4.9 Air Quality

This section evaluates potential impacts to air quality and the contribution of greenhouse gas emissions that could result from implementing the Proposed Action. A region's air quality depends on many factors, including the type and amount of pollutants and how they are emitted into the atmosphere, the size and topography of the air basin, and the local meteorological conditions.

4.9.1 Approach to Analysis

This analysis estimated emissions associated with the alternatives and assessed the potential impacts of increased pollutant concentrations. It examines long-term increases in criteria pollutant and selected hazardous air pollutant emissions in relation to public proximity to the emissions, including sensitive populations, and prevailing wind patterns. These emissions were evaluated based on the location of emission sources, the magnitude of emissions, the frequency of occurrence, the location of sensitive receptors, and how and where the emissions would disperse based on local meteorology. Emission sources associated with the construction and operations of the Proposed Action include the following:

- Use of diesel- and gas-powered construction equipment
- Movement of trucks containing construction materials or removal of debris
- Commuting of construction workers
- Dust emissions from earth disturbance and travel on-road surfaces
- Vehicles used to travel throughout the Military Lease Area during training events and ground equipment used for training
- Fixed-wing and rotary-wing aircraft
- New stationary sources (e.g., emergency electrical power generators at the Base Camp, and a small incinerator for solid waste management)
- Live-fire training at Multi-Purpose Maneuver Range and Explosives Training Range (use of small caliber weapons and ordnance)

Appendix K describes in detail the emission estimation methodology used in this analysis. Emissions were evaluated based on whether they would occur on land or by aircraft over water, out to 3 nautical miles from shore within CNMI territorial seas, between 3 and 12 nautical miles from shore within U.S. territorial sea, and beyond 12 nautical miles from shore. Criteria pollutant and hazardous air pollutant emissions were limited to releases at or below 3,000 feet above ground level (U.S. EPA 1992). The 3,000-foot level serves as a common altitude cap for emissions that could impact ground level air quality, as emissions above this altitude are above the atmospheric inversion layer and have little interaction with the ground level. Greenhouse gas emissions were also estimated for aircraft operating above 3,000 feet.

The Proposed Action would involve live-fire from the Multi-Purpose Maneuver Range with 0.50 caliber ammunition and below, and from the Explosives Training Range, with a maximum of 40 pounds net explosive weight. Emissions from munitions and ordnance would be limited to the two live-fire range areas and consist of hazardous air pollutants such as acrolein, benzene, toluene, and particulate matter. The Agency for Toxic Substances and Disease Registry evaluated air emissions and their dispersion associated with munition constituents at active DoD ranges and munitions treatment sites (Agency for Toxic Substances and Disease Registry 2003a). In this study, the dispersion of air contaminants associated with weapons and ordnance use was found to be

primarily influenced by the prevailing wind direction, and the levels of various hazardous air pollutants measured were not at concentrations associated with adverse health effects. Additionally, measured particulate matter concentrations were significantly lower than applicable air quality standards (Agency for Toxic Substances and Disease Registry 2003b). Since the studies concluded there were no health hazards from weapons firing and ordnance use at active DoD ranges and the prevailing easterly trade winds transport emissions away from sensitive receptors on Tinian, a quantitative analysis of emissions associated with weapons firing and ordinance disposal was not conducted.

For construction, while emissions were quantified for CO, PM_{10}, and $PM_{2.5}$, a localized hot-spot analysis was not conducted as proposed construction-related activities that cause temporary increases in emissions would last 5 years or less at any individual site, per C.F.R. section 93.123(c)(5). As shown in Appendix K, while the proposed construction would last longer than 5 years, construction activities would not last longer than 5 years at any one location.

4.9.2 Emissions Calculations

Air pollutant emissions released during construction and training are evaluated for each alternative. Emission calculation details appear in Appendix K.

Construction emissions are calculated for on-road and non-road construction equipment, fugitive dust, on-road vehicles for construction worker commuting, and construction phasing. Construction is assumed to take place in phases over 10 to 15 years, with no individual project exceeding 5 years to construct. Estimates of the emissions from construction equipment were developed based on the anticipated types of equipment and levels of use, including the estimated hours of equipment use and appropriate emission factors for each type of equipment.

Emission factors for criteria pollutants, hazardous air pollutants, and greenhouse gases from both construction equipment and vehicles were derived from the most recent U.S. EPA's Motor Vehicle Emission Simulator Version 4.0 emission factor model (U.S. EPA 2023c), which is associated with the national default model database for both non-road equipment and on-road vehicle engines. The quantity and type of equipment and vehicle travel miles necessary were calculated from construction estimates for each project component. Because the Motor Vehicle Emission Simulator model does not contain data for the CNMI, the database for the U.S. Virgin Islands was used, based on a recommendation from the U.S. EPA (D. Brzezinski, Personal Communication, 2013). This database was selected due to the similar remote nature of the U.S. Virgin Islands compared to the CNMI. Selecting model input parameters available for a similar remote island for Tinian is considered reasonable, as standard control measures or population data inputs are limited compared to most states.

