building 8401 in the main cantonment also dates to the historic period. Therefore, these buildings and structures were documented and evaluated as potential historic properties—both individually and as contributors of a district. Building 10130 (existing Fitness Center) was constructed in 2008, and therefore, it does not meet the age-threshold for historic properties. No archaeological sites exist within the APE.

Per §800.3(c-f), VAFB is consulting with the California State Historic Preservation Officer (SHPO) on its findings. Details of the investigation are provided in the attachment. No historic properties exist within or immediately adjacent to the Project APE. VAFB presents the following federal agency determinations for concurrence from the State Historic Preservation Officer:

a. The APE for the MQ-9 Wing Beddown Project at VAFB is adequately delineated;

b. None of the buildings or structures of the Vandenberg Airfield District nor the District itself meets any of the NRHP criteria and therefore are not eligible for the NRHP; and

c. Building 8401 does not meet any of the NRHP criteria and therefore is not eligible for the NRHP.

Pending concurrence with our above determinations, VAFB determined that the proposed MQ-9 Operational Wing Beddown at VAFB would result in no historic properties affected. Barring objection to this finding by the SHPO, VAFB has fulfilled its Section 106 responsibilities for this undertaking and no further consultation is required. If project implementation results in an inadvertent discovery, VAFB would re-open Section 106 consultation.

If you have any questions or require additional information, please contact Christopher Ryan, Cultural Resources Management, 30 CES/CEIEA, 1028 Iceland Avenue, Building 11146, Vandenberg AFB; phone: 805-605-0748; e-mail: christopher.ryan.7@us.af.mil. Thank you for your assistance with this undertaking.

Sincerely

AFTANAS.JASON.M.1035822506 Digitally signed by AFTANAS.JASON.M.1035822506 Date: 2020.05.08 13:31:57 -07'00'

JASON M. AFTANAS, Lt Col, USAF
Commander

Attachment:
Identification of Historic Properties, MQ-9 Wing Beddown Project

2

State of California • Natural Resources Agency

Gavin Newsom, *Governor*

DEPARTMENT OF PARKS AND RECREATION
OFFICE OF HISTORIC PRESERVATION

Lisa Ann L. Mangat, *Director*

Julianne Polanco, State Historic Preservation Officer
1725 23rd Street, Suite 100, Sacramento, CA 95816-7100
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June 3, 2020

Reply in Reference to: USAF_2020_0511_001

LtCol Jason Aftanas
Commander, 30th Civil Engineer Squadron
1172 Iceland Avenue
Vandenberg AFB, CA 93437-6011

VIA ELECTRONIC MAIL

Re: Consultation for MQ-9 Remotely Piloted Aircraft Beddown, Vandenberg AFB

Dear LtCol Aftanas:

The United States Air Force (USAF) notified the State Historic Preservation Officer in May 2020 that it chose Vandenberg AFB (VAFB) as one of two potential locations for the beddown of the MQ-9 Remotely Piloted Aircraft. The USAF's letter states that although the undertaking's preferred alternative has yet to be determined VAFB is not the preferred location.

The USAF's reliance on alternatives for this project indicates that SHPO concurrence will inform its preferred action under the National Environmental Protection Act. The SHPO reminds the USAF that pursuant to 36 CFR Part 800.8(c) "an agency official may use the process and documentation required for the preparation of an EA/FONSI or an EIS/ROD to comply with section 106 in lieu of the procedures set forth in 36 CFR Part 800.3-800.6 if the agency official has notified in advance the SHPO/THPO and the Council that it intends to do so…" Furthermore, Advisory Council on Historic Preservation guidance advises that planning activities that do not narrow the range of alternatives to avoid, minimize, or mitigate adverse effects to historic properties are not subject to review under Section 106 of the National Historic Preservation Act. The SHPO therefore recommends the USAF initiate section 106 consultation should VAFB be selected as the preferred alternative.

If there are any questions, contact Ed Carroll, Historian II, at (916) 445-7006 or Ed.Carroll@parks.ca.gov.

Sincerely,

Julianne Polanco
State Historic Preservation Officer

A.10 LIST OF DRAFT EIS REPOSITORIES

A.10.1 Tyndall AFB Area

- Bay County Public Library, 898 W 11th Street, Panama City, FL 32401
- Panama City Beach Public Library, 12500 Hutchison Blvd, Panama City Beach, FL 32407

A.10.2 Vandenberg AFB Area

- Lompoc Main Library, 501 E. North Avenue, Lompoc, CA 93436
- Santa Maria Public Library, 421 South McClelland Street, Santa Maria, CA 93454

A.11 DRAFT EIS DISTRIBUTION LIST

A.11.1 Notification List - Tyndall AFB

Elected Officials

Senator Rick Scott
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Tallahassee, FL 32301

Senator Marco Rubio
United States Senate
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Washington, DC 20510

Senator Marco Rubio
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Rm 454
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Representative Neal Dunn
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Florida State District 2
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Senator Bill Montford
Florida State District 3
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Bay County Commissioner, District 5
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City Hall
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Ralph Hammond, Mayor
City of Springfield
3529 E 3rd St
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Pamn Henderson, Mayor
City of Callaway
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Richard Musgrave, Mayor
City of Parker
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Parker, FL 32404

Al Cathey, Mayor
City of Mexico Beach
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Mexico Beach, FL 32410

Federal Agencies

BIA

Eastern Regional Office
Bureau of Indian Affairs
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Nashville, TN 37214

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NOAA

Noah Silverman, NEPA Coordinator
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U.S. Environmental Protection Agency
Region 4
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USFWS

Nicole Adimey - Regional Coordinator
U.S. Fish and Wildlife Service, Region 4
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Atlanta, GA 30345

Dr. Catherine Phillips, Field Supervisor
Panama City Ecological Services Field Office
U.S. Fish and Wildlife Service
1601 Balboa Ave
Panama City, FL 32405

State Agencies

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Noah Valenstein, Secretary
FL Department of Environmental Protection
3900 Commonwealth Boulevard M.S. 49
Tallahassee, FL 32399

FL Department of Environmental Protection
Division of Air Resource Management
2600 Blair Stone Road, MS 5500
Tallahassee, FL 32399-2400

Alex Reed, Director
FL Department of Environmental Protection
Division of Water Resource Management
2600 Blair Stone Road, MS 3500
Tallahassee, FL 32399

FL Department of Transportation

Phillip Gainer, Secretary
District Three, FL Department of Transportation
Highway 90 East
Chipley, FL 32428-0607

Aaron N. Smith, State Aviation Manager
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605 Suwannee Street, MS 46
Tallahassee, FL 32399

FL Fish and Wildlife

Eric Sutton, Executive Director
Florida Fish and Wildlife Conservation Commission
620 South Meridian Street
Tallahassee, FL 32399-1600

George Warthen, Regional Director
Florida Fish and Wildlife Conservation Commission
3911 Hwy. 2321
Panama City, FL 32409-1658

NW FL Water Management District

George Roberts, Chair
Northwest Florida Water Management District
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Havana, FL 32333-4712

State Clearinghouse

Chris Stahl, Coordinator
Florida State Clearinghouse
3900 Commonwealth Boulevard, M.S. 47
Tallahassee, FL 32399-3000

State Historic Preservation Office

Dr. Timothy Parsons
State Historic Preservation Officer
Florida Department of State
Division of Historical Resources
500 S. Bronough Street
R.A. Gray Building, Room 305
Tallahassee, FL 32399-0250

County

Bay County

Bay County Planning & Zoning
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Aviation

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Northwest Florida Beaches International Airport
6300 West Bay Parkway, Suite A,
Panama City, FL 32409

Tribal

Muscogee Creek Nation

Mr. James Floyd
Principal Chief
Muscogee Creek Nation
Office of the Administration
P.O. Box 580
Okmulgee, OK 74447

Ms. Corain Lowe-Zepeda
Tribal Historic Preservation Officer
Muscogee (Creek) Nation
Historic and Cultural Preservation Office
Human Development Building
Hwy 75 & Loop 56
P.O. Box 580
Okmulgee, OK 74447

Mr. Emman Spain
NAGPRA Coordinator
Muscogee (Creek) Nation
Historic and Cultural Preservation Office
Human Development Building
Hwy 75 & Loop 56
P.O. Box 580
Okmulgee, OK 74447

Seminole Nation of Oklahoma

Mr. Gregory Paul Chilcoat
Principal Chief
Seminole Nation of Oklahoma
Executive Office
P.O. Box 1498
Wewoka, OK 74884

Mr. Theodore Isham
Seminole Nation of Oklahoma
Historic Preservation Officer
P.O. Box 1498
Seminole, OK 74868

Seminole Tribe of Florida
Mr. Marcellus Osceola Jr.
Chairman
Seminole Tribe of Florida
6300 Stirling Road
Hollywood, FL 33024

Dr. Paul N. Backhouse
Tribal Historic Preservation Officer
Seminole Tribe of Florida
Ah-Ta-Thi-Ki Museum
30290 Josie Billie Hwy, PMB 1004
Clewiston, FL 33440

Ms. Dominique deBeaubien
NAGPRA Coordinator
Seminole Tribe of Florida
Ah-Ta-Thi-Ki Museum
30290 Josie Billie Hwy, PMB 1004
Clewiston, FL 33440

Poarch Band of Creek Indians

Ms. Stephanie A. Bryan
Tribal Chair
Poarch Band of Creek Indians
5811 Jack Spring Road
Atmore, AL 36502

Larry Haikey
Tribal Historic Preservation Officer
Poarch Band of Creek Indians
5811 Jack Springs Road, Building 500
Atmore, AL 36502

Miccosukee Tribe of Indians of Florida

Mr. Billy Cypress
Chairman
Miccosukee Tribe of Indians of Florida
Tamiami Station
P.O. Box 440021
Miami, FL 33144

Mr. Kevin Donaldson
Environmental Specialist
Miccosukee Tribe of Indians of Florida
Tamiami Station
P.O. Box 440021
Miami, FL 33144

Thlopthlocco Tribal Town

Mr. Ryan Morrow
Town King
Thlopthlocco Tribal Town
P.O. Box 188
Okemah, OK 74859-0188
Mr. Terry Clouthier
Tribal Historic Preservation Officer
Thlopthlocco Tribal Town
P.O. Box 188
Okemah, OK 74859-0188

Other

Chamber of Commerce/Economic Development

Sandy Sims, Chair
Bay Economic Development Alliance
5230 West Highway 98
Panama City, FL 32401

Will Cramer, Chair
Bay County Chamber of Commerce
235 W 5th Street
Panama City, FL 32401

Karen Smith, Chairwoman
Panama City Beach Chamber of Commerce
17500 Panama City Beach Pkwy.
Panama City Beach, FL 32413
Austin Mount
Chief Executive Officer
Emerald Coast Regional Council
P.O. Box 11399
Pensacola, FL 32524

Chris Rietow
Executive Director
Apalachee Regional Planning Council
2507 Callaway Road, Suite 200
Tallahassee, FL 32303

A.11.2 Notification List - Vandenberg AFB

Elected Officials

Senator Dianne Feinstein
United States Senate
331 Hart Senate Office Building
Washington, DC 20510

Senator Dianne Feinstein
11111 Santa Monica Blvd., Suite 915
Los Angeles, CA 90025

Senator Kamala D. Harris
United States Senate
112 Hart Senate Office Building
Washington, DC 20510

Senator Kamala D. Harris
11845 West Olympic Boulevard, Suite 1250W
Los Angeles, CA 90064

Representative Salud Carbajal
1431 Longworth HOB
Washington, DC 20515

Representative Salud Carbajal
1619 S. Thornburg Street
Santa Maria, CA 93458

Governor Gavin Newsom
1303 10th Street, Suite 1173
Sacramento, CA 95814

Senator Hannah-Beth Jackson
State of California, District 19
222 East Carrillo, Suite 309
Santa Barbara, CA 93101

Assemblymember Monique Limón
State of California, District 37
101 West Anapamu Street, Suite A
Santa Barbara, CA 93101

Mayor Jenelle Osborne
City of Lompoc
100 Civic Center Plaza
Lompoc, CA 93436

Mayor Alice Patino
City of Santa Maria
110 East Cook Street
Santa Maria, CA 93454-5190

Das Williams, 1st District Supervisor
Santa Barbara County
Board of Supervisors, 4th Floor
105 East Anapamu Street
Santa Barbara, CA 93101

Gregg Hart, 2nd District Supervisor
Santa Barbara County
105 East Anapamu Street
Santa Barbara, CA 93101

Joan Hartmann, 3rd District Supervisor
Santa Barbara County
105 East Anapamu Street
Santa Barbara, CA 93101

Peter Adam, 4th District Supervisor
Santa Barbara County
511 East Lakeside Pkwy, Suite 47
Santa Maria, CA 93455

Steve Lavagnino, 5th District Supervisor
Santa Barbara County
511 E. Lakeside Parkway, Suite 141
Santa Maria CA 93455-1341

Federal Agencies

BIA

Javin Moore, Superintendent
Southern California Agency
Bureau of Indian Affairs
1451 Research Park Drive, Suite 100
Riverside, CA 92507

FAA

Dennis Roberts, Regional Administrator
Federal Aviation Administration
Western-Pacific Region
777 S. Aviation Blvd., Suite 150
El Segundo, CA 90245

NMFS

National Marine Fisheries Service
West Coast Region
501 West Ocean Blvd., Suite 4200
Long Beach, CA 90802

NPS

Park Superintendent
Channel Islands National Park
1901 Spinnaker Dr.
Ventura, CA 93001

USDA

US Forest Service Pacific Southwest Region
Pacific Southwest Region
1323 Club Drive
Vallejo, CA 94592

Los Padres National Forest
Supervisor's Office
6750 Navigator Way, Suite 150
Goleta, CA 93117

USEPA

Mike Stoker, Regional Administrator
US Environmental Protection Agency,
Region 9
75 Hawthorne Street
San Francisco, CA, 94105

EPA Southern California Field Office
600 Wilshire Blvd., Suite 940
Los Angeles, CA 90017

USFWS

Mr. Stephen P. Henry
U.S. Fish and Wildlife Service
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, CA 93003

State Agencies

Cal Air Resources Board

Mary D. Nichols, Chair
California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812

CalEPA

Matthew Rodriquez, Secretary for
Environmental Protection
California Environmental Protection Agency
(CalEPA)
1001 I Street
Sacramento, CA 95812

Barbara A. Lee, Director
CA Department of Toxic Substances
Control
P.O. Box 806
Sacramento, CA 95812-0806

State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812-0100

CA Coastal Commission

Steve Hudson, District Director,
South Central Coast and South Coast, Los
Angeles County
89 S California Street #200
Ventura, CA 93001

CA Dept of Natural Resources

Secretary Wade Crowfoot
California Natural Resources Agency
1416 Ninth Street, Suite 1311
Sacramento, CA 95814

California Department of Conservation
801 K Street, MS 24-01
Sacramento, CA 95814

Ed Pert, Regional Manager
South Coast Region (Region 5)
California Department of Fish and Wildlife
3883 Ruffin Road
San Diego, CA 92123

California Department of Forestry and Fire Protection
P.O. Box 944246
Sacramento, CA 94244-2460

California Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001

CA Department of Transportation

Bob Franzoia, Acting Director
California Department of Transportation
1120 N Street
MS 49
Sacramento, CA 95814

Tim Gubbins, Director
California Department of Transportation
District 5
50 Higuera Street
San Luis Obispo, CA 93401-5415

State Clearinghouse

California State Clearinghouse
Governor's Office of Planning and Research
P.O. Box 3044
Sacramento, CA 95812-3044

State Historic Preservation Office

Ms. Julianne Polanco
State Historic Preservation Officer
Department of Parks and Recreation
Office of Historic Preservation
1725 23rd Street, Suite 100
Sacramento, CA 95816

County

Santa Barbara County

Mark A. Hartwig, Chief
Santa Barbara County Fire Department
4410 Cathedral Oaks Road
Santa Barbara, CA 93110

County of Santa Barbara Planning and Development
123 East Anapamu Street
Santa Barbara, CA 93101-2058

Aviation

Santa Barbara Airport
Airport Administration
601 Firestone Road
Santa Barbara, CA 93117

Santa Maria Public Airport
3217 Terminal Dr
Santa Maria, CA 93455
Lompoc City Airport
1801 N H St
Lompoc, CA 93436

Tribal

Santa Ynez Band of Chumash Indians
P.O. Box 517
Santa Ynez, CA 93460

Other

<u>Chamber of Commerce/Economic Development</u>

Glenn D. Morris
President & Chief Executive Officer
Santa Maria Valley Chamber of Commerce
and Visitor & Convention Bureau
614 S. Broadway
Santa Maria, CA 93454

Lompoc Valley Chamber of Commerce &
Visitors Bureau
111 South I Street
Lompoc, CA 93436

Economic Development Director
100 Civic Center Plaza
Lompoc, CA 93436-8001

A.12 DRAFT EIS DISTRIBUTION MEMORANDUM

DEPARTMENT OF THE AIR FORCE
AIR FORCE CIVIL ENGINEER CENTER
JOINT BASE SAN ANTONIO LACKLAND TEXAS

10 June 2020

MEMORANDUM FOR INTERESTED INDIVIDUALS, ORGANIZATIONS, PUBLIC GROUPS, GOVERNMENT AGENCIES AND OTHER

FROM: AFCEC/CZN
2261 Hughes Avenue, Suite 155
JBSA Lackland, TX 78236-9853

SUBJECT: Draft Environmental Impact Statement (EIS) for the F-35A Wing Beddown at Tyndall AFB, Florida and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB, California

1. We are pleased to provide you with a copy of the Draft EIS to evaluate the potential environmental consequences associated with the Air Force's proposed F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB. This document is provided in accordance with the National Environmental Policy Act (NEPA). Libraries are requested to have this document remain available throughout the 45-day public comment period, which ends on August 3, 2020. This document is available online at www.F-35WingandMQ-9WingEIS.com.

2. Notification of the availability of the Draft EIS will appear in the *Federal Register* on June 19, 2020. The Draft EIS analyzes the potential environmental consequences associated with the Air Force's proposed beddown of the F-35A Wing at Tyndall AFB and MQ-9 Wing beddown at Tyndall AFB or Vandenberg AFB.

3. The USAF will hold two "virtual" public hearings on the Draft EIS at the dates and internet/phone locations listed below. The purpose of the hearings is to receive public and agency input on the proposed actions and alternatives and the Draft EIS analysis. The hearings will also be announced through local media. More information about the public hearings is available online at www.F-35WingandMQ-9WingEIS.com.

Base	Date	Time	Access Information
Tyndall AFB	Tuesday, July 14, 2020	5:30–8:30 p.m. (Central Time)	Telephone: (833) 360-0875, Access Code: 2639037 Online: https://engage.vevent.com/rt/leidosinc/index.jsp?seid=294
Vandenberg AFB	Wednesday, July 15, 2020	5:30–8:30 p.m. (Pacific Time)	Telephone: (833) 360-0875, Access Code: 6088652 Online: https://engage.vevent.com/rt/leidosinc/index.jsp?seid=298

4. Substantive comments presented at the public hearings and submitted to the USAF will be considered in the Final EIS. Comments on the Draft EIS can be submitted electronically via the project website at www.F-35WingandMQ-9WingEIS.com; verbally at the public hearings; or by providing written comments to one of the following addresses. For U.S. Postal Service delivery, please use F-35A/MQ-9 EIS Project Manager, AFCEC/CZN, 2261 Hughes Ave, Ste 155, JBSA Lackland, TX 78236-9853; (by FedEx or UPS): F-35A/MQ-9 EIS Project Manager, AFCEC/CZN, 3515 S General McMullen, Ste 155, San Antonio, TX 78226-2018. Comments should be postmarked by August 3, 2020, to allow time for sufficient consideration and inclusion in the Final EIS.

PETTIT.CYNTHIA.J.1014356882 Digitally signed by PETTIT.CYNTHIA.J.1014356882 Date: 2020.06.09 14:21:47 -05'00'

CYNTHIA PETTIT, PMP, DAF
Project Manager, AFCEC NEPA Division

Receipt Confirmation from Florida State Clearinghouse

[redacted]

Subject: EXTERNAL: Florida Clearinghouse: SAI# FL202006168981C
Date: Friday, June 19, 2020 8:05:39 AM
Attachments: ~WRD000.jpg

[redacted]

Please see email below for your records.

Edwin Wallace, GS-12, DAF
Program Manager LBP/Asbestos,
NEPA
325 CES/CEIEC
[redacted]
Tyndall Air Force Base, FL 32403
[redacted]

From: State_Clearinghouse <State.Clearinghouse@dep.state.fl.us>
Sent: Friday, June 19, 2020 9:00 AM
To: WALLACE, EDWIN B GS-12 USAF ACC 325 CES/CEIEC <edwin.wallace.1@us.af.mil>
Subject: [Non-DoD Source] SAI# FL202006168981C

To: Edwin Wallace

Re: Florida State Clearinghouse Project Review

Project SAI#: FL202006168981C
Date Received: 06/15/20
Project Description: DEPARTMENT OF DEFENSE, DEPARTMENT OF THE AIR FORCE, DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR THE F-35A WING BEDDOWN AT TYNDALL AFB, FLORIDA AND MQ-9 WING BEDDOWN AT TYNDALL AFB, BAY COUNTY, FLORIDA.

The Florida State Clearinghouse has received the above-referenced project and has forwarded it to the appropriate state agencies for review. Please refer to the State Application Identifier (SAI) number in all correspondence with the Florida State Clearinghouse regarding this project. Applicants should expect to receive their State Clearance Letter 30-60 days from the received date. Additional information can be found at http://dep.state.fl.us/secretary/oip/state_clearinghouse/manual2.htm.

Please submit all future project applications and correspondence by email to state.clearinghouse@dep.state.fl.us. If your submittal is too large to send via email or if you need other assistance, contact Chris Stahl at (850) 717-9076.

A.13 DRAFT EIS PUBLIC COMMENTS AND RESPONSES

This appendix contains comments received from federal, state, and local agencies, the general public, and federally recognized tribes during the public comment period for the *Draft Environmental Impact Statement (EIS) for the F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB*. The Notice of Availability for the Draft EIS appeared in the *Federal Register* on June 19, 2020. This began a 45-day comment period. In accordance with the National Environmental Policy Act (NEPA), public and agency comments were reviewed and incorporated into the Final EIS. These public and agency comments will be taken into consideration by the USAF in its decision making process.

Public comment was encouraged at the public hearings, newspaper display advertisements, press releases, public service announcements, and letters sent to agencies and interested parties announcing the availability of the Draft EIS document. It was noted that these comments would be published in the Final EIS (and that providing personal information on those comments was considered consent to publish it). While all comments submitted were assessed and considered by the USAF, only substantive comments are addressed either individually or collectively in the Final EIS. Substantive comments are those that identify issues and concerns related to the quality of the document in consideration of the accuracy of the facts, adequacy of analysis, precision of language, consistency of analysis or facts, justifications for conclusions, and/or the merits of other alternatives than those discussed. Non-substantive comments are those that only express a conclusion, an opinion, or a vote for or against the proposal itself, or that otherwise state a personal preference or opinion. The following presents the USAF's Comment and Response Process.

A.13.1 Comment Receipt and Review

Comment Receipt: Comments on the Draft EIS included both written correspondence via letters, website, or emails, and oral testimony received during the 45-day public comment period. All comments received during that period are included in this Section A.13.

Comment Review: In accordance with 40 Code of Federal Regulations (CFR) 1503.4, comments were assessed and considered as follows:

- Each letter or testimony was assigned an identification number and each comment letter and each individual's oral comments were read and reviewed carefully.
- Within each comment letter or testimony, substantive comments were identified and bracketed. Three guidelines were used for determining substantive comments:
    a. The comment questions the Proposed Actions and alternatives, or other components of the F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB.
    b. The methodology of the analysis or results was questioned.
    c. The use, adequacy, or accuracy of data was questioned.
- The bracketed comments were reviewed by environmental resource specialists who draft the responses.

- The individual bracketed comments were assigned a comment number and a response code. These comments and responses are organized consecutively by number. The responses to comments appear in Section A.13.5 of this appendix.

Comment Organization: The bracketed comment letters are presented in Sections A.13.6, A.13.7, and A.13.8 in numerical order and are organized into three sections:

- Written comments and submitted letters from Individuals and members of the general public (Section A.13.6)
- Agency/Organization/Company letters (Section A.13.7)
- Public hearing transcript of oral testimonies (Section A.13.8)

A.13.2 Locating Your Comments

The Directory of Written Submittals and Public Hearing Comments begins on the next page and starts with a key that clarifies the naming convention that was used in the response codes. A directory to locate your name and the comment number and response code(s) for your comment (Table A-1) immediately follows the key to response codes. The directory provides an alphabetical listing of commenters by last name. Look for your last name and note the comment number in the second column. This is the number that was assigned to your comment, which is labeled on your letter or next to your comments. Comments are presented in Sections A.13.6, A.13.7, and A.13.8, in order of the assigned comment numbers.

As noted during the public hearing and on the project website, the comment forms, and copies of the Draft EIS and Executive Summary, providing your name in the EIS process meant that you understood that your name and comment would be made a part of the public record for this EIS.

A.13.3 Locating Responses to Comments

USAF responses to comments are located in Section A.13.5, immediately following the Directory of Written Submittals and Public Hearing Comments presented in Section A.13.4. Each substantive comment within each comment submittal and each substantive oral comment in public hearing transcripts was bracketed and given a response code (see comment submittals and hearing transcripts presented in Sections A.13.6, A.13.7, and A.13.8). Every bracketed comment has a corresponding response. Response codes are printed next to the brackets in the margin of the comments. Each response is designed to be read along with the comment it addresses. Responses are organized alphabetically by response code. The first page of the following Section A.13.4 (Directory of Written Submittals and Public Hearing Comments) provides a key that further clarifies the response codes. To find the response to your comment, first identify the response code(s) in Table A-1 corresponding to your comment and then locate the response code(s) in **Error! Reference source not found.**. Note that some comment submissions are addressed by more than one response code.

The responses refer to both the Draft EIS and Final EIS documents, as appropriate. For example, if the commenter suggests a deficiency in the Draft document, the response may refer to the Draft

EIS for clarification. If the Final EIS includes amended information, including mitigations, the reader will be directed to that section of the Final EIS.

Public and agency involvement is an important part of the NEPA process, and all comments, whether bracketed or not, are taken into consideration by the USAF in its decision-making process.

A.13.4 Directory of Written Submittals and Public Hearing Comments

The following response codes were applied during the bracketing of substantive comments in the preparation of the responses to comments. Note that some comment submissions have more than one response code.

Code Prefix	Resource Area/Category
AQ	Air Quality
BI	Biological Resources
IN	Infrastructure
NP	NEPA/Public Involvement
NS	Noise
WR	Water Resources

Table A-1 provides an alphabetical listing of commenters by last name, along with the comment number and response code(s) assigned to each comment number.

Table A-1. Alphabetical Directory for Individual and Agency/Organization/Company Written Submittals, and Public Hearing Transcripts

Name	Comment Identification #[1]	Submission Method	Notes	Comment Response Codes Applied[2]
Altman, Thad	O-004	Letter (via website)	Florida Defense Support Task Force	GS-1
Brudnicki, Greg	O-011	Letter (mailed)	Commission of The City of Panama City, Florida (resolution)	GS-1
Cathey, Al	E-001	Letter (mailed)	City of Mexico Beach, Florida	GS-1
Collins, Ray	O-003	Website, transmitting support letter O-004	Florida Defense Support Task Force	GS-1
Cramer, Will	O-015	Letter (mailed)	Bay County Chamber of Commerce Military Affairs Committee	GS-1
Crelling, Ian	E-005	Virtual Public Hearing (Tyndall AFB)	Bay County, Florida	GS-1
Gabreski, Terry	I-003	Website	Bay Defense Alliance	GS-1
Griffitts, Philip	O-010	Letter (mailed)	Board of County Commissioners of Bay County, Florida (resolution)	GS-1
Hammond, Ralph	O-013	Letter (mailed)	City of Springfield, Florida (resolution)	GS-1
Hardin, Becca	O-009	Letter (mailed)	Bay County Economic Development Alliance (resolution)	GS-1
Henderson, Pamn	E-002	Letter (mailed)	City of Callaway, Florida	GS-1
Henderson, Pamn	O-012	Letter (mailed)	City Commission of The City of Callaway, Florida (resolution)	GS-1
Hight, Jason	A-001	Letter (mailed)	Florida Fish and Wildlife Conservation Commission	BI-1, BI-2, BI-3, BI-4
Kajumba, Ntale for Mark J. Fite	A-002	Letter (via website and mailed)	U.S. Environmental Protection Agency, Region 4	NP-1, NS-1, NS-2
McDonald, Glen	O-005	Letter (via website)	Gulf Coast State College	GS-1
McQueen, Mark	E-004	Virtual Public Hearing (Tyndall AFB)	City of Panama City, Florida	GS-1
Musgrave, Rich	E-003	Virtual Public Hearing (Tyndall AFB)	City of Parker, Florida	GS-1
Neubauer, Tom	O-002	Letter (via website)	Bay Defense Alliance	GS-1
Neubauer, Tom	O-006	Virtual Public Hearing (Tyndall AFB)	Bay Defense Alliance	GS-1
Rowell, Andrew and Carol Roberts	O-001	Letter (mailed)	Bay County Chamber of Commerce	GS-1

Table A-1. Alphabetical Directory for Individual and Agency/Organization/Company Written Submittals, and Public Hearing Transcripts

Name	Comment Identification #[1]	Submission Method	Notes	Comment Response Codes Applied[2]
Rowell, Andrew and Carol Roberts	O-007	Letter (mailed)	Bay County Chamber of Commerce (letter)	GS-1
Rowell, Andrew and Carol Roberts	O-008	Letter (mailed)	Bay County Chamber of Commerce (resolution)	GS-1
Sharpe, Ron	O-014	Letter (mailed)	St. Andrew Bay Center, Inc. dba The Arc of the Bay (resolution)	GS-1
Shutt, Anthony	I-002	Website	Bay Defense Alliance Board	GS-1
Stahl, Chris	A-003	Email	Florida State Clearinghouse	AQ-1, AQ-2, BI-5, HS-1, HS-2, IN-1, WR-1, WR-2, WR-3
Vigil, Jennifer	I-001	Website	Bay County Chamber of Commerce	GS-1

Notes:
[1] A = Agency; E = Elected or Other Official; O = Organization; I = Individual
[2] See Table A-2 for responses to these coded comments.

A.13.5 Responses to Comments

To find the response to your comment, first identify the response code(s) in Table A-1 corresponding to your comment and then locate that response code(s) in the Table A-2 below. Note that some comments are addressed by more than one response code.

Table A-2. Comment and Response Matrix

Code	Comment ID	Comment	Response
AQ-1	A-003	If the project involves clearing of undeveloped and wooded land, the vegetative debris may be disposed by open burning on-site if the burn meets the requirements of state and county regulations. Best management practices should be applied for control of unconfined particulate matter from land-clearing, site grading and excavations.	On-site open burning of cleared vegetative debris is not part of the Proposed Action. As stated in the Draft EIS Sections 4.1.4 and 4.2.1.7 (Base Facilities Construction subsections), the analysis assumed that air quality BMPs identified in Table 2.7-1 would minimize fugitive dust emissions from the (1) operation of equipment on exposed soils and (2) handling of soils.
AQ-2	A-003	If relocatable crushers, concrete batch plants or asphalt plants are brought onsite as part of construction or demolition, they should be properly permitted and up to date on testing requirements. Future permitting requirements, rule analysis and PSD analysis for activities onsite. Items to consider when determining air permitting requirements include but are not limited to Gasoline dispensing facilities, surface coating, engine test cells/stands, boilers, emergency and non-emergency stationary engines.	Regarding the first sentence of the comment, relocatable crushers, concrete batch plants or asphalt plants brought onsite are not part of the Proposed Action. Regarding the second sentence of the comment, the following has been added to Sections 4.1.4 and 4.2.1.7 (Airfield Operations subsections) of the Final EIS: "Sources would operate in compliance with applicable FDEP air quality regulations, emission limitations, and permitting requirements."
BI-1	A-001	Beach-nesting Birds - State-listed seabirds and shorebirds overwinter and nest in the beach dune habitat within and adjacent to the proposed project site. Between 2017 and 2018, FWC staff documented approximately 337 instances of imperiled beach nesting shorebird nesting within one mile of the proposed work activities. Existing site conditions may also support beach-nesting bird breeding habitat and clearing associated with construction may create conditions conducive for nesting. Cleared sites such as areas that have undergone surface scraping and that leave open sandy soils may attract ground-nesting species such as least terns, black skimmers, or other imperiled beach- nesting birds (IBNB). IBNB nests have been documented on a variety of disturbed sites, including construction sites. Nesting has occurred on nearby projects	Management recommendations and/or references to these recommendations have been added to the EIS in Sections 2.7, 4.1.8, 4.2.1.15, and 4.3.8.

Table A-2. Comment and Response Matrix

Code	Comment ID	Comment	Response
		in similar locations and with similar soil composition. Eggs are typically deposited in shallow depressions or scrapes in the substrate, or within a vegetation clump. In addition to the beach dune areas and cleared sites with exposed bare soils, imperiled beach nesting birds can also utilize buildings with gravel rooftops for nesting and have been documented nesting on these types of buildings on Tyndall AFB. Egg-laying usually begins in early April, and colonies may range in size from a few breeding pairs to many hundreds. FWC staff recommends the following measures to reduce nesting potential during construction: • Conduct construction or demolition activities outside of the breeding season (generally April, but potentially as early as mid-February, through August), if feasible; • Clear the site only when ready to build, and avoid leaving cleared areas or potentially suitable nesting sites (such as gravel rooftops) with little to no activity for an extended amount of time; and • Monitor daily proposed works sites during the nesting season any cleared sites to ensure no active nests of ground nesting birds are present prior to the commencement of construction or demolition activities. If nesting is observed within or adjacent to a demolition or construction work site prior to or after the start of work, installation staff can coordinate with FWC staff at the end of this letter to discuss nest buffers and other avoidance and minimization measures. For additional information, please refer to FWC's Breeding Bird Protocol for Florida's Seabirds and Shorebirds located at the following web address: https://public.myfwc.com/crossdoi/shorebirds/PDF-files/BreedingBirdProtocol.pdf.	

Table A-2. Comment and Response Matrix

Code	Comment ID	Comment	Response
BI-2	A-001	Sea Turtle Lighting - The beaches at Tyndall AFB support nesting by loggerhead and green sea turtles and occasionally leatherback and Kemp's ridley turtles. The base has an active Sea Turtle Program that surveys and marks all sea turtle nests on the base's approximately 18 miles of beaches under an FWC marine turtle permit. The draft EIS indicates that wildlife-friendly lighting would be incorporated into the proposed action. FWC supports the base's efforts to reduce and minimize lighting impacts to coastal wildlife associated with the proposed action. For implementation, FWC staff recommends an exterior lighting plan be developed. The plan should specify long-wavelength (560 nanometers or shorter) lamps with the lowest lumen output necessary to meet the required design foot candles. Lamps should be installed in full cut-off, fully shielded fixtures mounted at the lowest height possible. To minimize visibility of lights from the adjacent beach, bollards – 42 inches or less in height – should be utilized in parking areas. Poles along roadways should be limited to 15 to 18 feet in height. In addition, restoration of coastal vegetation should include taller, shrubby plants that can serve as a barrier to landward lights and block sky glow. FWC staff are available for assistance and can be contacted at wildlifelighting@myfwc.com for specific lighting questions during the development of lighting plans for projects at Tyndall AFB. Additional information is available http://myfwc.com/wildlifehabitats/managed/sea-turtles/.	Management recommendations and/or references to these recommendations have been added to the EIS in Sections 2.7, 4.1.8, 4.2.1.15, and 4.3.8.
BI-3	A-001	FWC has received 437 reports of human-bear conflicts within a five-mile radius of the project site since 2006. Florida black bears are frequently observed on Tyndall AFB, which is within the East Panhandle Bear Management Unit identified in the 2019 Bear Management Plan. The Integrated Natural Resources Management Plan (INRMP) for Tyndall AFB includes management objectives to maintain the current population, reduce negative human-bear interactions, remove bear attractants	Management recommendations and/or references to these recommendations have been added to the EIS in Sections 2.7, 4.1.8, 4.2.1.15, and 4.3.8.

Table A-2. Comment and Response Matrix

Code	Comment ID	Comment	Response
		from populated areas on base, and educate the public. FWC staff recommend that Tyndall AFB continue to follow and implement these management objectives, since proactive planning may help prevent or reduce future conflicts with bears. Additional information about Florida black bears can be found on our website at http://www.myfwc.com/wildlifehabitats/managed/bear.	
BI-4	A-001	Florida Pine Snake - Although Florida pine snakes have not been documented on Tyndall AFB, they can occur in xeric (well-drained), upland habitat, which is present throughout the base property. Florida pine snakes are naturally secretive and can spend up to 80 percent of their time in underground refuges such as stump holes, gopher tortoise burrows, and the burrows of nine-banded armadillos and mice. This species is often associated with southeastern pocket gophers (Geomys pinetis); however, they can persist and thrive in areas without this species. Florida pine snakes are active from March through October but show the greatest activity in May, June, July, and October when they move more frequently and travel farther distances. Additional information can be found in the Florida Pine Snake Species Conservation Measures and Permitting Guidelines (https://myfwc.com/media/11571/floridapinesnakeguidelines-2018.pdf). If a Florida pine snake is observed during construction, FWC staff recommends that work activities cease, and the snake be allowed to leave with no support or hindrance. It would also contribute to FWC's research efforts if sightings are reported to the staff member at the close of this letter, preferably with a photograph and GPS coordinates.	Management recommendations and/or references to these recommendations have been added to the EIS in Sections 2.7, 4.1.8, 4.2.1.15, and 4.3.8.
BI-5	A-003	Based on the information received, it is unclear if there will be wetland impacts. The applicant is advised to contact the Department of Environmental Protection's Northwest District for further wetland and/or stormwater permitting guidance.	Table 2.6.1, page 2-44, of the Draft EIS states that there will be impacts to wetlands under all the proposed alternatives at Tyndall AFB. EIS Sections 4.1.8, 4.2.1.15, and 4.3.8 provide the analysis and additional details on those impacts.

Table A-2. Comment and Response Matrix

Code	Comment ID	Comment	Response
GS-1	E-001, E-002, E-003, E-004, E-005, I-001, I-002, I-003, O-001, O-002, O-003, O-004, O-005, O-006, O-007, O-008, O-009, O-010, O-011, O-012, O-013, O-014, O-015	General comments of support for the proposed actions.	Thank you for your comment.
IN-1	A-003	There is a potential for environmental issues with construction activities taking place in/around known contaminated sites. Most of these activities will need to be coordinated with the Division of Waste RCRA and Federal Programs	Environmental effects of construction activities in/around known contaminated sites is addressed in EIS Section 4.1.5.1.1. The discussion has been revised in the Final EIS in response to Florida State Clearinghouse comments on the Draft EIS to include: "requirements to inform the [Florida Department of Environmental Protection] would be met prior to the removal or disturbance of any potentially affected soils. Should soils need to be removed, transported, treated, and/or disposed, Resource Conservation and Recovery Act regulations would apply to the characterization, transportation, and disposal of this material."
IN-2	A-003	Possible presence of asbestos piping or asbestos fiber in old concrete - surveys should be conducted and required management practices should be applied.	Management of asbestos-containing material in construction wastes is discussed in Draft EIS Section 4.1.11.1. Revised the discussion in the Final EIS in response to Florida State Clearinghouse comments to read: "Construction waste contaminated with hazardous waste, asbestos containing material (ACM), lead based paint (LBP), or other undesirable components would be identified and managed in accordance with AFMAN 32-7002, which requires compliance with federal regulations."
IN-3	A-003	The Construction of potable water utilities beyond the Tyndall AFB master meter are not required to obtain DEP potable water permits as the system is a consecutive system of Bay County at this time. Connections directly to Bay County's water system may require DEP potable water permitting. A determination request can be made by	Revised EIS Section 4.3.11.1.1 to include language that if direct connections to Bay County's water system are needed, Florida Department of Environmental Protection potable water permitting will be evaluated by the USAF. A determination request would be submitted by emailing a description and drawing(s) to Epost.nwdwf@FloridaDEP.gov.

Table A-2. Comment and Response Matrix

Code	Comment ID	Comment	Response
		emailing a description and drawing(s) to Epost.nwdwf@FloridaDEP.gov.	
IN-4	A-003	Wastewater collection system construction permitting may be needed. Permit determinations are recommended and can be requested by emailing a description and drawing(s) to Epost.nwdwf@FloridaDEP.gov. The application is found at https://floridadep.gov/sites/default/files/62-604.300_8a_1.pdf.	Revised EIS Section 4.3.11.1.1 to include language stating that the USAF will contact the Florida Department of Environmental Protection to determine if permitting is needed for the construction of wastewater collection systems.
NP-1	A-002	In addition, the EPA recommends that the U.S. Air Force continue to keep the local community informed and involved during the proposed project.	As noted in Table 2.7-1, the USAF will continue to work with Bay County and Bay County cities to ensure compatible future community and Tyndall AFB future mission planning and implementation as the base, county, and cities rebuild.
NS-1	A-002	The EPA has particular concerns regarding noise levels at Tyndall Elementary School located on the installation. The DEIS indicates that noise levels will increase under both the Three-Squadron and the Four-Squadron F-35A alternatives. Under all three-squadron F-35A Wing afterburner-use scenarios, the number of indoor noise events with potential to interfere with speech per average daytime hour at Tyndall Elementary School would be as high as six events with windows open, or five events with windows closed. Recommendation: It is important that the U.S. Air Force address noise impacts to sensitive receptors such as children and similarly affected residents. The EPA recommends the U.S. Air Force and Air Base Commander implement the mitigation measures identified under the Best Management Practices identified in Table 2.7-1. The Final EIS should discuss the noise mitigation measures the U.S. Air Force will implement, as applicable, for the selected alternative.	In accordance with U.S. Environmental Protection Agency's recommendation, the USAF will implement the mitigation measures identified in Draft EIS Table 2.7-1. The USAF does not monitor real-time aircraft noise due to the robust Department of Defense–approved noise-modeling tools and software available to predict aircraft noise contours for long-term planning and assessment. However, as described in Table 2.7.1, a new Air Installation Compatible Use Zones (AICUZ) update will be scheduled, following full operational capability of units that are proposed to be bedded down. (Section 2.2.4.2 of the Draft EIS discusses that a 3-squadron beddown is expected to be complete in late Fiscal Year 2026). As part of the AICUZ update, operational points of contact would be consulted to confirm or update the operational parameters used in EIS noise modeling based on their first-hand knowledge. The USAF will use the findings of the AICUZ update to assess whether actual noise impacts exceed those described in the EIS, and, if so, actions will be considered to reduce the impacts and further National Environmental Policy Act (NEPA) analysis could be warranted. As noted briefly in Section 4.1.2.1 and in greater detail in Appendix D, the 50 dBA L_{max} threshold (i.e., the A-weighted decibel maximum sound level) used to estimate the frequency of potential speech interference events in the EIS was conservative, assuming that the speaker does raise their voice to be heard over the sound of aircraft. Also, the structure of Tyndall Elementary School

Table A-2. Comment and Response Matrix

Code	Comment ID	Comment	Response
			(concrete block walls, windows, and flat roof assembly) may provide greater structural noise attenuation than the standard structural attenuation assumed in EIS analysis (i.e., 15 dB with windows open or 25 dB with windows closed). Use of conservative assumptions reflects a lack of detailed information (e.g., regarding the aggregate noise attenuation provided by Tyndall Elementary School classrooms) and ensures that impacts are not underestimated as a result of analysis methodology.
NS-2	A-002	The EPA also recommends that the Final EIS indicate whether there will be a comprehensive noise monitoring program to ensure that ongoing noise impacts from military training flights are assessed and appropriately addressed once identified.	The USAF does not monitor real-time aircraft noise due to the robust Department of Defense–approved noise-modeling tools and software available to predict aircraft noise contours for long-term planning and assessment. An AICUZ update would confirm or replace the noise impacts described in the EIS, thereby ensuring that impacts from military operations are accurately assessed and mitigated to the extent practicable. Text has been added to the Final EIS describing operational noise mitigation measures that were considered but not adopted.
WR-1	A-003	If any dewatering permits are required for construction, there will need to be a careful evaluation and review of available groundwater data to determine the appropriate permit conditions.	Added text to Section 4.1.7, under the Groundwater subheading, "If dewatering is required in or within 500 feet of an identified contaminated site (see Section 3.1.5.4), the groundwater would be tested/characterized prior to dewatering to surface waters. If groundwater does not meet disposal-to-surface-water criteria without treatment, the USAF would consult with the [Florida Department of Environmental Protection] to determine the proper permit and method to dispose of groundwater."
WR-2	A-003	For dewatering of produced groundwater directly or indirectly to surface water or a conveyance connected to surface water: if the site is contaminated and does not meet surface water standards without treatment, dewatering cannot be authorized under the Generic Permit for Stormwater Discharge from Large and Small Construction Activities or the Generic Permit for Discharge of Groundwater from Dewatering Operations. These two permits are only appropriate when surface water criteria will be met without treatment. Some of the applicable rules for dewatering near contamination are found in 62-302, F.A.C. (surface water quality standards), 62-777, F.A.C.	See response to WR-1.

Table A-2. Comment and Response Matrix

Code	Comment ID	Comment	Response
		(contaminated cleanup target levels), and 62-780, F.A.C. (contaminated site cleanup criteria). Please consult with the department regarding dewatering. You may email a description and drawings to Epost.nwdwf@FloridaDEP.gov.	
WR-3	A-003	Based on the information submitted and minimal project impacts, the state has no objections to the subject project and, therefore, it is consistent with the Florida Coastal Management Program (FCMP).	Thank you for your review and FCMP determination concurrence.

A.13.6 Individual Comment Submittals

Jennifer Vigil, received 7/9/2020 **Comment Code: GS-1** Comment ID: **1-001**
I am a member of the Bay County Chamber of Commerce and want to express my full support for the beddown of an active duty F35 Wing with up to four squadrons and an MQ-9 Wing at Tyndall AFB. I have reviewed the Draft EIS and have found no issues that would cause me to submit a substantive comment. Our lives changed in this area on October 10, 2018 when our community and Tyndall AFB were hit by Hurricane Michael. Hurricane Michael was an unprecedented and catastrophic storm to Tyndall AFB and Bay County. I am grateful to the Air Force for everything you have done to help recover and rebuild Tyndall AFB since that time. Tyndall AFB is home to the 325th Fighter Wing and over 30 tenant units and has a legacy dating back to 1947. Our community has worked tirelessly since the beginning to ensure the military members and their families feel welcome in our community. You have my commitment that this support will continue and that we will continue to work in partnership with Tyndall AFB. I look forward to seeing F35s and MQ-9s flying over the skies in Bay County.

Anthony Shut, received 7/21/2020 **Comment Code: GS-1** Comment ID: **1-002**
I am a member of the Bay Defense Alliance Board, reside in the Bay County community and wish to express my full support for the bed down of an active F-35 operational wing with up to four squadrons of aircraft and the proposed "Base "Y" MQ-9 wing at Tyndall AFB. I have reviewed the draft EIS and find no substantive issues with the movement of these aircraft and the military members and families that will follow. Our lives changed in this area on October 10, 2018 when our community and Tyndall AFB were hit by Hurricane Michael. Hurricane Michael was an unprecedented and catastrophic storm to Tyndall AFB and Bay County. I am grateful to the Air Force for everything you have done to help recover and rebuild Tyndall AFB since that time. Tyndall AFB is home to the 325th Fighter wing and many tenant units which contribute substantially to our national defense. The 75-year relationship between our community our military has been a positive one and we were pleased to be named a "Great American Defense Community" by the Association of Defense Communities last year. You can count on Bay County for continued support of Tyndall Air Force base and the military members who will call our community home and I look forward to seeing F-35s and MQ-9s flying over the skies in Bay County.

Terry Gabreski, received 7/26/2020 **Comment Code: GS-1** Comment ID: **1-003**
I am a member of the Bay Defense Alliance, live in Bay County, and give my full support to beddown a 4 squadron, active F-35 operational wing and the proposed "Base "Y" MQ-9 wing at Tyndall AFB. I have reviewed the draft EIS and see no substantive issues with the movement of these aircraft and the military members with their families that will follow. 10 October 2018 changed our lives in this area when our community and Tyndall AFB were hit by Hurricane Michael. Hurricane Michael was catastrophic to Bay County and Tyndall AFB. I am personally grateful to the Air Force for everything you have done to recover and rebuild Tyndall AFB since that time. Tyndall AFB is home to the 325 FW and many associate units that contribute substantially to our national defense. The 75 year partnership between our community and our military has been an extremely positive one. You can count on Bay County for continued support for Tyndall AFB and the military and civilian members who call our community home. In my 35 years serving in the USAF, Bay County by far surpasses other assignments in its support and caring for our Air Force resources. I look forward to seeing F-35s and MQ-9s flying overhead in Bay County. Terry L. Gabreski, Lt Gen, USAF, (ret)

A.13.7 Agency/Organization/Company Comment Submittals

A-001

Florida Fish and Wildlife Conservation Commission

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Assistant Executive Director

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MyFWC.com

July 14, 2020

Chris Stahl, Coordinator
Florida State Clearinghouse
Florida Department of Environmental Protection
3800 Commonwealth Blvd., MS 47
Tallahassee, FL 32399-2400
Chris.Stahl@dep.state.fl.us
State.Clearinghouse@dep.state.fl.us

Re: Draft Environmental Impact Statement for F-35A Wing and MQ-9 Beddown at Tyndall Air Force Base (SAI FL202006168981C), Department of the Air Force, Bay County

Dear Mr. Stahl:

Florida Fish and Wildlife Conservation Commission (FWC) staff reviewed the above-referenced Draft Environmental Impact Statement (EIS). The following comments and recommendations are provided for your consideration in accordance with Chapter 379, Florida Statutes, the National Environmental Policy Act (NEPA), and the Coastal Zone Management Act/Florida's Coastal Management Program.

Project Description

The Department of the Air Force (USAF) has prepared a Draft EIS to evaluate the potential environmental impacts associated with two, proposed independent actions at Tyndall AFB: the beddown of an F-35A Wing and the beddown of an MQ-9 Remotely Piloted Aircraft Wing. The Draft EIS indicates that these actions are considered independent of each other and that the existing airspace at Tyndall AFB would be utilized for either action.

The relocation of the F-35 Wing to Tyndall AFB would involve three or four squadrons of 24 planes with two backup aircraft each. Existing operations, maintenance, and support services would be improved to support the move. This action could bring approximately 2,200 military personnel to Tyndall AFB. The relocation of the MQ-9 Remotely Piloted Aircraft Wing to Tyndall AFB would involve a squadron of 24 aircraft, the Wing Headquarters, and construction of supporting infrastructure. New infrastructure would include a Consolidated Operations Complex, a child development center, an airman dormitory, new ground data terminal antennas, a gym, and a maintenance complex. There are two options under consideration for the gym location, both of which are within the existing Flightline Area. There are also two options for the maintenance complex: a preferred option in the existing Flightline Area north of US 98, and the second option in a previously undeveloped site east of the Flightline Area.

The proposed site for either action is situated on approximately 788 acres of land located on Tyndall AFB. The site contains pine plantation (353.5 acres), airfield (172.6 acres), wet flatwoods (67.0 acres), institutional (56.9 acres), undeveloped open land (54.9 acres), hydric pine plantation (23.3 acres), estuarine ditch (17.7 acres), wet prairie (13.8 acres), shrub and brushland (9.5 acres), freshwater forested wetlands (6.9 acres), upland coniferous (5.9 acres), community recreation facilities (2.9 acres), commercial (2.7 acres), and marsh (0.9 acres). The proposed project impact to jurisdictional wetlands would vary from 11 acres to 306 acres depending on the alternative chosen, although Tyndall AFB would attempt to avoid and minimize wetland impacts during the permitting process. Tyndall AFB would consider the purchase of wetland credits from a permitted wetland mitigation bank and would also consider on-site and off-site in-kind mitigation.

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Potentially Affected Resources

The *Draft Environmental Impact Statement* (June 2020), which was prepared by Leidos on behalf of USAF, includes a Biological Evaluation that addresses potential impacts to listed species that may result from any demolition, renovation, and construction activities outlined in the proposed action. Listed species surveys were conducted as a part of field reviews during January 2020. The report indicates that no listed wildlife species were observed during the field reviews.

FWC staff also conducted a geographic information system (GIS) analysis of the project area. This analysis confirmed the information in the report and also found that the project site contains, is adjacent to, or occurs near:

- U.S. Fish and Wildlife (USFWS) Consultation Area for:
    - Red-cockaded woodpecker (*Picoides borealis*, Federally Endangered [FE])
- Documented occurrences or nesting of rufa red knot (*Calidris canutus rufa*, Federally Threatened [FT]), snowy plover (*Charadrius nivosus*, State Threatened [ST]), least tern (*Sternula antillarum*, ST), black skimmer (*Rynchops niger*, ST), and American oystercatcher (*Haematopus palliatus*, ST) and piping plover (*Charadrius melodus*, FT)
- Potential nesting areas for the loggerhead sea turtle (*Caretta caretta*, FT) and the green sea turtle (*Chelonia mydas*, FE)
- Potential habitat for the following federally and state-listed species:
    - St. Andrew beach mouse (*Peromyscus polionotus peninsularis,* FE)
    - Choctawhatchee beach mouse (*Peromyscus polionotus allophrys,* FE)
    - Eastern indigo snake (*Drymarchon corais couperi*, FT)
    - Reticulated flatwoods salamander (*Ambystoma bishopii*, FE)
    - Leatherback sea turtle (*Dermochelys coriacea*, FE)
    - Kemp's ridley sea turtle (*Lepidochelys kempi*, FE)
    - Gopher tortoise (*Gopherus polyphemus*, ST)
    - Southeastern American kestrel (*Falco sparverius paulus*, ST)
    - Florida pine snake (*Pituophis melanoleucus mugitus*, ST)
- Potential habitat for the Florida black bear (*Ursus americanus floridanus* - East Panhandle Bear Management Unit)
- Existing and proposed conservation lands:
    - Tyndall AFB Wildlife Management Area
    - Tyndall Critical Wildlife Area

Comments and Recommendations

Beach-nesting Birds

State-listed seabirds and shorebirds overwinter and nest in the beach dune habitat within and adjacent to the proposed project site. Between 2017 and 2018, FWC staff documented approximately 337 instances of imperiled beach nesting shorebird nesting within one mile of the proposed work activities. Existing site conditions may also support beach-nesting bird breeding habitat and clearing associated with construction may create conditions conducive for nesting. Cleared sites such as areas that have undergone surface scraping and that leave open sandy soils may attract ground-nesting species such as least terns, black skimmers, or other imperiled beach- BI-1

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nesting birds (IBNB). IBNB nests have been documented on a variety of disturbed sites, including construction sites. Nesting has occurred on nearby projects in similar locations and with similar soil composition. Eggs are typically deposited in shallow depressions or scrapes in the substrate, or within a vegetation clump. In addition to the beach dune areas and cleared sites with exposed bare soils, imperiled beach nesting birds can also utilize buildings with gravel rooftops for nesting and have been documented nesting on these types of buildings on Tyndall AFB.

Egg-laying usually begins in early April, and colonies may range in size from a few breeding pairs to many hundreds. FWC staff recommends the following measures to reduce nesting potential during construction:

BI-1 cont'd

- Conduct construction or demolition activities outside of the breeding season (generally April, but potentially as early as mid-February, through August), if feasible;
- Clear the site only when ready to build, and avoid leaving cleared areas or potentially suitable nesting sites (such as gravel rooftops) with little to no activity for an extended amount of time; and
- Monitor daily proposed works sites during the nesting season any cleared sites to ensure no active nests of ground nesting birds are present prior to the commencement of construction or demolition activities.

If nesting is observed within or adjacent to a demolition or construction work site prior to or after the start of work, installation staff can coordinate with FWC staff at the end of this letter to discuss nest buffers and other avoidance and minimization measures. For additional information, please refer to FWC's Breeding Bird Protocol for Florida's Seabirds and Shorebirds located at the following web address: https://public.myfwc.com/crossdoi/shorebirds/PDF-files/BreedingBirdProtocol.pdf.

Sea Turtle Lighting

The beaches at Tyndall AFB support nesting by loggerhead and green sea turtles and occasionally leatherback and Kemp's ridley turtles. The base has an active Sea Turtle Program that surveys and marks all sea turtle nests on the base's approximately 18 miles of beaches under an FWC marine turtle permit. The draft EIS indicates that wildlife-friendly lighting would be incorporated into the proposed action. FWC supports the base's efforts to reduce and minimize lighting impacts to coastal wildlife associated with the proposed action. For implementation, FWC staff recommends an exterior lighting plan be developed. The plan should specify long-wavelength (560 nanometers or shorter) lamps with the lowest lumen output necessary to meet the required design foot candles. Lamps should be installed in full cut-off, fully shielded fixtures mounted at the lowest height possible. To minimize visibility of lights from the adjacent beach, bollards – 42 inches or less in height – should be utilized in parking areas. Poles along roadways should be limited to 15 to 18 feet in height. In addition, restoration of coastal vegetation should include taller, shrubby plants that can serve as a barrier to landward lights and block sky glow. FWC staff are available for assistance and can be contacted at wildlifelighting@myfwc.com for specific lighting questions during the development of lighting plans for projects at Tyndall AFB. Additional information is available http://myfwc.com/wildlifehabitats/managed/sea-turtles/. BI-2

Florida Black Bear

FWC has received 437 reports of human-bear conflicts within a five-mile radius of the project site since 2006. Florida black bears are frequently observed on Tyndall AFB, which is within the East Panhandle Bear Management Unit identified in the 2019 Bear Management Plan. The Integrated Natural Resources Management Plan (INRMP) for Tyndall AFB includes management objectives to maintain the current population, reduce negative human-bear interactions, remove BI-3

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bear attractants from populated areas on base, and educate the public. FWC staff recommend that Tyndall AFB continue to follow and implement these management objectives, since proactive planning may help prevent or reduce future conflicts with bears. Additional information about Florida black bears can be found on our website at http://www.myfwc.com/wildlifehabitats/managed/bear. BI-3 cont'd

Florida Pine Snake

Although Florida pine snakes have not been documented on Tyndall AFB, they can occur in xeric (well-drained), upland habitat, which is present throughout the base property. Florida pine snakes are naturally secretive and can spend up to 80 percent of their time in underground refuges such as stump holes, gopher tortoise burrows, and the burrows of nine-banded armadillos and mice. This species is often associated with southeastern pocket gophers (*Geomys pinetis*); however, they can persist and thrive in areas without this species. Florida pine snakes are active from March through October but show the greatest activity in May, June, July, and October when they move more frequently and travel farther distances. Additional information can be found in the Florida Pine Snake Species Conservation Measures and Permitting Guidelines (https://myfwc.com/media/11571/floridapinesnakeguidelines-2018.pdf). BI-4
If a Florida pine snake is observed during construction, FWC staff recommends that work activities cease, and the snake be allowed to leave with no support or hindrance. It would also contribute to FWC's research efforts if sightings are reported to the staff member at the close of this letter, preferably with a photograph and GPS coordinates.

FWC staff appreciates the opportunity to provide input on this project. If you have specific technical questions regarding the content of this letter, please contact Bryan Phillips at (850) 767-3646 or by email at Bryan.Phillips@MyFWC.com. All other inquiries may be directed to ConservationPlanningServices@MyFWC.com.

Sincerely,

Jason Hight
Land Use Planning Program Administrator
Office of Conservation Planning Services

jh/bwp
Tyndall AFB – Draft EIS for the F-35A and MQ-9 Wing Beddown_41957_07142020

cc: Sean Blomquist, USFWS, sean_blomquist@fws.gov

A-002

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW
ATLANTA, GEORGIA 30303-3104

August 3, 2020

Ms. Cynthia J. Pettit, AFCEC/CZN
F-35A/MQ-9 EIS Project Manager
2261 Hughes Avenue, Suite 155
JBSA Lackland, Texas 78236-9853

Re: EPA Comments for the Draft Environmental Impact Statement, F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB. CEQ No. 2020125

Dear Ms. Pettit:

The U.S. Environmental Protection Agency has reviewed the U.S. Air Force Draft Environmental Impact Statement (DEIS) in accordance with our responsibilities under Section 102(2)(C) of the National Environmental Policy Act and Section 309 of the Clean Air Act. The purposed project involves the beddown of the F-35A Wing and possibly a MQ-9 Operational Wing at Tyndall Air Force Base (AFB), Florida, or an alternate beddown location for the MQ-9 Remote Piloted Aircraft (RPA) at Vandenburg AFB, California.

Within the DEIS, the U.S. Air Force examines a No Action Alternative and several Action Alternatives for the beddown of the proposed aircraft. The proposed alternatives are as follows:

- No Action Alternative: The No action for the F-35A Wing proposal reflects the status quo, where no beddown of an F-35A Wing or the proposed MQ-9 Operational Wing would occur, and there would be no F-35A–related changes to base facilities, personnel, or airfield and airspace flight operations.

- Alternative 1: Beddown a F-35A Wing at Tyndall Air Force Base as a Three-Squadron F-35A Wing Alternative with 72 Primary Aerospace Vehicles Authorized (PAA) and 6 Backup Aircraft Inventory (BAI) or as a Four-Squadron F-35A Wing Alternative with 96 PAA and 8 BAI.

- Alternative 2: Beddown a MQ-9 RPA Operational Wing with 24 aircraft at Tyndall AFB, and or at Vandenberg AFB MQ-9 Operational Wing.

- Alternative 3: Combined F-35A Wing and MQ-9 Operational Wing beddown alternatives at Tyndall AFB.

The U.S Air Force determined that only Tyndall AFB, the preferred alternative, can address the need for beddown of an additional active duty U.S. based F-35A Wing and the MQ-9 Operational Wing. According to the DEIS, Tyndall AFB has been identified as the proposed operational F-35A Wing beddown location because it provides Air Combat Command with extensive overwater Warning Areas, regional air-to-ground ranges, and airspace for combat proficiency training. The U.S. Air Force also identified the need to restructure and retain Tyndall as a fighter aircraft base due to its unique location and premier training airspace. Tyndall AFB was once the home of the fifth-generation F-22 fighters until Hurricane Michael severely damaged most of the buildings on the installation in 2018.

Based on the EPA's review, appropriate alternatives are considered and analyzed in the DEIS. The information provided in the DEIS is supportive of the preferred alternative to beddown the F-35 and the MQ-9 at Tyndall AFB. The DEIS indicates that the proposed action is technically and economically feasible and is consistent with current land use management at Tyndall AFB. The EPA's primary comment relates to noise impacts on sensitive or vulnerable populations, such as children. Please see the enclosure for EPA's technical comments on noise. These comments should be addressed in the Final EIS. In addition, the EPA recommends that the U.S. Air Force continue to keep the local community informed and involved during the proposed project NP-1

The EPA appreciates the opportunity to review and comment on this document. If you have any questions, please contact Mr. Larry Gissentanna, NEPA Section, DoD and Federal Facilities Project Manager, at (404) 562-8248 or by e-mail at gissentanna.larry@epa.gov.

Sincerely,

Mark J. Fite
Director
Strategic Programs Office

cc: Detailed Technical Comments

Enclosure
Draft Environmental Impact Statement F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB
CEQ No. 2020125

Noise: The Draft Environmental Impact Statement (DEIS) indicates that there are potential noise impacts associated with the preferred alternative. The EPA has particular concerns regarding noise levels at Tyndall Elementary School located on the installation. The DEIS indicates that noise levels will increase under both the Three-Squadron and the Four-Squadron F-35A alternatives. Under all three-squadron F-35A Wing afterburner-use scenarios, the number of indoor noise events with potential to interfere with speech per average daytime hour at Tyndall Elementary School would be as high as six events with windows open, or five events with windows closed.

NS-1

Recommendation: It is important that the U.S. Air Force address noise impacts to sensitive receptors such as children and similarly affected residents. The EPA recommends the U.S. Air Force and Air Base Commander implement the mitigation measures identified under the Best Management Practices identified in Table 2.7-1. The Final EIS should discuss the noise mitigation measures the U.S. Air Force will implement, as applicable, for the selected alternative. The EPA also recommends that the Final EIS indicate whether there will be a comprehensive noise monitoring program to ensure that ongoing noise impacts from military training flights are assessed and appropriately addressed once identified.

NS-2

A-003

[redacted]

[redacted]

Please see email below from State Clearance House in regards to their review of the Draft EIS. You should already have the attached USFWS letter.

Edwin Wallace, GS-12, DAF
Program Manager LBP/Asbestos,
NEPA
325 CES/CEIEC
[redacted]
Tyndall Air Force Base, FL 32403
[redacted]

From: Stahl, Chris <Chris.Stahl@dep.state.fl.us>
Sent: Thursday, August 6, 2020 8:59 AM
To: WALLACE, EDWIN B GS-12 USAF ACC 325 CES/CEIEC [redacted]
Cc: State_Clearinghouse <State.Clearinghouse@dep.state.fl.us>; 'FWC Conservation Planning Services' <FWCConservationPlanningServices@myfwc.com>
Subject: [Non-DoD Source] State Clearance Letter for FL202006168981C- Draft Environmental Impact Statement (EIS) For The F-35A Wing Beddown at Tyndall AFB, Florida and MQ-9 Wing Beddown at Tyndall AFB, Bay County, Florida

August 6, 2020

Edwin Wallace
USAF -Tyndall
325th Fighter Wing
[redacted]
Tyndall AFB, Florida 32403

RE: Department of Defense, Department of the Air Force, U.S. Air Force Draft Environmental Impact Statement (EIS) For The F-35A Wing Beddown at Tyndall AFB, Florida and MQ-9 Wing Beddown at

Tyndall AFB, Bay County, Florida
SAI # FL202006168981C

Dear Edwin:

Florida State Clearinghouse staff has reviewed the proposal under the following authorities: Presidential Executive Order 12372; § 403.061(42), Florida Statutes; the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended; and the National Environmental Policy Act, 42 U.S.C. §§ 4321-4347, as amended.

Based on the information received, it is unclear if there will be wetland impacts. The applicant is advised to contact the Department of Environmental Protection's Northwest District for further wetland and/or stormwater permitting guidance. BI-5 There is a potential for environmental issues with construction activities taking place in/around known contaminated sites. Most of these activities will need to be coordinated with the Division of Waste RCRA and Federal Programs. HM-1 If any dewatering permits are required for construction, there will need to be a careful evaluation and review of available groundwater data to determine the appropriate permit conditions. WR-1 If the project involves clearing of undeveloped and wooded land, the vegetative debris may be disposed by open burning on-site if the burn meets the requirements of state and county regulations. Best management practices should be applied for control of unconfined particulate matter from land-clearing, site grading and excavations. AQ-1 Possible presence of asbestos piping or asbestos fiber in old concrete - surveys should be conducted and required management practices should be applied. IN-1 If relocatable crushers, concrete batch plants or asphalt plants are brought onsite as part of construction or demolition, they should be properly permitted and up to date on testing requirements. Future permitting requirements, rule analysis and PSD analysis for activities onsite. Items to consider when determining air permitting requirements include but are not limited to Gasoline dispensing facilities, surface coating, engine test cells/stands, boilers, emergency and non-emergency stationary engines. AQ-2

The Construction of potable water utilities beyond the Tyndall AFB master meter are not required to obtain DEP potable water permits as the system is a consecutive system of Bay County at this time. Connections directly to Bay County's water system may require DEP potable water permitting. A determination request can be made by emailing a description and drawing(s) to Epost.nwdwf@FloridaDEP.gov. IN-2 Wastewater collection system construction permitting may be needed. Permit determinations are recommended and can be requested by emailing a description and drawing(s) to Epost.nwdwf@FloridaDEP.gov. The application is found at https://floridadep.gov/sites/default/files/62-604.300_8a_1.pdf. IN-3 For dewatering of produced groundwater directly or indirectly to surface water or a conveyance connected to surface water: if the site is contaminated and does not meet surface water standards without treatment, dewatering cannot be authorized under the Generic Permit for Stormwater Discharge from Large and Small Construction Activities or the Generic Permit for Discharge of Groundwater from Dewatering Operations. These two permits are only appropriate when surface water criteria will be met without treatment. Some of the applicable rules for dewatering near contamination are found in 62-302, F.A.C. (surface water quality standards), 62-777, F.A.C. (contaminated cleanup target levels), and 62-780, F.A.C. (contaminated site cleanup criteria). Please consult with the department regarding WR-2 dewatering. You may email a description and drawings to Epost.nwdwf@FloridaDEP.gov.

The Florida Fish and Wildlife Conservation Commission has reviewed the proposed action and independently submitted comments for your consideration. These have been attached to this letter and are incorporated hereto.

Based on the information submitted and minimal project impacts, the state has no objections to the subject project and, therefore, it is consistent with the Florida Coastal Management Program (FCMP). Thank you for the opportunity to review the proposed plan. If you have any questions or need further assistance, please don't hesitate to contact me at (850) 717-9076. WR-3

Sincerely,

Chris Stahl

Chris Stahl, Coordinator
Florida State Clearinghouse
Florida Department of Environmental Protection
3800 Commonwealth Blvd., M.S. 47
Tallahassee, FL 32399-2400
ph. (850) 717-9076
State.Clearinghouse@floridadep.gov

E-001 GS-1

THE CITY OF
MEXICO BEACH
F · L · O · R · I · D · A
P.O. Box 13425 • Mexico Beach, Florida • 32410
PHONE: 850-648-5700 • FAX: 850-648-8768

July 15, 2020

To Whom It May Concern:

As the Mayor of the City of Mexico Beach and a member of the Bay County community I wish to express our City's full support for the bed down of an active F-35 operational wing with up to four squadrons of aircraft and the proposed "Base "Y" MQ-9 wing at Tyndall AFB. I have reviewed the draft EIS and find no substantive issues with the movement of these aircraft and the military members and families that will follow. Mexico Beach is the Eastern neighbor to Tyndall and is proud to support this action.

Our lives changed in this area on October 10, 2018 when Mexico Beach and Tyndall AFB were hit by Hurricane Michael. The unprecedented Category 5 storm was catastrophic. We are grateful to the Air Force for everything that has been have done to help recover and rebuild Tyndall AFB since that time. Tyndall AFB is home to the 325th Fighter wing and many tenant units which contribute substantially to our national defense.

The 75-year relationship between our community and our military has been a positive one and we were pleased to be named a "Great American Defense Community" by the Association of Defense Communities last year. You can count on Mexico Beach and Bay County for continued support of Tyndall Air Force base and the military members who will call our community home and I look forward to seeing F-35s and MQ-9s flying over the skies in Bay County.

Sincerely,

Al Cathey
Mayor
City of Mexico Beach

201 Paradise Path, Mexico Beach, FL 32410

E-002 GS-1

I was not able to download the comment card, but I want my comments on the record.

As the Mayor of the City of Callaway, Florida, a municipality near Tyndall AFB, I want to express my full support for the beddown of an active duty F35 Wing with up to four squadrons and an MQ-9 Wing at Tyndall AFB. I have reviewed the Draft EIS and have found no issues that would cause me to submit a substantive comment.

Our lives changed in this area on October 10, 2018 when our community and Tyndall AFB were hit by Hurricane Michael. Hurricane Michael was an unprecedented and catastrophic storm to Tyndall AFB and Bay County. I am grateful to the Air Force for everything that has been done to help Tyndall AFB recover and rebuild since that time.

Tyndall AFB is home to the 325th Fighter Wing and over 30 tenant units and has a legacy dating back to 1947. Our community has worked tirelessly since the beginning to ensure that military members and their families feel welcome in our community. Callaway is particularly pro-military, as a large percentage of our residents are either retired military, active duty military or civilians working at Tyndall AFB. You have my commitment that this support will continue and that we will continue to work in partnership with Tyndall AFB. I look forward to seeing F35s and MQ-9s flying over the skies of Callaway.

Pamn Henderson

Pamn Henderson

Mayor, City of Callaway, Florida

Name Pamn Henderson

Address 133 H.L. Sudduth Drive

City/State/Zip Callaway, FL 32404


Pamela Henderson
133 H L Sudduth Dr.
Panama City, FL 32404-7917
PENSACOLA FL 325
24 JUL 2020 PM 2 L
MQ-9/F-35 EIS Project Manager
AFCEC/CZN
2261 Hughes Avenue Suite 155
JBSA Lackland TX 78236-9853
78236-985330

O-001

BAY COUNTY
CHAMBER OF COMMERCE
Est. 1913

GS-1

July 20, 2020

F-35/MQ-9 EIS Project Manager
AFCEC/CZN
2261 Hughes Avenue, Suite 155
JBSA Lackland, TX 78236-9853

Re: F-35A Wing and MQ-9 Wing Beddowns at Tyndall AFB EIS

Dear Ms. Pettit:

Thank you for the opportunity to comment on the draft EIS for the F-35A and MQ-9 Bedddowns at Tyndall AFB. The Bay County Chamber of Commerce has reviewed the draft EIS and has found no issues to submit substantive comment. In addition, the Chamber fully supports the F-35 A and MQ-9 Beddowns.

