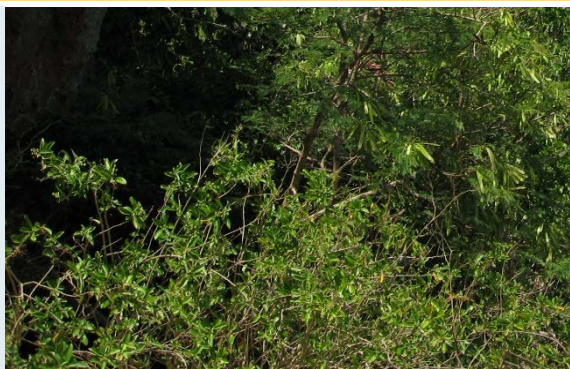


APPENDICES

Draft

SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR TINIAN DIVERT INFRASTRUCTURE IMPROVEMENTS, COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS United States Air Force



May 2019

PRIVACY ADVISORY

This Draft Supplemental Environmental Impact Statement (SEIS) is provided for public comment in accordance with the National Environmental Policy Act, the President's Council on Environmental Quality National Environmental Policy Act Regulations (40 CFR §§1500-1508), and 32 CFR § 989, Environmental Impact Analysis Process.

The Environmental Impact Analysis Process provides an opportunity for public input on U.S. Air Force (USAF) decision-making, allows the public to offer inputs on alternative ways for USAF to accomplish what it is proposing, and solicits comments on USAF's analysis of environmental effects.

Public commenting allows USAF to make better, informed decisions. Letters or other written or oral comments provided may be published in the Final SEIS. As required by law, comments provided will be addressed in the Final SEIS and made available to the public. Providing personal information is voluntary. Any personal information provided will be used only to identify your desire to make a statement during the public comment portion of any public meetings or hearings or to fulfill requests for copies of the Final SEIS or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of Final SEIS. However, only the names of the individuals making comments and specific comments will be disclosed. Personal information, home addresses, phone numbers, and emails addresses will not be published in the Final SEIS.



Appendices: Table of Contents

- A** Cooperating Agency Requests and Acceptance Letters
- B** Public Scoping Materials
- C** Section 106 Consultation Supporting Documentation
- D** Biological Resources Consultations Supporting Documentation
- E** Air Quality Analysis Supporting Documentation
- F** Compliance Actions and Industry Standards

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APPENDIX A

Cooperating Agency Requests and Acceptance Letters





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FAA Cooperating Agency Request.....	A-1
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DEPARTMENT OF THE AIR FORCE
AIR FORCE CIVIL ENGINEER CENTER
JOINT BASE SAN ANTONIO LACKLAND TEXAS

13 Apr 2018

AFCEC/CZN
2261 Hughes Ave, Ste 155
JBSA Lackland, TX 78236

Mr. Gordon Wong
Federal Aviation Administration
Western-Pacific Region Airports Division
Honolulu Airports District Office
PO Box 50244
Honolulu, HI 96850-0001

Dear Mr. Wong

The Air Force requested, by letter dated October 21, 2011 (Attachment 1), FAA's formal participation as a Cooperating Agency during preparation of an Environmental Impact Statement (EIS) for the Divert Activities and Exercises, Guam and Commonwealth of the Northern Mariana Islands. FAA accepted, by letter dated November 15, 2011 (Attachment 2), and participated in preparation of the EIS. The Final EIS for Divert Activities and Exercises was completed in September 2016, and the Record of Decision (ROD) was signed December 7, 2016.

After the ROD was signed, the Air Force conducted further evaluation of the fuel requirement and identified the need for additional infrastructure. The Air Force now proposes to construct a fuel pipeline to transport fuel from the seaport to the airport, and to improve certain existing roads that would be used to support Divert-related projects. These proposed actions require preparation of a Supplemental EIS (SEIS).

The Air Force would like to continue the Cooperating Agency relationship with FAA established for the original EIS to assist during planning and preparation of the upcoming SEIS. An SEIS project schedule is provided as Attachment 3. FAA participation in the Tinian Divert Infrastructure Improvements SEIS is anticipated to facilitate review and approval of revisions to the Airport Layout Plan should an alternative be selected that affects existing plans. It is recognized that the FAA has special agency expertise and jurisdiction to assist in development of the SEIS.

The Air Force would like to request that the FAA confirm in writing your agency's desire to continue to participate as a Cooperating Agency. Please direct any questions, concerns, or issues to Ms. Melissa L. Markell, 210-925-2728, melissa.markell@us.af.mil.

Sincerely,



RENAE FISCHER, REM, GS-14, DAF
Chief, NEPA Division

Attachments

1. AF Letter to FAA
2. FAA Letter to AF
3. SEIS Project Schedule



U.S. Department
of Transportation
**Federal Aviation
Administration**

Western-Pacific Region
Office of Airports

Federal Aviation Administration
15000 Aviation Boulevard, Suite 3012
Lawndale, CA 90261

MAY 16 2018

Ms. Renae Fischer
Chief, NEPA Division
Department of the Air Force
Air Force Civil Engineering Center
2261 Hughes Avenue, Suite 155
Joint Base San Antonio Lackland, TX 78236

SUBJECT: Section 106 Participation for U.S. Air Force Divert Activities and Exercises in the Commonwealth of the Northern Mariana Islands

Dear Ms. Fischer:

Thank you for your letter requesting the Federal Aviation Administration (FAA) participate as a cooperating agency in the Supplemental Environmental Impact Statement (SEIS) for Tinian Divert Infrastructure Improvements, Commonwealth of the Northern Mariana Islands.

The FAA is pleased to participate in the SEIS in accordance with the National Environmental Policy Act of 1969 as amended and its implementing regulations.

Mr. Gordon Wong, Manager of the FAA's Honolulu Airports District Office will be the FAA's point of contact for the SEIS. Please contact Mr. Wong at (808) 312-6028 should you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read 'M. McClardy', with a long, sweeping underline.

Mark A. McClardy
Director, Office of Airports
Western-Pacific Region

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DEPARTMENT OF THE AIR FORCE
AIR FORCE CIVIL ENGINEER CENTER
JOINT BASE SAN ANTONIO LACKLAND TEXAS

13 Apr 2018

AFCEC/CZN
2261 Hughes Ave, Ste 155
JBSA Lackland, TX 78236

Rear Admiral Shoshana Chatfield
Commander, Joint Region Marianas
PSC 455, Box 195
FPO AP 96540-2937

Dear RDML Chatfield

The Air Force requested, by letter dated September 20, 2011 (Attachment 1), Navy's formal participation as a Cooperating Agency during preparation of an Environmental Impact Statement (EIS) for the Divert Activities and Exercises, Guam and Commonwealth of the Northern Mariana Islands. The Navy accepted, by letter dated November 4, 2011 (Attachment 2), and participated in preparation of the EIS. The Final EIS for Divert Activities and Exercises was completed in September 2016, and the Record of Decision (ROD) was signed December 7, 2016.

After the ROD was signed, the Air Force conducted further evaluation of the fuel requirement and identified the need for additional infrastructure. The Air Force now proposes to construct a fuel pipeline to transport fuel from the seaport to the airport, and to improve certain existing roads that would be used to support Divert-related projects. These proposed actions require preparation of a Supplemental EIS (SEIS).

The Air Force would like to continue the Cooperating Agency relationship with the Navy established for the original EIS to assist during planning and preparation of the upcoming SEIS. An SEIS project schedule is provided as Attachment 3. Navy participation in the Tinian Divert Infrastructure Improvements SEIS is anticipated to facilitate coordination with agencies throughout the region. It is recognized that the Navy, and Joint Region Marianas (JRM) has special agency expertise and jurisdiction to assist in development of the SEIS.

The Air Force would like to request that the Navy confirm in writing your agency's desire to continue to participate as a Cooperating Agency. Please direct any questions, concerns, or issues to Ms. Melissa L. Markell, 210-925-2728, melissa.markell@us.af.mil.

Sincerely,



RENAE FISCHER, REM, GS-14, DAF
Chief, NEPA Division

Attachments

1. AF Letter to Navy
2. Navy Letter to AF
3. SEIS Project Schedule



DEPARTMENT OF THE NAVY
JOINT REGION MARIANAS
PSC 455 BOX 211
FPO AP 96540-1000

4000
Ser J00/0243
July 18, 2018

Renae Fischer, REM, GS-14, DAF
Chief, NEPA Division
AFCE/CZN
2261 Hughes Ave, Ste 155
JBSA Lackland, TX 78236

Dear Ms. Fischer:

SUBJECT: JOINT REGION MARIANAS COOPERATING AGENCY STATUS

In reference to your letter of April 13, 2018 Joint Region Marianas (JRM) accepts your invitation to continue participating as a Cooperating Agency for the Divert project proposed Divert Fuel Pipeline Supplemental Environmental Impact Statement (SEIS).

My point of contact for this matter is Mr. Randel Sablan, Commonwealth of the Northern Mariana Islands (CNMI) JRM Coordination Office, and may be reached at 671-682-5069 or via e-mail at randel.sablan@fe.navy.mil. You may also contact Mr. John Salas, J45 Joint Region Marianas Naval Facilities Engineering Command, and may be reached at 671-349-4420 or via e-mail at john.f.salas@fe.navy.mil.

Sincerely,

A handwritten signature in black ink, appearing to read "S. S. Chatfield".

S. S. CHATFIELD
Rear Admiral, U.S. Navy
Commander

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APPENDIX B

Public Scoping Materials





Appendix B: Table of Contents

Notice of Intent.....	B-1
Notices of Public Scoping Meetings.....	B-2
Public Scoping Distribution Letters and Lists	B-3
Public Scoping Fact Sheet	B-9

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PREVIOUSLY ANNOUNCED TIME AND DATE OF THE MEETING: 10:00 a.m., Friday, April 20, 2018.

CHANGES IN THE MEETING: The time of the meeting has changed. This meeting will now be held at 9:45 a.m. on Friday, April 20, 2018.

CONTACT PERSON FOR MORE INFORMATION: Christopher Kirkpatrick, 202-418-5964.

Natise L. Allen,
 Executive Assistant.

[FR Doc. 2018-08287 Filed 4-17-18; 4:15 pm]

BILLING CODE 6351-01-P

DEPARTMENT OF DEFENSE

Department of the Air Force

Notice of Intent To Prepare a Supplemental Environmental Impact Statement for Tinian Divert Infrastructure Improvements, Commonwealth of the Mariana Islands

AGENCY: Department of the Air Force, Department of Defense.

ACTION: Notice of Intent.

SUMMARY: The United States Air Force (USAF) is issuing this notice to advise the public of the intent to prepare a Supplemental Environmental Impact Statement (SEIS) for the proposed Tinian Divert Infrastructure Improvements. The SEIS will assess the potential environmental consequences of the construction of a fuel pipeline and associated support facilities, and improvements to existing roadways, on the island of Tinian in the Commonwealth of the Northern Mariana Islands (CNMI).

DATES: USAF invites the public, stakeholders, and other interested parties to attend an open house public scoping meeting from 5 p.m. to 8 p.m. on Thursday, May 17, 2018 at the Tinian Elementary School cafeteria. A Chamorro/Carolinian interpreter will be available at the meeting and can assist with translation of meeting materials and written comments.

ADDRESSES: The project website www.PACAFDivertMarianasEIS.com provides more information on the SEIS and can be used to submit scoping comments. Scoping comments may also be submitted to Ms. Melissa Markell, (210) 925-2728, AFCEC/CZN; Attn: Tinian Divert SEIS; 2261 Hughes Ave, Suite 155; JBSA Lackland, TX 78236-9853, melissa.markell@us.af.mil. 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 SEIS, scoping comments should be submitted in English to the website or the address listed above by May 27, 2018.

SUPPLEMENTARY INFORMATION: The USAF intends to prepare an SEIS to address changes made since the September 2016 completion of the Final EIS for Divert Activities and Exercises and the signature of the Record of Decision (ROD), signed December 7, 2016, announcing the USAF decision to select the Modified Tinian Alternative (Final EIS, Section 2.7, page 2-52) and specifically the North Option (Final EIS, Section 2.5.2, page 2-28), as a future Divert location.

After the ROD was signed in December 2016, the USAF conducted further evaluation of the fuel requirement and associated infrastructure, including the feasibility of different alternatives that were not considered in the original EIS. The USAF now proposes to construct a fuel pipeline to transport fuel from the seaport to the airport, and associated infrastructure at the seaport, rather than using fuel trucks for fuel transfer. In addition, recent reconnaissance surveys of the routes proposed for Divert-related vehicles, and coordination with Tinian leadership, indicate the existing surface road network is inadequate to support heavy vehicle traffic required for Divert activities, and is in need of improvements. Therefore, the USAF also proposes to improve certain existing roads between the seaport and airport that would be used to support Divert-related projects.

Scoping and Agency Coordination: To effectively define the full range of issues to be evaluated in the SEIS, the USAF will determine the scope of the analysis by soliciting comments from interested local, state and federal elected officials and agencies, as well as interested members of the public and others. A scoping meeting will be held on Tinian and the scheduled date, time, and location for the scoping meeting will also be published in local media a minimum of 15 days prior to the scoping meeting. The USAF also welcomes comments under Section 106 of the National Historic Preservation Act (36 Code of Federal Regulations 800) regarding the identification of or effects on historic properties.

If you have comments or would like to become a consulting party in the Section 106 process, please visit the project website or contact Ms. Melissa

Markell, AFCEC/CZN at the address above.

Henry Williams,
 Acting Air Force Federal Register Liaison Officer.

[FR Doc. 2018-08199 Filed 4-18-18; 8:45 am]

BILLING CODE 5001-05-P

DEPARTMENT OF DEFENSE

Department of the Army

Environmental Impact Statement for Area Development Plan, Davison Army Airfield, Fort Belvoir, VA

AGENCY: Department of the Army, DOD.

ACTION: Notice of intent.

SUMMARY: The Department of the Army (Army) announces its intent to conduct public scoping under the National Environmental Policy Act (NEPA) and solicit public comments to gather information to prepare an Environmental Impact Statement (EIS) for a proposed Area Development Plan (ADP) for Davison Army Airfield (DAAF), U.S. Army Garrison Fort Belvoir (Fort Belvoir), Virginia. The EIS will analyze the potential environmental impacts that would result from implementing the projects identified in the ADP (Proposed Action). The Proposed Action consists of multiple new construction, replacement, demolition, and renovation projects at DAAF. The Proposed Action does not include, nor would it require, substantial changes in missions, air operations, or the number of aircraft or personnel. The scoping process will help identify reasonable alternatives, potential environmental impacts, and key issues of concern to be analyzed in the EIS. The Army intends to comply with the requirements of Section 106 of the National Historic Preservation Act in parallel with this NEPA process, and invites federally recognized tribes and the State Historic Preservation Office to participate in the consultation process.

DATES: Comments must be sent by May 21, 2018.

ADDRESSES: Please send written comments to: U.S. Army Corps of Engineers, ATTN. Heather Cisar, Planning Division, 2 Hopkins Plaza, 10th Floor, Baltimore, MD 21201.

FOR FURTHER INFORMATION CONTACT: Heather Cisar at: FortBelvoirNOI@usace.army.mil

SUPPLEMENTARY INFORMATION: DAAF is located on Fort Belvoir's North Post in Fairfax County, VA. DAAF is home to The Army Aviation Brigade's (TAAB)



NOTICE OF INTENT AND NOTICE OF PUBLIC SCOPING MEETING UNITED STATES AIR FORCE



The U.S. Air Force invites you to attend the Public Scoping Meeting for the proposed Tinian Divert Infrastructure Improvements Supplemental Environmental Impact Statement.

The U.S. Air Force (Air Force) will host an open house public scoping meeting to discuss the proposal to construct a fuel pipeline from the Tinian seaport to Tinian International Airport, to include a booster pump house, a boom storage building, and associated infrastructure at the Tinian seaport. The Air Force also proposes to improve certain existing roads between the Tinian seaport and airport that would be used to support Divert-related projects.

In September 2016, the Air Force completed the Final Environmental Impact Statement (EIS) for Divert Activities and Exercises and the Record of Decision (ROD) was signed December 7, 2016, which announced the Air Force decision to select the Modified Tinian Alternative (Final EIS, Section 2.7, page 2-52) and specifically the North Option (Final EIS, Section 2.5.2, page 2- 28), as a future Divert location. After the ROD was signed in December 2016, the Air Force conducted further evaluation of the fuel requirement and associated infrastructure, including the feasibility of different alternatives that were not considered in the original EIS. The Air Force now proposes to construct a fuel pipeline to transport fuel from the seaport to the airport, and associated infrastructure at the seaport, rather than using fuel trucks for fuel transfer. In addition, recent reconnaissance surveys of the routes proposed for Divert-related vehicles, and coordination with Tinian leadership, indicate the existing surface road network is inadequate to support heavy vehicle traffic required for Divert activities, and is in need of improvements. Therefore, the Air Force also proposes to improve certain existing roads between the Tinian seaport and airport that would be used to support Divert-related projects.

SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (SEIS). Pursuant to the National Environmental Policy Act, the Air Force will prepare an SEIS, which will assess the potential environmental consequences of the proposed infrastructure improvements on Tinian, Commonwealth of the Northern Mariana Islands.

PUBLIC SCOPING MEETING. The public is encouraged to attend an “open house” scoping meeting to learn more about the proposal and assist the Air Force in scoping issues to evaluate in the SEIS. The meeting will be arranged in a “come and go” format with no formal Air Force presentation or opportunity for public testimony. Written comments will be accepted at the meeting; your input is valuable and assists the Air Force in making more informed decisions. **Please drop in anytime between 5 p.m. and 8 p.m. on May 17, 2018 (ChST) at the Tinian Elementary School cafeteria.** A Chamorro/Carolinian interpreter will be available at the scoping meeting to assist with translation of meeting materials and written comments.

PUBLIC COMMENT. The Air Force welcomes comments, suggestions, and relevant information on the proposal. Please submit comments in English at the public scoping meeting, by visiting www.PACAFDivertMarianasEIS.com, or contacting Ms. Melissa Markell at the address below. Address comments to:

Ms. Melissa Markell, AFCEC/CZN
Attn: Tinian Divert SEIS
2261 Hughes Ave, Suite 155
JBSA Lackland, TX 78236-9853

The Air Force also welcomes comments under Section 106 of the National Historic Preservation Act (36 Code of Federal Regulations 800) regarding the identification of or effects on historic properties. If you have comments or would like to become a consulting party in the Section 106 process, please visit the project website or contact Ms. Melissa Markell, AFCEC/CZN at the address above.

To ensure the Air Force has sufficient time to consider public input in the Draft SEIS and the Section 106 process, please submit comments by May 31, 2018.

www.PACAFDivertMarianasEIS.com



**DEPARTMENT OF THE AIR FORCE
PACIFIC AIR FORCES**

11 April 2018

MEMORANDUM FOR INTERESTED INDIVIDUALS, ORGANIZATIONS, PUBLIC GROUPS,
GOVERNMENT AGENCIES AND OTHERS

FROM: HQ PACAF/A5/8D
25 E Street, Suite B-200
Joint Base Pearl Harbor-Hickam HI 96853-5420

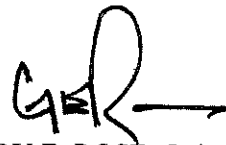
SUBJECT: Tinian Divert Infrastructure Improvements

1. The United States Air Force (USAF) intends to prepare a Supplemental Environmental Impact Statement (SEIS) to assess the potential environmental consequences associated with the proposed Tinian Divert Infrastructure Improvements. A Notice of Intent for this SEIS is being published in the Federal Register. Per 32 Code of Federal Regulations (CFR) 989.17, this letter serves as notification of the start of the environmental impact analysis process and the USAF invites you to review and provide comments on the proposal.
2. In September 2016, the USAF completed the Final EIS for Divert Activities and Exercises. The Record of Decision (ROD) was signed December 7, 2016, which announced the USAF decision to select the Modified Tinian Alternative (Final EIS, Section 2.7, page 2-52) and specifically the North Option (Final EIS, Section 2.5.2, page 2-28), as a future Divert location. After the ROD was signed, the USAF conducted further evaluation of the fuel requirement and associated infrastructure, including the feasibility of different alternatives that were not considered in the original EIS. The USAF now proposes to construct a fuel pipeline, and associated infrastructure at the seaport, to transport fuel from the seaport to the airport, rather than using fuel trucks for fuel transfer. In addition, recent reconnaissance surveys of the routes proposed for Divert-related vehicles, and coordination with Tinian leadership, indicate the existing surface road network is inadequate to support heavy vehicle traffic required for Divert activities, and is in need of improvements. Therefore, the USAF also proposes to improve certain existing roads between the seaport and airport that would be used to support Divert-related projects. Additional information about the Proposed Action is provided in the attached information sheet and is also available on the project website at www.PACAFDivertMarianasEIS.com.
3. While public scoping is not required for an SEIS per 32 CFR 989.20; the USAF has determined that conducting public scoping for the proposed infrastructure improvements will help inform interested stakeholders, elicit valuable community input, and provide transparency through a mutual exchange of information. The USAF will host a public, drop-in type "open house" scoping meeting on Tinian. The purpose of the meeting and of public scoping is to solicit comments on the scope of environmental issues to be analyzed in depth in the SEIS. The USAF invites the public, stakeholders, and other interested parties to attend the open-house public scoping meeting from 5 p.m. to 8 p.m. on May 17, 2018 (ChST) at the Tinian Elementary School cafeteria. A Chamorro and Carolinian interpreter will be available at the

scoping meeting and can assist with translating meeting materials and written comments. The attached flier provides details about the public scoping meeting and can be reproduced or distributed.

4. Public, agency, and stakeholder comments provided at the scoping meeting, through postal mail, and on the project website will be considered in the preparation of the SEIS. The USAF also welcomes comments under Section 106 of the National Historic Preservation Act (36 CFR 800) regarding the identification of or effects on historic properties. To ensure we have sufficient time to consider your input in the Draft SEIS and Section 106 process, please submit scoping comments by May 31, 2018.

5. If you have comments or questions on this project, or would like to become a consulting party in the Section 106 process, please submit them in English by visiting the project website or contacting Ms. Melissa Markell, AFCEC/CZN; Attn: Tinian Divert SEIS; 2261 Hughes Ave, Suite 155; JBSA Lackland, TX 78236-9853.



GARY E. ROSE, Colonel, USAF
Deputy Director of Strategy, Plans, and
Programs

2 Attachments:

1. Tinian Divert Infrastructure Improvements Information Sheet
2. Tinian Divert Infrastructure Improvements Scoping Meeting Informational Flier

Tinian Divert Infrastructure Improvements Scoping Distribution List

Title	Organization	City	State
Commander	36th Wing, Andersen AFB, Guam	APO	AP
Program Analyst	Advisory Council on Historic Preservation	Washington	D.C.
Administrator	CNMI Bureau of Environmental and Coastal Quality	Saipan	MP
Tinian Ports Manager	CNMI Commonwealth Ports Authority	Tinian	MP
Director	CNMI Department of Lands and Natural Resources, Division of Fish and Wildlife	Saipan	MP
	CNMI Historic Preservation Review Board	Saipan	MP
Vice Speaker	CNMI House of Representatives, 20th Commonwealth Legislature	Saipan	MP
Speaker	CNMI House of Representatives, 20th Commonwealth Legislature	Saipan	MP
Floor Leader	CNMI House of Representatives, 20th Commonwealth Legislature	Saipan	MP
Representative, District 6	CNMI House of Representatives, 20th Commonwealth Legislature	Saipan	MP
President	CNMI Senate, 20th Commonwealth Legislature	Saipan	MP
Vice President	CNMI Senate, 20th Commonwealth Legislature	Saipan	MP
Floor Leader	CNMI Senate, 20th Commonwealth Legislature	Saipan	MP
Senator	CNMI Senate, 20th Commonwealth Legislature	Saipan	MP
Senator	CNMI Senate, 20th Commonwealth Legislature	Saipan	MP
Governor	Commonwealth of the Northern Mariana Islands	Saipan	MP
Lt. Governor	Commonwealth of the Northern Mariana Islands	Saipan	MP
Executive Director	Commonwealth Ports Authority Board of Directors	Saipan	MP
Member	Commonwealth Ports Authority Board of Directors	Saipan	MP
Member	Commonwealth Ports Authority Board of Directors	Saipan	MP
Member	Commonwealth Ports Authority Board of Directors	Saipan	MP
Member	Commonwealth Ports Authority Board of Directors	Saipan	MP
Member	Commonwealth Ports Authority Board of Directors	Saipan	MP
Secretary	Commonwealth Ports Authority Board of Directors	Saipan	MP
Vice Chairman	Commonwealth Ports Authority Board of Directors	Saipan	MP
Chairman of the Board	Commonwealth Ports Authority, Board of Directors	Saipan	MP
Director	Commonwealth Utilities Corporation	CK, Saipan	MP
Director	CRMO	CK, Saipan	MP
Historic Preservation Officer	Department of Community and Cultural Affairs	Saipan	MP
HPO Archaeologist	Department of Community and Cultural Affairs	Saipan	MP
Secretary	Department of Public Lands	Saipan	MP
Secretary	Department of Public Works	Gualo Rai, Saipan	MP
Director	DEQ	Saipan	MP
Air Traffic Manager	FAA Guam ARTCC	Barrigada	GU
CNMI Military Liaison	Governor's Office	Saipan	MP
Manager	Honolulu Airports District Office (ADO)- FAA	Honolulu	HI
Commander, Joint Region Marianas	Joint Region Marianas	FPO AP	GU

Title	Organization	City	State
Mayor	Municipality of Saipan	Saipan	MP
Mayor	Municipality of Tinian and Aguiguan	Tinian	MP
Cultural Resources Program Manager	National Park Service- War in the Pacific National Historic Park	Hagatna	GU
Superintendent	National Park Service- War in the Pacific National Historic Park	Hagatna	GU
Legal Counsel	Office of the Governor, Commonwealth of the Northern Mariana Islands	Saipan	MP
Field Supervisor	Pacific Islands Office- USFWS	Honolulu	HI
President	Saipan Chamber of Commerce	Saipan	MP
President	Tinian Chamber of Commerce	Tinian	MP
Tinian Mil Liaison	Tinian Mayor's Office	Tinian	MP
Sector Commander	U.S. Sector Guam- USCG	FPO AP	GU
Congresswoman, Guam	US House of Representatives	Hagatna	GU
Congressman, Northern Mariana Islands	US House of Representatives	Saipan	MP
FAA Airports Division Manager	Western-Pacific Region	Los Angeles	CA
Chief Executive Officer	Alter City Group	Saipan	MP
	Alternative Zero Coalition	Saipan	MP
Legal Counsel	CNMI Bureau of Environmental and Coastal Quality	Saipan	MP
Nonpoint Source and Marine Monitoring Program Manager	CNMI Bureau of Environmental and Coastal Quality	Saipan	MP
Congressman Sablan's Office	CNMI Congressional Delegate, CNMI District Office	Saipan	MP
Secretary	CNMI Department Community & Cultural Affairs	Saipan	MP
Secretary	CNMI Department of Lands and Natural Resources	Saipan	MP
Director	CNMI Department of Lands and Natural Resources, Division of Parks and Recreation	Saipan	MP
Commissioner	CNMI Department of Public Safety, Office of the Commissioner	Saipan	MP
Director	CNMI Department of Public Safety, Tinian Fire Division	Saipan	MP
Administrative office	CNMI Department of Public Works	Rota	MP
Representative, District 5	CNMI House of Representatives, 20th Commonwealth Legislature	Saipan	MP
Representative, District 3	CNMI House of Representatives, 20th Commonwealth Legislature	Saipan	MP
Representative, District 3	CNMI House of Representatives, 20th Commonwealth Legislature	Saipan	MP
Representative, District 3	CNMI House of Representatives, 20th Commonwealth Legislature	Saipan	MP
Representative, District 3	CNMI House of Representatives, 20th Commonwealth Legislature	Saipan	MP
Representative, District 1	CNMI House of Representatives, 20th Commonwealth Legislature	Saipan	MP
Representative, District 5	CNMI House of Representatives, 20th Commonwealth Legislature	Saipan	MP
Representative, District 1	CNMI House of Representatives, 20th Commonwealth Legislature	Saipan	MP
Representative, District 1	CNMI House of Representatives, 20th Commonwealth Legislature	Saipan	MP
Representative, District 4	CNMI House of Representatives, 20th Commonwealth Legislature	Saipan	MP
Representative, District 3	CNMI House of Representatives, 20th Commonwealth Legislature	Saipan	MP
Representative, District 1	CNMI House of Representatives, 20th Commonwealth Legislature	Saipan	MP
Representative, District 2	CNMI House of Representatives, 20th Commonwealth Legislature	Saipan	MP
Representative, District 4	CNMI House of Representatives, 20th Commonwealth Legislature	Saipan	MP
Representative, District 1	CNMI House of Representatives, 20th Commonwealth Legislature	Saipan	MP
Representative, District 3	CNMI House of Representatives, 20th Commonwealth Legislature	Saipan	MP

Title	Organization	City	State
Press Secretary	CNMI Public Information and Protocol Office	Saipan	MP
Senator	CNMI Senate, 20th Commonwealth Legislature	Saipan	MP
Senator	CNMI Senate, 20th Commonwealth Legislature	Saipan	MP
Senator	CNMI Senate, 20th Commonwealth Legislature	Saipan	MP
Legislative Secretary	CNMI Senate, 20th Commonwealth Legislature	Saipan	MP
Regulatory Branch Chief	Dept. of the Army, USACE, Honolulu District, Regulatory Office	Fort Shafter	HI
Lead Program Manager	Federal Aviation Administration	Honolulu	HI
	FPA Pacific Corp	Tinian	MP
Chairman	House Armed Services Committee (HASC)	Washington	DC
Ranking Member	House Armed Services Committee (HASC)	Washington	DC
	Joint Region Marianas	FPO AP	
	MARFORPAC, Attn: DPRI	Camp Smith	HI
Managing Director	Marianas Visitors Authority	Saipan	MP
Pacific West Regional Director	National Park Service	San Francisco	CA
Director, Environmental Readiness	NAVFACPAC	Pearl Harbor	HI
Assistant Regional Administrator for Protected Resources	NOAA FISHERIES PACIFIC ISLANDS REGIONAL OFFICE	Honolulu	HI
CNMI Field Office	NOAA NMFS CNMI Office	Saipan	MP
Assistant Regional Administrator for Habitat	NOAA NMFS Habitat Division	Honolulu	HI
Coral Reef Ecologist	NOAA NMFS Habitat Division-Guam	Mangilao	GU
Counsel to the Assistant Secretary	Office of Insular Affairs , U.S. Department of the Interior	Washington	DC
Resident Department Head	Tinian Department of Finance	Tinian	MP
Resident Department Head	Tinian Department of Labor	Tinian	MP
Resident Department Head	Tinian Department of Public Works	Tinian	MP
	U.S. Department of Interior, Office of Environmental Policy and Compliance	Washington	DC
Regional Environmental Officer	U.S. Department of Interior, Office of Environmental Policy and Compliance, Pacific Southwest Region	San Francisco	CA
Guam Field Office Project Manager	USACE Guam Field Office	FPO	AP
Wildlife Services State Director	USDA Animal and Plant Health Inspection Service	Barrigada	GU
Research Ecologist	USDA Forest Service; Pacific Southwest Research Station, Institute of Pacific Islands Forestry	Hilo	HI
Assistant Director for Field Operations, West Area	USDA NRCS Pacifics Islands Area: State Office	Barrigada	GU
Director	USDA NRCS Pacifics Islands Area: State Office	Honolulu	HI
District Conservationist	USDA NRCS Saipan Service Center	Saipan	MP
	USEPA Region 9 Pacific Islands Contact Office	Honolulu	HI
Pacific Islands Office Manager	USEPA Region 9 Pacific Islands Office	San Francisco	CA
CNMI Program Manager	USEPA Region 9 Pacific Islands Office	San Francisco	CA
Private Citizens			

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Tinian Divert Infrastructure Improvements Supplemental Environmental Impact Statement



Commonwealth of the Northern Mariana Islands

Tinian Divert Infrastructure Improvements: Public Scoping

Introduction

The National Environmental Policy Act (NEPA) was enacted to address concerns about federal actions and their effects on the environment. An Environmental Impact Statement (EIS) is the most detailed analysis prescribed by regulations implementing NEPA. A Supplemental Environmental Impact Statement (SEIS) is prepared after an EIS when substantial changes are made to a proposed action, there are significant new circumstances or information relevant to environmental concerns, or the purposes of NEPA will be furthered by completion of the SEIS. An SEIS is a public document and public involvement is a vital component of the NEPA process.

The U.S. Air Force has published a Notice of Intent to prepare an SEIS, pursuant to NEPA, for the proposed Tinian Divert Infrastructure Improvements. The Proposed Action includes the construction of a fuel pipeline and associated support facilities, and improvements to certain existing roadways on the island of Tinian in the Commonwealth of the Northern Mariana Islands (CNMI).

Background of the U.S. Air Force Tinian Divert Project

In September 2016, the U.S. Air Force completed the Final EIS for Divert Activities and Exercises. The Record of Decision (ROD) was signed December 7, 2016, which announced the U.S. Air Force decision to select the Modified Tinian Alternative, and specifically the North Option, as a future Divert location (see Figure 1). After the ROD, the U.S. Air Force conducted further evaluation of the fuel requirement and associated infrastructure, and of the existing surface roadway networks on Tinian. The U.S. Air Force now proposes to construct a fuel pipeline to transport fuel from the seaport to the airport, rather than using fuel trucks for fuel transfer. In addition, the U.S. Air Force also proposes to improve certain existing roads between the seaport and airport that would be used to support Divert-related projects.

What is the Public Scoping Process?

Public scoping is an early and open process for identifying issues and alternatives to be addressed in an EIS and determining who (e.g., public and government agencies) is interested in the proposed action. While federal regulations do not require public scoping for an SEIS, the U.S. Air Force determined that conducting public scoping for the proposed infrastructure improvements will help inform interested stakeholders, elicit valuable community input, and provide transparency through a mutual exchange of information. The public scoping process began with publication of the Notice of Intent in the Federal Register stating the U.S. Air Force's intent to prepare an SEIS. Comments received during the public scoping process will be considered in the preparation of the Draft SEIS. See the timeline on the back of this page for additional information regarding steps in the SEIS process.

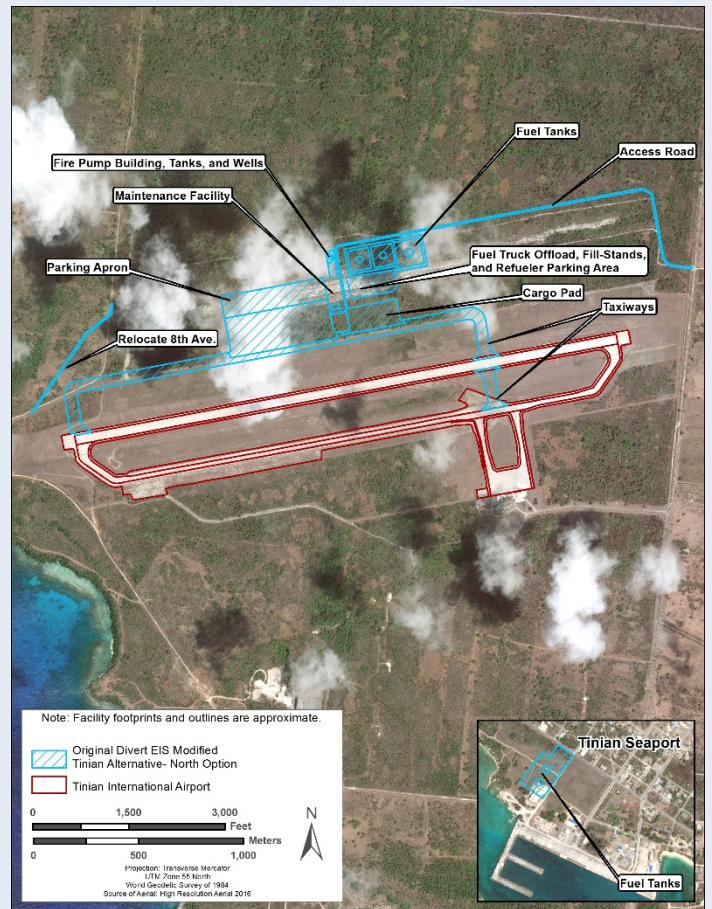


Figure 1: Original EIS Modified Tinian Alternative – North Option

Proposed Action and Alternatives

The Proposed Action is to construct a fuel pipeline from the Tinian seaport to Tinian International Airport, to include a booster pump house, boom storage building, and necessary utility connections at the Tinian seaport. The Proposed Action also includes the improvement of certain existing roads between the seaport and airport that would be used to support Divert-related projects. The Proposed Action would have three aspects:

- **Fuel Pipeline:** The pipeline would be constructed underground within a 20 foot easement and along existing right-of-ways, to the extent practicable. The U.S. Air Force is considering two direct routes from the seaport to the airport for the pipeline.
- **Seaport Support Facilities:** To support pipeline operations, a booster pump house, boom storage building, and associated infrastructure would be constructed at the Tinian seaport in place of the two seaport fuel storage tanks proposed in the original EIS.
- **Roadway Improvements:** Roadway improvements are proposed on Divert-related transportation routes that were analyzed in the original EIS, and would include, where necessary, removing and replacing the existing deteriorated asphalt cap of the roadway.

Figure 2 provides an overview of all proposed infrastructure improvements and alternatives.

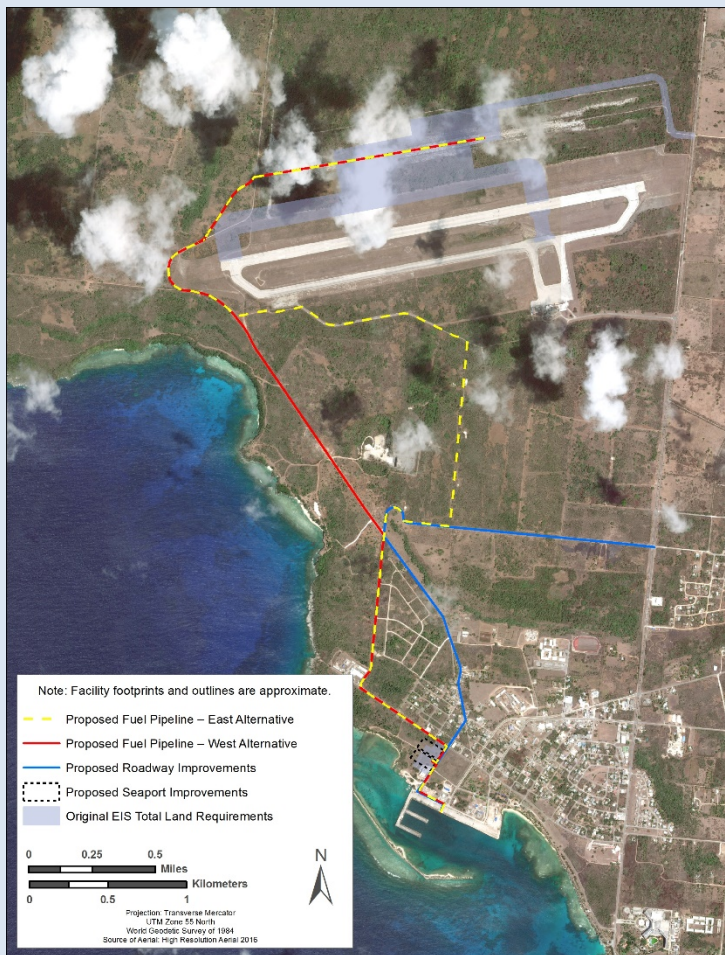
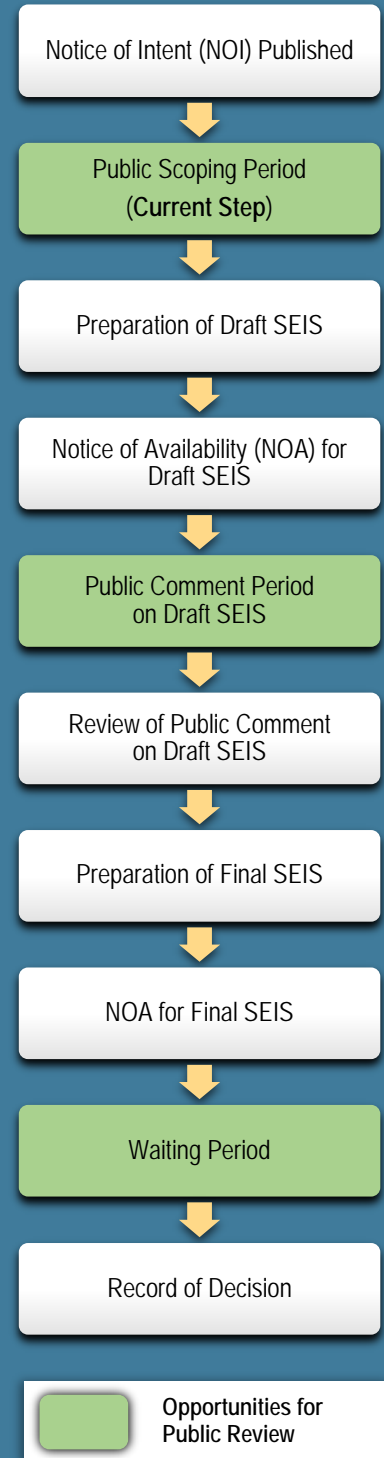


Figure 2: Tinian Divert Infrastructure Improvements
 Proposed Action and Alternatives

Tinian Divert Infrastructure Improvements SEIS Timeline



Comments, suggestions, and relevant information are welcomed on the proposal. Please submit comments in English at the public scoping meeting, by visiting the project website, or contacting Ms. Melissa Markell at the address below. A Chamorro/Carolinian interpreter is available at the public scoping meeting to assist with translation of written comments into English.

Address comments to: Ms. Melissa Markell, AFCEC/CZN
 Attn: Tinian Divert SEIS
 2261 Hughes Ave, Suite 155
 JBSA Lackland, TX 78236-9853

The U.S. Air Force also welcomes comments under Section 106 of the National Historic Preservation Act (36 Code of Federal Regulations 800) regarding the identification of or effects on historic properties, and requests to become a consulting party in the Section 106 process.

APPENDIX C

Section 106 Consultation Supporting Documentation





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C.1. Section 106 Consultation

The U.S. Air Force (USAF) is complying with Section 106 of the National Historic Preservation Act (NHPA) concurrent with developing the Supplemental Environmental Impact Statement (SEIS). USAF invited all Consulting Parties from the Divert Activities and Exercises consultation to engage on the Tinian Infrastructure and Improvements undertaking. USAF also engaged the public and invited the participation of new consulting parties through newspaper advertisements, at the public scoping meeting, and through the Divert website. A total of 52 people representing local and federal government, organizations, and personal interests were invited to, or are participating in, the Section 106 consultation (**Table C-1**). USAF communicates with consulting parties via letters, emails, and meetings, summarized in **Table C-1**. Copies of correspondence and related materials are provided in **Section C.2**.

Table C-1. Consultation Record

Consulting Party	Consultation Invitation	Finding of Effect	Additional Correspondence
CNMI Governor's Office			
Ralph Torres, Governor	4/24/2018		
Gilbert Birnbrich, Legal Counsel	4/24/2018		Divert PA Annual Meeting, 6/16/2018
Tinian Mayor's Office			
Joey P. San Nicholas, Mayor	4/24/2018		Public Scoping Meeting, 5/17/2018
Ignacio Kiyoshi, Military Liaison	7/12/2018		Public Scoping Meeting, 5/17/2018
CNMI Historic Preservation Office			
Mertie Kani, HPO	4/24/2018		
James Palacios, Acting HPO	4/24/2018		Divert PA Annual Meeting, 6/16/2018
Jim Pruitt, CNMI Archaeologist	4/24/2018		Teleconference on Phase I Survey, 3/7/2018; Divert PA Annual Meeting, 6/16/2018
CNMI Historic Preservation Review Board			
Pedro Jun Duenas, Chairman	4/24/2018		
Dr. Duane Colt Denfeld	4/24/2018		
Don Farrell	4/24/2018		
Fr. Francis Hezel	4/24/2018		
Dr. Hiro Kurashina	4/24/2018		Divert PA Annual Meeting, 6/16/2018
Ping Limes	4/24/2018		
Dr. Liz Rechebei	4/24/2018		Divert PA Annual Meeting, 6/16/2018
CNMI Humanities Council			
Scott Russell	4/24/2018		

Table C-1. Consultation Record

Consulting Party	Consultation Invitation	Finding of Effect	Additional Correspondence
Commonwealth Ports Authority Board of Directors			
Christopher Tenorio, Executive Director	4/24/2018		
Edward B. Mendiola, Deputy Director	4/24/2018		
Wendi Prater, Project Manager/Executive Assistant	4/24/2018		
Jadene Villagomez, Secretary	4/24/2018		
Kimberlyn King-Hinds	4/24/2018		
Barrie Toves	4/24/2018		
CNMI Department of Public Lands			
Ray Cing, Director	7/12/2018		Public Scoping Meeting, 5/17/2018
CNMI Civilian-Military Liaison Office			
Stanley Iakopo, Executive Director	4/24/2018		
Advisory Council on Historic Preservation			
Kate Kerr, Program Analyst	4/24/2018		
National Park Service			
Stanley Austin, Pacific West Regional Director	4/24/2018		
Dr. Elaine Jackson-Retondo, Supervisory Historian, Pacific West Region	4/24/2018		
Barbara Alberti, Superintendent, War in the Pacific National Historic Park	4/24/2018		Divert PA Annual Meeting, 6/16/2018

Table C-1. Consultation Record

Consulting Party	Consultation Invitation	Finding of Effect	Additional Correspondence
David Lotz, Cultural Resources Program Manager, War in the Pacific National Historic Park	4/24/2018		
Dr. David Louter	4/24/2018		
Mike Gawel	4/24/2018		
Federal Aviation Administration			
Mark McClardy, FAA Airports Division Director	4/24/2018		Letter dated 5/16/2018
Gordon Wong, Manager, Honolulu Airports District Office	4/24/2018		
Dave Kessler, Environmental Protection Specialist	4/24/2018		
Marina Landis, Environmental Protection Specialist	4/24/2018		
Joint Region Marianas			
Shoshana Chatfield, Commander	4/24/2018		
Roy Tsutsui, Political-Military Affairs Policy Advisor Defense Coordinating Officer Representative	4/24/2018		
Ronnie Rogers	4/24/2018		
Individuals			
Deborah Fleming	4/24/2018		
Sam Mcphetres	4/24/2018		Email exchange 5/28 to 5/31/2018; Package received 5/29/2018
Tina Sablan	4/24/2018		

Table C-1. Consultation Record

Consulting Party	Consultation Invitation	Finding of Effect	Additional Correspondence
Robert Hunter	4/24/2018		
Rosemond B. Santos	4/24/2018		
Gordon Marciano	4/24/2018		
Genevieve Cabrera	4/24/2018		
Marilyn Swift	4/24/2018		
Manual Borja	4/24/2018		
Eric San Nicolas	4/24/2018		
John Castro	4/24/2018		
Keli Tenorio	4/24/2018		
Ray Munya	4/24/2018		
Pepe Batbon Connolly	7/12/2018		Public Scoping Meeting, 5/17/2018
Frederick Dela Cruz	7/12/2018		Public Scoping Meeting, 5/17/2018

C.2. Section 106 Initiation

C.2.1. Section 106 Initiation Letter (HPO/ACHP)



DEPARTMENT OF THE AIR FORCE
PACIFIC AIR FORCES

24 April 2018

Lieutenant Colonel John B. Kelley
Chief, Force Posture
HQ PACAF/A5F
25 E Street Suite B-200
Joint Base Pearl Harbor-Hickam, HI 96853-5420

[REDACTED]

Hafa Adai [REDACTED]

The U.S. Air Force (USAF) wishes to re-initiate consultation under Section 106 of the National Historic Preservation Act (NHPA) for the Divert Activities and Exercises (Divert) proposal. Under the original Divert undertaking, USAF proposed to transport fuel to the airport via tanker truck. USAF now proposes the construction and operation of a fuel pipeline between the seaport and airport, with construction of associated support facilities at the seaport. USAF is also proposing to improve certain existing roads that would be used for Divert project construction and activities. These projects (i.e. the fuel pipeline, seaport support facilities, and road improvements) comprise the Tinian Divert Infrastructure Improvements (Tinian Infrastructure) project and are the subject of a Supplemental Environmental Impact Statement (SEIS) that USAF is preparing in accordance with the National Environmental Policy Act (NEPA). USAF is complying with Section 106 of the NHPA concurrent with the NEPA process.