Training event emissions include those from on-road and off-road vehicles, aircraft, and stationary combustion sources, such as generators. Mobile vehicles associated with the various proposed training operations would generate fugitive dust emissions within areas of exposed soil. As with construction, emission factors for criteria pollutants, hazardous air pollutants, and greenhouse gases for mobile and non-road sources were derived from the U.S. EPA Motor Vehicle Emission Simulator Version 4.0 emission factor model. Particulate matter components in fugitive dust emissions from training vehicles maneuvering on unpaved roads were calculated using emission factors from the U.S. EPA guidance in AP-42, *Compilation of Air Pollutant Emissions Factors from Stationary Sources*. Stationary electrical generator emissions were calculated using factors

from U.S. EPA AP-42. Aircraft emissions were calculated using emission factors from the 2015 *MITT EIS/OEIS* and the 2020 *MITT Supplemental EIS/OEIS* (DON 2015b, 2020).

4.9.3 No Action Alternative

4.9.3.1 Criteria and Hazardous Air Pollutant Emissions

Under the No Action Alternative, ground and aviation training events would continue in the Military Lease Area with the same type of activities and at the same tempo as described in previous NEPA documents (DON 2010a, 2015b). In addition, all actions related to the U.S. Air Force Divert project (U.S. Air Force 2016, 2020) would be implemented. No change would occur under the No Action Alternative; therefore, there would be no change in impact on air quality.

Training event criteria pollutant and hazardous air pollutant emissions associated with the No Action Alternative, which were calculated following the methodology described above, are outlined in Table 4.9-1. Only those emissions sources that would also be included within the alternatives were considered (i.e., existing marine surface vessels were excluded for comparison purposes).

Table 4.9-1 No Action Alternative Criteria Pollutant and Hazardous Air Pollutant Emissions from Training Events

Location/Source	*Annual Emissions (Tons)*						
	CO	***NO_x***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***	***Total HAPs[1]***
State (0-3 nm offshore) [< 3,000 ft altitude]							
On-road Vehicles[2]	5.442	0.156	0.178	0.002	0.040	0.009	0.046
Nonroad Vehicles and Equipment[2]	2.429	10.148	0.825	0.029	0.517	0.502	0.332
Aircraft	194.572	226.016	27.525	16.270	60.151	54.148	7.848
Fugitive Road Dust	--	--	--	--	1,429.688	145.281	--
Total	**202.443**	**236.320**	**28.528**	**16.301**	**1490.396**	**199.940**	**8.226**
Waters of U.S. (3-12 nm offshore) [< 3,000 ft altitude]							
Aircraft	10.747	17.617	1.584	0.834	4.091	3.686	0.452
Total	**10.747**	**17.617**	**1.584**	**0.834**	**4.091**	**3.686**	**0.452**
High Seas (>12 nm offshore) [< 3,000 ft altitude]							
Aircraft	0.913	20.505	0.123	0.606	5.656	5.090	0.035
Total	**0.913**	**20.505**	**0.123**	**0.606**	**5.656**	**5.090**	**0.035**
Combined No Action Alternative Total	**214.103**	**274.441**	**30.235**	**17.741**	**1500.143**	**208.716**	**8.713**

Legend: < = less than; > = greater than; CO = carbon monoxide; ft = feet; HAP = hazardous air pollutant; nm = nautical miles; NO_x = nitrogen oxides; PM_{10} = particles with aerodynamic diameters less than or equal to a nominal 10 micrometers; $PM_{2.5}$ = particles with aerodynamic diameters less than or equal to a nominal 2.5 micrometers; SO_x = sulfur oxides; U.S. = United States; VOC = volatile organic compound.

Notes: [1] HAPs include acetaldehyde, acrolein, benzene, 1,3-butadiene, ethylbenzene, formaldehyde, isopropyl-benzene, methanol, 1-methylnaphthalene, 2-methylnaphthalene, naphthalene, phenol, propionaldehyde, styrene, toluene, xylene, and hexane.

[2] Mobile sources include a wide variety of vehicles, engines, and equipment. "On-road" or highway sources include vehicles used on roads for transportation of passengers or freight. "Nonroad" (also sometimes referred to as "off-road") sources include vehicles, engines, and equipment used for construction, military training, and many other purposes. Refer to Appendix K, *Air Quality Emissions Calculations*, for more information on the on-road and non-road sources.

4.9.3.2 Greenhouse Gas Emissions

The estimated greenhouse gas emissions under the No Action Alternative are presented in Table 4.9-2.