Since 1941, Tyndall Air Force Base has served as a base for advanced fighter aircraft. From the F-88 Sabre, F-104 Starfighter and the F-22 Raptor, to the future home of the F-35A Lightening and preferred alternative for MQ-9 Reaper, direct access to the Joint Gulf Range Complex has allowed pilots to train and test in 180,000 square miles of DoD controlled airspace over the Gulf of Mexico.

That airspace, combined with multiple nearby live-fire bombing ranges, makes Tyndall uniquely situated for the F-35, a fighter aircraft requiring an environment that allows for joint maritime, air and land training exercises. As Air Force Chief of Staff General David L. Goldfein recently stated, "Bringing [the F-35] to Tyndall ensures that the U.S. Air Force is ready to dominate in any conflict."

Of course, to those of us in Bay County, Tyndall is more than just an air base, it is a powerful economic driver and an incredible community partner. Tyndall is Bay County's largest employer. Just prior to Hurricane Michael, over 10,000 personnel, including dependents, called Bay County home, with a total annual payroll of over $370 million. Base operations result in nearly 2,000 indirect jobs, creating a total estimated economic impact to our community of nearly $600 million. Over 37 percent of economic activity in Bay County is related to Tyndall Air Force Base.

In addition to Tyndall AFB being an economic engine for all of Northwest Florida, Tyndall personnel and their families contribute to the region's culture and diversity. They are integral parts of our faith communities, our civic organizations, volunteer in schools, are actively involved in our Chamber and enjoy the world's most beautiful beaches.

P.O. BOX 1850 - PANAMA CITY, FLORIDA 32402
PHONE: 850.785.5206 - FAX: 850.763.6229 – WWW.PANAMACITY.ORG

Tyndall also works with Bay County government in countless ways, including hosting Bay County's Advanced Wastewater Treatment facility. Every other year, Tyndall's open house and air show brings 150,000 people to the base to showcase everything the Air Force has to offer.

As Tyndall rebuilds, "the base of the future" will be able to accommodate future missions as an installation for the fifth-generation fighter, and as the preferred alternative for the new MQ-9 Reaper Wing.

For more than 75 years, Bay County has been a partner with Tyndall to help it fulfill its mission as the Home of Air Dominance. We look forward to seeing the F-35A Wing and MQ-9 Wing to continue Tyndall Air Force Base's critical role in our community and the world.

Sincerely,

Andrew Rowell,
Chairman of the Board

Carol Roberts,
President/CEO

P.O. BOX 1850 - PANAMA CITY, FLORIDA 32402
PHONE: 850.785.5206 - FAX: 850.763.6229 – WWW.PANAMACITY.ORG

BAY COUNTY
CHAMBER OF COMMERCE
235 WEST 5TH ST.
PANAMA CITY FL 32402

PENSACOLA
FL 325
24 JUL 20

NEOPOST
07/24/2020
US POSTAGE $000.50

ZIP 32401

F-35/MQ-9 EIS Project Manager
AFCEC/CZN
2261 Hughes Avenue, Suite 155
JBSA Lackland, TX 78236-9853

78236-985390

O-002

GS-1

Bay Defense Alliance

28 July 2020

MQ-9/F-35 EIS Project Manager
AFCEC/CZN
3515 S General McMullen Drive Suite 155
San Antonio, TX 78226-2018

Ladies/Gentlemen:

The Bay Defense Alliance is the defense support lead for Bay County, so designated by the Bay County Board of Commissioners since 1995. The Board of the BDA is comprised of 30 volunteer members and organizations representing the primary economic development and academic institutions in our community. The mission of the Bay Defense Alliance is to enhance the military value of our installations by ensuring that base leadership has the community resources and support necessary to maximize the potential of missions and their contribution to the national defense strategy.

The citizens and municipal governments surrounding Tyndall AFB appreciate the commitment made by the Air Force to rebuild Tyndall as a uniquely capable and efficient, next-generation installation. Bay County is focused on assuring the base of the future will be part of a **forward looking community,** which provides resilient energy, utilities, transportation and communication infrastructure to Tyndall.

Tyndall has developed a 5th generation fighter aircraft culture for more than 20 years and offers decades of remotely piloted aircraft expertise as well. The community welcomes the bed down of F-35 operational aircraft, RPA MCE and LRE components and is prepared to fully support military members, defense civilians and their families who serve.

Please be assured the focus of our organization and our community has been to ensure the men and women who call Bay County, Florida, their home will have the benefit of an **outstanding school system**, **robust housing opportunities**, **excellent medical care** and **high quality of life standards**, attributes that will ultimately make Tyndall one of the most requested assignments in the Air Force. Attached is a recent update on the significant number of housing and apartment projects in the pipeline which should provide assurance of a strong housing recovery. Also, on July 27, 2020, the Bay County school board approved the construction manager for the creation of **Tyndall Academy**, a 40,000 square foot expansion, creating a K-8 school on base, as depicted in the attached plans.

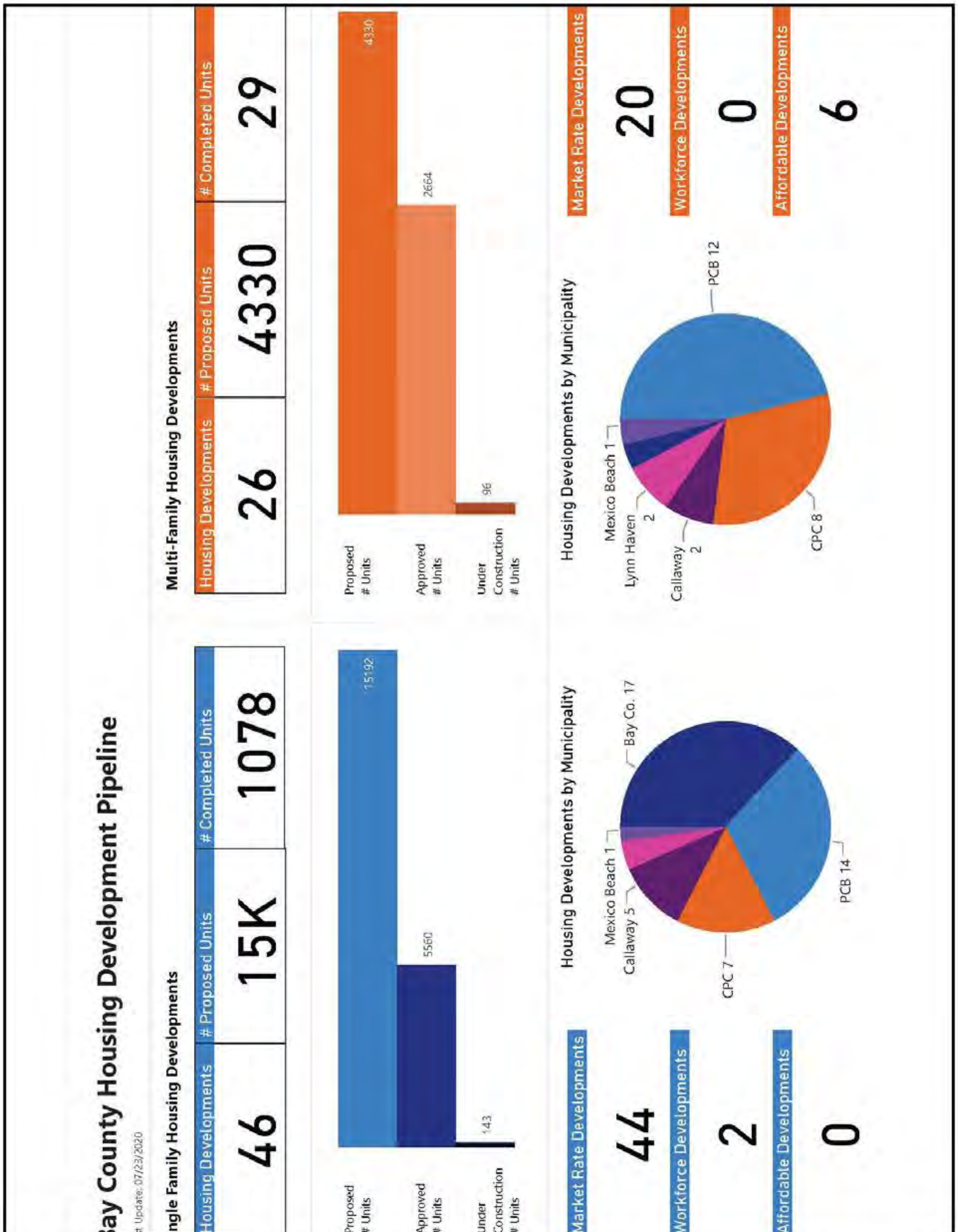
On behalf of the Bay Defense Alliance board and our *Great American Defense Community*, please pass along our sincere gratitude to the men and women serving in the **Air Force Civil Engineer Center**, **Air Force Installation Mission Support Center,** the **Office of the Secretary of the Air Force/IE** and especially for Tyndall's Airmen and families for the work that is being done every day to bring our community the most advanced and resilient installation in the Air Force.

Sincerely,

Tom Neubauer

Tom Neubauer, President

c/o 740 S. Tyndall Parkway, Panama City, Florida 32404
ofc: 850-522-7450 fax: 850-785-1583 cell: 850-819-1955
BDA@knology.net


Bay County Housing Development Pipeline
Last Update: 07/23/2020
Single Family Housing Developments
Housing Developments
46
Proposed Units
15K
Completed Units
1078
Proposed # Units
15192
Approved # Units
5560
Under Construction # Units
143
Market Rate Developments
44
Workforce Developments
2
Affordable Developments
0
Housing Developments by Municipality
Bay Co. 17
PCB 14
CPC 7
Callaway 5
Mexico Beach 1
Multi-Family Housing Developments
Housing Developments
26
Proposed Units
4330
Completed Units
29
Proposed # Units
4330
Approved # Units
2664
Under Construction # Units
96
Housing Developments by Municipality
Mexico Beach 1
Lynn Haven 2
Callaway 2
CPC 8
PCB 12
Market Rate Developments
20
Workforce Developments
0
Affordable Developments
6

Single Family Development Summary

MUNICIPALITY	DEVELOPMENT NAME	INCOME CATEGORY	# UNITS PROPOSED	# UNITS APPROVED	# UNITS UNDER CONSTRUCTION	# UNITS COMPLETED	STATUS
Bay Co.	Avalon Subdivision	Market Rate	43	43	5	29	In Progress
Bay Co.	Barrett's Park Phase III	Market Rate	109	109	6	100	In Progress
Bay Co.	Brighton Oaks	Market Rate	144	144	0	0	In Progress
Bay Co.	Butler Farms	Market Rate	52	52	0	0	In Progress
Bay Co.	Canopy Place	Market Rate	23	23	0	0	In Progress
Bay Co.	College Station	Market Rate	800	92	0	0	Planning
Bay Co.	College Station Phase 1 (Subheader)	Market Rate	41	41	0	0	Planning
Bay Co.	College Station Phase 2 (Subheader)	Market Rate	51	51	0	0	Planning
Bay Co.	Emerald Cove	Market Rate	114	114	8	26	In Progress
Bay Co.	Farmdale	Market Rate	64	64	1	6	In Progress
Bay Co.	Hodges Bayou Phase II	Market Rate	101	101	8	47	In Progress
Bay Co.	Magnolia Hills	Market Rate	134	134	8	32	In Progress
Bay Co.	Megan's Ridge	Market Rate	20	20	0	0	Planning
Bay Co.	Mill Pointe Subdivision	Market Rate	24	24	0	0	Planning
Bay Co.	Sunset Village	Market Rate	235	235	10	91	In Progress
Bay Co.	Titus Park	Market Rate	1000	154	0	0	In Progress
Bay Co.	Titus Park Phase 1 (Subheader)	Market Rate	154	154	0	0	In Progress
Callaway	Bridge Harbor	Market Rate	105	105	10	80	In Progress
Callaway	Callaway Bayou Village	Market Rate	200	200	0	0	Planning
Callaway	Callway Corners	Market Rate	50	50	3	12	In Progress
Callaway	Park Place Subdivision	Market Rate	300	51	6	0	Planning
Callaway	Park Place Subdivision Phase 1 (Subheader)	Market Rate	51	51	6	0	Planning
CPC	Liberty Falls - PC North Area	Market Rate	1900	332	0	0	Planning
CPC	Liberty Falls Phase 1 (Subheader)	Market Rate	200	200	0	0	Planning
CPC	Liberty Falls Phase 2 (Subheader)	Market Rate	132	132	0	0	Planning
CPC	Sweet Bay	Market Rate	3000	200	25	175	In Progress
CPC	Sweet Bay Phase III (Subheader)	Market Rate	80	80	0	0	In Progress
CPC	Horizon Lane	Workforce	27	27	0	0	In Progress
CPC	Michael's Landing	Workforce	21	21	0	0	Planning
Lynn Haven	Andrew's Plantation	Market Rate	86	86	0	86	Complete
Lynn Haven	Camryn's Crossing II	Market Rate	57	57	10	34	In Progress
Mexico Beach	St. Joe PUD Mixed Use	Market Rate	200	200	0	0	Planning
PCB	Breakfast Point	Market Rate	1000	400	20	300	In Progress
PCB	Breakfast Point East Phase 1 (Subheader)	Market Rate	74	74	0	0	Planning
PCB	Breakfast Pointe Phase 4 (Subheader)	Market Rate	80	80	9	0	In Progress
PCB	Breakfast Pointe Phase IV A (Subheader)	Market Rate	82	82	8	60	In Progress
PCB	Coastal Palms Subdivision Phase 1	Market Rate	66	66	0	0	Planning
PCB	Coastal Palms Subdivision Phase 2	Market Rate	45	45	0	0	Planning
PCB	Hidden Cove	Market Rate	23	23	0	0	Planning
PCB	Laguna Haven Subdivision	Market Rate	41	41	0	0	In Progress
PCB	Latitude Margaritaville Phase 1 (Subheader)	Market Rate	48	48	0	0	Planning
PCB	Latitude Margaritaville Phase 2 (Subheader)	Market Rate	200	200	0	0	Planning
PCB	Latitude Margaritaville Phase 3 (Subheader)	Market Rate	391	391	0	0	Planning
PCB	Latitude Margaritaville Watersound	Market Rate	3500	639	0	0	Planning
PCB	Oak Beach Subdivision	Market Rate	72	72	0	0	Planning
PCB	Tapestry Park Phase II	Market Rate	52	52	0	0	In Progress
Total			15192	5560	143	1078	

Multi-Family Development Summary

MUNICIPALITY	DEVELOPMENT NAME	INCOME CATEGORY	# UNITS PROPOSED	# UNITS APPROVED	# UNITS UNDER CONSTRUCTION	# UNITS COMPLETED	STATUS
Bay Co.	Ocean Park	Market Rate	80	80	0	0	Planning
Callaway	Gay Ave. Townhomes	Market Rate	50	0	0	0	Planning
Callaway	Sentinel Point	Market Rate	96	96	8	29	In Progress
CPC	PCHA Fletcher Black Redevelopment	Affordable	80	80	0	0	In Progress
CPC	PCHA Massalina Redevelopment	Affordable	120	120	0	0	In Progress
CPC	Royal Arm Apartments Rehabilitation	Affordable	88	88	88	0	In Progress
CPC	Balboa Townhomes	Market Rate	24	24	0	0	Planning
CPC	Glen Cove Apartments	Market Rate	164	0	0	0	Planning
CPC	PC North Area Apartments	Market Rate	800	0	0	0	Planning
CPC	Sweet Bay Apartments	Market Rate	300	300	0	0	Planning
CPC	Wilson Ave Apartments	Market Rate	400	400	0	0	In Progress
Lynn Haven	Hilltop Pointe	Affordable	50	50	0	0	In Progress
Lynn Haven	Parkview Townhomes	Market Rate	50	50	0	0	In Progress
Mexico Beach	St. Joe Mexico Beach "Village" Garden Apartments and Townhomes	Market Rate	500	0	0	0	Planning
PCB	Matthew Commons	Affordable	38	38	0	0	In Progress
PCB	Tupelo Park	Affordable	47	47	0	0	In Progress
PCB	Clara Beach Way Residences	Market Rate	257	257	0	0	In Progress
PCB	Coastal Palms Subdivision Phase 3	Market Rate	62	62	0	0	Planning
PCB	Holley Lane Townhomes	Market Rate	152	0	0	0	In Progress
PCB	Old Hombre Golf Course	Market Rate	50	50	0	0	In Progress
PCB	Old Hombre Golf Course Redevelopment	Market Rate	50	50	0	0	In Progress
PCB	Residential At Thomas Drive	Market Rate	12	12	0	0	In Progress
PCB	Seaside Heights Townhomes	Market Rate	16	16	0	0	In Progress
PCB	Tellus Partners PCB	Market Rate	232	232	0	0	In Progress
PCB	The Tyde	Market Rate	300	300	0	0	In Progress
PCB	Watermark Panama City Beach	Market Rate	312	312	0	0	In Progress
Total			**4330**	**2664**	**96**	**29**	

Housing Definitions

Types of Housing

Public Housing
Owned by Panama City Housing Authority, or the Springfield Housing Authority.

Mixed Income Housing
A deliberate effort to construct and/or own a multifamily development that has the mixing of income groups as a fundamental part of its financial and operations plans

Mixed Use Building
Mixed use development is the use of a building or set of buildings for more than one purpose. Instead of single use development that can only serve one purpose, mixed use development can combine commercial, industrial, and residential uses on one property

Housing Income Categories

Low-Fixed Income Housing
60% or less of area median income (AMI)

Workforce Housing
61% - 80% of area median income (AMI)

Moderate Income Housing
81% - 120% of area median income (AMI)

Market Rate Housing
120% + of area median income (AMI)

Development Activity

Proposed Developments
Announced construction projects, that are in planning stages of construction, with documents having been filed with the county or city

Under Construction Properties
Have received permits for construction and broken ground

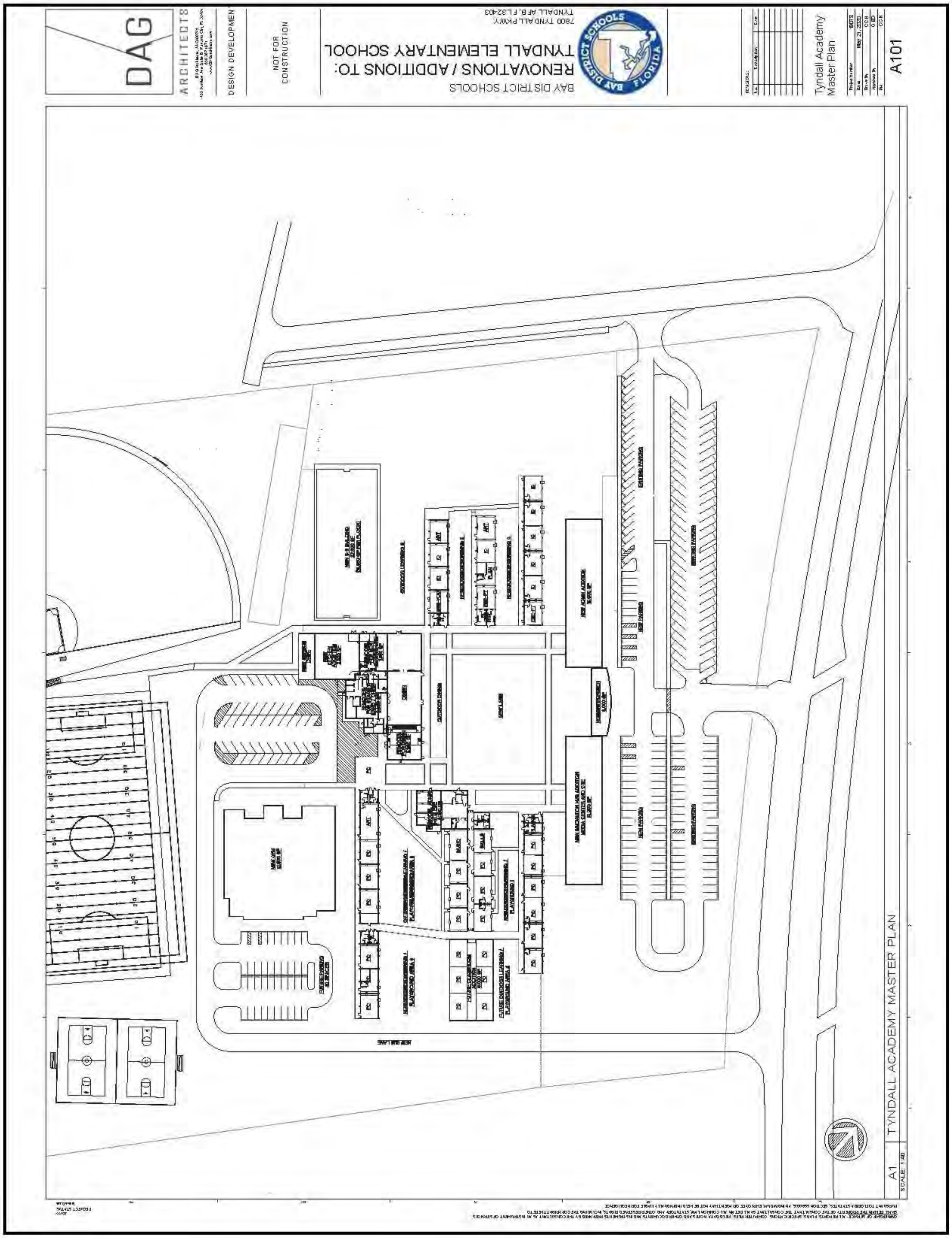
Projected Completions
Projected completions are limited to a year out and are based on properties currently under construction and their expected completion date

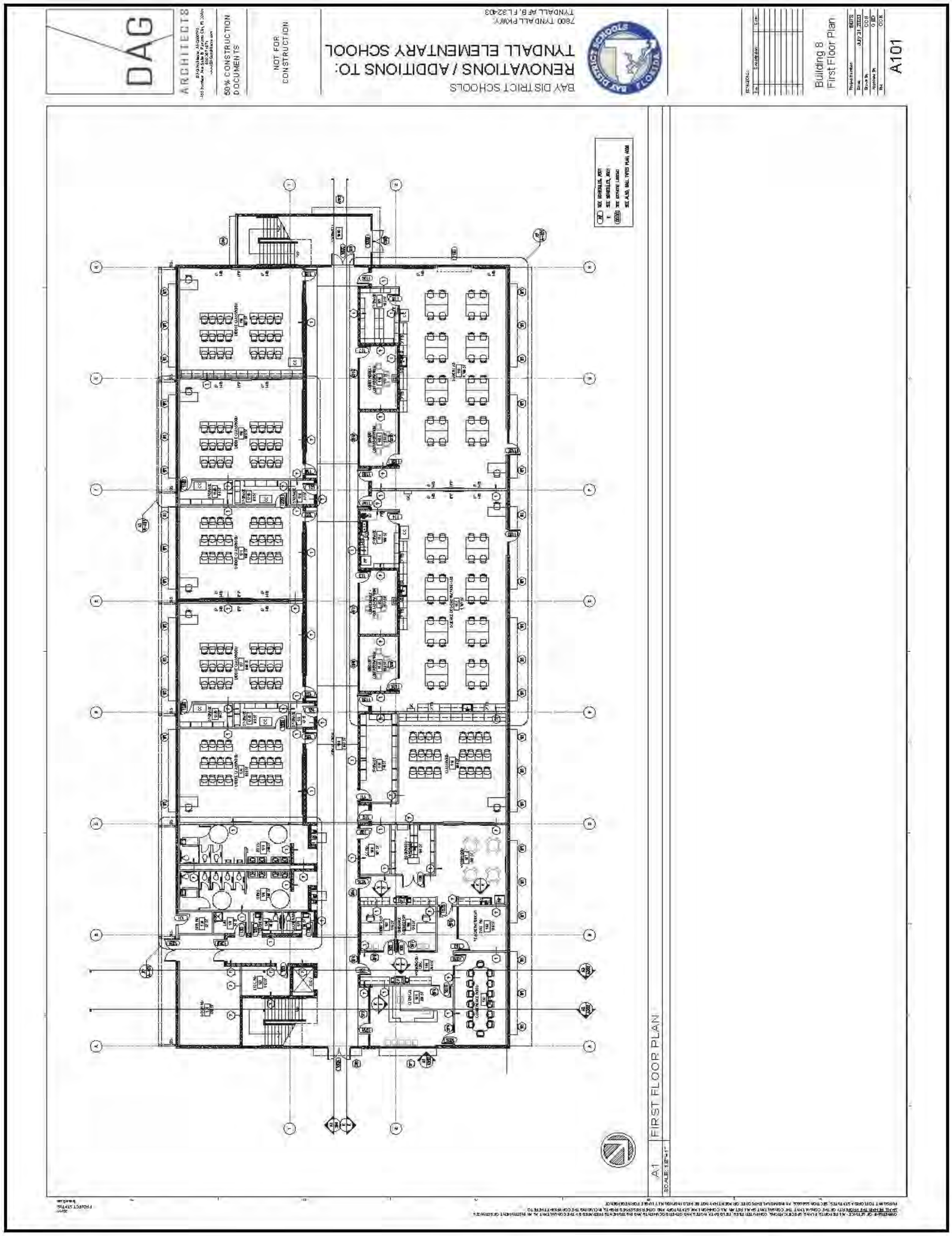
Completion Count
Are reported based on property status as of the start of the month

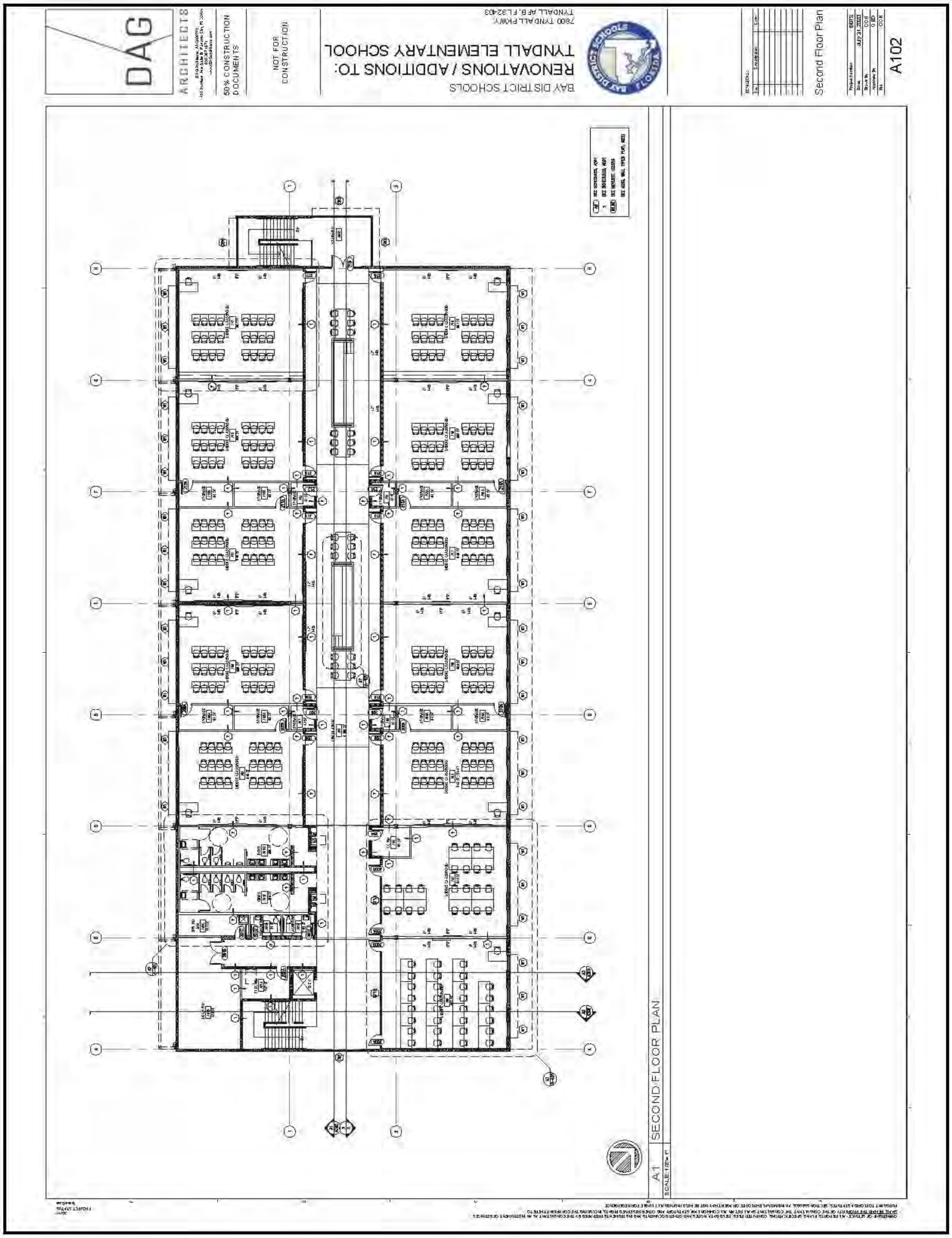
Tyndall Academy

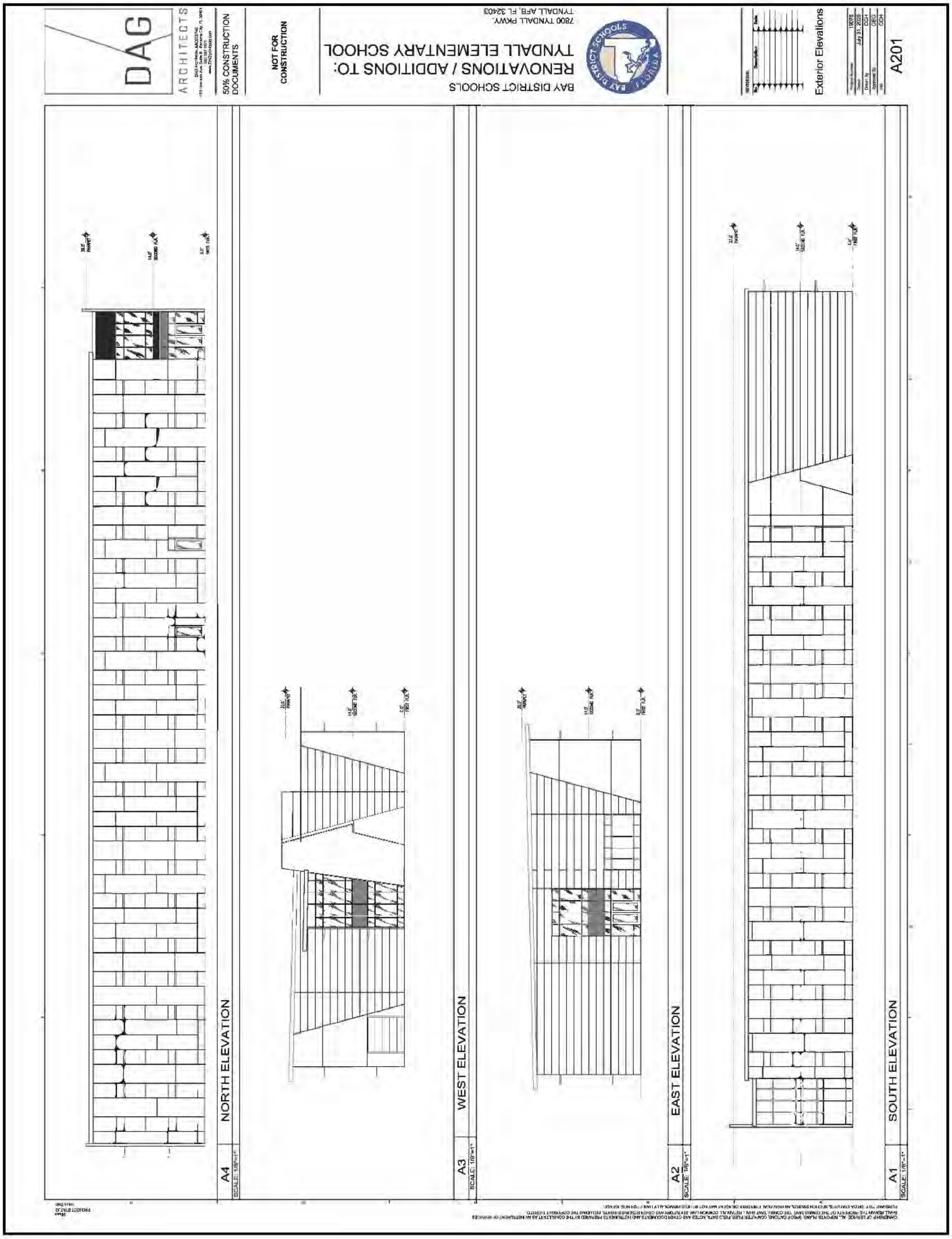
- The first building in design is the replacement for building 8 which was damaged beyond reasonable repair.
- The Board of Bay County District Schools voted to approve the construction manager to begin pricing the project and working with the architect to complete the drawings which are currently at 50% completion.
- The new building will be approximately 40,000 square feet and house the incoming middle school students.
- This building will include a Makerspace and separate science demonstration lab space located on the first floor.
- There are also an additional six classrooms planned for the first floor and twelve classrooms located on the second floor.
- The second phase will include upgrading the existing cafeteria with an expanded footprint.
- The project will also have a gymnasium and additional space to meet DOE standards for middle schoolers, band and art space are at the top of the list.
- This will have a three-year time table since these improvements will need to be completed by the time eighth graders arrive.

As noted on the schematic drawings attached, site improvements including traffic flow, sports parks and bus/ parent pickup stacking space will be reworked to accommodate the increased enrollment. Final planned phase will be two new wings across the front of the school; these will include a media center, administration area and additional classroom space. This will serve to provide a modern look for the campus and close in the building perimeters for additional security.


DAG
ARCHITECTS
DESIGN DEVELOPMENT
NOT FOR CONSTRUCTION
BAY DISTRICT SCHOOLS
RENOVATIONS / ADDITIONS TO:
TYNDALL ELEMENTARY SCHOOL
7800 TYNDALL PKWY.
TYNDALL AFB, FL 32403
BAY DISTRICT SCHOOLS FLORIDA
Tyndall Academy Master Plan
A101
A1
TYNDALL ACADEMY MASTER PLAN


DAG
ARCHITECTS
50% CONSTRUCTION DOCUMENTS
NOT FOR CONSTRUCTION
RENOVATIONS / ADDITIONS TO:
TYNDALL ELEMENTARY SCHOOL
BAY DISTRICT SCHOOLS
7800 TYNDALL PKWY.
TYNDALL AFB, FL 32403
Building 8
First Floor Plan
A101
A1
FIRST FLOOR PLAN


DAG
ARCHITECTS
50% CONSTRUCTION DOCUMENTS
NOT FOR CONSTRUCTION
BAY DISTRICT SCHOOLS
RENOVATIONS / ADDITIONS TO:
TYNDALL ELEMENTARY SCHOOL
7800 TYNDALL PKWY.
TYNDALL AFB, FL 32403
Second Floor Plan
A102
A1
SECOND FLOOR PLAN


DAG
ARCHITECTS
50% CONSTRUCTION DOCUMENTS
NOT FOR CONSTRUCTION
BAY DISTRICT SCHOOLS
RENOVATIONS / ADDITIONS TO:
TYNDALL ELEMENTARY SCHOOL
7800 TYNDALL PKWY.
TYNDALL AFB, FL 32403
Exterior Elevations
A201
NORTH ELEVATION
A4
WEST ELEVATION
A3
EAST ELEVATION
A2
SOUTH ELEVATION
A1

O-003 GS-1

Lt Col Raymond Collins, USAF (Ret.), Exec Director, Florida Defense Support Task Force
rcollins@enterpriseflorida.com

Attached is a Joint Letter of Support from the Florida Defense Support Task Force and the Florida Defense Alliance for the findings of the EIS.

O-004

GS-1

Florida Defense Support Task Force

July 29, 2020

MQ-9/F-35 EIS Project Manager
AFCEC/CZN
3515 S General McMullen Drive Suite 155
San Antonio, TX 78226-2018

The Florida Defense Support Task Force (FDSTF) and the Florida Defense Alliance (FDA) fully support the Environmental Impact Statement, presented publicly on July 14, 2020, which provides for the bed down of up to four squadrons of F-35 operational aircraft and a Remotely Piloted Aircraft wing with Mission Control Element and Launch and Recovery Element capability.

The FDSTF, created under Florida Statute 288.987, has the mission to preserve, protect, and enhance Florida's military missions and installations. The FDA was created under Florida Statute 288.980 to enhance partnerships with communities near major defense installations. The Governor and the Florida legislature work closely with the FDSTF, FDA and defense communities to prevent base encroachment and to strengthen support for military families and veterans with a state-wide focus on education, health care, employment and family programs.

The FDSTF and FDA would also like to take this opportunity to thank the Air Force for its commitment to all of Florida's Air Force installations, and especially, for the decision to rebuild Tyndall Air Force Base as "a base of the future." Supporting the Air Force in the rebuild of Tyndall AFB is one of the top three priorities for the defense sector in Florida for Governor Ron DeSantis, the FDSTF and the FDA.

Enterprise Florida, Incorporated
101 North Monroe Street, Suite 1000 | Tallahassee, Florida 32301
Phone: (850) 878-0826 | Website: www.enterpriseflorida.com

O-004

Over the years the state of Florida has provided defense grants to support installations and Florida's defense communities. The Bay County defense community has secured more than six million dollars in grants for projects of mutual benefit to the community and Tyndall Air Force Base. Most recently, the FDSTF awarded a $279,000 grant to Bay County for the purpose of evaluating the infrastructure of communities surrounding Tyndall AFB necessary to enhance resiliency for the installation.

The state of Florida is proud to be recognized as the most defense-friendly state in the nation and remains committed to supporting Florida's defense assets.

Very Best Regards

Thad Altman

Thad Altman
Chairman

Kellie Jo Kilberg

Kellie Jo Kilberg
Chairwoman, Florida Defense Alliance

2

O-005

GULF COAST
STATE COLLEGE
SINCE 1957

GS-1

July 29, 2020

I first want to thank the U.S. Air Force for committing to the rebuild efforts at Tyndall AFB, FL. Our community is supportive of the Air Force and honored that you choose to place such important missions at Tyndall AFB. I had the chance to participate in the public scoping meeting for the Environmental Impact Statement Draft Report and would like to declare my wholehearted support for the bed downs of the F35 and MQ-9 missions at Tyndall AFB. I am proud to support these two new missions and we are proud to be your partner.

Glen McDonald

Signature

Glen McDonald, Vice President, GCSC

5230 West U.S. Highway 98
Panama City, Florida 32401
850.769.1551 T 800.311.3685
www.gulfcoast.edu

O-007

BAY COUNTY
CHAMBER OF COMMERCE

GS-1

July 30, 2020

F-35/MQ-9 EIS Project Manager
AFCEC/CZN
2261 Hughes Avenue, Suite 155
JBSA Lackland, TX 78236-9853

Re: F-35A Wing and MQ-9 Wing Beddowns at Tyndall AFB EIS

Dear Ms. Pettit,

Thank you for allowing our community to comment on the draft EIS for the F-35A and MQ-9 Bedddowns at Tyndall AFB. For more than 75 years, the Bay County Chamber and its Military Affairs Committee has served as a liaison between the community and Tyndall AFB, strengthening bonds and partnerships with Tyndall to help it fulfill its mission as the Home of Air Dominance.

Enclosed you will find resolutions providing for full support from Bay County's local government and community organizations.

We look forward to welcoming new Tyndall personnel and their families to not just our community, but to our neighborhoods, workplaces, faith communities, civic organizations and schools. The F-35A Wing and MQ-9 Wing missions will reinforce Tyndall Air Force Base's critical role in our community and the world, and Bay County stands ready to support.

Sincerely,

Andrew Rowell,
Chairman of the Board

Carol Roberts,
President/CEO

Enclosures (7):
Bay County Chamber Resolution of Support
Bay Economic Development Agency Resolution of Support
Bay County Commissioners Resolution of Support
City of Panama City Resolution of Support
City of Callaway Resolution of Support
City of Springfield Resolution of Support
The Arc of the Bay Resolution of Support

P.O. BOX 1850 - PANAMA CITY, FLORIDA 32402
PHONE: 850.785.5206 - FAX: 850.763.6229 – WWW.PANAMACITY.ORG

O-008 GS-1

BAY COUNTY
CHAMBER OF COMMERCE

BE IT RESOLVED, that The Bay County Chamber of Commerce gratefully acknowledges the commitment by the U.S. Air Force to rebuild Tyndall AFB, Florida as a next-generation installation supporting up to four squadrons of F-35 operational aircraft and an operational RPA (Remotely Piloted Aircraft) wing with both a MCE (Mission Control Element) and LRE (Launch and Recovery Element) with 24 aircraft;

WHEREAS, the Air Force depends on the support of surrounding communities to ensure access to resilient utilities, drainage and transportation infrastructure;

WHEREAS, the Bay County community and The Bay County Chamber of Commerce shall endeavor to provide military members and their families access to quality schools, diverse housing options, outstanding medical care, spousal employment opportunities and other key quality of life factors;

NOW, THEREFORE BE IT PROCLAIMED, THE BAY COUNTY CHAMBER FULLY SUPPORTS

- The bed-down of four-squadrons of F-35 operational aircraft at Tyndall AFB as described in the draft Environmental Impact Statement;
- the addition of a Remotely Piloted Aircraft wing to include a MCE and LRE with 24 aircraft;
- and appreciates the presence, and contribution to national defense of Tyndall AFB tenant units and commands, including, but not limited to, the F-22 Formal Training Unit; AFCEC (Air Force Civil Engineering Center); AFNORTH (Air Forces Northern), CONR (Continental NORAD Region); the 601st Air Operations Center; the 53d WEG (Weapons Evaluation Group); the 337th Air Control Squadron and General Lori Robinson Air Battle Manager Schoolhouse; 823rd Red Horse Detachment 1 and others;
- The Bay County Chamber of Commerce pledges to continue to work cooperatively with the Bay Defense Alliance, the Florida Defense Alliance, the Florida Defense Support Task Force, base and community leadership to ensure that Bay County and Florida installations will have the resources and outstanding community support necessary to assure the success of missions contributing to the National Defense Strategy.

THIS RESOLUTION SHALL BE EFFECTIVE UPON PASSAGE.

PASSED AND ADOPTED this 21st day of July, 2020.

Andrew Rowell,
Chairman of the Board

ATTEST:

Carol Roberts

Carol A. Roberts
President/CEO

O-009

GS-1

Bay EDA
ECONOMIC DEVELOPMENT ALLIANCE

Be it resolved, that the Bay County Economic Development Alliance (BayEDA) gratefully acknowledges the commitment by the U.S. Air Force to rebuild Tyndall AFB, Florida as a next-generation installation supporting up to four squadrons of F-35 operational aircraft and an operational RPA (Remotely Piloted Aircraft) wing with both a MCE (Mission Control Element) and LRE (Launch and Recovery Element) with 24 aircraft;

Whereas, the Air Force depends on the support of surrounding communities to ensure access to resilient utilities, drainage and transportation infrastructure;

Whereas, the Bay County community and BayEDA shall endeavor to provide military members and their families access to quality schools, diverse housing options, outstanding medical care, spousal employment opportunities and other key quality of life factors;

Now, therefore Be it Proclaimed, BayEDA supports

- the bed-down of F-35 operational aircraft at Tyndall AFB as described in the draft Environmental Impact Statement;
- the addition of a Remotely Piloted Aircraft wing to include a MCE and LRE with 24 aircraft;
- and appreciates the presence, and contribution to national defense of Tyndall AFB tenant units and commands, including, but not limited to, the F-22 Formal Training Unit; AFCEC (Air Force Civil Engineering Center); AFNORTH (Air Forces Northern), CONR (Continental NORAD Region); the 601st Air Operations Center; the 53d WEG (Weapons Evaluation Group); the 337th Air Control Squadron and General Lori Robinson Air Battle Manager Schoolhouse; 823rd Red Horse Detachment 1 and others;
- The BayEDA pledges to continue to work cooperatively with the Bay Defense Alliance, the Florida Defense Alliance, the Florida Defense Support Task Force, base and community leadership to ensure that Bay County and Florida installations will have the resources and outstanding community support necessary to assure the success of missions contributing to the National Defense Strategy.

Respectfully,

Becca B. Hardin

Becca Hardin
President, BayEDA

5230 W. Highway 98 | Panama City, Florida 32401 | Phone: 850.215.9965 | Fax: 850.215.9962
www.BayEDA.com

O-010

GS-1
A CERTIFIED TRUE COPY
BILL KINSAUL CLERK
OF COURT & COMPTROLLER
BY
Deputy Clerk

RESOLUTION NO. 3722

A RESOLUTION OF THE BOARD OF COUNTY COMMISSIONERS OF BAY COUNTY, FLORIDA, SUPPORTING THE BED-DOWN OF AN F-35A OPERATIONAL WING AT TYNDALL AIR FORCE BASE AND THE THE BED-DOWN OF AN MQ-9 REMOTELY PILOTED AIRCRAFT OPERATIONAL WING AT TYNDALL AIR FORCE BASE.

WHEREAS, since 1941 Tyndall Air Force Base has served as home to some of America's most advanced fighter aircraft, including as a training center and operational squadron for iconic aircraft such as the F-99 Sabre, the F-104 Starfighter, the F-15 Eagle, and the F-22 Raptor; and

WHEREAS, Tyndall Air Force Base has direct access to the Joint Gulf Range Complex, which allows pilots to test and train in 180,000 square miles of U.S. Department of Defense controlled airspace over the Gulf of Mexico; and

WHEREAS, the Joint Gulf Range Complex, together with multiple nearby live-fire bombing ranges, makes Tyndall Air Force Base uniquely situated for the F-35, a fighter aircraft that requires an environment that allows for joint maritime, air and land training exercises; and

WHEREAS, Tyndall Air Force Base's access to nearby training ranges, its weather, and its lack of competition for air space also makes it an ideal location to meet the unique requirements of the MQ-9 Reaper; and

WHEREAS, throughout its 75 year history, Tyndall Air Force Base has enjoyed a close connection with its community, as demonstrated by Bay County's 2019 Great American Defense Community Award, recognizing the community's engagement in improving the quality of life for veterans, service members and their families; and

WHEREAS, Bay County and its community partners have provided Tyndall Air Force Base with resilient utilities, drainage and transportation infrastructure; quality schools for military families; diverse housing options, outstanding medical care; spousal employment opportunities; and other key quality of life factors.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF BAY COUNTY, FLORIDA, AS FOLLOWS:

That Bay County, Florida, gratefully acknowledges the commitment by the U.S. Air Force to rebuild Tyndall AFB, Florida as a next-generation installation supporting up to four squadrons of F-35 operational aircraft and an operational RPA (Remotely Piloted Aircraft) wing with both a MCE (Mission Control Element) and LRE (Launch and Recovery Element) with 24 aircraft;

O-010

GS-1

That Bay County, Florida, fully supports the bed-down of F-35 operational aircraft at Tyndall AFB as described in the draft Environmental Impact Statement, and the addition of a Remotely Piloted Aircraft wing to include a MCE and LRE with 24 aircraft;

That Bay County, Florida, appreciates the presence, and contribution to national defense of Tyndall AFB tenant units and commands, including, but not limited to, the F-22 Formal Training Unit; AFCEC (Air Force Civil Engineering Center); AFNORTH (Air Forces Northern), CONR (Continental NORAD Region); the 601st Air Operations Center; the 53d WEG (Weapons Evaluation Group); the 337th Air Control Squadron and General Lori Robinson Air Battle Manager Schoolhouse; 823rd Red Horse Detachment 1 and others; and

That Bay County, Florida, pledges to continue to work cooperatively with the Bay Defense Alliance, the Florida Defense Alliance, the Florida Defense Support Task Force, base and community leadership to ensure that Bay County and Florida installations will have the resources and outstanding community support necessary to assure the success of missions contributing to the National Defense Strategy.

ADOPTED this 21 day of July, 2020.

BOARD OF COUNTY COMMISSIONERS
OF BAY COUNTY, FLORIDA

SEAL — BOARD OF COUNTY COMMISSIONERS — BAY COUNTY, FLORIDA

ATTEST: [signature]

Bill Kinsaul, Clerk

By: [signature]

Philip "Griff" Griffitts, Chairman

Approved as to form:

[signature]

Office of County Attorney

O-011

GS-1

RESOLUTION NO. 20200728.1

A RESOLUTION OF THE COMMISSION OF THE CITY OF PANAMA CITY, FLORIDA, RECOGNIZING THE COMMITMENT BY THE U.S. AIR FORCE TO REBUILD TYNDALL AFB, FLORIDA AS A NEXT-GENERATION INSTALLATION SUPPORTING UP TO FOUR SQUADRONS OF F-35 OPERATIONAL AIRCRAFT AND AN OPERATIONAL REMOTELY PILOTED AIRCRAFT ("RPA") WING WITH BOTH A MISSION CONTROL ELEMENT ("MCE") AND A LAUNCH AND RECOVERY ELEMENT ("LRA") WITH 24 AIRCRAFT.

WHEREAS the United States Air Force depends on the support of surrounding communities to ensure access to resilient utilities, drainage and transportation infrastructure; and

WHEREAS the Bay County community and City of Panama City shall endeavor to provide military members and their families access to quality schools, diverse housing options, outstanding medical care, spousal employment opportunities and other key quality of life factors; and

WHEREAS the City of Panama City pledges to continue to work cooperatively with the Bay Defense Alliance, the Florida Defense Alliance, the Florida Defense Support Task Force, base and community support necessary to assure the success of missions contributing to the National Defense Strategy.

NOW THEREFORE, BE IT RESOLVED BY THE CITY COMMISSION OF THE CITY OF PANAMA CITY, FLORIDA fully supports the following:

1. The bed-down of F-35 operational aircraft at Tyndall AFB as described in the draft Environmental Impact Statement; and
2. The addition of a RPA wing to include an MCE and LRE with 24 aircraft; and
3. The presence and contribution to national defense of Tyndall AFB tenant units and commands, including but not limited to the F-22 Formal Training Unit; Air Force Civil Engineering Center ("AFCEC"); Air Forces Northern ("AFNORTH"), Continental NORAD Region ("CONR"); the 601st Air Operations Center; the 53rd Weapons Evaluation Group ("WEG"); the 337th Air Control Squadron and General Lori Robinson Air Battle Manager Schoolhouse; 823rd Red Horse Detachment 1 and others.

PASSED, APPROVED AND ADOPTED by the City Commission of the City of Panama City, Florida, at its regular meeting on the 28th day of July 2020.

CITY OF PANAMA CITY, FLORIDA

By: ______________________
Greg Brudnicki, Mayor

Attest:

____
Jane Greathouse, Deputy City Clerk

O-012

GS-1

RESOLUTION NO. 19-43

A RESOLUTION OF THE CITY COMMISSION OF THE CITY OF CALLAWAY, FLORIDA, SUPPORTING BEDDOWN OF TWO NEW OPERATIONAL WINGS AT TYNDALL AIR FORCE BASE, FLORIDA; AND PROVIDING AN EFFECTIVE DATE.

WHEREAS, the United States Air Force, pursuant to the National Environmental Policy Act of 1969, intends to prepare an Environmental Impact Statement to evaluate environmental consequences associated with two potential Operational Wings at Tyndall AFB, Florida; and

WHEREAS, the Commission of the City of Callaway takes special pride in the presence and support of Tyndall AFB; and

WHEREAS, the City Commission supports the acquisition of the F-35A Operational Wing and the MQ-9 Remotely Piloted Aircraft Operation Wing at Tyndall AFB.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COMMISSION OF THE CITY OF CALLAWAY, FLORIDA, THAT:

SECTION 1. The foregoing "WHEREAS" clauses are hereby ratified and confirmed as being true and correct and are incorporated herein by this reference.

SECTION 2. The City Commission of the City of Callaway supports the acquisition of the F-35A Operational Wing and the MQ-9 Remotely Piloted Aircraft Operational Wing at Tyndall AFB.

SECTION 3. Transmittal of Resolution - Upon City Commission approval of this Resolution, the adopted Resolution will be forwarded to the EIS Project Managers at Lackland AFB, TX and San Antonio AFB, TX, and any otherinterested parties.

SECTION 6. Effective Date - This Resolution shall become effective upon adoption by City Commission and signature of the Mayor.

PASSED, APPROVED AND DULY ADOPTED by the City Commission of the City of Callaway, Florida, meeting in regular session this 17th day of December, 2019.

CITY OF CALLAWAY, FLORIDA

Pamn Henderson

Pamn Henderson, Mayor

Attest: Janice L. Peters

Janice L. Peters, MMC, City Clerk

APPROVED AS TO FORM FOR THE CITY OF CALLAWAY ONLY:

Kevin Obos, City Attorney

VOTE OF COMMISSION:

Davis	AYE
Fairbanks	AYE
Griggs	AYE
Henderson	AYE
Jones	AYE

Page 1 of 1

O-013 GS-1

CITY OF SPRINGFIELD, FLORIDA

RESOLUTION NO. 20-09

A RESOLUTION OF THE CITY OF SPRINGFIELD, FLORIDA PLEDGING TO WORK COOPERATIVELY WITH THE BAY DEFENSE ALLIANCE, THE FLORIDA DEFENSE ALLIANCE AND THE FLORIDA DEFENSE SUPPORT TASK FORCE IN SUPPORT OF F35A AND MQ9 WING BED-DOWNS.

WHEREAS, the City of Springfield gratefully acknowledges the commitment by the U.S. Air Force to rebuild Tyndall AFB, Florida as a next-generation installation supporting up to four (4) squadrons of F-35 operational aircraft and an operational RPA (Remotely Piloted Aircraft) wing with both a MCE (Mission control Element) and a LRE (Launch and Recovery Element) with twenty-four (24) aircraft; and

WHEREAS, the U.S. Air Force depends on the support of the surrounding communities to ensure access to resilient utilities, stormwater and transportation infrastructure; and

WHEREAS, the Bay County community and the City of Springfield shall endeavor to provide military members and their families access to quality schools, diverse housing options, outstanding medical care, spousal employment opportunities, recreational amenities and other key quality of life factors;

NOW, THEREFORE, BE IT PROCLAIMED BY THE CITY COMMISSION OF THE CITY OF SPRINGFIELD, FLORIDA:

1. **The City of Springfield does hereby pledge to fully support:**

- the bed-down of F-35A operational aircraft at Tyndall Air Force Base as described in the draft Environmental Impact Statement;
- the addition of a Remotely Piloted Aircraft wing to include a MCE and a LRE wing with twenty-four (24) aircraft;
- the presence and contribution to the national defense of Tyndall Air Force Base tenant units and commands, including, but not limited to, the F-22 Formal Training Unit, the AFCEC (Air Force Civil Engineering Center), the AFNORTH (Air Forces Northern), CONR (Continental NORAD Region), the 601st (six hundred and first) Air Operations Center, the 53rd (fifty-third) WEG (Weapons Evaluation Group), the 337th (three hundred thirty-seventh) Air Control Squadron, the General Lori Robinson Air Battle Manager Schoolhouse, the 823rd (eight hundred twenty-third) Red Horse Detachment 1 (one) and others;

Resolution 20-09
Page 1 of 2

O-013

GS-1

2. **The City of Springfield does hereby pledge to continue to work cooperatively with:**

   - the Bay Defense Alliance, the Florida Defense Alliance, the Florida Defense Support Task Force, and the base and community leadership to ensure Bay County and Florida installations will have the resources and outstanding community support necessary to assure the success of missions contribution to the National Defense Strategy.

PASSED, APPROVED AND ADOPTED this the 20th day of July, 2020.

CITY OF SPRINGFIELD

Ralph Hammond

Ralph Hammond, Mayor

ATTEST:

Teresa Cox

Teresa Cox, City Clerk

Resolution 20-09
Page 2 of 2

O-014 GS-1

Be it resolved, that the St. Andrew Bay Center, Inc. dba…The Arc of the Bay gratefully acknowledges the commitment by the U.S. Air Force to rebuild Tyndall AFB, Florida as a next-generation installation supporting up to four squadrons of F-35 operational aircraft and an operational RPA (Remotely Piloted Aircraft) wing with both a MCE (Mission Control Element) and LRE (Launch and Recovery Element) with 24 aircraft;

Whereas, the Air Force depends on the support of surrounding communities to ensure access to resilient utilities, drainage and transportation infrastructure;

Whereas, the Bay County community and The Arc of the Bay shall endeavor to provide military members and their families access to quality schools, diverse housing options, outstanding medical care, spousal employment opportunities and other key quality of life factors;

Now, therefore Be it Proclaimed, The Arc of the Bay fully supports

- the bed-down of F-35 operational aircraft at Tyndall AFB as described in the draft Environmental Impact Statement;
- the addition of a Remotely Piloted Aircraft wing to include a MCE and LRE with 24 aircraft;
- and appreciates the presence, and contribution to national defense of Tyndall AFB tenant units and commands, including, but not limited to, the F-22 Formal Training Unit; AFCEC (Air Force Civil Engineering Center); AFNORTH (Air Forces Northern), CONR (Continental NORAD Region); the 601st Air Operations Center; the 53d WEG (Weapons Evaluation Group); the 337th Air Control Squadron and General Lori Robinson Air Battle Manager Schoolhouse; 823rd Red Horse Detachment 1 and others;
- The Arc of the Bay pledges to continue to work cooperatively with the Bay Defense Alliance, the Florida Defense Alliance, the Florida Defense Support Task Force, base and community leadership to ensure that Bay County and Florida installations will have the resources and outstanding community support necessary to assure the success of missions contributing to the National Defense Strategy.

Signatures Ron Sharpe

Ron Sharpe

The Arc of the Bay

The Arc of the Bay / St. Andrew Bay Center, Inc.
1804 Carolina Avenue | Lynn Haven, FL 32444
office 850-265-2951 | fax 850-248-2952 | cell 850-381-7804

bayarc.org

O-015 GS-1

Written Comment Form – Draft Environmental Impact Statement

ENVIRONMENTAL IMPACT STATEMENT FOR MQ-9 WING BEDDOWN AT TYNDALL AFB OR VANDENBERG AFB AND F-35A WING BEDDOWN AT TYNDALL AFB

PLEASE PRINT LEGIBLY

Location: PANAMA CITY, FLORIDA

Date: 7/29/2020

PLEASE SEE ATTACHED

**** CONTINUE ON BACK FOR MORE SPACE ****

Individual respondents may request confidentiality. If you wish to withhold your name or address from public review or from disclosure under the Freedom of Information Act (FOIA), you must state this prominently at the beginning of your comments. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals or officials representing organizations or businesses, will be made available for public inspection in their entirety.

Name: WILL CRAWL, CHAIRMAN

Organization: BAY COUNTY CHAMBER OF COMMERCE MILITARY AFFAIRS COMMITTEE

Address: 2251 W. 23RD STREET

City/State/Zip: PANAMA CITY FL 32405

☑ **Yes, include my name and address on the mailing list so I can receive information about the Environmental Impact Statement.**

☐ **No, do not include my name and address on the mailing list.**

Please mail comments by August 3, 2020

By U.S. Post Office:	*By FedEx or UPS:*
MQ-9/F-35 EIS Project Manager	**MQ-9/F-35 EIS Project Manager**
AFCEC/CZN	**AFCEC/CZN**
2261 Hughes Avenue, Suite 155	**3515 S General McMullen Drive, Suite 155**
JBSA Lackland, TX 78236-9853	**San Antonio, TX 78226-2018**

For additional project information, please visit our website: www.MQ-9WingandF-35WingEIS.com

O-015 GS-1

F-35/MQ-9 EIS Project Manager
AFCEC/CZN
2261 Hughes Avenue, Suite 155
JBSA Lackland, TX 78236-9853

Re: F-35A Wing and MQ-9 Wing Beddowns at Tyndall AFB EIS

Dear Cynthia Pettit,

Thank you for the opportunity to comment on the draft EIS for the F-35A and MQ-9 Bedddowns at Tyndall AFB. I have reviewed the draft EIS and has found no issues to submit substantive comment. In addition, I fully support the F-35 A and MQ-9 Beddowns.

The Military Affairs Committee, known as MAC was formed in 1946 to serve as a liaison between the military and civilian communities, to show our appreciation for the military's role in our national defense and for all the positive influences that members and their families bring to our community.

The MAC is made up of local business and community leaders. These are the folks who stand by our military men and women, welcoming them into our community and working with community leadership and partners to create a conducive environment in which our military families may achieve social, educational and economic prosperity.

Since 1941, Tyndall Air Force Base has served as a base for advanced fighter aircraft. From the F-88 Sabre, F-104 Starfighter and the F-22 Raptor, to the future home of the F-35A Lightening and preferred alternative for MQ-9 Reaper, direct access to the Joint Gulf Range Complex has allowed pilots to train and test in 180,000 square miles of DoD controlled airspace over the Gulf of Mexico.

That airspace, combined with multiple nearby live-fire bombing ranges, makes Tyndall uniquely situated for the F-35, a fighter aircraft requiring an environment that allows for joint maritime, air and land training exercises. As Air Force Chief of Staff General David L. Goldfein recently stated, "Bringing [the F-35] to Tyndall ensures that the U.S. Air Force is ready to dominate in any conflict."

Of course, to those of us in Bay County, Tyndall is more than just an air base, it is a powerful economic driver and an incredible community partner. In addition to Tyndall AFB being an economic engine for all of Northwest Florida, Tyndall personnel and their families contribute to the region's culture and diversity. They are integral parts of our faith communities, our civic organizations, volunteer in schools, are actively involved in our Chamber and enjoy the world's most beautiful beaches.

As Tyndall rebuilds, "the base of the future" will be able to accommodate future missions as an installation for the fifth-generation fighter, and as the preferred alternative for the new MQ-9 Reaper Wing.

O-015

GS-1

For more than 75 years, Bay County has been a partner with Tyndall to help it fulfill its mission as the Home of Air Dominance. We look forward to seeing the F-35A Wing and MQ-9 Wing to continue Tyndall Air Force Base's critical role in our community and the world.

Sincerely,

Will Cramer

Will Cramer
Chairman, Bay County Chamber of Commerce Military Affairs Committee

O-015

GS-1

BILL CRAMER
GMC
P. O. Box 490
Panama City, Florida 32402
Bill Cramer

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07/29/2020
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041M11297901

30 JUL '20
PM 2 L

MQ-9 / F-35 EIS PROJECT MANAGER
AFCEC / CZN
2261 HUGHES AVE, SUITE 155
JBSA LACKLAND, TX 78236-9853

78236-985330

A.13.8 Public Hearing Transcripts

July 14, 2020 Transcript of Public Hearing Comments

Comment O-006:

Atkinson-Baker, Inc.
www.depo.com

would like to speak, please take the opportunity now to call in and make your comments.

PUBLIC COMMENTS

LT. COL. NORTON: We do have speakers that have registered to speak. Our first speaker is Tom Neubauer. Your line is open.

O-006

GS-1

TOM NEUBAUER: Thank you very much. My name is Tom Neubauer, and I serve as president of the Bay Defense Alliance here in Bay County. This organization is comprised of dedicated volunteers focused on supporting the Air Force, Navy, and our Coast Guard installations and missions.

I'd just like to make some brief comments and observations for the record about strategic basing and the Natural Environmental Policy Act process as we've observed it.

First, I'd like to say Bay County enjoys a 78-year relationship with Tyndall, and our community is especially grateful for the Air Force decision to rebuild Tyndall following the catastrophic loss resulting from Hurricane Michael.

Secondly, this community has followed closely the strategic basing process for RPA Base Y and has been impressed with professional {sic} and straightforward approach to ensuring this community is the right location for the proposed RPA Wing.

Transcript of Virtual Proceedings
July 14, 2020 35

Tyndall has also developed a fifth generation fighter aircraft culture for almost 20 years. The community welcomes the beddown of F-35 operational aircraft and is prepared to support military members, and their families, who serve.

The focus of our organization in our community has been to ensure that the men and women who call Bay County, Florida, their home will have the benefit of outstanding {sic} school system, robust housing opportunities, excellent medical care, and the quality of life standards that will make Tyndall one of the most requested assignments in the Air Force.

This community is also focused on assuring the base of the future will be part of a forward-looking community, which provides resilient energy, utilities, transportation, and communication infrastructure to Tyndall Air Force Base.

And finally, on behalf of the Bay Defense Alliance Board, I'd like to say thank you to the men and women serving in the Air Force Civil Engineer Center, the Air Force Installation Mission Support Center, the Office of the Secretary of the Air Force, and especially the men and women at Tyndall for the work that is being done everyday to bring our community the most advanced and resilient installation in the Air Force. Thank you.

Comment E-004:

LT. COL. NORTON: Thank you, Mr. Neubauer. Our next speaker is Mr. Mark McQueen.

MARK McQUEEN: Thank you very much. I want to make sure I can be heard; is this correct?

LT. COL. NORTON: Yes, Mr. McQueen. Please go ahead. Please state and spell your name and indicate any affiliation as well as your address, please. Thank you.

E-004

MARK McQUEEN: Thank you very much. I am Mark

GS-1

McQueen, M-a-r-k M-c, capital Q, u-e-e-n, Major General, United States Army retired. I'm also the city manager for the City of Panama City.

I do, I do want to thank the United States Air Force for this incredible presentation that they've presented this evening and would like to provide insights into that which is taking place in the City of Panama City in an effort to recover from Hurricane Michael, but not only that, but also set the conditions for success for the alternatives that are being considered tonight.

First and foremost, the City of Panama City, the largest city in Bay County, is seeking a new objective for the community, and that is to become the premier city in the panhandle of Florida. And with that, there are four lines of effort that the city is focusing on that have direct impact and indirect impact to Tyndall Air Force Base in the matters being considered.

First, the safety and security for all citizens, and we're striving to enhance the entire safety and security of the entire city and its citizens both in physical security, personal security, and environmental security for the community.

The second line of effort that we're focusing on is our key and vital infrastructure. As noted, there will be a significant investment in the infrastructure of the City of Panama City from water, sewer, also looking at a strategy for underground utilities throughout the entire city of Panama City. We'll also be doing storm water management and entire new roads and bridges that we're looking at within the City of Panama City.

The third line of effort that we're focusing on is the economy and creating a resilient and redundant economy that is able to withstand the expansions and contractions that normal economic activities bring to communities. With that in mind, there's the significant investments that are getting ready to be made by private capital as well as public-private partnerships that are being embarked upon.

And then fourth is the line of effort of quality of life, which is the game changer in that which knits people together and clearly enhancing the entire waterfront community, access to the water, increasing parks and recreation, aquatic centers are just a few that are being done for the community.

That said, all of these items are designed to not only assist the citizens of the City of Panama City, but indeed the citizens of Bay County to include our great teammates at Tyndall Air Force Base. With that, we have anticipated over 5,000 homes that are already being planned for, in construction with puds (phonetic) that have already been approved and developments that are underway.

Additionally, we've created partnerships with our school system in the public, private, and charter domains, and which we are continuing to strive --

TIMEKEEPER: You have 30 seconds remaining, thank you.

MARK McQUEEN: Thank you -- which we are continuing to strive to improve upon to enhance the educational opportunities of the citizens, the children of Panama City, the children of Bay County, and certainly the children of Tyndall Air Force Base.

All told, Panama City fully supports the beddown of the F35s as well as the MQ-9s and looks forward to continuing to be partners with our great teammates at Tyndall Air Force Base. Thank you very much.

LT. COL. NORTON: Thank you for your comments, Major General McQueen. We appreciate them.

Our next speaker is Mr. Ian Crelling.

Comment E-005:

Mr. Crelling, would you please state and spell your name, provide any affiliation, and your address for the record? Thank you.

E-005 GS-1

IAN CRELLING: Yes, this is Ian Crelling. First name is Ian, I-a-n. Last name is Crelling, C-r-e-l-l-i-n-g. Can you hear me?

LT. COL. NORTON: Yes, we can hear you. Go ahead. Thank you.

IAN CRELLING: I'm the community development director for Bay County here in Florida. Thank you for this presentation and for the opportunity to speak. As you may or may not know, Tyndall Air Force Base is located in the unincorporated area of Bay County.

We've worked with Tyndall for years, since I've been here, over the last 19 years. They have great leadership there, and we've worked with them, cooperated with them on many projects over the years.

We strongly support the bedding down of the F-35 and MQ-9 missions, and we certainly look forward to working with Tyndall and its leadership in the future. And that's all I have.

LT. COL. NORTON: Thank you for your comments, Mr. Crelling.

IAN CRELLING: Thank you.

LT. COL. NORTON: At this time we do not have any speakers in the queue. As I've mentioned, the hearing is scheduled to end at 8:30 p.m. Central. We've heard from everyone at this point who requested to speak, and we still have some time left.

Please call in if you have not spoken yet but would like to do so, and we'll give you an opportunity to speak. Additionally, if there is anyone who has already spoken who would like another three minutes, you have an opportunity at this time to expand on your comments.

If you have not chosen to make a verbal comment during this hearing, there are several other ways to make comments on the Draft EIS. This slide shows that you can submit formal written comments either by submitting your comments online at www.F-35wingandMQ-9wingEIS.com or by sending comments to the addresses on the slide.

If you have a pen and paper, I will read the addresses where you can send written comments. You can send written comments via the postal service to F-35A/MQ-9 EIS Project Manager, AFCEC/CZN, 2261 Hughes Avenue, Suite 155, JBSA, Lackland Air Force Base, Texas, 78236-9853; or additionally, you can send comments via a courier, such as FedEx or UPS, to F35-A/MQ-9 EIS Project Manager, AFCEC-CZN, 3515 South General McMullen Drive, Suite 155, San Antonio, Texas, 78226-2018.

Remember that the Draft EIS is available on the website, www.F-35wingandMQ-9wingEIS.com, or at one of the public libraries. Please be sure to include your name, affiliation, and address with your comments. Your address will not be included in the Final EIS. Your comments need, do need to be postmarked by at least August 3, 2020, the end of the comment period.

Your comments will provide the decision-maker, the Secretary of the Air Force, with information to assist in making a decision regarding the F-35A Wing and MQ-9 Wing. Your comments during this process provide the benefit of your knowledge of the local area and your concerns about the environmental impacts or analysis.

It appears that we have no remaining speakers. We will take a brief pause for three minutes to verify that all participants who desire to speak have been heard and that there are no more registered speakers.

(A pause was taken.)

LT. COL. NORTON: And for those of you on the line, once again, we will continue a three-minute pause to once again verify that all participants who desire to speak have been heard and until we can confirm we have no more registered speakers.

(A pause was taken.)

We have approximately two minutes remaining before this meeting will adjourn unless we have any additional

Comment E-003:

commenters. So please call in if you do wish to speak. The telephone line once again is (833) 360-0875 and use the conference ID 2639037.

Remember also you can make written comments and submit those prior to the end of the public comment period.

(A pause was taken.)

It looks like we have an additional speaker, Mr. Rich Musgrave. Mr. Musgrave, you may make your comments. Please state and spell your name and provide any affiliation if appropriate as well as your address. Thank you, Mr. Musgrave.

E-003

GS-1

RICH MUSGRAVE: Thank you. My name is Rich Musgrave, M-u-s-g-r-a-v-e. I'm the mayor of the City of Parker, community immediately adjacent to Tyndall Air Force Base. Our City Hall address is 1001 West Park Street, Parker.

Tyndall, we know is home to the 325 Fighter Wing and over 30 tenant units and dates back to a relationship back in 1946-7. Our community is home to many active-duty and retired military, and we've worked tirelessly to ensure the military members and their families feel welcome in our community.

We're working diligently with several developers toward making sure that we can create the necessary housing the base personnel will require and make a walkable, livable community for them to enjoy. You have my promise that this support will continue and that we will continue to work in partnership with Tyndall.

I look forward to seeing F-35s and MQ-9s flying over the sky in Bay County, and more importantly, we look forward to hearing this sound of freedom. Thank you very much.

LT. COL. NORTON: Thank you for your comments, Mayor Musgrave. They are appreciated.

