

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 Code of Federal Regulations §§ 1500–1508), and 32 Code of Federal Regulations § 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 Personal information, home addresses, telephone numbers, and emails addresses will not be published in the Final SEIS.

1 **Cover Sheet**
2 **Supplemental Environmental Impact Statement**
3 **for Tinian Divert Infrastructure Improvements**

4 **Responsible Agency:** U.S. Air Force (USAF)

5 **Cooperating Agencies:** Federal Aviation Administration, Joint Region Marianas (to include the
6 U.S Navy and U.S. Marine Corps)

7 **Report Designation:** Draft Supplemental Environmental Impact Statement (SEIS)

8 **Abstract:** This SEIS addresses proposed changes since the September 2016 completion of
9 the Environmental Impact Statement (EIS) for Divert Activities and Exercises ("2016 Divert EIS")
10 and Record of Decision (ROD), signed December 7, 2016. The ROD announced the USAF
11 decision to select the Modified Tinian Alternative (Final EIS, Section 2.7), and specifically the
12 North Option (Final EIS, Section 2.5.2), as a future Divert location. The 2016 Divert ROD and
13 2016 Divert EIS are available for review or download from the project website at:
14 <http://pacafdivertmarianaseis.com/archive>.

15 The 2016 Divert EIS evaluated the proposal to construct facilities and infrastructure at the Tinian
16 International Airport to support cargo, tanker, and similar aircraft and associated support
17 personnel for divert operations, periodic exercises, and humanitarian assistance and disaster
18 relief (Final EIS, Section 2.5.2). This SEIS addresses USAF's supplemental proposal to
19 construct a fuel pipeline and associated infrastructure at the seaport to transport fuel from the
20 seaport to the airport, and to improve certain existing roads between the seaport and airport to
21 support Divert activities.

22 After the ROD was signed in December 2016, USAF conducted further evaluation of fuel
23 transfer methods and associated infrastructure, including the feasibility of other alternatives that
24 were not considered in the 2016 Divert EIS. USAF now proposes to construct a fuel pipeline
25 from the Tinian seaport to Tinian International Airport, to include a booster pump house and
26 associated fire protection systems, a boom storage building, and necessary utility connections
27 at the seaport. The proposed pipeline would eliminate the need for bulk fuel storage tanks at
28 the Tinian seaport and the need for fuel tanker trucks to transport fuel from the seaport to the
29 airport, both analyzed in the 2016 Divert EIS; however, the other components of the fuel system
30 evaluated in the 2016 Divert EIS would not change (Final EIS, Section 2.5.2). USAF also
31 proposes to improve certain existing roads between the seaport and airport that would be used
32 to support Divert activities. No other actions associated with the Divert Activities and Exercise
33 project would differ from what was presented for the Modified Tinian Alternative, North Option,
34 in the 2016 Divert EIS. The No Action Alternative for the pipeline and roadway proposals are
35 the conditions described as the Modified Tinian Alternative, North Option, in the 2016 Divert
36 EIS, the potential impacts of which are presented in this SEIS.

37 **Inquiries:** Inquiries regarding this document should be sent to: Ms. Julianne Turko;
38 AFCEC/CZN; Attn: Tinian Divert SEIS; 2261 Hughes Avenue, Suite 155; JBSA Lackland, TX
39 78236-9853.

Draft

**SUPPLEMENTAL
ENVIRONMENTAL IMPACT STATEMENT
FOR
TINIAN DIVERT INFRASTRUCTURE IMPROVEMENTS**



HEADQUARTERS PACIFIC AIR FORCES (HQ PACAF)

JOINT BASE PEARL HARBOR-HICKAM, HAWAII

MAY 2019

Table of Contents

Privacy Advisory

Cover Sheet

Abbreviations and Acronyms	vii
1. Purpose of and Need for the Proposed Actions	1-1
1.1 Introduction.....	1-1
1.2 Proposed Project Location.....	1-2
1.3 Purpose and Need.....	1-4
1.3.1 Purpose and Need for 2016 Divert Environmental Impact Statement	1-4
1.3.2 Purpose and Need for Supplemental Environmental Impact Statement.....	1-4
1.4 The Environmental Impact Analysis Process	1-4
1.5 Interagency and Public Involvement	1-6
1.5.1 Lead and Cooperating Agencies	1-6
1.5.2 Public Involvement	1-6
1.5.3 Agency Consultation	1-8
2. Description of the Proposed Actions and Alternatives	2-1
2.1 Proposed Actions	2-1
2.2 Fuel Pipeline and Support Infrastructure.....	2-3
2.2.1 Pipeline and Support Infrastructure Selection of Alternatives.....	2-8
2.2.2 Pipeline and Support Infrastructure Alternatives Carried Forward for Analysis.....	2-13
2.2.3 Pipeline and Support Infrastructure No Action Alternative	2-13
2.3 Roadway Improvements	2-14
2.3.1 Roadway Selection of Alternatives	2-14
2.3.2 Roadway Alternatives Carried Forward for Analysis	2-15
2.3.3 Roadway No Action Alternative	2-17
2.4 Summary of Proposed Actions and Alternatives	2-17
2.5 Identification of Preferred Alternatives	2-19
2.6 Summary of Environmental Impacts and Mitigation Measures.....	2-19
3. Affected Environment	3-1
3.1 Noise	3-2
3.1.1 Definition of the Resource	3-2
3.1.2 Existing Conditions.....	3-5
3.2 Biological Resources	3-5
3.2.1 Terrestrial Biological Resources.....	3-5
3.2.2 Marine Biological Resources	3-10
3.3 Cultural Resources	3-13
3.3.1 Definition of the Resource	3-13
3.3.2 Existing Conditions.....	3-14

3.4	Socioeconomics	3-20
3.4.1	Definition of the Resource	3-20
3.4.2	Existing Conditions	3-20
3.5	Environmental Justice and the Protection of Children	3-25
3.5.1	Definition of the Resource	3-25
3.5.2	Existing Conditions	3-27
3.6	Health and Safety	3-27
3.6.1	Definition of the Resource	3-27
3.6.2	Existing Conditions	3-29
3.7	Soils and Geology.....	3-31
3.7.1	Definition of the Resource	3-31
3.7.2	Existing Conditions	3-31
3.8	Water.....	3-35
3.8.1	Definition of the Resource	3-35
3.8.2	Existing Conditions	3-38
3.9	Infrastructure and Transportation.....	3-40
3.9.1	Definition of the Resource	3-40
3.9.2	Existing Conditions	3-41
3.10	Land Use and Recreation	3-44
3.10.1	Definition of the Resource	3-44
3.10.2	Existing Conditions	3-45
3.11	Hazardous Materials and Waste	3-51
3.11.1	Definition of the Resource	3-51
3.11.2	Existing Conditions	3-51
3.12	Air Quality.....	3-55
3.12.1	Definition of the Resource	3-55
3.12.2	Existing Conditions	3-59
4.	Environmental Consequences	4-1
4.1	Noise	4-1
4.1.1	Analysis Methodology.....	4-1
4.1.2	Pipeline and Support Infrastructure	4-2
4.1.3	Roadway Improvements.....	4-5
4.1.4	Summary of Impacts	4-6
4.2	Biological Resources	4-6
4.2.1	Terrestrial Biological Resources	4-6
4.2.2	Marine Biological Resources	4-12
4.2.3	Summary of Impacts	4-15
4.3	Cultural Resources	4-16
4.3.1	Analysis Methodology.....	4-16
4.3.2	Pipeline and Support Infrastructure	4-16
4.3.3	Roadway Improvements.....	4-19
4.3.4	Summary of Impacts	4-19
4.4	Socioeconomics	4-20
4.4.1	Analysis Methodology.....	4-20
4.4.2	Pipeline and Support Infrastructure	4-20

4.4.3	Roadway Improvements	4-25
4.4.4	Summary of Impacts	4-27
4.5	Environmental Justice and the Protection of Children	4-28
4.5.1	Analysis Methodology	4-28
4.5.2	Pipeline and Support Infrastructure	4-28
4.5.3	Roadway Improvements	4-30
4.5.4	Summary of Impacts	4-31
4.6	Health and Safety	4-31
4.6.1	Analysis Methodology	4-31
4.6.2	Pipeline and Support Infrastructure	4-32
4.6.3	Roadway Improvements	4-36
4.6.4	Summary of Impacts	4-37
4.7	Soils and Geology	4-37
4.7.1	Analysis Methodology	4-37
4.7.2	Pipeline and Support Infrastructure	4-38
4.7.3	Roadway Improvements	4-42
4.7.4	Summary of Impacts	4-44
4.8	Water	4-44
4.8.1	Analysis Methodology	4-44
4.8.2	Pipeline and Support Infrastructure	4-45
4.8.3	Roadway Improvements	4-48
4.8.4	Summary of Impacts	4-50
4.9	Infrastructure and Transportation	4-50
4.9.1	Analysis Methodology	4-50
4.9.2	Pipeline and Support Infrastructure	4-52
4.9.3	Roadway Improvements	4-57
4.9.4	Summary of Impacts	4-60
4.10	Land Use and Recreation	4-62
4.10.1	Analysis Methodology	4-62
4.10.2	Pipeline and Support Infrastructure	4-63
4.10.3	Roadway Improvements	4-65
4.10.4	Summary of Impacts	4-67
4.11	Hazardous Materials and Wastes	4-67
4.11.1	Analysis Methodology	4-67
4.11.2	Pipeline and Support Infrastructure	4-67
4.11.3	Roadway Improvements	4-70
4.11.4	Summary of Impacts	4-71
4.12	Air Quality	4-71
4.12.1	Analysis Methodology	4-71
4.12.2	Pipeline and Support Infrastructure	4-73
4.12.3	Roadway Improvements	4-80
4.12.4	Summary of Impacts	4-81
5.	Cumulative Effects and Irreversible and Irretrievable Commitment of Resources	5-1
5.1	Past, Present and Reasonably Foreseeable Actions	5-2
5.2	Cumulative Impacts Analysis	5-2

5.2.1	Socioeconomics	5-3
5.2.2	Soils and Geology	5-3
5.2.3	Infrastructure and Transportation	5-3
5.3	Irreversible and Irrecoverable Commitment of Resources.....	5-4
6.	References.....	6-1
7.	List of Preparers.....	7-1
8.	Index.....	8-1
9.	Glossary.....	9-1

Figures

1.2-1.	Tinian, CNMI Location Map.....	1-3
2.2-1.	Proposed Support Infrastructure at the Tinian Seaport.....	2-6
2.2-2.	Runway Route and Broadway Pipeline Route Alternatives	2-10
2.2-3.	Roadway Map of Tinian	2-11
2.2-4.	Proposed West and East Pipeline Route Alternatives	2-12
2.3-1.	Proposed Roadway Improvements	2-16
2.4-1.	Summary of Proposed Actions and Alternatives.....	2-18
3.2-1.	Vegetation Communities within the Project Areas	3-7
3.3-1.	Potential for Buried Archaeological Sites in the APE	3-19
3.4-1.	CNMI Average Hotel Daily Rate and Occupancy Rates, 2013–2017.....	3-23
3.7-1.	Tinian Soils Classes and Soils with High Erosion Factors	3-33
3.8-1.	Water Map of Tinian.....	3-39
3.10-1.	Land Ownership on Tinian	3-47
3.10-2.	Land Use Near the Proposed Actions	3-48
3.10-3.	Popular Recreational Resources on Tinian	3-50
3.11-1.	Hazardous Materials and Waste Sites near the Project Areas	3-52

Tables

1.5-1.	FAA Impact Topics.....	1-7
1.5-2.	Consultation Requirements.....	1-8
2.1-1.	Comparison of 2016 Divert EIS and 2018 Draft SEIS Proposed Action Components on Tinian	2-2
2.2-1.	Pipeline Route Alternatives Screened Against Selection Standards.....	2-9
2.6-1.	Summary of Pipeline and Support Infrastructure Environmental Impacts and Mitigation Measures	2-21
2.6-2.	Summary of Road Improvements Environmental Impacts and Mitigation Measures	2-25
3.1-1.	Sound Levels and Human Response	3-3
3.1-2.	Typical Outdoor Noise Levels	3-4
3.1-3.	Noise Levels Associated with Construction Equipment	3-4
3.1-4.	NSRs Tinian.....	3-5
3.2-1.	Vegetation Communities within the Project Areas on Tinian.....	3-6

3.2-2. Terrestrial Threatened and Endangered Species with Potential to Occur in the Project Area3-10

3.2-3. Fishery Assemblages and Lifestages with EFH that Occurs Adjacent to the Project Areas on Tinian.....3-12

3.2-4. Marine Threatened and Endangered Species with Potential to Occur Near Tinian....3-12

3.3-1. Cultural Resources Identified in the APE.....3-15

3.4-1. Population, 1990–20163-21

3.4-2. Residents by Birthplace, 2016.....3-21

3.4-3. Employment by Industry, 2016.....3-22

3.4-4. Housing Characteristics, 20103-24

3.5-1. Main Ethnic Origin, 2016.....3-27

3.7-1. Characteristics of Soils Mapped in the Project Areas on Tinian.....3-32

3.9-1. Year 2008 Existing Conditions: Key Tinian Roadways3-44

3.9-2. Year 2022 Future Conditions: Key Tinian Roadways3-44

3.10-1. Tinian Land Ownership3-46

3.12-1. National and CNMI Ambient Air Quality Standards3-57

4.1-1. Percentage of Population Highly Annoyed by DNL Noise Levels4-2

4.1-2. Noise Levels Associated with Construction Equipment4-2

4.1-3. NSR Proximity to Pipeline and Support Infrastructure Construction and Associated Noise Level Exposure4-4

4.1-4. NSR Proximity to Roadway Improvements and Associated Noise Level Exposure4-5

4.5-1. Minority, Low Income, Child, and Elderly Populations4-29

4.9-1. Estimated Total Water Use – West Route Construction4-53

4.9-2. Estimated Maximum Daily Trips – West Route Construction.....4-55

4.9-3. Estimated Total Water Use – Road Improvements Construction.....4-58

4.9-4. Estimated Maximum Daily Trips – Roadway Construction4-60

4.9-5. Estimated Water Use under the Proposed Actions.....4-61

4.9-6. Estimated Debris under the Proposed Actions4-61

4.9-7. Estimated Maximum Daily Trips – Construction4-61

4.12-1. Divert Action and West Route Construction Emissions4-73

4.12-2. Divert Action and West Route Operation Criteria Pollutant Emissions.....4-75

4.12-3. Divert Action and West Route Operation GHG Emissions.....4-75

4.12-4. Divert Action and East Route Construction Emissions4-77

4.12-5. Divert Action and East Route Operation Criteria Pollutant Emissions.....4-78

4.12-6. Divert Action with East Route Operation GHG Pollutant Emissions.....4-79

4.12-7. No Action Alternative Construction Emissions.....4-80

4.12-8. No Action Alternative Operation Emissions4-80

4.12-9. Construction Emissions – Improved Roadway4-81

Appendices

- 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

Abbreviations and Acronyms

ACAM	Air Conformity Applicability Model	DOD	Department of Defense
A CHP	Advisory Council on Historic Preservation	DPS	Department of Public Safety
ADT	average daily traffic	DPL	Department of Public Lands
AFOSH	Air Force Occupational Safety and Health	EFH	Essential Fish Habitat
APC	Area of Particular Concern	EIAP	Environmental Impact Analysis Process
APE	Area of Potential Effect	EIS	Environmental Impact Statement
AQCR	air quality control region	EISA	Energy Independence and Security Act
ARFF	Aircraft Rescue and Firefighting	EMUA	Exclusive Military Use Area
AST	aboveground storage tank	EO	Executive Order
BECQ	Bureau of Environmental and Coastal Quality	ESA	Endangered Species Act
BMP	best management practice	ESCP	erosion and sediment control plan
CAA	Clean Air Act	FAA	Federal Aviation Administration
CEDS	Comprehensive Economic Development Strategic	FEMA	Federal Emergency Management Agency
CEQ	Council on Environmental Quality	FIRM	Flood Insurance Rate Map
CFR	Code of Federal Regulations	FPPA	Farmland Protection Policy Act
CGP	Construction General Permit	FR	Federal Register
CJMT	Commonwealth of the Northern Mariana Islands Joint Military Training	GDP	gross domestic product
CNMI	Commonwealth of the Northern Mariana Islands	GEPA	Guam Environmental Protection Agency
CO	carbon monoxide	GHG	greenhouse gas
CO ₂	carbon dioxide	gpd	gallons per day
CO _{2e}	carbon dioxide equivalent	gpm	gallons per minute
CPA	Commonwealth Ports Authority	HAP	hazardous air pollutant
CRM	Coastal Resources Management	HIES	Household Income and Expenditure Survey
CUC	Commonwealth Utilities Corporation	HUD	U.S. Department of Housing and Urban Development
CW	conditional worker	IBB	International Broadcasting Bureau
CWA	Clean Water Act	ICS	Incident Command System
CZMA	Coastal Zone Management Act	ILS	instrument landing system
dB	decibel	LBA	Leaseback Area
dBA	A-weighted decibel	LOS	level of service
DCRM	Division of Coastal Resources Management	µg/m ³	micrograms per cubic meter
DNL	day-night sound level	MBTA	Migratory Bird Treaty Act
		mg/m ³	milligrams per cubic meter

MIRC	Mariana Islands Range Complex	PM ₁₀	particulate matter equal to or less than 10 microns in diameter
MITT	Mariana Island Testing and Training Activities	ppb	parts per billion
MLA	Military Lease Area	PPE	personal protective equipment
mph	miles per hour	ppm	parts per million
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act	PSD	Prevention of Significant Deterioration
MSL	mean sea level	ROD	Record of Decision
MW	megawatt	ROI	Region of Influence
NAAQS	National Ambient Air Quality Standards	ROW	right-of-way
NEPA	National Environmental Policy Act	RPZ	Runway Protection Zone
NHPA	National Historic Preservation Act	RTA	range and training area
NKK	Nan'yō Kōhatsu Kaisha	SDWA	Safe Drinking Water Act
NMFS	National Marine Fisheries Service	SEIS	Supplemental Environmental Impact Statement
NMTIT	Northern Marianas territorial income tax	SHPO	State Historic Preservation Officer
NO ₂	nitrogen dioxide	SIP	State Implementation Plan
NOAA	National Oceanic and Atmospheric Administration	SO ₂	sulfur dioxide
NO _x	nitrogen oxides	SPCC	Spill Prevention, Control, and Countermeasure
NPDES	National Pollutant Discharge Elimination System	SWPPP	Storm Water Pollution Prevention Plan
NPS	National Park Service	TCP	Traditional Cultural Property
NRHP	National Register of Historic Places	tpy	tons per year
NSR	noise sensitive receptor	TR	Tinian Route
O ₃	ozone	UFC	Unified Facilities Criteria
OSHA	Occupational Safety and Health Administration	USACE	U.S. Army Corps of Engineers
P.L.	Public Law	USAF	U.S. Air Force
PA	Programmatic Agreement	USC	United States Code
Pb	lead	USCB	U.S. Census Bureau
percent g	percentage of the force of gravity	USEPA	U.S. Environmental Protection Agency
PHMSA	Pipelines and Hazardous Materials Safety Administration	USFS	U.S. Forest Service
PIM Plan	Pipeline Integrity Management Plan	USFWS	U.S. Fish and Wildlife Service
PM _{2.5}	particulate matter equal to or less than 2.5 microns in diameter	UXO	unexploded ordnance
		VOC	volatile organic compound
		vs.	versus
		WPRFMC	Western Pacific Region Fishery Management Council

1. Purpose of and Need for the Proposed Actions

1.1 Introduction

This Draft Supplemental Environmental Impact Statement (SEIS) addresses proposed changes since the September 2016 completion of the Environmental Impact Statement (EIS) for Divert Activities and Exercises (“2016 Divert EIS”) and Record of Decision (ROD), signed December 7, 2016. The ROD announced the U.S. Air Force (USAF) decision to select the Modified Tinian Alternative (Final EIS, Section 2.7), and specifically the North Option (Final EIS, Section 2.5.2), as a future Divert location. The 2016 Divert ROD and 2016 Divert EIS are available for review or download from the project website at: <http://pacafdivertmarianaseis.com/archive>.

In the 2016 Divert 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 (Final EIS, Section 2.5.2). The 2016 Divert 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 (Final EIS, Section 2.5.2). 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 seaport, to transport fuel from the seaport 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 (Final EIS, Section 2.5.2). USAF also proposes to improve certain existing roads between the seaport and airport to support Divert activities. **Table 2.1-1** (see **Section 2.1**) provides a comparison of the actions proposed in the 2016 Divert EIS and those proposed in this SEIS.

This Draft SEIS was developed and prepared for public distribution prior to landfall of Typhoon Yutu on Tinian in October 2018. USAF recognizes that Typhoon Yutu caused island-wide damage on Tinian and resulted in potentially significant changes to the manmade and natural environment on the island. USAF conducted visual inspections on Tinian post-Typhoon Yutu and examined areas proposed for infrastructure in support of the Tinian Divert Infrastructure Improvements. During these inspections, USAF determined that no changes were necessary to the Tinian Divert Infrastructure Improvements that were proposed during scoping in May 2018, and which are presented in **Section 2** of this Draft SEIS. USAF also gathered information regarding the existing conditions of resource areas analyzed in this SEIS. To the extent practicable, the description of resources in **Section 3** has been revised to be consistent with conditions observed during the visual inspections conducted on Tinian post-Typhoon Yutu. USAF recognizes that conditions for some resources presented in **Section 3** could differ from those currently present on Tinian and that resource conditions will continue to change as Tinian recovers from Typhoon Yutu. USAF will reconsider these conditions upon completion of the

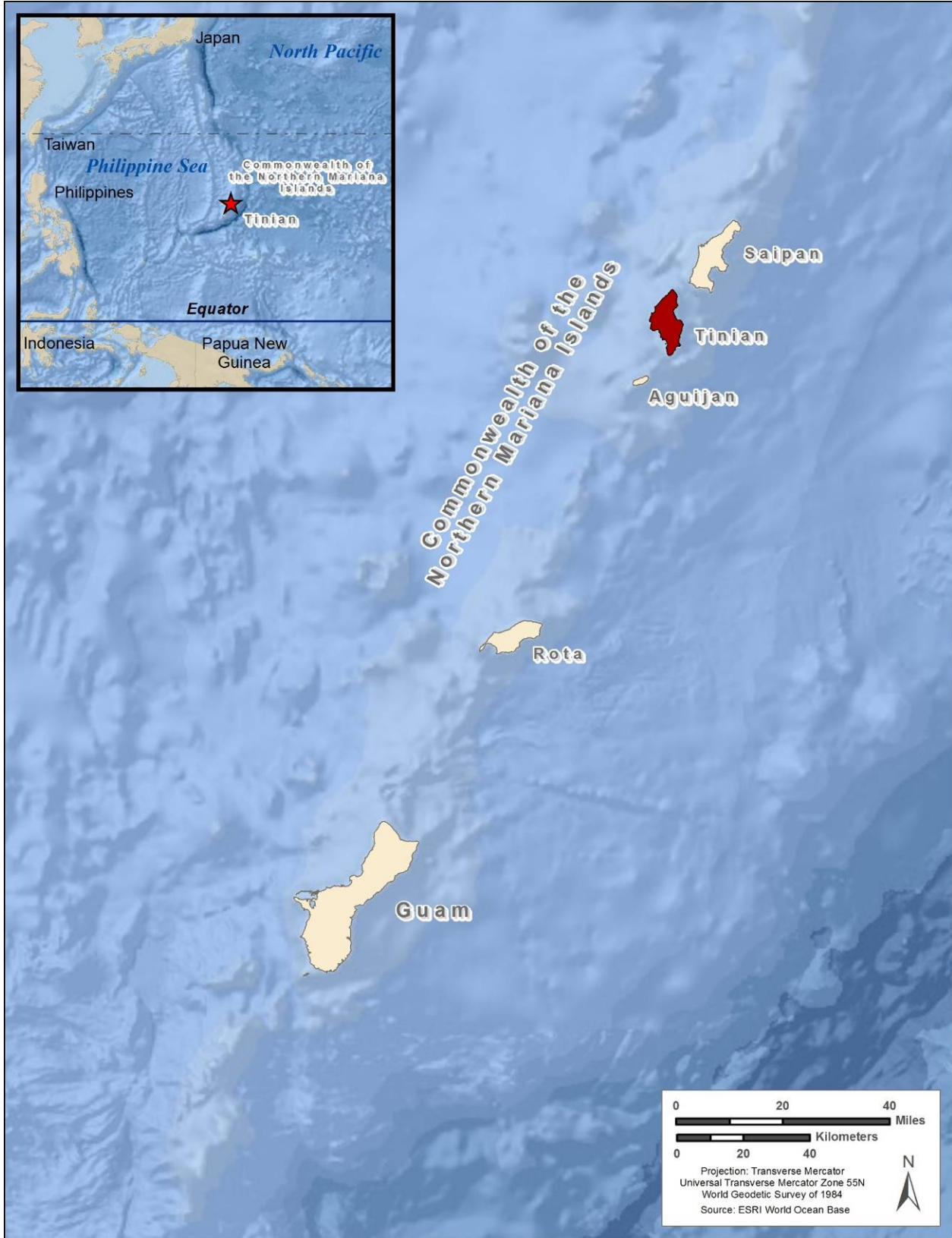
1 Draft SEIS and during development of the Final SEIS. The impact analyses presented in
2 **Sections 2.6, 4, and 5** are based on the potential impacts that could result from implementation
3 of the Proposed Actions, described in **Section 2**, on the resource conditions as they are
4 described in **Section 3**.

5 1.2 Proposed Project Location

6 The improvements proposed by USAF and presented in this SEIS are focused on the Island of
7 Tinian in the Commonwealth of the Northern Mariana Islands (CNMI) (see **Figure 1.2-1**). The
8 CNMI and Mariana Islands Archipelago are an integral part of the United States and straddle
9 the Pacific Ocean and the Philippine Sea. As a former United Nations Trust Territory, the CNMI
10 has a unique relationship with the federal government. Although not one of the 50 states of the
11 union, the CNMI has, by agreement with the United States, entered into a political union with the
12 United States making it a part of the United States governed in accordance with Article IV,
13 Section 3 of the U.S. Constitution.

14 The Covenant to Establish a Commonwealth of the Northern Mariana Islands in Political Union
15 with the United States of America (Covenant) (48 United States Code [USC] § 1801 et seq.)
16 provides the basis for the relationship between the people of the CNMI and the United States.
17 The United States and the CNMI government, through the adoption of the Covenant and the
18 CNMI Constitution, recognized the importance of land ownership for the culture and traditions of
19 the people of the Northern Mariana Islands; the Covenant provides for unique property rights to
20 protect the CNMI people against exploitation and to promote their economic advancement and
21 self-sufficiency, while also recognizing their status as U.S. citizens subject to the sovereignty
22 rights of the United States.

23 USAF recognizes that the CNMI and federal governments have established a policy concerning
24 use of real property that includes the joint use of civilian airfields and harbors on Tinian (see
25 Covenant Article VIII; 48 USC § 1801 et seq.). As part of the Covenant agreement, the United
26 States retained certain use and entry rights at the civilian facilities of West Field in Tinian
27 (i.e., Tinian International Airport), and certain lease, entry, and use rights at Tinian harbor for
28 military purposes (Covenant Article VIII; Section 802 and 803). Furthermore, Article VIII of the
29 Covenant recognizes the right of the United States, as a sovereign government, to acquire
30 property for public purpose. This sovereign right is limited, by mutual agreement between the
31 CNMI and the United States, to acquiring the minimum area necessary to accomplish the public
32 purpose and seeking only the minimum interest in real property necessary to support such
33 public purpose. USAF intends to continue to respect this agreement in the development of any
34 proposed facilities or infrastructure at the Tinian seaport and Tinian International Airport in
35 accordance with 48 USC § 1801 et seq.



1
2
3

Figure 1.2-1. Tinian, CNMI Location Map

1.3 Purpose and Need

The overall purpose and need in this SEIS remain unchanged from those stated in the 2016 Divert EIS (Final EIS, Sections 1.3.1 and 1.3.2) and are described in **Section 1.3**. The purpose and need for the two Proposed Actions addressed in this SEIS are discussed in further detail in **Section 1.3.2**.

1.3.1 Purpose and Need for 2016 Divert Environmental Impact Statement

The purpose of the original Proposed Action is to establish divert capabilities to support and conduct current, emerging, and future USAF exercises, while ensuring the capability to meet mission requirements in the event that access to Andersen Air Force Base or other western Pacific locations is limited or denied.

The original Proposed Action is needed because there is no existing divert or contingency airfield on U.S. territory in the western Pacific that is designed and designated to provide strategic operational and exercise capabilities for U.S. forces when needed, or that supports humanitarian assistance and disaster relief in times of natural or man-made disasters.

1.3.2 Purpose and Need for Supplemental Environmental Impact Statement

After the ROD was signed, USAF further evaluated fuel transfer methods and surface transportation network on Tinian in consultation with the CNMI Department of Public Lands (DPL) and Commonwealth Ports Authority (CPA). USAF sought to determine, through these consultations, if there was a more efficient alternative for fuel delivery to the airport than transporting via fuel tank trucks, and if the existing transportation network could support the anticipated Divert vehicles, as were studied in the 2016 Divert EIS (Final EIS, Section 2.5.2).

Pipeline and Support Infrastructure. The purpose of the proposed fuel pipeline and support infrastructure is to provide fuel from the seaport to bulk storage tanks at Tinian International Airport. The fuel pipeline would result in lower overall lifecycle costs for fuel transfer and eliminate the need for construction of fuel tanks at the seaport and transfer of fuel by tanker truck. The pipeline and support infrastructure are needed to provide a safer, more reliable, secure, efficient, and less costly method than was analyzed in the 2016 Divert EIS.

Roadway Improvements. The purpose of the proposed surface road improvements is to facilitate heavy vehicle traffic that is anticipated under the overall Divert project, while ensuring the roads continue to provide adequate service to the local community. The roadway improvements are needed because recent reconnaissance surveys and information received from Tinian officials indicate that roadways anticipated to be used for the overall Divert project are in varying stages of disrepair and inadequate to support the heavy vehicle traffic that will be required to build the Divert infrastructure and, if required, transfer fuel via tanker truck.

1.4 The Environmental Impact Analysis Process

The National Environmental Policy Act (NEPA) of 1969 (42 USC §§ 4321–4347) is a federal statute requiring the identification and analysis of potential environmental impacts associated

1 with proposed federal actions before those actions are taken. The intent of NEPA is to support
2 decision makers in making well-informed decisions based on an understanding of the potential
3 environmental consequences, and taking actions to protect, restore, or enhance the
4 environment. Title II of NEPA established the Council on Environmental Quality (CEQ), which
5 was charged with the development and implementation of regulations and ensuring federal
6 agency compliance with NEPA.

7 The process for implementing NEPA is codified in 40 Code of Federal Regulations (CFR)
8 §§ 1500–1508, Regulations for Implementing the Procedural Provisions of the National
9 Environmental Policy Act. CEQ regulations specify that an EIS be prepared when a federal
10 agency proposes a major action with the potential to significantly affect the quality of the human
11 environment. As directed by 40 CFR § 1502.9, a supplement to an EIS is prepared when
12 substantial changes are made to a proposed action relevant to environmental concerns, when
13 there are significant new circumstances or information relevant to environmental concerns or
14 bearing on the proposed action or its impacts, or when the purposes of NEPA will be furthered
15 by completion of a supplement. The SEIS will focus on issues specific to the proposed fuel
16 pipeline and support infrastructure and roadway improvements; it does not address components
17 that have not changed from the 2016 Divert EIS and ROD.

18 Air Force Policy Directive 32-70, *Environmental Considerations in Programs and Activities*,
19 states that USAF will comply with applicable federal, state, and local environmental laws and
20 regulations, including NEPA. The USAF implementing regulation for NEPA is its Environmental
21 Impact Analysis Process (EIAP), 32 CFR § 989, as amended.

22 In accordance with CEQ regulations implementing NEPA, and with the intent of reducing the
23 potential encyclopedic nature that could result in this document, this SEIS incorporates by
24 reference relevant material from the Divert Activities and Exercises Final EIS and ROD (USAF
25 2016a, USAF 2016b). These documents are also available for review or download from the
26 project website at <http://pacafdivertmarianaseis.com/archive>.

27 Specifically, this SEIS incorporates by reference the affected environment described for CNMI
28 and Tinian in Section 3 of the 2016 Divert EIS (Final EIS, Section 3); the affected environment
29 described in **Sections 3.1 through 3.12** of this SEIS has been adopted from the 2016 Divert
30 EIS to avoid repetitiveness and duplication of content. To facilitate reader review and
31 understanding of the affected environment, **Sections 3.1 through 3.12** each provide a brief
32 summary from the 2016 Divert EIS of the respective resource area and include updated
33 information, where applicable and available. Resource area information in **Section 3** was
34 updated based on the physical areas being proposed for action, the type of action being
35 proposed and the nature of potential impacts on that resource area, or because the resource
36 has changed. Additionally, this SEIS incorporates by reference the cumulative projects
37 addressed in the 2016 Divert EIS analysis of cumulative impacts (Final EIS, Sections 5.2.1 and
38 5.2.2) and the cumulative impacts analysis for the Modified Tinian Alternative, North Option
39 (Final EIS, Section 5.3). The cumulative effects analysis in **Section 5** of this SEIS takes into
40 consideration actions identified since completion of the 2016 Divert SEIS with considerable
41 potential for cumulative impacts if implemented concurrently with the Proposed Actions.
42 **Sections 5.2.1 through 5.2.3** describe cumulative impacts on resources areas that would differ
43 from those presented in the 2016 Divert EIS.

1.5 Interagency and Public Involvement

Compliance with EIAP (32 CFR § 989.24) and CEQ regulations for implementing NEPA (40 CFR § 1506.6) requires several steps to ensure public and agency involvement in the process. Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, as amended by EO 12416 of the same name, requires federal agencies to provide opportunities for consultation by elected officials of state and local governments that would be directly affected by a federal proposal.

1.5.1 Lead and Cooperating Agencies

The lead agency for the SEIS is the Department of the Air Force. Cooperating agencies include the Federal Aviation Administration (FAA) and Joint Region Marianas, as commanded by the U.S. Navy and to include the U.S. Marine Corps; both agencies were also cooperating agencies on the 2016 Divert EIS (Final EIS, Section 1.7.1). **Appendix A** includes copies of the cooperating agency request and acceptance correspondence.

FAA's role as a cooperating agency stems from its responsibilities pursuant to 49 USC § 40101 et seq. for civil aviation and regulation of air commerce in the interests of aviation safety and efficiency. FAA has special expertise and jurisdiction by law to approve proposed development at civilian airports, to include installation of the proposed fuel pipeline on airport property. To facilitate FAA review and adoption of the SEIS, **Table 1.5-1** cross-references USAF impact categories analyzed in the SEIS with FAA impact categories listed in Appendix A of FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*. Additionally, Section 4(f) of the U.S. Department of Transportation Act of 1966 is applicable to the Proposed Action because FAA, an agency in the Department of Transportation, could adopt the SEIS for their use. The Section 4(f) analysis presented in the 2016 Divert EIS (Final EIS, Section 1.7.2) for construction at the Tinian International Airport is applicable to this Proposed Action.

1.5.2 Public Involvement

1.5.2.1 Public Scoping

Scoping is used to involve the public early in the environmental planning process and to solicit input from the public and interested agencies on the nature and extent of issues and impacts to be addressed and the methods by which potential impacts are evaluated. Scoping for the SEIS differs from that conducted for the 2016 Divert EIS (Final EIS, Section 1.7.3). According to 40 CFR § 1502.9, the agency shall prepare, circulate, and file a supplement to an EIS in the same fashion (exclusive of scoping) as a draft and final EIS, unless alternative procedures are approved by CEQ.

USAF determined that conducting public scoping for the proposed infrastructure improvements would help inform interested stakeholders and provide transparency through a mutual exchange of information. The public scoping period for the SEIS began on April 27, 2018, with publication of the Notice of Intent in the *Federal Register*, and ended on May 31, 2018. Concurrent with the publication of the Notice of Intent, USAF published newspaper advertisements in the *Marianas Variety* and *Saipan Tribune* and distributed scoping notification letters to the distribution list from the 2016 Divert EIS. All scoping notifications provided a brief description of the Proposed Actions and alternatives and requested the public submit comments in a timely manner to

1 **Table 1.5-1. FAA Impact Topics**

FAA Impact Categories	SEIS Section
Air Quality	Air Quality
Coastal Resources	Land Use
Compatible Land Use	Noise, Land Use
Construction Impacts	Throughout Section 4
Department of Transportation Act: Sec. 4(f)	2016 Divert EIS (Final EIS, Section 1.7.2)
Farmlands	Geology and Soils
Fish, Wildlife, and Plants	Biological Resources
Floodplains	Water
Hazardous Materials, Pollution Prevention, and Solid Waste	Hazardous Materials and Wastes
Historical, Architectural, Archaeological, and Cultural Resources	Cultural Resources
Light Emissions and Visual Impacts	Light Emissions – Not Applicable Visual Impacts – Not Applicable
Natural Resources and Energy Supply	Infrastructure and Utilities
Noise	Noise
Secondary (Induced) Impacts	Secondary impacts are identified as “indirect” impacts
Socioeconomic Impacts, Environmental Justice, and Children’s Environmental Health and Safety Risks	Socioeconomics, Environmental Justice and the Protection of Children
Water Quality	Water
Wetlands	Water, Biological Resources
Wild and Scenic Rivers	Not Applicable

2 ensure consideration in the SEIS. USAF requested the public to provide comments via the
 3 project website, at the scoping meeting, or through postal mail. USAF also held one public
 4 scoping meeting on Tinian on May 17, 2018 at Tinian Elementary School, to invite public
 5 comment on the proposed infrastructure improvements. The meeting was held in an open
 6 house format where citizens could review display boards about the Proposed Actions and speak
 7 individually with USAF personnel. **Appendix B** includes materials developed in support of the
 8 public scoping period.

9 **1.5.2.2 Public and Agency Draft SEIS Review**

10 USAF has released this Draft SEIS to the public and agencies for review and comment. A
 11 Notice of Availability was published in the Federal Register, newspaper display advertisements,
 12 press releases, flyers, and letters accompanying the direct mailing of this Draft SEIS document.
 13 This Draft SEIS has been posted on a publicly accessible website at
 14 <http://www.pacafdivertmarianaseis.com>. Copies of this Draft SEIS document were also sent to
 15 local document repositories. One public hearing is scheduled on Tinian.

16 The Draft SEIS public comment period is 45 days beginning on the Notice of Availability
 17 publication date. All substantive comments received prior to the close of the public comment
 18 period will be considered during preparation of the Final SEIS. USAF responds to substantive
 19 comments on a Draft SEIS in the Final SEIS, consistent with 40 CFR § 1503.4. Substantive

1 comments are regarded as those comments that challenge the analysis, methodologies, or
 2 information in the Draft SEIS as being factually inaccurate or analytically inadequate; identify
 3 impacts not analyzed or identify reasonable alternatives or feasible mitigations not considered
 4 by the agency; or offer specific information that may have a bearing on the decision such as
 5 differences in interpretations of significance, scientific data, or technical conclusions.
 6 Non-substantive comments, which do not require a USAF response, are generally considered
 7 those comments that express a conclusion, an opinion, or a vote for or against the proposal
 8 itself, or some aspect of it; state a position for or against a particular alternative; or otherwise
 9 state a personal preference or opinion.

10 **1.5.3 Agency Consultation**

11 Consultation is required with various authorities during the impact analysis process, as
 12 described in the 2016 Divert EIS (Final EIS, Section 1.7.2). **Table 1.5-2** lists consultation
 13 requirements for this SEIS and includes the status of each consultation. For consultations that
 14 result in USAF commitment to corresponding mitigations, the USAF will fully consider these
 15 mitigations in the decision-making process, prior to signature of a ROD.

16 **Table 1.5-2. Consultation Requirements**

Agency	Consultation	Status
CNMI Historic Preservation Officer	Section 106 under the National Historic Preservation Action (NHPA)	Section 106 has been initiated with the Historic Preservation Officer and consulting parties. The consulting parties have been provided a description of the Undertaking, APE, and historic properties. USAF is continuing consultation to incorporate the Proposed Actions and associated mitigation measures into the Divert Activities and Exercises PA.
U.S. Fish and Wildlife Service (USFWS)	Section 7 under the ESA for Terrestrial Species	USAF has developed a Biological Assessment and determined that the Proposed Actions will have no effect on terrestrial threatened and endangered species. Based on this determination, neither informal or formal consultation under Section 7 are required.
National Oceanic and Atmospheric Administration (NOAA) Fisheries	Section 7 under the ESA for Marine Species	USAF developed a Biological Assessment and determined that the Proposed Actions may affect, but are not likely to adversely affect, marine threatened and endangered species. On November 19, 2018, NOAA Fisheries concurred with the USAF effect determinations.
NOAA Fisheries	Effects on Essential Fish Habitat (EFH) under the Magnuson-Stevens Fishery Conservation and Management Act	USAF developed an EFH Assessment and determined that adverse effects on EFH from the Proposed Actions would be none to minimal. USAF is seeking NOAA Fisheries review and concurrence with the determinations.
CNMI Coastal Resources Management Office	Compliance with the Coastal Zone Management Act	USAF has prepared notification to the Coastal Resources Management Office that the Proposed Actions are consistent to the maximum extent practicable with the enforceable policies of the CNMI coastal zone management program and is seeking review and concurrence with the determination.

2. Description of the Proposed Actions and Alternatives

In accordance with CEQ regulations (40 CFR § 1502.14[d]) and the USAF EIAP (32 CFR § 989.8), this section describes the Proposed Actions and alternatives USAF is considering to fulfill its purpose of and need for action. As discussed in **Section 1.4**, the NEPA process evaluates potential environmental consequences associated with proposed actions and considers alternative courses of action. Reasonable alternatives must satisfy the purpose of and need for a proposed action, as defined in **Section 1.3**. In addition, CEQ regulations specify the inclusion of a No Action Alternative against which potential impacts can be compared. The No Action Alternative is analyzed in detail in accordance with CEQ regulations.

2.1 Proposed Actions

To meet the purposes and needs described in **Section 1.3**, USAF 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 (Final EIS, Section 2.5.2).

Each Proposed Action is independent of the other and has standalone value for supporting the Divert Activities and Exercises project. While full implementation of each Proposed Action would result in the greatest benefit for the Divert project, each of the Proposed Actions would also benefit the Divert project if implemented alone. No other actions associated with the Divert Activities and Exercises project would differ from what was presented in the 2016 Divert EIS (Final EIS, Section 2.5.2), including but not limited to: infrastructure proposed at the airport; supporting utilities, fencing, and access roads; fuel delivery and offload; aircraft operations; operational support personnel; and mitigations for these actions including construction monitoring, stormwater management, and general road repair. **Table 2.1-1** provides a comparison of the actions proposed in the 2016 Divert EIS and those proposed in this SEIS.

Figures 2.2-1 and 2.2-4 (see **Section 2.2.1**) provide locations of the pipeline and support infrastructure proposed in this SEIS, as well as land areas that were addressed in the 2016 Divert EIS for construction and associated laydown areas, utilities, proposed mitigations, and long-term lease. **Figure 2.3-1** (see **Section 2.3.2**) identifies the existing roadways proposed for improvements. USAF recognizes that Typhoon Yutu caused island-wide damage on Tinian in October 2018 and resulted in potentially significant changes to the manmade and natural environment on the island. USAF conducted visual inspections on Tinian post-Typhoon Yutu and examined locations for the Proposed Actions that were previously identified during scoping in May 2018. During these inspections, USAF determined that no changes were necessary to the Proposed Actions that were presented during scoping.

1 **Table 2.1-1. Comparison of 2016 Divert EIS and 2018 Draft SEIS Proposed Action**
2 **Components on Tinian**

Proposed Action Element	2016 Divert EIS Modified Tinian North	2018 SEIS Pipeline and Support Infrastructure	2018 SEIS Roadway Improvements
Airport Taxiway	Included	No change	No change
Airport Parking Apron	Included	No change	No change
Airport Fuel Hydrant System	Included	No change	No change
Airport Cargo Pad	Included	No change	No change
Airport Maintenance Facility	Included	No change	No change
8th Ave (TR25) Reroute around Proposed Taxiway	Included	No change	No change
Airport Infrastructure Access Roads	Included	No change	No change
Airport Fuel Storage	Included	No change	No change
Airport Fuel Pump Tanks and Wells	Included	No change	No change
Airport Fire Pump Tanks and Wells	Included	No change	No change
Airport Utility Installation/Upgrade	Included	No change	No change
Airport Infrastructure Fencing	Included	No change	No change
Local Lodging for up to 265 Personnel	Included	No change	No change
Aircraft Operations	Included	No change	No change
Construction Workers	Included	Additional workers required to support construction of the pipeline	Additional workers required to support construction of the roadway improvements
Fuel Truck Trips from Seaport to Airport	Included	Removed from consideration	No change
Construction Truck Trips	Included	Additional trips required to support construction of the pipeline	Additional trips required to support construction of the roadway improvements
Minor Roadway Repairs on Fuel and Construction Truck Routes	Included	No change	No change
Roadway Improvements on Fuel Truck Route	Not included	Not included	Included
Seaport Fuel Storage	Included	Removed from consideration	No change
Fuel Delivery and Offload at the Seaport	Included	No change	No change
Seaport Utility Installation/Upgrade	Included	Included but adjusted for change in proposed infrastructure at seaport	No change
Seaport Infrastructure Fencing	Included	Included but adjusted for change in proposed infrastructure at seaport	No change

Proposed Action Element	2016 Divert EIS Modified Tinian North	2018 SEIS Pipeline and Support Infrastructure	2018 SEIS Roadway Improvements
Pipeline from Seaport to Airport	Not included	Included	Not included
Seaport Pipeline Support Infrastructure	Not included	Included	Not included
Mitigations from 2016 Divert EIS	Included	No change	No change

Included: Indicates the element is included as part of the analysis for that Proposed Action

Not Included: Indicates the element is not part of the analysis for that Proposed Action

No Change: Indicates the element has not changed since analysis as part of the Modified Tinian North Proposed Action in the 2016 Divert EIS

Removed from Consideration: Indicates the element would not be included as part of the Divert proposal, under that Proposed Action

2.2 Fuel Pipeline and Support Infrastructure

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 2016 Divert EIS (Final EIS, Section 2.5.2). However, the other components of the fuel infrastructure system evaluated in the 2016 Divert EIS would not change (Final EIS, Section 2.5.2).

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*; the Pipeline Hazardous Materials Safety Administration’s (PHMSA) pipeline safety regulations specified in 49 CFR § 190, *Pipeline Safety Enforcement And Regulatory Procedures*; Part 194, *Response Plans For Onshore Oil Pipelines*; Part 195, *Transportation of Hazardous Liquids by Pipelines*; and Part 199, *Drug And Alcohol Testing*. As stated in UFC 3-460-01, Section 2-14.1, it is the firm policy of the 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.

Portions of the proposed pipeline would be constructed at Tinian International Airport and the Tinian seaport on public land acquired or leased by USAF and proposed for construction in the 2016 Divert EIS (Final EIS, Section 2.5.2). The pipeline would also be constructed on public land within easement rights held by the U.S. federal government that allow it to install, operate, and maintain fuel infrastructure and other utilities. Appropriate routing for use of these easement rights would be coordinated with the CNMI, platted, and recorded.

The pipeline would be constructed underground to prevent breaches, vandalism, sabotage, or any other means to disrupt the flow of fuel. The pipeline would be installed to a depth of approximately 3 feet; however, the pipeline could be installed deeper than 3 feet at intersection crossings. The pipeline would also be installed within a 20-foot easement; however, the impacts analysis in the SEIS will assume that an 80-foot wide corridor 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. The utility easement would be marked

1 aboveground with pipeline utility markers in accordance with applicable regulations. The USAF
2 would retain the 20-foot utility easement to allow for maintenance of the pipeline when required.
3 The easement may prevent or allow removal of certain surface plants but primary management
4 of the surface with the utility easement is typically the responsibility of the landowner.

5 The pipeline would be constructed and installed in two separate sections. The first section
6 would include a bulk receipt pipeline that would connect a new seaport turbine bulk receipt
7 header to a booster pump house. The bulk receipt pipeline would be a 14-inch diameter and
8 externally coated carbon steel pipe. The second section of the pipeline would be a transfer
9 pipeline to connect the booster pump house to the Divert bulk receipt fuel tanks on the north
10 side of the airport. The transfer pipeline would be a 12-inch diameter and externally coated
11 carbon steel pipe. The transfer pipeline would be equipped with an impressed current cathodic
12 protection system and would be designed to allow for cleaning and testing of the pipeline
13 between the seaport and the airport.

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

20 Fuel pipeline construction would occur over the course of approximately 2 to 3 years. Once the
21 pipeline is installed, jet fuel would be delivered to and offloaded at the Tinian seaport per the
22 existing fuel supply chain and fuel receipt protocols, as described in the 2016 Divert EIS (Final
23 EIS, Section 2.5.2). Fuel deliveries and operation of the pipeline would be managed by USAF
24 until Defense Logistics Agency capitalization of the pipeline. Once offloaded at the existing
25 seaport bulk receipt header, the jet fuel would then enter the bulk receipt pipeline rather than
26 being transferred to bulk fuel storage tanks. The pipeline rate of flow would be approximately
27 2,000 gallons per minute (gpm). Required jet fuel volumes to support Divert activities and
28 exercises would not change from that described in the 2016 Divert EIS (Final EIS, Section
29 2.5.2); approximately 220,000 barrels (bbls) of jet fuel (9.24 million gallons) would be transferred
30 through the pipeline to fill the two 60,000-bbl tanks and one 100,000-bbl tank at the airport.

31 USAF would follow PHMSA's pipeline safety regulations specified in 49 CFR §§ 190, 194-195,
32 and 199; 40 CFR § 112 *Oil Pollution Prevention*; USAF Technical Order 37-1-1, *General*
33 *Operations and Inspection of Installed Fuel Storage and Dispensing Systems*; UFC 3-460-03,
34 *Operation and Maintenance: Maintenance of Petroleum Facilities*; AFI 23-201, *Fuels*
35 *Management*; AFI 32-1067, *Water and Fuels Systems*; and AFI 32-7044, *Storage Tank*
36 *Environmental Compliance* for the operation of the fuel pipeline and support facilities.
37 Additionally, a Spill Prevention, Control, and Countermeasures Plan and a Facility Response
38 plan would be implemented in compliance with the Clean Water Act and the regulations
39 contained in 40 CFR § 112. The safe, efficient, and economical operation of petroleum storage,
40 dispensing systems, and associated infrastructure depends largely on an effective and proactive
41 recurring maintenance program. UFC 3-460-03 establishes the required frequency intervals for
42 the recurring maintenance. Operation and maintenance of the pipeline would be managed by a

1 Pipeline Integrity Management Plan (PIM Plan) to assist with and guide pipeline integrity
2 maintenance. PIM Plans improve the integrity management of piping systems and help prevent
3 leaks or pipeline failures. The plans are developed based on the principles of American
4 Petroleum Institute Standard 570, *Inspection, Repair, Alteration, and Rerating of In-Service*
5 *Piping Systems*, and federal and local regulations. Additional information on compliance actions
6 and industry standards is included in **Appendix F**.

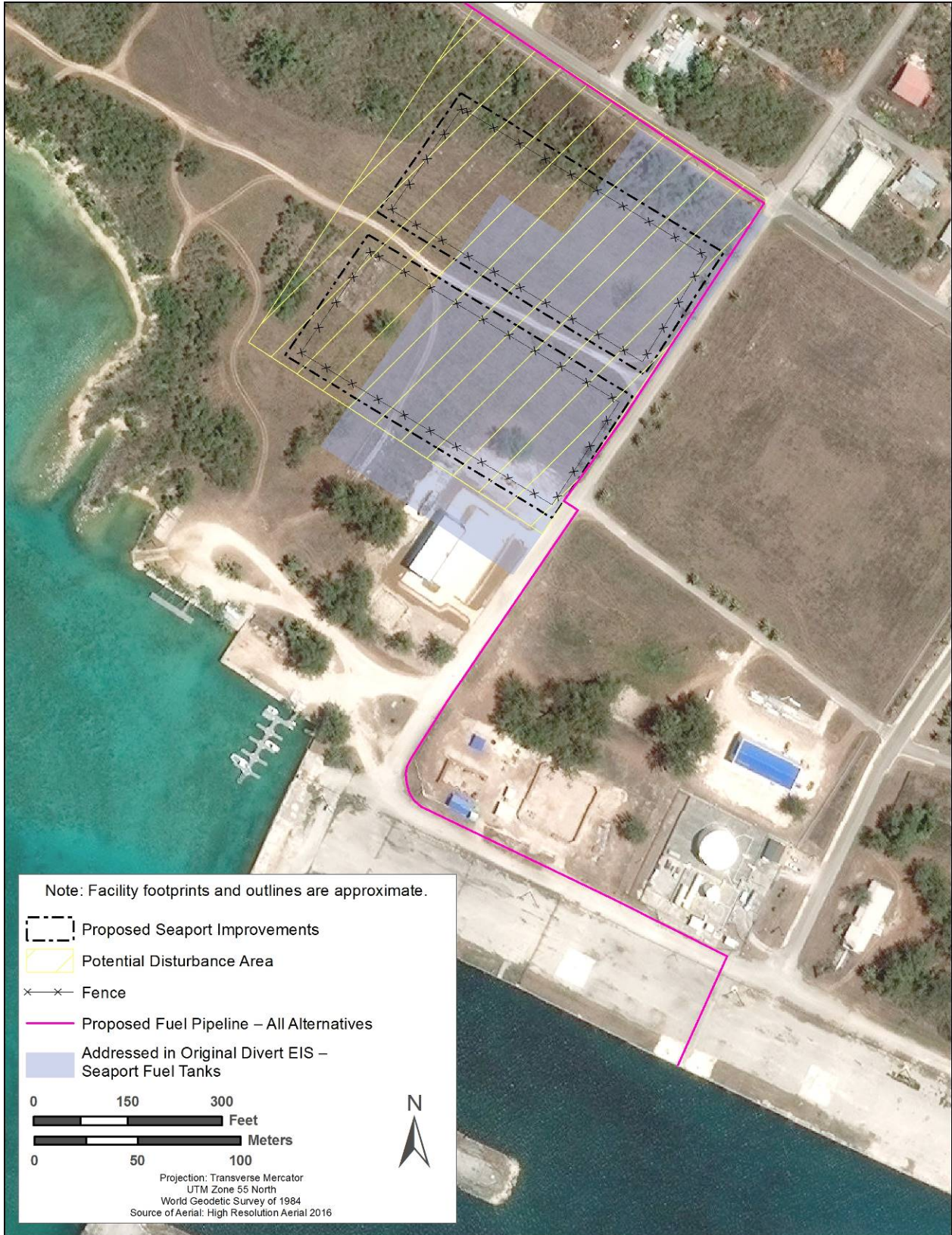
7 **Support Infrastructure Construction and Operation.** A booster pump house and boom
8 storage building would be constructed near the seaport to support the fuel pipeline operations.
9 The booster pump house and boom storage building would be co-located with a construction
10 laydown yard, biosecurity area, parking area, sanitary sewer septic tank system with leach field,
11 water storage tanks, bioinfiltration swales, and utility lines and connections within the area
12 shown in **Figure 2.2-1**. Gravel pedestrian pathways and access roads would also be created or
13 widened within this area; all existing roads would remain open to the public. Two diesel
14 generators would also be installed to operate the support facilities during an outage. Up to 8.23
15 acres could be disturbed for development of all seaport support infrastructure.

16 All petroleum fuel support facilities would be designed and constructed in accordance with all
17 appropriate federal, CNMI, DOD, and USAF regulations for petroleum fuel facilities, including
18 UFC 3-460-01, *Petroleum Fuel Facilities*. Additionally, all applicable permits required from 2016
19 Divert EIS would be obtained (Final EIS, Section 4.16). The booster pump house would be
20 equipped with a leak detection monitoring system and sized to fit three pumps and include a
21 pump room, control room, mechanical room, and toilet. The pump house would be
22 approximately 3,750 square feet and constructed with an automatic fire suppression system.
23 The pump house would contain three electric 350-horsepower motors to transfer the fuel to the
24 Divert bulk receipt fuel tanks at the airport. During fuel transfer operations, only two of the
25 motors would operate, while the third would be kept idle as a spare. The pump house would
26 also require installation of water and electric utilities, underground or overhead, which would be
27 extended from existing service lines and along the utility easement.

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

32 The proposed seaport support infrastructure would be constructed in the same location at the
33 Tinian seaport as the location proposed in the 2016 Divert EIS for the two 50,000-barrel fuel
34 storage tanks (Final EIS, Section 2.5.2). The proposed fuel pipeline would eliminate the need
35 for these bulk fuel storage tanks at the seaport proposed in the 2016 Divert EIS. The combined
36 impervious surface footprint of the support infrastructure proposed in this SEIS (4,550 square
37 feet) would be approximately half the size of the fuel storage tanks and support structures
38 (7,534 square feet) proposed in the 2016 Divert EIS at the same location. Additionally, the
39 combined area of potential disturbance proposed at the seaport in this SEIS (8.23 acres) is in
40 the same area as the fuel storage tank area (5.29 acres) proposed in the 2016 Divert EIS.
41 Therefore, much of the analysis presented in the 2016 Divert EIS (Final EIS, Section 4) for
42 construction of the fuel storage tanks is applicable to the proposed construction of the support

1



2

3 Figure 2.2-1. Proposed Support Infrastructure at the Tinian Seaport

1 infrastructure at the seaport, including the booster pump house and boom storage building.
2 **Figure 2.2-1** presents the support infrastructure location at the seaport compared to the
3 previously analyzed footprint of the seaport bulk fuel tanks. Both support facilities would be
4 enclosed within a secure fenced area (see **Figure 2.2-1**).

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

9 **Construction Materials.** All materials would be transported to or produced on Tinian as
10 described in the 2016 Divert EIS (Final EIS, Section 2.5.2). Transport of materials on Tinian to
11 support construction of the fuel pipeline would not exceed the amount of fuel truck traffic
12 analyzed in the 2016 Divert EIS (1,800 one-way trips); however, fuel truck traffic was included in
13 the 2016 Divert EIS during the Divert implementation phase and transport of construction
14 materials would occur along the pipeline route and during the construction phase (Final EIS,
15 Section 2.5.2 and Section 4.11.2.2). Construction materials could also be transported to the site
16 by construction workers as part of their daily commute to the construction site. Details
17 regarding construction worker support are provided in the **Construction Workers** section.
18 Movement of construction personnel, equipment, and supplies could result in the movement and
19 spread of invasive plant and animal species to Tinian. In order to prevent the spread of invasive
20 species, the routing of shipments through Guam would be minimized and redundant inspection
21 of materials that must be shipped from that island (both before they arrive on Tinian and when
22 they arrive) would be conducted. USAF would also conduct risk analyses, develop and
23 implement procedures, and participate in regional planning to reduce or eliminate the spread of
24 invasive species.

25 Transport of construction materials to the seaport was addressed in the 2016 Divert EIS for
26 construction of the fuel tanks (Final EIS, Section 2.5.2). Fewer volumes of construction
27 materials would be needed for development of the seaport support infrastructure than the fuel
28 tanks due to the smaller impervious surface footprint of the support infrastructure. Therefore,
29 transport of construction materials to the seaport is addressed in the 2016 Divert EIS and will
30 not be analyzed further in this SEIS.

31 **Construction Workers.** Approximately 75 construction workers, in addition to those analyzed
32 in the 2016 Divert EIS (Final EIS, Section 2.5.2), could be required to support construction of
33 the pipeline during the course of the 2- to 3-year construction period. It is anticipated that the
34 peak number of workers would only be needed during shorter duration intensive or critical
35 construction periods. In 2016, the construction workforce of Tinian was 122 people and it is
36 assumed that this entire workforce would support the construction proposed in the 2016 Divert
37 EIS. Therefore, for purposes of analysis in this SEIS, it is assumed the entire workforce to
38 support pipeline construction would be from off-island. The impact analysis in **Section 4**
39 assumes all construction workers would be needed during the 2- to 3-year construction period
40 to determine the maximum effect of construction workers.

2.2.1 Pipeline and Support Infrastructure Selection of Alternatives

Identification and analysis of alternatives is one of the core elements of the environmental impact analysis process under NEPA and USAF's implementing regulations. USAF may expressly eliminate alternatives from detailed analysis based on reasonable selection standards (32 CFR § 989.8(c)). To be considered reasonable, an alternative must be suitable for decision making, capable of implementation, and able to meet the purpose of and need for the action.

USAF initially considered multiple means of fuel transport via pipeline, including use of aboveground or temporary pipelines. However, both of these pipeline types are susceptible to breaches, vandalism, and sabotage, and do not meet the need of the Proposed Action to provide a safe, reliable, and secure means of fuel transport. Therefore, only alternatives for placement of an underground pipeline were developed and compared to the selection standards. Additionally, to maximize efficiency in pipeline construction and fuel transfer, USAF focused consideration of pipeline routes on those that would travel as direct as possible from the Tinian seaport to the airport, with minimal deviation.

The following selection standards were developed based on USAF requirements for the proposed underground pipeline and applied to possible pipeline routes to select those considered reasonable for implementing the Proposed Action. Reasonable alternatives will be carried forward for detailed analysis in the SEIS. The following selection standards are required for placement of the underground pipeline:

1. Utilize easement rights based on the 1994 *Naval Facilities Assets Database Real property Inventory; End of Year Processing and Disposal Agreement* (Common Name: 1994 Leaseback and Disposal Agreement) and the 1999 *Partial Release of Leasehold Interest between CNMI and USA* [Common Name: 1999 Partial Release of Leasehold Interest]. Formerly leased lands in the seaport area and in and around the Tinian International Airport are subject to blanket easements within these documents which provide the federal government the right to install, operate, and maintain fuel infrastructure and other utilities.
2. Minimize disturbance within established Tinian communities and to any existing infrastructure to ensure the pipeline can be efficiently constructed, operated, and maintained.
3. Minimize pipeline route distance and road/utility crossings.

USAF identified four possible routes from the Tinian seaport to the Divert bulk receipt fuel tanks at the airport: the Runway route, West route, East route, and Broadway route. These possible alternatives were evaluated against the selection standards. The detailed evaluation of each alternative is provided in the following paragraphs and in **Table 2.2-1**, and a summary of the evaluation and selection of alternatives for analysis in the SEIS is provided in **Section 2.2.1**.

1 **Table 2.2-1. Pipeline Route Alternatives Screened Against Selection Standards**

Alternative	Selection Standards		
	Utilize Easement Rights	Minimize Disturbance	Minimize Distance
Runway Route	Entirely within lands with easement rights	Extensive disturbance to existing infrastructure; cannot be efficiently constructed or maintained	Approximately 3.70 miles
West Route	Entirely within lands with easement rights	Minimal disturbance	Approximately 4.08 miles
East Route	Entirely within lands with easement rights	Minimal disturbance	Approximately 4.94 miles
Broadway Route	Partially outside of lands with easement rights	Disturbance to the community and infrastructure	Approximately 4.16 miles

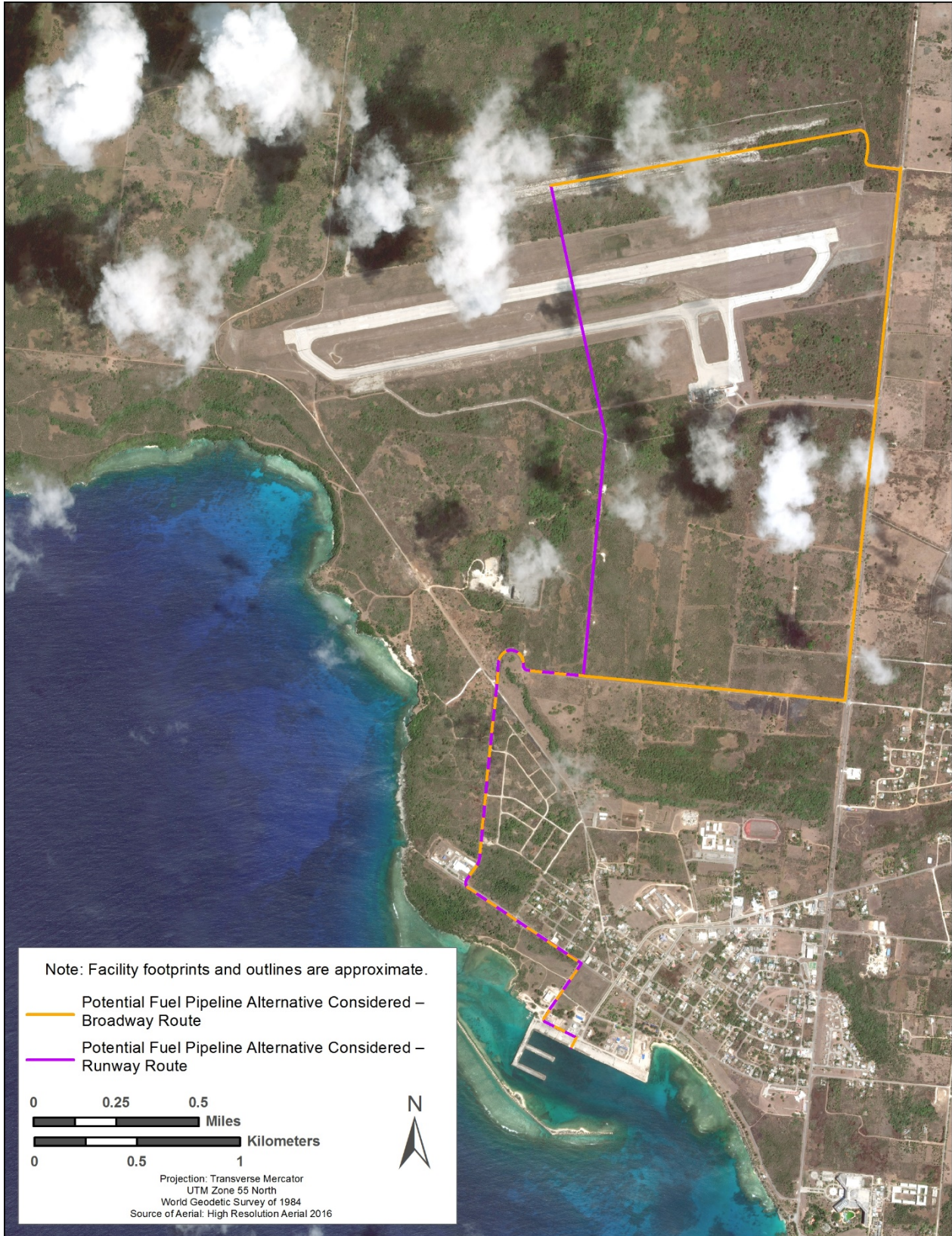
2 **Runway Route.** The Runway route travels north from the Tinian seaport until it intersects
3 Tinian Route (TR) 26 (i.e., West Avenue) and then stays on a northwestern path by following
4 TR26 and 6th Avenue until it reaches TR24 (i.e., 42nd Street) where it turns east (see **Figure**
5 **2.2-2** for a map of the Runway route). The route then continues east on TR24 until due south of
6 the airport, where it turns north and continues north underneath the existing Tinian International
7 Airport taxiway and runway to approach the Divert fuel storage tanks from the south (see **Figure**
8 **2.2-3** for the TR locations and names). This route falls entirely within lands with easement
9 rights; however, construction of this route underneath the existing airport taxiway and runway
10 would cause extensive disturbance to existing infrastructure and could not be efficiently
11 constructed, operated, or maintained, as confirmed through coordination with FAA. This route is
12 approximately 3.70 miles long.

13 **West Route.** The West route travels north from the Tinian seaport until it intersects TR26 and
14 then stays on a northwestern path by following TR26, 6th Avenue, and TR25 (i.e., 8th Avenue),
15 and then turns northeast along TR23 to approach the Divert fuel storage tanks from the west
16 side. (See **Section 2.4** for more details and **Figure 2.2-4** for a map of the West route.) This
17 route falls entirely within lands with easement rights; does not travel extensively along any
18 existing communities, infrastructure, or buildings; and is approximately 4.08 miles long.

19 **East Route.** The East route extends north from the Tinian seaport along the same path as the
20 Runway route until just south of the airport runway, where it turns north towards the airport and
21 then west and eventually reconnects with the proposed West route to approach the airport from
22 the west (see **Section 2.4** for more details and **Figure 2.2-4** for a map of the East route.) This
23 route falls entirely within lands with easement rights; does not travel extensively along any
24 existing communities, infrastructure, or buildings; and is approximately 4.94 miles long.