Table 4.9-2 No Action Alternative Greenhouse Gas Annual Emissions

Location/Source	*Annual Emissions – Metric Tons*			
	CO_2	*CH_4*	*N_2O*	*CO_2e*
State (0-3 nm offshore) [< 3,000 ft altitude]				
On-road Vehicles	433.360	0.019	0.007	435.970
Off-road Vehicles and Equipment	9,537.226	0.035	0.016	9,542.897
Aircraft	109,234.569	4.588	0.896	109,616.186
Total	**119,205.155**	**4.642**	**0.919**	**119,595.053**
Waters of U.S. (3-12 nm offshore) [< 3,000 ft altitude]				
Aircraft	10,406.566	0.435	0.085	10,442.857
Total	**10,406.566**	**0.435**	**0.085**	**10,442.857**
High Seas (>12 nm offshore) [< 3,000 ft altitude]				
Aircraft	6,614.155	0.269	0.054	6,636.910
Total	**6,614.155**	**0.269**	**0.054**	**6,636.910**
> 3,000 ft Altitude				
Aircraft	458,898.685	19.148	3.759	460,497.556
Total	**458,898.685**	**19.148**	**3.759**	**460,497.556**
Combined No Action Alternative Total	**595,124.561**	**24.494**	**4.817**	**597,172.376**

Legend: < = less than; > = greater than; CH_4 = methane; CO_2 = carbon dioxide; CO_2e = carbon dioxide equivalent; ft = feet; N_2O = nitrous oxide; nm = nautical miles; U.S. = United States.

4.9.4 Alternative 1

4.9.4.1 Criteria and Hazardous Air Pollutant Emissions

Construction and training event air emissions for both criteria pollutants and hazardous air pollutants associated with Alternative 1 are presented in Table 4.9-3 through Table 4.9-6. Table 4.9-5 presents emissions that would be generated from stationary sources that are permitted to operate without an air permit. The potential use of a small diesel-powered solid waste incinerator at the Base Camp is an example of a permitted source. The emission limits (or caps) for this small incinerator are conservatively assumed in the emission analysis. Other minor stationary source equipment includes diesel-powered standby generators used only during power outages at the Base Camp, surface radar sites, and radio communications towers. Emissions from these generators would be intermittent; 500 operational hours per year are assumed for each generator. The maximum construction year provided in Table 4.9-6 represents the maximum annual emissions for each pollutant over any of the construction years.

Table 4.9-3 Alternative 1 Criteria Pollutant and Hazardous Air Pollutant Emissions from Training Events

Location/Source	*Annual Emissions (Tons)*						
	CO	*NO_x*	*VOC*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*	*Total HAPs*[1]
State (0-3 nm offshore) [< 3,000 ft altitude]							
On-road Vehicles[2]	6.400	0.184	0.210	0.003	0.047	0.011	0.054
Nonroad Vehicles and Equipment[2]	4.282	18.029	1.432	0.058	0.906	0.879	0.569

Location/Source	Annual Emissions (Tons)						
	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	Total HAPs[1]
Aircraft	330.254	348.666	46.358	23.319	104.995	94.508	13.218
Fugitive Road Dust	--	--	--	--	3,145.767	316.889	--
Total	**340.937**	**366.880**	**48.000**	**23.379**	**3,251.715**	**412.286**	**13.841**
Waters of U.S. (3-12 nm offshore) [< 3,000 ft altitude]							
Aircraft	33.595	39.735	5.075	1.931	12.843	11.563	0.885
Total	**33.595**	**39.735**	**5.075**	**1.931**	**12.843**	**11.563**	**0.885**
High Seas (>12 nm offshore) [< 3,000 ft altitude]							
Aircraft	2.248	51.008	0.277	1.353	14.725	13.253	0.042
Total	**2.248**	**51.008**	**0.277**	**1.353**	**14.725**	**13.253**	**0.042**
Combined Alternative 1 Total	**376.780**	**457.623**	**53.352**	**26.663**	**3,279.283**	**437.102**	**14.768**

Legend: CO = carbon monoxide; ft = feet; HAP = hazardous air pollutant; nm = nautical miles; NO_x = nitrogen oxides; PM_{10} = particles with aerodynamic diameters less than or equal to a nominal 10 micrometers; $PM_{2.5}$ = particles with aerodynamic diameters less than or equal to a nominal 2.5 micrometers; SO_x = sulfur oxides; U.S. = United States; VOC = volatile organic compound.

Notes: [1] HAPs include acetaldehyde, acrolein, benzene, 1,3-butadiene, ethylbenzene, formaldehyde, isopropyl-benzene, methanol, 1-methylnaphthalene, 2-methylnaphthalene, naphthalene, phenol, propionaldehyde, styrene, toluene, xylene, and hexane.