USAF is re-initiating consultation with current Divert consulting parties (Attachment 1). USAF will actively seek additional consulting parties during public outreach as part of the NEPA process. Our plan to involve the public in the Section 106 process includes the following elements:

- 1) Newspaper ads inviting the public to submit comments or request consulting party status in accordance with the Section 106 process.
- 2) Section 106 subject matter expert at NEPA scoping meeting to provide information to the public about the Section 106 process; requests to be a consulting party or comments on the 106 process will also be welcomed at the NEPA scoping meeting.
- 3) Section 106 information page on the Divert Activities and Exercises website (to be publicized in newspaper ads and scoping meeting materials).
- 4) Inclusion of Section 106 information and concerns in the SEIS for public review.
- 5) Section 106 subject matter expert at NEPA public hearing to provide information to the public about the Section 106 process; requests to be a consulting party or comments on the 106 process will also be welcomed at the NEPA public hearing.

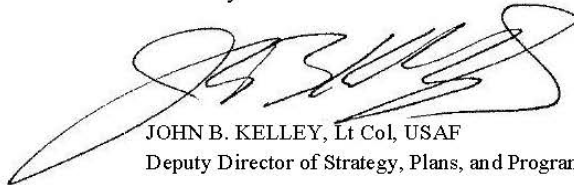
USAF has prepared a summary of changes to the undertaking and the area of potential effects (APE), provided as Attachment 2. As part of our effort to identify historic properties in the APE, we have retained HDR to conduct a literature review and cultural resources survey of

the APE. The survey will include all areas of the APE associated with the pipeline and seaport improvements. No survey is planned for the proposed road improvement areas, due to the nature of those planned improvements. However, the road improvement areas will be included in the literature review.

Section 106 consultation for the Divert Activities undertaking resulted in a Programmatic Agreement (PA) amongst USAF, the CNMI HPO, and the Advisory Council on Historic Preservation (ACHP). Per Stipulation VI of the PA, USAF proposes to amend the PA to include these additional proposed activities in the original undertaking description. Once efforts have been completed to identify and evaluate historic properties that may be affected by the proposed Tinian Infrastructure activities, USAF intends to consult with PA signatories and consulting parties regarding determination of effects within the framework of the existing PA.

We welcome your input on the definition of the APE and our plan to involve the public. Further, please inform us if you know of any individuals in addition to those listed in Attachment 1 that should be invited as consulting parties. If you have any questions, please contact George Herbst, (808) 449-1083, george.herbst@us.af.mil. We look forward to working with you on historic preservation matters related to the Tinian Divert Infrastructure Improvements undertaking.

Sincerely



JOHN B. KELLEY, Lt Col, USAF
Deputy Director of Strategy, Plans, and Programs

Attachment:

1. Invited Consulting Parties
2. Description of the Undertaking and Area of Potential Effects

Attachment 1: Invited Consulting Parties

Stanley Austin
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Ronnie Rogers
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Office of the Mayor, Municipality of Tinian
and Aguiguan
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Chairman
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Saipan, MP 96950
[REDACTED]

Liz Rechebei
CNMI Historic Preservation Review Board
[REDACTED]

Hiro Kurashina
CNMI Historic Preservation Review Board
[REDACTED]

Don Farrell
CNMI Historic Preservation Review Board
[REDACTED]

Francis Hezel
CNMI Historic Preservation Review Board
[REDACTED]

Ping Limes
CNMI Historic Preservation Review Board
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Duane Colt Denfeld
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CNMI Historic Preservation Review Board
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Sam Mcphetres
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[REDACTED]

Tina Sablan
Friends of Marpi Point
[REDACTED]

Robert Hunter
CNMI Museum of Culture and History
[REDACTED]

Rosemond B. Santos
Blue Continent Communications
[REDACTED]

Gordon Marciano
Owner
PDI Tour Agency
[REDACTED]

Genevieve Cabrera
[REDACTED]

Marilyn Swift
[REDACTED]

Manual Borja
[REDACTED]

Eric San Nicolas
[REDACTED]

John Castro
[REDACTED]

Keli Tenorio
[REDACTED]

Ray Munya
[REDACTED]

U.S. Air Force Tinian Divert Infrastructure Improvements

Section 106 Consultation: Definition of the Undertaking and Area of Potential Effects

1. Definition of the Undertaking

The U.S. Air Force (USAF) is revising the Divert Activities and Exercises (Divert) undertaking (Undertaking) to incorporate supplemental projects, consisting of pipeline construction and road improvements, to support the Divert proposal. After the Record of Decision for the Divert Environmental Impact Statement (EIS) was signed in December 2016, USAF conducted further evaluation of the fuel requirement and associated infrastructure, including the feasibility of different alternatives that were not considered in the original EIS. The USAF now proposes to construct a fuel pipeline, and associated infrastructure at the seaport, to transport fuel from the seaport to the airport. In addition, recent reconnaissance inspections and coordination with Tinian leadership indicate the existing surface road network is inadequate to support heavy vehicle traffic required for Divert construction and activities. Therefore, USAF also proposes to improve certain existing roads between the seaport and airport that would be used to support Divert-related projects. USAF is in the process of beginning a Supplemental EIS to evaluate these infrastructure improvements, which are collectively referred to as the Tinian Divert Infrastructure Improvements project.

1.1 Existing Components of the Divert Undertaking

The Divert undertaking, as defined in the Divert Activities and Exercises Programmatic Agreement (PA), included components for the three alternatives analyzed in the Divert EIS. This summary focuses on components of the Modified Tinian Alternative – North Option that was selected in the Record of Decision. This alternative included the following components, with footprints shown in **Figure 1**:

- Parking apron, cargo pad, maintenance facility, taxiways
- Jet fuel receiving, storage, and distribution
 - Fuel tanks at seaport, airport
 - Fuel hydrant system at airport
 - Truck transportation from seaport to airport
- Fencing and utilities, including fire suppression
- Access road
- Reroute of 8th Avenue
- Transportation of construction materials
- Up to 720 aircraft operations over an eight week period, annually
- Transportation of concrete and construction materials

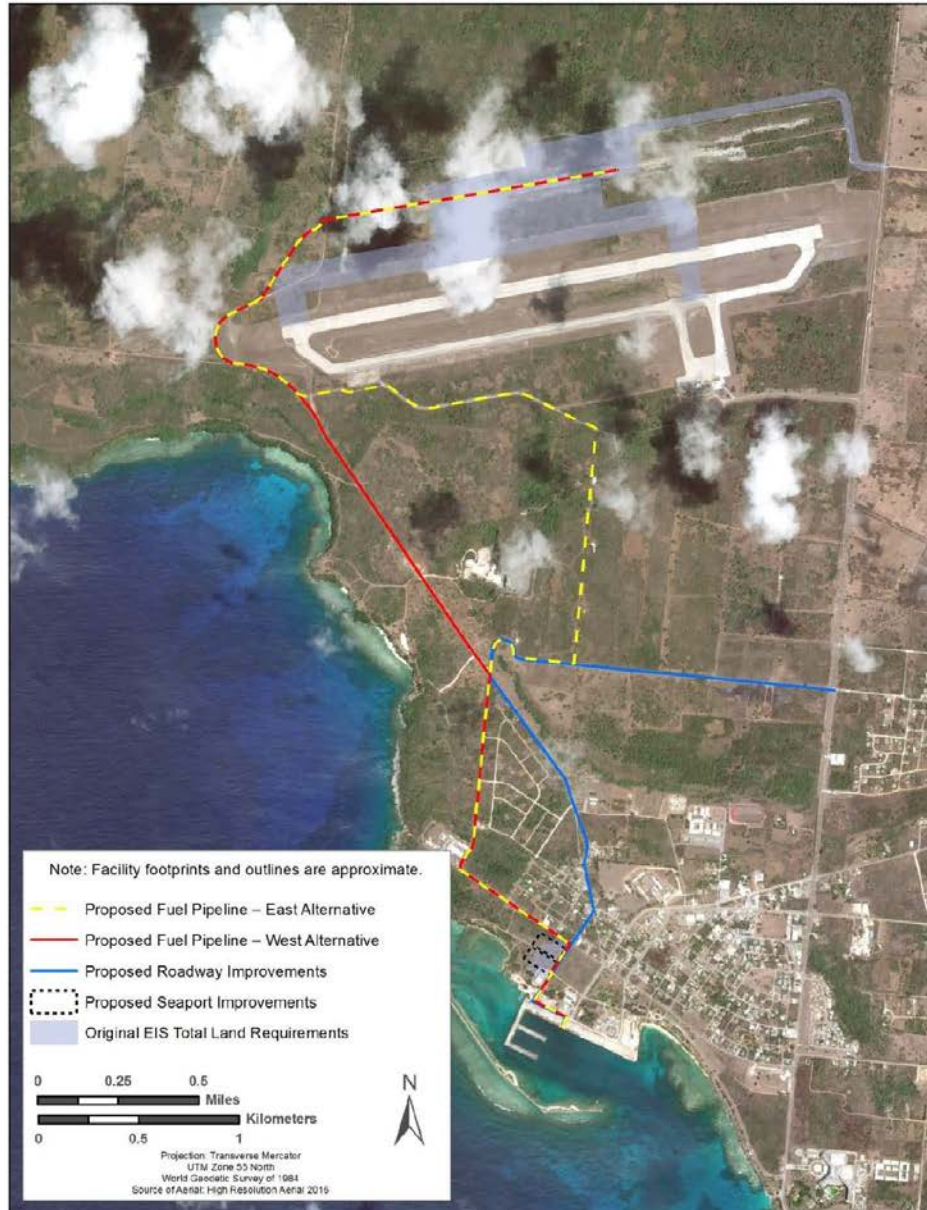


Figure 1. Proposed Pipeline and Road Improvement Routes showing Original Divert Land Requirements

1.1 Fuel Pipeline

The pipeline and supporting infrastructure would replace the truck-transport of fuel and bulk fuel storage tanks at the seaport that were included in the original undertaking. The pipeline would be constructed underground primarily along existing roads. The pipeline would be installed within a 20-foot easement; however, for the purposes of assessing effects of the undertaking, USAF is assuming that an 80-foot easement could be disturbed during construction to allow for materials laydown and routing adjustments. The pipeline will be installed to a depth of approximately 3 feet. Low point drains would be installed approximately every 500 feet along the second section of pipeline. These points would be used to drain water or particulate matter from the pipe or to fully drain the pipe if required. Low point drains would be installed in pits approximately 3.5 feet deep to allow access below ground surface.

USAF is considering two pipeline routes between the Tinian seaport and the airport (Figure 1):

West Route. The West route travels north from the Tinian seaport until it intersects Tinian Route (TR) 26 (i.e. West Avenue) and then stays on a northwestern path by following TR26, 6th Avenue, and TR25 (i.e., 8th Avenue), and then turns northeast along TR23 to approach the Divert fuel storage tanks from the west side. This route follows existing roads and is approximately 4.1 miles long. Exact placement of the pipeline along this route is under development, but is expected to be within 40 feet of existing roads.

East Route. The East route extends north from the Tinian seaport along the same path as the West route until it reaches TR24 (i.e., 42nd Street), where it turns east. The route then continues east on TR24 until just south of the airport, where it turns north, then west, and eventually reconnects with the proposed West route to approach the Divert fuel storage tanks from the west side. This route primarily follows existing roads, abandoned roads, and abandoned airfield pavements. The route is approximately 4.9 miles long. Exact placement of the pipeline along this route is under development, but is expected to be within 40 feet of existing/abandoned roads and airfield pavements.

1.2 Seaport Support Infrastructure

Seaport support infrastructure would be constructed at the Tinian seaport in place of the two seaport fuel storage tanks proposed in the original EIS. A booster pump house and boom storage building would be constructed near the seaport to support the fuel pipeline operations. The booster pump house and boom storage building would be collocated with a construction laydown yard, biosecurity area, parking area, sewage holding tank, and water storage tanks. Gravel pedestrian pathways and access roads would also be created or widened within this area; all existing roads would remain open to the public. The booster pump house would be sized to fit three pumps and would include a pump room, control room, mechanical room, and toilet. The pump house would also require installation of water and electric utilities, which would be extended from existing service lines. The boom storage building would be constructed in close proximity to the booster pump house for the storage of fuel spill containment booms and fuel transfer hose supplies. The building would require overhead door access for ease of loading/unloading. Infrastructure including fencing and utility connections would be constructed

in the seaport improvement area. A total area of 8.2 acres could be disturbed for development of all seaport support infrastructure.

1.3 Road Improvements

The proposed roadway improvements would occur on roads previously analyzed for Divert-related vehicles in the original EIS. The roadway improvements would support construction of all Divert-related facilities and if needed, transfer of fuel via tanker truck if the proposed pipeline and support facilities are not implemented. The road improvements would include replacement of the existing roadway surfaces, which would entail: removing the existing deteriorated asphalt cap, which is approximately 2 to 4-inches thick; grading the road subsurface down approximately 8 inches below the original asphalt cap; laying a new 8-inch subbase; and finishing the surface with a new 3-inch asphalt cap. All roadway improvements would occur within the existing roadbeds and shoulders, and no roadbed widening or ROW alterations would occur. For the purposes of assessing effects of the undertaking, USAF assumes the above activities would occur along all roadways proposed for improvement; however, portions of the roadways may require less extensive repairs.

Only one roadway route is under consideration for road improvements (**Figure 1**). This route travels from the Tinian seaport north to TR25, north along TR25 to its intersection with TR24, east along TR24 to its intersection with TR21 (i.e. Broadway).

2. Definition of the Area of Potential Effects

The Area of Potential Effects (APE) represents the geographic area or areas within which an undertaking may directly or indirectly affect historic properties. USAF is expanding the Divert APE to include all areas where ground disturbance could occur during implementation of the pipeline, seaport support facilities, and road improvement projects. The horizontal APE consists of the following components:

- A 100 foot (30 meter) corridor along both proposed pipeline routes, centered on identified road/pavement alignments with the actual pipeline alignment subject to change within this corridor.
- An 8.2-acre area where seaport support facilities would be constructed.
- The existing roadways where improvements could occur.

The vertical APE corresponds with the potential depth of disturbance. The vertical APE is 4 feet for the fuel pipeline and seaport support facilities and 1 foot for road improvements.

C.2.2. Section 106 Initiation Letter (Other Consulting Parties)



DEPARTMENT OF THE AIR FORCE
PACIFIC AIR FORCES

24 April 2018

Lieutenant Colonel John B. Kelley
Chief, Force Posture
HQ PACAF/A5F
25 E Street Suite B-200
Joint Base Pearl Harbor-Hickam, HI 96853-5420



Hafa Adai [REDACTED]

As a consulting party to previous or ongoing Department of Defense projects in the Commonwealth of the Northern Mariana Islands (CNMI), the U.S. Air Force (USAF) wishes to inform you of a new proposal associated with the Divert Activities and Exercises (Divert) project: the Tinian Divert Infrastructure Improvements (Tinian Infrastructure) project. Under this proposal, USAF would construct a fuel pipeline and associated infrastructure and improve certain existing roads between the seaport and airport that would be used to support Divert-related projects. USAF is preparing a Supplemental EIS (SEIS), as required by the National Environmental Policy Act (NEPA), to analyze the potential environmental consequences associated with the project. You may be receiving, or have already received, a letter with information about the NEPA process and an invitation to a public "open house" scoping meeting, which will be held from 5 p.m. to 8 p.m. on May 17, 2018 at the Tinian Elementary School cafeteria.

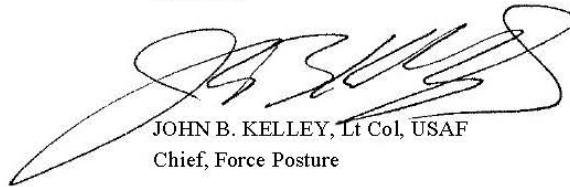
USAF is also re-initiating consultation on the Divert undertaking under Section 106 of the National Historic Preservation Act (NHPA). As you may be aware, USAF concluded Section 106 consultation on the original Divert undertaking with execution of a Programmatic Agreement amongst USAF, the CNMI Historic Preservation Office, and the Advisory Council on Historic Preservation (ACHP). USAF proposes to amend the existing PA to include these new activities in the undertaking description and to reopen this consultation to identify and evaluate historic properties that may be affected by these new activities. USAF cordially invites you to participate as a consulting party in this renewed consultation. Under the Section 106 process, consulting parties provide information to assist the federal agency by providing information and sharing valuable perspectives at various points through the Section 106 process. For more information about consulting parties and the Section 106 process, see the Advisory Council on Historic Preservation's publication "A Citizen's Guide to Section 106 Review," available at <http://www.achp.gov/docs/Citizen Guide.pdf>.

You will find attached to this letter a summary of the changes to the undertaking and Area of Potential Effects (APE). USAF cultural resource representatives will be present at the NEPA scoping meeting on May 17, 2018 to take comments related to the Section 106 consultation. USAF is also planning a cultural resources survey to identify historic properties in the APE.

Upon conclusion of the survey, USAF will share non-sensitive information with consulting parties.

We request your response affirming whether you would like to participate as a consulting party on the Tinian Infrastructure project. If you choose not to participate as a consulting party, you will still have opportunities to provide comments and share information as a member of the public through the NEPA public involvement process. You may also request to join as a consulting party at any time during the Section 106 consultation process. If you would like to consult on the Tinian Infrastructure project, we ask that you take this opportunity to share information about historic properties in the APE, such as a description of the property, its location, why it is important, and how construction and operation of the pipeline might affect the property. This information will assist USAF in evaluating properties for their eligibility for listing in the National Register of Historic Places and whether the undertaking would adversely affect the sites. We also ask that you update your contact information with us, including mailing and email addresses. Please submit your comments, questions, and contact information to George Herbst, (808) 449-1083, george.herbst@us.af.mil. You may also find project information online at www.PACAF_DivertMarianasEIS.com. We look forward to working with you on historic preservation matters related to the Tinian Infrastructure project.

Sincerely



JOHN B. KELLEY, Lt Col, USAF
Chief, Force Posture

Attachment:

1. Description of the Undertaking and Area of Potential Effects

U.S. Air Force Tinian Divert Infrastructure Improvements

Section 106 Consultation: Definition of the Undertaking and Area of Potential Effects

1. Definition of the Undertaking

The U.S. Air Force (USAF) is revising the Divert Activities and Exercises (Divert) undertaking (Undertaking) to incorporate supplemental projects, consisting of pipeline construction and road improvements, to support the Divert proposal. After the Record of Decision for the Divert Environmental Impact Statement (EIS) was signed in December 2016, USAF conducted further evaluation of the fuel requirement and associated infrastructure, including the feasibility of different alternatives that were not considered in the original EIS. The USAF now proposes to construct a fuel pipeline, and associated infrastructure at the seaport, to transport fuel from the seaport to the airport. In addition, recent reconnaissance inspections and coordination with Tinian leadership indicate the existing surface road network is inadequate to support heavy vehicle traffic required for Divert construction and activities. Therefore, USAF also proposes to improve certain existing roads between the seaport and airport that would be used to support Divert-related projects. USAF is in the process of beginning a Supplemental EIS to evaluate these infrastructure improvements, which are collectively referred to as the Tinian Divert Infrastructure Improvements project.

1.1 Existing Components of the Divert Undertaking

The Divert undertaking, as defined in the Divert Activities and Exercises Programmatic Agreement (PA), included components for the three alternatives analyzed in the Divert EIS. This summary focuses on components of the Modified Tinian Alternative – North Option that was selected in the Record of Decision. This alternative included the following components, with footprints shown in **Figure 1**:

- Parking apron, cargo pad, maintenance facility, taxiways
- Jet fuel receiving, storage, and distribution
 - Fuel tanks at seaport, airport
 - Fuel hydrant system at airport
 - Truck transportation from seaport to airport
- Fencing and utilities, including fire suppression
- Access road
- Reroute of 8th Avenue
- Transportation of construction materials
- Up to 720 aircraft operations over an eight week period, annually
- Transportation of concrete and construction materials

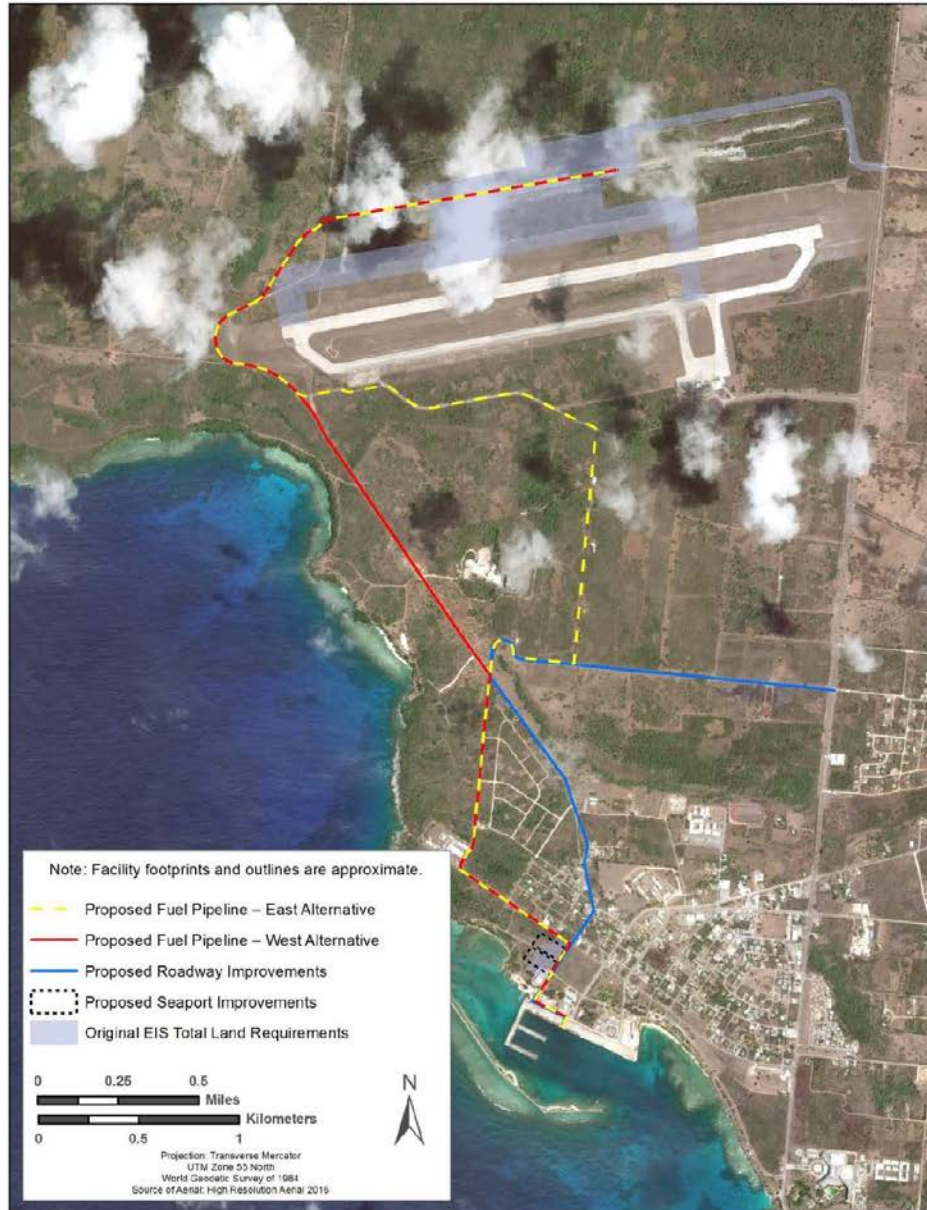


Figure 1. Proposed Pipeline and Road Improvement Routes showing Original Divert Land Requirements

1.1 Fuel Pipeline

The pipeline and supporting infrastructure would replace the truck-transport of fuel and bulk fuel storage tanks at the seaport that were included in the original undertaking. The pipeline would be constructed underground primarily along existing roads. The pipeline would be installed within a 20-foot easement; however, for the purposes of assessing effects of the undertaking, USAF is assuming that an 80-foot easement could be disturbed during construction to allow for materials laydown and routing adjustments. The pipeline will be installed to a depth of approximately 3 feet. Low point drains would be installed approximately every 500 feet along the second section of pipeline. These points would be used to drain water or particulate matter from the pipe or to fully drain the pipe if required. Low point drains would be installed in pits approximately 3.5 feet deep to allow access below ground surface.

USAF is considering two pipeline routes between the Tinian seaport and the airport (Figure 1):

West Route. The West route travels north from the Tinian seaport until it intersects Tinian Route (TR) 26 (i.e. West Avenue) and then stays on a northwestern path by following TR26, 6th Avenue, and TR25 (i.e., 8th Avenue), and then turns northeast along TR23 to approach the Divert fuel storage tanks from the west side. This route follows existing roads and is approximately 4.1 miles long. Exact placement of the pipeline along this route is under development, but is expected to be within 40 feet of existing roads.

East Route. The East route extends north from the Tinian seaport along the same path as the West route until it reaches TR24 (i.e., 42nd Street), where it turns east. The route then continues east on TR24 until just south of the airport, where it turns north, then west, and eventually reconnects with the proposed West route to approach the Divert fuel storage tanks from the west side. This route primarily follows existing roads, abandoned roads, and abandoned airfield pavements. The route is approximately 4.9 miles long. Exact placement of the pipeline along this route is under development, but is expected to be within 40 feet of existing/abandoned roads and airfield pavements.

1.2 Seaport Support Infrastructure

Seaport support infrastructure would be constructed at the Tinian seaport in place of the two seaport fuel storage tanks proposed in the original EIS. A booster pump house and boom storage building would be constructed near the seaport to support the fuel pipeline operations. The booster pump house and boom storage building would be collocated with a construction laydown yard, biosecurity area, parking area, sewage holding tank, and water storage tanks. Gravel pedestrian pathways and access roads would also be created or widened within this area; all existing roads would remain open to the public. The booster pump house would be sized to fit three pumps and would include a pump room, control room, mechanical room, and toilet. The pump house would also require installation of water and electric utilities, which would be extended from existing service lines. The boom storage building would be constructed in close proximity to the booster pump house for the storage of fuel spill containment booms and fuel transfer hose supplies. The building would require overhead door access for ease of loading/unloading. Infrastructure including fencing and utility connections would be constructed

in the seaport improvement area. A total area of 8.2 acres could be disturbed for development of all seaport support infrastructure.

1.3 Road Improvements

The proposed roadway improvements would occur on roads previously analyzed for Divert-related vehicles in the original EIS. The roadway improvements would support construction of all Divert-related facilities and if needed, transfer of fuel via tanker truck if the proposed pipeline and support facilities are not implemented. The road improvements would include replacement of the existing roadway surfaces, which would entail: removing the existing deteriorated asphalt cap, which is approximately 2 to 4-inches thick; grading the road subsurface down approximately 8 inches below the original asphalt cap; laying a new 8-inch subbase; and finishing the surface with a new 3-inch asphalt cap. All roadway improvements would occur within the existing roadbeds and shoulders, and no roadbed widening or ROW alterations would occur. For the purposes of assessing effects of the undertaking, USAF assumes the above activities would occur along all roadways proposed for improvement; however, portions of the roadways may require less extensive repairs.

Only one roadway route is under consideration for road improvements (**Figure 1**). This route travels from the Tinian seaport north to TR25, north along TR25 to its intersection with TR24, east along TR24 to its intersection with TR21 (i.e. Broadway).

2. Definition of the Area of Potential Effects

The Area of Potential Effects (APE) represents the geographic area or areas within which an undertaking may directly or indirectly affect historic properties. USAF is expanding the Divert APE to include all areas where ground disturbance could occur during implementation of the pipeline, seaport support facilities, and road improvement projects. The horizontal APE consists of the following components:

- A 100 foot (30 meter) corridor along both proposed pipeline routes, centered on identified road/pavement alignments with the actual pipeline alignment subject to change within this corridor.
- An 8.2-acre area where seaport support facilities would be constructed.
- The existing roadways where improvements could occur.

The vertical APE corresponds with the potential depth of disturbance. The vertical APE is 4 feet for the fuel pipeline and seaport support facilities and 1 foot for road improvements.

C.2.3. Section 106 Initiation Responses



U.S. Department
of Transportation
**Federal Aviation
Administration**

Western-Pacific Region
Office of Airports

Federal Aviation Administration
15000 Aviation Boulevard, Suite 3012
Lawndale, CA 90261

MAY 16 2018

Ms. Renae Fischer
Chief, NEPA Division
Department of the Air Force
Air Force Civil Engineering Center
2261 Hughes Avenue, Suite 155
Joint Base San Antonio Lackland, TX 78236

SUBJECT: Section 106 Participation for U.S. Air Force Divert Activities and Exercises in the Commonwealth of the Northern Mariana Islands

Dear Ms. Fischer:

Thank you for your letter requesting the Federal Aviation Administration (FAA) participate as a cooperating agency in the Supplemental Environmental Impact Statement (SEIS) for Tinian Divert Infrastructure Improvements, Commonwealth of the Northern Mariana Islands.

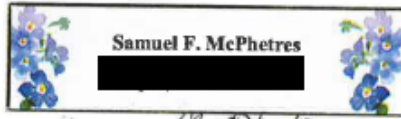
The FAA is pleased to participate in the SEIS in accordance with the National Environmental Policy Act of 1969 as amended and its implementing regulations.

Mr. Gordon Wong, Manager of the FAA's Honolulu Airports District Office will be the FAA's point of contact for the SEIS. Please contact Mr. Wong at (808) 312-6028 should you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read 'Mark A. McClardy', written over a horizontal line.

Mark A. McClardy
Director, Office of Airports
Western-Pacific Region



Sam McPhetres

Tel.



112 Beth Clerk

HDR

9791 Meridian Blvd, Suite 400

Englewood, CO 80112

Note

Because of storms & mechanical failures my communications equipment has temporarily failed.

This note is to accept your invitation to work with your next divert workshop on Tinian.

My apologies for this message. I do expect more details follow in a week.

Sincerely

Samuel F. McPhetres



P.S. Mr. Weintrab diary of battle of Tinian

TYI

APPENDIX D

Biological Resources Consultations Supporting Documentation





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D-1. Terrestrial Biological Resources Survey Report

In May 2018, the U.S. Air Force (USAF) completed a field survey on Tinian of the project areas for the Proposed Actions. The Final version of the survey report is provided on page **D-3**. USAF has provided USFWS with a courtesy copy of the survey report for their records

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Final

Biological Survey Report

Proposed Infrastructure Improvements on
Tinian, Commonwealth of the Northern
Mariana Islands

*Contract No. FA8903-16-D-0031
Task Order No. FA8903-18-F-0034*

Prepared for:



Headquarters Pacific Air Forces (PACAF)
Joint Base Pearl Harbor-Hickam,
Hawai'i, 96853-5233

Prepared by:



8690 Balboa Avenue, Suite 200
San Diego, CA 92123

September
2018

Abbreviations and Acronyms

CBD	Center for Biological Diversity
CNMI	Commonwealth of the Northern Mariana Islands
DPS	Distinct Population Segment
EIS	Environmental Impact Statement
PACAF	Pacific Air Forces
ROD	Record of Decision
SEIS	Supplemental Environmental Impact Statement
TIA	Tinian International Airport
USAF	United States Air Force
USFWS	U.S. Fish and Wildlife Service

FINAL

**BIOLOGICAL SURVEY REPORT
PROPOSED INFRASTRUCTURE IMPROVEMENTS ON
TINIAN, COMMONWEALTH OF THE NORTHERN
MARIANA ISLANDS**

**CONTRACT No. FA8903-16-D-0031
TASK ORDER No. FA8903-18-F-0034**

Prepared for



**Headquarters Pacific Air Forces (PACAF)
Joint Base Pearl Harbor-Hickam
Hawai'i, 96853-5233**

Prepared by



SEPTEMBER 2018

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- Appendix B. Plant Species List

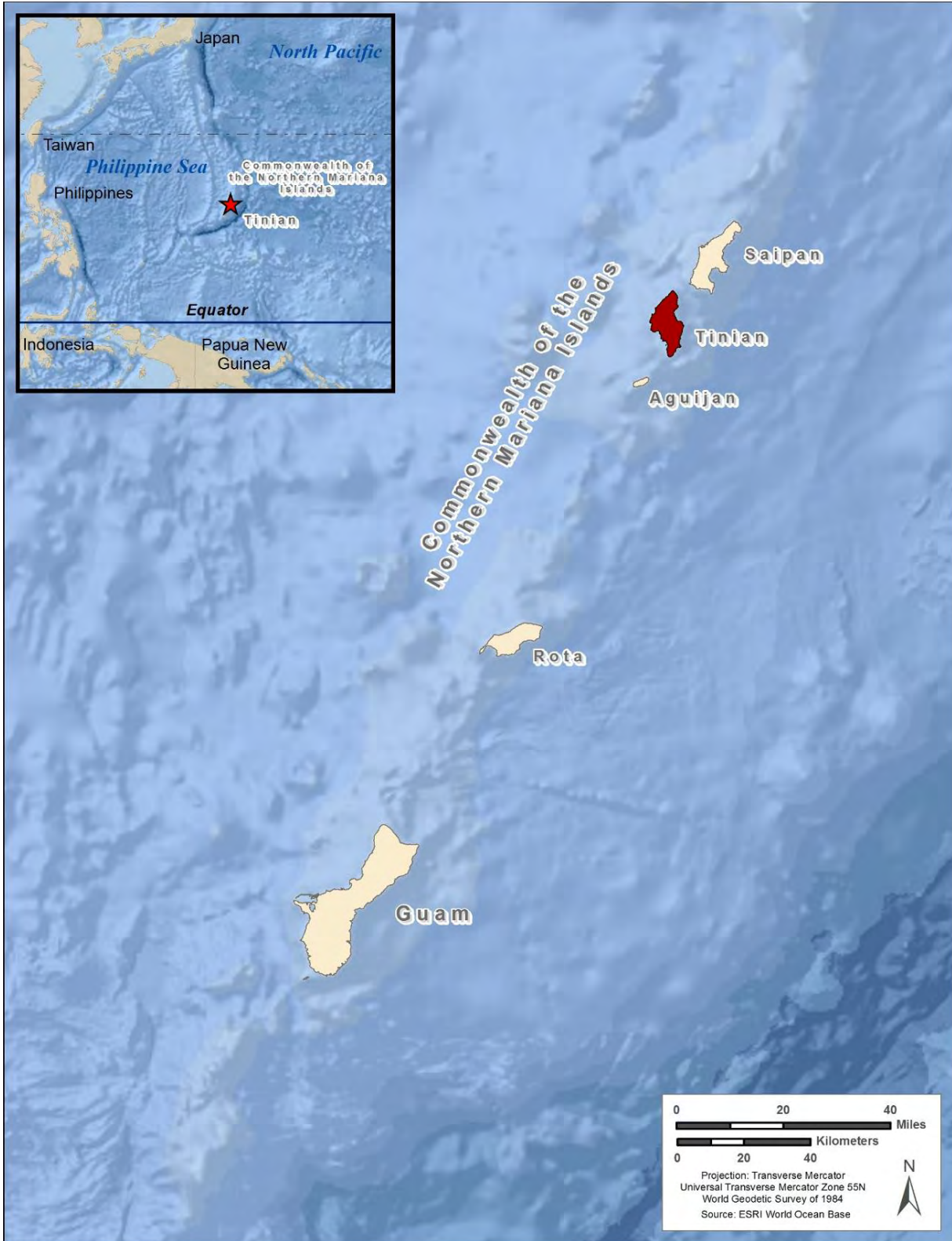


1. Introduction

The U.S. Air Force (USAF) completed an Environmental Impact Statement (EIS) for Divert Activities and Exercises in September 2016 (“2016 Divert EIS”) and issued a Record of Decision (ROD) in December 2016. In the ROD, the USAF announced the decision to select the Modified Tinian Alternative (2016 Divert EIS, Section 2.7), and specifically the North Option (2016 Divert EIS, Section 2.5.2), as the future Divert location. The 2016 Divert EIS evaluated the construction of fuel infrastructure at the Tinian airport and seaport, and also evaluated fuel transport from the seaport to the airport by tanker truck. After the ROD was signed, USAF conducted further evaluation of the fuel requirement and associated infrastructure, including the feasibility of different alternatives that were not considered in the 2016 Divert EIS. The USAF now proposes to construct a fuel pipeline, and associated infrastructure at the seaport, to transport fuel from the seaport to the airport. The USAF also proposes to improve select existing roads between the seaport and airport to support Divert activities. A Supplemental Environmental Impact Statement (SEIS) is being prepared for the proposed infrastructure improvements. The SEIS will analyze the potential environmental consequences associated with the proposed construction and operation of the fuel pipeline and related seaport facilities, and of the proposed roadway improvements. A biological survey was conducted in the Project area of the proposed infrastructure and roadway improvements. This report contains the findings of the biological survey and considers resources protected under the Endangered Species Act.

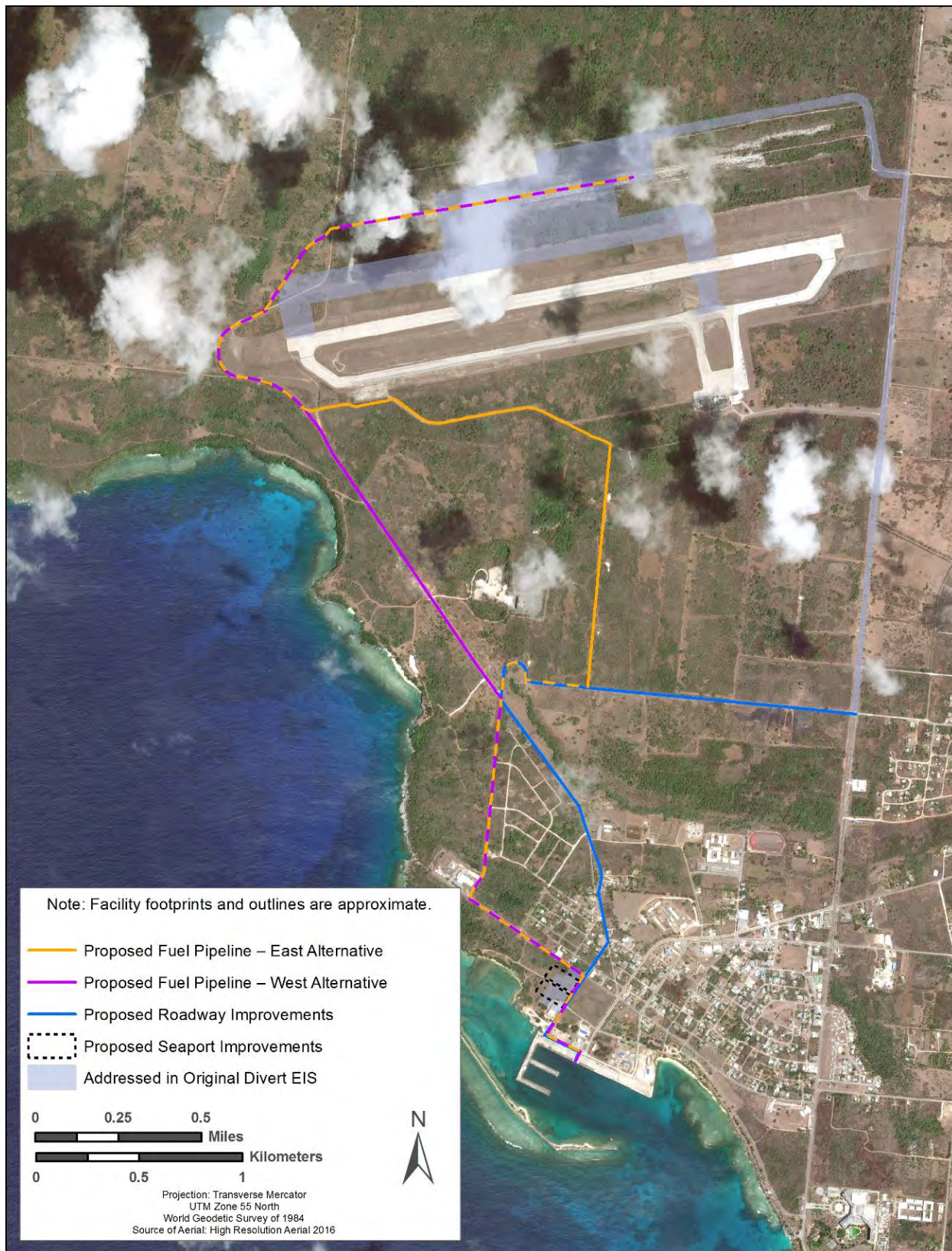
1.1 Site Location

The improvements proposed by USAF are focused on the island of Tinian in the Commonwealth of the Northern Mariana Islands (CNMI) (**Figure 1-1**). The proposed infrastructure improvements (Project) include East and West pipeline route alternatives, related seaport infrastructure improvements, and roadway improvements (**Figure 1-2**). The Project is located in the southern part of Tinian, between the Tinian International Airport (TIA) and Tinian Harbor, and includes areas within the village of San Jose.



1

2 **Figure 1-1. Tinian, Commonwealth of the Northern Mariana Islands**



1

2 **Figure 1-2. Proposed East and West Alternative Fuel Pipeline Routes, Roadway**
3 **Improvements and Proposed Seaport Improvement Area**

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2. Methods

HDR conducted a biological survey of the proposed fuel pipeline routes, roadway improvements, and seaport improvement areas from 12 May to 16 May 2018. All plant and wildlife species observed were recorded. Existing vegetation mapping data (Donnegan et al. 2011) collected in 2004 was evaluated for accuracy and any deviations from reported vegetation community composition were noted. Biologists also noted federally or Commonwealth-listed species observed in proposed Project construction areas and habitat that might support such species.

2.1 Background Research

Prior to field surveys, HDR conducted background research of federally listed species and CNMI listed species that have been identified as Greatest Conservation Need by CNMI DFW and approved by U.S. Fish and Wildlife Service (USFWS) in the 2015 CNMI Wildlife Action Plan (Liske-Clark 2015) that potentially occur near proposed Project areas on Tinian. HDR consulted recent environmental survey documents, including the 2016 Divert EIS, the U.S. Marine Corps' Commonwealth of the Northern Mariana Islands Joint Military Training Draft EIS analysis, and recent USFWS publications and survey reports conducted within the CNMI to identify listed species that could be present in the Project area. The findings are presented in **Table 2-1** and **2-2**. There are no plant species included in the 2015 CNMI Wildlife Action Plan as a CNMI listed species with Greatest Conservation Need.

Table 2-1. Federally Listed Species with Potential to Occur in the Project Area

Common Name	Scientific Name	Federal Status
Wildlife		
Green sea turtle*	<i>Chelonia mydas</i>	E
Hawksbill sea turtle	<i>Eretmochelys imbricata</i>	E
Mariana common moorhen	<i>Gallinula chloropus guami</i>	E
Micronesian megapode	<i>Megapodius laperouse laperouse</i>	E
Tinian monarch	<i>Monarcha takatsukasae</i>	Petition/ under review
Humped tree snail	<i>Partula gibba</i>	E
Mariana fruit bat	<i>Pteropus mariannus mariannus</i>	T
Plants		
Fadang	<i>Cycas micronesica</i>	T
No common name	<i>Dendrobium guamense</i>	E
Ufa-halomtano	<i>Heritiera longipetiolata</i>	E
Berenghenas halomtano	<i>Solanum guamense</i>	E

* Central West Pacific Distinct Population Segment

Notes: E: Endangered, T: Threatened



1 **Table 2-2. Commonwealth Species of Special Concern with Potential to Occur in the**
 2 **Project Area**

Common Name	Scientific Name	CNMI Status
Wildlife		
Micronesian starling	<i>Aplonis opaca</i>	P
Green sea turtle	<i>Chelonia mydas</i>	T&E/P
Pacific sheath-tailed bat	<i>Emballonura semicaudata rotensis</i>	T&E
Hawksbill sea turtle	<i>Eretmochelys imbricate</i>	T&E/P
White-throated ground dove	<i>Gallicolumba xanthonura</i>	P
Mariana common moorhen	<i>Gallinula chloropus guami</i>	T&E
Micronesian megapode	<i>Megapodius laperouse laperouse</i>	T&E/P
Tinian monarch	<i>Monarcha takatsukasae</i>	P
Micronesian gecko	<i>Perochirus ateles</i>	T&E/P
Mariana fruit bat	<i>Pteropus marianus marianus</i>	T&E/P
Mariana fruit dove	<i>Ptilinopus roseicapilla</i>	P
Rufous fantail	<i>Rhipidura rufifrons</i>	P

T&E = Threatened and Endangered § 85-30.1-101, P = Protected (hunting prohibited) § 85-30.1-310 (d). From Title 85: Department of Lands and Natural Resources, Chapter 85-30 Division of Fish and Wildlife, Subchapter 30.1 Non-commercial Fish and Wildlife Regulations.

3 **2.2 Field Methods**

4 Biologists walked meandering transects throughout the Project area, including an 80-foot
 5 easement along the East and West pipeline routes, a 4-foot easement on either side of roads
 6 identified for roadway improvements, and the 8.23-acre area identified for seaport
 7 improvements. Biologists compiled a list of plant and wildlife species observed during surveys
 8 and verified vegetation mapping data from Donnegan et al. (2011). Unique habitats that could
 9 support listed species were also noted.

10 All notable plant or wildlife observations were recorded using a Trimble Geo7X Global
 11 Positioning System. Species names for plants were confirmed at The Plant List
 12 (<http://www.theplantlist.org/>) to verify the most current accepted taxonomy. Common names
 13 use Chamorro names (Raulerson and Rinehart 1991) where available and the U.S. Department
 14 of Agriculture Plants Database (<https://plants.usda.gov/java/>) was consulted for other standard
 15 common names as well.

16



3. Results

Wildlife observed during the survey is presented in **Table 3-1**. Photographs were taken throughout the Project area and are provided in **Appendix A**. Common plant species observed in each vegetation type are presented in **Table 3-2**, a complete plant species list can be found in **Appendix B**.

3.1 Wildlife

No federally listed wildlife was observed during surveys and no potential habitat for federally listed wildlife was observed. A total of 3 mammals, 13 birds, 1 amphibian, 4 reptiles, 4 butterflies, and 1 hermit crab were observed (**Table 3-1**). The Tinian monarch (*Monarcha takatsukasae*), a species endemic to Tinian and currently under petition for relisting as a federally protected species, along with nests, were frequently observed in forested areas, including Tangantangan (*Leucaena leucocephala*) Forest and Mixed Introduced Forest, with an overhead canopy. None of the species observed are considered threatened and endangered by the CNMI; however, five species observed are on the protected species list that precludes hunting. CNMI protected species observed include the Micronesian starling (*Aplonis opaca*), white-throated ground dove (*Gallicolumba xanthonura*), Tinian monarch, Mariana fruit dove (*Ptilinopus roseicapilla*), and rufous fantail (*Rhipidura rufifrons*).

Table 3-1. Wildlife Species Observed in the Project Area

Common Name	Scientific Name
Mammals	
Musk shrew	<i>Suncus murinus</i>
Feral cat	<i>Felis silvestris catus</i>
Polynesian rat	<i>Rattus exulans</i>
Birds	
Noddy*	<i>Anous</i> sp.
Micronesian starling*	<i>Aplonis opaca</i>
Orange-cheeked waxbill	<i>Estrilda melpoda</i>
White-throated ground dove*	<i>Gallicolumba xanthonura</i>
White tern*	<i>Gygis alba</i>
Collared kingfisher*	<i>Halcyon chloris</i>
Yellow bittern*	<i>Ixobrychus sinensis</i>
Tinian monarch*†	<i>Monarcha takatsukasae</i>
Micronesian honeyeater*	<i>Myzomela rubratra</i>
Eurasian tree sparrow	<i>Passer montanus</i>
Mariana fruit dove *	<i>Ptilinopus roseicapilla</i>
Rufous fantail*	<i>Rhipidura rufifrons saipanensis</i>
Philippine turtle-dove	<i>Streptopelia bitorquata</i>
Bridled white-eye*	<i>Zosterops conspicillatus</i>



Common Name	Scientific Name
Amphibians	
Cane toad	<i>Rhinella marina</i>
Reptiles	
Green anole	<i>Anolis carolinensis</i>
Curious skink	<i>Carlia fusca</i>
Pacific blue-tailed skink*	<i>Emoia caeruleocauda</i>
Green tree skink	<i>Lamprolipis smaragdina</i>
Insects	
Lemon migrant*	<i>Catopsilia pomona</i>
Blue-branded king crow*	<i>Euploea eunice</i>
Blue moon*	<i>Hypolimnas bolina</i>
Common mormon	<i>Papilio polytes</i>
Other Species	
Hermit crab*	<i>Coenobita</i> sp.

* Native to Tinian, † Endemic to Tinian

1 **3.1.1 Mariana Common Moorhen**

2 The Mariana common moorhen (*Gallinula chloropus guami*) is a federally endangered
 3 subspecies of the common moorhen (*G. chloropus*). The Mariana common moorhen, or pulattat
 4 locally, is a medium size wetland bird (14 inches in length) with slate-black coloration and a
 5 distinctive red bill and frontal shield. The moorhen inhabits freshwater marshes, ponds, and
 6 slow-moving rivers with emergent vegetation (USFWS 1991). They are frequently observed in
 7 man-made wetlands, particularly golf course ponds, sewage settling ponds, and flooded
 8 ponding basins. Moorhens are known to occur on Tinian, and have been reported from various
 9 wetlands, including Lake Hagoi, the Mahalang Complex, and the Bateha Sites. The Bateha
 10 Sites are the closest to the Project area, approximately 1.8 miles from the northernmost pipeline
 11 alignment, and were occupied during surveys in 2014 (NAVFAC 2014a). Mariana common
 12 moorhens are unlikely to occur in the Project area because wetland habitat suitable for Mariana
 13 common moorhens does not occur there.