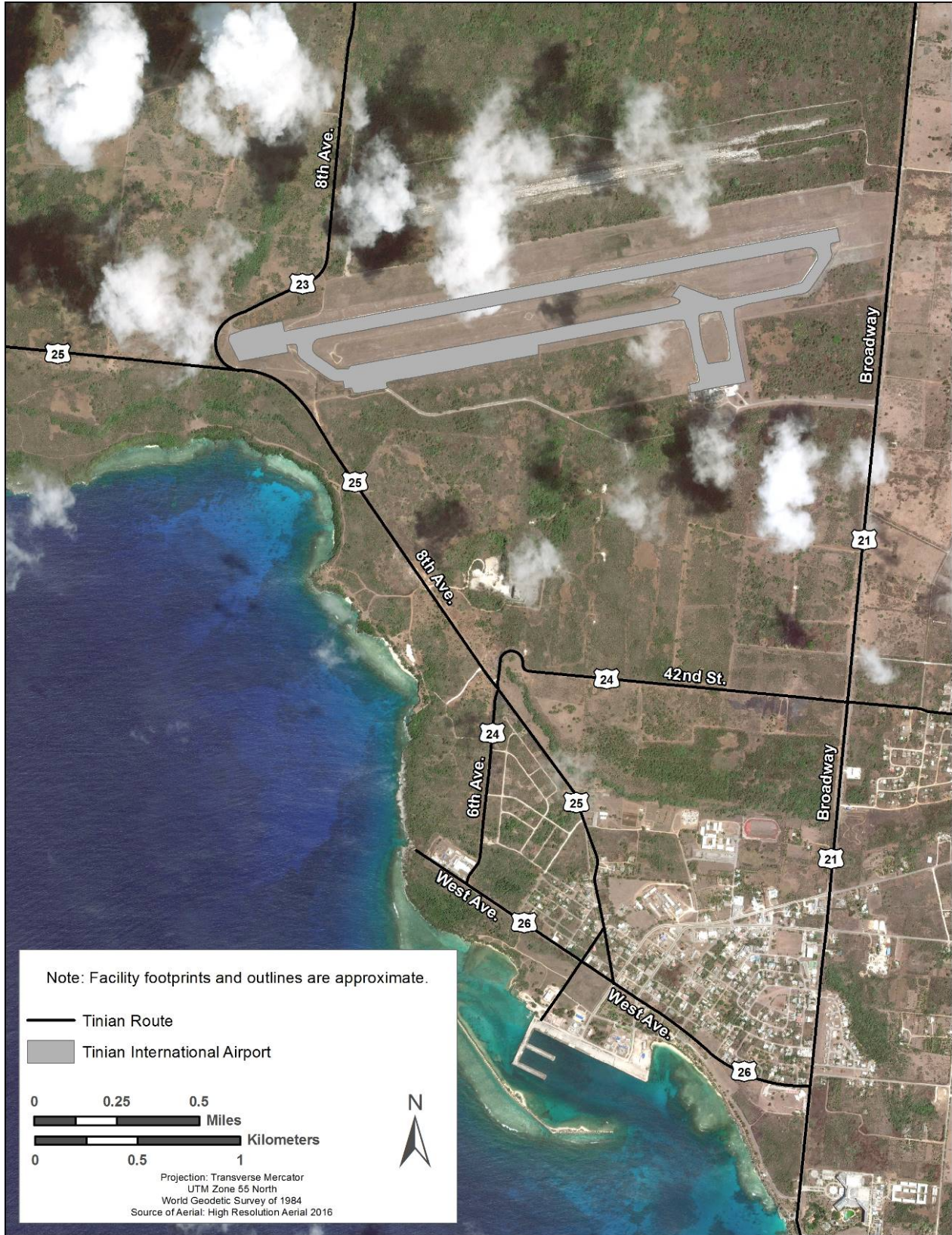
25 **Broadway Route.** The Broadway route follows the same path as the Runway and East routes,
26 except rather than turning north when south of the airport, it continues to travel east on TR24
27 until intersecting TR21 (i.e., Broadway). At TR21, this route turns north and travels alongside
28 TR21 before turning west along an unnamed roadway to approach the Divert fuel storage tanks
29 from the east (see **Figure 2.2-4** for a map of the Broadway route). This route partially falls
30 outside of existing lands with easement rights and also travels along TR21, which is one of the
31 main transportation routes on Tinian and would increase the potential to disturb the community
32 and existing infrastructure along this route. This route is approximately 4.16 miles long.

1



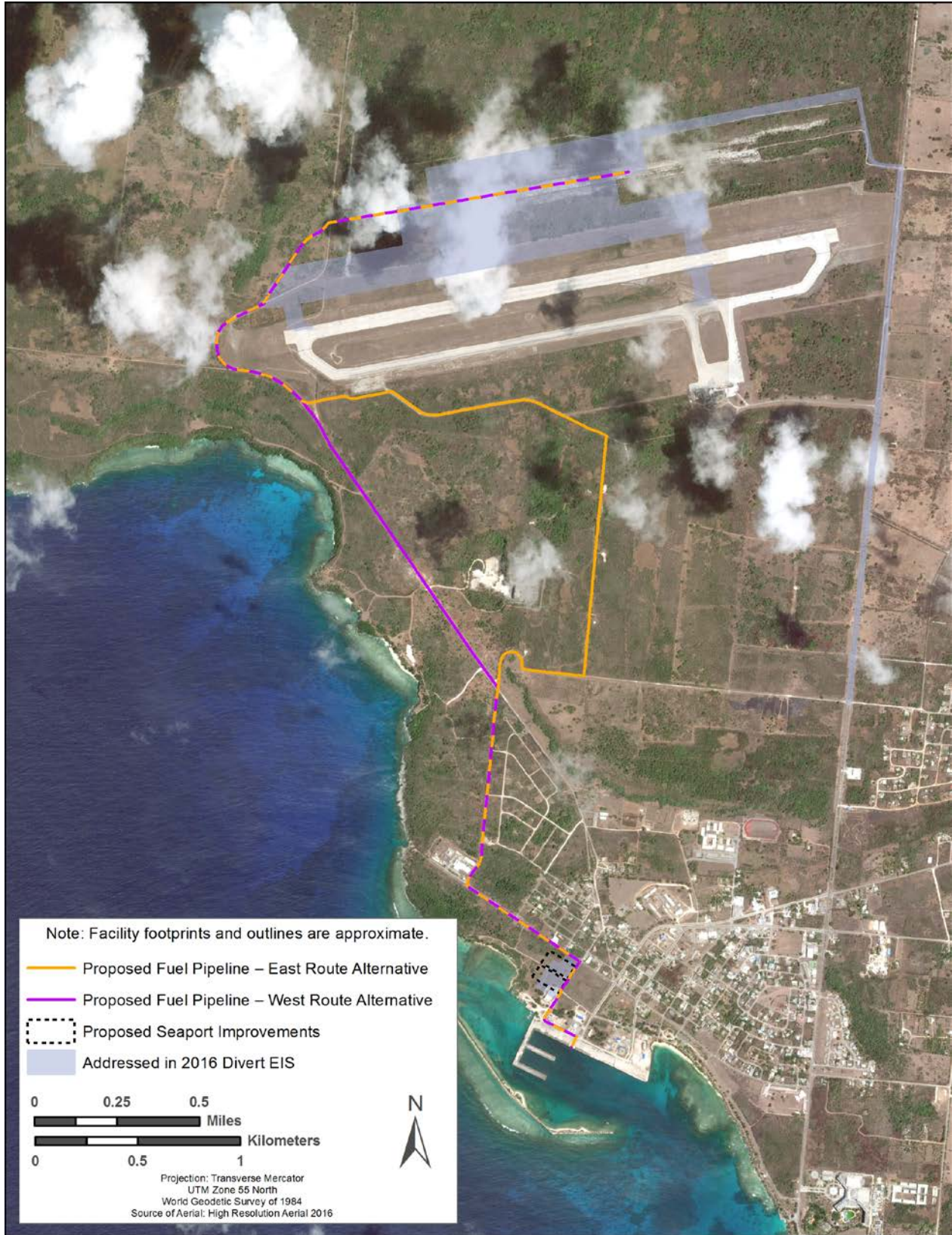
2

3 Figure 2.2-2. Runway Route and Broadway Pipeline Route Alternatives



1

2 Figure 2.2-3. Roadway Map of Tinian



1

2 Figure 2.2-4. Proposed West and East Pipeline Route Alternatives

1 **Support Infrastructure.** Based on review of the 2016 Divert EIS and consideration of technical
2 and siting factors, USAF determined that the proposed support infrastructure should be sited in
3 the location originally proposed for the bulk fuel storage facilities at the seaport (Final EIS,
4 Section 2.5.2). The original site proposed for construction of the bulk fuel tanks:

- 5 • was analyzed in the 2016 Divert EIS for construction and significant impacts were not
6 identified (Final EIS, Section 4)
- 7 • is co-located with the Divert biosecurity facility and laydown yard, condensing the total
8 land that would be required for these facilities
- 9 • is within close proximity to the seaport fuel off-load header, allowing efficient transfer of
10 the fuel from the fuel off-load header to the pump house.

11 Therefore, no other site alternatives were identified or considered for construction of the support
12 infrastructure at the seaport. The proposed support infrastructure would be constructed in the
13 location presented in **Figure 2.2-1**, regardless of the pipeline route alternative proposed for
14 construction.

15 2.2.2 Pipeline and Support Infrastructure Alternatives Carried Forward for 16 Analysis

17 As described in **Section 2.2.1**, USAF evaluated four possible pipeline routes in comparison to
18 the selection standards identified for this Proposed Action. Only two of the pipeline routes, the
19 West route and East route, have the ability to meet each selection standard. The Runway route
20 has been dismissed from further analysis because it does not minimize disturbance to existing
21 infrastructure and could not be efficiently constructed, operated, or maintained because of its
22 routing underneath the taxiway and runway. The Broadway route has been dismissed from
23 further analysis because it does not fall entirely within lands with easement rights or minimize
24 disturbance to existing infrastructure and the Tinian community.

25 Accordingly, the West route and East route shown in **Figure 2.2-4** will be carried forward for
26 analysis in the SEIS. Both the West route and East route would be constructed and operated
27 as described in the introduction of **Section 2.2** and would include construction of the support
28 infrastructure shown in **Figure 2.2-1**. The exact location and length of either pipeline route and
29 size of the support infrastructure could shift, within the constraints of the environmental effects
30 analysis presented in **Section 4**, based on engineering, environmental, or design limiting
31 factors; input from CNMI agencies; negotiations with property owners; or potential changes
32 requested by FAA for pipeline construction at the airport.

33 2.2.3 Pipeline and Support Infrastructure No Action Alternative

34 Section 1502.14(d) of NEPA requires the analysis of a No Action Alternative, which provides a
35 benchmark, enabling decision makers to compare the magnitude of the environmental effects to
36 a proposed action and alternatives. No action means that an action would not take place and
37 the resulting environmental effects from taking no action would be compared with the effects of
38 allowing the proposed activity to go forward. Under the No Action Alternative, the proposed fuel
39 pipeline and support infrastructure described in **Section 2.2** would not be constructed and

1 operated. Under this alternative, Divert activities and exercises at Tinian International Airport
2 (North) would be dependent on fuel trucks to transport fuel from the Tinian seaport to Tinian
3 International Airport and fuel tanks would be constructed and operated at the seaport, as was
4 analyzed in the 2016 Divert EIS and later selected in the ROD (Final EIS, Section 2.5.2). The
5 No Action Alternative would increase fuel resupply time and increase for the risk of
6 environmental impacts from potential fuel spills from trucks during loading, driving, and
7 offloading.

8 2.3 Roadway Improvements

9 USAF proposes to improve, as needed, certain existing roadways previously analyzed for Divert
10 vehicles in the 2016 Divert EIS (Final EIS, Section 2.5.2) that would support construction of all
11 Divert facilities and, if needed, transfer of fuel via tanker truck. Roadway improvements have
12 standalone value for supporting the Divert project and would occur independently of the
13 decision to construct the pipeline and support infrastructure described in **Section 2.2**. The road
14 improvements would include replacement of the existing roadway surfaces, which would entail
15 removing the existing deteriorated asphalt cap, which is up to 2 to 4 inches thick; grading the
16 road subsurface down approximately 8 inches below the original asphalt cap; laying an up to
17 8-inch sub base; and finishing the surface with a 3-inch asphalt cap. Asphalt removed from the
18 deteriorated cap would be reused as road improvement material or recycled on Tinian to the
19 extent feasible. All roadway improvements would occur within the existing roadbeds and
20 shoulders, and no roadbed widening or ROW alterations would occur. Road improvements
21 would be executed either by USAF or the Defense Access Roads program and could take place
22 prior to, during, or as repairs after construction of the Divert infrastructure identified in the 2016
23 Divert EIS (Final EIS, Section 2.5.2); however, road improvements are not anticipated to exceed
24 1 year of total construction time.

25 The impacts analysis in this SEIS assumes that all roadways proposed for improvements would
26 be reconstructed with a new sub base and asphalt cap; however, portions of these roadways
27 may require less extensive repairs based on geotechnical analysis. Additionally, lesser
28 maintenance and repair of any road proposed for Divert, including TR21, could occur, as
29 considered in the 2016 Divert EIS (Final EIS, Section 4.11.2).

30 2.3.1 Roadway Selection of Alternatives

31 USAF determined that any road proposed for improvements should meet the following selection
32 standards:

- 33 • Be a route that was proposed for Divert traffic in the 2016 Divert EIS (either for
34 construction vehicles or fuel trucks) (Final EIS, Section 2.5.2).
- 35 • Be a route in need of extensive improvement and reconstruction to better support Divert
36 activities and minimize impacts to community transportation.

37 **2016 Divert EIS Construction Route.** USAF conducted an engineering site visit to Tinian to
38 examine the roadways proposed for Divert traffic in the 2016 Divert EIS (Final EIS, Section
39 2.5.2). The route proposed for construction traffic in the 2016 Divert EIS travels from the Tinian
40 seaport and to the southeast directly to TR21, and then along TR21. TR21 is one of the main

1 roadways on Tinian with an average daily traffic volume of approximately 390–1,470 vehicles.
2 The engineering site visit indicated that TR21 is classified as “fair” with good drainage.
3 Shoulder improvements and roadway surface repairs could be required on TR21; however,
4 extensive roadway improvement and replacement would not be required.

5 **2016 Divert EIS Fuel Truck Route.** The route proposed for fuel trucks in the 2016 Divert EIS
6 (Final EIS, Section 2.5.2) travels from the Tinian seaport north to TR25, north along TR25 to its
7 intersection with TR24, east along TR24 to its intersection with TR21, and finally north along
8 TR21. As described in the introduction of **Section 2.3**, the roadway improvements would be
9 independent from the proposal to construct the pipeline and support infrastructure. If the
10 pipeline is not constructed, this route would be utilized by fuel vehicles as described in the 2016
11 Divert EIS (Final EIS, Section 2.5.2). Construction of the pipeline would eliminate the need for
12 fuel transfer by vehicle; therefore, if the pipeline is constructed, USAF would utilize this route for
13 all Divert construction vehicles rather than fuel vehicles. The engineering site visit indicated that
14 a portion of the fuel truck route analyzed in the 2016 Divert EIS, from the seaport to TR21, is
15 classified as poor/failing paved surfaces with potholes and uneven surfaces. The pavement of
16 this route is deteriorating and cracked, and there are low spots in the pavement surfaces that
17 retain water. Therefore, extensive roadway improvement and replacement along this route
18 would be required.

19 2.3.2 Roadway Alternatives Carried Forward for Analysis

20 As described in **Section 2.3.1**, USAF evaluated possible roads for improvement in comparison
21 to the selection standards identified for this Proposed Action. Only one segment of roadway
22 meets the selection standards. The construction traffic route analyzed in the 2016 Divert EIS
23 (Final EIS, Section 2.5.2) has been dismissed from further analysis because it does not meet
24 the selection standard for requiring extensive improvement and reconstruction. Accordingly,
25 only the fuel truck route analyzed in the 2016 Divert EIS (Final EIS, Section 2.5.2), excluding
26 TR21, will be carried forward for analysis in the SEIS for road improvements and is shown in
27 **Figure 2.3-1**. However, as described in **Section 2.3**, lesser maintenance and repair of any road
28 proposed for Divert use, including TR21, could still occur as considered in the 2016 Divert EIS
29 (Final EIS, Section 4.11.2).

30 As stated in **Section 2.3.1**, the route proposed for roadway improvements could be utilized for
31 Divert construction traffic if fuel trucks were not needed due to construction of the pipeline. Use
32 of this route for fuel or construction vehicles would not exceed the amount of fuel truck traffic
33 analyzed in the 2016 Divert EIS (Final EIS, Section 2.5.2). The roadway improvements would
34 take place over 2.51 miles and would be constructed as described in **Section 2.3**.

35 **Construction Materials.** To construct the proposed road improvements, construction materials
36 such as road base and asphalt would be needed along the entirety of the road proposed for
37 improvements. All materials, excluding reused materials from asphalt removal, would be
38 transported to or produced on Tinian as described in the 2016 Divert EIS (Final EIS, Section
39 2.5.2). Materials would be transferred from the seaport along the same route that was proposed
40 for fuel trucks in the 2016 Divert EIS (Final EIS, Section 2.5.2). However, 1,178 construction
41 truck trips, in addition to those analyzed in the 2016 Divert EIS (Final EIS, Section 2.5.2), would
42 be needed for the road improvements, which equates to approximately 3 roundtrips per day by
43 dump trucks over the course of 1 year.



1

2 Figure 2.3-1. Proposed Roadway Improvements

1 **Construction Workers.** Approximately 25 construction workers, in addition to those analyzed
2 in the 2016 Divert EIS (Final EIS, Section 2.5.2), could be required to support construction of
3 the road improvements. It is anticipated that the peak number of workers would only be needed
4 during shorter duration intensive or critical construction periods. In 2016, the construction
5 workforce of Tinian was 122 people and it is assumed that this entire workforce would support
6 the construction proposed in the 2016 Divert EIS. Therefore, it is assumed the entire workforce
7 to support the road improvements would be from off-island. The impact analysis in **Section 4**
8 assumes all construction workers would be needed during the construction period to determine
9 the maximum effect of construction workers.

10 2.3.3 Roadway No Action Alternative

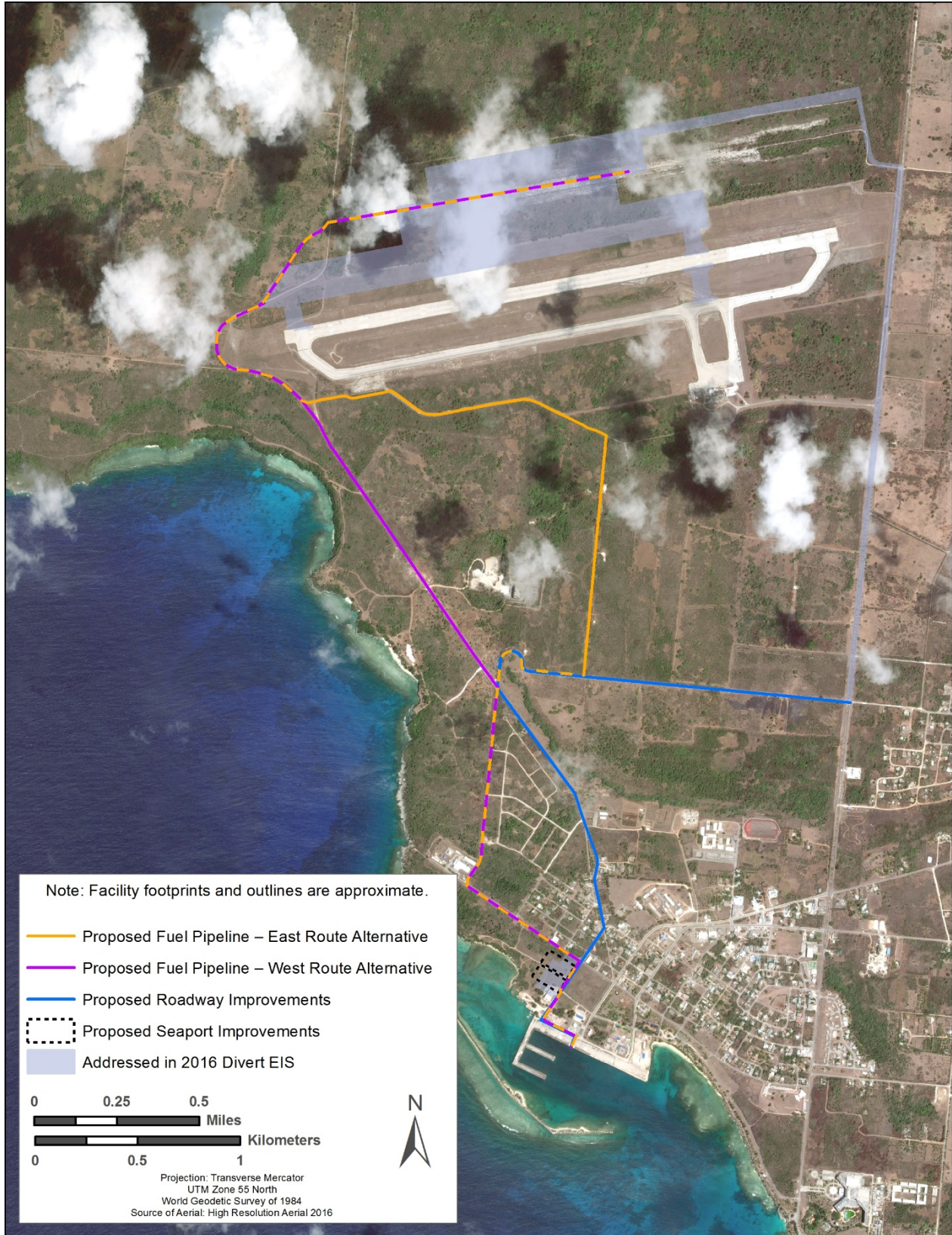
11 Under the No Action Alternative, the proposed roadway improvements would not be
12 constructed. Under this alternative, only minor roadway repairs along the construction and fuel
13 truck routes would occur, as was considered in the 2016 Divert EIS (Final EIS, Section 4.11.2).
14 The No Action Alternative would cause the continued deterioration of the Tinian roadways
15 proposed in the 2016 Divert EIS for Divert fuel trucks (Final EIS, Section 2.5.2).

16 2.4 Summary of Proposed Actions and Alternatives

17 In summary, USAF proposes to accomplish the following actions:

- 18 • Construct a fuel pipeline from the Tinian seaport to Tinian International Airport along
19 either the West route or the East route. In support of the pipeline, construct
20 infrastructure at the Tinian seaport, to include a booster pump house and associated fire
21 protection systems, a boom storage building, and necessary utility connections.
- 22 • Improve the roadway along the fuel truck route that was analyzed in the 2016 Divert EIS
23 (Final EIS, Section 2.5.2), excluding TR21. If the pipeline is not constructed, this route
24 would be used by fuel truck traffic as analyzed in the 2016 Divert EIS (Final EIS, Section
25 2.5.2). If the pipeline is constructed, this route would be utilized to support construction
26 of all Divert-related projects.

27 The Proposed Actions and alternatives are shown in **Figure 2.4-1**.



1

2 Figure 2.4-1. Summary of Proposed Actions and Alternatives

2.5 Identification of Preferred Alternatives

According to CEQ guidelines, an agency's preferred alternative is the alternative that the agency believes would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors. CEQ regulations require the section of the SEIS on alternatives to "identify the agency's preferred alternative if one or more exists, in the draft statement, and identify such alternative in the final statement..." (CEQ 1981).

USAF's Preferred Alternative for the fuel pipeline and support infrastructure is the East route alternative, as described in **Section 2.2.2**. The analysis of impacts for the fuel pipeline and support infrastructure also includes the West route as described in **Section 2.2.2**, and the No Action Alternative as described in **Section 2.2.3**. USAF is identifying the Preferred Alternative pursuant to 40 CFR § 1502.14(e); however, no final decision selecting a particular alternative for implementation has been made. The USAF decision maker will use the SEIS to support the decision about how best to satisfy the stated purpose and need within mission constraints. The final decision will be documented in the ROD.

USAF has not identified a Preferred Alternative for the roadway improvements at this time. USAF will identify a Preferred Alternative for the roadway improvements in the Final SEIS from the Proposed Action and No Action alternatives.

2.6 Summary of Environmental Impacts and Mitigation Measures

NEPA requires focused analysis on environmental resources and topics potentially affected by the Proposed Actions. Environmental impacts that could result from implementing USAF's Pipeline and Support Infrastructure Proposed Action alternatives and the No Action Alternative are summarized in **Table 2.6-1**. Environmental impacts that could result from implementing USAF's Roadway Improvements Proposed Action and No Action Alternative are summarized in **Table 2.6-2**. These tables present potential adverse impacts that could occur, unless otherwise noted as beneficial impacts, and include consideration of compliance with federal and local regulations and requirements. Potential impacts are also based on consultations with federal and CNMI agencies responsible for ensuring compliance with resource-specific regulations; for example, Section 106 consultation with CNMI SHPO, Section 7 consultation with USFWS. Detailed descriptions of the existing environmental conditions and environmental consequences for resources potentially affected by the Proposed Actions and alternatives are provided in **Sections 3 and 4**, respectively.

Mitigation measures avoid, minimize, remediate, or compensate for environmental impacts. CEQ regulations (40 CFR § 1508.20) define mitigation to include the following:

1. Avoid the impact altogether by not taking a certain action or parts of an action.
2. Minimize impacts by limiting the degree or magnitude of the action, and its implementation.
3. Rectify the impact by repairing, rehabilitating, or restoring the affected environment.

1 4. Reduce or eliminate the impact over time by preservation and maintenance operations
2 during the life of the action.

3 5. Compensate for the impact by replacing or providing substitute resources or
4 environments.

5 Avoiding, minimizing, or reducing potential impacts has been a priority guiding the Proposed
6 Actions in this SEIS. Mitigation measures for implementing the Proposed Actions and avoiding,
7 minimizing, remediating, or compensating for potential impacts on specific resource areas have
8 been identified and would be implemented as required, as shown in **Tables 2.6-1** and **2.6-2**,
9 **Section 4**, and **Appendix F**. Mitigation measures detailed in **Tables 2.6-1** and **2.6-2** are those
10 that have been developed to specifically address the impacts anticipated from the Proposed
11 Actions and are also based on consultations with federal and CNMI agencies. **Tables 2.6-1** and
12 **2.6-2** also summarize mitigations measures that are routine or standard compliance actions
13 dictated by federal, Department of Defense, USAF, or CNMI regulations and are built into the
14 design, construction, and operation of the proposed infrastructure for USAF fuel facilities and
15 roadways. **Appendix F** provides detailed information on compliance actions and industry
16 standard mitigation measures by the resource area and Proposed Action for which they would
17 be implemented.

18 Following the ROD, a Mitigation Plan will be prepared in accordance with 32 CFR § 989.22(d).
19 The Mitigation Plan will address specific mitigations identified and agreed to during the EIAP.
20 The Mitigation Plan will identify principal and subordinate organizations having responsibility for
21 oversight and execution of specific mitigation and management actions. The plan will be
22 prepared in accordance with the CEQ mitigation and monitoring guidance.

Table 2.6-1. Summary of Pipeline and Support Infrastructure Environmental Impacts and Mitigation Measures

West Route Alternative	East Route Alternative	No Action Alternative	West Route Mitigation Measures	East Route Mitigation Measures
Noise				
<p>Short-term, minor to moderate impacts would be expected from construction noise. Impacts are not expected from operation, once construction is complete.</p>		<p>Construction noise levels and impacts would be similar to those presented for the Proposed Action. Noise impacts associated with fuel truck trips under the No Action Alternative would be short term and moderate on receptors adjacent to the roadways.</p>	<p>USAF would utilize available technology to reduce noise from construction equipment and restrict construction operating hours. Appendix F provides further details on noise compliance actions and industry standard mitigation measures.</p>	
Biological Resources				
<p><i>Terrestrial Resources.</i> Short- and long-term, minor, direct impacts are expected on vegetation and wildlife, respectively. Adverse impacts are not expected on special status terrestrial species.</p> <p><i>Marine Biological Resources.</i> Short-term, no to minor indirect impacts would be expected on nearshore marine resources, EFH, and special status marine species during construction. Long-term, negligible, indirect impacts would be expected on nearshore marine resources, EFH, and special status marine species during operation.</p>		<p><i>Terrestrial Resources.</i> Under the No Action Alternative, no vegetation along pipeline routes would be disturbed and there would be no loss of or disturbance of wildlife habitat along a pipeline route; impacts on vegetation and wildlife would be less than under the Proposed Action.</p> <p><i>Marine Biological Resources.</i> While impacts on marine species could be expected because potential fuel spills from trucks are more common than from pipelines (Strata 2017), impacts are anticipated to be negligible.</p>	<ul style="list-style-type: none"> • Two individual Fadang, a cycad, have been planted within the landscaping of the Nanyo Kohatsu Kabushiki Kaisha Administration Building and Laboratory, along TR26 near the southern terminus of the West and East routes. These plants and the surrounding memorial would be avoided during construction of the pipeline. • USAF would implement all measures described in the Biological Opinion for the 2016 Divert proposal and EIS to prevent the spread of brown treesnakes and other invasive species. • To avoid harming nesting birds, surveys or monitoring 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. • As outlined in Appendix F, USAF would adhere to federal and CNMI requirements and design standards for water quality, stormwater management, and erosion and sediment control to minimize and prevent impacts on nearshore waters. 	

West Route Alternative	East Route Alternative	No Action Alternative	West Route Mitigation Measures	East Route Mitigation Measures
Cultural Resources				
<p>Ground disturbance during construction of the pipeline would have potential to affect the physical integrity of historic properties, having minor to major impacts on the sites. Construction would also have short-term, minor to moderate impacts on the historic setting or feeling of the properties. Impacts from operation of the pipeline are not expected. As part of the Section 106 process, USAF has determined the Undertaking would contribute to adverse effects from the Divert Activities and Exercises undertaking. USAF is consulting with the CNMI SHPO and consulting parties on mitigation measures that will be included in an amendment to the existing Divert Activities and Exercises PA.</p>	<p>Construction of the fuel tanks and fuel truck traffic under the No Action Alternative would have no impact on cultural resources.</p>	<ul style="list-style-type: none"> • USAF would, to the extent practicable, minimize the use of tracked equipment and replace excavated airport pavements consistent with the West Field runway's current appearance in accordance with the Secretary of the Interior's Guidelines for the Treatment of Historic Properties. • USAF would design the pipeline to avoid sites HDR-18-07 and TN-4-1010. • USAF would monitor pipeline construction in sensitive areas for archaeology and human remains and implement inadvertent discovery procedures established in the Programmatic Agreement. • Additional mitigation measures will be outlined in the Programmatic Agreement developed under the Section 106 consultation. 		
Socioeconomics				
<p>Short-term, minor to moderate impacts on the Tinian population, housing, public services, and sociocultural issues would result from construction; however, direct, beneficial impacts on the local economy would be expected. No to negligible beneficial long-term impacts on socioeconomics would occur during operation of the pipeline or seaport infrastructure.</p>	<p>The No Action Alternative would have no impacts on existing socioeconomic conditions. Beneficial impacts would be expected from the operation of the fuel trucks and vehicle fuel purchases. Demand for public services and changes in sociocultural issues would not change from existing conditions.</p>	<ul style="list-style-type: none"> • USAF personnel and their contractors would coordinate with local hotels to secure the required number of hotel rooms prior to proposed use to minimize impacts and avoid supply issues. • To minimize the impacts on the Tinian Health Center, the construction contractor would be responsible for medical care for construction personnel. • Additional security and fire personnel could be required to rectify the increased demand due to an increase in island population during construction. 		
Environmental Justice and Protection of Children				
<p>Construction and operation of the pipeline infrastructure would not result in significant or disproportionately high and adverse health or environmental impacts on minority, low-income, elderly, or children populations on Tinian. Although adverse impacts would occur, the impacts would be less than significant.</p>	<p>Construction impacts under the No Action Alternative would be reduced in comparison to the Proposed Action. However, operation under the No Action Alternative would have long-term, periodic, negligible impacts on environmental justice populations due to the use of fuel trucks.</p>	<p>USAF would adhere to federal and CNMI requirements and design standards that would reduce impacts on minority, low-income, elderly, or children populations in the unlikely event of a fuel spill. Appendix F provides further details on compliance actions and industry standard mitigation measures for stormwater and fuels management.</p>		

West Route Alternative	East Route Alternative	No Action Alternative	West Route Mitigation Measures	East Route Mitigation Measures
Health and Safety				
Short-term, direct, negligible impacts on explosives safety and public health and safety could occur.	Impacts on explosives safety and public health and safety during operations would be minor and similar to, but slightly greater than, those described for the West route.	Lesser impacts on construction personnel health and safety and explosives safety under the No Action Alternative in comparison to the Proposed Action because less construction would be required. Greater impacts on the health and safety of operational personnel and the public would be expected from the increased potential for spills, leaks, or other hazardous risks because such issues with trucks are more common than with pipelines.	USAF and their contractors would adhere to established federal and CNMI safety regulations and industry standard safety protocols to minimize impacts on construction worker safety and public safety. Appendix F provides further details on health and safety compliance actions and industry standard mitigation measures.	
Short- and long-term, direct, minor impacts on contractor health and safety and airfield safety during construction and operations. Short-term, direct, negligible impacts on public safety during construction.				
Soils and Geology				
Long-term, negligible to moderate impacts on physiography and topography from construction. Short- and long-term, minor to moderate impacts on soils from construction and operation. Long-term, minor to moderate impacts from geologic hazards during pipeline installation and operation.	Impacts on regional geology, physiography, topography, and soils would be greater than those described for the West route, but not significant. Impacts from geologic hazards would be slightly less than those described for the West route.	Lesser impacts on regional geology, physiography and topography, and soils, and from geologic hazards under the No Action Alternative in comparison to the Proposed Action. Greater impacts on soils within the seaport project area and from potential fuel-related impacts.	<ul style="list-style-type: none"> • USAF would design facilities to adhere to federal and CNMI requirements and design standards for erosion and sediment control, spill prevention, and geologic hazards. • USAF would implement erosion and sediment control measures and spill prevention measures for facilities post-construction. • Appendix F provides further details on soils and geology compliance actions and industry standard mitigation measures. 	
Short- and long-term, minor to moderate impacts on groundwater resources and surface and coastal water resources.		Increased impacts under the No Action Alternative in comparison to the Proposed Action due to increased potential for spills and larger area of impervious surfaces. Storm water runoff volumes could be increased under this scenario.		
	<ul style="list-style-type: none"> • USAF would design facilities to adhere to federal and CNMI requirements and design standards for water quality and stormwater management. • USAF would implement stormwater management and monitoring methods to ensure water quality before and after construction. • Appendix F provides further details on water compliance actions and industry standard mitigation measures. 			

West Route Alternative	East Route Alternative	No Action Alternative	West Route Mitigation Measures	East Route Mitigation Measures
Infrastructure and Transportation				
Short-term, minor to moderate impacts on the water supply. Short-term, minor impacts on solid waste and local transportation.	Short-term, moderate impacts on the water supply. Short-term, minor to moderate impacts on solid waste and local transportation.	Under the No Action Alternative, lesser impacts would be expected on the water supply than under the Proposed Action; however, greater impacts on solid waste and transportation would be expected.	<ul style="list-style-type: none"> USAF wells proposed in the 2016 Divert EIS (Final EIS, Section 4.13.2.1) would be designed to incorporate the need for water under the proposed pipeline and supporting infrastructure action. USAF would manage draw rates from the existing and proposed wells to ensure that water supply is not exceeded. USAF would implement measures to manage construction debris and promote energy efficiency as outlined in Appendix F. 	
Short-term, negligible impacts on the airfield, seaport, electrical system, and liquid fuel supply. Beneficial impacts would occur from jet fuel receipt and transfer capabilities. Short-term, minor, impacts on stormwater.				
Land Use and Recreation				
Short-term, minor impacts on land ownership and recreation. Short- and long-term, minor to moderate impacts on land use. Proposed infrastructure could affect coastal uses and resources that are subject to CZMA federal consistency requirements.	Use of fuel trucks would generate long-term, periodic, negligible impacts on recreation.	No mitigation measures for land use have been identified.		
Hazardous Materials and Wastes				
Short-term, minor impacts would occur from the use of hazardous materials and petroleum products and the generation of hazardous wastes. Long-term, negligible impacts would occur from operation of the proposed fuel pipeline in the event of a release.	Long-term, negligible to minor impacts on hazardous materials and wastes would occur under the No Action Alternative.	The pipeline would be routed down the center of the Tinian dump access road until the pipeline is clear of the dump for at least 500 feet, and would be clearly marked in this area.	No additional mitigation measures for the East route for hazardous materials and wastes have been identified.	<ul style="list-style-type: none"> USAF would design, manage, operate, and construct fuel infrastructure to adhere to federal and CNMI requirements and industry standards. USAF would implement spill prevention and control, hazardous material handling, and environmental contamination protocols. Appendix F provides further details on hazardous materials and wastes compliance actions and industry standard mitigation measures.
Air Quality				
Short- and long-term, direct, negligible to minor impacts would be expected from construction emissions, land disturbance, and use of emergency generators.	Impacts on air quality would be minor and, depending on the air pollutant, would be greater or less than emissions under the Proposed Action.	USAF would implement fugitive dust control measures and obtain necessary air permits. Appendix F provides further details on air quality compliance actions and industry standard mitigation measures.		

Table 2.6-2. Summary of Road Improvements Environmental Impacts and Mitigation Measures

Road Improvements	No Action Alternative	Mitigation Measures
Noise		
Noise impacts on San Jose residential areas would be short-term and moderate for individual residences located nearest the proposed road improvement segments of TR25 and TR26.	Noise level increases associated with minor road repairs would be short-term and minor.	USAF would utilize available technology to reduce noise from construction equipment and restrict construction operating hours. Appendix F provides further details on noise compliance actions and industry standard mitigation measures.
Biological Resources		
<p><i>Terrestrial Resources.</i> Negligible, short-term, direct impacts would be expected on native vegetation and wildlife. No adverse impacts on special status terrestrial species.</p> <p><i>Marine Biological Resources.</i> Short-term, no to negligible, indirect impacts would be expected on nearshore marine resources, EFH, and special status marine species during roadway improvements.</p>	Under the No Action Alternative, minor roadway repairs associated with routine use would have no impact on terrestrial or marine biological resources.	<ul style="list-style-type: none"> USAF would implement all measures described in the Biological Opinion for the 2016 Divert proposal and EIS to prevent the spread of brown treesnakes and other invasive species. As outlined in Appendix F, USAF would adhere to federal and CNMI requirements and design standards for water quality, stormwater management, and erosion and sediment control to minimize and prevent impacts on nearshore waters.
Cultural Resources		
Roadway improvements would have potential to impact cultural resources during excavation and ground disturbance within the roadway and limited surface disturbance from foot and vehicle traffic within 5 feet of the roadway. However, cultural resources surveys in proposed road improvement areas did not identify any historic properties. As part of the Section 106 process, USAF has determined the Undertaking would contribute to adverse effects from the Divert Activities and Exercises undertaking. USAF is consulting with the CNMI SHPO and consulting parties on mitigation measures that will be included in an amendment to the existing Divert Activities and Exercises PA.	Minor roadway repairs would have no impact on cultural resources.	If inadvertent discoveries of buried archaeological deposits or human remains were to occur during construction, USAF would implement the procedures for inadvertent discoveries in the Programmatic Agreement.

Road Improvements	No Action Alternative	Mitigation Measures
Socioeconomics		
Short-term, minor to moderate impacts on the Tinian population, housing, public services, and sociocultural issues would result from construction; however, direct, beneficial impacts on the local economy would be expected.	The No Action Alternative would have no impacts on existing socioeconomic conditions but would result in fewer beneficial impacts on the local economy than the Proposed Action. Demand for public services and changes in sociocultural issues would not change from existing conditions.	<ul style="list-style-type: none"> • USAF personnel and their contractors would coordinate with local hotels to secure the required number of hotel rooms prior to proposed use to minimize impacts and avoid supply issues. • To minimize the impacts on the Tinian Health Center, the construction contractor would be responsible for medical care for construction personnel. • Additional security and fire personnel could be required to rectify the increased demand due to an increase in island population during construction.
Environmental Justice and Protection of Children		
Construction of roadway improvements would not result in significant or disproportionately high and adverse health and environmental impacts on minority, low-income, elderly, or children populations on Tinian. Although impacts would occur, the impacts would be less than significant.	The No Action Alternative would require minimal construction along the routes and, therefore, fewer impacts on minority and low income populations with no impact to environmental justice.	No mitigation measures for environmental justice and protection of children have been identified.
Health and Safety		
Short-term, direct, negligible to minor impacts on contractor health and safety, explosives safety, and public safety could occur.	Impacts on contractor health and safety, explosives safety, and public health and safety would be less under the No Action Alternative. Long-term, direct, minor impacts on public health and safety would be expected from continued use of degraded roadways.	USAF and their contractors would adhere to established federal and CNMI safety regulations and industry standard safety protocols to minimize impacts on construction worker safety and public safety. Appendix F provides further details on health and safety compliance actions and industry standard mitigation measures.
Soils and Geology		
Long-term, negligible impacts on regional geology, physiography, and topography. Short-term, minor impacts on soils. Long-term, direct, minor to moderate impacts from geologic hazards.	Lesser impacts under the No Action Alternative on regional geology, physiography and topography, and soils, and less susceptibility to geologic hazards due to reduced ground disturbance.	<ul style="list-style-type: none"> • USAF would design facilities to adhere to federal and CNMI requirements and design standards for erosion and sediment control, spill prevention, and geologic hazards. • USAF would implement erosion and sediment control measures and spill prevention measures for facilities post-construction. • Appendix F provides further details on soils and geology compliance actions and industry standard mitigation measures.

Road Improvements	No Action Alternative	Mitigation Measures
Water		
Short-term, negligible to minor impacts on groundwater and surface water.	Under the No Action Alternative, there would be an increase in the potential for accidental spills or leaks of fuels during transport on roads that have had only minor repairs.	<ul style="list-style-type: none"> • USAF would design facilities to adhere to federal and CNMI requirements and design standards for water quality and stormwater management. • USAF would implement stormwater management and monitoring methods to ensure water quality before and after construction. • Appendix F provides further details on water compliance actions and industry standard mitigation measures.
Infrastructure and Transportation		
Short-term, negligible impacts on the seaport and liquid fuel supply. Long-term, minor, beneficial impacts on the seaport. Short-term, minor impacts on solid waste and transportation. Long-term, minor to moderate, beneficial impacts on the transportation network.	Under the No Action Alternative, lesser impacts would be expected on the water supply and solid waste than under the Proposed Action; however, greater short- and long-term impacts on the transportation network would be expected.	<ul style="list-style-type: none"> • USAF wells proposed in the 2016 Divert EIS (Final EIS, Section 4.13.2.1) would be designed to incorporate the need for water to support the proposed roadway improvements construction. USAF would manage draw rates from the existing and proposed wells to ensure that water supply is not exceeded. • USAF would implement measures to manage construction debris as outlined in Appendix F.
Land Use and Recreation		
Short-term, negligible to minor impacts on land use and recreation. Proposed infrastructure could affect coastal uses and resources that are subject to CZMA federal consistency requirements.	Short- and long-term, periodic, negligible impacts on land use and recreation due to continuous need for road repairs.	No mitigation measures for land use and recreation have been identified.
Hazardous Materials and Wastes		
Short-term, minor impacts would occur from the use of hazardous materials and petroleum products and the generation of hazardous wastes.	No impacts on hazardous materials and wastes would occur under the No Action Alternative.	<ul style="list-style-type: none"> • USAF would implement spill prevention and control, hazardous material handling, and environmental contamination protocols. • Appendix F provides further details on hazardous materials and wastes compliance actions and industry standard mitigation measures.
Air Quality		
Short-term, negligible to minor impacts on air quality from air emission during construction.	Periodic, long-term, negligible to minor impacts on air quality from air emissions during minor roadway repairs.	USAF would implement fugitive dust control measures. Appendix F provides further details on air quality compliance actions and industry standard mitigation measures.

This page intentionally left blank.

3. Affected Environment

This section describes the resources being analyzed, the regulatory setting for each resource, and the affected environment on Tinian and in the CNMI for the Proposed Actions, which forms the basis of the analysis presented in **Section 4**. To the extent practicable, the description of resources in this section has been revised to be consistent with conditions observed during visual inspections conducted on Tinian post-landfall of Typhoon Yutu in October 2018. USAF recognizes that conditions described for some resources could differ from those currently present on Tinian and that resource conditions will continue to change as Tinian recovers from Typhoon Yutu. USAF will reconsider these conditions upon completion of the Draft SEIS and during development of the Final SEIS.

The affected environment described for CNMI and Tinian in Section 3 of the 2016 Divert EIS (Final EIS, Section 3) is hereby incorporated by reference; the affected environment described in **Sections 3.1 through 3.12** of this SEIS has been adopted from the 2016 Divert EIS to avoid repetitiveness and duplication of content. The 2016 Divert EIS is available for review or download from the project website at: <http://pacafdivertmarianaseis.com/archive>. To facilitate reader review and understanding of the affected environment, **Sections 3.1 through 3.12** each provide a brief summary from the 2016 Divert EIS of the respective resource area and include updated information, where applicable and available. Resource information in Section 3 was updated based on the physical areas being proposed for action, the type of action being proposed and the nature of potential impacts on that resource area, or because the resource has changed.

Throughout this SEIS, as applicable, the area for each of the Proposed Actions or alternatives that could be physically disturbed is referred to as the “project area.” The term “project area” encompasses the locations proposed for construction for each particular Proposed Action. This SEIS uses the term “Region of Influence” (ROI) to describe the complete geographic scope of potential consequences for the resource area. For most of the resource areas, the ROI is defined as the area of Tinian affected by the construction or operation of the proposed infrastructure. For some resources, such as noise, air quality, and socioeconomics, the ROI extends into surrounding communities, or across the CNMI, unique to that specific resource.

In compliance with NEPA, CEQ, and USAF EIAP (32 CFR § 989) guidelines, this SEIS focuses on those resources potentially subject to impacts from the Proposed Actions or No Action Alternatives. This SEIS has been prepared as a concise document that addresses resource-specific concerns while meeting the comparative needs of the USAF decision makers. Public, agency, and other comments received during scoping were used to focus the analysis on those environmental resources of interest to scoping participants. Certain environmental resources were not carried forward for evaluation in this SEIS for both of the Proposed Actions because it was determined that the actions would be unlikely to impact those resources. Resources that have been eliminated from further detailed study in this SEIS and the rationale for eliminating them are presented below.

1 **Airspace.** Airspace was not evaluated because the Proposed Actions do not include any
2 proposals for new airspace, nor do they include changes to the manner in which the existing
3 airspace is used. Under the Proposed Actions, all aircraft operations proposed in the 2016
4 Divert EIS (Final EIS, Section 2.5.2) would remain unchanged and there would be no alterations
5 to airspace within the CNMI. Measures to avoid or rectify impacts on airfield operations during
6 construction identified in the 2016 Divert EIS (Final EIS, Section 4.16) would be implemented
7 during pipeline construction at the airfield. Therefore, impacts on airspace are not expected.

8 **Visual Resources.** Visual resources were not evaluated because the Proposed Actions would
9 not impact landscapes and landforms or other features that attribute to landscape-level visually
10 aesthetic qualities. Therefore, impacts on visual resources are not expected.

11 3.1 Noise

12 3.1.1 Definition of the Resource

13 Noise is generally described as unwanted sound. Sound is a physical phenomenon consisting
14 of minute vibrations that travel through a medium, such as air or water, and are sensed by the
15 human ear. Unwanted sound can be based on objective effects (such as hearing loss and
16 speech interruptions) or subjective judgments (such as noise complaints and annoyance).

17 There are two main concepts to understand how noise is generated—sound level and
18 frequency.

- 19 • **Sound Level.** Sound level or intensity is a measure of the loudness of a sound
20 expressed in decibels (dB). A human ear can only detect sounds that are above a
21 certain dB level. The other end of the spectrum is sound so loud (high dB level) that it
22 can cause pain, discomfort, and hearing loss.
- 23 • **Frequency.** Frequency is a measure of sound-wave cycles per unit of time, with higher
24 frequency sounds dispersing more quickly than those at lower frequencies. The
25 standard unit of measurement for sound wave frequency is cycles per second,
26 expressed as hertz.

27 Sound waves move outward in all directions from the source and weaken as the distance from
28 the source increases. Sound waves (i.e., noise) can also be diminished or enhanced by wind
29 movement, terrain, ground cover, and temperature. Human hearing can generally perceive
30 frequencies between 20 and 20,000 hertz. The human ear cannot hear sounds above and
31 below these frequencies.

32 Regulatory Framework

33 **Noise Metrics and Regulations.** Although individual human response to noise varies,
34 projected noise levels and zones can be modeled to predict typical human responses.
35 “A-weighted decibel” (dBA) is used to characterize sound levels that can be sensed by the
36 human ear. “A-weighted” denotes the adjustment of the frequency range to what the average
37 human ear can sense when experiencing an audible event. The threshold of audibility is
38 generally within the range of 10 to 25 dBA for normal hearing. The threshold of pain occurs at
39 the upper boundary of audibility, which is normally in the region of 135 dBA (USEPA 1981b).

1 **Table 3.1-1** compares common sounds and shows how they rank in terms of the effects of
 2 hearing. As shown, a whisper is normally 30 dBA and considered to be very quiet while an air
 3 conditioning unit 20 feet away is considered an intrusive noise at 60 dBA. Noise levels can
 4 become annoying at 80 dBA and very annoying at 90 dBA. To the human ear, each 10 dBA
 5 increase seems twice as loud (USEPA 1981a). Additionally, although noise generated from a
 6 source is constant, the perceived noise level decreases by approximately 6 dB with each
 7 doubling of distance away from the source (OSHA 2013).

8 **Table 3.1-1. Sound Levels and Human Response**

Noise Level (dBA)	Common Sounds	Effect
10	Just audible	Negligible*
30	Soft whisper (15 feet)	Very quiet
50	Light auto traffic (100 feet)	Quiet
60	Air conditioning unit (20 feet)	Intrusive
70	Noisy restaurant or freeway traffic	Telephone use difficult
80	Alarm clock (2 feet)	Annoying
90	Heavy truck (50 feet) or city traffic	Very annoying Hearing damage (8 hours)
100	Garbage truck	Very annoying*
110	Pile drivers	Strained vocal effort*
120	Jet take-off (200 feet) or auto horn (3 feet)	Maximum vocal effort
140	Carrier deck jet operation	Painfully loud

Source: USEPA 1981a

Note: *HDR estimation

9 Noise annoyance can be especially impactful on noise sensitive receptors (NSRs), which are
 10 defined as locations or areas where dwelling units or other fixed, developed sites of frequent
 11 human use occur. Generally, NSRs include people living in residential areas, students in
 12 schools, and patients in hospitals.

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

21 Sound levels, resulting from multiple single events, are used to characterize noise effects from
 22 aircraft or vehicle activity and are referred to as a day-night sound level (DNL). The DNL noise
 23 metric incorporates a “penalty” for nighttime noise events to account for increased annoyance.
 24 DNL is the energy-averaged sound level measured over a 24-hour period. To account for the
 25 perception of increased noise during normally quiet times, an additional 10-dBA is added to
 26 noise events occurring between 10 p.m. and 7 a.m. DNL is the designated noise metric of the
 27 FAA, U.S. Department of Housing and Urban Development (HUD), U.S. Environmental
 28 Protection Agency (USEPA), and DOD for modeling airport environments.

1 Land use guidelines identified by the Federal Interagency Committee on Urban Noise and FAA,
2 Part 150–Airport Noise Compatibility Planning regulation (14 CFR § 150), are used to determine
3 compatible types of land use surrounding airports within the 65 to 80+ dBA DNL noise contours
4 (FICUN 1980). DOD, USEPA, FAA, and HUD use these guidelines in their noise policies and
5 programs. For outdoor activities, USEPA recommends 55 dBA DNL as the sound level below
6 which there is no reason to suspect that the general population would be at risk from any of the
7 effects of noise. For indoor activities, USEPA recommends 45 dBA DNL (USEPA 1974).

8 **Ambient Sound Levels.** Noise levels vary depending on the housing density and proximity to
9 parks and open space, major traffic areas, or airports. As shown in **Table 3.1-2**, the noise level
10 in a normal suburban area is approximately 55 dBA DNL, which increases to 60 dBA for an
11 urban residential area, and to 80 dBA in the downtown section of a city (USEPA 1974). Most
12 people are exposed to sound levels of 50 to 55 dBA or higher on a daily basis.

13 **Table 3.1-2. Typical Outdoor Noise Levels**

dBA DNL	Location
50	Residential area in a small town or quiet suburban area
55	Suburban residential area
60	Urban residential area
65	Noisy urban residential area
70	Very noisy urban residential area
80	City noise (downtown of major metropolitan area)
88	3rd floor apartment in a major city next to a freeway

Source: USEPA 1974

14 **Construction Sound Levels.** Building demolition and construction can cause an increase in
15 sound well above the ambient level. Sounds emitted during construction typically vary
16 according to the type of work equipment being used. **Table 3.1-3** lists noise levels associated
17 with common types of construction equipment. Construction equipment usually exceeds the
18 ambient sound levels by 20 to 25 dBA in an urban environment and up to 30 to 35 dBA in a
19 quiet suburban area.

20 **Table 3.1-3. Noise Levels Associated with Construction Equipment**

Construction Equipment	Predicted Noise Level at 50 feet (dBA)
Backhoe	72–93
Concrete mixer	74–88
Crane	75–87
Front loader	72–83
Grader	80–93
Jackhammer	81–98
Paver	86–88
Pile driver	95–105
Roller	73–75
Truck	83–94

Source: USEPA 1971

3.1.2 Existing Conditions

The ambient noise environment on Tinian is typical of a rural town or small suburban area. Traffic activity and associated traffic noise is low due to the low population density on the island. Major sources of noise on Tinian include aviation and ground-training activities that occur at the Tinian MLA, private heliports, and the aircraft operations at Tinian International Airport. The MLA supports intermittent small unit-level training up to large field exercises and expeditionary warfare training. Noise from intermittent military operations generally does not extend into populated areas (DON 2010b). Except in the immediate proximity of the airfield during training activities, noise exposure for the entire island exists at or below 65 dB, a noise level considered to be compatible with almost any land use (e.g., schools, hospitals, places of worship, residential, and commercial areas) (DON 2015a, USAF 2016a). NSRs on Tinian are shown in **Table 3.1-4**.

Table 3.1-4. NSRs Tinian

NSR	Type
Tinian High School	School
Tinian Elementary School	School
Northern Marianas College, Tinian	School
City of San Jose	Residential Area
Kammer Beach	Recreational and Residential Area
Marpo Heights	Residential Area
Northeast Marpo Heights	Residential Area
San Jose Catholic Church	Place of Worship
Tinian Health Center	Medical Facility

3.2 Biological Resources

3.2.1 Terrestrial Biological Resources

3.2.1.1 Definition of the Resource

Terrestrial biological resources include vegetation, wildlife, and the ecosystems in which these resources occur. Specific concerns relating to terrestrial biological resources considered in this SEIS include declines in species diversity and impacts on special status species. Biological resources are protected by federal or CNMI regulations.

Migratory Bird Treaty Act. The Migratory Bird Treaty Act (MBTA) provides USFWS regulatory authority to protect migratory birds. The MBTA regulates any “take” of these species. “Take” is defined per *50 CFR § 10.12* as to “hunt, shoot, wound, kill, trap, capture, or collect.”

Endangered Species Act. The federal ESA requires that all federal agencies seek to conserve threatened and endangered species and utilize their authorities in furtherance of the purposes of the ESA (Sec. 2(c)). Section 7 consultations with USFWS ensure that “any action authorized, funded, or carried out by such an agency...is not likely to jeopardize the continued existence of any endangered or threatened species...” (Sec. 7(a)(2)).

1 **Fish, Game, and Endangered Species Act.** The Government of the CNMI has concurrent
2 jurisdiction over all federally protected wildlife and has the authority to list non-federally
3 protected species as endangered under Public Law (P.L.) #2-51, the “Fish, Game, and
4 Endangered Species Act.” The CNMI Government maintains a separate listing of locally
5 endangered plant and animal species that is more extensive than the list of species protected
6 under the ESA.

7 3.2.1.2 Existing Conditions

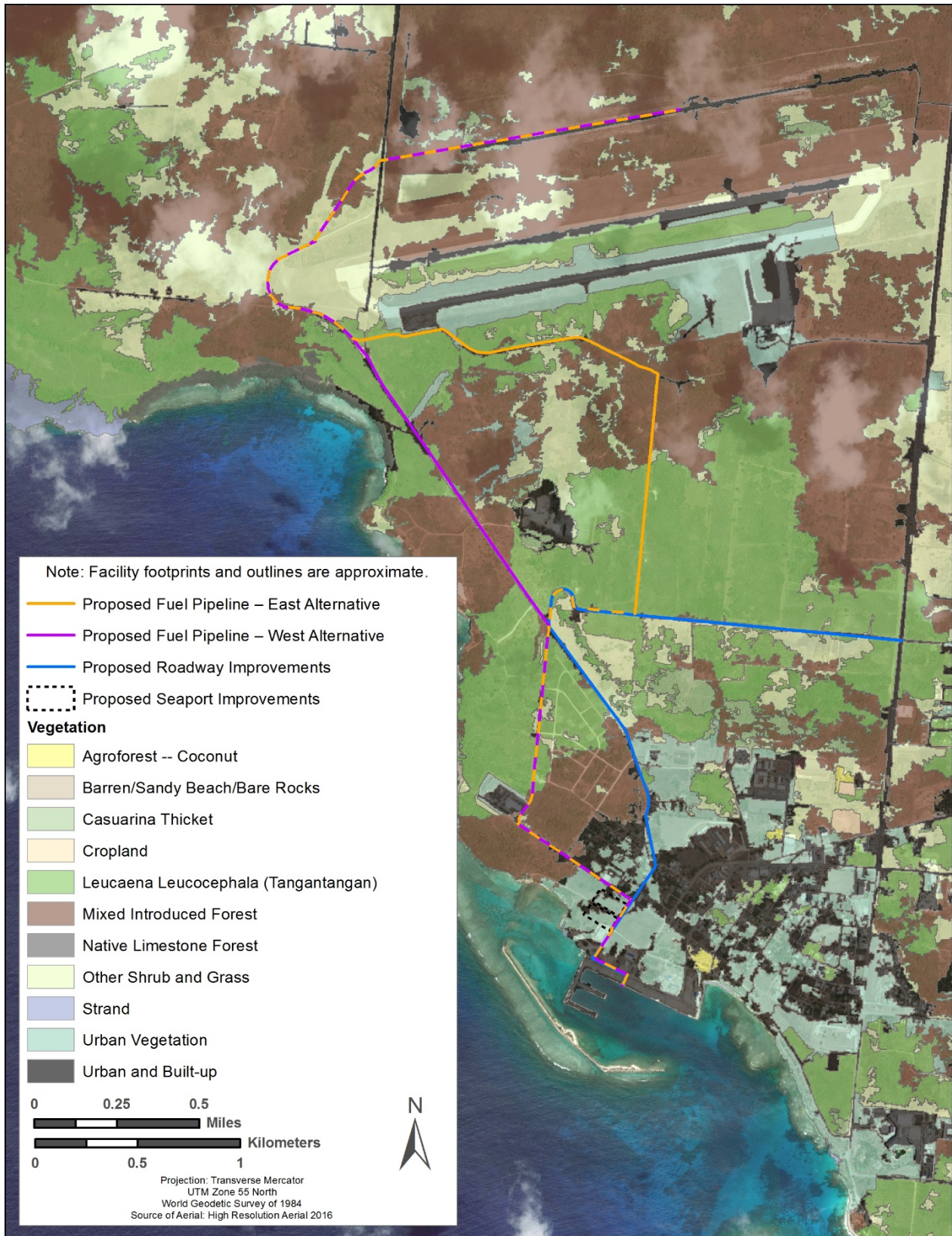
8 A survey was conducted from May 12 to 16, 2018, by biologists familiar with the flora and fauna
9 of the Mariana Islands, to characterize flora and fauna within the project areas; the results of
10 this survey are provided in a Biological Survey Report in **Appendix D** and are used to describe
11 the existing conditions in the project areas in the subsections below.

12 **Vegetation.** Biologists identified 141 flora species (40 native and 101 nonnative) in six
13 vegetation communities and other land cover types within the project areas during the May 2018
14 surveys, as shown in **Table 3.2-1** and **Figure 3.2-1**. Descriptions of each vegetation type noted
15 in **Table 3.2-1** in the project areas are provided in the Biological Survey Report in **Appendix D**.

16 **Table 3.2-1. Vegetation Communities within the Project Areas on Tinian**

Vegetation Type	Acres	Percentage
West Route and Support Infrastructure		
Mixed Introduced Forest	31.09	30
Urban and Built-up	24.55	24
<i>Leucaena Leucocephala</i> (Tangantangan)	21.78	21
Other Shrub and Grass	19.3	19
Urban Vegetation	6.13	6
Casuarina Thicket	0.78	<1
East Route and Support Infrastructure		
<i>Leucaena Leucocephala</i> (Tangantangan)	38.53	30
Mixed Introduced Forest	34.15	27
Urban and Built-up	25.21	20
Other Shrub and Grass	22.36	17
Urban Vegetation	7.75	6
Casuarina Thicket	0.78	<1
Roadway Improvement Sections		
<i>Leucaena Leucocephala</i> (Tangantangan)	20.19	33
Urban and Built-up	19.37	32
Other Shrub and Grass	9.69	16
Urban Vegetation	7.91	13
Mixed Introduced Forest	3.95	6

Source: Liu and Fischer 2006, HDR 2018a



1

2 **Figure 3.2-1. Vegetation Communities within the Project Areas**

1 Following Typhoon Yutu in October 2018, visual inspections noted that foliage was removed
2 from vegetation in the upper stratum (canopies) and tangantangan on Tinian, and some
3 individuals were uprooted. It is anticipated that regrowth will occur within the upper stratum
4 consistent with observations during the May 2018 surveys. Additionally, the area proposed for
5 the seaport improvements was covered with gravel and used for a staging effort during Typhoon
6 Yutu recovery efforts, reducing the amount of urban vegetation within the project areas for both
7 alternatives. It is unknown whether this area will be revegetated once typhoon recovery is
8 complete.

9 **Wildlife.** The following description of fauna within and near the project areas was based on
10 observations during the May 2018 surveys, previous characterizations, and investigations of
11 wildlife on Tinian (USFWS 2009a, NAVFAC 2014a, CNMI DFW 2015). A list of wildlife species
12 observed is available in the Biological Survey Report in **Appendix D**.

13 **Mammals.** The only native mammal on Tinian is the Mariana fruit bat (*Pteropus mariannus*
14 *mariannus*), which is described under **Special Status Species**. Four nonnative mammals were
15 observed during the 2018 survey: feral dogs (*Canis lupus familiaris*), feral cats (*Felis silvestris*
16 *catus*), Polynesian rats (*Rattus exulans*), and musk shrew (*Suncus murinus*). All of the feral
17 cats and dogs were observed within the town of San Jose, or along roadsides, especially near
18 the Tinian Municipal Dump.

19 **Birds.** Over 40 native species of birds have been reported on Tinian, including forest birds,
20 shorebirds, waterfowl, waterbirds, and seabirds, and there are numerous nonnative species
21 (USFWS 2009a, NAVFAC 2014a, DON 2015a). During the 2018 surveys, the most commonly
22 observed native species included the Mariana fruit dove (*Ptilinopus roseicapilla*), Micronesian
23 starling (*Aplonis opaca*), collared kingfisher (*Halcyon chloris*), white tern (*Gygis alba*), and
24 rufous fantail (*Rhipidura rufifrons*). Tinian monarchs (*Monarcha takatsukasae*) also were
25 frequently observed in the project areas and were previously being reviewed for listing under the
26 federal ESA. In December 2018, USFWS announced relisting of the Tinian monarch was not
27 warranted (USFWS 2018). As mentioned in the **Vegetation** section, Typhoon Yutu removed
28 foliage from vegetation in the upper stratum (canopies) and tangantangan on Tinian, and
29 uprooted some individuals. Therefore, the prevalence of forest bird species on Tinian could be
30 less than that identified in the May 2018 surveys because canopy cover is no longer present for
31 shelter and nesting. However, it is anticipated that these species will return as regrowth of
32 foliage in this upper stratum occurs.

33 **Reptiles and Amphibians.** There are eight native reptiles (including two marine turtles protected
34 under the ESA) and no native amphibians on Tinian. The Micronesian gecko (*Perochirus*
35 *ateles*) is classified by the government of CNMI as threatened and endangered (CNMI DFW
36 2015). There also are numerous nonnative reptiles and amphibians, including the following
37 species observed in the 2018 survey: green anoles (*Anolis carolinensis*), green tree skink
38 (*Lamprolepis smaragdina*), curious brown skink (*Carlia fusca*), and cane toad (*Rhinella marina*).

39 **Invertebrates.** Native invertebrate species include three crab species and one snail, the native
40 humped tree snail (*Partula gibba*), which is classified as endangered under the ESA (USFWS
41 2009a, DON 2015a). No invertebrates were observed during the May 2018 survey (HDR
42 2018a).

1 **Special Status Species.** Seven terrestrial species classified as threatened or endangered,
2 under the federal ESA occur or have been documented in the recent past on Tinian.
3 Additionally, two terrestrial species are documented as threatened and endangered under CNMI
4 regulation, only. All nine of the terrestrial species classified as threatened or endangered under
5 the federal ESA or CNMI regulations that could occur within or near the project area species are
6 provided in **Table 3.2-2** (USFWS 2015b, 80 FR 59424). During the 2018 surveys of the project
7 areas, biologists identified and documented only one of these species, the fadang, which is
8 further described in the paragraphs below. Descriptions of special status species with the
9 potential to occur in the project area are provided in the Biological Survey Report in **Appendix**
10 **D.** The Biological Survey Report also addresses the Tinian monarch, as it was under review for
11 listing at the time the biological survey was complete in 2018. In December 2018, USFWS
12 made the determination that relisting of the Tinian monarch was not warranted (USFWS 2018).

13 Fadang is a native cycad that has been reintroduced on Tinian. Over 900 individuals of this
14 species were observed near Mount Lasso in 2016 in an area where they were planted by the
15 CNMI Department of Land and Natural Resources in 2008–2009 (NAVFAC 2017). A small
16 number of individuals also occur along roadsides and at a shrine in the town of San Jose and
17 elsewhere on southern Tinian (NAVAFC 2017). Two fadang were observed during the 2018
18 survey approximately 20 feet southwest of the edge of road TR26, adjacent to the proposed
19 shared East and West pipeline route. The two individuals were planted as part of a decorative
20 landscape for the Nanyo Kohatsu Kabushiki Kaisha Administration Building and Laboratory
21 (HDR 2018b). During visual inspections following Typhoon Yutu, these two individuals
22 appeared unaffected by the October 2018 typhoon and intact.

23 Five other federally listed species historically occurred on Tinian, including the Mariana swiftlet
24 (*Aerodramus vanikorensis bartschi*), nightingale reed-warbler (*Acrocephalus luscini*), Slevin's
25 skink (*Emoia slevini*), Pacific sheath-tailed bat (*Emballonura semicaudata rotensis*) and the
26 orchid *Tuberolabium guamense* (USFWS 1998a, Cruz et al. 2008, USFWS 2010b). These
27 species no longer occur on Tinian; further detail regarding these species is included in the 2018
28 Biological Assessment (HDR 2018b).

29 **Wetlands.** Information on wetlands is provided in **Section 3.8.2.**

30

1 **Table 3.2-2. Terrestrial Threatened and Endangered Species with Potential to Occur in**
2 **the Project Area**

Common Name	Scientific Name	Federal Status	CNMI Status	Present ¹	Comments
Birds					
Mariana common moorhen	<i>Gallinula chloropus guami</i>	E	TE	No	No suitable wetland habitat within or near the project area. Not observed during May 2018 survey.
Micronesian megapode	<i>Megapodius laperouse</i>	E	TE	Unlikely	Rare on Tinian. No suitable limestone forest habitat in project area. Not observed during May 2018 survey.
Crustaceans and Mollusks					
Humped tree snail	<i>Partula langfordi</i>	E	-	Unlikely	Rare on Tinian in moist, native forests. Not observed during May 2018 survey.
Mammals					
Mariana fruit bat	<i>Pteropus mariannus mariannus</i>	T	TE	No	Extirpated from or very rare on Tinian (USFWS 2014). No suitable habitat within or near the project area. Not observed during May 2018 survey.
Reptiles					
Micronesian gecko	<i>Perochirus ateles</i>	-	TE	Unlikely	Rare on Tinian in native limestone forests. Not observed during May 2018 survey.
Plants					
Berenghenas halomtano	<i>Solanum guamense</i>	E	-	No	Rare or extirpated on Tinian. No steep topography with native limestone forest within or near project area. Not observed during May 2018 survey.
Fadang	<i>Cycas micronesica</i>	T	-	Yes	Two planted individuals occur along TR26 in San Jose associated with the Nanyo Kohatsu Kabushiki Kaisha Administration Building and Laboratory Historic Site.
No common name	<i>Dendrobium guamense</i>	T	-	No	Uncommon on Tinian. No suitable native limestone forest in project area. Not observed during May 2018 survey.
Ufa-halomtano	<i>Heritiera longipetiolata</i>	E	-	No	Uncommon on Tinian. No suitable coastal native forest within the project area. Not observed during May 2018 survey.

Source USFWS 2015b, 79 FR 59364, HDR 2018a

Note: ¹ Likelihood of presence within the Project Area

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

3 3.2.2 Marine Biological Resources

4 3.2.2.1 Definition of the Resource

5 This section describes existing environmental conditions for marine biological resources
6 potentially affected by the Proposed Actions described in **Sections 2.2** and **2.3**. Marine
7 biological resources include those marine species and habitats that could be affected by the
8 construction and operation of the pipeline routes, seaport support infrastructure, or roadway

1 improvements. All project activities would occur onshore and marine biological resources that
2 occur in the marine environment surrounding Tinian, therefore, would not be directly affected.
3 This section describes the regulated marine biological resources that could be indirectly affected
4 by a change in water quality resulting from an increase in sedimentation, change in stormwater
5 flow, or fuel spill during or following construction of a pipeline or improvement of roads.
6 Specifically this section describes EFH there that is regulated under the MSFCMA and
7 threatened and endangered species that occur in the marine environment surrounding Tinian.