[2] Mobile sources include a wide variety of vehicles, engines, and equipment. "On-road" or highway sources include vehicles used on roads for transportation of passengers or freight. "Nonroad" (also sometimes referred to as "off-road") sources include vehicles, engines, and equipment used for construction, military training, and many other purposes. Refer to Appendix K, *Air Quality Emissions Calculations*, for more information on the on-road and non-road sources.

Table 4.9-4 Alternative 1 Criteria Pollutant and Hazardous Air Pollutant Emissions from Construction

Location/Source	Annual Emissions (Tons)						
	CO	NOx	VOC	SOx	PM10	PM2.5	Total HAPs[1]
State (0-3 nm offshore) [< 3,000 ft altitude]							
2026	2.741	0.106	0.408	0.001	0.047	0.042	0.137
2027	2.741	0.106	0.408	0.001	0.047	0.042	0.137
2028	4.752	0.639	0.238	0.003	0.082	0.040	0.079
2030	2.873	0.470	0.404	0.001	0.064	0.057	0.138
2031	0.726	0.504	0.077	0.001	0.033	0.028	0.030
2033	0.475	0.385	0.031	0.001	3.093	0.321	0.013
2036	0.048	0.073	0.005	0.000	0.494	0.052	0.002
2038	0.028	0.014	0.004	0.000	3.077	0.309	0.001
2039	0.028	0.014	0.004	0.000	3.077	0.309	0.001
Combined Alternative 1 Total	**14.413**	**2.310**	**1.578**	**0.008**	**10.013**	**1.201**	**0.539**

Legend: < = less than; CO = carbon monoxide; ft = feet; HAP = hazardous air pollutant; nm = nautical miles; NO_x = nitrogen oxides; PM_{10} = particles with aerodynamic diameters less than or equal to a nominal 10 micrometers; $PM_{2.5}$ = particles with aerodynamic diameters less than or equal to a nominal 2.5 micrometers; SO_x = sulfur oxides; U.S. = United States; VOC = volatile organic compound.

Note: [1] HAPs include acetaldehyde, acrolein, benzene, 1,3-butadiene, ethylbenzene, formaldehyde, isopropyl-benzene, methanol, 1-methylnaphthalene, 2-methylnaphthalene, naphthalene, phenol, propionaldehyde, styrene, toluene, xylene, and hexane.

Table 4.9-5 Alternative 1 Criteria Pollutant and Hazardous Air Pollutant Emissions from Stationary Sources

Location/Source	Annual Emissions (Tons)						
	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	Total HAPs[1]
State (0-3 nm offshore) [< 3,000 ft altitude]							
Emergency Generators[2]	2.866	2.772	0.395	0.006	0.176	0.171	0.005
Solid Waste Incinerator (permitted thresholds)[3]	<1	<1	<1	<1	<1	<1	<0.1
Combined Alternative 1 Total	**<3.866**	**<3.772**	**<1.395**	**<1.006**	**<1.176**	**<1.171**	**<0.105**

Legend: < = less than; CO = carbon monoxide; ft = feet; HAP = hazardous air pollutant; nm = nautical miles; NO_x = nitrogen oxides; PM_{10} = particles with aerodynamic diameters less than or equal to a nominal 10 micrometers; $PM_{2.5}$ = particles with aerodynamic diameters less than or equal to a nominal 2.5 micrometers; SO_x = sulfur oxides; U.S. = United States; VOC = volatile organic compound.

Notes: [1] HAPs include acetaldehyde, acrolein, benzene, 1,3-butadiene, ethylbenzene, formaldehyde, isopropyl-benzene, methanol, 1-methylnaphthalene, 2-methylnaphthalene, naphthalene, phenol, propionaldehyde, styrene, toluene, xylene, and hexane.

[2] Includes six 200-kilowatt diesel-powered emergency generators and two 50-kilowatt diesel-powered emergency generators operating up to 500 hours per year.

[3] Permitted stationary minor source limits per Northern Mariana Islands Administrative Code section 65-10, Air Pollution Control Regulations section 65-10-303(e)(1) for potential operation of a small solid waste incinerator to reduce the volume of training waste at Base Camp.