14 **3.1.2 Micronesian Megapode**

15 The Micronesian megapode (*Megapodius laperouse laperouse*), or sasangat locally, is a
 16 federally endangered forest bird, generally found foraging on the forest floor. The medium-sized
 17 grey-brown to black bird with an ashy head, short crest, and large prominent feet is typically
 18 found in limestone forest, and occasionally in secondary forest, including forest dominated by
 19 Tangantangan (USFWS 1998). Observations of megapodes on Tinian are generally associated
 20 with areas of limestone forest on and around Mount Lasso, approximately 2 miles north of the
 21 Project area. The megapode population on Tinian is considered to be transient, with individuals
 22 rarely observed (NAVFAC 2014a). No megapodes were detected during surveys conducted in
 23 2013 around Mount Lasso. Potential habitat for megapodes was observed in Mixed Introduced
 24 Forest and Tangantangan Forest on both the East and West pipeline routes. The best potential
 25 habitat occurred north of 42nd Street on the East pipeline route, where larger blocks of closed



1 canopy Tangantangan Forest occurred away from the disturbance of road edges.
2 Tangantangan is not a preferred habitat for megapodes; only 28 percent of megapode sightings
3 around the Marpi cliffs in Saipan were in Tangantangan Forest (Glass and Aldan 1988).
4 Surveys of the Project area were conducted passively; no call playback surveys were
5 conducted. No megapodes were observed or heard during surveys. The megapode population
6 on Tinian is very small and considered transitory, but marginal habitat does occur within the
7 Project area.

8 **3.1.3 Tinian Monarch**

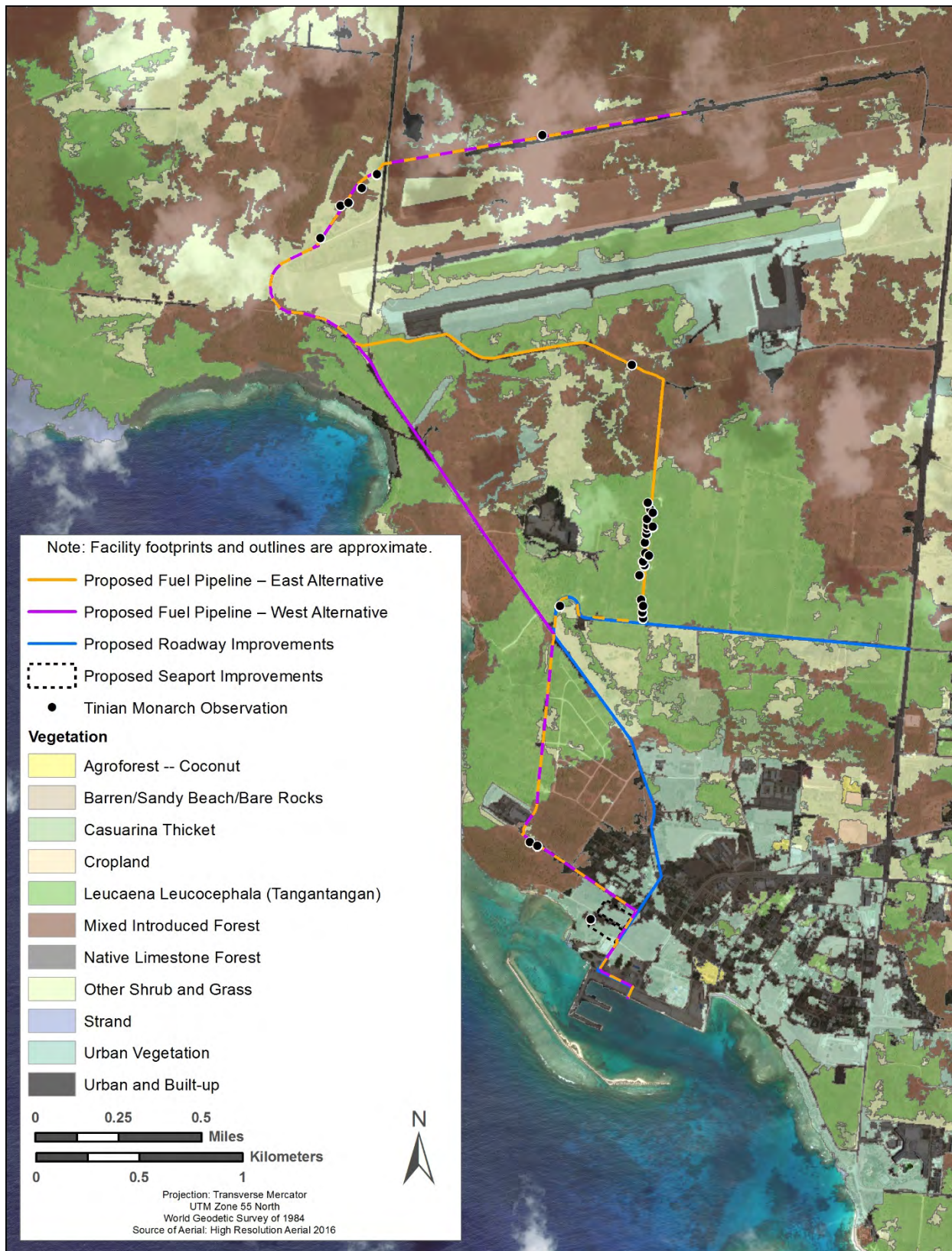
9 The Tinian monarch is a small forest bird endemic to the island of Tinian. Monarchs
10 (Monarchidae) are a family of approximately 100 species of Old World flycatchers, feeding
11 primarily on insects. Tinian monarchs are dull colored with buffy tan sides, face, eye-ring, and
12 underparts. The back and wings are chocolate brown with two narrow white wing bars. This
13 species was originally listed as endangered in 1970 (69 Federal Register [FR] 56367) as a
14 result of native forest destruction during the Japanese sugar cane farming era and the
15 destructive effects of World War II. Once a bird of the native limestone forest, they have
16 adapted to use secondary forests as well. The monarch was down-listed in 2004 when
17 populations exceeded 55,000 individuals and a significant increase in forest density was
18 observed. In December 2013, the Center for Biological Diversity (CBD) petitioned the USFWS
19 to relist the Tinian monarch (CBD 2013), and in September 2015 the USFWS found that listing
20 “may be warranted” (USFWS 2015). No final rule has been determined to date, and in April
21 2018 the CBD filed a lawsuit (Case No. 1:18-cv-862) to compel a final rule by USFWS.

22 Tinian monarchs and their nests (**Photographs 9 and 10 in Appendix A**) were found in both
23 Mixed Introduced Forest and Tangantangan Forest (**Figure 3-1**). Most of the observations were
24 made along the East pipeline route in blocks of closed canopy Tangantangan Forest. Additional
25 observations were made in Mixed Introduced Forest in both the southern and northern portions
26 of the pipeline routes that are shared between the two alternatives.

27 **3.1.4 Humped Tree Snail**

28 The humped tree snail (*Partula gibba*) is one of five species of Partulid snails known to occur in
29 the Mariana Islands and the only species reported from Tinian (DFW 2005). Humped tree
30 snails are small arboreal snails; adults measure 0.6 to 0.7 inches long and 0.4 to 0.6 inches
31 wide. Coloration is variable and ranges from chestnut brown to whitish-yellow and purple (Kerr
32 2013). They are the most widely distributed of the Partulids in the Mariana Islands, formerly
33 occurring on at least eight islands. Prior to surveys conducted in 2013 (NAVFAC 2014a),
34 humped tree snails had not been reported from Tinian since 1970 (DFW 2005). In 2013, 92
35 humped tree snails were reported from the South Dump Coke area, approximately 2.6 miles to
36 the northwest of the Project area (NAVFAC 2014a). The humped tree snail prefers shaded
37 moist forest understory typically found in native limestone forest. They can be found on virtually
38 any of the large leaved plant species found in suitable forest habitats, whether the plant is native
39 or introduced (Kerr 2014).

40



1

2 **Figure 3-1. Tinian Monarch Observations**



1 No live humped tree snails or ground shells (shells of dead snails on the ground) were observed
2 during surveys of the Project area. At the South Dump Coke site, humped tree snails were
3 observed in limestone forest dominated by puting (*Barringtonia asiatica*) and fagot (*Ochrosia*
4 *oppositifolia*) trees. This type of habitat was not observed during surveys within the Project
5 area. The closest potential suitable habitat is a strip of limestone forest between the beach and
6 cliffs near Unai Swimming Hole, approximately 275 feet to the west of the West pipeline route
7 alternative. Surveys conducted in this section of forest in 2013 did not find humped tree snails.
8 Biologists conducting the 2013 survey noted that while the area was selected for surveys due to
9 its apparent similarity to the South Dump Coke site, there was no protected habitat in this area
10 and not even ground shells were observed. For the current survey, biologists spent a limited
11 amount of time at this area looking for evidence of humped tree snails and did not observe live
12 snails or ground shells. The lack of suitable habitat for humped tree snails and the lack of
13 evidence of past presence in the form of ground shells makes the potential for humped tree
14 snails in the Project area unlikely.

15 **3.1.5 Mariana Fruit Bat**

16 The Mariana fruit bat (*Pteropus marianus marianus*), or fanihi, is one of only three native
17 mammals, all of which are bat species, occurring in the Mariana Islands. The Mariana fruit bat
18 was original listed as endangered in 1984 (49 FR 33881) but the listing only included the Guam
19 population. In 2005, the Mariana fruit bat was reclassified as a threatened species throughout
20 its range (Guam and the CNMI) (USFWS 2005). The fruit bat roosts and forages primarily in
21 native forest, and occasionally forages in agricultural forest (USFWS 2009). Mariana fruit bats
22 are infrequently observed on Tinian. In the mid 1990s a small population of approximately 200
23 individuals occurred on Aguiguan, 5.5 miles south of Tinian, and were believed to be the source
24 of incidental observations on Tinian and Saipan. Although fruit bat habitat does occur on Tinian,
25 the bats are not currently considered to be resident on the island.

26 No Mariana fruit bats were observed during surveys of the Project area; however, suitable
27 foraging tree species, including talisai (*Terminalia catappa*), papaya (*Carica papaya*), coconut
28 (*Cocos nucifera*), and Hodda (*Ficus tinctoria*), were observed scattered in all vegetation types.
29 The closest suitable roosting and foraging fruit bat habitat is a small strip of limestone forest 275
30 feet west of the West pipeline route. Larger and more extensive tracks of limestone forest occur
31 1.4 miles north of the Project area at Mount Lasso. The presence of potential Mariana fruit bat
32 foraging trees in and around the Project area and infrequent historic observations on Tinian
33 suggests that there is a very small potential that Mariana fruit bats could forage in the Project
34 area.

35 **3.1.6 Green Sea Turtle**

36 The green sea turtle (*Chelonia mydas*) was federally listed as a threatened species in 1978 (43
37 FR 32800). In 2016, the National Marine Fisheries Service issued a final rule dividing the green
38 sea turtle population into 11 distinct population segments (DPS) and listing each segment
39 separately. The final rule lists the Central West Pacific DPS, which includes the Mariana
40 Islands, as an endangered species (81 FR 20058). The green sea turtle can reach a maximum
41 size of 4 feet across and weigh up to 440 pounds. As juveniles, green sea turtles are more
42 pelagic, feeding on jellyfish and other invertebrates. As they grow older, they settle into more



1 coastal environments and become more vegetarian, feeding primarily on algae and sea grass.
2 They have a strong nest site fidelity and often make long migrations between feeding grounds
3 and nesting sites.

4 No green sea turtle nesting habitat was observed during surveys of the Project area. A coralline
5 sand and gravel beach is present approximately 198 feet west of the seaport improvement area
6 at an unnamed beach west of Tinian Harbor. This beach is not identified in survey reports
7 dating back to 1984 and therefore is unlikely to be suitable for green sea turtles. Known sea
8 turtle nesting has occurred 1,700 feet west (Unai Barcinas Cove) and 920 feet west of the
9 Project area (Unai Leprosarium) (NAVFAC 2014b) near the combined East and West pipeline
10 alternatives. The lack of suitable nesting habitat and the lack of historic nesting in the last
11 decade near the Project area makes green sea turtles unlikely to be present.

12 **3.1.7 Hawksbill Sea Turtle**

13 The hawksbill sea turtle (*Eretmochelys imbricata*) was listed as a federally endangered species
14 throughout its range in 1970 (35 FR 8491). The hawksbill sea turtle can reach up to 3 feet
15 across and weigh up to 300 pounds. They typically inhabit rocky areas, coral reefs, shallow
16 coastal areas, lagoons, or oceanic islands. They are most often associated with the coral reef
17 community where they feed primarily on sponges.

18 No hawksbill sea turtle nesting habitat was observed during surveys of the Project area.
19 Hawksbill sea turtles have not been documented nesting on Tinian (NAVFAC 2014b). The lack
20 of nesting habitat and the absence of recorded nesting attempts on the island indicate that
21 hawksbill sea turtles are unlikely to occur near the Project area.

22 **3.2 Plants**

23 No federally listed plant species were observed during surveys, as discussed in **Sections 3.3.1**
24 **to 3.3.4**. A total of 141 plant species were observed, 40 of which are native species and 101
25 nonnative. Common plant species found in each of the six vegetation communities are
26 presented in **Table 3-2**. A list of plants observed during surveys can be found in **Appendix B**.

27 **3.3 Vegetation Communities**

28 The Donnegan et al. (2011) vegetation mapping identifies six vegetation communities within the
29 Project area (**Table 3-3**).

- 30 • **Mixed Introduced Forest:** Forests with a mixture of native and nonnative species. This
31 vegetation type represents forests recovering from disturbance, native forests invaded
32 by nonnatives, and forests establishing in disturbed areas from a mix of seed sources.
- 33 • **Tangantangan Forest:** Dominated by Tangantangan with other native and nonnative
34 species.
- 35 • **Other Shrub and Grass:** Dominated by shrubs, grasses, and vines.
- 36 • **Urban and built-up areas:** Urban areas.



- 1 • **Casuarina Thicket:** Monospecific stands of *Casuarina equisetifolia*.
- 2 • **Urban Vegetation:** Used as a landcover type in USFS 2006, but not described.
- 3 The following observed differences from the Donnegan et al. (2011) vegetation map were noted.
- 4 • Along the East pipeline alternative, vegetation mapped as Tangantangan Forest
- 5 contained significant areas of Other Shrub and Grass vegetation. These areas were
- 6 dominated by Guinea grass (*Panicum maximum*) and St. Thomas lidpod (*Operculina*
- 7 *ventricosa*) vines. The variation in vegetaton was attributed to a jeep trail and several
- 8 large disturbed sites that have since been overgrown by vegetation.
- 9 • Along the West pipeline route on the east side of 6th Avenue, an increase in Other
- 10 Shrub and Grass vegetation was noted and attributed to vegetation recovering from a
- 11 fire.
- 12 • Along the East pipeline alternative, north of 42nd Street and south of the TIA there is a
- 13 block of forest mapped as Mixed Introduced Forest north of the area mapped as
- 14 Tangantangan Forest. This area, up to the service road south of TIA is Other Shrub and
- 15 Grass vegetation with a few scattered emergent trees. The vegetation is dominated by
- 16 Lantana (*Lantana camara*), Jack in the bush (*Chromolaena odorata*), Guinea grass, and
- 17 St. Thomas lidpod forming dense thickets (**Photograph 4 in Appendix B**).



1 **Table 3-2. Common Plant Species Observed in Each Vegetation Type in the Project Area***

Common Name	Scientific Name
Tangantangan Forest	
Tangantangan	<i>Leucaena leucocephala</i>
Sumak	<i>Aidia cochinchinensis</i>
Alum	<i>Melanolepis multiglandulosa</i>
Crested Philippine violet	<i>Barleria cristata</i>
St. Thomas lidpod	<i>Operculina ventricosa</i>
Rougeplant	<i>Rivina humilis</i>
Corkystem passionflower	<i>Passiflora suberosa</i>
Balloon vine	<i>Cardiospermum halicacabum</i>
Ahgao	<i>Premna [obtusifolia] serratifolia</i>
Aploghating	<i>Psychotria mariana</i>
Climbing hempvine	<i>Mikania scandens</i>
Soft butterfly pea	<i>Centrosema molle</i>
Mixed Introduced Forest	
Rosarypea	<i>Abrus precatorius</i>
Sumak	<i>Aidia cochinchinensis</i>
Tronkon-kalaskas	<i>Albizia lebbbeck</i>
Coral vine	<i>Antigonon leptopus</i>
Crested Philippine violet	<i>Barleria cristata</i>
Balloon vine	<i>Cardiospermum halicacabum</i>
Yokewood	<i>Catalpa longissima</i>
Flame tree	<i>Delonix regia</i>
Hodda	<i>Ficus tinctoria</i> var. <i>neo-ehudarum</i>
Ocean-blue morning glory	<i>Ipomoea indica</i>
Littlebell	<i>Ipomoea triloba</i>
Alum	<i>Melanolepis multiglandulosa</i>
St. Thomas lidpod	<i>Operculina ventricosa</i>
Kamachile	<i>Pithecellobium dulce</i>
Ahgao	<i>Premna [obtusifolia] serratifolia</i>
Strawberrytree	<i>Muntingia calabura</i>
Rougeplant	<i>Rivina humilis</i>
Other Shrub and Grass	
Mission grass	<i>Pennisetum polystachion</i>
Guinea grass	<i>Panicum maximum</i>
Jack in the bush	<i>Chromolaena odorata</i>
Crested Philippine violet	<i>Barleria cristata</i>
Lantana	<i>Lantana camara</i>
Coral vine	<i>Antigonon leptopus</i>
St. Thomas lidpod	<i>Operculina ventricosa</i>
Spiderling	<i>Boerhavia erecta</i>
Turkey berry	<i>Solanum torvum</i>



Common Name	Scientific Name
Urban Vegetation	
Bermuda grass	<i>Cynodon dactylon</i>
Bur grass	<i>Cenchrus echinatus</i>
Indian goosegrass	<i>Eleusine indica</i>
Caucasian bluestem	<i>Bothriochloa bladhii</i>
Guinea grass	<i>Panicum maximum</i>
Tropical lucerne	<i>Stylosanthes guianensis</i>
Turkey tangle fogfruit	<i>Phyla nodiflora</i>
White moneywort	<i>Alysicarpus vaginalis</i>
Coatbuttons	<i>Tridax procumbens</i>
Common wireweed	<i>Sida acuta</i>
Hairy beggarticks	<i>Bidens pilosa</i>
Pillpod sandmat	<i>Euphorbia hirta</i>
Casuarina Thicket	
Beach sheoak	<i>Casuarina equisetifolia</i>
Cure-for-all	<i>Pluchea carolinensi</i>
Lantana	<i>Lantana camara</i>
Jack in the bush	<i>Chromolaena odorata</i>
Urban and Built-up	
Bermuda grass	<i>Cynodon dactylon</i>
Bur grass	<i>Cenchrus echinatus</i>
Indian goosegrass	<i>Eleusine indica</i>
Caucasian bluestem	<i>Bothriochloa bladhii</i>
Tropical lucerne	<i>Stylosanthes guianensis</i>
Turkey tangle fogfruit	<i>Phyla nodiflora</i>
White moneywort	<i>Alysicarpus vaginalis</i>
Coatbuttons	<i>Tridax procumbens</i>
Sessile joyweed	<i>Alternanthera sessilis</i>
Common wireweed	<i>Sida acuta</i>
Hairy beggarticks	<i>Bidens pilosa</i>
Pillpod sandmat	<i>Euphorbia hirta</i>

* A full list of plant species observed is presented in **Appendix B**.



1 **Table 3-3. Vegetation Communities within the Project Area**

Vegetation Type
Mixed Introduced Forest
Urban and Built-up
Tangantangan Forest
Other Shrub and Grass
Urban Vegetation
Casuarina Thicket

2 **3.3.1 Berenghenas Halomtano**

3 Berenghenas halomtano (*Solanum guamense*) is a small shrub in the Solanum family and is
 4 endemic to the Mariana Islands. It was listed as a federally endangered species in October
 5 2015 (80 FR 59424) and is currently known from only a single specimen located on Guam. It
 6 was known to inhabit native limestone forest habitats and was historically present on Tinian.

7 No berenghenas halomtano were observed during surveys and no suitable habitat was
 8 observed. It is unlikely this plant is present on the Project area.

9 **3.3.2 Fadang**

10 Fadang (*Cycas micronesica*) is a stout-trunked tree in the Cycad family and found on the
 11 islands of Guam, Rota and Pagan in the Mariana Islands and on Palau. Leaves are restricted to
 12 the terminal end of the trunk, or to the terminal end of branches that may form as the tree gets
 13 older. Fadang are typically found growing in native limestone or ravine forest habitats. The
 14 population has declined rapidly after the introduction of Asian cycad scale (*Aulacaspis*
 15 *yasumatsui*) in 2003. In October 2015, fadang was federally listed as a threatened species (80
 16 FR 59424). Cycads are not known from Tinian; however, 900 fadang were donated to the
 17 CNMI Department of Land and Natural Resources in 2008-2009 to create a population free of
 18 Asian cycad scale to help guard against extinction. These plants were planted primarily around
 19 Mount Lasso and a few shrines and memorials around the island.

20 Two fadang were observed at the Nanyo Kohatsu site on West Avenue. Both fadang appeared
 21 to have been planted. No other cycads were observed during surveys and no limestone or
 22 ravine forest habitats were observed. Aside from planted fadang, it is unlikely any additional
 23 individuals are present in the Project area.

24 **3.3.3 Dendrobium guamense (No Common Name)**

25 *Dendrobium guamense* is an epiphytic orchid endemic to the Mariana Islands and found
 26 growing on trees in moist limestone and ravine forest. The plant appears as a cluster of reed-
 27 like stems up to 3 feet in length growing in filtered to full sun (Raulerson and Rinehart 1992).
 28 Leaves are oblong-lanceolate and are arranged alternately on the stem. Flowers appear from
 29 the stem sheath between leaves and are open for only a single day. *D. guamense* is known to
 30 occur on Tinian in a scattered distribution.



1 No *D. guamense* were observed during surveys. Overall epiphytic growth was observed to be
2 extremely limited. The common epiphytic monarch fern (*Phymatosorus scolopendria*) was
3 observed; however, in most cases it was growing terrestrially. Another common epiphytic fern
4 known to grow on Tangantangan, lanceleaf tongue fern (*Pyrrosia lanceolata*), was also
5 extremely limited in the Project area. While these ferns are not considered indicators of suitable
6 *D. guamense* habitat, they do suggest that the forest in the Project area is generally dry and not
7 suitable to epiphytes. The scattered and limited distribution of *D. guamense* on Tinian and the
8 observed lack of general epiphytic growth within the Project area would suggest that the
9 presence of *D. guamense* is unlikely.

10 **3.3.4 Ufa-halomtano**

11 Ufa-halomtano (*Heritiera longipetiolata*) is a tree endemic to the Mariana Islands and found in
12 limestone forest. Mature trees are typically short and stout, frequently with a twisted trunk. The
13 upper surface of the leaf is dark green, while the underside of the leaf is silvery-tawny. Fruits
14 are brown and woody. Approximately 30 to 40 individuals are known to occur on Tinian
15 (Raulerson and Rinehard 1992).

16 Ufa-halomtano was not observed during surveys and no limestone forest habitat that would
17 support the tree was observed. Given the limited number of specimens known from Tinian and
18 the lack of habitat observed, it is unlikely that this tree is present on the Project area.

19

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4. Conclusions

4.1 Wildlife

Potential foraging habitat for Mariana fruit bat, a federally threatened species, was observed scattered throughout the Project area in Mixed Introduced Forest and Tangantangan Forest. Mature ahgao trees were observed in Tangantangan Forest and Mixed Introduced Forest, and mature hodda was observed in Mixed Introduced Forest. Both species are found on a list of common forage plants for Mariana fruit bats (USFWS 2009). Additional foraging resources, including talisai, papaya, and coconut were also observed in lesser quantities in these vegetation types and scattered among urban residences. Tangantangan Forest represents 20.19 acres (33 percent) of the total Project area and Mixed Introduced Forest represents 3.95 acres (6.5 percent) for a total of 24.1 acres (39.5 percent) of the Project area. Mariana fruit bats, however, were not observed during surveys and their occurrence on Tinian is considered to be infrequent, transient, and in small numbers.

Potential marginal habitat for Micronesian megapodes is present in Tangantangan Forest and Mixed Introduced Forest. Megapodes have been observed to use secondary forest, including forest dominated by Tangantangan (USFWS 1998). The megapode population on Tinian is characterized as small and transient, perhaps dispersing from other islands through Tinian. No megapodes were observed during passive surveys of the Project area, and historic observations have generally occurred north of the Project area in limestone forest associated with Mount Lasso.

The Tinian monarch was observed in forested areas along the Project area in the form of individuals, pairs, and nests (active and inactive). The Tinian monarch was originally listed as an endangered species in 1970 but has since shown an increase in numbers. In 2004 it was removed from the list of endangered species due to recovery. In 2013, the USFWS found that relisting of the monarch “may be warranted” in response to a petition initiated by the CBD. No final rule has been published to date, but the CBD has filed a lawsuit to compel USFWS to issue a final rule.

4.2 Plants

No suitable habitat is present in the Project area for berenghenas-halomtano, *Dendrobium guamense*, or ufa-halomtano. Fadang occurs in the Project area as a landscape plant at a historic building. The current population of fadang on Tinian is the result of a conservation initiative that involved the relatively recent outplanting of 900 individual plants. Therefore, the distribution of outplanted fadang on Tinian is well-known and no naturally-occurring individuals were observed within the Project area.



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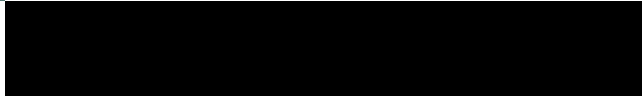


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6. References

- CBD 2013 Center for Biological Diversity. 2013. Petition to List the Tinian Monarch (*Monarcha takatsuasae*) as Threatened or Endangered Under the Endangered Species Act.
- DFW 2005 Commonwealth of the Northern Mariana Islands. 2005. Comprehensive Wildlife Conservation Strategy for the Commonwealth of the Northern Mariana Islands. Department of Lands and Natural Resources, Division of Fish and Wildlife. 358 pp.
- Donnegan et. al. 2011 Donnegan, J.A., S.L. Butler, O. Kuegler, B.A. Hiserote. 2011. Commonwealth of the Northern Mariana Islands' forest resources, 2004. Resource Bulletin. PNW-RB-261. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 40 p.
- Glass and Aldan 1988 Glass, P.O. and D.T. Aldan. 1988. Micronesian megapode surveys and research. Pp. 133-153 in Division of Fish and Wildlife Research and Management Progress Report: 1982-1987. CNMI Division of Fish and Wildlife, Saipan, MP>
- Kerr 2013 Kerr, A.M. 2013. The partulid tree snails of the Mariana Islands, Micronesia. UOG Marine Lab Tech Report 152: 1-21.
- Liske-Clarke 2015 Liske-Clark, J. 2015. Wildlife Action Plan for the Commonwealth of the Northern Marian Islands, 2015-2025. CNMI DLNR – Division of Fish and Wildlife, Saipan, MP.
- NAVFAC 2014a Naval Facilities Engineering Command (NAVFAC). 2014. Terrestrial Biological Surveys on Tinian in Support of the Commonwealth of the Northern Mariana Islands Joint Military Training Environmental Impact Statement/ Overseas Environmental Impact Statement. 95 pp.
- NAVFAC 2014b NAVFAC. 2014. Sea Turtle Marine Resources Survey Report in Support of the Commonwealth of the Northern Mariana Islands Joint Military Training Environmental Impact Statement/ Overseas Environmental Impact Statement. 222 pp.
- NAVFAC 2017 NAVFAC. 2017. Endangered Species Act-listed Plant Surveys on Tinian in Support of the Commonwealth of the Northern Mariana Islands Joint Military Training Environmental Impact Statement/ Overseas Environmental Impact Statement. 136pp.
- Raulerson and Rinehard 1991 Raulerson, L and A. Rinehart. 1991. Trees and Shrubs of the Northern Mariana Islands. Coastal Resources Management, Office of the Governor, Commonwealth of the Northern Mariana Islands, Saipan, Northern Mariana Islands.



- Raulerson and Rinehard 1992 Raulerson, L and A. Rinehart. 1992. Ferns and Orchids of the Mariana Islands. Lynn Raulerson and Agnes Rinehard, Agana, Guam.
- USAF 2016 U.S. Air Force. 2016. Environmental Impact Statement for Divert Activities and Exercises, Commonwealth of the Northern Mariana Islands. Prepared for Headquarters, Pacific Air Forces Joint Base Pearl Harbor – Hickam, Hawai'i.
- USFWS 1991 USFWS. 1991. Recovery Plan for the Mariana Common Moorhen (= Gallinule), *Gallinula chloropus guami*. U.S. Fish and Wildlife Service, Portland, OR. Pp. 55.
- USFWS 1996 USFWS. 1996. Status and Distribution of Marine Turtles on the Island of Tinian, Commonwealth of the Northern Mariana Islands – 1994 & 1995, Vol. III. Prepared for PACNAVFACENGCOM. Pearl Harbor, Honolulu, Hawaii. Pp. 39.
- USFWS 1998 USFWS. 1998. Recovery Plan for the Micronesian Megapode (*Megapodius laperouse laperouse*). U.S. Fish and Wildlife Service, Portland OR. 65+pp.
- USFWS 2005 USFWS. 2005. Endangered and threatened wildlife and plants; Mariana fruit bat (*Pteropus marianus marianus*): Reclassification from endangered to threatened in the Territory of Guam and listing as threatened in the Commonwealth of the Northern Mariana Islands. Federal Register 70: 1190-1210. January 6 2005
- USFWS 2009 USFWS. 2009. Draft Revised Recovery Plan for the Mariana Fruit Bat or Fanihi (*Pteropus marianus marianus*). U.S. Fish and Wildlife Service, Portland, Oregon. xiv + 83 pp.
- USFWS 2015 USFWS. 2015. Endangered Status for 16 Species and Threatened Status for 7 Species in Micronesia; Final Rule. Federal Register 80:59424-59497



Appendix A.

Site Photographs

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Photograph 1. Typical Mixed Introduced Forest observed within the Project area.



Photograph 2. Characteristic Tangantangan Forest observed during surveys.



Photograph 3. Other Shrub and Grass vegetation dominated by Guinea grass and St. Thomas lidpod.



Photograph 4. Other Shrub and Grass vegetation dominated by Jack in the bush and Lantana.



Photograph 5. Other Shrub and Grass vegetation dominated by Jack in the bush, Lantana, and turkey berry.



Photograph 6. Example of the Urban Vegetation observed near the seaport.



Photograph 7. Casuarina Thicket observed north of the Tinian International Airport.



Photograph 8. Urban and Built Up vegetation near the seaport.



Photograph 9. Tinian monarch in Tangantangan Forest west of the Tinian International Airport in cattle pastures.



Photograph 10. Tinian monarch nest in Tangantangan Forest.



Photograph 11. Rufous fantail nest in Tangantangan Forest.



Photograph 12. View along the west pipeline route on 8th Avenue.



Photograph 13. View of the Project area looking east along the East pipeline route on 42nd Street.



Photograph 14. View looking southeast on 42nd Street in proposed roadway improvement area outside an urban area.



Photograph 15. View looking Southeast on 42nd Street in proposed roadway improvement area in Urban Area.



Photograph 16. Tangantangan Forest in pasture at the west end of the Tinian International Airport Runway. Mapped as Other Shrub and Grass.



Photograph 17. Area of Other Shrub and Grass Mapped (USFWS 2006) as Mixed Introduced Forest.



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Appendix B.

Plant Species List



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Table B-1. Plant Species Observed in the Proposed Disturbance Area

Species	Origin*	Growth Form
PTERIDOPHYTA		
NEPHROLEPIDACEAE		
Giant swordfern (<i>Nephrolepis biserrata</i>)	N	Terrestrial Fern
POLYPODIACEAE		
Lanceleaf tongue fern (<i>Pyrrosia lanceolata</i>)	N	Epiphytic Fern
Monarch fern (<i>Phymatosorus scolopendria</i>)	N	Epiphytic Fern
PTERIDACEAE		
Ladder brake (<i>Pteris vittata</i>)	E	Terrestrial Fern
GYMNOSPERMAE		
CYCADACEAE		
Micronesian cycad (<i>Cycas micronesica</i> [fadang])	N	Tree
ANGIOSPERMAE		
MONOCOTYLEDONAE		
ARECACEAE		
Betel palm (<i>Areca catechu</i>)	E	Tree
Coconut palm (<i>Cocos nucifera</i>)	E	Tree
Queen palm (<i>Syagrus romanzoffiana</i>)	E	Tree
ASPARAGACEAE		
<i>Dracaena</i> sp.	E	Shrub
Viper's bowstring hemp (<i>Sansevieria trifasciata</i>)	E	Forb
CYPERACEAE		
Hurricanegrass (<i>Fimbristylis cymosa</i>)	N	Sedge
Nutgrass (<i>Cyperus rotundus</i>)	E	Sedge
Pacific island flatsedge (<i>Cyperus cyperoides</i>)	N	Sedge
Poorland flatsedge (<i>Cyperus compressus</i>)	E	Sedge
Whitehead spikesedge (<i>Kyllinga nemoralis</i>)	N	Sedge
ORCHIDACEAE		
Tinygland didymoplexis (<i>Didymoplexis fimbriata</i>)	N	Forb
PANDANACEAE		
Tahitian screwpine (<i>Pandanus tectorius</i>)	N	Tree
POACEAE		
Arrocillo (<i>Paspalum paniculatum</i>)	E	Grass
Basketgrass (<i>Oplismenus</i> sp.)	N	Grass
Bermuda grass (<i>Cynodon dactylon</i>)	E	Grass
Brown's lovegrass (<i>Eragrostis brownii</i>)	E	Grass
Caucasian bluestem (<i>Bothriochloa bladhii</i>)	E	Grass
Egyptian grass (<i>Dactyloctenium aegyptium</i>)	E	Grass
Gophertail lovegrass (<i>Eragrostis ciliaris</i>)	E	Grass
Guineagrass (<i>Urochloa maxima</i>)	E	Grass



Species	Origin*	Growth Form
Indian goosegrass (<i>Eleusine indica</i>)	E	Grass
Japanese lovegrass (<i>Eragrostis amabilis</i>)	N	Grass
Mission grass (<i>Pennisetum polystachion</i>)	E	Grass
Radiate fingergrass (<i>Chloris radiata</i>)	E	Grass
Rose Natal grass (<i>Melinis repens</i>)	E	Grass
Smut grass (<i>Sporobolus fertilis</i>)	N	Grass
Southern sandbur (<i>Cenchrus echinatus</i>)	E	Grass
Thin paspalum (<i>Paspalum setaceum</i>)	E	Grass
Wild sugar cane (<i>Saccharum spontaneum</i>)	N	Grass
DICOTYLEDONAE		
ACANTHACEAE		
Browne's blechum (<i>Ruellia blechum</i>)	E	Forb
Crested Philippine violet (<i>Barleria cristata</i>)	E	Shrub
Prostrate wild petunia (<i>Ruellia prostrata</i>)	E	Forb
AMARANTHACEAE		
<i>Deeringia amaranthoides</i>	N	Vine
Devil's horsewhip (<i>Achyranthes aspera</i>)	N	Forb
Sessile joyweed (<i>Alternanthera sessilis</i>)	N	Forb
Slender amaranth (<i>Amaranthus viridis</i>)	E	Forb
Spiny amaranth (<i>Amaranthus spinosus</i>)	E	Forb
ANNONACEAE		
<i>Meiogyne cylindrocarpa</i> [<i>Guamia mariannae</i>]	N	Tree
APOCYNACEAE		
Singapore graveyard flower (<i>Plumeria obtusa</i>)	E	Tree
BALSAMNACEAE		
Buzzy lizzy (<i>Impatiens walleriana</i>)	E	Forb
BIGNONIACEAE		
Haitian catalpa (<i>Catalpa longissima</i>)	E	Tree
BORAGINACEAE		
Fourspike heliotrope (<i>Heliotropium procumbens</i>)	N	Herb
CASUARINACEAE		
Beach sheoak (<i>Casuarina equisetifolia</i>)	N	Tree
CARICACEAE		
Papaya (<i>Carica papaya</i>)	E	Forb
CELASTRACEAE		
Thompson's gymnosporia (<i>Gymnosporia thompsonii</i>)	N	Tree
COMBRETACEAE		
Tropical almond (<i>Terminalia catappa</i>)	N	Tree



Species	Origin*	Growth Form
COMMELINACEAE		
Boatlily (<i>Tradescantia spathacea</i>)	E	Forb
Inchplant (<i>Tradescantia zebrina</i>)	E	Forb
Jio (<i>Commelina benghalensis</i>)	E	Forb
COMPOSITAE		
Climbing hempvine (<i>Mikania scandens</i>)	E	Vine
Coat buttons (<i>Tridax procumbens</i>)	E	Forb
Cure for all (<i>Pluchea carolinensis</i>)	E	Shrub
Hairy beggarticks (<i>Bidens pilosa</i>)	E	Forb
Jack in the bush (<i>Chromolaena odorata</i>)	E	Forb
Little ironweed (<i>Cyanthillium cinereum</i>)	N	Forb
Straggler daisy (<i>Calyptocarpus vialis</i>)	E	Forb
CONVOLVULACEAE		
Littlebell (<i>Ipomoea triloba</i>)	N	Vine
Oceanblue morning-glory (<i>Ipomoea indica</i>)	N	Vine
St. Thomas lidpod (<i>Operculina ventricosa</i>)	E	Vine
CROTONEAE		
<i>Croton</i> sp.	E	Shrub
CUCURBITACEAE		
Balsampear (<i>Momordica charantia</i>)	E	Vine
Ivy gourd (<i>Coccinia grandis</i>)	E	Vine
Sinkwa towelsponge (<i>Luffa acutangula</i>)	E	Vine
EUPHORBIACEAE		
Carry me seed (<i>Phyllanthus amarus</i>)	E	Forb
Fire on the mountain (<i>Euphorbia cyathophora</i>)	E	Forb
Graceful sandmat (<i>Chamaesyce hypericifolia</i>)	E	Forb
Indian acalypha (<i>Acalypha indica</i>)	E	Forb
<i>Melanolepis multiglandulosa</i>	N	Tree
Mexican fireplant (<i>Euphorbia heterophylla</i>)	E	Forb
Pillpod sandmat (<i>Chamaesyce hirta</i>)	E	Forb
Prostrate sandmat (<i>Chamaesyce prostrata</i>)	E	Forb
LAMIACEAE		
Holy basil (<i>Ocimum tenuiflorum</i>)	N	Forb
LEGUMINOSAE		
Anil de pasto (<i>Indigofera suffruticosa</i>)	E	Shrub
Emperor's candlesticks (<i>Senna alata</i>)	E	Shrub
Glossy shower (<i>Senna surattensis</i>)	E	Tree
Monkeypod (<i>Pithecellobium dulce</i>)	E	Tree
Napoleon's plume (<i>Bauhinia monandra</i>)	E	Tree
Pigeon bundleflower (<i>Desmanthus pernambucanus</i>)	E	Forb



Species	Origin*	Growth Form
Purple bushbean (<i>Macroptilium atropurpureum</i>)	E	Vine
Rosarypea (<i>Abrus precatorius</i>)	E	Vine
Sensitive partridge pea (<i>Chamaecrista nictitans</i>)	E	Shrub
Shameplant (<i>Mimosa pudica</i>)	E	Forb
Small Philippine acacia (<i>Acacia confusa</i>)	E	Tree
Smooth rattlebox (<i>Crotalaria pallida</i>)	E	Shrub
Soft butterfly pea (<i>Centrosema molle</i>)	E	Vine
<i>Stylosanthes guianensis</i>	E	Forb
Tamarind (<i>Tamarindus indica</i>)	E	Tree
Tangantangan (<i>Leucaena leucocephala</i>)	E	Tree
Threeflower ticktrefoil (<i>Desmodium triflorum</i>)	E	Forb
Ticktrefoil (<i>Desmodium umbellatum</i>)	N	Shrub
Unknown Legume #1	-	Vine
White moneywort (<i>Alysicarpus vaginalis</i>)	E	Forb
Woman's tongue (<i>Albizia lebbek</i>)	E	Tree
Yellow nicker (<i>Caesalpinia bonduc</i>)	N	Vine
MALVACEAE		
Common wireweed (<i>Sida acuta</i>)	E	Forb
Cuban jute (<i>Sida rhombifolia</i>)	E	Forb
Monkeybush (<i>Abutilon indicum</i>)	E	Shrub
Threelobe false mallow (<i>Malvastrum coromandelianum</i>)	E	Forb
Uhaloa (<i>Waltheria indica</i>)	E	Forb
MELIACEAE		
<i>Aglaiia mariannensis</i>	N	Tree
Neem (<i>Azadirachta indica</i>)	E	Tree
MORACEAE		
Dyer's fig (<i>Ficus tinctoria</i> var. <i>neobudarum</i>)	N	Tree
Fig (<i>Ficus prolixa</i>)	N	Tree
MUSACEA		
Banana (<i>Musa</i> sp.)	E	Forb
MYRTACEAE		
Mountain stopper (<i>Eugenia reinwardtiana</i>)	N	Tree
NYCTAGINACEAE		
Erect spiderling (<i>Boerhavia erecta</i>)	E	Forb
Grand devil's-claws (<i>Pisonia grandis</i>)	N	Tree
OLACACEAE		
<i>Jasminum marianum</i>	N	Vine
OXALIDACEAE		
Bilimbi (<i>Averrhoa bilimbi</i>)	E	Tree



Species	Origin*	Growth Form
PASSIFLORACEAE		
Corkstem passionflower (<i>Passiflora suberosa</i>)	E	Vine
Fetid passionflower (<i>Passiflora foetida</i>)	E	Vine
PHYTOLACCACEAE		
Rougeplant (<i>Rivina humilis</i>)	E	Forb
POLYGONACEAE		
Coral vine (<i>Antigonon leptopus</i>)	E	Vine
PORTULACACEAE		
Kiss me quick (<i>Portulaca pilosa</i>)	E	Forb
Little hogweed (<i>Portulaca oleracea</i>)	N	Forb
RHAMNACEAE		
Asian nakedwood (<i>Colubrina asiatica</i>)	N	Vine
RUBIACEAE		
<i>Aidia cochinchinensis</i>	N	Tree
<i>Dentella repens</i>	E	Forb
False buttonweed (<i>Spermacoce</i> sp.)	E	Forb
Flat-top mille grains (<i>Oldenlandia corymbosa</i>)	E	Forb
Indian mulberry (<i>Morinda citrifolia</i>)	N	Tree
<i>Psychotria mariana</i>	N	Tree
Scarlet jungleflame (<i>Ixora coccinea</i>)	E	Shrub
RUTACEAE		
<i>Citrus</i> sp.	E	Tree
Limeberry (<i>Triphasia trifolia</i>)	E	Shrub
SAPINDACEAE		
Balloon vine (<i>Cardiospermum halicacabum</i>)	E	Vine
SOLANACEAE		
Cayenne pepper (<i>Capsicum annum</i> var. <i>annuum</i>)	E	Forb
Cutleaf groundcherry (<i>Physalis angulata</i>)	E	Forb
Turkey berry (<i>Solanum torvum</i>)	E	Shrub
TILIACEAE		
Strawberrytrees (<i>Muntingia calabura</i>)	E	Tree
URTICACEAE		
Rockweed (<i>Pilea microphylla</i>)	E	Forb
VERBENACEAE		
Lantana (<i>Lantana camara</i>)	E	Shrub
Light-blue snakeweed (<i>Stachytarpheta jamaicensis</i>)	E	Forb
Malbau (<i>Premna [obtusifolia] serratifolia</i>)	N	Tree
Turkey tangle fogfruit (<i>Phyla nodiflora</i>)	E	Forb
VITACEAE		
Veldt-grape (<i>Cissus quadrangularis</i>)	E	Vine

* N = Native, E = Exotic/Introduced



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D-2. Terrestrial Biological Assessment and Correspondence with USFWS

USAF developed a Biological Assessment for terrestrial listed species for the Proposed Actions. In the Biological Assessment, the USAF concluded the Proposed Actions would have no effect on terrestrial listed species. The USAF has chosen not to include a copy of the Biological Assessment in this Appendix because it repeats much of the information included in the Biological Resources Survey Report (page **D-3**) and the effects analysis in the SEIS (**Section 4.9**). As the USAF has concluded no effect, concurrence from the U.S. Fish and Wildlife Service (USFWS) is not required; however, USAF has provided USFWS with a courtesy copy of the Biological Assessment for their records.

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D-3. Marine Biological Assessment and Section 7 Correspondence with NMFS

USAF has developed a Biological Assessment in support of the Section 7 informal consultation for federally listed marine species with the National Marine Fisheries Service (NMFS) for the Proposed Actions. In the Biological Assessment, the USAF has concluded the Proposed Actions may affect, but are not likely to adversely affect listed marine species. The Biological Assessment was provided to NMFS and a copy is provided here on page **D-55**. A copy of NMFS concurrence with the USAF effects determination for federally listed marine species is provided on page **D-111**.

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Biological Assessment

of Effects to Marine Species from
Tinian Divert Infrastructure Improvements,
Commonwealth of the Northern Mariana Islands

Prepared for:

Headquarters Pacific Air Forces (HQ PACAF)
Joint Base Pearl Harbor-Hickam, Hawai'i
96853-5233

October 2018

Abbreviations and Acronyms

API	American Petroleum Institute
BA	Biological Assessment
bbf	barrel(s)
BMP	best management practice
CFR	Code of Federal Regulations
CNMI	Commonwealth of the Northern Mariana Islands
DoD	Department of Defense
DPL	Department of Public Lands
DPS	Distinct Population Segment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
LID	low-impact development
mg/L	milligram(s) per liter
mL	milliliter(s)
MSL	mean sea level
NMFS	National Marine Fisheries Service
PIMP	Pipeline Integrity Management Plan
POL	petroleum, oil, and lubricants
RP	Recommended Practice
ROD	Record of Decision
ROW	right-of-way
SEIS	Supplemental Environmental Impact Statement
SPCC	Spill Prevention Control and Countermeasures
SWPPP	Stormwater Pollution Prevention Plan
UFC	Unified Facilities Criteria
USAF	U.S. Air Force
USEPA	U.S. Environmental Protection Agency

BIOLOGICAL ASSESSMENT
OF EFFECTS TO MARINE SPECIES FROM
TINIAN DIVERT INFRASTRUCTURE IMPROVEMENTS,
COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS



HEADQUARTERS PACIFIC AIR FORCES (HQ PACAF)
JOINT BASE PEARL HARBOR-HICKAM, HAWAII

OCTOBER 2018

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1. Background and History

This Biological Assessment (BA) has been prepared by the U.S. Air Force (USAF) to evaluate the potential effects of the infrastructure improvements proposed on Tinian in the Commonwealth of the Northern Mariana Islands (CNMI) (“Tinian Divert infrastructure improvements”) on marine species listed as threatened and endangered under the Endangered Species Act (ESA). This assessment supplements letters from USAF to the National Marine Fisheries Service (NMFS) in October 2012 and January 2016, requesting concurrence on USAF’s determination that developing facilities and conducting divert activities and exercises at the Tinian International Airport and Tinian seaport (“2016 Divert project”) would not likely adversely affect threatened and endangered species.

USAF completed consultation with NMFS in 2016 as required under Section 7 of the ESA for developing infrastructure on Tinian and implementing Divert activities and exercises at the Tinian International Airport (2016 Divert project). USAF also completed an Environmental Impact Statement (EIS) for Divert Activities and Exercises in September 2016 and issued a Record of Decision (ROD) in December 2016 (USAF 2016a, 2016b). In the ROD, USAF announced the decision to select the Modified Tinian Alternative (2016 Divert EIS, Section 2.7, page 2-52), specifically the North Option (2016 Divert EIS, Section 2.5.2, page 2-28), as the future location for Divert activities and exercises. The 2016 ESA consultation and EIS evaluated the construction of fuel infrastructure at the Tinian airport and seaport, as well as fuel transport from the seaport to the airport by tanker truck. After the ROD was signed in December 2016, USAF conducted further evaluation of fuel transfer methods and associated infrastructure, including the feasibility of different alternatives that were not considered in the 2016 Divert EIS.