8 **Essential Fish Habitat.** Section 305(b) of the MSFCMA mandates that federal agencies
9 consult with the Secretary of Commerce on all proposed activities authorized, funded, or
10 undertaken by the agency that might adversely affect EFH. EFH is defined as those waters and
11 substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. Within the
12 EFH, Habitat Areas of Particular Concern are specific areas that are essential to the life cycle of
13 important coral reef species.

14 **Special Status Species.** The federal ESA requires that all federal agencies seek to conserve
15 threatened and endangered species and utilize their authorities in furtherance of the purposes
16 of the ESA (Sec. 2(c)). Section 7 consultations with NOAA Fisheries ensure that “any action
17 authorized, funded, or carried out by such an agency...is not likely to jeopardize the continued
18 existence of any endangered or threatened species...” (Sec. 7(a)(2)).

19 3.2.2.2 Existing Conditions

20 **Essential Fish Habitat.** The Mariana Islands are within the jurisdiction of the Western Pacific
21 Region Fishery Management Council (WPRFMC). WPRFMC currently manages fisheries in the
22 Western Pacific as five assemblages (or management units) under two fishery ecosystem plans
23 (WPRFMC 2009a, WPRFMC 2009b). These assemblages include (1) bottomfish,
24 (2) crustaceans, (3) precious corals, (4) coral reef ecosystems, and (5) pelagic species. The
25 project areas include only land areas adjacent to marine waters, but not within marine waters;
26 **Table 3.2-3** lists the fishery assemblages and lifestages with EFH adjacent to the project areas
27 on Tinian.

28 **Special Status Species.** At least 14 marine species classified as threatened or endangered
29 under the federal ESA occur or could occur in the waters surrounding Tinian (see **Table 3.2-4**).
30 Four listed species of sea turtles have been documented near Tinian. Green sea turtles and
31 hawksbill sea turtles are known to forage offshore of Tinian, and there is a small population of
32 green sea turtles that nests on Tinian (Pultz et al. 1999, Kolinski 2001, Maison et al. 2010,
33 NAVFAC 2014b). Nesting by green sea turtles likely occurs on all or most of the beaches on
34 Tinian (Minton et al. 2009, Maison et al. 2010, DON 2010a), and nesting activity has been
35 observed in all months (NAVFAC 2014b). Leatherback sea turtles are uncommon in the Tinian
36 area; however, there have been two sightings of the species in open water (DON 2015a). The
37 CNMI is part of the migratory range of olive ridley sea turtles, but they are not known to nest
38 there (WRPFMC Undated).

39 Scalloped hammerhead sharks are found worldwide in coastal warm temperate and tropical
40 seas in the Atlantic, Pacific, and Indian Oceans between 46°N and 36°S. The giant manta ray
41 is found worldwide in tropical, subtropical, and temperate bodies of water; it is commonly found

1 **Table 3.2-3. Fishery Assemblages and Lifestages with EFH that Occurs Adjacent to the**
2 **Project Areas on Tinian**

Fishery Assemblage	Lifestage				
	Eggs	Larvae	Juveniles	Adults	Spawning Adults
Bottomfish ¹	Water column	Water column	Water column, bottom habitat	Water column, bottom habitat	None designated
Crustaceans ^{1,3}	None designated	Water column	Bottom habitat	Bottom habitat	None designated
Precious Corals ^{1,4}	None designated adjacent to the project area.				
Coral Reef Ecosystems ^{1,4}	Water column, bottom habitat (Habitat Area of Particular Concern is designated in Saipan Lagoon)				
Pelagic Species ²	Epipelagic zone (water surface to depths of approximately 200 meters)	Epipelagic zone (water surface to depths of approximately 200 meters)	Water column	Water column	None designated

Sources:

¹ WPRFMC 2009a

² WPRFMC 2009b

Notes:

³ Spiny lobster (Family Palinuridae), slipper lobsters (Family Scyllaridae), and Kona crab (*Ranina ranina*) are the only group of crustaceans with EFH designated adjacent to the project area.

⁴ EFH is not designated by lifestage for precious corals and coral ecosystems.

3 **Table 3.2-4. Marine Threatened and Endangered Species with Potential to Occur Near**
4 **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 CWP DPS ¹	<i>Chelonia mydas</i>	T	TE
Hawksbill turtle	<i>Eretmochelys imbricata</i>	E	TE
Leatherback turtle	<i>Dermochelys coriacea</i>	E	
Olive ridley turtle	<i>Lepidochelys olivacea</i>	T	TE
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

Note: ¹ Likelihood of presence within the Project Area

1 offshore, in oceanic waters, and near productive coastlines. Scalloped hammerhead sharks
2 and giant manta rays were not observed during Tinian coastal surveys conducted in 2013 for
3 corals and sea turtles (NAVFAC 2014b).

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

8 At least 26 marine mammals protected under the Marine Mammal Protection Act occur in the
9 waters around the Mariana Islands (NMFS 2012, DON 2015a). Because deep waters come
10 close to shore around the Mariana Archipelago, it is possible that deepwater marine mammal
11 species (those occurring along and seaward of the shelf break) could make their way into
12 waters within a few miles of shore (e.g., sperm whales) (DON 2007, Fulling et al. 2011). The
13 most common species found near shore and in shallow water are spinner dolphins, bottlenose
14 dolphins, and short-finned pilot whales.

15 3.3 Cultural Resources

16 3.3.1 Definition of the Resource

17 Cultural resources are any prehistoric or historic district, site, building, structure, or object
18 considered important to a culture, subculture, or community for scientific, traditional, religious, or
19 other purposes. These include archaeological resources (prehistoric and historic), historic
20 architectural resources, and traditional resources. Traditional resources can include
21 archaeological resources, sacred sites, structures, buildings, and districts. Sacred sites are
22 discrete locations with religious significance to, or ceremonial use by, an indigenous religion.
23 Cultural resources that are historically or culturally significant and retain historic integrity are
24 termed “historic properties” and are eligible for listing on the NRHP. Traditional resources
25 identified by Native American tribes or other groups that are eligible for listing on the NRHP are
26 sometimes referred to as Traditional Cultural Properties (TCP).

27 In addition to NEPA, USAF is concurrently meeting its obligations under Section 106 of the
28 NHPA. The NHPA provides a framework for determining whether cultural resources are eligible
29 for NRHP listing, establishes preservation programs, and establishes requirements for federal
30 agencies in the management and treatment of historic properties. Section 106 of the NHPA
31 (36 CFR § 800, Subpart B) requires federal agencies to consider the effects of their actions,
32 termed “undertakings,” on historic properties. USAF has defined the Tinian Divert Infrastructure
33 Improvements project to include both pipeline route alternatives, inclusive of the seaport support
34 infrastructure, and the road improvements, as a part of the Divert Activities and Exercises
35 Undertaking. USAF is consulting under Section 106 with the CNMI SHPO, Advisory Council on
36 Historic Preservation (ACHP), National Park Service (NPS), Joint Region Marianas, FAA, CNMI
37 Governor’s office, CNMI Historic Preservation Review Board, and members of the public.

38 The study area for cultural resources is the area where the Proposed Actions have the potential
39 to affect existing or potential archaeological, historic, architectural, or traditional resources, also
40 known as the APE. The ACHP’s regulations implementing Section 106 define the APE as “the

1 geographic area or areas within which an Undertaking may directly or indirectly cause
2 alterations in the character or use of historic properties, if any such properties exist”
3 (36 CFR § 800.16(d)). As part of the Section 106 consultation for this effort, USAF engaged the
4 public and consulting parties to develop an appropriate APE for the Proposed Actions and
5 alternatives. The APE consists of a 100-foot corridor along each pipeline alternative, centered
6 on corresponding roadways or parcel boundaries, and a 40-foot corridor along the road
7 improvement areas (see **Figure 2.4-1**).

8 3.3.2 Existing Conditions

9 A detailed cultural history of the Mariana Islands and the island of Tinian is presented in the
10 2016 Divert EIS (Final EIS, Section 3.8.4) and is incorporated by reference. The 2016 Divert
11 EIS is available for review or download from the project website at:
12 <http://pacafdivertmarianaseis.com/archive>. A brief summary of the cultural setting of Tinian is
13 presented here, followed by a discussion of cultural resource investigations in the APE and
14 identified cultural resources. The APE for the Proposed Action encompasses areas not
15 analyzed in the 2016 Divert EIS and information is presented discussing cultural resources
16 identified in these new areas. Updated information is also presented for one resource
17 discussed in the 2016 Divert EIS, site TN-6-0030 (West Field), based on the results of recent
18 archaeological study (Leclerc et al. 2018a).

19 **Cultural Setting.** Tinian and the rest of the Mariana Islands were the earliest islands settled in
20 Pacific Oceania, with the first people arriving approximately 3,500 years ago. These early
21 inhabitants lived on and near the ancient shoreline, which was approximately 6 feet higher than
22 today (Carson 2014, Carson 2016). As relative sea levels declined over time, changes in the
23 reef prompted shifts in preferred or available foods and also corresponded with increased
24 reliance on inland agriculture. The Latte period began as early as A.D. 800 and is named for
25 the period’s most distinctive remains: stone columns overlaid with carved semispherical
26 capstones called *latte* in the Chamorro language. The Latte period and *latte* construction on
27 Tinian extended well past initial contact with Europeans until about 1700 when the Spanish
28 forcibly concentrated all Chamorro people in villages on Guam and Rota, sometimes referred to
29 as the *Reducción*.

30 Spain maintained colonial control of the Mariana Islands until the Spanish-American War, after
31 which Germany briefly gained control of what is now the CNMI. Little evidence has been found
32 on Tinian from the Spanish or German occupations. The Japanese captured the Northern
33 Mariana Islands from Germany during World War I and developed numerous sugarcane
34 plantations on Tinian. Beginning in 1939, Japan began fortifying Tinian for war. The U.S.
35 military invaded Tinian in July 1944 and established two B-29 airbases and cantonments for
36 over 150,000 military personnel. Following the conclusion of World War II, most military
37 construction on Tinian was demolished and salvaged.

38 **Cultural Resource Surveys.** Most of the APE was previously surveyed for cultural resources
39 between 1986 and 2015; however, many of these efforts were inadequate by current standards
40 or were monitoring projects. Therefore, USAF performed new investigations along all portions
41 of the APE except the immediate harbor facilities, which were evaluated in 2010. A Phase I
42 pedestrian survey of the APE was completed in May 2018, during which archaeologists

1 examined the ground surface for archaeological and architectural remains. The survey included
2 a literature review of previous cultural resources work in and around the APE. The literature
3 review and Phase I survey identified 35 sites in the APE, discussed below. Exact locations of
4 some sites were unavailable from the literature review, and of the 35 sites, only 26 were
5 documented in the APE during the Phase I pedestrian survey.

6 **Identified Resources.** A total of 35 cultural resources were identified in the APE, of which 26
7 were documented during the Phase I pedestrian survey and 9 were documented only in existing
8 archaeological literature, some with poor locational information (see **Table 3.3-1**). The nine
9 sites not confirmed during the survey may be outside the APE or may have been destroyed.
10 Five sites in the APE are eligible for NRHP listing, consisting of the Tinian Harbor (3028), the
11 Third Farm District (IV) (SC-5043), West Field (TN-6-0030), a Japanese defensive position
12 (TN-5-0690), and the Nan'yō Kōhatsu Kabushiki Kaisha (NKK) sugar mill district (TN-4-1010).
13 Site TN-4-1010 also contains two buildings that are individually listed in the NRHP. In addition
14 to these five sites, a newly recorded multicomponent site requires additional work to evaluate
15 the site's prehistoric component for NRHP eligibility (HDR-18-07). This site is considered
16 potentially eligible for the purposes of this EIS. Eligible and potentially eligible sites are
17 discussed individually below.

18 **Table 3.3-1. Cultural Resources Identified in the APE**

Site Number	Description	Significance (NRHP Criteria) ^a	Action/Alternative
3028/Tinian Harbor	Historic Tinian Harbor	Eligible (A, C)	East route West route
T-1	U.S. World War II camp possibly associated with Group Pacific (GROPAC) 6 and/or 27th Special Naval Construction Battalion	Not Eligible	East route West route
T-10	U.S. World War II structures associated with Tinian Harbor	Not Eligible	East route West route Support Infrastructure
1571-T-60 ^b	Historic and pre-contact artifact scatter	Not Eligible	West route
1571-T-61 ^b	Pre-contact artifact scatter	Not Eligible	West route
1571-T-62	Historic and pre-contact artifact scatter	Not Eligible	West route
1571-T-64 ^b	Historic and pre-contact artifact scatter	Not Eligible	West route
1571-T-65 ^b	Historic and pre-contact artifact scatter	Not Eligible	East route West route
PSCI-60 ^b	Japanese colonial period artifact scatter and bamboo grove.	Not Eligible	East route West route
SC-5043 ^b	Third Farm District (IV)	Eligible (A, D)	East route West route
HDR-18-01	Historic period multi-use dump	Not Eligible	East route West Route
HDR-18-02	Small historic-era depression with subterranean chamber (possible cistern or culvert, potentially destroyed)	Not Eligible	East route West route Support Infrastructure
HDR-18-03	Small historic-era depression (potentially destroyed)	Not Eligible	East route West route Support Infrastructure

Site Number	Description	Significance (NRHP Criteria) ^a	Action/Alternative
HDR-18-04	Push pile with World War II-era debris	Not Eligible	East route West route
HDR-18-05	Push pile	Not Eligible	East route West route
HDR-18-06	Push pile with World War II-era debris	Not Eligible	East route
HDR-18-07	Japanese gun emplacement with historic and pre-contact artifact scatter	Potentially Eligible (D)	East route West route
HDR-18-08	Possible road or railroad grade	Not Eligible	East route West route
HDR-18-09	Large berm or push pile	Not Eligible	East route
HDR-18-10	Large berm or push pile	Not Eligible	East route
HDR-18-IF-01	Push pile with no artifacts	Not Eligible	East route West route
HDR-18-IF-02	Push pile with WWII-era debris	Not Eligible	East route
HDR-18-IF-03	Push pile with no artifacts	Not Eligible	East route West route
HDR-18-IF-04	Historic period rock alignment with no artifacts	Not Eligible	East route West route
HDR-18-IF-05	Push pile with no artifacts	Not Eligible	East route West route
HDR-18-IF-06	Isolated flag pole bases, removed and dumped	Not Eligible	East route West route
HDR-18-IF-07	Partially buried metal conduit with concrete pylon	Not Eligible	West route
HDR-18-IF-08	Late historic artifact scatter	Not Eligible	East route
HDR-18-IF-09	Depression with late historic period artifacts	Not Eligible	West route
HDR-18-IF-10	Pre-contact ceramic sherd	Not Eligible	West route
TN-6-0030	West Field	Eligible (A, C, D)	East route West route
TN-5-0690 ^b	Japanese defensive position	Eligible (A, C, D)	East route West route
TN-6-0692 ^b	World War II airplane remains	Not Eligible	East route West route
TN-5-0695 ^b	Japanese colonial railroad cart	Not Eligible	East route West route
TN-4-1010	NKK Sugar Mill (Administration Building and Laboratory Building)	NRHP-Listed	East route West route

Source: Leclerc et al. 2018b

^a The NRHP Criteria of Significance are:

- A) Properties associated with events that have made a significant contribution to the broad patterns of our history.
- B) Properties associated with the lives of persons significant in our past.
- C) Properties that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.
- D) Properties that have yielded or may be likely to yield information important in prehistory or history.

^b Not located during Phase I survey.

1 Following Typhoon Yutu in October 2018, visual inspections noted that the area proposed for
2 the seaport improvements was covered with gravel and used for staging materials and
3 equipment for typhoon recovery efforts. This activity appears to have potentially destroyed two
4 sites documented during the Phase I pedestrian survey (HDR-18-02 and HDR-18-03) and
5 severely impacted site T-10. A U.S. Navy construction battalion camp, Camp Adams, was
6 established on part of TN-6-0030, West Field, during typhoon recovery efforts. Use of the
7 former airfield pavements does not appear to have affected the site. Remaining NRHP-eligible
8 sites identified in the APE appeared intact and unaffected during the visual inspections.

9 3028, Tinian Harbor. Historic features of the Tinian Harbor consist of seven structures built by
10 the U.S. Navy during World War II. These are the wharf (or quay), two bulkheads (or quay
11 walls), two piers, the causeway, and the breakwater. The site also includes a dredged turning
12 basin and navigable channel.

13 SC-5043, Third Farm District (IV). Site SC-5043 is a large site that designates a portion of the
14 Japanese Third Farm District and extends well beyond the APE. The site incorporates several
15 smaller sites, such as a Japanese farmstead and railroad berm, none of which are within the
16 APE.

17 HDR-18-07. Site HDR-18-07 is a Japanese gun emplacement recorded during USAF's Phase I
18 survey. A single pre-contact ceramic sherd was observed nearby the feature. Additional
19 research is needed to determine whether the site is eligible for NRHP listing.

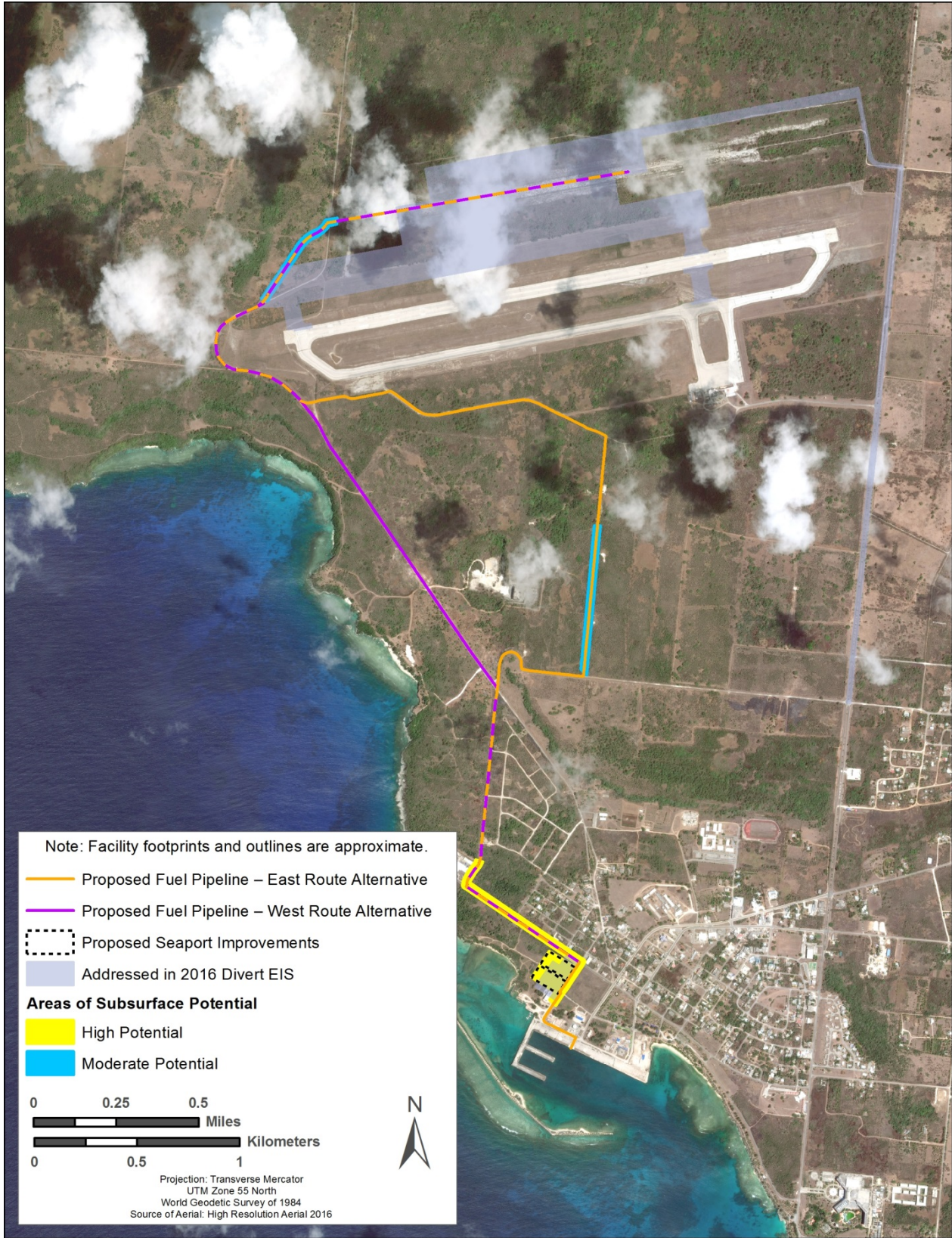
20 TN-6-0030, West Field. West Field was one of two airbases built on Tinian for B-29 aircraft and
21 also incorporated Naval Air Station Tinian. The site was also in the APE for the 2016 Divert
22 EIS, and information about the site in that EIS is incorporated by reference. (The 2016 Divert
23 EIS is available for review or download from the project website at:
24 <http://pacafdivertmarianaseis.com/archive>.) Aboveground structures were demolished during
25 post-war salvage operations; however, most of the pavements remain intact. Runways 2 and 3
26 have been developed and incorporated into the modern Tinian International Airport. Facilities
27 associated with the Modified Tinian Alternative of the Divert Activities and Exercises action will
28 be built over portions of Runway 1, two taxiways, and several B-29 hardstands.

29 TN-5-0690. Site TN-5-0690 was recorded in 2002 as a Japanese defensive position (Dixon and
30 Welch 2002). The site's exact location is unknown and was not located during recent
31 pedestrian surveys of the area (Leclerc et al. 2018a, Leclerc et al. 2018b). The site may have
32 been destroyed or may be outside the APE.

33 TN-4-1010. The site number TN-4-1010 has been applied broadly to the former NKK sugar mill
34 district (Jones 1991) and more specifically to the Administration Building within the former
35 complex (Dixon et al. 2015). We are using the broader definition in this SEIS to include all
36 remains associated with the sugar mill complex. Remains in the APE consist of the NKK
37 Administration Building and the NKK Laboratory, which were individually listed in the NRHP in
38 1981 (Jones 1980). A concrete cistern and additional slab foundations are present east-
39 northeast of the building and are within the APE.

1 The Phase I survey reviewed soils and geology, land use history, previous subsurface
2 archaeological studies, and archaeological site distribution patterns to assess the potential for
3 buried archaeological sites in areas of the APE associated with the pipeline and Seaport
4 Support Infrastructure. This review determined that portions of the APE at the Seaport Support
5 Infrastructure Area and portions of the East and West pipeline alternatives have moderate to
6 high potential for buried archaeology (**Figure 3.3-1**). The review did not include road
7 improvements portions of the APE as proposed road improvements would be shallow and would
8 not be likely to encounter buried archaeology. Following Typhoon Yutu in October 2018, visual
9 inspections noted that the Seaport Support Infrastructure Area was covered with gravel and
10 used for staging materials and equipment for typhoon recovery efforts. The extent or depth of
11 disturbance and resulting impact on potential unidentified buried archaeological resources is
12 unknown.

13 During a recent TCP study of Tinian, researchers conducted archival research, ethnographic
14 research, and interviews with Tinian residents to identify traditional cultural practices and
15 potential TCPs on the island (Griffin et al. 2015). No TCPs were identified in the APE.



1

2 Figure 3.3-1. Potential for Buried Archaeological Sites in the APE

3.4 Socioeconomics

3.4.1 Definition of the Resource

Socioeconomics encompasses economies and social elements such as population levels and economic activity, which are the focus of this analysis. Factors that describe the socioeconomic environment represent a composite of several interrelated and nonrelated attributes. Factors that are typically used as indicators of economic conditions for a geographic area include demographics, median household income, unemployment rates, employment, and housing data. Data on employment identify employment by industry or trade and unemployment trends. Data on personal income in a region are used to compare the before and after impacts of any jobs created or lost as a result of a proposed action. Data on industrial, commercial, and other sectors of the economy provide baseline information about the economic health of a region. Changes in demographic and economic conditions are typically accompanied by changes in other community components such as housing availability and the provision of public services, which are discussed in this section. Sociocultural issues, such as land ownership, quality of life, and cultural identity, are also important indicators of the socioeconomic condition of a region.

The geographic area in which a majority of the socioeconomic effects of a proposed action and alternatives would occur is defined as the socioeconomic ROI. The ROI is considered a primary effect area because it receives direct and indirect, adverse and beneficial, economic impacts from proposed actions due to factors such as residency of construction workers and employees and their dependents, commuting distances and times, and the location of businesses providing goods and services during construction and operation of the actions. Other components include regional economic activity, population, housing, and public services.

While the physical footprints of the Proposed Actions are confined to Tinian, most anticipated socioeconomic impacts under the Proposed Actions would likely affect CNMI as a whole due to the small size of Tinian and the CNMI. Therefore, socioeconomic data in this section are presented at the CNMI and island or municipality (i.e., Tinian) levels and, when available, for geographic subsets (i.e., Tinian villages). It should be noted that the population of Saipan accounts for approximately 90 percent of the CNMI population (CNMI Department of Commerce 2017a) and, therefore, is the primary component of any CNMI-level data. Data have been collected from previously published documents issued by federal, CNMI, and other local agencies and organizations.

3.4.2 Existing Conditions

Population Characteristics. The 2016 population of CNMI has remained relatively unchanged since 2010 (changed less than 0.1 percent), while Tinian's population has decreased by approximately 2.5 percent (see **Table 3.4-1**). In 2016, 5.7 percent of CNMI's population resided in Tinian (CNMI Department of Commerce 2017a). The estimated population of the CNMI in August 2017 was 52,263 (USCB 2018), while the mid-year Tinian population estimate was 2,626 (CNMI Department of Commerce 2018).

1 **Table 3.4-1. Population, 1990–2016**

Geographic Area	1990	2000	2010	2016
CNMI	43,345	69,221	53,883	53,890
Tinian	2,118	3,540	3,136	3,056

Sources: CNMI Department of Commerce 2015, USCB 2010a, CNMI Department of Commerce 2017a

2 Tinian is divided into eight villages. Tinian International Airport is in the village of Western
3 Tinian and the Tinian seaport is in the village of San Jose. The proposed fuel pipeline and
4 roadway improvements are in the villages of Western Tinian and San Jose. Western Tinian did
5 not have any residents in 2010; however, San Jose had 1,939 residents, which was 61.8
6 percent of the Tinian population. The proposed roadway improvements would also be adjacent
7 to Marpo Heights, which had 679 residents representing 21.7 percent of Tinian’s population
8 (USCB 2010a).

9 **Table 3.4-2** shows the birthplace of residents of the CNMI and Tinian in 2016. Approximately
10 46 percent of the residents of CNMI and Tinian were born outside of the CNMI, while
11 approximately 42 percent of the CNMI residents and 40 percent of Tinian residents were foreign
12 born (i.e., born outside the CNMI, Guam, or the United States).

13 **Table 3.4-2. Residents by Birthplace, 2016**

Birthplace	CNMI	Tinian
	53,890 residents	3,056 residents
Saipan	49.9%	34.6%
Tinian	1.6%	19.7%
Rota	2.7%	0.3%
Northern Islands	0.3%	0.0%
Guam	2.1%	2.4%
United States	1.9%	2.7%
Federated States of Micronesia	3.3%	0.8%
Palau	1.3%	0.5%
China	3.4%	2.1%
Korea	1.0%	0.0%
Philippines	29.3%	29.0%
Elsewhere	3.2%	8.0%

Source: CNMI Department of Commerce 2017a

14 **Economic Characteristics.** Economic activity in the CNMI rose sharply in 2016 after several
15 years of real gross domestic product (GDP) decreases and slower growth. In 2016, real GDP
16 increased 28.6 percent to approximately \$1.24 billion. The primary contributor to this growth
17 was a 73.4 percent increase in exports of services consisting mainly of visitor spending
18 (i.e., tourism), particularly on casino gambling.

19

1 In 2016, the labor forces in the CNMI and Tinian were approximately 27,102 people and 1,430
2 people, respectively (see **Table 3.4-3**). The construction industry accounted for 9.6 percent of
3 the employed labor force of the CNMI (2,141 people) and 11.1 percent of the employed labor
4 force of Tinian (122 people) (CNMI Department of Commerce 2017a).

5 **Table 3.4-3. Employment by Industry, 2016**

Employment Characteristics	CNMI	Tinian
Potential Labor Force Population (Persons 16 Years Old and Over)	38,727	2,056
Labor Force Population ¹	27,102 (70.0%)	1,430 (69.6%)
Employed Working Persons ²	22,301 (82.3%)	1,097 (76.7%)
Percent of Employed Persons (by Industry)		
Agriculture, fishing, quarrying, utilities	1.1%	2.2%
Construction	9.6%	11.1%
Manufacturing	2.5%	2.2%
Wholesale trade and retail trade	12.5%	17.0%
Transport and warehousing	5.0%	0.7%
Information, finance, real estate	4.8%	5.9%
Professional, scientific, technical	1.8%	0.0%
Administrative support	6.4%	8.1%
Educational services	5.2%	8.9%
Health care and social assistance	5.5%	4.5%
Arts, entertainment, recreation	6.1%	3.0%
Accommodation and food service	23.3%	11.1%
Other service (except public administration)	5.8%	5.9%
Public administration	10.5%	19.2%

Sources: CNMI Department of Commerce 2017a

Notes:

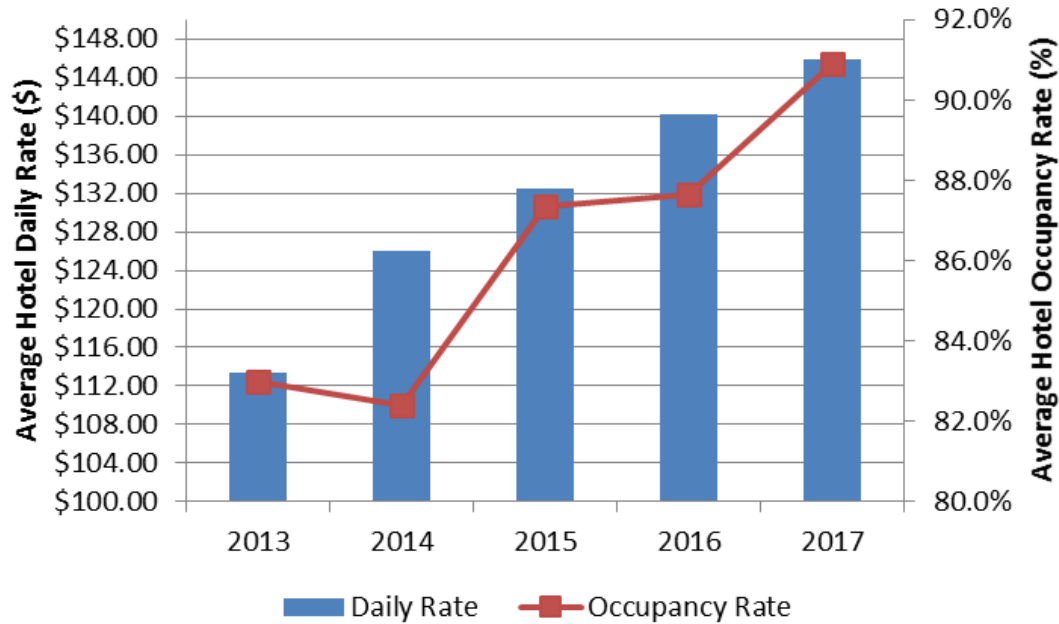
¹ Labor force population is a person that is 16 years and over and either in paid employment, temporarily on leave from paid employment, or unemployed but looking for work (including first time employees).

² Employed working persons are those in paid employment at the time of the survey, but not those temporarily on leave from paid employment. Some people have paid employment, but were not working at the time of the survey.

6 **Tourism.** Several airlines provide service to the CNMI through Saipan International Airport.
7 Domestic inter-island flights, such as to Tinian, are provided by Star Marianas Air and Arctic
8 Circle Air (CPA 2018a). There is an average of 80 aircraft operations per day at Tinian
9 International Airport of which 74 percent are air taxi (AirNav.com 2018). Visitor arrivals in the
10 CNMI during 2017 were approximately 653,150.

11 The average CNMI hotel occupancy rate and hotel daily rate have steadily increased over the
12 past several years (see **Figure 3.4-1**). In 2017, CNMI hotels had an average occupancy rate of
13 91 percent and the average daily hotel rate was \$145.93 (CNMI Department of Commerce
14 2017c).

15 While tourism is the major industry on Tinian and the CNMI, other smaller industries exist.
16 Other industries on Tinian include commercial agriculture consisting of small-scale vegetable
17 and fruit cultivation that is marketed locally and shipped to Saipan, a few family-owned ranches,



1
2 **Figure 3.4-1. CNMI Average Hotel Daily Rate and Occupancy Rates, 2013–2017**

3 and retail establishments in the village of San Jose (NPS 2001). In 2009, there were 31 farms
4 on Tinian representing 2,071 acres (of which 93 percent was pasture/grazing land and 3 percent
5 was cropland) that had a market value of approximately \$264,000 for all agricultural products
6 (USDA 2009).

7 **Housing.** In 2010, CNMI had 20,850 housing units of which 5.4 percent were on Tinian (see
8 **Table 3.4-4**). Approximately 78.2 percent of Tinian’s 1,118 housing units were occupied. Of
9 the occupied housing units on Tinian, 51.0 percent were occupied by renters (USCB 2010b).
10 The median house value of owner occupied units and median gross rent on CNMI was slightly
11 more than those in Tinian. Typhoon Yutu in October 2018 damaged the majority of housing on
12 Tinian; however, an estimate of housing units that will be repaired or rebuilt was not available as
13 of April 2019.

14 **Public Services.** This section addresses health and human services and public safety, as
15 these are two public services most likely to be affected by the Proposed Actions.

16 **Health and Human Services.** Health and medical services on Tinian are provided by the
17 Commonwealth Healthcare Corporation at the Tinian Health Center. Tinian Health Center was
18 built in 1987 and was renovated in September 2018, and is the island’s only medical facility.
19 The health center, which has a five-bed capacity as well as an emergency room and outpatient
20 clinic, provides emergency services, laboratory, X ray, ultrasound, pharmacy, and public health
21 services. If necessary, patients can be evacuated from the Tinian Health Center to the
22 Commonwealth Health Center on Saipan via airplane or U.S. Coast Guard. The
23 Commonwealth Health Center is an 86-bed hospital on Saipan that can accommodate inpatient
24 and outpatient medical/surgical services including obstetrics, adult and neonatal intensive care,
25 general medicine, pediatrics, and psychiatry; emergency care; public health services; dental
26 services; other ancillary and diagnostic services such as hemodialysis, physical therapy,
27 respiratory care, and radiology; and has a pharmacy and medical laboratory (CHCC 2018b).

1 **Table 3.4-4. Housing Characteristics, 2010**

Housing Characteristic	CNMI	Tinian
Total Housing Units*	20,850	1,118
Occupied Units	16,035	874
Owner Occupied	4,537	304
Renter Occupied	11,498	570
Vacant Units	4,815	244
Median Value of Owner Occupied Units	\$123,777	\$121,212
Median Gross Rent **	\$324	\$261
Median Gross Rent as Percentage of Household Income	20.9%	15.0%
Total Median Household Income	\$19,958	\$24,470
Owner Occupied	\$39,032	\$44,444
Renter Occupied	\$16,341	\$17,744

Source: USCB 2010b, USCB 2010c, USCB 2010d

Notes: * The majority of housing units on Tinian were damaged during October 2018 Typhoon Yutu.

** Gross rent is the amount of contract rent plus the estimated average monthly cost of utilities and fuels if these are paid for by the renter.

2 **Public Safety.** The CNMI Department of Public Safety (DPS) consists of four major divisions:
3 State Police Division, State Fire Division, Bureau of Motor Vehicles, and Bureau of
4 Investigation. DPS has a 24-hour operations center and police, fire, traffic, criminal
5 investigation, and motor vehicle sections on Tinian. The DPS facilities in the village of San Jose
6 are staffed by 21 police officers and 11 firefighters (De La Torre 2018, DON 2015a).
7 Additionally, Tinian International Airport’s firefighting capability can be made available to DPS in
8 the event of a major emergency (DON 2015a). The Tinian International Airport Aircraft Rescue
9 and Firefighting (ARFF) department has two firefighting vehicles and a staff of 10 personnel who
10 have dual roles as ARFF personnel and Ports police officers. There is a police lockup on
11 Tinian. Other correctional facilities, including a detention facility, jail, a women’s unit, and a
12 work release unit, are located on Saipan. These facilities are inadequate and are overcrowded
13 (USDOJ-OIA 2008).

14 **Sociocultural Issues.** This section describes sociocultural issues, such as land ownership,
15 cultural identity, and quality of life, that contribute to the socioeconomic characteristics of Tinian
16 and the CNMI.

17 Article 805 of the Covenant recognizes “the importance of the ownership of land for the culture
18 and traditions of the people of the Northern Mariana Islands.” As such, Article 11, Section 5 of
19 the CNMI constitution sets aside portions of CNMI public lands for a homestead program. The
20 CNMI DPL is mandated to designate public land on the CNMI, including land on Tinian, for
21 potential homesteads for village or agricultural use. The program is intended to assist those
22 without the means to acquire a lot and give them the opportunity to maintain a sustainable
23 lifestyle through the granting of a portion of public land for village (residential) or agricultural
24 purposes. Eligible persons must be of Northern Marianas descent, and can obtain one village
25 and one agricultural homestead lot. A person of Northern Marianas descent is someone who is
26 a citizen or national of the United States, and who has at least some degree (at least

1 one-quarter) of Northern Marianas Chamorro or Northern Marianas Carolinian blood, or a
2 combination thereof.

3 The Tinian Agricultural Homestead Act of 1988 states that public lands on Tinian that might be
4 suitable for agricultural or grazing purposes, and that are not required for government use or
5 other purposes, can be designated for homesteading purposes. Additional eligibility
6 requirements for homestead applicants on Tinian include that an applicant must be a resident of
7 Tinian for at least 5 years (Title 2 Section 4374 of the Commonwealth Code).

8 The U.S. citizen population of Tinian and the CNMI is primarily of Chamorro cultural descent,
9 although Carolinians and immigrants from East Asia and Micronesia have also settled in the
10 Mariana Islands. Chamorro life revolves around family and clans. Family loyalty is seen as
11 important in both politics and business in the CNMI.

12 Quality of life is a person's overall well-being and includes many of the resource areas
13 discussed in this SEIS. Generally, it relates to the ability of Tinian to support the Proposed
14 Actions adequately, including how the island's general tranquility, family and community
15 relations, cultural identity, infrastructure, social services, and standards of living could be
16 affected.

17 3.5 Environmental Justice and the Protection of Children

18 3.5.1 Definition of the Resource

19 Analysis of environmental justice and other sensitive receptors is directed by EO 12898, *Federal*
20 *Actions to Address Environmental Justice in Minority Populations and Low Income Populations*;
21 EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*; and
22 USAF's *Guide for Environmental Justice Analysis under the Environmental Impact Analysis*
23 *Process (EIAP)* (USAF 2014). USAF guidance for implementation of EO 12898 is in the *Guide*
24 *for Environmental Justice Analysis under the Environmental Impact Analysis Process (EIAP)*.
25 Although not specifically identified as environmental justice populations, this USAF guidance
26 identifies child and elderly populations as sensitive receptors, and discusses the importance of
27 analyzing impacts on these populations because they have the potential to be more susceptible
28 than other populations to certain environmental impacts and risks.

29 EO 12898 requires each federal agency to identify and address whether their proposed action
30 results in disproportionately high and adverse environmental and health impacts on low income
31 or minority populations. USEPA defines Environmental Justice to include the fair treatment and
32 meaningful involvement of all people regardless of race, color, national origin, or income with
33 respect to the development, implementation, and enforcement of environmental laws,
34 regulations, and policies. Fair treatment means that no groups of people, including racial,
35 ethnic, or socioeconomic groups, should bear a disproportionate share of the negative
36 environmental consequences resulting from industrial, municipal, and commercial operations or
37 the execution of federal, state, tribal, and local programs and policies.

38 EO 13045 states that each federal agency "(a) shall make it a high priority to identify and assess
39 environmental health risks and safety risks that may disproportionately impact children; and
40 (b) shall ensure that its policies, programs, activities, and standards address disproportionate

1 risks to children that result from environmental health risks or safety risks.” Activities occurring
2 near areas that could have higher concentrations of children during any given time, such as
3 schools and childcare facilities, might further intensify potential impacts on children. To the
4 extent to which children might be impacted, disproportionate impact on children is inherent due
5 to their inherent vulnerabilities.

6 Consideration of concerns related to environmental justice and other sensitive receptors
7 includes the race, ethnicity, poverty status, and age of populations in the vicinity of a proposed
8 action. Such information aids in evaluating whether a proposed action would render vulnerable
9 any of the populations targeted for protection.

10 For the purposes of this SEIS, minority, low-income, child, and elderly populations are defined
11 as follows:

- 12 • **Minority Population:** CEQ and USAF define minority populations as members of the
13 following population groups: Black or African American, American Indian and Alaska
14 Native, Asian, Native Hawaiian and Other Pacific Islander, and multi race that includes
15 one of the aforementioned races; and Hispanic or Latino (CEQ 1997a, USAF 2014).
16 The U.S. Census Bureau (USCB) considers race and Hispanic or Latino origin (ethnicity)
17 as two separate concepts, and these data are recorded separately. However, the USCB
18 collects race, ethnic, and Hispanic origin data differently in the Island Areas (i.e., CNMI)
19 than on the U.S. mainland. Race and ethnic origin data for CNMI are collected together
20 through one census question and, therefore, are presented as one subject in the Census
21 data. Some of the single and combined ethnic origins/races identified by U.S. Census
22 data are Native Hawaiian and Other Pacific Islander (Chamorro, Carolinian, Chuukese,
23 Palauan), Asian (Filipino, Chinese, Korean), Hispanic or Latino, White, and two or more
24 ethnic origins or races. There is no definition of minority populations that is specific to
25 the CNMI. Therefore, this SEIS uses racial and ethnic categories to identify ethnicity of
26 the CNMI population.

27 For the purposes of the environmental justice analysis, the total minority population will
28 include main ethnic origin populations as identified in the 2016 CNMI HIES (CNMI
29 Department of Commerce 2017a). However, data from the 2010 U.S. Census, the latest
30 federal data available, also are presented in this section, where necessary, to
31 supplement 2016 CNMI HIES data.

- 32 • **Low-income Population:** Low-income populations are defined as individuals whose
33 income is below the federal poverty threshold based on income data. In 2015, the
34 federal poverty threshold for an individual was \$12,082 (USCB 2015).
- 35 • **Child Population:** Children are defined as all people 19 years of age and under.
- 36 • **Elderly Population:** Elderly persons are defined as all people 65 years of age and over.

37 The ROI for environmental justice and other sensitive receptors is the area within which
38 potential impacts from a proposed action could occur. For this analysis, the ROI is Tinian with
39 emphasis on areas within the surrounding community that are near the Proposed Actions
40 (i.e., along the fuel pipeline and roadway improvement routes).

3.5.2 Existing Conditions

The CNMI, including Tinian, has a complex and dynamic ethnic history due to the influences of many cultures throughout its past history and the in-migration of many foreign workers in recent history. Based on the federal definition of a minority, most of the Tinian population would be considered a minority. There is no regional or CNMI-specific definition of a minority; therefore, the federal definition is used in this analysis.

The 2016 CNMI HIES presents the main ethnic origin of the 2016 population of Tinian (see **Table 3.5-1**). These data are organized differently than the 2010 U.S. Census data, and do not allow for characterization of the minority population according to the federal definition.

Therefore, they are presented here for informational purposes. The 2016 CNMI HIES data show similar patterns as the 2010 U.S. Census data in the 2016 Divert EIS (Final EIS, Section 3.14.4.2), with Chamorro and Filipino people representing the largest portions of the Tinian population.

Table 3.5-1. Main Ethnic Origin, 2016

Demographic		Tinian
Total Population		3,056
Percent Main Ethnic Origin		
Chamorro		36.7%
Carolinian		0.8%
Federated States of Micronesia		0.8%
Palauan		0.5%
Chinese		2.9%
Filipino		47.1%
Other Asian		7.7%
Other		3.5%

Source: CNMI Department of Commerce 2017a

More than 50 percent of the population of Tinian was below the poverty level in 2015. According to the 2016 CNMI HIES, 54.3 percent of the population of Tinian were in poverty (CNMI Department of Commerce 2017a).

In 2016, the population of Tinian was relatively young; the median age was 33.3 years old. Persons 19 years old and younger accounted for more than one third of the population of Tinian (39.1 percent), while the population over 65 years old was small accounting for less than 5 percent of the populations (CNMI Department of Commerce 2017a).

3.6 Health and Safety

3.6.1 Definition of the Resource

A safe environment is one in which there is no, or an optimally reduced, potential for death, serious bodily injury or illness, or property damage. Health and safety addresses the well-being, safety, and health of contractors, USAF personnel, and members of the public during the various aspects of the Proposed Actions and alternatives.

1 Safety and accident hazards can often be identified and reduced or eliminated. Necessary
2 elements for an accident-prone situation or environment include the presence of the hazard
3 itself together with the exposed (and possibly susceptible) population. The degree of exposure
4 depends primarily on the proximity of the hazard to the population. Activities that can be
5 hazardous include construction, facility/infrastructure operation, maintenance and repair
6 activities, and the creation of extremely noisy environments. The proper operation,
7 maintenance, and repair of vehicles, equipment, and infrastructure (such as pipelines) can carry
8 important safety implications. Extremely noisy environments can also mask verbal or
9 mechanical warning signals such as sirens, bells, or horns. Refer to **Section 3.1** for information
10 regarding noise. Additionally, areas where explosive or other rapid oxidation processes could
11 occur create unsafe environments if not properly marked or managed.

12 OSHA and USEPA have the statutory responsibility to ensure the safety and health of the public
13 and workforce within the United States and its territories (OSHA and USEPA 1991). OSHA
14 regulations address the health and safety of people at work and cover potential exposure to a
15 wide range of chemical, physical, and biological hazards and ergonomic stressors. The
16 regulations are designed to control these hazards by eliminating exposure to the hazards via
17 administrative or engineering controls, substitution, use of personal protective equipment (PPE),
18 and availability of Safety Data Sheets. USEPA responsibilities include the protection of public
19 health and the environment by assuring compliance with federal environmental statutes and
20 regulations.

21 The CNMI Department of Labor has also developed regulations to protect the health and safety
22 of contractors and recognizes OSHA regulations as the minimum safety standards for all
23 employers. Chapter 80 of the Northern Mariana Islands Administrative Code includes
24 requirements for employers, such as providing the appropriate safeguards to employees
25 (e.g., PPE, safe walking and working surfaces, machine guarding), providing adequate drinking
26 water supplies, and adopting any other necessary practices to adequately protect the health and
27 safety of employees.

28 Contractor safety is largely a matter of adherence to regulatory requirements imposed for the
29 benefit of employees and implementation of operational practices that reduce risks of illness,
30 injury, death, and property damage. The health and safety of onsite USAF and civilian
31 contractors are safeguarded by numerous DOD and USAF regulations designed to comply with
32 standards issued by OSHA and USEPA, as well as Air Force Occupational Safety and Health
33 (AFOSH) standards. These standards specify the amount and type of training required for
34 industrial workers, the use of PPE and clothing, engineering controls, and maximum exposure
35 limits for workplace stressors. In accordance with AFOSH standards, USAF would develop a
36 project-specific health and safety plan.

37 The USAF safety program ensures the safety of personnel, contractors, and the public by
38 regulating mission activities. AFI 91-202, *USAF Mishap Prevention Program*, implements Air
39 Force Policy Directive 91-2, *Safety Programs*, and provides guidance for implementing the
40 safety program during all USAF activities. To meet the goals of minimizing loss of USAF
41 resources and protecting military personnel, mishap prevention programs address groups at
42 increased risk for mishaps, injury, or illness; a process for tracking incidents; funding for safety

1 programs; metrics for measuring performance; safety goals; and methods to identify safety best
2 management practices (BMPs). This program ensures that all USAF workplaces meet federal
3 safety and health requirements.

4 The U.S. Department of Transportation's PHMSA issues pipeline safety regulations that
5 address construction, operation, and maintenance 49 CFR §§ 190–199. Additionally, PHMSA
6 inspects pipeline operators and enforces pipeline safety laws and regulations (Pipeline101
7 2016, PHMSA 2017). DOD also has various safety regulations that are applicable to the
8 construction, operation, and maintenance of pipelines, fuel storage and dispensing systems,
9 and petroleum facilities. These regulations include Technical Order 37-1-1 and UFC 3-460-03
10 described in **Section 2.2**. Additional applicable federal and DOD regulations are listed in
11 **Appendix F**.

12 3.6.2 Existing Conditions

13 **Contractor Health and Safety.** All contractors are responsible for following federal and CNMI
14 safety regulations and workers compensation programs. Construction and operations
15 contractors are also required to conduct activities in a manner that does not pose an undue risk
16 to construction or USAF personnel. Industrial hygiene programs address exposure to
17 hazardous materials, use of PPE, and availability of Safety Data Sheets. Industrial hygiene is
18 the responsibility of the contractors, as applicable. Contractor responsibilities are to review
19 potentially hazardous workplace operations; to monitor exposure to workplace chemicals
20 (e.g., hazardous materials, petroleum products), physical hazards (e.g., noise propagation,
21 falls), biological agents (e.g., infectious waste, wildlife, poisonous plants), and ergonomic
22 stressors; and to recommend and evaluate controls (e.g., prevention, administrative,
23 engineering) to ensure personnel are properly protected or unexposed. Contractors are also
24 responsible for ensuring a medical surveillance program is in place to perform occupational
25 health physicals for those personnel subject to the use of respiratory protection, engaged in
26 hazardous waste work, or other work requiring medical monitoring.

27 In addition to CNMI and other federal requirements, contractors working on fuel pipelines are
28 required to adhere to PHMSA and DOD regulations specific to pipeline and pipeline
29 infrastructure construction. The pipeline and support infrastructure operator is responsible for
30 ensuring operations and maintenance activities are being conducted in accordance with
31 applicable PHMSA and DOD regulations and that maintenance occurs when required
32 (Pipeline101 2016). Contractors would also comply with the project-specific health and safety
33 plan.

34 **USAF Personnel Health and Safety.** USAF personnel do not currently operate at Tinian
35 International Airport or the seaport on a routine basis; however, USAF personnel will operate at
36 the airport during Divert activities and at the seaport during fuel receipt and offload as proposed
37 in the 2016 Divert EIS (Final EIS, Section 2.5.2). USAF personnel are required to adhere to all
38 applicable federal and CNMI safety regulations.

39 **Airfield Safety.** Tinian International Airport has two Runway Protection Zones (RPZs), one at
40 each end of the runway, which are to be kept clear of all aboveground objects and all facilities
41 supporting incompatible activities. RPZs were established to enhance the protection of people

1 and property on the ground under the flight approach zones (FAA 2012). The Tinian
2 International Airport RPZs are trapezoidal and centered about the extended runway centerline
3 at both ends. At 2,700 feet from the runway edge, the RPZ's width is 1,750 feet, and then
4 narrows toward the runway edge (DON 2015a). The proposed West and East route project
5 areas partially overlap with the western RPZ.

6 **Explosive Safety.** Unexploded ordnance (UXO) could be present within the proposed project
7 areas due to the historic military use of Tinian during World War II. As described in **Section**
8 **3.11.2**, the occurrence of UXO is most likely to be discovered in heavily vegetated areas that
9 have not been used for development since World War II and at the former World War II-era fuel
10 tank farm that was east of TR25 to the south of Tinian International Airport (DON 2015a, USAF
11 2016a, CPA and FAA 1998).

12 **Public Health and Safety.** The CNMI DPS provides police, fire, and emergency medical
13 services. As of 2014, the Tinian Division of the CNMI DPS was staffed by 21 police officers
14 (a ratio of 6.9 officers for every 1,000 residents) and 11 firefighters (a ratio of 3.6 firefighters per
15 1,000 residents) (De La Torre 2018, DON 2015a). The ratios of police officers and firefighters
16 per 1,000 residents on Tinian are more than double those of the U.S., which as of 2013 and
17 2015 had an average of 2.1 police officers and 1.5 firefighters per 1,000 residents, respectively
18 (Bureau of Justice Statistics 2015, NFPA 2016). Therefore, Tinian public safety services are
19 considered to have more than sufficient capacity to meet the needs of the public. Additionally,
20 the CPA maintains firefighting capability at Tinian International Airport that is available to the
21 Tinian Division of the CNMI DPS in the event of an emergency (DON 2015a).

22 The Tinian Health Center is the only medical facility on the island. The Health Center was
23 recently expanded and improved and operates various sections, including: an emergency room,
24 out-patient clinic, pharmacy, laboratory, and X ray and ultrasound unit. The Tinian Health
25 Center is currently staffed by 31 personnel including one family nurse practitioner (the only
26 medical provider present), four registered nurses, four licensed practical nurses, and one
27 nursing assistant (CHCC 2018a). Despite the limitations and operational inefficiencies of
28 medical care in remote areas with small populations such as Tinian (e.g., major emergency and
29 specialty medical cannot be provided), the Health Center has not shown indications it is
30 overburdened (DON 2015a, CHCC 2018a).

31 Tinian International Airport is listed as an evacuation safe zone as designated by the CNMI
32 Emergency Management Office (CNMI HS&EM 2016). Additionally, the National Weather
33 Service has recognized Tinian as "Tsunami Ready" because it has defined tsunami hazard
34 zones; produced evacuation maps and installed evacuation route signs; supported ongoing,
35 sustained tsunami public education and outreach (including to schools in tsunami hazard
36 zones); established a 24-hour warning point; supported emergency operations center
37 operations; established more than one way to receive tsunami warnings and to alert the public;
38 established a formal tsunami operations plan; and held annual evacuation exercises (NWS
39 undated a, NWS undated b).

3.7 Soils and Geology

3.7.1 Definition of the Resource

Geological resources consist of the Earth's surface and subsurface materials. Within a given physiographic province, these resources are typically described in terms of geology, physiography and topography, soils, and geologic hazards.

Geology is the study of the Earth's composition and provides information on the structure and configuration of surface and subsurface features. Such information derives from field analysis based on observations of the surface and borings to identify subsurface composition.

Physiography and topography pertain to the general shape and arrangement of a land surface, including its height and the position of its natural and human-made features.

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

Important farmland is protected under the Farmland Protection Policy Act of 1981 and is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses. The soil qualities, growing season, and moisture supply are needed for a well-managed soil to produce a sustained high yield of crops in an economic manner. The land could be cropland, pasture, rangeland, or other land, but not urban built-up land or water.

Geologic hazards are defined as natural geologic events that can endanger human lives and threaten property. Examples of geologic hazards include earthquakes, tsunamis, and landslides.

3.7.2 Existing Conditions

Regional Geology. Four major geologic units make up the island: Tinian Pyroclastic Rocks; Tagpochau Limestone; Mariana Limestone; and unconsolidated sediments consisting of beach deposits, alluvium, and colluvium (USGS 2002). The project areas overlay Mariana limestone. Additionally, portions of the West route, East route, and roadway improvements would occur within an area of the beach deposits, alluvium, and colluvium at the seaport. Seaport support infrastructure would be constructed north of the beach deposits, alluvium, and colluvium area.

The project areas are also at or near Tinian's western coastline (see **Figure 2.4-1**). 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).

1 **Physiography and Topography.** The project areas are within the Central Plateau and Median
2 Valley physiographic regions of Tinian. The Central Plateau is characterized by broad and
3 gently sloping terrain that is isolated by the steep slopes and scarps at its southern and northern
4 boundaries, which are associated with north-south trending faults. The Median Valley is a low,
5 broad depression with little relief that is bounded by faults (University of Guam 2002, DON
6 2015a).

7 Topography at the Tinian International Airport (at the northern end of the West and East routes)
8 is relatively flat with elevations ranging from approximately 60 to 100 feet above mean sea level
9 (MSL) (DON 2010b, USGS 1999). Elevation surrounding the airstrip drops towards the ocean
10 to the east and west. Between the airport and the seaport (where the West route, East route,
11 and roadway improvements project areas are located), elevations range from approximately
12 20 feet above MSL near the seaport and shoreline to approximately 85 feet MSL to the north.

13 Topography at the seaport and within the seaport infrastructure project area ranges from less
14 than 10 feet above MSL to approximately 30 feet above MSL (USGS 1999).

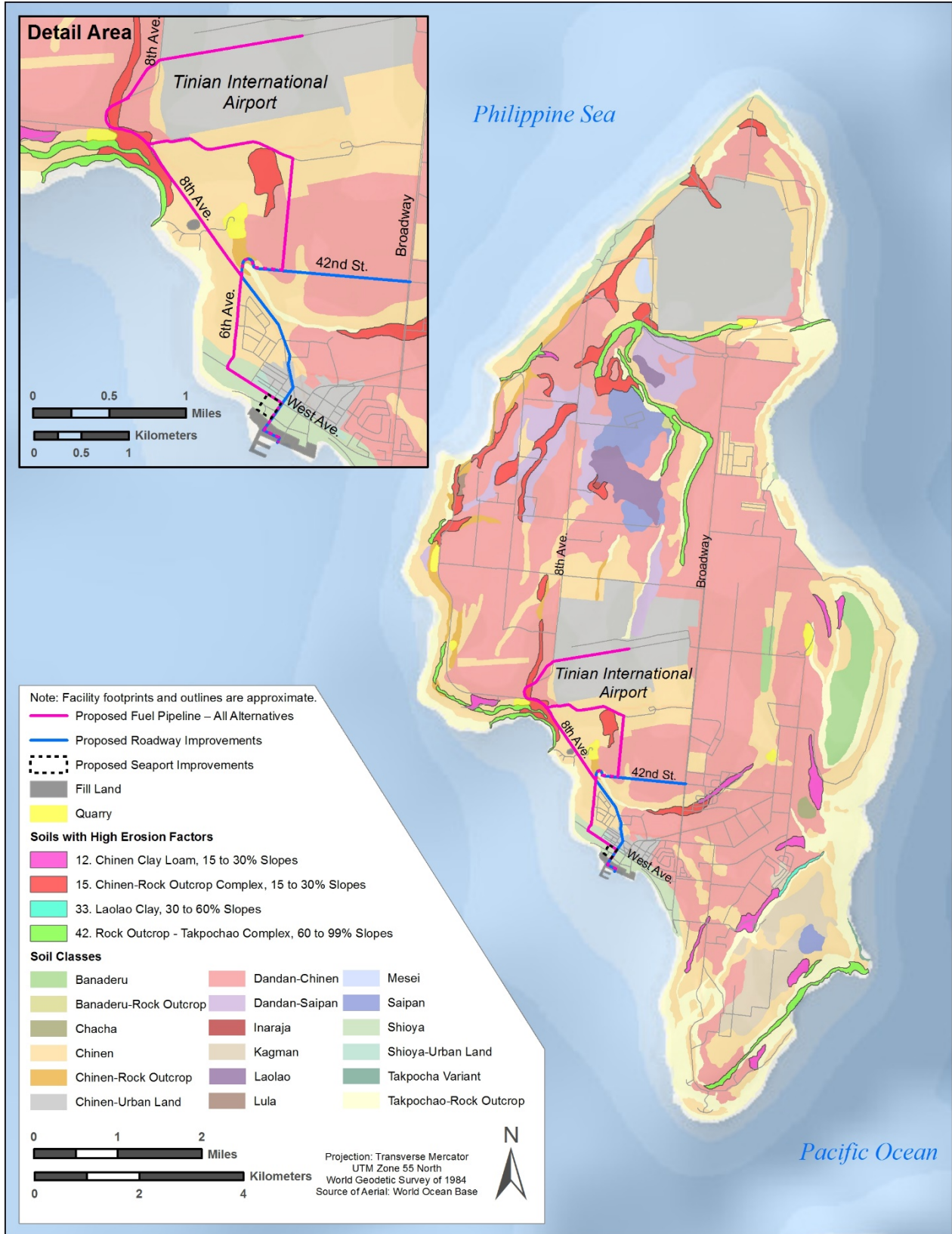
15 **Soils.** There are 18 soil classes present on Tinian and six (excluding fill land) covering 97.7
16 acres are present within the project areas (see **Table 3.7-1** and **Figure 3.7-1**). Fill land
17 comprises approximately 3.3 acres of the West and East route project areas and 0.78-acre of
18 the roadway improvements project area. No important farmland soils are within the proposed
19 project areas; therefore, farmland soils are not discussed further.

20 **Table 3.7-1. Characteristics of Soils Mapped in the Project Areas on Tinian**

Soil Class Mapping Unit	Texture	Erosion Hazard*	Location (acres within project 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 acres)	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.



1

2 Figure 3.7-1. Tinian Soils Classes and Soils with High Erosion Factors

1 The 2010 CNMI *Statewide Assessment and Resources Strategy Report* found that a majority of
2 the soils along Tinian's western coastline are considered to be moderately to highly erodible
3 (CNMI SWARS 2010). The locations of soil types with high erosion factors on Tinian are
4 depicted by **Figure 3.7-1**. The only soil type with a high erosion factor within the project areas
5 is the Chinen-Rock Outcrop Complex, 15 to 30 percent slopes present within the West and East
6 route project areas.

7 **Geologic Hazards.** Geologic hazards on Tinian include earthquakes, tsunamis, landslides,
8 liquefaction, and karst features (e.g., sinkholes). Earthquakes are common in the CNMI and
9 seismic activity in the region is a result of the subduction of the Pacific Plate beneath the
10 Philippine Plate (CRMO 2011, USGS 2012). Earthquakes with a magnitude range of 6 to 7
11 occur on average once every 10 years, and earthquakes with a magnitude greater than 7 occur
12 on average once every 100 years (Lander et al. 2002, DON 2010b). Due to the frequency of
13 seismic activity, the CNMI is considered to be within Seismic Zone 4 (CNMI 2017). Seismic
14 Zone 4 describes regions in which a common level of seismic design is required due to the
15 frequent occurrence of earthquakes. (USGS Undated). The proposed West route, East route,
16 and roadway improvements project areas partially coincide with fault lines.

17 Large earthquakes originating in the Mariana Trench and other nearby Pacific subduction zones
18 pose a tsunami threat to the CNMI. The proposed seaport support infrastructure project area is
19 within a potential tsunami affected area on Tinian's west coast, and the West route, East route,
20 and roadway improvements project areas partially overlap with the potential tsunami affected
21 area (TDPL 2017).

22 The likelihood for landslides to occur on Tinian is generally low because the consolidated nature
23 of the limestone units reduce the potential for slope failure (DON 2010b). Tinian does not have
24 a Hazard Mitigation Plan; however, a plan for Guam determined slopes with an angle of 30
25 percent or more are considered to have a moderate to high potential for a landslide to occur and
26 slopes of less than 5 percent are considered to have a low potential for a landslide to occur
27 regardless of the geologic deposits present (Guam 2014). The West route project area partially
28 coincides with an area of steep slopes associated with the western coastline. The East route,
29 seaport support infrastructure, and roadway improvements project areas do not contain steep
30 slopes.

31 Typically, liquefaction occurs in areas where there are loose soils with poor drainage (WWU
32 undated, DON 2015a). On Tinian, these conditions could be present on fill land located near
33 the coast; however, the consolidated limestone geologic units on Tinian are not usually
34 susceptible to liquefaction (WWU undated, DON 2015a, USAF 2016a).

35 Karst topography exists on Tinian due to the presence of limestone on the island. No karst
36 features were detected during site investigations for the 2016 Divert EIS on Tinian (Final EIS,
37 Section 3.4.2.2), and karst features identified during geologic investigations by Gingerich and
38 Yeatts in 2000 do not overlap the project areas (University of Guam 2002).

3.8 Water

3.8.1 Definition of the Resource

Water resources include groundwater, surface water, wetlands, floodplains, and their relationship to the area of a proposed action. These resources are described in terms of occurrence, distribution, movement, and properties through the processes of precipitation, subsurface flow, evapotranspiration, and surface runoff.

Groundwater. Groundwater is water that collects or flows beneath the earth's surface within aquifers. On Tinian, groundwater forms a lens-shaped freshwater body called a freshwater lens, floating on denser seawater within the aquifer. Groundwater is described in terms of depth from the surface, aquifer or well capacity, quality, recharge rate, and surrounding geologic formations.

The Safe Drinking Water Act (SDWA) of 1974 establishes a federal program to monitor and increase the safety of all commercially and publicly supplied drinking water. The 1986 amendments to the SDWA required USEPA to establish maximum contaminant levels, maximum contaminant level goals, and best available technology treatment techniques for organic, inorganic, radioactive, and microbial contaminants; and turbidity in drinking water sources.

The Federal Sole Source Aquifer regulations authorized under the SDWA protect aquifers that are critical to water supply. USEPA defines a Sole Source Aquifer as one that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. These areas tend to have no alternative drinking water sources that could physically, legally, or economically supply those who depend upon the aquifer for drinking water.

Surface and Coastal Waters. Surface water includes natural, modified, and constructed water confinement and conveyance features. These features are generally classified as streams, springs, lakes, wetlands, natural and artificial impoundments (e.g., ponds), and constructed drainage canals and ditches. 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. Storm water is surface water generated by precipitation events that may percolate into permeable soils or runoff, which occurs when the stormwater flows across the top of impervious or saturated surficial areas.

The CWA (33 USC § 1251 *et. seq.*, as amended) establishes federal limits, through the National Pollutant Discharge Elimination System (NPDES), on the amounts of specific pollutants that are discharged to surface waters to restore and maintain the chemical, physical, and biological integrity of the water.

Section 402 of the CWA forbids the discharge of pollutants from a point source into navigable waters without an NPDES permit. The NPDES stormwater program requires construction site

1 operators engaged in clearing, grading, and excavating activities that disturb 1 acre or more to
2 obtain coverage under an NPDES permit for their stormwater discharges. NPDES permits in
3 the CNMI are issued by USEPA Region 9. Construction stormwater discharges are permitted
4 under USEPA's Construction General Permit (CGP), which requires compliance with effluent
5 limits and development of a site-specific Storm Water Pollution Prevention Plan (SWPPP).
6 USEPA published the technology-based Final Effluent Limitations Guidelines and the
7 "Construction and Development Rule" to control the discharge of pollutants from construction
8 sites. The Construction and Development Rule requires construction site operators to meet
9 erosion and sediment control, pollution prevention, and stabilization requirements. USEPA
10 currently regulates large and small (greater than 1 acre) construction activities through the final
11 2017 CGP. NPDES industrial stormwater permit requirements would be followed as determined
12 by USEPA Region 9. Sections 404 and 401 (through water quality certification) of the CWA
13 regulate the discharge of dredged or fill materials into the waters of the United States. The
14 CNMI BECQ is the administrative authority for CWA Section 401 Water Quality Certifications
15 required for validation of NPDES permits.

16 Section 303(d) of the CWA requires states to identify and develop a list of impaired water bodies
17 where technology based and other required controls have not provided attainment of water
18 quality standards. Section 305(b) of the CWA requires states to assess and report the quality of
19 their water bodies. CNMI combined their 303(d) and 305(b) list into one report referred to as the
20 Integrated Report. The Integrated Report identifies those water bodies that are impaired and do
21 not meet designated uses, and it establishes total maximum daily loads for the pollutants of
22 concern (CNMI BECQ 2016).

23 Section 438 of the Energy Independence and Security Act (EISA) (42 USC § 17094) establishes
24 stormwater design requirements for federal construction projects that disturb a footprint greater
25 than 5,000 square feet of land. Under these requirements, predevelopment site hydrology must
26 be maintained or restored to the maximum extent technically feasible with respect to
27 temperature, rate, volume, and duration of flow. Additional guidance is provided in the USEPA
28 *Technical Guidance on Implementing the Storm Water Runoff Requirements for Federal*
29 *Projects under Section 438 of the Energy Independence and Security Act.*

30 The CNMI BECQ also developed its own Water Quality Standards, which are promulgated in
31 accordance with the Federal CWA, the Commonwealth Environmental Protection Act of 1982
32 (2 Commonwealth Code §§ 3101–3134, P.L. 3-23), the Commonwealth Environmental
33 Amendments Act of 1999 (P.L. 11-103), and the Commonwealth Groundwater Management
34 and Protection Act of 1988 (2 Commonwealth Code §§ 3311–3333, P.L. 6-12). The CNMI
35 Water Quality Standards define two classes (AA and A) of marine water uses. The majority of
36 the coastal marine waters are Class AA, meaning that these waters should remain in their
37 natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of
38 water quality from any human source or actions. The uses protected in these waters are the
39 support and propagation of marine life, conservation of coral reefs and wilderness areas,
40 oceanographic research, and aesthetic enjoyment and compatible recreation inclusive of whole
41 body contact and related activities. Class A waters are protected for their recreational use and
42 aesthetic enjoyment; other uses are allowed as long as they are compatible with the protection

1 and propagation of fish, shellfish, and wildlife, and recreation in and on the water is of a limited
2 body contact nature.

3 Per the Northern Mariana Islands Administrative Code Chapter 65-30, Earthmoving and Erosion
4 Control Regulations, no person shall commence or continue grading, filling, or
5 vegetation-clearing activities without first obtaining a permit from the CNMI BECQ. The CNMI
6 BECQ in coordination with the GEPA developed a guidance manual in 2006 to assist the local
7 engineering and development communities and local government agencies of Guam and CNMI
8 in developing and implementing stormwater- and erosion-control plans that adequately address
9 nonpoint source pollution through the use of currently accepted BMPs. Volume I of the *Storm*
10 *Water Management Manual* provides designers a general overview of local stormwater issues,
11 lists the stormwater performance standards for the islands, and describes how to size and
12 design BMPs to comply with those standards. Volume II of the Manual contains more detailed
13 information on how to select, site, and construct BMP specifications (CNMI BECQ and GEPA
14 2006).