Our three minutes have expired, so please remember if you have not -- if you have chosen not to make a verbal comment during this hearing, there are several other ways to make comments on the Draft EIS. You can submit written comments by submitting your comments online at www.F-35wingandMQ-9wingEIS.com or by mailing your comments to the addresses previously provided.

We have no more remaining speakers, and having provided a pause for those so that we can verify that we have no more participants who desire to speak and confirming that all speakers who desire to speak have been heard, this hearing will be adjourned.

CLOSING REMARKS

LT. COL. NORTON: This final slide is our thank you for your participation in tonight's hearing and in the Air Force's NEPA process. This project and your inputs are important to the Air Force.

We look forward to inputs provided from the public and agencies as we proceed through the environmental impact analysis. Once again, we invite you to submit comments on the Draft EIS to www.F-35wingandMQ-9wingEIS.com. We will display our slides with the directions for written comments.

This hearing is adjourned.

(The virtual hearing concluded at 7:36 p.m. EST.)

July 15, 2020 Transcript

Excerpt of Transcript Requesting Public Comments:

you to put on the record your views and concerns about the proposal that you want the decision makers to consider. Questions that you pose during your verbal testimony will be become part of the record and will be considered for the final EIS.

Lastly, if you have been listening to this hearing on your computer, please mute your computer speakers before you begin to speak to avoid audio interference with your telephone. Clicking the speaker icon in the upper right corner of the web guest window will turn off the web guest sound.

I have been provided a list of individuals who would like to speak. Do we have any individuals who would like to speak this evening and are there any registered speakers?

(No response from 18:03:27 to 18:03:39.)

Currently, we have nobody that has registered to speak and we have nobody in our queue to participate in the public comment portion of this hearing. So I would like to remind anyone on the line or viewing this presentation online that you have the opportunity to dial in to the toll free number provided earlier.

It is on the slide, and once again, that number is: (833) 360-0875 and use the Conference ID: 6088652. Please remember you will need to press star 1 in order to speak.

(No response from 18:04:24 to 18:04:33.)

I will pause for a few moments now just to ensure and verify that there is nobody who would like to speak. So we will give you a moment so that you can register to speak and get into the queue. And once again, just a reminder that you can press star 1 to speak if you would like to do so.

(No response from 18:04:54 to 18:05:33.)

And we still have no registered speakers in the queue. As I mentioned, this hearing is scheduled to end at 8:30 p.m. Pacific time.

At this point, we've heard from -- we verified that we've had no registered speakers to this point, but we do still have some time left. Please, call in if you have not spoken yet, but would like to do so, and we'll ask you to speak. If you are already on the phone line and would like to speak, please press star 1 and you will be placed in the commentor queue to be called on to speak in order.

(No response from 18:06:12 to 18:06:36.)

If you have not chosen to make a verbal comment during this hearing, there are several other ways to make comments on the Draft EIS. This slide shows that you can submit written comments either by submitting your comments online at www.F-35WingandMQ-9WingEIS.com or by sending comments to the addresses on the slide.

If you have a pen and paper, I will read you the addresses where you can send written comments. You can send written comments via the postal service @to F-35A/MQ-9 EIS Project Manager, AFCEC/CZN 2261 Hughes Avenue, Suite 155, JBSA-Lackland Air Force Base, Texas 78236-9853, or you can send comments via a courier such as FedEx or UPS to F-35A/MQ-9 EIS Project Manager, AFCEC/CZN, 3515 South General McMullen Drive, Suite 155, San Antonio, Texas 78226-2018.

Remember, that the Draft EIS is available on the website, www.F-35WingandMQ-9WingEIS.com or at one of the public libraries. Please be sure to include your name, affiliation and address with your comments. Your address will be not included in the final EIS. Your comments need to be postmarked by at least August 3rd, 2020. Your comments will provide the decision maker, the Secretary of the Air Force, with information to assist in making a decision regarding the F-35A Wing and the MQ-9 Wing.

Your comments during this process provide the benefit of your knowledge of the local area and your concerns about the environmental impacts or analysis.

We still have no registered speakers and we have no one currently in the process of dialing in. Because we want to verify and confirm that all participants who wanted to speak have the opportunity to do so, this hearing will take a brief pause for five minutes to verify that all participants who desire to speak have been heard and there are no more registered speakers.

As I mentioned before, please call the number displayed on the slide if you have not spoken yet but would like to do so and we'll ask you to speak. If you are already on the phone line and you would like to speak, all you have to do is press star and the Number 1 and you will be automatically placed in the commenter queue to be called upon to speak in order.

At this time, the hearing will be paused for five minutes. I will give notifications at each minute before we move on to adjourning the hearing.

(No response from 18:10:11 to 18:11:34.)

LT. COL. NORTON: To verify we have no speakers, once again, four more minutes.

(No response from 18:11:40 to 18:12:27.)

LT. COL. NORTON: We have three more minutes remaining. There are still no callers in the queue to speak and as a reminder, if you are currently on the phone line and you would like to speak, all you need to do is press star 1 and you'll be placed in the commenter queue to make your comments.

(No response from 18:12:44 to 18:13:17.)

LT. COL. NORTON: There is a two-minute warning. At the conclusion of two minutes we will move on to the adjournment of this hearing.

(No response from 18:13:18 to 18:14:17.)

LT. COL. NORTON: We still have no registered speakers, so at the conclusion of one minute I will move on to the adjournment of this hearing.

(No response from 18:14:24 to 18:15:22.)

LT. COL. NORTON: It appears that we have no registered speakers, so with that this hearing will be adjourned. The final slide is our Thank You slide for your participation in tonight's hearing and in the Air Force's NEPA process. This project and your inputs are important to the Air Force. We look forward to inputs provided from the public and agencies as we proceed through the environmental impact analysis. Once again, we invite you to submit comments on the Draft EIS to www.F-35WingandMQ-9WingEIS.com. We will display our slide with the directions for written comments, and with that, this hearing is adjourned.

(Proceedings adjourned at 18:16:06.)

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APPENDIX B
RESOURCE DEFINITION & METHODOLOGY FOR ANALYSIS

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B.1 AIRSPACE MANAGEMENT AND AIR TRAFFIC CONTROL

B.1.1 Resource Definition

Airspace management and air traffic control is generally defined as the direction, control, and handling of flight operations in the navigable airspace overlying the geopolitical borders of the United States and its territories. The Federal Aviation Administration (FAA) is responsible for governing and managing this navigable airspace to ensure its safe and efficient use by all concerned. In doing so, the FAA has structured the National Airspace System in a manner that is strictly regulated and managed to meet both the individual and common needs of all military, commercial, and general aviation interests to include Unmanned Aircraft Systems (UAS) operations. The UAS includes the entire ground control system and communications for operating a Remotely Piloted Aircraft (RPA) such as the MQ-9 being evaluated in this study.

In general, all navigable airspace is categorized as Controlled, Special Use (SUA), Uncontrolled, or Other, depending on the flight rules applying to the operational use of each category. This categorization is also dependent upon (1) the complexity, density, and nature of aircraft operations, (2) the level of safety required, and (3) national and public interest.

The affected airspace environments for both Tyndall Air Force Base (AFB) and Vandenberg AFB include controlled airspace, SUA, and other airspace areas in which F-35 and MQ-9 would operate under the different alternatives. The different controlled airspace categories and classifications are defined below as they relate to the environments being examined for the Proposed Action and alternatives.

The different controlled airspace categories and classifications and the terms discussed in this EIS for airspace uses are defined below as they relate to the environments being examined for the Proposed Action and alternatives.

Visual Flight Rules (VFR) – rules regulating flights conducted in visual conditions where at least 3 miles visibility is required and pilots must be able to see the ground while staying clear of clouds and seeing and avoiding other aircraft. These rules are used mostly by general aviation pilots operating propeller type aircraft.

Instrument Flight Rules (IFR) - rules regulating flights that may be conducted in marginal weather conditions where pilots depend on navigational systems and aircraft instruments to guide and direct their flights. These rules are used by commercial and other jet aircraft that requires a pilot IFR certification.

Air Traffic Control (ATC) – a system of personnel and equipment that directs and separates all IFR aircraft while flying to, from, and enroute between airports. This system includes control towers and FAA and military radar approach control facilities (i.e., Air Force RAPCON) that control airport related aircraft and the FAA air route traffic control centers that control aircraft while they are enroute between airports.

Federal Airways and Jet Routes (shown as victor "V" routes and "J" on aeronautical maps) are "highways" in the sky that pilots follow when transiting between airports. These routes are based on navigational aids (transmitters) and aircraft equipment (receivers) as directional guidance for operating along these routes. Such routes are also established for using the Global Positioning System as a means of navigational guidance.

Instrument Landing System (ILS) is a navigational system that provides a pilot with both vertical and horizontal guidance during an approach to a runway for landing.

Controlled Airspace

Controlled airspace in which most air traffic operates is categorized as either Class A, B, C, D, or E where FAA regulations dictate pilot qualification requirements, the rules of flight to be followed, and aircraft equipment necessary to operate within each class. Uncontrolled airspace (Class G) exists outside the other classes where it is not normally regulated in any manner.

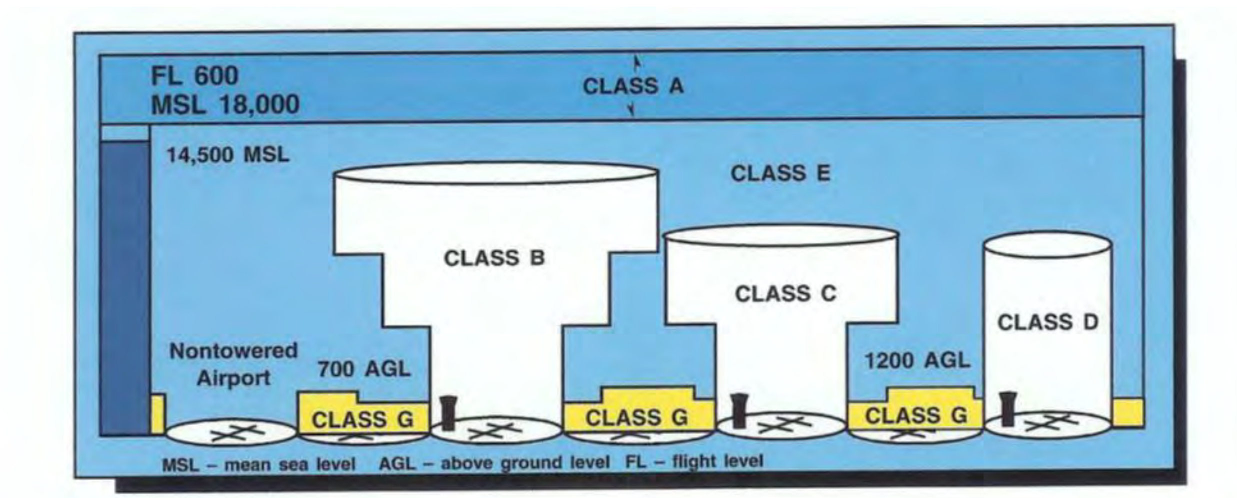

Figure B.1.1. Controlled/Uncontrolled Airspace Depictions

- Class A is all airspace beginning at 18,000 feet mean sea level (MSL) (expressed as Flight Level [FL] 180) up to and including FL 600 within which only instrument flight rules (IFR) aircraft can operate. This class contains jet routes used for enroute IFR air traffic and may include SUA and Air Traffic Control Assigned Airspace (ATCAAs) such as the restricted areas and ATCAAs being examined for this study.
- Class B airspace is designated around the nation's busiest airports where it typically extends from the airport surface in the inter segment and higher altitudes in outer segments up to 10,000 feet MSL. Each Class B area is tailored to meet the individual traffic and flight safety needs where this class is established. All IFR and visual flight rules (VFR) aircraft operating within Class B airspace must be under the control of the responsible Air Traffic Control (ATC) radar approach control facility. No Class B airspace exists in the study area; therefore, it is not discussed further.
- Class C airspace surrounds busy airports having an operational control tower and radar approach control services such as the Pensacola and Tallahassee Airports in the Tyndall

AFB region and the Santa Barbara Airport in the Vandenberg AFB region. This class is tailored and managed similarly to Class B where it generally extends from the surface within a 5-nautical mile (NM) radius and 1,200 feet above ground level (AGL) in an outer 10-NM radius up to 4,000 feet above the airfield elevation. VFR aircraft are only required to be in radio contact with ATC for traffic advisories while operating within Class C airspace.

- Class D airspace surrounds those airfields having an operational control tower, such as Tyndall AFB and Vandenberg AFB, where it generally consists of a 5-SM radius of the airfield that extends from the surface up to 2,500 feet AGL unless otherwise tailored to meet local air traffic requirements. Class D provides the regulated airspace needed to encompass runway traffic patterns and the published instrument approach procedures to the different runways.
- Class E airspace is controlled airspace not classified as Class A, B, C, or D that consumes most of the nation's airspace below FL 180 in both airfield and enroute air traffic environments. Charted Class E areas adjoin Class B, C, or D airspace, beginning at the surface or at 700 or 1,200 feet AGL, as needed to extend the airspace containing the airfield's published instrument approaches. Uncharted Class E airspace extends from 14,500 feet MSL up to, but not including, 18,000 feet MSL where the Class A airspace begins.
- Class G is uncontrolled, uncharted airspace existing in those less used air traffic areas where the controlled airspace classes are not designated. ATC services are not generally provided in this class where "see and avoid" is the standard for VFR aircraft that mostly operate in this airspace**.**

Special Use Airspace

SUA is of defined dimensions wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. SUA includes prohibited areas, restricted areas (RAs), military operations areas (MOAs), warning areas (WAs), alert areas, controlled firing areas, and national security areas, which are identified on aeronautical charts for public awareness and avoidance. The SUA supporting F-35A and MQ-9 training uses in the study areas include RAs, MOAs, and WAs described below.

RAs support ground or flight activities such as artillery practice, missile firing, and other such activities that could be considered hazardous to nonparticipating aircraft. Similar to RAs, WAs are established over domestic or international waters at least 3 NM from the coastline for conducting hazardous activities. While flight of nonparticipating aircraft within RAs and WAs is not wholly prohibited, it is subject to restrictions when these areas are active. Typically, RPAs train in these areas where they do not require constant monitoring by ground-based or airborne observers.

MOAs are established below 18,000 feet MSL for conducting nonhazardous military activities where they are separated and segregated from IFR traffic that ATC may route through this airspace when active. VFR aircraft may operate through an MOA, but the pilots must exercise extreme vigilance to remain clear of the military aircraft when operating within, near, or below this airspace when active.

Certificate of Authorization

The FAA (Joint Order [JO] 7200.23A) requires that the Department of Defense obtain a Certificate of Authorization (COA) waiver to conduct UAS operations outside of SUA while conducting flight training activities within an airfield environment and transiting between an airfield and SUA training areas. A COA permits an agency to operate a specific RPA type for a particular purpose within a defined area that ensures that such operations do not jeopardize the safety of other aviation operations. When a COA is required, the requesting agency must submit an application to the FAA; the FAA will conduct a comprehensive review of the application and, upon approval, identify any limitations needed to provide an equivalent level of safety as for manned aircraft. Scheduled use of established COAs to include the location, times, and altitudes at which RPA operations will be conducted are publicized through a Notice to Airmen (NOTAM) and other advisory means.

B.1.2 Regulatory Setting

The specific rules and regulations governing airspace designation and management are contained in FAA JO 7400.2, Procedures for Handling Airspace Matters. Specific instructions for UAS operations are addressed in FAA JO 7610.4, Special Operations, and FAA JO 7200.23A, Unmanned Aircraft Operations (UAS). The USAF manages airspace in accordance with processes and procedures detailed in Air Force Instruction (AFI) 13-201, Airspace Management. USAF installations, including Tyndall AFB and Vandenberg AFB, establish local standard operating procedures in a directive that governs how flight operations are to be conducted at the airfield and training airspace environments.

B.1.3 Methodology

Baseline conditions for the Proposed Action and alternatives are based on information received from reviews of the applicable regulations, documents, and operations data pertaining to the region of influence, interviews with airport operators, ATC and airspace management personnel, and affected aviation interests, as appropriate. Descriptions of the affected airspace environment discussed in Chapter 3 include, as applicable, those airspace classes, delegated terminal airspace areas, SUA, and other areas of interest that may be potentially affected by the Proposed Action and alternatives. Also considered are any concerns identified by the FAA or other aviation interests during the scoping process as having a potential bearing on the Proposed Action or alternatives.

The potential environmental consequences of the Proposed Action and alternatives are examined by determining what effects any changes in aircraft activities, airspace modifications, or other similar actions may have on air traffic and airspace use in the region relative to current baseline conditions. Potential impacts and recommended mitigation measures are validated with the appropriate controlling and cooperative agencies and stakeholders during preparation of the preliminary draft National Environmental Policy Act documents and subsequent review processes. The airspace management reviews and analyses provide FAA and USAF airspace managers and other decision makers with the information needed to help ensure all proposed airport and airspace actions have minimal effects on the National Airspace System.

B.2 ACOUSTIC ENVIRONMENT

Refer to Appendix D.

B.3 HEALTH AND SAFETY

B.3.1 Resource Definition

The discussion of health and safety includes consideration for any activities, occurrences, or operations that have the potential to affect the safety, well-being, or health of members of the public. A safe environment is one in which there is no, or optimally reduced, potential for death, serious bodily injury or illness, or property damage. The primary goal is to identify and prevent potential accidents or impacts on the general public. The region of influence (ROI) for the safety and health resource area encompasses Tyndall AFB and Vandenberg AFB, as well as areas where assigned U.S. Air Force (USAF) aircraft operate, including any overland MOAs and SUAs (e.g., Eglin Gulf Test Range in the Gulf of Mexico).

The health and safety discussion addresses flight safety, including the potential for aircraft mishaps and Bird/wildlife Aircraft Strike Hazards (BASH). Health and safety also considers issues related range safety and ground safety. Range safety evaluates potential risks and associated safety measures related to the use of flares. Ground safety assesses safety issues related to day-to-day operations, including construction safety, which evaluates whether procedures associated with construction activities are designed to minimize hazards to workers and are completed in accordance with required safety standards.

Note: Health and Safety does not evaluate potential impacts to the public from existing airfield Clear Zones and Accident Potential Zones, as no populations reside within these areas. (NOTE: These zones delineate areas around an airfield where an aircraft mishap is most likely to happen.) Q-D arcs, defined as safety distances to be maintained between explosive storage areas and other types of facilities, are also not evaluated as these safety distances would not change with implementation of proposed activities.

B.3.2 Regulatory Setting

A variety of federal and USAF regulations address and govern day-to-day safety at military installations, while the primary standards and regulations that apply to safety as it relates to the Proposed Action and alternatives are summarized below:

- Occupational Safety and Health Act, United States Code (U.S.C.) Title 29, Chapter 15: The Occupational Safety and Health Act is the primary federal law that governs occupational health and safety in the private sector and federal government in the United States. Its main goal is to ensure that employers provide employees with an environment free from recognized hazards, such as exposure to toxic chemicals, excessive noise levels, mechanical dangers, heat or cold stress, or unsanitary conditions. (Note: Under Title 29 Code of Federal Regulations (CFR) 1960 series, Occupational Safety and Health Administration (OSHA) standards do not apply to military-unique workplaces, operations, equipment, and systems. However, according to DoD Instruction (DoDI), they will be followed insofar as is possible, practicable, and consistent with military requirements.)

- DoDI 6055.1, *DoD Safety and Occupational Health Program*, dated October 2014: Establishes occupational safety and health guidance for managing and controlling health and safety risks for DoD personnel and operations worldwide during peacetime and military deployments. It specifically addresses risk management, aviation safety, ground safety, radiation safety, traffic safety, occupational safety, and occupational health.
- Air Force Manual (AFMAN) 91-203, *Air Force Occupational Safety, Fire and Health Standards*, updated September 2019: Implements applicable OSHA requirements related to occupational safety, fire prevention, and health regulations governing USAF activities and procedures associated with safety in the workplace.
- AFI 13-212 (three volumes) - *Volume 1, Range Planning and Operations; Volume 2, Range Construction and Maintenance; and Volume 3, SAFE-RANGE Program Methodology*: Provides guidance for the planning, operations, management, safety, equipment, facilities, and security of USAF ranges.
- DoDI 6055.07, *Mishap Notification, Investigation, Reporting, and Record Keeping*, updated August 2018: Presents procedures for mishap notification, investigation, reporting, and record keeping and implements OSHA reporting requirements.
- AFI 91-202, *U.S. Air Force Mishap Prevention Program*, dated April 2019: This supplement establishes command mishap prevention program requirements.
- AFI 91-204, *Safety Investigation and Hazard Reporting*, dated April 2018: Provides guidance that is common to investigating and reporting of all USAF safety events.

B.3.3 Methodology

In the analyses, issues that have a potential to affect safety are evaluated relative to the degree to which the activity increases or decreases safety risks to military personnel, the public, and property. For example, the analysis evaluates the potential for an increase in the number of aircraft Class A mishaps from flight operations by comparing the projected operational tempo (i.e., number of proposed aircraft sorties) against aircraft-specific aircraft mishap rates.

B.3.4 Elements Common to Operations at Both Installations

The following elements related to flight safety, range safety, construction safety, and antiterrorism/force protection are common to the affected environments at Tyndall AFB and Vandenberg AFB.

Flight Safety

Flight safety is based on the physical risks associated with aircraft flight. In addition to regulatory drivers presented above, military aircraft fly in accordance with FAA Regulations Part 91, General Operating and Flight Rules, which govern such things as operating near other aircraft, right-of-way rules, aircraft speed, and minimum safe altitudes. These rules include the use of testing and training flight areas, arrival and departure routes, and airspace restrictions as appropriate to help control air operations.

There is no generally recognized threshold of flight safety that defines acceptable or unacceptable conditions. Instead, the focus of airspace managers is to reduce risks through numerous measures. These include, but are not limited to, providing and disseminating information to airspace users, setting appropriate standards for equipment performance and maintenance, defining rules governing the use of airspace, and assigning appropriate and well-defined responsibilities to the users and managers of the airspace.

The USAF values safety and professionalism and has adopted many measures to promote aviation safety. All personnel are provided continuous safety training throughout their career with the USAF. Specifically, all USAF pilots use state-of-the-art simulators for training purposes that include all facets of flight operations and comprehensive emergency (such as mechanical failure or bird strike) response procedures that minimize the mishap risks associated with pilot error. Maintenance crews are also highly trained to perform preventative maintenance actions, maintenance repairs, diagnostic testing of the repair, and flight safety inspections on each aircraft in accordance with USAF regulations.

Mishap Prevention

The primary goal of a flight safety program is the prevention of mishaps that could result in damage to property or injury or loss of life. The military services define four categories of aircraft mishaps, with Class A mishaps defined as the most serious. A Class A mishap results in one or more of the following: (1) direct mishap cost totaling $2,000,000 or more; (2) a fatality or permanent total disability; or (3) the destruction of a DoD aircraft. NOTE: A destroyed remotely piloted vehicle (e.g., unmanned aerial vehicles) is not a Class A mishap unless the preceding criteria in “1” or “2” are met. Because of the scope of potential impacts associated with its occurrence, this document will focus only of discussions of Class A mishaps.

USAF personnel periodically perform mishap drills to simulate how to properly respond to an aircraft mishap. Flying units must develop a pre-mishap plan that describes the steps that must be taken when a mishap occurs. The plan also anticipates all reasonable eventualities and devises measures to cope with them. Deficiencies are identified through periodic drills designed to ensure the plan’s smooth execution when a mishap occurs, focusing on the flow of information. While the contents of each unit’s pre-mishap plan may vary slightly, all plans attempt to be all-inclusive and address coordination with local commands, nearby military aviation facilities, local news media, area law enforcement officials, civil fire and rescue agencies, the U.S. Environmental Protection Agency, the FAA, and plans for medical services.

For in-flight emergencies, military pilots are trained to take all appropriate emergency measures, including avoiding populated areas, if possible. If a mishap does occur, there are well-established emergency response procedures currently in place. Each installation maintains emergency and mishap response plans to guide responses to aircraft accidents. These plans assign responsibilities and prescribe functional activities necessary to react to mishaps, whether on- or off-base. Additionally, highly trained maintenance crews perform inspections on each aircraft in accordance with DoD regulations, and maintenance activities are monitored to ensure that aircraft are equipped to withstand the rigors of operational and training events safely. When these measures are implemented, risks are minimized, even though they can never be eliminated.

In case of a mishap, a response normally occurs in two phases. The initial response focuses on rescue, evacuation, fire suppression, safety, elimination of explosive devices, ensuring security of the area, and other actions immediately necessary to prevent loss of life or further property damage. The second phase is the mishap investigation, which involves an array of organizations whose participation would be governed by the circumstances associated with the mishap and actions required to be performed (DoDI 6055.07, Mishap Notification, Investigation, Reporting, and Record Keeping [updated August 2018] and AFI 91-204, Safety Investigation and Hazard Reporting [dated April 2018]). If an aircraft accident occurs on nonfederal property, the agency initially responding would likely be the local fire department. Both Tyndall and Vandenberg AFBs have established cooperative agreements with local municipalities for firefighting assistance.

Bird/Animal Aircraft Strike Hazard

Potential bird/animal aircraft strikes are another safety concern for aircraft operations. Aircraft strikes of birds or other animals (e.g., bats and deer) are a safety concern because of the potential for damage to aircraft or injury to pilots or local populations if an aircraft crash should occur in a populated area. Aircraft may encounter birds at altitudes of 3,000 feet above MSL or higher. However, most reported bird strikes occur at an elevation of less than 1,000 feet AGL (FAA, 2007). Birds, in particular, are drawn to the typical open, grassy areas and warm pavement of an airfield. Although most bird and animal strikes do not result in crashes, they may cause structural and mechanical damage to aircraft. Due to the speed of the aircraft, collisions with birds or other animals can happen with considerable force.

Military airfields are artificially maintained environments designed specifically for the safe launch and recovery of aircraft. Proper habitat management on and surrounding military airfields reduce the probability of wildlife strikes and provide an adequate safety margin (wildlife exclusion zone). While it is impossible to keep all wildlife away from the airfield environment, it is important to discourage habitats that directly (availability of food, water, cover, and nesting) or indirectly (increasing prey species) attract wildlife; attracting wildlife to an airfield is mutually detrimental to wildlife and mission capability.

Passive control measures such as landscape design, elimination of food and roost sources, turf/water management, and forest management are the most permanent ways of reducing the attractiveness of airfields for bird and wildlife utilization. U.S. Department of Agriculture Wildlife Services is the primary source for observing wildlife hazard conditions. They conduct wildlife surveys, maintain a database of wildlife activities to identify long-term trends, trap animals when necessary (raccoons, coyotes, etc.), and train airfield management personnel on proper BASH response. Wildlife Services coordinates with Flight Safety, Base Operation, and maintenance personnel for collection of bird remains after strikes, submitting reports, shipping salvaged bird remains for analysis, and providing wildlife harassment and dispersal services. Active control measures used at an installation may incorporate trained working dogs, pyrotechnics, bioacoustics, and depredation (lethal control) activities. (NOTE: Depredation activity is only implemented as a last resort when other scare tactics are proven unsuccessful.)

AFI 91-212, Bird/Wildlife Aircraft Strike Hazard (BASH) Management Program (dated May 31, 2018), presents policy and guidance for implementing an effective BASH program for the USAF. It establishes program requirements, assigns responsibilities, and contains program management information. Under this program, installations supporting a flying mission develop and publish a BASH Plan listing responsibilities and procedures associated with reducing strike hazards. In addition to the measures described above, BASH Plans also specify installation bird watch conditions and associated implementation procedures. These bird watch conditions provide an immediate exchange of information between ground agencies and aircrews concerning the existence and location of birds that pose a potential hazard to safe flying operations. The following terminology is typically used for bird watch conditions:

- Bird watch Condition SEVERE. Heavy concentration of birds on or immediately above the active runway or other specific locations that represents an immediate hazard to safe flying operations. Supervisors and aircrews must thoroughly evaluate mission need before conducting operations in areas under condition SEVERE.
- Bird watch Condition MODERATE. Concentration of birds observable in locations that represent a probable hazard to safe flying operations. This condition requires increased vigilance by all agencies and supervisors and caution by aircrews.
- Bird watch Condition LOW. Normal bird activity on and above the airfield with a low hazard potential (no restrictions).

Once a bird watch condition has been declared, it is the declaring authority's responsibility to either cancel or downgrade the condition commensurate with updated information and make sure the Command Center is informed.

Range Safety

Standard range safety procedures exist to ensure limited public access to affected areas during training. These procedures require every practical effort to keep the designated training and testing areas clear of all nonparticipating aircraft and surface vessels. This may include the use of the installation Public Affairs Offices to provide local media with advance information regarding upcoming training by issuing releases for publication in local newspapers and/or recorded messages for radio stations. These news releases inform the public of low-flying aircraft and loud noises that could result from flying operations.

Warnings may also be transmitted to nonparticipating aircraft (NOTAM) and/or surface vessels (Notice to Mariners) to clear the area or to provide notification of specific hazards in designated training areas. These warnings are transmitted over specific Marine Very High Frequency (VHF), High Frequency-Amplitude Modulation (HF-AM), and Citizens Band radio channels. Similar warnings are provided to Airmen and mariners in written form. The airspace to be utilized is also surveyed visually and electronically to ensure that unauthorized aircraft are not in the area at the scheduled usage time. For example, Tyndall AFB uses an E-9A twin turboprop aircraft to provide support for air-to-air weapons system evaluation, development, and operational testing. This aircraft is used as a surveillance platform to ensure the Gulf of Mexico waters are clear of civilian boaters and aircraft during live missile launches and other hazardous military activities (USAF, 2019e).

In addition to the measures discussed above, the range must also be able to safely contain the hazard area of the weapons and equipment employed. The hazard area is based on the size and performance characteristics of the weapon, and it includes a safety buffer around the target to account for items ricocheting and potentially going off range or malfunctioning. Additionally, participating aircraft will conduct a visual and/or electronic search of the training area by initiating a practice or "cold" pass over the area. After verifying the area is clear, the scheduled activities will be allowed to proceed. If any unauthorized personnel, aircraft, or surface vessels are detected within the area, the training activity is temporarily halted until the area is again cleared and secured.

Ground and Construction Safety

The USAF implements OSHA standards through DoDI 6055.1 and AFI 91-302. In addition, the Air Force Safety Center has developed the Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) standards to supplement OSHA standards to ensure worker safety. The goal is to ensure that all guidance complies with OSHA and other federal standards and incorporates "lessons learned" and appropriate parts of consensus standards to provide the supervisor and worker with the tools to prevent mishaps.

Day-to-day operations at the installation are conducted in accordance with applicable USAF safety regulations, published USAF Technical Orders, and standards prescribed by AFOSH requirements. Contractors working on the installation must prepare appropriate job site safety plans explaining how job safety will occur throughout the life of the project. Contractors must also follow applicable OSHA requirements.

B.4 AIR QUALITY

B.4.1 Resource Definition

Criteria Pollutants and Toxic Air Contaminants

Air quality refers to concentrations of various air pollutants in the atmosphere. Air quality is defined by the size and topography of the air basin, the local and regional meteorological influences, and the types and concentrations of pollutants in the atmosphere. One aspect of the significance of a pollutant concentration is to compare it to a national and/or state ambient air quality standard. These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare and include a reasonable margin of safety to protect the more sensitive individuals in the population.

The U.S. Environmental Protection Agency (USEPA) established the National Ambient Air Quality Standards (NAAQS) to regulate the following criteria pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter less than or equal to 10 microns in diameter (PM_{10}), particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$), and lead. Units of concentration for the NAAQS are generally expressed in parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). In Florida, the Florida Department of Environmental Protection (FDEP) relies on the NAAQS for purposes of regulating air quality within Florida. In California, the California Air Resource Board (CARB) relies on the NAAQS for purposes of regulating air quality and they have also established the California Ambient Air

Quality Standards (CAAQS) for this purpose. The CAAQS are at least as restrictive as the NAAQS and include pollutants for which national standards do not exist. Table B.4-1 presents the NAAQS and CAAQS.

Table B.4-1. National and California State Ambient Air Quality Standards

Pollutant	Averaging Period	NAAQS Primary Standard[1,2]	NAAQS Secondary Standard[1,3]	CAAQS
Ozone, O_3 (ppm)	1 hour	--	--	0.09
	8 hours	0.070	0.070	0.070
Carbon Monoxide, CO (ppm)	1 hour	35	--	20
	8 hours	9	--	9
Nitrogen Dioxide, NO_2 (ppm)	1 hour	0.10	--	0.18
	Annual	0.053	0.053	0.03
Sulfur Dioxide, SO_2 (ppm)	1 hour	0.075	--	0.25
	3 hours	--	0.5	-
	24 hours	--	--	0.04
Respirable Particulate Matter (PM_{10}) (µg/m^3)	24 hours	150	150	50
	Annual	--	--	20
Fine Particulate Matter ($PM_{2.5}$) (µg/m^3)	24 hours	35	35	--
	Annual	12	15	12
Lead (µg/m^3)[4]	Rolling 3-month average	0.15	0.15	--
	30 day average	--	--	1.5
Vinyl chloride (ppm)[4]	24 hours	--	--	0.01
Sulfates (µg/m^3)	24 hours	--	--	25
Hydrogen Sulfide, H_2S (ppm)	1 hour	--	--	0.03
Visibility Reducing Particles	8 hours	--	--	[5]

Sources: USEPA 2020 and CARB 2016

Key: '—' = No standard; AAQS = Ambient Air Quality Standards; ppm = parts per million; ppb = parts per billion; mg/m^3 = milligrams per cubic meter; µg/m^3 = micrograms per cubic meter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter.

Notes:

[1] Concentrations expressed in units that the USEPA used to first promulgate the standard.

[2] Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[3] Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[4] The CARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[5] The general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard are instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer," respectively.

The following paragraph describes the specific NAAQS attainment definitions for each criteria pollutant. The NAAQS 8-hour O_3 standard is attained when the 3-year average of the fourth-highest daily maximum 8-hour concentration measured each year is less than or equal to 0.070 ppm. For CO and PM_{10}, the NAAQS are not to be exceeded more than once per year. The NAAQS annual NO_2 standard is attained when the annual arithmetic mean concentration in a calendar year is less than or equal to 0.053 ppm. The 1-hour NO_2 standard is attained when the 3-year average of the 98th percentile of the daily maximum 1-hour average concentration does not exceed 0.10 ppm. For SO_2, the primary NAAQS is attained when the 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years, is less than or equal to 0.075 µg/m^3. The

NAAQS $PM_{2.5}$ standards are attained when the annual arithmetic mean concentration is less than or equal to 12 $\mu g/m^3$ and when the 98th percentile of the 24-hour concentration is less than or equal to 35 $\mu g/m^3$, both averaged over 3 years.

O_3 concentrations are typically highest during the warmer months of the year and coincide with periods of high solar radiation. However, there are circumstances that can contribute to higher levels of ozone under cooler temperatures. Maximum O_3 concentrations tend to be homogeneously spread throughout a region, as it often takes several hours to convert precursor emissions to O_3 (mainly nitrogen oxides [NO_x] and photochemically reactive volatile organic compounds [VOCs]) in the atmosphere. Inert pollutants, such as CO, tend to have the highest concentrations during the colder months of the year, when light winds and nighttime/early morning surface-based temperature inversions inhibit atmospheric dispersion. Maximum inert pollutant concentrations are usually found near an emission source.

The USEPA also regulates hazardous air pollutants (HAPs) that are known or are suspected to cause serious health effects or adverse environmental effects. The Clean Air Act (CAA) identifies 188 substances as HAPs (e.g., benzene, formaldehyde, mercury, and toluene). HAPs are emitted from a range of industrial facilities and vehicles. The USEPA sets federal regulations to reduce HAP emissions from stationary sources in the National Emission Standards for Hazardous Air Pollutants (NESHAP). In California, the CARB regulates HAPs and additional toxic air contaminants (TACs) under the California Air Toxics Program. Both programs set ambient levels of concern for HAPs and TACs.

Greenhouse Gases

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. GHG emissions are generated by both natural processes and human activities. The accumulation of GHGs in the atmosphere regulates the earth's temperature. Human activities are contributing to climate change, primarily by releasing GHGs into the atmosphere. Climate change refers to any significant change in the measures of climate lasting for an extended period of time (USEPA, 2016).

Numerous studies document the recent trend of rising atmospheric concentrations of CO_2. The longest continuous record of CO_2 monitoring extends back to 1958 (Keeling, 1960; Scripps Institution of Oceanography, 2019). These data show that atmospheric CO_2 levels have risen an average of 1.6 ppm per year over the last 60 years (NOAA, 2019). As of 2018, CO_2 levels are approximately 40 percent higher than the highest levels estimated for the 800,000 years preceding the industrial revolution, as determined from CO_2 concentrations analyzed from air bubbles in Antarctic ice core samples (USGCRP, 2018).

The U.S. Global Change Research Program (USGCRP) report, *Climate Science Special Report: Fourth National Climate Assessment* (USGCRP, 2017), states the following:

Global annually averaged surface air temperature has increased by about 1.8 degrees Fahrenheit (°F) (1.0°Celsius [°C]) over the last 115 years (1901–2016). This period is now the warmest in the history of modern civilization.

It is extremely likely that human activities, especially emissions of GHGs, are the dominant cause of the observed warming since the mid-20th century.

Over the next few decades (2021–2050), annual average temperatures are expected to rise by about 2.5°F for the United States, relative to the recent past (average from 1976–2005), under all plausible future climate scenarios.

Many other aspects of global climate are changing, including rising oceanic temperatures; melting glaciers; diminishing snow cover; shrinking sea ice; rising sea levels; ocean acidification; and increasing atmospheric water vapor.

Global average sea level has risen by about 7 to 8 inches since 1900, a rate that is greater than during any preceding century in at least 2,800 years. Global sea level rise has already affected the United States; the incidence of daily tidal flooding is accelerating in more than 25 Atlantic and Gulf Coast cities. Global average sea levels are expected to continue to rise by at least several inches in the next 15 years and by 1 to 4 feet by 2100. A rise of as much as 8 feet by 2100 cannot be ruled out. Sea level rise will be higher than the global average on the East and Gulf Coasts of the United States.

Annual trends toward earlier spring melt and reduced snowpack are already affecting water resources in the western United States and these trends are expected to continue. Under higher emission scenarios, and assuming no change to current water resources management, chronic, long-duration hydrological drought is increasingly possible before the end of this century.

The magnitude of climate change beyond the next few decades will depend primarily on the amount of GHGs (especially carbon dioxide [CO_2]) emitted globally. Without major reductions in emissions, the increase in annual average global temperature relative to preindustrial times could reach 9°F (5°C) or more by the end of this century. With significant reductions in emissions, the increase in annual average global temperature could be limited to 3.6°F (2°C) or less.

GHGs include water vapor, CO_2, methane (CH_4), nitrous oxide, O_3, and several hydrocarbons and chlorofluorocarbons. Each GHG has an estimated global warming potential (GWP), which is a function of its lifetime and ability to trap heat in the atmosphere. The GWP rating system is standardized to CO_2, which has a value of one. For example, CH_4 has a GWP of 28, which means that it has a global warming effect 28 times greater than CO_2 on an equal-mass basis (USGCRP, 2017). To simplify GHG analyses, total GHG emissions from a source are often expressed as a carbon dioxide equivalent (CO_2e). The CO_2e is calculated by multiplying the emissions of each GHG by its GWP and adding the results together to produce a single, combined emission rate representing all GHGs. While CH_4 and nitrous oxide have much higher GWPs than CO_2, CO_2 is emitted in such greater quantities that it is the overwhelming contributor to global CO_2e emissions from both natural processes and human activities.

B.4.2 Regulatory Setting

The CAA and its subsequent amendments establish air quality regulations and the NAAQS, and delegate the enforcement of these standards to the states. The FDEP and CARB are responsible for enforcing air pollution regulations in Florida and California, respectively. CAA gives states the authority to establish air quality rules and regulations. These rules and regulations must be equivalent to, or more stringent than, the federal program. The CAA establishes air quality planning processes and requires states to develop a State Implementation Plan (SIP) that details how they will maintain the NAAQS or attain a standard in nonattainment within mandated timeframes. The requirements and compliance dates for attainment are based on the severity of the nonattainment classification of the area. The following summarizes the air quality rules and regulations that apply to the proposed actions.

Federal Regulations

CAA Section 176(c) and USEPA's General Conformity Rule (GCR) generally prohibit federal agencies from engaging in, supporting, permitting, or approving any activity that does not conform to the most recent USEPA-approved SIP. This means that federal projects in such areas or other activities using federal funds or requiring federal approval (1) will not cause or contribute to any new violation of an NAAQS; (2) will not increase the frequency or severity of any existing violation; or (3) will not delay the timely attainment of any standard, interim emission reduction, or other milestone. The USEPA's GCR regulations implementing the prohibitions of CAA Section 176(c) are promulgated at 40 CFR Part 93, Subpart B.

The GCR applies to federal actions affecting areas that are in nonattainment of an NAAQS and to designated maintenance areas (attainment areas that have been reclassified from a previous nonattainment status and are required to prepare an air quality maintenance plan). Conformity requirements only apply to nonattainment and maintenance pollutants and their precursor emissions. Conformity determinations are required when the annual direct and indirect emissions that would result from a proposed federal action equal or exceed an applicable *de minimis* threshold. These thresholds vary by pollutant and the severity of nonattainment conditions in the region that would be affected by the proposed action. If the GCR applicability analysis shows the net annual direct and indirect emissions generated by a proposed action in these areas would be below the applicable *de minimis* thresholds, then the action is exempt from any further requirements under the GCR (40 CFR § 93.153(c)(1)). Since the Tyndall Air Force Base (AFB) and Vandenberg AFB project regions attain all NAAQS, they would not be subject to the requirements of the GCR.

As part of the Prevention of Significant Deterioration (PSD) Regulation, the CAA provides special protection for air quality and air quality-related values (including visibility and pollutant deposition) in selected areas of the United States (National Parks greater than 6,000 acres or National Wilderness Areas greater than 5,000 acres). These Class I areas are areas in which any appreciable deterioration of air quality is considered significant. In 1999, the USEPA promulgated a regional haze regulation that requires states to establish goals and emission reduction strategies to make initial improvements in visibility within their respective Class I areas. Visibility impairment is defined as a reduction in the visual range and atmospheric discoloration. Criteria to determine the significance of air quality impacts in Class I areas usually pertain to stationary emission sources, because mobile sources are generally exempt from permit review by regulatory agencies. However, Section 169A of the CAA states the national goal of prevention of any future impairment of visibility within Class I areas from manmade sources of air pollution. The nearest Class I Area to Tyndall AFB is the Bradwell Bay Wilderness Area, whose nearest border is about 50 miles to the east-northeast. The nearest Class I Area to Vandenberg AFB is the San Rafael Wilderness Area, whose nearest border is about 22 miles to the northeast. Due to these substantial distances from proposed aircraft operations, impacts from potential emissions generated by the project alternatives to visibility within these areas would be *de minimis* and therefore they are not evaluated in this Environmental Impact Statement (EIS).

Under the CAA, state and local agencies can establish ambient air quality standards and regulations of their own, provided these are at least as stringent as the federal requirements. These state and local standards and regulations are described in the affected environment sections for each alternative base (see EIS Sections 3.1.4 and 3.2.4).

Greenhouse Gases

Federal agencies address emissions of GHGs by reporting and meeting reductions mandated in federal laws, Executive Orders (EOs), and agency policies. Some of these requirements include EO 13834 and the EPA *Final Mandatory Reporting of Greenhouse Gases Rule*. EO 13834 identifies requirements for federal agencies to increase efficiency and to report GHG emissions. Under the *Mandatory Reporting of Greenhouse Gases Rule*, stationary sources that emit 25,000 metric tons or more per year of CO_2e are required to report their annual GHG emissions to the EPA.

At this time, climate change presents a global problem caused by increasing global atmospheric concentrations of GHG emissions and the current state of the science surrounding it does not support determining the global significance of local or regional emissions of GHGs from a particular action. Therefore, the quantitative analysis of CO_2e emissions in this EIS is for disclosing the local net effects of the proposed action and alternatives and for its potential usefulness in making reasoned choices among alternatives.

B.4.3 Methodology

The air quality analysis estimated the magnitude of emissions that would be generated by construction and operational activities due to each project alternative and basing location. Detailed emissions assumptions and calculation methods are included in Appendix C, Air Quality.

Potential impacts to air quality are evaluated with respect to the extent, context, and intensity of the impact in relation to relevant regulations, guidelines, and scientific documentation. The Council on Environmental Quality defines significance in terms of context and intensity in 40 CFR 1508.27. This requires that the significance of an action be analyzed in respect to the setting of the action and based relative to the severity of the impact. In the context of criteria pollutants for which the proposed project region is in attainment of a NAAQS, the analysis compares the annual net increase in emissions estimated for each project alternative to the USEPA PSD permitting threshold of 250 tons per year as an initial indicator of the local significance of potential impacts to air quality. The PSD permitting threshold represents the level of potential new emissions below which a new or existing minor non-listed stationary source may acceptably emit without triggering the requirement to obtain a permit. Thus, if the intensity of any net emissions increase for a project alternative is below 250 tons per year in the context of an attainment criteria pollutant the indication is the air quality impacts will be insignificant for that pollutant. In the case of criteria pollutants for which the proposed project region does not attain a NAAQS, the analysis compares the net increase in annual direct and indirect emissions to the applicable pollutant *de minimis* threshold(s). If the net direct and indirect emissions from the project alternative equal or exceed an applicable *de minimis* threshold, then a positive general conformity determination is required before any emissions from the actions may occur.

It is important to note that the proposed indicator thresholds only provide a clue to the potential impacts to air quality. If projected emissions exceed an indicator threshold, further analysis was conducted to determine whether impacts were significant. In such cases, if emissions (1) do not contribute to an exceedance of an ambient air quality standard or (2) conform to the approved SIP, then impacts would not be significant.

Construction

The proposed missions at each alternative base would require the construction of operational, maintenance, and base support facilities. Air quality impacts associated with proposed construction activities would result from (1) combustive emissions generated by fossil fuel-powered equipment and (2) fugitive dust emissions (PM_{10}/$PM_{2.5}$) from operation of equipment on exposed soil.

The USAF Air Conformity Applicability Model (ACAM) version 5.0.16b was used to estimate air emissions that would be generated by construction activities associated with the proposed MQ-9 and F-35A missions (Solutio Environmental, Inc., 2020). Construction activity data developed for each alternative base were used as inputs for ACAM. Appendix C includes an explanation of the ACAM reports, which are available upon request, that detail the calculations of criteria pollutant emissions and GHGs that would occur from proposed construction activities for each project alternative.

Inclusion of best management practices into proposed construction activities would reduce fugitive dust emissions generated from the use of construction equipment on exposed soil by 50 percent from uncontrolled levels (Countess Environmental, 2006). The standard construction practices for fugitive dust control include the following:

- Use water trucks to keep areas of vehicle movement damp enough to minimize the generation of fugitive dust.
- Minimize the amount of disturbed ground area at a given time.
- Suspend all soil disturbance activities when winds exceed 25 miles per hour or when visible dust plumes emanate from the site, and stabilize all disturbed areas with water application.
- Designate personnel to monitor the dust control program and to increase watering, as necessary, to minimize the generation of dust.

The air quality analysis assumed that proposed construction activities would begin in year 2021 and would be completed in year 2023 or 2024, depending on the project alternative.

Operations

The proposed MQ-9 and F-35A actions would generate emissions at basing locations due to (1) aircraft operations, (2) aircraft engine maintenance and testing, and (3) aerospace ground equipment, and (4) personnel commuting activities. Proposed aircraft operations also would occur within airspaces adjacent to the basing locations. The analysis employed the ACAM to estimate emissions from these activities. The air quality analysis assumed that the actions would reach full operations and resulting emissions from 2025 to 2028, depending on the alternative and after the completion of all required infrastructure improvements.

The analysis of proposed aircraft operations is limited to operations that would occur within the lowest part of the atmosphere known as the mixing layer, because this is where the release of aircraft emissions would affect ground-level pollutant concentrations. In general, aircraft emissions released above the mixing layer would not appreciably affect ground-level air quality. In accordance with the GCR (40 CFR 93 Subpart B), where the applicable SIP or Transportation Implementation Plan does not specify a mixing height, the Federal agency can use 3,000 feet (914 meters) above ground level (AGL) as a default mixing height. Since the SIPs for Tyndall AFB and Vandenberg AFB do not specify a mixing height, the analysis used 3,000 feet AGL as a default mixing height at both alternative locations. Additionally, since proposed MQ-9 operations within airspaces or training areas would occur above 3,000 feet AGL, the analysis did not estimate emissions for those operations.

Flight operations (including arrivals, departures, patterns, and airspace operations) for project aircraft were derived by utilizing the same site-specific operational data as the project noise impact analysis. Both analyses (i.e., noise and air quality) factor in the number and type of operations, location-specific landing and takeoff patterns, aircraft engine power settings, and other relevant details of the affected environment, the proposed action(s), and alternatives necessary to produce a consistent determination of environmental consequences and anticipated mitigations. The air quality impacts analysis at each proposed basing location was evaluated based on the U.S. Environmental Protection Agency (USEPA) Time In Mode (TIM) Model and site-specific representative TIM cycles. Representative TIM cycles factored in weighted frequency and times in each mode of flight operations (i.e., TIMs) that occur at or below 3,000 feet AGL, based on the site-specific flight profiles developed and the projected frequency of use of each flight profile. Since the publication of the Draft EIS, it has been determined that the document was inadvertently released without relevant data from 100 percent of the flight profiles being directly used in the air quality impacts analysis as indicated above. Rather, profiles flown less than or equal to 5 percent frequency were indirectly analyzed in the Draft EIS by amalgamation with a more frequently utilized flight profile. The USAF has corrected this discrepancy in the Final EIS and updated the air quality impacts analysis calculations to incorporate 100 percent of the flight profiles as originally indicated above. Chapter 4 contains the estimated emissions from these updated calculations and the analysis of projected air quality effects. Although annual F-35A operational emissions changed due to these updates, the previous conclusions regarding their significance remain unchanged from the Draft EIS.

Calculations showing the time weighted average assigned to each flight operation based on its TIM and percentage of use, consistent with the operational data used throughout this analysis, are presented in Appendix C.

B.5 HAZARDOUS MATERIALS AND WASTE MANAGEMENT

B.5.1 Resource Definition

Hazardous materials (HM) and hazardous wastes (HW) refer to substances defined as hazardous by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA). In general, HM include substances that, because of their quantity concentration or physical, chemical, or infectious characteristics, may present substantial danger to public health or the environment when released into the environment. HW are regulated under the Resource Conservation and Recovery Act and defined as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes that either exhibit one or more of the hazardous characteristics of ignitability, corrosivity, toxicity, or reactivity, or are listed as an HW under 40 CFR 261.

The affected resources include USAF Environmental Restoration Program (ERP) sites. The ERP is used by the USAF to identify, characterize, clean up, and restore sites contaminated with toxic and hazardous substances, low-level radioactive materials, petroleum products, or other pollutants and contaminants.

B.5.2 Regulatory Setting

HM are identified and regulated under CERCLA, OSHA, and Emergency Planning and the Community Right-to-Know Act. HM are defined in AFI 32- 7086, Hazardous Materials Management, to include any substance with special characteristics that could harm people, plants, or animals. Waste may be classified as hazardous due to its toxicity, reactivity, ignitability, or corrosivity. In addition, certain types of waste are listed or identified as hazardous in 40 CFR Part 263. The State of Florida’s Department of Environmental Protection regulations are contained in Florida Statute Chapter 62-730.

California has its own regulations that govern hazardous materials including 19 California Code of Regulations, Division 2, Chapter 4.5, California Accidental Release Prevention Program, which requires that stationary sources storing above-threshold quantities of hazardous materials that could affect the general public establish an accidental release prevention and response program. California Health and Safety Code, Division 20, Chapter 6.95, Article 2, Hazardous Materials Management, adopts the federal accidental release prevention program, with certain amendments specific to California, as the state’s accidental release prevention program and directs the California Governor's Office of Emergency Services and the local Certified Unified Program Agency (CUPA) to implement it.

B.5.3 Methodology

The analysis focused on how and to what degree the alternatives would affect HM usage/management and hazardous/solid waste generation and management, as well as how alternatives would affect contamination sites. A significant impact would occur if implementing the Proposed Action resulted in any of the following conditions:

- Using HMs that are highly toxic or have a potential to cause severe environmental damage (e.g., extremely hazardous substances as listed in the Superfund Amendments and Reauthorization Act Title III)
- Generating HW types or quantities or solid waste quantities that could not be accommodated by the current management systems
- Disturbing a contamination site that would pose a potential for environmental or health impacts or result in new/additional remediation measures

B.6 SOILS AND GEOLOGIC RESOURCES

B.6.1 Resource Definition

The geology of an area may include bedrock materials, mineral deposits, and fossil remains. The principal geological factors influencing the stability of structures are soil stability and seismic properties. Soil refers to unconsolidated earthen materials overlying bedrock or other parent material. Soil structure, elasticity, strength, shrink-swell potential, and erodibility determine the ability for the ground to support structures and facilities. Soils are typically described in terms of their type, slope, physical characteristics, and relative compatibility or limitations with regard to particular construction activities and types of land use.

The ROI for soils and geologic resources would be any area of ground-disturbing activities associated with the individual or collective proposed actions (in this case the areas potentially disturbed by the beddown of either or both the F-35A and MQ-9). For Tyndall AFB this would be areas of construction indicated in Figure 2.2-1 and Figure 2.3-1. Local and regional resource conditions are described for context, where applicable.

B.6.2 Regulatory Setting

Consideration of geologic resources extends to prime or unique farmlands. The Farmland Protection Policy Act was enacted in 1981 in order to minimize the loss of prime farmland and unique farmlands as a result of federal actions. The implementing procedures of the Farmland Protection Policy Act require federal agencies to evaluate the adverse effects of their activities on farmland, which includes prime and unique farmland and farmland of statewide and local importance, and to consider alternative actions that could avoid adverse effects.

B.6.3 Methodology

Impacts to soils can result from earth disturbance that exposes soil to wind or water erosion. Analysis of impacts to soils examines the potential for such erosion at each alternative base and describes typical measures taken to minimize erosion. In addition, soil limitations and associated typical engineering remedial measures are evaluated with respect to proposed construction.

Criteria for evaluating impacts related to soil resources associated with implementation of the Proposed Action are impacts on unique soil resources, minimization of soil erosion, and the siting of facilities relative to potential soil limitations. Should development proposed as part of the Proposed Action substantially affect any of these features, impacts would be considered significant. Soil disturbance that would result from implementation of the Proposed Action was calculated by summing the square footages of the proposed construction.

B.7 WATER RESOURCES

B.7.1 Resource Definition

Water resources include surface water, groundwater, and floodplains. Surface water resources include lakes, rivers, and streams and are important for a variety of reasons, including economic, ecological, recreational, and human health factors. Groundwater includes the subsurface hydrologic resources of the physical environment; its properties are often described in terms of depth to aquifer or water table, water quality, and surrounding geologic composition. Floodplains are lowland areas adjacent to surface waterbodies where flooding events periodically cover areas with water. Wetlands are commonly included in analysis of water resources; however, in this document, wetlands are addressed in biological resources analysis (Section B.8).

For the purposes of this analysis of water resources, the ROI for the Proposed Action and alternatives, including the No Action Alternative, includes the areas proposed for infrastructure upgrades and construction, along with areas immediately downstream of base outfalls that could be impacted during construction.

B.7.2 Regulatory Setting

The Clean Water Act (CWA) of 1972 (33 U.S.C. 1251 et seq.) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. Pollutants regulated under the CWA include “priority” pollutants, which include various toxic chemicals and other pollutants such as nutrients, total suspended solids, fecal coliform, oil and grease, and pH (a measure of the acidity or basicity of water). The National Pollutant Discharge Elimination System (NPDES) permit program, created in 1972 by the CWA, helps address water pollution by regulating point sources that discharge pollutants to waters of the United States. The permit provides two levels of control: technology-based limits and water quality-based limits (if technology-based limits are not sufficient to provide protection of the waterbody).

Section 303(d) of the CWA requires states to identify waters where current pollution control technologies alone cannot meet the water quality standards set for that waterbody. Every two years, states are required to submit a list of impaired waters plus any that may soon become impaired to USEPA for approval. The impaired waters are prioritized based on the severity of the pollution and the designated use of the waterbody (e.g., fish propagation or human recreation). States must establish the total maximum daily load(s) of the pollutant(s) in the waterbody for impaired waters on their list.

Section 438 of the Energy Independence and Security Act (EISA) (42 U.S.C. §17094) establishes stormwater design requirements for federal construction projects that disturb a footprint of greater than 5,000 square feet of land. EISA Section 438 requirements are independent of stormwater requirements under the CWA. A project footprint consists of all horizontal hard surface and disturbed areas associated with project development.

Under these requirements, pre-development site hydrology must be maintained or restored to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow. Pre-development hydrology is calculated using recognized tools that take into account site-specific factors such as soil type, ground cover, and ground slope. Site design shall incorporate stormwater retention and reuse technologies such as bioretention areas, permeable pavements, cisterns/recycling, and green roofs to the maximum extent technically feasible.

Post-construction analyses shall be conducted to evaluate the effectiveness of the as-built stormwater reduction features. These regulations were incorporated into applicable DoD Unified Facilities Criteria (UFC) in April 2010 (UFC 3-210-10), which requires that low-impact development (LID) features need to be incorporated into new construction activities to comply with EISA Section 438. LID is a stormwater management strategy designed to maintain site hydrology and mitigate the adverse impacts of stormwater runoff and non-point source pollution. LID can manage the increase in runoff between pre- and post-development conditions on the project site through interception, infiltration, storage, and evapotranspiration processes before the runoff is conveyed to receiving waters. Examples of the methods that could reduce the potential impacts of a proposed action include bioretention, permeable pavements, cisterns/recycling, and green roofs.

Section 404 of the CWA and EO 11990, Protection of Wetlands, regulate development activities in or near streams and wetlands. Actions that affect streams and/or wetlands require a permit from the U.S. Army Corps of Engineers (USACE) for dredging and filling in wetlands. EO 11988, Floodplain Management, requires federal agencies to take action to reduce the risk of flood damage; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains. Federal agencies are directed to consider the proximity of their actions to or location within floodplains. Wetlands are discussed in Section B.8, Biological Resources.

With respect to soil erosion, Section 402(p) of the CWA regulates non-point source discharges of pollutants, under the NPDES program or state equivalent program. This section of the CWA was amended to require USEPA to establish regulations for discharges from active construction sites. NPDES General Construction Permits require preparation of a Stormwater Pollution Prevention Plan (SWPPP) for projects that would disturb more than 1 acre of land.

Through the Coastal Zone Management Act (CZMA) of 1972, Congress established national policy to preserve, protect, develop, restore, or enhance resources in the coastal zone. This act encourages coastal states to properly manage use of their coasts and coastal resources, prepare and implement coastal management programs, and provide for public and governmental participation in decisions affecting the coastal zone. To this end, CZMA imparts an obligation upon federal agencies whose actions or activities affect any land or water use or natural resource of the coastal zone to be carried out in a manner consistent to the maximum extent practicable with the enforceable policies of federally approved state coastal management programs. However, federal lands, which are "lands the use of which is by law subject solely to the discretion of the Federal

Government, its officers, or agents," are statutorily excluded from the state's "coastal uses or resources." If, however, the proposed federal activity affects coastal uses or resources beyond the boundaries of the federal property (i.e., has spillover effects), the CZMA Section 307 federal consistency requirement applies. As a federal agency, USAF is required to determine whether its proposed activities would affect the coastal zone. This takes the form of a consistency determination, a negative determination, or a determination that no further action is necessary.

B.7.3 Methodology

Impacts to surface water can result from earth disturbance that exposes soil to wind or water erosion. Analysis of impacts to soils and surface water examines the potential for such erosion at each alternative base and describes typical measures taken to minimize erosion. In addition, soil limitations and associated typical engineering remedial measures are evaluated with respect to proposed construction.

Criteria for evaluating impacts related to soil resources associated with implementation of the Proposed Action and alternatives are impacts on unique soil resources, minimization of soil erosion, and the siting of facilities relative to potential soil limitations. Should development proposed as part of the Proposed Action substantially affect any of these features, impacts would be considered significant. Soil disturbance that would result from implementation of the Proposed Action for each alternative was calculated by totaling the square footage of the proposed construction footprints (e.g., the disturbed area).

Criteria for evaluating impacts related to water resources associated with implementation of the proposed MQ-9/F-35A missions are water availability, water quality, adherence to applicable regulations, and presence of floodplains. Impacts are measured by the potential to reduce water availability to existing users, endanger public health or safety by creating or worsening health hazards or safety conditions, or violate laws or regulations adopted to protect or manage water resources.

Flooding impacts are evaluated by determining if proposed construction is located in a designated floodplain. Groundwater impacts are evaluated by determining if groundwater resources beneath the project site would be used for implementing the proposed mission, and if so, by determining the potential to adversely affect those groundwater resources.

B.8 BIOLOGICAL RESOURCES

B.8.1 Resource Definition

Biological resources include the native and introduced terrestrial and aquatic plants and animals found in the ROI. For the purposes of this biological resources analysis, the ROI for the Proposed Actions and No Action Alternatives is the land area (habitats) that could potentially be affected by infrastructure and construction projects on the base and land area potentially affected by aircraft operations in the airfield. The ROI generally includes the developed cantonment and airfield areas of the respective bases, but could also include areas near but outside the base boundary. Examples of off-base areas include managed wildlife areas and surface waters that could be indirectly affected by noise or changes in water quality, respectively. Habitat types are based on floral, faunal, and geophysical characteristics. For F-35A-related actions, the ROI also includes airspace and ranges proposed for training.

For the purposes of this analysis, biological resources were organized into four categories: flora, fauna, sensitive species, and wetlands. Vegetation includes existing terrestrial plant communities, but does not include sensitive plant species, which are described below. Plant species composition within an area generally defines ecological communities and indicates the type of wildlife that could be present. Marine vegetation (plants that inhabit the seas and oceans) would not be impacted by implementation of the F-35A or MQ-9 missions at either of the alternative bases and therefore are not further described in this EIS.

Wildlife includes all vertebrate animal species, with the exception of sensitive species, which are described below. Typical wildlife includes animal groups such as large and small mammals, songbirds, waterfowl, seabirds, reptiles, and amphibians. The attributes and quality of available habitats influences the composition, diversity, and abundance of terrestrial and marine wildlife communities.

Sensitive species are those plant and animal species protected by various regulations established by federal and state agencies. These regulations and the species addressed by them are described in Section B.8.2.

Wetlands are areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

B.8.2 Regulatory Setting

The Sikes Act was approved September 15, 1960 (as amended in 2003), and is implemented to promote effectual planning, development, maintenance, and coordination of wildlife, fish, and game conservation and rehabilitation on military reservations. The Sikes Act applies to federal land under DoD control and requires military services to establish Integrated Natural Resources Management Plans (INRMPs) to conserve natural resources for their military installations. AFMAN 32-7003, *Environmental Conservation,* explains how to manage natural resources on USAF property in compliance with federal, state, and local standards. The chief tool for managing base ecosystems is the INRMP. Based on an interdisciplinary approach to ecosystem management, the INRMP ensures the successful accomplishment of the military mission by integrating all aspects of natural resources management with each other and the rest of the base's mission.

Sensitive species are subject to regulations under the authority of federal (U.S. Fish and Wildlife Service [USFWS]) and state (California Department of Fish and Wildlife, Georgia Department of Natural Resources, Alabama Department of Conservation and Natural Resources, and the Florida Fish and Wildlife Commission). Sensitive species include species designated as threatened, endangered, or candidate species by state or federal agencies. Under the Endangered Species Act (ESA) (16 U.S.C. 1536), an endangered species is defined as any species in danger of extinction throughout all or a significant portion of its range. A threatened species is defined as any species likely to become an endangered species in the foreseeable future. Candidate species are those species for which the USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher-priority listing activities. Although candidate species receive no statutory protection under the ESA, the USFWS believes it is important to advise government agencies, industry, and the public that these species are at risk and could warrant protection under the ESA.

The Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-712) is the domestic law that affirms, or implements, the United States' commitment to four international conventions (with Canada, Japan, Mexico, and Russia) for the protection of a shared migratory bird resource. Each of the conventions protect selected species of birds that are common to both countries (i.e., species occur in both countries at some point during their annual life cycle). The act protects all migratory birds and their parts (including eggs, nests, and feathers).

The Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668d) is legislation in the United States that protects two species of eagles. The BGEPA prohibits anyone without a permit issued by the Secretary of the Interior from "taking" bald eagles. Taking involves molesting or disturbing birds, their parts, nests, or eggs. The BGEPA prescribes criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald or golden eagles... [or any golden eagle], alive or dead, or any part, nest, or egg thereof."

The Marine Mammal Protection Act (MMPA) is a statute enacted in 1972 by the United States to protect marine mammals and their habitat. The MMPA prohibits the "taking" of marine mammals, and enacts a moratorium on the import, export, and sale of any marine mammal, along with any marine mammal part or product within the United States. The Act defines "take" as "the act of hunting, killing, capture, and/or harassment of any marine mammal; or, the attempt at such." The MMPA defines harassment as "any act of pursuit, torment or annoyance which has the potential to either: a. injure a marine mammal in the wild, or b. disturb a marine mammal by causing disruption of behavioral patterns, which includes, but is not limited to, migration, breathing, nursing, breeding, feeding, or sheltering."

Section 404 of the CWA established a program to regulate the discharge of dredged and fill material into waters of the United States, including wetlands. Activities in waters of the United States that are regulated under this program include fills for development, water resource projects (e.g., dams and levees), infrastructure development (e.g., highways and airports), and conversion of wetlands to uplands for farming and forestry. The USACE is the lead agency in protecting wetland resources. The USACE maintains jurisdiction over federal wetlands (33 *CFR* 328.3) under Section 404 of the CWA (33 *CFR* 323.3) and Section 10 of the Rivers and Harbors Act (30 *CFR* 329). The USEPA assists the USACE (in an administrative capacity) in the protection of wetlands (40 *CFR* 225.1 to 233.71). In addition, the USFWS and the National Marine Fisheries Service provide support with important advisory roles.

Furthermore, EO 11990, *Protection of Wetlands*, requires federal agencies, including the USAF, to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. EO 11990 requires federal agencies to avoid, to the extent possible, the long- and short-term, adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative; if construction in wetlands cannot be avoided, the USAF would issue a Finding of No Practicable Alternative (FONPA).

Under CWA Section 401, applicants for a federal license or permit to conduct activities that could result in the discharge of a pollutant into waters of the United States must obtain certification from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. Therefore, all projects that have a federal component and could affect state water quality (including projects that require federal agency approval, such as issuance of a Section 404 permit) must also comply with CWA Section 401.

The State Water Resources Control Board of California has issued regulations for the state that differ than federal regulations. The State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State lays out the states definition for wetlands and what wetlands and other surface water features are considered protected as Waters of the State.

B.8.3 Methodology

The first step in the analysis of potential impacts to biological resources was to determine the locations of sensitive habitats and species at each alternative base in relation to the proposed mission. Maps were examined to locate sensitive habitats and species. Next, areas of overlap for the proposed development and sensitive habitats and species were identified. Scientific literature was reviewed for studies that examined similar types of noise-related impacts to biological resources. The literature review included a review of basic characteristics and habitat requirements of each sensitive species. Where available, information was also gathered relative to management considerations, incompatible resource management activities, and threats to each sensitive species. Impact analyses were then conducted based on the information gathered from the literature reviews and discussions with natural resource managers at each alternative base. At Tyndall AFB, the analyses included an assessment of the impacts to biological resources that could result from both construction activities (ground disturbance) and daily aircraft operations (changes in takeoffs, landings, engine runups) at the alternative bases and in the associated airspace and ranges. At Vandenberg AFB, the analysis considered construction activities and daily aircraft operations.

Measures to avoid and/or minimize adverse impacts to biological resources are also presented. The following criteria were evaluated when determining the significance of an effect on biological resources that could result from implementation of the proposed missions:

- The direct impact or taking of a sensitive species, including habitat alteration
- The importance (legal, commercial, ecological, or scientific) of the resource
- The relative sensitivity of biological resources that could be affected by implementation of the mission
- The quantity or percentage of biological resources affected by implementation of the mission relative to overall abundance in the ROI
- The expected duration of potential impacts that would result from implementation of the mission

The focus of the analysis is on the federally listed species. Other species of conservation concern are addressed, but are not analyzed to the same level of detail as the species listed by the USFWS as threatened or endangered. Impacts to threatened, endangered, and special status species/communities that would result from implementation of the F-35A or MQ-9 mission for any of the project alternatives include potential habitat loss, temporary and permanent impacts associated with the construction and use of facilities, and ground impacts associated with the use of defensive countermeasures.

Plant species below the airspace and range areas proposed for use were excluded from extensive review and analysis because the proposed aircraft operations would not result in new ground disturbance. Inert ordnance delivery and flare use would continue only in areas permitted for such uses.

Determination of the significance of wetland impacts is based on (1) loss of wetland acreage, (2) the function and value of the wetland, (3) the proportion of the wetland that would be affected relative to the occurrence of similar wetlands in the region, (4) the sensitivity of the wetland to proposed activities, and (5) the duration of ecological ramifications. Impacts to wetland resources are considered significant if high-value wetlands would be adversely affected or if wetland acreage is lost. High-value wetlands are those wetlands that provide a significant function or value (i.e., flood control, unique wildlife habitat, etc.).

B.9 CULTURAL RESOURCES

B.9.1 Resource Definition

Cultural resources are any prehistoric or historic district, site, building, structure, or object considered important to a culture, subculture, or community for scientific, traditional, religious or other purposes. They include archaeological resources, historic architectural resources, and traditional cultural resources. Archaeological resources are locations where prehistoric or historic activity measurably altered the earth or produced deposits of physical remains (e.g., arrowheads, bottles). Historic architectural resources include standing buildings and other structures of historic or aesthetic significance. Architectural resources generally must be more than 50 years old to be considered for inclusion on the NRHP; however, more recent structures, such as Cold War–era resources, may warrant protection if they have the potential to gain significance in the future and are considered extraordinary in nature. Traditional cultural properties are associated with cultural practices and beliefs of a living community that are rooted in its history and are important in maintaining the continuing cultural identity of the community. Historic properties (as defined in 36 CFR 60.4 and 36 CFR 800.15(l)(1)) are significant archaeological, architectural, or traditional resources that are defined as eligible for listing on the NRHP.

B.9.2 Regulatory Setting

As a federal agency, the USAF is required to consider the effects their actions may have on historic properties. These requirements are considered under AFMAN 32-7003 and the NHPA of 1966, as amended. The NHPA of 1966 sets federal policy for managing historic properties. Federal agencies must identify historic properties and consult with the Advisory Council on Historic Preservation and SHPO as necessary (AFMAN 32-7003). Section 106 of the NHPA specifically requires that federal agencies analyze the impacts of federal activities on historic properties. NHPA obligations for a federal agency are independent from NEPA and must be complied with even when an environmental document is not required.

In 1999, the DoD published the *American Indian and Alaska Native Policy*, and in 2006, DoDI 4710.02, both of which emphasize the importance of respecting and consulting with tribal governments on a government-to-government basis. The policy requires that before decisions are made, an assessment should be conducted through consultation of proposed DoD actions that may have the potential to affect protected tribal resources, tribal rights, and Indian lands significantly. The USAF implements DoDI 4710.02 through Department of Air Force Instruction (DAFI) 90-2002, Interactions with Federally Recognized Tribes.

B.9.3 Methodology

Analysis of potential impacts to cultural resources considers both direct and indirect impacts. Direct impacts may be the result of physically altering, damaging, or destroying all or part of a cultural resource. Indirect impacts may be the result of altering characteristics of the surrounding environment that contribute to the importance of the resource, introducing visual, atmospheric, or audible elements that are out of character for the period the resource represents (thereby altering the setting), or neglecting the resource to the extent that it deteriorates or is destroyed.

For the purposes of cultural resources analysis, the ROI for cultural resources is considered equivalent to the Area of Potential Effects (APE), as defined by 36 CFR 800.16(d). The APE for cultural resources is based on the type of potential impacts that might occur within the area. The APE for direct impacts is the area directly affected by construction activities that could physically alter, damage, or destroy all or part of a cultural resource; in this case, it covers the areas of proposed disturbance at Tyndall AFB and Vandenberg AFB. The APE for indirect visual effects is the same APE for direct impacts, plus the addition of a 0.5-mile buffer to account for the potential introduction of a visual or atmospheric element that could alter the setting of an NHRP-listed or -eligible architectural resource by introducing a visual component that is out of character for the period the resource represents. Finally, the APE for indirect noise effects consists of the 65 dB noise contour for proposed airfield operations to account for potential noise and/or vibration issues that could affect the setting or otherwise damage an NHRP-listed or -eligible architectural resource.