USAF now proposes to construct a fuel pipeline and associated infrastructure at the Tinian seaport to transport fuel from there to the airport. The proposed pipeline would eliminate the need for bulk fuel storage tanks at the Tinian seaport and the need for fuel tanker trucks to transport fuel from the seaport to the airport, both analyzed in the 2016 Divert EIS; however, the other components of the fuel system evaluated in the 2016 Divert EIS would not change. USAF also proposes to improve certain existing roads between the seaport and airport to support the Divert activities. Therefore, USAF has prepared additional analyses in this BA, and is preparing a Supplemental Environmental Impact Statement (SEIS), to evaluate the potential environmental consequences associated with the proposed construction and operation of the fuel pipeline and seaport facilities, and proposed roadway improvements.

This BA documents the evaluation conducted by USAF to determine whether the proposed Tinian Divert infrastructure improvements would adversely affect threatened and endangered species under NMFS jurisdiction. The contents of a biological assessment are at the discretion of the federal agency and will depend on the nature of the federal action. This document includes the following:

- a description of the infrastructure improvements that USAF proposes on Tinian (**Section 2**)
- a description of the action area (**Section 2**)

- a detailed description of the methods that will be used to avoid and minimize impacts to the coastal environment during construction and operation of infrastructure on Tinian, including:
 - a description of the methods for stormwater management for the Tinian Divert infrastructure improvements that USAF will implement to comply with regulatory requirements and guidelines (**Sections 3.1, 3.2, and 3.3**)
 - a list of the methods for the prevention and control of spills of hazardous materials for the Tinian Divert infrastructure improvements that USAF will implement to comply with regulatory requirements and guidelines (**Section 3.3.3**)
- a summary of the threatened and endangered species under NMFS jurisdiction that occur in the action area (**Section 4**)
- a summary of the environmental baseline conditions in the action area where proposed construction and implementation will take place (**Section 5**)
- an analysis of the potential effects of the Tinian Divert infrastructure improvements on marine threatened and endangered species (**Section 6**)
- a justification of the conclusion reached by USAF that the Tinian Divert infrastructure improvements are not likely to adversely affect threatened or endangered species under NMFS jurisdiction (**Section 7**).

1.1 Consultation History

The document, *Supplemental Information Supporting USAF Informal Consultation: Effects of the Divert Project on Marine Corals and Scalloped Hammerhead Shark* (“Supplemental Information”), sent to NMFS in March 2016 for the 2016 Divert project and the NMFS 28 March 2016 letter of concurrence summarize consultation actions taken from October 2012 through March 2016 for the original Divert project (PIR-2016-9800; I-PI-16-1364-AG). On 30 October 2012, NMFS concurred with USAF that the 2016 Divert project may affect but is not likely to adversely affect the Central West Pacific Distinct Population Segment (DPS) of green sea turtles (*Chelonia mydas*), hawksbill sea turtles (*Eretmochelys imbricata*), leatherback sea turtles (*Deremochelys coriacea*), olive ridley sea turtles (*Lepidochelys olivacea*), blue whales (*Balaenoptera musculus*), fin whales (*Balaenoptera physalus*), the Western North Pacific DPS of humpback whales (*Megaptera novaeangliae*), sei whales (*Balaenoptera borealis*), and sperm whales (*Physeter macrocephalus*) (PIR-2012-9144). On 28 March 2016, NMFS concurred with the determination that conducting the 2016 Divert project is not likely to adversely affect the corals *Acropora globiceps*, *Acropora retusa*, *Seriatopora aculeata*, and the Indo-West Pacific DPS of scalloped hammerhead shark, *Sphyrna lewini* (PIR-2016-9800; I-PI-16-1364-AG).

Since the March 2016 letter of concurrence, USAF has taken the following actions and had the following communications with NMFS in accordance with the ESA for the conservation of marine threatened and endangered species, since receiving concurrence on the Divert project in March 2016:

- On 7 December 2016, USAF published a ROD, which announced the USAF decision to select the Modified Tinian Alternative (Final EIS, Section 2.7, page 2-52), and specifically the North Option (Final EIS, Section 2.5.2, page 2-28), as a future Divert location.
- After the ROD was signed in December 2016, USAF conducted further evaluation of the fuel requirement and associated infrastructure, including the feasibility of other alternatives that were not considered in the 2016 Divert EIS. USAF now proposes to construct a fuel pipeline and associated infrastructure at the seaport to transport fuel from the seaport to the airport, and to improve certain existing roads between the seaport and airport to support Divert activities.
- On June 26, 2018 the USAF conducted a teleconference with NMFS/Pacific Islands Regional Office/Protected Resources Division staff. The USAF and NMFS/PRD staff discussed the proposed Tinian Divert infrastructure improvements and verified the federally-listed marine species that could occur near Tinian.

2. Project Description and Action Area

As described in **Section 1**, USAF has coordinated with NMFS regarding the potential effects of the Divert project on marine threatened and endangered species since 2012. NMFS provided their concurrence in October 2012 and March 2016 with the USAF determinations that the Divert Project would not likely adversely affect marine threatened and endangered species under their jurisdiction. USAF now proposes the following actions:

- Construct a fuel pipeline from the Tinian seaport to the Tinian International Airport, to include a booster pump house and associated fire protection systems, a boom storage building, and necessary utility connections at the seaport.
- Improve certain existing roads between the seaport and airport that were previously analyzed for Divert vehicles in the 2016 Divert EIS.

2.1 Fuel Pipeline and Support Infrastructure

2.1.1 Fuel Pipeline Construction and Operation

The proposed fuel pipeline would eliminate the need for bulk fuel storage tanks at the Tinian seaport, and the need for fuel tanker trucks to transport fuel from the seaport to the airport, as described in the original Divert EIS. However, the other components of the fuel infrastructure system evaluated would not change, as described in the subsequent paragraphs.

Alternatives. USAF considered four possible pipeline routes in comparison to selection standards identified for construction and routing of the pipeline. Only two of the pipeline routes, the West route and East route, have the ability to meet each selection standard. The two alternatives eliminated from consideration, (the Runway and Broadway routes) did not meet the selection criteria due to anticipated extensive disturbance to existing infrastructure and the community.

The West route travels north from the Tinian seaport until it intersects TR26 and then stays on a northwestern path by following TR26, 6th Avenue, and TR25 (i.e., 8th Avenue), and then turns northeast along TR23 to approach the Divert fuel storage tanks from the west side. (See **Section 2.4** for more details and **Figure 2-1** for a map of the West route.) This route falls entirely within existing right-of-way (ROW) easements; does not travel extensively along any existing communities, infrastructure, or buildings; and is approximately 4.08 miles long.

The East route travels north from the Tinian seaport until it intersects Tinian Route (TR) 26 (i.e., West Avenue) and then stays on a northwestern path by following TR26 and 6th Avenue until just south of the airport runway, where it turns west and eventually reconnects with the proposed West route to approach the Divert fuel storage tanks from the west side (see **Section 2.4** for more details and **Figure 2-1** for a map of the East route.) This route falls entirely within existing ROW easements; does not travel extensively along any existing communities, infrastructure, or buildings; and is approximately 4.94 miles long.

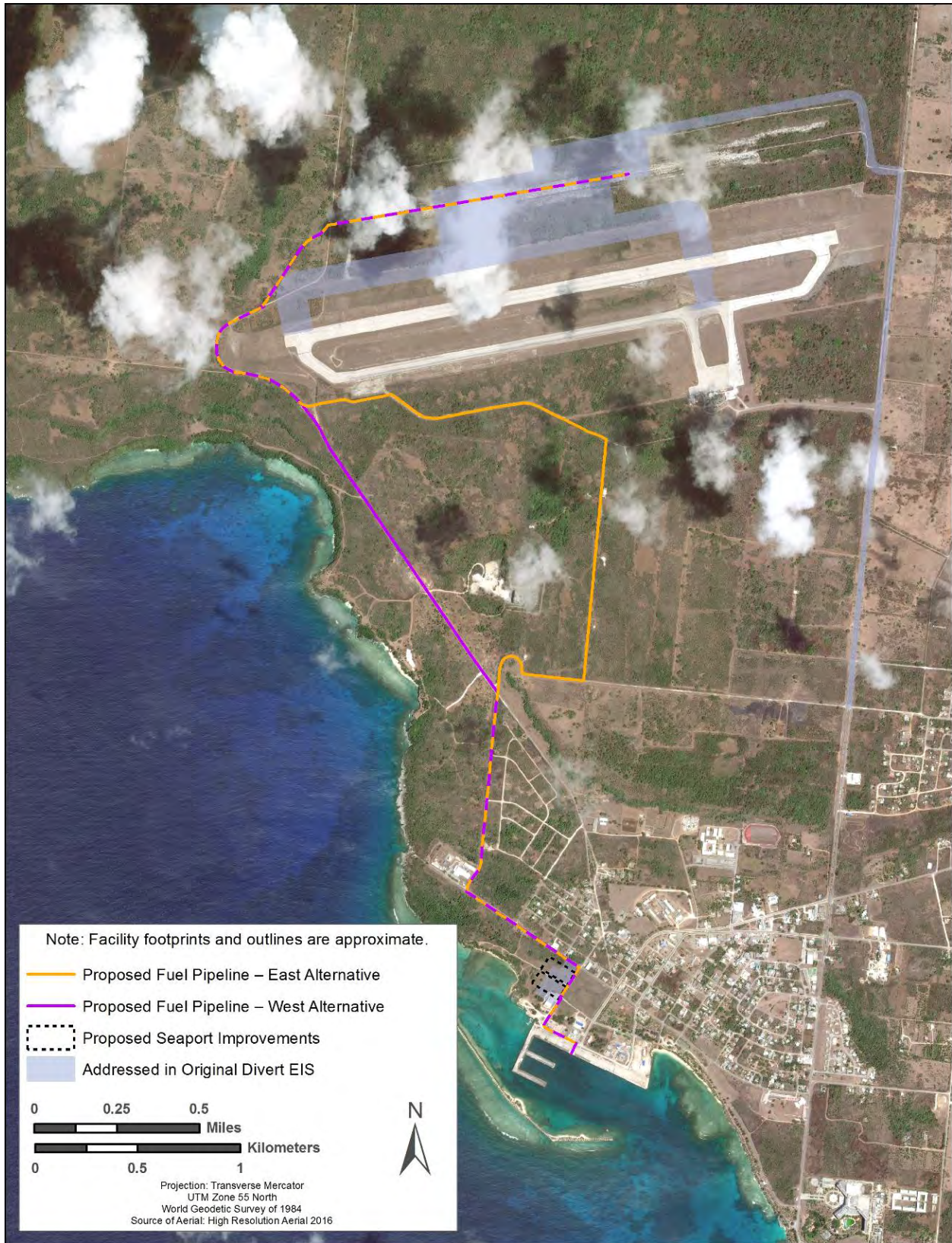


Figure 2-1. Proposed West and East Pipeline Route Alternatives

Construction. The proposed fuel pipeline would be designed and constructed in accordance with all appropriate federal, CNMI, Department of Defense (DoD), and USAF regulations for petroleum fuel pipelines and facilities, including Unified Facilities Criteria (UFC) 3-460-01, *Petroleum Fuel Facilities*, and 49 CFR § 195 *Transportation of Hazardous Liquids by Pipelines*. It is the firm policy of DoD to design and construct fueling facilities in a manner that will prevent damage to the environment by accidental discharge of fuels, their vapors, or residues.

The pipeline would be constructed underground along existing ROWs, to the extent practicable, to prevent breaches, vandalism, sabotage, or any other means to disrupt the flow of fuel. The pipeline would be installed within a 20-foot easement and to a depth of approximately 3 feet. However, the impacts analysis in the SEIS will assume that an 80-foot easement could be disturbed during construction to allow for materials laydown and routing adjustments. Once installed, the pipeline would occupy 6 feet of unencumbered space, allowing for a minimum of 2 feet on either side of the pipeline, within the 20-foot easement. USAF would retain the 20-foot easement to allow for maintenance of the pipeline when required.

The pipeline would be installed in two separate sections. The first section would include a bulk receipt pipeline that would connect the seaport bulk receipt header to a booster pump house. The second section of the pipeline would connect the booster pump house to the Divert bulk receipt fuel tanks on the north side of the airport. Low point drains would be installed approximately every 500 feet along the second section of pipeline. These points would be used to drain water or particulate matter from the pipe or to fully drain the pipe if required. Low point drains would be installed in pits to allow access below ground surface. Pits would be equipped with traffic rated covers and locked for security. The transfer pipeline would be a 12-inch diameter and externally coated carbon steel pipe. The transfer pipeline would be equipped with an impressed current cathodic protection system and would be designed to allow for cleaning and testing of the pipeline between the seaport and the airport.

Low point drains would be installed at the seaport header and approximately every 500 feet along the second section of pipeline. These points would be used to drain water or particulate matter from the pipe or to fully drain the pipe if required. Low point drains would be installed in pits lined with fiberglass to prevent infiltration to the subsurface soils or groundwater and would allow access below ground surface. Drained material would be removed from the pits via a vacuum truck, or similar process. Pits would be equipped with traffic rated covers and locked for security.

Fuel pipeline construction would occur over the course of approximately 2 to 3 years. Once the pipeline is installed, jet fuel would be delivered to and offloaded at the Tinian seaport per the existing fuel supply chain and fuel receipt protocols, as described in the 2016 Divert EIS. Once offloaded at the existing seaport bulk receipt header, the jet fuel would then enter the bulk receipt pipeline rather than being transferred to bulk fuel storage tanks. The pipeline rate of flow would be approximately 2,000 gallons per minute. Required jet fuel volumes to support Divert activities and exercises would not change from that described in the 2016 Divert EIS; approximately 220,000 barrels (bbl) of jet fuel (9.24 million gallons) would be transferred through the pipeline to fill the two 60,000 bbl tanks and one 100,000 bbl tank at the airport.

Operation. USAF would follow 49 CFR § 195 *Transportation of Hazardous Liquids by Pipelines*, Technical Order 37-1-1, *General Operations and Inspection of Installed Fuel Storage and Dispensing Systems*, UFC 3-460-03, *Operation and Maintenance: Maintenance of Petroleum Facilities*, and AFI 23-201, *Fuels Management*, for the operation of the fuel pipeline and support facilities. The safe, efficient, and economical operation of petroleum storage, dispensing systems, and associated infrastructure depends on an effective and proactive recurring maintenance program. UFC 3-460-03 establishes the required frequency intervals for the recurring maintenance. Operation and maintenance of the pipeline would be managed by a Pipeline Integrity Management Plan (PIMP) to assist with and guide pipeline integrity maintenance. PIMPs improve the integrity management of piping systems and help prevent leaks or pipeline failures. The plans are developed based on the principles of American Petroleum Institute Standard 570, *Inspection, Repair, Alteration, and Rerating of In-Service Piping Systems*, and federal and local regulations.

2.1.2 Seaport Improvements Support Infrastructure

The booster pump house would support the fuel pipeline operations. The booster pump house, boom storage building, and other support infrastructure would be constructed in and near the same location at the Tinian seaport as the location proposed in the 2016 Divert EIS for the two 50,000 bbl fuel storage tanks; however, the footprint would be slightly different (see **Figure 2-2**). The booster pump house and boom storage building would be collocated with a construction laydown yard, biosecurity area, parking area, traditional septic system and drainage leach field, water storage tanks, and utility lines and connections within the area shown in **Figure 2-2**. The boom storage building and pump house would be a total of approximately 4,550 square feet. Gravel pedestrian pathways and access roads also would be created or widened within this area; all existing roads would remain open to the public. Two diesel generators would also be installed to operate the support facilities during an outage. A total area of 8.23 acres could be disturbed for development of all seaport support infrastructure.

All petroleum fuel support facilities would be designed and constructed in accordance with all appropriate federal, CNMI, DoD, and USAF regulations for petroleum fuel facilities, including UFC 3-460-01, *Petroleum Fuel Facilities*. The booster pump house would be sized to fit three pumps and include a pump room, control room, mechanical room, and toilet. The pump house would be approximately 3,750 square feet and constructed with an automatic fire suppression system. The pump house would contain three electric 350-horsepower motors to transfer the fuel to the Divert bulk receipt fuel tanks at the airport. During fuel transfer operations, only two of the motors would operate, while the third would be kept idle as a spare. The pump house would also require installation of water and electric utilities, underground or overhead, which would be extended from existing service lines and along the pipeline ROW.

The boom storage building would be constructed in close proximity to the booster pump house for the storage of fuel spill containment booms and fuel transfer hose supplies. The building would require overhead door access for ease of loading/unloading. The estimated size of the storage building would be approximately 800 square feet.

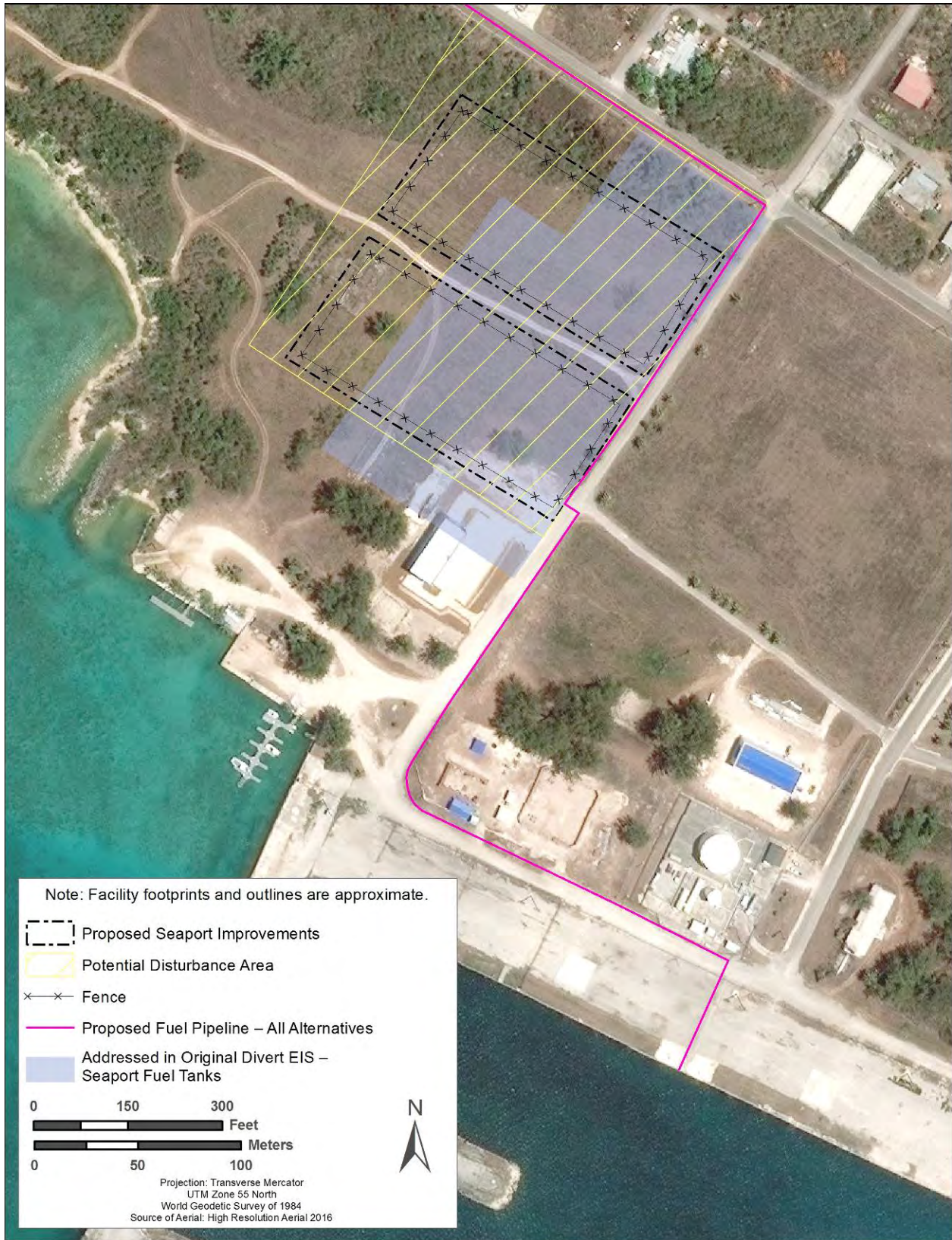


Figure 2-2. Proposed Support Infrastructure at the Tinian Seaport.

The proposed fuel pipeline would eliminate the need for bulk fuel storage tanks at the seaport that were proposed in the 2016 Divert EIS. The combined impervious surface footprint of the support infrastructure proposed in this SEIS is 4,550 square feet, compared to the 7,534 square feet for the fuel storage tanks and support structures proposed in the 2016 Divert EIS at the same location. Additionally, the combined area of potential disturbance proposed at the seaport in this SEIS (8.23 acres) is in the same area as the fuel storage tank area (5.29 acres) proposed in the 2016 Divert EIS. Therefore, much of the analysis presented in the 2016 Divert EIS for construction of the fuel storage tanks is applicable to the proposed construction of the support infrastructure at the seaport, including the booster pump house and boom storage building. **Figure 2-2** presents the support infrastructure location at the seaport compared to the previously analyzed footprint of the seaport bulk fuel tanks. Both support facilities would be enclosed within a secure fenced area (see **Figure 2-2**).

Construction of the support infrastructure would occur concurrently with the pipeline construction over approximately 2 to 3 years. As described for the pipeline operation and maintenance, USAF would follow Technical Order 37-1-1, UFC 3-460-03, and AFI 23-201 for the operation and maintenance of the support facilities.

Based on review of the 2016 Divert EIS and consideration of technical and siting factors, USAF determined that the proposed support infrastructure should be sited in the location originally proposed for the bulk fuel storage facilities at the seaport for the following reasons:

- The original site proposed for construction of the bulk fuel tanks was analyzed in the 2016 Divert EIS for construction and significant impacts were not identified.
- It is co-located with the Divert biosecurity facility and laydown yard, condensing the total land that would be required for these facilities
- It is within close proximity to the seaport offload header, allowing efficient transfer of the fuel from offload to the pump house.

The proposed support infrastructure would be constructed in the location presented in **Figure 2-2**, regardless of the pipeline route alternative proposed for construction.

2.1.3 Construction Materials

All materials would be transported to or produced on Tinian as described in the original Divert EIS and the 2016 Supplemental ESA Information. Transport of materials on Tinian to support construction of the fuel pipeline would not exceed the amount of fuel truck traffic analyzed in the 2016 Supplemental ESA Information; however, fuel truck traffic was included for the Divert implementation phase and transport of construction materials would occur along the pipeline route and during the construction phase. Construction materials could also be transported to the site by construction workers as part of their daily commute to the construction site. Details regarding construction worker support are provided in the **Construction Workers** section.

Movement of construction personnel, equipment, and supplies could result in the movement and spread of invasive plant and animal species to Tinian. In order to prevent the spread of invasive species, the routing of shipments through Guam would be minimized and redundant inspection of materials that must be shipped from that island (both before they arrive on Tinian and when

they arrive) would be conducted. USAF would also conduct risk analyses, develop and implement procedures, and participated in regional planning to reduce or eliminate the spread of invasive species.

Transport of construction materials to the seaport was addressed in the 2016 Supplemental ESA information for construction of the fuel tanks. Therefore, transport of construction materials will not be analyzed further.

2.1.4 Construction Workers

Approximately 75 construction workers, in addition to those included in the 2016 Supplemental ESA Information, could be required to support construction of the pipeline during the course of the 2- to 3-year construction period. It is anticipated that the peak number of workers would only be needed during shorter duration intensive or critical construction periods. In 2016, the construction workforce of Tinian was 122 people, and it is assumed that this entire workforce would support the construction proposed in the 2016 Supplemental ESA Information.

Therefore, it is assumed the entire workforce to support pipeline construction would be from off-island.

2.2 Roadway Improvements

USAF proposes to improve certain existing roadways previously analyzed for Divert vehicles in the 2016 Divert EIS that would support construction of all Divert facilities and, if needed, transfer of fuel via tanker truck. Roadway improvements have standalone value for supporting the Divert project and would occur independently of the decision to construct the pipeline and support infrastructure described in **Section 2.1**.

The route proposed for roadway improvements is the route proposed for fuel trucks in the 2016 Divert EIS and is shown in **Figure 2-3**. This 2.51-mile route travels from the Tinian seaport north to TR25, north along TR25 to its intersection with TR24, east along TR24 to its intersection with TR21, and finally north along TR21. A second route was evaluated for repair, but was dismissed from consideration because it did not meet the selection standard for requiring extensive improvement and reconstruction.

Generally, the road improvements would include replacement of the existing roadway surfaces, which would entail removing the existing deteriorated asphalt cap, which is approximately 2- to 4-inches thick; grading the road subsurface down approximately 8 inches below the original asphalt cap; laying a new 8-inch sub base; and finishing the surface with a new 3-inch asphalt cap. Asphalt removed from the deteriorated cap would be reused as road improvement material or recycled on Tinian to the extent feasible. Some portions of these roadways could require less extensive repairs. All roadway improvements would occur within the existing roadbeds and shoulders, and no roadbed widening or ROW alterations would occur. Additionally, lesser maintenance and repair of any road proposed for Divert, including TR21, could occur, as considered in the 2016 Divert EIS. Road improvements could take place prior to, during, or as repairs after construction of the Divert infrastructure identified in the 2016 Divert EIS; however, road improvements are not anticipated to exceed 1 year of total construction time.



Figure 2-3. Proposed Roadway Improvements

The engineering site visit indicated that a portion of the fuel truck route analyzed in the 2016 Divert EIS, from the seaport to TR21, is classified as poor/failing paved surfaces with potholes and uneven surfaces. The pavement of this route is deteriorating and cracked, and there are low spots in the pavement surfaces that retain water. Therefore, extensive roadway improvement and replacement along this route would be required.

The roadway improvements would be independent from the proposal to construct the pipeline and support infrastructure. If the pipeline is not constructed, this route would be utilized by fuel vehicles as described in the 2016 Divert EIS. Use of this route for fuel or construction vehicles would not exceed the amount of fuel truck traffic analyzed in the 2016 Divert EIS. Construction of the pipeline would eliminate the need for fuel transfer by vehicle; therefore, if the pipeline is constructed, USAF would utilize this route for all Divert construction vehicles rather than fuel vehicles.

2.2.1 Construction Materials

To construct the proposed road improvements, construction materials such as road base and asphalt would be needed along the entirety of the road proposed for improvements. All materials would be transported to or produced on Tinian as described in the 2016 Divert EIS. Materials would be transferred from the seaport along the same route that was proposed for fuel trucks in the 2016 Divert EIS. However, approximately 1,178 construction truck trips, in addition to those analyzed in the 2016 Divert EIS, would be needed for the road improvements, which equates to approximately 3 roundtrips per day by dump trucks over the course of 1 year. USAF would take reasonable precautions during construction to prevent particulate matter from becoming airborne, based on the construction standards for erosion control and the requirements of CNMI Chapter 65-10, Part 415. Where possible, paved roadways would be used to transport materials and workers. Vehicle speeds would be limited to 15 miles per hour (mph) or less at construction sites on unpaved roads.

2.2.2 Construction Workers

Approximately 25 construction workers, in addition to those analyzed in the 2016 Divert EIS, could be required to support construction of the road improvements. It is anticipated that the peak number of workers would only be needed during shorter duration intensive or critical construction periods. In 2016, the construction workforce of Tinian was 122 people, and it is assumed that this entire workforce would support the construction proposed in the 2016 Divert EIS. Therefore, it is assumed the entire workforce to support the road improvements would be from off-island. The impact analysis in **Section 4** of the SEIS will be based on peak construction workers to determine the maximum effect of construction workers, although most of the construction would be executed by fewer than peak construction worker crews.

2.3 Summary of Proposed Actions and Alternatives

In summary, USAF proposes to accomplish the following actions:

- Construct a fuel pipeline from the Tinian seaport to Tinian International Airport along either the West or East route. In support of the pipeline, construct infrastructure at the Tinian seaport, to include a booster pump house and associated fire protection systems, a boom storage building, and necessary utility connections.

- Improve the roadway along the fuel truck route that was analyzed in the 2016 Divert EIS, excluding TR21. If the pipeline is not constructed, this route would be used by fuel truck traffic as analyzed in the 2016 Divert EIS. If the pipeline is constructed, this route would be utilized to support construction of all of the Divert projects.

The Proposed Actions and alternatives are shown in **Figure 2-4**.

2.4 Action Area

The action area for this project includes all areas proposed for construction as shown in **Figure 2-4**, the watersheds that the proposed construction would occur in, and the nearshore marine environment of Tinian where these watersheds drain. Marine threatened and endangered species do not occur in the construction footprint, as the proposed project is on land. However, marine threatened and endangered species have the potential to occur within the action area offshore of the construction footprint because of the potential for discharge into coastal waters. Coastal waters surrounding Tinian serve as the discharge areas for all surface runoff and subsurface drainage from the island. Perennial or intermittent streams are not included within the action area because they do not occur on Tinian. The limestone plateaus of Tinian are too porous to support stream or wetland development, and most precipitation either evaporates or percolates into the highly permeable limestone substrata.

Surface water systems are typically defined in terms of watersheds. A watershed is a land area bounded by topography that drains water to a common destination. On Tinian, this destination is eventually coastal waters. Coastal waters are waters that are adjacent to the shorelines that contain a measurable quantity or percentage of seawater, including, but not limited to, sounds, bays, lagoons, bayous, ponds, and estuaries. Watersheds divide the landscape into hydrologically defined areas, and serve to drain, capture, filter, and store water and determine its subsequent release. Stormwater is surface water generated by precipitation that may percolate into permeable soils or runoff, which occurs when the stormwater flows across the top of impervious or saturated surficial areas.

The Tinian seaport occurs within the Makpo Watershed, which drains west-southwest into the Philippine Sea (CNMI BECQ 2016) (**Figure 2-5**). Tinian International Airport spans across the Puntan Daiplolamanibot Watershed, which drains west into the Philippine Sea and the Masalok Watershed, which drains northeast into the Pacific Ocean (CNMI BECQ 2016). Stormwater drainage ditches and swales direct water off the runway and airfield into the stormwater retention area and the large, excavated depressions in between the runway and taxiway. The action area spans across the Puntan Daiplolamanibot, Makpo, and Masalok watersheds.

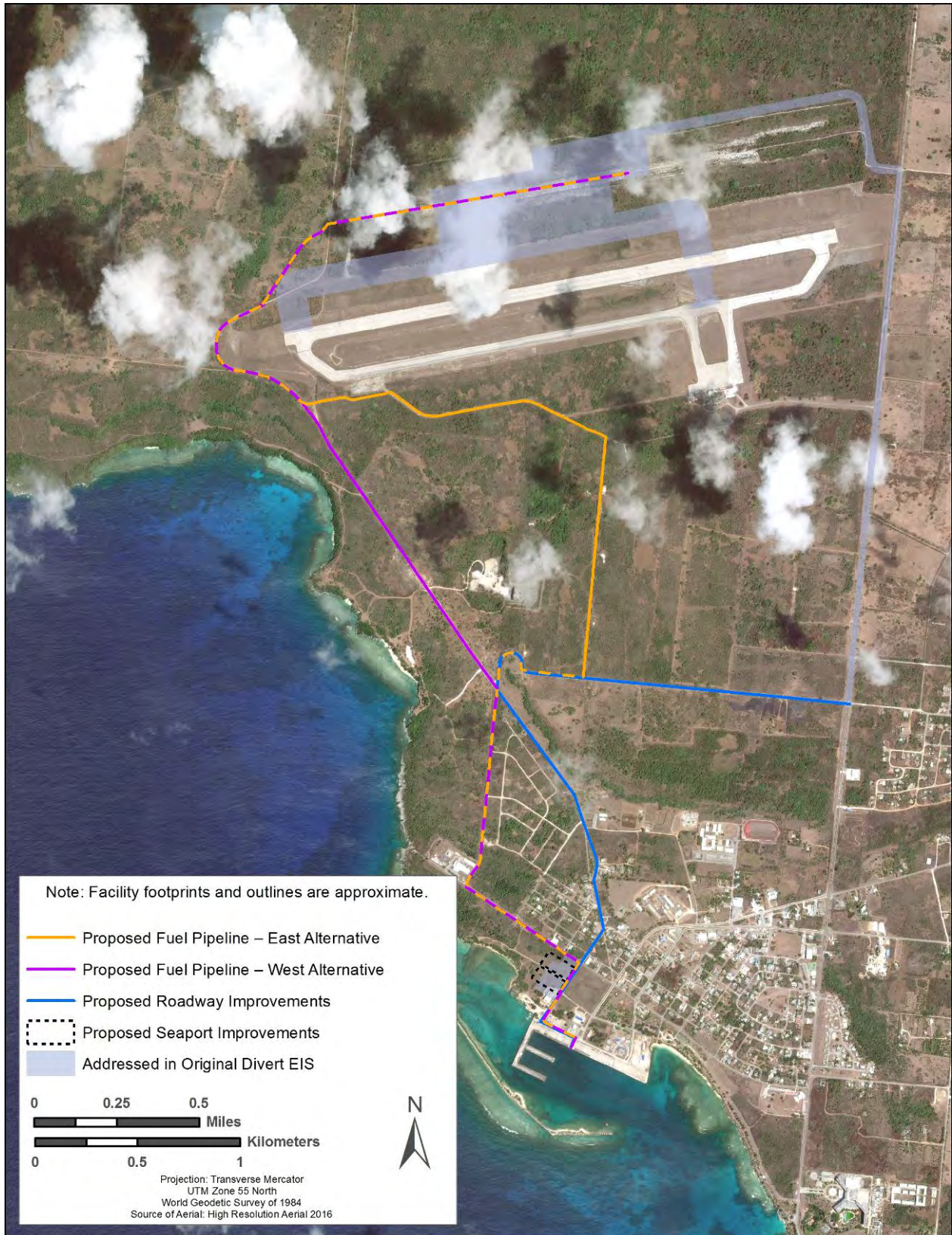


Figure 2-4. Summary of Proposed Actions and Alternatives



Figure 2-5. Watersheds on Tinian (from CNMI BECQ 2016)

3. Minimization of Impacts to Water Quality

USAF would implement planning, design, operations, and maintenance standards for fuel infrastructure that, by reducing impacts on water quality, would ultimately reduce potential impacts on coastal waters and therefore, marine threatened and endangered species. Strategies would be used to reduce the potential for increases in stormwater runoff, altered hydrologic conditions, groundwater contamination, construction and operation-related accidents, release of petroleum products, and altered water quality that have the potential to adversely affect marine threatened and endangered species.

These actions and standards are dictated by federal, DoD, USAF, or CNMI regulations or guidance that would be implemented under the Proposed Actions. These are routine and common practice and are not specific to the Proposed Actions. These compliance actions and industry standards are built into the design, construction, and operation of the proposed infrastructure and when implemented, would reduce the potential for environmental impacts, including adverse effects on marine threatened and endangered species.

Based on the design, implementation, and management of controls described in **Sections 3.1, 3.2, and 3.3**, USAF does not anticipate that stormwater runoff or petroleum, oil, and lubricants (POL) would be discharged into the nearshore waters of Tinian during or after construction, or that the Proposed Actions would cause a measureable increase in the volume or discharge rate of fresh water into the marine environment. USAF would be committed to ensuring that any stormwater runoff or POL release from the project site is consistent with CNMI Water Quality Standards (CNMI BECQ 2014a), which are described in detail in **Section 3.2.6**.

3.1 Planning and Design

USAF would plan and design stormwater management and fuels infrastructure to ultimately reduce potential environmental impacts. Designs would reduce the potential for an increase in stormwater runoff, altered hydrologic conditions, altered water quality, decline in groundwater recharge, groundwater contamination, construction and operation-related accidents, and a release of petroleum products.

3.1.1 Stormwater Management and Low Impact Development

USAF design for the proposed pipeline infrastructure and roadway improvements would focus on maintaining predevelopment hydrology and preventing net increases in stormwater runoff once construction is complete, to the extent practical. “Predevelopment hydrology” is defined as the pre-project hydrologic conditions of temperature, rate, volume, and duration of stormwater flow from the project site. The permanent stormwater management infrastructure for the actions described in **Section 2.1 and 2.2** would be designed so that the post-development peak discharge rate frequency would not exceed the pre-development peak discharge rate for the 25-year frequency storm event (CNMI BECQ and GEPA 2006). USDA NRCS has calculated a 25-year, 24-hour rainfall event to be 12.49 inches for Saipan (USDA NRCS 2008).

As impervious surfaces would not be increased beyond those analyzed in the 2016 Divert EIS, additional calculation of pre- and post-development stormwater volumes would not be

necessary (DoD 2015). USAF would maintain predevelopment hydrology through implementation of low impact development (LID), performance standards, and best management practices (BMPs), consistent with the previous EFH consultation. LID would apply to the fuel infrastructure, to the extent practical. USAF would also develop and implement plans, and conduct monitoring, to ensure that water flowing from project sites meets CNMI water quality standards. USAF would implement all applicable stormwater management and low impact strategies identified in Section 4.16 of the original Divert EIS and Section 3 of the Supplemental Information provided for informal consultation.

Table 3-1 provides an example of BMPs that USAF would incorporate into their permanent stormwater infrastructure design, to capture stormwater runoff and meet water quality treatment goals. These BMPs would be consistent with LID requirements of UFC 3-210-01 *Low Impact Development* (DoD 2015) and were selected based on the following criteria:

1. can capture and treat the full water quality volume
2. are capable of approximately 80 percent total suspended solids removal
3. are capable of meeting management objectives for specific resource protection areas through elevated total phosphorus, total nitrogen and/or fecal coliform bacteria removal
4. have acceptable longevity in the field.

Table 3-1. Permanent Structural Stormwater Management BMPs

Group	Practice	Description
Infiltration	Infiltration Trenches/Chambers	An infiltration practice that stores the water quality volume in the void spaces of a limestone aggregate trench or within an open chamber before it is infiltrated into underlying soils within the B or C soil horizons.
	Infiltration Basin	An infiltration practice that stores the water quality volume in a shallow surface depression before it is infiltrated into the underlying soils within the B or C soil horizons.
Filtering Practices	Bioretention	A shallow depression that treats stormwater as it flows through a soil matrix, and is returned to the storm drain system, or infiltrated into underlying soils or substratum.
Open Channels	Dry Swale	An open vegetated channel or depression explicitly designed to detain and promote filtration of stormwater runoff into an underlying fabricated soil matrix.

Source: CNMI BECQ and GEPA 2006.

As previously described, the permanent stormwater management system and associated BMPs would be designed so that the post-development peak discharge rate frequency would not exceed the pre-development peak discharge rate for the 25-year frequency storm event (CNMI BECQ and GEPA 2006). The BMPs would also be designed to meet water quality criteria, overland erosion and channel protection criteria, overbank flood control/receiving stream criteria, and recharge criteria.

Additional LID site features that USAF could deploy include rain gardens, vegetated filter strips, downspout disconnection, reduced impervious area, tree preservation or re-vegetation using native plants, soil amendments.

3.1.2 Fuel Infrastructure Planning, Design, and Management Standards

To reduce the likelihood of spills during construction and operation of the pipeline infrastructure, as well as the impact of spills (e.g., or spill migration to nearshore waters) in the unlikely event that one should occur, all proposed fuels infrastructure on Tinian would be designed and constructed according to the most stringent applicable federal and CNMI requirements.

It is the firm policy of the Department of Defense to design and construct fueling facilities in a manner that will prevent damage to the environment by accidental discharge of fuels, their vapors or residues.

Specific standards include, but are not limited to, the following:

Standard 1: General Design and Construction. USAF would follow UFC 3-460-01 Design: Petroleum Fuel Facilities for material, design, fabrication, erection and inspection of the pipeline and support infrastructure.

Standard 2: Infrastructure Protection. USAF would plan and design all fuel infrastructure with the goal of protecting the fuels, storage, and transfer capability from enemy attack, terrorists, sabotage, fire, seismic activity, and other potential damaging influences.

Standard 3: Cathodic Protection. Cathodic protection would be provided for all carbon steel and stainless steel underground piping, in accordance with UFC 3-570-02N and 40 CFR § 280. The cathodic protection system would be isolated from the filter/separator discharge header and the hydrant pump house bulk receipt system by isolation flanges, which would keep the impressed current isolated to the underground portion of the transfer pipeline.

Standard 4: Industry Requirements. Piping design, materials, fabrication, assembly, erection, inspection, and pressure tests would be in accordance with ANSI/ASME B31.3 *Process Piping*.

Standard 5: Roadways. Underground piping which passes under public roadways or railroad tracks would be designed in accordance with Department of Transportation regulations 49 CFR § 195 and American Petroleum Institute (API) Recommended Practice (RP) 1102.

Standard 6: Venting. The pipeline would be equipped with high point vents and low point drains. The high point vents would be used to remove noncondensing gas from the pipeline. The low point drains would be used to drain water or particulate matter from the pipe and can also be used to fully drain the pipe if required. The high point vents and low point drains would be installed in pits. The pits would be equipped with traffic rated covers and lockable to prevent vandalism and theft.

Standard 7: Pig Launcher: The transfer pipeline would be equipped with a permanently installed pig launcher at the booster pump house and a permanently installed pig receiver at the bulk storage pump house. The transfer pipeline would be designed to be piggable to allow for cleaning and testing of the line between the booster pump house and the hydrant pump house.

Standard 8: Valves. The transfer pipeline would be equipped with an isolation valve pit midway between the booster pump house and the bulk storage pump house. The isolation valve pit would be equipped with a double block and bleed valve that would be used during pressure testing and can be closed in the event of an emergency upstream or downstream of the valve. The transfer pipeline would also be equipped with a double block and bleed valve after it transitions aboveground at the bulk storage pump house. The double block and bleed valve at the booster pump house and the double block and bleed valve at the bulk storage pump house can be used to fully isolate the underground section of the transfer pipeline and would be used when annual and five year pressure testing of the pipeline is required.

Standard 9: Personnel Training. USAF will annually train all personnel handling POL in the operation and maintenance of equipment to prevent discharges; discharge procedure protocols; and general facility operations.

Standard 10: Equipment Testing. USAF will maintain all petroleum equipment in good functioning order, including regular testing and checking for any failure. This greatly adds to the effectiveness of spill prevention control and countermeasures.

Standard 11: On-site Personnel. USAF would provide a full-time onsite person or persons to inspect and maintain all POL infrastructures, in accordance with USAF requirements. These personnel would be trained to provide USAF with spill planning, preparedness and response capability, in accordance with the SPCC and FRP required by 40 CFR Part 112 and AFI 32-7044. This capability could thereby potentially upgrade island-wide capability for spill response through cooperative spill response agreements that could be developed, if determined applicable.

3.2 Construction

During construction, USAF would implement measures to prevent the spread of invasive species and as dictated by existing regulations and industry standards for stormwater management, erosion control, and POL handling that would reduce potential impacts on marine threatened and endangered species by reducing environmental impacts. Strategies would include reducing the potential for an increase in stormwater runoff, altered hydrologic conditions, altered water quality, decline in groundwater recharge, groundwater contamination, and a release of petroleum products during construction. During construction of the pipeline infrastructure and roadways, USAF would manage stormwater runoff in accordance with a USEPA NPDES Construction General Permit and would perform the following activities:

- implement erosion and sediment controls
- stabilize soils
- implement pollution prevention measures
- provide and maintain buffers around surface waters
- prohibit certain discharges
- utilize surface outlets for discharges from basins and impoundments.

3.2.1 Invasive Species

EO 13112 directs agencies to prevent the spread of invasive species in their work. To prevent the introduction of brown tree snakes and the spread of other invasive species, control and interdiction methods agreed upon by USFWS and USAF for construction of facilities at the Tinian International Airport (USFWS 2013, USFWS 2015) would be implemented during construction of the pipeline and for other proposed infrastructure upgrades. These measures, which include minimizing the routing of shipments through Guam, and redundant inspection of materials that must be shipped from that island, would reduce to a very low level the risk that a brown tree snake would be transported to Tinian during pipeline construction.

3.2.2 Stormwater Pollution Prevention Plan

USAF would develop and implement a Stormwater Pollution Prevention Plan (SWPPP) for construction that would adhere to USEPA Guidelines. The SWPPP would be completed prior to submitting the Notice of Intent for permit coverage. The SWPPP will describe the following:

- responsible parties
- site evaluation, assessment, and planning
- documentation of compliance with other federal requirements
- erosion and sediment controls
- permanent construction BMPs
- pollution prevention standards
- inspection and corrective actions
- training requirements
- certification and notification requirements
- operation and maintenance of permanent stormwater controls.

Site-Specific Measures. USAF would design all construction site stormwater management measures to accommodate (safely convey without creating erosive conditions) the 10-year frequency storm. The 10-year frequency storm represents a large event that will generally produce significant runoff and yet has a high chance of occurring in any given year (i.e., 10 percent) (CNMI BECQ and GEPA 2006).

USAF would design all temporary sediment trapping devices to retain runoff from a minimum of the 10-year storm. The 10-year storm represents a frequent event that generates runoff and potential sediment load (CNMI BECQ and GEPA 2006). USDA NRCS has calculated a 10-year, 1-hour rainfall event to be 2.92 inches for Saipan (USDA NRCS 2008).

For maximum efficacy, USAF site-specific stormwater management measures during construction would include some, or all, of the following to manage stormwater runoff from the 10-year frequency storm:

- **Stabilized construction entrances.** Stabilized construction entrances are temporary crushed rock/coral pads located at all points where vehicles enter or leave a construction site. The purpose of a stabilized entrance is to reduce the tracking of sediment/mud from the site onto paved roads and parking lots.

- **Silt fencing.** A temporary barrier of geotextile fabric, silt fencing is installed across a slope, around stockpiles, or along a perimeter. The purpose of a silt fence is to intercept sediment-laden runoff from small drainage areas of disturbed soil, slow runoff velocity, and allow sediment to settle out. Alternatives to silt fencing could include the following.
 - earth berms: linear barrier of compacted soil used to block or divert runoff.
 - compost socks: mesh tubes (also called filter socks or tubes) filled by blower with organic or wood mulch. They can be used around site perimeters, as conveyance checks, and as inlet protection.
 - silt dikes: reusable, triangular, foam product covered in geotextile used along perimeters, curbs, and as check dams.
- **Berms and swales.** Berms and swales, depending on their location, can be used to divert “clean” runoff around disturbed areas, or to move “dirty” runoff to sediment traps. Berms (also called earth berms or diversion dikes) are mounds of compacted soil placed at the top or base of slopes, along the site perimeter, or across exposed areas. Swales are temporary channels used to convey runoff to a sediment trapping device.
- **Check dams.** Small check dams constructed of rock/coral, bagged sand, compost tubes, or other durable materials are placed across an open drainage channel to reduce erosive runoff flows and allow sediment to settle out.
- **Channels.** Vegetated or lined channels are used to safely convey flows from stabilized areas or outlets without damage from erosion. Waterways are typically stabilized with grass, erosion control matting, rock rip rap, gabions, or concrete depending on slope, soil, and runoff velocity.
- **Basins and traps.** Large basins and small traps are temporary ponding structures used to collect runoff and allow sediment to settle out before runoff leaves site. Basins and traps are formed by an embankment and/or excavation.
- **Stabilization.** Covering an area of bare ground with vegetation, topsoil, mulch, or erosion control blankets for temporary or permanent erosion prevention is critical. Temporary stabilization is often needed because grading operations can last several months and extend into or through the rainy season. Final stabilization will be required for project close out. Vegetative cover can be established through a combination of seeding techniques, topsoil amendments, and mulching to conserve moisture and control weeds.
- **Erosion control blankets.** Temporary erosion control blankets (also called matting) are used to hold seed and soil in place, particularly on steep slopes. There are many types of products available made of biodegradable or synthetic materials.
- **Inlet protection.** Various inlet protection devices can be used as temporary structures to keep silt, sediment, and construction debris from entering storm drains through open inlets. Devices should trap sediment while allowing water to slowly flow over or through materials.

- **Outlet protection.** Rock should be placed around and below an outlet to stabilize the outlet, reduce the depth and velocity of discharge waters, and prevent downstream erosion. Outlet protection applies to culverts, outfalls from basins, and other conduits.
- **Level spreaders.** Level spreaders are temporary (or permanent) devices that take concentrated flow from a pipe, berm, or swale and release it evenly over a wider area to prevent erosion and promote infiltration. This is particularly useful where sheet flow discharges through vegetated buffers are possible.

3.2.3 Stormwater Monitoring

All stormwater management structures and practices would be inspected and maintained during all stages of the construction process in accordance with the SWPPP and CNMI regulations to ensure proper function. Inspections would be conducted by on-site USAF or contractor personnel. At a minimum, those inspections would occur following major rainfall to ensure that stormwater control structures are functioning as designed and remain effective.

USAF would implement an adaptive management approach that would be based on information obtained during regular monitoring and inspection of construction stormwater management controls. USAF would identify any structures that are damaged or are not functioning in accordance with applicable standards and repair them. All construction stormwater management procedures will ensure maximum protection of the marine environment. These procedures will be detailed in a SWPPP, and will comply with all applicable USEPA NPDES Construction General Permit requirements. USAF has programmed for costs associated with stormwater monitoring and repair, if needed, to ensure timely completion of these inspections and repairs as a part of an adaptive management process. The USAF Engineering Technical Letter 14-1 *Construction and Operation and Maintenance Guidance for Storm Water Systems* provides inspection checklists and schedules for each type of stormwater management control that would be followed for inspections and maintenance.