15 **Wetlands.** Wetlands generally include swamps, marshes, bogs, and similar areas
16 (33 CFR § 328). The U.S. Army Corps of Engineers (USACE) defines wetlands as “those areas
17 that are inundated or saturated with ground or surface water at a frequency and duration
18 sufficient to support, and that under normal circumstances do support, a prevalence of
19 vegetation typically adapted to life in saturated soil conditions.”

20 Section 404 of the CWA authorizes USACE to issue permits for the discharge of dredged or fill
21 materials into the waters of the United States, including wetlands. In addition, Section 404 of
22 the CWA also grants states with sufficient resources the right to assume these responsibilities.
23 Section 401 of the CWA gives the state board and regional boards the authority to regulate
24 through water quality certification any proposed federally permitted activity that could result in a
25 discharge to water bodies, including wetlands.

26 EO 11990, *Protection of Wetlands*, requires that federal agencies provide leadership and take
27 actions to minimize or avoid the destruction, loss, or degradation of wetlands and to preserve
28 and enhance the natural and beneficial values of wetlands. Federal agencies are to avoid new
29 construction in wetlands, unless the agency finds there is no practicable alternative to
30 construction in the wetland and the proposed construction incorporates all possible measures to
31 limit harm to the wetland.

32 **Floodplains.** Floodplains are areas of low-level ground present along rivers, stream channels,
33 or coastal waters that are subject to periodic or infrequent inundation from rainfall. Risk of
34 flooding typically depends on local topography, the frequency of precipitation events, and the
35 size of the watershed above the floodplain. Flood potential is evaluated by the Federal
36 Emergency Management Agency (FEMA), which defines the 100-year floodplain as an area that
37 has a 1 percent chance of inundation by a flood event in a given year.

38 EO 11988, *Floodplain Management*, requires federal agencies to determine whether a proposed
39 action would occur within a floodplain. This determination typically involves consultation of
40 FEMA Flood Insurance Rate Maps (FIRMs), which contain enough general information to
41 determine the relationship of the project areas to nearby floodplains.

3.8.2 Existing Conditions

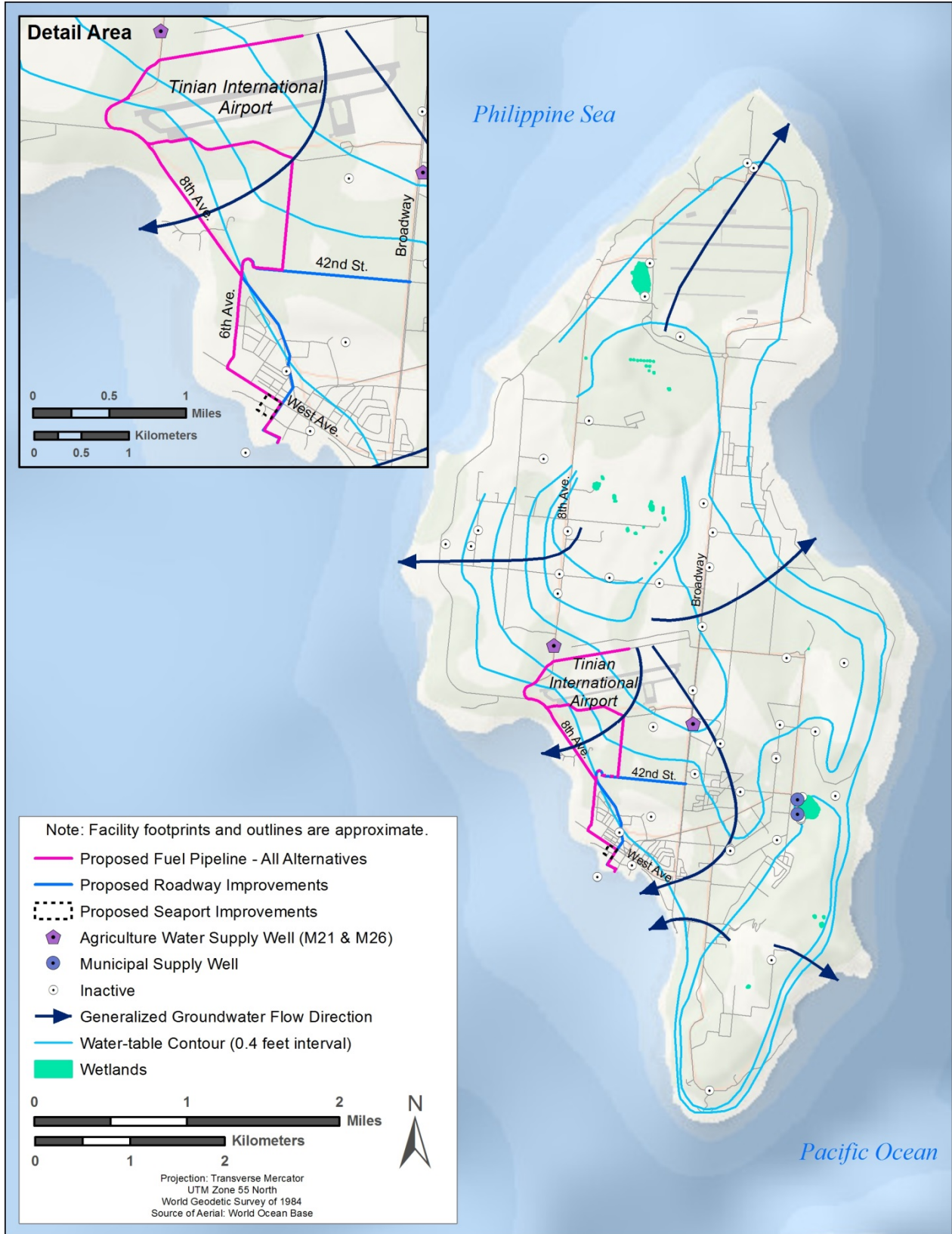
Groundwater. The main source of freshwater on Tinian is groundwater from a basal freshwater lens within an aquifer composed of high-permeability coralline limestone (Takpochao Limestone) overlying low-permeability volcanic rock (Gingerich 2002). The basal fresh water lens extends from 2 to 4 feet MSL to approximately 80 to 160 feet below sea level at its deepest point (DON 2010c). Elevations of the water table in the project areas range from 0.4 feet MSL at the proposed seaport and West route to 1.2 feet 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 3.8-1**).

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).

Existing groundwater resources may be capable of supplying up to 7 million gallons per day (gpd) 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 gpm, or approximately 1.1 million gpd (Gingerich 2002). No sole source aquifer is designated on the island (CPA and FAA 1998).

Surface Water and Coastal Waters. 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. The seaport occurs within the Makpo Watershed, which drains west-southwest into the Philippine Sea (CNMI BECQ 2016). The coastal waters of the Makpo Watershed are impaired (Category 5). These waters do not support use by aquatic life due to low dissolved oxygen levels and poor aquatic habitat, and do not support recreational use due to Enterococci exceedances. Total maximum daily loads for these impaired waters have not yet been developed (CNMI BECQ 2016).

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). The coastal waters of the Puntan Daiplolamanibot and Masalok watersheds are impaired (Category 5) and are not attaining recreational use because of Enterococci. Aquatic habitat is ranked as “fair” at Puntan Daiplolamanibot and “good” at Masalok (CNMI BECQ 2016). A stormwater retention area is in place at the west end of the Tinian International Airport runway. Storm water 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 project areas span across the Puntan Daiplolamanibot and Makpo watersheds.



1

2 Figure 3.8-1. Water Map of Tinian

1 Coastal waters surrounding Tinian serve as the discharge areas for all surface runoff from the
2 island. As stated above, CNMI coastal waters are divided into Class A and Class AA waters by
3 CNMI DEQ. The coastal waters of the Puntan Daipolamanibot and Masalok watersheds are
4 designated as Class AA marine waters. The coastal waters of the Makpo Watershed, the
5 location of the proposed seaport, are designated as Class A marine waters, which are
6 designated for recreational purposes and aesthetic enjoyment and are to be protected for these
7 uses (CNMI BECQ 2016).

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

15 During surveys conducted May 12 to 16, 2018, biologists searched the project areas for open
16 water, wetlands, and drainages. No ponds, streams, wetlands, or other water were found, and
17 no drainages or other features that might be regulated under Section 404 of the Clean Water
18 Act (CWA) were identified. The closest wetland to the project areas is approximately 1 mile
19 away from the proposed pipeline routes.

20 **Flood Zones.** According to FEMA FIRM Panel Number 750001 0040 B (effective date May 15,
21 1991), three areas designated as Flood Zone A occur near the Tinian International Airport
22 (FEMA 1991). These flood zones are areas with a 1 percent annual chance of flooding.
23 Because they are not associated with floodplains of surface water bodies, these flood zones are
24 not protected under EO 11988, *Floodplain Management*. These flood zones are associated
25 with depressions created by former excavation activities and are only considered flood zones
26 because of their potential to hold water during heavy rain events.

27 3.9 Infrastructure and Transportation

28 3.9.1 Definition of the Resource

29 Infrastructure consists of the systems and physical structures that enable a population in a
30 specified area to function. Infrastructure is wholly human-made, with a high correlation between
31 the type and extent of infrastructure and the degree to which an area is characterized as “urban”
32 or developed. The availability of infrastructure and its capacity for expansion are generally
33 regarded as essential to the economic growth of an area. The infrastructure components
34 discussed in this section include airfield, seaport, utilities, solid waste management, and
35 transportation.

36 The airfield encompasses all pavements, runways, taxiways, overruns, aprons, cargo pads,
37 navigational aids, hangars, and facilities and equipment that are associated with aircraft
38 maintenance and aircraft operations. The seaport area includes berthing space and yard area.
39 Utilities include electrical supply, liquid fuel supply, water supply, stormwater drainage, and
40 sanitary sewer systems. Solid waste management primarily relates to the availability of systems

1 and landfills to support a population's residential, commercial, and industrial needs. The
2 infrastructure information contained in this section provides a brief overview of each
3 infrastructure component and comments on its existing general condition.

4 This section also describes the existing roadway facilities that serve the island of Tinian. The
5 CNMI Comprehensive Highway Master Plan was used to identify the existing conditions of the
6 roadway network potentially impacted by the Proposed Actions.

7 3.9.2 Existing Conditions

8 **Airfield.** The Tinian International Airport airfield is currently designed to accommodate aircraft
9 up to the size and dimensions of a 747. The main component of the airfield, runway 8/26 is
10 8,600 feet long, 150 feet wide, and has two 25-foot-wide paved shoulders. It is grooved for
11 flight safety and drainage purposes (AFCEE/PACAF 2010).

12 **Seaport.** The main wharf at the Port of Tinian has a useable length of approximately 1,600 feet
13 long with depths between 24 and 29 feet. It is used to moor commercial barges operating
14 between Tinian and Saipan. There are two piers (Pier 1 and Pier 2) on the southwest of the
15 main wharf, both of which are in poor condition. A mooring buoy 2 miles from Tinian Harbor
16 was removed; however the anchoring system is still useable for large draft ships. A tugboat and
17 lightering barge (used to transport cargo from larger draft vessels incapable of entering the
18 harbor) are available for use, as needed (DON 2015a).

19 The current harbor infrastructure is in need of improvements and repairs but previously
20 underwent emergent repairs to include the sea wall, bollards, and fenders and therefore
21 continues to support shipping vessels. According to the Tinian Harbor Master Plan, the current
22 usable depth of the Tinian Harbor is approximately 27 feet by some accounts (Tenorio and
23 Dashiell 1997).

24 The Port of Tinian receives, stores, and issues diesel and unleaded gasoline, but has no
25 aviation fuel capacity.

26 **Electrical Supply.** The electrical infrastructure at Tinian is capable of satisfying considerably
27 more demand than the current base and peak loads with a maximum electrical capacity of
28 approximately 20 megawatts (MW) (DOD 2019) and could be expanded to 30 MW because the
29 island's power plant was built during a period of high resort development interest. The energy
30 infrastructure is also in good condition and well-maintained. Tinian has a current peak load of
31 1 MW, with a demand of 500,000 kilowatt-hours per month and additional capacity via a standby
32 generator kept in reserve (DOD 2019). This allows for peak demand to be met when one of the
33 two largest 5-MW generators is down for maintenance (DON 2015a). Distribution is through
34 four 13.8-kilovolt feeders, one of which is dedicated solely to the U.S. Government International
35 Broadcasting Bureau (IBB) (CNMI 2011; DON 2015a). The primary IBB distribution line runs
36 above ground on poles from the generation facility to the IBB along TR25. Many of the
37 distribution lines and utility poles were damaged or downed during Typhoon Yutu in October
38 2018 but are being gradually replaced.

39 About 50 percent of Tinian's power consumption was previously from two customers: Tinian
40 Dynasty Hotel and Casino and the IBB. However, the Tinian Dynasty has closed and therefore

1 IBB is the main source of power consumption on the island. The airport is a smaller, yet still
2 considerable consumer of power (CNMI 2011). A substantial amount of energy is required to
3 pump and treat water for potable use, and to collect, pump, and treat wastewater on Tinian
4 (CNMI 2011).

5 Tinian International Airport is connected to the existing power system; however, it has a highly
6 limited feeder distribution network (CNMI 2011). An electrical line runs on the east end of the
7 airport property but does not extend throughout the entire Tinian International Airport property
8 (AFCEE/PACAF 2010).

9 **Liquid Fuel Supply.** Currently, Tinian International Airport has limited capacity for the receipt,
10 storage, and distribution of aviation fuel. The airfield has no A1 jet fuel infrastructure. Current
11 aviation fuel inadequacies of Tinian include the following:

- 12 • no capability for Jet A1 fuel supply or storage on Tinian
- 13 • no fuel hydrant system on the airfield
- 14 • no fuel trucks capable of servicing aircraft on Tinian

15 The Port of Tinian can support limited cargo ships and the main wharf can support up to 4,500
16 tons of cargo per day (AFCEE/PACAF 2010, DON 2010a). Fuel storage at the seaport includes
17 a 12,000-bbl (500,000-gallon) diesel aboveground storage tank (AST) and a 1,500-bbl
18 (63,000-gallon) unleaded gasoline AST. The seaport has no aviation fuel storage capability
19 (AFCEE/PACAF 2010).

20 **Water Supply.** Potable water on Tinian is primarily withdrawn from groundwater wells;
21 however, some households use catchment basins (CNMI 2011, AFCEE/PACAF 2010). Most of
22 the agricultural and domestic water supply originates in the Makpo wetland area and is collected
23 in storage tanks at Marpo Heights and Carolina Heights (DON 2010a). The water system uses
24 four water storage tanks. The Tinian Airport Tank is a 60,000-gallon tank along the airport
25 access road that serves the airport and its associated facilities. The Marpo Tank is a
26 250,000-gallon tank that serves the Marpo Valley agricultural area and Marpo Heights
27 residential area. A 500,000-gallon tank is sited above the Carolinas residential area that serves
28 the Carolinas Heights subdivision, San Jose, Carolinas Heights Agricultural Homesteads, and a
29 portion of Marpo Valley (DON 2015a). The fourth tank is also 500,000 gallons and was
30 constructed in 2017 adjacent to the Carolinas tank; this tank was constructed to provide the
31 capability for maintenance of the existing 500,000 gallon reservoir without interrupting water
32 services to the residents of Tinian (Marianas Variety 2016).

33 From 1945 to 1999, all municipal water was supplied by the Municipal Well (a 300-foot-long
34 horizontal trench). In 1999, two vertical wells (i.e., TH04 and TH06) were added to the system.
35 By 2001, a new 400-foot-long infiltration gallery replaced the Municipal Well in a nearby
36 location. Pumps are generally operated 24 hours per day, except during maintenance and low
37 demand in the rainy season. Withdrawals have fluctuated less than 10 percent throughout the
38 years. The new infiltration gallery can supply approximately 875 gpm. Well TH06 produces
39 approximately 60 gpm and well TH04 is capable of producing 50 gpm; however, they are
40 generally only used to maintain pressure in the distribution system during peak demand hours
41 (Gingerich 2002). In October 2018, Typhoon Yutu damaged the supply well and distribution

1 system. A new municipal water well was installed near the former well during the typhoon relief
2 efforts; however, the exact location of the new well is unknown (DOD 2019). Based on the
3 available withdrawal data, Tinian is capable of producing approximately 1,260,000 gpd of water.

4 In 2013, there were 833 metered accounts for residential, commercial, and government
5 customers on Tinian. Between October 2011 and August 2014, the island was estimated to use
6 approximately 320,000 gpd with a loss of approximately 787,000 gpd; the Commonwealth
7 Utilities Corporation (CUC) estimates that this loss is approximately 75 to 80 percent of CNMI's
8 potable water supply (DON 2015a).

9 The Tinian International Airport relies on the CUC for water; however, the airport has its own
10 local water distribution system. The IBB is not connected to the CUC and uses non-potable
11 rainwater collection, non-potable bulk water trucked from the CUC, and bottled drinking water.

12 **Stormwater.** There is limited information on the stormwater infrastructure on Tinian. Most of
13 the precipitation on Tinian either runs off, evaporates, or percolates into the limestone substrata.
14 During periods of intense rainfall, approximately 7 percent of total rainfall becomes runoff that
15 flows towards the low-lying coastal areas. Tinian International Airport is surrounded by pervious
16 soil with vegetation. Stormwater at Tinian International Airport is handled by open drainage
17 ditches and sheet flow overland to lower elevations and the land has been graded to
18 accommodate runoff. Grading included incorporation of detention basins north of and between
19 the airstrips, and a drainage swale south of the airstrips. A stormwater culvert transports runoff
20 from the drainage swale south of the airstrip to an area southwest of the airstrip and outside the
21 airport fence line (DOD 2019). Stormwater at the seaport area sheet flows to the coastline,
22 except for the areas around the ASTs, which have secondary containment systems. See
23 **Section 3.8** for additional information on stormwater.

24 **Sanitary Sewer and Wastewater Treatment.** There are no wastewater processing facilities on
25 Tinian (CNMI Department of Commerce 2009). Residents and businesses on Tinian, including
26 Tinian International Airport, use septic systems and leach fields for wastewater treatment (CNMI
27 2011).

28 **Solid Waste.** Currently, solid waste on Tinian is disposed of at the open landfill adjacent to
29 TR25, recycled at the Tinian recycling center, or transported to Saipan for disposal. In
30 November 2006, the Mayor of Tinian declared a "state of disaster emergency" due to the failure
31 to close Tinian's unsafe dumpsite (i.e., Tinian landfill). On January 20, 2010, CNMI BECQ
32 issued an administrative order to the CNMI Department of Public Works and the Mayor's Office
33 of Tinian for failure to comply with landfill operating requirements at the municipal dump. BECQ
34 stated that the office's "non-compliance posed a threat to human health and the environment."
35 The municipal dump received violations for air quality regulations for the open burning of solid
36 wastes. They also failed to cover exposed solid waste at the end of each operating day, control
37 disease carriers, implement a waste exclusion plan to prevent receiving hazardous wastes and
38 polychlorinated biphenyl wastes, have trained operators, and have control of public access to
39 prevent unauthorized disposal within and outside the dump (Saipan Tribune 2010). A new
40 sanitary transfer station has opened on Tinian and a new solid waste facility is planned;
41 however, it has not opened as of January 2019.

1 **Transportation.** Tinian’s roadway system consists of approximately 70 miles of two-lane
 2 undivided roadways on the Territorial Highway System (CNMI DPW undated; DON 2015a). A
 3 majority of Tinian roadways were paved during and shortly after World War II under U.S. Navy
 4 Administration (USDOJ-OIA 1999). Key roadways on Tinian are described in **Table 3.9-1** and
 5 shown in **Figure 2.2-3**. **Table 3.9-1** includes average daily traffic (ADT) volumes and level of
 6 service (LOS). LOS is a measure of vehicle carrying capacity and is the standard used to
 7 evaluate traffic conditions at intersections and interchanges. All of the roadways currently
 8 operate at LOS A. Traffic volume on all other roads, including those in the Military Lease Area
 9 and Port of Tinian, is well below 500 daily trips (DON 2015a). No intersections on Tinian were
 10 analyzed in the CNMI Comprehensive Highway Master Plan. Roadway pavement conditions
 11 tend to be poor as a result of drainage issues and the use of coral and acidic-base pavement
 12 materials (CNMI DPW 2009).

13 **Table 3.9-1. Year 2008 Existing Conditions: Key Tinian Roadways**

Roadway	ADT Volume	Level of Service
TR21	390–1,470	A
TR24	150	A
TR25	180–300	A

Source: CNMI DPW 2009

14 In addition to existing conditions, the CNMI Comprehensive Highway Master Plan includes
 15 projected ADT volumes and associated future traffic operations (assuming no improvements) for
 16 2022. **Table 3.9-2** shows the future conditions of key roadways on Tinian. Based on the
 17 predicted future LOS, the CNMI Comprehensive Highway Master Plan also provides
 18 improvement recommendations for several roadways; however, no improvements were
 19 identified for the key roadways in **Table 3.9-2**.

20 **Table 3.9-2. Year 2022 Future Conditions: Key Tinian Roadways**

Roadway	ADT Volume	Level of Service
TR21	500–1,880	A
TR24	190	A
TR25	230–380	A

Source: CNMI DPW 2009

21 3.10 Land Use and Recreation

22 3.10.1 Definition of the Resource

23 **Land Use.** Land use refers to real property classifications that indicate either natural conditions
 24 or the types of human activity occurring on a parcel. In many cases, land use descriptions are
 25 codified in local zoning laws. However, there is no nationally recognized convention or uniform
 26 terminology for describing land use categories.

27 Two main objectives of land use planning are to ensure orderly growth and compatible uses
 28 among adjacent property parcels or areas. In appropriate cases, the location and extent of a

1 proposed action is evaluated for its potential effects on a project site and adjacent existing land
2 uses. The foremost factor affecting a proposed action in terms of land use is its compliance
3 with any applicable land use or zoning regulations. Other relevant factors include matters such
4 as existing land use at the project site, the types of land uses on adjacent properties and their
5 proximity to a proposed action, the duration of a proposed activity, and its “permanence.”

6 *Coastal Zone and Submerged Lands.* The CZMA was promulgated in 1972 as a means to
7 “...preserve, protect, develop, and where possible, to restore or enhance, the resources of the
8 Nation’s coastal zones for this and succeeding generations [through] the development and
9 implementation of management programs to achieve wise use of the land and water resources
10 of the coastal zone, giving full consideration to ecological, cultural, historic, and aesthetic
11 values, as well as the needs for compatible economic development...” (16 USC §§ 1451–1466).
12 The CZMA is administered through local programs designed in cooperation with the federal
13 government.

14 Federal consistency requirements of the CZMA require that federal activities comply to the
15 greatest extent possible with the enforceable policies of applicable local coastal zone
16 management programs. Non-federal activities must comply fully with local management
17 programs if they require a federal permit or license, or if they receive federal funding (15 CFR
18 § 930). Land and submerged lands under federal jurisdiction are excluded from the territorial
19 coastal zone. According to the CZMA, federal activities that affect any land or submerged land
20 use or natural resource of a territory’s coastal zone shall be carried out in a manner that is
21 consistent to the maximum extent practicable with the enforcement policies of the federally
22 approved territorial Coastal Zone Management Program.

23 **Recreation.** Recreation refers to natural and human made lands designated by planning
24 entities to offer visitors and residents diverse opportunities to enjoy leisure activities.
25 Recreational resources are places or amenities set aside as parklands, beaches, trails,
26 recreational fields, sport or recreational venues, open spaces, open waters, and aesthetically
27 pleasing landscapes along with a variety of other uses. Federal, commonwealth, and local
28 jurisdictions typically have designated land areas with defined boundaries for recreation. Other
29 less structured activities (e.g., fishing) are performed in broad, less defined locales. A
30 recreational setting might consist of natural or human made landscapes and can vary in size
31 from a roadside monument to a designated sport area to a wilderness area. For the purpose of
32 this analysis, recreational activities include any type of outdoor activity in which area residents,
33 visitors, or tourists could participate and pertain to the physical geography of the islands.

34 **ROI.** The ROI for land use and recreation is the land and submerged lands of Tinian. The
35 analysis focuses on Tinian International Airport, Tinian seaport, and the routes of the proposed
36 pipeline and roadway improvements.

37 3.10.2 Existing Conditions

38 The following section describes land ownership and associated land uses, including coastal
39 zone and submerged lands. Land on Tinian is managed primarily though land ownership, which
40 influences the land use.

1 **Land Ownership and Land Use.** Public lands within the CNMI are managed by the CNMI DPL
2 and are subcategorized as Grant of Public Domain, Designated/In Use, Undesignated/Not In
3 Use, Leased, and Covenant/Military Leased. Grant of Public Domain Public Lands have been
4 transferred from DPL to another CNMI public agency and are managed by that agency.
5 Designated/In Use Public Lands are actively managed for a particular use such as a forest or a
6 park. Public lands without a specified use are undeveloped and are classified as
7 Undesignated/Not In Use Public Lands. Leased Public Lands are leased to non-government
8 agencies and require government approval. The CNMI Office of Planning and Development
9 was established in 2017 to oversee land use planning and sustainable development, consistent
10 with DPL.

11 Public lands make up approximately 90 percent (approximately 22,682 acres) of lands on
12 Tinian, while private lands account for approximately 10 percent (2,434 acres) of Tinian land
13 (CNMI DPL 2018b). **Table 3.10-1** presents the breakdown of Tinian land ownership on Tinian,
14 and **Figure 3.10-1** provides a depiction of land ownership on Tinian. CNMI DPL land use
15 designations, which are a combination of land ownership and land uses, are shown in **Figure**
16 **3.10-2**. This figure includes the best available data, and the following land use descriptions
17 have been updated with information provided in the Draft CNMI Comprehensive Land Use Plan
18 and the associated GIS Map Book (CNMI DPL 2018a).

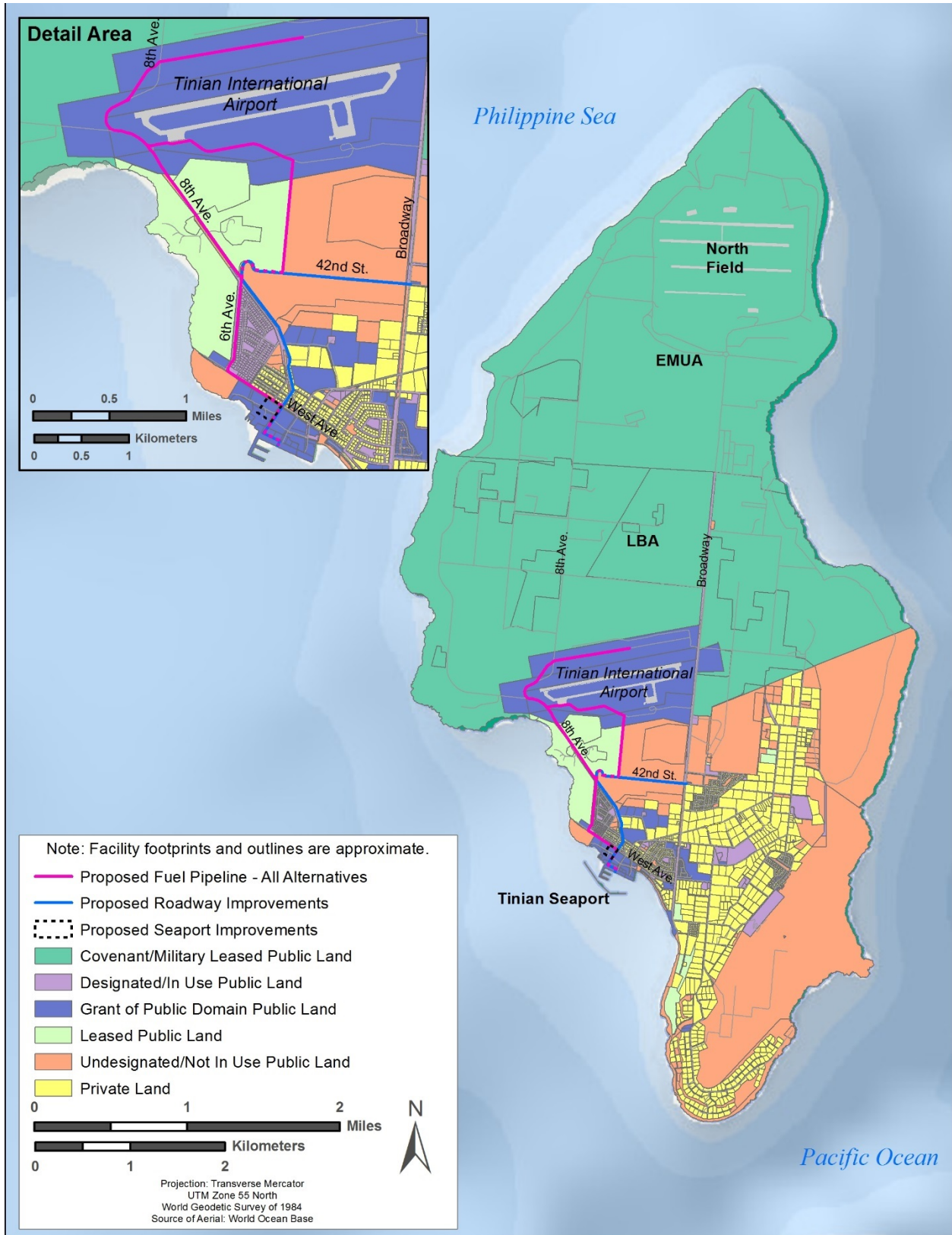
19 **Table 3.10-1. Tinian Land Ownership**

Owner	Sub-classification	Acres
Private Lands	Private	2,434
Public Lands	Grant of Public Domain	1,604
	Designated/In Use	1,277
	Leased	1,458
	Covenant/Military Leased	15,469
	Undesignated/Not in Use	2,874
Total		25,116

Source: CNMI DPL 2018b

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

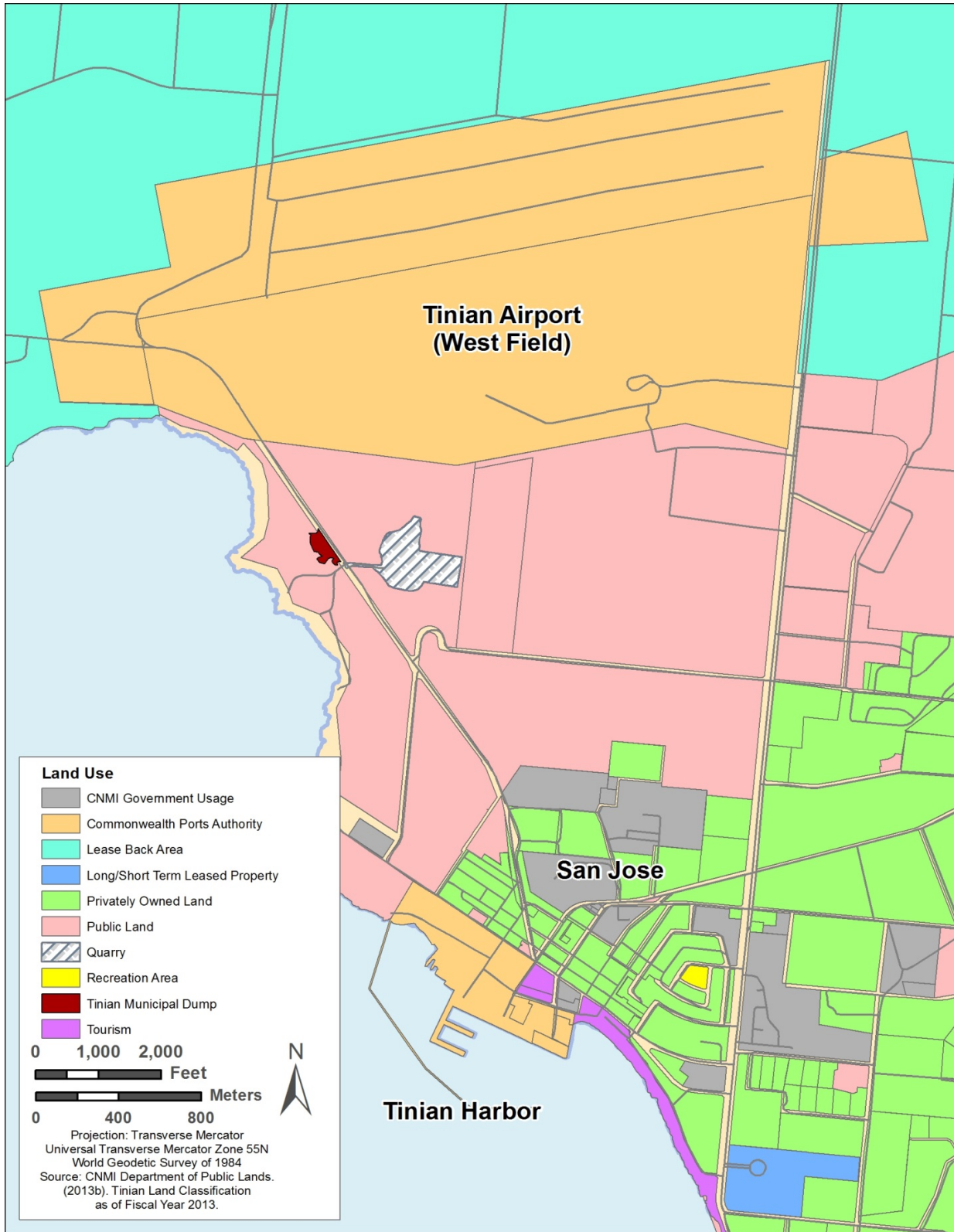
32 **Coastal Zone and Submerged Lands.** The coastal zone of the CNMI includes all non-
33 federally owned or leased lands and water areas, including submerged lands and waters within



1

2 Source: DoN 2015a

3 **Figure 3.10-1. Land Ownership on Tinian**



1
2 Source: DON 2010b

3 **Figure 3.10-2. Land Use Near the Proposed Actions**

4

1 3 nautical miles of the coast. Submerged lands refer to coastal waters extending from the CNMI
2 coastline into the ocean for 3 nautical miles, which is the limit of state, commonwealth, or
3 territorial jurisdiction.

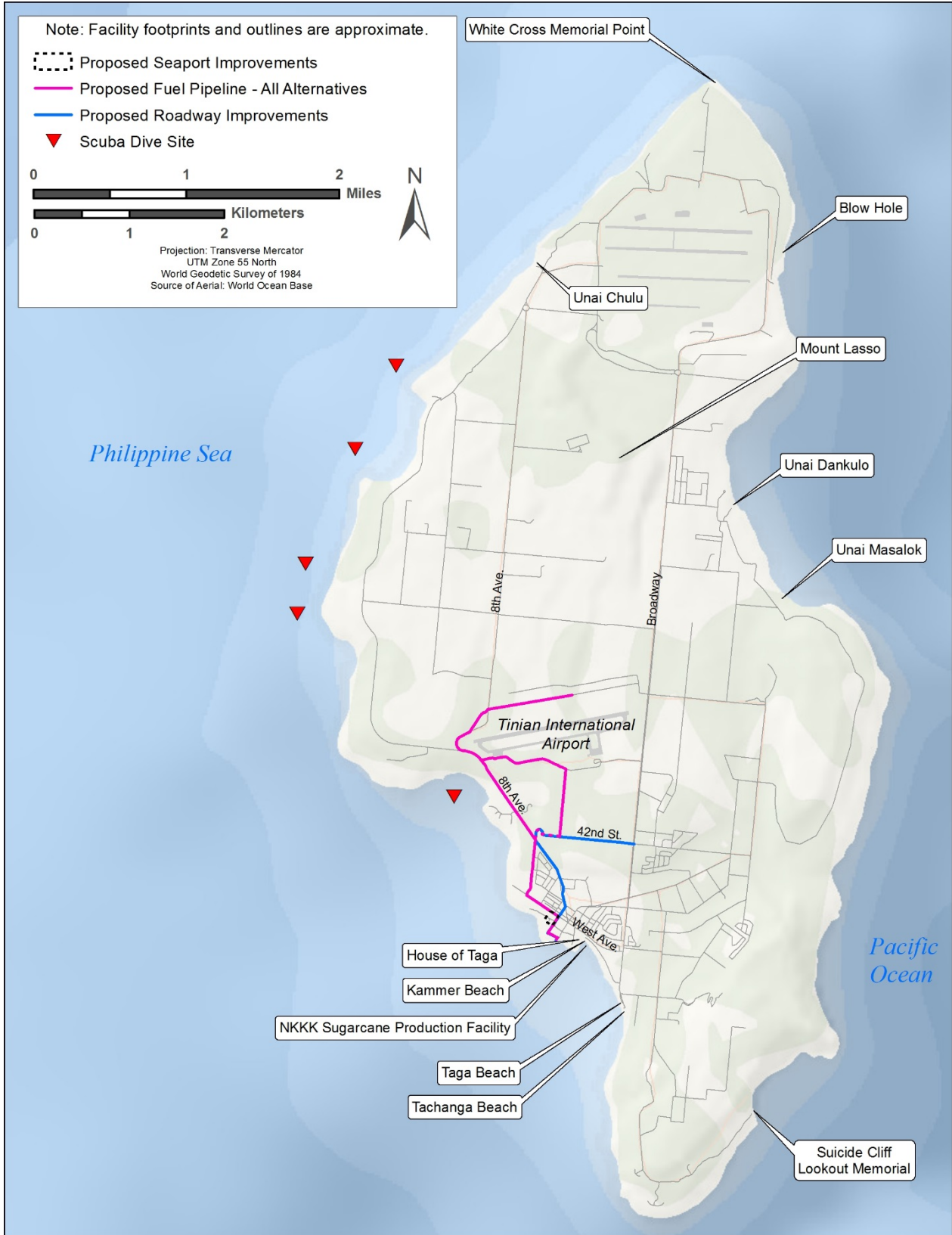
4 The CZMA is administered in the CNMI by the Division of Coastal Resources Management
5 (DCRM) within the Bureau of Environmental and Coastal Quality. As part of the CNMI Coastal
6 Resources Management (CRM) Program, the DCRM has identified Areas of Particular Concern
7 (APCs), which are separate geographically delineated areas within CRM jurisdiction
8 (i.e., coastal zone) that are subject to special management requirements and specific criteria
9 permit evaluations. Currently, the following five APCs are in the CNMI (CNMI CRMO 2012):

- 10 • *Shoreline.* Area between the mean high water mark and 150 feet inland.
- 11 • *Lagoon and Reef.* Area extending seaward from the mean high water mark to the outer
12 slope of the reef.
- 13 • *Wetlands and Mangrove.* Areas that are permanently or periodically covered with water
14 and where species or mangrove vegetation can be found.
- 15 • *Port and Industrial.* Land and water areas surrounding the commercial ports of Saipan,
16 Tinian, and Rota.
- 17 • *Coastal Hazards.* Areas identified as a coastal flood hazard zone (zones V and VE) in
18 the FEMA FIRMs.

19 All five APCs are found on Tinian. The Shoreline, Lagoon and Reef, and Coastal Hazards
20 APCs surround the entire island of Tinian. The Wetlands and Mangrove APC consists of four
21 main areas: Lake Hagoi, Mahalang complex, and Bateha in the MLA, and Makpo in the
22 southeast portion of the island. The Port and Industrial APC consists of Tinian seaport in San
23 Jose (CNMI DCRM 2016).

24 Before work begins on any project to be located wholly or partially within an APC or if a project
25 is a major siting (i.e., a proposed project that has the potential to directly and significantly impact
26 coastal resources), regardless of whether the project is within an APC, a valid CRM permit must
27 be obtained. A CRM permit is not required for projects on federal-lease lands or federally
28 owned submerged lands, but a federal consistency determination under CZMA would be
29 required. Separately, any federal agency proposing to conduct or support an activity that will
30 directly affect the CNMI coastal zone is required to do so in a manner consistent to the
31 maximum extent practicable with the CNMI CRM Program. As such, a federal agency must
32 conduct a consistency determination under the CZMA. If the DCRM does not issue a written
33 response to the agency's consistency determination within 60 days of application certification,
34 the federal agency may presume concurrence that the activity is consistent with the CNMI CRM
35 Program.

36 **Recreation.** The predominant community and tourism activities on Tinian are on the
37 southwestern portion of the island, associated with San Jose Village. Several small and narrow
38 fringing reefs and a small barrier reef are found near Tinian Harbor on the western side of the
39 island. Recreational resources include trails, historic and cultural attractions, beaches and
40 parks, scenic points, and dive spots throughout the island (see **Figure 3.10-3**). Detailed
41 information on recreational resources on Tinian is provided in the 2016 Divert EIS (Final EIS,
42 Section 3.9.2.2).



1
2 **Figure 3.10-3. Popular Recreational Resources on Tinian**

3

3.11 Hazardous Materials and Waste

3.11.1 Definition of the Resource

Hazardous materials are defined by 49 CFR § 171.8 as hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (49 CFR § 172.101), and materials that meet the defining criteria for hazard classes and divisions in 49 CFR § 173. Hazardous wastes are defined by the Resource Conservation and Recovery Act at 42 USC § 6903(5), as amended by the Hazardous and Solid Waste Amendments, as “a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.”

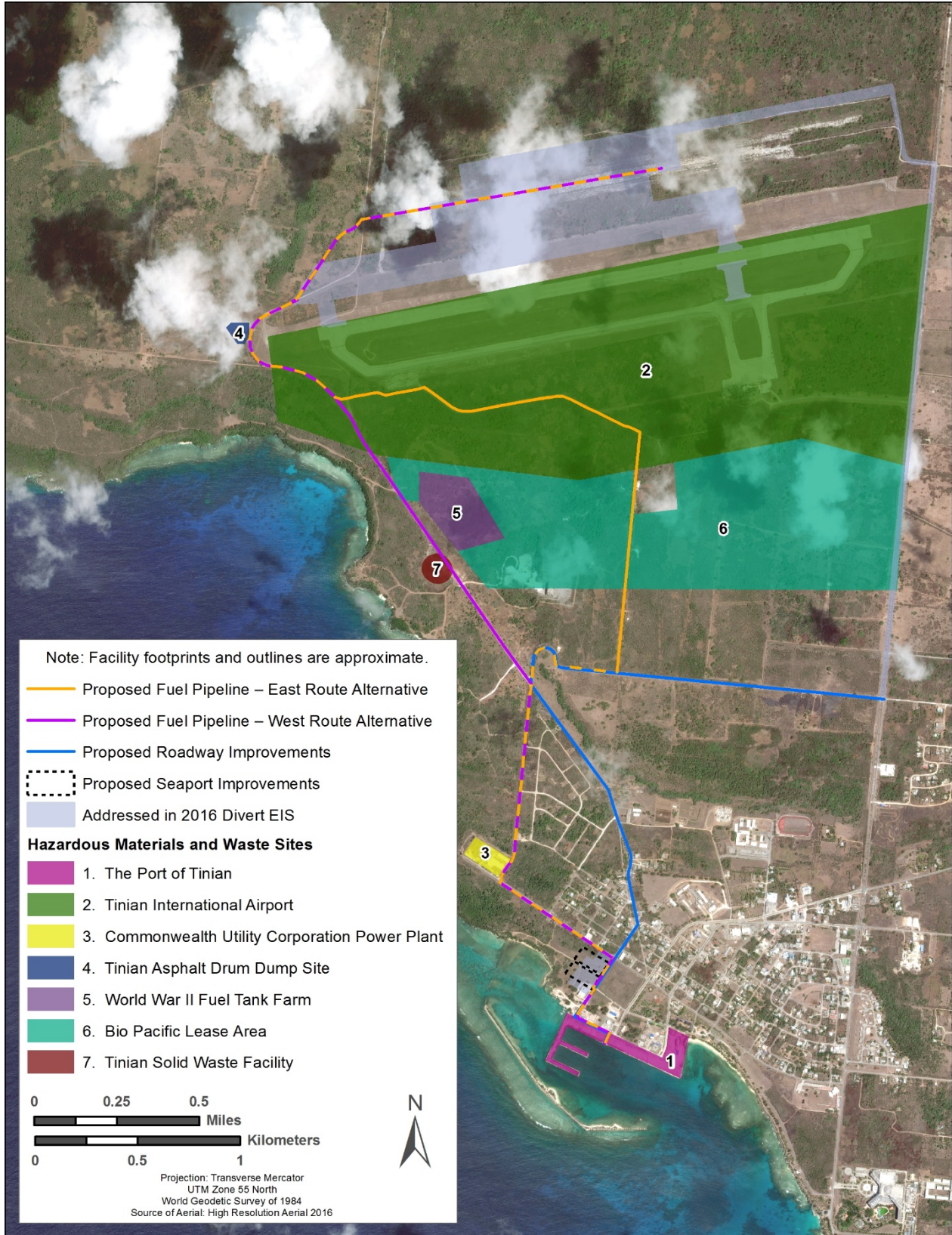
Petroleum products include crude oil or any derivative thereof, such as gasoline, diesel, or propane. They are considered hazardous materials because they present health hazards to users in the event of incidental releases or extended exposure to their vapors.

Evaluation of hazardous materials and wastes focuses on the storage, transportation, handling, and use of hazardous materials, as well as the generation, storage, transportation, handling, and disposal of hazardous wastes. In addition to being a threat to humans, the improper release or storage of hazardous materials, hazardous wastes, and petroleum products can threaten the health and well-being of wildlife species, habitats, soil systems, and water resources.

3.11.2 Existing Conditions

No hazardous materials, hazardous wastes, or petroleum products are known to exist and no environmental contamination has been documented along the proposed West route and East route of the fuel pipeline, at the location for the seaport support infrastructure, and along the roadways proposed for improvement. However, several facilities proximate to the project areas use and store hazardous materials, hazardous wastes, and petroleum products. Additionally, industrial and military activities have occurred on Tinian since before modern environmental regulations; therefore, there is the potential that improper onsite use, storage, and disposal of hazardous materials, hazardous wastes, and petroleum products has occurred and contaminated soil or groundwater is potentially within the project areas.

Sites in proximity to the project areas that are known to use, store, or dispose of hazardous materials, hazardous wastes, and petroleum products or with the potential to have been impacted by past spills or releases are shown in **Figure 3.11-1** and include the following:



1

2 Figure 3.11-1. Hazardous Materials and Waste Sites near the Project Areas

- 1 1. *The Port of Tinian.* A bulk fuel storage facility is located at the Port of Tinian; however,
2 the facility is not within the project area. It is adjacent to the proposed West route and
3 East route of the fuel pipeline and roadway improvements. The facility receives and
4 stores petroleum products for use at the island's power plant and vehicle fueling
5 stations. Fuel is delivered to the facility by tanker vessel from Guam on a monthly basis.
6 Fuel is offloaded via a 4-inch pipeline into a 500,000-gallon, diesel AST and
7 63,000-gallon, gasoline AST. A release of approximately 10,000-gallons of unleaded
8 gasoline was reported at the fuel storage facility in 1992. While the boundaries for the
9 area impacted by the release is not available, it is unlikely this area coincides with the
10 project areas. Remediation of soil and groundwater was implemented, and the site is
11 subject to quarterly groundwater monitoring. No groundwater monitoring wells are
12 believed to coincide with the project areas. Fuel ASTs and piping were inspected by
13 Mobil following Typhoon Yutu in October 2018 and there was no indication of damage to
14 this infrastructure or of a release (Jacobs 2019).
- 15 2. *Tinian International Airport.* Tinian International Airport is adjacent to the proposed West
16 route and East route of the fuel pipeline. The airport uses, handles, and stores
17 hazardous materials, hazardous wastes, and petroleum products for day-to-day
18 operations. However, because the airport currently only is served by smaller aircraft and
19 has limited aircraft maintenance and repair capabilities, the amounts of hazardous
20 materials, hazardous wastes, and petroleum products are limited. Fuel storage
21 infrastructure at the airport currently includes two diesel ASTs measuring 1,500 and
22 2,000 gallons each. Other hazardous materials used at the airport include pesticides,
23 industrial and household cleaning products, hydraulic fluids, paints, and solvents. Jet
24 fuel is not currently available at Tinian International Airport. The only aviation fuel
25 available is 100 Low Lead Aviation Gasoline, which is for piston-engine aircraft. The 100
26 Low Lead Aviation Gasoline is delivered from Saipan via isotanks. Tinian International
27 Airport exchanges one empty isotank at the seaport when a full tank arrives. Only minor
28 leaks have been reported at the airport. However, there is the potential for improper
29 onsite disposal of hazardous and petroleum wastes to have occurred during former
30 operations because the airport predates modern environmental regulations and was
31 used by Japanese and American military forces during World War II (DON 2015a, USAF
32 2016a). As described in the 2016 Divert EIS (Final EIS, Section 2.5.2), USAF will
33 construct and operate 9.24 million gallons of jet fuel storage capacity at Tinian
34 International Airport, configured using two, 2.52-million-gallon ASTs and one,
35 4.20-million-gallon AST.
- 36 3. *Commonwealth Utility Corporation Power Plant and Fuel Delivery Pipeline.* The
37 Commonwealth Utility Corporation power plant is at the intersection of TR26 and 6th
38 Avenue and is adjacent to the proposed West route and East route of the fuel pipeline.
39 The power plant's fuel storage infrastructure includes a 500,000-gallon diesel AST and
40 five smaller diesel and gasoline ASTs. Fuel is transported to the power plant from the
41 Port of Tinian through a 3-inch-diameter pipeline. This pipeline is largely aboveground
42 except where it cross beneath roadways. This pipeline coincides with the proposed
43 West route and East route along TR26. Additionally, the proposed roadway

1 improvements cross the pipeline at the intersection with TR26. No reported releases
2 have been reported at the power plant or along the pipeline (DON 2015a).

- 3 4. *Tinian Asphalt Drum Dump Site.* The Tinian Asphalt Drum Dump Site is a Defense
4 Environmental Restoration Program for Formerly Used Defense Sites site (DON 2015a,
5 USAF 2016a). It is located at the western end of the Tinian International Airport runway
6 and adjacent to the proposed West route and East route of the fuel pipeline. Few details
7 regarding the environmental conditions of this dumpsite are available; however, this site
8 is believed to have resulted from military activities during World War II. The remnants of
9 asphalt plant equipment, drums, and scrap metal are believed to be at the site.
- 10 5. *World War II Fuel Tank Farm.* A World War II-era fuel tank farm was located east of
11 TR25 to the south of the Tinian International Airport (DON 2015a). This site is adjacent
12 to the proposed West route of the fuel pipeline along TR25. The site is unevaluated for
13 whether all fuel storage tanks were removed and the environmental conditions of soil
14 and groundwater. Evidence suggests munitions might also be present on the site.
- 15 6. *Bio Pacific Lease Area.* The Bio Pacific Lease Area is a large area south of the Tinian
16 International Airport that was used during the 1980s for experimental cultivation of sugar
17 cane (DON 2015a). Several chemicals, including pesticides, may have been applied to
18 the land; however, the environmental conditions have not been evaluated. This area is
19 adjacent to the proposed West route of the fuel pipeline along TR25 and coincides with a
20 portion of the proposed East route.
- 21 7. *Tinian Solid Waste Facility.* The Tinian Solid Waste Facility is adjacent to the proposed
22 West route of the fuel pipeline along TR25. The facility has been used for unrestricted
23 dumping of municipal, medical, and military waste in an unlined landfill. The site does
24 not comply with Resource Conservation and Recovery Act regulations governing
25 landfills. The environmental conditions at this facility is unevaluated (DON 2015a, USAF
26 2016a).

27 Additionally, Typhoon Yutu made landfall on Tinian in October 2018 and resulted in temporary
28 and potentially permanent hazardous waste conditions. Typhoon Yutu damaged and
29 dismantled numerous transformers on Tinian in October 2018. As of February 2019,
30 transformers were being removed and associated polychlorinated biphenyl-contaminated
31 material was being excavated across the island (Jacobs 2019). Household hazardous waste,
32 electronic waste, nonhazardous 55-gallon drum waste, nonhazardous material, and generators
33 used for or generated by damage from Typhoon Yutu were accumulated at a storage area at
34 the seaport; however, it is unknown whether these materials will be transferred to a disposal
35 facility or will be permanently stored at this location (PACAF 2019).

36 Tinian was a battleground during World War II; therefore, there is the potential for UXO to be
37 present within the project areas. UXO is most likely to be discovered in heavily vegetated areas
38 that have not been developed since World War II. Because the area north of the Tinian
39 International Airport was extensively cleared during construction of West Field, it is likely that
40 most of the UXO has been removed from the northern portion of the proposed West route and
41 East route of the fuel pipeline (CPA and FAA 1998). However, in the remaining portions of the

1 project areas, the presence of UXO has not been confirmed but the possibility exists for its
2 discovery.

3 3.12 Air Quality

4 3.12.1 Definition of the Resource

5 Air quality is defined as a measurement of pollutants in the air. Air quality refers to pollutants in
6 the air, and the health and safety aspect of those pollutants to humans and the environment,
7 including plants and animals. Air pollution refers to chemical substances, particulates, biological
8 materials, or other harmful materials that degrade the quality of the atmosphere. Air quality is
9 affected by air pollutants from mobile sources such as vehicles, aircraft, ships, and construction
10 equipment, as well as by stationary sources such as emergency generators, industrial stacks,
11 exhaust vents, prescribed fires, and natural processes (e.g., wildfires and volcanic activity).

12 The air quality ROI for the Proposed Actions is Tinian's airshed, which includes the land areas
13 and coastal waters within 3 nautical miles of the island.

14 In accordance with Federal Clean Air Act (CAA) requirements, the air quality in a given region or
15 area is measured by the concentration of various pollutants in the atmosphere. The
16 measurements of these "criteria pollutants" in ambient air are expressed in units of parts per
17 million (ppm), parts per billion (ppb), milligrams per cubic meter (mg/m^3), or micrograms per
18 cubic meter ($\mu\text{g}/\text{m}^3$). The air quality in a region is a result not only of the types and quantities of
19 atmospheric pollutants and pollutant sources in an area, but is also influenced by the surface
20 topography, the size of the topological "air basin," and the prevailing meteorological conditions.

21 The regulatory framework governing air quality for the Proposed Actions includes the CAA
22 (42 USC § 7401 et seq.) and CNMI Air Pollution Control Regulations (52 FR 43574 and
23 79 FR 22032).

24 **Ambient Air Quality Standards.** The CAA directed USEPA to develop, implement, and
25 enforce strong environmental regulations that would ensure clean and healthy ambient air
26 quality. To protect public health and welfare, USEPA developed numerical concentration based
27 standards, or National Ambient Air Quality Standards (NAAQS), for pollutants that have been
28 determined to impact human health and the environment. USEPA established primary and
29 secondary NAAQS under the provisions of the CAA.

30 USEPA, under the requirements of the CAA, and codified in 40 CFR § 50, established NAAQS
31 for the following six contaminants, referred to as criteria pollutants:

- 32 • Carbon monoxide (CO)
- 33 • Nitrogen dioxide (NO₂)
- 34 • Ozone (O₃)
- 35 • Respirable particulate matter (including particulate matter equal to or less than 10
36 microns in diameter [PM₁₀] and particulate matter equal to or less than 2.5 microns in
37 diameter [PM_{2.5}]),

- 1 • Lead (Pb)
- 2 • Sulfur dioxide (SO₂).

3 Although O₃ is considered a criteria pollutant and is measurable in the atmosphere, it is not
4 often considered a regulated pollutant when calculating emissions because O₃ is typically not
5 emitted directly from most emissions sources. Ozone is formed in the atmosphere by
6 photochemical reactions involving sunlight and previously emitted pollutants or O₃ precursors.
7 The O₃ precursors consist primarily of nitrogen oxides (NO_x) and volatile organic compounds
8 (VOCs) that are directly emitted from a wide range of emissions sources. For this reason,
9 regulatory agencies attempt to limit atmospheric O₃ concentrations by controlling NO_x and VOC
10 pollutants.

11 The primary NAAQS represent maximum levels of background air pollution that are considered
12 safe, with an adequate margin of safety to protect public health. They were established to
13 protect human health, particularly the health of sensitive populations such as asthmatics,
14 children, and the elderly. Sensitive land uses protected by the primary NAAQS are areas used
15 by these sensitive populations including residences, hospitals, libraries, churches, parks,
16 playgrounds, and schools.

17 Secondary NAAQS represent the maximum pollutant concentration necessary to protect
18 vegetation, crops, and other public resources along with maintaining visibility standards. They
19 set limits to protect the environment, including plants and animals, from adverse effects
20 associated with pollutants in the air.

21 The CAA also gives the authority to states, territories, and commonwealths to establish air
22 quality rules and regulations, including adopting the NAAQS. The CNMI has adopted the
23 Federal NAAQS. **Table 3.12-1** presents the primary and secondary Federal NAAQS.

24 **Attainment and General Conformity.** USEPA classifies the air quality in an air quality control
25 region (AQCR), or in subareas of an AQCR, according to whether the concentrations of criteria
26 pollutants in ambient air exceed the NAAQS. Areas within each AQCR are therefore
27 designated as “attainment,” “nonattainment,” “maintenance,” or “unclassified” for each of the six
28 criteria pollutants.

29 Attainment means that the air quality within an AQCR is better than the NAAQS. In these
30 areas, concentration levels of a criteria pollutant are beneath the NAAQS. Nonattainment
31 means that a criteria pollutant level equals or exceeds the NAAQS. Maintenance indicates that
32 an area was previously designated nonattainment, but is now attainment, and has an approved
33 maintenance plan under § 175 of the CAA. Unclassifiable means insufficient data exist to
34 determine an area’s attainment status, so the area is considered in attainment.

35 USEPA has delegated the authority for ensuring compliance with the NAAQS in the CNMI to the
36 CNMI BECQ. The CNMI BECQ’s air pollution control regulations can be found at 52 FR 43574
37 and 79 FR 22032. In accordance with the CAA, each state or commonwealth must develop a
38 State Implementation Plan (SIP), which is a compilation of regulations, strategies, schedules,
39 and enforcement actions designed to bring the state or commonwealth into compliance with all
40 NAAQS.

1 **Table 3.12-1. National and CNMI Ambient Air Quality Standards**

Pollutant	Averaging Time	Primary Standard		Secondary Standard
		Federal	CNMI	
CO	8-hour ⁽⁵⁾	9 ppm (10 mg/m ³)	Same	None
	1-hour ⁽⁵⁾	35 ppm (40 mg/m ³)	Same	None
Pb	Rolling 3-Month Average ⁽⁶⁾	0.15 µg/m ³ ⁽¹⁾	Same	Same as Primary
NO ₂	Annual ⁽⁷⁾	53 ppb ⁽²⁾	Same	Same as Primary
	1-hour ⁽⁸⁾	100 ppb	Same	None
PM ₁₀	24-hour ⁽⁹⁾	150 µg/m ³	Same	Same as Primary
PM _{2.5}	Annual ⁽¹⁰⁾	12 µg/m ³	Same	15 µg/m ³
	24-hour ⁽⁸⁾	35 µg/m ³	Same	Same as Primary
O ₃	8-hour ⁽¹¹⁾	0.07 ppm ⁽³⁾	Same	Same as Primary
SO ₂	1-hour ⁽¹²⁾	75 ppb ⁽⁴⁾	Same	None
	3-hour ⁽⁵⁾	--	Same	0.5 ppm

Sources: USEPA 2015, CNMI BECQ 2004, CNMI 2012

Notes: Parenthetical values are approximate equivalent concentrations.

1. In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m³ as a calendar quarter average) also remain in effect.
2. The level of the annual NO₂ standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.
3. 2015 O₃ standard. The previous (2008) O₃ standards remain in effect in some areas.
4. The previous SO₂ standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous SO₂ standards or is not meeting the requirements of a SIP call under the previous SO₂ standards (40 CFR § 50.4[3]). A SIP call is a USEPA action requiring a state to resubmit all or part of its SIP to demonstrate attainment of the required NAAQS.
5. Not to be exceeded more than once per year.
6. Not to be exceeded.
7. Annual mean.
8. 98th percentile, averaged over 3 years.
9. Not to be exceeded more than once per year on average over 3 years.
10. Annual mean, averaged over 3 years.
11. Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years.
12. 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years.

Key: ppm = parts per million; ppb = parts per billion; mg/m³ = milligrams per cubic meter; µg/m³ = micrograms per cubic meter

- 2 To some degree, the localized air quality condition on Tinian can be correlated with the
- 3 proximity of major emission sources. Stationary source permits regulate emissions from a
- 4 facility but cannot be utilized to calculate ambient air quality conditions in terms of the NAAQS.
- 5 The General Conformity Rule applies only to actions in nonattainment or maintenance areas.
- 6 The General Conformity Rule requires that any federal action meet the requirements of an
- 7 existing SIP or Federal Implementation Plan. More specifically, CAA conformity is ensured

1 when a federal action does not cause a new violation of the NAAQS; contribute to an increase
2 in the frequency or severity of violations of the NAAQS; or delay the timely attainment of any
3 NAAQS, interim progress milestones, or other milestones towards achieving compliance with
4 the NAAQS. Because Tinian is designated as attainment/unclassifiable, the General Conformity
5 Rule does not apply.

6 **Federal Prevention of Significant Deterioration.** Federal Prevention of Significant
7 Deterioration (PSD) regulations apply in attainment areas to major stationary sources
8 (e.g., sources with the potential to emit 250 tons per year [tpy] of regulated pollutants) and
9 significant modifications to major stationary sources (e.g., change that adds 0.6 tpy for Pb, or
10 10 tpy to 100 tpy depending on the regulated pollutant, to the facility's potential to emit).
11 Additional PSD permitting thresholds apply to significant increases in major stationary source
12 greenhouse gas (GHG) emissions. PSD permitting can also apply to a proposed project if all
13 three of the following conditions exist: (1) the proposed project is a modification with a net
14 emissions increase to an existing PSD major source, and (2) the proposed project is within
15 10 kilometers of national parks or wilderness areas (i.e., Class I Areas), and (3) regulated
16 stationary source pollutant emissions would cause an increase in the 24 hour average
17 concentration of any regulated pollutant in the Class I area of 1 µg/m³ or more
18 (40 CFR § 52.21[b][23][iii]). A Class I area includes national parks larger than 6,000 acres,
19 national wilderness areas and national memorial parks larger than 5,000 acres, and
20 international parks. PSD regulations also define ambient air increments, limiting the allowable
21 increases to any area's baseline air contaminant concentrations, based on the area's Class
22 designation (40 CFR § 52.21[c]). USEPA administers the PSD program in the CNMI.
23 Emissions associated with the Proposed Action are not expected to trigger PSD.

24 **Title V Requirements.** Title V of the CAA Amendments of 1990 requires states and local
25 agencies to permit major stationary sources. A Title V major stationary source has the potential
26 to emit regulated air pollutants and hazardous air pollutants (HAPs) at levels equal to or greater
27 than Major Source Thresholds. Major Source Thresholds vary depending on the attainment
28 status of an AQCR. The purpose of the permitting rule is to establish regulatory control over
29 large, industrial-type activities and monitor their impact on air quality. Section 112 of the CAA
30 lists HAPs and identifies stationary source categories that are subject to emissions control
31 and/or work practice requirements. Emissions associated with the Proposed Action are not
32 expected to trigger Title V.

33 **Greenhouse Gas Emissions.** GHGs are gas emissions that include water vapor, carbon
34 dioxide (CO₂), methane, nitrous oxide, O₃, and several fluorinated and chlorinated gaseous
35 compounds.

36 **Fugitive Dust Emissions.** CNMI Air Pollution Control Regulations in Chapter 65-10, Part 415
37 relating to fugitive dust, require reasonable precautions to prevent particulate matter from
38 becoming airborne. This is applicable to materials handling, transport, and storage. This is also
39 applicable to road construction, repair, alteration, and demolition. Visible fugitive dust emissions
40 are not allowed beyond the lot line of the property on which the emissions originate.

1 3.12.2 Existing Conditions

2 Tinian is in the CNMI, which is within the USEPA Pacific Southwest Region 9 (USEPA 2011).
3 As defined in 40 CFR § 81.354, due to lack of monitoring the CNMI is designated as
4 attainment/unclassifiable for all criteria pollutants (USEPA 2012). USEPA has not designated
5 an AQCR that encompasses the CNMI. In addition, no emissions inventories or monitoring data
6 are available locally or regionally for the CNMI.

7 The U.S. Department of Energy, Energy Information Administration, does not provide estimates
8 for gross CO₂ emissions for the CNMI.

9 The CNMI BECQ regulates air quality air permits for stationary air pollution sources in the
10 CNMI. The CNMI BECQ requires all air permit application submissions to include dispersion
11 modeling (conservative or refined), which is evaluated and compared against the NAAQS for
12 compliance.

13 Tinian has a tropical climate. Over the course of the year, the temperature varies from 76 to
14 88 degrees Fahrenheit (24 to 31 degrees Celsius) and is rarely below 73 degrees Fahrenheit
15 (22 degrees Celsius) or above 90 degrees Fahrenheit (32 degrees Celsius). The probability of
16 precipitation varies throughout the year but occurs most often around October. Wind speeds
17 typically vary from 2 to 22 miles per hour with dominant winds originating from the east. Due to
18 its location relative to an area of cyclonic development in the Pacific Ocean, Tinian is always
19 under weather condition 4, which means that 40 miles per hour winds are possible within 72
20 hours (Pacific RISA undated). It is anticipated that air pollutants from the island are quickly
21 dispersed under normal weather conditions.

22 There are no Class I areas in the CNMI, and the CNMI is not within 10 kilometers of a Class I
23 area. The existing airport and seaport are not PSD major sources. Emissions associated with
24 the Proposed Actions are not expected to create a major source or trigger PSD.

25 The largest stationary sources on Tinian include power generation units and facilities that
26 comprise the existing island-wide power system owned by the Commonwealth Utilities
27 Corporation. The power generation facility consists of four 2.5 MW diesel generators and two
28 5-MW diesel generators. These generators are the largest stationary sources of air emissions
29 on Tinian. In addition to the major stationary sources, facilities may have back-up generators in
30 case of grid power failure; however, these sources are intermittent and considered minor
31 stationary sources.

32 Traffic along major travel routes, such as TR21 and TR25 within the San Jose area, are the
33 dominant source of mobile emissions. Operation of aircraft and vessels also generates
34 emissions. Existing effects from these emission sources are negligible when compared to those
35 from immediately adjacent roadway traffic.

This page intentionally left blank.

4. Environmental Consequences

This section presents the analysis of potential impacts on the identified resources from the Proposed Actions and No Action Alternatives. The potential impacts are provided for each Proposed Action and No Action Alternative, and a summary of potential impacts is provided at the end of each resource analysis if both Proposed Actions were to be implemented.

As described in **Section 3**, throughout this SEIS, as applicable, the area for each of the Proposed Actions or alternatives that could be physically disturbed is referred to as the “project area.” The term “project area” encompasses the locations proposed for construction for each particular Proposed Action. This SEIS uses the term ROI to describe the complete geographic scope of potential consequences for the resource area. For most of the resource areas, the ROI is defined as the area of the island affected by the construction or operation of the proposed infrastructure. For some resources, such as noise, air quality, and socioeconomics, the ROI extends into surrounding communities, or across the CNMI, unique to that specific resource. Specific descriptions of compliance actions have been integrated into the resource area analysis for each alternative and are summarized in **Appendix F**.

4.1 Noise

4.1.1 Analysis Methodology

Noise impact analysis evaluates potential changes to the existing noise environment that would result from a proposed action. Potential changes in the acoustical environment can be beneficial (i.e., if they reduce the number of sensitive receptors exposed to high noise levels or reduce the ambient sound level) or adverse (i.e., if they result in increased sound exposure to high noise levels or ultimately increase the ambient sound level). Significant noise impacts would be those that exceed allowable thresholds as defined under local or state regulations, or result in sustained noise annoyance or noise exposure affecting nearby NSRs.

Noise annoyance is defined by USEPA as any negative subjective reaction to noise by an individual or group. DNL is an accepted metric for quantifying community annoyance to general environment noise, including construction noise. **Table 4.1-1** lists the percentages of people that would be projected to be “highly annoyed” when exposed to various levels of noise measured in DNL. This table presents consolidated results of more than a dozen studies of the relationship between noise and annoyance levels. This relationship was suggested in 1977 by the National Academy of Sciences and was recently reevaluated for use in describing peoples’ reactions to semicontinuous (transportation) noise (Finegold et al. 1994). **Table 4.1-1** provides a perspective on the level of annoyance that might be anticipated from construction of the Proposed Actions.

1 **Table 4.1-1. Percentage of Population Highly Annoyed by DNL Noise Levels**

DNL Noise Contours	Percentage of Persons Highly Annoyed	
	Low	High
65–70 dBA	12	22
70–75 dBA	22	36
75–80 dBA	36	54
80+ dBA	> 54	

Source: Finegold et al. 1994

2 **4.1.2 Pipeline and Support Infrastructure**

3 **4.1.2.1 West Route**

4 **Construction.** Short-term, minor to moderate impacts on the ambient sound environment
 5 would be expected from construction of the West route pipeline from construction equipment
 6 and trucks. It is not anticipated that the temporary increase in ambient sound levels associated
 7 with construction would result in a significant noise impact. Construction could be restricted to
 8 between sunrise and sunset to reduce annoyance to adjacent populations.

9 Individual equipment used for construction would be expected to result in noise levels
 10 comparable to those shown in **Table 4.1-2**. Noise levels associated with the individual types of
 11 construction equipment presented in **Table 4.1-2** assumes the equipment would be operated
 12 without the use of enclosures, mufflers, or other sound-reducing equipment. However, use of
 13 these common measures, such as equipment exhaust mufflers, would minimize noise impacts.