B.10 LAND USE AND RECREATION

B.10.1 Resource Definition

Land use describes the way the natural landscape has been modified or managed to provide for human needs. Land management plans, comprehensive plans, and zoning regulations determine the type and extent of land use in specific areas to limit conflicting uses and protect certain designated or environmentally sensitive areas. The attributes of land use addressed in this analysis include the land use regulatory setting, general land-use patterns, specific uses and attributes in the area of interest, and Special Use Land Management Areas (SULMAs). SULMA is a term used to categorize types of land uses for analysis purposes and is not an official term used by federal or state agencies. SULMAs generally include designated parks, monuments and recreation areas, conservation and wildlife refuges, and other natural areas underlying the airspace owned by state and federal agencies, in this case, the military airspace used for proposed operations. SULMAs also include Native American Reservation lands. Issues related to Native American lands are addressed in the Cultural Resources section in this EIS (see Sections 3.1.9, 3.2.9, 4.19, 4.2.1.9, 4.2.2.9, and Appendix B, Section B.9).

Recreational resources are the natural or man-made attributes that support the participation and enjoyment of people in outdoor recreational activities. In urban and suburban areas, these resources include public facilities (e.g., parks, playgrounds, zoos, playing fields, amphitheaters, and outdoor sports facilities.) Outdoor recreational resources also include the myriad of opportunities provided by natural surroundings. These recreational uses generally occur in areas owned and managed by local, state, and federal agencies. Typical activities include, for example, backcountry exploration, hiking/running, hunting, fishing, water sports, off-road vehicle use, skiing, and surfing. Recreational resources also support passive pursuits such as photography, enjoyment of quiet and remote qualities, scenic driving, and visual resource appreciation (including dark skies). Recreational resources include associated developed infrastructure such as picnic areas, campgrounds, trails, ski areas, marinas/docks/ramps, archaeological sites, historical and educational sites, and trails that are designated or available for public outdoor recreational use. Recreation areas may have specific plans that describe and protect the recreational resources and valued attributes of a location or area.

Land use typically reflects intrinsic attributes, natural and man-made resources, and attributes that make an area suitable for its ongoing or planned use or uses. Man-made improvements, natural qualities, or both may be essential for some land uses. As an example, the suitability of land for recreational hunting depends on that land's capability to support wildlife and other factors, such as accessibility, natural setting, and quietness.

B.10.2 Regulatory Setting

The regulatory framework for land use includes the key federal, state, and local statutes, regulations, plans, policies, and programs applicable to land use on and near each alternative military base and under the airspace used for training. The following are the primary regulations and guidance documents applicable to land use in relation to the actions evaluated in this EIS.

Federal Interagency Committee on Urban Noise Guidelines for Considering Noise in Land Use Planning and Control (FICUN 1980). In 1979, the FICUN was formed to develop federal policy and guidance on noise. The committee included the EPA, FAA, Federal Highway Administration, DoD, U.S. Department of Housing and Urban Development, and U.S. Department of Veterans Affairs. The designations contained in the FICUN land-use compatibility table do not constitute a federal determination that any use of land covered by the program is acceptable or unacceptable under federal, state, or local law. The responsibility for determining the acceptable and permissible land uses, and the relationship between specific properties and specific noise contours, rests with the local authorities.

The FICUN guidelines consider areas with noise levels of 75 L_{dnmr} or greater as unacceptable living environments. Areas between 65 to 74 L_{dnmr} are considered "generally unacceptable" for noise-sensitive land uses such as residences, schools, hospitals, and public services. Houses located in areas between 65 to 74 L_{dnmr} may not qualify for federal mortgage insurance without additional costs associated with installing noise attenuation. In the outdoor noise environment, levels greater than 65 L_{dnmr} may be annoying to some people during communications. Generally, residential development is not recommended in areas experiencing noise levels of 65 dBA or greater. Although discouraged, residential development is compatible within the 65 to 69 dBA and 70 to 74 dBA contours, provided noise reduction levels of 25 dB and 30 dB, respectively, are achieved. Commercial/retail businesses are compatible without restrictions up to 69 dBA, and up to 79 dBA, if noise-reduction levels of 25 dB and 30 dB, respectively, are achieved for public areas. Industrial/manufacturing, transportation, and utility companies have a high noise-level compatibility, and therefore, can be located within the higher noise zones.

14 CFR Part 150, Airport Noise Compatibility Planning (1979) (14 CFR 150). Part 150, *Airport Noise Compatibility Planning*, was established under the Aviation Safety and Noise Abatement Act of 1979. It is the primary federal regulation guiding and controlling planning for aviation noise compatibility on and around civil airports. The regulations of 14 CFR Part 150 established procedures, standards, and methodologies to be used by airport operators for the preparation of Airport Noise Exposure Maps and Airport Noise Compatibility Programs. The Noise Compatibility Program is a balanced approach for mitigating the noise impacts of airports on their neighbors while protecting or increasing both airport access and capacity, as well as maintaining the efficiency of the national aviation system. The regulations contained in 14 CFR Part 150 are voluntary, and airport operators are not required to participate. However, an approved Noise Compatibility Program is the primary vehicle for gaining approval of applications for federal grants for noise abatement projects and provides the required analyses for evaluating impacts of any proposed constraints upon an airport's operations.

Air Force Integrated Installation Planning (AFI 32-1015) (30 July 2019). This instruction establishes a comprehensive and integrated planning framework for development/redevelopment of USAF installations. It provides a single resource that implements comprehensive planning through Installation Development Plans that comply with Title 10 United States Code (U.S.C.) 2864, *Master Plans for Major Military Installations*. It also ensures that installation development planning processes follow the requirements of 32 CFR Part 989, *Environmental Impact Analysis Process (EIAP)*. Finally, it ensures that processes, procedures and products meet the intent of installation planning described in DoDI 4165.70, *Real Property Management*, and within AFPD 32-90. Copies of the UFCs are available at the *Whole Building Design Guide* website, https://www.wbdg.org/ffc/dod/unified-facilities-criteria-ufc. This instruction also sets service requirements for the Air Installations Compatible Use Zones (AICUZ) and noise programs. This includes directing the use of noise models and metrics, providing information to manage and explain noise exposure to off-base populations, and analyzing the effects of accident potential and noise on natural and human environments. This is done when conducting the EIAP across installations, air-to-ground ranges, ground ranges, Special Use Airspace, and Airspace for Special Use. It supports compatible land-use analysis, comprehensive planning, facility-space planning, management of noise inquiries/complaints, and the USAF EIAP. (This instruction supersedes the following: AFI 32-7061, 12 Mar 2003; AFI 32-7062, 18 Dec 2015; AFI 32-7063, 18 Dec 2015; AFI 32-7070, 21 Apr 2016; AFI 32-10142, 14 May 2013.)

Coastal Zone Management Act (CZMA) was enacted to develop a national coastal management program that comprehensively manages and balances the impact of competing uses of land and the impacts of those uses to a coastal use or resource. The CZMA federal consistency requirement, CZMA Section 307, mandates that federal agency activities be consistent to the maximum extent practicable with the enforceable policies of a state management program. The federal consistency requirement applies when any federal activity, regardless of location, affects any land or water use or natural resource of the coastal zone. The question of whether a specific federal agency activity may affect any natural resource, land use, or water use in the coastal zone is determined by the agency implementing the action. Federal agencies make determinations as to whether their actions are consistent with approved state plans and submit these determinations for state agency review and concurrence. All relevant state agencies must review the Proposed Action and Alternatives and issue a consistency determination.

Wilderness Act of 1964. This act established the National Wilderness Preservation System and instructed federal land management agencies to manage wilderness areas and preserve wilderness character. To support the mandates of the Wilderness Act, the NPS developed specific policy to address wilderness management and stewardship. *NPS Management Policies (2006)* and Director's Order 41 (2013), which are updated on a periodic basis, help managers understand why wilderness is important and how they can manage these areas most effectively.

Florida Coastal Zone Protection Act (FCZPA). This act establishes the Florida Coastal Management Program. The program's goal is to coordinate local, state, and federal agency activities using existing laws to ensure that Florida's coast is as valuable to future generations as it is today. The Florida Department of Environmental Protection (FDEP) is responsible for directing the implementation of the statewide coastal management program. Due to its location on the coast, projects implemented on Tyndall AFB are subject to the FCZPA administered by the FDEP. The act regulates construction within 1,500 feet landward of the Coastal Construction Control Line (CCCL), which is the area referred to as the coastal building zone. FDEP jurisdiction over coastal construction without an established CCCL extends 50 feet landward of the mean high water line on Atlantic or Gulf sandy shorelines per Florida Statute 161.052. Low-energy mangrove or marsh shorelines are not included within this jurisdiction. In addition, per subparagraph 62B-33.004(3)(b), Florida Administrative Code, activities on lands owned and maintained by the U.S. government are exempt from Chapter 161 coastal construction regulations of the State of Florida.

Florida Statutes, Title XII, Planning and Development. These statutes adopts the State Comprehensive Plan that sets goals and policies for land use, natural systems and recreation lands, agriculture, and urban revitalization. Several Florida regulations govern land use and compatible zoning. Chapter 163 of the Florida Statutes guides compatible land-use planning by requiring each local government to adopt a comprehensive plan and establishing minimum criteria, which identify required elements of a comprehensive plan. Florida Statute 163.3175 requires counties with military installations to coordinate with installations on future land-use plans or changes in land-use regulations to prevent incompatible development near the installation. Military installations are asked to provide local counties with information on change in noise levels or land-use planning through programs such as AICUZ (Air Force 2008a).

Bay County Code of Ordinances, Chapter 6 Buildings, Construction and Technical Codes; Chapter 20, Planning and Development, Article 1, Comprehensive Plan. These codes guide land development in the unincorporated areas of the county. Local municipalities are responsible for planning and zoning in incorporated areas.

California Coastal Act of 1976. The California Coastal Act includes specific policies (see Division 20 of the Public Resources Code) that address issues such as shoreline public access and recreation, lower-cost visitor accommodations, terrestrial and marine habitat protection, visual resources, landform alteration, agricultural lands, commercial fisheries, industrial uses, water quality, offshore oil and gas development, transportation, development design, power plants, ports, and public works. The policies of the California Coastal Act constitute the statutory standards applied to planning and regulatory decisions made by the commission and by local governments, pursuant to the California Coastal Act. At the county level, general and comprehensive plans include coastal zone planning, consistent with the California Coastal Act.

California Government Code (Sections 65000, et seq.). This code contains many of the laws pertaining to the regulation of land uses by local governments including the general plan requirement, specific plans, subdivisions, and zoning. State law requires that each of these jurisdictions adopt "a comprehensive, long-term general plan for [its] physical development." This general plan is the official city or county policy regarding the location of housing, business, industry, roads, parks, and other land uses; protection of the public from noise and other environmental hazards; and conservation of natural resources. The general plan must be consistent with compatibility plans for airfields (military or civilian) within their planning area. Public Utilities Code Section 21675 requires adoption of compatibility plans for military airports (State of California, 2015).

Santa Barbara County, Chapter 35, Land Use and Development Code. This code provides for the preparation and adoption of a County Comprehensive Plan.

San Luis Obispo County Title 22 Land Use Ordinance; Title 23 Coastal Zone Land Use; Title 26 Growth Management. This ordinance governs land-use-related planning, controls and implementation in the county.

B.10.3 Methodology

Identification of Impact Drivers

The primary impact drivers on land use for the EIS alternatives include:

- Impact of new on-base construction on existing activities and structures on base and installation plans;
- Impact of aircraft noise on land use compatibility, including recreational areas;
- Impact of demand for new off-base housing for military personnel on local land use, zoning and plans;
- Impact of increased demand of new military personnel and dependents on local recreational resources;
- Impact of noise from military training in regional military training airspace on underlying land use and recreational resources.

Assumptions

The following assumptions are made in the evaluation of land use impacts:

- The current planning document for Tyndall AFB (post-hurricane) is the Recovery Plan: Analysis of Alternatives. This plan supersedes the Installation Development Plan, since much of base infrastructure was damaged, and the ongoing missions were relocated. The Recovery Plan evaluated redevelopment based on an F-35A (three- or four-squadron mission) and an MQ-9 mission. The plan identified optional scenarios for redevelopment that were acceptable, although they had differing "pros" and "cons". The sites proposed for the proposed mission alternatives are consistent with the options identified in the Recovery Plan. Therefore, little evaluation is given to facility siting, as this would proceed under the guidance of the Base Civil Engineer, with appropriate measure, in accordance with USAF regulations and instructions, to minimize a spectrum of physical, environmental, and human impacts.

- Because of the geographic isolation of Tyndall AFB on a long peninsula off the mainland, on-base structures and ground-based activities are not adjacent to mainland land use. Existing safety zones are also within the boundaries of the installation and/or over water. Because of this isolation, ground-based uses on base have no direct impact on surrounding off-base land us; therefore, the analysis did not address typical adjacency issues such as fencing, odors, dust, visual incongruity, and access.

- The noise assessment found that proposed training operations at Grand View, Pinecastle, and Avon Park Ranges were within the usual operating levels for these ranges when combined with ongoing training. Therefore, the proposed training caused no change in conditions at these ranges. No land use assessment was undertaken for these locations.

- Impacts on persons (estimated populations, speech interference, noise annoyance) and specific sensitive locations and activities (for example, schools, hospitals, landmark, urban center) are evaluated in the EIS Noise assessment see Sections 4.1.2, 4.2.2, and 4.23, and Appendix E).

- Planning documents indicate that local zoning is mostly similar to land use maps and consistent with future land use maps. Some exceptions are noted in the analysis where zoning and land use are not consistent. The evaluation of noise effects on land use uses current Bay County land use data from 2018, augmented by descriptions in local planning documentation.

- The impacts of demand for housing on the local housing market is addressed in the socioeconomic analysis in the EIS. Since it unknown what location is preferred for new off-base military housing, the analysis considers impacts on land development in surrounding areas qualitatively. Contextual information is the primary focus of the assessment.

Method of Analysis

Impact of new on-base construction on existing site uses and installation plans

- The analysis evaluated whether the proposed locations of conceptual construction areas (blocks) for the alternatives were congruent with alternatives developed in the Recovery Plan for the F-35A and MQ-9 missions. In all cases, they were consistent; therefore, no impact on base plans per se were identified.

Impact of aircraft noise on land use compatibility, including recreational areas

The following four steps were used in the evaluation of noise and land use compatibility:

1. Characterized current land use in the areas surrounding the base. The analysis uses Bay County GIS 2018 pre-hurricane land use data (most current available). The land use categories used by Bay County were consolidated into a smaller number of categories to correlate more closely to categories in AICUZ land use guidelines. The cross-categorization in Table B.10-2 was used.

Table B.10-2 Land Use Categories Used EIS Land Use Analysis

Bay County Land Use[1]	EIS Land Use Category
Acreage Not Zoned For Agriculture	Undesignated
Agricultural	Open/Ag/Low Density
Centrally Assessed	Undesignated
Industrial[1]	Industrial
Institutional[1]	Public/Quasi-Public
Mining	Industrial
Other	Undesignated
Parcels With No Values[1]	Undesignated
Public/Semi-Public[1]	Public/Quasi-Public
Recreation	Recreational
Residential[1]	Residential
Retail/Office[1]	Commercial
Row	Transportation
Vacant Nonresidential[1]	Open/Ag/Low Density
Vacant Residential[1]	Open/Ag/Low Density
Water	Water

Notes:
1. Land Within The Noise-Impacted Footprint (65 Db DNL And Greater) Under Any Of The EIS Alternatives Only Included The Yellow Highlighted Bay County Land Use Categories.

The following categories used in the GIS analysis are further defined below:

- Commercial: Wholesale or retail establishments including offices, retail establishments, restaurants, hotels, and motels.
- Industrial: Manufacturing, warehouses, and other similar uses

- Public/Quasi Public: Publicly owned lands and lands open to public access; including military reservations, prisons, public buildings, schools, churches, non-residential charitable establishments, cemeteries, and medical facilities (unless medical care is provided in home, in which case the land use was classified as residential), and parks.
- Residential: All types of residential activity, such as single- and multi-family residences, and orphanages.
- Transportation: Roads, railroads, and other linear ground transportation infrastructure (including right-of-way for such infrastructure.
- Open/Agriculture/Low Density: Open refers to undeveloped land. Agricultural lands include cropland, grazing lands, and livestock production. This land may include single-family residences located within an agricultural parcel, where the residence is the primary residence for persons engaging in agriculture. Low Density includes resource extraction operations such as forestry, mining or quarrying.
- Undesignated: Areas of undetermined use.
- Water: Lakes, rivers, bayous, bays, ocean.

2. Identify noise levels surrounding the military airfield for the current/recent operational condition and for each of the alternatives considered in the EIS

   The Noise analysis for this EIS (See Appendix E) computes the extent and intensity of noise surrounding the military airfield and defines the area exposed to noise levels of 65 dB DNL and greater in 5 decibel increments. A geospatial depiction of noise contours is the output of this analysis.

3. Determine the area exposed to noise levels of 65 dB DNL and greater by land use

   This step combines the noise contours with the land use data using GIS land use data to calculate the acreage of land use within each 5-decibel exposure band.

4. Determine the compatibility of the areas exposed to 65 dB DNL and greater

   This step applies the AICUZ noise compatibility recommended land use guidelines (Table B-10-1) to determine if affected land uses (exposed to 65 dB DNL and greater) are compatible. Many land uses are conditionally compatible depending on attenuating actions or specific conditions of the underlying activity or use. In these cases, the analysis identifies if attenuating actions are recommended.

<u>Impact of demand for new off-base housing for military personnel on local land use, zoning and plans</u>

For this evaluation, the demand for new off-base housing for each alternative is translated into residential area based on a range of development from 4 to 8 dwelling units per acre. The analysis assumes that this demand would use vacant residential land for constructing new homes. Based on the supply of residential land and the current constraints on residential development around

Tyndall AFB and Vandenberg AFB, a qualitative estimate of impacts on land-use patterns and land use allocation was determined. The feasibility for meeting the demand for residential development considered local plans and current constraints on residential development.

Impact of increased demand of new military personnel and dependents on local recreational resources

The impact of new military personnel and dependents at Tyndall AFB considered the magnitude of the demand in relations to current and past recreational opportunities. It also considered the recent impact of Hurricane Michael on the area, and slow recovery and rebuilding of public and commercial recreational resources. The evaluation is qualitative based on the estimated number of new households living off base for each alternative. The analysis considers the relative change in demand in local communities and the degree to which this could affect the capacity of local recreational resources to serve area residents.

Impact of noise from military training using regional military training airspace on underlying land use and recreational resources

To evaluate land uses underlying the training airspace, the type of underlying land use is described broadly. Using output from noise modelling, the degree of change in noise on the ground was calculated. The resultant noise levels are compared to the AICUZ guidelines to determine compatibility. Also, the incremental change in noise is considered. Increases up to about 2.5 dB L_{dnmr} are generally considered unnoticeable so that impacts are low. Change above 2.5 dB L_{dnmr} are noticeable to some persons depending on the degree of change, current condition, and familiarity of the person to the acoustic environment. In these areas, the analysis looks more closely at underlying sensitive areas.

Special Use Land Management Areas (SULMAs) are identified by using the Environmental Systems Research Institute (ESRI) Federal lands datasets (ESRI 2009) and also the Managed Areas Database (MAD) (Managed Areas Database 1996). The ESRI Federal lands dataset identified lands administered by various Federal agencies such as the U.S. Forest Service and USFWS, National Parks, and National Monuments, Wilderness Areas and Federal Indian Reservation lands held in trust by the Bureau of Indian Affairs. The MAD dataset was filtered to show items at a state or local level because Federal lands were already covered in the ESRI dataset. Examples of land included in the MAD dataset are state and local parks and state wildlife refuges.

The area of each SULMA was calculated using GIS to determine the acreage below the airspace units. If a SULMA consisted of more than one part (i.e., polygon), the areas were totaled so that calculations used the entire area. Airspace units were "intersected" with the land use SULMA layers to identify the overlap with the SULMAs and the percentage of overlap was calculated. Airspace units were calculated individually because some MOAs, ranges, and restricted airspaces overlap each other. The affected SULMAs were exported in a tabular format listed by airspace unit. How the SULMAs would be affected by the various scenarios was evaluated by reviewing projected levels and changes in noise compared to the baseline scenario. Note that in the discussion of impacts on SULMAs, Wilderness Areas are considered particularly sensitive to noise increases due to wilderness characteristics and goals described in the Wilderness Act, including, for example, "naturalness" and in some cases, "outstanding opportunities for solitude."

Evaluation of regional recreational resources considers whether proposed changes would preclude, displace, or alter the suitability of an area or facility for ongoing or planned recreational uses. This could be triggered by changes in noise, access, visual context, availability of recreational sites, or change in the desired qualities of an area that contribute to recreational opportunity. The current and resulting estimated noise levels, degree of change and sensitivity of underlying recreational uses and designated areas was considered. Wilderness Areas are specifically addressed in the analysis based on their sensitivity to noise. The analysis considers the relative importance of affected areas. This assessment considers management goals, and availability of similar recreational opportunities.

The noise effect of sonic booms can disrupt or startle persons in outdoor settings. Even very infrequent sonic booms may cause annoyance for recreational activities where quiet is desirable, such as remote hiking, camping, and hunting. Because of their infrequency, sonic booms may be startling but should have a minimal effect on the overall quality of recreational opportunities or experiences.

The interface between military aircraft and recreational use of airspace for flying, parasailing, gliding and ballooning is an air safety concern. Because the F-35A would use existing military training airspace, these activities would already be known or identified with appropriate avoidance procedures or local protocols. An increase in military use could affect the availability of airspace for recreational uses in some locations.

B.11 INFRASTRUCTURE

B.11.1 Resource Definition

Infrastructure consists of the systems and physical structures that enable the population of a USAF base to function. Infrastructure is primarily human-made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as urban, or developed built environment. The availability of infrastructure and its capacity for expansion are essential to the ability of a base to carry out a specific mission and provide for the needs of employees and residents.

Utilities analyzed in this EIS include water supply and distribution, sanitary sewer and wastewater systems, stormwater drainage, solid waste, electrical system, and natural gas. Solid waste management primarily relates to the availability of systems and landfills to support a population's residential, commercial, and industrial needs. AFI 32-7042, 13 Waste Management, incorporates the requirements of Subtitle D, 40 CFR 240 through 244, 257, and 258; applicable federal regulations; other AFIs; and DoD directives. It also establishes the requirement for bases to have a solid waste management plan; procedures for handling, storage, collection, and disposal of solid waste; record keeping and reporting; and pollution prevention.

The infrastructure information contained in the Affected Environment sections in Chapter 3 provides a brief overview of each infrastructure component and describes its capacities, effectiveness, deficiencies, and existing general condition.

For the purposes of this infrastructure analysis, the ROI for the Proposed Actions and No Action Alternative includes the areas proposed for infrastructure upgrades on Tyndall AFB and the areas surrounding the base.

B.11.2 Regulatory Setting

There is no applicable regulatory setting for infrastructure resources.

B.11.3 Methodology

Effects from the Proposed Actions on infrastructure were evaluated based on the potential for disruption or improvement of existing levels of service and additional needs for water, energy and natural gas consumption, wastewater and stormwater drainage systems, and solid waste system availability. Changes in population and proposed development were used to determine impacts to infrastructure. For each alternative base, the maximum demand or impact to capacity was calculated for the potable water, wastewater, electric, and natural gas systems based on the change in population. For the transportation analysis, any change in population was assumed to reside off base.

The impact analysis consisted of (1) a quantitative assessment, based on available information for average and peak use and demand data for each on-base utility and the ability of a utility provider to absorb a given level of demand increase for its service area, and (2) a qualitative assessment of the physical condition of each on-base system. Impacts could arise from physical changes to utility supply and distribution systems over their design life cycles and energy needs created by either direct or indirect workforce and population changes related to base activities. An effect would be considered adverse if Proposed Action requirements caused any of the following:

- A violation of a permit condition or contract with a utility provider
- A capacity exceedance of a utility or solid waste facility
- A system that could not sustain a mission increase due to poor condition, inefficient function, or operation
- A mission increase that would require costly upgrades
- A long-term interruption of a utility

To assess the potential environmental consequences associated with ground traffic and transportation resources, increased utilization of the existing roadway system and base access gates due to the change in personnel was analyzed, as well as potential effects of construction activities.

Impacts could arise from physical changes to circulation, construction-related traffic delays, and changes in traffic volumes. Adverse impacts on roadway capacities would be significant if roads with no history of capacity exceedance would have to operate at or above their full design capacity as a result of the Proposed Actions.

B.12 TRANSPORTATION

B.12.1 Resource Definition

Ground traffic and transportation infrastructure includes the public roadway network, public transportation systems, airports, railroads, pedestrian/bicycle facilities, and waterborne transportation required for the movement of people, materials, and goods. Implementation of the F-35A/MQ-9 Wing beddowns have the potential to impact the public roadways that provide access to the base, base access control points or gates, and the base internal roadway system. Roadways are typically assigned a functional classification by the corresponding State Department of Transportation. Functional classification is the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide. The three main functional classifications for roadways include:

- Arterial – These roadways provide mobility so traffic can move from one place to another quickly and safely.
- Local – These roadways provide access to homes, businesses, and other property.
- Collector – These roadways link arterial and local roads and perform some of the duties of each.

For the purposes of this transportation analysis, the ROI for the proposed action and No Action Alternative includes the areas proposed for upgrades on Tyndall AFB and Vandenberg AFB, and the areas surrounding those bases.

B.12.2 Regulatory Setting

There is no applicable regulatory setting for transportation resources.

B.12.3 Methodology

Effects on transportation systems were evaluated for the proposed F-35A and MQ-9 Wing beddowns based on the potential for disruption or improvement of existing LOSs and additional infrastructure needs. Changes in population and proposed development were used to determine impacts to infrastructure. At each base, the maximum demand or impact to capacity was calculated for the transportation system based on personnel added and resulting trips. For the transportation analysis, any change in population was assumed to reside off base.

The impact analysis consisted of 1) a quantitative assessment, based on available information for

peak period trips, and 2) a qualitative assessment of the potential impacts, including other access locations and options for alternate routes to the area.

To assess the potential environmental consequences associated with ground traffic and

transportation resources, increased utilization of the existing roadway system and base access gates due to the change in personnel is analyzed, as well as potential effects of construction activities.

Impacts could arise from physical changes to circulation, construction-related traffic delays, and changes in traffic volumes. Adverse impacts to roadway capacities would be significant if roads with no history of capacity exceedance had to operate at or above their full design capacity as a result of implementation of the proposed F-35A and MQ-9 Wing beddowns.

B.13 SOCIOECONOMICS

B.13.1 Resource Definition

Socioeconomics refers to features or characteristics of the social and economic environment. Socioeconomics evaluates the change in personnel and expenditures associated with the proposed F-35A and MQ-9 missions that could potentially impact population, employment, earnings, housing, education, and public services. Socioeconomics also addresses potential noise effects to housing, schools, and other noise-sensitive social or economic activities. For the purposes of this socioeconomics analysis, the ROI for the Proposed Actions and No Action Alternatives generally includes the county area or areas where each alternative base is located.

B.13.2 Regulatory Setting

There is no applicable regulatory setting for socioeconomics.

B.13.3 Methodology

Population, housing, and economic estimates were collected from the most recent local, state, and federal sources. The IMPLAN economic model was used to determine the direct, indirect, and induced number of employees and associated wages in the affected region and the potential impacts on employment levels from personnel changes associated with the alternatives and from construction expenditures associated with each alternative (IMPLAN, 2018). Education data was obtained from state departments of education. Changes in the demand for public services such as police, fire, and medical services associated with the incoming personnel under the Proposed Action and alternatives were evaluated based on the national average level of service (the number of service professionals per 1,000 capita).

B.14 ENVIRONMENTAL JUSTICE

B.14.1 Resource Definition

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, directs federal agencies to address environmental and human health conditions in minority and low-income communities. In addition to environmental justice issues are concerns pursuant to EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, which directs federal agencies to identify and assess environmental health and safety risks that may disproportionately affect children.

USAF guidance for implementation of EO 12898 is contained in the *Guide for Environmental Justice Analysis under the Environmental Impact Analysis Process (EIAP)*, dated November 2014 (USAF, 2014d).

The terms "minority" and "low income" are defined below for purposes of this analysis.

Minority: The term "minority" for purposes of environmental justice analysis includes those individuals who have identified themselves as having one of the following origins: "Hispanic," "Asian-American," "Native Hawaiian and other Pacific Islander," "Black or African-American," "American Indian or Alaskan Native," or "Some Other Race" (which does not include "White," "Black or African-American," "American Indian or Alaska Native," "Asian," and "Native Hawaiian or Other Pacific Islander" race categories) (USAF, 2014d).

Low Income: The U.S. Census Bureau (USCB) defines the term "poverty" (also referred to as "low income") as "a set of money income thresholds that vary by family size and composition to determine who is in poverty" (USCB, 2019). A family and each individual in the family is considered in poverty if the total family income is less than the family's threshold or the dollar amount calculated by the U.S. Census to determine poverty status.

Although children and elderly populations are not specifically included as environmental justice populations, they are identified as sensitive receptors in the guidelines (USAF, 2014d). Children are vulnerable to environmental exposure, and potential health and safety effects to children are considered in this EIS under the guidelines established by EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. For purposes of this analysis, the term "children" refers to any person under 18 years of age. The U.S. Environmental Protection Agency (USEPA) and USAF EIAP guidance identify the importance of considering an elderly person as a sensitive receptor to potential environmental impacts. The term "elderly" refers to any person 65 years of age or older.

B.14.2 Regulatory Setting

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, directs federal agencies to address environmental and human health conditions in minority and low-income communities.

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, which directs federal agencies to identify and assess environmental health and safety risks that may disproportionately affect children.

USAF guidance for implementation of EO 12898 is contained in the *Guide for Environmental Justice Analysis Under the Environmental Impact Analysis Process (EIAP)*, dated November 2014 (USAF, 2014d).

B.14.3 Methodology

Environmental justice analysis applies to adverse environmental impacts. Potential disproportionate impacts to minority or low-income populations are assessed only when adverse environmental consequences to the human population are anticipated; otherwise, no analysis is required. The same is true for analysis of special risks to children, which would be driven by adverse environmental impacts. If adverse impacts are not anticipated, no analysis of special risk to children is required.

In the event that adverse environmental impacts to the human population are anticipated, the effects would be identified, and the impact footprint would be mapped for the specified ROI. For this EIS, the resource that has the potential to impact environmental justice communities is noise. The FAA and DoD have identified residential use as incompatible with noise levels above the 65 dB DNL, unless special measures are taken to reduce interior noise levels for affected residences. Residential use is identified as incompatible regardless of noise attenuation at noise levels greater than 75 dB DNL. Therefore, the environmental justice analysis focuses on off-base residents potentially affected by noise levels of 65 dB DNL or greater.

Disproportionate impacts to environmental justice communities are determined by comparing the percentage of minority populations and low-income populations in the ROI to the COC. In this analysis, the ROI encompasses the census block groups that are wholly or partially within the affected area, defined as the area at 65 dB DNL or greater due to aircraft noise from the action alternatives. The COC is defined as the census tract(s) in which the affected area is located. If the ROI is greater than or equal to the COC, then disproportionate impacts would be anticipated. If minority or low-income population percentages in the ROI are less than the COC, then disproportionate impacts would not be anticipated. If the results of the analysis conclude that there would be disproportionate impacts on environmental justice populations, then mitigations would be identified to reduce or eliminate impacts to those populations. Similarly, children (under 18 years of age) and elderly (65 years of age and older) populations are inherently disproportionately impacted, and mitigations may be required to reduce or eliminate impacts to these population segments as well (e.g., avoidance of overflights near schools and noise-sensitive areas such as parks and hospitals). In the case where the results of the analysis conclude that there would not be disproportionate impacts, it may be necessary to perform additional outreach and analysis to ensure that no minority or low-income populations have been overlooked (USAF, 2014d).

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APPENDIX C
AIR QUALITY

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ACRONYMS AND ABBREVIATIONS

AB	afterburner
ACAM	Air Conformity Applicability Model
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFE	above airfield elevation
AGE	aerospace ground equipment
AGL	above ground level
APU	auxiliary power unit
AS	average air speed
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2e	carbon dioxide equivalents
CY	calendar year
EIAP	environmental impact analysis process
EIS	Environmental Impact Statement
ETR	engine thrust request
ft	foot/feet
ft^2	square foot/feet
ft^3	cubic foot/feet
fps	foot/feet per second
GCR	General Conformity Rule
HDDV	heavy duty diesel vehicle
HDGV	heavy duty gasoline vehicle
kts	knots
lb	pound(s)
LDDT	light duty diesel truck
LDDV	light duty diesel vehicle
LDGT	light duty gasoline truck
LDGV	light duty gasoline vehicle
LTO	landing and takeoff
MSL	mean sea level
NAAQS	National Ambient Air Quality Standards
NH_3	ammonia
NO_x	nitrogen oxide
Pb	lead
$PM_{2.5}$	particulate matter less than or equal to 2.5 microns in diameter
PM_{10}	particulate matter less than or equal to 10 microns in diameter
POV	privately owned vehicle
ROAA	Record of Air Analysis
ROCA	Record of Conformity Analysis
SO_2	sulfur dioxide
SO_x	sulfur oxide
TGO	touch-and-go
TIM	time in mode
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound
yd^3	cubic yard(s)

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AIR QUALITY

C.1 INTRODUCTION

This appendix describes the methods used to estimate construction and operational air emissions for the *F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB Environmental Impact Statement* (EIS). The analysis includes emissions estimations for proposed activities at the following alternative basing locations: Tyndall Air Force Base (AFB), Florida, and Vandenberg AFB, California. Each project alternative would require construction activities and would increase aircraft operations within the base region and associated airspaces.

C.2 EMISSION CALCULATION METHODS

Emissions associated with the proposed F-35A and MQ-9 basing alternatives were evaluated in accordance with the tiered approach outlined in the *Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide – Fundamentals, Volume 1 of 2* (EIAP) (AFCEC 2017). The first step of this approach involved conducting an assessment to determine if a proposed action is exempt from air quality analyses. The proposed F-35A and MQ-9 basing actions are not subject to any categorical exclusion or exemption identified in the General Conformity Rule (GCR). Therefore, this EIS analysis performs a quantitative assessment (Tier II). The Tier II assessment requires a formal evaluation of air impacts based on quantification of annual net total direct and indirect emissions of pollutants of concern.

The analysis used the USAF Air Conformity Applicability Model (ACAM), Version 5.0.16b, to estimate construction and operational emissions from the proposed F-35A and MQ-9 basing alternatives (Solutio Environmental, Inc. 2020). The ACAM provides a level of consistency with respect to emissions factors and calculations. Emissions considered in the analysis include the following:

- Volatile organic compounds (VOCs),
- Carbon monoxide (CO),
- Nitrogen oxides (NO_x),
- Sulfur dioxide (SO_2),
- Particulate matter less than 10 microns in diameter (PM_{10}),
- Particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and
- Carbon dioxide equivalent (CO_2e).

The ACAM also identifies whether a project region of analysis is in nonattainment, maintenance, or attainment of the national ambient air quality standards (NAAQS) for purposes of defining emission indicator thresholds to determine the significance of projected air quality impacts.

The following sections provide details on the assumptions and methods used in the estimation of proposed construction and operational emissions. Attachments C-1 through C-4 of this appendix present documentation of these emissions estimates for each project basing alternative.

C.2.1 Calculations for Construction

The ACAM evaluates emissions from the following types of construction activities:

- Demolition,
- Site Grading,

- Trenching/Excavation,
- Building Construction,
- Architectural Coating, and
- Paving.

Sources of air emissions associated with these activities include nonroad construction equipment, on-road trucks and worker vehicles, fugitive dust, and VOCs from architectural coatings and asphalt pavement off-gassing.

Each project alternative would require the construction of operational, maintenance, and base support facilities, as identified in EIS Section 2. Construction activity data for each alternative in terms of building demolition/renovation/construction volumes, areas of pavement construction, and areas of disturbed ground for fugitive dust were used as inputs to the ACAM. The air quality analysis assumed that proposed construction activities would begin in year 2021 and would be completed in year 2023 or 2024, depending on the project alternative.

C.2.2 Calculations for Operations

The proposed MQ-9 and F-35A actions would generate emissions at basing locations due to (1) aircraft operations, (2) aircraft engine maintenance and testing, (3) aerospace ground equipment (AGE), (4) space and water heating, (5) solvent usages, and (6) personnel commuting activities. Proposed aircraft operations also would occur with airspaces adjacent to the basing locations. The analysis employed the ACAM to estimate emissions from these activities. The ACAM evaluates emissions from a variety of stationary and mobile source activities associated with operation of a typical U.S. AFB.

The air quality analysis assumed that the project alternatives would reach full operations and resulting emissions from 2025 to 2028, depending on the alternative and after the completion of all required infrastructure improvements.

The analysis of aircraft operations is limited to operations that would occur within the lowest 3,000 feet of the atmosphere, because this is the typical depth of the atmospheric mixing layer where the release of aircraft emissions would affect ground-level pollutant concentrations. In general, aircraft emissions released above the mixing layer would not appreciably affect ground-level air quality. The ACAM takes this factor into consideration when estimating emissions from aircraft operations at a basing location, such as a landing and takeoff (LTO) cycle. Likewise, for proposed aircraft operations within affected airspaces, the analysis considers only operations that would occur within 3,000 feet above ground level (AGL).

The analysis also used the ACAM to evaluate air quality impacts within affected airspaces and training areas. The F-35A project alternatives at Tyndall AFB would operate in the same airspaces and training areas as existing aircraft missions, but at higher altitudes. Proposed F-35A operations within these areas would occur above 3,000 feet AGL approximately 99 percent of the time; therefore, these operations would not appreciably affect ground-level air quality. Additionally, since proposed MQ-9 operations within airspaces or training areas adjacent to Tyndall AFB and Vandenberg AFB would occur above 3,000 feet AGL, the analysis did not estimate emissions for these operations.

Flight operations (including arrivals, departures, patterns, and airspace operations) for project aircraft were derived by utilizing the same site-specific operational data as the project noise impact analysis. Both analyses (i.e., noise and air quality) factor in the number and type of operations, location-specific landing and takeoff patterns, aircraft engine power settings, and other relevant details of the affected environment, the proposed action(s), and alternatives necessary to produce a consistent determination of environmental consequences and anticipated mitigations. The air quality impacts analysis at each proposed basing location was evaluated based on the U.S. Environmental Protection Agency (USEPA) Time In Mode (TIM) Model and site-specific representative TIM cycles. Representative TIM cycles factored in weighted frequency and times in each mode of flight operations (i.e., TIMs) that occur at or below 3,000 feet AGL, based on the site-specific flight profiles developed and the projected frequency of use of each flight profile. Since the publication of the Draft EIS, it has been determined that the document was inadvertently released without relevant data from 100 percent of the flight profiles being directly used in the air quality impacts analysis as indicated above. Rather, profiles flown less than or equal to 5 percent frequency were indirectly analyzed in the Draft EIS by amalgamation with a more frequently utilized flight profile. The USAF has corrected this discrepancy in the Final EIS and updated the air quality impacts analysis calculations to incorporate 100 percent of the flight profiles as originally indicated above. Chapter 4 contains the estimated emissions from these updated calculations and the analysis of projected air quality effects. Although annual F-35A operational emissions changed due to these updates, the previous conclusions regarding their significance remain unchanged from the Draft EIS.

The air quality analysis for the F-35A project alternatives at Tyndall AFB evaluates F-35A takeoff operations based on afterburner (AB) scenarios of (1) 5 percent, (2) 50 percent, and (3) 95 percent of total take-offs in AB mode. Activity levels and resulting emissions for all other proposed operational activities would remain the same under each AB scenario.

The following section includes discussion of the methodologies and calculations used to derive the time weighted average TIMs for each flight operation, consistent with the operational data used throughout this analysis. Derivations of TIMs for proposed F-35A and MQ-9 aircraft operations for use in the project air quality analysis are included as attachments to this Appendix C.

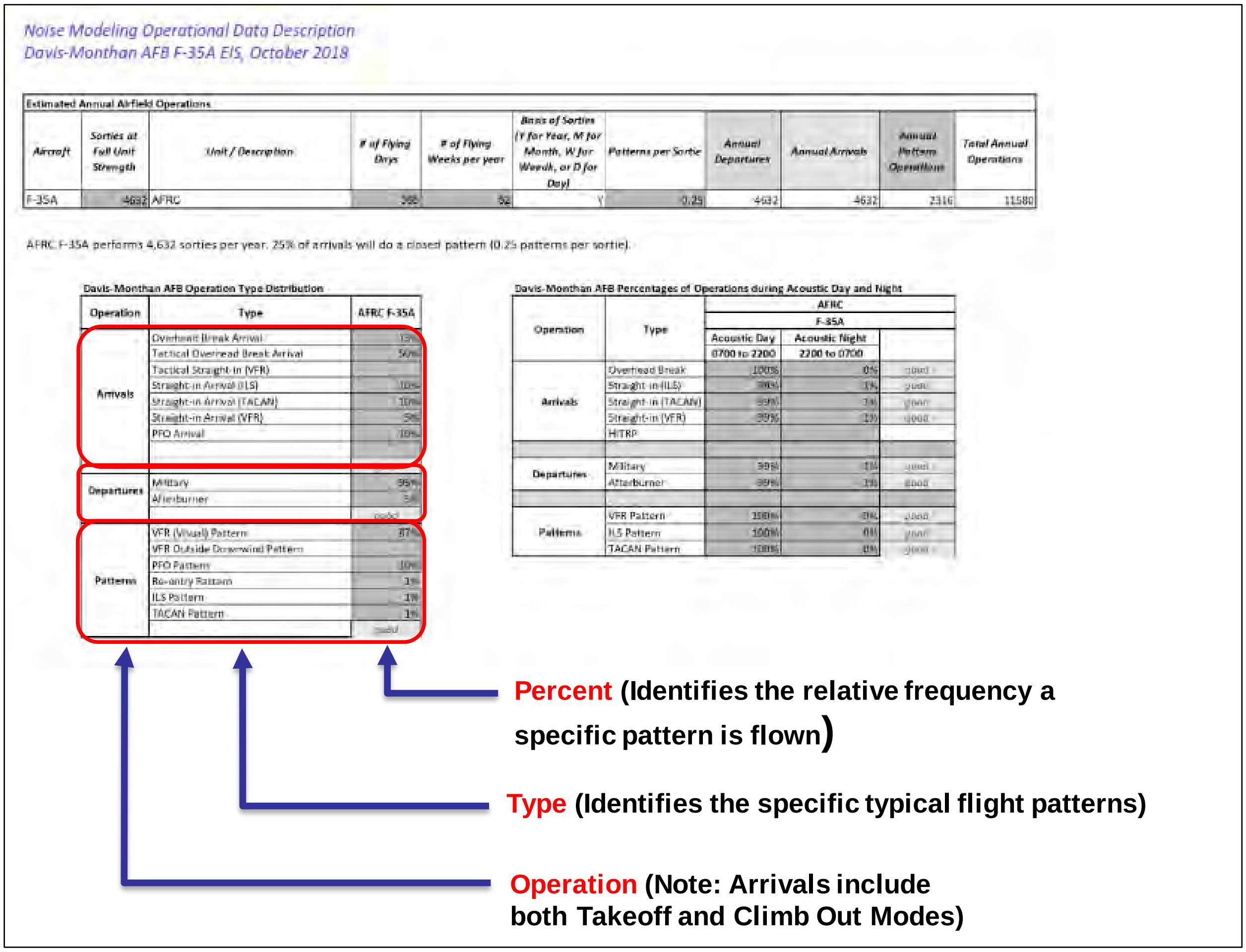
C.2.2.1 Standardized Procedures for Deriving Landing and Takeoff Cycles from Noise Profiles

Dependent on the data collection methodology, a potential to create a substantial amount of error exists. Therefore, a technical/statistical evaluation of the collection method must be performed to demonstrate the validity of the calculated values. This evaluation must include identification and propagation of errors associated with the data collection methodology, extrapolation and interpolation methodologies, and calculations.

A flight profile describes altitude values in feet. These values sometimes are presented as above airfield elevation (AFE), AGL, or mean sea level (MSL). AFE and AGL values are equal, and MSL values can be adjusted to AFE values by subtracting the elevation of the airfield from the MSL value.

Step 1, Identify Flight Operations: In collecting noise data, several flight patterns are identified that are typical to the specific aircraft under evaluation. These typical patterns are usually summarized in a table that identifies parameters required to derive representative LTO and touch-and-go (TGO) cycles.

Example Table From a Noise Modeling Operational Data Description Document



Noise Modeling Operational Data Description
Davis-Monthan AFB F-35A EIS, October 2018

Estimated Annual Airfield Operations

Aircraft	Sorties at Full Unit Strength	Unit / Description	# of Flying Days	# of Flying Weeks per year	Basis of Sorties (Y for Year, M for Month, W for Week, or D for Day)	Patterns per Sortie	Annual Departures	Annual Arrivals	Annual Pattern Operations	Total Annual Operations
F-35A	4632	AFRC	366	52	Y	0.25	4632	4632	2316	11580

AFRC F-35A performs 4,632 sorties per year. 25% of arrivals will do a closed pattern (0.25 patterns per sortie).

Davis-Monthan AFB Operation Type Distribution

Operation	Type	AFRC F-35A
Arrivals	Overhead Break Arrival	15%
	Tactical Overhead Break Arrival	50%
	Tactical Straight-in (VFR)	
	Straight-in Arrival (ILS)	10%
	Straight-in Arrival (TACAN)	10%
	Straight-in Arrival (VFR)	5%
	PFO Arrival	10%
		good
Departures	Military	95%
	Afterburner	5%
		good
Patterns	VFR (Visual) Pattern	87%
	VFR Outside Downwind Pattern	
	PFO Pattern	10%
	Re-entry Pattern	1%
	ILS Pattern	1%
	TACAN Pattern	1%
		good

Davis-Monthan AFB Percentages of Operations during Acoustic Day and Night

Operation	Type	AFRC		
		F-35A		
		Acoustic Day 0700 to 2200	Acoustic Night 2200 to 0700	
Arrivals	Overhead Break	100%	0%	good
	Straight-in (ILS)	99%	1%	good
	Straight-in (TACAN)	99%	1%	good
	Straight-in (VFR)	99%	1%	good
	HITRP			
Departures	Military	99%	1%	good
	Afterburner	99%	1%	good
Patterns	VFR Pattern	100%	0%	good
	ILS Pattern	100%	0%	good
	TACAN Pattern	100%	0%	good

Step 2, Obtain Flight Patterns and Profiles: For each of the specific operations identified in the table (i.e., arrivals, departures, and patterns), compile the noise flight patterns and profiles for each "type" of operation. For example, the departures operation has two types: military departures and afterburner departures. Note that a noise flight pattern and profile is often used for the same "type" of operation.

Step 3, Interpolation of Critical Points: This step is performed for each "type" of operation identified in Step 2. The LTO Cycle Model has critical data points that represent the start and end of specific flight modes as defined by the model. Unfortunately, noise profiles do not usually fall on these critical data points; therefore, these critical data points must be extrapolated from the available noise data. Generally, data collected for noise are missing critical data points for takeoff at 500 ft AGL, for climb out at 3,000 ft AGL, and for approach at the 3,000 ft AGL. At each of these critical data points, which are missing in a noise profile, the distance (i.e., horizontal), height (i.e., altitude), power setting, and air speed must be approximated. For example, the following approach profile is missing the 3,000 ft AGL point where the approach mode would begin.

Example Noise Approach Profile

Point	Distance (ft)	Height (ft)	Power (% ETR)	Speed (kts)
a	209,442	10000	15	300
b	73,060	1500	35	300
c	42,864	1500	15	300
d	31,898	1500	35	210
e	21,932	1500	50	200
f	17,932	1500	15	200
g	11,966	1500	60	200
h	6,000	300	40	170
i	0	50	40	160

Missing 3,000 ft critical point

Extrapolation is *estimating* a value by *assuming that existing trends will continue;* however, noise profiles have very few data points from which to suggest any specific trend. Therefore, we must default to the even less precise method of *interpolation* to approximate the needed critical points. Linear interpolation is quick and easy, but this is a very imprecise method. *Linear interpolation error can be substantial* because the error is proportional to the square of the distance between the data points.

By assuming a linear relationship between points (which has been proven to not be true), we can approximate the distance (horizontal), power setting, and air speed for a given missing critical point. In a linear relationship, any point between the two known points can be derived with the point-slope equation of a straight line.

$$y = \frac{y_2 - y_1}{x_2 - x_1} \times (x - x_2) + y_2$$

Therefore, for the previous example, the horizontal distance along flight track *(D),* power setting *(P),* and air speed *(S)* at an altitude *(A)* of 3,000 AGL can be approximated as follows.

$$D = \frac{D_b - D_a}{A_b - A_a} \times (A - A_b) + D_b$$

$$D = \frac{73060 - 209442}{1500 - 10000} \times (3000 - 1500) + 73060 = \mathbf{97{,}127\ ft}$$

$$P = \frac{P_b - P_a}{A_b - A_a} \times (A - A_b) + P_b$$

$$P = \frac{25 - 15}{1500 - 10000} \times (3000 - 1500) + 35 = \mathbf{31\%}$$

$$S = \frac{S_b - S_a}{A_b - A_a} \times (A - A_b) + S_b$$

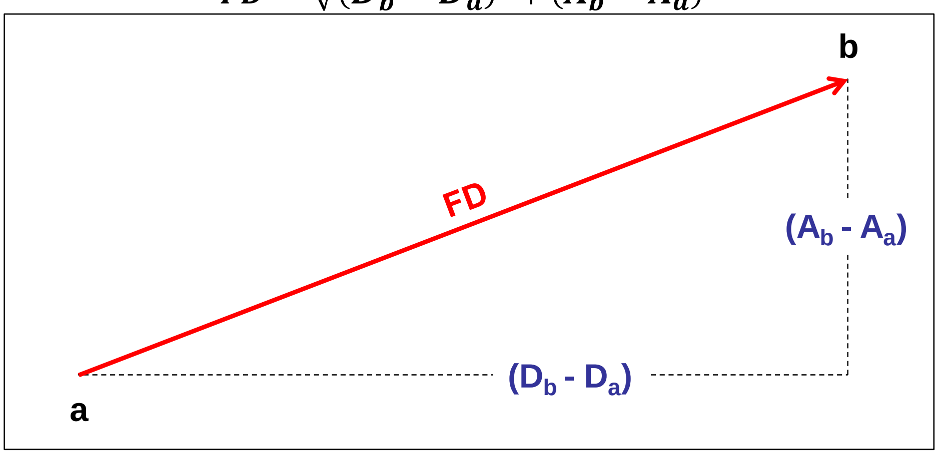
$$P = \frac{300 - 300}{1500 - 10000} \times (3000 - 1500) + 300 = \mathbf{300\ Kts}$$

Example Noise Profile with Extrapolation of Critical Point

Point	Distance (ft)	Height (ft)	Power (% ETR)		Speed (kts)
a	209,442	10000	15	Variable	300
	97,127	3000	31		300
b	73,060	1500	35	Variable	300
c	42,864	1500	15	Variable	300
d	31,898	1500	35	Variable	210
e	21,932	1500	50	Parallel	200
f	17,932	1500	15	Parallel	200
g	11,966	1500	60	Parallel	200
h	6,000	300	40	Parallel	170
i	0	50	40	Parallel	160

Step 4, Derive Flight Distances *(FD):* This step is performed for each "type" of operation identified in Step 2. Flight distance is the actual distance an aircraft travels between two points on a flight track (i.e., a segment). The variables used are the horizontal distance along flight track *(D)* and altitude *(A).* The altitude values and the distance along flight track values are presented in feet. Therefore, one can calculate approximate flight distance *(FD)* using the Pythagorean theorem.

$$\boldsymbol{FD} = \sqrt{(\boldsymbol{D_b} - \boldsymbol{D_a})^2 + (\boldsymbol{A_b} - \boldsymbol{A_a})^2}$$



Therefore, for the previous example, the flight distance *(FD)* between the critical point of 3,000 AGL and point "b" can be approximated as follows.

$$\boldsymbol{FD} = \sqrt{(\mathbf{97127} - \mathbf{73060})^2 + (\mathbf{3000} - \mathbf{1500})^2} = \mathbf{24,114}\ \boldsymbol{ft}$$

Example Noise Profile with Derived Flight Distances

Point	Distance (ft)	Height (ft)	Power (% ETR)		Speed (kts)	True Flight Distance (ft)
a	209,442	10000	15	Variable	300	
	97,127	3000	31		300	
b	73,060	1500	35	Variable	300	24114
c	42,864	1500	15	Variable	300	30196
d	31,898	1500	35	Variable	210	10966
e	21,932	1500	50	Parallel	200	9966
f	17,932	1500	15	Parallel	200	4000
g	11,966	1500	60	Parallel	200	5966
h	6,000	300	40	Parallel	170	6085
i	0	50	40	Parallel	160	6005

Step 5, Convert Air Speed: This step is performed for each "type" of operation identified in Step 2. Noise profiles provide air speed (speed) in knots (kts) at the beginning and end of a segment, so the values must be converted to feet per second (fps), and an average air speed (AS) of the segment must be calculated. The conversion from kts to fps is 1 kts = 1.6878 fps or AS (fps) = AS (kts) x 1.6878 (fps/kts); therefore, AS is calculated with the following equation.

$$\boldsymbol{AS = \frac{Speed_a + Speed_b}{2} \times 1.6687}$$

Example Noise Profile with Derived Flight Distances and Air Speed

Point	Distance (ft)	Height (ft)	Power (% ETR)		Speed (kts)	True Flight Distance (ft)	Air Speed (fps)
a	209,442	10000	15	Variable	300		
	97,127	3000	31		300		
b	73,060	1500	35	Variable	300	24114	506
c	42,864	1500	15	Variable	300	30196	506
d	31,898	1500	35	Variable	210	10966	430
e	21,932	1500	50	Parallel	200	9966	346
f	17,932	1500	15	Parallel	200	4000	338
g	11,966	1500	60	Parallel	200	5966	338
h	6,000	300	40	Parallel	170	6085	312
i	0	50	40	Parallel	160	6005	278

Step 6, Approximate Time to Travel Segment: This step is performed for each "type" of operation identified in Step 2. Once the actual distance traveled between two points on a flight track (i.e., a segment) and AS is determined, the time to travel a specific segment can be approximated. Segment time *(ST)* is approximated by dividing the segment's flight distance *(FD)* by the AS of the segment.

$$ST = \frac{FD}{AS}$$

Example Noise Profile with Derived Segment Times

Point	Distance (ft)	Height (ft)	Power (% ETR)		Speed (kts)	True Flight Distance (ft)	Air Speed (fps)	Segment Time (sec)
a	209,442	10000	15	Variable	300			
	97,127	3000	31		300			
b	73,060	1500	35	Variable	300	24114	506	47.62
c	42,864	1500	15	Variable	300	30196	506	59.64
d	31,898	1500	35	Variable	210	10966	430	25.48
e	21,932	1500	50	Parallel	200	9966	346	28.80
f	17,932	1500	15	Parallel	200	4000	338	11.85
g	11,966	1500	60	Parallel	200	5966	338	17.67
h	6,000	300	40	Parallel	170	6085	312	19.49
i	0	50	40	Parallel	160	6005	278	21.56

Step 7, TIMs by Altitude Method: This step is performed for each "type" of operation identified in Step 2. The LTO cycle provides a basis for calculating aircraft emissions. According to USEPA guidance (EPA 420-R-92-009 and EPA 450/3-78-117),

> During each mode of operation, the aircraft engines operate at a fairly standard power setting for a given aircraft category. Emissions for one complete cycle for a given aircraft can be calculated by knowing emission factors for specific aircraft engines at those power settings. Then, if the activity of all aircraft in the modeling zone can be determined for the inventory period, the total emissions can be calculated.

Step 7a, Derive TIMs for Specific Noise Flight Profiles Based on Altitudes: For each mode of flight operations represented in a noise flight profile (i.e., takeoff, climb out, and approach), add all segment times that are associated with each specific mode as defined by altitude only.

- Takeoff TIM = time to fly from 0 ft (end of runway) to 500 ft (start of climb out mode)
- Climb Out TIM = time to fly from 500 ft (after takeoff mode) to 3,000 ft (mixing height)
- Approach TIM = time to fly from 3,000 to 0 ft (landing)

Example Noise Profile with Derived Takeoff and Climb Out TIMs

Point	Distance (ft)	Height (ft)	Power (% ETR)		Speed (kts)	True Flight Distance (ft)	Air Speed (fps)	Segment Time (sec)	
a	0	0	75	75% ETR	0				
b	3,000	0	100	Variable	150	3000	253	11.85	
c	3,500	7	100	Mil	174	500	273	1.83	Take Off = 33 sec
d	10,000	250	100	Variable	300	6505	400	16.26	
	11,582	500	100		305	1601	510	3.14	
e	27,400	3000	95	Variable	350	16015	552	28.99	Climbout= 29 sec
f	53,624	10000	35	Variable	350				
g	200,000	10000	35	Variable	350				

Example Noise Profile with Derived Approach TIM

Point	Distance (ft)	Height (ft)	Power (% ETR)		Speed (kts)	True Flight Distance (ft)	Air Speed (fps)	Segment Time (sec)	
a	209,442	10000	15	Variable	300				
	97,127	3000	31		300				
b	73,060	1500	35	Variable	300	24114	506	47.62	
c	42,864	1500	15	Variable	300	30196	506	59.64	
d	31,898	1500	35	Variable	210	10966	430	25.48	
e	21,932	1500	50	Parallel	200	9966	346	28.80	Approach = 232 sec
f	17,932	1500	15	Parallel	200	4000	338	11.85	
g	11,966	1500	60	Parallel	200	5966	338	17.67	
h	6,000	300	40	Parallel	170	6085	312	19.49	
i	0	50	40	Parallel	160	6005	278	21.56	

NOTE: Noise flight profiles do not include taxi in and taxi out data; therefore, taxi TIMs cannot be derived from noise profiles.

For each operation type identified in Step 1, tabulate the TIMs by mode derived in this step.

Example of Operations Type TIMs Tabulated by Modes

Mode		Arrivals					Departures	
		Overhead Break Arrival Lead (F35AO03)	Overhead Break Arrival - Wingman (F35AO04)	Straight in IFR Arrival (F35AA01)	straight in VFR Arrival (F35AA06)	PFO Arrival (F35AS01)	Mil Departure (F35ADM01)	Afterburner Departure (F35ADA01)
Takeoff Afterburner		0	0	0	0	0	0	30.85
Takeoff Military		0	0	0	0	0	33.08	27.23
Climb Out		0	0	0	0	0	28.99	0
Approach		217	232	120	230	34	0	0
Taxi/Idle Out/In		0	0	0	0	0	0	0
Frequency Flown =		15%	50%	20%	5%	10%	95%	5%

Step 7b, Derive Overall Representative TIMs Based on Altitudes: For each operation type identified in Step 1 and tabulated in Step 7a, calculate the percent-weighted representative TIMs for each mode (i.e., operation) by multiplying the time spent in a specified mode by the percent (i.e., frequency) the aircraft is flown in that specified mode for each operation type (i.e., profile).

$$\boldsymbol{TIM_{Mode_{Type}} = time\ spent\ in\ a\ mode\ for\ a\ specific\ operation\ type}$$
$$\boldsymbol{= TIM_{Mode_{Type}} \times Percent_{Type}}$$

For example, calculate the TIMs for the approach mode (using the values in the previous table).

$$TIM_{Approach_{F35Ao03}} = 217 \times 15\% = 32.57\ sec$$

Then, the representative TIMs are derived by adding all percent-weighted representative TIMs for each mode.

$$\text{Representative } TIM_{Mode} = \sum TIM_{Mode_{Type}}$$

For example, calculate the representative TIMs for the approach mode (using the values in the following table).

$$\text{Representative TIM}_{Approach} = 32.57 + 116.06 + 23.94 + 11.51 + 3.39$$
$$= 187.47\ sec$$

Example of Weighted Times Based on Noise Profiles (seconds)

Mode	Arrivals					Departures		Noise LTO
	Overhead Break Arrival Lead (F35AO03)	Overhead Break Arrival - Wingman (F35AO04)	Straight in IFR Arrival (F35AA01)	straight in VFR Arrival (F35AA06)	PFO Arrival (F35AS01)	Mil Departure (F35ADM01)	Afterburner Departure (F35ADA01)	Cycle Contributions
Takeoff Afterburner	0.00	0.00	0.00	0.00	0.00	0.00	1.54	1.54
Takeoff Military	0.00	0.00	0.00	0.00	0.00	31.42	1.36	32.79
Climb Out	0.00	0.00	0.00	0.00	0.00	27.54	0.00	27.54
Approach	32.57	116.06	23.94	11.51	3.39	0.00	0.00	187.47
Taxi/Idle Out/In	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Derived Representative TIMs

NOTE: The derived representative TIMs do not include a TIM for Taxi/Idle Out/In. Therefore, the existing Taxi/Idle Out/In value must be used.

Step 8, TIMs by Power Setting Method: This step is performed for each "type" of operation identified in Step 2. This method is a modification of the USEPA method (EPA 420-R-92-009 and EPA 450/3-78-117) described in Step 7. In this case, the altitudes are ignored except for 3,000 ft AGL, which is used to identify the end of a Climb Out and the beginning of the approach. Instead of altitudes to define the modes for flight operations, the engine's percent thrust range is used.

- Taxi/Idle TIM = time flown within the range of 0 to 18.5 percent thrust below 3,000 ft AGL
- Approach TIM = time flown within the range of 18.5 to 50 percent thrust below 3,000 ft AGL
- Climb Out TIM = time flown within the range of 50 to 92.5 percent thrust below 3,000 ft AGL
- Military Takeoff TIM = time flown within the range of 92.5 to 105 percent thrust below 3,000 ft AGL
- AB Takeoff TIM = time flown within the range of 105 to 150 percent thrust below 3,000 ft AGL

Step 8a, Derive TIMs for Specific Noise Flight Profile Based on Power Settings: For each mode of flight operations represented in a noise flight profile (i.e., takeoff, climb out, and approach), add all segment times that are associated with each specific mode as defined by percent thrust range only.

Example Noise Profile with Derived Takeoff and Climb Out TIMs

Point	Distance (ft)	Height (ft)	Power (% ETR)		Speed (kts)	True Flight Distance (ft)	Air Speed (fps)	Segment Time (sec)	
a	0	0	75	75% ETR	0				
b	3,000	0	100	Variable	150	3000	253	11.85	← Millitary Take Off
c	3,500	7	100	Mil	174	500	273	1.83	← Millitary Take Off
d	10,000	250	100	Variable	300	6505	400	16.26	← Millitary Take Off
	11,582	500	100		305	1601	510	3.14	← Millitary Take Off
e	27,400	3000	95	Variable	350	16015	552	28.99	← Millitary Take Off
f	53,624	10000	35	Variable	350				← Climbout
g	200,000	10000	35	Variable	350				← Climbout

Note, that in this scenario, the segment times for climb out mode are blank (i.e., 0.0 value) because the climb out power range starts above 3,000 ft AGL.

For each operation type identified in Step 1, tabulate the TIMs by mode that were derived in this step.

Example of Operations Type TIMs Tabulated by Mode

Mode	% Thrust Range		Arrivals					Departures	
			Overhead Break Arrival Lead (F35AO03)	Overhead Break Arrival - Wingman (F35AO04)	Straight in IFR Arrival (F35AA01)	straight in VFR Arrival (F35AA06)	PFO Arrival (F35AS01)	Mil Departure (F35ADM01)	Afterburner Departure (F35ADA01)
	>	≤							
Takeoff Afterburner	105	150	0.0	0.0	0.0	0.0	0.0	0.0	9.7
Takeoff Military	92.5	105	0.0	0.0	0.0	0.0	0.0	62.1	48.4
Climb Out	50	92.5	17.7	17.7	0.0	0.0	0.0	0.0	0.0
Approach	18.5	50	128.0	143.0	119.7	230.3	0.0	0.0	0.0
Taxi/Idle Out/In	0	18.5	71.5	71.5	0.0	0.0	33.9	0.0	0.0
Frequency Flown =			15%	50%	20%	5%	10%	95%	5%

Step 8b, Derive Overall Representative TIMs Based on Power Settings: For each operation type identified in Step 1 and tabulated in Step 7a, calculate the percent-weighted representative TIMs for each mode (operation) by multiplying the time spent in a specified mode by the percent (frequency) the aircraft is flown in that specified mode for each operation type (profile).

$$TIM_{Mode_{Type}} = time\ spent\ in\ a\ mode\ for\ a\ specific\ operation\ type$$
$$= TIM_{Mode_{Type}} \times Percent_{Type}$$

For example, calculate the TIMs for the approach mode (using the values in the previous table).

$$TIM_{Approach_{F35Ao03}} = 128 \times 15\% = 19.2\ sec$$

The representative TIMs are then derived by adding all percent-weighted representative TIMs for each mode.

$$\text{Representative } TIM_{Mode} = \sum TIM_{Mode_{Type}}$$

For example, calculate the representative TIMs for the approach mode (using the values in the following table).

$$\text{Representative TIM}_{Approach} = 19.2 + 71.5 + 23.9 + 11.5 = 126.1\ sec$$

Representative TIM$_{\text{Mode}}$ = (Σ TIM$_{\text{segement}}$) x Percent$_{\text{Mode}}$

Example of Weighted Times Based on Noise Profiles (seconds)

Mode	% Thrust Range		Arrivals					Departures		Noise LTO
			Overhead Break Arrival Lead (F35AO03)	Overhead Break Arrival - Wingman (F35AO04)	Straight in IFR Arrival (F35AA01)	straight in VFR Arrival (F35AA06)	PFO Arrival (F35AS01)	Mil Departure (F35ADM01)	Afterburner Departure (F35ADA01)	Cycle Contributions
	>	≤								
Takeoff Afterburner	105	150	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5
Takeoff Military	92.5	105	0.0	0.0	0.0	0.0	0.0	59.0	2.4	61.4
Climb Out	50	92.5	2.7	8.8	0.0	0.0	0.0	0.0	0.0	11.5
Approach	18.5	50	19.2	71.5	23.9	11.5	0.0	0.0	0.0	126.1
Taxi/Idle Out/In	0	18.5	10.7	35.7	0.0	0.0	3.4	0.0	0.0	49.9

Derived Representative TIMs

Step 9, Derive Overall Average Representative TIMs: Given there are two viable methodologies for deriving representative LTO Cycle TIMs, the last step is to assume both methods are equally valid. Therefore, the TIMS for a representative LTO Cycle are derived by simply averaging the TIM values.

$$Representative\ TIM = \frac{(\text{TIM by Altitude Method} + \text{TIM by Power Setting Method})}{2}$$

For example, calculate the representative TIMs for the approach mode (using the previous example values).

$$Representative\ TIM_{\text{Approach}} = \frac{(187 + 126)}{2} = 157\ sec = 2.61\ min$$

C.3 ORGANIZATION OF EMISSIONS DATA IN ATTACHMENTS

Attachments C-1 through C-4 present construction and operational emissions data and estimates for each project alternative. Each of the following attachments contains an individual Air Conformity Applicability Model Report Record of Conformity Analysis (ROCA) summary report, followed by a Detail Air Conformity Applicability Model Report for base activities and airspace operations, as output by the ACAM:

- Attachment 1: Beddown of Three Squadron F 35A Operational Wing at Tyndall AFB - Air Conformity Applicability Model Reports,
- Attachment 2: Beddown of Four Squadron F 35A Operational Wing at Tyndall AFB - Air Conformity Applicability Model Reports,
- Attachment 3: Beddown of MQ-9 Operational Wing at Tyndall AFB - Air Conformity Applicability Model Reports, and
- Attachment 4: Beddown of MQ-9 Operational Wing at Vandenberg AFB - Air Conformity Applicability Model Reports.

The ACAM summary reports include general project alternative information and summaries of total calendar year emissions. The ACAM detail reports include specific information on construction and operational source activities, emission factors, and emission calculation methods. The packets for the project F-35A alternatives include evaluations of a 50% AB takeoff scenario.

Attachment 5 contains data used to estimate Tyndall AFB baseline emissions inventories.

The following attachments contain derivations of TIMs for proposed F-35A and MQ-9 operations for use in the project air quality analysis:

- Attachment 6: Derivations of F-35A Arrival TIMs from Noise Flight Profiles for the Project Air Quality Analysis - Tyndall AFB,
- Attachment 7: Derivations of F-35A Departure TIMs from Noise Flight Profiles for the Project Air Quality Analysis - Tyndall AFB,
- Attachment 8: Derivations of F-35A Closed Patterns TIMs from Noise Flight Profiles for the Project Air Quality Analysis - Tyndall AFB,
- Attachment 9: Derivations of MQ-9 TIMs from Noise Flight Profiles for the Project Air Quality Analysis - Tyndall AFB, and
- Attachment 10: Derivations of MQ-9 TIMs from Noise Flight Profiles for the Project Air Quality Analysis – Vandenberg AFB.

C.3.1 Organization of Construction Emissions Data

The ACAM detail reports for each project alternative begins with construction emissions data, followed by operational emissions data. The construction emissions data include one or more of the following sections:

- General Information,
- Construction/Demolition,
- Trenching/Excavating Phase,
- Building Construction Phase,
- Architectural Coatings Phase,
- Site Grading Phase, and
- Paving Phase.

C.3.2 Organization of Operations Emissions Data

The ACAM detail report for each project alternative contains operations emissions data for the proposed aircraft mission. These data occur in separate sections titled “Aircraft,” and they include the following information:

- General Information and Timeline Assumptions,
- Aircraft and Engines,
- Flight Operations,
- Auxiliary Power Unit (APU) (F-16C only),
- Aircraft Engine Test Cell, and
- AGE.

After the “Aircraft” sections, the ACAM detail report includes a section titled “Personnel,” which includes the operational emissions calculations for government motor vehicle and personal owned vehicle activities due to net increases in personnel for each project alternative. The detailed reports for the F-35A project alternatives end with analyses of operations with affected airspaces and training areas.

C.4 ESTIMATIONS OF TYNDALL AFB BASELINE EMISSIONS INVENTORIES

A recent emissions inventory of mobile and stationary sources for Tyndall AFB needed to define baseline conditions for the project air quality analysis does not exist. The recent tempo of Tyndall AFB is unique, as the damage done by Hurricane Michael in October 2018 resulted in an immediate and drastic reduction in operations and associated air emissions at Tyndall AFB. For example, the majority of flying operations and associated equipment and personnel, including two squadrons of F-22s and one squadron of T-38s, were relocated from Tyndall AFB to other bases. Therefore, the air quality analysis required Tyndall AFB emissions baselines based on the most recent full calendar year of operations (1) prior to the effects of Hurricane Michael (2017) and (2) post-Hurricane Michael (2019). The 2017 emissions inventory is the environmental baseline used for the NEPA air quality analysis. The following summarizes the development of these two baselines.

Tyndall AFB develops annual stationary source emission inventories for permitted sources and the analysis assumes that these data are adequate to represent on-base stationary source emissions. The most recent mobile source emissions inventory completed for Tyndall AFB is 2013 (AFCEC, 2014). While these data include emissions from F-22 and T-38 squadrons, they do not include the addition of F-22 and T-38 squadrons and resulting operations that arrived late in 2013 and into 2014 as proposed in the Environmental Assessment for the F-22 Operational Squadron and T-38 Detachment Beddown at Tyndall AFB, Florida (USAF, 2011). Therefore, the following techniques were used to estimate Tyndall AFB mobile source emissions for years 2017 and 2019.