Table 4.9-6 Alternative 1 Criteria Pollutant and Hazardous Air Pollutant Annual Emissions (Maximum Construction Year and Training Events Occurring Concurrently)

Location/Source	Annual Emissions (Tons)						
	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	Total HAPs[1]
State (0-3 nm offshore) [< 3,000 ft altitude]							
On-road Vehicles[2]	6.400	0.184	0.210	0.003	0.047	0.011	0.054
Nonroad Vehicles and Equipment[2]	4.282	18.029	1.432	0.058	0.906	0.879	0.569
Aircraft	330.254	348.666	46.358	23.319	104.995	94.508	13.218
Fugitive Road Dust	--	--	--	--	3,145.77	316.89	--
Stationary Sources	3.866	3.772	1.395	1.006	1.176	1.171	0.105
Maximum Construction Year	4.752	0.639	0.408	0.003	3.093	0.321	0.138
Total	**349.555**	**371.290**	**49.802**	**24.388**	**3255.985**	**413.778**	**14.085**
Waters of U.S. (3-12 nm offshore) [< 3,000 ft altitude]							
Aircraft	33.595	39.735	5.075	1.931	12.843	11.563	0.885
Total	**33.595**	**39.735**	**5.075**	**1.931**	**12.843**	**11.563**	**0.885**
High Seas (>12 nm offshore) [< 3,000 ft altitude]							
Aircraft	2.248	51.008	0.277	1.353	14.725	13.253	0.042
Total	**2.248**	**51.008**	**0.277**	**1.353**	**14.725**	**13.253**	**0.042**
Combined Alternative 1 + Construction Total	**385.398**	**462.034**	**55.155**	**27.672**	**3283.553**	**438.594**	**15.011**
Increase from No Action Alternative	**171.295**	**187.592**	**24.920**	**9.931**	**1783.410**	**229.878**	**6.298**

Legend: CO = carbon monoxide; ft = feet; HAP = hazardous air pollutant; nm = nautical miles; NO_x = nitrogen oxides; PM_{10} = particles with aerodynamic diameters less than or equal to a nominal 10 micrometers; $PM_{2.5}$ = particles with

aerodynamic diameters less than or equal to a nominal 2.5 micrometers; SO_x = sulfur oxides; U.S. = United States; VOC = volatile organic compound.

Notes: [1] HAPs include acetaldehyde, acrolein, benzene, 1,3-butadiene, ethylbenzene, formaldehyde, isopropyl-benzene, methanol, 1-methylnaphthalene, 2-methylnaphthalene, naphthalene, phenol, propionaldehyde, styrene, toluene, xylene, and hexane.

[2] Mobile sources include a wide variety of vehicles, engines, and equipment. "On-road" or highway sources include vehicles used on roads for transportation of passengers or freight. "Nonroad" (also sometimes referred to as "off-road") sources include vehicles, engines, and equipment used for construction, military training, and many other purposes. Refer to Appendix K, *Air Quality Emissions Calculations*, for more information on the on-road and non-road sources.

Criteria air pollutant and hazardous air pollutant emissions from construction activities and training activities associated with Alternative 1 would have a less than significant impact on the air quality on Tinian due to the following:

- Construction emissions would be temporary, and fugitive dust control measures would be implemented where practical and in accordance with the Northern Mariana Islands Administrative Code, section 65-10-103, Fugitive dust.
- Emissions produced by construction, training, and operational activities would predominantly occur within the Military Lease Area and would not be in proximity to sensitive receptors (i.e., residences, schools). The closest sensitive receptor is the Marpo Heights residential area which is located at a distance of 2,000 feet from the Military Lease Area boundary.
- Operational emissions include permitted and exempt (minor activity) stationary source equipment used at the Base Camp or within the Military Lease Area training areas. The permitted stationary source equipment would be a diesel-powered solid waste incinerator, if that option is pursued, to manage training-generated solid waste. Exempt stationary source equipment would primarily be smaller equipment such as water heaters or standby emergency generators for the Base Camp, surface radar sites, and radio communications towers used only during power outages. All new permitted stationary sources would be evaluated and permitted as appropriate through the CNMI Bureau of Environmental and Coastal Quality. Stationary sources would be subject to emissions limits and control measures as applicable, per the Northern Mariana Islands Administrative Code, section 65-10, Air Pollution Control Regulations, and any specific conditions developed as part of the permitting process.
- Residents and visitors would be temporarily restricted from accessing areas immediately adjacent to or within a certain distance from where certain training activities occur within the Military Lease Area, such as aircraft activity or use of the live-fire ranges, which would minimize long-term exposure to operational emissions.
- Emissions from aircraft, which account for the majority of emissions during training events, excluding fugitive dust, would be released primarily at higher altitudes, increasing the dispersion of these emissions before they reach ground level, which decreases the concentration of criteria and hazardous air pollutants at any specific location.
- On-road emissions would be expected to occur primarily within the Military Lease Area. Outside the Military Lease Area, emissions would occur from transportation of service members and equipment or materials to be used during training from TNI or the Port of Tinian to training areas within the Military Lease Area. This would include a total of 50 individual bus trips on local roadways from TNI to and from the Military Lease Area in

the days preceding and following a large-scale training event. The maximum daily traffic under Alternative 1, including existing traffic volume along the most heavily trafficked street on Tinian outside of the Military Lease Area, is about 2,500 vehicles per day. Because there are no monitoring stations on Tinian or in CNMI, average daily traffic counts around air monitoring stations in Honolulu, Kapolei and Pearl City, Hawaii were used as a reference. Applying this methodology, even with an overly-conservative assumption that trips outside the Military Lease Area could occur on a daily basis, the total vehicle trips per day remain well below any actionable air levels.