14 **Table 4.1-2. Noise Levels Associated with Construction Equipment**

Equipment Type	Noise Level (dBA)	Median Noise Level (dBA)
Backhoe	72–93	81
Concrete mixer	74–88	83
Crane	75–87	80.5
Front loader	72–83	81
Grader	80–93	88
Jackhammer	81–98	89
Paver	86–88	86.5
Roller	73–75	74
Truck	83–94	87.5

Source: USEPA 1971

15 Construction vehicle trips would be dispersed throughout the day and noise levels from
 16 construction trucks generally range between 83 and 94 dBA, 50 feet from the source.
 17 Roadways that would likely receive the majority of the construction and worker traffic include
 18 6th Avenue, TR26, TR25, and TR24. Noise level increases would be temporary, occurring
 19 several times per day during work hours. Therefore, noise impacts from construction traffic on
 20 the ambient sound environment are not anticipated to be significant.

1 To predict how construction and related traffic volume increases would impact adjacent
2 populations or other nearby NSRs, noise levels from the probable associated equipment were
3 estimated. **Table 4.1-3** provides the nearest distances at which NSRs would be exposed to
4 construction noise and the maximum anticipated noise levels at those distances. Construction
5 of the West route could result in short-term, minor noise impacts on nearby NSRs and would not
6 be significant because construction would not be constant for any one location, and would
7 generally be far enough from NSRs that noise exposure would not reach 65 dB. However,
8 some residences along TR26 would be exposed to moderate increases in noise levels
9 conservatively estimated to reach 92.7 dB when construction actions are occurring adjacent to
10 those locations.

11 Construction at the seaport, including operation of construction equipment and vehicles, would
12 conservatively generate a noise level of approximately 90.7 dB within 50 feet of the construction
13 site. As shown in **Table 4.1-3**, noise levels at nearby NSRs would not reach or exceed 65 dBA.

14 **Operation.** Once constructed and in service, normal pipeline operations are not audible.
15 Operation of the booster pump station would generate noise, but would be consistent with the
16 existing noise levels for the surrounding area, and would not be disruptive or reach levels of
17 annoyance.

18 4.1.2.2 East Route

19 Because the routing of the West and East routes are the same from the seaport northward to
20 TR24, noise impacts on nearby communities resulting from construction of the East route in this
21 portion of the East route would be the same as described for the West route. Each residence in
22 San Jose located along TR26 would be moderately impacted by construction noise within a
23 0.5-mile proximity. However, as construction progresses toward the 6th Avenue connection, the
24 level of noise exposure on those residences would return to ambient conditions. As pipeline
25 installation progresses north of TR24 and along the final approaches to the Divert fuel storage
26 tank, construction noise impacts would be concentrated around the southern, western, and
27 northern boundaries of the airfield. Impacts on noise from construction of the seaport support
28 infrastructure would be the same as those described for the West route.

29 **Operation.** Once constructed and in service, normal pipeline operations are not audible.
30 Operation of the booster pump station would generate noise, but would be consistent with the
31 existing noise levels for the surrounding area, and would not be disruptive or reach levels of
32 annoyance.

33 4.1.2.3 No Action Alternative

34 Under the No Action Alternative, USAF would not construct the fuel pipeline but would construct
35 a fuel storage tank at the seaport and use fuel trucks to transport fuel from the seaport to the
36 airport. As described in the 2016 Divert EIS (Final EIS, Section 4.1.2.1), noise levels from
37 construction of the fuel storage tank would be similar to those presented for construction of the
38 seaport support infrastructure. Additionally, noise impacts associated with fuel truck trips
39 between the airport and seaport would be short-term and moderate on receptors adjacent to the
40 roadways. These impacts would be similar to the noise expected from construction vehicles for
41 construction of the pipeline.

1 **Table 4.1-3. NSR Proximity to Pipeline and Support Infrastructure Construction and Associated Noise Level Exposure**

NSR	Type	Nearest Construction, Distance, and Noise Level ^{1, 2, 3, 4}							
		Pipeline Installation						Seaport Infrastructure	
		6th Avenue		TR26		TR24		Seaport	
		feet	dB	feet	dB	feet	dB	feet	dB
Tinian High School	School	3,696	53	2,741	56	2,500	57	3,875	53
Tinian Elementary School	School	3,092	53	1,440	62	3,526	54	2,698	56
Northern Marianas College, Tinian	School	1,838	59	2,401	57	2,217	58	3,620	54
City of San Jose	Residential Area	1,085	64	39	93	1,835	59	1,270	63
Kammer Beach	Recreational and Residential Area	3,060	53	899	65	6,201	47	1,275	61
Marpo Heights	Residential Area	6,158	49	1,665	60	1,630	60	6,127	49
Northeast Marpo Heights	Residential Area	9,500	45	9,023	46	3,899	53	10,111	45
San Jose Catholic Church	Place of Worship	3,266	54	1,083	64	4,074	52	1,200	63
Tinian Health Center	Medical Facility	4,015	53	1,289	62	4,143	52	2,632	56

Table Notes:

¹ Distances estimated using Google Earth measurement tool.

² Noise levels calculated using OSHA Technical Manual formula for determining cumulative construction noise levels at a distance (OSHA 2013).

³ Noise level is associated with anticipated construction noise for the nearest construction point proximal to the identified NSR. In the cases of residential areas, residences are at least 25 feet from the nearest roadway. Generally, residences located along roadways were determined to have setback distances of between 25 and 150 feet.

⁴ Distances indicated for residential areas use an individual residence located nearest to the road where construction actions could occur. Because the alternative routes use different roadway combinations, the residences located nearest to each road were used for distance determinations.

1 4.1.3 Roadway Improvements

2 4.1.3.1 Proposed Action

3 Noise impacts on San Jose residential areas would be short-term and moderate for individual
4 residences located nearest the proposed roadway improvement segments of TR25 and TR26,
5 as shown in **Table 4.1-4**. However, as construction progresses northward, noise exposure for
6 residences located approximately 0.5 mile north or south of where construction would actually
7 be occurring would be less than the 65 dBA compatibility threshold; therefore, impacts at this
8 distance would be minor. For the duration of construction, measures such as use of mufflers,
9 barriers, and restricting construction to daytime hours would help to reduce noise increases on
10 nearby populations. The median noise level for roadway improvement construction was
11 estimated at 92.7 dB.

12 **Table 4.1-4. NSR Proximity to Roadway Improvements and Associated Noise Level**
13 **Exposure**

NSR	Type	Nearest Construction, Distance, and Noise Level ^{1, 2, 3, 4}	
		Road Improvements	
		feet	dB
Tinian High School	School	1,740	62
Tinian Elementary School	School	991	67
Northern Marianas College, Tinian	School	311	77
City of San Jose	Residential Area	25	99
Kammer Beach	Recreational and Residential Area	1,300	63
Marpo Heights	Residential Area	4,261	54
Northeast Marpo Heights	Residential Area	6,633	50
San Jose Catholic Church	Place of Worship	941	67
Tinian Health Center	Medical Facility	1,485	63

Table Notes:

¹ Distances estimated using Google Earth measurement tool.

² Noise levels calculated using OSHA Technical Manual formula for determining cumulative construction noise levels at a distance (OSHA 2013).

³ Noise level is associated with anticipated construction noise for the nearest construction point proximal to the identified NSR. In the cases of residential areas, residences are located at least 25 feet from the nearest roadway. Generally, residences located along roadways were determined to have setback distances of between 25 and 150 feet.

⁴ Distances indicated for residential areas use an individual residence located nearest to the road where construction actions could occur. Because the alternative routes use different roadway combinations, the residences located nearest to each road were used for distance determinations.

14 For a distance of approximately 0.5 mile along TR25 during road construction, Tinian
15 Elementary and Northern Marianas College would be exposed to noise exceeding the 65 dBA
16 compatibility threshold. Respectively, outdoor noise level at Tinian Elementary and Northern
17 Marianas College would likely be dominated by the 67 dBA and 77 dBA construction noise
18 levels. Additionally, outdoor noise at the San Jose Catholic Church would be expected to be
19 dominated by the approximately 67 dB construction noise when activities are occurring in its

1 location. Because noise would be intermittent and short term, people at these locations would
2 likely remain indoors during hours of construction, and the buildings would offer some additional
3 level of noise reduction, the annoyance impacts on the people inside the schools and the church
4 would be less. Once construction reaches TR24, noise associated with the roadway
5 improvements would be imperceptible to NSRs. Therefore, significant noise impacts on nearby
6 populations or NSRs would not be expected.

7 4.1.3.2 No Action Alternative

8 Under the No Action Alternative, only minor roadway repairs along the construction and fuel
9 truck routes would occur, as was considered in the 2016 Divert EIS (Final EIS, Section 4.11.2).
10 Noise level increases associated with road repairs would be short term, direct, and minor as
11 equipment would be minimally required to accommodate repairs.

12 4.1.4 Summary of Impacts

13 4.1.4.1 Proposed Actions and Alternatives

14 Anticipated construction noise impacts on the ambient sound environment would include short-
15 term, intermittent, moderate increases of the outdoor noise levels at residences immediately
16 proximal to roads where operation of equipment and vehicles to construct the proposed fuel
17 pipeline, seaport infrastructure, and roadway improvements would occur. These impacts would
18 be experienced within 0.5 mile of each affected residence along the construction route.
19 Implementing noise reduction measures that would include use of mufflers on construction
20 equipment and limiting construction actions to daytime business hours would be expected to
21 reduce noise impacts on nearby NSRs. Operation of the pipeline and support infrastructure
22 would have no impacts on the noise environment.

23 4.1.4.2 No Action Alternatives

24 Under the No Action Alternatives, USAF would not construct the fuel pipeline, support
25 infrastructure, and roadway improvements but would construct a fuel storage tank at the
26 seaport, complete only minor road repairs, and use fuel trucks to transport fuel from the seaport
27 to the airport. Residences near the seaport and near the roadways undergoing minor repair or
28 being used for fuel transport would experience periodic or short-term, minor to moderate
29 increases in noise.

30 4.2 Biological Resources

31 4.2.1 Terrestrial Biological Resources

32 4.2.1.1 Analysis Methodology

33 Issues and concerns addressed in this section include the potential direct, indirect, and
34 cumulative impacts of construction and implementation of the Proposed Actions and alternatives
35 on terrestrial biological resources. Impacts can be either temporary (reversible) or permanent
36 (irreversible). Direct and indirect impacts are distinguished as follows.

37 *Direct impacts* are associated with proposed construction (e.g., ground-disturbing activities) and
38 implementation (e.g., fuel transportation). Potential types of direct impacts include the following:

- 1 • injury or mortality to plants and animals, including special status species, caused by the
2 action
- 3 • loss of habitat due to vegetation removal and excavation during construction
- 4 • temporary avoidance of habitat during construction from noise, lighting, and human
5 activity
- 6 • impacts to terrestrial habitats from potential releases of fuel during operations of the
7 pipeline.

8 *Indirect impacts* are caused by or result from project activities, are usually later in time, and are
9 reasonably foreseeable (e.g., increased likelihood of nonnative, invasive species moving into
10 the area after disturbance). Potential indirect impacts include the following:

- 11 • introduction of nonnative, invasive species or increased abundance or dispersal of those
12 species
- 13 • a change in freshwater or marine water quality from an increase in erosion or stormwater
14 runoff following installation of the pipeline and improvement of roads.

15 The level of impact on biological resources is based on (1) the importance (i.e., legal,
16 commercial, recreational, ecological, or scientific) of the resource, (2) the proportion of native
17 biological resource that would be affected relative to its occurrence in the region, (3) the
18 sensitivity of the resource to the proposed activities, and (4) the duration of ecological
19 ramifications. Impacts on biological resources are considered significant if species or habitats
20 of high concern are affected over relatively large areas, or disturbances cause reductions in
21 population size or distribution of a species of special concern. A habitat perspective is used to
22 provide a framework for analysis of impacts.

23 **ESA Consultation.** As a requirement under the ESA, federal agencies must ensure that their
24 actions do not jeopardize the existence of any threatened or endangered species or adversely
25 modify critical habitat. In addition, the ESA prohibits the “taking” of threatened or endangered
26 animals. Section 7 of the ESA establishes a consultation process with USFWS for terrestrial
27 species for evaluating effects of federal projects on protected species.

28 To comply with Section 7 of the ESA, USAF prepared a Biological Assessment to evaluate the
29 effects of the Proposed Actions on federally listed proposed, threatened, and endangered
30 species and proposed and designated critical habitat. In the Biological Assessment, USAF
31 determined that the Proposed Actions would have no effect on federally listed proposed,
32 threatened, and endangered species and proposed and designated critical habitat. Therefore,
33 consultation with and concurrence from USFWS are not required.

34 4.2.1.2 Pipeline and Support Infrastructure

35 4.2.1.2.1 West Route

36 **Vegetation.** Long-term, minor, direct impacts on vegetation are expected from construction of
37 the pipeline along the West route. Impacts on vegetation from construction of infrastructure at
38 the seaport would be negligible because that area has been developed and has urban

1 vegetation characterized by introduced landscaped grasses and forbs maintained by periodic
2 mowing. Impacts are not expected on vegetation from the operation of the fuel pipeline or
3 support infrastructure.

4 If the pipeline were to be constructed along the West route, the ROI would include an estimated
5 103.63 acres. The utility easement for the pipeline has not yet been selected; therefore, the
6 affected acreage is calculated based on the 2018 survey width, which in areas was 100 feet
7 wide. The actual acreage of vegetation that would be affected during construction would likely
8 be significantly less than 103.63 acres, especially because less than an 80-foot width is
9 expected to be cleared for pipeline installation (see **Table 3.2-1**).

10 Much of the vegetation to be cleared along the West route is Mixed Introduced Forest
11 (31 acres), Tangantangan Forest (22 acres), and Other Shrub and Grass (19 acres). Over 24
12 acres of the West route is with Urban and Built Up land. No vegetation communities that are
13 rare and have a high diversity of native plant species, such as native limestone and strand
14 forests, would be disturbed. Thus, construction of the pipeline would cause a minor reduction in
15 native vegetation and little or no change in the diversity of vegetation communities or
16 composition of vegetation within those communities. Because much of the route has been
17 previously disturbed, vegetation communities there are dominated by nonnative species, and
18 native plants are uncommon, installation and operation of the pipeline would not cause a
19 noticeable increase in invasive or other nonnative vegetation in the area.

20 **Wildlife.** Short-term, minor, direct impacts on native wildlife are expected from construction of
21 the pipeline along the West route. Impacts on wildlife from construction of infrastructure at the
22 seaport would be negligible because the site and surrounding area has been developed and
23 has little or no suitable habitat for native species. Impacts are not expected on wildlife from the
24 operation of the fuel pipeline or support infrastructure.

25 Forested areas along the western and southern portion of the West route are used by the Tinian
26 native forest birds such as the Mariana fruit dove, Micronesian starling, collared kingfisher,
27 rufous fantail, Tinian monarch, and by numerous other native and nonnative species of wildlife.
28 Pipeline construction would cause a loss of a small amount of the available habitat for those
29 species on Tinian. There are over 11,000 acres of tangantangan and other second growth
30 forest vegetation on Tinian (Donnegan et al. 2011); therefore, installation of a fuel pipeline along
31 the West route would result in the loss of a negligible amount of available suitable habitat on
32 Tinian.

33 Migratory birds and other mobile wildlife would temporarily avoid areas along and near the
34 pipeline route during construction. Smaller, less-mobile species and nesting birds could
35 inadvertently be harmed during construction. To avoid harming nesting birds, surveys or
36 monitoring during construction would be conducted and areas where active nests are found
37 would be avoided, or other measures would be taken to avoid harming any migratory birds,
38 nests, or eggs. Long-term, permanent impacts on native species of wildlife would be minor
39 because very little habitat used by those species would be disturbed and because the species
40 observed in the project area are abundant in surrounding areas.

1 Nonnative, invasive species are an important threat to native wildlife on Tinian (CNMI DFW
2 2015). Movement of equipment and supplies could result in the introduction or spread of
3 invasive plant and animal species to Tinian. The potential establishment of the brown tree
4 snake (*Boiga irregularis*) is of great concern there. If brown tree snakes were to become
5 established (without immediate suppression) on Tinian under the Proposed Action, the impacts
6 would likely be similar to those experienced on Guam (DON 2010b). EO 13112 directs
7 agencies to prevent the spread of invasive species in their work. To prevent the introduction of
8 brown tree snakes and the spread of other invasive species, control and interdiction methods
9 agreed upon by USFWS and USAF for construction of facilities at the Tinian International
10 Airport (USFWS 2013, USFWS 2015c) would be implemented during construction of the
11 pipeline and for other proposed infrastructure upgrades. These measures, which include
12 minimizing the routing of shipments through Guam, and redundant inspection of materials that
13 must be shipped from that island, would reduce to a very low level the risk that a brown tree
14 snake would be transported to Tinian during pipeline construction. USAF would also conduct
15 risk analyses, develop and implement procedures, and participate in regional planning to reduce
16 or eliminate the spread of other invasive species.

17 **Special Status Species.** Two fadang were observed during the 2018 survey along the
18 southern edge of road TR26. The two individuals were planted as part of a decorative
19 landscape for the Nanyo Kohatsu Kabushiki Kaisha Administration Building and Laboratory,
20 which is listed on the National Register of Historic Places (NRHP). The proposed pipeline
21 would be designed and sited to avoid the two individual fadang and the associated NRHP-listed
22 property. The pipeline would be located within a proposed utility easement between the existing
23 overhead electrical lines and road. During construction, crews and equipment would entirely
24 avoid the NRHP-listed property and the two fadang within the landscaped area. Thus,
25 construction and operation of the proposed fuel pipeline and support infrastructure, and
26 roadway improvements would not affect fadang.

27 No other terrestrial species listed as threatened and endangered under the federal ESA or by
28 CNMI (see **Table 3.2-2**) would be affected by pipeline construction along the West route or the
29 seaport support infrastructure. The pipeline would be constructed in Mixed Introduced Forest,
30 Tangantangan Forests, mowed fields, Casuarina Thickets, or other disturbed or developed
31 areas (see **Table 3.2-1**). Threatened and endangered species occur on Tinian in native
32 limestone forests, beachstrand forests, or wetlands, none of which exists within or near the
33 West route (see **Table 3.2-2**). For example, the Micronesian megapode, Mariana fruit bat,
34 humped tree snail, Micronesian gecko, *Solanum guamense*, *Dendrobium guamense*, and
35 Ufa-halomtano require moist, native forests, while the Mariana common moorhen requires
36 vegetated wetlands. Forested areas that were observed along the West route lacked an overall
37 presence of epiphytic plants that would indicate potential for humped tree snail or *D. guamense*
38 habitat and neither of these species were observed or detected during the 2018 surveys.

39 Surveys or monitoring for nests would be conducted during construction and active nests would
40 be avoided, or other measures would be taken to avoid harming any migratory birds, nests, or
41 eggs. In addition, USAF would implement measures agreed upon by USFWS and USAF for
42 construction of facilities at the Tinian International Airport (USFWS 2013, USFWS 2015c) to
43 reduce to a very low level the risk that a brown tree snake would be transported to Tinian during

1 pipeline construction. Impacts are not expected on special status species from the operation of
2 the fuel pipeline or support infrastructure.

3 A Biological Assessment containing the effect determinations for each species has been
4 prepared by USAF (HDR 2018b). The Proposed Action will have no effect on terrestrial
5 threatened and endangered species.

6 4.2.1.2.2 East Route

7 **Vegetation.** Long-term, minor, direct, impacts on vegetation are expected from pipeline
8 construction along the East route. The West and East routes share a common path until the
9 intersection of TR25 and TR24. The vegetation along the common path is primarily Mixed
10 Introduced Forest and Tangantangan Forest along and near areas that have been disturbed
11 previously.

12 If the pipeline were to be constructed along the East route, the ROI would be an estimated
13 128.78 acres. The utility easement for the pipeline has not yet been selected; therefore, the
14 affected acreage is calculated based on the 2018 survey width, which in areas was 100 feet
15 wide. The actual acreage of vegetation that would be affected during construction would be
16 significantly less than 128.78 acres, especially because less than an 80-foot width is expected
17 to be cleared for pipeline installation (see **Table 3.2-2**).

18 Much of the vegetation to be cleared along the East route is Tangantangan Forest (39 acres),
19 Mixed Introduced Forest (34 acres), and Other Shrubs and Grass (22 acres). No vegetation
20 communities that are rare and have a high diversity of native plant species, such as native
21 limestone and strand forests, would be disturbed. Thus, construction of the pipeline would
22 cause a minor reduction in native vegetation and little or no change in the diversity of vegetation
23 communities or composition of vegetation within those communities. Although sections of the
24 East route do contain Mixed Introduced Forest with more native species observed than other
25 portions of the project area, it is a relatively small area (less than 10 acres). Because much of
26 the route has been previously disturbed, vegetation communities there are dominated by
27 nonnative species, and native plants are uncommon, installation and operation of the pipeline
28 would not cause a noticeable increase in invasive or other nonnative vegetation in the area.

29 **Wildlife.** Short-term, minor, direct impacts on native wildlife are expected from construction of
30 the pipeline along the East route. In addition to the forested areas within the common paths for
31 the West and East routes, the central portion of the East route that traverses north from TR24
32 contains forested areas where Tinian native forest birds such as the Mariana fruit dove,
33 Micronesian starling, collared kingfisher, rufous fantail, and Tinian monarch, and other native
34 and nonnative wildlife are more common. Pipeline construction would cause a long-term,
35 permanent loss of habitat for those and other species. This forested area provides an
36 insignificant amount of habitat for native wildlife considering there are over 11,000 acres of
37 second growth forest vegetation on Tinian (Donnegan et al. 2011) available as habitat;
38 therefore, the East route would result in the loss of a small amount of available suitable habitat
39 on Tinian.

40 Migratory birds and other mobile wildlife would temporarily avoid areas along the pipeline route
41 during construction. Smaller, less-mobile species and nesting birds could inadvertently be

1 harmed during construction. To avoid harming nesting birds, surveys or monitoring during
2 construction would be conducted and areas where active nests are found would be avoided, or
3 other measures would be taken to avoid harming any migratory birds, nests, or eggs.

4 Long-term, permanent impacts on native species of wildlife would be minor and negligible
5 because very little habitat used by those species would be disturbed and because the species
6 observed in the project area are abundant in surrounding areas.

7 As described in **Section 4.2.1.2.1**, control and interdiction methods would be implemented
8 during construction of the pipeline to prevent the introduction of brown tree snakes and the
9 spread of other invasive species.

10 **Special-Status Species.** Two fadang were observed during the 2018 survey along the
11 southern edge of road TR26. The two individuals were planted as part of a decorative
12 landscape for the Nanyo Kohatsu Kabushiki Kaisha Administration Building and Laboratory,
13 which is listed on the NRHP. The proposed pipeline would be designed and sited to avoid the
14 two individual fadang and the associated NRHP-listed property. The pipeline would be located
15 within a proposed utility easement between the existing overhead electrical lines and road.
16 During construction, crews and equipment would entirely avoid the NRHP-listed property and
17 the two fadang within the landscaped area. Thus, construction and operation of the proposed
18 fuel pipeline and support infrastructure, and roadway improvements would not affect fadang.

19 The Mixed Introduced Forest between TR24 and the airport could provide marginal habitat for
20 humped tree snails and *D. guamense*. Although marginal habitat is present for both species, no
21 snail shells were observed during surveys and no *D. guamense* were detected during surveys
22 and an overall presence of epyphitic plants that would indicate potential for this species was
23 lacking.

24 No other terrestrial species listed as threatened and endangered under the federal ESA or by
25 CNMI (see **Table 3.2-2**) would be affected by pipeline construction along the East route. The
26 pipeline would be constructed in Mixed Introduced Forest, Tangantangan Forests, mowed
27 fields, Casuarina Thickets, or other disturbed areas (see **Table 3.2-2**). Threatened and
28 endangered species occur on Tinian in native limestone forests, beachstrand forests, or
29 wetlands, none of which exists within or near the East route (see **Table 3.2-2**).

30 Surveys or monitoring for nests would be conducted during construction and active nests would
31 be avoided, or other measures would be taken to avoid harming any migratory birds, nests, or
32 eggs. As described in **Section 4.2.1.2.1**, USAF would implement measures agreed upon by
33 USFWS and USAF for construction of facilities at the Tinian International Airport (USFWS 2013,
34 USFWS 2015c) to reduce to a very low-level risk that a brown tree snake would be transported
35 to Tinian during pipeline construction.

36 A Biological Assessment containing the effect determinations for each species has been
37 prepared by USAF (HDR 2018b). The Proposed Action will have no effect on terrestrial
38 threatened and endangered species.

1 4.2.1.2.3 No Action Alternative

2 Under the No Action Alternative, USAF would not construct the fuel pipeline but would construct
3 a fuel storage tank at the seaport and use fuel trucks to transport fuel from the seaport to the
4 airport. Under this alternative, no vegetation along a pipeline route would be disturbed and
5 there would be no loss of or disturbance of wildlife habitat along a pipeline route; impacts on
6 vegetation and wildlife would be less than under the Proposed Action.

7 4.2.1.3 Roadway Improvements

8 4.2.1.3.1 Proposed Action

9 **Vegetation.** All improvements are expected to occur within the roadbeds and shoulders.
10 Vegetation along the edges of the roads consists of nonnative shrubs, grasses, and vines. All
11 of the roads have been or continue to be disturbed by public use and general maintenance.
12 Thus, roadway improvements would have no or negligible, short-term, direct impacts on native
13 vegetation.

14 **Wildlife.** All roadway improvements would occur within the existing roadbeds and shoulders,
15 and few or no areas where birds nest or other native wildlife is found would be disturbed. Thus,
16 roadway improvements would have no or negligible, short-term, direct impacts on native wildlife.

17 **Special-Status Species.** Roadway improvements would be conducted entirely within the
18 existing roadbeds and shoulders and would not affect species listed as threatened and
19 endangered under the federal ESA or by CNMI (see **Table 3.2-2**).

20 **Wetlands.** There are no wetlands within or near the roadways proposed for improvements.

21 4.2.1.3.2 No Action Alternative

22 Under the No Action Alternative, only minor roadway repairs along the construction and fuel
23 truck routes would occur, as was considered in the 2016 Divert EIS (Final EIS, Section 4.11.2).
24 Minor roadway repairs associated with routine use would have no impact on terrestrial biological
25 resources.

26 4.2.2 Marine Biological Resources

27 4.2.2.1 Analysis Methodology

28 As mentioned in **Section 3.2.2**, the Proposed Actions would occur entirely on land, with no
29 activities occurring in marine environments. Therefore all impacts analyzed are considered
30 indirect as a result of construction or operation.

31 Impacts on marine biological resources were assessed using the potential following outcomes:

- 32 • permanent loss of habitat
- 33 • temporary loss or modification of habitat that affects a substantial number of a species
- 34 • permanent loss of feeding and breeding areas of a federal-listed species
- 35 • temporary loss or modification of feeding and breeding areas that affects a substantial
36 number of individuals of a species

- 1 • substantial interference with movement of any resident species that results in the
2 inability of the species to survive.

3 As discussed in **Sections 4.7.1** and **4.8.1** and **Appendix F**, DOD policies, compliant with
4 federal and CNMI regulations, would be followed to minimize erosion and sedimentation during
5 construction and to manage stormwater runoff after construction. By implementing those
6 policies, impacts of sedimentation and runoff would be minor. EFH, coral species, and other
7 nearshore resources are considered in the context of these potential indirect effects. Marine
8 biological resources considered also include special status sea turtles and marine mammals
9 that could be indirectly affected by the Proposed Actions.

10 To comply with Section 7 of the ESA, USAF prepared a Biological Assessment (see **Appendix**
11 **D**) that evaluates the effects of the Proposed Actions on federally listed proposed, threatened,
12 and endangered marine species. USAF determined in the Biological Assessment that the
13 Proposed Actions may affect, but are not likely to adversely affect, federally listed proposed,
14 threatened, and endangered marine species. On November 19, 2018, National Marine
15 Fisheries Service (NMFS) concurred with the USAF determination that the Proposed Actions
16 are not likely to adversely affect federally listed proposed, threatened, and endangered marine
17 species (see **Appendix D**).

18 To comply with MSFCMA, USAF prepared an EFH Assessment that evaluates the effects of the
19 Proposed Actions on EFH. USAF determined in the EFH Assessment that the Proposed
20 Actions would have no to minimal adverse effect to EFH. USAF is consulting with NMFS on this
21 determination.

22 4.2.2.2 Pipeline and Support Infrastructure

23 4.2.2.2.1 West and East Routes

24 **Nearshore Marine Resources.** Short-term, indirect, negligible impacts on nearshore marine
25 resources could occur from sedimentation, runoff, and potential spills during the construction of
26 the fuel pipeline and support infrastructure. USAF would implement compliance actions and
27 industry standards for erosion and sediment control, stormwater management, and spill
28 prevention and control during construction discussed in more detail in **Appendix F**. By
29 implementing these measures, the release of fresh water, sediment, and hazardous materials
30 from the project areas into the marine environment during construction would be avoided or
31 minimized.

32 Long-term, negligible, indirect impacts on nearshore marine resources could occur as a result of
33 underground fuel pipeline spills during pipeline and support infrastructure operation. In the
34 unlikely event of a fuel spill, measures described in **Appendix F** would be implemented to avoid
35 or minimize these impacts on marine resources.

36 **Essential Fish Habitat.** Short-term, no to minor, indirect impacts on EFH would be expected
37 during pipeline and support infrastructure construction. Sedimentation, runoff, and potential
38 spills during the construction and operation of the fuel pipeline could occur. USAF prepared an
39 EFH Assessment regarding the Proposed Action and measures for sedimentation, runoff, and
40 potential spills during construction would be implemented such as those provided in

1 **Appendix F.** Under the MSFCMA, USAF determined in the EFH Assessment that the
2 Proposed Actions would have no to minimal adverse effect to EFH.

3 Long-term, negligible, indirect impacts on EFH could occur as a result of underground fuel
4 pipeline spills during pipeline and support infrastructure operation. In the unlikely event of a fuel
5 spill, measures described in **Appendix F** would be implemented to avoid or minimize these
6 impacts on marine resources.

7 **Threatened and Endangered Species.** Short-term, negligible to minor, indirect impacts on
8 marine threatened and endangered species would be expected during pipeline and support
9 infrastructure construction. Sedimentation, runoff, and potential spills during the construction
10 and operation of the fuel pipeline could occur. USAF developed a Biological Assessment (see
11 **Appendix D**) to evaluate the effects of the Proposed Actions on federally listed proposed,
12 threatened, and endangered marine species. USAF has determined that the Proposed Action
13 may affect, but is not likely to adversely affect, marine threatened and endangered species;
14 NMFS concurred with this determination on November 19, 2018. Measures for sedimentation,
15 runoff, and potential spills during construction and operation will be identified in the effects
16 determination, such as those provided in **Appendix F**.

17 Long-term, negligible, indirect impacts on marine threatened and endangered species could
18 occur as a result of underground fuel pipeline spills. In the unlikely event of a fuel spill,
19 measures described in **Appendix F** would be implemented to avoid or minimize these impacts
20 on marine resources.

21 4.2.2.2 *No Action Alternatives*

22 Under the No Action Alternative, USAF would not construct the fuel pipeline but would construct
23 a fuel storage tank at the seaport and use fuel trucks to transport fuel from the seaport to the
24 airport. Greater impacts on marine species from potential fuel spills would be expected
25 because spills and leaks from trucks are more common than from pipelines (Strata 2017).

26 4.2.2.3 *Roadway Improvements*

27 4.2.2.3.1 *Proposed Action*

28 **Nearshore Marine Resources.** Short-term, indirect, negligible impacts on nearshore marine
29 resources could occur from sedimentation, runoff, and potential spills during the construction of
30 the roadway improvements. USAF would implement compliance actions and industry standards
31 for erosion and sediment control, stormwater management, and spill prevention and control
32 during construction discussed in more detail in **Appendix F**. By implementing these measures,
33 the release of fresh water, sediment, and hazardous materials from the project area into the
34 marine environment during construction would be avoided or minimized.

35 **Essential Fish Habitat.** Short-term, no to negligible, indirect impacts on EFH would be
36 expected during construction of the roadway improvements. Sedimentation, runoff, and
37 potential spills during the construction could occur. USAF prepared an EFH Assessment
38 regarding the Proposed Action and measures for sedimentation, runoff, and potential spills
39 during construction would be implemented such as those provided in **Appendix F**. Under the

1 MSFCMA, USAF determined in the EFH Assessment that the Proposed Actions would have no
2 to minimal adverse effect to EFH.

3 **Threatened and Endangered Species.** Short-term, negligible, indirect impacts on marine
4 threatened and endangered species would be expected during roadway improvements
5 construction. Sedimentation, runoff, and potential spills during the construction could occur.
6 USAF developed a Biological Assessment (see **Appendix D**) to evaluate the effects of the
7 Proposed Actions on federally listed proposed, threatened, and endangered marine species.
8 USAF has determined that the Proposed Action may affect, but is not likely to adversely affect,
9 marine threatened and endangered species; NMFS concurred with this determination on
10 November 19, 2018. Measures for sedimentation, runoff, and potential spills during
11 construction will be identified in the effects determination, such as those provided in
12 **Appendix F.**

13 4.2.2.3.2 No Action Alternative

14 Under the No Action Alternative, only minor roadway repairs along the construction and fuel
15 truck routes would occur, as was considered in the 2016 Divert EIS (Final EIS, Section 4.11.2).
16 Under the No Action Alternative, minor roadway repairs associated with routine use would have
17 no impact on terrestrial or marine biological resources.

18 4.2.3 Summary of Impacts

19 4.2.3.1 Proposed Actions and Alternatives

20 The Proposed Actions would have short- to long-term, negligible to moderate impacts on
21 terrestrial and marine biological resources. The majority of impacts would be generated from
22 the removal of vegetation and wildlife habitat for construction of the pipeline, and impacts would
23 be similar across both the West and East routes. USAF would implement compliance actions
24 and industry standards for erosion and sediment control, stormwater management, and spill
25 prevention and control during construction and operation, discussed in more detail in **Appendix**
26 **F**, to minimize or eliminate the potential for impacts from stormwater runoff or spills. USAF
27 would also implement measures agreed upon by USFWS and USAF for construction of facilities
28 at the Tinian International Airport (USFWS 2013, USFWS 2015c) to reduce to a very low-level
29 risk that a brown tree snake would be transported to Tinian during pipeline or road
30 improvements construction. No adverse effects, as defined under Section 7 of the ESA, on
31 terrestrial or marine special status species are expected to occur.

32 4.2.3.2 No Action Alternatives

33 Under the No Action Alternatives, USAF would not construct the fuel pipeline, support
34 infrastructure, and roadway improvements but would construct a fuel storage tank at the
35 seaport, complete only minor road repairs, and use fuel trucks to transport fuel from the seaport
36 to the airport. Under the No Action Alternatives, impacts on biological resources would be
37 expected from construction at the seaport and use of fuel trucks to transfer fuel and the potential
38 for a spill during transfer.

4.3 Cultural Resources

4.3.1 Analysis Methodology

Impact analysis for cultural resources in this SEIS focuses on assessing whether an action alternative has the potential to affect cultural resources that are eligible for listing in the NRHP. Under the NHPA, an adverse effect is any action that might directly or indirectly change the characteristics that make the historic property eligible for listing in the NRHP. Such impacts can occur by physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's significance; introducing visual or audible elements that are out of character with the property or alter its setting; or neglecting the resource to the extent that it deteriorates or is destroyed. During Section 106 consultation on the Divert Activities and Exercises undertaken concurrent with the 2016 Divert EIS, the consulting parties agreed that a distinction between direct effects and indirect effects was not necessary, and both types of effects constitute an adverse effect (Final EIS, Section 4.8). Therefore, the decision was made to remove the distinction between direct and indirect impacts in the 2016 Divert EIS (Final EIS, Section 4.8) and this SEIS.

As part of the Section 106 process, USAF has determined the Tinian Divert Infrastructure Improvements would contribute to adverse effects on historic properties from the Divert Activities and Exercises undertaken. Members of the public may comment on this finding during the public comment period on the Draft SEIS.

USAF intends to conclude its Section 106 consultation on the Tinian Divert Infrastructure Improvements by amending the *Programmatic Agreement among the Pacific Air Forces, Directorate of the Strategy, Plans, and Programs, the Commonwealth of the Northern Mariana Islands State Historic Preservation Office, and the Advisory Council on Historic Preservation Regarding the Proposed Construction and Operation of Divert Activities and Exercises within the Commonwealth of the Northern Mariana Islands*. USAF will begin drafting the amendment in consultation with the HPO and Consulting Parties during the Draft SEIS public comment period. USAF will consider public comments before finalizing the amendment, which will be executed prior to completion of the Final SEIS. USAF anticipates the amendment will describe the alternatives and associated APE, identify historic properties in the APE, and stipulate measures applicable to the alternatives. Based on feedback from Consulting Parties, USAF also intends to expand the scope of interpretive products required under the current PA to include a broader historic context beyond the World War II West Field context. **Appendix C** contains materials related to the cultural resources investigations and Section 106 consultation process.

4.3.2 Pipeline and Support Infrastructure

4.3.2.1 West Route

Construction and operation of the pipeline along the West route would have short- to long-term, minor to moderate impacts on cultural resources. Ground disturbance during construction of the pipeline would have the potential to affect the physical integrity of historic properties, having minor to moderate impacts on the sites. Construction would also have short-term, minor to

1 moderate impacts on the historic setting or feeling of the properties. Impacts from operation of
2 the pipeline are not expected.

3 Four historic properties were identified in the APE that could be affected by construction of the
4 pipeline along the West route: archaeological sites TN-6-0030, HDR-18-07, TN-4-1010, and the
5 Tinian Harbor. Site TN-5-0690 was also identified in the APE in background research; however,
6 the site was not found during cultural resource surveys and appears to be outside the APE or
7 destroyed. Similarly, no archaeological deposits or features associated with site SC-5043 are
8 within the APE.

9 Construction of the West route would have short- to long-term, minor to moderate impacts on
10 site TN-6-0030, West Field. The pipeline would be installed into Runway 1 and would include
11 areas of disturbance in addition to the land requirement presented in the 2016 Divert EIS (Final
12 EIS, Section 2.5.2). Historic pavement would be removed within the pipeline trench and any
13 pits and would be replaced with new material after the pipeline is installed. Construction would
14 further detract from the site's historic character and tracked heavy equipment could affect the
15 paved surface of the runway outside of the trench. Impacts on the site would be greatest during
16 active construction when equipment is present onsite and the pipeline trench is open. To
17 minimize long-term impacts, USAF would, to the extent practicable, minimize the use of tracked
18 equipment and replace excavated pavements consistent with the runway's current appearance
19 in accordance with the Secretary of the Interior's *Guidelines for the Treatment of Historic*
20 *Properties*. Such treatment would only occur in areas outside of Divert infrastructure footprints
21 analyzed in the 2016 Divert EIS (Final EIS, Section 2.5.2).

22 The West route would have short-term, minor impacts on sites HDR-18-07 and TN-4-1010 due
23 to visual disturbance and noise during construction. USAF would design the pipeline to avoid
24 the sites and no long-term impacts would occur. The West route would have no impact on the
25 Tinian Harbor. The USAF would use the existing seaport bulk receipt header and new pipeline
26 construction would be consistent with other modern alterations and facilities in the immediate
27 vicinity.

28 Based on the results of the Phase I survey and previous cultural resources work in the APE,
29 USAF has determined that portions of the West route have potential to contain unidentified
30 cultural resources, including the possibility for burials and human remains. USAF would
31 conduct a Phase II survey with subsurface testing in areas of moderate to high potential for
32 buried archaeological sites, to be stipulated in the PA amendment. USAF would also conduct
33 archaeological monitoring of pipeline construction in sensitive areas for archaeology and human
34 remains and implement inadvertent discovery procedures established in the PA in the event of a
35 discovery.

36 Operation of the pipeline is not expected to impact historic properties along the West route. In
37 the unlikely event of a spill, ground disturbance to repair the pipeline would be expected to
38 occur within the limits of disturbance during pipeline construction. Additional impacts on known
39 historic properties or buried archaeological sites could occur if soils outside the limits of
40 disturbance must be removed for decontamination. In the event of unanticipated adverse
41 effects on historic properties, USAF would conduct additional consultation under the PA to

1 resolve the effects. Impacts would not be expected on traditional hunting areas or fishing
2 grounds.

3 Construction and operation of seaport support infrastructure is not expected to impact cultural
4 resources. No historic properties were identified in the APE for the seaport support
5 infrastructure area. Based on the results of the Phase I survey and previous cultural resources
6 work in the APE, USAF determined that the area around the seaport support infrastructure has
7 potential to contain unidentified cultural resources, including the possibility for burials and
8 human remains. Following Typhoon Yutu, this area was modified for use as a materials and
9 equipment staging area for recovery efforts, including the creation of graveled surface area. It is
10 unknown whether this activity has affected the subsurface potential in this area, although it is
11 likely that deeper strata would be unaffected. USAF would conduct a Phase II survey with
12 subsurface testing, monitor construction in sensitive areas for archaeology and human remains,
13 and implement inadvertent discovery procedures established in the PA in the event of a
14 discovery. No traditional resources occur in the seaport support infrastructure area. These
15 impacts are consistent with what was analyzed in the 2016 Divert EIS (Final EIS, Section 4.8.2).

16 4.3.2.2 East Route

17 Impacts on cultural resources along the East route would be similar to those described for the
18 West route because all historic properties identified in the APE are in areas where the two
19 routes have a shared alignment. The East route involves a greater length of pipeline within site
20 TN-6-0030, West Field, and impacts on this resource from construction of the East route would
21 be slightly greater. Under the East route, the pipeline would be constructed within paved
22 elements of the historic airfield south of the Tinian International Airport as well as Runway 1
23 north of the airport. Affected southern elements include 0.84 mile of taxiway and several
24 hardstands. As with the West route, historic pavement would be removed within the pipeline
25 trench and any pits would be replaced with new material after the pipeline is installed.
26 Construction would further detract from the site's historic character and tracked heavy
27 equipment could affect the paved surface of the runway outside of the trench. Impacts on the
28 site would be greatest during active construction when equipment is present onsite and the
29 pipeline trench is open. To minimize long-term impacts, USAF would minimize the use of
30 tracked equipment to the extent practicable and replace excavated pavements consistent with
31 the runway's current appearance in accordance with the Secretary of the Interior's *Guidelines
32 for the Treatment of Historic Properties*.

33 As with the West route, short-term, minor impacts would be expected on sites HDR-18-07 and
34 TN-4-1010 due to construction and noise; however, the sites would be avoided and no
35 long-term impacts would be expected. No impacts would be expected on the historic Tinian
36 Harbor. Portions of the East route have the potential to contain unidentified cultural resources,
37 including the possibility for burials and human remains. USAF would conduct a Phase II survey
38 with subsurface testing in areas of moderate to high potential for buried archaeological sites.
39 USAF would also conduct archaeological monitoring of pipeline construction in sensitive areas
40 for archaeology and human remains and implement inadvertent discovery procedures
41 established in the PA in the event of a discovery.

1 Pipeline operations are not expected to impact cultural resources along the East route. In the
2 unlikely event of a spill or leak, ground disturbance to repair the pipeline would be expected to
3 occur within the limits of previous disturbance. Additional impacts could occur if soil
4 decontamination is required beyond the limits of disturbance. In the event of unanticipated
5 adverse effects on historic properties, USAF would conduct additional consultation under the PA
6 to resolve the effects.

7 Construction and operation of seaport support infrastructure is not expected to impact cultural
8 resources and would be the same as described for the West route.

9 4.3.2.3 No Action Alternative

10 Under the No Action Alternative, USAF would not construct the fuel pipeline and support
11 infrastructure but would construct a fuel storage tank at the seaport and use fuel trucks to
12 transport fuel from the seaport to the airport. Short-term impacts from construction noise and
13 activities would not occur at sites TN-6-0030, TN-4-1010, or HDR-18-07, and additional long-
14 term impacts from pipeline construction would not occur at TN-6-0030 (West Field). Impacts at
15 West Field would still result from construction and operation of Divert infrastructure analyzed in
16 the 2016 Divert EIS (Final EIS, Section 4.8.2). As presented in the 2016 Divert EIS (Final EIS,
17 Section 4.8.2), construction of the fuel tanks and fuel truck traffic would have no impact on
18 cultural resources.

19 4.3.3 Roadway Improvements

20 4.3.3.1 Proposed Action

21 Roadway improvements would have potential to impact cultural resources during excavation
22 and ground disturbance within the roadway and limited surface disturbance from foot and
23 vehicle traffic within 5 feet of the roadway. Cultural resources surveys in proposed road
24 improvement areas did not identify any historic properties. Previous cultural resource
25 monitoring projects indicate buried archaeological sites and human remains may occur beneath
26 potential disturbance areas. However, the proposed road improvements are not expected to
27 encounter these resources because excavations would be limited to a depth of 12 inches within
28 existing paved roadways. If inadvertent discoveries of buried archaeological deposits or human
29 remains were to occur during construction, USAF would implement the procedures for
30 inadvertent discoveries in the PA.

31 4.3.3.2 No Action Alternative

32 Under the No Action Alternative, only minor roadway repairs along the construction and fuel
33 truck routes would occur as considered in the 2016 Divert EIS. These minor roadway repairs
34 would have no impact on cultural resources.

35 4.3.4 Summary of Impacts

36 4.3.4.1 Proposed Actions and Alternatives

37 The Proposed Actions would have short-term to long-term, minor to moderate impacts on
38 cultural resources. The majority of impacts would be generated from construction of the
39 pipeline, and impacts would be similar across both the West route and East route because all

1 identified historic properties occur in areas shared among both routes. However, the East route
2 would have slightly greater impacts on site TN-6-0030, West Field, due to the greater extent of
3 pipeline that would affect historic features of this site. Construction of roadway improvements
4 and operation of the pipeline and seaport support infrastructure would not be expected to impact
5 cultural resources.

6 4.3.4.2 No Action Alternatives

7 Under the No Action Alternatives, USAF would not construct the fuel pipeline, support
8 infrastructure, and roadway improvements but would construct a fuel storage tank at the
9 seaport, complete only minor road repairs, and use fuel trucks to transport fuel from the seaport
10 to the airport. Under the No Action Alternatives, no impact on cultural resources would be
11 expected.

12 4.4 Socioeconomics

13 4.4.1 Analysis Methodology

14 Impacts on socioeconomics were assessed to determine if the Proposed Actions and
15 alternatives resulted in any of the following:

- 16 • substantial change in the local or regional population, housing, public services (health,
17 police, and fire services), or in social conditions from the demands of additional
18 population or population shifts
- 19 • substantial change in the local or regional economy, employment, or spending or
20 earning patterns.

21 4.4.2 Pipeline and Support Infrastructure

22 4.4.2.1 West Route

23 **Population Characteristics.** Short-term, moderate impacts on the population of Tinian would
24 result from construction of the pipeline along the West route. An addition of 75 construction
25 workers to Tinian would increase the population by 2.5 percent. However, if the 150
26 construction workers required during peak construction for the original Divert project are also
27 working on Tinian as described in the 2016 Divert EIS (Final EIS, Section 2.5.2), then the island
28 population would be 7.4 percent higher. However, this increase would be sustained for a limited
29 time. There is precedent for large, temporary population increases on Tinian as approximately
30 1,800 mostly foreign workers spent 18 months on the island during construction of the Tinian
31 Dynasty Hotel and Casino in the late 1990s (DON 2015b).

32 While the specific source of construction workers is unknown, it is assumed most workers would
33 be from Saipan, Guam, and the Federated States of Micronesia. While it is likely that the
34 majority of construction workers would be from Saipan or Guam, workers from outside of the
35 CNMI and Guam could be required during peak work periods and for some specialty tasks. The
36 CW-1 permit program for nonimmigrant transitional foreign workers was recently extended
37 through December 31, 2029, and the CW-1 permit cap was increased from 4,999 to 13,000
38 (U.S. Citizen and Immigration Services 2018). Foreign construction workers, including alien and

1 H2B workers, would be required to comply with the requirements of 48 U.S.C. Sec. 1806(b) for
2 work in the CNMI. An increase in population from construction workers is not considered a
3 direct impact; however, it has the potential to result in indirect, adverse and beneficial impacts
4 on other socioeconomic factors as discussed in the following subsections.

5 No long-term impacts on Tinian's population would occur during operation of the West route
6 pipeline because there would be no anticipated permanent population increases. Any
7 personnel required for maintenance and operation of the pipeline and fuels infrastructure would
8 be supported by the exercise and support personnel (e.g., security guards) analyzed in the
9 2016 Divert EIS (Final EIS, Section 4.14.2.2). It is assumed that any additional personnel
10 required to inspect and maintain the pipeline would be negligible (e.g., 0 to 5 personnel) and
11 would be from on-island.

12 **Economic Characteristics.** Short-term, moderate, direct and indirect, beneficial impacts on
13 the local economy would occur from construction of the pipeline along the West route.

14 Disruption of traffic along the West route, particularly TR26, 6th Avenue, and TR25, during
15 construction could cause delays for delivery trucks and persons traveling north to visit cultural
16 and historic sites, but the roadways would remain open. Therefore, there would be no impacts
17 on the local economy.

18 Short-term, moderate, beneficial impacts on the local economy would be expected from
19 construction of the West route. Construction would result in increases of employment, purchase
20 of goods and services, and tax revenue. Impacts on economic conditions in Tinian would occur
21 due to the presence of construction workers and in Saipan or Guam where most construction
22 materials would be sourced. The increase in employment would result in increased wages paid.
23 Based on a survey of wages and salaries in the CNMI, construction and extraction occupations
24 earned an average direct wage of \$7.60 per hour, with other specialized, technical, and
25 managerial positions earning more (CNMI Department of Commerce 2017b). Therefore, it is
26 assumed that each worker would be paid at least \$304 per week. Increased wages would in
27 turn increase government revenue from employment taxes (wage and salary tax [Chapter 2 tax]
28 and Northern Marianas territorial income tax [NMTIT]).

29 Construction would increase demand for and purchase of local and regional supplies, materials,
30 and services. Most supplies, such as construction supplies and materials, would need to be
31 purchased in Saipan or Guam and shipped to Tinian. However, some supplies, including food,
32 water, and fuel, could be purchased from local businesses. Local contractors would provide
33 services such as construction equipment/vehicle maintenance; bus transportation of workers;
34 and disposal of solid, liquid, and hazardous wastes from work sites. In addition, temporary
35 housing would be needed and would require renting houses/rooms or purchasing rooms at local
36 hotels that would contribute to beneficial impacts on the local economy.

37 The increase of up to 75 additional construction workers on Tinian could also create a
38 short-term, moderate, beneficial impact on the local economy by increasing local business sales
39 volume and spending on tourist activities. Local construction workers from the CNMI might be
40 more inclined to buy products and services in the local economy when they are earning a
41 steady income. However, it is likely that expenditures by foreign construction workers would be

1 minimal as foreign workers send much of their incomes back to their home countries through
2 remittances (U.S. GAO 2000). Based on the volume of increased sales, there could be
3 secondary increases in employment and income generated from local businesses.

4 Negligible impacts on the local economy are expected from operation of the West route. Any
5 parts or services that are needed for periodic maintenance and repair would be minimal and
6 likely be purchased from off-island sources. Personnel for maintenance and operation of the
7 pipeline and fuels infrastructure would be supported by the exercise and support personnel
8 (e.g., security guards) analyzed in the 2016 Divert EIS (Final EIS, Section 4.14.2.2). It is
9 assumed that any additional personnel required to inspect and maintain the pipeline would be
10 negligible (e.g., 0 to 5 personnel) and would be from on-island, resulting in long-term negligible
11 beneficial impacts on employment.

12 **Housing.** Short-term, moderate impacts on housing would occur during construction of the
13 West route. It is assumed that workers from Guam and the Federated States of Micronesia
14 would not return to their home location until the completion of construction. However, workers
15 from Saipan might be able to commute to Tinian daily. All travel to and from Tinian by
16 construction workers would be on existing commercial flights or carriers, and additional flights
17 would not be required.

18 In 2010, there were 244 vacant housing units on Tinian (USCB 2010b). If there is not sufficient
19 hotels or other housing units to support up to 75 construction workers due to damage from
20 Typhoon Yutu, the impact on housing could be major. The ability of the Tinian hotel market to
21 provide the necessary amount of hotel rooms for sustained periods would decrease the longer
22 construction lasts and the longer the peak level of hotel rooms was needed. To minimize
23 impacts, the construction contractor would consider using other newly constructed or repaired
24 non-hotel housing units and secure the required number of rooms for the 75 workers prior to
25 construction.

26 No impacts on housing on Tinian would occur during operation of the West route. Because it is
27 assumed there would be no permanent population increases or additional personnel hired from
28 off-island, no long-term housing would be required as part of the Proposed Action.

29 **Public Services.** Short-term, moderate impacts on public services could result from increased
30 demand placed on local health/medical, law enforcement, and firefighting services from the
31 influx of new construction workers to Tinian. Tinian would need to accommodate the increased
32 demands for public services associated with a 2.5 percent to 7.4 percent population increase,
33 as described under **Population Characteristics** for a limited time.

34 Due to the small scale of the Tinian Health Center, it could not be able to manage the increased
35 demand adequately. To minimize the impacts on the Tinian Health Center, the construction
36 contractor would be responsible for medical care for construction personnel during peak work
37 periods. Similarly, the DPS would experience increased demands for law enforcement and
38 firefighting services. While there is precedent for continuing to provide adequate police and
39 firefighting services during periods when the island's population experiences large increases
40 (i.e., during construction of the Tinian Dynasty Hotel and Casino), it is possible that additional

1 security and fire personnel could be required to rectify the increased demand during
2 construction of the West route.

3 The magnitude of the impact on public services is based on the largest population increase and
4 not necessarily the duration over which these increases would need to be sustained. Therefore,
5 the impacts on public services would be moderate during construction of the West route
6 pipeline.

7 There would be no impacts on public services from operation of the West route pipeline
8 because it is assumed there would be no permanent population increases creating increased
9 demand on the services.

10 **Sociocultural Issues.** Short-term, minor sociocultural impacts could occur during construction
11 of the pipeline along the West route. Portions of pipeline construction at Tinian International
12 Airport and the Tinian seaport would occur on public land acquired or leased by USAF and
13 proposed for construction in the 2016 Divert EIS (Final EIS, Section 2.5.2). The pipeline would
14 also be constructed on public land and within easement rights held by the U.S. federal
15 government that allow it to install, operate, and maintain fuel infrastructure and other utilities.
16 Portions of the utility easement for the pipeline would also fall within existing CNMI ROWs for
17 roadways and utilities. None of these public lands are currently proposed for homesteads and
18 existing ROWs are not suitable for residential or agricultural homestead; therefore, no land that
19 might be homesteaded would be affected.

20 While construction would bring up to 75 people to Tinian during peak work periods, it is likely
21 that a majority of these workers would be from the CNMI and Guam and respectful of local
22 culture and customs. Therefore, it is unlikely that there would be any significant conflicts with
23 local Tinian residents. There would be no impacts on sociocultural issues from operation of the
24 West route. Operation of the pipeline would not require new restricted access areas and it is
25 assumed no additional personnel would be required to move to the area.

26 Construction and operation of the pipeline support infrastructure at the Tinian seaport would not
27 disrupt any port operations. Impacts on socioeconomics from construction of the seaport
28 facilities are discussed as part of the pipeline construction. No impacts on socioeconomics are
29 expected from operation of the seaport support infrastructure.

30 4.4.2.2 East Route

31 **Population Characteristics.** Construction of the pipeline along the East route would be similar
32 to that described under the West route, except the East route is 0.86 mile longer and, therefore,
33 workers would be on Tinian for a slightly longer time. The East route construction would not
34 require additional workers beyond the 75 peak workers identified for the West route. Therefore,
35 short-term, moderate impacts on the population of Tinian would be expected during pipeline
36 construction. No impacts on Tinian's population would occur from operation of the East route
37 because it is assumed no additional personnel would be hired from off-island as part of the
38 Proposed Action.

39 **Economic Characteristics.** Construction of the pipeline along the East route would be similar
40 to that described under the West route, except the East route is 0.86 mile longer, which would

1 require more materials and workers would be on Tinian for a slightly longer time. Therefore,
2 additional construction supplies and material might be required and construction workers would
3 continue to make purchase in the local community for a longer period of time. However,
4 impacts would be the same as those of the West route pipeline, and short-term, moderate,
5 direct and indirect, beneficial impacts on the local economy would be expected.

6 Negligible impacts on the local economy are expected from operation of the East route. It is
7 assumed if additional personnel would be required for inspection and maintenance they would
8 be hired from on island, which would have a negligible beneficial impact on employment. Any
9 parts or services needed for periodic maintenance and repair would be minimal and likely be
10 purchased from off-island sources.

11 **Housing.** Construction of the pipeline along the East route would be similar to that described
12 under the West route, except workers would be on Tinian for a slightly longer time. Short-term,
13 moderate impacts on housing would be expected during construction of the East route.

14 No impacts on housing would occur during operation of the East route because it is assumed no
15 long-term housing would be required as part of the Proposed Action.

16 **Public Services.** Construction of the pipeline along the East route would be similar to that
17 described under the West route, except workers would be on Tinian for a slightly longer time.
18 Short-term, moderate impacts on public services would be expected during construction of the
19 East route.

20 No impacts on Tinian's public services would occur from operation of the East route because
21 there would be no increased demand on these services as it is assumed no additional
22 personnel would be hired from off-island.

23 **Sociocultural Issues.** Construction of the pipeline along the East route would be similar to that
24 described under the West route, except workers would be on Tinian for a slightly longer time.
25 Short-term, minor sociocultural impacts would be expected.

26 Similar to the West route, there would be no impacts on sociocultural issues from operation of
27 the East route.

28 Construction and operation of the pipeline support infrastructure at the Tinian seaport would not
29 disrupt any port operations. Impacts on socioeconomics from construction of the seaport
30 facilities are discussed as part of the pipeline construction. No impacts on socioeconomics are
31 expected from operation of the seaport support infrastructure.

32 4.4.2.3 No Action Alternative

33 Under the No Action Alternative, USAF would not construct the fuel pipeline or support
34 infrastructure but would construct a fuel storage tank at the seaport and use fuel trucks to
35 transport fuel from the seaport to the airport. It is expected that the No Action Alternative would
36 require less construction because only storage tanks would be constructed at the seaport
37 instead of a pipeline and support infrastructure, which would result in a shorter construction
38 period, fewer purchases of construction materials and services by the construction contractor,
39 and fewer purchases of goods and services in the community by construction workers.

1 Therefore, the No Action Alternative would not have an impact on existing socioeconomic
2 conditions. Beneficial impacts would be expected from the operation of the fuel trucks and
3 vehicle fuel purchases. The No Action Alternative would occur within the context of the original
4 Divert construction and, therefore, demand for public services and changes in sociocultural
5 issues would not change from existing conditions.

6 4.4.3 Roadway Improvements

7 4.4.3.1 Proposed Action

8 **Population Characteristics.** Short-term, minor to moderate impacts on the population of
9 Tinian would result from construction of roadway improvements. An addition of 25 people to
10 Tinian would increase the population by 0.8 percent. However, if the 150 construction workers
11 required during peak construction for the original Divert project are also working on Tinian, then
12 the island population would be 5.7 percent higher. Therefore, an increase of the Tinian
13 population of up to approximately 0.8 percent to 5.7 percent would be experienced during
14 construction due to the Proposed Action and the original Divert construction, but this increase
15 would be sustained for a limited time.

16 While the specific source of construction workers is unknown, it is assumed most workers would
17 be from Saipan, Guam, and the Federated States of Micronesia. The CW-1 permit program for
18 nonimmigrant transitional foreign workers was recently extended through December 31, 2029,
19 and the CW-1 permit cap was increased from 4,999 to 13,000 (U.S. Citizen and Immigration
20 Services 2018). While it is likely that the majority of construction workers would be from Saipan
21 or Guam, workers from outside of the CNMI would be required during peak work periods and for
22 some specialty tasks. An increase in population is not considered a direct impact; however, it
23 has the potential to result in indirect, adverse and beneficial impacts on other socioeconomic
24 factors as discussed in the following subsections.

25 **Economic Characteristics.** Short-term, minor to moderate, direct and indirect, beneficial
26 impacts on the local economy would occur from construction of the roadway improvements.

27 Disruption of traffic along the route of roadway improvements, particularly TR24 and TR25,
28 could cause delays for delivery trucks and persons traveling north to the airport or to visit
29 cultural and historic sites, but the roadways would remain open. Therefore, there would be no
30 impacts on the local economy.

31 Short-term, minor to moderate, beneficial impacts on the local economy would be expected from
32 construction of the roadway improvements. Construction would result in increases of
33 employment, purchase of goods and services, and tax revenue. Impacts on economic
34 conditions in Tinian would occur due to the presence of construction workers and in Saipan or
35 Guam where most construction materials would be sourced. The increase in employment
36 resulting from this alternative would result in increased wages paid. Based on a survey of
37 wages and salaries in the CNMI, construction and extraction occupations earned an average
38 direct wage of \$7.60 per hour, with other specialized, technical, and managerial positions
39 earning more (CNMI Department of Commerce 2017b). Therefore, it is assumed that each
40 worker would be paid at least \$304 per week. Increased wages would in turn increase
41 government revenue from employment taxes (wage and salary tax [Chapter 2 tax] and NMTIT).

1 Construction would increase demand for and purchase of local and regional supplies, materials,
2 and services. Most supplies, such as construction supplies and materials, would need to be
3 purchased in Saipan or Guam and shipped to Tinian. However, some supplies, including food,
4 water, and fuel, could be purchased from local businesses. Local contractors would provide
5 services such as construction equipment/vehicle maintenance; bus transportation of workers;
6 and disposal of solid, liquid, and hazardous wastes from work sites. In addition, temporary
7 housing would be needed and would require renting houses/rooms or purchasing rooms at local
8 hotels that would contribute to beneficial impacts on the local economy.

9 The increase of up to 25 additional people on Tinian in the form of construction workers could
10 also create a short-term, minor, beneficial impact on the local economy by increasing local
11 business sales volume and spending on tourist activities. Local construction workers from the
12 CNMI might be more inclined to buy products and services in the local economy when they are
13 earning a steady income. However, it is likely that expenditures by foreign construction workers
14 would be minimal as foreign workers send much of their incomes back to their home countries
15 through remittances (U.S. GAO 2000).

16 **Housing.** Short-term, minor to moderate impacts on housing would occur during construction
17 of the roadway improvements. It is assumed that workers from Guam and the Federated States
18 of Micronesia would not return to their home location until the completion of construction.
19 However, workers from Saipan might be able to commute to Tinian daily. All travel to and from
20 Tinian by construction workers would be on existing commercial flights or carriers, and
21 additional flights would not be required. The number of workers that would commute to Saipan
22 daily is assumed to be negligible and the majority would remain on Tinian.

23 In 2010, there were 244 vacant housing units on Tinian (USCB 2010b). If there are not
24 sufficient hotels or other housing units to support up to 25 construction workers due to damage
25 from Typhoon Yutu, the impact on housing could be major. The ability of the Tinian hotel
26 market to provide the necessary number of hotel rooms for sustained periods would decrease
27 the longer construction lasts and the longer the peak level of hotel rooms was needed. To
28 minimize impacts, the construction contractor would consider using newly constructed or
29 repaired other non-hotel housing units and secure the required number of rooms for the
30 25 workers prior to construction.

31 **Public Services.** Short-term, minor to moderate impacts on public services could result from
32 increased demand placed on local health/medical, law enforcement, and firefighting services
33 from the influx of new construction workers to Tinian. The demand on public services would
34 increase with a 0.8 percent to 5.7 percent population increase for a limited time.

35 Due to the small scale of the Tinian Health Center, it could not be able to manage the increased
36 demand adequately. To minimize the impacts on the Tinian Health Center, the construction
37 contractor would be responsible for medical care for construction personnel during peak work
38 periods. Similarly, the DPS would experience increased demands for law enforcement and
39 firefighting services. While there is precedent for continuing to provide adequate police and
40 firefighting services during periods when the island's population experiences large increases
41 (i.e., during construction of the Tinian Dynasty Hotel and Casino), it is possible that additional

1 security and fire personnel could be required to rectify the increased demand during the
2 roadway improvements.

3 The magnitude of the impact on public services is based on the largest population increase and
4 not necessarily the duration over which these increases would need to be sustained. Therefore,
5 the impacts on public services would be minor to moderate during construction of the roadway
6 improvements.

7 **Sociocultural Issues.** Short-term, minor sociocultural impacts could occur during construction
8 of the roadway improvements. Road improvements would occur within existing roadbeds and
9 ROWs; therefore, no land that might be homesteaded would be affected.

10 While construction would bring up to 25 people to Tinian during peak work periods, it is likely
11 that a majority of these workers would be from the CNMI and Guam and respectful of local
12 culture and customs. Therefore, it is unlikely that there would be any significant conflicts with
13 local Tinian residents.

14 4.4.3.2 No Action Alternative

15 Under the No Action Alternative, only minor roadway repairs along the construction and fuel
16 truck routes would occur, as was considered in the 2016 Divert EIS (Final EIS, Section 4.11.2).
17 The No Action Alternative would require much less construction, which would result in a shorter
18 construction period, fewer purchases of construction materials and services by the construction
19 contractor, and fewer purchases of goods and services in the community by construction
20 workers. Therefore, the No Action Alternative would not have an impact on existing
21 socioeconomic conditions, but it would result in fewer beneficial impacts on the local economy
22 than the Proposed Action. The No Action Alternative would occur within the context of the
23 original Divert construction and, therefore, demand for public services and changes in
24 sociocultural issues would not change from existing conditions.

25 4.4.4 Summary of Impacts

26 4.4.4.1 Proposed Actions and Alternatives

27 Increases in the Tinian population from construction workers would result in increased sales
28 volumes in the local community, which could in turn generate indirect and induced jobs in
29 affected industries. While existing housing/hotels on Tinian likely would be able to temporarily
30 support the increased population, the large inflow of people could result in short-term impacts
31 due to capacity constraints for the hotel/housing market and public services. The population
32 increase would increase demand on public services, especially the Tinian Health Center, but
33 medical services and other public services such as law enforcement would be augmented by
34 the construction contractor during peak construction work periods to minimize impacts. During
35 construction, short-term benefits on the local economy would result from the employment of
36 construction workers and the purchase of construction-related materials and other goods and
37 services, as well as secondary purchases of goods and services in the community.

1 4.4.4.2 No Action Alternatives

2 Under the No Action Alternatives, USAF would not construct the fuel pipeline, support
3 infrastructure, and roadway improvements but would construct a fuel storage tank at the
4 seaport, complete only minor road repairs, and use fuel trucks to transport fuel from the seaport
5 to the airport. The No Action Alternatives would require less construction and fewer
6 construction workers than the Proposed Actions resulting in fewer beneficial impacts on the
7 local economy and no adverse impacts on housing and public services.

8 4.5 Environmental Justice and the Protection of Children

9 4.5.1 Analysis Methodology

10 Analysis of environmental justice and other sensitive receptors is conducted pursuant to
11 EO 12898 and EO 13045, and guided by USAF's *Guide for Environmental Justice Analysis*
12 *under the Environmental Impact Analysis Process (EIAP)*. The Proposed Actions and
13 alternatives were assessed to determine if disproportionately high and adverse human health
14 and environmental impacts on minority and low-income populations, or disproportionate impacts
15 from environmental health risks or safety risks on child and elderly populations would result.

16 The potential for disproportionate impacts on minority and low-income populations is determined
17 by comparing the percentage of each population in the ROI with the percentage of each
18 population in the community of comparison (COC). Per the *Guide for Environmental Justice*
19 *Analysis under the Environmental Impact Analysis Process (EIAP)*, the COC should be the
20 smallest set of USCB data or other comparable data. Typically, if the percentage of minority or
21 low-income population within the ROI is greater than or equal to the percentages within the
22 COC, impacts to human populations in the ROI would constitute a disproportionate impact
23 (USAF 2014).

24 For all child and elderly populations, disproportionate impacts are inherent. The extent to which
25 child and elderly populations would be impacted is disproportionate due to their inherent
26 vulnerabilities. Pursuant to EO 13045, due to age-related physiological differences in types and
27 levels of exposure, the analysis of environmental impacts on children is different from the
28 analysis of environmental impacts on adults (e.g., because children breathe more rapidly than
29 adults and their bodies are not yet fully developed, they have different responses to
30 environmental impacts). Therefore, the evaluation of environmental impacts on these
31 populations is different from the evaluation of environmental impacts on adults and other
32 populations, respectively.

33 To determine the disproportionately high percentage of minority or low-income population of the
34 ROI (Tinian), the ROI is compared to the population of the community of comparison (CNMI),
35 using the methodology described above.

36 4.5.2 Pipeline and Support Infrastructure

37 4.5.2.1 West Route

38 Based on analysis of 2010 U.S. Census, a slightly higher percentage of the Tinian population
39 was minority as compared to the CNMI (98.2 percent versus [vs.] 97.9 percent) (USCB 2010e).

1 The 2016 CNMI HIES data indicates that there is a slightly lower percentage of low-income
 2 persons in Tinian as compared to the CNMI (54.3 percent vs. 55.7 percent) (CNMI Department
 3 of Commerce 2017a) (see **Table 4.5-1**). Using the methodology identified in **Section 4.5.1**,
 4 there could be disproportionate impacts on Tinian’s minority population. However, the
 5 percentage of minority persons in the populations of Tinian and CNMI differs by only 0.3
 6 percent, and the minority populations of the CNMI and Tinian are both close to 100 percent and
 7 could be considered the same. Similarly, the difference between the percentages of the low-
 8 income population of Tinian and CNMI is close, and could be considered the same. Although
 9 the comparative analysis does not indicate a significant difference in the percentage of low
 10 income or minorities between the ROI and the COC, any potential impacts to human
 11 populations would affect communities which are considered to be low income and/or minority
 12 communities. Therefore, all potential impacts to human populations are discussed in the
 13 Environmental Justice section.