C.4.1 2017 Mobile Source Inventory

The year 2013 mobile source emissions inventory for Tyndall AFB was developed through the Air Program Information Management System and it includes (1) aircraft operations, (2) AGE, (3) nonroad equipment, and (4) on-road vehicles. The approach to estimate Tyndall AFB mobile source emissions for 2017 included the following:

1. Aircraft Emissions – Subtracted F-22 and T-38 aircraft emissions from the 2013 inventory. Obtained F-22 and T-38 aircraft actual operations data from the Tyndall AFB 2016 AICUZ for year 2015 (the most recent year of actual data) and assumed these operations were representative of operations in 2017. Also included F-35A aircraft projected 2018 operations data from the Tyndall AFB 2016 AICUZ and assumed these operations were representative of operations in 2017, as there are no F-35A aircraft emissions in the 2013 inventory. Input these operational data into the Air Force Air Conformity Applicability Model (ACAM) to estimate their emissions. Added these emissions to the 2013 aircraft emissions inventory (minus the 2013 F-22 and T-38 emissions previously mentioned) to produce a 2017 aircraft emissions inventory.
2. AGE Emissions – The 2013 emissions inventory does not identify AGE usage by aircraft type. Therefore, to estimate 2013 AGE usages for F-22 and T-38 aircraft, multiplied total 2013 AGE emissions by the ratio of 2013 engine idling durations of F-22 plus T-38 aircraft divided by 2013 total aircraft idling durations. Subtracted these emissions from the 2013 inventory. Used F-22, T-38, and F-35A aircraft landing and take-off operations developed

for the 2017 inventory as inputs to ACAM to estimate 2017 AGE emissions for these aircraft. Added these emissions to the 2013 AGE emissions inventory (minus the 2013 F-22 and T-38 emissions previously mentioned) to produce a 2017 AGE emissions inventory.

3. Nonroad Equipment and On-road Vehicles – Factored 2013 nonroad equipment and on-road vehicle emissions by the ratio of 2017/2013 base populations (appropriated fund military and civilian staff, non-appropriated fund civilian staff, and active duty military dependents) to estimate their 2017 emissions. These populations equate to 10,715 (EIS Table 3.1-35) and 7,919 (USAF, 2009) for years 2017 and 2013.

C.4.2 2019 Mobile Source Inventory

1. Aircraft and AGE Emissions – Subtracted emissions attributed to F-22 and T-38 aircraft operations and AGE usages from the 2017 inventory to produce a 2019 aircraft emissions inventory.
2. Nonroad Equipment and On-road Vehicles – Factored 2013 nonroad equipment and on-road vehicle emissions by the ratio of 2019/2013 base populations to estimate 2019 emissions. These populations equate to 7,367 (EIS Table 3.1-35) and 7,919 for years 2017 and 2013.

C.4.3 Estimations of Tyndall AFB Baseline Emissions Inventories – Summary Tables

Attachment 5 contains the ACAM summary reports of the emissions estimations for the 2017 F-22, T-38, and F-35A aircraft operations and AGE usages. It also shows the development of nonroad equipment and on-road vehicles data and the compilation of data that created the Tyndall AFB 2017 and 2019 emissions inventories.

C.5 REFERENCES

AFCEC. (2014). *Air Program Information Management System (APIMS) 2013 Criteria Pollutant Emissions*. Report Type: Mobile Air Emissions Inventory - Tyndall AFB. Air Force Civil Engineer Center.

AFCEC. (2017). *Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide – Fundamentals, Volume 1 of 2*. Air Force Civil Engineer Center, Compliance Technical Support Branch.

Solutio Environmental, Inc. (2020). U.S. Air Force Air Conformity Applicability Model (ACAM). Developed by Solutio Environmental, Inc. Version 5.0.16b.

USAF (2009). *General Plan-Based Environmental Impact Analysis Process Environmental Assessment Volume I: Tyndall Air Force Base*. Tyndall Air Force Base, Florida: United States Air Force Air Education and Training Command 325th Fighter Wing.

USAF. (2011). F-22 Operational Squadron and T-38 Detachment Beddown at Tyndall AFB, Florida. United States Air Force.

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ATTACHMENT 1

BEDDOWN OF THREE SQUADRON F-35A OPERATIONAL WING AT TYNDALL AFB - AIR CONFORMITY APPLICABILITY MODEL REPORTS

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

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: TYNDALL AFB
State: Florida
County(s): Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2021

e. Action Description:

The following analysis evaluates the Project Alternative to locate an F-35A Operational Wing at Tyndall AFB, Florida. The action pertains to the addition of 3 squadrons of F-35As, aircraft operations, and construction activities.

f. Point of Contact:
Name: Chris Crabtree
Title: Air Quality Meteorologist
Organization: Leidos Corp.
Email: crabtreec@leidos.com
Phone Number: 805-566-6422

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

_____ applicable
__X__ not applicable

Total net direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the start of the action through achieving "steady state" (i.e., net gain/loss upon action fully implemented) emissions. The ACAM analysis used the latest and most accurate emission estimation techniques available; all algorithms, emission factors, and methodologies used are described in detail in the USAF Air Emissions Guide for Air Force Stationary Sources, the USAF Air Emissions Guide for Air Force Mobile Sources, and the USAF Air Emissions Guide for Air Force Transitory Sources.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA Prevention of Significant Deterioration Program (PSD) thresholds that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning whether the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality. Therefore, the worst-case year emissions were compared against the PSD Indicator and are summarized below.

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

Analysis Summary:

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.534	250	No
NOx	5.221	250	No
CO	5.805	250	No
SOx	0.014	250	No
PM 10	1.684	250	No
PM 2.5	0.225	250	No
Pb	0.000	250	No
NH3	0.006	250	No
CO2e	1320.9		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	2.197	250	No
NOx	8.951	250	No
CO	10.256	250	No
SOx	0.026	250	No
PM 10	17.772	250	No
PM 2.5	0.364	250	No
Pb	0.000	250	No
NH3	0.008	250	No
CO2e	2522.2		

2023

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.080	250	No
NOx	3.727	250	No
CO	4.882	250	No
SOx	0.011	250	No
PM 10	1.006	250	No
PM 2.5	0.144	250	No
Pb	0.000	250	No
NH3	0.004	250	No
CO2e	1079.9		

2024

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	250	No
NOx	0.000	250	No
CO	0.000	250	No
SOx	0.000	250	No
PM 10	0.000	250	No
PM 2.5	0.000	250	No

Pb	0.000	250	No
NH3	0.000	250	No
CO2e	0.0		

2025

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	250	No
NOx	0.000	250	No
CO	0.000	250	No
SOx	0.000	250	No
PM 10	0.000	250	No
PM 2.5	0.000	250	No
Pb	0.000	250	No
NH3	0.000	250	No
CO2e	0.0		

2026

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	250	No
NOx	0.000	250	No
CO	0.000	250	No
SOx	0.000	250	No
PM 10	0.000	250	No
PM 2.5	0.000	250	No
Pb	0.000	250	No
NH3	0.000	250	No
CO2e	0.0		

2027

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	27.516	250	No
NOx	276.802	250	Yes
CO	261.145	250	Yes
SOx	24.625	250	No
PM 10	36.839	250	No
PM 2.5	33.571	250	No
Pb	0.000	250	No
NH3	0.265	250	No
CO2e	68935.1		

2028 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	27.516	250	No
NOx	276.802	250	Yes
CO	261.145	250	Yes

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

SOx	24.625	250	No
PM 10	36.839	250	No
PM 2.5	33.571	250	No
Pb	0.000	250	No
NH3	0.265	250	No
CO2e	68935.1		

The steady state estimated annual net emissions associated with this action exceed the Air Quality Indicators, indicating a potential for a significant impact to air quality. Therefore, the ACAM analysis is inconclusive and further air quality impact assessment is needed.

Chris Crabtree, Air Quality Meteorologist DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: TYNDALL AFB
State: Florida
County(s): Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2021

- Action Purpose and Need:
To ensure implementation of ACC objectives to efficiently and effectively maintain combat capability and mission readiness.

- Action Description:
The following analysis evaluates the Project Alternative to locate an F-35A Operational Wing at Tyndall AFB, Florida. The action pertains to the addition of 3 squadrons of F-35As, aircraft operations, and construction activities.

- Point of Contact

Name: Chris Crabtree
Title: Air Quality Meteorologist
Organization: Leidos Corp.
Email: crabtreec@leidos.com
Phone Number: 805-566-6422

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Construct Squad Ops/AMU Hangar #1
3.	Construction / Demolition	Construct Squad Ops/AMU Hangar #2
4.	Construction / Demolition	Construct Squad Ops/AMU Hangar #3
5.	Construction / Demolition	Construct Maintenance Squadron Complex
6.	Construction / Demolition	Construct F-35 AGE Facility
7.	Construction / Demolition	Construct F-35A Munitions Storage Facilities
8.	Construction / Demolition	Construct Weapons Load Training Hangar
9.	Construction / Demolition	Construct F-35A Flight Simulator Facility
10.	Construction / Demolition	Construct Aircraft MX Fuel Cell Hangar
11.	Construction / Demolition	Construct Aircraft Wash Rack
12.	Construction / Demolition	Renovate F-35A Parking Apron
13.	Aircraft	TAFB Base Operations for the 3-Squadron F-35A Alternative - LTO 50% AB Scenario
14.	Aircraft	TAFB Base Operations for the 3-Squadron F-35A Alternative - Closed Patterns
15.	Personnel	Commuting Activities for 3-Squadron F-35A Alternative at TAFB
16.	Heating	Space and Water Heating Requirements
17.	Degreaser	Solvent Usage
18.	Aircraft	TAFB F-35A Airspace Operations - 3 Squadron Alternative

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Squad Ops/AMU Hangar #1

- Activity Description:
Square Feet

Squad Ops/AMU Hangar #1 Total = 83,151
Maintenance Hangar 35,349
Squadron Operations 16,555
Aircraft Maintenance Unit 27,749
Covered Outdoor Storage 3,498

- Activity Start Date
Start Month: 1
Start Month: 2021

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2021

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.647373
SO_x	0.005790
NO_x	2.283309
CO	2.496001
PM 10	0.960767

Pollutant	Total Emissions (TONs)
PM 2.5	0.099674
Pb	0.000000
NH_3	0.002537
CO_2e	565.3

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

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

- Phase Duration
Number of Month: 1
Number of Days: 0

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

2.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft^2): 85000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 900

- Site Grading Default Settings

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

- Construction Exhaust (default)

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

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

2.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791

LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

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

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

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

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

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

2.2 Trenching/Excavating Phase

2.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 1
Number of Days: 0

2.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 1500
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 100

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

- Construction Exhaust (default)

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

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

2.2.3 Trenching / Excavating Phase Emission Factor(s)

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

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

2.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

2.3 Building Construction Phase

2.3.1 Building Construction Phase Timeline Assumptions

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

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

2.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 83151
Height of Building (ft): 25
Number of Units: N/A

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips

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

- Vendor Trips Vehicle Mixture (%)

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

2.3.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0845	0.0013	0.6033	0.3865	0.0228	0.0228	0.0076	128.82
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0293	0.0006	0.1458	0.2148	0.0056	0.0056	0.0026	54.462
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0362	0.0006	0.2977	0.2707	0.0130	0.0130	0.0032	61.074
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0280	0.0003	0.1634	0.1787	0.0088	0.0088	0.0025	25.665

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851

LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

2.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

2.4 Architectural Coatings Phase

2.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 1
Number of Days: 0

2.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 24000
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

2.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379

LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

2.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

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

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 0
Number of Days: 3

2.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 15000

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- 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

2.5.3 Paving Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

2.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

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

3. Construction / Demolition

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

3.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Squad Ops/AMU Hangar #2

- Activity Description:
SF

Squad Ops/AMU Hangar #2 Total = 78,006
Maintenance Hangar 35,349
Squadron Operations 16,555
Aircraft Maintenance Unit 22,604
Covered Outdoor Storage 3,498

- Activity Start Date
Start Month: 1
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.601572
SO_x	0.005747
NO_x	2.101451
CO	2.473472
PM 10	0.895041

Pollutant	Total Emissions (TONs)
PM 2.5	0.086706
Pb	0.000000
NH_3	0.002467
CO_2e	560.6

3.1 Site Grading Phase

3.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

3.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 80000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 800

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Site Grading Default Settings

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

- Construction Exhaust (default)

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

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

3.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

3.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (20 * ACRE * WD) / 2000$

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

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3.2 Trenching/Excavating Phase

3.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

3.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 1200
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 100

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

- Construction Exhaust (default)

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

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

3.2.3 Trenching / Excavating Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e

Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

3.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

V_{POL}: Vehicle Emissions (TONs)

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

3.3 Building Construction Phase

3.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2022

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

3.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 78000
Height of Building (ft): 25
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

3.3.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0797	0.0013	0.5505	0.3821	0.0203	0.0203	0.0071	128.81
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0274	0.0006	0.1265	0.2146	0.0043	0.0043	0.0024	54.457
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0340	0.0006	0.2783	0.2694	0.0116	0.0116	0.0030	61.069
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0260	0.0003	0.1557	0.1772	0.0077	0.0077	0.0023	25.661

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

3.3.4 Building Construction Phase Formula(s)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

3.4 Architectural Coatings Phase

3.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

3.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 22000
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

3.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

3.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

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

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

3.5 Paving Phase

3.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 3

3.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 10000

- 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

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

3.5.3 Paving Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

3.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

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

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

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

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

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

- Off-Gassing Emissions per Phase
VOC_P = (2.62 * PA) / 43560

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

4. Construction / Demolition

4.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity Title: Construct Squad Ops/AMU Hangar #3

- Activity Description:
SF

Squad Ops/AMU Hangar #3 Total = 78,006
Maintenance Hangar 35,349
Squadron Operations 16,555
Aircraft Maintenance Unit 22,604
Covered Outdoor Storage 3,498

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

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.583561
SO_x	0.005747
NO_x	1.955802
CO	2.463205
PM 10	0.884468

Pollutant	Total Emissions (TONs)
PM 2.5	0.076134
Pb	0.000000
NH_3	0.002467
CO_2e	560.5

4.1 Site Grading Phase

4.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

4.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 80000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 800

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

- Construction Exhaust (default)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

4.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

4.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

4.2 Trenching/Excavating Phase

4.2.1 Trenching / Excavating Phase Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

4.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 1200
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 100

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

- Construction Exhaust (default)

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

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

4.2.3 Trenching / Excavating Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

4.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase

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

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

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

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

4.3 Building Construction Phase

4.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2023

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

4.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 78000
Height of Building (ft): 25
Number of Units: N/A

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

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

- Vendor Trips Vehicle Mixture (%)

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

4.3.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0754	0.0013	0.5027	0.3786	0.0181	0.0181	0.0068	128.79
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0258	0.0006	0.1108	0.2145	0.0034	0.0034	0.0023	54.454
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0320	0.0006	0.2612	0.2683	0.0103	0.0103	0.0028	61.065
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0242	0.0003	0.1487	0.1761	0.0067	0.0067	0.0021	25.657

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

4.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.4 Architectural Coatings Phase

4.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

4.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 22000
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

4.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

4.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
VMT_{WT} = (1 * WT * PA) / 800

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

PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

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

- Off-Gassing Emissions per Phase
VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

4.5 Paving Phase

4.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 3

4.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 10000

- 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
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

4.5.3 Paving Phase Emission Factor(s)

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

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

4.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

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

5. Construction / Demolition

5.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Maintenance Squadron Complex

- Activity Description:
SF

Maintenance Squadron Complex Total = 105,605

Maintenance Backshops 34,003
Maintenance HQ 5,005
AGE Maintenance Shop 11,496
AGE Covered Storage 18,105
Aircraft Parts/Spares Office 36,996

- Activity Start Date
Start Month: 1
Start Month: 2021

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2021

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.645490
SO_x	0.005374
NO_x	2.136997
CO	2.335644
PM 10	0.640173

Pollutant	Total Emissions (TONs)
PM 2.5	0.093525
Pb	0.000000
NH_3	0.002503
CO_2e	525.3

5.1 Site Grading Phase

5.1.1 Site Grading Phase Timeline Assumptions

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

- Phase Duration
Number of Month: 0
Number of Days: 15

5.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 110000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 1100

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

- Construction Exhaust (default)

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

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

5.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

5.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

5.2 Trenching/Excavating Phase

5.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2021

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- Phase Duration
Number of Month: 0
Number of Days: 10

5.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 1500
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 150

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

- Construction Exhaust (default)

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

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

5.2.3 Trenching / Excavating Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

5.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase

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

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)

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

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

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

5.3 Building Construction Phase

5.3.1 Building Construction Phase Timeline Assumptions

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

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

5.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 105605
Height of Building (ft): 20
Number of Units: N/A

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips

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

- Vendor Trips Vehicle Mixture (%)

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

5.3.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0845	0.0013	0.6033	0.3865	0.0228	0.0228	0.0076	128.82
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0293	0.0006	0.1458	0.2148	0.0056	0.0056	0.0026	54.462
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0362	0.0006	0.2977	0.2707	0.0130	0.0130	0.0032	61.074
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0280	0.0003	0.1634	0.1787	0.0088	0.0088	0.0025	25.665

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

5.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

5.4 Architectural Coatings Phase

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5.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 2
Number of Days: 0

5.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 26000
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

5.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

5.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

V_{POL}: Vehicle Emissions (TONs)

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

- Off-Gassing Emissions per Phase

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

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

5.5 Paving Phase

5.5.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 9
Start Quarter: 1
Start Year: 2021

- Phase Duration

Number of Month: 0
Number of Days: 4

5.5.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft^2): 10000

- 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
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)

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- Worker Trips Vehicle Mixture (%)

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

5.5.3 Paving Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

5.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

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

6. Construction / Demolition

6.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct F-35 AGE Facility

- Activity Description:
F-35 AGE Facility 20,699 sf.

- Activity Start Date
Start Month: 2
Start Month: 2021

- Activity End Date
Indefinite: False
End Month: 12

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End Month: 2021

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.241391
SO_x	0.002372
NO_x	0.801143
CO	0.973200
PM 10	0.082597

Pollutant	Total Emissions (TONs)
PM 2.5	0.032288
Pb	0.000000
NH_3	0.000815
CO_2e	230.4

6.1 Site Grading Phase

6.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 2
Start Quarter: 1
Start Year: 2021

- Phase Duration

Number of Month: 0
Number of Days: 5

6.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft^2): 21000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 200

- Site Grading Default Settings

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

- Construction Exhaust (default)

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

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

6.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

6.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

6.2 Trenching/Excavating Phase

6.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 0
Number of Days: 10

6.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 600
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 60

- Trenching Default Settings
Default Settings Used: Yes

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

- Construction Exhaust (default)

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

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

6.2.3 Trenching / Excavating Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

6.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

6.3 Building Construction Phase

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6.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 10
Number of Days: 0

6.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 20699
Height of Building (ft): 20
Number of Units: N/A

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

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

- Vendor Trips Vehicle Mixture (%)

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

6.3.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0845	0.0013	0.6033	0.3865	0.0228	0.0228	0.0076	128.82
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0293	0.0006	0.1458	0.2148	0.0056	0.0056	0.0026	54.462
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

6.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase

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

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

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

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

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

6.4 Architectural Coatings Phase

6.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 1
Number of Days: 0

6.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 9000
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

6.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

6.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

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

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

6.5 Paving Phase

6.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1

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Start Year: 2021

- Phase Duration
Number of Month: 0
Number of Days: 2

6.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 2000

- 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
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

6.5.3 Paving Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

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

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	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

6.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

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

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

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

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

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

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

7. Construction / Demolition

7.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct F-35A Munitions Storage Facilities

- Activity Description:
SF

F-35 Munitions Storage Total = 15,156
Conventional Munitions Maintenance Shop Facility 1,496
Conventional Munitions Maintenance Shop Pad 2,605
Munitions Storage Igloo (4) 4,435
Munitions Admin Facility 5,124
Air Support Equipment Shop/Storage Facility 1,496

- Activity Start Date
Start Month: 4
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 11
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.186414
SO_x	0.001910
NO_x	0.586934
CO	0.789482
PM 10	0.053483

Pollutant	Total Emissions (TONs)
PM 2.5	0.022378
Pb	0.000000
NH_3	0.000608
CO_2e	185.1

7.1 Site Grading Phase

7.1.1 Site Grading Phase Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 4

7.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 16000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 160

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

- Construction Exhaust (default)

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

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

7.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e

Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

7.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

7.2 Trenching/Excavating Phase

7.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 10

7.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 500
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 50

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

- Construction Exhaust (default)

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

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC

POVs	0	0	0	0	0	100.00	0

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

7.2.3 Trenching / Excavating Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

7.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

7.3 Building Construction Phase

7.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 8
Number of Days: 0

7.3.2 Building Construction Phase Assumptions

- General Building Construction Information

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Building Category: Office or Industrial
Area of Building (ft^2): 15156
Height of Building (ft): 15
Number of Units: N/A

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

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

- Vendor Trips Vehicle Mixture (%)

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

7.3.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0797	0.0013	0.5505	0.3821	0.0203	0.0203	0.0071	128.81
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0274	0.0006	0.1265	0.2146	0.0043	0.0043	0.0024	54.457
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705

HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

7.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

- Vender Trips Emissions per Phase

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

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

7.4 Architectural Coatings Phase

7.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

7.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 7000
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

7.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851

LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

7.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

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

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

7.5 Paving Phase

7.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 2

7.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 1500

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	1	8
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

7.5.3 Paving Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

7.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

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

8. Construction / Demolition

8.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Weapons Load Training Hangar

- Activity Description:
The Weapons Load Training Hangar is a new 26,522 square foot facility.

- Activity Start Date
Start Month: 3
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.425366
SO_x	0.004040
NO_x	1.395881
CO	1.856141
PM 10	0.107421

Pollutant	Total Emissions (TONs)
PM 2.5	0.054259
Pb	0.000000
NH_3	0.001334
CO_2e	389.3

8.1 Site Grading Phase

8.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 4

8.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 27000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 300

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

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- Construction Exhaust (default)

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

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

8.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

8.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

8.2 Trenching/Excavating Phase

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

8.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 15

8.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 700
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 70

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

- Construction Exhaust (default)

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

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

8.2.3 Trenching / Excavating Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								

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	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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

8.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

8.3 Building Construction Phase

8.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 10
Number of Days: 0

8.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Commercial or Retail
Area of Building (ft^2): 26522
Height of Building (ft): 25
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)

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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

- 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

8.3.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0754	0.0013	0.5027	0.3786	0.0181	0.0181	0.0068	128.79
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0258	0.0006	0.1108	0.2145	0.0034	0.0034	0.0023	54.454
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0320	0.0006	0.2612	0.2683	0.0103	0.0103	0.0028	61.065
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0242	0.0003	0.1487	0.1761	0.0067	0.0067	0.0021	25.657

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

8.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)

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

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (0.32 / 1000) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.32 / 1000): Conversion Factor ft^3 to trips (0.32 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

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

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

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

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.05 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.05 / 1000): Conversion Factor ft^3 to trips (0.05 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)

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

8.4 Architectural Coatings Phase

8.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

8.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 16000
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

8.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

8.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

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

1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

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

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

8.5 Paving Phase

8.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 2

8.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 2500

- 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
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
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

8.5.3 Paving Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

8.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

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

PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

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

9. Construction / Demolition

9.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct F-35A Flight Simulator Facility

- Activity Description:
F-35A Flight Simulator Facility footprint of 32,496 square feet.

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity Start Date
Start Month: 1
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.410674
SO_x	0.004681
NO_x	1.758203
CO	2.162002
PM 10	0.149975

Pollutant	Total Emissions (TONs)
PM 2.5	0.072931
Pb	0.000000
NH_3	0.001630
CO_2e	451.9

9.1 Site Grading Phase

9.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 5

9.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 33000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 300

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

- Construction Exhaust (default)

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

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

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

- Worker Trips Vehicle Mixture (%)

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

9.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

9.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (20 * ACRE * WD) / 2000$

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

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

9.2 Trenching/Excavating Phase

9.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 3

9.2.2 Trenching / Excavating Phase Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 800
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 80

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

- Construction Exhaust (default)

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

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

9.2.3 Trenching / Excavating Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628

HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

9.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

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

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

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

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

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

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

V_{POL}: Vehicle Emissions (TONs)

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

9.3 Building Construction Phase

9.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2022

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

9.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 32496
Height of Building (ft): 15
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

9.3.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0797	0.0013	0.5505	0.3821	0.0203	0.0203	0.0071	128.81
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0274	0.0006	0.1265	0.2146	0.0043	0.0043	0.0024	54.457
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0340	0.0006	0.2783	0.2694	0.0116	0.0116	0.0030	61.069
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0260	0.0003	0.1557	0.1772	0.0077	0.0077	0.0023	25.661

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

9.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)

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

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

9.4 Architectural Coatings Phase

9.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2022

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Phase Duration
Number of Month: 1
Number of Days: 0

9.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 10000
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

9.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

9.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
VMT_{WT} = (1 * WT * PA) / 800

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

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

- Off-Gassing Emissions per Phase
VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

9.5 Paving Phase

9.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 2

9.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 3000

- 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
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

9.5.3 Paving Phase Emission Factor(s)

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

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

9.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

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

10. Construction / Demolition

10.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Aircraft MX Fuel Cell Hangar

- Activity Description:
Aircraft MX Fuel Cell Hangar of 29,525 sf.

- Activity Start Date
Start Month: 1
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.500659
SO_x	0.004866
NO_x	1.815781

Pollutant	Total Emissions (TONs)
PM 2.5	0.075232
Pb	0.000000
NH_3	0.001770

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CO	2.216533
PM 10	0.176162

CO_2e	470.6

10.1 Site Grading Phase

10.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 10

10.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 30000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 300

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

- Construction Exhaust (default)

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

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

10.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

10.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

10.2 Trenching/Excavating Phase

10.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 10

10.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 700
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 70

- 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

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- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

10.2.3 Trenching / Excavating Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

10.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

10.3 Building Construction Phase

10.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2022

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

10.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 29525
Height of Building (ft): 25
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

10.3.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0797	0.0013	0.5505	0.3821	0.0203	0.0203	0.0071	128.81
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**

Emission Factors	0.0274	0.0006	0.1265	0.2146	0.0043	0.0043	0.0024	54.457
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0340	0.0006	0.2783	0.2694	0.0116	0.0116	0.0030	61.069
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0260	0.0003	0.1557	0.1772	0.0077	0.0077	0.0023	25.661

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

10.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase

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

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

WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

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

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

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

10.4 Architectural Coatings Phase

10.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

10.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 17000
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

10.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

10.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

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

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

10.5 Paving Phase

10.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 10

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Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 2

10.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 3000

- 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
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

10.5.3 Paving Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

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- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

10.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase

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

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

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

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)

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

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

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

11. Construction / Demolition

11.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Aircraft Wash Rack

- Activity Description:
SF

Aircraft Wash Rack Total = 15,758
Aircraft Wash Rack, Open-Air 15,522
Wash Rack Equipment/Tool Shop 237

- Activity Start Date
Start Month: 4
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 9
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.070711
SO_x	0.001343
NO_x	0.375203
CO	0.562187
PM 10	0.014206

Pollutant	Total Emissions (TONs)
PM 2.5	0.013462
Pb	0.000000
NH_3	0.000444
CO_2e	130.1

11.1 Trenching/Excavating Phase

11.1.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

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Start Month: 6
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 3

11.1.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 500
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 50

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

- Construction Exhaust (default)

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

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

11.1.3 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	000.578	000.008	000.613	005.086	000.009	000.008		000.034	00391.932
LDGT	000.823	000.010	001.060	008.566	000.010	000.009		000.034	00522.586
HDGV	001.597	000.016	002.785	026.982	000.023	000.020		000.046	00814.010
LDDV	000.216	000.004	000.307	004.001	000.006	000.006		000.008	00402.372
LDDT	000.537	000.006	000.822	008.176	000.008	000.008		000.008	00626.077
HDDV	000.762	000.015	007.639	002.810	000.395	000.363		000.028	01633.017
MC	003.190	000.008	000.648	014.785	000.027	000.024		000.048	00392.026

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11.1.4 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)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

11.2 Building Construction Phase

11.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 6
Number of Days: 0

11.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 15758
Height of Building (ft): 10
Number of Units: N/A

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

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

- Vendor Trips Vehicle Mixture (%)

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

11.2.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0754	0.0013	0.5027	0.3786	0.0181	0.0181	0.0068	128.79
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0258	0.0006	0.1108	0.2145	0.0034	0.0034	0.0023	54.454
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

11.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase

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

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

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

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

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

11.3 Paving Phase

11.3.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 4

11.3.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 5000

- Paving Default Settings
Default Settings Used: Yes

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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
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

11.3.3 Paving 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	000.578	000.008	000.613	005.086	000.009	000.008		000.034	00391.932
LDGT	000.823	000.010	001.060	008.566	000.010	000.009		000.034	00522.586
HDGV	001.597	000.016	002.785	026.982	000.023	000.020		000.046	00814.010
LDDV	000.216	000.004	000.307	004.001	000.006	000.006		000.008	00402.372
LDDT	000.537	000.006	000.822	008.176	000.008	000.008		000.008	00626.077
HDDV	000.762	000.015	007.639	002.810	000.395	000.363		000.028	01633.017
MC	003.190	000.008	000.648	014.785	000.027	000.024		000.048	00392.026

11.3.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)

0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

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

12. Construction / Demolition

12.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Renovate F-35A Parking Apron

- Activity Description:
Repair existing concrete surface and infill with new concrete to create a Parking Apron of 659,020 sf for the F-35As.

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity Start Date
Start Month: 6
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 11
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.497988
SO_x	0.008539
NO_x	2.688267
CO	2.614573
PM 10	16.496891

Pollutant	Total Emissions (TONs)
PM 2.5	0.106845
Pb	0.000000
NH_3	0.001439
CO_2e	854.0

12.1 Site Grading Phase

12.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 3
Number of Days: 0

12.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 494265
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 6102

- Site Grading Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Crawler Tractors Composite	2	8
Graders Composite	1	4
Off-Highway Trucks Composite	3	8
Other Construction Equipment Composite	1	8
Scrapers Composite	1	8
Sweepers/Scrubbers Composite	1	4
Tractors/Loaders/Backhoes Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20

Average Hauling Truck Round Trip Commute (mile): 20

- 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

- Worker Trips Vehicle Mixture (%)

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

12.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Crawler Tractors Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0931	0.0012	0.5745	0.5163	0.0310	0.0310	0.0084	114.22
Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Off-Highway Trucks Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1303	0.0026	0.6573	0.5446	0.0215	0.0215	0.0117	260.37
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Scrapers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1723	0.0026	1.1176	0.7579	0.0447	0.0447	0.0155	262.87
Sweepers/Scrubbers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0497	0.0009	0.2947	0.4867	0.0123	0.0123	0.0044	78.655
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

12.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

12.2 Trenching/Excavating Phase

12.2.1 Trenching / Excavating Phase Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

12.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 164755
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 3051

- Trenching Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Trenchers Composite	1	4

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 20

- 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

- Worker Trips Vehicle Mixture (%)

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

12.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Crawler Tractors Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0931	0.0012	0.5745	0.5163	0.0310	0.0310	0.0084	114.22
Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Off-Highway Trucks Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1303	0.0026	0.6573	0.5446	0.0215	0.0215	0.0117	260.37

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Scrapers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1723	0.0026	1.1176	0.7579	0.0447	0.0447	0.0155	262.87
Sweepers/Scrubbers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0497	0.0009	0.2947	0.4867	0.0123	0.0123	0.0044	78.655
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

12.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

12.3 Paving Phase

12.3.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 3
Number of Days: 0

12.3.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 659020

- Paving Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Off-Highway Trucks Composite	4	6
Other General Industrial Equipmen Composite	1	8
Pavers Composite	1	8
Pumps Composite	1	6

Surfacing Equipment Composite	2	6
Sweepers/Scrubbers Composite	1	4

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20

- 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

- Worker Trips Vehicle Mixture (%)

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

12.3.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Crawler Tractors Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0931	0.0012	0.5745	0.5163	0.0310	0.0310	0.0084	114.22
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Off-Highway Trucks Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1303	0.0026	0.6573	0.5446	0.0215	0.0215	0.0117	260.37
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1723	0.0026	1.1176	0.7579	0.0447	0.0447	0.0155	262.87
Sweepers/Scrubbers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0497	0.0009	0.2947	0.4867	0.0123	0.0123	0.0044	78.655
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

12.3.4 Paving Phase Formula(s)

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

13. Aircraft

13.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: TAFB Base Operations for the 3-Squadron F-35A Alternative - LTO 50% AB Scenario

- Activity Description:
Annual LTOs for 3 full Squadrons of F-35As - 50% AB Scenario. LTO TIMs derived from noise analyses by AFCEC/CZTQ, except idle TIMs = ACAM defaults. TIMS for trim tests = ACAM defaults, as noise analyses substantially overestimated this activity.

- Activity Start Date
Start Month: 1
Start Year: 2027

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	22.163434
SO_x	20.380034
NO_x	200.826948
CO	208.386167
PM 10	31.652623

Pollutant	Emissions Per Year (TONs)
PM 2.5	28.903384
Pb	0.000000
NH_3	0.000000
CO_2e	50444.0

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

Pollutant	Emissions Per Year (TONs)
VOC	0.381277
SO_x	15.583958
NO_x	132.295268
CO	168.934814
PM 10	24.683178

Pollutant	Emissions Per Year (TONs)
PM 2.5	22.177977
Pb	0.000000
NH_3	0.000000
CO_2e	45908.9

- Activity Emissions [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.002539
SO_x	0.408761
NO_x	5.860028
CO	1.235020
PM 10	0.508902

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.458071
Pb	0.000000
NH_3	0.000000
CO_2e	1235.5

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

Pollutant	Emissions Per Year (TONs)

Pollutant	Emissions Per Year (TONs)

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VOC	21.779618		PM 2.5	6.267335
SO_x	4.387315		Pb	0.000000
NO_x	62.671651		NH_3	0.000000
CO	38.216334		CO_2e	3299.7
PM 10	6.460543			

13.2 Aircraft & Engines

13.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-35A
Engine Model: F135-PW-100
Primary Function: Combat
Aircraft has After burn: Yes
Number of Engines: 1

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

13.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)
Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

13.3 Flight Operations

13.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 72
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 12300
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 0
Number of Annual Trim Test(s) per Aircraft: 12

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
Taxi/Idle Out [Idle] (mins): 18.81
Takeoff [Military] (mins): 0.44
Takeoff [After Burn] (mins): 0.19
Climb Out [Intermediate] (mins): 0.19
Approach [Approach] (mins): 2.18
Taxi/Idle In [Idle] (mins): 11.3

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

- Trim Test
Idle (mins): 12
Approach (mins): 27

Intermediate (mins): 9
Military (mins): 9
AfterBurn (mins): 3

13.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year
AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000

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

- Aircraft Emissions for LTOs per Year
$AE_{LTO} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

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

- Aircraft Emissions per Mode for TGOs per Year
AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000

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

- Aircraft Emissions for TGOs per Year
$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

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

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)

60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

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

13.4 Auxiliary Power Unit (APU)

13.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

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

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

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e

13.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year
$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

13.5 Aircraft Engine Test Cell

13.5.1 Aircraft Engine Test Cell Assumptions

- Engine Test Cell
Total Number of Aircraft Engines Tested Annually: 72

- Default Settings Used: Yes

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- Annual Run-ups / Test Durations

Annual Run-ups (Per Aircraft Engine): 1 (default)
Idle Duration (mins): 12 (default)
Approach Duration (mins): 27 (default)
Intermediate Duration (mins): 9 (default)
Military Duration (mins): 9 (default)
After Burner Duration (mins): 3 (default)

13.5.2 Aircraft Engine Test Cell Emission Factor(s)

- See Aircraft & Engines Emission Factor(s)

13.5.3 Aircraft Engine Test Cell Formula(s)

- Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

$TestCellPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * ARU / 2000$

$TestCellPS_{POL}$: Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Total Number of Engines (For All Aircraft)
ARU: Annual Run-ups (Per Aircraft Engine)
2000: Conversion Factor pounds to TONs

- Aircraft Engine Test Cell Emissions per Year

$TestCell = TestCellPS_{IDLE} + TestCellPS_{APPROACH} + TestCellPS_{INTERMEDIATE} + TestCellPS_{MILITARY} + TestCellPS_{AFTERBURN}$

TestCell: Aircraft Engine Test Cell Emissions (TONs)
$TestCellPS_{IDLE}$: Aircraft Engine Test Cell Emissions for Idle Power Setting (TONs)
$TestCellPS_{APPROACH}$: Aircraft Engine Test Cell Emissions for Approach Power Setting (TONs)
$TestCellPS_{INTERMEDIATE}$: Aircraft Engine Test Cell Emissions for Intermediate Power Setting (TONs)
$TestCellPS_{MILITARY}$: Aircraft Engine Test Cell Emissions for Military Power Setting (TONs)
$TestCellPS_{AFTERBURN}$: Aircraft Engine Test Cell Emissions for After Burner Power Setting (TONs)

13.6 Aerospace Ground Equipment (AGE)

13.6.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 12300

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.33	No	Air Compressor	MC-1A - 18.4hp
1	1	No	Bomb Lift	MJ-1B
1	0.33	No	Generator Set	A/M32A-86D
1	0.5	No	Heater	H1

1	0.5	No	Hydraulic Test Stand	MJ-2/TTU-228 - 130hp
1	8	No	Light Cart	NF-2
1	0.33	No	Start Cart	A/M32A-60A

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

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

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068	24.8
MJ-1B	0.0	3.040	0.219	4.780	3.040	0.800	0.776	141.2
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089	147.0
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006	8.9
MJ-2/TTU-228 - 130hp	7.4	0.195	0.053	3.396	0.794	0.089	0.086	168.8
NF-2	0.0	0.010	0.043	0.110	0.080	0.010	0.010	22.1
A/M32A-60A	0.0	0.270	0.306	1.820	5.480	0.211	0.205	221.1

13.6.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

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

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

14. Aircraft

14.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: TAFB Base Operations for the 3-Squadron F-35A Alternative - Closed Patterns

- Activity Description:
F-35A Closed Patterns for 3 full Squadrons of F-35As. - TIMs derived from noise analyses by AFCEC/CZTQ.

- Activity Start Date
Start Month: 1
Start Year: 2027

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

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Pollutant	Emissions Per Year (TONs)
VOC	0.010957
SO_x	2.409643
NO_x	34.388978
CO	1.829416
PM 10	3.057388

Pollutant	Emissions Per Year (TONs)
PM 2.5	2.751674
Pb	0.000000
NH_3	0.000000
CO_2e	7283.0

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

Pollutant	Emissions Per Year (TONs)
VOC	0.010957
SO_x	2.409643
NO_x	34.388978
CO	1.829416
PM 10	3.057388

Pollutant	Emissions Per Year (TONs)
PM 2.5	2.751674
Pb	0.000000
NH_3	0.000000
CO_2e	7283.0

14.2 Aircraft & Engines

14.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: F-35A
Engine Model: F135-PW-100
Primary Function: Combat
Aircraft has After burn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

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

14.2.2 Aircraft & Engines Emission Factor(s)

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

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

14.3 Flight Operations

14.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 72
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 0
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 8840
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi/Idle Out [Idle] (mins): 0
Takeoff [Military] (mins): 0.64
Takeoff [After Burn] (mins): 0
Climb Out [Intermediate] (mins): 0.22

Approach [Approach] (mins):	2.21
Taxi/Idle In [Idle] (mins):	0

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

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	9
AfterBurn (mins):	3

14.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year

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

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

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

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

- Aircraft Emissions per Mode for TGOs per Year

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

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

- Aircraft Emissions for TGOs per Year

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

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

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

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

- Aircraft Emissions for Trim per Year
AE_{TRIM} = $AEPS_{IDLE}$ + $AEPS_{APPROACH}$ + $AEPS_{INTERMEDIATE}$ + $AEPS_{MILITARY}$ + $AEPS_{AFTERBURN}$

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

14.4 Auxiliary Power Unit (APU)

14.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

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

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

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e

14.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year
APU_{POL} = APU * OH * LTO * EF_{POL} / 2000

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

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15. Personnel

15.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Commuting Activities for 3-Squadron F-35A Alternative at TAFB

- Activity Description:
The beddown of a new F-35 Wing would bring an estimated 1,920 personnel to Tyndall AFB consisting of 1,714 active-duty USAF (133 officers and 1,581 enlisted), 13 DoD civilians, an estimated 129 Base Operating Support (BOS) personnel, and an estimated 64 contractor personnel to provide F-35A system support.

- Activity Start Date
Start Month: 1
Start Year: 2027

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	4.303145
SO_x	0.028911
NO_x	3.471547
CO	49.319692
PM 10	0.076882

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.065460
Pb	0.000000
NH_3	0.265494
CO_2e	4425.9

15.2 Personnel Assumptions

- Number of Personnel
Active Duty Personnel: 1843
Civilian Personnel: 13
Support Contractor Personnel: 64
Air National Guard (ANG) Personnel: 0
Reserve Personnel: 0

- Default Settings Used: Yes

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

- Personnel Work Schedule
Active Duty Personnel: 5 Days Per Week (default)
Civilian Personnel: 5 Days Per Week (default)
Support Contractor Personnel: 5 Days Per Week (default)
Air National Guard (ANG) Personnel: 4 Days Per Week (default)

Reserve Personnel: 4 Days Per Month (default)

15.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

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

15.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

15.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)
NP: Number of Personnel
WD: Work Days per Year
AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

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

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

- Vehicle Emissions per Year

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

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

16. Heating

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16.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Space and Water Heating Requirements

- Activity Description:
For AMU Hangers #1-3, MX Squadron Complex, AGE Facility, Munitions Storage, Weapons Hanger, Flight Simulator Facility, and MX Fuel Cell Hanger. Total square footage = 469,156. Assumed half of this area to simulate both space and water heating needs.

- Activity Start Date
Start Month: 1
Start Year: 2027

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.061376
SO_x	0.006696
NO_x	1.115921
CO	0.937374
PM 10	0.084810

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.084810
Pb	0.000000
NH_3	0.000000
CO_2e	1343.5

16.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 234578
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.0999

- Default Settings Used: Yes

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

16.3 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

16.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

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

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement (MMBtu/ft^2)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year

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

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

17. Degreaser

17.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Solvent Usage

- Activity Description:
Potential solvent usage for all maintenance activities.

- Activity Start Date
Start Month: 1
Start Year: 2027

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.976950
SO_x	0.000000
NO_x	0.000000
CO	0.000000
PM 10	0.000000

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.000000
Pb	0.000000
NH_3	0.000000
CO_2e	0.0

17.2 Degreaser Assumptions

- Degreaser
Net solvent usage (total less recycle) (gallons/year): 300

- Default Settings Used: Yes

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

17.3 Degreaser Formula(s)

- Degreaser Emissions per Year
DE_{VOC}= (VOC / 100) * NS * SG * 8.35 * (1 - (CD / 100)) / 2000

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

18. Aircraft

18.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: TAFB F-35A Airspace Operations - 3 Squadron Alternative

- Activity Description:
Tyndall-based F-35As under the 3 Squadron Alternative would spend 159 hours per year in W-470 and 18 hours per year in W-151 at 90% ETR below 3k' AGL (1.28% of total time - see EIS Table 2.2-6). Missions flown over land do not include time at <3000 AGL.

- Activity Start Date
Start Month: 1
Start Year: 2027

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO_x	1.799489
NO_x	36.998841
CO	0.672706
PM 10	1.967666

Pollutant	Emissions Per Year (TONs)
PM 2.5	1.765854
Pb	0.000000
NH_3	0.000000
CO_2e	5438.8

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

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO_x	1.799489
NO_x	36.998841
CO	0.672706
PM 10	1.967666

Pollutant	Emissions Per Year (TONs)
PM 2.5	1.765854
Pb	0.000000
NH_3	0.000000
CO_2e	5438.8

18.2 Aircraft & Engines

18.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-35A
Engine Model: F135-PW-100
Primary Function: Combat
Aircraft has After burn: Yes
Number of Engines: 1

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

18.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)
Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

18.3 Flight Operations

18.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 72
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 0
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 1
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
Taxi/Idle Out [Idle] (mins): 0
Takeoff [Military] (mins): 10620
Takeoff [After Burn] (mins): 0
Climb Out [Intermediate] (mins): 0

Approach [Approach] (mins): 0
Taxi/Idle In [Idle] (mins): 0

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

- Trim Test
Idle (mins): 12
Approach (mins): 27
Intermediate (mins): 9
Military (mins): 9
AfterBurn (mins): 3

18.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year
AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000

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

- Aircraft Emissions for LTOs per Year
$AE_{LTO} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

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

- Aircraft Emissions per Mode for TGOs per Year
AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000

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

- Aircraft Emissions for TGOs per Year
$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

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

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

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

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

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

18.4 Auxiliary Power Unit (APU)

18.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

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

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

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e

18.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year
APU_{POL} = APU * OH * LTO * EF_{POL} / 2000

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

ATTACHMENT 2

BEDDOWN OF FOUR SQUADRON F-35A OPERATIONAL WING AT TYNDALL AFB - AIR CONFORMITY APPLICABILITY MODEL REPORTS

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

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: TYNDALL AFB
State: Florida
County(s): Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2021

e. Action Description:

The following analysis evaluates the Project Alternative to locate an F-35A Operational Wing at Tyndall AFB, Florida. The action pertains to the addition of 4 squadrons of F-35As, aircraft operations, and construction activities.

f. Point of Contact:
Name: Chris Crabtree
Title: Air Quality Meteorologist
Organization: Leidos Corp.
Email: crabtreec@leidos.com
Phone Number: 805-566-6422

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

_____ applicable
__X__ not applicable

Total net direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the start of the action through achieving "steady state" (i.e., net gain/loss upon action fully implemented) emissions. The ACAM analysis used the latest and most accurate emission estimation techniques available; all algorithms, emission factors, and methodologies used are described in detail in the USAF Air Emissions Guide for Air Force Stationary Sources, the USAF Air Emissions Guide for Air Force Mobile Sources, and the USAF Air Emissions Guide for Air Force Transitory Sources.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA Prevention of Significant Deterioration Program (PSD) thresholds that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning whether the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality. Therefore, the worst-case year emissions were compared against the PSD Indicator and are summarized below.

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

Analysis Summary:

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.534	250	No
NOx	5.221	250	No
CO	5.805	250	No
SOx	0.014	250	No
PM 10	1.684	250	No
PM 2.5	0.225	250	No
Pb	0.000	250	No
NH3	0.006	250	No
CO2e	1320.9		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	2.197	250	No
NOx	8.951	250	No
CO	10.256	250	No
SOx	0.026	250	No
PM 10	17.772	250	No
PM 2.5	0.364	250	No
Pb	0.000	250	No
NH3	0.008	250	No
CO2e	2522.2		

2023

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.080	250	No
NOx	3.727	250	No
CO	4.882	250	No
SOx	0.011	250	No
PM 10	1.006	250	No
PM 2.5	0.144	250	No
Pb	0.000	250	No
NH3	0.004	250	No
CO2e	1079.9		

2024

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.568	250	No
NOx	1.829	250	No
CO	2.455	250	No
SOx	0.006	250	No
PM 10	0.876	250	No
PM 2.5	0.068	250	No

Pb	0.000	250	No
NH3	0.002	250	No
CO2e	560.5		

2025

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	250	No
NOx	0.000	250	No
CO	0.000	250	No
SOx	0.000	250	No
PM 10	0.000	250	No
PM 2.5	0.000	250	No
Pb	0.000	250	No
NH3	0.000	250	No
CO2e	0.0		

2026

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	250	No
NOx	0.000	250	No
CO	0.000	250	No
SOx	0.000	250	No
PM 10	0.000	250	No
PM 2.5	0.000	250	No
Pb	0.000	250	No
NH3	0.000	250	No
CO2e	0.0		

2027

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	250	No
NOx	0.000	250	No
CO	0.000	250	No
SOx	0.000	250	No
PM 10	0.000	250	No
PM 2.5	0.000	250	No
Pb	0.000	250	No
NH3	0.000	250	No
CO2e	0.0		

2028

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	36.680	250	No
NOx	368.678	250	Yes
CO	348.063	250	Yes

SOx	32.822	250	No
PM 10	49.094	250	No
PM 2.5	44.738	250	No
Pb	0.000	250	No
NH3	0.354	250	No
CO2e	91665.8		

2029 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	36.680	250	No
NOx	368.678	250	Yes
CO	348.063	250	Yes
SOx	32.822	250	No
PM 10	49.094	250	No
PM 2.5	44.738	250	No
Pb	0.000	250	No
NH3	0.354	250	No
CO2e	91665.8		

The steady state estimated annual net emissions associated with this action exceed the Air Quality Indicators, indicating a potential for a significant impact to air quality. Therefore, the ACAM analysis is inconclusive and further air quality impact assessment is needed.

Chris Crabtree, Air Quality Meteorologist DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location
Base: TYNDALL AFB
State: Florida
County(s): Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2021

- Action Purpose and Need:
To ensure implementation of ACC objectives to efficiently and effectively maintain combat capability and mission readiness.

- Action Description:
The following analysis evaluates the Project Alternative to locate an F-35A Operational Wing at Tyndall AFB, Florida. The action pertains to the addition of 4 squadrons of F-35As, aircraft operations, and construction activities.

- Point of Contact
Name: Chris Crabtree
Title: Air Quality Meteorologist
Organization: Leidos Corp.
Email: crabtreec@leidos.com
Phone Number: 805-566-6422

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Construct Squad Ops/AMU Hangar #1
3.	Construction / Demolition	Construct Squad Ops/AMU Hangar #2
4.	Construction / Demolition	Construct Squad Ops/AMU Hangar #3
5.	Construction / Demolition	Construct Maintenance Squadron Complex
6.	Construction / Demolition	Construct F-35 AGE Facility
7.	Construction / Demolition	Construct F-35A Munitions Storage Facilities
8.	Construction / Demolition	Construct Weapons Load Training Hangar
9.	Construction / Demolition	Construct F-35A Flight Simulator Facility
10.	Construction / Demolition	Construct Aircraft MX Fuel Cell Hangar
11.	Construction / Demolition	Construct Aircraft Wash Rack
12.	Construction / Demolition	Renovate F-35A Parking Apron
13.	Construction / Demolition	Construct Squad Ops/AMU Hangar #4
14.	Aircraft	TAFB Base Operations for the 4-Squadron F-35A Alternative - LTOs
15.	Aircraft	TAFB Base Operations for the 4-Squadron F-35A Alternative - Closed Patterns
16.	Personnel	Commuting Activities for the 4-Squadron F-35A Alternative at TAFB
17.	Heating	Space and Water Heating Requirements
18.	Degreaser	Solvent Usage
19.	Aircraft	F-35A Airspace Operations - TAFB

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Squad Ops/AMU Hangar #1

- Activity Description:
Square Feet

Squad Ops/AMU Hangar #1 Total = 83,151
Maintenance Hangar 35,349
Squadron Operations 16,555
Aircraft Maintenance Unit 27,749
Covered Outdoor Storage 3,498

- Activity Start Date
Start Month: 1
Start Month: 2021

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2021

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.647373
SO_x	0.005790
NO_x	2.283309
CO	2.496001
PM 10	0.960767

Pollutant	Total Emissions (TONs)
PM 2.5	0.099674
Pb	0.000000
NH_3	0.002537
CO_2e	565.3

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

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

- Phase Duration
Number of Month: 1
Number of Days: 0

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

2.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 85000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 900

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

- Construction Exhaust (default)

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

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

2.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791

LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

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

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

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

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

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

2.2 Trenching/Excavating Phase

2.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 1
Number of Days: 0

2.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 1500
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 100

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

- Construction Exhaust (default)

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

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

2.2.3 Trenching / Excavating Phase Emission Factor(s)

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

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

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

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

2.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

2.3 Building Construction Phase

2.3.1 Building Construction Phase Timeline Assumptions

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

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

2.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 83151
Height of Building (ft): 25
Number of Units: N/A

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips

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

- Vendor Trips Vehicle Mixture (%)

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

2.3.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0845	0.0013	0.6033	0.3865	0.0228	0.0228	0.0076	128.82
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0293	0.0006	0.1458	0.2148	0.0056	0.0056	0.0026	54.462
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0362	0.0006	0.2977	0.2707	0.0130	0.0130	0.0032	61.074
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0280	0.0003	0.1634	0.1787	0.0088	0.0088	0.0025	25.665

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851

LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

2.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

2.4 Architectural Coatings Phase

2.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 1
Number of Days: 0

2.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 24000
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

2.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379

LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

2.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
VMT_{WT} = (1 * WT * PA) / 800

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

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

- Off-Gassing Emissions per Phase
VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 0
Number of Days: 3

2.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 15000

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- 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

2.5.3 Paving Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

2.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

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

3. Construction / Demolition

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

3.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Squad Ops/AMU Hangar #2

- Activity Description:
SF

Squad Ops/AMU Hangar #2 Total = 78,006
Maintenance Hangar 35,349
Squadron Operations 16,555
Aircraft Maintenance Unit 22,604
Covered Outdoor Storage 3,498

- Activity Start Date
Start Month: 1
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)	Pollutant	Total Emissions (TONs)
VOC	0.601572	PM 2.5	0.086706
SO_x	0.005747	Pb	0.000000
NO_x	2.101451	NH_3	0.002467
CO	2.473472	CO_2e	560.6
PM 10	0.895041		

3.1 Site Grading Phase

3.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

3.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 80000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 800

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Site Grading Default Settings

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

- Construction Exhaust (default)

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

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

3.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

3.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (20 * ACRE * WD) / 2000$

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

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3.2 Trenching/Excavating Phase

3.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

3.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 1200
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 100

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

- Construction Exhaust (default)

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

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

3.2.3 Trenching / Excavating Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e

Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

3.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

V_{POL}: Vehicle Emissions (TONs)

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

3.3 Building Construction Phase

3.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2022

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

3.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 78000
Height of Building (ft): 25
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

3.3.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0797	0.0013	0.5505	0.3821	0.0203	0.0203	0.0071	128.81
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0274	0.0006	0.1265	0.2146	0.0043	0.0043	0.0024	54.457
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0340	0.0006	0.2783	0.2694	0.0116	0.0116	0.0030	61.069
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0260	0.0003	0.1557	0.1772	0.0077	0.0077	0.0023	25.661

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

3.3.4 Building Construction Phase Formula(s)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

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

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

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

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

3.4 Architectural Coatings Phase

3.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

3.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 22000
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

3.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

3.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

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

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

3.5 Paving Phase

3.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 3

3.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 10000

- 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

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

3.5.3 Paving Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

3.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

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

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_P = (2.62 * PA) / 43560

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

4. Construction / Demolition

4.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity Title: Construct Squad Ops/AMU Hangar #3

- Activity Description:
SF

Squad Ops/AMU Hangar #3 Total = 78,006
Maintenance Hangar 35,349
Squadron Operations 16,555
Aircraft Maintenance Unit 22,604
Covered Outdoor Storage 3,498

- Activity Start Date
Start Month: 1
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.583561
SO_x	0.005747
NO_x	1.955802
CO	2.463205
PM 10	0.884468

Pollutant	Total Emissions (TONs)
PM 2.5	0.076134
Pb	0.000000
NH_3	0.002467
CO_2e	560.5

4.1 Site Grading Phase

4.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

4.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 80000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 800

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

4.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.2 Trenching/Excavating Phase

4.2.1 Trenching / Excavating Phase Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

4.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 1200
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 100

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49

Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

4.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.3 Building Construction Phase

4.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 12
Number of Days: 0

4.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 78000
Height of Building (ft): 25
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 (%)

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	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

4.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0754	0.0013	0.5027	0.3786	0.0181	0.0181	0.0068	128.79
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0258	0.0006	0.1108	0.2145	0.0034	0.0034	0.0023	54.454
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0320	0.0006	0.2612	0.2683	0.0103	0.0103	0.0028	61.065
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0242	0.0003	0.1487	0.1761	0.0067	0.0067	0.0021	25.657

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

4.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.4 Architectural Coatings Phase

4.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

4.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 22000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

4.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)

PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

4.5 Paving Phase

4.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 3

4.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 10000

- 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
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

4.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre$)^2$ / acre)

5. Construction / Demolition

5.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Maintenance Squadron Complex

- Activity Description:
SF

Maintenance Squadron Complex Total = 105,605

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Maintenance Backshops 34,003
Maintenance HQ 5,005
AGE Maintenance Shop 11,496
AGE Covered Storage 18,105
Aircraft Parts/Spares Office 36,996

- Activity Start Date
Start Month: 1
Start Month: 2021

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2021

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.645490
SO_x	0.005374
NO_x	2.136997
CO	2.335644
PM 10	0.640173

Pollutant	Total Emissions (TONs)
PM 2.5	0.093525
Pb	0.000000
NH_3	0.002503
CO_2e	525.3

5.1 Site Grading Phase

5.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 0
Number of Days: 15

5.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 110000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 1100

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	2	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

5.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.2 Trenching/Excavating Phase

5.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2021

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- Phase Duration
Number of Month: 0
Number of Days: 10

5.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 1500
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 150

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

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	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

5.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.3 Building Construction Phase

5.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 12
Number of Days: 0

5.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 105605
Height of Building (ft): 20
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

5.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0845	0.0013	0.6033	0.3865	0.0228	0.0228	0.0076	128.82
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0293	0.0006	0.1458	0.2148	0.0056	0.0056	0.0026	54.462
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0362	0.0006	0.2977	0.2707	0.0130	0.0130	0.0032	61.074
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0280	0.0003	0.1634	0.1787	0.0088	0.0088	0.0025	25.665

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

5.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = BA * BH * (0.42 / 1000) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.4 Architectural Coatings Phase

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5.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 2
Number of Days: 0

5.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 26000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

5.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

5.5 Paving Phase

5.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 0
Number of Days: 4

5.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 10000

- 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
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)

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- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

5.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

6. Construction / Demolition

6.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct F-35 AGE Facility

- Activity Description:
F-35 AGE Facility 20,699 sf.

- Activity Start Date
Start Month: 2
Start Month: 2021

- Activity End Date
Indefinite: False
End Month: 12

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End Month: 2021

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.241391
SO_x	0.002372
NO_x	0.801143
CO	0.973200
PM 10	0.082597

Pollutant	Total Emissions (TONs)
PM 2.5	0.032288
Pb	0.000000
NH_3	0.000815
CO_2e	230.4

6.1 Site Grading Phase

6.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 0
Number of Days: 5

6.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 21000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 200

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

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	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

6.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

6.2 Trenching/Excavating Phase

6.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 0
Number of Days: 10

6.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 600
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 60

- Trenching Default Settings
Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

6.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

6.3 Building Construction Phase

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6.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 10
Number of Days: 0

6.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 20699
Height of Building (ft): 20
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

6.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0845	0.0013	0.6033	0.3865	0.0228	0.0228	0.0076	128.82
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0293	0.0006	0.1458	0.2148	0.0056	0.0056	0.0026	54.462
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

6.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

6.4 Architectural Coatings Phase

6.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 1
Number of Days: 0

6.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 9000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

6.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

6.5 Paving Phase

6.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1

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Start Year: 2021

- Phase Duration
Number of Month: 0
Number of Days: 2

6.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 2000

- 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
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

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	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

6.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

7. Construction / Demolition

7.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct F-35A Munitions Storage Facilities

- Activity Description:
SF

F-35 Munitions Storage Total = 15,156
Conventional Munitions Maintenance Shop Facility 1,496
Conventional Munitions Maintenance Shop Pad 2,605
Munitions Storage Igloo (4) 4,435
Munitions Admin Facility 5,124
Air Support Equipment Shop/Storage Facility 1,496

- Activity Start Date
Start Month: 4
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 11
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.186414
SO_x	0.001910
NO_x	0.586934
CO	0.789482
PM 10	0.053483

Pollutant	Total Emissions (TONs)
PM 2.5	0.022378
Pb	0.000000
NH_3	0.000608
CO_2e	185.1

7.1 Site Grading Phase

7.1.1 Site Grading Phase Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 4

7.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 16000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 160

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

7.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e

Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

7.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

7.2 Trenching/Excavating Phase

7.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 10

7.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 500
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 50

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC

POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

7.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

7.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

7.3 Building Construction Phase

7.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 8
Number of Days: 0

7.3.2 Building Construction Phase Assumptions

- General Building Construction Information

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Building Category: Office or Industrial
Area of Building (ft^2): 15156
Height of Building (ft): 15
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

7.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0797	0.0013	0.5505	0.3821	0.0203	0.0203	0.0071	128.81
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0274	0.0006	0.1265	0.2146	0.0043	0.0043	0.0024	54.457
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705

HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

7.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (0.42 / 1000) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase

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VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

7.4 Architectural Coatings Phase

7.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

7.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 7000
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

7.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851

LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

7.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

7.5 Paving Phase

7.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 2

7.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 1500

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

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- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	1	8
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

7.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

7.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

8. Construction / Demolition

8.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Weapons Load Training Hangar

- Activity Description:
The Weapons Load Training Hangar is a new 26,522 square foot facility.

- Activity Start Date
Start Month: 3
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)	Pollutant	Total Emissions (TONs)
VOC	0.425366	PM 2.5	0.054259
SO_x	0.004040	Pb	0.000000
NO_x	1.395881	NH_3	0.001334
CO	1.856141	CO_2e	389.3
PM 10	0.107421		

8.1 Site Grading Phase

8.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 4

8.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 27000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 300

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

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- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

8.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.2 Trenching/Excavating Phase

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8.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 15

8.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 700
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 70

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

8.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.3 Building Construction Phase

8.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 10
Number of Days: 0

8.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Commercial or Retail
Area of Building (ft^2): 26522
Height of Building (ft): 25
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

8.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0754	0.0013	0.5027	0.3786	0.0181	0.0181	0.0068	128.79
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0258	0.0006	0.1108	0.2145	0.0034	0.0034	0.0023	54.454
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0320	0.0006	0.2612	0.2683	0.0103	0.0103	0.0028	61.065
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0242	0.0003	0.1487	0.1761	0.0067	0.0067	0.0021	25.657

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

8.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.32 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.32 / 1000): Conversion Factor ft^3 to trips (0.32 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.05 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.05 / 1000): Conversion Factor ft^3 to trips (0.05 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.4 Architectural Coatings Phase

8.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

8.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 16000
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

8.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

8.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

8.5 Paving Phase

8.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 2

8.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 2500

- 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
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
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

8.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

8.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

9. Construction / Demolition

9.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct F-35A Flight Simulator Facility

- Activity Description:
F-35A Flight Simulator Facility footprint of 32,496 square feet.

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity Start Date
Start Month: 1
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.410674
SO_x	0.004681
NO_x	1.758203
CO	2.162002
PM 10	0.149975

Pollutant	Total Emissions (TONs)
PM 2.5	0.072931
Pb	0.000000
NH_3	0.001630
CO_2e	451.9

9.1 Site Grading Phase

9.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 5

9.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 33000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 300

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

9.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

9.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

9.2 Trenching/Excavating Phase

9.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 3

9.2.2 Trenching / Excavating Phase Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 800
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 80

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

9.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628

HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

9.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

9.3 Building Construction Phase

9.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 12
Number of Days: 0

9.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 32496
Height of Building (ft): 15
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

9.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0797	0.0013	0.5505	0.3821	0.0203	0.0203	0.0071	128.81
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0274	0.0006	0.1265	0.2146	0.0043	0.0043	0.0024	54.457
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0340	0.0006	0.2783	0.2694	0.0116	0.0116	0.0030	61.069
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0260	0.0003	0.1557	0.1772	0.0077	0.0077	0.0023	25.661

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

9.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

9.4 Architectural Coatings Phase

9.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

9.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 10000
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

9.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

9.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

9.5 Paving Phase

9.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 2

9.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 3000

- 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
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

9.5.3 Paving Phase Emission Factor(s)

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- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

9.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

10. Construction / Demolition

10.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Aircraft MX Fuel Cell Hangar

- Activity Description:
Aircraft MX Fuel Cell Hangar of 29,525 sf.

- Activity Start Date
Start Month: 1
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.500659
SO_x	0.004866
NO_x	1.815781

Pollutant	Total Emissions (TONs)
PM 2.5	0.075232
Pb	0.000000
NH_3	0.001770

CO	2.216533		CO_2e	470.6
PM 10	0.176162			

10.1 Site Grading Phase

10.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 10

10.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 30000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 300

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

10.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite

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	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

10.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

10.2 Trenching/Excavating Phase

10.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 10

10.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 700
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 70

- 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

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- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

10.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

10.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

10.3 Building Construction Phase

10.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2022

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- Phase Duration
Number of Month: 12
Number of Days: 0

10.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 29525
Height of Building (ft): 25
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

10.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0797	0.0013	0.5505	0.3821	0.0203	0.0203	0.0071	128.81
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e

Emission Factors	0.0274	0.0006	0.1265	0.2146	0.0043	0.0043	0.0024	54.457
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0340	0.0006	0.2783	0.2694	0.0116	0.0116	0.0030	61.069
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0260	0.0003	0.1557	0.1772	0.0077	0.0077	0.0023	25.661

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

10.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

10.4 Architectural Coatings Phase

10.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

10.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 17000
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

10.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

10.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

10.5 Paving Phase

10.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 10

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Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 2

10.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 3000

- 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
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

10.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

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- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

10.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

11. Construction / Demolition

11.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Aircraft Wash Rack

- Activity Description:
SF

Aircraft Wash Rack Total = 15,758
Aircraft Wash Rack, Open-Air 15,522
Wash Rack Equipment/Tool Shop 237

- Activity Start Date
Start Month: 4
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 9
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.070711
SO_x	0.001343
NO_x	0.375203
CO	0.562187
PM 10	0.014206

Pollutant	Total Emissions (TONs)
PM 2.5	0.013462
Pb	0.000000
NH_3	0.000444
CO_2e	130.1

11.1 Trenching/Excavating Phase

11.1.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

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Start Month: 6
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 3

11.1.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 500
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 50

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

11.1.3 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	000.578	000.008	000.613	005.086	000.009	000.008		000.034	00391.932
LDGT	000.823	000.010	001.060	008.566	000.010	000.009		000.034	00522.586
HDGV	001.597	000.016	002.785	026.982	000.023	000.020		000.046	00814.010
LDDV	000.216	000.004	000.307	004.001	000.006	000.006		000.008	00402.372
LDDT	000.537	000.006	000.822	008.176	000.008	000.008		000.008	00626.077
HDDV	000.762	000.015	007.639	002.810	000.395	000.363		000.028	01633.017
MC	003.190	000.008	000.648	014.785	000.027	000.024		000.048	00392.026

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11.1.4 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)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

11.2 Building Construction Phase

11.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 6
Number of Days: 0

11.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 15758
Height of Building (ft): 10
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

11.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0754	0.0013	0.5027	0.3786	0.0181	0.0181	0.0068	128.79
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0258	0.0006	0.1108	0.2145	0.0034	0.0034	0.0023	54.454
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

11.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

11.3 Paving Phase

11.3.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 4

11.3.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 5000

- Paving Default Settings
Default Settings Used: Yes

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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
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

11.3.3 Paving 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	000.578	000.008	000.613	005.086	000.009	000.008		000.034	00391.932
LDGT	000.823	000.010	001.060	008.566	000.010	000.009		000.034	00522.586
HDGV	001.597	000.016	002.785	026.982	000.023	000.020		000.046	00814.010
LDDV	000.216	000.004	000.307	004.001	000.006	000.006		000.008	00402.372
LDDT	000.537	000.006	000.822	008.176	000.008	000.008		000.008	00626.077
HDDV	000.762	000.015	007.639	002.810	000.395	000.363		000.028	01633.017
MC	003.190	000.008	000.648	014.785	000.027	000.024		000.048	00392.026

11.3.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)

0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

12. Construction / Demolition

12.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Renovate F-35A Parking Apron

- Activity Description:
Repair existing concrete surface and infill with new concrete to create a Parking Apron of 659,020 sf for the F-35As.

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- Activity Start Date
Start Month: 6
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 11
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.497988
SO_x	0.008539
NO_x	2.688267
CO	2.614573
PM 10	16.496891

Pollutant	Total Emissions (TONs)
PM 2.5	0.106845
Pb	0.000000
NH_3	0.001439
CO_2e	854.0

12.1 Site Grading Phase

12.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 3
Number of Days: 0

12.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 494265
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 6102

- Site Grading Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Crawler Tractors Composite	2	8
Graders Composite	1	4
Off-Highway Trucks Composite	3	8
Other Construction Equipment Composite	1	8
Scrapers Composite	1	8
Sweepers/Scrubbers Composite	1	4
Tractors/Loaders/Backhoes Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Average Hauling Truck Round Trip Commute (mile): 20

- 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

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

12.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Crawler Tractors Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0931	0.0012	0.5745	0.5163	0.0310	0.0310	0.0084	114.22
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Off-Highway Trucks Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1303	0.0026	0.6573	0.5446	0.0215	0.0215	0.0117	260.37
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1723	0.0026	1.1176	0.7579	0.0447	0.0447	0.0155	262.87
Sweepers/Scrubbers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0497	0.0009	0.2947	0.4867	0.0123	0.0123	0.0044	78.655
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

12.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

12.2 Trenching/Excavating Phase

12.2.1 Trenching / Excavating Phase Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

12.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 164755
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 3051

- Trenching Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Trenchers Composite	1	4

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 20

- 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

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

12.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Crawler Tractors Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0931	0.0012	0.5745	0.5163	0.0310	0.0310	0.0084	114.22
Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Off-Highway Trucks Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1303	0.0026	0.6573	0.5446	0.0215	0.0215	0.0117	260.37

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Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1723	0.0026	1.1176	0.7579	0.0447	0.0447	0.0155	262.87
Sweepers/Scrubbers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0497	0.0009	0.2947	0.4867	0.0123	0.0123	0.0044	78.655
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

12.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

12.3 Paving Phase

12.3.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 3
Number of Days: 0

12.3.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 659020

- Paving Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Off-Highway Trucks Composite	4	6
Other General Industrial Equipmen Composite	1	8
Pavers Composite	1	8
Pumps Composite	1	6

Surfacing Equipment Composite	2	6
Sweepers/Scrubbers Composite	1	4

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20

- 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

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

12.3.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Crawler Tractors Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0931	0.0012	0.5745	0.5163	0.0310	0.0310	0.0084	114.22
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Off-Highway Trucks Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1303	0.0026	0.6573	0.5446	0.0215	0.0215	0.0117	260.37
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1723	0.0026	1.1176	0.7579	0.0447	0.0447	0.0155	262.87
Sweepers/Scrubbers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0497	0.0009	0.2947	0.4867	0.0123	0.0123	0.0044	78.655
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

12.3.4 Paving Phase Formula(s)

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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
$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

13. Construction / Demolition

13.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Squad Ops/AMU Hangar #4

- Activity Description:
SF

Squad Ops/AMU Hangar #4 Total = 78,006
Maintenance Hangar 35,349
Squadron Operations 16,555
Aircraft Maintenance Unit 22,604
Covered Outdoor Storage 3,498

- Activity Start Date
Start Month: 1
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.568305
SO_x	0.005747
NO_x	1.828803
CO	2.455040
PM 10	0.875867

Pollutant	Total Emissions (TONs)
PM 2.5	0.067533
Pb	0.000000
NH_3	0.002467
CO_2e	560.5

13.1 Site Grading Phase

13.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

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13.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft^2): 80000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 800

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

13.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705

HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

13.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

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V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

13.2 Trenching/Excavating Phase

13.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

13.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 1200
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 100

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

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13.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

13.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

13.3 Building Construction Phase

13.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 12
Number of Days: 0

13.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 78000
Height of Building (ft): 25
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

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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

13.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0715	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
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	CH_4	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	CH_4	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	CH_4	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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379

LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

13.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

13.4 Architectural Coatings Phase

13.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

13.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 22000
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

13.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628

HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

13.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

13.5 Paving Phase

13.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 3

13.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 10000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

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Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
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

13.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

13.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment

WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_P = (2.62 * PA) / 43560

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

14. Aircraft

14.1 General Information & Timeline Assumptions

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- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: TAFB Base Operations for the 4-Squadron F-35A Alternative - LTOs

- Activity Description:
Annual LTOs for 4 full Squadrons of F-35As - 50% AB Scenario. LTO TIMs derived from noise analyses by AFCEC/CZTQ, except idle TIMs = ACAM defaults. TIMS for trim tests = ACAM defaults, as noise analyses substantially overestimated this activity.