- Hazardous air pollutant emissions per year are below the Clean Air Act major source thresholds of a combined total of 25 tons per year.

4.9.4.2 Greenhouse Gas Emissions

Alternative 1 would generate an increase in greenhouse gas emissions during both construction and training events as compared to the No Action Alternative. These emissions, along with the net increase are presented in Table 4.9-7.

Table 4.9-7 Alternative 1 Greenhouse Gas Annual Emissions (Maximum Construction Year and Training Events Occurring Concurrently)

Location/Source	*Annual Emissions – Metric Tons*			
	CO_2	*CH_4*	*N_2O*	*CO_2e*
State (0-3 nm offshore) [< 3,000 ft altitude]				
On-road Vehicles	509.674	0.022	0.008	512.743
Off-road Vehicles and Equipment	19,317.797	0.061	0.028	19,327.627
Aircraft	175,819.613	7.378	1.442	176,433.673
Stationary Sources	544.912	0.022	0.004	546.782
Maximum Construction Year	865.570	0.018	0.018	871.386
Total	**197057.565**	**7.502**	**1.500**	**197692.211**
Waters of U.S. (3-12 nm offshore) [< 3,000 ft altitude]				
Aircraft	22,191.385	0.924	0.182	22,268.684
Total	**22,191.385**	**0.924**	**0.182**	**22,268.684**
High Seas (>12 nm offshore) [< 3,000 ft altitude]				
Aircraft	16,789.143	0.681	0.137	16,846.879
Total	**16,789.143**	**0.681**	**0.137**	**16,846.879**
> 3,000 ft Altitude				
Aircraft	620,318.869	25.666	5.074	622,472.617
Total	**620,318.869**	**25.666**	**5.074**	**622,472.617**
Combined Alternative 1 + Construction Total	**856,356.963**	**34.774**	**6.893**	**859,280.390**
Increase from No Action Alternative	**261,232.402**	**10.280**	**2.076**	**262,108.014**

Legend: > = greater than; CH_4 = methane; CO_2 = carbon dioxide; CO_2e = carbon dioxide equivalent; ft = feet; N_2O = nitrous oxide; nm = nautical miles; U.S. = United States.

Greenhouse gas emissions generated from training and construction under Alternative 1 would contribute to the global atmosphere, regardless of their specific location of production. The net changes in greenhouse gas emissions resulting from Alternative 1, compared to the No Action Alternative, would increase CO_2e emissions within both the CNMI and the U.S. territories by the

percentages shown in Table 4.9-8, based on the most recent available greenhouse gas emissions inventories including the CNMI inventory from only partial sectors.

Table 4.9-8 Net Increase in Greenhouse Gas Emissions from Proposed Action as Compared to CNMI and U.S. Territory Greenhouse Gas Emissions Inventories

2023 CNMI Priority Sector GHG Inventory (Metric Tons of CO2e)	*2021 U.S. Territories[1] GHG Inventory (Metric Tons of CO2e)*	*Net Increase under Alternative 1*	*Net Increase under Alternative 2*
443,167	33,305,000	262,108	61,358
Percentage of 2023 CNMI Priority Sector Inventory		59.1	13.8
Percentage of 2021 U.S. Territories Inventory		0.8	0.2

Notes: [1] U.S. Territories (American Samoa, Guam, Hawaii, Northern Marianas Islands, U.S. Virgin Islands, and Puerto Rico) are included U.S. National Greenhouse Gas Inventory. The total land area of all U.S. Territories is 1.05 million hectares, representing 0.1 percent of the total land base for the U.S.

Legend: CNMI = Commonwealth of the Northern Mariana Islands; CO_2e = carbon dioxide equivalent; GHG = greenhouse gas; U.S. = United States.

Source: CNMI Climate Planning and Policy Program 2024; U.S. Environmental Protection Agency 2024.

The net changes in greenhouse gas emissions resulting from Alternative 1 were also compared to equivalencies to help contextualize the emissions in more familiar terms, such as annual household emissions, average emissions from a certain number of vehicles on the road, or the quantity of fuel burned. Based on the difference between the greenhouse gas emission results of the No Action and Alternative 1 (Table 4.9-7), equivalency values (i.e., increases) were derived using U.S. EPA's Greenhouse Gas Equivalencies Calculator (U.S. EPA 2024) and are summarized in Table 4.9-9.