14 **Table 4.5-1. Minority, Low Income, Child, and Elderly Populations**

Demographic	Percent Minority ¹	Percent Low-Income ²	Percent Children ²	Percent Elderly ²
CNMI (Community of Comparison)	97.9%	55.7%	35.5%	4.7%
Tinian (ROI)	98.2%	54.3%	39.1%	4.3%

Sources:

¹ USCB 2010e

² CNMI Department of Commerce 2017a

15 The resources that could result in disproportionate impacts on minority and low-income
 16 populations during construction and operation of the West route pipeline would be noise, air
 17 quality, socioeconomics, health and safety, and water resources. The specific potential impacts
 18 from construction include temporary increased noise and traffic levels in the immediate vicinity
 19 of work areas, decreased air quality, and increased demand on hotels/housing and public
 20 services due to a short-term population increase. Air pollutant emissions during construction
 21 would not degrade the regional air quality. Construction noise would be temporary and periodic.

22 Increased demand for hotels/housing and public services could be minimized through practices
 23 discussed in **Section 4.4.2.1**. There would be few long-term impacts during operation of the
 24 pipeline. Although unlikely, the pipeline could leak resulting in impacts on health and safety and
 25 water quality if the leak affected the aquifer and near shore environments. As described in
 26 **Appendix F**, USAF would comply with all federal, CNMI, and local regulations; and industry
 27 standards and USAF policies regarding design, installation, operation and maintenance of a fuel
 28 pipeline to ensure the safe operations. Additionally, the pipeline would be actively managed by
 29 a PIM Plan, which improves integrity management of piping systems, to assist with and guide
 30 pipeline integrity maintenance and help prevent leaks or pipeline failures. Therefore, it is
 31 expected that construction and operation of the West route would not result in significant or
 32 disproportionately high and adverse health or environmental impacts on minority or low-income
 33 populations on Tinian. Although, impacts would occur because of the construction and
 34 operation of the West route, the impacts would be less than significant.

1 Tinian has a higher percentage of children as compared to CNMI (39.1 percent vs. 35.5
2 percent), but a slightly lower percentage of elderly persons (4.3 percent vs. 4.7 percent). The
3 greatest concentration of schools on Tinian is in the village of San Jose, and includes Head
4 Start, Tinian Elementary School, and Tinian Junior/Senior High School. The closest school to
5 the West route is Tinian Elementary School, which is approximately 0.25 mile north. Therefore,
6 while Tinian has a higher percentage of children, the resulting impact would be negligible to
7 minor, short-term and intermittent, and less than significant.

8 The impacts on environmental justice populations due to construction and operation of the
9 seaport support infrastructure would be identical to those described for the West route pipeline.

10 4.5.2.2 East Route

11 The impacts on environmental justice populations due to construction and operation of the East
12 route and seaport support infrastructure would be identical to those described under the West
13 route in **Section 4.5.2.1**.

14 4.5.2.3 No Action Alternative

15 Under the No Action Alternative, USAF would not construct the fuel pipeline and support
16 infrastructure but would construct a fuel storage tank at the seaport and use fuel trucks to
17 transport fuel from the seaport to the airport. Construction under the No Action Alternative
18 would be much less than the Proposed Action and, therefore, most construction impacts that
19 could affect environmental justice populations under the Proposed Action would be reduced.
20 However, operation of the No Action Alternative would have long-term, periodic, negligible
21 impacts on environmental justice populations due to the use of fuel trucks. Fuel trucks would
22 run 10 hours per day for 30 days, during exercises, to transfer fuel to the proposed airport
23 storage tanks. Traffic volumes along the fuel truck route would increase, thereby increasing
24 long-term noise, traffic, and air emissions. These impacts would be less than significant.

25 4.5.3 Roadway Improvements

26 4.5.3.1 Proposed Action

27 The potential for disproportionate impacts on minority and low-income populations was
28 determined by comparing the percentages of these populations on Tinian with the percentages
29 of the comparable populations in the CNMI. As stated in **Section 4.5.2.1** and **Table 4.5-1**, the
30 Tinian population had a higher percentage of minority persons and a lower percentage of
31 low-income persons than the CNMI, and as such, there could be disproportionate impacts on
32 Tinian's minority population based on the methodology identified in **Section 4.5.1**. However,
33 the percentage of minority and low-income persons in the populations of Tinian and CNMI are
34 very close and could be considered the same.

35 The resources that could result in disproportionate impacts on minority and low-income
36 populations during construction of the roadway improvements would be noise, air quality, and
37 socioeconomics. The specific potential impacts from construction include increased temporary
38 noise and traffic levels in the immediate vicinity of work areas, decreased air quality, and
39 increased demand on hotels/housing and public services due to a short-term population
40 increase. Air pollutant emissions during construction would not degrade the regional air quality.

1 Construction noise would be temporary and periodic. Increased demand for hotels/housing and
2 public services could be minimized by requiring the construction contractor to secure housing
3 prior to the start of construction and to hire additional medical, security, and firefighting
4 personnel to supplement the existing staff during peak construction periods. Therefore,
5 construction of the roadway improvements would not result in significant or disproportionately
6 high and adverse health or environmental impacts on minority or low-income populations on
7 Tinian. Although impacts would occur because of the roadway improvements, the impacts
8 would be less than significant.

9 As discussed in **Section 4.5.2.1**, Tinian has a higher percentage of children as compared to
10 CNMI, but a slightly lower percentage of elderly persons. While Tinian has a higher percentage
11 of children, the resulting impact of construction of roadway improvements would be negligible to
12 minor, short-term and intermittent, and less than significant.

13 4.5.3.2 No Action Alternative

14 Under the No Action Alternative, only minor roadway repairs along the construction and fuel
15 truck routes would occur, as was considered in the 2016 Divert EIS (Final EIS, Section 4.11.2).
16 The No Action Alternative would require minimal construction along the routes and, therefore,
17 fewer impacts on environmental justice populations would occur.

18 4.5.4 Summary of Impacts

19 4.5.4.1 Proposed Actions and Alternatives

20 Disproportionately high impacts on environmental justice populations would not be expected
21 during construction and operation of the Proposed Actions. While most of the Tinian population
22 consists of minority persons and more than half of the population is low-income, the potential
23 impacts from the Proposed Actions would be less than significant.

24 4.5.4.2 No Action Alternatives

25 Under the No Action Alternatives, USAF would not construct the fuel pipeline, support
26 infrastructure, and roadway improvements but would construct a fuel storage tank at the
27 seaport, complete only minor road repairs, and use fuel trucks to transport fuel from the seaport
28 to the airport. The No Action Alternatives would require less construction than the Proposed
29 Actions and would result in fewer impacts on environmental justice populations.

30 4.6 Health and Safety

31 4.6.1 Analysis Methodology

32 Impacts on health and safety were assessed by evaluating the relative scope and location of the
33 proposed projects and their potential to alter or impact the existing conditions for health and
34 safety. Impact significance was determined by analyzing the extent or degree to which
35 implementation of the proposed projects could result in an increased risk to contractor, USAF
36 personnel, or public health and safety. Any increase in safety risks would be considered an
37 impact on health and safety. Impacts are assessed to determine if a proposed project would
38 provide any of the following results:

- 1 • Substantially increase risks associated with the safety of contractors and construction
2 personnel, USAF personnel, or the public.
- 3 • Substantially hinder the ability to respond to an emergency.
- 4 • Introduce a new health or safety risk for which the project proponent or impacted
5 community is not prepared or does not have adequate management and response plans
6 in place.

7 4.6.2 Pipeline and Support Infrastructure

8 Contractors and USAF personnel would implement standard compliance measures and industry
9 standards during construction and operation of the proposed West or East route and seaport
10 support infrastructure as described in **Appendix F**. Contractor and USAF personnel would
11 follow Air Force Occupational Health program requirements when on property leased by the
12 USAF. The actions and measures applicable to all projects and alternatives include the
13 following:

- 14 • Contractors, construction personnel, and USAF personnel would adhere to all applicable
15 federal, DOD, USAF and CNMI safety regulations as described **Section 3.6.1** and
16 **Appendix F**.
- 17 • Contractors would be required to establish and maintain site-specific health and safety
18 programs for their personnel.
- 19 • Contractors, construction personnel, and USAF personnel would be required to wear
20 appropriate PPE such as ear protection, steel-toed boots, hard hats, gloves, and other
21 appropriate safety gear.
- 22 • Equipment would be maintained and stored in accordance with the manufacturer's
23 guidelines to prevent worker injury while operating equipment.
- 24 • Safety Data Sheets for all hazardous materials and chemicals used or stored at the
25 worksite would be kept on site and be available for immediate review.
- 26 • Contractors, construction personnel, and USAF personnel would be properly trained on
27 chemical, physical, and biological hazards as well as ergonomic stressors associated
28 with construction and operations.
- 29 • If contaminated soils were discovered during construction, all activities would be stopped
30 and appropriate remedial measures would be implemented. Additional information on
31 the potential for contaminated soils within the project areas is included in **Section 4.11**.

32 USAF would require appropriate plans (e.g., evacuation plans) and safety protocols related to
33 geological hazards to be in place prior to the commencement of construction or operations to
34 provide for adequate protection for construction and USAF personnel. The public's exposure to
35 geological hazards would not increase as a result of the proposed projects and, therefore, the
36 health and safety impacts associated with geologic hazards on the public are not analyzed.
37 Additional information on potential impacts from geologic hazards is provided in **Section 4.7**.

1 4.6.2.1 West Route

2 **Contractor Health and Safety.** Short-term, direct, minor impacts on contractor health and
3 safety could occur during pipeline construction. Construction personnel could be exposed to
4 hazards that are unique to pipeline construction. When digging trenches for the pipeline,
5 digging too deep could potentially result in cave-ins with injury to construction personnel;
6 however, cave-ins would be prevented through the use of trench stabilization measures. The
7 heavy pipes used to assemble the pipeline could move or roll while being unloaded, and
8 construction personnel engaged in moving pipes could experience lifting or crush injuries if the
9 pipes are not handled carefully. Contractors should ensure proper staging of materials and that
10 stockpile areas of pipes and fittings are secure, and should be prepared for high risk locations in
11 advance, such as areas with slopes or soft ground (LHSFNA 2015). When lowering heavy
12 pipes into excavated trenches, pipe layer machinery would be used. If a pipe layer machine
13 becomes overloaded, the pipe could be dropped in active construction areas (About Pipelines
14 2015). However, contractors would keep manufacturer's load recommendations readily
15 available to ensure that equipment is not loaded beyond its capacity when handling pipes or
16 other heavy materials (Oil & Gas Technology 2012).

17 Potential impacts could also result from the risk of exposure to chemical, physical, and
18 biological hazards; ergonomic stressors; and traffic when installing the pipeline along roadways.
19 Construction along roadways would require additional safety measures, such as reduced speed
20 limit enforcement, blockades and cones, and qualified flaggers to direct traffic and ensure
21 construction personnel safety. Additionally, construction personnel should use caution in
22 construction sites, such as when working in areas with steep slopes within the West route
23 project area, to avoid slips, trips, and falls. Adherence to pipeline construction compliance
24 actions and industry standards described in **Section 4.6.1, Appendix F, Technical Order**
25 **37-1-1, UFC 3-460-03, and PHMSA pipeline safety regulations** would minimize the potential for
26 impacts on contractor health and safety; therefore, no significant impacts from pipeline
27 construction would be expected.

28 Long-term, direct, minor impacts on contractor health and safety could occur during pipeline
29 operations and maintenance. In the event of a spill or leak, potential hazards to personnel
30 would include exposure to highly flammable jet fuel, hazardous vapors that would collect in low
31 areas, and burns or other injuries from skin contact. However, all operations and maintenance
32 personnel would wear the necessary PPE and would be trained in emergency response
33 procedures for spills and leaks in order to protect themselves and the public. Emergency
34 response steps would include informing the appropriate parties to halt pipeline operation;
35 staying clear of vapors, fumes, smoke, and spills; using appropriate air-monitoring equipment to
36 establish the extent of vapor travel; and securing the scene without entering the hazard area.
37 Pipeline incidents require coordination of information and resources among all responders. To
38 ensure proper coordination, an Incident Command System (ICS) could be established. An ICS
39 would provide common terminology, organizational structure, duties, and operational
40 procedures to operator personnel and various federal, state, and local agencies that may be
41 involved in response operations (PAPA 2017). Additionally, appropriate remediation procedures
42 would be followed.

1 In addition to spill response actions, potential impacts on the health and safety of pipeline
2 operations and maintenance personnel from activities such as the use of equipment and
3 exposure to chemicals and petroleum products would be minimized by the adhering to
4 applicable regulations and standards described in **Section 4.6.1** and **Appendix F**. Operations
5 personnel would follow the PIM Plan and adhere to UFC 3-460-03 to ensure the pipeline is
6 maintained properly, which would minimize the potential for spills or leaks. Therefore, no
7 significant impacts on contractor health and safety would be expected.

8 **USAF Personnel Health and Safety.** No health and safety impacts on USAF personnel would
9 be expected during pipeline construction because they would not be involved with this stage of
10 the project beyond potential oversight visits. If USAF personnel are present within the
11 construction area, they would adhere to all safety requirements and wear all necessary PPE.
12 Potential impacts on USAF personnel health and safety from pipeline operation and
13 maintenance would be the same as those described under **Contractor Health and Safety** if
14 USAF personnel conduct operation or maintenance activities.

15 **Airfield Safety.** Short- and long-term, direct, negligible impacts on airfield safety could occur
16 during pipeline construction and operation within the RPZ because equipment could be
17 obstructions for pilots and personnel would be within approach zones where accidents could
18 occur. To avoid potential impacts, construction and maintenance activities would be
19 coordinated with Tinian International Airport personnel to prevent airfield obstructions and safety
20 hazards. Therefore, no significant impacts on airfield safety would be expected.

21 **Explosives Safety.** Short-term, direct, negligible impacts on explosives safety could occur if
22 construction occurs within areas with potential UXO. When working in areas where UXO could
23 be present, USAF could provide a UXO technician to remain on site. A UXO technician would
24 help to ensure the appropriate safety procedures are adhered to and quickly identify suspected
25 UXO. If suspected UXO were discovered during construction, work would be halted and a UXO
26 technician would be notified if not already present. The UXO technician would render the
27 material safe before it is ultimately processed for disposal in accordance with AFI 32-3001.
28 Therefore, no significant impacts on explosives safety would be expected.

29 **Public Health and Safety.** Short-term, direct, negligible impacts on public safety could occur
30 during pipeline construction. Signs would be posted to warn the public of hazards. Additionally,
31 pits would be equipped with traffic-rated covers and locked for security. Emergency services
32 would not be hindered; however, there would be slightly increased traffic on roadways when
33 transporting construction materials and personnel, which could potentially slow emergency
34 response times. Construction would be coordinated with CNMI DPS to ensure the ability of the
35 emergency services personnel to respond to public emergencies. Therefore, no significant
36 impacts on public safety would be expected during pipeline construction.

37 Long-term, minor impacts on public health and safety could result from pipeline operation due to
38 the potential for spills and leaks. Potential hazards would be the same as those discussed
39 under **Contractor Health and Safety**. The occurrence of a spill or leak would be unlikely;
40 however, all pipeline operations and emergency response personnel would be prepared for
41 potential spills and leaks (Strata 2017). Emergency response steps would include securing the
42 scene and halting pipeline operations to minimize potential impacts on public health and safety.

1 Additionally, use of an ICS would facilitate a quick response from local emergency response
2 personnel that would help to determine the extent of potential hazards. If necessary, members
3 of the public within the hazard area would be evacuated immediately and an evacuation plan
4 would be developed prior to pipeline operation. Additionally, the impacted area would be
5 remediated as soon as possible to minimize potential long-term health impacts. Therefore, no
6 significant impacts on public health and safety would be expected.

7 Impacts on contractor health and safety, USAF personnel health and safety, explosives safety,
8 and public health and safety from seaport support infrastructure construction and operation are
9 incorporated into those described for the West route. Potential pipeline-specific construction
10 and operations impacts and traffic hazards described for the West route would not occur for
11 seaport support infrastructure construction.

12 4.6.2.2 East Route

13 Impacts on contractor health and safety, USAF personnel health and safety, and airfield safety
14 from East route pipeline construction and operations would be the same as those described for
15 the West route in **Section 4.6.2.1**. Impacts on explosives and public health and safety from
16 East route pipeline construction and operations would be minor and similar to, but slightly
17 greater than, those described for the West route. The East route would be approximately
18 0.86-mile longer than the West route; therefore, the larger construction area could increase the
19 potential for UXO discovery and the area that could be impacted by spills or leaks. Potential
20 impacts would be minimized through use of compliance measures and industry standards
21 described in **Section 4.6.1** as well as adherence to Technical Order 37-1-1, UFC 3-460-03, and
22 PHMSA pipeline safety regulations; therefore, no significant impacts would be expected from
23 the construction and operation of the East route pipeline.

24 Impacts on contractor health and safety, USAF personnel health and safety, explosives safety,
25 and public health and safety from seaport support infrastructure construction and operation are
26 incorporated into those described for the East route. Potential pipeline-specific construction and
27 operations impacts and traffic hazards described for the West route would not occur for seaport
28 support infrastructure construction.

29 4.6.2.3 No Action Alternative

30 Under the No Action Alternative, USAF would not construct the fuel pipeline and support
31 infrastructure but would construct a fuel storage tank at the seaport and use fuel trucks to
32 transport fuel from the seaport to the airport. The No Action Alternative would result in lesser
33 impacts on construction personnel health and safety and explosives safety because a lesser
34 degree of construction would be required. Greater impacts on the health and safety of
35 operational personnel and the public would be expected from the increased potential for spills,
36 leaks, or other hazardous risks because such issues with trucks are more common than with
37 pipelines (Strata 2017). No significant impacts would be expected under the No Action
38 Alternative.

4.6.3 Roadway Improvements

As described in **Section 4.6.2** contractors and USAF personnel would implement standard compliance measures and industry standards during construction of the roadway improvements.

4.6.3.1 Proposed Action

Contractor Health and Safety. Short-term, direct, minor impacts on contractor health and safety could occur during roadway improvements construction. Potential impacts would result from the risk of exposure to chemical, physical, and biological hazards; ergonomic stressors; and traffic when working along or within roadways. Construction along or within roadways would require additional safety measures, such as reduced speed limit enforcement, blockades and cones, and qualified flaggers to direct traffic and ensure construction personnel safety. Adherence to applicable regulations, compliance actions, and industry standards described in **Section 4.6.1** would minimize the potential for impacts on contractor health and safety; therefore, no significant impacts from roadway improvements construction would be expected.

USAF Personnel Health and Safety. No health and safety impacts on USAF personnel would be expected during roadway improvements construction because they would not be involved with this stage of the project beyond potential oversight visits. If USAF personnel are present within the project area, they would adhere to all safety requirements and wear all necessary PPE.

Airfield Safety. The proposed roadway improvements would not occur within an RPZ; therefore, no impacts on airfield safety would be expected.

Explosives Safety. Short-term, direct, negligible impacts on explosives safety could occur if construction occurs within areas with potential UXO. Although the roadways have been previously disturbed, UXO could be discovered within the project area. When working in areas where UXO could be present, USAF could provide a UXO technician to remain on site. If suspected UXO were discovered during construction, work would be halted and the UXO technician would render the material safe before it is ultimately processed for disposal. Therefore, no significant impacts on explosives safety would be expected.

Public Health and Safety. Short-term, direct, negligible impacts on public safety could occur during roadway improvements construction. Traffic signs would be posted to warn the public of hazards associated with construction. There would be increased traffic on roadways when transporting construction materials and personnel and roadways would be temporarily closed, which could slow emergency response times. Construction would be coordinated with CNMI DPS to ensure the ability of the emergency services personnel to respond to public emergencies. Therefore, no significant impacts on public safety would be expected during roadway improvements construction.

4.6.3.2 No Action Alternative

Under the No Action Alternative, only minor roadway repairs along the construction and fuel truck routes would occur, as was considered in the 2016 Divert EIS (Final EIS, Section 4.11.2). Therefore, impacts on contractor health and safety, USAF personnel health and safety, explosives safety, and public health and safety would be less under the No Action Alternative

1 due the lesser degree of required construction and subsequent roadway closures. Long-term,
2 direct, minor impacts on public health and safety would be expected from continued use of
3 degraded roadways. No significant impacts would be expected under the No Action Alternative.

4 4.6.4 Summary of Impacts

5 4.6.4.1 Proposed Actions and Alternatives

6 Impacts on contractor health and safety could occur during construction from the risk of
7 exposure to chemical, physical, and biological hazards; ergonomic stressors; and traffic if
8 working along or within roadways. Additional impacts on contractor health and safety would be
9 expected from hazards that are unique to pipeline construction. Impacts on contractor health
10 and safety could occur due to the potential for jet fuel leaks and spills, use of equipment, and
11 exposure to chemicals and petroleum products. No health and safety impacts on USAF
12 personnel would be expected during pipeline, seaport support infrastructure, or roadway
13 improvements construction. Impacts on airfield safety could occur during pipeline construction
14 and operation within the Runway Protection Zone because equipment could be obstructions for
15 pilots and personnel would be within approach zones where accidents could occur. Impacts on
16 explosives safety could occur if construction activities occur within areas with potential UXO.
17 Impacts on public safety could occur during construction from increased traffic on roadways and
18 during operation due to the potential for spills, leaks, or other hazardous risks. All impacts
19 would be minimized through adherence to applicable standards and implementation of
20 compliance measures in **Section 4.6.1** and **Appendix F**.

21 4.6.4.2 No Action Alternatives

22 Under the No Action Alternatives, USAF would not construct the fuel pipeline, support
23 infrastructure, and roadway improvements but would construct a fuel storage tank at the
24 seaport, complete only minor road repairs, and use fuel trucks to transport fuel from the seaport
25 to the airport. In general, the No Action Alternative would have fewer impacts on health and
26 safety due to the lesser degree of construction required. However, greater impacts on
27 operational personnel and public health and safety would be expected from the increased
28 potential for spills and leaks because spills, leaks, or other hazardous risks from trucks are more
29 common than from pipelines (Strata 2017). Additional impacts on public health and safety
30 would be expected from continued use of degraded roadways.

31 4.7 Soils and Geology

32 4.7.1 Analysis Methodology

33 The methodology for identifying and evaluating impacts on geology and soils involves
34 establishing baseline conditions through review and evaluation of maps, reports, and other
35 relevant data showing the location and known status of geology, topographic features, soil
36 types, and geologic hazards. This information is then correlated to elements of a proposed
37 action and alternatives to determine potential impacts. The impact assessment for geology,
38 topography, soils, and geologic hazards considers the following:

- 39 • potential to destroy unique geological features

- 1 • effects on important geologic features (including large-scale soil or rock removal)
- 2 • potential to impact soil or geological structures that control groundwater quality or
- 3 groundwater availability
- 4 • substantial alteration of the surrounding landscape
- 5 • diminished slope stability
- 6 • physical disturbance that would substantially increase the rate of erosion and soil loss
- 7 • physical disturbance that would substantially increase impervious surfaces
- 8 • substantial alteration of soil structure or function
- 9 • change to soil and/or bedrock conditions that would increase the vulnerability of people
- 10 or property to a geologic hazard (e.g., seismic activity, tsunami, landslides, and
- 11 liquefaction) and the probability that such a hazard could result in injury or property
- 12 damage.

13 Potential impacts are evaluated based on the degree of project-induced change in a particular
14 factor (e.g., soil erosion) relative to existing conditions, as well as by regulatory standards,
15 where applicable. Generally, direct and indirect impacts can be avoided or minimized if proper
16 construction techniques, erosion control measures, and structural engineering design are
17 incorporated into project development.

18 4.7.2 Pipeline and Support Infrastructure

19 USAF would implement the construction techniques, erosion control measures, and structural
20 engineering designs for the proposed West or East route pipeline and seaport support
21 infrastructure, as identified in **Appendix F**, to minimize or avoid impacts on geological
22 resources. In accordance with the Northern Mariana Islands Administrative Code Chapter
23 65-30, *Earthmoving and Erosion Control Regulations*, no person will commence or continue
24 grading, filling, or vegetation-clearing without first obtaining a permit from the CNMI Bureau of
25 Environmental and Coastal Quality (BECQ). The application for this permit must include an
26 ESCP that meets outlined requirements for conveyance and sediment control structures, slope
27 stabilization, and erosion control. Additionally, the CNMI BECQ and Guam Environmental
28 Protection Agency (GEPA) developed a *Storm Water Management Manual* that addresses the
29 development and implementation of stormwater and erosion control plans. These plans are to
30 adequately address nonpoint source pollution through the use of currently accepted BMPs
31 (CNMI BECQ and GEPA 2006). Additional details on the *Storm Water Management Manual*
32 are provided in **Appendix F**. USAF would also implement the spill prevention and control
33 measures described in **Appendix F**. These mitigation measures would minimize impacts on
34 geological resources and soils that could occur due to an inadvertent spill during construction of
35 the Proposed Actions or operation of the fuel infrastructure.

36 4.7.2.1 West Route

37 **Regional Geology.** The installation of the West route and seaport support infrastructure could
38 result in long-term, direct, minor impacts on Mariana and Holocene limestone formations from
39 site preparation and pipeline installation (i.e., excavation, filling, or grading). The disturbance of

1 limestone formations could impact the permeable rock's ability to recharge aquifers. Soil
2 compaction over the Mariana and Holocene limestone formations would be minimized by
3 limiting construction vehicles and equipment to existing roads and through the use of measures
4 described under **Appendix F**. The degree of disturbance and soil compaction expected would
5 not substantially change the overall ability of the limestone formations to recharge groundwater
6 to underlying aquifers and would not significantly alter geological structures or features;
7 therefore, no significant impacts on regional geology would be expected. No impact on
8 geological formations would be expected from the operation of the West route pipeline.

9 **Physiography and Topography.** Long-term, direct, negligible to minor impacts on
10 physiography and topography would be expected as a result of site preparation and pipeline
11 installation. These disturbances would alter the landscape, could result in slope instability, and
12 could alter surface drainage patterns. Potential slope instability and changes to surface
13 drainage resulting from the changes to the existing slopes would be avoided or minimized by
14 using appropriate engineering design and controls such as those described in **Appendix F**.
15 Additionally, natural topography and drainage would be maintained to the extent possible and
16 the project area would be revegetated with landscape vegetation following installation of the
17 pipeline, which would help maintain slope stability. The proposed seaport support infrastructure
18 project area is relatively flat; therefore, disturbance of the area would not appreciably change
19 local topography and no significant impacts would be expected. Therefore, no significant
20 impacts on physiography and topography would be expected.

21 **Soils.** Short-term, moderate, direct impacts on soils would be expected as a result of soil
22 disturbance and erosion during site preparation and pipeline installation. Ground disturbance
23 could occur along the 80-foot-wide construction corridor throughout the approximately 4.08-mile
24 long pipeline route, which includes areas of highly erosive soil (Chinen-Rock Outcrop Complex,
25 15 to 30 percent slopes). Soil productivity, which is the capacity of the soil to produce
26 vegetative biomass, would decline in temporarily disturbed areas. Loss of soil structure due to
27 compaction from grading as well as foot and construction vehicle/equipment traffic could result
28 in changes in drainage patterns and increased erosion. The seaport project area has been
29 disturbed and compacted through previous landscaping and the Shioya soils that comprise the
30 project area have a slight erosion hazard (USDA NRCS 1989). Long-term impacts would result
31 from permanent vegetation removal and the 4,550-square foot increase in impervious surfaces,
32 which would result in increased rates of erosion due to increased stormwater runoff flows

33 Measures discussed in **Appendix F**, such as complying with CNMI erosion and sediment
34 controls standards, would be implemented, and an ESCP would be prepared and implemented
35 to avoid or minimize impacts from erosion and compaction. Additional erosion control measures
36 would be implemented when disturbing areas of Chinen-Rock Outcrop Complex, 15 to 30
37 percent slopes. Additionally, the utility easement would be revegetated following pipeline
38 installation, which would reduce the potential for erosion and allow for soils to regain
39 productivity. Therefore, no significant impacts on soils within the West route project area would
40 be expected from site preparation and pipeline installation.

41 Long-term, direct, minor to moderate impacts would result from pipeline operation due to the
42 potential for spills or leaks to occur. The degree of the impact to soils would depend on the

1 severity of the spill or leak; however, monitoring of the pipeline would prevent major spills and
2 allow for quick clean-ups. Additionally, the occurrence of a spill would be unlikely (Strata 2017).
3 USAF would follow the measures identified in **Appendix F**, such as Technical Order 37-1-1, for
4 the operation of the fuel pipeline, and maintenance would occur as appropriate to minimize the
5 potential for spills or leaks. Various practices and controls, such as the use of pipeline “pigs”
6 that maintain and monitor pipelines from within, would also minimize the potential for spills or
7 leaks (API 2015).

8 In the event of a spill or leak, jet fuel would impact the surrounding soils. While evaporation
9 would remove some of the fuel from the terrestrial environment, bioremediation and
10 biodegradation could lessen the impacts on soil from potential releases of jet fuel (Karthikeyan
11 et al.1999). Additionally, use of measures described in **Appendix F** that would limit
12 disturbance, erosion, and compaction would preserve the presence of microbial soil
13 communities that could biodegrade jet fuels (Karthikeyan et al.1999). Additional remediation
14 measures that would be implemented in the event of a spill or leak are discussed in **Section**
15 **4.11**.

16 Additional long-term impacts would be expected from continued pipeline and vegetation
17 maintenance in the corridor that would result in soil compaction from foot and vehicle traffic as
18 well as disturbance and erosion. These impacts would be minimized by keeping vehicles on
19 paved roadways and implementing erosion control measures during vegetation maintenance.
20 Therefore, no significant impacts from pipeline operation would be expected.

21 **Geologic Hazards.** Long-term, direct, minor to moderate impacts from geologic hazards could
22 occur as a result of potential damage during pipeline and support infrastructure installation and
23 operation. As stated in **Section 3.7.2**, fault lines underlie portions of the proposed West route.
24 For those portions of the pipeline that could not avoid fault lines, appropriate engineering
25 designs would be employed to minimize potential impacts.

26 The West route partially occurs within areas that could be impacted by tsunamis and the
27 seaport project area is entirely within an area that could be impacted; however, the pipeline
28 would be underground and both the pipeline and support infrastructure would be engineered to
29 withstand the loss of soil stability (i.e., erosion) that could result. Additionally, the West route’s
30 location on the western side of the island would allow for hazard mitigation in the event of a
31 tsunami, the band of coral reef that surrounds Tinian provides protection from tsunamis, and the
32 steep slope of the ocean floor surrounding the island lowers the risk of significant wave run up
33 (NOAA 2013, USAF 2016a).

34 A majority of the West route would be on relatively level ground; however, portions of the
35 pipeline would be in areas with steep slopes, which could increase the potential for landslides.
36 Measures such as erosion controls and protective barriers (as described in **Appendix F**) would
37 be used to reduce the potential for landslides as a result of pipeline installation.

38 A majority of the West route would be underlain by consolidated limestone bedrock; however,
39 portions of the pipeline would be installed on fill or other unconsolidated materials that could fail
40 due to liquefaction. Installation and operation of the pipeline in accordance with applicable
41 standards would minimize potential hazards associated with ground movement and liquefaction.

1 The seaport support infrastructure project area does not contain steep slopes or fill land/other
2 unconsolidated materials; therefore, there would be a lower chance for impacts from landslides
3 and liquefaction. Karst topography is not known to occur within the West route or seaport
4 project area; however, proper construction techniques would be implemented if it were
5 discovered.

6 Prior to pipeline installation, USAF would evaluate subsurface conditions and determine design
7 and installation procedures for earthquake, tsunami, landslide, and liquefaction safety.
8 Additionally, the pipeline would be designed and operated in accordance with the standards
9 described in **Appendix F** to minimize potential damage to the pipeline. If a geologic event were
10 to damage the pipeline, low point drains could be used to fully drain the pipe if required and flow
11 of the jet fuel would be shut off in order to prevent additional spills or leaks. With the use of
12 engineering controls and adherence to all applicable installation and operation standards, the
13 potential for pipeline damage during an earthquake or subsequent tsunami, landslide, or
14 liquefaction event would be reduced; therefore, no significant impacts would be expected.

15 The proposed projects would occur in Seismic Zone 4; therefore, all buildings and infrastructure
16 would be designed and constructed to meet the engineering requirements in the 2018
17 International Building Code (CNMI 2017). Additionally, UFC 3-310-04, *Seismic Design of*
18 *Buildings*, would be employed when designing and constructing structures in order to reduce
19 impacts from geologic hazards associated with slope instability (i.e., landslides), seismic activity,
20 and liquefaction. UFC 3-460-01 would be followed when designing and constructing the
21 proposed pipeline and support infrastructure. Adherence to these requirements would minimize
22 potential for impacts on human life and property associated with geologic hazards.

23 4.7.2.2 East Route

24 **Regional Geology, Physiography, and Topography.** Impacts from construction at the
25 seaport would be the same as those described in **Section 4.7.2.1**. The installation of the East
26 route would result in impacts that are similar to, but slightly greater than, those described for
27 regional geology, physiography, and topography in **Section 4.7.2.1** for the West route. The
28 East route would be approximately 0.86 mile longer than the West route; therefore, it would
29 result in increased areas of site preparation and pipeline installation. Potential impacts would
30 be minimized through use of compliance measures and industry standards described in
31 **Appendix F**; therefore, no significant impacts on regional geology, physiography, or topography
32 would be expected from site preparation or pipeline installation. No impacts on regional
33 geology, physiography, or topography would be expected from the operation of the East route.

34 **Soils.** Short- and long-term impacts on soils would be similar to, but slightly greater than, those
35 described for the West route due to the increased area of site preparation and pipeline
36 installation. The highly erosive Chinen-Rock Outcrop Complex, 15 to 30 percent slopes soil is
37 also present within the East route project area. The measures in **Appendix F** would be
38 implemented and an ESCP would help minimize impacts from erosion and compaction.
39 Additional erosion control measures would be implemented when disturbing areas of
40 Chinen-Rock Outcrop Complex, 15 to 30 percent slopes. Additionally, the utility easement
41 would be revegetated following pipeline installation. Therefore, no significant impacts on soils
42 would be expected from site preparation or pipeline installation.

1 Operational impacts on soils related to potential spills or leaks of jet fuel from the pipeline would
2 be similar to those described for the West route. USAF would follow all applicable guidelines for
3 the operation of the fuel pipeline described in **Appendix F**, conduct maintenance as
4 appropriate, and implement various engineering controls and practices to minimize the potential
5 for spills or leaks. Impacts associated within soil compaction, disturbance, and erosion during
6 pipeline maintenance would be slightly greater due to the greater length of the East route.
7 These impacts would be minimized by implementing erosion control measures during
8 vegetation maintenance. Therefore, no significant impacts on soils would be expected from
9 pipeline operation.

10 **Geologic Hazards.** Impacts from geologic hazards would similar to those described for the
11 West route; however, the East route does not contain as many steep slopes as the West route
12 and would have a slightly lower chance of landslide impacts during site preparation, pipeline
13 installation, and operation. Prior to pipeline installation, USAF would evaluate subsurface
14 conditions and determine design and installation procedures for earthquake, tsunami, landslide,
15 and liquefaction safety. Additionally, the pipeline would be installed and operated in accordance
16 with the standards described in **Appendix F** to minimize potential damage to the pipeline.
17 Therefore, no significant impacts from geologic hazards would be expected from the installation
18 and operation of the East route pipeline.

19 4.7.2.3 No Action Alternative

20 Under the No Action Alternative, USAF would not construct the fuel pipeline and support
21 infrastructure but would construct a fuel storage tank at the seaport and use fuel trucks to
22 transport fuel from the seaport to the airport. The No Action Alternative would result in lesser
23 impacts on regional geology, physiography and topography, and soils within the West and East
24 route project areas due to the lesser degree of ground disturbance required; however, greater
25 impacts on soils within the seaport support infrastructure project area would be expected due to
26 the increased impervious surface area proposed for the bulk fuel tanks in the 2016 Divert EIS
27 (7,534 square feet) (Final EIS, Section 2.5.2). Greater impacts on soils from potential jet fuel
28 spills would be expected because spills and leaks from trucks are more common than from
29 pipelines (Strata 2017). Potential impacts from geologic hazards would be similar to, but lesser
30 than, those described for the pipeline and seaport support infrastructure because the potential
31 for damage from geologic hazards would be lower. No significant impacts would be expected
32 under the No Action Alternative.

33 4.7.3 Roadway Improvements

34 As described in **Section 4.7.2**, USAF would obtain the appropriate permits and implement the
35 construction techniques, erosion control measures, and structural engineering designs for the
36 roadway improvements, as identified in **Appendix F**, to minimize or avoid impacts on geological
37 resources. USAF would also implement the spill prevention and control measures described in
38 **Appendix F**. These mitigation measures would minimize impacts on geological resources and
39 soils from an inadvertent spill during construction of the Proposed Actions or operation of the
40 fuel infrastructure.

1 4.7.3.1 Proposed Action

2 **Regional Geology.** Impacts on regional geology from roadway improvements would be long-
3 term, direct, and negligible. Impacts on Mariana and Holocene limestone formations would be
4 expected from ground disturbance and construction (i.e., excavation, grading, and paving) along
5 approximately 2.51 miles of roadways. The disturbance of limestone formations could impact
6 the permeable rock's ability to recharge aquifers; however, soil compaction over the Mariana
7 and Holocene limestone formations would be minimized through use of measures described in
8 **Appendix F**; therefore, no significant impacts would be expected.

9 **Physiography and Topography.** Long-term, direct, negligible impacts would be expected on
10 physiography and topography as a result of roadway improvements. The proposed roadway
11 improvements project area is relatively flat; therefore, disturbance of the area would not
12 appreciably change local topography and no significant impacts would be expected.

13 **Soils.** Short-term, direct, minor impacts on soils would be expected as a result of soil
14 disturbance and erosion during roadway improvements. Although removal and replacement of
15 pavement would occur largely on already disturbed soils under the existing roadbed, soil
16 productivity would decline in nearby temporarily disturbed areas. Loss of soil structure due to
17 compaction from grading as well as foot and construction vehicle/equipment traffic could result
18 in changes in drainage patterns and increased erosion. The measures discussed in **Appendix**
19 **F** would be implemented and help reduce impacts, and an ESCP would be prepared and
20 implemented to avoid or minimize impacts from erosion and compaction during construction.
21 Therefore, no significant impacts from construction would be expected.

22 **Geologic Hazards.** Long-term, direct, minor to moderate impacts from geologic hazards could
23 occur as a result of potential damage during roadway improvements construction. As stated in
24 **Section 3.7.2**, fault lines underlie portions of the proposed roadway improvements. For those
25 portions of the roadway that could not avoid fault lines, appropriate engineering designs would
26 be employed to minimize potential impacts. The roadway improvements would partially occur
27 within areas that could be impacted by tsunamis; however, the roadway would be engineered to
28 withstand the loss of soil stability (i.e., erosion) that could result.

29 The roadway improvements project area does not contain steep slopes and would have a low
30 chance of landslide impacts during construction.

31 A majority of the roadway improvements would be underlain by consolidated limestone bedrock;
32 however, portions of the roadway improvements would be implemented on fill or other
33 unconsolidated materials that could fail due to liquefaction. Construction of the roadway in
34 accordance with applicable standards would minimize potential hazards associated with ground
35 movement and liquefaction.

36 Prior to construction, USAF would evaluate subsurface conditions and determine design and
37 installation procedures for earthquake, tsunami, landslide, and liquefaction safety. Additionally,
38 the roadway would be constructed in accordance with the applicable standards described in
39 **Appendix F** to minimize potential damage. Therefore, no significant impacts from geologic
40 hazards would be expected from the construction of roadway improvements.

1 4.7.3.2 No Action Alternative

2 Under the No Action Alternative, only minor roadway repairs along the construction and fuel
3 truck routes would occur, as was considered in the 2016 Divert EIS (Final EIS, Section 4.11.2).
4 Impacts on regional geology, physiography and topography, soils, and susceptibility to geologic
5 hazards would be lesser under the No Action Alternative. However, the roadway pavements
6 would not be replaced and subject to greater continued maintenance. No significant impacts
7 would be expected under the No Action Alternative.

8 4.7.4 Summary of Impacts

9 4.7.4.1 Proposed Actions and Alternatives

10 Impacts on regional geology, physiography, and typography would occur from site preparation
11 and construction, which would disturb the underlying limestone formations, compact soils, and
12 temporarily alter the landscape, surface drainage patterns, and potential slope instability.
13 Impacts on soils would also occur from site preparation resulting in soil disturbance, erosion,
14 and compaction. Long-term impacts on soils could occur from pipeline operations in the event
15 of a spill or leak. Impacts from geological hazards on the project areas could occur due to the
16 potential for damage from earthquakes, tsunamis, landslides, and liquefaction. All impacts
17 would be minimized through adherence to applicable standards, the use of appropriate
18 engineering techniques, and implementation of the measures discussed in **Appendix F**.

19 4.7.4.2 No Action Alternatives

20 Under the No Action Alternatives, USAF would not construct the fuel pipeline, support
21 infrastructure, and roadway improvements but would construct a fuel storage tank at the
22 seaport, complete only minor road repairs, and use fuel trucks to transport fuel from the seaport
23 to the airport. In general, the No Action Alternatives would have a lesser impact on soils and
24 geology. However, greater impacts on soils within the seaport support infrastructure project
25 area would be expected due to the increased impervious surface area proposed for the bulk fuel
26 tanks in the 2016 Divert EIS (Final EIS, Section 2.5.2). Additionally, greater impacts on soils
27 from potential jet fuel spills would be expected because spills and leaks from trucks are more
28 common than from pipelines (Strata 2017).

29 4.8 Water

30 4.8.1 Analysis Methodology

31 Factors considered in determining whether a proposed action would have a significant impact
32 on water resources include the extent or degree to which its implementation would result in one
33 or more of the following situations:

- 34 • Degrade groundwater, surface, or coastal water quality in a manner that would reduce
35 the existing or potential beneficial uses of the water.
- 36 • Reduce the availability of, or accessibility to, one or more of the beneficial uses of a
37 water resource.

- 1 • Alter the existing pattern of groundwater or surface water flow or drainage in a manner
2 that would affect the uses of the water within or downgradient from the project area.
- 3 • Be out of compliance with existing or proposed water quality standards or with other
4 regulatory requirements related to protecting or managing water resources.
- 5 • Substantially increase risks associated with human health or environmental hazards.
- 6 • Increase the hazard of flooding or the amount of damage that could result from flooding,
7 including from runoff or from severe weather events.

8 4.8.2 Pipeline and Support Infrastructure

9 USAF would implement stormwater management and water quality control compliance actions
10 and industry standards into the design, construction, and operation of the Proposed Action, as
11 described in **Appendix F**. Implementation of these measures would reduce potential
12 environmental impacts on water resources by reducing the potential for increased stormwater
13 runoff, altered hydrologic conditions, altered water quality, decline in groundwater recharge, and
14 groundwater contamination from construction or a release of petroleum products.

15 Measures provided in **Appendix F** would also be implemented for erosion and sediment control
16 both during and after construction, and would minimize impacts on water resources by
17 controlling sedimentation. Lastly, measures applicable to the safe design and operation of fuel
18 facilities would also be implemented, as described in **Appendix F**.

19 4.8.2.1 West Route

20 **Groundwater.** Short- and long-term, minor to moderate impacts on groundwater resources
21 could result from construction and operation of the 4.08-mile West route. Pollution from
22 stormwater runoff could contribute to groundwater impacts, as well as direct impacts on
23 groundwater resources through percolation. Impacts on groundwater resources could also
24 result from a reduction in groundwater recharge associated with the construction and operation
25 of seaport support infrastructure.

26 The reduction in vegetation and increase in impervious surface associated with the construction
27 of seaport support infrastructure has the potential to affect overland water flow and recharge of
28 the local aquifer. Clearing vegetation, soil compaction, and impervious surface would reduce
29 infiltration and percolation of water to the groundwater lens by removing vegetation and natural
30 depressions that might serve to pond stormwater and promote recharge to the aquifer.
31 However, these impacts would be avoided or minimized through use of stormwater
32 management measures to improve water quality and promote groundwater recharge, as
33 identified in **Appendix F**.

34 Storm water generated during construction could contain elevated sediment concentrations from
35 trenching, and hazardous materials from spills and leaks of lubricants, fuels, or other chemicals.
36 Due to the high permeability of the limestone on Tinian, the aquifer could be very susceptible to
37 contamination. However, adhering to the provisions of the CGP and implementing measures in
38 **Appendix F** associated with addressing site- and activity-specific water resource protection
39 needs would decrease stormwater pollutant loading potential and thus reduce pollution loading

1 potential to the underlying groundwater subbasins. The potential for stormwater runoff from the
2 construction site would be minimized through development and implementation of a site-specific
3 SWPPP, which describes the measures to be implemented onsite to prevent stormwater runoff.

4 Groundwater could also be impacted by accidental spills or leaks of fuels, lubricants, and
5 coolant from construction equipment. By implementing proper storage, containment, and
6 handling procedures, however, the potential hazard would be greatly minimized or avoided.
7 USAF would develop and adhere to the provisions contained in a site-specific Spill Prevention,
8 Control, and Countermeasure (SPCC) Plan.

9 Groundwater could also be impacted by accidental leaks of fuel from the pipeline. To reduce
10 the likelihood of spills during construction and operation, all proposed fuels infrastructure would
11 be constructed according to the most stringent applicable federal and CNMI requirements.
12 Operation and maintenance of the pipeline would be managed by a PIM Plan, which improves
13 the integrity management of piping systems and helps prevent leaks or pipeline failures. Based
14 on the general direction of groundwater flow and distance/setback of the project area from the
15 municipal well, potential leaks would not flow to the public water system well. Therefore,
16 impacts on groundwater quality as a result of an accidental spill during construction and
17 operation are anticipated to be minor.

18 **Surface and Coastal Waters.** Short- and long-term, direct, minor impacts on surface and
19 coastal water resources could result from construction and operation of the 4.08-mile West
20 route. In general, temporary impacts would result from construction such as trenching and
21 pipeline installation and from potential leaks during operation. Impacts on surface water and
22 coastal water resources from the seaport support infrastructure could result from degraded
23 water quality, increased stormwater runoff, and altered hydrologic conditions.

24 Impacts on water quality in downgradient surface water bodies and coastal waters could occur.
25 Construction activities such as trenching and excavating would displace soils and sediment. If
26 not managed properly, disturbed soils and sediments could be washed into nearby surface
27 water bodies or coastal waters during storm events and reduce water quality. To minimize the
28 potential temporary increases in erosion and sedimentation, a CGP would be obtained and an
29 ESCP and SWPPP would be prepared and implemented. Construction work would follow the
30 CNMI erosion control requirements and utilize measures such as limiting ground disturbance
31 during wet weather, minimizing compaction of soils, and use of temporary diversions and
32 sedimentation basins that direct stormwater away from construction areas to minimize potential
33 erosion and transportation of sediment and pollutants to coastal waters. By adhering to the
34 provisions of the CGP and implementing erosion control measures, pollutant loading to runoff
35 would be reduced and potential indirect impacts to nearshore waters would be subsequently
36 lessened. The ESCP and SWPPP would identify construction-specific measures that would be
37 implemented as part of the action to reduce the potential for erosion, runoff, sedimentation, and
38 subsequent water quality impacts.

39 As previously described for groundwater, clearing and grading activities would remove
40 vegetation and natural depressions that might serve to pond stormwater, thereby increasing
41 stormwater volume and velocity. However, stormwater quantity would be managed through the
42 use of vegetated swales and grading to maintain the pre-development hydrology and through

1 the use of detention/retention ponds downstream of new impervious surfaces to maintain the
2 pre-development flow rates.

3 The construction of the seaport support infrastructure would result in approximately
4 4,550 square feet of new impervious surface, which could increase the rate and volume of
5 stormwater runoff to downgradient surface waters. Increased sediment runoff would increase
6 surface water turbidity in receiving waters, thereby degrading water quality. However,
7 implementation of a site-specific SWPPP with appropriate pollution-control practices would
8 minimize these effects. Storm water management controls would be designed and
9 implemented consistent with permit requirements and stormwater standards to minimize
10 potential impacts on surface water associated with the permanent increase in impervious
11 surfaces. Low impact development strategies would be implemented as needed to comply with
12 EISA Section 438 and would be designed in accordance with the CNMI BECQ/GEPA Storm
13 Water Management Manual (CNMI BECQ and GEPA 2006).

14 Heavy equipment (e.g., bulldozers, backhoes, dump trucks) would be used on site throughout
15 the duration of the proposed construction. Fuels, hydraulic fluids, oils, and lubricants would be
16 stored on site to support contractor vehicles and machinery. Proper housekeeping,
17 maintenance of equipment, and containment of fuels and other potentially hazardous materials
18 would be conducted to minimize the potential for a release of fluids into surface waters.
19 Additionally, a site-specific SPCC Plan and clean-up plans would be followed to prevent spills or
20 leaks of hazardous materials or wastes from impacting the environment.

21 In accordance with the project SPCC, the following setbacks from surface water resources
22 would be maintained throughout construction and operation (unless otherwise noted):

- 23 • Construction spoil piles would be set back a minimum of 10 feet.
- 24 • No hazardous materials storage, concrete coating, or refueling would occur within
25 100 feet.

26 **Wetlands.** No effects on wetlands would occur as a result of West route and seaport
27 infrastructure construction and operation. The West route and seaport infrastructure would not
28 cross through wetlands. The closest wetland to the project area is approximately 1 mile away
29 from the pipeline route. Implementation of properly designed and maintained erosion and
30 sediment controls and stormwater management practices during trenching would minimize the
31 potential for any effects on wetlands occurring in proximity to the project area.

32 **Floodplains.** No effects on floodplains would occur as a result of West route and seaport
33 infrastructure construction and operation. Although there are areas designated as Flood Zone A
34 in the area of the seaport construction, no impacts on floodplains would be expected. Because
35 these flood zone areas are only designated as such due to their potential to hold water during
36 heavy rain events and because these areas are not associated with floodplains of surface water
37 bodies, these areas are not protected under EO 11988, *Floodplain Management*. During and
38 after construction, water from heavy rain would be addressed by permit conditions of the CGP
39 associated SWPPP.

1 4.8.2.2 East Route

2 **Groundwater.** Short- and long-term, minor to moderate impacts on groundwater resources
3 from possible contamination of the groundwater lens associated with the construction and
4 operation of the 4.94-mile East route would be similar in type as those described for the West
5 route. The East route is longer than the West route and would almost completely occur within
6 an area with a shallow water table. This could increase the risk of impacts to the groundwater
7 lens if a spill or leak were to occur.

8 **Surface and Coastal Waters.** Short and long-term, direct, minor impacts on surface water and
9 coastal water resources would be expected from degraded water quality associated with
10 construction and operation of the East route and would be similar to those described for the
11 West route. Impacts from construction of the East route would have lesser potential to affect
12 coastal waters, as the East route travels more inland than the West route.

13 **Wetlands.** No effects on wetlands would occur as a result of East route construction and
14 operation. The East route would not cross through wetlands. Implementation of properly
15 designed and maintained erosion and sediment controls and stormwater management practices
16 during trenching would minimize the potential for any effects on wetlands occurring in proximity
17 to the project area.

18 **Floodplains.** No effects on floodplains would occur as a result of East route construction and
19 operation for the same reasons described under the West route.

20 4.8.2.3 No Action Alternative

21 Under the No Action Alternative, USAF would not construct the fuel pipeline and support
22 infrastructure but would construct a fuel storage tank at the seaport and use fuel trucks to
23 transport fuel from the seaport to the airport. The use of fuel tanker trucks would increase the
24 potential for accidental spills or leaks of fuels and have greater impacts than the Proposed
25 Action. Under the No Action Alternative, bulk fuel storage tanks would be constructed at the
26 seaport, resulting in a smaller area of disturbance but a larger area of impervious surfaces.
27 Storm water runoff volumes could be increased under this scenario. An increase in the amount
28 of stormwater entering a surface water feature would impact the rate, volume, and duration of
29 flow, which could degrade its quality.

30 4.8.3 Roadway Improvements

31 As described in **Section 4.8.2**, USAF would implement stormwater management and water
32 quality control compliance actions and industry standards into the design and construction of the
33 Proposed Actions, as described in **Appendix F**. Implementation of these measures would
34 reduce potential environmental impacts on water resources by reducing the potential for
35 increased stormwater runoff, altered hydrologic conditions, altered water quality, decline in
36 groundwater recharge, and groundwater contamination from construction or a release of
37 petroleum products.

38 Measures provided in **Appendix F** would also be implemented for erosion and sediment control
39 both during and after construction, and would minimize impacts on water resources by

1 controlling sedimentation. Lastly, measures applicable to the safe design and operation of fuel
2 facilities would also be implemented, as described in **Appendix F**.

3 4.8.3.1 Proposed Action

4 **Groundwater.** Short-term, negligible impacts on groundwater could occur as a result of the
5 road improvements. Construction of the road improvements could result in negligible direct and
6 indirect effects from accidental spills. However, implementation of measures identified in
7 **Appendix F** would avoid or minimize impacts on groundwater resources.

8 A spill or release of fuel or hazardous materials from the heavy equipment could impact
9 groundwater quality; however, all appropriate measures would be implemented to avoid such
10 discharges. All equipment would be maintained according to the manufacturer's specifications,
11 and the potential for spills to occur would be minimized through the implementation of a SPCC
12 plan. Items addressed in the SPCC include containment structure requirements, inspection of
13 storage tanks, personnel training on spill prevention procedures, site security, loading and
14 unloading operations, and drainage control. Therefore, construction of road improvements
15 would have a negligible impact on groundwater resources.

16 Any minor grading and surface preparations for road improvements would not be anticipated to
17 intersect the local groundwater table. Due to the surficial nature of the Proposed Action, no
18 effects on the local aquifer would be anticipated.

19 **Surface Waters.** Short-term, minor impacts on surface water could occur as a result of road
20 improvements. Without the implementation of proper controls, grading and other ground-
21 disturbing activities would result in erosion and sedimentation. Proper grading techniques and
22 implementation of standard measures and erosion and sediment controls as identified in
23 **Appendix F** would minimize the transport of sediment to nearby surface waters. Roadside
24 drainage would be maintained to capture runoff and prevent erosion issues.

25 Measures would be incorporated into the design of new construction to reduce the amount of
26 stormwater runoff, promote ground infiltration, and reduce the potential for erosion. Storm water
27 would be managed in accordance with federal, state, and local requirements.

28 Implementing features that manage surface water runoff into the design of the project, such as
29 appropriately designed conveyance structures (such as roadways, channels, and culverts),
30 detention basins, or natural open space, would ensure that impacts to surface water as a result
31 of implementation of the Proposed Action would be minimal.

32 **Wetlands.** No effects on wetlands would occur as a result of roadway improvements. The
33 closest wetland is approximately 1.4 miles away.

34 **Floodplains.** No effects on floodplains would occur as a result of roadway improvements.
35 Although there are areas designated as Flood Zone A in the area of the seaport construction, no
36 impacts on floodplains would be expected. Because these flood zone areas are only
37 designated as such due to their potential to hold water during heavy rain events and because
38 these areas are not associated with floodplains of surface water bodies, these areas are not

1 protected under EO 11988, *Floodplain Management*. During and after construction, water from
2 heavy rain would be addressed by permit conditions of the CGP associated SWPPP.

3 4.8.3.2 No Action Alternative

4 Under the No Action Alternative, only minor roadway repairs along the construction and fuel
5 truck routes would occur, as was considered in the 2016 Divert EIS (Final EIS, Section 4.11.2).
6 Under the No Action Alternative, there would be an increase in the potential for accidental spills
7 or leaks of fuels during transport on degraded roads. Any spill or leak could degrade the quality
8 of groundwater, surface water, and downgradient coastal waters.

9 4.8.4 Summary of Impacts

10 4.8.4.1 Proposed Actions and Alternatives

11 Through the design, implementation, and adaptive management of an effective stormwater
12 management system and erosion control procedures as described in **Appendix F**, construction
13 and increases in impervious surfaces required for the Proposed Actions would result in no or an
14 unmeasurably small increase in the amount of sediment entering water resources on Tinian. In
15 addition, the fuel pipeline and seaport support facilities, would be designed to prevent and
16 contain spills of hazardous materials, and plans would be developed and implemented to
17 maintain that infrastructure and ensure rapid response in the unlikely event of a spill.

18 4.8.4.2 No Action Alternatives

19 Under the No Action Alternatives, USAF would not construct the fuel pipeline, support
20 infrastructure, and roadway improvements but would construct a fuel storage tank at the
21 seaport, complete only minor road repairs, and use fuel trucks to transport fuel from the seaport
22 to the airport. The No Action Alternative would increase the potential for accidental spills or
23 leaks of fuels and have greater potential for runoff in comparison to the Proposed Actions.

24 4.9 Infrastructure and Transportation

25 4.9.1 Analysis Methodology

26 Impacts on infrastructure are evaluated based on their potential for disruption, excessive use, or
27 improvement of the existing utilities, and solid waste management. Impacts might arise from
28 physical changes to utility needs created by either direct or indirect changes related to the
29 Proposed Action. Assessing impacts on utilities entails a determination of utilities that would be
30 used or improved as a result of the Proposed Action. Effects on infrastructure were assessed to
31 determine if the Proposed Action would result in the following impacts:

- 32 • Exceed the capacity of a utility or infrastructure.
- 33 • Result in a long-term interruption of a utility or infrastructure.
- 34 • Result in a violation of a permit condition.
- 35 • Result in a violation of an approved plan for a utility or infrastructure.

36 Impacts on transportation were evaluated based on traffic volume and existing LOS. Impacts
37 are considered minor if LOS would not degrade as a result of the additional traffic or if the
38 increase in traffic volume is less than 10 percent. Impacts are considered major if LOS would

1 degrade as a result of the additional traffic and the increase in traffic volumes is greater than
2 10 percent. Additionally, impacts could remain major with a relatively small traffic volume
3 increase if the existing LOS was already “F.” Short-term impacts on the ground transportation
4 network are considered to be those occurring during construction and immediately thereafter
5 (approximately 1- to 4-year timeframe) and long-term impacts are considered to occur and
6 continue starting from approximately 5 years from start of construction.

7 Several possible activities associated with the Proposed Actions could impact the transportation
8 network, including construction and the movement of materials and personnel during
9 construction. The impacts of these activities were qualitatively assessed based on information
10 from the CNMI Comprehensive Master Plan and estimated number of trips generated by the
11 activities associated with the Proposed Actions.

12 USAF would implement compliance measures and industry standards during construction and
13 implementation of the West route, East route, and roadway improvements, regardless of
14 alternative, to minimize or avoid infrastructure and utilities impacts. The compliance measures
15 applicable to all alternatives are described in the following paragraphs and summarized in
16 **Appendix F.**

17 ***During Construction***

18 *Solid Waste.* Waste would be recycled per EO 13834, *Efficient Federal Operations*, and DOD
19 requirements. Additionally, waste from vegetation clearing for construction would be
20 composted, as practicable. USAF or their contractors would obtain all necessary permits for
21 solid waste management and processing, including recycling and green waste processing.
22 Required permits could include the BECQ Solid Waste Collection and Solid Waste Processing
23 permits. Contractors hired for the various construction projects would be responsible for the
24 removal and disposal of their construction wastes generated on site.

25 *Water Supply.* USAF would coordinate with local regulatory authorities and CUC to avoid any
26 localized impacts on the water supply during construction.

27 ***During Operation***

28 *Energy Efficiency.* New facilities would be designed to achieve Leadership in Energy and
29 Environmental Design Silver certification; therefore, state-of-the-art energy efficiency would be
30 expected and impacts on electrical supply would be reduced. USAF would follow DOD Energy
31 Conservation goals; therefore, impacts on electrical supply during implementation would be
32 reduced.

33 ***During Construction and Operation***

34 *Water Supply.* Measures provided in **Appendix F** would be implemented for erosion and
35 sediment control during and after construction, and would minimize impacts on potable water
36 resources by controlling sedimentation. **Section 4.8** includes potential impacts on stormwater
37 systems, and spill prevention and control are discussed in detail in **Section 4.11.**

4.9.2 Pipeline and Support Infrastructure

4.9.2.1 West Route

Airfield. Short-term, negligible impacts on the airfield would be expected from the potential disruption caused by construction associated with the West route. Disruption could be expected on airfield access roads and potentially on airfield ground operations because of the potential for foreign object debris during installation of the pipeline. Impacts would be temporary and consistent with those expected from construction of the aboveground infrastructure proposed at the airport in the 2016 Divert EIS (Final EIS, Section 4.13.2.1).

Once the pipeline is installed, fuel would be delivered to the airport through the pipeline. No impacts on airspace or airfield operations would be expected from the operation of the pipeline, and the jet fuel receiving, storage, and distribution system would remain as described the 2016 Divert EIS (Final EIS, Section 2.5.2). As with any similar system, fueling operations could result in incidental spills of fuel, but implementing appropriate spill containment and management plans would manage the potential for impacts.

Seaport. Short-term, negligible impacts on the seaport would be expected from the disruption caused by construction. Long-term impacts on jet fuel storage capacity at the seaport would occur because the fuel tanks described in the 2016 Divert EIS (Final EIS, Section 2.5.2) would no longer be constructed. However, these impacts would be offset by installation of the pipeline, which would provide the capability to offload jet fuel from the seaport.

Electrical Supply. Short-term, negligible impacts on the existing electrical system would be expected during the extension of electrical lines to the pump house and the relocation or upgrading of any buried electrical lines. These impacts would be temporary. Additional short-term, negligible, impacts could be expected from potential power disruptions when new facilities and lighting systems are connected. It is assumed that the construction contractors would primarily use diesel- or battery-powered equipment. Any construction equipment that is powered via electricity would likely receive power from a portable generator or a temporary electrical panel.

Liquid Fuel Supply. Short-term, negligible impacts on liquid fuel supply would be expected due to the petroleum that would be required for construction equipment. The required petroleum would be brought on site by contractors and removed when construction is complete.

The seaport and airport currently do not have jet fuel receipt, storage, or distribution capabilities, so construction of the proposed fuel infrastructure would not interrupt existing liquid fuel operations. Long-term, major, beneficial impacts on the capacity to receive and distribute aviation fuel would result from the West route, which would increase fuel capacity at Tinian International Airport by operating the pipeline with an approximate rate of flow around 2,000 gallons per minute that would enter a bulk receipt pipeline rather than fuel storage tanks.

Water Supply. Short-term, minor to moderate impacts on the water supply would be expected from the temporary shutoff, extension, connection, and use of water lines during construction, and long-term minor impacts would be expected during operation from use of the water.

1 Construction. During construction, the water storage system at the seaport would be connected
 2 to the existing main waterline near the corner of Pump House Road; minor to moderate impacts
 3 would be expected as this system was being connected.

4 An estimated 500 gallons/acre/day could be used for dust suppression during construction as
 5 identified in the 2016 Divert EIS (Final EIS, Section 4.13.2.1). Assuming an 80-foot wide
 6 corridor over the length of the pipeline (approximately 40 acres of disturbance) and 8 acres of
 7 disturbance for supporting infrastructure, the West route would require approximately
 8 24,000 gallons of water per day over the course of construction.

9 Water to support an additional 75 construction workers would also be required during
 10 construction at an average rate of 98 gpd per person, equating to approximately 7,350 gpd for
 11 all workers. Negligible amounts of water would also be needed for additional washing
 12 construction vehicles and equipment and wetting base and subgrade to optimize moisture
 13 content for compaction, and continuously spraying aggregate stockpiles to maintain a saturated
 14 surface-dry state.

15 No other measureable water use is proposed to support construction and it is assumed static
 16 testing of the pipeline would take place after construction is complete. In total, an estimated
 17 31,350 gpd of water would be required to support construction of the West route. This amount
 18 of water would be required in addition to the water required to support construction of the
 19 infrastructure in the 2016 Divert EIS (Final EIS, Section 4.13.2.1). However, fuel storage tanks
 20 would no longer be constructed at the seaport under the Proposed Action; therefore, static
 21 testing for storage tanks at the seaport, as described in the 2016 Divert EIS (Final EIS, Section
 22 4.13.2.1), would no longer be required during construction. **Table 4.9-1** provides a summary of
 23 all water needed to support the Proposed Action and construction proposed in the 2016 Divert
 24 EIS (Final EIS, Section 4.13.2.1).

25 **Table 4.9-1. Estimated Total Water Use – West Route Construction**

Project	Total Gallons Per Day During Construction*
West Route Construction	+ 31,350
Original Divert Construction	+ 81,016
Seaport Fuel Tank Static Testing – no longer needed	- 11,507
Maximum Total	+ 100,859

Note: *HDR estimation

26 Tinian is able to generate 1,260,000 gallons of potable water per day; however, it is estimated,
 27 as described in **Section 3.9**, that up to 80 percent of this water is lost; therefore, only
 28 approximately 252,000 gpd of potable water would be available on Tinian from the existing
 29 system. Given these assumptions of water loss, proposed water usage during construction of
 30 the West route and construction infrastructure described in the 2016 Divert EIS (Final EIS,
 31 Section 4.13.2.1) would utilize 40 percent of Tinian’s daily water supply available from the
 32 existing CUC water system. Under the 2016 Divert EIS (Final EIS, Section 4.13.2.1), USAF
 33 would obtain CPA board approval to install two water wells to meet USAF water requirements,
 34 each approximately 350 feet deep, to rectify impacts on the CUC potable water. Project design

1 would incorporate the need for water for the proposed pipeline and supporting infrastructure.
2 USAF would manage draw rates from the existing and proposed wells to ensure that water
3 supply is not exceeded. The water wells would be constructed at the beginning of the
4 construction phase and would be able to support the remainder of construction if the CUC
5 supply could not meet the demand. Therefore, minor to moderate impacts on the water supply
6 are expected.

7 Operation. Once construction is complete, static testing of the pipeline would be required. It is
8 assumed that the entire pipeline would be filled with potable water during a single day to
9 conduct the testing and that testing would not occur during the same time as divert exercises or
10 when fire suppression tanks were being filled, as described in the 2016 Divert EIS (Final EIS,
11 Section 4.13.2.2). A volume of approximately 127,186 gpd would be required for static testing
12 of the West route pipeline. This volume is approximately 50 percent of Tinian's daily water
13 supply available from the existing CUC water system. As described under *Construction* and in
14 the 2016 Divert EIS (Final EIS, Section 4.13.2.1), USAF would install two water wells to meet
15 USAF water requirements and to rectify impacts on the CUC potable water. Project design
16 would incorporate the need for water for the proposed pipeline and supporting infrastructure,
17 both during construction and operation. Therefore, short- and long-term minor impacts on the
18 water supply are expected.

19 **Storm Water.** Short-term, minor impacts on the stormwater management system would be
20 expected from during construction and from new impervious surfaces associated with seaport
21 infrastructure. Measures to control erosion and sedimentation described in **Section 4.8** and
22 **Appendix F** would reduce these impacts. The discharge of stormwater runoff from construction
23 would be authorized by CNMI and USEPA permits described in **Section 4.8** and **Appendix F**.
24 Impacts on stormwater could also occur in the unlikely event of a fuel spill; however, measures
25 described in **Appendix F** would be implemented to avoid or minimize these impacts. Therefore,
26 the impacts on stormwater would not be significant.

27 **Sanitary Sewer and Wastewater Treatment.** Negligible to minor impacts on sewer or
28 wastewater treatment would be expected from an increase in the generation of wastewater
29 during the construction of the West route. To manage construction-related wastewater,
30 construction contractors could utilize the permitted leaching field controlled by JRM, lease or
31 rent the processing system from the closed Tinian Dynasty, or develop a new system. It is also
32 assumed that construction workers would use portable toilets at the construction site and
33 non-local workers would use existing wastewater infrastructure at their place of lodging.

34 **Solid Waste.** Short-term, minor impacts on solid waste management would be expected from
35 the generation of construction debris. Construction debris is generally composed of clean
36 materials and therefore, to minimize impacts on the solid waste system, it would be managed as
37 described in **Section 4.9.1**. However, debris that is not recycled would be landfilled, which
38 would be considered a long-term, irreversible effect. The estimated amounts of debris
39 generated from the proposed construction are approximately 1,742,400 square feet for the
40 pipeline and approximately 20,000 square feet from the seaport infrastructure.

41 The debris generated from the proposed construction associated with the West route would total
42 an estimated 881 tons over a period of 3 years prior to any recycling effort. Waste would be

1 recycled per EO 13834, *Efficient Federal Operations*, and DOD requirements. There is a lack of
 2 municipal solid waste facilities on Tinian; therefore, the remaining construction debris that is not
 3 recycling or managed as green waste would have to be disposed of in the Tinian landfill or
 4 collected and transported off the island by the construction contractor using commercial solid
 5 waste haulers and commercial barges or ships until a permitted municipal solid waste facility is
 6 constructed.

7 **Transportation.** Short-term, minor impacts would be expected on the local transportation
 8 network in Tinian from construction of the West route. Transportation impacts during
 9 construction are limited to traffic added to the existing roadway network as a result of
 10 construction along the ROW for TR26, 6th Avenue, TR25, and TR23. This could overlap with
 11 the roadway shoulder, which could impact vehicles accessing the corridor. Approximately 75
 12 construction workers, in addition to those analyzed in the 2016 Divert EIS (Final EIS, Section
 13 2.5.2), could be required to support construction of the pipeline during the course of the 2- to
 14 3-year construction period. This maximum number of workers would only be needed
 15 during shorter duration intensive or critical construction periods.