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	29.551245
SO_x	27.173378
NO_x	267.769263
CO	277.848223
PM 10	42.203497

Pollutant	Emissions Per Year (TONs)
PM 2.5	38.537845
Pb	0.000000
NH_3	0.000000
CO_2e	67258.7

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.508369
SO_x	20.778611
NO_x	176.393691
CO	225.246418
PM 10	32.910905

Pollutant	Emissions Per Year (TONs)
PM 2.5	29.570637
Pb	0.000000
NH_3	0.000000
CO_2e	61211.8

- Activity Emissions [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.003386
SO_x	0.545014
NO_x	7.813371
CO	1.646693
PM 10	0.678535

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.610762
Pb	0.000000
NH_3	0.000000
CO_2e	1647.3

- Activity Emissions [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	29.039491
SO_x	5.849753
NO_x	83.562202
CO	50.955112
PM 10	8.614057

Pollutant	Emissions Per Year (TONs)
PM 2.5	8.356446
Pb	0.000000
NH_3	0.000000
CO_2e	4399.6

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

14.2 Aircraft & Engines

14.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation:	F-35A
Engine Model:	F135-PW-100
Primary Function:	Combat
Aircraft has After burn:	Yes
Number of Engines:	1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate?	No
Original Aircraft Name:	
Original Engine Name:	

14.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

14.3 Flight Operations

14.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	96
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft:	16400
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft:	0
Number of Annual Trim Test(s) per Aircraft:	12

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi/Idle Out [Idle] (mins):	18.81
Takeoff [Military] (mins):	0.44
Takeoff [After Burn] (mins):	0.19
Climb Out [Intermediate] (mins):	0.19
Approach [Approach] (mins):	2.18
Taxi/Idle In [Idle] (mins):	11.3

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	9
AfterBurn (mins):	3

14.3.2 Flight Operations Formula(s)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Aircraft Emissions per Mode for LTOs per Year

AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year

AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft

NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

14.4 Auxiliary Power Unit (APU)

14.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

14.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e

14.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year
$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

14.5 Aircraft Engine Test Cell

14.5.1 Aircraft Engine Test Cell Assumptions

- Engine Test Cell
Total Number of Aircraft Engines Tested Annually: 96

- Default Settings Used: Yes

- Annual Run-ups / Test Durations
Annual Run-ups (Per Aircraft Engine): 1 (default)
Idle Duration (mins): 12 (default)
Approach Duration (mins): 27 (default)
Intermediate Duration (mins): 9 (default)

Military Duration (mins): 9 (default)
After Burner Duration (mins): 3 (default)

14.5.2 Aircraft Engine Test Cell Emission Factor(s)

- See Aircraft & Engines Emission Factor(s)

14.5.3 Aircraft Engine Test Cell Formula(s)

- Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)
$TestCellPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * ARU / 2000

$TestCellPS_{POL}$: Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Total Number of Engines (For All Aircraft)
ARU: Annual Run-ups (Per Aircraft Engine)
2000: Conversion Factor pounds to TONs

- Aircraft Engine Test Cell Emissions per Year
TestCell = $TestCellPS_{IDLE}$ + $TestCellPS_{APPROACH}$ + $TestCellPS_{INTERMEDIATE}$ + $TestCellPS_{MILITARY}$ + $TestCellPS_{AFTERBURN}$

TestCell: Aircraft Engine Test Cell Emissions (TONs)
$TestCellPS_{IDLE}$: Aircraft Engine Test Cell Emissions for Idle Power Setting (TONs)
$TestCellPS_{APPROACH}$: Aircraft Engine Test Cell Emissions for Approach Power Setting (TONs)
$TestCellPS_{INTERMEDIATE}$: Aircraft Engine Test Cell Emissions for Intermediate Power Setting (TONs)
$TestCellPS_{MILITARY}$: Aircraft Engine Test Cell Emissions for Military Power Setting (TONs)
$TestCellPS_{AFTERBURN}$: Aircraft Engine Test Cell Emissions for After Burner Power Setting (TONs)

14.6 Aerospace Ground Equipment (AGE)

14.6.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage
Number of Annual LTO (Landing and Take-off) cycles for AGE: 16400

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.33	No	Air Compressor	MC-1A - 18.4hp
1	1	No	Bomb Lift	MJ-1B
1	0.33	No	Generator Set	A/M32A-86D
1	0.5	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-2/TTU-228 - 130hp
1	8	No	Light Cart	NF-2
1	0.33	No	Start Cart	A/M32A-60A

14.6.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068	24.8
MJ-1B	0.0	3.040	0.219	4.780	3.040	0.800	0.776	141.2
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089	147.0
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006	8.9
MJ-2/TTU-228 - 130hp	7.4	0.195	0.053	3.396	0.794	0.089	0.086	168.8
NF-2	0.0	0.010	0.043	0.110	0.080	0.010	0.010	22.1
A/M32A-60A	0.0	0.270	0.306	1.820	5.480	0.211	0.205	221.1

14.6.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year
AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)
AGE: Total Number of Aerospace Ground Equipment
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

15. Aircraft

15.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: TAFB Base Operations for the 4-Squadron F-35A Alternative - Closed Patterns

- Activity Description:
F-35A Closed Patterns for 4 full Squadrons of F-35As. - TIMs derived from noise analyses by AFCEC/CZTQ.

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.014608
SO_x	3.212676
NO_x	45.849377
CO	2.439084

Pollutant	Emissions Per Year (TONs)
PM 2.5	3.668691
Pb	0.000000
NH_3	0.000000
CO_2e	9710.1

PM 10	4.076287		

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)	Pollutant	Emissions Per Year (TONs)
VOC	0.014608	PM 2.5	3.668691
SO_x	3.212676	Pb	0.000000
NO_x	45.849377	NH_3	0.000000
CO	2.439084	CO_2e	9710.1
PM 10	4.076287		

15.2 Aircraft & Engines

15.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
- **Aircraft Designation:** F-35A
- **Engine Model:** F135-PW-100
- **Primary Function:** Combat
- **Aircraft has After burn:** Yes
- **Number of Engines:** 1

- Aircraft & Engine Surrogate
- **Is Aircraft & Engine a Surrogate?** No
- **Original Aircraft Name:**
- **Original Engine Name:**

15.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

15.3 Flight Operations

15.3.1 Flight Operations Assumptions

- Flight Operations
- **Number of Aircraft:** 96
- **Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft:** 0
- **Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft:** 11786
- **Number of Annual Trim Test(s) per Aircraft:** 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
- **Taxi/Idle Out [Idle] (mins):** 0
- **Takeoff [Military] (mins):** 0.64
- **Takeoff [After Burn] (mins):** 0
- **Climb Out [Intermediate] (mins):** 0.22
- **Approach [Approach] (mins):** 2.21
- **Taxi/Idle In [Idle] (mins):** 0

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	9
AfterBurn (mins):	3

15.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

15.4 Auxiliary Power Unit (APU)

15.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: No

- Auxiliary Power Unit (APU)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

15.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e

15.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year
APU_{POL} = APU * OH * LTO * EF_{POL} / 2000

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

16. Personnel

16.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Commuting Activities for the 4-Squadron F-35A Alternative at TAFB

- Activity Description:
The total personnel associated with this alternative is estimated to be 2,475 active duty (178 officers, 2,108 enlisted, 17 DoD civilians, and 172 BOS personnel). An additional 86 contractor support personnel would accompany the four squadrons of this alternative.

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	5.739767
SO_x	0.038563
NO_x	4.630538
CO	65.785276
PM 10	0.102549

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.087314
Pb	0.000000
NH_3	0.354131
CO_2e	5903.5

16.2 Personnel Assumptions

- Number of Personnel
Active Duty Personnel: 2458
Civilian Personnel: 17
Support Contractor Personnel: 86
Air National Guard (ANG) Personnel: 0
Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule
Active Duty Personnel: 5 Days Per Week (default)
Civilian Personnel: 5 Days Per Week (default)
Support Contractor Personnel: 5 Days Per Week (default)
Air National Guard (ANG) Personnel: 4 Days Per Week (default)
Reserve Personnel: 4 Days Per Month (default)

16.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

16.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

16.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)
NP: Number of Personnel
WD: Work Days per Year
AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)
VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)
VMT_C: Civilian Personnel Vehicle Miles Travel (miles)
VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)
VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)
VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{Total}: Total Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Personnel On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

17. Heating

17.1 General Information & Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Space and Water Heating Requirements

- Activity Description:
For AMU Hangers #1-4, MX Squadron Complex, AGE Facility, Munitions Storage, Weapons Hanger, Flight Simulator Facility, and MX Fuel Cell Hanger. Total square footage = 547,162. Assumed half of this area to simulate both space and water heating needs.

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.071842
SO_x	0.007837
NO_x	1.306221
CO	1.097226
PM 10	0.099273

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.099273
Pb	0.000000
NH_3	0.000000
CO_2e	1572.6

17.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 274581
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.0999

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

17.3 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

17.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

18. Degreaser

18.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Solvent Usage

- Activity Description:
Potential solvent usage for all maintenance activities.

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	1.302600
SO_x	0.000000
NO_x	0.000000
CO	0.000000
PM 10	0.000000

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.000000
Pb	0.000000
NH_3	0.000000
CO_2e	0.0

18.2 Degreaser Assumptions

- Degreaser
Net solvent usage (total less recycle) (gallons/year): 400

- Default Settings Used: Yes

- Degreaser Consumption
Solvent used: Mineral Spirits CAS#64475-85-0 (default)
Specific gravity of solvent: 0.78 (default)
Solvent VOC content (%): 100 (default)
Efficiency of control device (%): 0 (default)

18.3 Degreaser Formula(s)

- Degreaser Emissions per Year
DE_{VOC}= (VOC / 100) * NS * SG * 8.35 * (1 - (CD / 100)) / 2000

DE_{VOC}: Degreaser VOC Emissions (TONs per Year)
VOC: Solvent VOC content (%)
(VOC / 100): Conversion Factor percent to decimal
NS: Net solvent usage (total less recycle) (gallons/year)
SG: Specific gravity of solvent
8.35: Conversion Factor the density of water
CD: Efficiency of control device (%)
(1 - (CD / 100)): Conversion Factor percent to decimal (Not effected by control device)
2000: Conversion Factor pounds to tons

19. Aircraft

19.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: F-35A Airspace Operations - TAFB

- Activity Description:
Tyndall-based F-35As would spend 211 hours per year in W-470 and 24 hours per year in W-151 at 90% ETR below 3k' AGL (1.28% of total time - see EIS Table 2.2-6). Missions flown over land do not include time at <3000 AGL.

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000

Pollutant	Emissions Per Year (TONs)
PM 2.5	2.344495

SO_x	2.389152	Pb	0.000000
NO_x	49.122755	NH_3	0.000000
CO	0.893141	CO_2e	7221.0
PM 10	2.612437		

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)	Pollutant	Emissions Per Year (TONs)
VOC	0.000000	PM 2.5	2.344495
SO_x	2.389152	Pb	0.000000
NO_x	49.122755	NH_3	0.000000
CO	0.893141	CO_2e	7221.0
PM 10	2.612437		

19.2 Aircraft & Engines

19.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-35A
Engine Model: F135-PW-100
Primary Function: Combat
Aircraft has After burn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate
Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

19.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)
Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

19.3 Flight Operations

19.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 96
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 0
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 1
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
Taxi/Idle Out [Idle] (mins): 0
Takeoff [Military] (mins): 14100
Takeoff [After Burn] (mins): 0
Climb Out [Intermediate] (mins): 0
Approach [Approach] (mins): 0
Taxi/Idle In [Idle] (mins): 0

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Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	9
AfterBurn (mins):	3

19.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)

$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
AE_{TRIM} = $AEPS_{IDLE}$ + $AEPS_{APPROACH}$ + $AEPS_{INTERMEDIATE}$ + $AEPS_{MILITARY}$ + $AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

19.4 Auxiliary Power Unit (APU)

19.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

19.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e

19.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year
APU_{POL} = APU * OH * LTO * EF_{POL} / 2000

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

ATTACHMENT 3

BEDDOWN OF MQ-9 OPERATIONAL WING AT TYNDALL AFB - AIR CONFORMITY APPLICABILITY MODEL REPORTS

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AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF AIR ANALYSIS (ROAA)

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: TYNDALL AFB
State: Florida
County(s): Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2021

e. Action Description:

Locate an MQ-9 RPA Wing at Tyndall AFB Florida. In addition to aircraft operations, this action include construction activities at the base.

f. Point of Contact:

Name: Chris Crabtree
Title: Air Quality Meteorologist
Organization: Leidos Corp.
Email: crabtreec@leidos.com
Phone Number: 805-566-6422

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

_____ applicable
__X__ not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA Prevention of Significant Deterioration Program (PSD) thresholds that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning whether the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality. Therefore, the worst-case year emissions were compared against the PSD Indicator and are summarized below.

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF AIR ANALYSIS (ROAA)

Analysis Summary:

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.135	250	No
NOx	2.377	250	No
CO	2.531	250	No
SOx	0.006	250	No
PM 10	1.523	250	No
PM 2.5	0.104	250	No
Pb	0.000	250	No
NH3	0.003	100	No
CO2e	601.7		
NOT IN A REGULATORY AREA			
VOC	0.000	250	No
NOx	0.000	250	No
CO	0.000	250	No
SOx	0.000	250	No
PM 10	0.000	250	No
PM 2.5	0.000	250	No
Pb	0.000	250	No
NH3	0.000	100	No
CO2e	0.0		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.868	250	No
NOx	5.035	250	No
CO	5.677	250	No
SOx	0.014	250	No
PM 10	5.519	250	No
PM 2.5	0.206	250	No
Pb	0.000	250	No
NH3	0.007	100	No
CO2e	1401.8		
NOT IN A REGULATORY AREA			
VOC	0.000	250	No
NOx	0.000	250	No
CO	0.000	250	No
SOx	0.000	250	No
PM 10	0.000	250	No
PM 2.5	0.000	250	No
Pb	0.000	250	No
NH3	0.000	100	No
CO2e	0.0		

2023

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF AIR ANALYSIS (ROAA)

		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.510	250	No
NOx	2.152	250	No
CO	2.846	250	No
SOx	0.007	250	No
PM 10	0.205	250	No
PM 2.5	0.082	250	No
Pb	0.000	250	No
NH3	0.003	100	No
CO2e	642.4		
NOT IN A REGULATORY AREA			
VOC	0.000	250	No
NOx	0.000	250	No
CO	0.000	250	No
SOx	0.000	250	No
PM 10	0.000	250	No
PM 2.5	0.000	250	No
Pb	0.000	250	No
NH3	0.000	100	No
CO2e	0.0		

2024

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.800	250	No
NOx	1.703	250	No
CO	2.282	250	No
SOx	0.005	250	No
PM 10	0.510	250	No
PM 2.5	0.063	250	No
Pb	0.000	250	No
NH3	0.002	100	No
CO2e	513.9		
NOT IN A REGULATORY AREA			
VOC	0.000	250	No
NOx	0.000	250	No
CO	0.000	250	No
SOx	0.000	250	No
PM 10	0.000	250	No
PM 2.5	0.000	250	No
Pb	0.000	250	No
NH3	0.000	100	No
CO2e	0.0		

2025

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	250	No
NOx	0.000	250	No
CO	0.000	250	No

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF AIR ANALYSIS (ROAA)

SOx	0.000	250	No
PM 10	0.000	250	No
PM 2.5	0.000	250	No
Pb	0.000	250	No
NH3	0.000	100	No
CO2e	0.0		
NOT IN A REGULATORY AREA			
VOC	8.280	250	No
NOx	8.699	250	No
CO	53.969	250	No
SOx	0.410	250	No
PM 10	0.861	250	No
PM 2.5	0.781	250	No
Pb	0.000	250	No
NH3	0.268	100	No
CO2e	7372.1		

2026 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	250	No
NOx	0.000	250	No
CO	0.000	250	No
SOx	0.000	250	No
PM 10	0.000	250	No
PM 2.5	0.000	250	No
Pb	0.000	250	No
NH3	0.000	100	No
CO2e	0.0		
NOT IN A REGULATORY AREA			
VOC	8.280	250	No
NOx	8.699	250	No
CO	53.969	250	No
SOx	0.410	250	No
PM 10	0.861	250	No
PM 2.5	0.781	250	No
Pb	0.000	250	No
NH3	0.268	100	No
CO2e	7372.1		

None of estimated emissions associated with this action are above the PSD indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Chris Crabtree, Air Quality Meteorologist   DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location
Base: TYNDALL AFB
State: Florida
County(s): Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2021

- Action Purpose and Need:
To ensure implementation of ACC objectives to efficiently and effectively maintain combat capability and mission readiness.

- Action Description:
Locate an MQ-9 RPA Wing at Tyndall AFB Florida. In addition to aircraft operations, this action include construction activities at the base.

- Point of Contact
Name: Chris Crabtree
Title: Air Quality Meteorologist
Organization: Leidos Corp.
Email: crabtreec@leidos.com
Phone Number: 805-566-6422

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Construct Operations Complex for MQ-9
3.	Construction / Demolition	Construct Maintenance Complex for MQ-9 - Option 1
4.	Construction / Demolition	Ground Data Terminal Foundations and Towers for MQ-9
5.	Construction / Demolition	Construct Fitness Center for MQ-9
6.	Construction / Demolition	Construct Airmen Dormitory for MQ-9
7.	Construction / Demolition	Install Infrastructure and Communication Conduit Extensions - Maintenance Complex Option 2
8.	Construction / Demolition	Construct Maintenance Complex for MQ-9 Option 2 - Additional Items not part of Option 1
9.	Construction / Demolition	Construct Child Development Center
10.	Construction / Demolition	Construct Munitions Storage Buildings
11.	Aircraft	TAFB MQ-9 Base Operations - LTOs
12.	Aircraft	TAFB MQ-9 Base Operations - Closed Patterns
13.	Personnel	Personnel Commuting Activities
14.	Heating	Space and Water Heating Requirements
15.	Degreaser	Solvent Usage

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.

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Operations Complex for MQ-9

- Activity Description:
The Operations Complex includes the Wing HQ, Operations Group HQ, OSS, and two Attack Squadrons, utilities, and associated parking lot. Two optional sites for the Consolidated Operations Complex - Option 1 (42 acres) and Option 2 (52 acres). ~130,000 sf of building construction, plus a new Parking Area for up to 420 vehicles of 138,600 sf.

Two generators (with fencing) would be needed to support the Attack Squadrons and SOC. Four 50-foot by 50-foot concrete pads would be constructed on the exterior to the building to support four satellite communications antennas with a supporting generator (with fencing).

- Activity Start Date
Start Month: 1
Start Month: 2021

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2021

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.135421
SO_x	0.006111
NO_x	2.377120
CO	2.531110
PM 10	1.522697

Pollutant	Total Emissions (TONs)
PM 2.5	0.103845
Pb	0.000000
NH_3	0.003341
CO_2e	601.7

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 0
Number of Days: 15

2.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 268000

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Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 3000

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	2	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331

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MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.2 Trenching/Excavating Phase

2.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 1
Number of Days: 0

2.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 10000
Amount of Material to be Hauled On-Site (yd^3): 2000
Amount of Material to be Hauled Off-Site (yd^3): 2000

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

2.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.3 Building Construction Phase

2.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 12
Number of Days: 0

2.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 130000
Height of Building (ft): 25
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6

Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

2.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0845	0.0013	0.6033	0.3865	0.0228	0.0228	0.0076	128.82
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0293	0.0006	0.1458	0.2148	0.0056	0.0056	0.0026	54.462
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0362	0.0006	0.2977	0.2707	0.0130	0.0130	0.0032	61.074
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0280	0.0003	0.1634	0.1787	0.0088	0.0088	0.0025	25.665

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

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2.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.4 Architectural Coatings Phase

2.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 1
Number of Days: 0

2.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 65000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

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2.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
VMT_{WT} = (1 * WT * PA) / 800

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 0
Number of Days: 10

2.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 138600

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6

Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

2.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

3. Construction / Demolition

3.1 General Information & Timeline Assumptions

- Activity Location

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County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Maintenance Complex for MQ-9 - Option 1

- Activity Description:
Includes Maintenance Group HQ, Aircraft Maintenance Squadron, AMU, Aircraft Maintenance Communications Unit, LR Attack Squadron, utilities, and associated parking lot. LR Squadron requirements include constructing a new 20,000-square foot facility located on the flight line. Two MGCSs would be placed on an exterior 70-foot
by 70-foot concrete pad with up to four ECUs and up to three generators (with fencing). ~365,000 sf new buildings, plus a parking lot for up to 330 vehicles = 108,900 sf.

Option 1 would be on the south side of the existing Primary Runway, toward the eastern end of the airfield and Option 2 would be on the west side of the Alternate Runway in the eastern portion of the base. Option 2 would require construction of a new Base Entry Control Gate and roadway - see additional construction module for MxC Option 2.

- Activity Start Date
Start Month: 1
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.343049
SO_x	0.007573
NO_x	2.675309
CO	2.699517
PM 10	4.924834

Pollutant	Total Emissions (TONs)
PM 2.5	0.109007
Pb	0.000000
NH_3	0.005238
CO_2e	760.4

3.1 Site Grading Phase

3.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

3.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 473900
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 5000

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- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	1	8
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Scrapers Composite	2	8
Tractors/Loaders/Backhoes Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0648	0.0013	0.3170	0.5103	0.0136	0.0136	0.0058	119.72
Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Scrapers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1723	0.0026	1.1176	0.7579	0.0447	0.0447	0.0155	262.87
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791

LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

3.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3.2 Trenching/Excavating Phase

3.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

3.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 10000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 200

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0648	0.0013	0.3170	0.5103	0.0136	0.0136	0.0058	119.72
Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Scrapers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1723	0.0026	1.1176	0.7579	0.0447	0.0447	0.0155	262.87
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

3.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3.3 Building Construction Phase

3.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 10
Number of Days: 0

3.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 300000

Height of Building (ft): 25
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	7
Forklifts Composite	2	7
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

3.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0797	0.0013	0.5505	0.3821	0.0203	0.0203	0.0071	128.81
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0274	0.0006	0.1265	0.2146	0.0043	0.0043	0.0024	54.457
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0340	0.0006	0.2783	0.2694	0.0116	0.0116	0.0030	61.069
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e

Emission Factors	0.0260	0.0003	0.1557	0.1772	0.0077	0.0077	0.0023	25.661

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

3.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3.4 Architectural Coatings Phase

3.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 2
Number of Days: 0

3.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 80000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

3.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

3.5 Paving Phase

3.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 8

3.5.2 Paving Phase Assumptions

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- General Paving Information
Paving Area (ft^2): 108900

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0648	0.0013	0.3170	0.5103	0.0136	0.0136	0.0058	119.72
Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Scrapers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1723	0.0026	1.1176	0.7579	0.0447	0.0447	0.0155	262.87
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

3.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

4. Construction / Demolition

4.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Ground Data Terminal Foundations and Towers for MQ-9

- Activity Description:
Up to seven Ground Data Terminal foundations and towers would be required for each option of the Maintenance Complex, and would consist of 12-foot by 12-foot concrete pads, with towers up to 60 feet tall. In order to perform maintenance on the Ground Data Terminals, a 12-foot wide one lane Access Road (unpaved) connecting them would be built.

- Activity Start Date
Start Month: 5
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 8
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.060050
SO_x	0.001168
NO_x	0.385816
CO	0.427636
PM 10	0.035510

Pollutant	Total Emissions (TONs)
PM 2.5	0.014978
Pb	0.000000
NH_3	0.000881
CO_2e	117.1

4.1 Site Grading Phase

4.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2023

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- Phase Duration
Number of Month: 0
Number of Days: 2

4.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 20000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 200

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

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- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

4.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.2 Trenching/Excavating Phase

4.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 4

4.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 1000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 560

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

4.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.3 Building Construction Phase

4.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 2
Number of Days: 0

4.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 50000
Height of Building (ft): 25
Number of Units: N/A

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- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

4.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0754	0.0013	0.5027	0.3786	0.0181	0.0181	0.0068	128.79
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0258	0.0006	0.1108	0.2145	0.0034	0.0034	0.0023	54.454
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0320	0.0006	0.2612	0.2683	0.0103	0.0103	0.0028	61.065
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0242	0.0003	0.1487	0.1761	0.0067	0.0067	0.0021	25.657

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

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	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

4.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5. Construction / Demolition

5.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Fitness Center for MQ-9

- Activity Description:
Either option of the Fitness Center would be a new building up to 28,000 square feet and parking area (10,000 sf).

- Activity Start Date
Start Month: 4
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.322942
SO_x	0.003679
NO_x	1.276593
CO	1.682838
PM 10	0.142582

Pollutant	Total Emissions (TONs)
PM 2.5	0.049780
Pb	0.000000
NH_3	0.001283
CO_2e	355.2

5.1 Site Grading Phase

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5.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 7

5.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 40000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 200

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61

Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

5.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.2 Trenching/Excavating Phase

5.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 10

5.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 250
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 50

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

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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

5.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

5.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.3 Building Construction Phase

5.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 9
Number of Days: 0

5.3.2 Building Construction Phase Assumptions

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- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft^2): 28000
Height of Building (ft): 15
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

5.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0754	0.0013	0.5027	0.3786	0.0181	0.0181	0.0068	128.79
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0258	0.0006	0.1108	0.2145	0.0034	0.0034	0.0023	54.454
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0320	0.0006	0.2612	0.2683	0.0103	0.0103	0.0028	61.065
Tractors/Loaders/Backhoes Composite								

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0242	0.0003	0.1487	0.1761	0.0067	0.0067	0.0021	25.657

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

5.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.4 Architectural Coatings Phase

5.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

5.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 9000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

5.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

5.5 Paving Phase

5.5.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 9
Start Quarter: 1
Start Year: 2023

- Phase Duration

Number of Month: 0

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Number of Days: 5

5.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 10000

- 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
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851

LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

5.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

6. Construction / Demolition

6.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Airmen Dormitory for MQ-9

- Activity Description:
A new 95,626 square foot building and parking area for up to 120 vehicles (39,600 sf).

- Activity Start Date
Start Month: 1
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.800234
SO_x	0.005265
NO_x	1.703249
CO	2.281704
PM 10	0.510336

Pollutant	Total Emissions (TONs)
PM 2.5	0.063016
Pb	0.000000
NH_3	0.002416
CO_2e	513.9

6.1 Site Grading Phase

6.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 10

6.1.2 Site Grading Phase Assumptions

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- General Site Grading Information
Area of Site to be Graded (ft^2): 135226
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 1400

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	2	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379

LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

6.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

6.2 Trenching/Excavating Phase

6.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 10

6.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 1000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 50

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.2.3 Trenching / Excavating Phase Emission Factor(s)

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- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

6.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

6.3 Building Construction Phase

6.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 12
Number of Days: 0

6.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 95626
Height of Building (ft): 20
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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

6.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0715	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
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	CH_4	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	CH_4	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	CH_4	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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331

MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

6.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (0.42 / 1000) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)

BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

6.4 Architectural Coatings Phase

6.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 0

6.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 44000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

6.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

6.5 Paving Phase

6.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 6

6.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 39600

- 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

6.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

6.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_P = (2.62 * PA) / 43560

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

7. Construction / Demolition

7.1 General Information & Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Install Infrastructure and Communication Conduit Extensions - Maintenance Complex Option 2

- Activity Description:
Install power, base communication, water, and wastewater lines to Maintenance Complex site on Alternate Runway. A combination of existing conduit and over 31,000 feet of new conduit would be required to support the Maintenance Complex.

- Activity Start Date
Start Month: 7
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 9
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.046227
SO_x	0.000870
NO_x	0.254670
CO	0.343727
PM 10	0.318338

Pollutant	Total Emissions (TONs)
PM 2.5	0.009906
Pb	0.000000
NH_3	0.000244
CO_2e	83.7

7.1 Trenching/Excavating Phase

7.1.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

7.1.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 31000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 50

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day

Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

7.1.3 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	000.578	000.008	000.613	005.086	000.009	000.008		000.034	00391.932
LDGT	000.823	000.010	001.060	008.566	000.010	000.009		000.034	00522.586
HDGV	001.597	000.016	002.785	026.982	000.023	000.020		000.046	00814.010
LDDV	000.216	000.004	000.307	004.001	000.006	000.006		000.008	00402.372
LDDT	000.537	000.006	000.822	008.176	000.008	000.008		000.008	00626.077
HDDV	000.762	000.015	007.639	002.810	000.395	000.363		000.028	01633.017
MC	003.190	000.008	000.648	014.785	000.027	000.024		000.048	00392.026

7.1.4 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)
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

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$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

7.2 Building Construction Phase

7.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 2
Number of Days: 0

7.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 10000
Height of Building (ft): 15

Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

7.2.3 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	0.0797	0.0013	0.5505	0.3821	0.0203	0.0203	0.0071	128.81
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0274	0.0006	0.1265	0.2146	0.0043	0.0043	0.0024	54.457
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628

HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

7.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8. Construction / Demolition

8.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Maintenance Complex for MQ-9 Option 2 - Additional Items not part of Option 1

- Activity Description:
New gate and roadway.

- Activity Start Date
Start Month: 1
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 6
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.048855
SO_x	0.000771
NO_x	0.252687
CO	0.329613
PM 10	0.024954

Pollutant	Total Emissions (TONs)
PM 2.5	0.010230
Pb	0.000000
NH_3	0.000257
CO_2e	75.0

8.1 Site Grading Phase

8.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2022

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- Phase Duration
Number of Month: 0
Number of Days: 2

8.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 16000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 100

- Site Grading Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	8
Off-Highway Trucks Composite	1	6
Other Construction Equipment Composite	1	8
Plate Compactors Composite	1	4
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	2	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 20

- 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

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Off-Highway Trucks Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1303	0.0026	0.6573	0.5446	0.0215	0.0215	0.0117	260.37
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Plate Compactors Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**

Emission Factors	0.0050	0.0001	0.0314	0.0263	0.0012	0.0012	0.0004	4.3251
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

8.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.2 Building Construction Phase

8.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 3
Number of Days: 0

8.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 1000
Height of Building (ft): 12
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

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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

- 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

8.2.3 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	0.0797	0.0013	0.5505	0.3821	0.0203	0.0203	0.0071	128.81
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0274	0.0006	0.1265	0.2146	0.0043	0.0043	0.0024	54.457
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

8.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (0.42 / 1000) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.3 Paving Phase

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8.3.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 8

8.3.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 130000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.3.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Off-Highway Trucks Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1303	0.0026	0.6573	0.5446	0.0215	0.0215	0.0117	260.37
Other Construction Equipment Composite								

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Plate Compactors Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0050	0.0001	0.0314	0.0263	0.0012	0.0012	0.0004	4.3251
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

8.3.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

9. Construction / Demolition

9.1 General Information & Timeline Assumptions

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Child Development Center

- Activity Description:
The CDC is a new 44,000-square foot facility.

- Activity Start Date
Start Month: 1
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.429486
SO_x	0.005015
NO_x	1.852769
CO	2.303914

Pollutant	Total Emissions (TONs)
PM 2.5	0.076686
Pb	0.000000
NH_3	0.001558
CO_2e	482.7

PM 10	0.250740			

9.1 Site Grading Phase

9.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 10

9.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 50000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 300

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

9.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e

Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

9.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

9.2 Trenching/Excavating Phase

9.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

9.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 1000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 100

- 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

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- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

9.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

9.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

9.3 Building Construction Phase

9.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2022

- Phase Duration

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Number of Month: 12
Number of Days: 0

9.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Commercial or Retail
Area of Building (ft^2): 44000
Height of Building (ft): 12
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

9.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0797	0.0013	0.5505	0.3821	0.0203	0.0203	0.0071	128.81
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0274	0.0006	0.1265	0.2146	0.0043	0.0043	0.0024	54.457

Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0340	0.0006	0.2783	0.2694	0.0116	0.0116	0.0030	61.069
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0260	0.0003	0.1557	0.1772	0.0077	0.0077	0.0023	25.661

- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

9.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.32 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.32 / 1000): Conversion Factor ft^3 to trips (0.32 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.05 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.05 / 1000): Conversion Factor ft^3 to trips (0.05 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

9.4 Architectural Coatings Phase

9.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 11
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

9.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 10000
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

9.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

9.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

10. Construction / Demolition

10.1 General Information & Timeline Assumptions

- Activity Location

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Munitions Storage Buildings

- Activity Description:
Two 2,160-square foot munitions storage buildings would be built within the existing Munitions Storage Area.

- Activity Start Date
Start Month: 4
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 11
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.127328
SO_x	0.001759
NO_x	0.489812
CO	0.735533
PM 10	0.026816

Pollutant	Total Emissions (TONs)
PM 2.5	0.017321
Pb	0.000000
NH_3	0.000500
CO_2e	170.1

10.1 Site Grading Phase

10.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 4

10.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 5000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 50

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8

Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

10.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

10.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

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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 (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

10.2 Trenching/Excavating Phase

10.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1

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Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 3

10.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 200
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 50

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

10.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

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- 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	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

10.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

10.3 Building Construction Phase

10.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 8
Number of Days: 0

10.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 5000
Height of Building (ft): 12
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

10.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0754	0.0013	0.5027	0.3786	0.0181	0.0181	0.0068	128.79
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0258	0.0006	0.1108	0.2145	0.0034	0.0034	0.0023	54.454
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

10.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

10.4 Architectural Coatings Phase

10.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2023

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- Phase Duration
Number of Month: 0
Number of Days: 14

10.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 3000
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

10.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

10.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

11. Aircraft

11.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: TAFB MQ-9 Base Operations - LTOs

- Activity Description:
MQ-9 Annual LTOs - TIMs values derived from noise analysis by AFCEC/CZTQ, except idle = ACAM defaults + minor addition from noise data. TIMs for trim tests from noise data.

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	3.172956
SO_x	0.280950
NO_x	2.727032
CO	2.668893
PM 10	0.504959

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.453740
Pb	0.000000
NH_3	0.000000
CO_2e	849.2

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	3.147236
SO_x	0.277254
NO_x	2.690554
CO	2.641403
PM 10	0.497993

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.447479
Pb	0.000000
NH_3	0.000000
CO_2e	838.0

- Activity Emissions [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.025720

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.006261

SO_x	0.003696		Pb	0.000000
NO_x	0.036478		NH_3	0.000000
CO	0.027489		CO_2e	11.2
PM 10	0.006966			

- Activity Emissions [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)		Pollutant	Emissions Per Year (TONs)
VOC	0.000000		PM 2.5	0.000000
SO_x	0.000000		Pb	0.000000
NO_x	0.000000		NH_3	0.000000
CO	0.000000		CO_2e	0.0
PM 10	0.000000			

11.2 Aircraft & Engines

11.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: MQ-9
Engine Model: TPE-331
Primary Function: Unmanned Aerial Vehicle
Aircraft has After burn: No
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

11.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
Idle	112.00	90.97	1.07	2.86	61.52	2.68	2.41	3234
Approach	250.00	0.74	1.07	9.92	6.96	2.40	2.16	3234
Intermediate	409.00	0.17	1.07	11.86	0.98	1.47	1.32	3234
Military	458.00	0.13	1.07	12.36	0.76	1.75	1.57	3234
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3234

11.3 Flight Operations

11.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 24
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 2820
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 0
Number of Annual Trim Test(s) per Aircraft: 12

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi/Idle Out [Idle] (mins): 6.8
Takeoff [Military] (mins): 5.7

Takeoff [After Burn] (mins): 0
Climb Out [Intermediate] (mins): 8.58
Approach [Approach] (mins): 7.36
Taxi/Idle In [Idle] (mins): 4.83

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test
Idle (mins): 12
Approach (mins): 27
Intermediate (mins): 9
Military (mins): 12
AfterBurn (mins): 0

11.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year
AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year
$AE_{LTO} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year
AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

11.4 Auxiliary Power Unit (APU)

11.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

11.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e

11.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year
$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs

EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

11.5 Aircraft Engine Test Cell

11.5.1 Aircraft Engine Test Cell Assumptions

- Engine Test Cell
Total Number of Aircraft Engines Tested Annually: 24

- Default Settings Used: Yes

- Annual Run-ups / Test Durations
Annual Run-ups (Per Aircraft Engine): 1 (default)
Idle Duration (mins): 12 (default)
Approach Duration (mins): 27 (default)
Intermediate Duration (mins): 9 (default)
Military Duration (mins): 12 (default)
After Burner Duration (mins): 0 (default)

11.5.2 Aircraft Engine Test Cell Emission Factor(s)

- See Aircraft & Engines Emission Factor(s)

11.5.3 Aircraft Engine Test Cell Formula(s)

- Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)
$TestCellPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * ARU / 2000$

$TestCellPS_{POL}$: Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Total Number of Engines (For All Aircraft)
ARU: Annual Run-ups (Per Aircraft Engine)
2000: Conversion Factor pounds to TONs

- Aircraft Engine Test Cell Emissions per Year
$TestCell = TestCellPS_{IDLE} + TestCellPS_{APPROACH} + TestCellPS_{INTERMEDIATE} + TestCellPS_{MILITARY} + TestCellPS_{AFTERBURN}$

TestCell: Aircraft Engine Test Cell Emissions (TONs)
$TestCellPS_{IDLE}$: Aircraft Engine Test Cell Emissions for Idle Power Setting (TONs)
$TestCellPS_{APPROACH}$: Aircraft Engine Test Cell Emissions for Approach Power Setting (TONs)
$TestCellPS_{INTERMEDIATE}$: Aircraft Engine Test Cell Emissions for Intermediate Power Setting (TONs)
$TestCellPS_{MILITARY}$: Aircraft Engine Test Cell Emissions for Military Power Setting (TONs)
$TestCellPS_{AFTERBURN}$: Aircraft Engine Test Cell Emissions for After Burner Power Setting (TONs)

11.6 Aerospace Ground Equipment (AGE)

11.6.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

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- AGE Usage
Number of Annual LTO (Landing and Take-off) cycles for AGE: 2820

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation

11.6.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e

11.6.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year
$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)
AGE: Total Number of Aerospace Ground Equipment
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

12. Aircraft

12.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: TAFB MQ-9 Base Operations - Closed Patterns

- Activity Description:
MQ-9 Closed Patterns. TIMs values derived from noise analysis by AFCEC/CZTQ.

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.027147
SO_x	0.091280

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.149465
Pb	0.000000

NO_x	0.990190	NH_3	0.000000
CO	0.228033	CO_2e	275.9
PM 10	0.166400		

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)	Pollutant	Emissions Per Year (TONs)
VOC	0.027147	PM 2.5	0.149465
SO_x	0.091280	Pb	0.000000
NO_x	0.990190	NH_3	0.000000
CO	0.228033	CO_2e	275.9
PM 10	0.166400		

12.2 Aircraft & Engines

12.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: MQ-9
Engine Model: TPE-331
Primary Function: Unmanned Aerial Vehicle
Aircraft has After burn: No
Number of Engines: 1

- Aircraft & Engine Surrogate
Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

12.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
Idle	112.00	90.97	1.07	2.86	61.52	2.68	2.41	3234
Approach	250.00	0.74	1.07	9.92	6.96	2.40	2.16	3234
Intermediate	409.00	0.17	1.07	11.86	0.98	1.47	1.32	3234
Military	458.00	0.13	1.07	12.36	0.76	1.75	1.57	3234
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3234

12.3 Flight Operations

12.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 24
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 0
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 11281
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
Taxi/Idle Out [Idle] (mins): 1.5
Takeoff [Military] (mins): 1.37
Takeoff [After Burn] (mins): 0

Climb Out [Intermediate] (mins): 0
Approach [Approach] (mins): 1.12
Taxi/Idle In [Idle] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test
Idle (mins): 12
Approach (mins): 27
Intermediate (mins): 9
Military (mins): 12
AfterBurn (mins): 0

12.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year
AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year
$AE_{LTO} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year
AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year
$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
AE_{TRIM} = $AEPS_{IDLE}$ + $AEPS_{APPROACH}$ + $AEPS_{INTERMEDIATE}$ + $AEPS_{MILITARY}$ + $AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

12.4 Auxiliary Power Unit (APU)

12.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

12.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e

12.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year
APU_{POL} = APU * OH * LTO * EF_{POL} / 2000

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

13. Personnel

13.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Personnel Commuting Activities

- Activity Description:
The beddown of a new MQ-9 Wing would bring an estimated 1,940 additional personnel to the selected base. The additional personnel would include 1,500 active duty USAF (300 officers and 1,200 enlisted) personnel, 300 DoD civilians, and an estimated 100 BOS personnel who would provide engineering, contracting, and other base support for the new MQ 9 Wing. An estimated 40 contractor personnel would be expected to accompany the MQ-9 Wing to provide system support.

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	4.347969
SO_x	0.029212
NO_x	3.507709
CO	49.833438
PM 10	0.077683

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.066142
Pb	0.000000
NH_3	0.268260
CO_2e	4472.0

13.2 Personnel Assumptions

- Number of Personnel
Active Duty Personnel: 1600
Civilian Personnel: 300
Support Contractor Personnel: 40
Air National Guard (ANG) Personnel: 0
Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule
Active Duty Personnel: 5 Days Per Week (default)

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Civilian Personnel: 5 Days Per Week (default)
Support Contractor Personnel: 5 Days Per Week (default)
Air National Guard (ANG) Personnel: 4 Days Per Week (default)
Reserve Personnel: 4 Days Per Month (default)

13.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

13.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

13.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year
$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)
NP: Number of Personnel
WD: Work Days per Year
AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year
$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)
VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)
VMT_C: Civilian Personnel Vehicle Miles Travel (miles)
VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)
VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)
VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year
$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{Total}: Total Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Personnel On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

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14. Heating

14.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Space and Water Heating Requirements

- Activity Description:
For the Ops Complex, MX Complex, Airman's Dormitory, Fitness Center, Childs Development Center, and Munitions Storage. Total square footage = 619,900. Used 50% of this area to simulate both space and water heating needs.

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.081096
SO_x	0.008847
NO_x	1.474476
CO	1.238560
PM 10	0.112060

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.112060
Pb	0.000000
NH_3	0.000000
CO_2e	1775.1

14.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 309950
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.0999

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

14.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

14.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

15. Degreaser

15.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Solvent Usage

- Activity Description:
Potential solvent usage for the Maintenance Complex.

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.651300
SO_x	0.000000
NO_x	0.000000
CO	0.000000
PM 10	0.000000

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.000000
Pb	0.000000
NH_3	0.000000
CO_2e	0.0

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15.2 Degreaser Assumptions

- Degreaser
Net solvent usage (total less recycle) (gallons/year): 200

- Default Settings Used: Yes

- Degreaser Consumption

Solvent used:	Mineral Spirits CAS#64475-85-0 (default)
Specific gravity of solvent:	0.78 (default)
Solvent VOC content (%):	100 (default)
Efficiency of control device (%):	0 (default)

15.3 Degreaser Formula(s)

- Degreaser Emissions per Year
DE_{VOC}= (VOC / 100) * NS * SG * 8.35 * (1 - (CD / 100)) / 2000

DE_{VOC}: Degreaser VOC Emissions (TONs per Year)
VOC: Solvent VOC content (%)
(VOC / 100): Conversion Factor percent to decimal
NS: Net solvent usage (total less recycle) (gallons/year)
SG: Specific gravity of solvent
8.35: Conversion Factor the density of water
CD: Efficiency of control device (%)
(1 - (CD / 100)): Conversion Factor percent to decimal (Not effected by control device)
2000: Conversion Factor pounds to tons

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ATTACHMENT 4

BEDDOWN OF MQ-9 OPERATIONAL WING AT VANDENBERG AFB - AIR CONFORMITY APPLICABILITY MODEL REPORTS

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AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF AIR ANALYSIS (ROAA)

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: VANDENBERG AFB
State: California
County(s): Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2021

e. Action Description:

Locate an MQ-9 RPA Wing at Vandenberg AFB, California. In addition to aircraft operations, this action includes construction activities.

f. Point of Contact:

Name: Chris Crabtree
Title: Air Quality Meteorologist
Organization: Leidos Corp.
Email: crabtreec@leidos.com
Phone Number: 805-566-6422

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

_____ applicable
__X__ not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA Prevention of Significant Deterioration Program (PSD) thresholds that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning whether the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality. Therefore, the worst-case year emissions were compared against the PSD Indicator and are summarized below.

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF AIR ANALYSIS (ROAA)

Analysis Summary:

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.689	250	No
NOx	2.303	250	No
CO	2.247	250	No
SOx	0.006	250	No
PM 10	0.266	250	No
PM 2.5	0.098	250	No
Pb	0.000	250	No
NH3	0.003	100	No
CO2e	569.8		
NOT IN A REGULATORY AREA			
VOC	0.000	250	No
NOx	0.000	250	No
CO	0.000	250	No
SOx	0.000	250	No
PM 10	0.000	250	No
PM 2.5	0.000	250	No
Pb	0.000	250	No
NH3	0.000	100	No
CO2e	0.0		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.322	250	No
NOx	2.860	250	No
CO	2.593	250	No
SOx	0.008	250	No
PM 10	4.938	250	No
PM 2.5	0.110	250	No
Pb	0.000	250	No
NH3	0.005	100	No
CO2e	772.4		
NOT IN A REGULATORY AREA			
VOC	0.000	250	No
NOx	0.000	250	No
CO	0.000	250	No
SOx	0.000	250	No
PM 10	0.000	250	No
PM 2.5	0.000	250	No
Pb	0.000	250	No
NH3	0.000	100	No
CO2e	0.0		

2023

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF AIR ANALYSIS (ROAA)

		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.422	250	No
NOx	1.773	250	No
CO	1.966	250	No
SOx	0.005	250	No
PM 10	2.751	250	No
PM 2.5	0.069	250	No
Pb	0.000	250	No
NH3	0.002	100	No
CO2e	495.0		
NOT IN A REGULATORY AREA			
VOC	0.000	250	No
NOx	0.000	250	No
CO	0.000	250	No
SOx	0.000	250	No
PM 10	0.000	250	No
PM 2.5	0.000	250	No
Pb	0.000	250	No
NH3	0.000	100	No
CO2e	0.0		

2024

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.416	250	No
NOx	1.403	250	No
CO	1.770	250	No
SOx	0.005	250	No
PM 10	1.633	250	No
PM 2.5	0.051	250	No
Pb	0.000	250	No
NH3	0.002	100	No
CO2e	439.9		
NOT IN A REGULATORY AREA			
VOC	0.000	250	No
NOx	0.000	250	No
CO	0.000	250	No
SOx	0.000	250	No
PM 10	0.000	250	No
PM 2.5	0.000	250	No
Pb	0.000	250	No
NH3	0.000	100	No
CO2e	0.0		

2025

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	250	No
NOx	0.000	250	No
CO	0.000	250	No

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF AIR ANALYSIS (ROAA)

SOx	0.000	250	No
PM 10	0.000	250	No
PM 2.5	0.000	250	No
Pb	0.000	250	No
NH3	0.000	100	No
CO2e	0.0		
NOT IN A REGULATORY AREA			
VOC	7.304	250	No
NOx	8.091	250	No
CO	27.527	250	No
SOx	0.399	250	No
PM 10	1.437	250	No
PM 2.5	1.072	250	No
Pb	0.000	250	No
NH3	0.269	100	No
CO2e	8540.6		

2026 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	250	No
NOx	0.000	250	No
CO	0.000	250	No
SOx	0.000	250	No
PM 10	0.000	250	No
PM 2.5	0.000	250	No
Pb	0.000	250	No
NH3	0.000	100	No
CO2e	0.0		
NOT IN A REGULATORY AREA			
VOC	7.304	250	No
NOx	8.091	250	No
CO	27.527	250	No
SOx	0.399	250	No
PM 10	1.437	250	No
PM 2.5	1.072	250	No
Pb	0.000	250	No
NH3	0.269	100	No
CO2e	8540.6		

None of estimated emissions associated with this action are above the PSD indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Chris Crabtree, Air Quality Meteorologist

DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location
Base: VANDENBERG AFB
State: California
County(s): Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2021

- Action Purpose and Need:
To ensure implementation of ACC objectives to efficiently and effectively maintain combat capability and mission readiness.

- Action Description:
Locate an MQ-9 RPA Wing at Vandenberg AFB, California. In addition to aircraft operations, this action includes construction activities.

- Point of Contact
Name: Chris Crabtree
Title: Air Quality Meteorologist
Organization: Leidos Corp.
Email: crabtreec@leidos.com
Phone Number: 805-566-6422

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Construct Operations Complex for MQ-9
3.	Construction / Demolition	Construct Maintenance Complex for MQ-9
4.	Construction / Demolition	Ground Data Terminal Foundations and Towers for MQ-9
5.	Construction / Demolition	Construct Fitness Center for MQ-9
6.	Construction / Demolition	Construct Airmen Dormitory for MQ-9
7.	Construction / Demolition	Install Infrastructure and Communication Conduit Extensions for MQ-9
8.	Construction / Demolition	Construct MQ-9 Parking Ramp and Taxiways
9.	Aircraft	VAFB MQ-9 Base Operations - LTOs
10.	Aircraft	VAFB MQ-9 Base Operations - Closed Patterns
11.	Personnel	Personnel Commuting Activities
12.	Heating	Space and Water Heating Requirements
13.	Degreaser	Solvent Usage

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity Location
County: Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Operations Complex for MQ-9

- Activity Description:
Renovate the interior of Building 8401 to house the Wing Headquarters (HQ)/Operations Group/Operations Support Squadron/Squadron Operations Center, two Attack Squadrons, and PMATS/dwell space. ~130,000 sf of renovation. Also includes utilities and a parking lot 20,000 sf.

Two generators (with fencing) would be needed to support the Attack Squadrons and SOC.
Four 50-foot by 50-foot concrete pads would need to be constructed on the exterior to the building to support four satellite communications antennas with a supporting generator

- Activity Start Date
Start Month: 1
Start Month: 2021

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2021

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.688747
SO_x	0.005918
NO_x	2.302657
CO	2.246858
PM 10	0.266307

Pollutant	Total Emissions (TONs)
PM 2.5	0.097711
Pb	0.000000
NH_3	0.003196
CO_2e	569.8

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 0
Number of Days: 4

2.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 20000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 200

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.2 Trenching/Excavating Phase

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

2.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 1
Number of Days: 0

2.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 12500
Amount of Material to be Hauled On-Site (yd^3): 2000
Amount of Material to be Hauled Off-Site (yd^3): 2000

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

2.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.3 Building Construction Phase

2.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 12
Number of Days: 0

2.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 130000
Height of Building (ft): 25
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

2.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0845	0.0013	0.6033	0.3865	0.0228	0.0228	0.0076	128.82
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0293	0.0006	0.1458	0.2148	0.0056	0.0056	0.0026	54.462
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0362	0.0006	0.2977	0.2707	0.0130	0.0130	0.0032	61.074
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0280	0.0003	0.1634	0.1787	0.0088	0.0088	0.0025	25.665

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

2.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (0.42 / 1000) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.4 Architectural Coatings Phase

2.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 1
Number of Days: 0

2.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 30000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

2.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 0
Number of Days: 10

2.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 20000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

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- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

2.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre$)^2$ / acre)

3. Construction / Demolition

3.1 General Information & Timeline Assumptions

- Activity Location
County: Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Maintenance Complex for MQ-9

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- Activity Description:

Includes Maintenance Group HQ, Aircraft Maintenance Squadron, AMU, Aircraft Maintenance Communications Unit, LR Attack Squadron, utilities, and associated parking lot. LR Squadron requirements include constructing a new 20,000-square foot facility located on the flight line. Two MGCSs would be placed on an exterior 70-foot
by 70-foot concrete pad with up to four ECUs and up to three generators (with fencing). ~365,000 sf of buildings construction. Also includes a parking lot for up to 330 vehicles (108,900 sf).

- Activity Start Date

Start Month: 1
Start Month: 2022

- Activity End Date

Indefinite: False
End Month: 12
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.322443
SO_x	0.007852
NO_x	2.860286
CO	2.593400
PM 10	4.938300

Pollutant	Total Emissions (TONs)
PM 2.5	0.109745
Pb	0.000000
NH_3	0.005331
CO_2e	772.4

3.1 Site Grading Phase

3.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2022

- Phase Duration

Number of Month: 1
Number of Days: 0

3.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft^2): 473900
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 5000

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	1	8
Graders Composite	1	8
Other Construction Equipment Composite	1	8

Rubber Tired Dozers Composite	1	8
Scrapers Composite	2	8
Tractors/Loaders/Backhoes Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0648	0.0013	0.3170	0.5103	0.0136	0.0136	0.0058	119.72
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1723	0.0026	1.1176	0.7579	0.0447	0.0447	0.0155	262.87
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

3.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

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$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

3.2 Trenching/Excavating Phase

3.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

3.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 10000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 200

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0648	0.0013	0.3170	0.5103	0.0136	0.0136	0.0058	119.72
Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e

Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1723	0.0026	1.1176	0.7579	0.0447	0.0447	0.0155	262.87
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

3.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3.3 Building Construction Phase

3.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 10
Number of Days: 0

3.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 300000
Height of Building (ft): 25
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

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Cranes Composite	1	7
Forklifts Composite	2	7
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

3.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0797	0.0013	0.5505	0.3821	0.0203	0.0203	0.0071	128.81
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0274	0.0006	0.1265	0.2146	0.0043	0.0043	0.0024	54.457
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0340	0.0006	0.2783	0.2694	0.0116	0.0116	0.0030	61.069
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0260	0.0003	0.1557	0.1772	0.0077	0.0077	0.0023	25.661

- 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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699

MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

3.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)

BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3.4 Architectural Coatings Phase

3.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 2
Number of Days: 0

3.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 80000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

3.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

3.5 Paving Phase

3.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

3.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 108900

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day

Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0648	0.0013	0.3170	0.5103	0.0136	0.0136	0.0058	119.72
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1723	0.0026	1.1176	0.7579	0.0447	0.0447	0.0155	262.87
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

3.5.4 Paving Phase Formula(s)

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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
$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre$)^2$ / acre)

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4. Construction / Demolition

4.1 General Information & Timeline Assumptions

- Activity Location
County: Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Ground Data Terminal Foundations and Towers for MQ-9

- Activity Description:
Up to seven Ground Data Terminal foundations and towers would be built along the northeast side of the runway. They would consist of 12-foot by 12-foot concrete pads, with towers up to 60 feet tall. A 1.1 mile long 12-foot wide one-lane Access Road (unpaved) would be built to connect to the three towers that would not be accessible from existing airfield taxiway pavement.

- Activity Start Date
Start Month: 5
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 8
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.056901
SO_x	0.001238
NO_x	0.419835
CO	0.408246
PM 10	0.179935

Pollutant	Total Emissions (TONs)
PM 2.5	0.014943
Pb	0.000000
NH_3	0.000895
CO_2e	121.5

4.1 Site Grading Phase

4.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 5

4.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 70000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 400

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- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

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4.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.2 Trenching/Excavating Phase

4.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 4

4.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 1000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 560

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e

Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

4.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.3 Building Construction Phase

4.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 2
Number of Days: 0

4.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 50000
Height of Building (ft): 25
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

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Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

4.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0754	0.0013	0.5027	0.3786	0.0181	0.0181	0.0068	128.79
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0258	0.0006	0.1108	0.2145	0.0034	0.0034	0.0023	54.454
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0320	0.0006	0.2612	0.2683	0.0103	0.0103	0.0028	61.065
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0242	0.0003	0.1487	0.1761	0.0067	0.0067	0.0021	25.657

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

4.3.4 Building Construction Phase Formula(s)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5. Construction / Demolition

5.1 General Information & Timeline Assumptions

- Activity Location
County: Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Fitness Center for MQ-9

- Activity Description:
The Fitness Center would be an addition/alteration that would add 38,700 square feet to the current Fitness Center and parking areas (10,000 sf addition).

- Activity Start Date
Start Month: 5
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.307818
SO_x	0.003022
NO_x	1.032398
CO	1.240129
PM 10	0.157896

Pollutant	Total Emissions (TONs)
PM 2.5	0.040339
Pb	0.000000
NH_3	0.001134
CO_2e	287.0

5.1 Site Grading Phase

5.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 5

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

5.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft^2): 50000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 100

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845

LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

5.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

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$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.2 Trenching/Excavating Phase

5.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 10

5.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 250
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 50

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

5.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

5.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.3 Building Construction Phase

5.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 7
Number of Days: 0

5.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 38700
Height of Building (ft): 15
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

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- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

5.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0754	0.0013	0.5027	0.3786	0.0181	0.0181	0.0068	128.79
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0258	0.0006	0.1108	0.2145	0.0034	0.0034	0.0023	54.454
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0320	0.0006	0.2612	0.2683	0.0103	0.0103	0.0028	61.065
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0242	0.0003	0.1487	0.1761	0.0067	0.0067	0.0021	25.657

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468

LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

5.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.4 Architectural Coatings Phase

5.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

5.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 12000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718

LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

5.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

5.5 Paving Phase

5.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 5

5.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 10000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

5.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_P = (2.62 * PA) / 43560

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

6. Construction / Demolition

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

6.1 General Information & Timeline Assumptions

- Activity Location
County: Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Airmen Dormitory for MQ-9

- Activity Description:
A new 68,200-square foot building. No new parking area needed due to existing facilities..

- Activity Start Date
Start Month: 4
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.375540
SO_x	0.003725
NO_x	1.191150
CO	1.447930
PM 10	1.615437

Pollutant	Total Emissions (TONs)
PM 2.5	0.043085
Pb	0.000000
NH_3	0.001640
CO_2e	356.8

6.1 Site Grading Phase

6.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 7

6.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 682000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 600

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day

Excavators Composite	1	8
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Scrapers Composite	2	8
Tractors/Loaders/Backhoes Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0584	0.0013	0.2523	0.5090	0.0100	0.0100	0.0052	119.71
Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Scrapers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1564	0.0026	0.9241	0.7301	0.0368	0.0368	0.0141	262.83
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- 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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

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6.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

6.2 Trenching/Excavating Phase

6.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 10

6.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 1000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 50

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e

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Emission Factors	0.0584	0.0013	0.2523	0.5090	0.0100	0.0100	0.0052	119.71
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1564	0.0026	0.9241	0.7301	0.0368	0.0368	0.0141	262.83
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- 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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

6.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

6.3 Building Construction Phase

6.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 8
Number of Days: 0

6.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 68200
Height of Building (ft): 20
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

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- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

6.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	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**
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**	**CH_4**	**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**	**CH_4**	**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**	**CH_4**	**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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468

LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

6.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (0.42 / 1000) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

6.4 Architectural Coatings Phase

6.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 11
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

6.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 16000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718

LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

6.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

7. Construction / Demolition

7.1 General Information & Timeline Assumptions

- Activity Location
County: Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Install Infrastructure and Communication Conduit Extensions for MQ-9

- Activity Description:
Power, base communication, water, and wastewater lines would need to be extended to facilities. Infrastructure capabilities are accessible to all facilities and can be extended to the facilities using disturbed corridors.

- Activity Start Date
Start Month: 7
Start Month: 2024

- Activity End Date
Indefinite: False

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End Month: 9
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.040522
SO_x	0.000878
NO_x	0.212074
CO	0.321748
PM 10	0.017818

Pollutant	Total Emissions (TONs)
PM 2.5	0.007422
Pb	0.000000
NH_3	0.000244
CO_2e	83.2

7.1 Trenching/Excavating Phase

7.1.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

7.1.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 1000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 50

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC

POVs	50.00	50.00	0	0	0	0	0

7.1.3 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	000.240	000.004	000.179	002.019	000.047	000.020		000.034	00349.301
LDGT	000.529	000.004	000.390	003.951	000.049	000.022		000.034	00438.299
HDGV	001.133	000.012	002.177	017.401	000.185	000.079		000.045	01175.364
LDDV	000.057	000.003	000.387	000.455	000.084	000.055		000.008	00322.805
LDDT	000.127	000.004	000.747	000.768	000.138	000.107		000.008	00404.546
HDDV	000.429	000.015	008.814	001.758	000.338	000.240		000.029	01587.930
MC	004.838	000.002	001.285	028.044	000.019	000.009		000.050	00181.592

7.1.4 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)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

7.2 Building Construction Phase

7.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 0

7.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 10000
Height of Building (ft): 15
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

7.2.3 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
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- 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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

7.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8. Construction / Demolition

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8.1 General Information & Timeline Assumptions

- Activity Location
County: Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct MQ-9 Parking Ramp and Taxiways

- Activity Description:
Requires 240,000 sf of new surfaces.

- Activity Start Date
Start Month: 4
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 5
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.057011
SO_x	0.000876
NO_x	0.320793
CO	0.317808
PM 10	2.413288

Pollutant	Total Emissions (TONs)
PM 2.5	0.013512
Pb	0.000000
NH_3	0.000311
CO_2e	86.5

8.1 Site Grading Phase

8.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

8.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 240000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 4000

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day

Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	2	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

8.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)

WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.2 Trenching/Excavating Phase

8.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

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Start Month: 5
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 5

8.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 5000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 50

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								

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	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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

8.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.3 Paving Phase

8.3.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 15

8.3.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 240000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Pavers Composite	1	8
Paving Equipment Composite	2	6
Rollers Composite	2	6

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

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- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.3.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

8.3.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

9. Aircraft

9.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: VAFB MQ-9 Base Operations - LTOs

- Activity Description:
MQ-9 Annual LTOs. LTO TIMs for Approach, Climbout, and Military engine setting derived from the noise analysis by AFCEC/CZTQ and Idle engine settings are ACAM defaults. For Trim Tests, used noise data, which has twice the total annual usage/aircraft as ACAM defaults, but they only include Interm. and Military engine throttle settings.

- Activity Start Date
Start Month: 1

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Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	3.042023
SO_x	0.155509
NO_x	1.359928
CO	2.390866
PM 10	0.303654

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.272946
Pb	0.000000
NH_3	0.000000
CO_2e	470.0

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	3.016304
SO_x	0.151813
NO_x	1.323450
CO	2.363377
PM 10	0.296687

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.266685
Pb	0.000000
NH_3	0.000000
CO_2e	458.8

- Activity Emissions [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.025720
SO_x	0.003696
NO_x	0.036478
CO	0.027489
PM 10	0.006966

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.006261
Pb	0.000000
NH_3	0.000000
CO_2e	11.2

- Activity Emissions [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO_x	0.000000
NO_x	0.000000
CO	0.000000
PM 10	0.000000

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.000000
Pb	0.000000
NH_3	0.000000
CO_2e	0.0

9.2 Aircraft & Engines

9.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: MQ-9
Engine Model: TPE-331
Primary Function: Unmanned Aerial Vehicle
Aircraft has After burn: No
Number of Engines: 1

- Aircraft & Engine Surrogate
Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

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9.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
Idle	112.00	90.97	1.07	2.86	61.52	2.68	2.41	3234
Approach	250.00	0.74	1.07	9.92	6.96	2.40	2.16	3234
Intermediate	409.00	0.17	1.07	11.86	0.98	1.47	1.32	3234
Military	458.00	0.13	1.07	12.36	0.76	1.75	1.57	3234
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3234

9.3 Flight Operations

9.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 24
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 2820
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 0
Number of Annual Trim Test(s) per Aircraft: 12

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi/Idle Out [Idle] (mins): 6.8
Takeoff [Military] (mins): 1.89
Takeoff [After Burn] (mins): 0
Climb Out [Intermediate] (mins): 2.57
Approach [Approach] (mins): 4.41
Taxi/Idle In [Idle] (mins): 4.4

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins): 12
Approach (mins): 27
Intermediate (mins): 9
Military (mins): 12
AfterBurn (mins): 0

9.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year

AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
LTO: Number of Landing and Take-off Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)

$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

9.4 Auxiliary Power Unit (APU)

9.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

9.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e

9.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year
$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

9.5 Aircraft Engine Test Cell

9.5.1 Aircraft Engine Test Cell Assumptions

- Engine Test Cell
Total Number of Aircraft Engines Tested Annually: 24

- Default Settings Used: Yes

- Annual Run-ups / Test Durations
Annual Run-ups (Per Aircraft Engine): 1 (default)
Idle Duration (mins): 12 (default)
Approach Duration (mins): 27 (default)
Intermediate Duration (mins): 9 (default)
Military Duration (mins): 12 (default)
After Burner Duration (mins): 0 (default)

9.5.2 Aircraft Engine Test Cell Emission Factor(s)

- See Aircraft & Engines Emission Factor(s)

9.5.3 Aircraft Engine Test Cell Formula(s)

- Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)
$TestCellPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * ARU / 2000$

$TestCellPS_{POL}$: Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Total Number of Engines (For All Aircraft)
ARU: Annual Run-ups (Per Aircraft Engine)
2000: Conversion Factor pounds to TONs

- Aircraft Engine Test Cell Emissions per Year
$TestCell = TestCellPS_{IDLE} + TestCellPS_{APPROACH} + TestCellPS_{INTERMEDIATE} + TestCellPS_{MILITARY} + TestCellPS_{AFTERBURN}$

TestCell: Aircraft Engine Test Cell Emissions (TONs)
$TestCellPS_{IDLE}$: Aircraft Engine Test Cell Emissions for Idle Power Setting (TONs)
$TestCellPS_{APPROACH}$: Aircraft Engine Test Cell Emissions for Approach Power Setting (TONs)
$TestCellPS_{INTERMEDIATE}$: Aircraft Engine Test Cell Emissions for Intermediate Power Setting (TONs)
$TestCellPS_{MILITARY}$: Aircraft Engine Test Cell Emissions for Military Power Setting (TONs)
$TestCellPS_{AFTERBURN}$: Aircraft Engine Test Cell Emissions for After Burner Power Setting (TONs)

9.6 Aerospace Ground Equipment (AGE)

9.6.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage
Number of Annual LTO (Landing and Take-off) cycles for AGE: 2820

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation

9.6.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e

9.6.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year
$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)
AGE: Total Number of Aerospace Ground Equipment
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

10. Aircraft

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10.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: VAFB MQ-9 Base Operations - Closed Patterns

- Activity Description:
MQ-9 Closed Patterns. Aircraft TIMs from the noise analysis and estimated by AFCEC/CZTQ.

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.092017
SO_x	0.185080
NO_x	1.859805
CO	0.838166
PM 10	0.376791

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.338817
Pb	0.000000
NH_3	0.000000
CO_2e	559.4

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.092017
SO_x	0.185080
NO_x	1.859805
CO	0.838166
PM 10	0.376791

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.338817
Pb	0.000000
NH_3	0.000000
CO_2e	559.4

10.2 Aircraft & Engines

10.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: MQ-9
Engine Model: TPE-331
Primary Function: Unmanned Aerial Vehicle
Aircraft has After burn: No
Number of Engines: 1

- Aircraft & Engine Surrogate
Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

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10.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
Idle	112.00	90.97	1.07	2.86	61.52	2.68	2.41	3234
Approach	250.00	0.74	1.07	9.92	6.96	2.40	2.16	3234
Intermediate	409.00	0.17	1.07	11.86	0.98	1.47	1.32	3234
Military	458.00	0.13	1.07	12.36	0.76	1.75	1.57	3234
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3234

10.3 Flight Operations

10.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 24
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 0
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 11281
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi/Idle Out [Idle] (mins): 1.56
Takeoff [Military] (mins): 1.37
Takeoff [After Burn] (mins): 0
Climb Out [Intermediate] (mins): 0
Approach [Approach] (mins): 4.85
Taxi/Idle In [Idle] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins): 12
Approach (mins): 27
Intermediate (mins): 9
Military (mins): 12
AfterBurn (mins): 0

10.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year

AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

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- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

10.4 Auxiliary Power Unit (APU)

10.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

10.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e

10.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

11. Personnel

11.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Personnel Commuting Activities

- Activity Description:
The beddown of a new MQ-9 Wing would bring an estimated 1,940 additional personnel to the selected base. The additional personnel would include 1,500 active duty USAF (300 officers and 1,200 enlisted) personnel, 300 DoD civilians, and an estimated 100 BOS personnel who would provide engineering, contracting, and other base support for the new MQ 9 Wing. An estimated 40 contractor personnel would be expected to accompany the MQ 9 Wing to provide system support.

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes

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End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	3.351203
SO_x	0.039864
NO_x	1.821821
CO	21.736703
PM 10	0.525016

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.228244
Pb	0.000000
NH_3	0.268682
CO_2e	3839.7

11.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 1600
Civilian Personnel: 300
Support Contractor Personnel: 40
Air National Guard (ANG) Personnel: 0
Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel: 5 Days Per Week (default)
Civilian Personnel: 5 Days Per Week (default)
Support Contractor Personnel: 5 Days Per Week (default)
Air National Guard (ANG) Personnel: 4 Days Per Week (default)
Reserve Personnel: 4 Days Per Month (default)

11.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

11.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

11.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)
NP: Number of Personnel
WD: Work Days per Year
AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year
$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)
VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)
VMT_C: Civilian Personnel Vehicle Miles Travel (miles)
VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)
VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)
VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year
$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{Total}: Total Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Personnel On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

12. Heating

12.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Space and Water Heating Requirements

- Activity Description:
For the Ops Complex, MX Complex, Airman's Dormitory, and Fitness Center. Total square footage = 556,900. Used this area to simulate both space and water heating needs.

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.167733

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.231776

SO_x	0.018298
NO_x	3.049690
CO	2.561740
PM 10	0.231776

Pb	0.000000
NH_3	0.000000
CO_2e	3671.5

12.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 556900
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.115

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

12.3 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

12.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year
FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement (MMBtu/ft^2)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year
HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

13. Degreaser

13.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity Location
County: Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Solvent Usage

- Activity Description:
Potential solvent usage for the Maintenance Complex.

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.651300
SO_x	0.000000
NO_x	0.000000
CO	0.000000
PM 10	0.000000

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.000000
Pb	0.000000
NH_3	0.000000
CO_2e	0.0

13.2 Degreaser Assumptions

- Degreaser
Net solvent usage (total less recycle) (gallons/year): 200

- Default Settings Used: Yes

- Degreaser Consumption
Solvent used: Mineral Spirits CAS#64475-85-0 (default)
Specific gravity of solvent: 0.78 (default)
Solvent VOC content (%): 100 (default)
Efficiency of control device (%): 0 (default)

13.3 Degreaser Formula(s)

- Degreaser Emissions per Year
DE_{VOC}= (VOC / 100) * NS * SG * 8.35 * (1 - (CD / 100)) / 2000

DE_{VOC}: Degreaser VOC Emissions (TONs per Year)
VOC: Solvent VOC content (%)
(VOC / 100): Conversion Factor percent to decimal
NS: Net solvent usage (total less recycle) (gallons/year)
SG: Specific gravity of solvent
8.35: Conversion Factor the density of water
CD: Efficiency of control device (%)
(1 - (CD / 100)): Conversion Factor percent to decimal (Not effected by control device)
2000: Conversion Factor pounds to tons

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ATTACHMENT 5

ESTIMATIONS OF TYNDALL AFB BASELINE EMISSIONS INVENTORIES - AIR CONFORMITY APPLICABILITY MODEL REPORTS

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Table C-5-1. Annual 2013 Mobile Source Emissions Inventory - Tyndall AFB.

	Tons per Year								
Scenario/Source Type	*VOC*	*CO*	*NO_X*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*	*CO_2e (mt)*	*Total HAPs*
Aircraft Operations	18.77	100.37	109.60	11.93	32.97	28.38	32,418	29,470	0.69
Aerospace Ground Equipment	2.43	6.30	29.37	2.00	2.15	2.15	1,589	1,445	0.04
Nonroad Equipment	8.24	22.67	101.26	6.69	7.18	7.18	385	350	0.14
On-road Vehicles	6.63	70.37	5.96	0.08	0.26	0.13	4,410	4,009	0.58
Total - 2013	**36.07**	**199.71**	**246.19**	**20.70**	**42.56**	**37.84**	**38,802**	**35,274**	**1.45**

Source: AFCEC 2014.

Note: The 2013 emissions inventory did not estimate GHG emissions. Therefore, CO2e for AC, AGE, and on-road based on the ratio of CO2/SO2 emissions and nonroad based on the ratio of CO2/CO emissions. HAPs for on-road =HAPs/PM10 ratio from 2017 Bay County EI.

Table C-5-2. Annual 2013 Aircraft Idling Durations - Tyndall AFB.

Aircraft Type	*Idling (Min)*
F-4	16,874
F-22	78,970
F-15	11,324
F-16	18,178
T-1	672
T-38	2,592
E-3	6,996
C-130	3,657
C-17	1,908
C-141	1,034
C-5	1,876
KC-10	2,067
KC-135	7,871
B-737	1,352
Total Idling	**155,371**
Total F-22 and T-38 Idling	**81,562**
F-22s and T-38s Fraction of Total Idling	**0.52**

Source: AFCEC 2014.

Table C-5-3. Annual 2013 Mobile Source Emissions Inventory for F-22 and T-38 Aircraft Operations and AGE Usages - Tyndall AFB.

Scenario/Source Type	Tons per Year							CO_2e (mt)	Total HAPs
	VOC	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2e		
Aircraft Operations									
F-22 Aircraft Operations (1)	0.22	33.06	33.20	4.84	8.65	7.56	13,037	11,852	0.21
T-38 Aircraft Operations (1)	0.06	7.21	0.07	0.05	0.13	0.08	139	127	0.04
Total - F-22 and T-38 Aircraft Operations	**0.28**	**40.27**	**33.27**	**4.89**	**8.78**	**7.64**	**13,177**	**11,979**	**0.25**
AGE Usages									
F-22 and T-38 AGE Usages	1.28	3.31	15.42	1.05	1.13	1.13	834	758	0.02
Total - F-22 and T-38 AGE Usages	**1.28**	**3.31**	**15.42**	**1.05**	**1.13**	**1.13**	**834**	**758**	**0.02**

Note: (1) Source: AFCEC 2014.