Table 4.9-9 Equivalency Examples for Maximum Net Annual Increases of Greenhouse Gas Emissions from Proposed Alternatives

Equivalent Source	*Alternative 1*	*Alternative 2*
Barrels of crude oil consumed	606,835	142,057
Gasoline powered passenger vehicles driven for one year	61,138	14,312
Tanker truck's-worth of gasoline	3,470	812
Natural gas-fired power plant in one year	0.686	0.16

Implementation of Alternative 1 would contribute directly to emissions of greenhouse gases from the combustion of fossil fuels during construction and training predominantly from mobile source combustion when training occurs. Compared to the No Action Alternative in future years, Alternative 1 would result in increased greenhouse gas emissions that could affect the CNMI's efforts to achieve its long-term greenhouse gas emission reduction goals. However, the effect from change in greenhouse gas emissions should be evaluated on a global scale as all cumulative emissions contribute to the overall atmospheric greenhouse gas burden. Alternative 1 would only result in a small percentage of total greenhouse gas emissions in the U.S. Therefore, the greenhouse gas emissions from Alternative 1 should have a less than significant impact even though there is no single, universally accepted greenhouse gas emissions threshold for significance.

4.9.5 Alternative 2

4.9.5.1 Criteria and Hazardous Air Pollutant Emissions

Construction and training event criteria and hazardous air pollutant emissions associated with Alternative 2 are outlined in Table 4.9-10 and Table 4.9-11. The emissions from construction and stationary sources would be the same as shown for Alternative 1 (Tables 4.9-4 and 4.9-5). As with Alternative 1, the maximum construction year provided in Table 4.9-11 represents the maximum annual emissions for each pollutant over any of the construction years.

Table 4.9-10 Alternative 2 Criteria Pollutant and Hazardous Air Pollutant Emissions from Training Events

Location/Source	*Annual Emissions (Tons)*						
	CO	*NO_x*	*VOC*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*	*Total HAPs*[1]
State (0-3 nm offshore) [< 3,000 ft altitude]							
On-road Vehicles[2]	6.400	0.184	0.210	0.003	0.047	0.011	0.054
Non-road Vehicles and Equipment[2]	2.907	12.239	0.976	0.039	0.617	0.598	0.388
Aircraft	231.904	262.771	32.528	18.377	73.632	66.281	9.275
Fugitive Road Dust	--	--	--	--	2,100.03	212.32	--
Total	**241.212**	**275.195**	**33.714**	**18.419**	**2,174.323**	**279.205**	**9.717**
Waters of U.S. (3-12 nm offshore) [< 3,000 ft altitude]							
Aircraft	20.627	25.261	3.104	1.253	7.219	6.501	0.885
Total	**20.627**	**25.261**	**3.104**	**1.253**	**7.219**	**6.501**	**0.885**
High Seas (>12 nm offshore) [< 3,000 ft altitude]							
Aircraft	1.121	25.253	0.146	0.720	7.078	6.370	0.042
Total	**1.121**	**25.253**	**0.146**	**0.720**	**7.078**	**6.370**	**0.042**
Combined Alternative 2 Total	**262.959**	**325.709**	**36.964**	**20.391**	**2,188.620**	**292.076**	**10.644**

Legend: < = less than; > = greater than; CO = carbon monoxide; ft = feet; HAP = hazardous air pollutant; nm = nautical miles; NO_x = nitrogen oxides; PM_{10} = particles with aerodynamic diameters less than or equal to a nominal 10 micrometers; $PM_{2.5}$ = particles with aerodynamic diameters less than or equal to a nominal 2.5 micrometers; SO_x = sulfur oxides; U.S. = United States; VOC = volatile organic compound.

Notes: [1] HAPs include acetaldehyde, acrolein, benzene, 1,3-butadiene, ethylbenzene, formaldehyde, isopropyl-benzene, methanol, 1-methylnaphthalene, 2-methylnaphthalene, naphthalene, phenol, propionaldehyde, styrene, toluene, xylene, and hexane.

[2] Mobile sources include a wide variety of vehicles, engines, and equipment. "On-road" or highway sources include vehicles used on roads for transportation of passengers or freight. "Nonroad" (also sometimes referred to as "off-road") sources include vehicles, engines, and equipment used for construction, military training, and many other purposes. Refer to Appendix K, *Air Quality Emissions Calculations*, for more information on the on-road and non-road sources. On-road vehicle emissions are assumed to be the same compared to Alternative 1 as the change in vehicle trips would be too small to be measurable.