16 Non-local workers would most likely be housed at local lodging in or near San Jose village.
 17 Buses would be used to transport the workers to and from the construction site. If lodging for all
 18 non-resident workers were provided in San Jose and assuming 50 people per bus,
 19 approximately four round trips (two round trips in the morning and two round trips in the
 20 afternoon) would be required to transport the non-resident workers, totaling eight daily trips. It is
 21 assumed that a majority of the workers would remain on site for all breaks.

22 In addition to worker travel, construction would generate additional traffic resulting from
 23 miscellaneous trips occurring by inspectors, project managers, and other personnel that visit the
 24 site multiple times a day. The number of trips associated with miscellaneous trips was
 25 estimated as one round trip for every 25 workers on site. During the peak construction period
 26 when 75 workers are on site, this would equate to six trips per day. These construction trips
 27 would be dispersed throughout the day.

28 **Table 4.9-2** summarizes the estimated daily trips expected during construction. It should be
 29 noted that this is the estimated maximum number of trips expected to occur only for several
 30 months during the peak of construction activity.

31 **Table 4.9-2. Estimated Maximum Daily Trips – West Route Construction**

Trip Source	Daily One-Way Trips*	Trip Timeframe*
Non-Local Worker Transport	8	Morning and afternoon
Miscellaneous Trips	6	All day
Total Additional Trips per Day	14	

Note: *HDR estimation

32 The daily trips generated during construction have the potential to impact the existing
 33 transportation network by increasing congestion and delay on local roadways, thereby reducing
 34 LOS, and by causing additional stress on roadway surfaces resulting in deterioration
 35 (e.g., rutting, cracking, pavement breakup) of the driving surface.

1 It is assumed the buses to transport non-local workers would use TR21. TR21 currently
2 operates at LOS A with an ADT of 1,470 vehicles. Capacity of this segment is 8,000 vehicles
3 per day (CNMI DPW 2009). If all construction-generated trips used TR21, vehicular delay
4 would increase, but the segment LOS would not change because the delay increase would not
5 be enough to degrade the LOS.

6 Roadway surfaces have a limited lifespan and deteriorate incrementally over time. The amount
7 of deterioration is in part a function of the materials used to construct the roadway, the amount
8 of vehicular traffic, and the mix of vehicles (trucks vs. cars). The additional vehicular traffic
9 during construction, specifically truck traffic resulting from deliveries, would likely increase the
10 normal deterioration of the roadways in the vicinity of the project area. Although deterioration is
11 expected to varying degrees, it is not possible to estimate the extent of the deterioration
12 because current pavement condition and the existing vehicle mix are unknown.

13 As described in the 2016 Divert EIS (Final EIS, Section 4.11.2), to help rectify potential roadway
14 deterioration, the roadways that would be used for construction could be repaired, overlaid, and
15 reinforced as needed to accommodate the additional traffic prior, during, or after the start of
16 substantial construction activities. Additionally, these routes could be repaired and overlaid as
17 needed upon completion of construction to restore the pavement condition to pre-construction
18 levels (see **Section 4.9.3** for impacts to roadway improvements).

19 4.9.2.2 East Route

20 Impacts on the **Airfield, Seaport, Electrical Supply, Liquid Fuel Supply, Storm Water, and**
21 **Sanitary Sewer and Wastewater Treatment** would be the same as described under the West
22 route. Construction and operation impacts on **Water Supply** and **Solid Waste** under the East
23 route would be similar to but greater than those described for the West route because of the
24 additional 0.86 mile of pipeline required for this route. This would lead to an additional 8 acres
25 of disturbance. The same assumptions for water use under the West route would apply to the
26 East route. An additional 4,000 gallons of water per day could be used over the course of
27 construction for dust suppression because of the extended length of the pipeline. This equates
28 to 42 percent of the assumed Tinian water availability from the existing CUC system for
29 construction of the East route, an additional 2 percent than the West route. An additional
30 27,919 gallons of water could be used for static testing of the East, also because of the
31 extended length of the pipeline. This equates to 62 percent of the assumed Tinian water
32 availability from the existing CUC system for testing of the East route, an additional 12 percent
33 than the West route. As described under *Construction* in **Section 4.9.2.1** and in the 2016 Divert
34 EIS (Final EIS, Section 4.13.2.1), USAF would install two water wells to meet USAF water
35 requirements and to rectify impacts on the CUC potable water.

36 An additional 344,256 square feet of debris could be generated from construction of the East
37 route, which is an estimated additional 172 tons over a period of 3 years. There is a lack of
38 municipal solid waste facilities on Tinian; therefore, the construction debris would have to be
39 collected and transported off the island using commercial solid waste haulers and commercial
40 barges or ships until a permitted municipal solid waste facility is constructed.

1 Transportation impacts would be similar to those for the West route; however, the pipeline
2 would travel an additional 0.86 mile along existing roadways. Therefore, transportation impacts
3 along the East route would be slightly higher under this alternative. Supporting infrastructure
4 under both alternatives would be sited in the location proposed for the bulk fuel storage facilities
5 in the 2016 Divert EIS (Final EIS, Section 2.5.2). Therefore, impacts on supporting
6 infrastructure would be identical to those described under the East route.

7 4.9.2.3 No Action Alternative

8 Under the No Action Alternative, USAF would not construct the fuel pipeline and support
9 infrastructure but would construct a fuel storage tank at the seaport and use fuel trucks to
10 transport fuel from the seaport to the airport. Fewer impacts would be expected on the water
11 supply than under the Proposed Action; however, greater impacts on solid waste and
12 transportation would be expected.

13 The additional water use (24,000 gpd for the West route or 28,000 gpd for the East route) for
14 construction of the pipeline would not be required. However, fuel storage tanks would be
15 constructed at the seaport and require static testing, which would use approximately 11,507 gpd
16 of the island's available water supply over the course of 1 year.

17 Construction of fuel storage at the seaport under the 2016 Divert EIS (Final EIS, Section 2.5.2)
18 would occur under the No Action Alternative, generating 1,451 tons of debris, which is greater
19 than debris that would be generated from the West route (881 tons) or East route (1,053 tons).

20 Impacts on transportation would be expected from use of fuel trucks, as described in the
21 2016 Divert EIS (Final EIS, Section 4.13.2.2). An additional 52 to 71 trips would be made
22 during construction, depending on concrete pouring schedule.

23 4.9.3 Roadway Improvements

24 4.9.3.1 Proposed Action

25 **Airfield.** No impacts on the airfield would be expected from the proposed roadway
26 improvements.

27 **Seaport.** Short-term, negligible impacts on the seaport would be expected from the disruption
28 caused by construction associated with roadway improvements. Construction could limit ease
29 of access on the seaport roads proposed for improvement. Long-term, minor, beneficial
30 impacts on the port would be expected because of improved access to the seaport.

31 **Electrical Supply.** No impacts on the electrical supply would be expected from the proposed
32 roadway improvements. It is assumed that the construction contractors would primarily use
33 diesel- or battery-powered equipment. Any construction equipment that is powered via
34 electricity would likely receive power from a portable generator or a temporary electrical panel.

35 **Liquid Fuel Supply.** Short-term, negligible impacts on liquid fuel supply would be expected
36 due to the minimal amounts of petroleum that would be required for construction equipment.
37 The required petroleum would be brought on site by contractors and removed when

1 construction is complete. Roadway improvements would not be expected to disrupt commercial
 2 aircraft fueling operations or interrupt existing liquid fuel operations at the seaport.

3 **Water Supply.** As with the 2016 Divert EIS (Final EIS, Section 4.13.2.1), an estimated
 4 500 gallons/acre/day could be used for dust suppression during construction. Assuming a
 5 30-foot-wide surface disturbance over 2.51 miles (approximately 9 acres of disturbance), the
 6 roadway improvements would require approximately 4,500 gallons of water per day over the
 7 course of construction. Water to support an additional 25 construction workers would also be
 8 required during construction, at an average rate of 98 gpd per person, equating to
 9 approximately 2,450 gpd for all workers. Negligible amounts of water would also be needed for
 10 additional washing construction vehicles and equipment and wetting base and subgrade to
 11 optimize moisture content for compaction, and continuously spraying aggregate stockpiles to
 12 maintain a saturated surface-dry state.

13 In total, an estimated 6,950 gpd of water would be required to support construction of the road
 14 improvements. This amount of water would be required in addition to the water required to
 15 support construction of the infrastructure in the 2016 Divert EIS (Final EIS, Section 4.13.2.1).
 16 **Table 4.9-3** provides a summary of all water needed to support the Proposed Action and
 17 construction proposed in the 2016 Divert EIS (Final EIS, Section 4.13.2.1).

18 **Table 4.9-3. Estimated Total Water Use – Road Improvements Construction**

Project	Total Gallons Per Day During Construction*
Road Improvements	+ 6,950
Original Divert Construction (includes seaport fuel tank static testing)	+ 81,016
Maximum Total	+ 87,966

Note: *HDR estimation

19 Proposed water usage during road improvements and construction of infrastructure described in
 20 the 2016 Divert EIS (Final EIS, Section 4.13.2.1) would utilize 35 percent of Tinian’s daily water
 21 supply available from the existing CUC water system. Under the 2016 Divert EIS (Final EIS,
 22 Section 4.13.2.1), USAF would obtain CPA board approval to install two water wells to meet
 23 USAF water requirements. Project design would incorporate the need for water for the road
 24 improvements. USAF would manage draw rates from the existing and proposed wells to ensure
 25 that water supply is not exceeded. The water wells would be constructed at the beginning of the
 26 construction phase and would be able to support the remainder of construction if the CUC
 27 supply could not meet the demand. Therefore, short-term minor to moderate impacts on the
 28 water supply are expected.

29 **Storm Water.** Short-term, minor adverse impacts on the stormwater management system
 30 would be expected from roadway construction. The proposed roadway improvements would not
 31 create any new impervious surface areas; however, during construction, a temporary increase
 32 in stormwater runoff, erosion, and sedimentation would be expected. Measures to control
 33 sediment described in **Section 4.8** and **Appendix F** would reduce these impacts. The
 34 discharge of stormwater runoff from construction would be authorized by CNMI and USEPA
 35 permits described in **Section 4.8**.

1 **Sanitary Sewer and Wastewater Treatment.** Negligible to minor short-term impacts on sewer
2 or wastewater treatment would be expected from an increase in the generation of wastewater
3 during the construction of the road improvements. To manage construction-related wastewater,
4 construction contractors could utilize the permitted leaching field controlled by JRM, lease or
5 rent the processing system from the closed Tinian Dynasty, or develop a new system. It is also
6 assumed that construction workers would use portable toilets at the construction site and
7 non-local workers would use existing wastewater infrastructure at their place of lodging.

8 **Solid Waste.** Short-term, minor impacts on solid waste management would be expected from
9 the generation of construction debris. Construction debris is generally composed of clean
10 materials and therefore, to minimize impacts on the solid waste system, it would be managed as
11 described in **Section 4.9**. However, debris that is not recycled would be landfilled, which would
12 be considered a long-term, irreversible effect.

13 The debris generated from the proposed roadway improvements would total an estimated
14 318,072 square feet (160 tons) over a period of 1 year. There is a lack of municipal solid waste
15 facilities on Tinian; therefore, the remaining construction debris that is not recycling or managed
16 as green waste would have to be disposed of in the Tinian landfill or collected and transported
17 off the island by the construction contractor using commercial solid waste haulers and
18 commercial barges or ships until a permitted municipal solid waste facility is constructed.

19 **Transportation.** Short-term, minor impacts would be expected on the local transportation
20 network in Tinian during roadway construction. Impacts would be limited to roadway closure
21 during construction and construction traffic added to the existing roadway network.
22 Approximately 25 construction workers, in addition to those analyzed in the 2016 Divert EIS
23 (Final EIS, Section 2.5.2), could be required to support roadway improvements. This maximum
24 number of workers would only be needed during shorter duration intensive or critical
25 construction periods.

26 Non-local workers would most likely be housed in local lodging in San Jose village. Buses
27 would be used to transport the workers to and from the construction site during construction. If
28 lodging for all non-resident workers were provided in San Jose village, and assuming 50 people
29 per bus, approximately two round trips (one round trip in the morning and one round trip in the
30 afternoon) would be required to transport the non-resident workers, totaling four daily trips. It is
31 assumed that a majority of the workers would remain on site for all breaks.

32 In addition to worker travel, construction would generate additional traffic resulting from
33 miscellaneous trips occurring by inspectors, project managers, and other personnel that visit the
34 site multiple times a day. The number of trips associated with deliveries and miscellaneous trips
35 was estimated as one round trip for every 25 workers on site. During the peak construction
36 period when 25 workers are on site, this would equate to two trips per day. These construction
37 trips would be dispersed throughout the day. Materials would be transferred from the seaport
38 along the same route that was proposed for fuel trucks in the 2016 Divert EIS (Final EIS,
39 Section 2.5.2). However, an additional 1,178 construction truck trips would be needed for the
40 road improvements.

1 **Table 4.9-4** summarizes the estimated daily trips expected during the construction of the road
2 improvements over the course of one year. It should be noted that this is the estimated
3 maximum number of trips expected to occur only for several months during the peak of
4 construction activity.

5 **Table 4.9-4. Estimated Maximum Daily Trips – Roadway Construction**

Trip Source	Daily One-Way Trips*	Trip Timeframe
Non-Local Worker Transport	4	Morning and afternoon
Miscellaneous Trips	2	All day
Concrete and Cement Truck Trips	6.5	All day
Total Additional Trips per Day	12.5	

Note: *HDR estimation

6 The daily trips generated during construction have the potential to impact the existing
7 transportation network by increasing congestion and delay on local roadways, thereby reducing
8 LOS, and by causing additional stress on roadway surfaces resulting in deterioration
9 (e.g., rutting, cracking, pavement breakup) of the driving surface.

10 The proposed bus route to transport non-local workers would use TR21, which currently
11 operates at LOS A with an ADT of 1,470 vehicles. Capacity of this segment is 8,000 vehicles
12 per day (CNMI DPW 2009). If all construction-generated trips used TR21, vehicular delay
13 would increase, but the segment LOS would not change because the delay increase would not
14 be enough to degrade the LOS.

15 During construction, road improvements could require full or partial closure of TR24, resulting in
16 the need for traffic detours and rerouting that could potentially cause delays and congestion.
17 However, once complete, road improvements would have a long-term, minor to moderate,
18 beneficial impact on the transportation network by providing a new surface and restore
19 pavements that would become deteriorated from Divert vehicles.

20 4.9.3.2 No Action Alternative

21 Under the No Action Alternative, only minor roadway repairs along the construction and fuel
22 truck routes would occur, as was considered in the 2016 Divert EIS (Final EIS, Section 4.11.2).
23 Under the No Action Alternative, roadway improvements would not be implemented and
24 roadways would continue to deteriorate over time. The airfield, seaport, electrical supply, liquid
25 fuel supply, and stormwater would remain as described in **Section 3.9.2**. Water demand (4,500
26 gallons) and the generation of solid waste (160 tons) would no longer be required for roadway
27 improvements.

28 4.9.4 Summary of Impacts

29 4.9.4.1 Proposed Actions and Alternatives

30 Short-term, negligible to minor impacts on infrastructure and transportation would be expected
31 under the Proposed Actions during construction and in the unlikely event of a fuel spill.
32 However, long-term, beneficial impacts would be expected from the installation of the jet fuel
33 pipeline and distribution, and improvements to the local roadways.

1 **Table 4.9-5** shows all water requirements under the Proposed Actions and includes water
2 requirements from the 2016 Divert EIS (Final EIS, Sections 4.13.2.1 and 4.13.2.2). The
3 maximum impact on the Tinian water supply would be during the single day of static testing of
4 the East route pipeline; the amount of water required for static testing of the East route would
5 exceed the maximum amount of water potentially required for construction, which would be if
6 the East route, road improvements, and original Divert infrastructure were all constructed
7 concurrently.

8 **Table 4.9-5. Estimated Water Use under the Proposed Actions**

Project	Total Gallons per Day*
West Route Construction ⁺	31,350
East Route Construction ⁺	35,350
West Route Operation [^]	127,186
East Route Operation [^]	155,105
Roadway Improvements	6,950
Original Divert Construction (includes seaport storage tank static testing)	81,016
Original Divert Construction (without seaport storage tank static testing)	69,509

Source: DoN 2015a

Note: ⁺includes supporting infrastructure, [^]static testing on a single day, *HDR estimation.

9 **Table 4.9-6** shows the estimated debris generated under both Proposed Actions.

10 **Table 4.9-6. Estimated Debris under the Proposed Actions**

Project	Total Square Footage	Multiplier (pounds/ft ²)*	Debris Generated (pounds)	Debris Generated (tons)
West Route	1,742,400	1	1,742,400	871
East Route	2,086,656	1	2,086,656	1,043
Supporting Infrastructure	4,550	4.34	19,757	10
Roadway Improvements	318,072	1	318,072	160
Maximum Total	2,409,278	N/A	2,424,485	1,213

Source: USEPA 2009

*Based on the weighted average of materials per square foot.

11 A comparison of the estimated daily trips for construction the Proposed Actions is provided in
12 **Table 4.9-7.**

13 **Table 4.9-7. Estimated Maximum Daily Trips – Construction**

Trip Source	Total Additional Trips per Day*	Trip Timeframe
West Route	14	Morning and afternoon
East Route	14	All day
Roadway Improvements	12.5	All day
Maximum Additional Trips per Day	26.5	

Note: *HDR estimation

4.9.4.2 No Action Alternatives

Under the No Action Alternatives, USAF would not construct the fuel pipeline, support infrastructure, or roadway improvements but would construct a fuel storage tank at the seaport, complete only minor road repairs, and use fuel trucks to transport fuel from the seaport to the airport. Under the No Action Alternatives, less water would be required for static testing of the fuel tanks and would not be required for road improvements. Additionally, less construction debris would be generated. However, impacts on transportation would be expected from use of fuel trucks, as described in the 2016 Divert EIS (Final EIS, Section 4.11.2), and deterioration of roadways would likely increase. The airfield, seaport, electrical supply, liquid fuel supply, and stormwater would remain as described in **Section 3.9.2**.

4.10 Land Use and Recreation

4.10.1 Analysis Methodology

Land Use and Ownership. A comparative methodology is used to determine potential impacts on land use. The Proposed Actions are examined and compared to existing land use conditions. Impacts are evaluated as they relate to the following:

- compatibility of the proposed activities with existing land ownership and land uses at the proposed project areas and in the surrounding areas
- availability of sufficient land within the appropriate land use designation for the proposed activities.

Land use compatibility is defined here as the ability of two or more land uses to coexist without conflict. Examples of conflicts include interference of proposed activities with existing activities, and activities resulting in human health and safety issues due to poor siting. Frequently, compatibility between land uses exists in varying degrees based on the frequency, duration, and intensity of a proposed activity. Land uses or land use designations may preclude proposed activities from being located within a designated area that would be incompatible with the current or proposed uses. However, an activity could be co-located within a land use designation that it is not normally associated with based on evaluation of its compatibility with nearby activities, including consideration of the availability of facilities and infrastructure, safety issues, and sensitive environments. Potential impacts on land use compatibility are based on qualitative assessments. Land disturbance within a given land use designation is not considered a land use impact under these criteria unless the disturbance results from a proposed activity that is incompatible with the land use designation.

Coastal Zone and Submerged Lands. Impacts on coastal uses or resources within the Tinian coastal zone, including APCs, were evaluated by examining the consistency of the Proposed Actions with the coastal resources and uses. USAF has prepared a consistency determination for the Proposed Actions and it was submitting to the DCRM with the public Draft SEIS. When a response is received from DCRM, it will be noted in the SEIS.

Recreation. The environmental impacts on recreational resources near the Proposed Actions are assessed based on recreational availability and use. Each Proposed Action is assessed to

1 determine if it would substantially impede access to recreational resources, reduce recreational
2 opportunities, cause conflicts between recreational users, or result in the physical deterioration
3 of recreational resources.

4 4.10.2 Pipeline and Support Infrastructure

5 4.10.2.1 West Route

6 **Land Use and Ownership.** Portions of the proposed pipeline would be constructed at Tinian
7 International Airport and the Tinian seaport on public land acquired or leased by USAF and
8 proposed for construction in the 2016 Divert EIS. The pipeline would also be constructed on
9 public land within easement rights held by the U.S. federal government that allow it to install,
10 operate, and maintain fuel infrastructure and other utilities. Appropriate routing for use of these
11 easement rights would be coordinated with the CNMI, platted, and recorded. Coordination with
12 local and federal agencies, engineering or design limiting factors, and other factors could
13 require modification of the route. Construction of the West route pipeline could result in
14 short-term, minor impacts on public land ownership. If the utility easement location required
15 acquisition in real property interest of private land with an existing use that conflicted with
16 construction, then the impact on land ownership would be long-term and moderate.

17 Construction of the pipeline at the Tinian seaport and Tinian International Airport would occur on
18 public lands currently operated by the CPA, and designated as public facility, public facility
19 undeveloped, and undeveloped public land by the CNMI DPL. Other portions of the West route
20 pipeline between the seaport and airport are within public lands designated as public facility
21 undeveloped and undeveloped public land. Construction and operation of the pipeline in these
22 areas would be consistent with the public land use designations.

23 A majority of the West route is surrounded by undeveloped public land, except at and near the
24 Tinian seaport and Tinian International Airport. The West route would pass approximately
25 0.25 mile of residential lots on private land on TR26 and the Tinian Municipal Dump on public
26 land on TR25. Although not incompatible with these uses, construction of the pipeline near the
27 residences could create temporary disturbances such as increased noise and traffic. Pipeline
28 construction would not disrupt operations at the Tinian seaport or Tinian International Airport.
29 Therefore, construction of the West route pipeline would be compatible with the public and
30 private land uses, but would result in short-term, minor to moderate impacts on land use due to
31 temporary disturbances.

32 Operation of the West route pipeline would occupy 6 feet of unencumbered space within a
33 20-foot utility easement. The U.S. federal government retains easement rights to install,
34 operate, and maintain fuel infrastructure and other utilities within approximately 1,356 acres of
35 land at Tinian International Airport (West Tinian Airport and Expansion Land), and 1,245 acres
36 south of the airport (Surplus Area) according to the 1994 Leaseback and Disposal Agreement
37 and the 1999 Partial Release of Leasehold Interest (CNMI 1994, CNMI 1999). The West route
38 pipeline would be fully within these areas and, therefore, USAF has the right to operate and
39 maintain the proposed pipeline and retain a 20-foot maintenance easement in the area. The
40 presence of the pipeline would preclude the future siting of other public land uses in the 20-foot
41 easement. This would be a long-term, minor impact, as a majority of the West route is
42 undeveloped public land that is available for public land uses, including a pipeline. Operation of

1 the West route pipeline would not preclude the future development of any homestead
2 subdivisions, including the West San Jose Homestead site that is on TR24 (6th Avenue), east of
3 the West route. Therefore, operation of the West route pipeline could result in long-term, minor
4 to moderate impacts on land use.

5 Impacts on land use and ownership from construction and operation of the seaport support
6 infrastructure would be the same as those described for the southern portion of the West route.
7 Therefore, short- and long-term, minor impacts on land use and land ownership would be
8 expected from construction or operation of the seaport support infrastructure.

9 **Coastal Zone and Submerged Lands.** Construction and operation of the West route pipeline
10 and support infrastructure at the Tinian seaport would occur within the Port and Industrial APC
11 and Shoreline APC. Therefore, the proposed infrastructure could affect coastal uses and
12 resources that are subject to CZMA federal consistency requirements. USAF completed a
13 consistency determination for both Proposed Actions, including the West route pipeline, and
14 submitted it to the DCRM with the Draft SEIS. The West route would be consistent to the
15 maximum extent practicable with the enforceable policies of the CNMI CRM Program as per the
16 *Procedures Guide for Achieving Federal Consistency with the CNMI Coastal Management*
17 *Program* (CNMI DCRM 2015b). The portion of the West route pipeline outside of the Tinian
18 seaport would not occur within any designated APCs or affect coastal resources.

19 **Recreation.** Short-term, minor impacts would be expected on recreational resources on Tinian
20 during construction of the pipeline along the West route. The majority of the recreational
21 resources on Tinian are associated with coastal areas islandwide, the Ushi Field-North Field
22 Trail, and near San Jose Village. The southern end of the West route and support infrastructure
23 project area is within approximately 0.25 mile of Kammer Beach, House of Taga, and the
24 marina/boat ramp at the seaport. Few recreational resources are found along the central and
25 northern portions of the West route and in the immediate vicinity of Tinian International Airport.
26 Construction would expose some recreation resources in the San Jose area to construction
27 noise and could increase the number of vehicles on roads, thereby disturbing some recreational
28 users and increasing congestion and travel times to recreation areas, respectively. However, all
29 roadways would remain open and no recreation areas would be closed. Tourists, visitors, and
30 residents would still have access to all recreational opportunities. The total West route
31 construction period would be 2 to 3 years, but would not be in any one location for the whole
32 2- to 3-year period. Therefore, impacts on recreation from construction noise and additional
33 congestion would be short-term and minor.

34 No impacts on recreation are expected during operation of the West route pipeline.

35 4.10.2.2 East Route

36 **Land Use and Ownership.** Impacts on land use and ownership due to construction and
37 operation of the pipeline along the East route would be similar to those described under the
38 West route in **Section 4.10.2.1**. The northern and southern portions of the East route would be
39 identical to the West route, but the central portion of the East route takes a more easterly route
40 as compared to the West route. The East route pipeline would not pass the Tinian Municipal
41 Dump, but would traverse an undeveloped area of public land south of Tinian International

1 Airport that is designated as undeveloped public land. Construction and operation of the East
2 route would be consistent with the public and private land uses and compatible with existing
3 land ownership. Therefore, construction and operation of the East route pipeline would result in
4 short- and long-term, minor impacts on land use and ownership. However, if the East route
5 must be relocated to private land, there could be short- and long-term, minor to moderate
6 impacts on land use and ownership.

7 **Coastal Zone and Submerged Lands.** Construction and operation of the East and West
8 pipeline routes at the Tinian seaport would be identical. Therefore, the East route pipeline
9 within the seaport would also occur within the Port and Industrial APC and Shoreline APC, and
10 could affect coastal uses and resources that are subject to CZMA federal consistency
11 requirements. USAF completed a consistency determination for both Proposed Actions,
12 including the East route pipeline, and submitted it to the DCRM with the Draft SEIS. The East
13 route pipeline would be consistent to the maximum extent practicable with the enforceable
14 policies of the CNMI CRM Program as per the *Procedures Guide for Achieving Federal*
15 *Consistency with the CNMI Coastal Management Program* (CNMI DCRM 2015b).

16 **Recreation.** Recreational impacts due to construction of the pipeline along the East route
17 would be similar to those described under the West route, but to a slightly greater extent
18 because the East route is 0.86 mile longer and construction would be expected to last longer
19 than the West route. Construction would increase congestion on roadways and would expose
20 some recreation resources in the San Jose area to noise, which could inconvenience travelers
21 using the roadways and disturb some recreational users for a longer period of time. Therefore,
22 short-term, minor impacts on recreational resources would be expected.

23 No impacts on recreation are expected during operation of the East route pipeline.

24 4.10.2.3 No Action Alternative

25 Under the No Action Alternative, USAF would not construct the fuel pipeline and support
26 infrastructure but would construct a fuel storage tank at the seaport and use fuel trucks to
27 transport fuel from the seaport to the airport. Construction of the No Action Alternative would
28 have similar impacts on land use and ownership, APCs, and recreation as described under the
29 West route in **Section 4.10.2.1**. However, operation of the No Action Alternative would have
30 long-term, periodic, negligible impacts on recreation due to the use of fuel trucks. Fuel trucks
31 would run 10 hours per day for 30 days, during exercises, to transfer fuel to the proposed airport
32 storage tanks. Traffic volumes along the fuel truck route would increase, and travel to the
33 recreational resources in the northern portion of the island could become temporarily
34 inconvenienced. However, tourists, visitors, and residents would not be denied access to
35 recreational uses.

36 4.10.3 Roadway Improvements

37 4.10.3.1 Proposed Action

38 **Land Use and Ownership.** Construction of the roadway improvements would occur on public
39 land (i.e., existing roadways), and would occur within the existing roadbeds and shoulders. No
40 roadbed widening or ROW alterations would occur. Roadways do not have an official CNMI
41 DPL land use designation, but are on public land and are considered public facilities. A majority

1 of the roadway improvement route is surrounded by undeveloped public land, except at the
2 Tinian seaport and approximately 0.5 mile that passes residential lots on private land within San
3 Jose. Although the proposed roadway work is not incompatible with residential uses,
4 construction near the residences could create temporary disturbances such as increased noise
5 and traffic. Construction is expected to remain within the existing roadbed and shoulder.
6 However, construction could require a disturbance area of up to 30 feet wide, which would
7 extend outside of the roadbed and shoulder. Any disturbances from construction would be
8 temporary and, if necessary, areas that were disturbed would be vegetated or otherwise
9 returned to their original state. Construction of the roadway improvements would be consistent
10 with public and private land uses and land ownership, and compatible with surrounding land
11 uses. Therefore, proposed construction of roadway improvements would result in short-term,
12 negligible impacts on land use due to temporary construction disturbances.

13 **Coastal Zone and Submerged Lands.** Construction of the roadway improvements at the
14 Tinian seaport would occur within the Port and Industrial APC and Shoreline APC. Therefore,
15 the proposed roadway improvements at the seaport could affect coastal uses and resources
16 that are subject to CZMA federal consistency requirements. USAF completed a consistency
17 determination for both Proposed Actions, including the roadway improvements, and submitted it
18 to the DCRM with the Draft SEIS. The roadway improvements would be consistent to the
19 maximum extent practicable with the enforceable policies of the CNMI CRM Program as per the
20 *Procedures Guide for Achieving Federal Consistency with the CNMI Coastal Management*
21 *Program* (CNMI DCRM 2015b). The portion of the roadway improvements that are outside of
22 the Tinian seaport would not occur within any designated APCs or affect coastal resources.

23 **Recreation.** Short-term, minor impacts would be expected on recreational resources on Tinian
24 during construction of the roadway improvements. The majority of the recreational resources on
25 Tinian are associated with coastal areas island-wide, the Ushi Field North Field Trail, and near
26 San Jose Village. The southern end of the roadway improvements is within 0.25 mile of
27 Kammer Beach, House of Taga, and the marina/boat ramp at the seaport. Few recreational
28 resources are found along the central and northern portions of the roadway improvement route.
29 Construction would expose some recreation resources in the San Jose area to construction
30 noise, and could increase the number of vehicles on roads, thereby disturbing some
31 recreational users and increasing congestion and travel times to recreation areas, respectively.
32 However, all roadways would remain open and no recreation areas would be closed. Tourists,
33 visitors, and residents would still have access to all recreational opportunities. The roadway
34 improvement construction period would be 1 year, but actual work would progress along the
35 route and not be in any one location for the whole 1-year period. Therefore, impacts on
36 recreation from construction noise and traffic congestion would be short-term and minor.

37 4.10.3.2 No Action Alternative

38 Under the No Action Alternative, only minor roadway repairs along the construction and fuel
39 truck routes would occur, as was considered in the 2016 Divert EIS (Final EIS, Section 4.11.2).
40 The No Action Alternative would require minimal construction along the routes and, therefore,
41 fewer short-term impacts on land use and recreation. However, because the roadways would
42 continue to deteriorate, repairs would be made periodically as needed to repair substandard
43 roadways. Therefore, the No Action Alternative would have short- and long-term, periodic,
44 negligible impacts on land use and recreation.

1 4.10.4 Summary of Impacts

2 4.10.4.1 Proposed Actions and Alternatives

3 The Proposed Actions would occur on public land on which the U.S. federal government retains
4 easement rights that allow it to install, operate, and maintain fuel infrastructure and other
5 utilities. Construction and operation of the Proposed Actions would be consistent with the public
6 land ownership and compatible with designated land uses within the project areas and
7 surrounding areas. Portions of each Proposed Action would occur adjacent to private land with
8 residential uses, and could create temporary disturbances such as increased noise and traffic.
9 These disturbances would result in short-term, minor impacts on land use and recreation. The
10 presence of the pipeline would preclude the future siting of other land uses in a 20-foot utility
11 easement. Therefore, operation of the pipeline would result in long-term, minor to moderate
12 impacts on land use and ownership.

13 4.10.4.2 No Action Alternatives

14 Under the No Action Alternatives, USAF would not construct the fuel pipeline, support
15 infrastructure or roadway improvements but would construct a fuel storage tank at the seaport,
16 complete only minor road repairs, and use fuel trucks to transport fuel from the seaport to the
17 airport. The No Action Alternatives would require less construction than the Proposed Actions,
18 and would result in fewer short-term impacts on land use and recreation, but more long-term
19 impacts from the use of fuel trucks and from potential road deterioration.

20 4.11 Hazardous Materials and Wastes

21 4.11.1 Analysis Methodology

22 Impacts on or from hazardous materials and wastes would be considered significant if a
23 proposed action would result in noncompliance with applicable federal or CNMI regulations, or
24 increase the amounts generated or procured beyond current management procedures, permits,
25 and capacities. Impacts on contaminated sites would be considered significant if a proposed
26 action would disturb or create contaminated sites resulting in negative impacts on human health
27 or the environment, or if a proposed action would make it substantially more difficult or costly to
28 remediate existing contaminated sites.

29 4.11.2 Pipeline and Support Infrastructure

30 4.11.2.1 West Route

31 Short-term, minor impacts would occur from the use of hazardous materials and petroleum
32 products and the generation of hazardous wastes during the construction of the proposed West
33 route pipeline. Hazardous materials that could be used in pipeline construction include welding
34 gases, solvents, preservatives, and sealants. Hydraulic fluids and petroleum products, such as
35 diesel and gasoline, would be used in the vehicles and equipment supporting construction.
36 Construction would generate negligible to minor quantities of hazardous wastes. Contractors
37 would be responsible for the disposal of hazardous wastes in accordance with federal and
38 CNMI laws. All hazardous materials, petroleum products, and hazardous wastes used or
39 generated during construction would be contained, stored, and managed appropriately
40 (e.g., secondary containment, inspections, spill kits) in accordance with applicable regulations to

1 minimize the potential for releases. Contractors could be required to develop and implement
2 their own Spill Prevention Control and Countermeasure Plans. All construction equipment
3 would be maintained according to the manufacturer's specifications and drip mats would be
4 placed under parked equipment as needed.

5 No hazardous materials, hazardous wastes, or petroleum products are stored within the West
6 route. Therefore, no hazardous materials, hazardous wastes, or petroleum products would
7 need to be removed prior to construction. While no existing contamination areas are known to
8 occur along the proposed West Route, the route passes adjacent to several facilities or
9 locations that are known to use, store, or dispose of hazardous materials, hazardous wastes,
10 and petroleum products or with the potential to have environmental contamination. The pipeline
11 would be routed down the center of the dump access road until the pipeline is clear of the dump
12 for at least 500 feet on either side. The pipeline would also be clearly marked in these areas to
13 ensure that the pipeline is not damaged by earth moving equipment that may be operated at the
14 trash dump.

15 Additionally, the possibility exists for the discovery of UXO during construction, especially in
16 areas that have not been developed since World War II. If soil or groundwater that is believed
17 to be contaminated or UXO were discovered, the contractor would be required to immediately
18 stop work, report the discovery to USAF, and implement appropriate safety measures.
19 Commencement of field activities would not continue in this area until the issue was investigated
20 and resolved. The remediation of any existing contamination or UXO would be a long-term,
21 minor, beneficial effect. The proposed pipeline would not interfere with the operation of any
22 existing fuel storage or delivery infrastructure, most notably the existing ASTs at the Port of
23 Tinian, Tinian International Airport, and Commonwealth Utility Corporation power plant as well
24 as the fuel pipeline between the Port of Tinian and the Commonwealth Utility Corporation power
25 plant. The West route would cross the power plant's fuel pipeline and parallel that pipeline
26 along TR26; however, it would not disrupt its operation.

27 Long-term, negligible impacts would occur from operation of the proposed fuel pipeline under
28 the West route resulting from the potential for a release. The proposed pipeline would be
29 capable of transporting approximately 2,000 gallons of jet fuel per minute and would transport
30 all jet fuel necessary to sustain divert activities occurring on Tinian; therefore, a breach or failure
31 of the pipeline could result in a sizable release. However, a release is unlikely. As stated in
32 **Section 2.2** and **Appendix F**, the proposed fuel pipeline would be designed and constructed in
33 accordance with all appropriate federal, CNMI, Department of Defense, and USAF regulations
34 for petroleum fuel pipelines and facilities, including UFC 3-460-01. The pipeline would be
35 constructed underground, to the extent practicable, to prevent breaches, vandalism, sabotage,
36 or any other means to disrupt the flow of fuel. USAF would follow Technical Order 37-1-1,
37 UFC 3-460-03, and AFI 23-201 for the operation of the fuel pipeline. Maintenance on the
38 proposed pipeline would be conducted as needed, and the pipeline would be managed by a
39 PIM Plan to assist with and guide pipeline integrity maintenance. PIM Plans improve the
40 integrity management of piping systems and help prevent leaks or pipeline failures. The plans
41 are developed based on the principles of *API Standard 570 Inspection, Repair, Alteration, and*
42 *Rerating of In-Service Piping Systems* and federal and local regulations.

1 The 2016 Divert EIS (Final EIS, Section 2.5.2) analyzed the operation of 9.24 million gallons of
2 jet fuel storage capacity at Tinian International Airport. These ASTs would be filled using the
3 proposed pipeline rather than delivery trucks as analyzed in the 2016 Divert EIS (Final EIS,
4 Section 2.5.2). Fuel delivery trucks have a greater potential for a release as compared to a fuel
5 pipeline because vehicular accidents, equipment malfunctions, and operator error are
6 occasional occurrences and contributors of a release (Hansen and Dursteler undated).
7 Therefore, the elimination of delivery trucks and the use of the proposed fuel pipeline would
8 have long-term, negligible, beneficial impacts on hazardous materials and wastes from a slightly
9 lesser potential for a release.

10 Impacts on hazardous materials and wastes from construction and operation of the proposed
11 seaport support infrastructure would be the same as those described for the fuel pipeline. The
12 proposed seaport support infrastructure would not interfere with the operation of any existing
13 fuel storage or delivery infrastructure on Tinian. The proposed seaport support infrastructure
14 would be designed and constructed in accordance with the same federal, CNMI, Department of
15 Defense, and USAF regulations for petroleum fuel pipelines and facilities. The proposed fuel
16 pipeline would eliminate the need for the two 50,000-barrel fuel storage tanks at the seaport
17 described in the 2016 Divert EIS (Final EIS, Section 2.5.2).

18 4.11.2.2 East Route

19 Impacts on hazardous materials and wastes from pipeline construction under the East route
20 would be the same as those described for the West route in **Section 4.11.2.1**. However, these
21 impacts would occur at some different locations on Tinian and the pipeline would not need to be
22 routed in consideration of the Tinian dump. Short-term, minor impacts would occur from the use
23 of hazardous materials and petroleum products and the generation of hazardous wastes during
24 the construction of the proposed East route pipeline. No hazardous materials, hazardous
25 wastes, or petroleum products are stored within the East route; therefore, none would need to
26 be removed prior to construction. While no existing contamination areas are known to occur
27 along the proposed East route, the route passes adjacent to several facilities that are known to
28 use, store, or dispose of hazardous materials, hazardous wastes, and petroleum products or
29 with the potential to have environmental contamination. Additionally, the possibility exists for
30 the discovery of UXO during construction, especially in areas that have not been developed
31 since World War II. Similar actions as described for the West route would be implemented in
32 the event of the discovery of environmental contamination or UXO during construction of the
33 East route. The proposed pipeline would not interfere with the operation of any existing fuel
34 storage or delivery infrastructure on Tinian. The East route would cross the power plant's fuel
35 pipeline and parallel that pipeline along TR26; however, it would not disrupt its operation.

36 Identical long-term, negligible impacts would occur from operation of the proposed fuel pipeline
37 under the East route as are described in **Section 4.11.2.1** for operation under the West route.
38 The proposed pipeline would be designed and constructed in accordance with the same federal,
39 CNMI, Department of Defense, and USAF regulations for petroleum fuel pipelines and facilities,
40 and the pipeline would be managed by a PIM Plan. Similar long-term, negligible, beneficial
41 impacts would occur from a slightly lesser potential for a release using the proposed pipeline as
42 compared to the fuel delivery trucks analyzed in the 2016 Divert EIS (Final EIS, Section
43 4.12.2.2).

4.11.2.3 No Action Alternative

Under the No Action Alternative, USAF would not construct the fuel pipeline but would construct a fuel storage tank at the seaport and use fuel trucks to transport fuel from the seaport to the airport. Long-term, negligible to minor impacts on hazardous materials and wastes would occur under the No Action Alternative. Fuel delivery trucks have a slightly greater potential for a release when compared to a fuel pipeline (Hansen and Dursteler undated). Additionally, two 50,000-barrel fuel storage tanks would be constructed at the seaport rather than the pump house and boom storage infrastructure. This added fuel storage capability would slightly increase the potential for a release at the seaport. The proposed fuel storage tanks would be designed and constructed in accordance with the same federal, CNMI, Department of Defense, and USAF regulations for petroleum fuel pipelines and facilities. The 2016 Divert EIS (Final EIS, Section 4.12.2) provides further detail on hazardous materials and wastes impacts from the use of fuel delivery trucks and the 50,000-barrel fuel storage tanks.

4.11.3 Roadway Improvements

4.11.3.1 Proposed Action

Impacts on hazardous materials and wastes from construction associated with the proposed roadway improvements would be short term and minor. Hazardous materials that could be used in roadway construction are mainly hydraulic fluids and petroleum products, such as diesel and gasoline, used in the vehicles and equipment supporting construction. Additionally, the roadways themselves would be made of asphalt, and asphalt is a by-product of the petroleum refining process. Contractors would be responsible for the disposal of hazardous wastes in accordance with federal and CNMI laws. All hazardous materials, petroleum products, and hazardous wastes used or generated during construction would be contained, stored, and managed appropriately (e.g., secondary containment, inspections, spill kits) in accordance with applicable regulations to minimize the potential for releases. Contractors could be required to develop and implement their own SPCC Plans. All construction equipment would be maintained according to the manufacturer's specifications and drip mats would be placed under parked equipment as needed.

While no existing contamination is known to occur within the footprint of the proposed roadway improvements, the roadways pass adjacent to several facilities that are known to use, store, or dispose of hazardous materials, hazardous wastes, and petroleum products or with the potential to have environmental contamination. Additionally, the slight possibility exists for the discovery of UXO during construction of the proposed roadway improvements. In the event of the discovery of environmental contamination or UXO during construction of the proposed roadway improvements, all work would be stopped. The proposed roadway improvements would not interfere with the operation of any existing fuel storage or delivery infrastructure on Tinian. Care would be paid to where the existing fuel pipeline between the Port of Tinian and the Commonwealth Utility Corporation power plant crosses beneath the proposed roadway improvements to ensure that a release does not occur.

4.11.3.2 No Action Alternative

Under the No Action Alternative, only minor roadway repairs along the construction and fuel truck routes would occur, as was considered in the 2016 Divert EIS (Final EIS, Section 4.11.2).

1 No impacts on hazardous materials and wastes would occur under the No Action Alternative.
2 The proposed roadway improvements would not occur; therefore, no construction would
3 transpire and hazardous materials and wastes would not be used. Environmental
4 contamination and UXO would have no potential to be discovered.

5 4.11.4 Summary of Impacts

6 4.11.4.1 Proposed Actions and Alternatives

7 The Proposed Actions would have short-term, minor impacts from the use of hazardous
8 materials and petroleum products and the generation of hazardous wastes during construction.
9 All hazardous materials, petroleum products, and hazardous wastes used or generated during
10 construction would be contained, stored, and managed appropriately in accordance with
11 applicable regulations to minimize the potential for releases. Additionally, the possibility exists
12 for the discovery of UXO during construction. If soil or groundwater that is believed to be
13 contaminated or UXO were discovered, the contractor would be required to immediately stop
14 work, report the discovery to USAF, and implement appropriate safety measures.

15 Long-term, negligible impacts would occur from operation of the proposed fuel pipeline under
16 the West and East routes and the seaport support infrastructure. While a breach or failure of
17 the pipeline could result in a sizable release, a release is unlikely. As described in **Appendix F**,
18 the proposed pipeline and seaport support infrastructure would be designed and constructed in
19 accordance with federal, CNMI, Department of Defense, and USAF regulations for petroleum
20 fuel pipelines and facilities.

21 4.11.4.2 No Action Alternative

22 Under the No Action Alternatives, USAF would not construct the fuel pipeline but would
23 construct a fuel storage tank at the seaport, complete only minor road repairs, and use fuel
24 trucks to transport fuel from the seaport to the airport. Long-term, negligible to minor impacts on
25 hazardous materials and wastes would occur from the use of fuel delivery trucks rather than the
26 proposed fuel pipeline. Fuel delivery trucks have a slightly greater potential for a release when
27 compared to a fuel pipeline (Hansen and Dursteler undated) and the additional fuel storage
28 capacity at the seaport would slightly increase the potential for a release. The 2016 Divert EIS
29 (Final EIS, Section 4.12.2) provides further detail on hazardous materials and wastes impacts
30 from the use of fuel delivery trucks and the fuel storage tanks at the seaport. No impacts on
31 hazardous materials and wastes would occur from not conducting the proposed road
32 improvements.

33 4.12 Air Quality

34 4.12.1 Analysis Methodology

35 The assessment of construction and operations emissions was conducted through use of the Air
36 Force Air Conformity Applicability Model (ACAM), Version 5.0.11. The following items are
37 provided in **Appendix E**:

- 38 • ACAM output reports
- 39 • calculation sheets that show how ACAM input parameters were determined

- 1 • emission estimates from ACAM pertaining to activities represented in this SEIS
- 2 • total project emissions for each of the Proposed Actions and alternatives.

3 The environmental consequences to local and regional air quality conditions near a proposed
4 federal action are determined based upon the increases in regulated pollutant emissions relative
5 to existing conditions and ambient air quality. Specifically, the impact in NAAQS attainment
6 areas is assessed to determine if the net increases in pollutant emissions from the federal
7 action would result in any one of the following scenarios:

- 8 • cause or contribute to a violation of any national, state, commonwealth, or territory
9 ambient air quality standard
- 10 • expose sensitive receptors to substantially increased pollutant concentrations
- 11 • exceed any Evaluation Criteria established by an SIP or permit limitations/requirements
- 12 • emissions representing an increase of 100 tpy for any attainment criteria pollutant or
13 their precursors (O₃ [NO_x and VOCs are precursors to O₃], CO, PM₁₀, PM_{2.5}, and SO₂).

14 The project areas are considered unclassifiable/attainment; however, the 100 tpy threshold was
15 applied in the analysis as a measure of significance. The rationale for applying a 100 tpy
16 threshold is that it is consistent with the highest General Conformity *de minimis* levels for
17 nonattainment areas and maintenance areas. In addition, it is consistent with federal stationary
18 major source thresholds for Title V permitting that formed the basis for the nonattainment
19 *de minimis* levels.

20 Tinian is in attainment areas for all criteria pollutants; therefore, the General Conformity rule
21 does not apply to any alternative and is not discussed further in the air quality analysis.
22 Additionally, only stationary source emissions are evaluated for PSD and Title V permitting
23 impacts as construction activity emissions are typically not subject to PSD and Title V permitting
24 because they are not caused by stationary sources. The alternatives would not entail major-
25 source significant increases to stationary source emissions from the 2016 Divert EIS (Final EIS,
26 Section 4.2.2); therefore, PSD and Title V permitting significance criteria are not discussed
27 further. HAPs emissions were also considered. However, due to the expected negligible
28 emissions based on the emission source types and the trade winds that carry emissions out to
29 sea, HAPs were omitted in the quantitative analysis both in the 2016 Divert EIS (Final EIS,
30 Section 4.2) and in this SEIS.

31 GHG emissions resulting from the Proposed Actions have been quantified to the extent feasible
32 in this SEIS. The potential effects of GHG emissions are by nature global and cumulative
33 impacts, as worldwide sources of GHGs contribute to climate change. In an effort to reduce
34 energy consumption, reduce dependence on petroleum, and increase the use of renewable
35 energy resources in accordance with the goals set by EOs and the Energy Policy Act of 2005,
36 the DOD implements the DOD Strategic Sustainability Performance Plan. USAF also has a
37 sustainability program in place for reducing CO_{2e} emissions through increases in energy/fuel
38 efficiency and using renewable sources where possible. As a result of these objectives, the

1 USAF takes proactive measures to reduce their overall emissions of GHGs and the resulting
 2 effects on climate change.

3 For both Proposed Actions, USAF would take reasonable precautions during construction to
 4 prevent particulate matter from becoming airborne, based on the construction standards
 5 provided in **Appendix F** and the requirements of CNMI Chapter 65-10, Part 415. Construction
 6 of the pipeline and roadway improvements would be done in sections (phasing) to minimize the
 7 amount of area that is disturbed at one time. Water would be utilized as needed to wet
 8 disturbed areas and storage piles prior to backfilling. Where possible, paved roadways would
 9 be used to transport materials and workers. Vehicle speeds would be limited to 15 miles per
 10 hour (mph) or less at construction sites on unpaved roads. During operations, particulate matter
 11 emissions from stationary sources are expected to be minimal, and no off-property visible
 12 emissions are expected. USAF would coordinate with CNMI BECQ to obtain the necessary
 13 stationary source permits prior to commencing construction of any potential stationary source.

14 **4.12.2 Pipeline and Support Infrastructure**

15 **4.12.2.1 West Route**

16 Short and long-term, direct, negligible to minor impacts would be expected from construction
 17 emissions, land disturbance, and use of emergency generators.

18 **Pipeline and Seaport Support Infrastructure Construction.** Table 4.12-1 quantifies the air
 19 emissions associated with construction of the pipeline and support infrastructure for the West
 20 route and seaport support infrastructure.

21 **Table 4.12-1. Divert Action and West Route Construction Emissions**

Construction Emissions by Calendar Year	NO _x (tons)	VOC (tons)	CO (tons)	SO ₂ (tons)	PM ₁₀ (tons)	PM _{2.5} (tons)	CO _{2e} (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	N/A

Note: Total emissions are those for the construction of the West route pipeline and seaport infrastructure as part of the overall Divert action, and emissions for the seaport fuel storage tanks, fuel loading at seaport, and fuel transfer by truck have been removed. Airport fuel storage is included, as in the 2016 Divert EIS (Final EIS, Section 4.2.2.2).

22 Air Pollutant Emissions. Minor impacts on regional air quality would be expected during
 23 construction primarily from site-disturbing activities, operation of construction equipment,
 24 evaporative emissions from architectural coatings, and materials hauling. Construction
 25 emissions are below the air quality significance criteria of 100 tpy. Additionally, average daily
 26 wind speeds on Tinian of 7 to 15 mph would result in negligible impacts to air quality due to
 27 construction. No significant impacts on local and regional air quality is anticipated. In addition,
 28 GHG emissions would increase.

1 Fugitive Dust. Construction projects would generate particulate matter emissions as fugitive
2 dust from ground-disturbing activities. Fugitive dust emissions would be greatest during initial
3 site-preparation activities and would vary from day to day depending on the construction phase,
4 level of activity, and prevailing weather conditions. The quantity of uncontrolled fugitive dust
5 emissions from a construction site is proportional to the area of land being worked and the level
6 of construction activity. Measures identified in **Section 4.12.1** would be employed during
7 construction to reduce and control fugitive dust and to suppress emissions. Specific fugitive
8 dust control measures could include watering the construction surface and phasing work to limit
9 dust, setting up wind fences to limit windblown dust, and limiting vehicle speed to 15 mph or
10 less at construction sites on unpaved roads.

11 Permitting. Title V permit criteria do not apply, as all sources during construction are mobile
12 sources which are not regulated under the Title V permit program. USAF would coordinate with
13 CNMI BECQ to obtain the necessary stationary source permits prior to commencing
14 construction or installation of any potential stationary source.

15 The following text describes specific sources of the emissions for construction and installation of
16 the pipeline and support infrastructure, and assumptions used to generate the emissions in
17 ACAM:

- 18 • Trenching and excavating. Emissions during trenching and excavating would be
19 expected from earthmoving dust, heavy equipment combustion, worker commutes, and
20 earth hauling associated with trenching for the pipeline and low point drains for
21 4.08 miles along the conservative 80-foot-wide construction corridor. For purposes of air
22 emission estimates, an average disturbed area at any given time is assumed to be
23 52,800 square feet. Time between excavation and backfill/re-seeding is expected to be
24 less than 90 days. Construction workers are expected to be housed temporarily in the
25 San Jose area, where the majority of neighborhoods and housing are located on Tinian.
26 The pipeline area's farthest distance from San Jose is approximately 4 miles. The
27 commuting distance would change as the trench is dug. Therefore, the average
28 commute was assumed to be to the mid-point of the pipeline length and back. It was
29 assumed that no significant amount of earth or related materials would be hauled on or
30 off site during trenching and excavating. No credit was taken for dust suppression
31 activities such as watering.
- 32 • Pipeline construction. Emissions during pipeline construction would be expected from
33 hauling pipe sections, assembling the pipe along the trench (layout), welding, lowering it
34 in the trench, equipment exhaust and area dust emissions, and worker and vendor
35 commutes. Hauling of pipe sections to pipeline locations would occur from the seaport
36 to the work site, and that distance would vary along the pipeline. For pipeline
37 construction, emissions were estimated based on the maximum expected pipe diameter
38 (2 feet) times the length of the finished pipeline.
- 39 • Coating. For potential application of a corrosion-resistant coating to the pipeline,
40 emissions were estimated based on the maximum expected pipe circumference
41 (6.3 feet) times the length of the finished pipeline.
- 42 • Grading. Emissions would be expected from backfilling and leveling the ground over the
43 pipeline and were estimated based on a maximum disturbed area before re-seeding of

52,800 square feet. Emissions would also be expected from grading at the seaport for the support infrastructure, including laydown areas and the biosecurity facility. Disturbance at the seaport in the 2016 Divert EIS (Final EIS, Section 2.5.2) was estimated to be 5.39 acres. Under the Proposed Action in this SEIS, land disturbance at the seaport is estimated to be 8.23 acres. Emissions due to the additional grading of 2.94 acres at the seaport were estimated using ACAM. No credit is taken for dust suppression such as watering.

- New construction emissions estimates were not generated for construction of the seaport infrastructure because the impervious footprint for these facilities would be less than for the seaport infrastructure analyzed in the 2016 Divert EIS (Final EIS, Section 2.5.2) (4,550 square feet vs. 7,534 square feet for the bulk storage area). Based on the reduced construction area, construction emissions are assumed to be equal to or less than those in the 2016 Divert EIS (Final EIS, Section 4.2.2.1).

Pipeline and Infrastructure Operation. Tables 4.12-2 and 4.12-3 identify the air emissions from operation of the West route pipeline and seaport infrastructure.

Table 4.12-2. Divert Action and West Route Operation Criteria Pollutant Emissions

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

Note: Total emissions are those for the operation of the West route pipeline and seaport infrastructure as part of the overall Divert action, and emissions for the seaport fuel storage tanks, fuel loading at seaport, and fuel transfer by truck have been removed. Airport fuel storage is included, as in the 2016 Divert EIS (Final EIS, Section 4.2.2.2).

Table 4.12-3. Divert Action and West Route Operation GHG Emissions

Source Category	CO ₂ e (pounds)	CO ₂ e (kilograms)	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

Note: Total emissions are those for the operation of the West route pipeline and seaport infrastructure as part of the overall Divert action, and emissions for the seaport fuel storage tanks, fuel loading at seaport, and fuel transfer by truck have been removed. Airport fuel storage is included, as in the 2016 Divert EIS (Final EIS, Section 4.2.2.2).

1 Negligible impacts on regional air quality would be expected during pipeline and infrastructure
2 operation from use of emergency generators. Emissions are below the air quality significance
3 criteria of 100 tpy. Additionally, average daily wind speeds on Tinian of 7 mph to 15 mph would
4 result in negligible impacts to air quality due to construction. No significant impacts on local and
5 regional air quality is anticipated. In addition, GHG emissions would increase.

6 The following text describes specific sources of the emissions for operation of the pipeline and
7 support infrastructure, and assumptions used to generate the emissions in ACAM.

- 8 • Emissions presented do not include fuel transfer by truck emissions, seaport bulk
9 storage emissions, or seaport fuel transfer emissions. Operation of the pipeline removes
10 the need for truck transport of fuel between the seaport and airport, loading of fuel into
11 trucks at the seaport, and standing and working operations of the seaport storage tanks.
12 Emissions from operation were assumed to be insignificant and are not estimated.
- 13 • Pipeline leaks and testing. Any airborne leaks from non-welded, aboveground
14 connectors or valves would be minimal. Jet fuel vapor pressure is less than 0.05 pounds
15 per square inch absolute. A small amount of vehicle or testing emissions could occur, if
16 or when pipeline testing is needed. Emissions from leaks and testing are minimal and
17 therefore are not further evaluated.
- 18 • Evaporative losses at aboveground, non-welded components and controls. These
19 losses are expected to be less than evaporative losses associated with at-rest loading
20 arms at the seaport and similar components associated with storage tank controls at the
21 airport. Therefore, these minimal emissions are not further evaluated.
- 22 • Emergency/standby generator combustion emissions. Emissions were estimated in
23 ACAM assuming diesel fuel for a 500-kilowatt generator at the boom storage facility and
24 for a 400-kilowatt generator at the pump house.

25 4.12.2.2 East Route

26 Impacts from construction and operation of the East route pipeline and seaport infrastructure
27 would be similar to those presented in **Section 4.12.2.1** for the West route. Short- and
28 long-term, direct, negligible to minor impacts would be expected from construction emissions,
29 land disturbance, and use of emergency generators.

30 ***Pipeline and Seaport Support Infrastructure Construction.*** **Table 4.12-4** quantifies the air
31 emissions associated with construction of the pipeline and support infrastructure for the East
32 route and seaport support infrastructure.

33 Air Pollutant Emissions. Minor impacts on regional air quality would be expected during
34 construction activities primarily from site-disturbing activities, operation of construction
35 equipment, evaporative emissions from architectural coatings, and materials hauling.
36 Construction emissions are below the air quality significance criteria of 100 tpy. Additionally,
37 average daily wind speeds on Tinian of 7 to 15 mph would result in negligible impacts to air
38 quality due to construction. No significant impacts on local and regional air quality is
39 anticipated. In addition, GHG emissions would increase.

1 **Table 4.12-4. Divert Action and East Route Construction Emissions**

Construction Emissions by Calendar Year	NO _x (tons)	VOC (tons)	CO (tons)	SO ₂ (tons)	PM ₁₀ (tons)	PM _{2.5} (tons)	CO _{2e} (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	N/A

Note: Total emissions are those for the construction of the West route pipeline and seaport infrastructure as part of the overall Divert action, and emissions for the seaport fuel storage tanks, fuel loading at seaport, and fuel transfer by truck have been removed. Airport fuel storage is included, as in the 2016 Divert EIS (Final EIS, Section 4.2.2.2).

2 **Fugitive Dust.** Construction projects would generate particulate matter emissions as fugitive
 3 dust from ground-disturbing activities. Fugitive dust emissions would be greatest during initial
 4 site-preparation activities and would vary from day to day depending on the construction phase,
 5 level of activity, and prevailing weather conditions. The quantity of uncontrolled fugitive dust
 6 emissions from a construction site is proportional to the area of land being worked and the level
 7 of construction activity. Measures identified in **Section 4.12.1** would be employed during
 8 construction to reduce and control fugitive dust and to suppress emissions. Specific fugitive
 9 dust control measures could include watering the construction surface and phasing work to limit
 10 dust, setting up wind fences to limit windblown dust, and limiting vehicle speed to 15 mph or
 11 less at construction sites on unpaved roads.

12 **Permitting.** Title V permit criteria do not apply, as all sources during construction are mobile
 13 sources which are not regulated under the Title V permit program. The USAF would coordinate
 14 with CNMI BECQ to obtain the necessary stationary source permits prior to commencing
 15 construction or installation of any potential stationary source.

16 The following text describes specific sources of the emissions for construction and installation of
 17 the pipeline and support infrastructure, and assumptions used to generate the emissions in
 18 ACAM. The activities are similar to those for the West route, except the East route would be
 19 0.86 mile longer.

- 20 • **Trenching and excavating.** Emissions during trenching and excavating would be
 21 expected from earthmoving dust, heavy equipment combustion, worker commutes, and
 22 earth hauling associated with trenching for the pipeline and low point drains for
 23 4.94 miles along the conservative 80-foot-wide construction corridor. For purposes of air
 24 emission estimates, an average disturbed area at any given time is assumed to be
 25 52,800 square feet. Time between excavation and backfill/re-seeding is expected to be
 26 less than 90 days. Construction workers are expected to be housed temporarily in the
 27 San Jose area, where the majority of neighborhoods and housing are located on Tinian.
 28 The pipeline area's farthest distance from San Jose is approximately 4 miles. The
 29 commuting distance would change as the trench is dug. Therefore, the average
 30 commute was assumed to be to the mid-point of the pipeline length and back. It was
 31 assumed that no significant amount of earth or related materials would be hauled on or
 32 off site during trenching and excavating. No credit was taken for dust suppression
 33 activities such as watering.

- 1 • Pipeline construction. Emissions during pipeline construction would be expected from
2 hauling in pipe sections, assembling the pipe along the trench (layout), welding, lowering
3 it in the trench, equipment exhaust and area dust emissions, and worker and vendor
4 commutes. Hauling of pipe sections to pipeline locations would occur from the seaport
5 to the work site, and that distance would vary along the pipeline. For pipeline
6 construction, emissions were estimated based on the maximum expected pipe diameter
7 (2 feet) times the length of the finished pipeline.
- 8 • Coating. For potential application of a corrosion-resistant coating to the pipeline,
9 emissions were estimated based on the maximum expected pipe circumference
10 (6.3 feet) times the length of the finished pipeline.
- 11 • Grading. Emissions would be expected from backfilling and leveling the ground over the
12 pipeline and were estimated based on a maximum disturbed area before re-seeding of
13 52,800 square feet. Emissions would also be expected from grading at the seaport for
14 the support infrastructure, including laydown areas and the biosecurity facility.
15 Disturbance at the seaport in the 2016 Divert EIS (Final EIS, Section 2.5.2) was
16 estimated to be 5.39 acres. Under the Proposed Action in this SEIS, land disturbance at
17 the seaport is estimated to be 8.23 acres. Emissions due to the additional grading of
18 2.94 acres at the seaport were estimated using ACAM. No credit is taken for dust
19 suppression such as watering.

20 New construction emissions estimates were not generated for construction of the seaport
21 infrastructure because the impervious footprint for these facilities would be less than for the
22 seaport infrastructure analyzed in the 2016 Divert EIS (Final EIS, Section 2.5.2) (4,550 vs.
23 7,534 square feet for the bulk storage area). Based on the reduced construction area,
24 construction emissions are assumed to be equal to or less than those in the 2016 Divert EIS
25 (Final EIS, Section 4.2.2.1).

26 **Pipeline and Infrastructure Operation.** Tables 4.12-5 and 4.12-6 identify the air emissions
27 from operation of the East route pipeline and seaport infrastructure.

28 **Table 4.12-5. Divert Action and East Route Operation Criteria Pollutant Emissions**

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

Note: Total emissions are those for the operation of the East route pipeline and seaport infrastructure as part of the overall Divert action, and emissions for the seaport fuel storage tanks, fuel loading at seaport, and fuel transfer by truck have been removed. Airport fuel storage is included, as in the 2016 Divert EIS (Final EIS, Section 4.2.2.2).

1 **Table 4.12-6. Divert Action with East Route Operation GHG Pollutant Emissions**

Source Category	CO ₂ e (pounds)	CO ₂ e (kilograms)	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

Note: Total emissions are those for the operation of the East route pipeline and seaport infrastructure as part of the overall Divert action, and emissions for the seaport fuel storage tanks, fuel loading at seaport, and fuel transfer by truck have been removed. Airport fuel storage is included, as in the 2016 Divert EIS (Final EIS, Section 4.2.2.2).

2 Negligible impacts on regional air quality would be expected during pipeline and infrastructure
3 operation from use of emergency generators. Emissions are below the air quality significance
4 criteria of 100 tpy. Additionally, average daily wind speeds on Tinian of 7 to 15 mph would
5 result in negligible impacts to air quality due to construction. No significant impacts on local and
6 regional air quality is anticipated. In addition, GHG emissions would increase.

7 The following text describes specific sources of the emissions for operation of the pipeline and
8 support infrastructure, and assumptions used to generate the emissions in ACAM.

- 9 • Emissions presented do not include fuel transfer by truck emissions, seaport bulk
10 storage emissions, or seaport fuel transfer emissions. Operation of the pipeline removes
11 the need for truck transport of fuel between the seaport and airport, loading of fuel into
12 trucks at the seaport, and standing and working operations of the seaport storage tanks.
13 Emissions from operation were assumed to be insignificant and are not estimated.
- 14 • Pipeline leaks and testing. Any airborne leaks from non-welded, aboveground
15 connectors or valves would be minimal. Jet fuel vapor pressure is less than 0.05 pound
16 per square inch absolute. A small amount of vehicle or testing emissions could occur, if
17 or when pipeline testing is needed. Emissions from leaks and testing are minimal and
18 therefore are not further evaluated.
- 19 • Evaporative losses at aboveground, non-welded components and controls. These
20 losses are expected to be less than evaporative losses associated with at-rest loading
21 arms at the seaport and similar components associated with storage tank controls at the
22 airport. Therefore, these minimal emissions are not further evaluated.
- 23 • Emergency/standby generator combustion emissions. Emissions were estimated in
24 ACAM assuming diesel fuel for a 500-kilowatt generator at the boom storage facility and
25 for a 400-kilowatt generator at the pump house.

26 **4.12.2.3 No Action Alternative**

27 Under the No Action Alternative, USAF would not construct the fuel pipeline but would construct
28 fuel storage tanks at the seaport and use fuel trucks to transport fuel from the seaport to the

1 airport. Impacts on air quality would be minor and remain the same as presented in the 2016
2 Divert EIS (Final EIS, Section 4.2.2), as shown in **Tables 4.12-7** and **4.12-8**. Depending on the
3 air pollutant, emissions under the No Action Alternative would be greater or less than emissions
4 under the Proposed Action.

5 **Table 4.12-7. No Action Alternative Construction 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 (metric tonnes)
Year 1	10.15	1.41	9.18	0.33	77.51	7.83	1,738.30
Year 2	10.15	1.41	9.18	0.33	77.51	7.83	1,738.30
Year 3	10.15	1.41	9.18	0.33	77.51	7.83	1,738.30
Significance Criteria Threshold (tpy)	100	100	100	100	100	100	N/A

Source: USAF 2016a

6 **Table 4.12-8. No Action Alternative Operation Emissions**

Source Category	NO _x (tons)	VOC (tons)	CO (tons)	SO ₂ (tons)	PM ₁₀ (tons)	PM _{2.5} (tons)	CO ₂ (metric tonnes)
Airfield Operations	6.77	1.25	18.67	0.98	0.05	0.05	4,007
Fuel Truck and Commuter Vehicle Emissions	0.37	0.03	0.19	0.001	0.02	0.01	93
Fuel Transfer Emissions	N/A	0.01	N/A	N/A	N/A	N/A	0
Fuel Storage Tank Emissions	N/A	1.91	N/A	N/A	N/A	N/A	0
Total Pollutant Emissions	7.14	3.19	18.86	0.98	0.07	0.07	4,100
Significance Criteria Threshold (tpy)	100	100	100	100	100	100	N/A

Source: USAF 2016a

7 4.12.3 Roadway Improvements

8 4.12.3.1 Proposed Action

9 Short, direct, negligible to minor impacts would be expected from construction emissions and
10 land disturbance for the road improvements. Some existing road surfaces may not require
11 replacement, so the emissions estimates are conservative. Emissions from construction of
12 roadway improvements are presented in **Table 4.12-9**.

13 Negligible to minor impacts on regional air quality would be expected during construction
14 activities primarily from site-disturbing activities and operation of construction equipment.
15 Construction would include removal of road materials and application of asphalt paving material.
16 Construction emissions are below the air quality significance criteria of 100 tpy. Additionally,
17 average daily wind speeds on Tinian of 7 to 15 mph would result in negligible impacts to air
18 quality due to construction. No significant impacts on local and regional air quality is
19 anticipated.

1 **Table 4.12-9. Construction Emissions – Improved Roadway**

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
CO _{2e}	838.90

Note: Expected completion of road construction would be 1 year.

2 Measures identified in **Section 4.12.1** would be employed during construction to reduce and
 3 control fugitive dust and to suppress emissions. Specific fugitive dust control measures could
 4 include watering the construction surface and phasing work to limit dust, setting up wind fences
 5 to limit windblown dust, and limiting vehicle speed to 15 mph or less at construction sites on
 6 unpaved roads.

7 Use of these roadways as addressed in the 2016 Divert EIS (Final EIS, Section 4.2.2) and
 8 emissions from vehicle use are not presented in this section.

9 **4.12.3.2 No Action Alternative**

10 Under the No Action Alternative, only minor roadway repairs along the construction and fuel
 11 truck routes would occur, as was considered in the 2016 Divert EIS (Final EIS, Section 4.11.2).
 12 Impacts on air quality would be periodic, long-term, and negligible to minor from intermittent
 13 roadway repairs.