3.2.4 Erosion and Sediment Control Standards

USAF would follow standards for erosion and sediment control during construction of both Proposed Actions recommended by CNMI Chapter 65-30 *Earthmoving and Erosion Control Regulations*, most recently published in 2017, and the *2006 CNMI and Guam Stormwater Management Manual* (CNMI BECQ and GEPA 2006), including the following:

- **Standard 1:** Minimize unnecessary clearing and grading from all construction sites. Clearing and grading shall only be performed within areas needed to build the project, including structures, utilities, roads, recreational amenities, post-construction stormwater management facilities, and related infrastructure. Clearing should only be scheduled during the dry season if possible. Mass clearing during the wet season should be avoided.
- **Standard 2:** Whenever practicable and feasible, construction shall be phased to limit disturbance to only one area of active construction at a time. Future phases shall not be disturbed until construction of prior phases is complete and the land area is stabilized.

- **Standard 3:** Disturbed areas shall be stabilized as soon as feasibly possible after construction is completed within a designated construction area, and in no case longer than 14 days after completion of active construction.
- **Standard 4:** Steep slopes shall be protected from erosion by limiting clearing of these areas in the first place or, where grading is unavoidable, by providing special techniques to prevent upland runoff from flowing down a steep slope and through immediate stabilization to prevent gullying. A steep slope is defined as any slope over 20 percent (5:1) in grade over a length of 50 feet.
- **Standard 5:** Perimeter sediment controls shall be applied to retain or filter concentrated runoff from disturbed areas to trap or retain sediment before it leaves a construction site. Upland runoff should be diverted around excavations where possible.
- **Standard 6:** Sediment trapping and settling devices shall be employed to trap and/or retain suspended sediments and allow time for them to settle out in cases where perimeter sediment controls (e.g., silt fence) are deemed to be ineffective in trapping suspended sediments on-site.
- **Standard 7:** All construction site managers (or superintendents) shall provide documentation that they have received adequate training in the application and maintenance of erosion and sediment control practices.
- **Standard 8:** All construction site managers must participate in a pre-construction meeting with the applicable authority to review the provisions of the erosion and sediment control plan and make any field adjustment necessary to implement the intent of the plan to minimize erosion and maximize sediment retention on-site throughout the construction process.
- **Standard 9:** Construction should be scheduled to minimize soil exposure in the rainy season (1 July–30 November) and during periods of coral spawning. The 2014 CNMI Water Quality Standards note that to avoid coral spawning, a stoppage period starting around the June or July full moon (to be determined by the Bureau of Environmental and Coastal Quality), is required. The stoppage period, if determined to be applicable, shall be no less than twenty one calendar days (CNMI BECQ 2014a). USAF will also contact CNMI BECQ to determine when soil exposing work should be halted during spring rainfall events to avoid adversely affecting soft corals that are spawning.
- **Standard 10** Erosion and sediment control practices shall be aggressively maintained throughout all phases of construction. All erosion and sediment control plans shall have an enforceable operation and maintenance agreement.

USAF would keep waste materials, stockpiles, and building supplies tied down or covered to protect from wind or stormwater. Additionally, in accordance with CNMI Chapter 65-30 *Earthmoving and Erosion Control Regulations*, USAF would minimize grading, filling, clearing of vegetation or other disturbance of the soil during inclement weather and for the resulting period of time when the site is in a saturated, muddy or unstable condition.

3.2.5 Erosion and Sediment Control Plan

In compliance with CNMI Chapter 65-30 *Earthmoving and Erosion Control Regulations*, USAF would develop an Erosion and Sediment Control Plan that would be implemented during construction. The plan would include the following, at a minimum:

- elevations and dimensions including quantity, and extent of proposed grading
- existing tree locations, size, species, and the proposed extent and manner of tree cutting and vegetation clearing
- a description of equipment and methods to be employed.

3.2.6 Water Quality Management

Parameter that provide an indication of water quality include concentration of dissolved oxygen; levels of fecal coliform bacteria from human and animal wastes; concentrations of plant nutrients nitrogen and phosphorus; amount of particulate matter suspended in the water (turbidity); and amount of salt (salinity). In many bodies of water, the concentration of chlorophyll-*a*, a green pigment found in microscopic algae, is also filtered from water samples to give a measure of the microalgae living in the water column. Quantities of pesticides, herbicides, heavy metals and other contaminants may also be measured to determine water quality.

USAF is required to comply with CNMI water quality standards in compliance with a Clean Water Act, Section 401 Certification. **Table 3-2** provides the CNMI BECQ-published water quality standards for the waters of CNMI, which are the minimum water quality criteria that the USAF would comply with for discharges into Tinian waters (CNMI BECQ 2014a) during construction. Parameters can be added to or deleted from the list based upon knowledge of the onsite activities. For example, if weeds are to be controlled by a particular herbicide, it could be included on the list of parameters. USAF would also implement an adaptive management approach during construction based on information obtained during regular monitoring and inspection if CNMI water quality standards are not being met.

Table 3-2. 2014 CNMI Water Quality Standards

Criteria	Level*
Enterococci	Shall not exceed a geometric mean of 35 per 100 milliliters (mL) based on samples taken in any 30 day interval. The Statistical Threshold Value is 130 Enterococci per 100 mL.
E. coli	Shall not exceed a geometric mean of 126 per 100 mL based on samples taken in any 30 day interval. The Statistical Threshold Value is 410 E. coli per 100 mL
pH	Shall not deviate more than 0.5 units from a value of 8.1; no lower than 7.6 or higher than 8.6
Nitrate-Nitrogen	Concentration shall not exceed 0.20 milligrams per liter (mg/L)
Total Nitrogen	Concentration shall not exceed 0.40 mg/L
Orthophosphate	Concentration shall not exceed 0.025 mg/L
Total Phosphorous	Concentration shall not exceed 0.025 mg/L
Ammonia	Concentration shall not exceed 0.02 mg/L
Dissolved oxygen	Concentration all waters shall not be less than 75 percent saturation. Where natural conditions cause lower dissolved oxygen levels, controllable water quality factors shall not cause further reductions.
Total suspended solids	Concentrations of suspended matter at any point shall not be increased from ambient conditions at any time, and should not exceed 5 mg/L except when due to natural conditions.
Salinity	No alterations of the marine environment shall occur that would alter the salinity of marine or estuarine waters more than 10 percent from ambient conditions or which would otherwise adversely affect the indigenous biota and sedimentary patterns, except when due to natural causes.
Temperature	Water temperature shall not vary by more than 1.0 °C from the ambient conditions.
Turbidity	Turbidity at any point, as measured by nephelometric turbidity units, shall not exceed 0.5 nephelometric turbidity units over ambient conditions.
Oil and Petroleum Products	The concentration of oil or petroleum products in any Commonwealth or State waters shall not: (a) Be detectable as a visible film, sheen, or discoloration of the surface, or cause an objectionable odor. (b) Cause tainting of fish or other aquatic life, be injurious to the indigenous biota, or cause objectionable taste in drinking water. (c) Form an oil deposit on beaches or shoreline, or on the bottom of a body of water.
Enterococci	Shall not exceed a geometric mean of 35 per 100 mL based on samples taken in any 30 day interval. The Statistical Threshold Value is 130 Enterococci per 100 mL.

Source: CNMI BECQ 2014a

Note: *The level given is the most stringent standard for the marine waters of Tinian. Less stringent standards are applicable for some criteria for discharges into the San Jose harbor or fresh waters.

3.3 Infrastructure Operation Actions and Standards

Once construction is complete, USAF would implement measures in **Sections 3.3.1 through 3.3.5** for long-term stormwater control and management of fuels infrastructure that would ultimately reduce potential environmental impacts on biological resources, geology and soils, water resources, and hazardous materials and wastes. These strategies would reduce the post-construction potential for: long-term increases in stormwater runoff, altered hydrologic

conditions, altered water quality, decline in groundwater recharge, groundwater contamination, construction and operation-related accidents, and a release of petroleum products.

3.3.1 Stormwater Monitoring

USAF would conduct post-construction site visits to inspect all permanent stormwater infrastructure and assess stormwater management structures and validate if they have been constructed according to plans and specifications.

All existing and USAF-constructed stormwater management structures and practices would be systematically inspected and maintained. USAF would revise the existing SWPPP or develop a new SWPPP for management of stormwater infrastructure once construction is complete. The SWPPP would guide the monitoring inspections, which would be conducted by on-site USAF or contractor personnel. At a minimum, those inspections would occur following major rainfall to ensure that stormwater control structures are functioning as designed and remain effective.

USAF would also implement an adaptive management approach based on information obtained during regular monitoring and inspection of permanent stormwater management controls. USAF would identify any structures that are damaged or are not functioning in accordance with applicable standards and repair them. The objectives and required standards described above would serve as thresholds for determining whether the construction stormwater management system would need to be improved to avoid affecting the nearshore marine environment. USAF Engineering Technical Letter 14-1 provides inspection checklists and schedules for each type of stormwater management control that would be followed for inspections and maintenance (USAF 2014).

The stormwater management system would be adaptively managed and revised or improved when necessary to ensure that all planned objectives and required standards are being met.

3.3.2 Water Quality Management

Based on the design, implementation, and management of controls described in **Sections 3.3.1 and 3.3.2**, USAF does not anticipate that stormwater runoff or POL would be discharged into the nearshore waters of Tinian during or after construction, or that the Proposed Actions would cause a measureable increase in the volume or discharge rate of fresh water into the marine environment. However, USAF would be committed to ensuring that any stormwater runoff or release from the project sites post-construction are consistent with CNMI Water Quality Standards.

3.3.3 Spill Prevention Control and Countermeasures

USAF would develop and implement a Spill Prevention, Control and Countermeasure (SPCC) Plan (as required by Section 311(j)(1)(C) of the Clean Water Act as amended by the Oil Pollution Act of 1990) to control the potential for contamination from the unlikely event of a spill during construction of the Proposed Actions.

The SPCC Plan would be prepared, maintained, and implemented to prevent, control, counteract, and report of all spills. The SPCC Plan would provide measure to prevent, and to the maximum extent practicable, to remove a worst case discharge from the facility. The plan

would be certified by an appropriately licensed or certified technical authority ensuring that the plan considers applicable industry standards for spill prevention and environmental protection, and that the plan is prepared in accordance with good engineering practice and is adequate for the facility. Specifically, the SPCC Plan would include:

- **Prevention Section.** The prevention section of the plan would contain information on the facility; charts of drainage patterns; designated water protection areas; maps showing locations of various infrastructure which store, handles, and transfer POL that could produce a spill; critical water resources; land uses; and possible migration pathways. Maps would also be included, as appropriate, to predict direction and rate of flow, as well as the total quantity of substances that might be spilled as a result of a major failure.
- **Arrangements for Emergency Services.** The plan would describe arrangements with local police departments, fire departments, hospitals, contractors, and emergency response teams to coordinate emergency services. The plan would include a list of all emergency equipment, such as fire extinguishing systems, spill control equipment, communications and alarm systems (internal and external), and decontamination equipment, at each site where this equipment is required; an evacuation plan and a designated meeting place.
- **Spill Control Section.** The control section of the plan would identify resources for cleaning up spills, and directions on how to provide assistance to other agencies when requested. This section of the plan would contain a prioritized list of various critical water and natural resources that would be protected in the event of a spill. The plan would identify other resources addressed in prearranged agreements that are available to cleanup or reclaim a large spill, if such spill exceeds the response capability of the facility.

Bioremediation could be used in the event of a spill, which could overcome the factors limiting rates of microbial hydrocarbon biodegradation. While microbial communities are adversely impacted by spills, some microbe species have the capacity to biodegrade hydrocarbons and play a major role in spill remediation. Examples of bioremediation include adding water to soils to maintain sufficient moisture for microbial growth or growing vegetation to increase the rate of jet fuel removal from the terrestrial environment.

3.3.4 Facility Response Plan

USAF would also develop a Facility Response Plan, per the Oil Pollution Act of 1990 which amended the Clean Water Act, which would address an accidental "catastrophic" spill. The Facility Response Plan would include the resources of all industrial activities and the U.S. Coast Guard to direct how to handle an incident of the scale beyond any single individual facility's capability to respond.

3.3.5 Inspection and Monitoring of Fuel Systems

To ensure proper operation of all fuel infrastructure, USAF would follow Technical Order 37-1-1, *General Operations and Inspection of Installed Fuel Storage and Dispensing Systems* and UFC 3-460-03, *Operation and Maintenance: Maintenance of Petroleum Facilities*. The safe, efficient,

and economical operation of petroleum dispensing systems, and associated infrastructure depends largely on an effective and proactive recurring maintenance program. USAF would follow UFC 3-460-03, which establishes the required frequency intervals for the recurring maintenance. Operation and maintenance of the pipeline would be managed by a PIMP to assist with and guide pipeline integrity maintenance. PIMPs improve the integrity management of piping systems and help prevent leaks or pipeline failures. The plans are developed based on the principles of *API Standard 570 Inspection, Repair, Alteration, and Rerating of In-Service Piping Systems* and federal and local regulations.

Additional standards and regulations that would be observed for operation, inspection, and monitoring of the fuel pipeline and infrastructure include the following:

Standard 1: Pressure Testing. An automatic pipe pressure testing system would be installed at the booster pump house. The system would be attached to the bulk receipt line and the transfer pipeline. The system would be used to conduct periodic integrity tests of the pipelines and ensure the pipelines are in good working order. Hydrostatic testing would be conducted in accordance with ANSI/ASME B31.3 and UFC 3-460-03.

Standard 2: Valves and Piping. USAF would periodically inspect, in accordance with the PIMP all valves, piping, and appurtenances associated with fuels infrastructure in accordance with API 570 which is the recognized industry standard.

Standard 3: Pipeline Safety Management Systems: USAF would follow API RP 1173, which provides guidance in developing or maintaining a pipeline safety management system. Elements of the management system include: leadership and management commitment; stakeholder engagement; risk management; operational controls; incident investigation, evaluation, and lessons learned; safety assurance; management review and continuous improvement; emergency preparedness and response; competence, awareness, and training; and documentation and recordkeeping.

Standard 4: Leak Detection. USAF would follow API RP 1175 and implement a “Leak Detection Program Management.” API RP 1175 is an industry consensus document that provides a risk-based approach to managing a leak detection program, including developing a leak detection culture and strategy, selecting the appropriate leak detection system, and monitoring leak detection program performance. This RP also identifies Control Center procedures, training, and the roles and responsibilities of Control Center personnel, as well as identifying proper testing of equipment and alarms.

4. Listed Species and Critical Habitat in the Action Area

At least 14 marine species classified as threatened or endangered under the federal ESA occur or could occur in the waters surrounding Tinian (see **Table 4-1**). This includes, five whales, two fish, three sea turtles, and three corals.

Table 4-1. Marine Threatened and Endangered Species with Potential to Occur Near Tinian

Common Name	Scientific Name	Federal Status	CNMI Status
Blue whale	<i>Balaenoptera musculus</i>	E	
Fin whale	<i>Balaenoptera physalus</i>	E	
Humpback whale (Western North Pacific DPS)	<i>Megaptera novaeangliae</i>	E	
Sei whale	<i>Balaenoptera borealis</i>	E	
Sperm whale	<i>Physeter catodon</i>	E	
Green turtle (Central West Pacific DPS)	<i>Chelonia mydas</i>	T	TE
Hawksbill turtle	<i>Eretmochelys imbricate</i>	E	TE
Olive ridley turtle	<i>Lepidochelys olivacea</i>	T	TE
Leatherback turtle	<i>Dermochelys coriacea</i>	E	
Scalloped hammerhead shark (Indo-West Pacific DPS)	<i>Sphyrna lewini</i>	T	
Giant manta ray	<i>Manta birostris</i>	T	
Coral - No common name	<i>Acropora globiceps</i>	T	
Coral - No common name	<i>Acropora retusa</i>	T	
Coral - No common name	<i>Seriatopora aculeata</i>	T	

Key: E = Endangered, T = Threatened, TE = Threatened and Endangered under CNMI Law

ESA-listed whales that occur near Tinian include blue whale (*Balaenoptera musculus*), fin whale (*Balaenoptera physalus*), humpback whale (*Megaptera novaeangliae*), sei whale (*Balaenoptera borealis*), and sperm whale (*Physeter macrocephalus*). The ESA-listed large whale species generally have a seasonal occurrence (mid-November thru mid-May) in the Mariana Archipelago while making migrations to feeding areas in higher latitudes (DON 2005, DON 2007, NMFS 2012). Because deep waters come close to shore around the Mariana Archipelago, it is possible that deepwater marine mammal species (those occurring along and seaward of the shelf break) could make their way into waters within a few miles of shore (e.g., sperm whales) (DON 2007, Fulling et al. 2011).

Four listed species of sea turtles have been documented near Tinian (see **Table 4-1**). Green sea turtles and hawksbill sea turtles are known to forage offshore of Tinian, and there is a small population of green sea turtles that nests there (Pultz et al. 1999, Kolinski 2001, Maison et al.

2010, NAVFAC 2014). Ninety-four percent of the sea turtles observed offshore of Tinian during surveys in July 2013 were green sea turtles (the remainder were hawksbills) and 75 percent of the green sea turtles were juveniles (NAVFAC 2014). Leatherback sea turtles are uncommon in the Tinian area; however, there have been two sightings of the species in open water (NAVFAC 2015). Nesting by green sea turtles likely occurs on all or most of the beaches on Tinian (Minton et al. 2009, Maison et al. 2010, DON 2010a), and nesting activity has been observed in all months (NAVFAC 2014). The CNMI is part of the migratory range of olive ridley sea turtles, but they are not known to nest there (WRPFMC Undated).

Scalloped hammerhead sharks are found worldwide in coastal warm temperate and tropical seas in the Atlantic, Pacific, and Indian oceans between 46°N and 36°S. The giant manta ray is found worldwide in tropical, subtropical, and temperate bodies of water; it is commonly found offshore, in oceanic waters, and near productive coastlines. These species were not observed during coastal surveys of Tinian for corals and sea turtles in support of the U.S. Marine Corps CNMI Joint Military Training EIS (NAVFAC 2014).

Three species of ESA-listed coral could occur offshore of Tinian (see **Table 3.2-4**), although only one of these species, *Acropora globiceps*, has been documented to date (NAVFAC 2014). Colonies of *Acropora globiceps* occur in the intertidal zone, upper reef slopes, and reef flats in water shallower than 26 feet (DON 2015).

5. Environmental Baseline Conditions

This section describes the current conditions and baseline of the following selected environmental factors that were considered to evaluate effects of the proposed Tinian Divert infrastructure improvements on marine species: topography, geology, and soils; land use; water resources; and the nearshore marine environment.

5.1 Topography, Geology, and Soils

5.1.1 Physiography and Topography

Tinian is composed of five limestone plateaus at varying elevations, separated by steep slopes and escarpments. The West route, East route, and roadway improvements are within the Central Plateau and Median Valley, and the seaport support infrastructure is within the Median Valley (see **Figure 5-1**).

The Central Plateau is characterized by broad and gently sloping terrain that is isolated by the steep slopes and scarps at its southern and northern boundaries. These steep slopes and scarps are associated with north-south trending faults. The Median Valley is a low, broad depression with little relief that is bounded by faults (University of Guam 2002, DON 2015).

Topography at the Tinian International Airport (at the northern end of the West and East routes) is relatively flat with elevations ranging from approximately 60 to 100 feet above mean sea level (MSL) (DON 2010b, USGS 1999). Elevation surrounding the airstrip drops towards the ocean to the east and west. Between the airport and the seaport (where the West route, East route, and roadway improvements are located), elevations range from approximately 20 feet above MSL near the seaport and shoreline to approximately 85 feet above MSL to the north.

Topography at the seaport where the fuel support infrastructure is located, ranges from less than 10 feet above MSL to approximately 30 feet above MSL (USGS 1999).

5.1.2 Geology

Karst topography exists on Tinian due to the presence of limestone on the island. Limestone is a soluble rock primarily composed of calcium carbonate; on Tinian, the source of calcium carbonate is primarily from coral reef. Karst is a distinctive topography formed by dissolution of underlying soluble rocks by surface water or groundwater. Karst is characterized by caves, sinkholes, and subsurface drainage. These dissolution features are created when rainwater, which is slightly acidic, dissolves carbonate rocks, such as limestone. **Figure 5-2** depicts the types of subsurface karst development on carbonate islands such as Tinian, although not all cave types occur on all carbonate islands (Stafford et al. 2005). Although karst topography does exist on Tinian, no karst features were detected during site investigations for the 2016 Divert EIS on Tinian, and karst features identified during geologic investigations by Gingerich and Yeatts in 2000 do not overlap the action area (University of Guam 2002).

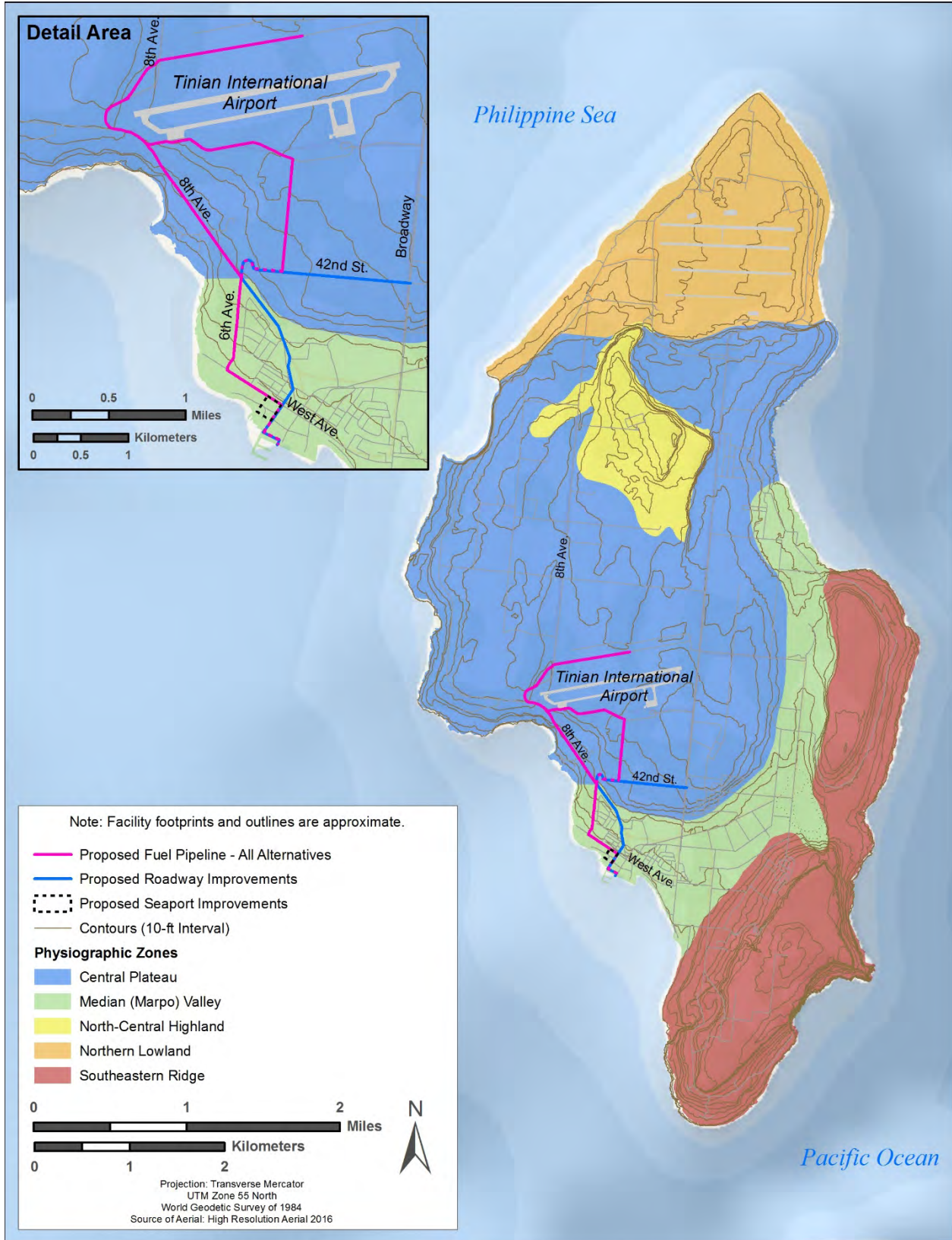


Figure 5-1. Tinian Physiography and Topography

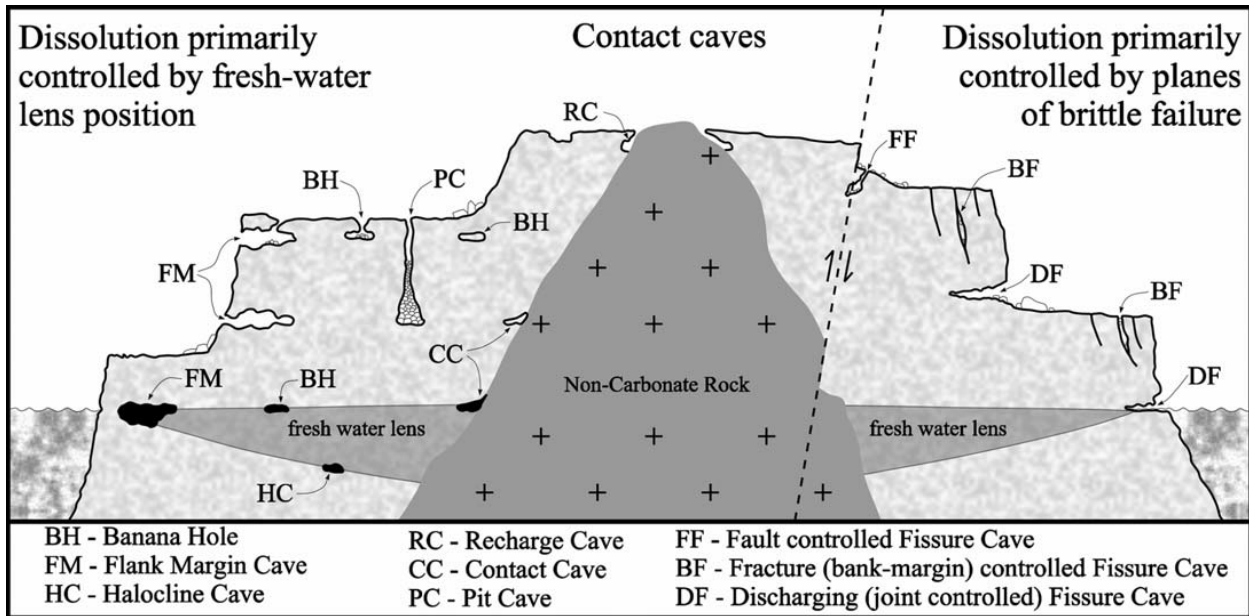


Figure 5-2. Types of Subsurface Karst Development on Carbonate Islands (Stafford et al. 2005)

The action area is at or near Tinian’s western coastline (see **Figure 5-1**). In the coastal regions of Tinian, Mariana limestone deposits are overlain by Holocene limestone, developing sands and gravels, and reefs (USGS 2002). Most of the shoreline on Tinian consists of limestone cliffs with sea level caverns, cuts, notches, and slumped borders. Reef development occurs primarily on the western coast, with minor fringing or apron reef development on the northern, eastern, and southern coasts (DON 2010a). Additionally, limestone outcrops occur at or near the ground surface at the Tinian International Airport (USAF 2016a).

5.1.3 Soils

Soil profiles on limestone regions are shallow and highly porous, (University of Guam 2002). **Table 5-1** lists the characteristics of soils mapped in the action area. There are six (excluding fill land) soil classes covering 97.7 acres present within the action area (see **Table 5-1** and **Figure 5-3**). Fill land comprises approximately 3.3 acres of the West and East routes and 0.78-acre of the roadway improvements. No important farmland soils are within the action area; therefore, farmland soils are not discussed further.

Table 5-1. Characteristics of Soils Mapped in the Action Area on Tinian

Soil Class Mapping Unit	Texture	Erosion Hazard*	Location (acres within action area)	Characteristics
Chinen-Urban Land	Urban land	Slight to moderate	West route (11.2 acres), East route (12.2 acres), roadway improvements (0.92 acre)	Shallow, well-drained, nearly level soils and urban areas
Chinen	Clay loam, very gravelly sandy loam	Slight to moderate	West route (22.2 acres), East route (23.0 acres), roadway improvements (3.2 acres)	Shallow to moderately deep, well-drained, nearly level to strongly sloping soils
Chinen-Rock Outcrop	Clay loam, rock	Moderate to severe	West route (6.2 acres), East route (7.5 acres), roadway improvements (0.52 acre)	Shallow, well-drained, nearly level to strongly sloping soils and rock outcrop; on limestone escarpments and plateaus
Dandan-Chinen	Clay loam, clay	Slight to moderate	West route (6.2 acres), East route (13.6 acres), roadway improvements (3.1 acres)	Shallow to moderately deep, well drained, nearly level to strongly sloping soils
Takpochao-Rock Outcrop	Rock	Slight	East route (0.04 acre)	Very shallow, well-drained, nearly level to strongly sloping soils and rock outcrop; on limestone escarpments and plateaus
Shioya	Loamy sand	Slight	West route (9.4 acres), East route (9.4 acres), seaport (8.2 acres), roadway improvements (0.70 acre)	Very deep, excessively drained, level to nearly level soils

Sources: USDA NRCS 1989, DON 2010b, USDA NRCS 2018

*Erosion hazard range is provided when multiple soil types are present within a soil class. Typically, the greater the slope, the greater the erosion hazard.

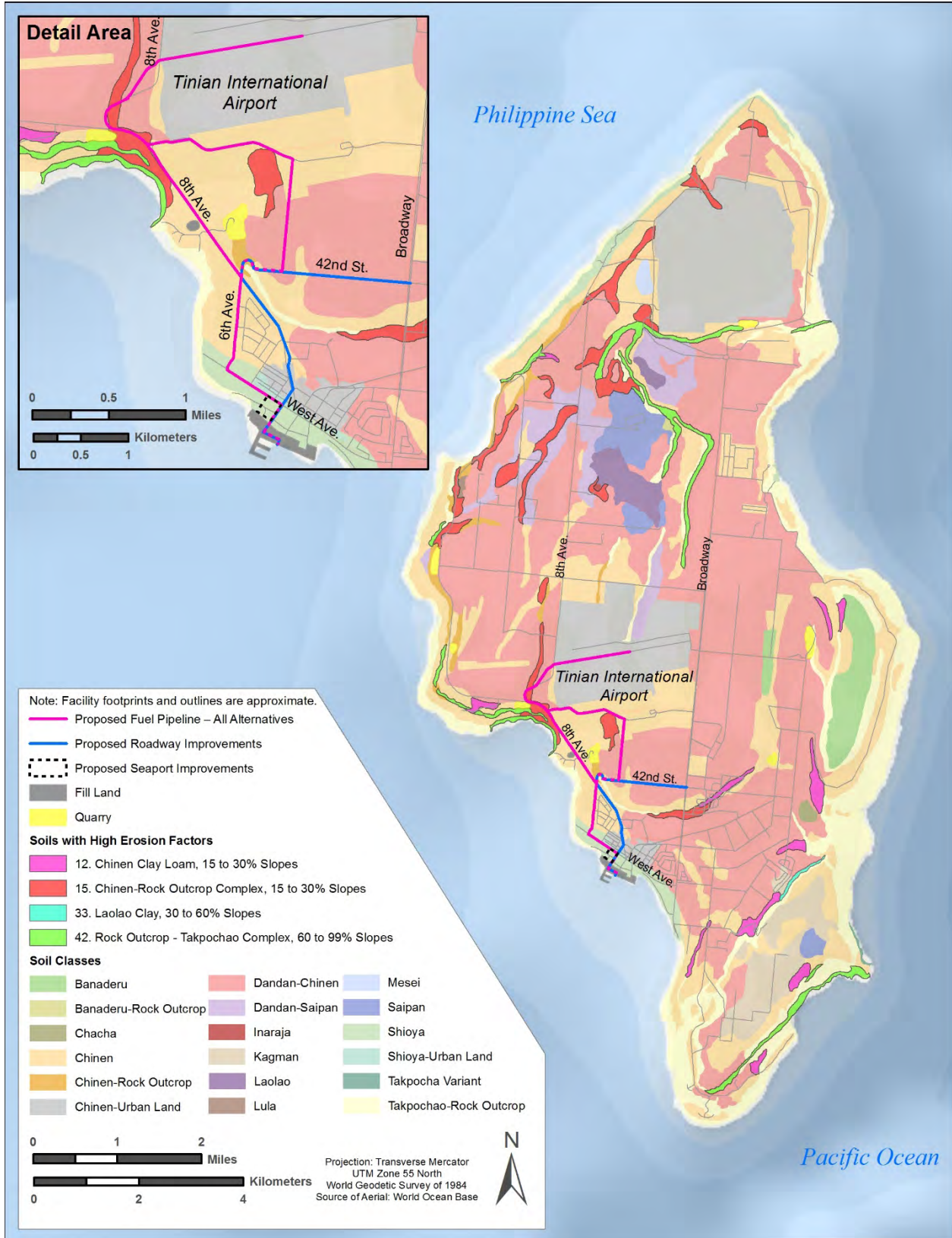


Figure 5-3. Tinian Soils Classes and Soils with High Erosion Factors

5.2 Land Use

Land use on Tinian is overseen by the CNMI Department of Public Lands (DPL), as the island does not have a local island-specific land use zoning board, zoning laws, or zoning maps. CNMI DPL land use designations are a combination of land ownership and land uses. The Office of Planning and Development was established in 2017 to oversee land use planning and sustainable development, consistent with DPL. Most land on Tinian is public land, and can include several uses such as civic, village and agricultural homesteads, nuisance activities (i.e., landfill, power generation, wastewater treatment plant, airport), public facilities (i.e., government offices, ports facilities, schools, roads), and community services. Land uses on the southern portion of Tinian are shown in **Figure 5-4**.

Tinian International Airport and the Tinian seaport are owned and operated by the Commonwealth Ports Authority under the Commonwealth Ports Authority Act. The airport is situated on approximately 1,400 acres of public land that is designated as a public facility. The area surrounding the airport is public land designated primarily as public facility undeveloped, undeveloped public land, and various conservation and agriculture uses (CNMI DPL 2018). The Tinian seaport, which is also a public facility, contains two piers, a small boat ramp, and a bulk fuel plant. It has undergone emergent repairs to the sea wall, bollards, and fenders and continues to support some shipping vessels. The land surrounding the seaport includes public and private land that is a mixture of public facility, residential, public facility undeveloped, undeveloped public land, and commercial/service industry uses (CNMI DPL 2018). Other land uses south of the airport and north of the seaport within public land include a quarry and a landfill (Tinian Municipal Dump).

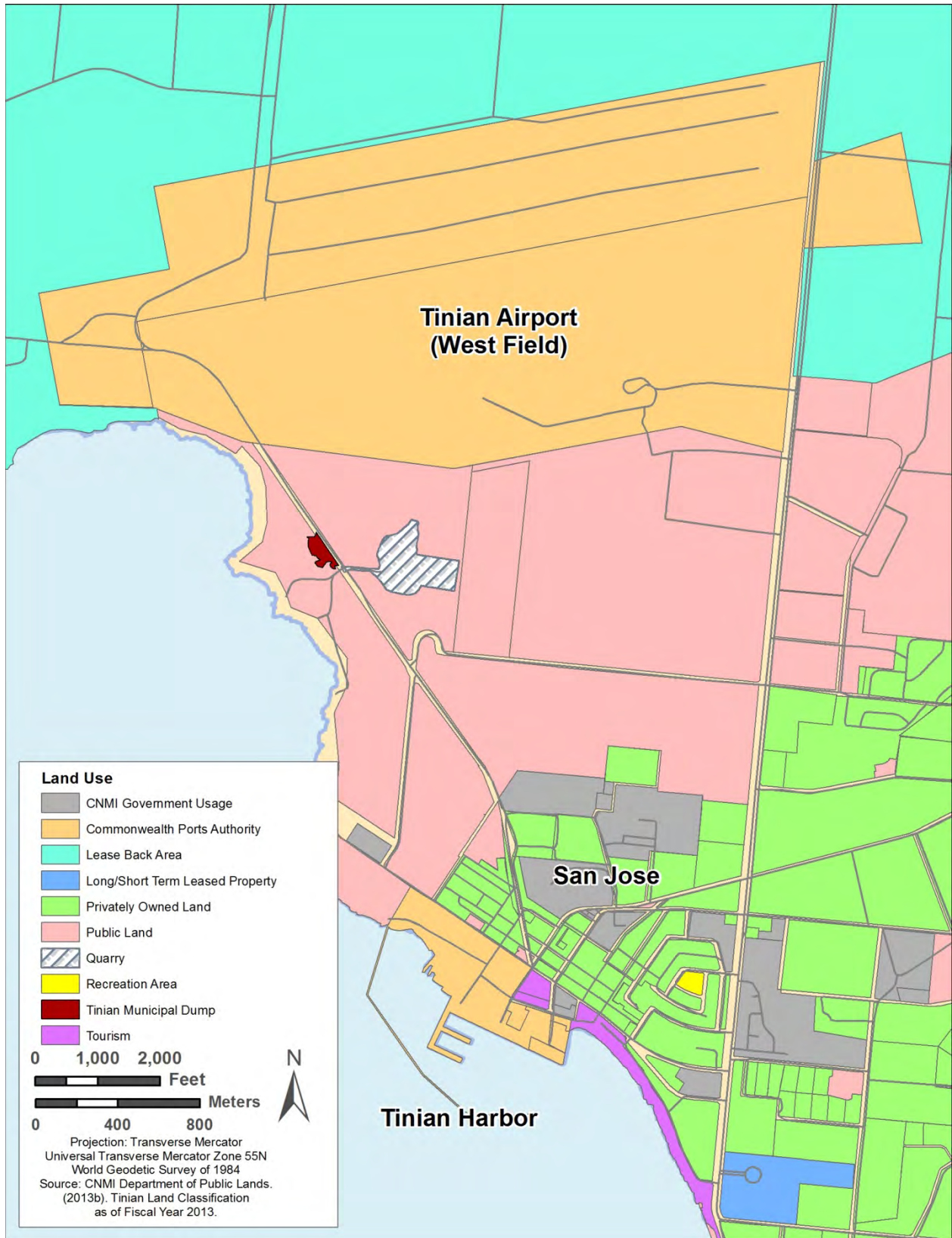
5.3 Water Resources

5.3.1 Groundwater

The main source of freshwater on Tinian is groundwater from a basal freshwater lens within an aquifer composed of high-permeability coralline limestone (Takpochao Limestone) overlying low-permeability volcanic rock (Gingerich 2002). The basal fresh water lens extends from 2 to 4 feet above MSL to approximately 80 to 160 feet below sea level at its deepest point (DON 2010c) (see **Figure 5-2**). Elevations of the water table in the action area range from 0.4 feet MSL at the proposed seaport and West route to 1.2 feet above MSL along the East route and at Tinian International Airport. Groundwater flows radially from the center of the island to coastal discharge zones (see **Figure 5-5**).

All fresh groundwater on Tinian originates as precipitation, mainly rainfall. The rain either runs off, evaporates or is transpired by vegetation, or recharges the groundwater system.

Approximately 7 percent of the annual rainfall becomes runoff, approximately 56 percent is evapotranspired, and approximately 37 percent recharges the groundwater. Tinian receives approximately 80 inches of annual rainfall with a distinct wet season (July through September) and dry season (February through March) (CNMI BECQ and GEPA 2006).



Source: DON 2010b

Figure 5-4. Land Use Near the Proposed Actions

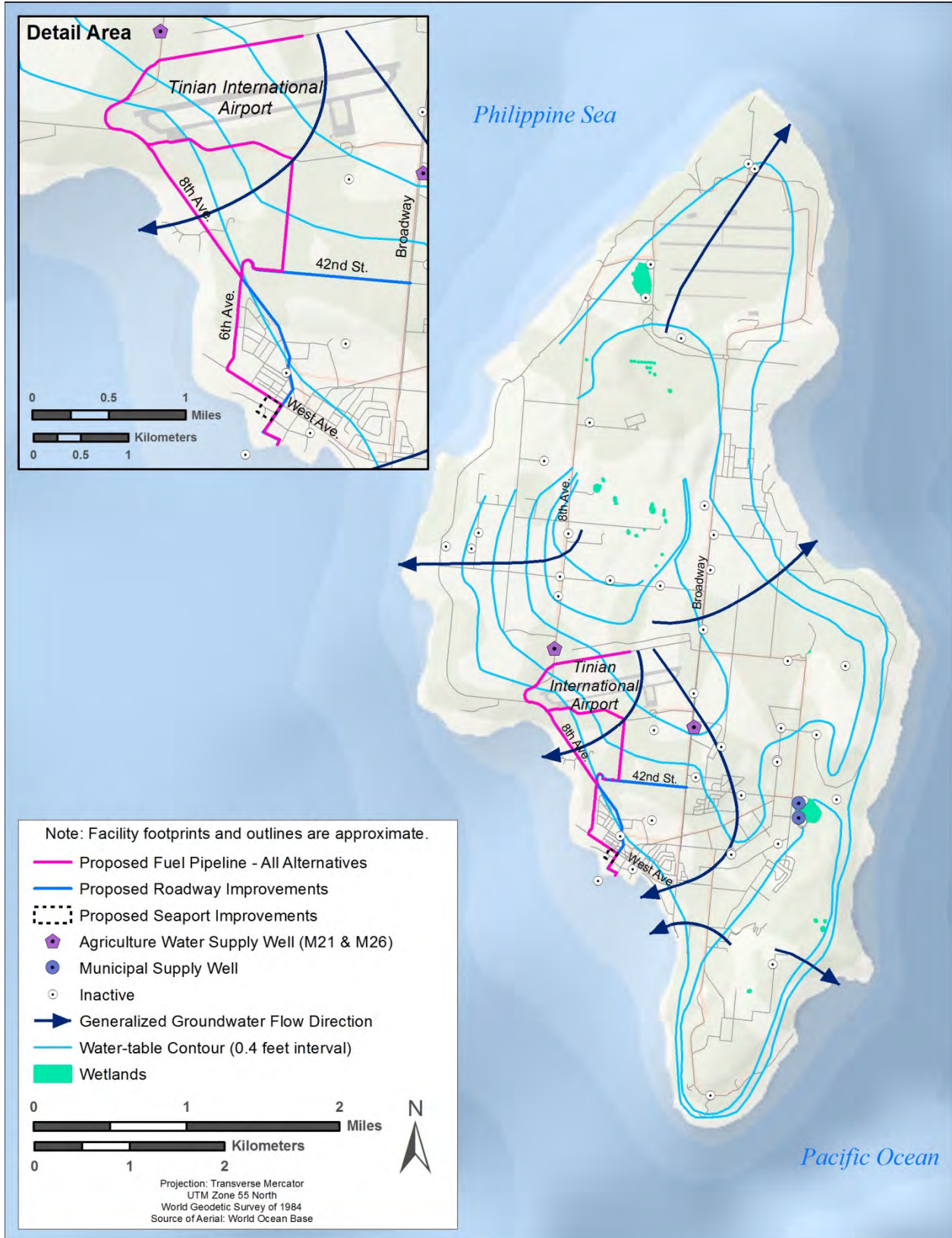


Figure 5-5. Water Map of Tinian

Existing groundwater resources may be capable of supplying up to 7 million gallons per day of potable fresh water (USAF 2016a). Water is withdrawn from the Makpo aquifer at a Maui-type well located east of San Jose Village (CPA and FAA 1998). From 1990 to 1997, groundwater withdrawal from this municipal well, the major source of water, averaged approximately 780 gallons per minute, or approximately 1.1 million gallons per day (Gingerich 2002). No sole source aquifer is designated on the island (CPA and FAA 1998).

5.3.2 Surface Water and Coastal Waters.

As discussed in **Section 2.4**, there are no perennial or intermittent streams on Tinian. Drainage throughout most of Tinian is underground and water generally percolates downward into porous limestone rock, which ultimately drain into coastal waters. The coastal waters associated with the Makpo, Puntan Daipolamanibot, and Masalok watersheds are included in the action area.

The CNMI Water Quality Standards define two classes (AA and A) of marine water uses (CNMI BECQ 2016). The majority of the coastal marine waters are Class AA, meaning that these waters should remain in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human source or actions. The uses protected in these waters are the support and propagation of marine life, conservation of coral reefs and wilderness areas, oceanographic research, and aesthetic enjoyment and compatible recreation inclusive of whole body contact and related activities. Class A waters are protected for their recreational use and aesthetic enjoyment; other uses are allowed as long as they are compatible with the protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water is of a limited body contact nature.

The coastal waters of the Makpo Watershed, the location of the proposed infrastructure at the seaport, are designated as Class A marine waters for recreational purposes and aesthetic enjoyment and are to be protected for these uses. The coastal waters of the Puntan Daipolamanibot and Masalok watersheds are designated as Class AA marine waters.

The coastal waters of the Makpo Watershed are impaired (Category 5) for aquatic life use because of low dissolved oxygen levels at one monitoring site (although the other sites have improved) and poor aquatic habitat and for recreational use because of Enterococci exceedances. The coastal waters of the Puntan Daipolamanibot and Masalok watersheds are impaired (Category 5) and are not attaining recreational use because of Enterococci. Total maximum daily loads for these impaired waters are required (CNMI BECQ 2016). Aquatic habitat is ranked as “fair” at Puntan Daipolamanibot and “good” at Masalok (CNMI BECQ 2016).

5.3.3 Wetlands

Wetland habitats on Tinian are typically discrete areas of impermeable clay that impound rainwater. In periods of drought, the water level in these wetlands drops and open water dramatically decreases. The largest wetland area on Tinian, Hagoi Lake (36 acres) in the northern lowland is supplied perennially by groundwater. Other Tinian wetlands are considered ephemeral because they are not large enough to sustain during periods of low rainfall. The Makpo wetland once supported open water, but municipal groundwater pumping significantly altered the water levels (DON 2010b).

None of the wetlands on Tinian are in close proximity to the action area. The closest wetland is more than 1 mile away from the proposed pipeline routes.

5.3.4 Flood Zones

According to Federal Emergency Management Agency Flood Insurance Rate Map Panel Number 750001 0040 B (effective date 15 May 1991), three areas designated as Flood Zone A occur near the Tinian International Airport (FEMA 1991). These flood zones are areas with a 1 percent annual chance of flooding. Because they are not associated with floodplains of surface water bodies, these flood zones are not protected under EO 11988, *Floodplain Management*. These flood zones are associated with depressions created by former excavation activities and are only considered flood zones because of their potential to hold water during heavy rain.

5.4 Marine Environment

The Tinian coastline is lined with rocky intertidal areas, steep cliffs, and the occasional sandy beach (DON 2015). Tinian's shoreline has 13 beaches (10 on the west coast [leeward side] and 3 on the east coast [windward side]) and is mostly undeveloped, except for Tinian Harbor (DON 2015). These beaches are comprised primarily of medium to coarse sands, gravel, and coral rubble (DON 2013). Coral reef habitat (hard bottom) covers approximately 8.9 square miles of the area around Tinian (Brainard 2012). There are approximately 0.10 to 0.15 square mile of reef flat around Tinian (Brainard 2012). Emergent vegetation is not found around Tinian (International Business Publications, USA 2011) with the seagrass, *Enhalus acoroides*, found at Unai Chiget.

As described in Brainard 2012, surveys conducted in 2003, 2005, and 2007 recorded moderately low sand cover around Tinian, suggesting that the substrate around the island is predominantly hard. The distribution of habitat complexity and live coral cover around Tinian were both varied and in some areas appeared to associate well with each other (Brainard 2012).

The island of Tinian is virtually surrounded by shore-attached fringing reef (Riegl and Dodge 2008; Brainard 2012). Coral, starfish, sea urchins, sea cucumbers, mollusks, and tube worms are the most common types of invertebrates found on Tinian reefs (DON 2010b). Most of the reef habitat on Tinian has 1 to 10 percent hard coral cover, but patches exceeding 50 percent cover do occur, particularly in shallow waters (Minton et al. 2009; Brainard 2012; DON 2014; Heenan et al. 2015). These patches are on the northwest side of Tinian between Lamnibot Bay and Ustri "Cross" Point. Survey data from 2009, 2011, and 2014, indicate that the predominant benthic group is turf algae (approximately 48 percent cover), followed by macroalgae (approximately 19 percent cover), hard corals (approximately 16 percent cover), and encrusting algae (approximately 5 percent cover) (Heenan et al. 2015). Sites surveyed in 2009, 2011, and 2014 were classified primarily as mid-depth (20 to 60 feet) forereef sites but also included shallow (0 to 20 feet) and deep (60 to 200 feet) forereef sites (Heenan et al. 2015). In 2014, the water depth of the sample sites ranged from approximately 10 to 100 feet. Shore-attached fringing reefs are the dominant reef habitat type on Tinian. Well-developed reef crests are less common and there are seven well-developed reef flats on Tinian. Most of the surface water runoff from the Tinian International Airport and surrounding area flows toward Unai Barcinas

and Unai Leprosarium. All of the reef flats on Tinian are extremely small compared with well-developed reef flat habitats in the Mariana Island archipelago such as in Tumon Bay and Piti Bay on Guam (DON 2015).