Table C-5-4. Annual 2013 Mobile Source Emissions Inventory without F-22 and T-38 Aircraft Operations and AGE Usages - Tyndall AFB.

Scenario/Source Type	Tons per Year							CO_2e (mt)	Total HAPs
	VOC	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2e		
Aircraft Operations	18.49	60.10	76.33	7.04	24.19	20.74	19,241	17,492	0.44
Aerospace Ground Equipment	1.15	2.99	13.95	0.95	1.02	1.02	755	686	0.02
Nonroad Equipment	8.24	22.67	101.26	6.69	7.18	7.18	385	350	0.14
On-road Vehicles	6.63	70.37	5.96	0.08	0.26	0.13	4,410	4,009	0.58
Total - 2013 without F-22s and T-38s	**34.51**	**156.13**	**197.50**	**14.76**	**32.65**	**29.07**	**24,791**	**22,537**	**1.18**

Table C-5-5. Annual 2017 F-22, T-38, and F-35A Aircraft Operations and AGE Usages - Tyndall AFB.

Scenario/Source Type	Tons per Year							CO_2e (mt)	Total HAPs
	VOC	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2e		
F-22s									
Aircraft Operations	9.40	364.09	152.18	19.66	30.32	24.22	52,958	48,144	0.35
Aerospace Ground Equipment	13.83	24.26	39.78	2.79	4.10	3.98	2,095	1,905	0.23
T-38s									
Aircraft Operations	33.39	210.87	3.19	1.86	5.91	4.61	5,178	4,707	1.23
Aerospace Ground Equipment	0.64	1.05	4.89	0.18	0.71	0.69	264	240	0.01
F-35As									
Aircraft Operations	0.01	1.36	17.50	1.18	1.48	1.33	3,547	3,225	0.00
Aerospace Ground Equipment	0.06	0.11	0.18	0.01	0.02	0.02	9	8	0.00
Total Aircraft Operations	**42.80**	**576.32**	**172.87**	**22.70**	**37.71**	**30.16**	**61,683**	**56,075**	**1.57**
Total AGE Usages	**14.53**	**25.42**	**44.85**	**2.98**	**4.83**	**4.69**	**2,368**	**2,153**	**0.24**

Note: Estimated with the use of TAFB year 2015 actual operations for F-22s and T-38s + 2018 projected F-35A operations from the 2016 AICUZ report and input into ACAM.

Table C-5-6. Annual Base Populations - Tyndall AFB.

Year	*Population*
2013	7,919
2017	10,715
2019	7,367

Source: 2017 and 2019 (EIS Table 3.1-35) and 2013 (2009 EA).

Table C-5-7. Estimated Annual 2017 Emissions Inventory with F-22, T-38, and F-35A Aircraft Operations and AGE Usages - Tyndall AFB.

	Tons per Year								
Scenario/Source Type	*VOC*	*CO*	*NO_X*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*	*CO_2e (mt)*	*Total HAPs*
Aircraft Operations	61.29	636.42	249.20	29.74	61.90	50.90	80,924	73,567	2.01
Aerospace Ground Equipment	15.68	28.41	58.80	3.93	5.85	5.71	3,123	2,839	0.26
Nonroad Equipment	11.15	30.67	137.01	9.05	9.72	9.72	521	474	0.19
On-road Vehicles	8.97	95.22	8.06	0.11	0.35	0.18	5,967	5,424	0.79
Stationary Sources	4.69	7.15	11.14	0.78	0.17				0.06
Total - 2017	**101.78**	**797.87**	**464.22**	**43.61**	**77.99**	**66.50**	**90,535**	**82,304**	**3.31**
Bay County 2017 Emissions	**31,416**	**32,545**	**9,040**	**2,066**	**7,918**	**2,506**		**7,657,264**	**4,353**
TAFB 2017 Emissions % of Bay County 2017 Emissions	**0.32%**	**2.45%**	**5.14%**	**2.11%**	**0.98%**	**2.65%**		**1.07%**	**0.08%**

Table C-5-8. Estimated Annual 2019 Emissions Inventory without F-22 and T-38 Aircraft Operations and AGE Usages - Tyndall AFB.

	Tons per Year								
Scenario/Source Type	*VOC*	*CO*	*NO_X*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*	*CO_2e (mt)*	*Total HAPs*
Aircraft Operations	18.50	61.46	93.83	8.22	25.67	22.07	22,788	20,716	0.44
Aerospace Ground Equipment	1.21	3.10	14.13	0.96	1.04	1.04	764	695	0.02
Nonroad Equipment	7.67	21.09	94.20	6.22	6.68	6.68	359	326	0.13
On-road Vehicles	6.17	65.46	5.54	0.07	0.24	0.12	4,102	3,729	0.54
Stationary Sources	2.05	2.14	7.92	0.44	0.47				0.54
Total - 2019	**35.60**	**153.26**	**215.63**	**15.92**	**34.10**	**29.91**	**28,013**	**25,466**	**1.68**
Bay County 2017 Emissions	**31,416**	**32,545**	**9,040**	**2,066**	**7,918**	**2,506**		**7,657,264**	**4,353**
TAFB 2019 Emissions % of Bay County 2017 Emissions	**0.11%**	**0.47%**	**2.39%**	**0.77%**	**0.43%**	**1.19%**		**0.33%**	**0.04%**

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location
Base: TYNDALL AFB
State: Florida
County(s): Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2017

- Action Purpose and Need:
To ensure implementation of ACC objectives to efficiently and effectively maintain combat capability and mission readiness.

- Action Description:
This analysis pertains to the estimation of emissions for F-22, T-38, and F-35A aircraft operations at Tyndall AFB, Florida in 2017.

- Point of Contact
Name: Chris Crabtree
Title: Air Quality Meteorologist
Organization: Leidos Corp.
Email: crabtreec@leidos.com
Phone Number: 805-566-6422

- Activity List:

Activity Type		
2.	Aircraft	F-35A 2017 Annual Operations
3.	Aircraft	F-22 2017 Annual Operations
4.	Aircraft	T-38 2017 Annual Operations

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. Aircraft

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: F-35A 2017 Annual Operations

- Activity Description:

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

F-35A 2017 Annual Operations

- Activity Start Date
Start Month: 1
Start Year: 2017

- Activity End Date
Indefinite: No
End Month: 12
End Year: 2017

- Activity Emissions:

Pollutant				
VOC	0.067880		PM 2.5	1.348022
SO_x	1.193742		Pb	0.000000
NO_x	17.678356		NH_3	0.000000
CO	1.472365		CO_2e	3556.8
PM 10	1.497330			

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant				
VOC	0.005906		PM 2.5	1.330188
SO_x	1.181258		Pb	0.000000
NO_x	17.500022		NH_3	0.000000
CO	1.363619		CO_2e	3547.4
PM 10	1.478946			

- Activity Emissions [Aerospace Ground Equipment (AGE) part]:

Pollutant				
VOC	0.061975		PM 2.5	0.017834
SO_x	0.012484		Pb	0.000000
NO_x	0.178334		NH_3	0.000000
CO	0.108746		CO_2e	9.4
PM 10	0.018384			

2.2 Aircraft & Engines

2.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-35A
Engine Model: F135-PW-100
Primary Function: Combat
Aircraft has After burn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate
Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

2.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

2.3 Flight Operations

2.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:	0
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft:	35
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft:	3415
Number of Annual Trim Test(s) per Aircraft:	12

- Default Settings Used: Yes

- Flight Operations TIMs (Time In Mode)

Taxi/Idle Out [Idle] (mins):	18.5 (default)
Takeoff [Military] (mins):	1.065 (default)
Takeoff [After Burn] (mins):	0.013 (default)
Climb Out [Intermediate] (mins):	0.012 (default)
Approach [Approach] (mins):	2.501 (default)
Taxi/Idle In [Idle] (mins):	11.3 (default)

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12 (default)
Approach (mins):	27 (default)
Intermediate (mins):	9 (default)
Military (mins):	9 (default)
AfterBurn (mins):	3 (default)

2.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year
AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year
AE_{TGO} = $AEM_{APPROACH}$ + $AEM_{CLIMBOUT}$ + $AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
AE_{TRIM} = $AEPS_{IDLE}$ + $AEPS_{APPROACH}$ + $AEPS_{INTERMEDIATE}$ + $AEPS_{MILITARY}$ + $AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

2.4 Auxiliary Power Unit (APU)

2.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

2.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e

2.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

2.5 Aerospace Ground Equipment (AGE)

2.5.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage
Number of Annual LTO (Landing and Take-off) cycles for AGE: 35

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.33	No	Air Compressor	MC-1A - 18.4hp
1	1	No	Bomb Lift	MJ-1B
1	0.33	No	Generator Set	A/M32A-86D
1	0.5	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-2/TTU-228 - 130hp
1	8	No	Light Cart	NF-2
1	0.33	No	Start Cart	A/M32A-60A

2.5.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068	24.8
MJ-1B	0.0	3.040	0.219	4.780	3.040	0.800	0.776	141.2
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089	147.0
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006	8.9
MJ-2/TTU-228 - 130hp	7.4	0.195	0.053	3.396	0.794	0.089	0.086	168.8
NF-2	0.0	0.010	0.043	0.110	0.080	0.010	0.010	22.1
A/M32A-60A	0.0	0.270	0.306	1.820	5.480	0.211	0.205	221.1

2.5.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year
AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)
AGE: Total Number of Aerospace Ground Equipment
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

3. Aircraft

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: F-22 2017 Annual Operations

- Activity Description:
F-22 2017 Annual Operations

- Activity Start Date
Start Month: 1
Start Year: 2017

- Activity End Date
Indefinite: No
End Month: 12
End Year: 2017

- Activity Emissions:

Pollutant	Total Emissions (TONs)	Pollutant	Total Emissions (TONs)
VOC	23.227905	PM 2.5	28.203094
SO_x	22.440622	Pb	0.000000
NO_x	191.962387	NH_3	0.000000
CO	388.352232	CO_2e	55052.4
PM 10	34.420654		

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Total Emissions (TONs)	Pollutant	Total Emissions (TONs)
VOC	9.402274	PM 2.5	24.224610
SO_x	19.655568	Pb	0.000000
NO_x	152.178627	NH_3	0.000000
CO	364.092628	CO_2e	52957.8
PM 10	30.319523		

- Activity Emissions [Aerospace Ground Equipment (AGE) part]:

Pollutant	Total Emissions (TONs)	Pollutant	Total Emissions (TONs)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

VOC	13.825631
SO_x	2.785053
NO_x	39.783760
CO	24.259604
PM 10	4.101132

PM 2.5	3.978484
Pb	0.000000
NH_3	0.000000
CO_2e	2094.6

3.2 Aircraft & Engines

3.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-22A
Engine Model: F119-PW-100
Primary Function: Combat
Aircraft has After burn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate
Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

3.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
Idle	1377.00	1.67	1.07	3.01	48.15	2.42	1.76	3234
Approach	2740.00	0.05	1.07	6.59	7.92	1.96	1.73	3234
Intermediate	10110.00	0.03	1.07	12.40	2.14	1.40	1.09	3234
Military	18612.00	0.01	1.07	19.81	0.75	1.12	0.97	3234
After Burn	50170.00	0.00	1.07	7.37	16.10	0.85	0.75	3234

3.3 Flight Operations

3.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 31
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 7808
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 11151
Number of Annual Trim Test(s) per Aircraft: 12

- Default Settings Used: Yes

- Flight Operations TIMs (Time In Mode)
Taxi/Idle Out [Idle] (mins): 18.5 (default)
Takeoff [Military] (mins): 0.2 (default)
Takeoff [After Burn] (mins): 0.2 (default)
Climb Out [Intermediate] (mins): 0.8 (default)
Approach [Approach] (mins): 3.5 (default)
Taxi/Idle In [Idle] (mins): 11.3 (default)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12 (default)
Approach (mins):	27 (default)
Intermediate (mins):	9 (default)
Military (mins):	9 (default)
AfterBurn (mins):	3 (default)

3.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)

$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

3.4 Auxiliary Power Unit (APU)

3.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

3.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e

3.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year
APU_{POL} = APU * OH * LTO * EF_{POL} / 2000

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

3.5 Aerospace Ground Equipment (AGE)

3.5.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage
Number of Annual LTO (Landing and Take-off) cycles for AGE: 7808

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.33	No	Air Compressor	MC-1A - 18.4hp
1	1	No	Bomb Lift	MJ-1B
1	0.33	No	Generator Set	A/M32A-86D
1	0.5	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-2/TTU-228 - 130hp
1	8	No	Light Cart	NF-2
1	0.33	No	Start Cart	A/M32A-60A

3.5.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068	24.8
MJ-1B	0.0	3.040	0.219	4.780	3.040	0.800	0.776	141.2
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089	147.0
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006	8.9
MJ-2/TTU-228 - 130hp	7.4	0.195	0.053	3.396	0.794	0.089	0.086	168.8
NF-2	0.0	0.010	0.043	0.110	0.080	0.010	0.010	22.1
A/M32A-60A	0.0	0.270	0.306	1.820	5.480	0.211	0.205	221.1

3.5.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year
$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)
AGE: Total Number of Aerospace Ground Equipment
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

4. Aircraft

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: T-38 2017 Annual Operations

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity Description:
T-38 2017 Annual Operations

- Activity Start Date
Start Month: 1
Start Year: 2017

- Activity End Date
Indefinite: No
End Month: 12
End Year: 2017

- Activity Emissions:

Pollutant	Total Emissions (TONs)	Pollutant	Total Emissions (TONs)
VOC	34.026611	PM 2.5	5.305435
SO_x	2.039885	Pb	0.000000
NO_x	8.084055	NH_3	0.000000
CO	211.928326	CO_2e	5441.8
PM 10	6.626002		

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Total Emissions (TONs)	Pollutant	Total Emissions (TONs)
VOC	33.387794	PM 2.5	4.613096
SO_x	1.864329	Pb	0.000000
NO_x	3.192476	NH_3	0.000000
CO	210.873788	CO_2e	5178.2
PM 10	5.911137		

- Activity Emissions [Aerospace Ground Equipment (AGE) part]:

Pollutant	Total Emissions (TONs)	Pollutant	Total Emissions (TONs)
VOC	0.638818	PM 2.5	0.692339
SO_x	0.175556	Pb	0.000000
NO_x	4.891579	NH_3	0.000000
CO	1.054538	CO_2e	263.6
PM 10	0.714865		

4.2 Aircraft & Engines

4.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: T-38A
Engine Model: J85-GE-5G
Primary Function: Trainer
Aircraft has After burn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate
Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

4.2.2 Aircraft & Engines Emission Factor(s)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
Idle	524.00	34.46	1.07	1.34	178.05	4.70	4.02	3234
Approach	798.00	2.59	1.07	2.13	78.20	3.01	1.84	3234
Intermediate	1098.00	1.36	1.07	2.73	58.01	2.15	1.20	3234
Military	1297.00	3.99	1.07	2.31	43.02	1.79	0.69	3234
After Burn	8470.00	0.92	1.07	2.60	29.00	0.25	0.09	3234

4.3 Flight Operations

4.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 17
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 5368
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 537
Number of Annual Trim Test(s) per Aircraft: 12

- Default Settings Used: Yes

- Flight Operations TIMs (Time In Mode)

Taxi/Idle Out [Idle] (mins): 12.8 (default)
Takeoff [Military] (mins): 0.2 (default)
Takeoff [After Burn] (mins): 0.2 (default)
Climb Out [Intermediate] (mins): 0.9 (default)
Approach [Approach] (mins): 3.8 (default)
Taxi/Idle In [Idle] (mins): 6.4 (default)

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins): 12 (default)
Approach (mins): 27 (default)
Intermediate (mins): 9 (default)
Military (mins): 9 (default)
AfterBurn (mins): 3 (default)

4.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year

AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Aircraft Emissions for LTOs per Year
$AE_{LTO} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year
$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year
$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

4.4 Auxiliary Power Unit (APU)

4.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

4.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e

4.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year
$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

4.5 Aerospace Ground Equipment (AGE)

4.5.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage
Number of Annual LTO (Landing and Take-off) cycles for AGE: 5368

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.5	No	Air Compressor	MC-1A - 18.4hp
1	0.17	No	Generator Set	A/M32A-86D
1	0.17	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-1-1
1	1	No	Light Cart	TF-1

4.5.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068	24.8
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089	147.0
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006	8.9
MJ-1-1	2.5	0.026	0.018	0.757	0.043	0.109	0.105	57.2
TF-1	0.0	0.025	0.043	0.170	0.130	0.160	0.155	30.7

4.5.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)
AGE: Total Number of Aerospace Ground Equipment
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

ATTACHMENT 6

DERIVATIONS OF F-35A ARRIVAL TIMS FROM NOISE FLIGHT PROFILES FOR THE PROJECT AIR QUALITY ANALYSIS - TYNDALL AFB

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Tyndall AFB F-35 Arrivals

Profile	Track	Day	Night	Total	% Flown	Cumulative % Flown
35A 2LA4-2	2LA4TL470 - 32L initial to Tac Lead from W-470	4.224	0.039	4.263	9.49%	9.49%
35A 2LA4-3	2LA4TW470 - 32L initial to Tac Wing from W-470	4.224	0.039	4.263	9.49%	18.98%
35A 4RA4-2	4RA4TL470 - 14R initial to Tactical Lead from W-470	3.186	0.030	3.216	7.16%	26.13%
35A 4RA4-3	4RA4TW470 - 14R initial to Tactical Wing from W-470	3.186	0.030	3.216	7.16%	33.29%
35A 2LA4-1	2LA4OH470 - 32L initial to OH from 470	2.112	0.020	2.132	4.74%	38.04%
35A 2RA4-2	2RA4TL470 - 32R initial to Tac Lead from W-470	1.810	0.017	1.827	4.07%	42.10%
35A 2RA4-3	2RA4TW470 - 32R initial to Tac Wing from W-151	1.810	0.017	1.827	4.07%	46.17%
35A 2RIL-2	2RILS470 - 32R instrument straight-in from 470	1.800	0.017	1.817	4.04%	50.21%
35A 4RA4-1	4RA4OH470 - 14R initial to OH from W-470	1.593	0.015	1.608	3.58%	53.79%
35A 4LA4-2	4LA4TL470 - 14L initial to Tactical Lead from W-470	1.366	0.013	1.378	3.07%	56.86%
35A 4LA4-3	4LA4TW470 - 14L initial to Tac Wing from W-470	1.366	0.013	1.378	3.07%	59.92%
35A 4LIL-2	4LILS470 - 14L instrument straight-in from 470	1.358	0.013	1.371	3.05%	62.98%
35A 2RA4-1	2RA4OH470 - 32R initial to OH from 470	0.905	0.008	0.914	2.03%	65.01%
35A 2LA2-2	2LA2TLCAR - 32L initial to Tac Lead from Carabelle	0.806	0.007	0.813	1.81%	66.82%
35A 2LA2-3	2LA2TWCAR - 32L initial to Tac Wing from Carabelle	0.806	0.007	0.813	1.81%	68.63%
35A 2LA1-2	2LA1TLCL - 32L initial to Tac Lead from Compass Lake	0.774	0.007	0.781	1.74%	70.37%
35A 2LA1-3	2LA1TWCL - 32L initial to Tac Wing from Compass Lake	0.774	0.007	0.781	1.74%	72.10%
35A 4LA4-1	4LA4OH470 - 14L initial to OH from W-470	0.683	0.006	0.689	1.53%	73.64%
35A 4RA2-2	4RA2TLCAR - 14R initial to Tactical Lead from Carabelle	0.608	0.006	0.614	1.37%	75.00%
35A 4RA2-3	4RA2TWCAR - 14R initial to Tac Wing from Carabelle	0.608	0.006	0.614	1.37%	76.37%
35A 4RA1-2	4RA1TLCL - 14R initial to Tactical Lead from Compass Lake	0.584	0.005	0.589	1.31%	77.68%
35A 4RA1-3	4RA1TWCL - 14R initial to Tac Wing from Compass Lake	0.584	0.005	0.589	1.31%	78.99%
35A 2LA3-2	2LA3TL151 - 32L initial to Tac Lead from W-151	0.469	0.004	0.474	1.05%	80.05%
35A 2LA3-3	2LA3TW151 - 32L initial to Tac Wing from W-151	0.469	0.004	0.474	1.05%	81.10%
35A 2LA2-1	2LA2OHCAR - 32L initial to OH from Carabelle	0.403	0.004	0.407	0.91%	82.01%
35A 2LA1-1	2LA1OHCL - 32L initial to OH from Compass Lake	0.387	0.004	0.391	0.87%	82.88%
35A 4RA3-2	4RA3TL151 - 14R initial to Tactical Lead from W-151	0.354	0.003	0.357	0.79%	83.67%
35A 4RA3-3	4RA3TW151 - 14R initial to Tactical Wing from W-151	0.354	0.003	0.357	0.79%	84.47%
35A 2RA2-2	2RA2TLCAR - 32R initial to Tac Lead from Carabelle	0.345	0.003	0.349	0.78%	85.24%
35A 2RA2-3	2RA2TWCAR - 32R initial to Tac Wing from Carabelle	0.345	0.003	0.349	0.78%	86.02%
35A 2RIL-4	2RILSCL - 32R instrument straight-in from Compass Lake	0.343	0.003	0.347	0.77%	86.79%
35A 2RA1-2	2RA1TLCL - 32R initial to Tac Lead from Compass Lake	0.332	0.003	0.335	0.75%	87.54%
35A 2RA1-3	2RA1TWCL - 32R initial to Tac Wing from Compass Lake	0.332	0.003	0.335	0.75%	88.28%
35A 2RIL-3	2RILSCAR - 32R instrument straight-in from Carrabelle	0.330	0.003	0.333	0.74%	89.03%
35A 4RA2-1	4RA2OHCAR - 14R initial to OH from Carabelle	0.304	0.003	0.307	0.68%	89.71%
35A 2LTA-1	2LTAC470 - 32R TACAN straight-in from 470	0.297	0.003	0.300	0.67%	90.38%
35A 4RA1-1	4RA1OHCL - 14R initial to OH from Compass Lake	0.292	0.003	0.295	0.66%	91.03%
35A 4LA2-2	4LA2TWCAR - 14L initial to Tac Wing from Carabelle	0.261	0.002	0.263	0.59%	91.62%
35A 4LA2-3	4LA2TWCAR - 14L initial to Tac Wing from Carabelle	0.261	0.002	0.263	0.59%	92.20%
35A 4LIL-3	4LILSCAR - 14L instrument straight-in from Carrabelle	0.259	0.002	0.261	0.58%	92.78%
35A 4LA1-2	4LA1TLCL - 14L initial to Tac Lead from Compass Lake	0.250	0.002	0.253	0.56%	93.35%
35A 4LA1-3	4LA1TWCL - 14L initial to Tac Wing from Compass Lake	0.250	0.002	0.253	0.56%	93.91%
35A 4LIL-4	4LILSCL - 14L instrument straight-in from Compass Lake	0.249	0.002	0.251	0.56%	94.47%
35A 2LA3-1	2LA3OH151 - 32L initial to OH from 151	0.235	0.002	0.237	0.53%	95.00%
35A 4RTA-1	4RTAC470 - 14R TACAN straight-in from 470	0.224	0.002	0.226	0.50%	95.50%
35A 2RA3-2	2RA3TL151 - 32R initial to Tac Lead from W-151	0.201	0.002	0.203	0.45%	95.95%
35A 2RA3-3	2RA3TW151 - 32R initial to Tac Wing from W-151	0.201	0.002	0.203	0.45%	96.40%
35A 2RIL-1	2RILS151 - 32R instrument straight-in from 151	0.200	0.002	0.202	0.45%	96.85%
35A 4RA3-1	4RA3OH151 - 14R initial to OH from W-151	0.177	0.002	0.179	0.40%	97.25%
35A 2RA2-1	2RA2OHCAR - 32R initial to OH from Carabelle	0.173	0.002	0.174	0.39%	97.64%
35A 2RA1-1	2RA1OHCL - 32R initial to OH from Compass Lake	0.166	0.002	0.167	0.37%	98.01%
35A 4LA3-2	4LA3TL151 - 14L initial to Tac Lead from W-151	0.152	0.001	0.153	0.34%	98.35%
35A 4LA3-3	4LA3TW151 - 14L initial to Tac Wing from W-151	0.152	0.001	0.153	0.34%	98.69%
35A 4LIL-1	4LILS151 - 14L instrument straight-in from 151	0.151	0.001	0.152	0.34%	99.03%
35A 4LA2-1	4LA2OHCAR - 14L initial to OH from Carabelle	0.130	0.001	0.131	0.29%	99.32%
35A 4LA1-1	4LA1OHCL - 14L initial to OH from Compass Lake	0.125	0.001	0.126	0.28%	99.60%
35A 2RA3-1	2RA3OH151 - 32R initial to OH from W-151	0.101	0.001	0.102	0.23%	99.83%
35A 4LA3-1	4LA3OH151 - 14L initial to OH from 151	0.076	0.001	0.077	0.17%	100.00%
				44.932	100.00%	

Weighted Value All Profiles

	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
	1.151170658	0	0	0	9.3105671
	1.682480192	0	0	0	9.8418766
	0.8684412	0	0	0	7.0238761
	1.269260215	0	0	0	7.4246951
	1.767493101	0	0	0	7.8410264
	0.493358853	0	0	0	3.990243
	0.72106294	0	0	0	4.2179471
	0.466556901	0	0	0	7.0580952
	1.3330811	0	0	0	5.9138698
	0.372111932	0	0	0	3.0096086
	0.543855901	0	0	0	3.1813526
	0.352036054	0	0	0	5.3256184
	0.757733909	0	0	0	3.3614907
	0.219540639	0	0	0	1.7756254
	0.320867088	0	0	0	1.8769518
	0.210899433	0	0	0	1.7057361
	0.308237633	0	0	0	1.8030743
	0.571202039	0	0	0	2.5339903
	0.16580314	0	0	0	1.3410012
	0.242327666	0	0	0	1.4175257
	0.159052197	0	0	0	1.2864002
	0.232460904	0	0	0	1.3598089
	0.127997863	0	0	0	1.0352355
	0.1870738	0	0	0	1.0943114
	0.337415428	0	0	0	1.4968564
	0.324150939	0	0	0	1.4380119
	0.096403454	0	0	0	0.7797027
	0.140897356	0	0	0	0.8241966
	0.094243153	0	0	0	0.7622303
	0.137739992	0	0	0	0.8057272
	0.0891003	0	0	0	1.3479136
	0.090462625	0	0	0	0.7316538
	0.132214606	0	0	0	0.7734057
	0.085505475	0	0	0	1.2935309
	0.254512374	0	0	0	1.1290784
	0.077031959	0	0	0	1.1653432
	0.244564008	0	0	0	1.084945
	0.071019912	0	0	0	0.5744028
	0.103798332	0	0	0	0.6071812
	0.067017805	0	0	0	1.0138486
	0.068319535	0	0	0	0.5525624
	0.099851628	0	0	0	0.5840945
	0.064450073	0	0	0	0.9750038
	0.196480237	0	0	0	0.8716338
	0.058030743	0	0	0	0.8778919
	0.05481765	0	0	0	0.4433603
	0.080118104	0	0	0	0.4686608
	0.051868186	0	0	0	0.7846644
	0.148396466	0	0	0	0.6583226
	0.144251313	0	0	0	0.6399337
	0.138448099	0	0	0	0.6141892
	0.041315766	0	0	0	0.3341583
	0.060384581	0	0	0	0.3532271
	0.039029526	0	0	0	0.5904405
	0.108603	0	0	0	0.4817891
	0.104457847	0	0	0	0.4634002
	0.084561115	0	0	0	0.3751335
	0.063835351	0	0	0	0.283189
Total (sec):	18.4774023	0	0	0	120.90961
Total (min):	0.307956705	0	0	0	2.0151602

Tables provided in this Attachment are presented in the same format as produced by the modeling software.

Tyndall AFB Runway Elevation ft: 18

35A_2LA4-2 - Tactical Lead

35A_2LA4-2

Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
0	0	0	0	110.2667	24.26666667	0	0	0	86	12.13333333	0	0	0	98.13333

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000				
b	11.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100				
c	6.8	3,100 AGL	15	Variable	350	-6.4	-3500	26	3100	AGL	3100				
c to 3000								1.73333333							
3000 to d								24.2666667				24.2666667	Approach	24.26666667	Idle
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600	12	Approach	12	Approach
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600	13	Approach	13	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600	12	Approach	12	Approach
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600	27	Approach	27	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_2LA4-3 - Tactical Wing

35A_2LA4-3

Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
0	0	0	0	121.4667	35.46666667	0	0	0	86	17.73333333	0	0	0	103.7333

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	33.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000				
b	12.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100				
c	7.8	3,100 AGL	15	Variable	350	-4.4	-2400	38	3100	AGL	3100				
c to 3000								2.53333333							
3000 to d								35.4666667				35.4666667	Approach	35.46666667	Idle
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600	12	Approach	12	Approach
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600	13	Approach	13	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600	12	Approach	12	Approach
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600	27	Approach	27	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_4RA4-2 - Tactical Lead

35A_4RA4-2

Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
0	0	0	0	110.2667	24.26666667	0	0	0	86	12.13333333	0	0	0	98.13333

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000				
b	11.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100				
c	6.8	3,100 AGL	15	Variable	350	-6.4	-3500	26	3100	AGL	3100				
c to 3000								1.73333333							
3000 to d								24.2666667				24.2666667	Approach	24.26666667	Idle
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600	12	Approach	12	Approach
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600	13	Approach	13	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600	12	Approach	12	Approach
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600	27	Approach	27	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_4RA4-3 - Tactical Wing

35A_4RA4-3

Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
0	0	0	0	121.4667	35.46666667	0	0	0	86	17.73333333	0	0	0	103.7333

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	33.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000				
b	12.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100				
c	7.8	3,100 AGL	15	Variable	350	-4.4	-2400	38	3100	AGL	3100				
c to 3000								2.53333333							
3000 to d								35.4666667				35.4666667	Approach	35.46666667	Idle
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600	12	Approach	12	Approach
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600	13	Approach	13	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600	12	Approach	12	Approach
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600	27	Approach	27	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_2LA4-1 - Overhead Break Arrival - Break at the Numbers

35A_2LA4-1

Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
0	0	0	0	202.5	74.5	0	0	0	128	37.25	0	0	0	165.25

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	10,000 AGL	15	Variable	300	-3.5	-1800	273	10000	AGL	10000				
a to 3000								227.5							

3000 to b								45.5				45.5	Approach	45.5	Idle
b	10.18	1,600 AGL	35	Variable	300	0	0	49	1600	AGL	1600	49	Approach	49	Approach
c	6.11	1,600 AGL	15	Variable	300	0	0	29	1600	AGL	1600	29	Approach	29	Idle
d	4.04	1,600 AGL	35	Variable	210	0	0	9	1600	AGL	1600	9	Approach	9	Approach
e	3.55	1,600 AGL	50	Parallel	200	0	0	9	1600	AGL	1600	9	Approach	9	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	19	1600	AGL	1600	19	Approach	19	Approach
g	2.03	1,600 AGL	60	Parallel	200	-11.8	-3900	20	1600	AGL	1600	20	Approach	20	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_2RA4-2 - Tactical Lead

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000				
b	11.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100				
c	6.8	3,100 AGL	15	Variable	350	-6.4	-3500	26	3100	AGL	3100				
c to 3000								1.73333333							
3000 to d								24.2666667				24.2666667	Approach	24.26666667	Idle
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600	12	Approach	12	Approach
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600	13	Approach	13	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600	12	Approach	12	Approach
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600	27	Approach	27	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2RA4-2	0	0	0	0	110.2667	24.26666667	0	0	0	86	12.13333333	0	0	0	98.13333

35A_2RA4-3 - Tactical Wing

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	33.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000				
b	12.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100				
c	7.8	3,100 AGL	15	Variable	350	-4.4	-2400	38	3100	AGL	3100				
c to 3000								2.53333333							
3000 to d								35.4666667				35.4666667	Approach	35.46666667	Idle
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600	12	Approach	12	Approach
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600	13	Approach	13	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600	12	Approach	12	Approach
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600	27	Approach	27	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2RA4-3	0	0	0	0	121.4667	35.46666667	0	0	0	86	17.73333333	0	0	0	103.7333

35A 2RIL-2 - Straight-in IFR Arrival

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	13,982 AGL	15	Variable	300	0	0	104	13982	AGL	13982				
b	25	13,982 AGL	15	Variable	250	-6.6	-2600	272	13982	AGL	13982				
b to 3000								248.925333							
3000 to c								23.0746667				23.0746667	Approach	23.07466667	Idle
c	8	1,982 AGL	50	Parallel	200	-1.6	-500	57	1982	AGL	1982	57	Approach	57	Approach
d	5	1,482 AGL	40	Parallel	180	-2.7	-800	106	1482	AGL	1482	106	Approach	106	Approach
e	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2RIL-2	0	0	0	0	186.0747	23.07466667	0	0	0	163	11.53733333	0	0	0	174.5373

35A 4RA4-1 - Overhead Break Arrival - Break at the Numbers

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	10,000 AGL	15	Variable	300	-3.5	-1800	273	10000	AGL	10000				
a to 3000								227.5							
3000 to b								45.5				45.5	Approach	45.5	Idle
b	10.18	1,600 AGL	35	Variable	300	0	0	49	1600	AGL	1600	49	Approach	49	Approach
c	6.11	1,600 AGL	15	Variable	300	0	0	29	1600	AGL	1600	29	Approach	29	Idle
d	4.04	1,600 AGL	35	Variable	210	0	0	9	1600	AGL	1600	9	Approach	9	Approach
e	3.55	1,600 AGL	50	Parallel	200	0	0	9	1600	AGL	1600	9	Approach	9	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	19	1600	AGL	1600	19	Approach	19	Approach
g	2.03	1,600 AGL	60	Parallel	200	-11.8	-3900	20	1600	AGL	1600	20	Approach	20	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4RA4-1	0	0	0	0	202.5	74.5	0	0	0	128	37.25	0	0	0	165.25

35A_4LA4-2 - Tactical Lead

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000				
b	11.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100				
c	6.8	3,100 AGL	15	Variable	350	-6.4	-3500	26	3100	AGL	3100				
c to 3000								1.73333333							
3000 to d								24.2666667				24.2666667	Approach	24.26666667	Idle
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600	12	Approach	12	Approach
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600	13	Approach	13	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600	12	Approach	12	Approach
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600	27	Approach	27	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4LA4-2	0	0	0	0	110.2667	24.26666667	0	0	0	86	12.13333333	0	0	0	98.13333

35A_4LA4-3 - Tactical Wing

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	33.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000				
b	12.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100				
c	7.8	3,100 AGL	15	Variable	350	-4.4	-2400	38	3100	AGL	3100				
c to 3000								2.53333333							
3000 to d								35.4666667				35.4666667	Approach	35.46666667	Idle
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600	12	Approach	12	Approach
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600	13	Approach	13	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600	12	Approach	12	Approach
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600	27	Approach	27	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4LA4-3	0	0	0	0	121.4667	35.46666667	0	0	0	86	17.73333333	0	0	0	103.7333

35A_4LIL-2 - Straight-in IFR Arrival

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	13,982 AGL	15	Variable	300	0	0	104	13982	AGL	13982				
b	25	13,982 AGL	15	Variable	250	-6.6	-2600	272	13982	AGL	13982				
b to 3000								248.925333							
3000 to c								23.0746667				23.0746667	Approach	23.07466667	Idle
c	8	1,982 AGL	50	Parallel	200	-1.6	-500	57	1982	AGL	1982	57	Approach	57	Approach
d	5	1,482 AGL	40	Parallel	180	-2.7	-800	106	1482	AGL	1482	106	Approach	106	Approach
e	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4LIL-2	0	0	0	0	186.0747	23.07466667	0	0	0	163	11.53733333	0	0	0	174.5373

35A_2RA4-1 - Overhead Break Arrival - Break at the Numbers

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	10,000 AGL	15	Variable	300	-3.5	-1800	273	10000	AGL	10000				
a to 3000								227.5							
3000 to b								45.5				45.5	Approach	45.5	Idle
b	10.18	1,600 AGL	35	Variable	300	0	0	49	1600	AGL	1600	49	Approach	49	Approach
c	6.11	1,600 AGL	15	Variable	300	0	0	29	1600	AGL	1600	29	Approach	29	Idle
d	4.04	1,600 AGL	35	Variable	210	0	0	9	1600	AGL	1600	9	Approach	9	Approach
e	3.55	1,600 AGL	50	Parallel	200	0	0	9	1600	AGL	1600	9	Approach	9	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	19	1600	AGL	1600	19	Approach	19	Approach
g	2.03	1,600 AGL	60	Parallel	200	-11.8	-3900	20	1600	AGL	1600	20	Approach	20	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2RA4-1	0	0	0	0	202.5	74.5	0	0	0	128	37.25	0	0	0	165.25

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300
i	0	50 AGL	40	Parallel	160				50	AGL	50

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
22	Approach	22	Approach
0	Approach	0	Approach

35A_2LA2-2 - Tactical Lead

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	32.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000
b	11.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100
c	6.8	3,100 AGL	15	Variable	350	-6.4	-3500	26	3100	AGL	3100
c to 3000								1.73333333			
3000 to d								24.2666667			
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300
i	0	50 AGL	40	Parallel	160				50	AGL	50

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
24.2666667	Approach	24.26666667	Idle
12	Approach	12	Approach
13	Approach	13	Approach
12	Approach	12	Approach
27	Approach	27	Approach
22	Approach	22	Approach
0	Approach	0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2LA2-2	0	0	0	0	110.2667	24.26666667	0	0	0	86	12.13333333	0	0	0	98.13333

35A_2LA2-3 - Tactical Wing

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	33.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000
b	12.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100
c	7.8	3,100 AGL	15	Variable	350	-4.4	-2400	38	3100	AGL	3100
c to 3000								2.53333333			
3000 to d								35.4666667			
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300
i	0	50 AGL	40	Parallel	160				50	AGL	50

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
35.4666667	Approach	35.46666667	Idle
12	Approach	12	Approach
13	Approach	13	Approach
12	Approach	12	Approach
27	Approach	27	Approach
22	Approach	22	Approach
0	Approach	0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2LA2-3	0	0	0	0	121.4667	35.46666667	0	0	0	86	17.73333333	0	0	0	103.7333

35A_2LA1-2 - Tactical Lead

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	32.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000
b	11.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100
c	6.8	3,100 AGL	15	Variable	350	-6.4	-3500	26	3100	AGL	3100
c to 3000								1.73333333			
3000 to d								24.2666667			
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300
i	0	50 AGL	40	Parallel	160				50	AGL	50

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
24.2666667	Approach	24.26666667	Idle
12	Approach	12	Approach
13	Approach	13	Approach
12	Approach	12	Approach
27	Approach	27	Approach
22	Approach	22	Approach
0	Approach	0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2LA1-2	0	0	0	0	110.2667	24.26666667	0	0	0	86	12.13333333	0	0	0	98.13333

35A_2LA1-3 - Tactical Wing

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	33.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000
b	12.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100
c	7.8	3,100 AGL	15	Variable	350	-4.4	-2400	38	3100	AGL	3100
c to 3000								2.53333333			
3000 to d								35.4666667			
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300
i	0	50 AGL	40	Parallel	160				50	AGL	50

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
35.4666667	Approach	35.46666667	Idle
12	Approach	12	Approach
13	Approach	13	Approach
12	Approach	12	Approach
27	Approach	27	Approach
22	Approach	22	Approach
0	Approach	0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2LA1-3	0	0	0	0	121.4667	35.46666667	0	0	0	86	17.73333333	0	0	0	103.7333

35A_4LA4-1 - Overhead Break Arrival - Break at the Numbers

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	32.92	10,000 AGL	15	Variable	300	-3.5	-1800	273	10000	AGL	10000
a to 3000								227.5			
3000 to b								45.5			
b	10.18	1,600 AGL	35	Variable	300	0	0	49	1600	AGL	1600
c	6.11	1,600 AGL	15	Variable	300	0	0	29	1600	AGL	1600
d	4.04	1,600 AGL	35	Variable	210	0	0	9	1600	AGL	1600
e	3.55	1,600 AGL	50	Parallel	200	0	0	9	1600	AGL	1600
f	3.06	1,600 AGL	28	Parallel	200	0	0	19	1600	AGL	1600
g	2.03	1,600 AGL	60	Parallel	200	-11.8	-3900	20	1600	AGL	1600
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300
i	0	50 AGL	40	Parallel	160				50	AGL	50

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
45.5	Approach	45.5	Idle
49	Approach	49	Approach
29	Approach	29	Idle
9	Approach	9	Approach
9	Approach	9	Approach
19	Approach	19	Approach
20	Approach	20	Approach
22	Approach	22	Approach
0	Approach	0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4LA4-1	0	0	0	0	202.5	74.5	0	0	0	128	37.25	0	0	0	165.25

35A_4RA2-2 - Tactical Lead

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	32.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000
b	11.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100
c	6.8	3,100 AGL	15	Variable	350	-6.4	-3500	26	3100	AGL	3100
c to 3000								1.73333333			
3000 to d								24.2666667			
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300
i	0	50 AGL	40	Parallel	160				50	AGL	50

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
24.2666667	Approach	24.26666667	Idle
12	Approach	12	Approach
13	Approach	13	Approach
12	Approach	12	Approach
27	Approach	27	Approach
22	Approach	22	Approach
0	Approach	0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4RA2-2	0	0	0	0	110.2667	24.26666667	0	0	0	86	12.13333333	0	0	0	98.13333

35A_4RA2-3 - Tactical Wing

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	33.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000
b	12.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100
c	7.8	3,100 AGL	15	Variable	350	-4.4	-2400	38	3100	AGL	3100
c to 3000								2.53333333			
3000 to d								35.4666667			
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300
i	0	50 AGL	40	Parallel	160				50	AGL	50

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
35.4666667	Approach	35.46666667	Idle
12	Approach	12	Approach
13	Approach	13	Approach
12	Approach	12	Approach
27	Approach	27	Approach
22	Approach	22	Approach
0	Approach	0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4RA2-3	0	0	0	0	121.4667	35.46666667	0	0	0	86	17.73333333	0	0	0	103.7333

35A_4RA1-2 - Tactical Lead

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	32.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000
b	11.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100
c	6.8	3,100 AGL	15	Variable	350	-6.4	-3500	26	3100	AGL	3100
c to 3000								1.73333333			
3000 to d								24.2666667			
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
24.2666667	Approach	24.26666667	Idle
12	Approach	12	Approach
13	Approach	13	Approach
12	Approach	12	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4RA1-2	0	0	0	0	110.2667	24.26666667	0	0	0	86	12.13333333	0	0	0	98.13333

g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600	27	Approach	27	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_4RA1-3 - Tactical Wing

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4RA1-3	0	0	0	0	121.4667	35.46666667	0	0	0	86	17.73333333	0	0	0	103.7333

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	33.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000				
b	12.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100				
c	7.8	3,100 AGL	15	Variable	350	-4.4	-2400	38	3100	AGL	3100				
c to 3000								2.53333333							
3000 to d								35.4666667				35.4666667	Approach	35.46666667	Idle
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600	12	Approach	12	Approach
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600	13	Approach	13	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600	12	Approach	12	Approach
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600	27	Approach	27	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_2LA3-2 - Tactical Lead

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2LA3-2	0	0	0	0	110.2667	24.26666667	0	0	0	86	12.13333333	0	0	0	98.13333

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000				
b	11.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100				
c	6.8	3,100 AGL	15	Variable	350	-6.4	-3500	26	3100	AGL	3100				
c to 3000								1.73333333							
3000 to d								24.2666667				24.2666667	Approach	24.26666667	Idle
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600	12	Approach	12	Approach
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600	13	Approach	13	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600	12	Approach	12	Approach
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600	27	Approach	27	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_2LA3-3 - Tactical Wing

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2LA3-3	0	0	0	0	121.4667	35.46666667	0	0	0	86	17.73333333	0	0	0	103.7333

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	33.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000				
b	12.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100				
c	7.8	3,100 AGL	15	Variable	350	-4.4	-2400	38	3100	AGL	3100				
c to 3000								2.53333333							
3000 to d								35.4666667				35.4666667	Approach	35.46666667	Idle
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600	12	Approach	12	Approach
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600	13	Approach	13	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600	12	Approach	12	Approach
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600	27	Approach	27	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_2LA2-1 - Overhead Break Arrival - Break at the Numbers

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2LA2-1	0	0	0	0	202.5	74.5	0	0	0	128	37.25	0	0	0	165.25

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	10,000 AGL	15	Variable	300	-3.5	-1800	273	10000	AGL	10000				
a to 3000								227.5							
3000 to b								45.5				45.5	Approach	45.5	Idle
b	10.18	1,600 AGL	35	Variable	300	0	0	49	1600	AGL	1600	49	Approach	49	Approach
c	6.11	1,600 AGL	15	Variable	300	0	0	29	1600	AGL	1600	29	Approach	29	Idle
d	4.04	1,600 AGL	35	Variable	210	0	0	9	1600	AGL	1600	9	Approach	9	Approach
e	3.55	1,600 AGL	50	Parallel	200	0	0	9	1600	AGL	1600	9	Approach	9	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	19	1600	AGL	1600	19	Approach	19	Approach
g	2.03	1,600 AGL	60	Parallel	200	-11.8	-3900	20	1600	AGL	1600	20	Approach	20	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_2LA1-1 - Overhead Break Arrival - Break at the Numbers

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2LA1-1	0	0	0	0	202.5	74.5	0	0	0	128	37.25	0	0	0	165.25

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	10,000 AGL	15	Variable	300	-3.5	-1800	273	10000	AGL	10000				
a to 3000								227.5							
3000 to b								45.5				45.5	Approach	45.5	Idle
b	10.18	1,600 AGL	35	Variable	300	0	0	49	1600	AGL	1600	49	Approach	49	Approach
c	6.11	1,600 AGL	15	Variable	300	0	0	29	1600	AGL	1600	29	Approach	29	Idle
d	4.04	1,600 AGL	35	Variable	210	0	0	9	1600	AGL	1600	9	Approach	9	Approach
e	3.55	1,600 AGL	50	Parallel	200	0	0	9	1600	AGL	1600	9	Approach	9	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	19	1600	AGL	1600	19	Approach	19	Approach
g	2.03	1,600 AGL	60	Parallel	200	-11.8	-3900	20	1600	AGL	1600	20	Approach	20	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_4RA3-2 - Tactical Lead

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4RA3-2	0	0	0	0	110.2667	24.26666667	0	0	0	86	12.13333333	0	0	0	98.13333

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000				
b	11.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100				
c	6.8	3,100 AGL	15	Variable	350	-6.4	-3500	26	3100	AGL	3100				
c to 3000								1.73333333							
3000 to d								24.2666667				24.2666667	Approach	24.26666667	Idle
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600	12	Approach	12	Approach
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600	13	Approach	13	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600	12	Approach	12	Approach
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600	27	Approach	27	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_4RA3-3 - Tactical Wing

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4RA3-3	0	0	0	0	121.4667	35.46666667	0	0	0	86	17.73333333	0	0	0	103.7333

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	33.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000				
b	12.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100				
c	7.8	3,100 AGL	15	Variable	350	-4.4	-2400	38	3100	AGL	3100				
c to 3000								2.53333333							
3000 to d								35.4666667				35.4666667	Approach	35.46666667	Idle
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600	12	Approach	12	Approach
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600	13	Approach	13	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600	12	Approach	12	Approach
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600	27	Approach	27	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A 2RA2-2 - Tactical Lead

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2RA2-2	0	0	0	0	110.2667	24.26666667	0	0	0	86	12.13333333	0	0	0	98.13333

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000				
b	11.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100				
c	6.8	3,100 AGL	15	Variable	350	-6.4	-3500	26	3100	AGL	3100				
c to 3000								1.73333333							
3000 to d								24.2666667				24.2666667	Approach	24.26666667	Idle
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600	12	Approach	12	Approach
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600	13	Approach	13	Approach

f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600	12	Approach	12	Approach
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600	27	Approach	27	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_2RA2-3 - Tactical Wing

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2RA2-3	0	0	0	0	121.4667	35.46666667	0	0	0	86	17.73333333	0	0	0	103.7333

Profile Segments

35A 2RA2-3

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	33.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000				
b	12.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100				
c	7.8	3,100 AGL	15	Variable	350	-4.4	-2400	38	3100	AGL	3100				
c to 3000								2.53333333							
3000 to d								35.4666667				35.4666667	Approach	35.46666667	Idle
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600	12	Approach	12	Approach
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600	13	Approach	13	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600	12	Approach	12	Approach
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600	27	Approach	27	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_2RIL-4 - Straight-in IFR Arrival

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2RIL-4	0	0	0	0	186.0747	23.07466667	0	0	0	163	11.53733333	0	0	0	174.5373

Profile Segments

35A 2RIL-4

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	13,982 AGL	15	Variable	300	0	0	104	13982	AGL	13982				
b	25	13,982 AGL	15	Variable	250	-6.6	-2600	272	13982	AGL	13982				
b to 3000								248.925333							
3000 to c								23.0746667				23.0746667	Approach	23.07466667	Idle
c	8	1,982 AGL	50	Parallel	200	-1.6	-500	57	1982	AGL	1982	57	Approach	57	Approach
d	5	1,482 AGL	40	Parallel	180	-2.7	-800	106	1482	AGL	1482	106	Approach	106	Approach
e	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_2RA1-2 - Tactical Lead

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A_2RA1-2	0	0	0	0	110.2667	24.26666667	0	0	0	86	12.13333333	0	0	0	98.13333

Profile Segments

35A_2RA1-2

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000				
b	11.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100				
c	6.8	3,100 AGL	15	Variable	350	-6.4	-3500	26	3100	AGL	3100				
c to 3000								1.73333333							
3000 to d								24.2666667				24.2666667	Approach	24.26666667	Idle
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600	12	Approach	12	Approach
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600	13	Approach	13	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600	12	Approach	12	Approach
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600	27	Approach	27	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_2RA1-3 - Tactical Wing

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2RA1-3	0	0	0	0	121.4667	35.46666667	0	0	0	86	17.73333333	0	0	0	103.7333

Profile Segments

35A 2RA1-3

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	33.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000				
b	12.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100				
c	7.8	3,100 AGL	15	Variable	350	-4.4	-2400	38	3100	AGL	3100				
c to 3000								2.53333333							
3000 to d								35.4666667				35.4666667	Approach	35.46666667	Idle
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600	12	Approach	12	Approach
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600	13	Approach	13	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600	12	Approach	12	Approach
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600	27	Approach	27	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_2RIL-3 - Straight-in IFR Arrival

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2RIL-3	0	0	0	0	186.0747	23.07466667	0	0	0	163	11.53733333	0	0	0	174.5373

Profile Segments

35A 2RIL-3

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	13,982 AGL	15	Variable	300	0	0	104	13982	AGL	13982				
b	25	13,982 AGL	15	Variable	250	-6.6	-2600	272	13982	AGL	13982				
b to 3000								248.925333							
3000 to c								23.0746667				23.0746667	Approach	23.07466667	Idle
c	8	1,982 AGL	50	Parallel	200	-1.6	-500	57	1982	AGL	1982	57	Approach	57	Approach
d	5	1,482 AGL	40	Parallel	180	-2.7	-800	106	1482	AGL	1482	106	Approach	106	Approach
e	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_4RA2-1 - Overhead Break Arrival - Break at the Numbers

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4RA2-1	0	0	0	0	202.5	74.5	0	0	0	128	37.25	0	0	0	165.25

Profile Segments

35A 4RA2-1

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	10,000 AGL	15	Variable	300	-3.5	-1800	273	10000	AGL	10000				
a to 3000								227.5							
3000 to b								45.5				45.5	Approach	45.5	Idle
b	10.18	1,600 AGL	35	Variable	300	0	0	49	1600	AGL	1600	49	Approach	49	Approach
c	6.11	1,600 AGL	15	Variable	300	0	0	29	1600	AGL	1600	29	Approach	29	Idle
d	4.04	1,600 AGL	35	Variable	210	0	0	9	1600	AGL	1600	9	Approach	9	Approach
e	3.55	1,600 AGL	50	Parallel	200	0	0	9	1600	AGL	1600	9	Approach	9	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	19	1600	AGL	1600	19	Approach	19	Approach
g	2.03	1,600 AGL	60	Parallel	200	-11.8	-3900	20	1600	AGL	1600	20	Approach	20	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A 2LTA-1 - TACAN from W470

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2LTA-1	0	0	0	0	186.0747	23.07466667	0	0	0	163	11.53733333	0	0	0	174.5373

Profile Segments

35A 2LTA-1

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	13,982 AGL	15	Variable	300	0	0	104	13982	AGL	13982				
b	25	13,982 AGL	15	Variable	250	-6.6	-2600	272	13982	AGL	13982				
b to 3000								248.925333							
3000 to c								23.0746667				23.0746667	Approach	23.07466667	Idle
c	8	1,982 AGL	50	Parallel	200	-1.3	-400	54	1982	AGL	1982	54	Approach	54	Approach
d	5.15	1,582 AGL	40	Parallel	180	-2.8	-800	109	1582	AGL	1582	109	Approach	109	Approach
e	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_4RA1-1 - Overhead Break Arrival - Break at the Numbers

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4RA1-1	0	0	0	0	202.5	74.5	0	0	0	128	37.25	0	0	0	165.25

Profile Segments

35A 4RA1-1

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	10,000 AGL	15	Variable	300	-3.5	-1800	273	10000	AGL	10000				
a to 3000								227.5							
3000 to b								45.5				45.5	Approach	45.5	Idle
b	10.18	1,600 AGL	35	Variable	300	0	0	49	1600	AGL	1600	49	Approach	49	Approach
c	6.11	1,600 AGL	15	Variable	300	0	0	29	1600	AGL	1600	29	Approach	29	Idle
d	4.04	1,600 AGL	35	Variable	210	0	0	9	1600	AGL	1600	9	Approach	9	Approach
e	3.55	1,600 AGL	50	Parallel	200	0	0	9	1600	AGL	1600	9	Approach	9	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	19	1600	AGL	1600	19	Approach	19	Approach
g	2.03	1,600 AGL	60	Parallel	200	-11.8	-3900	20	1600	AGL	1600	20	Approach	20	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_4LA2-2 - Tactical Lead

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4LA2-2	0	0	0	0	110.2667	24.26666667	0	0	0	86	12.13333333	0	0	0	98.13333

Profile Segments

35A 4LA2-2

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode

a	32.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000				
b	11.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100				
c	6.8	3,100 AGL	15	Variable	350	-6.4	-3500	26	3100	AGL	3100				
c to 3000								1.73333333							
3000 to d								24.2666667				24.2666667	Approach	24.26666667	Idle
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600	12	Approach	12	Approach
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600	13	Approach	13	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600	12	Approach	12	Approach
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600	27	Approach	27	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_4LA2-3 - Tactical Wing

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4LA2-3	0	0	0	0	121.4667	35.46666667	0	0	0	86	17.73333333	0	0	0	103.7333

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	33.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000				
b	12.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100				
c	7.8	3,100 AGL	15	Variable	350	-4.4	-2400	38	3100	AGL	3100				
c to 3000								2.53333333							
3000 to d								35.4666667				35.4666667	Approach	35.46666667	Idle
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600	12	Approach	12	Approach
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600	13	Approach	13	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600	12	Approach	12	Approach
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600	27	Approach	27	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_4LIL-3 - Straight-in IFR Arrival

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4LIL-3	0	0	0	0	186.0747	23.07466667	0	0	0	163	11.53733333	0	0	0	174.5373

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	13,982 AGL	15	Variable	300	0	0	104	13982	AGL	13982				
b	25	13,982 AGL	15	Variable	250	-6.6	-2600	272	13982	AGL	13982				
b to 3000								248.925333							
3000 to c								23.0746667				23.0746667	Approach	23.07466667	Idle
c	8	1,982 AGL	50	Parallel	200	-1.6	-500	57	1982	AGL	1982	57	Approach	57	Approach
d	5	1,482 AGL	40	Parallel	180	-2.7	-800	106	1482	AGL	1482	106	Approach	106	Approach
e	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_4LA1-2 - Tactical Lead

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4LA1-2	0	0	0	0	110.2667	24.26666667	0	0	0	86	12.13333333	0	0	0	98.13333

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000				
b	11.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100				
c	6.8	3,100 AGL	15	Variable	350	-6.4	-3500	26	3100	AGL	3100				
c to 3000								1.73333333							
3000 to d								24.2666667				24.2666667	Approach	24.26666667	Idle
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600	12	Approach	12	Approach
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600	13	Approach	13	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600	12	Approach	12	Approach
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600	27	Approach	27	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_4LA1-3 - Tactical Wing

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4LA1-3	0	0	0	0	121.4667	35.46666667	0	0	0	86	17.73333333	0	0	0	103.7333

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	33.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000				
b	12.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100				
c	7.8	3,100 AGL	15	Variable	350	-4.4	-2400	38	3100	AGL	3100				
c to 3000								2.53333333							
3000 to d								35.4666667				35.4666667	Approach	35.46666667	Idle
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600	12	Approach	12	Approach
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600	13	Approach	13	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600	12	Approach	12	Approach
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600	27	Approach	27	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_4LIL-4 - Straight-in IFR Arrival

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4LIL-4	0	0	0	0	186.0747	23.07466667	0	0	0	163	11.53733333	0	0	0	174.5373

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	13,982 AGL	15	Variable	300	0	0	104	13982	AGL	13982				
b	25	13,982 AGL	15	Variable	250	-6.6	-2600	272	13982	AGL	13982				
b to 3000								248.925333							
3000 to c								23.0746667				23.0746667	Approach	23.07466667	Idle
c	8	1,982 AGL	50	Parallel	200	-1.6	-500	57	1982	AGL	1982	57	Approach	57	Approach
d	5	1,482 AGL	40	Parallel	180	-2.7	-800	106	1482	AGL	1482	106	Approach	106	Approach
e	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_2LA3-1 - Overhead Break Arrival - Break at the Numbers

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2LA3-1	0	0	0	0	202.5	74.5	0	0	0	128	37.25	0	0	0	165.25

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	10,000 AGL	15	Variable	300	-3.5	-1800	273	10000	AGL	10000				
a to 3000								227.5							
3000 to b								45.5				45.5	Approach	45.5	Idle
b	10.18	1,600 AGL	35	Variable	300	0	0	49	1600	AGL	1600	49	Approach	49	Approach
c	6.11	1,600 AGL	15	Variable	300	0	0	29	1600	AGL	1600	29	Approach	29	Idle
d	4.04	1,600 AGL	35	Variable	210	0	0	9	1600	AGL	1600	9	Approach	9	Approach
e	3.55	1,600 AGL	50	Parallel	200	0	0	9	1600	AGL	1600	9	Approach	9	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	19	1600	AGL	1600	19	Approach	19	Approach
g	2.03	1,600 AGL	60	Parallel	200	-11.8	-3900	20	1600	AGL	1600	20	Approach	20	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_4RTA-1 - TACAN from W470

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4RTA-1	0	0	0	0	186.0747	23.07466667	0	0	0	163	11.53733333	0	0	0	174.5373

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	13,982 AGL	15	Variable	300	0	0	104	13982	AGL	13982				
b	25	13,982 AGL	15	Variable	250	-6.6	-2600	272	13982	AGL	13982				
b to 3000								248.925333							
3000 to c								23.0746667				23.0746667	Approach	23.07466667	Idle
c	8	1,982 AGL	50	Parallel	200	-1.3	-400	54	1982	AGL	1982	54	Approach	54	Approach
d	5.15	1,582 AGL	40	Parallel	180	-2.8	-800	109	1582	AGL	1582	109	Approach	109	Approach
e	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_2RA3-2 - Tactical Lead

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2RA3-2	0	0	0	0	110.2667	24.26666667	0	0	0	86	12.13333333	0	0	0	98.13333

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	32.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000				
b	11.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100				
c	6.8	3,100 AGL	15	Variable	350	-6.4	-3500	26	3100	AGL	3100				
c to 3000								1.73333333							
3000 to d								24.2666667				24.2666667	Approach	24.26666667	Idle
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600	12	Approach	12	Approach
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600	13	Approach	13	Approach
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600	12	Approach	12	Approach
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600	27	Approach	27	Approach
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300	22	Approach	22	Approach
i	0	50 AGL	40	Parallel	160				50	AGL	50	0	Approach	0	Approach

35A_2RA3-3 - Tactical Wing

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	33.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000
b	12.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100
c	7.8	3,100 AGL	15	Variable	350	-4.4	-2400	38	3100	AGL	3100
c to 3000								2.53333333			
3000 to d								35.4666667			
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300
i	0	50 AGL	40	Parallel	160				50	AGL	50

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
35.4666667	Approach	35.46666667	Idle
12	Approach	12	Approach
13	Approach	13	Approach
12	Approach	12	Approach
27	Approach	27	Approach
22	Approach	22	Approach
0	Approach	0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2RA3-3	0	0	0	0	121.4667	35.46666667	0	0	0	86	17.73333333	0	0	0	103.7333

35A_2RIL-1 - Straight-in IFR Arrival

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	32.92	13,982 AGL	15	Variable	300	0	0	104	13982	AGL	13982
b	25	13,982 AGL	15	Variable	250	-6.6	-2600	272	13982	AGL	13982
b to 3000								248.925333			
3000 to c								23.0746667			
c	8	1,982 AGL	50	Parallel	200	-1.6	-500	57	1982	AGL	1982
d	5	1,482 AGL	40	Parallel	180	-2.7	-800	106	1482	AGL	1482
e	0	50 AGL	40	Parallel	160				50	AGL	50

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
23.0746667	Approach	23.07466667	Idle
57	Approach	57	Approach
106	Approach	106	Approach
0	Approach	0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2RIL-1	0	0	0	0	186.0747	23.07466667	0	0	0	163	11.53733333	0	0	0	174.5373

35A_4RA3-1 - Overhead Break Arrival - Break at the Numbers

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	32.92	10,000 AGL	15	Variable	300	-3.5	-1800	273	10000	AGL	10000
a to 3000								227.5			
3000 to b								45.5			
b	10.18	1,600 AGL	35	Variable	300	0	0	49	1600	AGL	1600
c	6.11	1,600 AGL	15	Variable	300	0	0	29	1600	AGL	1600
d	4.04	1,600 AGL	35	Variable	210	0	0	9	1600	AGL	1600
e	3.55	1,600 AGL	50	Parallel	200	0	0	9	1600	AGL	1600
f	3.06	1,600 AGL	28	Parallel	200	0	0	19	1600	AGL	1600
g	2.03	1,600 AGL	60	Parallel	200	-11.8	-3900	20	1600	AGL	1600
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300
i	0	50 AGL	40	Parallel	160				50	AGL	50

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
45.5	Approach	45.5	Idle
49	Approach	49	Approach
29	Approach	29	Idle
9	Approach	9	Approach
9	Approach	9	Approach
19	Approach	19	Approach
20	Approach	20	Approach
22	Approach	22	Approach
0	Approach	0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4RA3-1	0	0	0	0	202.5	74.5	0	0	0	128	37.25	0	0	0	165.25

35A_2RA2-1 - Overhead Break Arrival - Break at the Numbers

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	32.92	10,000 AGL	15	Variable	300	-3.5	-1800	273	10000	AGL	10000
a to 3000								227.5			
3000 to b								45.5			
b	10.18	1,600 AGL	35	Variable	300	0	0	49	1600	AGL	1600
c	6.11	1,600 AGL	15	Variable	300	0	0	29	1600	AGL	1600
d	4.04	1,600 AGL	35	Variable	210	0	0	9	1600	AGL	1600
e	3.55	1,600 AGL	50	Parallel	200	0	0	9	1600	AGL	1600
f	3.06	1,600 AGL	28	Parallel	200	0	0	19	1600	AGL	1600
g	2.03	1,600 AGL	60	Parallel	200	-11.8	-3900	20	1600	AGL	1600
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300
i	0	50 AGL	40	Parallel	160				50	AGL	50

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
45.5	Approach	45.5	Idle
49	Approach	49	Approach
29	Approach	29	Idle
9	Approach	9	Approach
9	Approach	9	Approach
19	Approach	19	Approach
20	Approach	20	Approach
22	Approach	22	Approach
0	Approach	0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2RA2-1	0	0	0	0	202.5	74.5	0	0	0	128	37.25	0	0	0	165.25

35A_2RA1-1 - Overhead Break Arrival - Break at the Numbers

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	32.92	10,000 AGL	15	Variable	300	-3.5	-1800	273	10000	AGL	10000
a to 3000								227.5			
3000 to b								45.5			
b	10.18	1,600 AGL	35	Variable	300	0	0	49	1600	AGL	1600
c	6.11	1,600 AGL	15	Variable	300	0	0	29	1600	AGL	1600
d	4.04	1,600 AGL	35	Variable	210	0	0	9	1600	AGL	1600
e	3.55	1,600 AGL	50	Parallel	200	0	0	9	1600	AGL	1600
f	3.06	1,600 AGL	28	Parallel	200	0	0	19	1600	AGL	1600
g	2.03	1,600 AGL	60	Parallel	200	-11.8	-3900	20	1600	AGL	1600
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300
i	0	50 AGL	40	Parallel	160				50	AGL	50

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
45.5	Approach	45.5	Idle
49	Approach	49	Approach
29	Approach	29	Idle
9	Approach	9	Approach
9	Approach	9	Approach
19	Approach	19	Approach
20	Approach	20	Approach
22	Approach	22	Approach
0	Approach	0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2RA1-1	0	0	0	0	202.5	74.5	0	0	0	128	37.25	0	0	0	165.25

35A_4LA3-2 - Tactical Lead

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	32.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000
b	11.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100
c	6.8	3,100 AGL	15	Variable	350	-6.4	-3500	26	3100	AGL	3100
c to 3000								1.73333333			
3000 to d								24.2666667			
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300
i	0	50 AGL	40	Parallel	160				50	AGL	50

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
24.2666667	Approach	24.26666667	Idle
12	Approach	12	Approach
13	Approach	13	Approach
12	Approach	12	Approach
27	Approach	27	Approach
22	Approach	22	Approach
0	Approach	0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4LA3-2	0	0	0	0	110.2667	24.26666667	0	0	0	86	12.13333333	0	0	0	98.13333

35A_4LA3-3 - Tactical Wing

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	33.92	10,000 AGL	15	Variable	350	-3.1	-1900	217	10000	AGL	10000
b	12.85	3,100 AGL	35	Variable	350	0	0	52	3100	AGL	3100
c	7.8	3,100 AGL	15	Variable	350	-4.4	-2400	38	3100	AGL	3100
c to 3000								2.53333333			
3000 to d								35.4666667			
d	4.6	1,600 AGL	35	Variable	260	0	0	12	1600	AGL	1600
e	3.8	1,600 AGL	50	Parallel	200	0	0	13	1600	AGL	1600
f	3.06	1,600 AGL	28	Parallel	200	0	0	12	1600	AGL	1600
g	2.4	1,600 AGL	60	Parallel	200	-8.7	-2900	27	1600	AGL	1600
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300
i	0	50 AGL	40	Parallel	160				50	AGL	50

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
35.4666667	Approach	35.46666667	Idle
12	Approach	12	Approach
13	Approach	13	Approach
12	Approach	12	Approach
27	Approach	27	Approach
22	Approach	22	Approach
0	Approach	0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4LA3-3	0	0	0	0	121.4667	35.46666667	0	0	0	86	17.73333333	0	0	0	103.7333

35A_4LIL-1 - Straight-in IFR Arrival

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	32.92	13,982 AGL	15	Variable	300	0	0	104	13982	AGL	13982
b	25	13,982 AGL	15	Variable	250	-6.6	-2600	272	13982	AGL	13982
b to 3000								248.925333			
3000 to c								23.0746667			
c	8	1,982 AGL	50	Parallel	200	-1.6	-500	57	1982	AGL	1982
d	5	1,482 AGL	40	Parallel	180	-2.7	-800	106	1482	AGL	1482
e	0	50 AGL	40	Parallel	160				50	AGL	50

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
23.0746667	Approach	23.07466667	Idle
57	Approach	57	Approach
106	Approach	106	Approach
0	Approach	0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4LIL-1	0	0	0	0	186.0747	23.07466667	0	0	0	163	11.53733333	0	0	0	174.5373

35A_4LA2-1 - Overhead Break Arrival - Break at the Numbers

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4LA2-1	0	0	0	0	202.5	74.5	0	0	0	128	37.25	0	0	0	165.25

a	32.92	10,000 AGL	15	Variable	300	-3.5	-1800	273	10000	AGL	10000
a to 3000								227.5			
3000 to b								45.5			
b	10.18	1,600 AGL	35	Variable	300	0	0	49	1600	AGL	1600
c	6.11	1,600 AGL	15	Variable	300	0	0	29	1600	AGL	1600
d	4.04	1,600 AGL	35	Variable	210	0	0	9	1600	AGL	1600
e	3.55	1,600 AGL	50	Parallel	200	0	0	9	1600	AGL	1600
f	3.06	1,600 AGL	28	Parallel	200	0	0	19	1600	AGL	1600
g	2.03	1,600 AGL	60	Parallel	200	-11.8	-3900	20	1600	AGL	1600
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300
i	0	50 AGL	40	Parallel	160				50	AGL	50

45.5	Approach	45.5	Idle
49	Approach	49	Approach
29	Approach	29	Idle
9	Approach	9	Approach
9	Approach	9	Approach
19	Approach	19	Approach
20	Approach	20	Approach
22	Approach	22	Approach
0	Approach	0	Approach

35A_4LA1-1 - Overhead Break Arrival - Break at the Numbers

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4LA1-1	0	0	0	0	202.5	74.5	0	0	0	128	37.25	0	0	0	165.25

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	32.92	10,000 AGL	15	Variable	300	-3.5	-1800	273	10000	AGL	10000
a to 3000								227.5			
3000 to b								45.5			
b	10.18	1,600 AGL	35	Variable	300	0	0	49	1600	AGL	1600
c	6.11	1,600 AGL	15	Variable	300	0	0	29	1600	AGL	1600
d	4.04	1,600 AGL	35	Variable	210	0	0	9	1600	AGL	1600
e	3.55	1,600 AGL	50	Parallel	200	0	0	9	1600	AGL	1600
f	3.06	1,600 AGL	28	Parallel	200	0	0	19	1600	AGL	1600
g	2.03	1,600 AGL	60	Parallel	200	-11.8	-3900	20	1600	AGL	1600
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300
i	0	50 AGL	40	Parallel	160				50	AGL	50

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
45.5	Approach	45.5	Idle
49	Approach	49	Approach
29	Approach	29	Idle
9	Approach	9	Approach
9	Approach	9	Approach
19	Approach	19	Approach
20	Approach	20	Approach
22	Approach	22	Approach
0	Approach	0	Approach

35A_2RA3-1 - Overhead Break Arrival - Break at the Numbers

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2RA3-1	0	0	0	0	202.5	74.5	0	0	0	128	37.25	0	0	0	165.25

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	32.92	10,000 AGL	15	Variable	300	-3.5	-1800	273	10000	AGL	10000
a to 3000								227.5			
3000 to b								45.5			
b	10.18	1,600 AGL	35	Variable	300	0	0	49	1600	AGL	1600
c	6.11	1,600 AGL	15	Variable	300	0	0	29	1600	AGL	1600
d	4.04	1,600 AGL	35	Variable	210	0	0	9	1600	AGL	1600
e	3.55	1,600 AGL	50	Parallel	200	0	0	9	1600	AGL	1600
f	3.06	1,600 AGL	28	Parallel	200	0	0	19	1600	AGL	1600
g	2.03	1,600 AGL	60	Parallel	200	-11.8	-3900	20	1600	AGL	1600
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300
i	0	50 AGL	40	Parallel	160				50	AGL	50

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
45.5	Approach	45.5	Idle
49	Approach	49	Approach
29	Approach	29	Idle
9	Approach	9	Approach
9	Approach	9	Approach
19	Approach	19	Approach
20	Approach	20	Approach
22	Approach	22	Approach
0	Approach	0	Approach

35A_4LA3-1 - Overhead Break Arrival - Break at the Numbers

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4LA3-1	0	0	0	0	202.5	74.5	0	0	0	128	37.25	0	0	0	165.25

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	32.92	10,000 AGL	15	Variable	300	-3.5	-1800	273	10000	AGL	10000
a to 3000								227.5			
3000 to b								45.5			
b	10.18	1,600 AGL	35	Variable	300	0	0	49	1600	AGL	1600
c	6.11	1,600 AGL	15	Variable	300	0	0	29	1600	AGL	1600
d	4.04	1,600 AGL	35	Variable	210	0	0	9	1600	AGL	1600
e	3.55	1,600 AGL	50	Parallel	200	0	0	9	1600	AGL	1600
f	3.06	1,600 AGL	28	Parallel	200	0	0	19	1600	AGL	1600
g	2.03	1,600 AGL	60	Parallel	200	-11.8	-3900	20	1600	AGL	1600
h	1	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300
i	0	50 AGL	40	Parallel	160				50	AGL	50

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
45.5	Approach	45.5	Idle
49	Approach	49	Approach
29	Approach	29	Idle
9	Approach	9	Approach
9	Approach	9	Approach
19	Approach	19	Approach
20	Approach	20	Approach
22	Approach	22	Approach
0	Approach	0	Approach

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ATTACHMENT 7

DERIVATIONS OF F-35A DEPARTURE TIMS FROM NOISE FLIGHT PROFILES FOR THE PROJECT AIR QUALITY ANALYSIS - TYNDALL AFB

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Tyndall AFB F-35 Departures

Profile	Track	Day	Night	Total	% Flown	Cumulative % Flown
35A AB 2-2	2LDDTR470 - 32LD TROWT 2 departure to 470	6.006	0.030	6.036	13.43%	13.43%
35A MIL -2	2LDDTR470 - 32LD TROWT 2 departure to 470	6.006	0.030	6.036	13.43%	26.87%
35A AB 4-8	4RDOYS2470 - 14R OYSTE 2 departure to 470	4.531	0.022	4.553	10.13%	37.00%
35A MIL-16	4RDOYS2470 - 14R OYSTE 2 departure to 470	4.531	0.022	4.553	10.13%	47.13%
35A AB 2-6	2RDTR470 - 32R TROWT 2 departure to 470	2.574	0.013	2.587	5.76%	52.89%
35A MIL -6	2RDTR470 - 32R TROWT 2 departure to 470	2.574	0.013	2.587	5.76%	58.65%
35A AB 4-4	4LDOYS2470 - 14LD OYSTE 2 departure to 470	1.942	0.010	1.951	4.34%	62.99%
35A MIL-12	4LDOYS2470 - 14LD OYSTE 2 departure to 470	1.942	0.010	1.951	4.34%	67.33%
35A AB 2-3	2LDDTRCAR - 32LD TROWT 2 departure to Carabelle	1.146	0.006	1.151	2.56%	69.89%
35A MIL -3	2LDDTRCAR - 32LD TROWT 2 departure to Carabelle	1.146	0.006	1.151	2.56%	72.46%
35A AB 2-4	2LDDTRCL - 32LD TROWT 2 departure to Compass Lake	1.101	0.005	1.106	2.46%	74.92%
35A MIL -4	2LDDTRCL - 32LD TROWT 2 departure to Compass Lake	1.101	0.005	1.106	2.46%	77.38%
35A AB 4-5	4RDOYS2CAR - 14RD OYSTE 2 departure to Carabelle	0.864	0.004	0.869	1.93%	79.31%
35A MIL-13	4RDOYS2CAR - 14RD OYSTE 2 departure to Carabelle	0.864	0.004	0.869	1.93%	81.25%
35A AB 4-6	4RDOYS2CL - 14R Departure to Compass Lake	0.830	0.004	0.835	1.86%	83.11%
35A MIL-14	4RDOYS2CL - 14R Departure to Compass Lake	0.830	0.004	0.835	1.86%	84.96%
35A AB 2-1	2LDDTR151 - 32LD TROWT 2 departure to 151	0.667	0.003	0.671	1.49%	86.46%
35A MIL -1	2LDDTR151 - 32LD TROWT 2 departure to 151	0.667	0.003	0.671	1.49%	87.95%
35A AB 4-7	4RDOYS2151 - 14RD OYSTE 2 departure to 151	0.503	0.002	0.506	1.13%	89.08%
35A MIL-15	4RDOYS2151 - 14RD OYSTE 2 departure to 151	0.503	0.002	0.506	1.13%	90.20%
35A AB 2-7	2RDTRCAR - 32R TROWT 2 departure to Carabelle	0.491	0.002	0.493	1.10%	91.30%
35A MIL -7	2RDTRCAR - 32R TROWT 2 departure to Carabelle	0.491	0.002	0.493	1.10%	92.40%
35A AB 2-8	2RDTRCL - 32R TROWT 2 departure to Compass Lake	0.472	0.002	0.474	1.05%	93.45%
35A MIL -8	2RDTRCL - 32R TROWT 2 departure to Compass Lake	0.472	0.002	0.474	1.05%	94.51%
35A AB 4-1	4LDOYS2CAR - 14LD OYSTE 2 departure to Carabelle	0.370	0.002	0.372	0.83%	95.34%
35A MIL -9	4LDOYS2CAR - 14LD OYSTE 2 departure to Carabelle	0.370	0.002	0.372	0.83%	96.16%
35A AB 4-2	4LDOYS2CL - 14L dep track to Compasss Lake	0.356	0.002	0.358	0.80%	96.96%
35A MIL-10	4LDOYS2CL - 14L dep track to Compasss Lake	0.356	0.002	0.358	0.80%	97.76%
35A AB 2-5	2RDTR151 - 32R TROWT 2 departure to 151	0.286	0.001	0.287	0.64%	98.40%
35A MIL -5	2RDTR151 - 32R TROWT 2 departure to 151	0.286	0.001	0.287	0.64%	99.03%
35A AB 4-3	4LDOYS2151 - 14LD OYSTE 2 departure to 151	0.216	0.001	0.217	0.48%	99.52%
35A MIL-11	4LDOYS2151 - 14LD OYSTE 2 departure to 151	0.216	0.001	0.217	0.48%	100.00%
				44.932	100.00%	

Weighted Value All Profiles

	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
	0	3.082881706	1.18983607	1.0623536	1.0746906
	0	0	5.91079854	2.015045	1.612036
	0	2.325440757	0.897502257	0.8013413	0.8106472
	0	0	4.458559601	1.5199635	1.2159708
	0	1.321307981	0.509957905	0.4553196	0.4606071
	0	0	2.533339268	0.8636384	0.6909107
	0	0.996471539	0.384587504	0.3433817	0.3473694
	0	0	1.91053147	0.6513175	0.521054
	0	0.587872241	0.226888886	0.2025794	0.2049319
	0	0	1.127125434	0.3842473	0.3073978
	0	0.56488853	0.218018339	0.1946592	0.1969198
	0	0	1.083058844	0.3692246	0.2953797
	0	0.443840988	0.171300123	0.1529465	0.1547227
	0	0	0.850974806	0.290105	0.232084
	0	0.426475518	0.164597932	0.1469624	0.1486691
	0	0	0.81768005	0.2787546	0.2230036
	0	0.342712661	0.132269716	0.118098	0.1194694
	0	0	0.657081813	0.2240052	0.1792041
	0	0.258439056	0.099744376	0.0890575	0.0900917
	0	0	0.495504318	0.1689219	0.1351375
	0	0.251799318	0.097181773	0.0867694	0.0877771
	0	0	0.48277397	0.164582	0.1316656
	0	0.242095084	0.093436431	0.0834254	0.0843942
	0	0	0.464168076	0.1582391	0.1265913
	0	0.189998674	0.073329857	0.0654731	0.0662334
	0	0	0.364283807	0.1241877	0.0993501
	0	0.182848186	0.070570131	0.063009	0.0637408
	0	0	0.350574201	0.1195139	0.0956111
	0	0.146584998	0.056574379	0.0505128	0.0510994
	0	0	0.281046915	0.0958114	0.0766492
	0	0.11083256	0.04277575	0.0381926	0.0386362
	0	0	0.212498887	0.0724428	0.0579542
Total (sec):	0	11.4744898	26.42857143	11.454082	10
Total (min):	0	0.191241497	0.44047619	0.1909014	0.1666667

Tables provided in this Attachment are presented in the same format as produced by the modeling software.