14 **4.12.4 Summary of Impacts**

15 **4.12.4.1 Proposed Actions and Alternatives**

16 Short and long-term negligible to minor impacts would be expected on air emissions from the
 17 Proposed Actions and alternatives. Construction of pipeline and roadway infrastructure would
 18 generate short-term air emissions but would not exceed significance thresholds. Long-term
 19 impacts would only be expected from operation of emergency generators for the pipeline and
 20 support infrastructure.

21 **4.12.4.2 No Action Alternatives**

22 Under the No Action Alternatives, USAF would not construct the fuel pipeline but would
 23 construct a fuel storage tank at the seaport, complete only minor road repairs, and use fuel
 24 trucks to transport fuel from the seaport to the airport. Short- and long-term impacts would be
 25 expected from emissions associated with construction and operation of the seaport fuel tanks
 26 and fuel transfer vehicles.

This page intentionally left blank.

5. Cumulative Effects and Irreversible and Irretrievable Commitment of Resources

The CEQ regulations stipulate that the cumulative effects analysis in an EIS, or SEIS, should consider the potential environmental consequences resulting from “the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR § 1508.7).

Actions that have a potential to interact with the Proposed Actions to construct and operate a fuel pipeline and support infrastructure, and construct road improvements, as analyzed in this SEIS, are included in this cumulative effects analysis. This approach enables decision makers to have the most current information available so that they can evaluate the range of environmental consequences that would result from the Proposed Actions. Known construction and operational methods to support the Proposed Actions are a part of the analysis contained in this SEIS; however, potential future requirements cannot be predicted. As those requirements become known in the future, NEPA analysis would be conducted, as required.

In this section, USAF has identified past and present actions on Tinian and in the CNMI. In addition, this analysis also evaluates reasonably foreseeable future actions that are in the planning phase in the region.

The assessment of cumulative effects begins with defining the scope of other project actions and the potential interrelationship they may have with the Proposed Action(s) (CEQ 1997b). The scope of the analysis should consider other projects that coincide with the location and timetable of implementation of the Proposed Action(s). Cumulative impacts can arise from single or multiple actions and through additive or interactive processes acting individually or in combination with each other. Actions that are not part of the proposal, but that could be actions connected in time or space should be considered (40 CFR § 1508.25). This SEIS analysis addresses three questions to identify cumulative effects:

1. Does a relationship exist such that elements of the Proposed Actions or alternatives might interact with elements of past, present, or reasonably foreseeable actions?
2. If one or more of the elements of the alternatives and another action could be expected to interact, would the alternative affect or be affected by impacts of the other action?
3. If such a relationship exists, would an assessment reveal any potentially significant impacts not identified when the alternative is considered alone?

For a proposed action or alternative under consideration to have a cumulatively significant impact on an environmental resource, two conditions must be met. First, the combined impacts of all identified past, present, and reasonably foreseeable projects, activities, and processes on a resource, including the impacts of the proposed action, must be significant. Second, the proposed action must make a substantial contribution to that significant cumulative impact. Proposed actions of limited scope do not typically require as comprehensive an assessment of

1 cumulative impacts as proposed actions that have significant environmental impacts over a
2 large area (CEQ 2005).

3 5.1 Past, Present and Reasonably Foreseeable Actions

4 This section provides decision makers with an assessment of the anticipated contribution of
5 impacts from concurrent implementation of the proposed pipeline installation, seaport
6 infrastructure, and roadway improvement construction actions along with other identified past,
7 present, and reasonably foreseeable actions.

8 Past activities include projects that occurred within the geographic scope of cumulative effects
9 that have shaped the current environmental conditions of the project areas. During the later
10 stages of World War II, Japan occupied, garrisoned and constructed the original airfields on the
11 island of Tinian (DON 2010c). In 1944, the U.S. military seized Tinian from the Japanese and
12 transformed the island into the largest operational base in the world. Since that time, there have
13 been many changes in military operations that involved construction and improvements of the
14 operating areas, support facilities, and infrastructure.

15 For most resource areas, such as soils and water, biological resources, infrastructure, and
16 hazardous materials and waste, the impacts of past actions are now part of the existing
17 environment and are incorporated in the description of the affected environment in **Section 3**.

18 Past, present, and reasonably foreseeable projects addressed in the 2016 Divert EIS analysis of
19 cumulative impacts (Final EIS, Sections 5.2.1 and 5.2.2) are hereby incorporated by reference.
20 The 2016 Divert EIS is available for review or download from the project website at:
21 <http://pacafdivertmarianaseis.com/archive>. Although many additional local (non-DOD) projects
22 were identified beyond those addressed in the 2016 Divert EIS, only those actions determined
23 to be ongoing or projected to occur within the reasonably foreseeable future, and with
24 considerable potential for cumulative impacts if implemented concurrently with the Proposed
25 Action, were considered for the cumulative impacts analysis. Actions deemed small in scale,
26 lacking funding, or still conceptual were excluded from the analysis. The paragraph below
27 describes the proposed Tinian Harbor Improvements that was identified for consideration in the
28 cumulative effects analysis beyond those previously described in the 2016 Divert EIS (Final EIS,
29 Sections 5.2.1 and 5.2.2).

30 ***Tinian Harbor Improvements, U.S. Indo-Pacific Command.*** The U.S. Indo-Pacific Command
31 proposes to improve the Tinian Harbor to support military exercises. Improvements would
32 include concrete pile cap repair, installation of new mooring hardware, concrete pad
33 construction, and installation of new pile cap fenders.

34 5.2 Cumulative Impacts Analysis

35 The cumulative impacts analysis for the Modified Tinian Alternative, North Option, in the 2016
36 Divert EIS (Final EIS, Section 5.3) is hereby incorporated by reference. The 2016 Divert EIS is
37 available for review or download from the project website at:
38 <http://pacafdivertmarianaseis.com/archive>.

1 While the Proposed Actions described in this SEIS would be conducted in addition to the
2 Proposed Action described in the 2016 Divert EIS, the resulting cumulative impacts from
3 implementation of these actions in combination with the identified cumulative projects would be
4 similar to those described in the 2016 Divert EIS for noise, biological resources, cultural
5 resources, environmental justice and protection of children, health and safety, land use,
6 hazardous materials and wastes, and air quality. The potential for concurrent construction
7 projects on Tinian would increase and cumulative impacts on these resource areas could be
8 expected from increases in ground disturbance, vehicle/equipment use, and construction
9 workers during construction and fuels and stormwater management once construction is
10 complete. These types of cumulative impacts are discussed in the 2016 Divert EIS (Final EIS,
11 Section 5.3) and the overall context and intensity of impacts is expected to be similar to those
12 presented in the 2016 Divert EIS. Generally, implementation of the two Proposed Actions would
13 incur negligible to minor impacts on resources, with some action components resulting in
14 temporary, moderate impacts. Sections 5.2.1 through 5.2.3 describe cumulative impacts on
15 resources areas that would differ from those presented in the 2016 Divert EIS.

16 5.2.1 Socioeconomics

17 Cumulative impacts on population, public services, the economy, and sociocultural issues would
18 be similar to those described in the 2016 Divert EIS (Final EIS, Section 5.3.14.2.1) from the
19 influx of workers associated with the cumulative projects proposed on the island. However,
20 impacts on housing would be greater (moderate) than those described in the 2016 Divert EIS
21 (minor) if multiple cumulative projects, including the two Proposed Actions to support the Divert
22 mission, were implemented concurrently and a shortage of hotel rooms for workers could occur.

23 5.2.2 Soils and Geology

24 Types of cumulative impacts on soils and geology would be similar to those described in the
25 2016 Divert EIS (Final EIS, Section 5.3.4.2.1) from soil disturbance, compaction, erosion, and
26 sedimentation during construction. However, impacts on soils and geology would be greater
27 (minor to moderate) than those described in the 2016 Divert EIS (minor) if construction of all
28 cumulative projects, including the two Proposed Actions described in this SEIS, were
29 implemented concurrently.

30 5.2.3 Infrastructure and Transportation

31 Cumulative impacts on airfield, electrical supply, liquid fuel supply, and water supply
32 infrastructure on Tinian would be similar to those described in the 2016 Divert EIS (Final EIS,
33 Section 5.3.13.2.1) from multiple construction projects and construction workers on Tinian.
34 Short-term cumulative impacts on the seaport would be slightly greater than those described in
35 the 2016 Divert EIS (Final EIS, Section 5.3.13.2.1) from construction of the seaport
36 infrastructure and the proposed harbor improvements; however, long-term beneficial impacts
37 are expected from these improvements. Additionally, construction required for the Proposed
38 Actions and cumulative projects would generate considerable quantities of waste debris that
39 could have a greater impact on Tinian solid waste than described in the 2016 Divert EIS. While
40 debris would be recycled or composted to the extent practicable, landfilled construction debris
41 would be considered long-term, irreversible impacts on solid waste management infrastructure.

1 Additionally, implementation of the Proposed Actions would contribute major, direct, beneficial
2 impacts on the liquid fuel supply by adding capacity to store and distribute jet fuel.

3 Cumulative impacts on transportation infrastructure would also temporarily be greater than
4 those presented in the 2016 Divert EIS (Final EIS, Section 5.3.11.2.1). If all cumulative
5 construction projects were to occur simultaneously, more construction workers could be on the
6 island for weeks or months at a time. Increased traffic congestion would reduce the current
7 roadway levels of service and cause additional stress to road surfaces resulting in deterioration
8 (e.g., rutting, cracking, and breakup) of pavements. However, once completed, roadway
9 improvements on the island would be expected to help limit traffic congestion and maintain road
10 surfaces and safe driving conditions in the long term.

11 5.3 Irreversible and Irretrievable Commitment of Resources

12 An irreversible or irretrievable commitment of resources refers to impacts on or losses to
13 resources that cannot be reversed or recovered, even after an activity has ended and facilities
14 have been decommissioned. A commitment of resources is related to use or destruction of
15 nonrenewable resources, and the impacts that loss will have on future generations.

16 Improvement and periodic use of the airport or airports selected would involve the irreversible
17 and irretrievable commitment of materials, energy, terrestrial biota and soil, landfill space, and
18 human resources. The impacts on these resources would be permanent.

19 **Materials.** Material resources irretrievably used for pipeline installation, seaport infrastructure
20 construction, and roadway improvements would include steel, concrete, and other building
21 materials. Such materials are not in short supply and would not be expected to limit other
22 unrelated construction activities. The irretrievable use of material resources would not be
23 considered significant.

24 **Energy.** Energy resources used for the Proposed Actions would be irretrievably lost. These
25 include fossil fuels (e.g., gasoline, diesel, natural gas) and electricity. During construction and
26 operation of the Proposed Actions, gasoline and diesel fuel would be used for the operation of
27 construction vehicles, transportation vehicles, and equipment. Overall, consumption of energy
28 resources would not place a significant demand on their availability in the region. Therefore, no
29 significant impacts would be expected.

30 **Terrestrial Biota and Soils.** Pipeline installation and roadway improvements would result in
31 some irretrievable loss of wildlife habitat and soil resources. This result would be a permanent
32 loss or conversion.

33 **Landfill Space.** The generation of construction debris and subsequent disposal of that debris in
34 a landfill would be an irretrievable impact. Construction contractors would be expected to
35 recycle, to the greatest extent possible, any debris that is generated. Recycling wastes would
36 reduce irretrievable impacts on landfills. However, any waste generated by the Proposed Action
37 that is disposed of in a landfill would be considered an irretrievable loss of that landfill space.

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

6. References

- 6th NCBRC1945 6th Naval Construction Brigade (NCBR). c.1945. *6th NCBR*. U.S. Navy Seabee Museum. Naval Construction Battalion Cruisebooks collection. Available online: <https://www.history.navy.mil/content/history/museums/seabee/explore/wwii-cruisebooks/cruisebooks-ncb.html>.
- About Pipelines 2015 About Pipelines. 2015. "Preventing leaks is important, but what about pipeline safety for workers?" Available online: <https://www.aboutpipelines.com/en/blog/preventing-leaks-is-important-but-what-about-pipeline-safety-for-workers/>. Accessed 15 June 2018.
- AFCEE/PACAF 2010 AFCEE and PACAF. 2010. *Final CNMI Site Survey; Tinian, Rota, and Saipan*. October 2010.
- AirNav.com 2018 AirNav.com. 2018. "Tinian International Airport." Available online: <https://www.airnav.com/airport/PGWT>. Accessed 4 June 2018.
- Alter City Group undated Alter City Group. Undated. Lease and Supporting Documents for the Plumeria Resort.
- API 2015 American Petroleum Institute (API). 2015. "Pipelines." Available online: <http://www.oilspillprevention.org/oil-spill-sources/pipelines>. Accessed 12 June 2018.
- Ayers 2018 Ayers, Adam L. 2018. *The Commonwealth of the Northern Mariana Islands Fishing Community Profile: 2017 Update*. NOAA Tech. Memo. NMFS-PIFSC-66. January 2018. Available online: ftp://ftp.library.noaa.gov/noaa_documents.lib/NMFS/PIFSC/TM_NMFS_PIFSC/NOAA_Tech_Memo_PIFSC_66.pdf.
- BEA 2017 Bureau of Economic Analysis (BEA). 2017. News Release: CNMI GDP Increases in 2016. 15 October 2017. Available online: https://www.bea.gov/newsreleases/general/terr/2017/CNMIGDP_101517.pdf.
- Bouthillier 1998 Bouthillier, K. 1998. *Cultural Resources Management Overview Survey of Historic Period Sites on U.S. Military Lease Lands at Tinian, Commonwealth of the Northern Mariana Islands*. Ogden Environmental and Energy Services, Honolulu, Hawai'i.
- Brooke 2009 Brooke, A. 2009. Mariana Fruit Bat on Tinian and Aguiguan. Pages 269 to 272 in *Terrestrial Resource Surveys of Tinian and Aguiguan, Mariana Islands, 2008*. U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, HI.

- Bureau of Justice Statistics 2015 Bureau of Justice Statistics. 2015. *Local Police Departments, 2013: Personnel, Policies, and Practices*. May 2015. Available online: <<https://www.bjs.gov/content/pub/pdf/lpd13ppp.pdf>>. Accessed 14 June 2018.
- Carson 2014 Carson, M.T. 2014. *First Settlement of Remote Oceania: Earliest Sites in the Mariana Islands*. Springer, New York.
- Carson 2016 Carson, M.T. 2016. *Archaeological Landscape Evolution: The Mariana Islands in the Asia-Pacific Region*. Springer International Publishing, Switzerland.
- CEQ 1981 Council on Environmental Quality (CEQ). 1981. President's Council on Environmental Quality. Forty Most Asked Questions Concerning CEQ's NEPA Regulations. 23 March 1981. Available online: <<https://energy.gov/sites/prod/files/G-CEQ-40Questions.pdf>>. Accessed 19 February 2018.
- CEQ 1997a CEQ. 1997. *Environmental Justice Guidance Under the National Environmental Policy Act*. 10 December 1997.
- CEQ 1997b CEQ. 1997. "Considering Cumulative Effects Under the National Environmental Policy Act," Executive Office of the President, Council on Environmental Quality. January 1997.
- CEQ 2005 CEQ. 2005. "Guidance on the Consideration of Past Actions in Cumulative Effects Analysis," Executive Office of the President, Council on Environmental Quality. 24 June 2005.
- CHCC 2018a Commonwealth Healthcare Corporation (CHCC). 2018. "Tinian Health Center." Available online: <<http://www.chcc.gov.mp/index.php/tinian-health-center>>. Accessed 5 June 2018.
- CHCC 2018b CHCC. 2018. "Commonwealth Health Center." Available online: <<http://www.chcc.gov.mp/index.php/division-of-hospital-services>>. Accessed 5 June 2018.
- CNMI 1994 Commonwealth of the Northern Mariana Islands (CNMI). 1994. Leaseback and Disposal Agreement between the United States of America and the Commonwealth of the Northern Mariana Islands.
- CNMI 1999 CNMI. 1999. Partial Release of Leasehold Interest By and Between the Commonwealth of the Northern Mariana Islands and the United States of America.
- CNMI 2011 CNMI. 2011. *Commonwealth of the Northern Mariana Islands Initial Technical Assessment*. July 2011. Available online: <<http://www.nrel.gov/docs/fy11osti/50906.pdf>>. Accessed 10 January 2012.

- CNMI 2012 CNMI. 2012. CNMI Constitution. Available online: <<http://www.cnmilaw.org/constitution.htm>>. Accessed 7 February 2012.
- CNMI 2016 CNMI. 2016. *2016–2020 Section 309 Assessment and Strategy Report*. May 2016. Available online: <https://dcrm.gov.mp/wp-content/uploads/crm/309Assessment_2016_Final.pdf>. Accessed 11 June 2018.
- CNMI 2017 CNMI. 2017. Building Safety Code Rules and Regulations. Available online: <<http://cnmilaw.org/pdf/admincode/T155/T155-10.1.pdf>>. Accessed 11 June 2018.
- CNMI 2018 CNMI. 2018. CNMI Constitution. Available online: <<http://cnmilaw.org/cnmiconstitution.html>>. Accessed 22 May 2018.
- CNMI BECQ 2004 Commonwealth of the Northern Marianas Bureau of Environmental and Coastal Quality (CNMI BECQ). 2004. Title 65: *Division of Environmental Quality, Chapter 65-10: Air Pollution Control Regulations*. Published in the Northern Mariana Islands Administrative Code. 2004 edition.
- CNMI BECQ 2016 CNMI BECQ. 2016. Commonwealth of the Northern Mariana Islands Integrated 303(b), 305(d), and 314 Water Quality Assessment Integrated Report. December 2016.
- CNMI BECQ and GEPA 2006 CNMI BECQ and Guam Environmental Protection Agency (GEPA). 2006. *CNMI and Guam Stormwater Management Manual*. October 2006.
- CNMI CRMO 2012 CNMI Coastal Resources Management Office (CRMO). 2012. Description of Areas of Specific Concerns (APCs). Available online: <<http://www.crm.gov.mp/programs/permitting/apc.asp>>. Accessed 7 February 2012.
- CNMI DCRM 2015a CNMI Division of Coastal Resources Management (DCRM). 2015. Public Shoreline Access Guide for Saipan, Tinian, and Rota. Available online: <<http://www.diverota.com/activities/shorelineaccessguide2015.pdf>>.
- CNMI DCRM 2015b CNMI DCRM. 2015. *Procedures Guide for Achieving Federal Consistency with the CNMI Coastal Management Program*. Revised September 2015. Available online: <<https://dcrm.gov.mp/wp-content/uploads/crm/PROCEDURES-GUIDE-federal-consistency-Sept-2015.pdf>>.
- CNMI DCRM 2016 CNMI DCRM. 2016. Areas of Particular Concern for Rota and Tinian. Accessed via CNMI Bureau of Environmental and Coastal Quality – Open Data Portal. Available online: <http://becq1-dcrm.opendata.arcgis.com/datasets/dc4f07dbb29b498cb596ea1d1bad2a03_0>. Accessed 8 June 2018.

- CNMI Department of Commerce 2009 CNMI Department of Commerce, Commonwealth Economic Development Strategic Planning (CEDS) Commission. 2009. *Comprehensive Economic Development Strategic Plan for the U.S. Commonwealth of the Northern Mariana Islands 2009–2014*. February 2009.
- CNMI Department of Commerce 2013 CNMI Department of Commerce. 2013. *2013 CNMI Economic Development Forum Report and Recommendations*. Available online: <<http://commerce.gov.mp/wp-content/uploads/2013/09/FINAL-EDF-REPORT.pdf>>.
- CNMI Department of Commerce 2015 CNMI Department of Commerce. 2015. *2015 Commonwealth of the Northern Mariana Islands Statistical Yearbook*. Available online: <<http://i2io42u7ucg3bwn5b3l0fquc.wpengine.netdna-cdn.com/wp-content/uploads/2017/11/2015-Yearbook-11222017.pdf>>.
- CNMI Department of Commerce 2016 CNMI Department of Commerce. 2016. *2016-2021 Comprehensive Economic Development Strategy*. Available online: <<http://i2io42u7ucg3bwn5b3l0fquc.wpengine.netdna-cdn.com/wp-content/uploads/2017/12/CNMI-2016-2021-Comprehensive-Economic-Development-Strategy-Public-Comments.pdf>>.
- CNMI Department of Commerce 2017a CNMI Department of Commerce. 2017. *2016 Commonwealth of Northern Mariana Islands Household Income and Expenditures Survey (HIES) Report*. April 2017. Available online: <<http://i2io42u7ucg3bwn5b3l0fquc.wpengine.netdna-cdn.com/wp-content/uploads/2010/07/2016-HIES-Final-Report.pdf>>.
- CNMI Department of Commerce 2017b CNMI Department of Commerce. 2017. *2016 CNMI Prevailing Wage and Workforce Assessment Study: SOC Detailed Occupation Titles and Hourly Wages Report*. Version 1.1. 5 September 2017. Available online: <<http://i2io42u7ucg3bwn5b3l0fquc.wpengine.netdna-cdn.com/wp-content/uploads/2017/09/2016-PWWAS-Report-One-Full-Report-v1.1-1.pdf>>.
- CNMI Department of Commerce 2017c CNMI Department of Commerce. 2017. *Economic Indicator, A Quarterly Report, 1st - 4th Quarter 2017*. 2017. Available online: <<http://i2io42u7ucg3bwn5b3l0fquc.wpengine.netdna-cdn.com/wp-content/uploads/2018/05/2017-Economic-Indicator-05302018.pdf>>.
- CNMI Department of Commerce 2018 CNMI Department of Commerce. 2018. *CNMI Labor Force Participation Measures: General Population, Potential Labor Force, Labor Force, Employed, Unemployed, Not In-Labor Force Populations, Unemployment Rate and Labor Force Participation Rate in the Commonwealth of the Northern Mariana Islands, 4th Quarter, 2017*. 2 May 2018. Available online: <<http://i2io42u7ucg3bwn5b3l0fquc.wpengine.netdna-cdn.com/wp-content/uploads/2018/05/20174QLFPFD-ver.-1.1.pdf>>.

- CNMI Department of Commerce and U.S. Department of Agriculture (USDA). 2011. Commonwealth of the Northern Mariana Islands Department of Commerce & United States Department of Agriculture Rural Business Enterprise Grant Economic Restoration Project & Report: Findings and Recommendations. Prepared by Island Training Solutions. Available online: <<http://commerce.gov.mp/wp-content/uploads/2011/12/2011-CNMI-Economic-Restoration-Report.pdf>>.
- CNMI DFW 2015 CNMI Department of Fish and Wildlife (DFW). 2015. Wildlife Action Plan for the Commonwealth of the Northern Mariana Islands 2015-2025. CNMI DLR-Division of Fish and Wildlife, Saipan, MP.
- CNMI DPL 2018a 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/>>.
- CNMI DPL 2018b CNMI DPL. 2018. Tinian General Public Land Inventory. Available online: <<http://www.dpl.gov.mp/DPL/Maps/Tinian%20General%20Public%20Land%20Inventory.pdf>>. Accessed 22 May 2018.
- CNMI DPW undated CNMI Department of Public Works (DPW). Undated. General Highway Route Maps of Saipan, Tinian, and Rota.
- CNMI DPW 2009 CNMI DPW. 2009. Comprehensive Highway Master Plan Study 2008. Prepared by Parsons Brinckerhoff. March 2009.
- CNMI HS&EM 2016 CNMI Office of Homeland Security and Emergency Management (HS&EM). 2016. "Evacuation Safe Zones." Available online: <<http://www.cnmihsem.gov.mp/natural-disasters/tsunami/cnmievacsafezones>>. Accessed 9 June 2018.
- CNMI SWARS 2010 CNMI Statewide Assessment and Resource Strategies Council (SWARS). 2010. *Statewide Assessment and Resource Strategies*. Available online: <<http://www.wflccenter.org/islandforestry/cnmi.pdf>>. Accessed 11 June 2018.
- CPA 2018a Commonwealth Ports Authority (CPA). 2018. "Francisco C. Ada/Saipan International Airport." Available online: <<http://www.cpa.gov.mp/spnapt.asp>>. Accessed 4 June 2018.
- CPA 2018b CPA. 2018. "Tinian International Airport." Available online: <<http://www.cpa.gov.mp/tinapt.asp>>. Accessed 4 June 2018.
- CPA 2018c CPA. 2018. "Aircraft Rescue and Firefighting." Available online: <<http://www.cpa.gov.mp/arff.asp>>. Accessed 5 June 2018.

- 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.
- CRMO 2011 CNMI Coastal Resources Management Office (CRMO). 2011. *Coastal Resources Management Program: Section 309 Assessment and Strategy Report, 2011-2015*. Available online: <<https://www.coast.noaa.gov/czm/enhancement/media/cnmi3092011.pdf>>. Accessed 11 June 2018.
- Cruz et al. 2008 Cruz, J.B., S.R. Kremer, G. Martin, L.L. Williams, and V.A. Camacho. 2008. Relative abundance and distribution of Mariana swiftlets (Aves: Apodidae) in the Northern Mariana Islands. *Pacific Science* 62:233-246.
- De La Torre 2018 De La Torre, Ferdie. 2018. "New police academy has no cadets from Tinian, Rota." *SaipanTribune.com*. 20 April 2018. Available online: <<https://www.saipantribune.com/index.php/new-police-academy-has-no-cadets-from-tinian-rota/>>.
- Dixon and Welch 2002 Dixon, B. and D.J. Welch. 2002. *Archaeological Data Recovery of Site TN-1-691, West Tinian Airport Improvement Area, Island of Tinian*. International Archaeological Research Institute, Inc. Honolulu, Hawaii.
- Dixon et al. 2015 Dixon, B. R. Jones, T. Rudolph, and R. Schaefer. 2015. *Cultural Resources Survey on Tinian in Support of the Commonwealth of the Northern Mariana Islands Joint Military Training Environmental Impact Statement/Overseas Environmental Impact Statement*. Prepared for the Department of the Navy, Naval Facilities Engineering Command, Pacific, Honolulu, Hawaii.
- DOD 2019 Department of Defense (DOD). 2019. Tinian Construction Capacity Study, 28 Jan – 1 Feb 2019 Site Visit #2 And Meetings Trip Report. February 2019.
- 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, Hawaii 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, Hawaii: 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 2010d DON. 2010. Socioeconomic Impact Assessment Study. Appendix F of Final Environmental Impact Statement – GUAM AND CNMI MILITARY RELOCATION: Relocating Marines from Okinawa, Visiting Aircraft Carrier Berthing, and Army Air and Missile Defense Task Force. Prepared for the Joint Guam Program Office.
- DON 2015a DON. 2015. Commonwealth of the Northern Mariana Islands Joint Military Training Draft Environmental Impact Statement/Overseas Environmental Impact Statement. April 2015.
- DON 2015b DON. 2015. *Preliminary Draft V3 Socioeconomic Impact Assessment Study in Support of the Commonwealth of the Northern Mariana Islands Joint Military Training Environmental Impact Statement/Overseas Environmental Impact Statement.* Available online:
<<http://cnmimarines.s3.amazonaws.com/static/DraftEIS/Appendices/App%20Q%20-%20Socioeconomic%20Study.pdf>>.
- DON 2015c DON. 2015. *Mariana Islands Training and Testing Activities Final Environmental Impact Statement/Overseas Environmental Impact Statement.* May 2015.
- DON 2015d DON. 2015. Press Release: Department of Navy Releases Record of Decision for Relocation of Marines to Guam. 29 August 2015.
- Donnegan et al. 2011 Donnegan, J.A., S.L. Butler, O. Kuegler, and B.A. Hiserote. 2011. Northern Mariana Islands Forest Resources, 2004. U.S. Department of Agriculture, forest Service. Pacific Northwest Research Station Resource Bulletin PNW-RB-261. Portland, Oregon.
- FAA 2012 Federal Aviation Administration (FAA). 2012. Advisory Circular 150/5300-13A, *Airport Design.* Available online:
<https://www.faa.gov/documentLibrary/media/Advisory_Circular/150-5300-13A-chg1-interactive-201612.pdf>. Accessed 14 June 2018.
- FICUN 1980 Federal Interagency Committee on Urban Noise (FICUN). 1980. *Guidelines for Considering Noise in Land Use Planning and Control.* June 1980.

- Finegold et al. 1994 Finegold L. S., Harris C. S. and von Gierke H. E. 1994. "Community Annoyance and Sleep Disturbance: Updated Criteria for Assessment of the General Transportation Noise on People" *Noise Control Engineering Journal* 42, pp. 25–30. Annoyance from Road Traffic Noise: A Review (PDF Download Available). Available online: <https://www.researchgate.net/publication/222514786_Annoyance_from_Road_Traffic_Noise_A_Review>. Accessed 8 June 2018.
- 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.
- Griffin et al. 2015 Griffin, A., T. McCurdy, B. Dixon, and R. Jones. 2015. *Identification and Evaluation of Traditional Cultural Properties on the Island of Tinian, Commonwealth of the Northern Mariana Islands*. Prepared for Department of the Navy, Navy Facilities Engineering Command, Pacific.
- Guam 2014 Guam. 2014. *Final 2014 Guam Hazard Mitigation Plan*. April 2014. Available online: <https://www.wsspc.org/wp-content/uploads/2014/12/Final-Draft-2014-Guam-HMP_040914_9PM.pdf>. Accessed 12 June 2018.
- Hansen and Dursteler undated Hansen, Megan E. and Ethan Dursteler. Undated. *Pipelines, Rail, & Trucks. Economic, environmental, and safety impacts of transporting oil and gas in the U.S.*
- HDR 2018a HDR. 2018. Draft Biological Survey Report for the Proposed Infrastructure Improvements on Tinian, Commonwealth of the Northern Mariana Islands. August 2018.
- HDR 2018b HDR. Draft Biological Assessment of Effects to Terrestrial Species from Tinian Divert Infrastructure Improvements, Commonwealth of the Northern Mariana Islands. August 2018.
- Jacobs 2019 Jacobs. 2019. Phase I Supplemental Environmental Baseline Survey: Airport and Seaport Subject Properties, Island of Tinian, Commonwealth of the Northern Mariana Islands. February 2019.
- Jones 1980 Jones, J.B. 1980. *Nanyo Kahotsu Kabushiki Kaisha Laboratory*. National Register of Historic Places Inventory Nomination Form. J.B. Jones, Architect, Tamuning, Guam.

- Jones 1991 Jones, J.B. 1991. *Archaeological Survey of Non-Indigenous Historic Resources on the Portion of the Island of Tinian Commonwealth of the Northern Mariana Islands (CNMI) Leased for Military Purposes*. J.B. Jones, Architect, Tamuning, Guam.
- JSB Market Research 2017 JSB Market Research. 2017. BIGL - Tinian Ocean View Casino Resort - Northern Mariana Islands - Profile. Available online: <<http://www.jsbmarketresearch.com/construction/bigl-tinian-ocean-view-casino-resort-northern-mariana-islands-project-profile>>. Accessed 14 June 2018.
- Karthikeyan et al.1999 R. Karthikeyan, L.C. Davis, K.R. Mankin, L.E. Erickson, and P.A. Kulakow. 1999. "Biodegradation of Jet Fuel (JP-8) in the Presence of Vegetation." Presented at the 1999 Conference on Hazardous Waste Research. Available online: <<https://www.engg.ksu.edu/HSRC/99Proceed/karthikeyen.pdf>>. Accessed 12 June 2018.
- Kessler and Amidon 2009 Kessler, C., and F. A. Amidon. 2009. Micronesian Megapode on Tinian and Aguiguan. Pages 201 to 218 in *Terrestrial Resource Surveys of Tinian and Aguiguan, Mariana Islands, 2009*. U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, HI.
- 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.
- Lander et al. 2002 Lander, J.F., L.S. Whiteside, and P. Hattori. 2002. "Tsunami History of Guam: 1849-1993." *Science of Tsunami Hazards* 20: 158–174.
- Leclerc et al. 2018a Leclerc, E., K.P. Gilmore, and C. Blackwell. 2018. *Cultural Resources Investigation of West Field for the Divert Activities and Exercises Proposal*. HDR, Englewood, Colorado.
- Leclerc et al. 2018b Leclerc, E. and K.P. Gilmore. 2018. *Phase I Archaeological Survey for the Tinian Divert Infrastructure Improvements Project*. HDR, Englewood, Colorado.
- LHSFNA 2015 Laborer's Health and Safety Fund of North American (LHSFNA). 2015. "A Pipeline Primer for Construction Laborers." Available online: <<https://www.lhsfna.org/index.cfm/lifelines/august-2015/a-pipeline-primer-for-construction-laborers/>>. Accessed 15 June 2018.
- Licanto 2015 Licanto, Nestor. 2015. "Saipan's economy is on the upswing." KUAM News. Posted 28 June 2015. Available online: <<http://www.kuam.com/story/29428173/2015/06/28/saipans-economy-is-on-the-upswing>>.

- Liu and Fischer 2006 Liu, Z., and L. Fischer. 2006. Commonwealth of the Northern Mariana Islands Vegetation Mapping Using Very High Spatial Resolution Imagery. USDA: Forest Service Pacific Southwest Region.
- 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.
- Marianas Variety 2016 Marianas Variety. 2016. *CIP breaks ground on half-a-million gallon reservoir on Tinian*. 28 July 2018. Available online: <<http://www.mvariety.com/cnmi/cnmi-news/local/87999-cip-breaks-ground-on-half-a-million-gallon-reservoir-on-tinian>> Retrieved 1 October 2018.
- MarketPublishers.com 2018 MarketPublishers.com. 2018. ACG - Tinian Plumeria Golf and Casino Resort - Northern Mariana Islands - Project Profile. Available online: <<https://marketpublishers.com/report/industry/construction/acg-tinian-plumeria-golf-n-casino-resort-northern-mariana-islands-project-profile.html>>. Retrieved 14 June 2018.
- McPhee & Associates and Conway 2009 Malcolm D. McPhee & Associates and Dick Conway (McPhee Associates and Conway). 2009. *Economic Impact of Federal Laws on the Commonwealth of the Northern Mariana Islands*. Prepared for the Office of the Governor, The Commonwealth of the Northern Mariana Islands. Available online: <<http://www.saipanchamber.com/newsletters/92.pdf>>.
- 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. Suhkraj, 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.
- MVA 2012 Marianas Visitors Authority (MVA). 2012. "What to do – Sites." Available online: <http://www.mymarianas.com/wtd.asp?secID=30&wcat_wtypID=1#list>. Accessed 14 February 2012.
- NAVFAC 2014a Naval Facilities Engineering Command, Pacific (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. Department of the Navy, Naval Facilities Engineering Command, Pacific. Hawai'i.
- 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. Department of the Navy, Naval Facilities Engineering Command, Pacific. Hawaii.

- NAVFAC 2017 NAVFAC. 2017. Draft Survey Report: 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. Department of the Navy, Naval Facilities Engineering Command, Pacific. Hawai'i.
- NFPA 2016 National Fire Protection Association (NFPA). 2016. Career Firefighters per 1,000 Population for All Career Fire Departments, 2013-2015. August 2016. Available online: <<https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics/Fire-service/osCareerFF1000Population.ashx?la=en>>. Accessed 14 June 2018.
- 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.
- NOAA 2011 National Oceanic and Atmospheric Administration (NOAA). 2011. Commonwealth of the Northern Mariana Islands Coastal Resources Management Program. March 2011.
- NOAA 2013 NOAA. 2013. *Tsunami Hazard Assessment Special Series: Vol. 3 Tsunami hazard assessment of the Commonwealth of the Northern Mariana Islands*. Available online: <https://nctr.pmel.noaa.gov/hazard_assessment_reports/H03_CNMI_3949_low_res.pdf>. Accessed 11 June 2018.
- NPS 2001 National Park Service (NPS). 2001. Special Study North Field Historic District, Tinian, Commonwealth of the Northern Mariana Islands. September 2001.
- NWS undated a National Weather Service (NWS). Undated. "TsunamiReady in Guam/Northern Mariana Islands." Available online: <<https://www.weather.gov/tsunamiready/gu-tr>>. Accessed 12 June 2018.
- NWS undated b NWS. Undated. "How To Become TsunamiReady." Available online: <<https://www.weather.gov/tsunamiready/become>>. Accessed 12 June 2018.
- Oil & Gas Technology 2012 Oil & Gas Technology. 2012. "Safety tips for pipeline workers." Available online: <www.oilandgastechology.net/health-safety-environment-news/safety-tips-pipeline-workers>. Accessed 15 June 2018.
- OSHA 2013 Occupational Safety and Health Administration (OSHA). 2013. OSHA Technical Manual, Chapter 5: Noise, Appendix B: Sample Calculations for Noise Impacts Analysis. Available online: <https://www.osha.gov/dts/osta/otm/new_noise/>. Accessed 4 June 2018.

- OSHA and USEPA 1991 Occupational Safety and Health Administration (OSHA) and U.S. Environmental Protection Agency (USEPA). 1991. Memorandum of Understanding between the U.S. Department of Labor Occupational Safety and Health Administration and the U.S. Environmental Protection Agency Office of Enforcement. 13 February 1991. Available online: <<https://www.osha.gov/laws-regs/mou/1991-02-13>>. Accessed 14 June 2018.
- PACAF 2019 Pacific Air Forces (PACAF). 2019. Divert Activities and Exercises, Environmental Baseline Survey, Proposed Utility Easement, Tinian, Commonwealth Of The Northern Mariana Islands, Pre-draft. March 2019.
- Pacific RISA undated Pacific Regional Integrated Sciences and Assessments (Pacific RISA). Undated. Places: Commonwealth of the Northern Mariana Islands and explanation of Weather Condition Four. Available online: <<http://www.pacificrisa.org>>.
- PAPA 2017 Pipeline Associated for Public Awareness (PAPA). 2017. Pipeline Emergency Response Guidelines. Available online: <<https://www.pipelineawareness.org/media/1092/2017-pipeline-emergency-response-guidelines.pdf>>. Accessed 16 June 2018.
- Perez 2018 Perez, Jon. 2018. "CCC: Clarify room numbers in Garapan facility." *SaipanTribune.com*. 15 May 2018. Available online: <<https://www.saipantribune.com/index.php/ccc-clarify-room-numbers-in-garapan-facility/>>.
- PHMSA 2017 Pipeline and Hazardous Materials Safety Administration (PHMSA). 2017. "PHMSA Regulations." Available online: <<https://www.phmsa.dot.gov/phmsa-regulations>>. Accessed 13 June 2018.
- Pipeline101 2016 Pipeline101. 2016. "Who Oversees Pipeline Safety?" Available online: <<http://www.pipeline101.org/are-pipelines-safe/who-oversees-pipeline-safety>>. Accessed 13 June 2018.
- 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.
- Saipan Tribune 2010 Saipan Tribune. 2010. *DPW, Tinian and Rota mayors cited for violating dumpsite rules*. 7 September 2010. Available online: <<http://saipantribune.com/newsstory.aspx?cat=1&newsID=102807>>. Accessed 11 January 2012.
- Saipan Tribune 2014a Saipan Tribune. 2014. \$130M Resort on Tinian OK'd. 24 March 2014. Available online: <<http://www.saipantribune.com/index.php/130m-resort-tinian-okd/>>. Accessed 28 August 2015.

- Saipan Tribune 2014b Saipan Tribune. 2014. New \$130M hotel on Saipan breaks ground. 29 September 2014. Available online: <http://www.saipantribune.com/index.php/new_130m_hotel_saipan_breaks_ground/>. Accessed 28 August 2015.
- Saipan Tribune 2017 Saipan Tribune. 2017. Tinian Breaks Ground for a New Transfer Station. 15 June 2017. Available online: <<https://www.saipantribune.com/index.php/tinian-breaks-ground-new-transfer-station/>>. Accessed 15 June 2018.
- Saipan Tribune 2018 Saipan Tribune. 2018. Low-cost Housing Project Breaks Ground on Tinian. 19 February 2018. Available online: <<https://www.saipantribune.com/index.php/low-cost-housing-project-breaks-ground/>>. Retrieved 15 June 2018.
- Shell 2001 Shell, R.J. 2001. The Ladrones Population. *Journal of Pacific History*. 36(2):225-236.
- Shin 2007 Shin, Jong Soon. 2007. Commonwealth of the Northern Mariana Islands Business Opportunities Report. Prepared for the United States Department of the Interior Office of Insular Affairs. Updated July 2007. Originally written by Tomas Kandl in September 2004. Available online: <http://www.doi.gov/oia/reports/PDF/CNMI%202007%20Business%20Opportunities%20Report_FINAL.pdf>. Accessed 25 January 2012.
- Stradbroke 2017 Stradbroke, Steven. 2017. "Tinian approves online gambling by licenses casinos." *Calvinayre.com*. 25 September 2017. Available online: <<https://calvinayre.com/2017/09/25/casino/tinian-approves-online-gambling-licensed-casinos/>>.
- Strata 2017 Strata. 2017. *Pipelines, Rail, and Trucks: Economic, environmental, and safety impacts of transporting oil and gas in the U.S.* August 2017. Available online: <<https://www.strata.org/pipelines-rails-trucks/>>
- Takano and Haig 2004 Takano, L.L., and S.M. Haig. 2004. Distribution and abundance of the Mariana subspecies of the common moorhen. *Waterbirds* 27:245–250.
- TDPL 2017 Tinian Department of Public Lands (TDPL). 2017. Tinian Hazards Map. Available online: <www.dpl.gov.mp/wp-content/uploads/2018/05/Presentation-Part-8.pdf>. Accessed 12 June 2018.
- Tenorio and Dashiell 1997 Tenorio, Juan C. and Associates and Dashiell, Eugene P. 1997. Tinian Harbor Master Plan prepared for the Commonwealth Port Authority. July 1997.
- UOG RCPP 2016 University of Guam Regional Center for Public Policy (UOG RCPP). 2016. *2016 CNMI Economic Report*. Available online: <<http://www.pacificsbdc.com/sites/default/files/UOG-RCPP-2016-CNMI-Economic-Report.pdf>>.

- University of Guam 2002 University of Guam. 2002. Karst Geology and Hydrology of Tinian and Rota (Luta), CNMI: A Preliminary Report. September 2002.
- University of Hawaii 2010 University of Hawaii. 2010. Soils of Tinian: Properties and Diversity. Available online: <<https://www.ctahr.hawaii.edu/deenikj/Downloads/Extension2014/Soils%20of%20Tinian%202010.pdf>>. Accessed 16 May 2018.
- USAF 2014 U.S. Air Force (USAF). 2014. *Guide for Environmental Justice Analysis under the Environmental Impact Analysis Process (EIAP)*. November 2014.
- USAF 2016a 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.
- USCB 2010a U.S. Census Bureau (USCB). 2010. DP 1: Profile of General Demographic Characteristics: 2010. 2010 Commonwealth of the Northern Mariana Islands Demographic Profile Data. Accessed via American FactFinder. Available online: <<https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>>. Accessed 3 June 2018.
- USCB 2010b USCB. 2010. 2010 Census, Commonwealth of the Northern Mariana Islands. DP-4: Profile of Selected Housing Characteristics: 2010. Accessed via American FactFinder. Available online: <<http://factfinder2.census.gov>>. Accessed 3 June 2018.
- USCB 2010c USCB. 2010. 2010 Census, Commonwealth of the Northern Mariana Islands. HBG65. Median Gross Rent as a Percentage Of Household Income In 2009. Accessed via American FactFinder. Available online: <<http://factfinder2.census.gov>>. Accessed 3 June 2018.
- USCB 2010d USCB. 2010. 2010 Census, Commonwealth of the Northern Mariana Islands. Median Household Income in 2009 (Dollars) By Tenure. Accessed via American FactFinder. Available online: <<http://factfinder2.census.gov>>. Accessed 3 June 2018.
- USCB 2010e USCB. 2010. 2010 Census, Commonwealth of the Northern Mariana Islands. P3. Ethnic Origin or Race. Accessed via American FactFinder. Available online: <<http://factfinder2.census.gov>>. Accessed 3 June 2018.
- USCB 2010f USCB. 2010. 2010 Census, Commonwealth of the Northern Mariana Islands. PCT71. Poverty Status in 2009 by Age. Accessed via American FactFinder. Available online: <<http://factfinder2.census.gov>>. Accessed 3 June 2018.

- USCB 2015 USCB. 2015. Poverty Thresholds for 2015 by Size of Family and Number of Related Children Under 18 Years. Available online: <<https://www2.census.gov/programs-surveys/cps/tables/time-series/historical-poverty-thresholds/thresh15.xls>>. Accessed 3 June 2018.
- USCB 2018 USCB. 2018. Midyear Population and Density - Custom Region - Northern Mariana Islands, 2017. International Data Base. Available online: <<https://www.census.gov/data-tools/demo/idb/region.php?N=%20Results%20&T=6&A=separate&RT=0&Y=2017&R=-1&C=CQ>>. Accessed 3 June 2018.
- U.S. Citizen and Immigration Services 2018 U.S. Citizen and Immigration Services. 2018. “CW-1: CNMI-Only Transitional Worker.” Available online: <<https://www.uscis.gov/working-united-states/temporary-workers/cw-1-cnmi-only-transitional-worker>>. Accessed 16 August 2018.
- USDA 2009 U.S. Department of Agriculture (USDA). 2009. *2007 Census of Agriculture Northern Mariana Islands Commonwealth and Island Data*. Volume 1 Geographic Area Series Part 56. February 2009. Available online: <https://www.agcensus.usda.gov/Publications/2007/Full_Report/Outlying_Areas/cnmi.pdf>.
- 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 2018 USDA NRCS. 2018. “Web Soil Survey.” Available online: <<https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>>. Accessed 11 June 2018.
- USDOI-OIA 1999 U.S. Department of Interior, Office of Insular Affairs (USDOI-OIA). 1999. *A Report on the State of the Islands*.
- USDOI-OIA 2008 USDOI-OIA. 2008. Report on the State Of The Islands. Chapter 3: Commonwealth Of The Northern Mariana Islands. Last updated 12 March 2008. Available online: <<http://www.doi.gov/oia/StateIsland/ch3a.html>>. Accessed 3 June 2018.
- USEPA 1971 U.S. Environmental Protection Agency (USEPA). 1971. Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances. December 1971. Available online through the USEPA National Service Center for Environmental Publications Database: <<https://nepis.epa.gov>>. Accessed 8 June 2018.
- USEPA 1974 USEPA. 1974. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. Publication No. 550/9-74-004, Washington D.C. March 1974.

- USEPA 1981a USEPA. 1981. "Noise and its Measurement." January 1981. Available online: <<http://nonoise.org/epa/Roll19/roll19doc49.pdf>>. Accessed 3 March 2010.
- USEPA 1981b USEPA. 1981. Noise Effects Handbook. A Desk Reference to Health and Welfare Effects of Noise. Office of Noise Abatement and Control. October 1979, Revised July 1981. Available online: <<http://nonoise.org/epa/Roll7/roll7doc27.pdf>>. Accessed 3 March 2010.
- USEPA 2009 USEPA. 2009. Estimating 2003 Building-Related Construction and Demolition Materials Amounts. March 2009.
- USEPA 2011 USEPA. 2011. Pacific Southwest, Region 9, EPA Pacific Islands Program. 4 August 2011.
- USEPA 2012 USEPA. 2012. Title 40: Protection of Environment, Chapter I - Environmental Protection Agency, Subchapter C - Air Programs, Part 81 - Designation of Areas for Air Quality Planning Purposes, Subpart C - Section 07 Attainment Status Designations, Section 81.354 - Northern Mariana Islands. 7/1/11 Edition.
- USEPA 2015 USEPA. 2015. *National Ambient Air Quality Standards (NAAQS)*. Available online: <<http://www3.epa.gov/ttn/naaqs/criteria.html>>. Accessed 14 January 2015.
- USFWS 1998a U.S. Fish and Wildlife Service (USFWS). 1998. Recovery plan for the nightingale reed-warbler, *Acrocephalus lusciniæ*. U.S. Fish and Wildlife Service, Portland, Oregon.
- USFWS 1998b USFWS. 1998. Recovery Plan for the Micronesian Megapode (*Megapodius laperouse laperouse*). Portland, Oregon.
- USFWS 2009a USFWS. 2009. Terrestrial Resource Surveys of Tinian and Aguiguan, Mariana Islands, 2008. Final Report. Prepared for MARFORPAC and NAVFAC Pacific, Pearl Harbor, HI by USFWS, Pacific Islands Field Office, Honolulu, HI. December 2009.
- USFWS 2009b USFWS. 2009. Recommended Survey Guidelines for the Nightingale Reed-Warbler. Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii.
- USFWS 2010a USFWS. 2010. Micronesian megapode (*Megapodius laperouse*) 5-Year Review Summary and Evaluation. Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii.
- USFWS 2010b USFWS. 2010. Mariana Swiftlet or Chachaguak (*Aerodramus bartschi*) 5-Year Review Summary and Evaluation. Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii.

- 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 2014 USFWS. 2014. 5-Year Review Short Form Summary– Mariana fruit bat (*Pteropus mariannus mariannus*). USFWS Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii.
- USFWS 2015a USFWS. 2015. Endangered and Threatened Wildlife and Plants; Endangered Status for 16 Species and Threatened Status for 7 Species in Micronesia; Final Rule. Federal Register 80 (190): 59424–59497.
- USFWS 2015b USFWS. 2015. Environmental Conservation Online System Species by County Report: Tinian, MP. Available online: <<http://ecos.fws.gov/ecp/>>. Accessed 2 May 2018.
- USFWS 2015c 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.
- USFWS 2018 USFWS. 2018. Endangered Species Act Protections not Warranted for Tinian Monarch. December 2018. Available online: <<https://www.fws.gov/news/ShowNews.cfm?ID=CCCCECA9-DE20-F8B1-E3C13EBD0A288D57>>.
- U.S. GAO 2000 U.S. Government Accountability Office (U.S. GAO). 2000. *Northern Mariana Islands Garment and Tourist Industries Play a Dominant Role in the Commonwealth's Economy*. GAO/RCED/GGD-00-79. February 2000. Available online: <<http://www.gao.gov/archive/2000/r200079.pdf>>. Accessed 9 February 2012.
- U.S. GAO 2017 U.S. GAO. 2017. *Commonwealth of the Northern Mariana Islands: Implementation of Federal Minimum Wage and Immigration Laws*. GAO-17-437. May 2017. Available online: <<https://www.gao.gov/assets/690/684778.pdf>>.
- USGS 1999 U.S. Geologic Survey (USGS). 1999. Topographic Map of the Island of Tinian.
- 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.

- USGS 2012 USGS. 2012. *Seismic Hazard Assessment for Guam and the Northern Mariana Islands*. Available online: <<https://pubs.usgs.gov/of/2012/1015/report/OF12-1015.pdf>>. Accessed 11 June 2018.
- USGS 2017 USGS. 2017. "Karst Topography - Teacher's Guide and Paper Model." Available online: <<https://geomaps.wr.usgs.gov/parks/cave/karst.html>>. Accessed 12 June 2018.
- USGS undated USGS. Undated. "What is a seismic zone, or seismic hazard zone? Where can I find information on seismic zones 0, 1, 2, 3, or 4? What seismic zone is location X in?" Available online: <https://www.usgs.gov/faqs/what-a-seismic-zone-or-seismic-hazard-zone-where-can-i-find-information-seismic-zones-0-1-2-3?qt-news_science_products=0#qt-news_science_products>. Accessed 16 August 2018.
- U.S. Navy 1947 U.S. Navy. 1947. *Building the Navy's Bases in World War II. History of the Bureau of Yards and Docks and the Civil Engineer Corps, 1940–1946*. U.S. Navy Bureau of Yards and Docks, Washington D.C.
- Vogt and Williams 2004 Vogt, S.R. and L.L. Williams. 2004. Common Flora and Fauna of the Mariana Islands. WinGuide Saipan, Northern Mariana Islands. p. 158.
- Welch and Tuggle 2008 Welch, D.J. and H.D. Tuggle. 2008. *Tinian Prehistory and History: A Synthesis of Archaeological Research and Historical Documentation for the Military Lease Area of Tinian Island, CNMI. Cultural Resource Survey and Documentary Archival Research for COMNAVREG Marianas Military Lease Area, Tinian, CNMI. Volume I: Narrative*. International Archaeological Research Institute, Inc. Honolulu, Hawai'i.
- WPRFRMC 2009a Western Pacific Regional Fishery Management Council (WPRFMC). 2009. Fishery Ecosystem Plan for the Mariana Archipelago.
- WPRFRMC 2009b WPRFMC. 2009. Fishery Ecosystem Plan for Pacific Pelagic Fisheries of the Western Pacific Region.
- WWU undated Western Washington University (WWU). Undated. "Lecture 19: Liquefaction." Available online: <http://www.geol.wvu.edu/rjmitch/L19_liquefaction.pdf>. Accessed 12 June 2018.

1 7. List of Preparers

2 This SEIS has been prepared by HDR, Inc., under the direction of Air Force Civil Engineer
3 Center, Headquarters Pacific Air Forces, and Air Force Installation and Mission Support Center.
4 The individual contractors who contributed to the preparation of this document are listed as
5 follows:

6 **Chad Blackwell**

7 *QC Reviewer*

8 M.H.P. Architectural History

9 B.A. History

10 Years of Experience: 13

11 **Timothy Didlake**

12 *Resource Author*

13 B.S. Earth Sciences

14 Years of Experience: 10

15 **Kelly Flickinger**

16 *Resource Author*

17 B.S. Wildlife Conservation and
18 Management

19 Years of Experience: 8

20 **Nicolas Frederick**

21 *Resource Author*

22 M.S. Biology

23 B.S. Psychology

24 Years of Experience: 12

25 **Megan Gambone**

26 *Resource Author*

27 M.S. Biology

28 B.S. Environmental Sciences

29 Years of Experience: 14

30 **Leigh Hagan**

31 *Resource Author*

32 M.E.S.M. Environmental Science and
33 Management

34 B.S. Biology

35 Years of Experience: 13

36 **Chris Holdridge**

37 *Quality Assurance/Quality Control*

38 M.S. Environmental Assessment

39 B.S. Environmental Science/Chemistry

40 Years of Experience: 22

41 **Elizabeth Leclerc**

42 *Resource Author*

43 B.A. Anthropology

44 Years of Experience: 10

45 **Kathy Lemberg**

46 *Geographic Information Systems*

47 B.A. Anthropology

48 Years of Experience: 12

49 **Christopher McJetters**

50 *Technical Editor*

51 B.S. English

52 Years of Experience: 12

53 **Darrell Molzan, PE**

54 *QC Reviewer*

55 B.S. Civil Engineering

56 Years of Experience: 36

57 **Cheryl Myers**

58 *Document Production*

59 A.A.S. Nursing

60 Years of Experience: 26

61 **Deborah Peer**

62 *Resource Author*

63 M.S. Environmental Science and
64 Management

65 B.S. Zoology

66 B.S. Wildlife Science

67 Years of Experience: 17

1 **Stephen Pyle**
2 *Senior Project Manager*
3 J.D. with Certification in Environmental
4 Law
5 B.S. Natural Resources Management
6 Years of Experience: 18

7 **Kurt Rautenstrauch**
8 *QC Reviewer*
9 Ph.D. Wildlife and Fisheries Science
10 M.S. Wildlife and Fisheries Science
11 B.S. Wildlife Management
12 Years of Experience: 29

13 **Terri Rector, PE**
14 *Resource Author*
15 B.S. Chemical Engineering
16 Years of Experience: 31

17 **Morgan Shelby**
18 *Resource Author*
19 B.S. Environmental Studies
20 Years of Experience: 3

21

22 **Emily Smith**
23 *Project Manager*
24 M.R.L.S. Natural Resources Law Studies
25 B.A. Biology
26 Years of Experience: 12

27 **Patrick Solomon**
28 *QC Reviewer*
29 M.S. Geography
30 B.A. Geography
31 Years of Experience: 24

32 **Valerie Whalon**
33 *QC Reviewer*
34 M.S. Fisheries Science
35 B.S. Marine Science
36 Years of Experience: 24

8. Index

A

air quality, 2-23, 2-26, 3-1, 3-43, 3-55, 3-56, 3-57, 3-58, 3-59, 4-1, 4-29, 4-30, 4-72, 4-73, 4-76, 4-79, 4-80, 4-81, 5-3
aquifer, 3-35, 3-38, 4-29, 4-45, 4-49
archaeological, 2-24, 3-13, 3-14, 3-15, 3-18, 4-17, 4-18, 4-19

B

biological, 2-24, 3-5, 3-9, 3-10, 3-28, 3-29, 3-35, 3-55, 4-6, 4-7, 4-12, 4-13, 4-15, 4-32, 4-33, 4-36, 4-37, 5-2, 5-3

C

coastal zone, 1-8, 3-45, 3-46, 3-49, 4-62
conservation, 3-36, 3-46
contaminant, 3-35, 3-58

D

decibel, 3-2
discharge, 2-3, 3-35, 3-37, 3-38, 3-40, 4-54, 4-58
drinking water, 3-28, 3-35, 3-43

E

electrical, 2-22, 3-40, 3-41, 3-42, 4-9, 4-11, 4-51, 4-52, 4-57, 4-60, 4-62, 5-3
emissions, 2-23, 2-26, 3-56, 3-57, 3-58, 3-59, 4-29, 4-30, 4-71, 4-72, 4-73, 4-74, 4-75, 4-76, 4-77, 4-78, 4-79, 4-80, 4-81
endangered, 3-5, 3-6, 3-8, 3-9, 3-11, 4-7, 4-9, 4-11, 4-12, 4-13, 4-14, 4-15
environmental justice, 2-21, 2-25, 3-25, 3-26, 4-28, 4-30, 4-31, 5-3
erosion, 3-31, 3-32, 3-34, 3-36, 3-37, 4-7, 4-13, 4-14, 4-15, 4-38, 4-39, 4-40, 4-41, 4-42, 4-43, 4-44, 4-45, 4-46, 4-47, 4-48, 4-49, 4-50, 4-51, 4-54, 4-58, 5-3

F

farmland, 3-31, 3-32
fish, 3-11, 3-37
floodplain, 3-37

G

geology, 2-22, 2-25, 3-18, 3-31, 4-37, 4-39, 4-41, 4-42, 4-43, 4-44, 5-3
greenhouse gas (GHG), 3-58
groundwater, 2-4, 2-22, 2-25, 3-35, 3-38, 3-40, 3-42, 3-51, 3-53, 3-54, 4-38, 4-39, 4-44, 4-45, 4-46, 4-48, 4-49, 4-50, 4-68, 4-71

H

hazardous material, 2-23, 2-26, 3-29, 3-51, 3-53, 4-13, 4-14, 4-32, 4-45, 4-47, 4-49, 4-50, 4-67, 4-68, 4-69, 4-70, 4-71, 5-2, 5-3
hazardous waste, 2-23, 2-26, 3-29, 3-43, 3-51, 3-53, 3-54, 4-21, 4-26, 4-67, 4-68, 4-69, 4-70, 4-71
historic, 1-8, 2-20, 2-24, 3-13, 3-15, 3-16, 3-30, 3-45, 3-49, 4-16, 4-17, 4-18, 4-19, 4-20, 4-21, 4-25, 9-3
human health, 3-43, 3-51, 3-55, 3-56, 4-28, 4-45, 4-62, 4-67
hydrology, 3-36, 4-46

I

invasive species, 2-7, 2-20, 2-24, 4-7, 4-9, 4-11

L

land use, 2-22, 2-26, 3-4, 3-5, 3-18, 3-31, 3-44, 3-45, 3-46, 3-56, 4-62, 4-63, 4-64, 4-65, 4-66, 4-67, 5-3
landfill, 3-43, 3-46, 3-54, 4-55, 4-59, 5-4

limestone, 3-10, 3-31, 3-32, 3-34, 3-38,
3-43, 4-8, 4-9, 4-10, 4-11, 4-38, 4-40,
4-43, 4-44, 4-45

M

marine mammal, 3-13, 4-13
minority, 2-21, 2-25, 3-25, 3-26, 3-27, 4-28,
4-29, 4-30, 4-31
mitigation, 1-8, 2-20, 2-21, 2-22, 2-23, 2-24,
2-25, 2-26, 2-27, 4-38, 4-40, 4-42

N

natural gas, 5-4

P

particulate, 2-4, 3-55, 3-58, 4-73, 4-74, 4-77
permit, 3-35, 3-37, 3-45, 3-49, 3-58, 3-59,
4-20, 4-25, 4-38, 4-47, 4-50, 4-72, 4-74,
4-77
physiography, 2-22, 2-25, 3-31, 4-39, 4-41,
4-42, 4-43, 4-44
pollutant, 2-23, 3-55, 3-56, 3-58, 4-29, 4-30,
4-45, 4-46, 4-72, 4-80
pollution, 3-36, 3-37, 3-55, 3-56, 3-59, 4-38,
4-45, 4-47
potable water, 3-43, 4-51, 4-53, 4-54, 4-56
prehistoric, 3-13, 3-15, 9-3
private land, 3-46, 4-63, 4-65, 4-66, 4-67
project area, 2-22, 3-1, 3-6, 3-8, 3-9, 3-10,
3-11, 3-12, 3-30, 3-31, 3-32, 3-34, 3-37,
3-38, 3-40, 3-51, 3-53, 3-54, 4-1, 4-8,
4-10, 4-11, 4-13, 4-14, 4-32, 4-33, 4-36,
4-39, 4-40, 4-41, 4-42, 4-43, 4-44, 4-45,
4-46, 4-47, 4-48, 4-56, 4-62, 4-64, 4-67,
4-72, 5-2
public land, 2-3, 3-24, 3-25, 3-46, 4-23,
4-63, 4-64, 4-65, 4-67

R

recreation, 2-22, 2-26, 3-22, 3-36, 3-45,
4-64, 4-65, 4-66, 4-67
recycle, 5-4
reef, 3-11, 3-13, 3-14, 3-31, 3-49, 4-40

resident, 3-25, 4-13, 4-55, 4-59
runoff, 2-22, 3-35, 3-38, 3-40, 3-43, 4-7,
4-13, 4-14, 4-15, 4-39, 4-45, 4-46, 4-47,
4-48, 4-49, 4-50, 4-54, 4-58

S

sanitary sewer, 2-5, 3-40
sediment, 3-36, 4-13, 4-14, 4-15, 4-38,
4-39, 4-45, 4-46, 4-47, 4-48, 4-49, 4-50,
4-51, 4-58
socioeconomics, 2-21, 3-1, 4-1, 4-20, 4-23,
4-24, 4-29, 4-30
soil, 3-31, 3-32, 3-34, 3-37, 3-43, 3-51,
3-53, 3-54, 4-19, 4-37, 4-38, 4-39, 4-40,
4-41, 4-42, 4-43, 4-44, 4-45, 4-68, 4-71,
5-3, 5-4
solid waste, 2-22, 2-26, 3-40, 3-43, 3-51,
4-50, 4-51, 4-54, 4-55, 4-56, 4-57, 4-59,
4-60, 5-3
surface water, 2-25, 3-35, 3-37, 3-40, 4-45,
4-46, 4-47, 4-48, 4-49, 4-50

T

threatened and endangered species, 1-8,
3-5, 3-11, 4-10, 4-11, 4-14, 4-15
topography, 2-22, 2-25, 3-10, 3-31, 3-34,
3-35, 3-37, 3-55, 4-37, 4-39, 4-41, 4-42,
4-43, 4-44
tourist, 4-21, 4-26
transportation, 1-4, 2-9, 2-14, 2-22, 2-26,
3-40, 3-51, 4-1, 4-6, 4-21, 4-26, 4-46,
4-50, 4-51, 4-55, 4-57, 4-59, 4-60, 4-62,
5-4

U

utilities, 2-1, 2-3, 2-5, 2-8, 3-22, 3-24, 3-40,
4-23, 4-50, 4-51, 4-63, 4-67

V

vegetation, 2-20, 2-24, 3-5, 3-6, 3-8, 3-37,
3-38, 3-43, 3-49, 3-56, 4-7, 4-8, 4-10,
4-12, 4-15, 4-38, 4-39, 4-40, 4-42, 4-45,
4-46, 4-51

W

wastewater, 3-42, 3-43, 4-54, 4-59
water supply, 2-22, 2-26, 3-35, 3-40, 3-42,
4-51, 4-52, 4-53, 4-54, 4-57, 4-58, 4-61,
5-3
watershed, 3-35, 3-37
wells, 2-22, 2-26, 3-42, 3-53, 4-53, 4-54,
4-56, 4-58
wetlands, 3-9, 3-35, 3-37, 3-40, 4-9, 4-11,
4-12, 4-47, 4-48, 4-49
wildlife, 2-20, 2-24, 3-5, 3-6, 3-8, 3-29, 3-37,
3-51, 4-8, 4-9, 4-10, 4-12, 4-15, 5-4
World War II, 3-14, 3-15, 3-16, 3-17, 3-30,
3-44, 3-53, 3-54, 4-16, 4-68, 4-69, 5-2

This page intentionally left blank.

9. Glossary

A-weighted decibel (dBA): Decibel measurement on the “A-weighting” scale. A decibel adjusted (weighted) to reflect the relative loudness of sounds most sensitive to human ears.

Air Force Instruction (AFI): Instructions implementing U.S. laws and regulations, and providing policy for USAF personnel and activities.

Air Quality: The degree to which the ambient air is pollution-free, assessed by measuring a number of indicators of pollution.

Bird/Wildlife-Aircraft Strike Hazard (BASH): A USAF program to reduce the possibilities of bird or wildlife collisions with aircraft.

Clean Air Act (CAA): This Act empowered the U.S. Environmental Protection Agency to establish standards for common pollutants that represent the maximum levels of background pollution that are considered safe, with an adequate margin of safety to protect public health and safety.

Clean Water Act (CWA): The primary federal law in the United States governing water pollution. The CWA established the goals of eliminating releases of high amounts of toxic substances into water, eliminating additional water pollution, and ensuring that surface waters would meet standards necessary for human sports and recreation.

Council on Environmental Quality (CEQ): The CEQ is within the Executive Office of the President and is composed of three members appointed by the President, subject to approval by the Senate. Members are to be conscious of and responsive to the scientific, economic, social, esthetic, and cultural needs of the nation; and to formulate and recommend national policies to promote the improvement of environmental quality.

Day-Night Average Sound Level (DNL): The average sound energy in a 24-hour period with a 10 decibel (dB) penalty added to the nighttime levels of 10 p.m. to 7 a.m.

Decibel (dB): A unit used to express the intensity of a sound wave, equal to 20 times the common logarithm of the ratio of the pressure produced by the sound wave to a reference pressure, usually 0.0002 microbar.

De Minimis Threshold: The minimum threshold for which a conformity determination must be performed for various criteria pollutants in various areas.

Endangered Species: The Endangered Species Act of 1973 defined the term “endangered species” to mean any species (including any subspecies of fish or wildlife or plants, and any distinct population segment of any species or vertebrate fish or wildlife which interbreeds when mature) that is in danger of extinction throughout all or a significant portion of its range.

Environmental Justice: Pursuant to EO 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, review must be made as to whether a federal program, policy, or action presents a disproportionately high and adverse human health or

- 1 environmental effect on minority and/or low-income populations. Environmental Night: The
2 period between 10 p.m. and 7 a.m. when 10 dB is added to aircraft noise levels due to
3 increased sensitivity to noise at night.
- 4 **Fiscal Year:** U.S. government accounting year beginning 1 October through 30 September.
- 5 **Groundwater:** Water held underground in the soil or in pores and crevices in rock.
- 6 **Floodplain:** An area of low-lying ground adjacent to a river, formed mainly of river sediments
7 and subject to flooding.
- 8 **Hazardous Material:** Solids, liquids, or gases that can harm people, other living organisms,
9 property, or the environment.
- 10 **Hazardous Waste:** Waste that poses substantial or potential threats to public health or the
11 environment. In the United States, the treatment, storage and disposal of hazardous waste is
12 regulated under the Resource Conservation and Recovery Act.
- 13 **Important Farmland:** Important farmland is a designation assigned by the U.S. Department of
14 Agriculture. Important farmland is land that has the best combination of physical and chemical
15 characteristics for producing food, feed, forage, fiber, and oilseed crops. The land is also used
16 as cropland, pastureland, rangeland, forest land, or other land, but cannot be used as urban
17 built-up land or water.
- 18 **Mean Sea Level (MSL):** Altitude expressed in feet measured above average sea level.
- 19 **Mobile Sources:** Includes cars and light trucks, heavy trucks and buses, nonroad engines,
20 equipment, and vehicles.
- 21 **National Ambient Air Quality Standards (NAAQS):** NAAQS are established by USEPA for
22 criteria pollutants that represent the maximum levels of background pollution considered safe,
23 with an adequate margin of safety, to protect public health and safety.
- 24 **National Environmental Policy Act (NEPA):** The NEPA of 1969 directs federal agencies to
25 take environmental factors into consideration in their decisions.
- 26 **National Historic Preservation Act (NHPA):** The NHPA of 1966, as amended, established a
27 program for the preservation of historic properties throughout the United States.
- 28 **National Register of Historic Places (NRHP):** The NRHP is the federal government's official
29 list of districts, sites, buildings, structures, and objects deemed worthy of preservation.
- 30 **Scoping:** A NEPA process of identifying the main issues of concern at an early stage in
31 planning in order to discover any alternatives and aid in site selection.
- 32 **Threatened Species:** A species likely to become endangered within the foreseeable future
33 throughout all, or a significant portion, of its range.

- 1 **Traditional and Cultural Resource:** Traditional and cultural resources are any prehistoric or
2 historic district, site or building, structure, or object considered important to a culture, subculture,
3 or community for scientific, traditional, religious, or other purposes.
- 4 **Wetland, Jurisdictional:** A jurisdictional wetland is a wetland that meets all three of USACE's
5 criterion for jurisdictional status: appropriate hydrologic regime, hydric soils, and facultative to
6 obligate wetland plant communities under normal growing conditions.

This page intentionally left blank.