Fish biomass was higher in 2011 than 2009 and 2014 for all consumer groups (groups of fish based on diet) (planktivores, secondary consumers, and piscivores) except primary consumers. Note that primary consumers include herbivores and detritivores, while secondary consumers include omnivores and benthic invertivores. Survey data from 2009, 2011, and 2014 indicate that fish biomass by consumer group generally followed the same trend as the southern Mariana Island region. That is, the largest biomass is from the primary consumers, followed by secondary consumers, piscivores, and planktivores (Heenan et al. 2015).

6. Effects of the Action

The proposed Tinian Divert infrastructure improvements include planning, construction, and operation. The project is completely on land and neither the construction nor operation of the infrastructure include in-water activities. Thus, the proposed project would not directly affect the marine environment but has the potential to indirectly affect marine threatened and endangered species in the action area through stormwater runoff, sedimentation, and spills of hydrocarbons and other pollutants.

In order to avoid these indirect effects, USAF will develop and implement plans and procedures, design facilities, and adaptively manage their actions and facilities, as described in **Section 3** and as summarized below, to avoid and minimize runoff of stormwater and sediment and POL discharge into the nearshore marine environment, both during and after construction.

The design of the proposed pipeline infrastructure and roadway improvements would focus on maintaining predevelopment hydrology and preventing net increases in stormwater runoff once construction is complete. Fuel infrastructure would be designed, constructed, operated and maintained according to the most stringent applicable federal and CNMI requirements in order to reduce the likelihood of spills during construction and operation of the pipeline infrastructure, as well as the impact of spills (e.g., or spill migration to nearshore waters) in the unlikely event that one should occur. Impervious surfaces would not be increased beyond those planned for the original Divert project and additional calculation of pre- and post-development stormwater volumes would not be necessary (DoD 2015). Thus, the Tinian Divert infrastructure improvements are expected to result in no or an unmeasurably small increase in the total amount of sediment, fresh water, or other pollutants flowing into the ocean.

USAF would also implement an adaptive management approach that would be based on information obtained during regular monitoring and inspection of temporary and permanent stormwater management controls and fuel infrastructure. USAF would ensure the proper operation, maintenance and integrity of the pipeline by implementing the measures discussed in **Section 3.3.5**. USAF would identify any structures that are damaged or are not functioning in accordance with applicable standards and repair them. The stormwater management system would also be improved when necessary to ensure that all planned objectives and required standards continue to be met. In addition, the planned objectives and required standards described above would serve as thresholds for determining whether the construction stormwater management system would need to be improved to avoid affecting the nearshore marine environment. USAF is committed to program, fund, and execute post-construction stormwater BMPs. These requirements are currently programmed for military construction projects to ensure timely completion of these requirements as a part of an adaptive management process during the construction phase. After the construction is completed, post-construction BMP requirements will be detailed in a SWPPP. Programmed funds will be used exclusively when BMP triggers to be outlined in the SWPPP are met.

In addition, USAF would develop and implement spill control and prevention measures to prevent the release of fuel or other contaminants during construction and operation of the fuel infrastructure. An SPCC Plan shall be prepared and maintained to ensure maximum protection

of the marine environment in the unlikely event of a hazardous material spill during construction and operation of the fuel infrastructure.

In summary, and based on the following site conditions and project plans, the Tinian Divert infrastructure improvements would result in no or insignificant effects on marine threatened and endangered species.

These conclusions are based on the following:

- No activities would be conducted in marine waters.
- There would be no net increase of activity at the Tinian harbor, beyond what was previously analyzed in the 2016 Divert EIS and no modification of in-water facilities there.
- LID strategies will be used for long-term stormwater infrastructure design (**Section 3.1.1**).
- All proposed fuels infrastructure on Tinian would be designed, constructed, operated and maintained according to the most stringent applicable federal and CNMI requirements (**Sections 3.1, 3.2, and 3.3**).
- During construction, USAF and its contractors will manage stormwater runoff in accordance with the USEPA NPDES Construction General Permit and will develop the following plans and comply with the following standards.
 - A SWPPP will be developed and implemented in accordance with USEPA guidelines (**Section 3.2.2**)
 - An ESCP will be developed and implemented in accordance with CNMI regulations (**Section 3.2.5**).
 - Standards for erosion and sediment control recommendations in the CNMI and Guam Stormwater Management Manual would be met (**Section 3.2.4**).
- The site-specific stormwater management measures implemented during construction will meet the following requirements.
 - Accommodate runoff from the 10-year frequency storm (**Section 3.2.2**).
 - Retain onsite sediment in runoff from a 10-year frequency storm (**Section 3.2.2**).
- USAF will halt or modify work that could result in the release of sediments from construction sites when corals are spawning (**Section 3.2.4**).
- Facilities will be designed and adaptively managed to ensure that any stormwater discharges meet CNMI Water Quality Standards (**Sections 3.2.3, 3.2.6, and 3.3.1**).
- All stormwater management and spill prevention structures and practices will be monitored during construction and operation in accordance with the SWPPP and CNMI regulations to ensure proper function. The stormwater management system will be

adaptively managed and improved when necessary to ensure that all planned objectives and required standards are being met (**Sections 3.1., 3.2, and 3.3**).

- USAF would ensure proper operation, inspections, maintenance, and monitoring of all fuel infrastructure, by following all federal requirements, which establish frequency intervals for maintenance (**Section 3.3.5**).
- Spill prevention and control measures and plans will be developed and implemented for construction and operation of the fuel infrastructure to prevent the release of pollutants and to respond to unanticipated event (**Sections 3.3.3 and 3.3.4**).

7. Summary and Conclusions

USAF completed consultation with the NMFS in 2012 and 2016, as required under Section 7 of the ESA, for the implementation of Divert activities and exercises at the Tinian International Airport. That proposed action included, among many other actions, the construction of fuel infrastructure at the Tinian airport and seaport, as well as fuel transport from the seaport to the airport by tanker truck. Following completion of that consultation process, USAF conducted further evaluation of the fuel requirement and associated infrastructure, and now proposes to construct a fuel pipeline and associated infrastructure at the Tinian seaport to transport fuel from the seaport to the airport. USAF also proposes to improve certain existing roads between the seaport and airport to support the Divert activities. This BA evaluates the potential effects of those supplemental Divert activities on threatened and endangered species in the marine environment.

The design of the proposed pipeline infrastructure and roadway improvements would focus on maintaining predevelopment hydrology and preventing net increases in stormwater runoff once construction is complete. Impervious surfaces would not be increased beyond those analyzed in the 2016 Divert EIS; additional calculation of pre- and post-development stormwater volumes would not be necessary (DoD 2015). USAF would also implement an adaptive management approach that would be based on information obtained during regular monitoring and inspection of temporary and permanent stormwater management controls. USAF would ensure the proper operation, maintenance and integrity of the proposed fuel infrastructure. Based on these project controls, the Tinian improvements are expected to result in no or an unmeasurably small increase in the total amount of sediment, fresh water, or other pollutants flowing into the ocean. Therefore, **USAF concludes that the Tinian Divert infrastructure improvements are not likely to adversely affect any marine threatened and endangered species under NMFS jurisdiction.**

8. Literature Cited

- Brainard 2012 Brainard, R. *Coral Reef Ecosystem Monitoring Report of the Mariana Archipelago: 2003 to 2007*. National Oceanic and Atmospheric Administration Fisheries, Pacific Islands Fisheries Science Center. Retrieved from http://www.pifsc.noaa.gov/cred/hmapping/monitoring_report_mariana_archipelago_2003-2007/index.php
- CNMI BECQ 2014a CNMI BECQ. 2014. Commonwealth of the Northern Mariana Islands Water Quality Standards. 2014.
- CNMI BECQ 2014b CNMI BECQ. 2014. Final Commonwealth of the Northern Mariana Islands Integrated 305(b) and 303(d) Water Quality Assessment Report. September 2014.
- CNMI BECQ 2016 CNMI BECQ. 2016. Final Commonwealth of the Northern Mariana Islands Integrated 303(d), 305(b) and 314 Water Quality Assessment Report. December 2016.
- CNMI BECQ and GEPA 2006 CNMI BECQ and Guam Environmental Protection Agency. 2006. CNMI and Guam Stormwater Management Manual. October 2006.
- CNMI DPL 2018 CNMI Department of Public Lands (DPL). 2018. *Draft CNMI Comprehensive Public Land Use Plan Update for Department of Public Lands and GIS Map Book*. February 2018. Available online: <<http://www.dpl.gov.mp/land-use-plan-resources/>>.
- CPA and FAA 1998 Commonwealth Ports Authority and Federal Aviation Administration (CPA and FAA). 1998. Final Environmental Assessment for the Airport Improvements at Tinian International Airport, Island of Tinian, Commonwealth of the Northern Mariana Islands. 26 August 1998.
- DoD 2015 Department of Defense. 2015. UFC 3-210-01 Low Impact Development. 01 June 2015.
- DON 2005 Department of the Navy (DON). 2005. *Marine resources assessment for the Marianas Operating Area*. Prepared for Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawai'i under contract number N62470-02-D-9997, CTO 0027. Prepared by Geo-Marine, Inc., Plano, Texas.
- DON 2007 DON. 2007. *Marine mammal and sea turtle survey and density estimates for Guam and the Commonwealth of the Northern Mariana Islands*. Contract number N68711-02-D-8043; CTO 0036. Honolulu, Hawai'i: Naval Facilities Engineering Command Pacific and Commander, U.S. Pacific Fleet. 2007.

- DON 2010a DON. 2010. *Mariana Islands Range Complex (MIRC) Environmental Impact Statement (EIS)*. July 2010.
- DON 2010b DON. 2010. Joint Guam Program Office (JGPO) *Guam and CNMI Military Relocation EIS*. July 2010.
- DON 2010c DON. 2010. *Update of the Integrated Natural Resources Management Plans for Navy Leased Lands on Tinian and Farallon De Medinilla. Plan Years 2010-2015*. 29 May 2010.
- DON 2013 DON. 2013. *Draft Mariana Islands Training and Testing (MITT) Environmental Impact Statement /Overseas Environmental Impact Statement*. Retrieved from <http://mitt-eis.com/DocumentsandReferences/EISDocuments/NoticeofIntentinFederalRegister.aspx>
- DON 2014 DON 2014. *Final Coral Marine Resources Survey Report in Support of the Commonwealth of the Northern Mariana Islands Joint Military Training Environmental Impact Statement/Overseas Environmental Impact Statement*. Prepared by Tetra Tech for Naval Facilities Engineering Command, Pacific.
- DON 2015 (DON). 2015. Commonwealth of the Northern Mariana Islands Joint Military Training Draft Environmental Impact Statement/Overseas Environmental Impact Statement. April 2015.
- FEMA 1991 Federal Emergency Management Agency. 1991. Flood Insurance Rate Map, Tinian Island. Historic Community Panel Number 750001 0040 B. Effective Date 15 May 1991.
- Fulling et al. 2011 Fulling, G.L., P.H. Thorson, and J. Rivers. 2011. Distribution and abundance estimates for cetaceans in the waters off Guam and the Commonwealth of the Northern Mariana Islands. *Pacific Science* 65(3):321–343.
- Gingerich 2002 Gingerich, Stephen. 2002. "Geohydrology and Numerical Simulation of Alternative Pumping Distributions and the Effects of Drought on the Ground-Water Flow System of Tinian, Commonwealth of the Northern Mariana Islands U.S. Department of the Interior." Available online: <<http://hi.water.usgs.gov/publications/pubs/wri/wri02-4077.pdf>>. Accessed 11 January 2012.
- Heenan et al. 2015 Heenan, A. McCoy, K., J. Asher, P. Ayotte, K. Gorospe, A. Gray, K. Lino, J. Zamzow, and I. Williams. 2015. Ecological monitoring 2014 - stationary point count surveys of reef fishes and benthic habitats of the Northwestern Hawaiian Islands, Mariana Islands, and Wake Atoll. Pacific Reef Assessment and Monitoring Program Data Report. NOAA Pacific Islands Fisheries Science Center. PIFSC Data Report DR-15-001.

- International Business Publications, USA 2011 International Business Publications, USA. 2011. *Northern Mariana Islands Country Study Guide. Volume 1 Strategic Information and Developments*. Washington, D.C. Retrieved from <http://books.google.com/books?id=DCPtTfe49IIC&printsec=frontcover#v=onepage&q&f=false>
- Kolinski 2001 Kolinski, S.P. 2001. *Sea turtles and their marine habitats at Tinian and Aguijan, with projections on resident turtle demographics in the southern arc of the Commonwealth of the Northern Mariana Islands*. Southwest Fisheries Science Center Administrative Report H-01-06C.
- Maison et al. 2010 Maison, K.A., Kinan Kelly, I. and K.P. Frutchey. 2010. *Green Turtle Nesting Sites and Sea Turtle Legislation throughout Oceania*. U.S. Dep. Commerce, NOAA Technical Memorandum. NMFS-F/SPO-110, p. 52.
- Minton et al. 2009 Minton, D., V. Brown, K. Dugger, T. Flores, K. Foster, P. Houk, J. Iguel, C. Kessler, S. Kolinski, T. Schils, J. Starmer, N. Sukraj, M. Tenorio, and M. Trianni. 2009. *Marine resource surveys of Tinian, Commonwealth of the Northern Mariana Islands (Volume I)*. Prepared for Headquarters, United States Army Corps of Engineers.
- NAVFAC 2014 Naval Facilities Engineering Command, Pacific (NAVFAC). 2014. *Sea Turtle Marine Resources Survey Report in Support of the Commonwealth of the Northern Mariana Islands Joint Military Training Environmental Impact Statement/Overseas Environmental Impact Statement*. Department of the Navy, Naval Facilities Engineering Command, Pacific. Hawaii.
- NAVFAC 2015 NAVFAC. 2015. *Draft Commonwealth of the Northern Mariana Islands Joint Military Training Environmental Impact Statement/Overseas Environmental Impact Statement*. Department of the Navy, Naval Facilities Engineering Command, Pacific. Hawaii.
- NMFS 2012 National Marine Fisheries Service (NMFS). 2012. Correspondence from Alecia Van Atta, Assistant Regional Administrator of Protected Resources, regarding Draft Environmental Impact Statement (DEIS) for the Divert Activities and Exercises for Guam and the Commonwealth of the Northern Mariana Islands, to Captain Rebecca Heyse, Pacific Air Forces, dated 18 July 2012.
- Pultz et al. 1999 Pultz, S., D. O'Daniel, S. Krueger, H. McSharry and G. Balazs. 1999. Marine turtle survey on Tinian, Mariana Islands. *Micronesica* 32:85–94.
- Riegl and Dodge 2008 Riegl, B. M. and Dodge, R. E. 2008. *Coral Reefs of the USA (Vol. 1). Dordrecht, The Netherlands: Kluwer Academic Publishers*.

- Stafford et al. 2005 Stafford, K. W., Mylroie, J. E., and Jenson, J. B. (2004). *Karst geology of Aguijan and Tinian, Commonwealth of the Northern Mariana Islands cave inventory and structural analysis of development* (No. Water and Energy Research Institute Technical Report #106). Retrieved from <http://www.weriguam.org/reports/item/karst-geology-of-aguijan-and-tiniancnmi-cave-inventory-and-structural-analysis-of-development.html>
- University of Guam 2002 University of Guam. 2002. Karst Geology and Hydrology of Tinian and Rota (Luta), CNMI: A Preliminary Report. September 2002.
- USAF 2014 United States Air Force (USAF). 2014. Engineering Technical Letter (ETL) 14-1: Construction and Operation and Maintenance Guidance for Storm Water Systems. Available at: https://www.wbdg.org/ccb/AF/AFETL/etl_14_1.pdf
- USAF 2016a U.S. Air Force (USAF). 2016. Final Environmental Impact Statement for Divert Activities and Exercises, Commonwealth of the Northern Mariana Islands. September 2016.
- USAF 2016b USAF. 2016. Record of Decision for the Final Environmental Impact Statement for Divert Activities and Exercises, Commonwealth of the Northern Mariana Islands. September 2016.
- USDA NRCS 1989 U.S. Department of Agriculture Natural Resources Conservation Service (USDA NRCS). 1989. *Soil Survey of the Islands of Aguijan, Rota, Saipan, and Tinian, Commonwealth of the Northern Mariana Islands*.
- USDA NRCS 2008 USDA NRCS. 2008. Engineering Technical Note No. 3, Rainfall-Frequency and Design Rainfall Distribution, for Selected Pacific Islands. Available at: <https://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=21849.wba>
- USDA NRCS 2018 USDA NRCS. 2018. "Web Soil Survey." Available online: <https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>. Accessed 11 June 2018.
- USFWS 2013 USFWS. 2013. Biological Opinion for Divert Activities and Exercises at Saipan International Airport, CNMI. Pacific Islands Fish & Wildlife Office, Honolulu, HI. 27 June 2013.
- USFWS 2015 USFWS. 2015. Amendment to Biological Opinion for Development of Divert Capabilities and Conducting Divert Activities and Exercises, Saipan and Tinian, CNMI. Pacific Islands Fish & Wildlife Office, Honolulu, HI. 30 October 2015.

- USGS 1999 U.S. Geological Survey. 1999. Topographic Map of the Island of Tinian. Available online: <http://www.lib.utexas.edu/maps/topo/pacific_islands/txu-oclc-060797124x-tinian.jpg>. Accessed 13 February 2012.
- USGS 2002 USGS. 2002. *Geohydrology and Numerical Simulation of Alternative Pumping Distributions and the Effects of Drought on the Ground-Water Flow System of Tinian, Commonwealth of the Northern Mariana Islands*. Water-Resources Investigations Report 02-4077. Available online: <<https://pubs.usgs.gov/wri/wri02-4077/pdf/wri02-4077.pdf>>. Accessed 16 May 2018.



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NOV 19 2018

RE: Tinian Divert Infrastructure Improvements (PIR-2018-10464, I-PI-18-1693-AG)

Dear Mr. Ingoglia:

On October 17, 2018, NOAA's National Marine Fisheries Service (NMFS) received your written request for concurrence that the U.S. Air Force (USAF)'s proposed Tinian Divert Infrastructure Improvements project is not likely to adversely affect (NLAA) the following endangered or threatened species under NMFS' jurisdiction: endangered hawksbill sea turtles and Central West Pacific Distinct Population Segment (DPS) green sea turtles, threatened Indo-West Pacific DPS scalloped hammerhead sharks, *Acropora globiceps*, *A. retusa*, and *Seriatopora aculeata*. There is no critical habitat designated in the action area. This response to your request was prepared by NMFS pursuant to Section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. §1531 et seq.), implementing regulations at 50 CFR 402, and agency guidance for the preparation of letters of concurrence.

This letter underwent pre-dissemination review using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The concurrence letter will be available through NMFS' Public Consultation Tracking System [<https://pcts.nmfs.noaa.gov>]. A complete record of this consultation is on file at the Pacific Island Regional Office, Honolulu, Hawaii.

Proposed Action

The USAF previously consulted with NMFS twice on activities in Tinian, on October 30, 2012 and March 28, 2016 (NMFS No. PIR-2016-9800). In the previous consultations, we concluded that the USAF's action was not likely to adversely affect ESA-listed species in the action area. The USAF is requesting consultation for changes in the action.

The USAF is proposing to improve the existing airfield at the Tinian International Airport and Tinian seaport to accommodate joint military cargo, tanker, and fighter aircraft that may



bediverted from their primary airfields or that may be operated from those fields to support periodic exercises, and humanitarian and disaster relief assistance. The USAF will also conduct military aircraft training at the runway when the airfield at Anderson AFB is not available. In the previous consultation, the USAF proposed to construct tanks near the seaport to store fuel.

The USAF is proposing to construct a fuel pipeline and associated infrastructure at the Tinian seaport to transport fuel from there to the airport, which will eliminate the need for the construction of fuel tanks and operations that would include trucking fuel from the tanks to the airport. Most of the pipeline will be buried within the right-of-way of the access road, and will be equipped with an impressed current cathodic protection system and would be designed to allow for cleaning and testing of the pipeline between the seaport and the airport. We evaluated the potential effects of those changes and the project as a whole to ESA-listed species.

The USAF will construct a parking apron, cargo pad, taxiway, maintenance facility, access road, jet fuel receiving facilities, a pipeline, fire suppression system, boom storage building, fencing, and utilities. The USAF will also reroute an existing road.

In total, the USAF will add up to 98 acres of new impervious surfaces to the action area, but could add less than that total. There is an abandoned airstrip of unknown size where some of the new facilities are being proposed. The USAF may remove the existing impervious surfaces to place new ones, or the new facilities may be built on the existing impervious surfaces, resulting in no net gain for portions of the project. The combined impervious surface footprint of the support infrastructure proposed is 4,550 square feet, compared to the 7,534 square feet for the fuel storage tanks and support structures analyzed in the 2016 consultation. Additionally, the combined area of potential disturbance proposed at the seaport (8.23 acres) is in the same area as the fuel storage tank area (5.29 acres) analyzed in the 2016 consultation. Therefore, much of the analysis in the 2016 consultation for construction of the fuel storage tanks is applicable to the new proposal for construction of the support infrastructure at the seaport. Impervious surfaces would not be increased beyond those analyzed in the 2016 consultation. The USAF will also incorporate low impact development measures into their designs to reduce their impact on the action area and the surrounding environment.

The USAF proposes to build a series of berms and swales to contain runoff and maximize infiltration. The USAF is designing stormwater treatment facilities to accommodate the volume and peak discharge flows of approximately 18 acre-feet, which is based on 2.2 inches of precipitation per year or at least the 95th percentile storm, based on the 24-hour precipitation depth average over a minimum of 10 years. This design is intended to maintain predevelopment hydrology and prevent net increase in stormwater runoff.

Action Area

The action area for this project is based on the area affected by potential stressors from the action. The action area for the previous consultations was based on noise from aircrafts, which were estimated to be the in-water area in line with and directly beneath the approach and departure paths of the aircraft operating out of these fields, up to about one mile from the shoreline. We expect the action area for this reinitiation of consultation to be identical to the

action area analyzed in those consultations. The installation of a pipeline in place of fuel tanks and associated operational changes is not expected to change the action area.

Listed Species

The USAF determined that the ESA-listed threatened and endangered species under NMFS jurisdiction listed in Table 1 are known to occur, or could reasonably be expected to occur, in nearshore areas in Tinian and thus may be present in the action area.

Table 1- ESA listed species considered in this consultation.

ESA Species	Listing Status	Listing Date and Federal Register Notice	Critical Habitat Date and Federal Register Notice (if applicable)
Central North Pacific Green sea turtle DPS (<i>Chelonia mydas</i>)	Threatened	05/06/2016 81 FR 20057	Not designated
Hawksbill sea turtle (<i>Eretmochelys imbricata</i>)	Endangered	06/02/1970 35 FR 8491	09/02/1998 63 FR 46693 None within action area
Indo-West Pacific Scalloped hammerhead shark DPS (<i>Sphyrna lewini</i>)	Threatened	09/02/2014 79 FR 38213	Not designated
Coral (no common name) <i>Acropora globiceps</i>	Threatened	10/10/2014 79 FR 53851	Not designated
Coral (no common name) <i>Acropora retusa</i>	Threatened	10/10/2014 79 FR 53851	Not designated
Coral (no common name) <i>Seriatopora aculeata</i>	Threatened	10/10/2014 79 FR 53851	Not designated

Detailed information about the biology, habitat, and conservation status of sea turtles and scalloped hammerhead shark can be found in their status reviews, recovery plans, federal register notices, and other sources at <http://www.nmfs.noaa.gov/pr/species/esa/>.

Analysis of Effects

To determine that a proposed action is NLAA listed species, NMFS must find that the effects of the proposed action are expected to be insignificant, discountable, or beneficial as defined in the joint USFWS-NMFS Endangered Species Consultation Handbook: 1) insignificant effects relate to the size of the impact and should never reach the scale where take occurs¹; 2) discountable effects are those that are extremely unlikely to occur; and 3) beneficial effects are positive effects

¹ Take” is defined by the ESA as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any threatened or endangered species. NMFS defines “harass” as to “create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering.” NMFS defines “harm” as “an act which actually kills or injures fish or wildlife.” Such an act may include significant habitat modification or degradation where it actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding or sheltering. Take of species listed as endangered is prohibited at the time of listing, while take of threatened species may not be specifically prohibited unless NMFS has issued regulations prohibiting take under section 4(d) of the ESA.

without any adverse effects (USFWS & NMFS 1998). This standard, as well as consideration of the probable duration, frequency, and severity of potential interactions, was applied during the analysis of effects of the proposed action on ESA-listed marine species, as is described in detail in the USAF's consultation request.

All of the structures and development associated with this project is upland and far from the nearshore marine environment. The USAF may affect listed species during and after program implementation in the following ways:

- Exposure to elevated noise;
- collision with vessels; and
- exposure to waste and discharge.

Exposure to Elevated Noise. The USAF may affect listed species exposed to upland construction-related noises. Man-made sounds can affect animals exposed to them in three ways: non-auditory damage to gas-filled organs, hearing loss expressed in permanent threshold shift (PTS) or temporary threshold shift (TTS), and behavioral responses or changes. The majority of noises from upland construction and aircraft will be aerial and not originating in water.

Airborne noises transfer to water poorly and is not expected to be heard at significant levels below the surface. The USAF anticipates an increase of aircraft activity for 8 weeks per year, and an estimated 720 operations (360 take-offs and 360 landings). The noise created by aircraft are not likely to be at levels that would be detected by corals, or harmful to scalloped hammerhead sharks or sea turtles. Sea turtles could be exposed by airborne sounds if they are at the surface while aircrafts are flying overhead, but exposure times would be short and unlikely to be long enough to cause TTS.

Sea turtles and scalloped hammerhead sharks could be exposed to increased vessel noise and traffic as vessels are bringing supplies and materials during construction, and to fuel ships after construction is complete. Vessel engine, propeller and other associated noises are generally within the range of hearing of all marine mammals, sea turtles, and manta rays. Larger vessels produce louder sounds that travel longer distances from the source and have the potential to cause TTS in sea turtles or scalloped hammerhead sharks. However, at the loudest levels, the sounds are being generated while the vessels are moving, which decreases the duration of exposure to animals in the action area and would therefore be extremely unlikely to result in TTS. At lower levels, which could occur as the vessel is in port, the sounds generated are not loud enough to cause TTS to sea turtles or sharks. We expect sounds generated from vessel movement to have insignificant effects on listed species.

NMFS has suggested behavior response thresholds of 120 dB_{RMS} threshold for continuous sounds and 160 dB_{RMS} for impulsive sounds for marine mammals and 160 dB_{RMS} for all types of sounds for sea turtles. Noises from the action will generate sounds louder than those respective thresholds, which could affect listed species in their zone of influence. According to the practical spreading model, the zone of influence could extend far from the source.

Although the NOAA acoustic threshold exists for behavioral responses, it is less understood or studied than hearing loss and non-acoustic injury. The majority of sounds generated by this action would be airborne where only sea turtles at the surface are reasonably likely to be exposed. The majority of in-water sound would be generated in Tinian Harbor, which is an active harbor with daily commercial activity and sounds from the project's activities would be similar to daily activities at the harbor. Sea turtles and scalloped hammerhead sharks may respond to noises by avoiding, halting their activities, experience reduced hearing by masking, or attraction to source noises. Avoidance is most likely, and a common natural reaction by listed species and considered low risk. Sea turtles and scalloped hammerhead sharks are large and agile, and capable of swimming away safely from any disturbance that would harm them. We expect minimal risk from behavioral changes by sea turtles and scalloped hammerhead sharks exposed to sounds generated during construction. We expect the sounds generated during this action will have insignificant effects to sea turtles and scalloped hammerhead sharks.

Vessel Collisions. The USACE will use a variety of vessels during the action including a barge and small vessels to transport materials and supplies to the construction site. There is a potential for vessels to collide with sea turtles and scalloped hammerhead sharks as the vessel travels from port to the construction site. Scalloped hammerhead sharks are not required to breathe at the surface and are extremely unlikely to be struck by vessels. Large vessels are generally slow moving and the number of vessel trips are relatively limited.

NMFS (2008) estimated 37.5 sea turtle vessel strikes and mortalities per year from an estimated 577,872 trips per year in Hawaii. This calculates to a 0.006% probability of a vessel strike for all vessels and trips, many of who are not reducing speeds or employing lookouts for listed species. We have less vessel data from Tinian but the mechanisms of vessel collision are likely similar to those in Hawaii, and expect probabilities to be similar. Although interactions may be less probable because the sea turtle population in Tinian is much smaller than in the Main Hawaiian Islands. Thus, we expect effects on sea turtles and scalloped hammerhead sharks from vessel collisions to be discountable.

Hazardous Wastes. The USAF will add impervious surfaces and increase activities at the airport and roads from the seaport to the airport, which could increase pollution generation on land. The USAF determined that the addition of facilities, covering up to 98 acres of new impervious surface will have an insignificant effect on listed corals, sea turtles and scalloped hammerhead sharks. After surveying the topography, geologic, and hydrologic properties of the soils, the USAF concluded that the buildout of the facilities will have an insignificant impact on marine resources because the changes in runoff after buildout will be immeasurable. The highly permeable soils and land offer adequate infiltration and opportunities for bioswale treatment to remove suspended solids and pollutants from runoff being generated from the new impervious surfaces.

The USAF is building a series of berms and swales that are designed to hold water from running off the site before it can be treated or infiltrated. The USAF are sizing the stormwater treatment features to treat up to 18 acre-feet of water generated from the runoff of the new impervious surfaces. This would effectively treat the amount of water generated from the most common large storms where pollutants could be carried off site into waterways. Water generated from one

source during larger storms is often buffered because water is running off and ponding elsewhere, and any addition to water quantity from the project would appear immeasurable. Pollutants from impervious surfaces are generally minimal after the first flush when pollutant concentrations are the highest runs off. If storms produces precipitation greater than the stormwater treatment site is sized for, pollutant loads from the new impervious surface will be immeasurable.

We concur that the proposed stormwater treatment methods and sizes are adequate to treat runoff associated with the new impervious surfaces, and differences in water quality and water quantity of water entering marine waters where listed species are exposed will be immeasurable, and frequency, duration and intensity of stormwater flowing into marine waters are likely to be immeasurable as well. We concur that such effects from stormwater generated from the new facilities will be insignificant to listed corals, sea turtles, and scalloped hammerhead sharks.

The USAF is also implementing a Spill Prevention, Control, and Countermeasure Plan and several technical orders that include facility response, inspection and monitoring, pipeline safety management, and maintenance. These measures are intended to avoid and minimize the effects of catastrophic failures or spills that could affect aquatic habitats. The potential effects to listed species from impact by catastrophic spill due to leaking, rupture, or spill is highly unlikely and we concur that such effects would be discountable.

In this consultation, NMFS considered the information and assessments in the USAF's consultation request and follow-up materials, and the best scientific information available about the biology and expected behaviors of the ESA-listed marine species considered in this consultation. The risks to ESA-listed corals, sea turtles and scalloped hammerhead sharks include exposure to elevated noise, collision with vessels, and exposure to waste and discharge. We considered each of these risks and determined them to be either discountable (vessel strike, direct contact, exposure to wastes) or insignificant (general disturbance, turbidity, noise, changes to habitat). NMFS agrees with 1) the list of ESA-listed species and critical habitat potentially exposed to the effects of the action; 2) the suite of identified stressors; and 3) the USAF's assessment of exposure risk and significance of exposure to those stressors.

Conclusion

NMFS concurs with your determination that the proposed Tinian Divert Infrastructure Improvements project is not likely to adversely affect Central West Pacific green sea turtle DPS, hawksbill sea turtle, and Indo-West Pacific scalloped hammerhead shark DPS, *Acropora globiceps*, *A. retusa*, and *Seriatopora aculeata*. This conclusion is based on your description of the action, the methods and material identified, and BMPs included in the description of the action. We expect all aspects of the project will be implemented as described, including BMPs. This concludes your consultation responsibilities for this action under the ESA for species under NMFS' jurisdiction. If necessary, consultation pursuant to Essential Fish Habitat would be completed by NMFS' Habitat Conservation Division in separate communication.

ESA Consultation must be reinitiated if: 1) take occurs; 2) new information reveals effects of the action that may affect listed species or designated critical habitat in a manner or to an extent

not previously considered; 3) the identified action is subsequently modified in a manner causing effects to listed species or designated critical habitat not previously considered; or 4) a new species is listed or critical habitat designated that may be affected by the identified action.

If you have further questions please contact Joel Moribe on my staff at (808) 725-5142 or joel.moribe@noaa.gov. Thank you for working with NMFS to protect our nation's living marine resources.

Sincerely,

A handwritten signature in black ink that reads "Ann M. Garrett". The signature is written in a cursive, flowing style.

Ann M. Garrett
Assistant Regional Administrator

NMFS File No. (PCTS): PIR-2018-10464
PIRO Reference No.: I-PI-18-1693-AG

Literature Cited

NMFS (National Marine Fisheries Service). 2008. Biological Evaluation: Effects of continued operation of the non-longline pelagic fisheries of the western Pacific on ESA-listed sea turtles and marine mammals. NMFS PIR, Honolulu, Hawaii. 32 pp. July, 2008.

U.S. Fish and Wildlife Service and National Marine Fisheries Service. 1998. Endangered Species Consultation Handbook. Procedures for Conducting Consultation and Conference Activities under Section 7 of the Endangered Species Act.

http://www.nmfs.noaa.gov/pr/pdfs/laws/esa_section7_handbook.pdf

D-4. Essential Fish Habitat (EFH) Assessment and Correspondence with NMFS

USAF has developed an EFH Assessment to evaluate the potential effects on EFH from the Proposed Actions. The Assessment documents the evaluation conducted by USAF to determine whether the Proposed Actions would adversely affect EFH. The USAF has chosen not to include a copy of the EFH Assessment in this Appendix because it repeats much of the information (project information, existing conditions, proposed compliance actions) included in the Marine Biological Assessment (**D-54**), the effects analysis in the SEIS (**Section 4.9**), and the EFH Assessment from the 2016 Divert EIS (Final EIS, Appendices Volume, Appendix B). USAF has provided the EFH Assessment to NMFS for their review, comment, and concurrence. A copy of NMFS concurrence with the USAF determination of effects on EFH will be provided here when available.

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APPENDIX E

Air Quality Analysis Supporting Documentation





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DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

E-1. West Route Emissions for Trenching, Construction, Coating, and Grading

1. General Information

- Action Location

Base: GENERIC BASE

County(s): Tinian

Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: TINIAN DIVERT INFRASTRUCTURE IMPROVEMENTS Supplemental EIS,
Commonwealth of the Northern Mariana Islands

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

- Projected Action Start Date: 8 / 2020

- Action Purpose and Need:

This proposed action address proposed changes since the September 2016 completion of the Environmental Impact Statement (EIS) for Divert Activities and Exercises and Record of Decision (ROD), signed December 7, 2016. The ROD announced the USAF decision to select the Modified Tinian Alternative (Final EIS, Section 2.7, page 2-52), and specifically the North Option (Final EIS, Section 2.5.2, page 2-28), as a future Divert location.

In the original EIS, USAF proposed to construct facilities and infrastructure at the Tinian International Airport (North Option) to support cargo, tanker, and similar aircraft and associated support personnel for divert operations, periodic exercises, and humanitarian assistance and disaster relief. The original EIS evaluated construction of fuel infrastructure at the Tinian airport and seaport, and also evaluated fuel transport from the seaport to the airport by tanker truck. After the ROD was signed in December 2016, USAF conducted further evaluation of the fuel requirement and associated infrastructure, including the feasibility of different alternatives that were not considered in the original EIS.

USAF now proposes to construct a fuel pipeline, and associated additional grading for layout at the seaport, to transport fuel from the seaport to the airport. USAF also proposes to improve certain existing roads between the seaport and airport to support Divert activities.

- Action Description:

Emissions are estimated for the following, for the SEIS:

1. Construct a west routing fuel pipeline from the Tinian seaport to the Tinian International Airport. (Trenching, Construction, Coating, Grading)
2. Construct an east routing fuel pipeline from the Tinian seaport to the Tinian International Airport. (Trenching, Construction, Coating, Grading)
3. Construct additional graded surfaces for pipeline infrastructure support at the Tinian seaport. (Grading)
4. Operate emergency generators at the Tinian seaport. (Emergency Generators)
5. Construct road improvements on certain existing roads that will be used for operations. (Excavation, Paving)

Of these items, numbers 1, 2, and 5 are in this file.

- Point of Contact

Name: Terri Rector

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Title: Contractor
Organization: HDR
Email: terri.rector@hdrinc.com
Phone Number: 512-914-4415

- Activity List:

Activity Type	Activity Title
2. Construction / Demolition	1. Pipeline Construction, West Route

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location

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

- Activity Title: 1. Pipeline Construction, West Route

- Activity Description:

Trench and install west routing pipeline, as follows:
 -existing ROW
 -width 80 feet
 -depth 3 feet

- Activity Start Date

Start Month: 8
Start Month: 2020

- Activity End Date

Indefinite: False
End Month: 7
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	7.499197
SO _x	0.084726
NO _x	39.636101
CO	31.525736
PM 10	39.504772

Pollutant	Total Emissions (TONs)
PM 2.5	1.685227
Pb	0.000000
NH ₃	0.009250
CO _{2e}	8220.4

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 8
Start Quarter: 1
Start Year: 2020

- Phase Duration

Number of Month: 36
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 (ft²): 52800
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: No
 Average Day(s) worked per week: 5

- Construction Exhaust

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	2	8
Scrapers Composite	3	8
Tractors/Loaders/Backhoes Composite	2	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20
 Average Hauling Truck Round Trip Commute (mile): 0

- 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): 4.08

- 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)

Excavators Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91

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Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDGT	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
HdGV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDDV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDDT	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
HDDV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
MC	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

- Worker Trips Emissions per Phase

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

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: 8
 Start Quarter: 1
 Start Year: 2020

- Phase Duration

Number of Month: 36
 Number of Days: 0

2.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 52800
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: No
 Average Day(s) worked per week: 5

- Construction Exhaust

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

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20
 Average Hauling Truck Round Trip Commute (mile): 0

- Vehicle Exhaust Vehicle Mixture (%)

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Worker Trips

Average Worker Round Trip Commute (mile): 4.08

- 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)

Excavators Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDGT	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
HDGV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDDV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDDT	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
HDDV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
MC	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800

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)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

- Worker Trips Emissions per Phase

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

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

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

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

2.3 Building Construction Phase

2.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 8
Start Quarter: 1
Start Year: 2020

- Phase Duration

Number of Month: 36
Number of Days: 0

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

2.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
 Area of Building (ft²): 43901
 Height of Building (ft): 2
 Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: No
 Average Day(s) worked per week: 5

- Construction Exhaust

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): 4.08

- 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): 4.08

- 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

- 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)

Cranes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0898	0.0013	0.6610	0.3917	0.0256	0.0256	0.0081	128.83
Forklifts Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0320	0.0006	0.1690	0.2160	0.0070	0.0070	0.0028	54.467
Generator Sets Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0395	0.0006	0.3232	0.2731	0.0149	0.0149	0.0035	61.081
Tractors/Loaders/Backhoes Composite								

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897
Welders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0310	0.0003	0.1734	0.1816	0.0102	0.0102	0.0027	25.672

- 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	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDGT	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
HDGV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDDV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDDT	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
HDDV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
MC	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800

2.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

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

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

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

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

BA: Area of Building (ft²)

BH: Height of Building (ft)

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

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

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

V_{POL}: Vehicle Emissions (TONs)

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

0.002205: Conversion Factor grams to pounds

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

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

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

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

WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)

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

NE: Number of Construction Equipment

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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

- Vender Trips Emissions per Phase

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

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

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

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

2.4 Architectural Coatings Phase

2.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 8
Start Quarter: 1
Start Year: 2020

- Phase Duration

Number of Month: 36
Number of Days: 0

2.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category:
Total Square Footage (ft²): 134048
Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: No
Average Day(s) worked per week: 5

- Worker Trips

Average Worker Round Trip Commute (mile): 4.08

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
--	------	------	------	------	------	------	----

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POVs	50.00	50.00	0	0	0	0	0
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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	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDGT	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
HdGV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDDV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDDT	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
HDDV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
MC	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800

2.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

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

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

1: Conversion Factor man days to trips (1 trip / 1 man * day)

WT: Average Worker Round Trip Commute (mile)

PA: Paint Area (ft²)

800: Conversion Factor square feet to man days (1 ft² / 1 man * day)

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

V_{POL}: Vehicle Emissions (TONs)

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

0.002205: Conversion Factor grams to pounds

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

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

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

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

BA: Area of Building (ft²)

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

0.0116: Emission Factor (lb/ft²)

2000: Conversion Factor pounds to tons

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DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

E-2. East Route Emissions for Trenching, Construction, Coating, and Grading

1. General Information

- Action Location

Base: GENERIC BASE

County(s): Tinian

Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: TINIAN DIVERT INFRASTRUCTURE IMPROVEMENTS Supplemental EIS,
Commonwealth of the Northern Mariana Islands

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

- Projected Action Start Date: 8 / 2020

- Action Purpose and Need:

This proposed action address proposed changes since the September 2016 completion of the Environmental Impact Statement (EIS) for Divert Activities and Exercises and Record of Decision (ROD), signed December 7, 2016. The ROD announced the USAF decision to select the Modified Tinian Alternative (Final EIS, Section 2.7, page 2-52), and specifically the North Option (Final EIS, Section 2.5.2, page 2-28), as a future Divert location.

In the original EIS, USAF proposed to construct facilities and infrastructure at the Tinian International Airport (North Option) to support cargo, tanker, and similar aircraft and associated support personnel for divert operations, periodic exercises, and humanitarian assistance and disaster relief. The original EIS evaluated construction of fuel infrastructure at the Tinian airport and seaport, and also evaluated fuel transport from the seaport to the airport by tanker truck. After the ROD was signed in December 2016, USAF conducted further evaluation of the fuel requirement and associated infrastructure, including the feasibility of different alternatives that were not considered in the original EIS.

USAF now proposes to construct a fuel pipeline, and associated additional grading for layout at the seaport, to transport fuel from the seaport to the airport. USAF also proposes to improve certain existing roads between the seaport and airport to support Divert activities.

- Action Description:

Emissions are estimated for the following, for the SEIS:

1. Construct a west routing fuel pipeline from the Tinian seaport to the Tinian International Airport. (Trenching, Construction, Coating, Grading)
2. Construct an east routing fuel pipeline from the Tinian seaport to the Tinian International Airport. (Trenching, Construction, Coating, Grading)
3. Construct additional graded surfaces for pipeline infrastructure support at the Tinian seaport. (Grading)
4. Operate emergency generators at the Tinian seaport. (Emergency Generators)
5. Construct road improvements on certain existing roads that will be used for operations. (Excavation, Paving)

Of these items, numbers 1, 2, and 5 are in this file.

- Point of Contact

Name: Terri Rector

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Title: Contractor
Organization: HDR
Email: terri.rector@hdrinc.com
Phone Number: 512-914-4415

- Activity List:

Activity Type	Activity Title
2. Construction / Demolition	2. Pipeline Construction, East Route

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location

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

- Activity Title: 2. Pipeline Construction, East Route

- Activity Description:

Trench and install east routing pipeline, as follows:
 -existing ROW
 -width 80 feet
 -depth 3 feet

- Activity Start Date

Start Month: 8
Start Month: 2020

- Activity End Date

Indefinite: False
End Month: 7
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	8.680969
SO _x	0.097174
NO _x	45.497254
CO	35.618945
PM 10	39.747442

Pollutant	Total Emissions (TONs)
PM 2.5	1.927462
Pb	0.000000
NH ₃	0.012200
CO _{2e}	9480.0

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 8
Start Quarter: 1
Start Year: 2020

- Phase Duration

Number of Month: 36
Number of Days: 0

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2.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 52800
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: No
 Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	2	8
Other Construction Equipment Composite	2	8
Rubber Tired Dozers Composite	2	8
Scrapers Composite	4	8
Tractors/Loaders/Backhoes Composite	2	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20
 Average Hauling Truck Round Trip Commute (mile): 0

- 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): 4.95

- 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)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

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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	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDGT	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
HDGV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDDV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDDT	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
HDDV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
MC	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

- Worker Trips Emissions per Phase

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

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
 WD: Number of Total Work Days (days)
 WT: Average Worker Round Trip Commute (mile)

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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: 8
 Start Quarter: 1
 Start Year: 2020

- Phase Duration

Number of Month: 36
 Number of Days: 0

2.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 52800
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: No
 Average Day(s) worked per week: 5

- Construction Exhaust

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

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20
 Average Hauling Truck Round Trip Commute (mile): 4.95

- 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): 4.95

- 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

2.2.3 Trenching / Excavating 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	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDGT	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
HDGV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDDV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDDT	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
HDDV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
MC	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800

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

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

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

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

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

- Worker Trips Emissions per Phase

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

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

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

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

2.3 Building Construction Phase

2.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 8
Start Quarter: 1
Start Year: 2020

- Phase Duration

Number of Month: 36
Number of Days: 0

2.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft²): 53262
Height of Building (ft): 2
Number of Units: N/A

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- Building Construction Default Settings
 Default Settings Used: No
 Average Day(s) worked per week: 5

- Construction Exhaust

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): 4.95

- 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): 4.95

- 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

- 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)

Cranes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0898	0.0013	0.6610	0.3917	0.0256	0.0256	0.0081	128.83
Forklifts Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0320	0.0006	0.1690	0.2160	0.0070	0.0070	0.0028	54.467
Generator Sets Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0395	0.0006	0.3232	0.2731	0.0149	0.0149	0.0035	61.081
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897
Welders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0310	0.0003	0.1734	0.1816	0.0102	0.0102	0.0027	25.672

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

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

LDGV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDGT	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
HDGV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDDV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDDT	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
HDDV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
MC	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800

2.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

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

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

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

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

BA: Area of Building (ft²)

BH: Height of Building (ft)

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

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

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

V_{POL}: Vehicle Emissions (TONs)

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

0.002205: Conversion Factor grams to pounds

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

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

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

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

WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)

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

NE: Number of Construction Equipment

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

V_{POL}: Vehicle Emissions (TONs)

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

0.002205: Conversion Factor grams to pounds

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

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Vender Trips Emissions per Phase

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

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

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

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

2.4 Architectural Coatings Phase

2.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 8
 Start Quarter: 1
 Start Year: 2020

- Phase Duration

Number of Month: 36
 Number of Days: 0

2.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category:
 Total Square Footage (ft²): 162632
 Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: No
 Average Day(s) worked per week: 5

- Worker Trips

Average Worker Round Trip Commute (mile): 4.95

- 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	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDGT	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800

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HDGV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDDV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDDT	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
HDDV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
MC	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800

2.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

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

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

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

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

- Off-Gassing Emissions per Phase

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

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

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DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

E-3. Seaport Infrastructure Construction

1. General Information

- Action Location

Base: GENERIC BASE

County(s): Tinian

Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: TINIAN DIVERT INFRASTRUCTURE IMPROVEMENTS Supplemental EIS,
Commonwealth of the Northern Mariana Islands

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

- Projected Action Start Date: 8 / 2020

- Action Purpose and Need:

This proposed action address proposed changes since the September 2016 completion of the Environmental Impact Statement (EIS) for Divert Activities and Exercises and Record of Decision (ROD), signed December 7, 2016. The ROD announced the USAF decision to select the Modified Tinian Alternative (Final EIS, Section 2.7, page 2-52), and specifically the North Option (Final EIS, Section 2.5.2, page 2-28), as a future Divert location.

In the original EIS, USAF proposed to construct facilities and infrastructure at the Tinian International Airport (North Option) to support cargo, tanker, and similar aircraft and associated support personnel for divert operations, periodic exercises, and humanitarian assistance and disaster relief. The original EIS evaluated construction of fuel infrastructure at the Tinian airport and seaport, and also evaluated fuel transport from the seaport to the airport by tanker truck. After the ROD was signed in December 2016, USAF conducted further evaluation of the fuel requirement and associated infrastructure, including the feasibility of different alternatives that were not considered in the original EIS.

USAF now proposes to construct a fuel pipeline, and associated additional grading for layout at the seaport, to transport fuel from the seaport to the airport. USAF also proposes to improve certain existing roads between the seaport and airport to support Divert activities.