Tyndall AFB Runway Elevation ft: 18

35A_AB_2-2 - Afterburner Departure

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	16	0	AGL	0
b	0.33	0 AGL	150	Afterburner	150	0.8	200	2	0	AGL	0
c	0.41	7 AGL	150	Afterburner	174	2	900	12	7	AGL	7
d	1.32	200 AGL	100	Variable	350	15	9500	62	200	AGL	200
d to 500								1.89795918			
500 to 3000								15.8163265			
3000 to e								44.2857143			
e	7.32	10,000 AGL	35	Variable	350	0	0	263	10000	AGL	10000
f	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
16	Afterburner	16	Approach
2	Afterburner	2	Afterburner
12	Afterburner	12	Afterburner
1.8979592	Afterburner	1.89795918	Military
15.816327	Climbout	15.8163265	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A AB 2-2	0	31.89795918	0	15.8163265	0	0	14	17.71428571	0	16	0	22.94898	8.8571429	7.908163	8

35A_MIL_-2 - Mil Departure

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	24	0	AGL	0
b	0.49	0 AGL	100	Variable	150	0.8	200	2	0	AGL	0
c	0.58	7 AGL	100	Variable	174	4.3	2000	15	7	AGL	7
d	1.65	500 AGL	100	Variable	350	8.1	5100	30	500	AGL	500
e	4.53	3,000 AGL	80	Variable	350	15	9500	44	3000	AGL	3000
f	8.83	10,000 AGL	35	Variable	350	0	0	248	10000	AGL	10000
g	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
24	Military	24	Approach
2	Military	2	Military
15	Military	15	Military
30	Climbout	30	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A MIL -2	0	0	41	30	0	0	0	47	0	24	0	0	44	15	12

35A_AB_4-8 - Afterburner Departure

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	16	0	AGL	0
b	0.33	0 AGL	150	Afterburner	150	0.8	200	2	0	AGL	0
c	0.41	7 AGL	150	Afterburner	174	2	900	12	7	AGL	7
d	1.32	200 AGL	100	Variable	350	15	9500	62	200	AGL	200
d to 500								1.89795918			
500 to 3000								15.8163265			
3000 to e								44.2857143			
e	7.32	10,000 AGL	35	Variable	350	0	0	263	10000	AGL	10000
f	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
16	Afterburner	16	Approach
2	Afterburner	2	Afterburner
12	Afterburner	12	Afterburner
1.8979592	Afterburner	1.89795918	Military
15.816327	Climbout	15.8163265	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A AB 4-8	0	31.89795918	0	15.8163265	0	0	14	17.71428571	0	16	0	22.94898	8.8571429	7.908163	8

35A_MIL-16 - Mil Departure

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	24	0	AGL	0
b	0.49	0 AGL	100	Variable	150	0.8	200	2	0	AGL	0
c	0.58	7 AGL	100	Variable	174	4.3	2000	15	7	AGL	7
d	1.65	500 AGL	100	Variable	350	8.1	5100	30	500	AGL	500
e	4.53	3,000 AGL	80	Variable	350	15	9500	44	3000	AGL	3000
f	8.83	10,000 AGL	35	Variable	350	0	0	248	10000	AGL	10000
g	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
24	Military	24	Approach
2	Military	2	Military
15	Military	15	Military
30	Climbout	30	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A MIL-16	0	0	41	30	0	0	0	47	0	24	0	0	44	15	12

35A_AB_2-6 - Afterburner Departure

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	16	0	AGL	0
b	0.33	0 AGL	150	Afterburner	150	0.8	200	2	0	AGL	0
c	0.41	7 AGL	150	Afterburner	174	2	900	12	7	AGL	7
d	1.32	200 AGL	100	Variable	350	15	9500	62	200	AGL	200
d to 500								1.89795918			
500 to 3000								15.8163265			
3000 to e								44.2857143			
e	7.32	10,000 AGL	35	Variable	350	0	0	263	10000	AGL	10000
f	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
16	Afterburner	16	Approach
2	Afterburner	2	Afterburner
12	Afterburner	12	Afterburner
1.8979592	Afterburner	1.89795918	Military
15.816327	Climbout	15.8163265	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A AB 2-6	0	31.89795918	0	15.8163265	0	0	14	17.71428571	0	16	0	22.94898	8.8571429	7.908163	8

35A_MIL_-6 - Mil Departure

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	24	0	AGL	0
b	0.49	0 AGL	100	Variable	150	0.8	200	2	0	AGL	0
c	0.58	7 AGL	100	Variable	174	4.3	2000	15	7	AGL	7
d	1.65	500 AGL	100	Variable	350	8.1	5100	30	500	AGL	500
e	4.53	3,000 AGL	80	Variable	350	15	9500	44	3000	AGL	3000
f	8.83	10,000 AGL	35	Variable	350	0	0	248	10000	AGL	10000
g	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
24	Military	24	Approach
2	Military	2	Military
15	Military	15	Military
30	Climbout	30	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A MIL -6	0	0	41	30	0	0	0	47	0	24	0	0	44	15	12

35A_AB_4-4 - Afterburner Departure

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	16	0	AGL	0
b	0.33	0 AGL	150	Afterburner	150	0.8	200	2	0	AGL	0
c	0.41	7 AGL	150	Afterburner	174	2	900	12	7	AGL	7
d	1.32	200 AGL	100	Variable	350	15	9500	62	200	AGL	200
d to 500								1.89795918			
500 to 3000								15.8163265			
3000 to e								44.2857143			
e	7.32	10,000 AGL	35	Variable	350	0	0	263	10000	AGL	10000
f	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
16	Afterburner	16	Approach
2	Afterburner	2	Afterburner
12	Afterburner	12	Afterburner
1.8979592	Afterburner	1.89795918	Military
15.816327	Climbout	15.8163265	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A AB 4-4	0	31.89795918	0	15.8163265	0	0	14	17.71428571	0	16	0	22.94898	8.8571429	7.908163	8

35A_MIL-12 - Mil Departure

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A MIL-12	0	0	41	30	0	0	0	47	0	24	0	0	44	15	12

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	24	0	AGL	0
b	0.49	0 AGL	100	Variable	150	0.8	200	2	0	AGL	0
c	0.58	7 AGL	100	Variable	174	4.3	2000	15	7	AGL	7
d	1.65	500 AGL	100	Variable	350	8.1	5100	30	500	AGL	500
e	4.53	3,000 AGL	80	Variable	350	15	9500	44	3000	AGL	3000
f	8.83	10,000 AGL	35	Variable	350	0	0	248	10000	AGL	10000
g	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
24	Military	24	Approach
2	Military	2	Military
15	Military	15	Military
30	Climbout	30	Military

35A_AB_2-3 - Afterburner Departure

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A AB 2-3	0	31.89795918	0	15.8163265	0	0	14	17.71428571	0	16	0	22.94898	8.8571429	7.908163	8

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	16	0	AGL	0
b	0.33	0 AGL	150	Afterburner	150	0.8	200	2	0	AGL	0
c	0.41	7 AGL	150	Afterburner	174	2	900	12	7	AGL	7
d	1.32	200 AGL	100	Variable	350	15	9500	62	200	AGL	200
d to 500								1.89795918			
500 to 3000								15.8163265			
3000 to e								44.2857143			
e	7.32	10,000 AGL	35	Variable	350	0	0	263	10000	AGL	10000
f	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
16	Afterburner	16	Approach
2	Afterburner	2	Afterburner
12	Afterburner	12	Afterburner
1.8979592	Afterburner	1.89795918	Military
15.816327	Climbout	15.8163265	Military

35A_MIL_-3 - Mil Departure

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A MIL -3	0	0	41	30	0	0	0	47	0	24	0	0	44	15	12

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	24	0	AGL	0
b	0.49	0 AGL	100	Variable	150	0.8	200	2	0	AGL	0
c	0.58	7 AGL	100	Variable	174	4.3	2000	15	7	AGL	7
d	1.65	500 AGL	100	Variable	350	8.1	5100	30	500	AGL	500
e	4.53	3,000 AGL	80	Variable	350	15	9500	44	3000	AGL	3000
f	8.83	10,000 AGL	35	Variable	350	0	0	248	10000	AGL	10000
g	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
24	Military	24	Approach
2	Military	2	Military
15	Military	15	Military
30	Climbout	30	Military

35A_AB_2-4 - Afterburner Departure

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A AB 2-4	0	31.89795918	0	15.8163265	0	0	14	17.71428571	0	16	0	22.94898	8.8571429	7.908163	8

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	16	0	AGL	0
b	0.33	0 AGL	150	Afterburner	150	0.8	200	2	0	AGL	0
c	0.41	7 AGL	150	Afterburner	174	2	900	12	7	AGL	7
d	1.32	200 AGL	100	Variable	350	15	9500	62	200	AGL	200
d to 500								1.89795918			
500 to 3000								15.8163265			
3000 to e								44.2857143			
e	7.32	10,000 AGL	35	Variable	350	0	0	263	10000	AGL	10000
f	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
16	Afterburner	16	Approach
2	Afterburner	2	Afterburner
12	Afterburner	12	Afterburner
1.8979592	Afterburner	1.89795918	Military
15.816327	Climbout	15.8163265	Military

35A_MIL_-4 - Mil Departure

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A MIL -4	0	0	41	30	0	0	0	47	0	24	0	0	44	15	12

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	24	0	AGL	0
b	0.49	0 AGL	100	Variable	150	0.8	200	2	0	AGL	0
c	0.58	7 AGL	100	Variable	174	4.3	2000	15	7	AGL	7
d	1.65	500 AGL	100	Variable	350	8.1	5100	30	500	AGL	500
e	4.53	3,000 AGL	80	Variable	350	15	9500	44	3000	AGL	3000
f	8.83	10,000 AGL	35	Variable	350	0	0	248	10000	AGL	10000
g	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
24	Military	24	Approach
2	Military	2	Military
15	Military	15	Military
30	Climbout	30	Military

35A_AB_4-5 - Afterburner Departure

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A AB 4-5	0	31.89795918	0	15.8163265	0	0	14	17.71428571	0	16	0	22.94898	8.8571429	7.908163	8

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	16	0	AGL	0
b	0.33	0 AGL	150	Afterburner	150	0.8	200	2	0	AGL	0
c	0.41	7 AGL	150	Afterburner	174	2	900	12	7	AGL	7
d	1.32	200 AGL	100	Variable	350	15	9500	62	200	AGL	200
d to 500								1.89795918			
500 to 3000								15.8163265			
3000 to e								44.2857143			
e	7.32	10,000 AGL	35	Variable	350	0	0	263	10000	AGL	10000
f	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
16	Afterburner	16	Approach
2	Afterburner	2	Afterburner
12	Afterburner	12	Afterburner
1.8979592	Afterburner	1.89795918	Military
15.816327	Climbout	15.8163265	Military

35A_MIL-13 - Mil Departure

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A MIL-13	0	0	41	30	0	0	0	47	0	24	0	0	44	15	12

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	24	0	AGL	0
b	0.49	0 AGL	100	Variable	150	0.8	200	2	0	AGL	0
c	0.58	7 AGL	100	Variable	174	4.3	2000	15	7	AGL	7
d	1.65	500 AGL	100	Variable	350	8.1	5100	30	500	AGL	500
e	4.53	3,000 AGL	80	Variable	350	15	9500	44	3000	AGL	3000
f	8.83	10,000 AGL	35	Variable	350	0	0	248	10000	AGL	10000
g	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
24	Military	24	Approach
2	Military	2	Military
15	Military	15	Military
30	Climbout	30	Military

35A_AB_4-6 - Afterburner Departure

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A AB 4-6	0	31.89795918	0	15.8163265	0	0	14	17.71428571	0	16	0	22.94898	8.8571429	7.908163	8

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	16	0	AGL	0
b	0.33	0 AGL	150	Afterburner	150	0.8	200	2	0	AGL	0
c	0.41	7 AGL	150	Afterburner	174	2	900	12	7	AGL	7
d	1.32	200 AGL	100	Variable	350	15	9500	62	200	AGL	200
d to 500								1.89795918			
500 to 3000								15.8163265			
3000 to e								44.2857143			
e	7.32	10,000 AGL	35	Variable	350	0	0	263	10000	AGL	10000
f	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
16	Afterburner	16	Approach
2	Afterburner	2	Afterburner
12	Afterburner	12	Afterburner
1.8979592	Afterburner	1.89795918	Military
15.816327	Climbout	15.8163265	Military

35A_MIL-14 - Mil Departure

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A MIL-14	0	0	41	30	0	0	0	47	0	24	0	0	44	15	12

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	24	0	AGL	0
b	0.49	0 AGL	100	Variable	150	0.8	200	2	0	AGL	0
c	0.58	7 AGL	100	Variable	174	4.3	2000	15	7	AGL	7
d	1.65	500 AGL	100	Variable	350	8.1	5100	30	500	AGL	500
e	4.53	3,000 AGL	80	Variable	350	15	9500	44	3000	AGL	3000
f	8.83	10,000 AGL	35	Variable	350	0	0	248	10000	AGL	10000
g	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
24	Military	24	Approach
2	Military	2	Military
15	Military	15	Military
30	Climbout	30	Military

35A_AB_2-1 - Afterburner Departure

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A AB 2-1	0	31.89795918	0	15.8163265	0	0	14	17.71428571	0	16	0	22.94898	8.8571429	7.908163	8

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	16	0	AGL	0
b	0.33	0 AGL	150	Afterburner	150	0.8	200	2	0	AGL	0

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
16	Afterburner	16	Approach
2	Afterburner	2	Afterburner

c	0.41	7 AGL	150	Afterburner	174	2	900	12	7	AGL	7
d	1.32	200 AGL	100	Variable	350	15	9500	62	200	AGL	200
d to 500								1.89795918			
500 to 3000								15.8163265			
3000 to e								44.2857143			
e	7.32	10,000 AGL	35	Variable	350	0	0	263	10000	AGL	10000
f	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

12	Afterburner	12	Afterburner
1.8979592	Afterburner	1.89795918	Military
15.816327	Climbout	15.8163265	Military

35A_MIL_-1 - Mil Departure

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	24	0	AGL	0
b	0.49	0 AGL	100	Variable	150	0.8	200	2	0	AGL	0
c	0.58	7 AGL	100	Variable	174	4.3	2000	15	7	AGL	7
d	1.65	500 AGL	100	Variable	350	8.1	5100	30	500	AGL	500
e	4.53	3,000 AGL	80	Variable	350	15	9500	44	3000	AGL	3000
f	8.83	10,000 AGL	35	Variable	350	0	0	248	10000	AGL	10000
g	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
24	Military	24	Approach
2	Military	2	Military
15	Military	15	Military
30	Climbout	30	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A MIL -1	0	0	41	30	0	0	0	47	0	24	0	0	44	15	12

35A_AB_4-7 - Afterburner Departure

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	16	0	AGL	0
b	0.33	0 AGL	150	Afterburner	150	0.8	200	2	0	AGL	0
c	0.41	7 AGL	150	Afterburner	174	2	900	12	7	AGL	7
d	1.32	200 AGL	100	Variable	350	15	9500	62	200	AGL	200
d to 500								1.89795918			
500 to 3000								15.8163265			
3000 to e								44.2857143			
e	7.32	10,000 AGL	35	Variable	350	0	0	263	10000	AGL	10000
f	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
16	Afterburner	16	Approach
2	Afterburner	2	Afterburner
12	Afterburner	12	Afterburner
1.8979592	Afterburner	1.89795918	Military
15.816327	Climbout	15.8163265	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A AB 4-7	0	31.89795918	0	15.8163265	0	0	14	17.71428571	0	16	0	22.94898	8.8571429	7.908163	8

35A_MIL-15 - Mil Departure

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	24	0	AGL	0
b	0.49	0 AGL	100	Variable	150	0.8	200	2	0	AGL	0
c	0.58	7 AGL	100	Variable	174	4.3	2000	15	7	AGL	7
d	1.65	500 AGL	100	Variable	350	8.1	5100	30	500	AGL	500
e	4.53	3,000 AGL	80	Variable	350	15	9500	44	3000	AGL	3000
f	8.83	10,000 AGL	35	Variable	350	0	0	248	10000	AGL	10000
g	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
24	Military	24	Approach
2	Military	2	Military
15	Military	15	Military
30	Climbout	30	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A MIL-15	0	0	41	30	0	0	0	47	0	24	0	0	44	15	12

35A_AB_2-7 - Afterburner Departure

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	16	0	AGL	0
b	0.33	0 AGL	150	Afterburner	150	0.8	200	2	0	AGL	0
c	0.41	7 AGL	150	Afterburner	174	2	900	12	7	AGL	7
d	1.32	200 AGL	100	Variable	350	15	9500	62	200	AGL	200
d to 500								1.89795918			
500 to 3000								15.8163265			
3000 to e								44.2857143			
e	7.32	10,000 AGL	35	Variable	350	0	0	263	10000	AGL	10000
f	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
16	Afterburner	16	Approach
2	Afterburner	2	Afterburner
12	Afterburner	12	Afterburner
1.8979592	Afterburner	1.89795918	Military
15.816327	Climbout	15.8163265	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A AB 2-7	0	31.89795918	0	15.8163265	0	0	14	17.71428571	0	16	0	22.94898	8.8571429	7.908163	8

35A_MIL_-7 - Mil Departure

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	24	0	AGL	0
b	0.49	0 AGL	100	Variable	150	0.8	200	2	0	AGL	0
c	0.58	7 AGL	100	Variable	174	4.3	2000	15	7	AGL	7
d	1.65	500 AGL	100	Variable	350	8.1	5100	30	500	AGL	500
e	4.53	3,000 AGL	80	Variable	350	15	9500	44	3000	AGL	3000
f	8.83	10,000 AGL	35	Variable	350	0	0	248	10000	AGL	10000
g	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
24	Military	24	Approach
2	Military	2	Military
15	Military	15	Military
30	Climbout	30	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A MIL -7	0	0	41	30	0	0	0	47	0	24	0	0	44	15	12

35A_AB_2-8 - Afterburner Departure

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	16	0	AGL	0
b	0.33	0 AGL	150	Afterburner	150	0.8	200	2	0	AGL	0
c	0.41	7 AGL	150	Afterburner	174	2	900	12	7	AGL	7
d	1.32	200 AGL	100	Variable	350	15	9500	62	200	AGL	200
d to 500								1.89795918			
500 to 3000								15.8163265			
3000 to e								44.2857143			
e	7.32	10,000 AGL	35	Variable	350	0	0	263	10000	AGL	10000
f	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
16	Afterburner	16	Approach
2	Afterburner	2	Afterburner
12	Afterburner	12	Afterburner
1.8979592	Afterburner	1.89795918	Military
15.816327	Climbout	15.8163265	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A AB 2-8	0	31.89795918	0	15.8163265	0	0	14	17.71428571	0	16	0	22.94898	8.8571429	7.908163	8

35A_MIL_-8 - Mil Departure

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	24	0	AGL	0
b	0.49	0 AGL	100	Variable	150	0.8	200	2	0	AGL	0
c	0.58	7 AGL	100	Variable	174	4.3	2000	15	7	AGL	7
d	1.65	500 AGL	100	Variable	350	8.1	5100	30	500	AGL	500
e	4.53	3,000 AGL	80	Variable	350	15	9500	44	3000	AGL	3000
f	8.83	10,000 AGL	35	Variable	350	0	0	248	10000	AGL	10000
g	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
24	Military	24	Approach
2	Military	2	Military
15	Military	15	Military
30	Climbout	30	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A MIL -8	0	0	41	30	0	0	0	47	0	24	0	0	44	15	12

35A_AB_4-1 - Afterburner Departure

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	16	0	AGL	0
b	0.33	0 AGL	150	Afterburner	150	0.8	200	2	0	AGL	0
c	0.41	7 AGL	150	Afterburner	174	2	900	12	7	AGL	7
d	1.32	200 AGL	100	Variable	350	15	9500	62	200	AGL	200
d to 500								1.89795918			
500 to 3000								15.8163265			
3000 to e								44.2857143			
e	7.32	10,000 AGL	35	Variable	350	0	0	263	10000	AGL	10000
f	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
16	Afterburner	16	Approach
2	Afterburner	2	Afterburner
12	Afterburner	12	Afterburner
1.8979592	Afterburner	1.89795918	Military
15.816327	Climbout	15.8163265	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A AB 4-1	0	31.89795918	0	15.8163265	0	0	14	17.71428571	0	16	0	22.94898	8.8571429	7.908163	8

35A_MIL_-9 - Mil Departure

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	24	0	AGL	0
b	0.49	0 AGL	100	Variable	150	0.8	200	2	0	AGL	0
c	0.58	7 AGL	100	Variable	174	4.3	2000	15	7	AGL	7
d	1.65	500 AGL	100	Variable	350	8.1	5100	30	500	AGL	500
e	4.53	3,000 AGL	80	Variable	350	15	9500	44	3000	AGL	3000
f	8.83	10,000 AGL	35	Variable	350	0	0	248	10000	AGL	10000
g	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
24	Military	24	Approach
2	Military	2	Military
15	Military	15	Military
30	Climbout	30	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A MIL -9	0	0	41	30	0	0	0	47	0	24	0	0	44	15	12

35A_AB_4-2 - Afterburner Departure

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	16	0	AGL	0
b	0.33	0 AGL	150	Afterburner	150	0.8	200	2	0	AGL	0
c	0.41	7 AGL	150	Afterburner	174	2	900	12	7	AGL	7
d	1.32	200 AGL	100	Variable	350	15	9500	62	200	AGL	200
d to 500								1.89795918			
500 to 3000								15.8163265			
3000 to e								44.2857143			
e	7.32	10,000 AGL	35	Variable	350	0	0	263	10000	AGL	10000
f	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
16	Afterburner	16	Approach
2	Afterburner	2	Afterburner
12	Afterburner	12	Afterburner
1.8979592	Afterburner	1.89795918	Military
15.816327	Climbout	15.8163265	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A AB 4-2	0	31.89795918	0	15.8163265	0	0	14	17.71428571	0	16	0	22.94898	8.8571429	7.908163	8

35A_MIL-10 - Mil Departure

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	24	0	AGL	0
b	0.49	0 AGL	100	Variable	150	0.8	200	2	0	AGL	0
c	0.58	7 AGL	100	Variable	174	4.3	2000	15	7	AGL	7
d	1.65	500 AGL	100	Variable	350	8.1	5100	30	500	AGL	500
e	4.53	3,000 AGL	80	Variable	350	15	9500	44	3000	AGL	3000
f	8.83	10,000 AGL	35	Variable	350	0	0	248	10000	AGL	10000
g	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
24	Military	24	Approach
2	Military	2	Military
15	Military	15	Military
30	Climbout	30	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A MIL-10	0	0	41	30	0	0	0	47	0	24	0	0	44	15	12

35A_AB_2-5 - Afterburner Departure

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	16	0	AGL	0
b	0.33	0 AGL	150	Afterburner	150	0.8	200	2	0	AGL	0
c	0.41	7 AGL	150	Afterburner	174	2	900	12	7	AGL	7
d	1.32	200 AGL	100	Variable	350	15	9500	62	200	AGL	200
d to 500								1.89795918			
500 to 3000								15.8163265			
3000 to e								44.2857143			
e	7.32	10,000 AGL	35	Variable	350	0	0	263	10000	AGL	10000
f	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
16	Afterburner	16	Approach
2	Afterburner	2	Afterburner
12	Afterburner	12	Afterburner
1.8979592	Afterburner	1.89795918	Military
15.816327	Climbout	15.8163265	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A AB 2-5	0	31.89795918	0	15.8163265	0	0	14	17.71428571	0	16	0	22.94898	8.8571429	7.908163	8

35A_MIL_-5 - Mil Departure

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	24	0	AGL	0
b	0.49	0 AGL	100	Variable	150	0.8	200	2	0	AGL	0
c	0.58	7 AGL	100	Variable	174	4.3	2000	15	7	AGL	7
d	1.65	500 AGL	100	Variable	350	8.1	5100	30	500	AGL	500
e	4.53	3,000 AGL	80	Variable	350	15	9500	44	3000	AGL	3000
f	8.83	10,000 AGL	35	Variable	350	0	0	248	10000	AGL	10000
g	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
24	Military	24	Approach
2	Military	2	Military
15	Military	15	Military
30	Climbout	30	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A MIL -5	0	0	41	30	0	0	0	47	0	24	0	0	44	15	12

35A_AB_4-3 - Afterburner Departure

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	16	0	AGL	0
b	0.33	0 AGL	150	Afterburner	150	0.8	200	2	0	AGL	0
c	0.41	7 AGL	150	Afterburner	174	2	900	12	7	AGL	7
d	1.32	200 AGL	100	Variable	350	15	9500	62	200	AGL	200
d to 500								1.89795918			
500 to 3000								15.8163265			
3000 to e								44.2857143			
e	7.32	10,000 AGL	35	Variable	350	0	0	263	10000	AGL	10000
f	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
16	Afterburner	16	Approach
2	Afterburner	2	Afterburner
12	Afterburner	12	Afterburner
1.8979592	Afterburner	1.89795918	Military
15.816327	Climbout	15.8163265	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A AB 4-3	0	31.89795918	0	15.8163265	0	0	14	17.71428571	0	16	0	22.94898	8.8571429	7.908163	8

35A_MIL-11 - Mil Departure

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	0 AGL	50	Variable	0	0	0	24	0	AGL	0
b	0.49	0 AGL	100	Variable	150	0.8	200	2	0	AGL	0
c	0.58	7 AGL	100	Variable	174	4.3	2000	15	7	AGL	7
d	1.65	500 AGL	100	Variable	350	8.1	5100	30	500	AGL	500
e	4.53	3,000 AGL	80	Variable	350	15	9500	44	3000	AGL	3000
f	8.83	10,000 AGL	35	Variable	350	0	0	248	10000	AGL	10000
g	32.92	10,000 AGL	35	Variable	350				10000	AGL	10000

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
24	Military	24	Approach
2	Military	2	Military
15	Military	15	Military
30	Climbout	30	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A MIL-11	0	0	41	30	0	0	0	47	0	24	0	0	44	15	12

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ATTACHMENT 8

DERIVATIONS OF F-35A CLOSED PATTERNS TIMS FROM NOISE FLIGHT PROFILES FOR THE PROJECT AIR QUALITY ANALYSIS - TYNDALL AFB

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Tyndall AFB F-35 Closed Patterns						
Profile	**Track**	**Day**	**Night**	**Total**	**% Flown**	**Cumulative % Flown**
35A 2LC4	2LC4 - VFR CLOSED	5.960	0.006	5.966	36.95%	36.95%
35A 4RC4	4RC4 - VFR CLOSED	4.496	0.004	4.501	27.88%	64.83%
35A 2RC4	2RC4 - VFR CLOSED	2.554	0.002	2.557	15.84%	80.66%
35A 4LC4	4LC4 - VFR CLOSED	1.927	0.002	1.929	11.95%	92.61%
35A 2RSP-1	2RSP35A - Multiple SFO Pattern	0.323	0.000	0.323	2.00%	94.61%
35A 2RC1W	2RC1W - RADAR PATTERN	0.248	0.000	0.248	1.54%	96.15%
35A 4LSP-1	4LSP35A - Multiple SFO Pattern	0.244	0.000	0.244	1.51%	97.66%
35A 4LC1W	4LC1W - from nmi file	0.187	0.000	0.187	1.16%	98.82%
35A 2LSP-1	2LSP35A - Multiple SFO Pattern	0.081	0.000	0.081	0.50%	99.32%
35A 4RSP-1	4RSP35A - Multiple SFO Pattern	0.061	0.000	0.061	0.38%	99.70%
35A 2LC1W	2LC1W - TACAN from approach plate	0.028	0.000	0.028	0.17%	99.87%
35A 4RC1W	4RC1W - TACAN from approach plate	0.021	0.000	0.021	0.13%	100.00%
				16.146	100.00%	

	Weighted Value All Profiles				
	Idle (without Taxi)	**Takeoff AB**	**Takeoff Mil**	**Climbout**	**Approach**
	0	0	14.41062802	5.173046	41.0148644
	0	0	10.87198068	3.9027623	30.9433296
	0	0	6.176328502	2.2171436	17.5787811
	0	0	4.65942029	1.6726124	13.261427
	0	0	0.645423015	0	0.61507712
	0	0	0.476155085	0.2303976	14.7915273
	0	0	0.487564135	0	0.4646403
	0	0	0.359036294	0.1737272	11.0258888
	0	0	0.161855307	0	0.15424535
	0	0	0.121891034	0	0.11616008
	0	0	0.053759445	0.0260126	1.44977084
	0	0	0.040319584	0.0195095	1.08992939
Total (sec):	0	0	38.46436139	13.415211	132.505641
Total (min):	0	0	0.64107269	0.2235869	2.20842735

Tables provided in this Attachment are presented in the same format as produced by the modeling software.

Tyndall AFB Runway Elevation ft: 18

35A_2LC4 - VFR Pattern

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	0	50 AGL	40	Parallel	160	-3.8	-1000	2	50	AGL	50			2	Approach
b	0.1	10 AGL	100	Variable	150	0.9	400	22	10	AGL	10			22	Military
c	1.5	150 AGL	100	Variable	300	6.8	3300	17	150	AGL	150			17	Military
d	2.81	1,100 AGL	80	Variable	250	5.2	2200	14	1100	AGL	1100			14	Climbout
e	3.71	1,600 AGL	35	Variable	220	-0.7	-300	23	1600	AGL	1600			23	Approach
f	5.03	1,500 AGL	50	Parallel	200	0	0	24	1500	AGL	1500			24	Approach
g	6.35	1,500 AGL	28	Parallel	200	-4.5	-1600	19	1500	AGL	1500			19	Approach
h	7.38	1,000 AGL	50	Parallel	190	-6.4	-2000	21	1000	AGL	1000			21	Approach
i	8.42	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300			22	Approach
j	9.4	50 AGL	40	Parallel	160				50	AGL	50			0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2LC4						0	0	39	14	111	0	0	39	14	111

35A_4RC4 - VFR Pattern

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	0	50 AGL	40	Parallel	160	-3.8	-1000	2	50	AGL	50			2	Approach
b	0.1	10 AGL	100	Variable	150	0.9	400	22	10	AGL	10			22	Military
c	1.5	150 AGL	100	Variable	300	6.8	3300	17	150	AGL	150			17	Military
d	2.81	1,100 AGL	80	Variable	250	5.2	2200	14	1100	AGL	1100			14	Climbout
e	3.71	1,600 AGL	35	Variable	220	-0.7	-300	23	1600	AGL	1600			23	Approach
f	5.03	1,500 AGL	50	Parallel	200	0	0	24	1500	AGL	1500			24	Approach
g	6.35	1,500 AGL	28	Parallel	200	-4.5	-1600	19	1500	AGL	1500			19	Approach
h	7.38	1,000 AGL	50	Parallel	190	-6.4	-2000	21	1000	AGL	1000			21	Approach
i	8.42	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300			22	Approach
j	9.4	50 AGL	40	Parallel	160				50	AGL	50			0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4RC4						0	0	39	14	111	0	0	39	14	111

35A_2RC4 - VFR Pattern

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	0	50 AGL	40	Parallel	160	-3.8	-1000	2	50	AGL	50			2	Approach
b	0.1	10 AGL	100	Variable	150	0.9	400	22	10	AGL	10			22	Military
c	1.5	150 AGL	100	Variable	300	6.8	3300	17	150	AGL	150			17	Military
d	2.81	1,100 AGL	80	Variable	250	5.2	2200	14	1100	AGL	1100			14	Climbout
e	3.71	1,600 AGL	35	Variable	220	-0.7	-300	23	1600	AGL	1600			23	Approach
f	5.03	1,500 AGL	50	Parallel	200	0	0	24	1500	AGL	1500			24	Approach
g	6.35	1,500 AGL	28	Parallel	200	-4.5	-1600	19	1500	AGL	1500			19	Approach
h	7.38	1,000 AGL	50	Parallel	190	-6.4	-2000	21	1000	AGL	1000			21	Approach
i	8.42	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300			22	Approach
j	9.4	50 AGL	40	Parallel	160				50	AGL	50			0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2RC4						0	0	39	14	111	0	0	39	14	111

35A_4LC4 - VFR Pattern

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	0	50 AGL	40	Parallel	160	-3.8	-1000	2	50	AGL	50			2	Approach
b	0.1	10 AGL	100	Variable	150	0.9	400	22	10	AGL	10			22	Military
c	1.5	150 AGL	100	Variable	300	6.8	3300	17	150	AGL	150			17	Military
d	2.81	1,100 AGL	80	Variable	250	5.2	2200	14	1100	AGL	1100			14	Climbout
e	3.71	1,600 AGL	35	Variable	220	-0.7	-300	23	1600	AGL	1600			23	Approach
f	5.03	1,500 AGL	50	Parallel	200	0	0	24	1500	AGL	1500			24	Approach
g	6.35	1,500 AGL	28	Parallel	200	-4.5	-1600	19	1500	AGL	1500			19	Approach
h	7.38	1,000 AGL	50	Parallel	190	-6.4	-2000	21	1000	AGL	1000			21	Approach
i	8.42	300 AGL	40	Parallel	170	-2.4	-700	22	300	AGL	300			22	Approach
j	9.4	50 AGL	40	Parallel	160				50	AGL	50			0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4LC4						0	0	39	14	111	0	0	39	14	111

35A_2RSP-1 - Multiple SFO Pattern based on pilot interview

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	0	100 AGL	100	Variable	225	1.9	900	27	100	AGL	100			27	Military
b	2	500 AGL	100	Variable	300	45	27800	20	500	AGL	500				
b to 3000								5.2631579						5.263157895	Military
3000 to c								14.736842							
c	3.56	10,000 AGL	35	Variable	250	0	0	23	10000	AGL	10000				
d	5.18	10,000 AGL	35	Variable	250	0	0	18	10000	AGL	10000				
e	6.36	10,000 AGL	28	Parallel	220	-17	-6800	11	10000	AGL	10000				
f	7.01	8,777 AGL	28	Parallel	220	-15	-6000	19	8777	AGL	8777				
g	8.19	6,858 AGL	28	Parallel	220	-17	-6800	28	6858	AGL	6858				
h	9.92	3,648 AGL	28	Parallel	220	-15.8	-6300	34	3648	AGL	3648				
h to 3000								6.253761							
3000 to i								27.746239						27.746239	Approach
i	11.97	125 AGL	28	Parallel	220	-1.2	-500	3	125	AGL	125			3	Approach
j	12.17	100 AGL	100	Variable	225				100	AGL	100			0	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2RSP-1						0	0	32.2631579	0	30.74624	0	0	32.263158	0	30.74624

35A_2RC1W - ILS to 32R

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	0	50 AGL	40	Parallel	160	-1.9	-500	5	50	AGL	50			5	Approach
b	0.2	10 AGL	100	Variable	145	2.2	800	31	10	AGL	10			31	Military
c	1.89	400 AGL	80	Variable	250	14.3	6500	15	400	AGL	400			15	Climbout
d	2.92	2,000 AGL	60	Variable	250	8.3	3700	10	2000	AGL	2000			10	Approach
e	3.6	2,600 AGL	30	Variable	250	0	0	753	2600	AGL	2600			753	Approach
f	53.28	2,600 AGL	30	Variable	225	-1.9	-700	87	2600	AGL	2600			87	Approach
g	58.27	1,600 AGL	40	Parallel	190	-2.8	-900	108	1600	AGL	1600			108	Approach
h	63.54	50 AGL	40	Parallel	160				50	AGL	50			0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 2RC1W						0	0	31	15	963	0	0	31	15	963

35A_4LSP-1 - Multiple SFO Pattern based on pilot interview

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL	Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
a	0	100 AGL	100	Variable	225	1.9	900	27	100	AGL	100			27	Military
b	2	500 AGL	100	Variable	300	45	27800	20	500	AGL	500				
b to 3000								5.2631579						5.263157895	Military
3000 to c								14.736842							
c	3.56	10,000 AGL	35	Variable	250	0	0	23	10000	AGL	10000				
d	5.18	10,000 AGL	35	Variable	250	0	0	18	10000	AGL	10000				
e	6.36	10,000 AGL	28	Parallel	220	-17	-6800	11	10000	AGL	10000				
f	7.01	8,777 AGL	28	Parallel	220	-15	-6000	19	8777	AGL	8777				
g	8.19	6,858 AGL	28	Parallel	220	-17	-6800	28	6858	AGL	6858				
h	9.92	3,648 AGL	28	Parallel	220	-15.8	-6300	34	3648	AGL	3648				
h to 3000								6.253761							

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A 4LSP-1						0	0	32.2631579	0	30.74624	0	0	32.263158	0	30.74624

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
3000 to i								27.746239			
i	11.97	125 AGL	28	Parallel	220	-1.2	-500	3	125	AGL	125
j	12.17	100 AGL	100	Variable	225				100	AGL	100

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
		27.746239	Approach
		3	Approach
		0	Military

35A_4LC1W - ILS to 14L

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	50 AGL	40	Parallel	160	-1.9	-500	5	50	AGL	50
b	0.2	10 AGL	100	Variable	145	2.2	800	31	10	AGL	10
c	1.89	400 AGL	80	Variable	250	14.3	6500	15	400	AGL	400
d	2.92	2,000 AGL	60	Variable	250	8.3	3700	10	2000	AGL	2000
e	3.6	2,600 AGL	30	Variable	250	0	0	742	2600	AGL	2600
f	52.56	2,600 AGL	30	Variable	225	-1.9	-700	87	2600	AGL	2600
g	57.55	1,600 AGL	40	Parallel	190	-2.8	-900	108	1600	AGL	1600
h	62.81	50 AGL	40	Parallel	160				50	AGL	50

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
		5	Approach
		31	Military
		15	Climbout
		10	Approach
		742	Approach
		87	Approach
		108	Approach
		0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A_4LC1W						0	0	31	15	952	0	0	31	15	952

35A_2LSP-1 - Multiple SFO Pattern based on pilot interview

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	100 AGL	100	Variable	225	1.9	900	27	100	AGL	100
b	2	500 AGL	100	Variable	300	45	27800	20	500	AGL	500
b to 3000								5.2631579			
3000 to c								14.736842			
c	3.56	10,000 AGL	35	Variable	250	0	0	23	10000	AGL	10000
d	5.18	10,000 AGL	35	Variable	250	0	0	18	10000	AGL	10000
e	6.36	10,000 AGL	28	Parallel	220	-17	-6800	11	10000	AGL	10000
f	7.01	8,777 AGL	28	Parallel	220	-15	-6000	19	8777	AGL	8777
g	8.19	6,858 AGL	28	Parallel	220	-17	-6800	28	6858	AGL	6858
h	9.92	3,648 AGL	28	Parallel	220	-15.8	-6300	34	3648	AGL	3648
h to 3000								6.253761			
3000 to i								27.746239			
i	11.97	125 AGL	28	Parallel	220	-1.2	-500	3	125	AGL	125
j	12.17	100 AGL	100	Variable	225				100	AGL	100

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
		27	Military
		5.263157895	Military
		27.746239	Approach
		3	Approach
		0	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A_2LSP-1						0	0	32.2631579	0	30.74624	0	0	32.263158	0	30.74624

35A_4RSP-1 - Multiple SFO Pattern based on pilot interview

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	100 AGL	100	Variable	225	1.9	900	27	100	AGL	100
b	2	500 AGL	100	Variable	300	45	27800	20	500	AGL	500
b to 3000								5.2631579			
3000 to c								14.736842			
c	3.56	10,000 AGL	35	Variable	250	0	0	23	10000	AGL	10000
d	5.18	10,000 AGL	35	Variable	250	0	0	18	10000	AGL	10000
e	6.36	10,000 AGL	28	Parallel	220	-17	-6800	11	10000	AGL	10000
f	7.01	8,777 AGL	28	Parallel	220	-15	-6000	19	8777	AGL	8777
g	8.19	6,858 AGL	28	Parallel	220	-17	-6800	28	6858	AGL	6858
h	9.92	3,648 AGL	28	Parallel	220	-15.8	-6300	34	3648	AGL	3648
h to 3000								6.253761			
3000 to i								27.746239			
i	11.97	125 AGL	28	Parallel	220	-1.2	-500	3	125	AGL	125
j	12.17	100 AGL	100	Variable	225				100	AGL	100

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
		27	Military
		5.263157895	Military
		27.746239	Approach
		3	Approach
		0	Military

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A_4RSP-1						0	0	32.2631579	0	30.74624	0	0	32.263158	0	30.74624

35A_2LC1W - TACAN to 32L

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	50 AGL	40	Parallel	160	-1.9	-500	5	50	AGL	50
b	0.2	10 AGL	100	Variable	145	2.2	800	31	10	AGL	10
c	1.89	400 AGL	80	Variable	250	14.3	6500	15	400	AGL	400
d	2.92	2,000 AGL	60	Variable	250	8.3	3700	10	2000	AGL	2000
e	3.6	2,600 AGL	30	Variable	250	0	0	626	2600	AGL	2600
f	44.92	2,600 AGL	30	Variable	225	-1.9	-700	87	2600	AGL	2600
g	49.91	1,600 AGL	40	Parallel	190	-2.8	-900	108	1600	AGL	1600
h	55.18	50 AGL	40	Parallel	160				50	AGL	50

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
		5	Approach
		31	Military
		15	Climbout
		10	Approach
		626	Approach
		87	Approach
		108	Approach
		0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A_2LC1W						0	0	31	15	836	0	0	31	15	836

35A_4RC1W - TACAN to 14R

Profile Segments

Point	Distance NM	Height ft	Power % ETR		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Height Value	Height Unit	Corrected Height ft AGL
a	0	50 AGL	40	Parallel	160	-1.9	-500	5	50	AGL	50
b	0.2	10 AGL	100	Variable	145	2.2	800	31	10	AGL	10
c	1.89	400 AGL	80	Variable	250	14.3	6500	15	400	AGL	400
d	2.92	2,000 AGL	60	Variable	250	8.3	3700	10	2000	AGL	2000
e	3.6	2,600 AGL	30	Variable	250	0	0	628	2600	AGL	2600
f	45.06	2,600 AGL	30	Variable	225	-1.9	-700	87	2600	AGL	2600
g	50.05	1,600 AGL	40	Parallel	190	-2.8	-900	108	1600	AGL	1600
h	55.31	50 AGL	40	Parallel	160				50	AGL	50

Altitude Method Duration sec	Altitude Method Flight Mode	Power Setting Method Duration sec	Power Setting Method Flight Mode
		5	Approach
		31	Military
		15	Climbout
		10	Approach
		628	Approach
		87	Approach
		108	Approach
		0	Approach

	Aircraft Flight Mode TIMS (Altitude Method)					Aircraft Flight Mode TIMS (Power Setting Method)					Aircraft Flight Mode TIMS (Average)				
	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach	Idle (without Taxi)	Takeoff AB	Takeoff Mil	Climbout	Approach
35A_4RC1W						0	0	31	15	838	0	0	31	15	838

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ATTACHMENT 9

DERIVATIONS OF MQ-9 TIMS FROM NOISE FLIGHT PROFILES FOR THE PROJECT AIR QUALITY ANALYSIS - TYNDALL AFB

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Flight Profile Operations Summary - Tyndall AFB Proposed MQ-9 Operations

LTO Cycle		
Takeoff (Afterburner	0.00	mins
Takeoff (Military)	5.70	mins
Climbout	8.58	mins
Approach	7.36	mins
Taxi	0.43	mins

Closed Pattern (TGO Cycle)		
Takeoff (Afterburner	0.00	mins
Takeoff (Military)	1.37	mins
Climbout	0.00	mins
Approach	1.12	mins
Taxi	1.50	mins

Arrivals

Profile	Day	Night	Total	Yearly Total	Percent
MQ9A0101	6.606	0.348	6.953	2,537.8	90%
MQ9A1901	0.734	0.039	0.773	282.1	10%
		Total	7.726	2,820.0	

Departures

Profile	Day	Night	Total	Yearly Total	Percent
MQ9D1901	6.745	0.209	6.953	2,537.8	90%
MQ9D0101	0.749	0.023	0.773	282.1	10%
		Total	7.726	2,820.0	

Altitude Method		
T/o Mil	0.57	mins
C/o	10.25	mins
Approach	11.24	mins

Power Setting Method		
T/o Mil	10.82	mins
C/o	6.91	mins
Approach	3.48	mins
Taxi	0.85	mins

Arrivals

MQ9A0101	MQ9A1901
90%	10%

Point	Distance NM	Distance ft	Height ft	Power % Torque		Speed kts	Duration sec	
a	33.9	205980	5,982	60	Variable	200	87.33	
	29	176507	3000	60.00		200	44.67	c/o
b	26.58	161503	1,482	60	Variable	200	111	c/o
c	20.41	124014	1,000 AGL	60	Variable	200	259	c/o
d	7.83	47576	1,000 AGL	20	Variable	150	87	Approach
e	4.81	29226	500 AGL	35	Parallel	100	122	Approach
f	1.41	8567	500 AGL	17	Parallel	100	51	taxi
g	0	0	50 AGL	17	Parallel	100		

Altitude Method	Approach TIM	11.24	mins
Power Setting Method	Climbout	6.91	mins
	Approach TIM	3.48	mins
	Taxi	0.85	mins

Departures

MQ9D1901	MQ9D0101
90%	10%

Point	Distance NM	Distance ft	Height ft	Power % Torque		Speed kts	Duration sec	
a	0		0 AGL	100	Variable	0	26	T/o Mil
b	0.33		0	100	Variable	90	8.17	T/o Mil
	2	9577	500	100.00		158	35.83	T/o Mil
c	1.97		658	100	Variable	180	27	T/o Mil
d	3.39		1,223	100	Variable	200	552.28	T/o Mil
	7	45427	3000	95.76		200	141.72	
e	41.97		18,000	60	Variable	200		

Altitude Method	T/o Mil	0.57	mins
	C/o	10.25	mins
Power Setting Method	T/o Mil	10.82	mins

Closed Patterns

Profile	Day	Night	Total	Yearly Total	Percentage
MQ9C0101	27.814	0	27.814	10,152.1	90%
MQ9C1901	3.09	0	3.09	1,127.9	10%
		Total	30.904	11,280.0	

MQ9C0101	MQ9C1901
90%	10%

Point	Distance	Height	Power		Speed	Duration	
	NM	ft	% Torque		kts	sec	
a	0	50 AGL	15	Variable	100	6	taxi
b	0.16	0 AGL	100	Variable	100	17	T/o Mil
c	0.66	0 AGL	100	Variable	110	21	T/o Mil
d	1.4	300 AGL	100	Variable	150	44	T/o Mil
e	3.23	1,000 AGL	30	Variable	150	39	Appraoch
f	4.79	1,000 AGL	30	Parallel	140	28	Approach
g	5.78	1,000 AGL	17	Parallel	120	51	taxi
h	7.4	300 AGL	17	Parallel	110	33	taxi
i	8.37	50 AGL	17	Parallel	100		

Power Setting Method		
	T/o Mil	1.37
	Approach	1.12
	Taxi	1.50

Mode	% Thrust Range			
			>	</=
Takeoff Military			92.5	105
Climb Out			50	92.5
Approach			18.5	50
Taxi/Idle Out/In			0	18.5

ATTACHMENT 10

DERIVATIONS OF MQ-9 TIMS FROM NOISE FLIGHT PROFILES FOR THE PROJECT AIR QUALITY ANALYSIS – VANDENBERG AFB

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Flight Profile Operations Summary

T-6 Aircraft with PT6A-68 Engine - Vandenberg AFB Proposed Operations

Arrivals

Profile	Track		Day	Evening	Night	Total
MQ9A03	30A2_MQ9 - OVERHEAD ARRIVAL TO RWY 30		5.976	0.703	0.352	7.031
MQ9A04	12A2_MQ9 - OVERHEAD ARRIVAL TO RWY 12		0.591	0.592	0.593	0.594
		Total:	6.567	0.773	0.386	7.726
		Runway 12A:	9.00%	9.00%	9.00%	9.00%
		Runway 30D:	91.00%	91.00%	91.00%	91.00%
		Total:	85.00%	10.00%	5.00%	

Closed Patterns

Profile	Track		Day	Evening	Night	Total
MQ9C01	30EMQ9 - MQ9 Pattern East		13.358	0.703	0	14.061
MQ9C02_R	30WMQ9_R - MQ9 Pattern West - crosswind before end of runway per bio re		13.358	0.703	0	14.061
MQ9C03	12EMQ9 - MQ9 Pattern East		1.321	0.07	0	1.391
MQ9C04	12WMQ9 - MQ9 Pattern West		1.321	0.07	0	1.391
		Total:	29.359	1.545	0	30.904
		Runway 12:	9.00%	9.00%	0.00%	9.00%
		Runway 30:	91.00%	91.00%	0.00%	91.00%
		Total:	95.00%	5.00%	0.00%	

Departures

Profile	Track		Day	Evening	Night	Total
MQ9D01	30DD1_MQ9 - MQ9 Departure		6.468	0.352	0.211	7.031
MQ9D02	12AD1 - GAVIOTA THREE DEPARTURE - TXY A INTERSECTION		0.64	0.035	0.021	0.695
		Total:	7.108	0.386	0.232	7.726
		Runway 12A:	9.00%	9.00%	9.00%	9.00%
		Runway 30D:	91.00%	91.00%	91.00%	91.00%
		Total:	92.00%	5.00%	3.00%	

Flight Profile Details

MQ9A03 - Arrival from South

Notes	Arrival from South
Day Ops	5.97608
Night Ops	0.351534
Aircraft	T-6
Engine	PT6A-68
A/C Category	Based
Runway/Pad	30D
Track	30A2_MQ9 - OVERHEAD ARRIVAL TO RWY 30
Runup Time	----
Takeoff Displacement	0 ft
Landing Displacement	0 ft

Profile Segments

Point	Distance NM	Height ft		Power % Torque		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	33.9	5,632	AGL	60	Variable	200	-1.5	-500	462
b	8.23	1,532	AGL	60	Variable	200	0	0	48
c	5.57	1,532	AGL	20	Variable	200	0	0	32
d	4.02	1,532	AGL	35	Parallel	150	-3.7	-800	73
e	1.48	532	AGL	17	Parallel	100	-3.1	-500	53
f	0	50	AGL	17	Parallel	100			

MQ9A04 - Arrival from North

Notes	Arrival from North
Day Ops	0.591041
Night Ops	0.034767
Aircraft	T-6
Engine	PT6A-68
A/C Category	Based
Runway/Pad	12A
Track	12A2_MQ9 - OVERHEAD ARRIVAL TO RWY 12
Runup Time	----
Takeoff Displacement	0 ft
Landing Displacement	0 ft

Profile Segments

Point	Distance NM	Height ft		Power % Torque		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	33.9	5,632	AGL	60	Variable	200	-1.5	-500	462
b	8.23	1,532	AGL	60	Variable	200	0	0	48
c	5.57	1,532	AGL	20	Variable	200	0	0	32
d	4.02	1,532	AGL	35	Parallel	150	-3.7	-800	73
e	1.48	532	AGL	17	Parallel	100	-3.1	-500	53
f	0	50	AGL	17	Parallel	100			

MQ9C01 - VFR Pattern

Notes	VFR Pattern
Day Ops	13.3583
Night Ops	0
Aircraft	T-6
Engine	PT6A-68
A/C Category	Based
Runway/Pad	30
Track	30EMQ9 - MQ9 Pattern East
Runup Time	----
Takeoff Displacement	0 ft
Landing Displacement	0 ft
Profile Segments	

Point	Distance NM	Height ft		Power % Torque		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	50	AGL	15	Variable	100	-2.9	-500	6
b	0.16	0	AGL	100	Variable	100	0	0	17
c	0.66	0	AGL	100	Variable	110	3.8	900	21
d	1.4	300	AGL	100	Variable	150	3.8	1000	44
e	3.23	1,032	AGL	30	Variable	150	0	0	171
f	10.1	1,032	AGL	30	Parallel	140	0	0	168
g	16.16	1,032	AGL	17	Parallel	120	-3.6	-700	59
h	18.05	300	AGL	17	Parallel	110	-2.4	-400	34
i	19.04	50	AGL	17	Parallel	100			

MQ9C02_R - VFR Pattern - crosswind before end of runway per bio restric

Notes	VFR Pattern - crosswind before end of runway per bio restric flight track modified to comply with restrictions in current
Day Ops	13.3583
Night Ops	0
Aircraft	T-6
Engine	PT6A-68
A/C Category	Based
Runway/Pad	30
Track	30WMQ9_R-MQ9 Pattern West - crosswind before end of runway per bio re
Runup Time	----
Takeoff Displacement	0 ft
Landing Displacement	0 ft
Profile Segments	

Point	Distance NM	Height ft		Power % Torque		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	50	AGL	15	Variable	100	-2.9	-500	6
b	0.16	0	AGL	100	Variable	100	0	0	17
c	0.66	0	AGL	100	Variable	110	3.8	900	21
d	1.4	300	AGL	100	Variable	150	3.8	1000	44
e	3.23	1,032	AGL	30	Variable	150	0	0	89
f	6.8	1,032	AGL	30	Parallel	140	0	0	178
g	13.24	1,032	AGL	17	Parallel	120	-4.6	-900	47
h	14.75	300	AGL	17	Parallel	110	-2.4	-400	34
i	15.73	50	AGL	17	Parallel	100			

MQ9C03 - VFR Pattern

Notes	VFR Pattern	
Day Ops		1.32115
Night Ops		0
Aircraft	T-6	
Engine	PT6A-68	
A/C Category	Based	
Runway/Pad		12
Track	12EMQ9 - MQ9 Pattern East	
Runup Time	----	
Takeoff Displacement	0 ft	
Landing Displacement	0 ft	
Profile Segments		

Point	Distance NM	Height ft		Power % Torque		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	50	AGL	15	Variable	100	-2.9	-500	6
b	0.16	0	AGL	100	Variable	100	0	0	17
c	0.66	0	AGL	100	Variable	110	3.8	900	21
d	1.4	300	AGL	100	Variable	150	3.8	1000	44
e	3.23	1,032	AGL	30	Variable	150	0	0	161
f	9.72	1,032	AGL	30	Parallel	140	0	0	178
g	16.13	1,032	AGL	17	Parallel	120	-3.6	-700	60
h	18.05	300	AGL	17	Parallel	110	-2.4	-400	34
i	19.04	50	AGL	17	Parallel	100			

MQ9C04 - VFR Pattern

Notes	VFR Pattern	
Day Ops		1.32115
Night Ops		0
Aircraft	T-6	
Engine	PT6A-68	
A/C Category	Based	
Runway/Pad		12
Track	12WMQ9 - MQ9 Pattern West	
Runup Time	----	
Takeoff Displacement	0 ft	
Landing Displacement	0 ft	
Profile Segments		

Point	Distance NM	Height ft		Power % Torque		Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	50	AGL	15	Variable	100	-2.9	-500	6
b	0.16	0	AGL	100	Variable	100	0	0	17
c	0.66	0	AGL	100	Variable	110	3.8	900	21
d	1.4	300	AGL	100	Variable	150	3.8	1000	44
e	3.23	1,032	AGL	30	Variable	150	0	0	161
f	9.72	1,032	AGL	30	Parallel	140	0	0	178
g	16.16	1,032	AGL	17	Parallel	120	-3.6	-700	59
h	18.05	300	AGL	17	Parallel	110	-2.4	-400	34
i	19.04	50	AGL	17	Parallel	100			

MQ9D01 - to North

Notes	to North										
Day Ops	6.46823										
Night Ops	0.210921										
Aircraft	T-6										
Engine	PT6A-68										
A/C Category	Based										
Runway/Pad	30D										
Track	30DD1_MQ9 - MQ9 Departure										
Runup Time	5 sec										
Takeoff Displacement	0 ft										
Landing Displacement	0 ft										
Profile Segments											
	Point	Distance	Height		Power		Speed	Climb Angle	Climb Rate	Duration	
		NM	ft		% Torque		kts	°	fpm	sec	
	a	0	0	AGL	100	Variable	0	0	0	26	
	b	0.33	0	AGL	100	Variable	90	3.8	900	44	
	c	1.97	658	AGL	100	Variable	180	3.4	1200	50	
	d	4.64	1,632	AGL	100	Variable	200	5.4	1900	509	
	e	32.92	18,000	AGL	60	Variable	200				

MQ9D02 - to South

Notes	to South									
Day Ops	0.639714									
Night Ops	0.02086									
Aircraft	T-6									
Engine	PT6A-68									
A/C Category	Based									
Runway/Pad	12A									
Track	12AD1 - GAVIOTA THREE DEPARTURE - TXY A INTERSECTION									
Runup Time	5 sec									
Takeoff Displacement	0 ft									
Landing Displacement	0 ft									
Profile Segments										
	Point	Distance	Height		Power		Speed	Climb Angle	Climb Rate	Duration
		NM	ft		% Torque		kts	°	fpm	sec
	a	0	0	AGL	100	Variable	0	0	0	26
	b	0.33	0	AGL	100	Variable	90	3.8	900	44
	c	1.97	658	AGL	100	Variable	180	3.8	1300	27
	d	3.39	1,223	AGL	100	Variable	200	6.1	2200	463
	e	29.13	18,000	AGL	60	Variable	200			

Arrivals

2783

Profile	Total	Yearly Total	Percentage of total	Rolling Percentage	New Percentage
MQ9A03	7.031	2566	92%	92%	92%
MQ9A04	0.594	217	8%	100%	8%

total/yr 2783

Weighted Avg (Pwr)		
C/O	3.56	mins
App	2.63	mins

Weighted Avg (Altitude)		
App	6.19	mins

MQ9A03 & MQ9A04 100%

Point	Distance	Distance	Height		Power		Speed	Duration	
	NM	ft	ft		% ETR		kts	Sec	
a	33.9	205980	5,632	AGL	60	Variable	200	462	PWR
	17.42	105853	3000	AGL	60		200	165.42	C/O
b	8	50006	1532	AGL	60	Variable	200	48	C/O
c	6	33844	1532	AGL	20	Variable	200	32	Approach
d	4	24426	1532	AGL	35	Parallel	150	73	Approach
e	1	8993	532	AGL	17	Parallel	100	53	Approach
f	0	0	50	AGL	17	Parallel	100		Approach

Altitude TIMs	App	6.19	
Power Setting TIMs	C/O	3.56	
	App	2.63	6.19

Departures

Profile	Total	Yearly total	Percentage of total
MQ9D01	7.031	2566.32	91%
MQ9D02	0.695	253.68	9%

total/yr 2819.99

Weighted Avg (Pwr)		
T/o mil	2.68	mins

Weighted Avg (altitude)		
T/o Mil	1.09	mins
C/o	1.59	mins

MQ9D01 91%

Point	Distance	Distance	Height		Power		Speed	Duration	
	NM	ft	ft		% ETR		kts	sec	
a	0	0	0	AGL	100	Variable	0	26	Mil
b	0.33	2005	0	AGL	100	Variable	90	44	Mil
	1.58	9577	500		100		158.39	39.7	Mil
c	1.97	11970	658	AGL	100	Variable	180	50	Mil
d	4.64	28193	1,632	AGL	100	Variable	200	509	Mil
	7.00	42555	3000		96.66		200	42.5	Mil
e	32.92	200026	18,000	AGL	60	Variable	200	0	C/O

Altitude TIMs	Mil	1.09	
	C/o	1.61	2.71
Power Setting TIMs	Mil	2.71	

MQ9D02 9%

Point	Distance	Distance	Height		Power		Speed	Duration	
	NM	ft	ft		%ETR		kts	sec	
a	0	0	0	AGL	100	Variable	0	26	Mil
b	0.33	2005	0	AGL	100	Variable	90	44	Mil
	1.58	9577	500		100		158.39	39.68	Mil
c	1.97	11970	658	AGL	100	Variable	180	27	Mil
d	3.39	20598	1,223	AGL	100	Variable	200	463	Mil
	6.12	37164	3000		95.76		200	49.0	Mil
e	29.13	176997	18,000	AGL	60	Variable	200	0	C/O

Altitude TIMs	Mil	1.09	
	C/O	1.34	2.43
Power Setting TIMs	Mil	2.43	

Mode	% Thrust Range	
	>	</=
Takeoff Military	92.5	105
Climb Out	50	92.5
Approach	18.5	50
Taxi/Idle Out/In	0	18.5

Altitude Method		
T/o Mil	1.09	mins
Climbout	1.59	mins
Appraoch	6.19	mins
Taxi	0.00	mins

LTO Cycle			
Averaged TIMs [(Pwr+Alt)/2] (mins)			
T/o Mil	Climbout	Approach	Taxi
1.89	2.57	4.41	0.00

Power Setting Method		
T/o Mil	2.68	mins
Climbout	3.56	mins
Appraoch	2.63	mins
Taxi	0.00	mins

Closed Patterns

Profile	Total	Yearly total	Percentage of total
MQ9C01	14.061	5132.27	45%
MQ9C02_R	14.061	5132.27	45%
MQ9C03	1.391	507.72	5%
MQ9C04	1.391	507.72	5%

total/yr 11279.96

Weighted Average		
Taxi	1.56	mins
Approach	4.85	mins
T/o Mil	1.37	mins

MQ9C01 45%

Point	Distance	Distance	Height		Power		Speed	Duration	
	NM	ft	ft		% ETR		kts	sec	
a	0	0	50	AGL	15	Variable	100	6	Taxi
b	0.16	972	0	AGL	100	Variable	100	17	T/o Mil
c	0.66	4010	0	AGL	100	Variable	110	21	T/o Mil
d	1.4	8507	300	AGL	100	Variable	150	44	T/o Mil
e	3.23	19626	1032	AGL	30	Variable	150	171	Approach
f	10.1	61369	1032	AGL	30	Parallel	140	168	Approach
g	16.16	98190	1032	AGL	17	Parallel	120	59	taxi
h	18.05	109674	300	AGL	17	Parallel	110	34	taxi
i	19.04	115689	50	AGL	17	Parallel	100		

Power Setting Method			
	Taxi	1.65	mins
	approach	5.65	mins
	T/o Mil	1.37	mins

MQ9C02_R 45%

Point	Distance	Distance	Height		Power		Speed	Duration	
	NM	ft	ft		% ETR		kts	sec	
a	0	0	50	AGL	15	Variable	100	6	taxi
b	0.16	972	0	AGL	100	Variable	100	17	T/o Mil
c	0.66	4010	0	AGL	100	Variable	110	21	T/o Mil
d	1.4	8507	300	AGL	100	Variable	150	44	T/o Mil
e	3.23	19626	1032	AGL	30	Variable	150	89	Approach
f	6.8	41318	1032	AGL	30	Parallel	140	178	Appraoch
g	13.24	80448	1032	AGL	17	Parallel	120	47	taxi
h	14.75	89623	300	AGL	17	Parallel	110	34	taxi
i	15.73	95577	50	AGL	17	Parallel	100		

Power Setting TIMs		
	Taxi	1.45
	Approach	4.45
	T/o Mil	1.37

MQ9C03 5%

Point	Distance	Distance	Height		Power		Speed	Duration	
	NM	ft	ft		% ETR		kts	sec	
a	0	0	50	AGL	15	Variable	100	6	taxi
b	0.16	972	0	AGL	100	Variable	100	17	T/o Mil
c	0.66	4010	0	AGL	100	Variable	110	21	T/o Mil
d	1.4	8507	300	AGL	100	Variable	150	44	T/o Mil
e	3.23	19626	1032	AGL	30	Variable	150	161	Approach
f	9.72	59060	1032	AGL	30	Parallel	140	178	Approach
g	16.13	98008	1032	AGL	17	Parallel	120	60	taxi
h	18.05	109674	300	AGL	17	Parallel	110	34	taxi
i	19.04	115689	50	AGL	17	Parallel	100		

Power Setting TIMs		
	Taxi	1.67
	Approach	5.65
	T/o Mil	1.37

MQ9C04 5%

Point	Distance	Distance	Height		Power		Speed	Duration	
	NM	ft	ft		% ETR		kts	sec	
a	0	0	50	AGL	15	Variable	100	6	Taxi
b	0.16	972	0	AGL	100	Variable	100	17	T/o Mil
c	0.66	4010	0	AGL	100	Variable	110	21	T/o Mil
d	1.4	8507	300	AGL	100	Variable	150	44	T/o Mil
e	3.23	19626	1032	AGL	30	Variable	150	161	Approach
f	9.72	59060	1032	AGL	30	Parallel	140	178	Approach
g	16.16	98190	1032	AGL	17	Parallel	120	59	Taxi
h	18.05	109674	300	AGL	17	Parallel	110	34	Taxi
i	19.04	115689	50	AGL	17	Parallel	100		

Power Setting TIMs		
	Taxi	1.65
	Approach	5.65
	T/o Mil	1.37

Mode	% Thrust Range	
	>	</=
Takeoff Military	92.5	105
Climb Out	50	92.5
Approach	18.5	50
Taxi/Idle Out/In	0	18.5

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