- Action Description:

Emissions are estimated for the following, for the SEIS:

1. Construct a west routing fuel pipeline from the Tinian seaport to the Tinian International Airport. (Trenching, Construction, Coating, Grading)
2. Construct an east routing fuel pipeline from the Tinian seaport to the Tinian International Airport. (Trenching, Construction, Coating, Grading)
3. Construct additional graded surfaces for pipeline/infrastructure support at the Tinian seaport. (Grading)
4. Operate emergency generators at the Tinian seaport. (Emergency Generators)
5. Construct road improvements on certain existing roads that will be used for operations. (Excavation, Paving)

- Point of Contact

Name: Terri Rector

Title: Contractor

Organization: HDR

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Email: terri.rector@hdrinc.com
 Phone Number: 512-914-4415

- Activity List:

Activity Type	Activity Title
2. Construction / Demolition	3. Seaport Infrastructure Construction

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location

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

- Activity Title: 3. Seaport Infrastructure Construction

- Activity Description:

Increase of 2.84 acres of disturbed land at the seaport.

- Activity Start Date

Start Month: 8
 Start Month: 2020

- Activity End Date

Indefinite: False
 End Month: 7
 End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	3.391832
SO _x	0.047988
NO _x	23.179181
CO	16.594434
PM 10	45.267075

Pollutant	Total Emissions (TONs)
PM 2.5	0.962947
Pb	0.000000
NH ₃	0.001838
CO _{2e}	4754.2

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 8
 Start Quarter: 1
 Start Year: 2020

- Phase Duration

Number of Month: 36
 Number of Days: 0

2.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 123710

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Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: No
 Average Day(s) worked per week: 5

- Construction Exhaust

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	3	8
Tractors/Loaders/Backhoes Composite	2	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20
 Average Hauling Truck Round Trip Commute (mile): 0

- 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): 2

- 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)

Excavators Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDGT	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
HDGV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDDV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDDT	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
HDDV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
MC	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

- Worker Trips Emissions per Phase

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

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

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DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

E-4. Emergency Generator Operations

1. General Information

- Action Location

Base: GENERIC BASE

County(s): Tinian

Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: TINIAN DIVERT INFRASTRUCTURE IMPROVEMENTS Supplemental EIS,
Commonwealth of the Northern Mariana Islands

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

- Projected Action Start Date: 8 / 2023

- Action Purpose and Need:

This proposed action address proposed changes since the September 2016 completion of the Environmental Impact Statement (EIS) for Divert Activities and Exercises and Record of Decision (ROD), signed December 7, 2016. The ROD announced the USAF decision to select the Modified Tinian Alternative (Final EIS, Section 2.7, page 2-52), and specifically the North Option (Final EIS, Section 2.5.2, page 2-28), as a future Divert location.

In the original EIS, USAF proposed to construct facilities and infrastructure at the Tinian International Airport (North Option) to support cargo, tanker, and similar aircraft and associated support personnel for divert operations, periodic exercises, and humanitarian assistance and disaster relief. The original EIS evaluated construction of fuel infrastructure at the Tinian airport and seaport, and also evaluated fuel transport from the seaport to the airport by tanker truck. After the ROD was signed in December 2016, USAF conducted further evaluation of the fuel requirement and associated infrastructure, including the feasibility of different alternatives that were not considered in the original EIS.

USAF now proposes to construct a fuel pipeline, and associated additional grading for layout at the seaport, to transport fuel from the seaport to the airport. USAF also proposes to improve certain existing roads between the seaport and airport to support Divert activities.

- Action Description:

Emissions are estimated for the following, for the SEIS:

1. Construct a west routing fuel pipeline from the Tinian seaport to the Tinian International Airport. (Trenching, Construction, Coating, Grading)
2. Construct an east routing fuel pipeline from the Tinian seaport to the Tinian International Airport. (Trenching, Construction, Coating, Grading)
3. Construct additional graded surfaces for pipeline/infrastructure support at the Tinian seaport. (Grading)
4. Operate emergency generators at the Tinian seaport. (Emergency Generators)
5. Construct road improvements on certain existing roads that will be used for operations. (Excavation, Paving)

Items 3 and 4 above are in this file.

- Point of Contact

Name: Terri Rector

Title: Contractor

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Organization: HDR
Email: terri.rector@hdrinc.com
Phone Number: 512-914-4415

- Activity List:

Activity Type	Activity Title
2. Emergency Generator	4. Emergency Generator Operation at Seaport

2. Emergency Generator

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

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

- Activity Title: 4. Emergency Generator Operation at Seaport

- Activity Description:

During operations, run emergency generators as needed or for power outage, at seaport.

- Activity Start Date

Start Month: 8
Start Year: 2023

- Activity End Date

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

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.028697
SO _x	0.000501
NO _x	1.038072
CO	0.275750
PM 10	0.032425

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.032425
Pb	0.000000
NH ₃	0.000000
CO _{2e}	53.3

2.2 Emergency Generator Assumptions

- Emergency Generator

Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 2

- Default Settings Used: No

- Emergency Generators Consumption

Emergency Generator's Horsepower: 835
Average Operating Hours Per Year (hours): 48

2.3 Emergency Generator Emission Factor(s)

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

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

2.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year

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

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

NGEN: Number of Emergency Generators

HP: Emergency Generator's Horsepower (hp)

OT: Average Operating Hours Per Year (hours)

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

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DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

E-5. Road Improvement Excavation and Paving

1. General Information

- Action Location

Base: GENERIC BASE

County(s): Tinian

Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: TINIAN DIVERT INFRASTRUCTURE IMPROVEMENTS Supplemental EIS,
Commonwealth of the Northern Mariana Islands

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

- Projected Action Start Date: 8 / 2020

- Action Purpose and Need:

This proposed action address proposed changes since the September 2016 completion of the Environmental Impact Statement (EIS) for Divert Activities and Exercises and Record of Decision (ROD), signed December 7, 2016. The ROD announced the USAF decision to select the Modified Tinian Alternative (Final EIS, Section 2.7, page 2-52), and specifically the North Option (Final EIS, Section 2.5.2, page 2-28), as a future Divert location.

In the original EIS, USAF proposed to construct facilities and infrastructure at the Tinian International Airport (North Option) to support cargo, tanker, and similar aircraft and associated support personnel for divert operations, periodic exercises, and humanitarian assistance and disaster relief. The original EIS evaluated construction of fuel infrastructure at the Tinian airport and seaport, and also evaluated fuel transport from the seaport to the airport by tanker truck. After the ROD was signed in December 2016, USAF conducted further evaluation of the fuel requirement and associated infrastructure, including the feasibility of different alternatives that were not considered in the original EIS.

USAF now proposes to construct a fuel pipeline, and associated additional grading for layout at the seaport, to transport fuel from the seaport to the airport. USAF also proposes to improve certain existing roads between the seaport and airport to support Divert activities.

- Action Description:

Emissions are estimated for the following, for the SEIS:

1. Construct a west routing fuel pipeline from the Tinian seaport to the Tinian International Airport. (Trenching, Construction, Coating, Grading)
2. Construct an east routing fuel pipeline from the Tinian seaport to the Tinian International Airport. (Trenching, Construction, Coating, Grading)
3. Construct additional graded surfaces for pipeline infrastructure support at the Tinian seaport. (Grading)
4. Operate emergency generators at the Tinian seaport. (Emergency Generators)
5. Construct road improvements on certain existing roads that will be used for operations. (Excavation, Paving)

Of these items, numbers 1, 2, and 5 are in this file.

- Point of Contact

Name: Terri Rector

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Title: Contractor
Organization: HDR
Email: terri.rector@hdrinc.com
Phone Number: 512-914-4415

- Activity List:

Activity Type	Activity Title
2. Construction / Demolition	5. Road Improvement

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location

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

- Activity Title: 5. Road Improvement

- Activity Description:

Improve existing roads with pavement.

- Activity Start Date

Start Month: 8
Start Month: 2020

- Activity End Date

Indefinite: False
End Month: 7
End Month: 2021

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.707004
SO _x	0.009331
NO _x	3.797345
CO	5.064120
PM 10	7.768826

Pollutant	Total Emissions (TONs)
PM 2.5	0.203293
Pb	0.000000
NH ₃	0.012871
CO _{2e}	838.9

2.1 Trenching/Excavating Phase

2.1.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 8
Start Quarter: 1
Start Year: 2020

- Phase Duration

Number of Month: 12
Number of Days: 0

2.1.2 Trenching / Excavating Phase Assumptions

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- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 63360
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 11780

- Trenching Default Settings

Default Settings Used: No
 Average Day(s) worked per week: 5

- Construction Exhaust

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

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20
 Average Hauling Truck Round Trip Commute (mile): 0

- 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): 40

- Worker Trips Vehicle Mixture (%)

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

2.1.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

- 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	00.7810	00.0090	00.7260	11.5710	00.0300	00.0160		00.0950	00495.600
LDGT	00.7810	00.0090	00.7260	11.5710	00.0300	00.0160		00.0950	00495.600
HdGV	00.7810	00.0090	00.7260	11.5710	00.0300	00.0160		00.0950	00495.600
LDDV	00.7810	00.0090	00.7260	11.5710	00.0300	00.0160		00.0950	00495.600
LDDT	00.7810	00.0090	00.7260	11.5710	00.0300	00.0160		00.0950	00495.600
HDDV	00.7810	00.0090	00.7260	11.5710	00.0300	00.0160		00.0950	00495.600
MC	00.7810	00.0090	00.7260	11.5710	00.0300	00.0160		00.0950	00495.600

2.1.4 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

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- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

- Worker Trips Emissions per Phase

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

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

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

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

2.2 Paving Phase

2.2.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 8
Start Quarter: 1
Start Year: 2020

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Phase Duration

Number of Month: 12

Number of Days: 0

2.2.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft²): 318067

- Paving Default Settings

Default Settings Used: No

Average Day(s) worked per week: 5

- Construction Exhaust

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): 40

- 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): 40

- Worker Trips Vehicle Mixture (%)

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

2.2.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

- 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	00.7810	00.0090	00.7260	11.5710	00.0300	00.0160		00.0950	00495.600
LDGT	00.7810	00.0090	00.7260	11.5710	00.0300	00.0160		00.0950	00495.600
HDGV	00.7810	00.0090	00.7260	11.5710	00.0300	00.0160		00.0950	00495.600
LDDV	00.7810	00.0090	00.7260	11.5710	00.0300	00.0160		00.0950	00495.600
LDDT	00.7810	00.0090	00.7260	11.5710	00.0300	00.0160		00.0950	00495.600
HDDV	00.7810	00.0090	00.7260	11.5710	00.0300	00.0160		00.0950	00495.600
MC	00.7810	00.0090	00.7260	11.5710	00.0300	00.0160		00.0950	00495.600

2.2.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

CEE_{POL}: Construction Exhaust Emissions (TONs)

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

- Worker Trips Emissions per Phase

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

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

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

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

- Off-Gassing Emissions per Phase

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

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

E-6. West and East Route Pipeline Construction Emissions, Calculation Spreadsheet

Worksheet Descriptions

Workbook Tab/Worksheet	Description
Total Divert w W Pipeline	Summarizes total emissions by calendar year for Divert Project with West Pipeline Route and Associated Infrastructure Construction
Total Divert w E Pipeline	Summarizes total emissions by calendar year for Divert Project with East Pipeline Route and Associated Infrastructure Construction
Combustion_Evaporative	Estimates emissions from non-road equipment exhaust and evaporative volatile organic compound emissions for constructing the Divert project without storage tank and pipeline infrastructure support at the seaport. From original EIS with tank construction equipment removed.
Fugitive Dust	Estimates particulate emissions from construction activities including earthmoving, vehicle traffic, and windblown dust for the Divert project without the West Pipeline. No changes from original EIS.
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions for the Divert project without the West Pipeline. No changes from original EIS.
Construction Commuter	Estimates emissions for construction workers commuting to the site, without the West Pipeline. No changes from original EIS.
Haul Truck On-Road	Estimates emissions from hauling construction materials to the project site for the Divert Project without the West Pipeline. No changes from original EIS.
SEIS ACAM Emissions	Shows ACAM-estimated emissions for SEIS Activities: W pipeline construction, Seaport Pipeline Infrastructure Construction, E pipeline construction, Roadway construction, and Generators operation. (Relevant results incorporated into totals in this workbook.)
SEIS ACAM Inputs	Estimates and describes parameters input into ACAM for SEIS activities.

Summary of Air Pollutant Emissions from Divert with West Pipeline - Construction

Total Emissions Over Period

	NO _x (tons)	VOC (tons)	CO (tons)	SO ₂ (tons)	PM ₁₀ (tons)	PM _{2.5} (tons)	CO ₂ e (tons)
Combustion and Evaporative	14.655	1.023	6.120	0.574	0.948	0.919	1,760.231
Fugitive Dust	-	-	-	-	207.558	20.746	-
Construction Commuter	0.975	1.205	13.984	0.0159	0.040	0.017	874.603
Haul Truck On-Road	0.294	0.027	0.157	0.001	0.009	0.009	76.223
W Pipeline Construction	39.636	7.499	31.526	0.085	39.505	1.685	8,220.400
Seaport Pipe Support	23.179	3.392	16.594	0.048	45.267	0.963	4,754.200
TOTAL	78.74	13.15	68.38	0.72	293.33	24.34	15,685.66

Total Annual Emissions

Construction Emissions by Calendar Year	NO _x (tons)	VOC (tons)	CO (tons)	SO ₂ (tons)	PM ₁₀ (tons)	PM _{2.5} (tons)	CO ₂ e (metric tonnes)
Year 1	26.25	4.38	22.79	0.24	97.78	8.11	4,743.26
Year 2	26.25	4.38	22.79	0.24	97.78	8.11	4,743.26
Year 3	26.25	4.38	22.79	0.24	97.78	8.11	4,743.26
Significance Criteria Threshold (tpy)	100	100	100	100	100	100	Not Applicable

Note: Construction duration is estimated to be 36 months and the emissions are assumed to be distributed evenly over the construction period.

Summary of Air Pollutant Emissions from Divert with East Pipeline - Construction

Total Emissions Over Period

	NO _x (tons)	VOC (tons)	CO (tons)	SO ₂ (tons)	PM ₁₀ (tons)	PM _{2.5} (tons)	CO ₂ e (tons)
Combustion and Evaporative	14.655	1.023	6.120	0.574	0.948	0.919	1,760.231
Fugitive Dust	-	-	-	-	207.558	20.746	-
Construction Commuter	0.975	1.205	13.984	0.0159	0.040	0.017	874.603
Haul Truck On-Road	0.294	0.027	0.157	0.001	0.009	0.009	76.223
E Pipeline Construction	45.497	8.681	35.619	0.097	39.747	1.927	9,480.000
Seaport Pipe Support	23.179	3.392	16.594	0.048	45.267	0.963	4,754.200
TOTAL	84.60	14.33	72.47	0.74	293.57	24.58	16,945.26

Total Annual Emissions

Construction Emissions by Calendar Year	NO _x (tons)	VOC (tons)	CO (tons)	SO ₂ (tons)	PM ₁₀ (tons)	PM _{2.5} (tons)	CO ₂ e (metric tonnes)
Year 1	28.20	4.78	24.16	0.25	97.86	8.19	5,124.16
Year 2	28.20	4.78	24.16	0.25	97.86	8.19	5,124.16
Year 3	28.20	4.78	24.16	0.25	97.86	8.19	5,124.16
Significance Criteria Threshold (tpy)	100	100	100	100	100	100	Not Applicable

Note: Construction duration is estimated to be 36 months and the emissions are assumed to be distributed evenly over the construction period.

HQ PACAF | Draft SEIS for Tinian Divert Infrastructure Improvements
APPENDIX E: AIR QUALITY ANALYSIS SUPPORTING DOCUMENTATION

Combustion and Evaporative Emissions - Divert without Fuel Tank and Loading Area

Combustion Emissions of VOC, NO_x, SO₂, CO, PM_{2.5}, PM₁₀, and CO₂ due to Construction

Assumptions

When multiple options exist under the general construction activities the most conservative value will be used to quantify air emission.

General Construction Activities	Area Disturbed (ft ²)	
Construct Taxiway	1,385,300 ft ²	
Construct Road Re-Route	40,585 ft ²	
Construct New Access Roads	128,924 ft ²	
Construct Maintenance Facility	7,570 ft ²	
Construct Jet Fuel System and Fire Pump System (Operational, Bulk and at the Port of Tinian)	0 ft ²	Not applicable to SEIS.
Construct Hazardous Cargo Pad	299,754 ft ²	
Construct Parking Apron	1,729,805 ft ²	

Total General Construction Area:	7,570 ft ²	
	0.2 acres	
Total Demolition Area:	0 ft ²	
	0.0 acres	
Total Pavement Area:	3,584,368 ft ²	
	82.3 acres	
Total Disturbed Area:	3,591,938 ft ²	
	82.5 acres	
Construction Duration:	36 months	
1 Yr Project Construction Activity:	240 days/yr	Assume 12 months, 4 weeks per month, 5 days per week.

Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, Sacramento Metropolitan Air Quality Management District (SMAQMD), 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
 Emission factors are taken from the NONROAD model and were provided to eM by Larry Landman of the Air Quality and Modeling Center (Landman.Larry@epamail.epa.gov) on 12/14/07. Factors provided are for the weighted average US fleet for CY2007.
 Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

Grading

Equipment	No. Req ^d per 10 acres	NO _x (lb/day)	VOC ^b (lb/day)	CO (lb/day)	SO ₂ ^c (lb/day)	PM ₁₀ (lb/day)	PM _{2.5} (lb/day)	CO ₂ (lb/day)
Bulldozer	1	13.60	0.96	5.50	1.02	0.89	0.87	1456.90
Motor Grader	1	9.69	0.73	3.20	0.80	0.66	0.64	1141.65
Water Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	3	41.64	2.58	15.71	0.83	2.55	2.47	4941.53

Paving

Equipment	No. Req ^d per 10 acres	NO _x (lb/day)	VOC ^b (lb/day)	CO (lb/day)	SO ₂ ^c (lb/day)	PM ₁₀ (lb/day)	PM _{2.5} (lb/day)	CO ₂ (lb/day)
Paver	1	3.83	0.37	2.06	0.28	0.35	0.34	401.93
Roller	1	4.82	0.44	2.51	0.37	0.43	0.42	536.07
Truck	2	36.71	1.79	14.01	3.27	1.99	1.93	4685.95
Total per 10 acres of activity	4	45.37	2.61	18.58	0.91	2.78	2.69	5623.96

Demolition

Equipment	No. Req ^d per 10 acres	NO _x (lb/day)	VOC ^b (lb/day)	CO (lb/day)	SO ₂ ^c (lb/day)	PM ₁₀ (lb/day)	PM _{2.5} (lb/day)	CO ₂ (lb/day)
Loader	1	13.45	0.99	5.58	0.95	0.93	0.90	1360.10
Haul Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	2	31.81	1.89	12.58	0.64	1.92	1.87	3703.07

Building Construction

Equipment ^d	No. Req ^d per 10 acres	NO _x (lb/day)	VOC ^b (lb/day)	CO (lb/day)	SO ₂ ^c (lb/day)	PM ₁₀ (lb/day)	PM _{2.5} (lb/day)	CO ₂ (lb/day)
Stationary								
Generator Set	1	2.38	0.32	1.18	0.15	0.23	0.22	213.06
Industrial Saw	1	2.62	0.32	1.97	0.20	0.32	0.31	291.92
Welder	1	1.12	0.38	1.50	0.08	0.23	0.22	112.39
Mobile (non-road)								
Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Forklift	1	5.34	0.56	3.33	0.40	0.55	0.54	572.24
Crane	1	9.57	0.66	2.39	0.65	0.50	0.49	931.93
Total per 10 acres of activity	6	39.40	3.13	17.38	3.12	2.83	2.74	4464.51

Architectural Coatings

Equipment	No. Req ^d per 10 acres	NO _x (lb/day)	VOC ^b (lb/day)	CO (lb/day)	SO ₂ ^c (lb/day)	PM ₁₀ (lb/day)	PM _{2.5} (lb/day)	CO ₂ (lb/day)
Air Compressor	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77
Total per 10 acres of activity	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77

- The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.
- The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.
- The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO₂ emissions by more than a factor of two.
- Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

Combustion and Evaporative Emissions - Modified Alternative 2A - Construction Phase (Tinian North) - Continued

Project-Specific Combustion and Evaporative Emission Factor Summary

Source	Equipment Multiplier*	Project-Specific Emission Factors (lb/day)						
		NO _x	VOC	CO	SO ₂ **	PM ₁₀	PM _{2.5}	CO ₂
Grading Equipment	8	333.130	20.616	125.679	6.663	20.364	19.753	39532.211
Paving Equipment	8	362.938	20.846	148.627	7.259	22.209	21.543	44991.655
Demolition Equipment	1	31.808	1.886	12.584	0.636	1.923	1.865	3703.074
Building Construction	1	39.396	3.130	17.382	3.116	2.829	2.744	4464.512
Air Compressor for Architectural Coating	1	3.574	0.373	1.565	0.251	0.309	0.300	359.773
Architectural Coating**			7.091					

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NO_x = (Total Grading NO_x per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft ²)	Total Area (acres)	Total Days	
Grading:	3,591,938	82.46	6	(from "Grading" worksheet)
Paving:	3,584,368	82.29	49	
Demolition:	0	0.00	0	
Building Construction:	7,570	0.17	240	
Architectural Coating:	7,570	0.17	20	(per SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative.

The 'Total Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition.

The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Project Combustion and Evaporative Emissions by Activity (lbs)

	NO _x	VOC	CO	SO ₂	PM ₁₀	PM _{2.5}	CO ₂
Grading Equipment	1,998.78	123.70	754.08	39.98	122.18	118.52	237,193
Paving	17,783.98	1,021.44	7,282.74	355.68	1,088.23	1,055.58	2,204,591
Demolition	-	-	-	-	-	-	0
Building Construction	9,455.12	751.15	4,171.75	747.92	678.97	658.60	1,071,483
Architectural Coatings	71.48	149.28	31.31	5.02	6.19	6.00	7,195
Total Emissions (lbs):	29,309.35	2,045.57	12,239.88	1,148.60	1,895.57	1,838.70	3,520,463

Results: Project Annual Combustion and Evaporative Emission Rates

	NO _x	VOC	CO	SO ₂	PM ₁₀	PM _{2.5}	CO ₂
Total Project Combustion and Evaporative Emissions (lbs)	29,309.35	2,045.57	12,239.88	1,148.60	1,895.57	1,838.70	3,520,463
Total Project Combustion and Evaporative Emissions (tons)	14.65	1.02	6.12	0.57	0.95	0.92	1,760.23

Construction Fugitive Dust Emissions - Divert without Pipeline

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19 ton PM ₁₀ /acre-month		MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42 ton PM ₁₀ /acre-month		MRI 1996; EPA 2001; EPA 2006

PM_{2.5} Emissions

PM _{2.5} Multiplier	0.10	(10% of PM ₁₀ emissions assumed to be PM _{2.5})	EPA 2001; EPA 2006
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Control Efficiency

	0.50	(assume 50% control efficiency for PM ₁₀ and PM _{2.5} emissions)	EPA 2001; EPA 2006
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Project Assumptions

New Roadway Construction (0.42 ton PM₁₀/acre-month)

Duration of Construction Project	12 months
Area	82.3 acres

General Construction Activities (0.19 ton PM₁₀/acre-month)

Duration of Construction Project	12 months
Area	0.2 acres

	Project Emissions (tons/year)			
	PM ₁₀ uncontrolled	PM ₁₀ controlled	PM _{2.5} uncontrolled	PM _{2.5} controlled
New Roadway Construction	414.72	207.36	41.47	20.74
General Construction Activities	0.40	0.20	0.02	0.01
Total	415.12	207.56	41.49	20.75

General Construction Activities Emission Factor

0.19 ton PM₁₀/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM₁₀/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM₁₀/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton PM₁₀/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM₁₀/acre-month) and 75% of the average emission factor (0.11 ton PM₁₀/acre-month). The 0.19 ton PM₁₀/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM₁₀/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particulate (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District as well as the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM₁₀ and PM_{2.5} in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM₁₀/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM₁₀/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM₁₀/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM_{2.5} Multiplier

0.10

PM_{2.5} emissions are estimated by applying a particle size multiplier of 0.10 to PM₁₀ emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM₁₀ and PM_{2.5}

0.50

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM₁₀ and PM_{2.5} in PM nonattainment areas (EPA 2006). Wetting controls will be applied during project construction.

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999*. EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants*. Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1)*. Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Grading for Divert without Pipeline

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 82.5 acres/yr (from Combustion Worksheet)
 Qty Equipment: 25.0 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions

Terrain is mostly flat.
 An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
 200 hp bulldozers are used for site clearing.
 300 hp bulldozers are used for stripping, excavation, and backfill.
 Vibratory drum rollers are used for compacting.
 Stripping, Excavation, Backfill and Compaction require an average of two passes each.
 Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	82.46	10.31
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	82.46	40.31
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	41.23	41.57
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	41.23	17.06
2315 310 5020	Compaction	Vibrating roller, 6" lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	82.46	28.92
TOTAL								138.17

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 138.17
 Qty Equipment: 25.00
 Grading days/yr: 5.53

Construction/Staff Commuter Emissions - Divert Without Pipeline

Emissions from construction workers commuting to the job site are estimated in this spreadsheet.

Emission Estimation Method: Air Force Civil Engineer Center (AFCEE), Air Emissions Factor Guide to Air Force Mobile Sources, October 2014.

Assumptions:

Passenger vehicle emission factors for scenario year 2015 are used.
 The average roundtrip commute for a construction/staff worker = 40 miles
 Number of construction days = 240 days
 Number of construction/Staff workers (daily) = 150 people

Note: None

Personal Operating Vehicle (POV) On-Road Emission Factors for Year 2016 (grams/mile)

NO _x	VOC	CO	SO ₂	PM ₁₀	PM _{2.5}	CO ₂
0.614	0.759	8.810	0.010	0.025	0.011	551.000

Source: Emission factors for all pollutants are from Table 5-28: On-Road Vehicle Emission Factors - 2016 POV, Gasoline Light Duty Trucks (LDGT) at low altitude, within AFCEC Air Emissions Factor Guide to Air Force Mobile Sources, October 2014.

Construction Commuter Emissions

	NO _x	VOC	CO	SO ₂	PM ₁₀	PM _{2.5}	CO ₂
lbs	1,949,206	2,409,524	27,968,254	31,746	79,365	34,921	1,749,206,349
tons	0.975	1.205	13.984	0.016	0.040	0.017	874.603

Example Calculation: NO_x emissions (lbs) = 60 miles/day * NO_x emission factor (lb/mile) * number of construction days * number of workers

Construction/Haul Truck Emissions - Divert without Pipeline

Emissions from hauling construction supplies, demolition debris, fill, and excavated material are estimated in this spreadsheet.

Emission Estimation Method: Air Force Center for Environmental Excellence (AFCEE) Air Emissions Factor Guide to Air Force Mobile Sources, Dec. 2009.

Concrete Mixing and Dump Truck Assumptions:

Dump trucks carry 11 cubic yards of material per trip.

Concrete mixing trucks carry 10 cubic yards of material per trip.

The average distance from the port to Commercial Concrete Supply Company is 1.7 miles; therefore, dump trucks will travel 3.4 miles round trip.

The average distance from the Commercial Concrete Supply Company (CCSC) to the project site is 2.3 miles; therefore, concrete trucks will travel 4.6 miles round trip.

Fill Materials Assumptions:

Haul trucks carry 20 cubic yards of material per trip.

The average distance from the project site to the materials source is 20 miles; therefore, building material haul trucks will travel 40 miles round trip.

Estimated number of trips required by haul trucks = total amount of material/20 cubic yards per truck

Amount of demolition debris =	0 cubic yards	No Demolition in the Proposed Action
Amount of cement transported from port to CCSC =	4,004 cubic yards	
Amount of concrete transported from CCSC to project site =	64,780 cubic yards	
Amount of Excavation Materials for New Structures/Buildings =	3,364 cubic yards	Construction area multiplied by depth of disturbance which is assumed to be 12 feet.
Amount of Building/Structure Materials =	2,523 cubic yards	Construction area multiplied by 9 feet.

Number of dump trucks required (port to CCSC) =	364 heavy duty diesel haul truck trips, Cells rounded up
Number of concrete mixing trucks required (CCSC to project site) =	6478 heavy duty diesel haul truck trips, Cells rounded up
Number of trucks required (Building Materials) =	294 heavy duty diesel haul truck trips
Miles per trip (port to CCSC) =	3.4 miles
Miles per trip (CCSC to project site) =	4.6 miles
Miles per trip (Building Materials) =	40.0 miles

Low Altitude Heavy Duty Diesel Vehicle 8b (HDDV8b) Average Emission Factors (grams/mile)

	NO _x	VOC	CO	SO ₂	PM ₁₀	PM _{2.5}	CO ₂
HDDV8b	6.23	0.58	3.33	0.02	0.20	0.19	1615

Notes:

Emission factors for all pollutants are from Appendix A - On-Road Vehicle Emission Factors within AFCEE Air Emissions Factor Guide to Air Force Mobile Sources, Dec. 2009.

Emission factors from calendar year 2015 were used assuming the average vehicle model year is 2005.

HDDV8b Haul Truck Emissions

	NO _x	VOC	CO	SO ₂	PM ₁₀	PM _{2.5}	CO ₂
lbs	588.00	54.74	314.29	1.89	18.88	17.93	152,446.80
tons	0.29	0.03	0.16	0.00	0.01	0.01	76.22

Example Calculation: NO_x emissions (lbs) = 40 miles per trip * 34,955 trips * NO_x emission factor (g/mile) * lb/453.6 g

SEIS Emissions Estimated in ACAM

W Pipeline Construction		E Pipeline Construction		Seaport Grading Construction		Seaport Emergency Generator Operation	
Pollutant	Total Emissions (TONs)	Pollutant	Total Emissions (TONs)	Pollutant	Total Emissions (TONs)	Pollutant	Emissions Per Year (TONs)
VOC	7.50	VOC	8.68	VOC	3.39	VOC	0.029
SO _x	0.085	SO _x	0.10	SO _x	0.048	SO _x	0.00050
NO _x	39.64	NO _x	45.50	NO _x	23.18	NO _x	1.04
CO	31.53	CO	35.62	CO	16.59	CO	0.28
PM 10	39.50	PM 10	39.75	PM 10	45.27	PM 10	0.032
PM 2.5	1.69	PM 2.5	1.93	PM 2.5	0.96	PM 2.5	0.032
Pb	0	Pb	0	Pb	0	Pb	0
NH ₃	0.0093	NH ₃	0.012	NH ₃	0.0018	NH ₃	0
CO ₂ e	8220.40	CO ₂ e	9480	CO ₂ e	4754	CO ₂ e	53

Roadway Improvement
Construction

Pollutant	Total Emissions (TONs)
VOC	0.71
SO _x	0.0093
NO _x	3.80
CO	5.06
PM 10	7.77
PM 2.5	0.20
Pb	0
NH ₃	0.013
CO ₂ e	838.90

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 APPENDIX E: AIR QUALITY ANALYSIS SUPPORTING DOCUMENTATION

SEIS Project Assumptions / ACAM Input Parameters

W Pipeline Construction

Miles of New Pipeline Construction (West)	4.08 miles
Worst case disturbed, ROW maximum width	80 feet
Pipeline depth	3 feet
Operational Easement Max	20 feet
ROW	Existing, i.e. no road construction needed
Area to be trenched	430,848 ft2 (based on miles long x 20 feet easement)
Open trench area at any one time	52,800 ft2 (based on 0.5 mile sections)
Volume material excavated	47,872.00 yd3 (based on area to be trenched x depth)
Avg days/week worked	5
Graded area, Max	1,723,392
Graded area at any one time	52,800 ft2 (same as trenching estimate)
Pipeline diameter	2 ft (conservatively estimated)
"Area of Building" for pipeline construction	43,901 ft2 (estimated conservative pipe diameter x length of pipeline, for use in ACAM)
"Height of Building" for pipeline construction	2 ft (estimated conservative pipe diameter)
Estimated pipeline circumference	6.3 ft (estimated pipe circumference)
"Area" of pipe to be potentially coated	134,047.8 ft2 (circumference x pipe length, converted to feet)
Average hauling truck round trip commute, pipeline sections	4.08 miles (from port or San Jose, interim pipe distance one way and return; estimated as half finished pipe distance x 2)
Average vendor round trip commute, pipeline sections	4.08 miles (from port or San Jose, interim pipe distance one way and return; estimated as half finished pipe distance x 2)
Material to be hauled on site, trenching	0
Material to be hauled off site, trenching	0
Average truck hauling capacity, all	20 yd3 (original EIS, assume similar truck size)
Average worker round trip commute, trenching, construction, and gradin	4.08 miles (from San Jose, interim pipe distance one way and return; estimated as half finished pipe distance x 2)

E Pipeline Construction

Miles of New Pipeline Construction (East)	4.95 miles
Worst case disturbed, easement width	80 feet
Pipeline depth	3 feet
Operational Easement Max	20 feet
ROW	Existing, i.e. no road construction needed
Area to be trenched/graded	522,720 ft2 (based on miles long x 20 feet easement)
Open trench area at any one time	52,800 ft2 (based on 0.5 mile sections)
Volume material excavated	58,080 yd3 (based on area to be trenched x depth)
Avg days/week worked	5
Pipeline diameter	2 ft (conservatively estimated)
"Area of Building" for pipeline construction	53,262 ft2 (estimated conservative pipe diameter x length of pipeline, for use in ACAM)
"Height of Building" for pipeline construction	2 ft (estimated conservative pipe diameter)
Estimated pipeline circumference	6.3 ft (estimated pipe circumference)
"Area" of pipe to be potentially coated	162,631.6 ft2 (circumference x pipe length, converted to feet)
Average hauling truck round trip commute, building activity	4.95 miles (from port or San Jose, interim pipe distance one way and return; estimated as half finished pipe distance x 2)
Average vendor round trip commute, building activity	4.95 miles (from port or San Jose, interim pipe distance one way and return; estimated as half finished pipe distance x 2)
Material to be hauled on site, trenching	0
Material to be hauled off site, trenching	0
Average truck hauling capacity, all	20 yd3 (original EIS, assume similar truck size)
Average worker round trip commute, trenching, construction, and gradin	4.95 miles (from San Jose, interim pipe distance one way and return; estimated as half finished pipe distance x 2)

Seaport Infrastructure for Piped Fuel Scenario

Original EIS land disturbance at seaport	5.39 acres
Piped Fuel Scenario Land Disturbance	8.23 acres
Amount of additional land disturbance, piped fuel scenario	2.84 acres
Conversion factor	43560 square feet per acre
Amount of additional land disturbance, piped fuel scenario	123710 ft2 (converted from above)
Avg days/week worked	5
Material to be hauled on site, disturbance/grading	0
Material to be hauled off site, disturbance/grading	0
Average truck hauling capacity, all	20 yd3 (original EIS, assume similar truck size)
Average worker round trip commute, San Jose to seaport	2 mi (San Jose is no more than 1 mi from the port)

Roadway Improvement

Length of Roadway to be improved	2.51 miles
Standard road width	24 ft
Total Road Improvement Area (LxW)	318067 ft2 based on length, width
Total disturbed road area at any one time	63360 ft2 based on 0.5 mi x width
Depth excavated	1 ft
Avg days/week worked	5
Timeframe	1 year
Material to be hauled off	11780 yd3 (based on depth excavated x total area)
Material to be hauled on site, disturbance/grading	0
Material to be hauled off site, disturbance/grading	0
Average truck hauling capacity, all	20 yd3 (original EIS, assume similar truck size)
Average worker round trip commute, San Jose to seaport	2.51 miles round trip (assume half road length from port x 2)

E-7. West and East Route Pipeline Operations Emissions, Calculation Spreadsheet

Worksheet Descriptions

Workbook Tab/Worksheet	Description
Total Divert Op w Pipeline	Summarizes total annual emissions for Operation of the Divert Project with Either East or West Pipeline Route and Associated Infrastructure.
Airfield Operations	Estimates emissions from aircraft operations: taxi, take-off and landings (sorties or LTOs), touch-and-go operations (TGOs), and low flybys (LFB) by base aircraft. The airfield operations emissions were not changed for the SEIS.
Commuter Vehicles	Estimates emissions for worker vehicles commuting for project operation. Fuel truck transfer was included in this worksheet in the original EIS, but was removed for the SEIS. The commuter vehicle emissions were not changed for the SEIS.
Aircraft Fueling	Estimates emissions from fuel loading (into aircraft). Fuel truck loading at the seaport was originally also included in this worksheet, but was removed for the SEIS. The aircraft fueling emissions were not changed for the SEIS.
Fuel Storage Tanks	Estimates emissions from Above Ground Storage Tanks. The original EIS included tanks at both the seaport and the flightline. The seaport tanks were removed for the SEIS, and the flightline storage tank emissions were unchanged for the SEIS.
SEIS ACAM Emissions	Shows ACAM-estimated emissions for SEIS Activities: W pipeline construction, Seaport Pipeline Infrastructure Construction, E pipeline construction, Roadway construction, and Seaport Emergency Generators operation. (Relevant results incorporated into totals in this workbook.)
SEIS ACAM Inputs	Estimates and describes parameters input into ACAM for SEIS activities.

Annual Air Emissions Summary for SEIS Divert with Pipeline Operations

Source Category	PM ₁₀ (tons)	PM _{2.5} (tons)	CO (tons)	NO _x (tons)	SO _x (tons)	VOC (tons)
Airfield Operations	0.055	0.053	18.67	6.77	0.98	1.25
Commuter Vehicles	0.015	0.012	0.17	0.32	0.00059	0.028
Aircraft Fueling	-	-	-	-	-	0.0042
Fuel Storage Tanks	-	-	-	-	-	1.31
Emergency Generators	0.032	0.032	0.28	1.04	0.00050	0.029
TOTAL	0.10	0.10	19.11	8.13	0.98	2.62
Significance Criteria Threshold (tpy)	100	100	100	100	100	100

Source Category	CO ₂ e (lb)	CO ₂ e (kg)	CO ₂ e (metric tonnes)
Airfield Operations	8,833,755	4,006,991	4,007
Commuter Vehicles	183,189	83,095	83
Aircraft Fueling	-	-	-
Fuel Storage Tanks	-	-	-
Emergency Generators	106,600	48,354	48.35
TOTAL	9,123,545	4,138,440	4,138
Significance Criteria Threshold (tpy)	N/A	N/A	N/A

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 APPENDIX E: AIR QUALITY ANALYSIS SUPPORTING DOCUMENTATION

Airfield Operations

Aircraft exercises under this alternative are based on assuming 2 to 4 KC-135R aircraft operating up to 8 weeks per year for a maximum of 720 KC-135R operations per year. Each operation is equivalent to one landing or one take-off (1 LTO Cycle = 2 operations).

Landing and Takeoff (LTO) Cycles

Description	Quantity
# of KC-135R LTO's per year	360

Legend

Airfield Activity Data (Worst Case Scenario)

Aircraft Model	Aircraft Model Used to Match to Available Emission Factors	Engine Model	# Engines	APU Model	# APUs	Notes	LTO Cycles
KC-135R	KC-135R	F108-CF-201	4	No data on APUs		See below	360

Note: F108-CF-201 is the military designation of the CFM56-2B-1 engine.

Criteria Pollutant Emission Factors

Aircraft Model	Engine Model	# Engines	Reference Thrust Mode	LTO/TGO Thrust Mode	Fuel Flow (lb/hr)	Emission Factors in lb Pollutant per 1000 lb Fuel Burned						
						PM10	PM2.5	CO	NO _x	SO ₂	VOCs	TIM
KC-135R	F108-CF-201	4	Idle	Idle	1016	0.06	0.06	30.70	4.00	1.06	2.10	47.7
KC-135R	F108-CF-201	4	Approach	Approach	2468	0.06	0.05	4.20	8.20	1.06	0.09	5.2
KC-135R	F108-CF-201	4	Climbout	Climbout	6500	0.05	0.05	0.90	16.00	1.06	0.06	1.6
KC-135R	F108-CF-201	4	Takeoff	Takeoff	7818	0.07	0.06	0.90	18.05	1.06	0.05	0.7

Emission factors from Air Force Civil Engineer Center (AFCEC) October 2014 Air Emissions Guide for Air Force Mobile Sources, Table 2-8

APU Emission Factors

Aircraft Model	# APU	APU Model	PM10	PM2.5	CO	NO _x	SO ₂	VOCs	APU (hr)
KC-135R			No Data Available.						

Default Time-In-Mode

Aircraft Type	Typical Duration by Mode (minutes)					
	Taxi/Idle-out	Takeoff	Climbout	Approach	Taxi/Idle-in	Total
KC-135R	32.8	0.7	1.6	5.2	14.9	55.2

Default Time-In-Mode rates are from AFCEC October 2014 Air Emissions Guide for Air Force Mobile Sources, Table 2-4

Greenhouse Gas Emission Factors

Units	CO ₂	CH ₄	N ₂ O
kg/gal fuel	9.80	---	---
g/gal fuel	---	0.27	0.31

Reference: Footnote 2, from Table 2-8 of the AFCEC August 2013 Air Emissions Guide for Air Force Mobile Sources.

Criteria Pollutant and VOC Calculated Emissions per LTO by Aircraft Type

Calculated as the sum of the products of [(minutes) * (fuel flow/minute) * (lbs pollutant/lb fuel)] for each of the thrust modes.

Reported Aircraft Model	APU	Emission in lb Pollutant per LTO							APU
		Fuel (lb)	PM10 (lb)	PM2.5 (lb)	CO (lb)	NO _x (lb)	SO _x (lb)	VOCs (lb)	
KC - 135R	0	5144.6	0.3	0.3	103.7	37.6	5.5	6.9	0

Total Criteria Pollutant and VOC Emissions for maximum LTO's by Aircraft Type

Reported Aircraft Model	APU	Total LTO's	Fuel (lb)	PM10 (tons)	PM2.5 (tons)	CO (tons)	NO _x (tons)	SO _x (tons)	VOCs (tons)	APU
			KC - 135R	0	360	1,852,065.6	0.05	0.05	18.67	6.77
Worst Case Scenario			1,852,065.60	0.05	0.05	18.67	6.77	0.98	1.25	0

Total gallons of fuel used for LTOs (277,671 gal.) is based on the 6.67 lb/gal density of JP-8 as provided in footnote 2, of Table 2-8 of the AFCEC October 2014 Air Emissions Guide for Air Force Mobile Sources. Emissions from LTO's are for the time up to and down from 3,000 feet elevation which is the default mixing height.

Greenhouse Gas Calculated Emissions

Assume aircraft will use 7,500 pounds of fuel per LTO cycle, which is from the ground to 10,000 feet and from 10,000 feet back to a landing. This estimated fuel use was obtained from Maj. Travis Miyashiro, HIANG, PACAF A5XP. Fuel use and associated emissions above 10,000 feet are accounted for in the MIRC EIS.

Quantity (gallons)	Fuel Type	CH ₄ (kg)	N ₂ O (kg)	CO ₂ (kg)	CO ₂ -equivalent (kg)	CO ₂ -equivalent (metric tonne)
404,798	JP-8	109	125	3,967,016	4,006,991	4,007

The CH₄ and N₂O Global Warming Potential multipliers are 25 and 298, respectively from EPA's Climate Leadership, Emission Factors for Greenhouse Gas Inventories, Last Modified 4 April 2014.

Commuter Vehicle Emissions - Divert without Fuel Truck Hauling

Assumptions: A Gross Vehicle Weight (GVW) of 36,200 lbs will be used, based off of an 84 passenger Blue Bird bus.
 Assume 40 miles per roundtrip for busses.

Emission Factors

Relevant Vehicle Weight Classes for Which Emission Factors are Published

Vehicle Category	Description	SCC
HDDV8A	Class 8a Heavy-Duty Diesel Vehicles (33,001-60,000 lbs GVW)	A2230070000
HDDV8B	Class 8b Heavy-Duty Diesel Vehicles (>60,000 lbs GVW)	A2230070000

Emission Factors for Calendar Year 2015

Vehicle Class	Model Year	Emission Factors in grams per Mile ^a								
		PM ₁₀	PM _{2.5}	CO	NOx	SOx	VOCs	CO ₂	Fugitive PM ₁₀	Fugitive PM _{2.5}
HDDV8A*	2005	0.2	0.19	2.8	5.47	0.01	0.48	1544.1	0.05	0.01
HDDV8B**	2005	0.2	0.19	3.33	6.23	0.02	0.58	1615.2	0.05	0.01

* Low Altitude Emission Factors for Heavy Duty Diesel Vehicles Class 8a

**Low Altitude Emission Factors for Heavy Duty Diesel Vehicles Class 8b

a) Emission factors from Appendix A of Air Emissions Factor Guide to Air Force Mobile Sources, AFCEE, December 2009

Greenhouse Gas Emission Factors for Calendar Year 2015

Vehicle Class	CH ₄ (g/mile)	N ₂ O (g/mile)
HDDV	0.0051	0.0048

g/mile = grams per mile

CH₄ = Methane; N₂O = Nitrous Oxide

b) Emission Factors from EPA's Climate Leadership, Emission Factors for Greenhouse Gas Inventories, Last Modified 4 April 2014 (<http://www.epa.gov/climateleadership/documents/emission-factors.pdf>).

Miles for Commuter Emissions for 8 week training exercises

Vehicle Class	Speed Miles/hour	Miles/Trip	Total Trips/Day	Hours/Day	Total Days	Total Miles
HDDV8A - Class 8a Heavy-Duty Diesel Vehicles (33,001-60,000 lbs GVW)		40	24		56	53,760
HDDV8B - Class 8b Heavy-Duty Diesel Vehicles (>60,000 lbs GVW)	0			0	0.000	0

Removed for the SEIS.

Criteria and VOC Calculated Emissions

Vehicle Class	Model Year	Annual Miles	Criteria Pollutant Emissions (tons/year)					
			PM ₁₀	PM _{2.5}	CO	NOx	SOx	VOCs
HDDV8A - Class 8a Heavy-Duty Diesel Vehicles (33,001-60,000 lbs GVW)	2005	53,760	0.015	0.012	0.166	0.324	0.001	0.028
HDDV8B - Class 8b Heavy-Duty Diesel Vehicles (>60,000 lbs GVW)	2005	0	0.000	0.000	0.000	0.000	0.000	0.000
Total			0.015	0.012	0.166	0.324	0.001	0.028

Particulate emissions include exhaust, brake wear, tire wear. Assume paved road.

Greenhouse Gas Calculated Emissions

Vehicle Class	Annual Miles	CO ₂ (lb/year)	CH ₄ (lb/year)	N ₂ O (lb/year)	CH ₄ GWP Multiplier	N ₂ O GWP Multiplier	CO ₂ Equivalent (lb/year)	CO ₂ Equivalent (metric tonnes/year)
HDDV8A - Class 8a Heavy-Duty Diesel Vehicles (33,001-60,000 lbs GVW)	53,760	183,004.44	0.60	0.57	25	298	183,189.08	83.09
HDDV8B - Class 8b Heavy-Duty Diesel Vehicles (>60,000 lbs GVW)	0	0.00	0.00	0.00	25	298	0.00	0.00
Total		183,004.44	0.60	0.57	---	---	183,189.08	83.09

GWP = Global Warming Potential; 100-year GWP values obtained from EPA's Climate Leadership, Emission Factors for Greenhouse Gas Inventories, Last Modified 4 April 2014 (<http://www.epa.gov/climateleadership/documents/emission-factors.pdf>)

Emission Calculations Method - Fuel Truck and Commuter Vehicle Emissions for Modified Alternative 2a - Implementation Phase (Tinian North)

Calculation Method: Equation 4-1, AFCEE 2009, Mobile Emissions Guide

$$EP = VMTVehCat * EFPolVehCat * 0.002205$$

Where,

EP = Emissions of each individual pollutant (lb/yr)

VMTVehCat = Annual vehicle miles traveled by each vehicle category (LDGV, LDGT1, LDDV, etc.) (mi/yr)

EFPolVehCat = Emission factor of each pollutant for each vehicle category (g/mi)

0.002205 = Factor for converting grams to pounds (g/lb).

Aircraft Fueling: Fuel Transfer Air Emissions for Divert Operations without Seaport Fuel Truck Loading

Given:

Total Exercise Days (8 weeks)	56
Initial Fuel Fill Days	2.333333333
Remaining Fuel Fill Days	0
Total # of Fuel Trucks	6
Total Gallons per Fuel Truck	10,000
Trips per day per Fuel Truck	3
1 bbl conversion to gallons	42
Total Fuel (gal) during Initial Fill	420,000
Total Fuel (gal) during Remaining Exercise	0
Total Fuel (gal) during Exercise (8 Weeks)	420,000

SEIS Fuel Loading Operations

Location	Description	Fuel Type	Fuel Transferred (gal)	Category	
Flightline	Fueling Aircraft	JP-8	420,000	Loading	Left in for SEIS (was described in original EIS as Loading of Aircraft from Truck Stands)
Seaport, Loading Racks (50,000 bbl tank 1)	Loading Refueler Trucks	JP-8	0	Loading	Removed for SEIS
Seaport, Loading Racks (50,000 bbl tank 2)	Loading Refueler Trucks	JP-8	0	Loading	Removed for SEIS

Emission Factors

JP-8 emission factors (lb/Mgal)	Dispensing	Loading
	Splash	Bottom fill
Molecular Weight =	130	0.020
True Vapor Pressure (psia) =	0.011	
Dispensing Displacement losses =	0.0487	
Spillage =	0.7	
Total =	0.749	

AP-42 Table 7.1-2 dated 11/06
 AP-42 Table 7.1-2 dated 11/06 @ 70F (annual avg.)
 AP-42 Section 5.2 dated 6/08 Equation (1)
 AP-42 Table 5.2-7 dated 6/08

Emission Calculations

Location	Description	Fuel Type	Fuel Transferred	Displaced Vapor	Spillage	Total VOC	Total VOC
			(gal)	(lb)	(lb)	(lb)	(tons)
Flightline	Loading Aircraft from Truck Fill Stands	JP-8	420,000	8.5	0	8.5	0.004
Seaport, Loading Racks (50,000 bbl tank 1)	Loading Refueler Trucks	JP-8	0	0.0	0	0.0	0.000
Seaport, Loading Racks (50,000 bbl tank 2)	Loading Refueler Trucks	JP-8	0	0.0	0	0.0	0.000
Total			420,000	8	0	8.47	0.0042

Emission Calculations Method - Fuel Loading Emissions

Displacement emissions for Diesel and JP-8 were estimated using Equation (1) from AP-42 Section 5.2, Transportation and Marketing of Petroleum Liquids, dated 6/08

$$L_L = 12.46 \text{ (SPM)/T}$$

Where

L_L = Loading loss in lb/10³ gal

S = Saturation Factor 1.45 for splash loading, 0.6 for bottom loading

M = molecular weight,

T = temperature of bulk liquid (assume average annual ambient temperature)

Fuel Storage Tank Emissions for Divert Operations without Seaport Tanks

Fuel storage tank emissions were estimated using the U.S. EPA TANKS storage tank emissions calculation software (Version 4.0.9d). The emissions calculations algorithms in the TANKS program are based on Chapter 7 of EPA's AP-42. Honolulu, Hawaii was used as a surrogate location for the tanks as meteorological data does not exist in TANKS for CNMI. Jet Kerosene fuel was used as the surrogate for JP-8 in the TANKS model as it is the closest in characteristics to JP-8.

Emission Calculations Summary from TANKS*

Tank Type	Throughput (gal.)	Working Loss (lbs)	Breathing Loss (lbs)	VOC Total (lbs)	VOC Total (tons)
Tank 1 (Seaport) - 50,000 bbl, cut and cover or AST					
Tank 2 (Seaport) - 50,000 bbl, cut and cover or AST					
Tank 3 (Airport) - 60,000 bbl, cut and cover or AST	114,545	5.25	714.88	720.13	0.36
Tank 4 (Airport) - 60,000 bbl, cut and cover or AST	114,545	5.25	714.88	720.13	0.36
Tank 5 (Airport) - 100,000 bbl, cut and cover or AST	190,909	8.75	1172.01	1180.76	0.59
Total		19.25	2,601.77	2,621.02	1.31

Removed for SEIS.

Removed for SEIS.

*See the following references for TANKS printouts. (SM12 - TANKS) & (SM13 - TANKS)

SEIS Emissions Estimated in ACAM

W Pipeline Construction		E Pipeline Construction		Seaport Grading Construction		Seaport Emergency Generator Operation		Roadway Improvement Construction	
Pollutant	Total Emissions (TONs)	Pollutant	Total Emissions (TONs)	Pollutant	Total Emissions (TONs)	Pollutant	Emissions Per Year (TONs)	Pollutant	Total Emissions (TONs)
VOC	7.50	VOC	8.68	VOC	3.39	VOC	0.029	VOC	0.71
SO _x	0.085	SO _x	0.10	SO _x	0.048	SO _x	0.00050	SO _x	0.0093
NO _x	39.64	NO _x	45.50	NO _x	23.18	NO _x	1.04	NO _x	3.80
CO	31.53	CO	35.62	CO	16.59	CO	0.28	CO	5.06
PM 10	39.50	PM 10	39.75	PM 10	45.27	PM 10	0.032	PM 10	7.77
PM 2.5	1.69	PM 2.5	1.93	PM 2.5	0.96	PM 2.5	0.032	PM 2.5	0.20
Pb	0	Pb	0	Pb	0	Pb	0	Pb	0
NH ₃	0.0093	NH ₃	0.012	NH ₃	0.0018	NH ₃	0	NH ₃	0.013
CO ₂ e	8220.40	CO ₂ e	9480	CO ₂ e	4754	CO ₂ e	53	CO ₂ e	838.90

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 APPENDIX E: AIR QUALITY ANALYSIS SUPPORTING DOCUMENTATION

SEIS Project Assumptions / ACAM Input Parameters

W Pipeline Construction

Miles of New Pipeline Construction (West)	4.08 miles
Worst case disturbed, ROW maximum width	80 feet
Pipeline depth	3 feet
Operational Easement Max	20 feet
ROW	Existing, i.e. no road construction needed
Area to be trenched	430,848 ft ² (based on miles long x 20 feet easement)
Open trench area at any one time	52,800 ft ² (based on 0.5 mile sections)
Volume material excavated	47,872.00 yd ³ (based on area to be trenched x depth)
Avg days/week worked	5
Graded area, Max	1,723,392
Graded area at any one time	52,800 ft ² (same as trenching estimate)
Pipeline diameter	2 ft (conservatively estimated)
"Area of Building" for pipeline construction	43,901 ft ² (estimated conservative pipe diameter x length of pipeline, for use in ACAM)
"Height of Building" for pipeline construction	2 ft (estimated conservative pipe diameter)
Estimated pipeline circumference	6.3 ft (estimated pipe circumference)
"Area" of pipe to be potentially coated	134,047.8 ft ² (circumference x pipe length, converted to feet)
Average hauling truck round trip commute, pipeline sections	4.08 miles (from port or San Jose, interim pipe distance one way and return; estimated as half finished pipe distance x 2)
Average vendor round trip commute, pipeline sections	4.08 miles (from port or San Jose, interim pipe distance one way and return; estimated as half finished pipe distance x 2)
Material to be hauled on site, trenching	0
Material to be hauled off site, trenching	0
Average truck hauling capacity, all	20 yd ³ (original EIS, assume similar truck size)
Average worker round trip commute, trenching, construction, and grading	4.08 miles (from San Jose, interim pipe distance one way and return; estimated as half finished pipe distance x 2)

E Pipeline Construction

Miles of New Pipeline Construction (East)	4.95 miles
Worst case disturbed, easement width	80 feet
Pipeline depth	3 feet
Operational Easement Max	20 feet
ROW	Existing, i.e. no road construction needed
Area to be trenched/graded	522,720 ft ² (based on miles long x 20 feet easement)
Open trench area at any one time	52,800 ft ² (based on 0.5 mile sections)
Volume material excavated	58,080 yd ³ (based on area to be trenched x depth)
Avg days/week worked	5
Pipeline diameter	2 ft (conservatively estimated)
"Area of Building" for pipeline construction	53,262 ft ² (estimated conservative pipe diameter x length of pipeline, for use in ACAM)
"Height of Building" for pipeline construction	2 ft (estimated conservative pipe diameter)
Estimated pipeline circumference	6.3 ft (estimated pipe circumference)
"Area" of pipe to be potentially coated	162,631.6 ft ² (circumference x pipe length, converted to feet)
Average hauling truck round trip commute, building activity	4.95 miles (from port or San Jose, interim pipe distance one way and return; estimated as half finished pipe distance x 2)
Average vendor round trip commute, building activity	4.95 miles (from port or San Jose, interim pipe distance one way and return; estimated as half finished pipe distance x 2)
Material to be hauled on site, trenching	0
Material to be hauled off site, trenching	0
Average truck hauling capacity, all	20 yd ³ (original EIS, assume similar truck size)
Average worker round trip commute, trenching, construction, and grading	4.95 miles (from San Jose, interim pipe distance one way and return; estimated as half finished pipe distance x 2)

Seaport Infrastructure for Piped Fuel Scenario

Original EIS land disturbance at seaport	5.39 acres
Piped Fuel Scenario Land Disturbance	8.23 acres
Amount of additional land disturbance, piped fuel scenario	2.84 acres
Conversion factor	43560 square feet per acre
Amount of additional land disturbance, piped fuel scenario	123710 ft ² (converted from above)
Avg days/week worked	5
Material to be hauled on site, disturbance/grading	0
Material to be hauled off site, disturbance/grading	0
Average truck hauling capacity, all	20 yd ³ (original EIS, assume similar truck size)
Average worker round trip commute, San Jose to seaport	2 mi (San Jose is no more than 1 mi from the port)

Roadway Improvement

Length of Roadway to be improved	2.51 miles
Standard road width	24 ft
Total Road Improvement Area (LxW)	318067 ft ² based on length, width
Total disturbed road area at any one time	63360 ft ² based on 0.5 mi x width
Depth excavated	1 ft
Avg days/week worked	5
Timeframe	1 year
Material to be hauled off	11780 yd ³ (based on depth excavated x total area)
Material to be hauled on site, disturbance/grading	0
Material to be hauled off site, disturbance/grading	0
Average truck hauling capacity, all	20 yd ³ (original EIS, assume similar truck size)
Average worker round trip commute, San Jose to seaport	2.51 miles round trip (assume half road length from port x 2)

APPENDIX F

Compliance Actions and Industry Standards





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Appendix F: Compliance Actions and Industry Standards

This Appendix identifies actions and standards dictated by federal, Department of Defense (DOD), U.S. Air Force (USAF), or Commonwealth of the Northern Mariana Islands (CNMI) regulations or guidance that would be implemented under the Proposed Actions. These actions and standards are routine and common practice and are not specific to the Proposed Actions. Compliance actions and industry standards are built into the design, construction, and operation of the proposed infrastructure and would be implemented to reduce the potential for environmental impacts. This Appendix is not intended to be a comprehensive list of all regulations or guidance that would be implemented under the Proposed Actions but specifically focuses on those that would be incorporated into the Proposed Actions and appreciably reduce the potential for environmental impacts. USAF would comply with all applicable federal, DOD, USAF, and CNMI regulations and guidance for implementation of the Proposed Actions.

Compliance actions and industry standards that would reduce the potential for environmental impacts on a particular resource area are provided in **Section F.1 and Table F-1**. Compliance actions and industry standards that would reduce the potential for environmental impacts on multiple resource areas are detailed in **Sections F.2 through F.5**, organized by the Proposed Action for which they would be implemented and by the phase of the action.

F1. Resource-Specific Actions and Standards

USAF has identified measures for reducing the potential for impacts on specific resource areas for one or both Proposed Actions. These resource-specific measures are summarized for both Proposed Actions in **Table F-1**.

Table F-1. Resource-Specific Compliance Actions and Industry Standards

Compliance Action	Pipeline/Support Infrastructure	Roadway Improvements
NOISE		
<u>Construction Equipment</u> <ul style="list-style-type: none"> Construction activities could be restricted to between sunrise and sunset to reduce annoyance to adjacent populations. Common measures such as using equipment exhaust mufflers would minimize noise impacts. 	X	X
BIOLOGICAL RESOURCES		
<u>Migratory Birds during Construction</u> Surveys and/or monitoring for nesting birds during construction would be conducted and areas where active nests are found would be avoided, or other measures would be taken to avoid harming any migratory birds, nests, or eggs.	X	X
<u>Marine Resources</u> Compliance actions identified for geological resources and soils, water resources, and hazardous materials and wastes would reduce impacts on marine biological resources. See Sections F.2 through F.5 .	X	X
CULTURAL RESOURCES		
No compliance actions have been identified for cultural resources.		
SOCIOECONOMICS		
No compliance actions have been identified for socioeconomics.		
ENVIRONMENTAL JUSTICE		
Compliance actions identified for geological resources and soils, water resources, and hazardous materials and wastes would reduce impacts on minority, low-income, elderly, or children populations in the unlikely event of a spill. See Sections F.2 through F.5 .	X	
HEALTH AND SAFETY		
<u>Construction Workers</u> <ul style="list-style-type: none"> Potential impacts on construction contractor health and safety would be avoided or minimized by adherence to established federal and CNMI safety regulations. Workers would be required to wear protective gear such as ear protection, steel-toed boots, hard hats, gloves, and other appropriate safety gear. Contractors would be required to establish and maintain health and safety programs for their employees. Equipment would be maintained and stored in accordance with the manufacturer's guidelines to prevent worker injury while operating equipment. Safety Data Sheets for all hazardous materials and chemicals used or stored at the worksite would be kept on site and be available for immediate review. Contractors, construction personnel, and USAF personnel would be properly trained on chemical, physical, and biological hazards as well as ergonomic stressors associated with construction and operations. If contaminated soils were discovered during construction activities, all activities would be stopped and appropriate remedial measures would be implemented. USAF would require appropriate plans (e.g., evacuation plans) and safety protocols related to geological hazards to be in place prior to the commencement of construction or operations to provide for adequate protection for construction and USAF personnel. See Sections F.2 through F.5. 	X	X
<u>Airfield Safety</u> Construction and maintenance activities would be coordinated with Tinian International Airport/CPA personnel to prevent airfield obstructions and safety hazards.	X	
<u>Explosives Safety</u> When working in areas where UXO could be present, USAF could provide a UXO technician to remain on site.	X	X

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 APPENDIX F: COMPLIANCE ACTIONS AND INDUSTRY STANDARDS

Compliance Action	Pipeline/Support Infrastructure	Roadway Improvements
<u>Public Healthy and Safety</u> <ul style="list-style-type: none"> • Signs would be posted to warn the public of hazards. • Construction would be coordinated with CNMI Department of Public Safety to ensure the ability of the emergency services personnel to respond to public emergencies. • To ensure proper coordination, an Incident Command System (ICS) could be established. An ICS would provide common terminology, organizational structure, duties, and operational procedures to operator personnel and various federal, state, and local agencies that may be involved in response operations. • See Sections F.2 through F.5 	X	X
GEOLOGICAL RESOURCES AND SOILS		
<u>Erosion and Sediment Control</u> See Section F.2 through F.5	X	X
<u>Spill Prevention and Control</u> See Section F.2 through F.5	X	X
<u>Geologic Hazards</u> <ul style="list-style-type: none"> • Because development would occur in Seismic Zone 4, all buildings and other structures would be designed and constructed to meet the engineering requirements in the 2018 International Building Code. • UFC 3-310-04, Seismic Design of Buildings, would be employed when designing and constructing structures in order to reduce impacts from geologic hazards associated with slope instability (i.e., landslides), seismic activity, and liquefaction. 	X	X
WATER RESOURCES		
<u>Water Quality</u> See Sections F.2 through F.5	X	X
<u>Storm Water Management and Monitoring</u> See Sections F.2 through F.5	X	X
INFRASTRUCTURE AND UTILITIES		
<u>Construction Debris</u> <ul style="list-style-type: none"> • Waste would be recycled per EO 13693 <i>Planning for Federal Sustainability in the Next Decade</i> and DOD requirements. • Waste from vegetation clearing for construction would be composted, as practicable. • The USAF would obtain all necessary permits for solid waste management and processing, including recycling, and green waste processing. Required permits could include the BECQ Solid Waste Collection and Solid Waste Processing permits. • Contractors hired for the various construction projects would be responsible for the removal and disposal of their construction wastes generated on site. 	X	X
<u>Energy Efficiency</u> <ul style="list-style-type: none"> • New facilities would be designed to achieve Leadership in Energy and Environmental Design Silver certification; therefore, state-of-the-art energy efficiency would be expected and impacts on the electrical supply would be reduced. • The USAF would follow DOD Energy Conservation goals and therefore impacts on the electrical supply during implementation would be reduced. 	X	
<u>Water Supply</u> The USAF would coordinate with local regulatory authorities and CUC to avoid any localized impacts on the water supply.	X	X
LAND USE AND RECREATION		
No compliance actions have been identified for land use.		
HAZARDOUS MATERIALS AND WASTE		
<u>Fuel Infrastructure Design, Management, Operation, and Inspection</u> See Sections F.2 through F.5	X	

Compliance Action	Pipeline/Support Infrastructure	Roadway Improvements
<u>Spill Prevention and Control</u> See Section F.2 through F.5	X	X
<u>Hazardous Material Handling</u> <ul style="list-style-type: none"> To avoid or minimize impacts from hazardous materials, all hazardous materials would be imported, collected, stored and handled in accordance with applicable federal, CNMI, and USAF hazardous materials management regulations. Contractors would be responsible for the storage, handling, and disposal of hazardous wastes in accordance with federal, CNMI, and USAF hazardous waste management regulations. All collection, storage, and management of hazardous wastes by the contractor will be defined in the actual contract with the contractor, in coordination with CPA and the CNMI government. 	X	X
<u>Environmental Condition of Property</u> <ul style="list-style-type: none"> If environmental contamination or UXO is discovered during construction, the contractor would immediately stop work at the affected area, report the discovery to the USAF, property owner, and CNMI, as necessary, and implement appropriate safety measures. If environmental contamination or UXO is identified, construction site plans should be revised to avoid the contamination areas or remediate them as practicable. Commencement of field activities should not resume in the affected area until the issue is investigated and resolved. 	X	X
AIR QUALITY		
<u>Fugitive Dust</u> Fugitive dust control measures could include watering the construction surface and phasing work to limit dust, setting up wind fences to limit wind blown dust, and limiting vehicle speed to 15 mph or less at construction sites on unpaved roads.	X	X
<u>Construction Permitting</u> The USAF would coordinate with CNMI BECQ to obtain the necessary stationary source permits prior to commencing construction of any potential stationary source.	X	

F2. Planning and Design Actions and Standards

USAF would plan and design stormwater management and fuels infrastructure as described in **Section F2.1 and F2.2** to ultimately reduce potential environmental impacts. Designs would reduce the potential for an increase in stormwater runoff, altered hydrologic conditions, altered water quality, decline in groundwater recharge, groundwater contamination, construction and operation-related accidents, and a release of petroleum products.

F2.1 Stormwater Management and Low Impact Development

USAF design for the proposed pipeline infrastructure and roadway improvements would focus on maintaining predevelopment hydrology and preventing net increases in stormwater runoff once construction is complete, to the extent practical. “Predevelopment hydrology” is defined as the pre-project hydrologic conditions of temperature, rate, volume, and duration of stormwater flow from the project site. The permanent stormwater management infrastructure for the Proposed Actions would be designed so that the post-development peak discharge rate frequency would not exceed the pre-development peak discharge rate for the 25-year frequency storm event (CNMI BECQ and GEPA 2006). USDA NRCS has calculated a 25-year, 24-hour rainfall event to be 12.49 inches for Saipan (USDA NRCS 2008).

As impervious surfaces would not be increased beyond those analyzed in the 2016 Divert EIS, additional calculation of pre- and post-development stormwater volumes would not be

necessary (DoD 2015). USAF would maintain predevelopment hydrology through implementation of low impact development (LID), performance standards, and best management practices (BMPs), consistent with the 2016 Divert EIS. LID would apply to the fuel infrastructure, to the extent practical. USAF would also develop and implement plans, and conduct monitoring, to ensure that water flowing from project sites meets CNMI water quality standards. USAF would implement all applicable stormwater management and low impact strategies identified in Section 4.16 of the 2016 Divert EIS.

Table F-2 provides an example of BMPs that USAF would incorporate into their permanent stormwater infrastructure design, to capture stormwater runoff and meet water quality treatment goals. These BMPs would be consistent with LID requirements of UFC 3-210-01 *Low Impact Development* (DoD 2015) and were selected based on the following criteria:

1. can capture and treat the full water quality volume
2. are capable of approximately 80 percent total suspended solids removal
3. are capable of meeting management objectives for specific resource protection areas through elevated total phosphorus, total nitrogen and/or fecal coliform bacteria removal
4. have acceptable longevity in the field.

Table F-2. Permanent Structural Stormwater Management BMPs

Group	Practice	Description
Infiltration	Infiltration Trenches/Chambers	An infiltration practice that stores the water quality volume in the void spaces of a limestone aggregate trench or within an open chamber before it is infiltrated into underlying soils within the B or C soil horizons.
	Infiltration Basin	An infiltration practice that stores the water quality volume in a shallow surface depression before it is infiltrated into the underlying soils within the B or C soil horizons.
Filtering Practices	Bioretention	A shallow depression that treats stormwater as it flows through a soil matrix, and is returned to the storm drain system, or infiltrated into underlying soils or substratum.
Open Channels	Dry Swale	An open vegetated channel or depression explicitly designed to detain and promote filtration of stormwater runoff into an underlying fabricated soil matrix.

Source: CNMI BECQ and GEPA 2006.

As previously described, the permanent stormwater management system and associated BMPs would be designed so that the post-development peak discharge rate frequency would not exceed the pre-development peak discharge rate for the 25-year frequency storm event (CNMI BECQ and GEPA 2006). The BMPs would also be designed to meet water quality criteria, overland erosion and channel protection criteria, overbank flood control/receiving stream criteria, and recharge criteria.

Additional LID site features that USAF could deploy include rain gardens, vegetated filter strips, downspout disconnection, reduced impervious area, tree preservation or re-vegetation using native plants, soil amendments.

F2.2 Fuel Infrastructure Planning, Design, and Management Standards

To reduce the likelihood of spills during construction and operation of the pipeline infrastructure, as well as the impact of spills (e.g., or spill migration to nearshore waters) in the unlikely event that one should occur, all proposed fuels infrastructure on Tinian would be designed and constructed according to the most stringent applicable federal and CNMI requirements.

It is the firm policy of the Department of Defense to design and construct fueling facilities in a manner that will prevent damage to the environment by accidental discharge of fuels, their vapors or residues.

Specific standards include, but are not limited to, the following:

Standard 1: General Design and Construction. USAF would follow UFC 3-460-01 Design: Petroleum Fuel Facilities for material, design, fabrication, erection and inspection of the pipeline and support infrastructure.

Standard 2: Infrastructure Protection. USAF would plan and design all fuel infrastructure with the goal of protecting the fuels, storage, and transfer capability from enemy attack, terrorists, sabotage, fire, seismic activity, and other potential damaging influences.

Standard 3: Cathodic Protection. Cathodic protection would be provided for all carbon steel and stainless steel underground piping, in accordance with UFC 3-570-02N and 40 CFR § 280. The cathodic protection system would be isolated from the filter/separator discharge header and the hydrant pump house bulk receipt system by isolation flanges, which would keep the impressed current isolated to the underground portion of the transfer pipeline.

Standard 4: Industry Requirements. Piping design, materials, fabrication, assembly, erection, inspection, and pressure tests would be in accordance with ANSI/ASME B31.3 *Process Piping*.

Standard 5: Roadways. Underground piping which passes under public roadways or railroad tracks would be designed in accordance with Department of Transportation regulations 49 CFR § 195 and American Petroleum Institute (API) Recommended Practice (RP) 1102.

Standard 6: Venting. The pipeline would be equipped with high point vents and low point drains. The high point vents would be used to remove noncondensing gas from the pipeline. The low point drains would be used to drain water or particulate matter from the pipe and can also be used to fully drain the pipe if required. The high point vents and low point drains would be installed in pits. The pits would be equipped with traffic rated covers and lockable to prevent vandalism and theft.

Standard 7: Pig Launcher: The transfer pipeline would be equipped with a permanently installed pig launcher at the booster pump house and a permanently installed pig receiver at the bulk storage pump house. The transfer pipeline would be designed to be piggable to allow for cleaning and testing of the line between the booster pump house and the hydrant pump house.

Standard 8: Valves. The transfer pipeline would be equipped with an isolation valve pit midway between the booster pump house and the bulk storage pump house. The isolation valve pit would be equipped with a double block and bleed valve that would be used during pressure testing and can be closed in the event of an emergency upstream or downstream of the valve. The transfer pipeline would also be equipped with a double block and bleed valve after it transitions aboveground at the bulk storage pump house. The double block and bleed valve at the booster pump house and the double block and bleed valve at the bulk storage pump house can be used to fully isolate the underground section of the transfer pipeline and would be used when annual and five year pressure testing of the pipeline is required.

Standard 9: Personnel Training. USAF will annually train all personnel handling POL in the operation and maintenance of equipment to prevent discharges; discharge procedure protocols; and general facility operations.

Standard 10: Equipment Testing. USAF will maintain all petroleum equipment in good functioning order, including regular testing and checking for any failure. This greatly adds to the effectiveness of spill prevention control and countermeasures.

Standard 11: On-site Personnel. USAF would provide a full-time onsite person or persons to inspect and maintain all POL infrastructures, in accordance with USAF requirements. These personnel would be trained to provide USAF with spill planning, preparedness and response capability, in accordance with the SPCC and FRP required by 40 CFR Part 112 and AFI 32-7044. This capability could thereby potentially upgrade island-wide capability for spill response through cooperative spill response agreements that could be developed, if determined applicable.

F3. Construction Actions and Standards

During construction, USAF would implement measures described in **Sections F3.1 through F3.5** as dictated by existing regulations and industry standards for stormwater management, erosion control, and POL handling that would reduce potential environmental impacts. Strategies would include reducing the potential for an increase in stormwater runoff, altered hydrologic conditions, altered water quality, decline in groundwater recharge, groundwater contamination, and a release of petroleum products during construction. During construction of the pipeline infrastructure and roadways, USAF would manage stormwater runoff in accordance with a USEPA NPDES Construction General Permit and would perform the following activities:

- implement erosion and sediment controls
- stabilize soils
- implement pollution prevention measures
- provide and maintain buffers around surface waters
- prohibit certain discharges
- utilize surface outlets for discharges from basins and impoundments.

F3.1 Stormwater Pollution Prevention Plan

USAF would develop and implement a Stormwater Pollution Prevention Plan (SWPPP) for construction that would adhere to USEPA Guidelines. The SWPPP would be completed prior to submitting the Notice of Intent for permit coverage. The SWPPP will describe the following:

- responsible parties
- site evaluation, assessment, and planning
- documentation of compliance with other federal requirements
- erosion and sediment controls
- permanent construction BMPs
- pollution prevention standards
- inspection and corrective actions
- training requirements
- certification and notification requirements
- operation and maintenance of permanent stormwater controls.

Site-Specific Measures. USAF would design all construction site stormwater management measures to accommodate (safely convey without creating erosive conditions) the 10-year frequency storm. The 10-year frequency storm represents a large event that will generally produce significant runoff and yet has a relatively high chance of occurring in any given year (i.e., 10 percent) (CNMI BECQ and GEPA 2006).

USAF would design all temporary sediment trapping devices to retain runoff from a minimum of the 10-year storm. The 10-year storm represents a frequent event that generates runoff and potential sediment load (CNMI BECQ and GEPA 2006). USDA NRCS has calculated a 10-year, 1-hour rainfall event to be 2.92 inches for Saipan (USDA NRCS 2008).

For maximum efficacy, USAF site-specific stormwater management measures during construction would include some, or all, of the following to manage stormwater runoff from the 10-year frequency storm:

- **Stabilized construction entrances.** Stabilized construction entrances are temporary crushed rock/coral pads located at all points where vehicles enter or leave a construction site. The purpose of a stabilized entrance is to reduce the tracking of sediment/mud from the site onto paved roads and parking lots.
- **Silt fencing.** A temporary barrier of geotextile fabric, silt fencing is installed across a slope, around stockpiles, or along a perimeter. The purpose of a silt fence is to intercept sediment-laden runoff from small drainage areas of disturbed soil, slow runoff velocity, and allow sediment to settle out. Alternatives to silt fencing could include the following.
 - earth berms: linear barrier of compacted soil used to block or divert runoff.
 - compost socks: mesh tubes (also called filter socks or tubes) filled by blower with organic or wood mulch. They can be used around site perimeters, as conveyance checks, and as inlet protection.

- silt dikes: reusable, triangular, foam product covered in geotextile used along perimeters, curbs, and as check dams.
- **Berms and swales.** Berms and swales, depending on their location, can be used to divert “clean” runoff around disturbed areas, or to move “dirty” runoff to sediment traps. Berms (also called earth berms or diversion dikes) are mounds of compacted soil placed at the top or base of slopes, along the site perimeter, or across exposed areas. Swales are temporary channels used to convey runoff to a sediment trapping device.
- **Check dams.** Small check dams constructed of rock/coral, bagged sand, compost tubes, or other durable materials are placed across an open drainage channel to reduce erosive runoff flows and allow sediment to settle out.
- **Channels.** Vegetated or lined channels are used to safely convey flows from stabilized areas or outlets without damage from erosion. Waterways are typically stabilized with grass, erosion control matting, rock rip rap, gabions, or concrete depending on slope, soil, and runoff velocity.
- **Basins and traps.** Large basins and small traps are temporary ponding structures used to collect runoff and allow sediment to settle out before runoff leaves site. Basins and traps are formed by an embankment and/or excavation.
- **Stabilization.** Covering an area of bare ground with vegetation, topsoil, mulch, or erosion control blankets for temporary or permanent erosion prevention is critical. Temporary stabilization is often needed because grading operations can last several months and extend into or through the rainy season. Final stabilization will be required for project close out. Vegetative cover can be established through a combination of seeding techniques, topsoil amendments, and mulching to conserve moisture and control weeds.
- **Erosion control blankets.** Temporary erosion control blankets (also called matting) are used to hold seed and soil in place, particularly on steep slopes. There are many types of products available made of biodegradable or synthetic materials.
- **Inlet protection.** Various inlet protection devices can be used as temporary structures to keep silt, sediment, and construction debris from entering storm drains through open inlets. Devices should trap sediment while allowing water to slowly flow over or through materials.
- **Outlet protection.** Rock should be placed around and below an outlet to stabilize the outlet, reduce the depth and velocity of discharge waters, and prevent downstream erosion. Outlet protection applies to culverts, outfalls from basins, and other conduits.
- **Level spreaders.** Level spreaders are temporary (or permanent) devices that take concentrated flow from a pipe, berm, or swale and release it evenly over a wider area to prevent erosion and promote infiltration. This is particularly useful where sheet flow discharges through vegetated buffers are possible.

F3.2 Stormwater Monitoring

All stormwater management structures and practices would be inspected and maintained during all stages of the construction process in accordance with the SWPPP and CNMI regulations to ensure proper function. Inspections would be conducted by on-site USAF or contractor personnel. At a minimum, those inspections would occur following major rainfall events to ensure that stormwater control structures are functioning as designed and remain effective.

USAF would implement an adaptive management approach that would be based on information obtained during regular monitoring and inspection of construction stormwater management controls. USAF would identify any structures that are damaged or are not functioning in accordance with applicable standards and repair them. All construction stormwater management procedures will ensure maximum protection of the marine environment. These procedures will be detailed in a SWPPP, and will comply with all applicable USEPA NPDES Construction General Permit requirements. USAF has programmed for costs associated with stormwater monitoring and repair, if needed, to ensure timely completion of these inspections and repairs as a part of an adaptive management process. The USAF Engineering Technical Letter 14-1 *Construction and Operation and Maintenance Guidance for Storm Water Systems* provides inspection checklists and schedules for each type of stormwater management control that would be followed for inspections and maintenance.

F3.3 Erosion and Sediment Control Standards

USAF would follow standards for erosion and sediment control during construction of both Proposed Actions recommended by CNMI Chapter 65-30 *Earthmoving and Erosion Control Regulations*, most recently published in 2017, and the *2006 CNMI and Guam Stormwater Management Manual* (CNMI BECQ and GEPA 2006), including the following:

- **Standard 1:** Minimize unnecessary clearing and grading from all construction sites. Clearing and grading shall only be performed within areas needed to build the project, including structures, utilities, roads, recreational amenities, post-construction stormwater management facilities, and related infrastructure. Clearing should only be scheduled during the dry season if possible. Mass clearing during the wet season should be avoided.
- **Standard 2:** Whenever practicable and feasible, construction shall be phased to limit disturbance to only one area of active construction at a time. Future phases shall not be disturbed until construction of prior phases is complete and the land area is stabilized.
- **Standard 3:** Disturbed areas shall be stabilized as soon as feasibly possible after construction is completed within a designated construction area, and in no case longer than 14 days after completion of active construction.
- **Standard 4:** Steep slopes shall be protected from erosion by limiting clearing of these areas in the first place or, where grading is unavoidable, by providing special techniques to prevent upland runoff from flowing down a steep slope and through immediate stabilization to prevent gullying. A steep slope is defined as any slope over 20 percent (5:1) in grade over a length of 50 feet.

- **Standard 5:** Perimeter sediment controls shall be applied to retain or filter concentrated runoff from disturbed areas to trap or retain sediment before it leaves a construction site. Upland runoff should be diverted around excavations where possible.
- **Standard 6:** Sediment trapping and settling devices shall be employed to trap and/or retain suspended sediments and allow time for them to settle out in cases where perimeter sediment controls (e.g., silt fence) are deemed to be ineffective in trapping suspended sediments on-site.
- **Standard 7:** All construction site managers (or superintendents) shall provide documentation that they have received adequate training in the application and maintenance of erosion and sediment control practices.
- **Standard 8:** All construction site managers must participate in a pre-construction meeting with the applicable authority to review the provisions of the erosion and sediment control plan and make any field adjustment necessary to implement the intent of the plan to minimize erosion and maximize sediment retention on-site throughout the construction process.
- **Standard 9:** Construction should be scheduled to minimize soil exposure in the rainy season (1 July–30 November) and during periods of coral spawning. The 2014 CNMI Water Quality Standards note that to avoid coral spawning, a stoppage period starting around the June or July full moon (to be determined by the Bureau of Environmental and Coastal Quality), is required. The stoppage period, if determined to be applicable, shall be no less than twenty one calendar days (CNMI BECQ 2014a). USAF will also contact CNMI BECQ to determine when soil exposing work should be halted during spring rainfall events to avoid adversely affecting soft corals that are spawning.
- **Standard 10** Erosion and sediment control practices shall be aggressively maintained throughout all phases of construction. All erosion and sediment control plans shall have an enforceable operation and maintenance agreement.
- USAF would keep waste materials, stockpiles, and building supplies tied down or covered to protect from wind or stormwater. Additionally, in accordance with CNMI Chapter 65-30 *Earthmoving and Erosion Control Regulations* the USAF would minimize grading, filling, clearing of vegetation or other disturbance of the soil during inclement weather and for the resulting period of time when the site is in a saturated, muddy or unstable condition.

F3.4 Erosion and Sediment Control Plan

In compliance with CNMI Chapter 65-30 *Earthmoving and Erosion Control Regulations*, the USAF would develop an Erosion and Sediment Control Plan (ESCP) that would be implemented during construction. The plan would include the following, at a minimum:

- elevations and dimensions including quantity, and extent of proposed grading
- existing tree locations, size, species, and the proposed extent and manner of tree cutting and vegetation clearing

a description of equipment and methods to be employed.

F3.5 Water Quality Management

Parameters that provide an indication of water quality include concentration of dissolved oxygen; levels of fecal coliform bacteria from human and animal wastes; concentrations of plant nutrients nitrogen and phosphorus; amount of particulate matter suspended in the water (turbidity); and amount of salt (salinity). In many bodies of water, the concentration of chlorophyll-*a*, a green pigment found in microscopic algae, is also filtered from water samples to give a measure of the microalgae living in the water column. Quantities of pesticides, herbicides, heavy metals and other contaminants may also be measured to determine water quality.

USAF is required to comply with CNMI water quality standards in compliance with a Clean Water Act, Section 401 Certification. **Table F-3** provides the CNMI BECQ-published water quality standards for the waters of CNMI, which are the minimum water quality criteria that the USAF would comply with for discharges into Tinian waters (CNMI BECQ 2014a) during construction. Parameters can be added to or deleted from the list based upon knowledge of the onsite activities. For example, if weeds are to be controlled by a particular herbicide, it could be included on the list of parameters. USAF would also implement an adaptive management approach during construction based on information obtained during regular monitoring and inspection if CNMI water quality standards are not being met.

Table F-3. 2014 CNMI Water Quality Standards

Criteria	Level*
Enterococci	Shall not exceed a geometric mean of 35 per 100 milliliters (mL) based on samples taken in any 30 day interval. The Statistical Threshold Value is 130 Enterococci per 100 mL.
E. coli	Shall not exceed a geometric mean of 126 per 100 mL based on samples taken in any 30 day interval. The Statistical Threshold Value is 410 E. coli per 100 mL.
pH	Shall not deviate more than 0.5 units from a value of 8.1; no lower than 7.6 or higher than 8.6
Nitrate-Nitrogen	Concentration shall not exceed 0.20 milligrams per liter (mg/L)
Total Nitrogen	Concentration shall not exceed 0.40 mg/L
Orthophosphate	Concentration shall not exceed 0.025 mg/L
Total Phosphorous	Concentration shall not exceed 0.025 mg/L
Ammonia	Concentration shall not exceed 0.02 mg/L
Dissolved oxygen	Concentration all waters shall not be less than 75 percent saturation. Where natural conditions cause lower dissolved oxygen levels, controllable water quality factors shall not cause further reductions.
Total suspended solids	Concentrations of suspended matter at any point shall not be increased from ambient conditions at any time, and should not exceed 5 mg/L except when due to natural conditions.
Salinity	No alterations of the marine environment shall occur that would alter the salinity of marine or estuarine waters more than 10 percent from ambient conditions or which would otherwise adversely affect the indigenous biota and sedimentary patterns, except when due to natural causes.
Temperature	Water temperature shall not vary by more than 1.0 °C from the ambient conditions.
Turbidity	Turbidity at any point, as measured by nephelometric turbidity units, shall not exceed 0.5 nephelometric turbidity units over ambient conditions.
Oil and Petroleum Products	The concentration of oil or petroleum products in any Commonwealth or State waters shall not: (a) Be detectable as a visible film, sheen, or discoloration of the surface, or cause an objectionable odor. (b) Cause tainting of fish or other aquatic life, be injurious to the indigenous biota, or cause objectionable taste in drinking water. (c) Form an oil deposit on beaches or shoreline, or on the bottom of a body of water.
Enterococci	Shall not exceed a geometric mean of 35 per 100 mL based on samples taken in any 30 day interval. The Statistical Threshold Value is 130 Enterococci per 100 mL.

Source: CNMI BECQ 2014a

Note: *The level given is the most stringent standard for the marine waters of Tinian. Less stringent standards are applicable for some criteria for discharges into the San Jose harbor or fresh waters.

F4. Infrastructure Operation Actions and Standards

Once construction is complete, USAF would implement measures in **Sections F4.1 through F4.5** for long-term stormwater control and management of fuels infrastructure that would ultimately reduce potential environmental impacts on biological resources, geology and soils, water resources, and hazardous materials and wastes. These strategies would reduce the potential post-construction for: long-term increases in stormwater runoff, altered hydrologic conditions, altered water quality, decline in groundwater recharge, groundwater contamination, construction and operation-related accidents, and a release of petroleum products.

F4.1 Stormwater Monitoring

USAF would conduct post-construction site visits to inspect all permanent stormwater infrastructure and assess stormwater management structures and validate if they have been constructed according to plans and specifications.

All existing and USAF-constructed stormwater management structures and practices would be systematically inspected and maintained. The USAF would revise the existing SWPPP or develop a new SWPPP for management of stormwater infrastructure once construction is complete. The SWPPP would guide the monitoring inspections, which would be conducted by on-site USAF or contractor personnel. At a minimum, those inspections would occur following major rainfall events to ensure that stormwater control structures are functioning as designed and remain effective.

USAF would also implement an adaptive management approach based on information obtained during regular monitoring and inspection of permanent stormwater management controls. USAF would identify any structures that are damaged or are not functioning in accordance with applicable standards and repair them. The objectives and required standards described above would serve as thresholds for determining whether the construction stormwater management system would need to be improved to avoid affecting the nearshore marine environment. USAF Engineering Technical Letter 14-1 provides inspection checklists and schedules for each type of stormwater management control that would be followed for inspections and maintenance (USAF 2014). The stormwater management system would be adaptively managed and revised or improved when necessary to ensure that all planned objectives and required standards are being met.

F4.2 Water Quality Management

Based on the design, implementation, and management of controls described above, USAF does not anticipate that stormwater runoff or POL would be discharged into the nearshore waters of Tinian during or after construction, or that the Proposed Actions would cause a measureable increase in the volume or discharge rate of fresh water into the marine environment. However, USAF would be committed to ensuring that any stormwater runoff or release from the project sites post-construction are consistent with CNMI Water Quality Standards.

F4.3 Spill Prevention Control and Countermeasures

USAF would develop and implement a Spill Prevention, Control and Countermeasure (SPCC) Plan (as required by Section 311(j)(1)(C) of the Clean Water Act as amended by the Oil Pollution Act of 1990) to control the potential for contamination from the unlikely event of a spill during construction of the Proposed Actions.

The SPCC Plan would be prepared, maintained, and implemented to prevent, control, counteract, and report of all spills. The SPCC Plan would provide measures to prevent, and to the maximum extent practicable, to remove a worst case discharge from the facility. The plan would be certified by an appropriately licensed or certified technical authority ensuring that the plan considers applicable industry standards for spill prevention and environmental protection, and that the plan is prepared in accordance with good engineering practice and is adequate for the facility. Specifically, the SPCC Plan would include:

- **Prevention Section.** The prevention section of the plan would contain information on the facility; charts of drainage patterns; designated water protection areas; maps showing locations of various infrastructure which store, handle, and transfer POL that could produce a spill; critical water resources; land uses; and possible migration pathways. Maps would also be included, as appropriate, to predict direction and rate of flow, as well as the total quantity of substances that might be spilled as a result of a major failure.
- **Arrangements for Emergency Services.** The plan would describe arrangements with local police departments, fire departments, hospitals, contractors, and emergency response teams to coordinate emergency services. The plan would include a list of all emergency equipment, such as fire extinguishing systems, spill control equipment, communications and alarm systems (internal and external), and decontamination equipment, at each site where this equipment is required; an evacuation plan and a designated meeting place.
- **Spill Control Section.** The control section of the plan would identify resources for cleaning up spills, and directions on how to provide assistance to other agencies when requested. This section of the plan would contain a prioritized list of various critical water and natural resources that would be protected in the event of a spill. The plan would identify other resources addressed in prearranged agreements that are available to cleanup or reclaim a large spill, if such spill exceeds the response capability of the facility.

F4.4 Facility Response Plan

USAF would also develop a Facility Response Plan, per the Oil Pollution Act of 1990 which amended the Clean Water Act, which would address an accidental "catastrophic" spill. The Facility Response Plan would include the resources of all industrial activities and the U.S. Coast Guard to direct how to handle an incident of the scale beyond any single individual facility's capability to respond.

F4.5 Inspection and Monitoring of Fuel Systems

To ensure proper operation of all fuel infrastructure, USAF would follow Technical Order 37-1-1, *General Operations and Inspection of Installed Fuel Storage and Dispensing Systems* and UFC 3-460-03, *Operation and Maintenance: Maintenance of Petroleum Facilities*. The safe, efficient, and economical operation of petroleum dispensing systems, and associated infrastructure depends largely on an effective and proactive recurring maintenance program. USAF would follow UFC 3-460-03, which establishes the required frequency intervals for the recurring maintenance. Operation and maintenance of the pipeline would be managed by a PIMP to assist with and guide pipeline integrity maintenance. PIMPs improve the integrity management of piping systems and help prevent leaks or pipeline failures. The plans are developed based on the principles of *API Standard 570 Inspection, Repair, Alteration, and Rerating of In-Service Piping Systems* and federal and local regulations.

Additional standards and regulations that would be observed for operation, inspection, and monitoring of the fuel pipeline and infrastructure include the following:

Standard 1: Pressure Testing. An automatic pipe pressure testing system would be installed at the booster pump house. The system would be attached to the bulk receipt line and the transfer pipeline. The system would be used to conduct periodic integrity tests of the pipelines and ensure the pipelines are in good working order. Hydrostatic testing would be conducted in accordance with ANSI/ASME B31.3 and UFC 3-460-03.

Standard 2: Valves and Piping. USAF would periodically inspect, in accordance with the PIMP all valves, piping, and appurtenances associated with fuels infrastructure in accordance with API 570 which is the recognized industry standard.

Standard 3: Pipeline Safety Management Systems (SMS): USAF would follow API RP 1173, which provides guidance in developing or maintaining a pipeline safety management system. Elements of the management system include: leadership and management commitment; stakeholder engagement; risk management; operational controls; incident investigation, evaluation, and lessons learned; safety assurance; management review and continuous improvement; emergency preparedness and response; competence, awareness, and training; and documentation and recordkeeping.

Standard 4: Leak Detection. USAF would follow API RP 1175 and implement a “Leak Detection Program Management.” API RP 1175 is an industry consensus document that provides a risk-based approach to managing a leak detection program, including developing a leak detection culture and strategy, selecting the appropriate leak detection system, and monitoring leak detection program performance. This RP also identifies Control Center procedures, training, and the roles and responsibilities of Control Center personnel, as well as identifying proper testing of equipment and alarms.

F5. Additional Rules and Regulations

In addition to the compliance actions and industry standards outlined in **Sections F.1 through F.4**, USAF would follow all applicable federal, DOD, USAF, and CNMI rules and regulations. Additional rules and regulations that have been identified for potential applicability to the Proposed Actions are listed below. However, this is not a comprehensive list of all regulations that may be applicable to the Proposed Actions.

Federal Regulations

- 33 CFR Part 154 Facilities Transferring Oil or Hazardous Material in Bulk
- 40 CFR Part 60 Standards of Performance for New Stationary Sources
- 40 CFR Part 112 Oil Pollution Prevention
- 40 CFR Part 122 EPA Administered Permit Programs: The National Pollutant Discharge Elimination System (NPDES)
- 40 CFR Part 280 Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks (UST)
- 40 CFR Part 281 Approval of State Underground Storage Tank Programs
- 49 CFR §§ 190-199, U.S. Department of Transportation's Pipelines and Hazardous Materials Safety Administration pipeline safety regulations that address construction, operation, and maintenance 49 CFR Part 195 addresses Transportation of Hazardous Liquids by Pipeline.

DOD Specifications

- UFGS 01 33 23.33 Aviation Fuel System Submittal Requirements
- UFGS 33 52 43.28 Filter Separator, Aviation Fueling System
- UFGS 32 13 15.20 Concrete Pavement for Containment Dikes
- UFGS 33 52 43 Aviation Fuel Distribution (Non-Hydrant)
- UFGS 33 08 53 Aviation Fuel Distribution System Start-Up
- UFGS 33 52 80 Liquid Fuels Pipeline Coating Systems
- UFGS 33 08 55 Commissioning of Fuel Facility Systems
- UFGS 33 52 90.00 20 Welding for POL Service Piping
- UFGS 33 09 53 Aviation Fuel Pump Control and Annunciation System
- UFGS 33 52 10 Service Piping, Fuel Systems

- UFGS 33 56 63 Fuel Impermeable Liner System
- UFGS 33 52 43.11 Aviation Fuel Mechanical Equipment
- UFGS 33 57 00 Bulk Fuel Receiving / Dispensing Equipment
- UFGS 33 52 43.12 Aviation Fuel Pantograph
- UFGS 33 58 00 Leak Detection for Fueling Systems
- UFGS 33 52 43.13 Aviation Fuel Piping
- UFGS 33 59 00 Tightness of Existing Underground Fuel Systems
- UFGS 33 52 43.14 Aviation Fuel Control Valves
- UFGS 33 52 43.23 Aviation Fuel Pumps

Air Force Guidance

- AFH 32-1084 Facility Requirements
- AFI 32-1054 Corrosion Control
- AFI 91-203 Air Force Consolidated Occupational Safety Instruction
- AFM 88-9 Electrical Design – Lightning and Static Electricity Protection
- AF ETL 11-1 Civil Engineer Industrial Control System Information Assurance Compliance
- AFTO 37-1-1 General Operation and Inspection of Installed Fuel Storage and Dispensing Systems
- AFTO 42B1-1 Quality Control of Fuels and Lubricants

F6. References

- CNMI BECQ 2014a Commonwealth of the Northern Marianas Bureau of Environmental and Coastal Quality (CNMI BECQ). 2014. Commonwealth of the Northern Mariana Islands Water Quality Standards. 2014.
- CNMI BECQ 2014b CNMI BECQ. 2014. Final Commonwealth of the Northern Mariana Islands Integrated 305(b) and 303(d) Water Quality Assessment Report. September 2014.
- CNMI BECQ 2016 CNMI BECQ. 2016. Final Commonwealth of the Northern Mariana Islands Integrated 303(d), 305(b) and 314 Water Quality Assessment Report. December 2016.
- CNMI BECQ and GEPA 2006 CNMI BECQ and Guam Environmental Protection Agency. 2006. CNMI and Guam Stormwater Management Manual. October 2006.
- DOD 2015 Department of Defense. 2015. UFC 3-210-01 Low Impact Development. 01 June 2015.
- USAF 2014. USAF. 2014. Engineering Technical Letter (ETL) 14-1: Construction and Operation and Maintenance Guidance for Storm Water Systems. Available at: https://www.wbdg.org/ccb/AF/AFETL/etl_14_1.pdf
- USDA NRCS 2008 USDA NRCS. 2008. Engineering Technical Note No. 3, Rainfall-Frequency and Design Rainfall Distribution, for Selected Pacific Islands. Available at: <https://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=21849.wba>

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