Table 4.9-11 Alternative 2 Criteria Pollutant and Hazardous Air Pollutant Annual Emissions (Maximum Construction Year and Training Events Occurring Concurrently)

Location/Source	*Annual Emissions (Tons)*						
	CO	*NO_x*	*VOC*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*	*Total HAPs*[1]
State (0-3 nm offshore) [< 3,000 ft altitude]							
On-road Vehicles[2]	6.400	0.184	0.210	0.003	0.047	0.011	0.054
Nonroad Vehicles and Equipment[2]	2.907	12.239	0.976	0.039	0.617	0.598	0.388

Location/Source	Annual Emissions (Tons)						
	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	Total HAPs[1]
Aircraft	231.904	262.771	32.528	18.377	73.632	66.281	9.275
Fugitive Road Dust	--	--	--	--	2,100.03	212.32	--
Stationary Sources	3.866	3.772	1.395	1.006	1.176	1.171	0.105
Maximum Construction Year	4.752	0.639	0.408	0.003	3.093	0.321	0.138
Total	**249.830**	**279.605**	**35.517**	**19.428**	**2,178.593**	**280.697**	**9.961**
Waters of U.S. (3-12 nm offshore) [< 3,000 ft altitude]							
Aircraft	20.627	25.261	3.104	1.253	7.219	6.501	0.885
Total	**20.627**	**25.261**	**3.104**	**1.253**	**7.219**	**6.501**	**0.885**
High Seas (>12 nm offshore) [< 3,000 ft altitude]							
Aircraft	1.121	25.253	0.146	0.720	7.078	6.370	0.042
Total	**1.121**	**25.253**	**0.146**	**0.720**	**7.078**	**6.370**	**0.042**
Combined Alternative 2 + Construction Total	**271.577**	**330.119**	**38.767**	**21.401**	**2192.889**	**293.568**	**10.887**
Increase from No Action Alternative	**57.474**	**55.678**	**8.532**	**3.660**	**692.746**	**84.852**	**2.174**

Legend: CO = carbon monoxide; ft = feet; HAP = hazardous air pollutant; nm = nautical miles; NO_x = nitrogen oxides; PM_{10} = particles with aerodynamic diameters less than or equal to a nominal 10 micrometers; $PM_{2.5}$ = particles with aerodynamic diameters less than or equal to a nominal 2.5 micrometers; SO_x = sulfur oxides; U.S. = United States; VOC = volatile organic compound.

Notes: [1] HAPs include acetaldehyde, acrolein, benzene, 1,3-butadiene, ethylbenzene, formaldehyde, isopropyl-benzene, methanol, 1-methylnaphthalene, 2-methylnaphthalene, naphthalene, phenol, propionaldehyde, styrene, toluene, xylene, and hexane.

[2] Mobile sources include a wide variety of vehicles, engines, and equipment. "On-road" or highway sources include vehicles used on roads for transportation of passengers or freight. "Nonroad" (also sometimes referred to as "off-road") sources include vehicles, engines, and equipment used for construction, military training, and many other purposes. Refer to Appendix K, *Air Quality Emissions Calculations*, for more information on the on-road and non-road sources. On-road vehicle emissions are assumed to be the same compared to Alternative 1 as the change in vehicle trips would be too small to be measurable

Criteria air pollutant and hazardous air pollutant emissions from construction activities and training activities associated with Alternative 2 would have a less than significant impact on the air quality on Tinian for the same reasons as outlined for Alternative 1.

4.9.5.2 Greenhouse Gas Emissions

Alternative 2 would also generate an increase in greenhouse gas emissions during both construction and training events as compared to the No Action Alternative. These emissions, along with the net increase are presented in Table 4.9-12. However, the increase in greenhouse gas emissions would be much less compared to Alternative 1, as presented in Table 4.9-7.

The net changes in greenhouse gas emissions from Alternative 2, compared to the No Action Alternative, would increase CO_2e emissions within both the CNMI and the U.S. territories by the percentages shown in Table 4.9-10.

The net changes in greenhouse gas emissions resulting from Alternative 2 were also compared to equivalencies, such as annual household emissions, average emissions from a certain number of vehicles on the road, or the quantity of fuel burned that are summarized in Table 4.9-11. The changes in greenhouse gas emissions from Alternative 2 would only result in a small percentage

of total greenhouse gas emissions in the U.S. Therefore, the greenhouse gas emissions from Alternative 2 should have a less than significant impact.

Table 4.9-12 Alternative 2 Greenhouse Gas Annual Emissions (Maximum Construction Year and Training Events Occurring Concurrently)

Location/Source	*Annual Emissions – Metric Tons*			
	CO_2	*CH_4*	*N_2O*	*CO_2e*
State (0-3 nm offshore) [< 3,000 ft altitude]				
On-road Vehicles	509.674	0.022	0.008	512.743
Off-road Vehicles and Equipment	13,047.661	0.042	0.019	13,054.355
Aircraft	128,374.929	5.390	1.053	128,823.380
Stationary Sources	544.912	0.022	0.004	546.782
Maximum Construction Year	865.570	0.018	0.018	871.386
Total	**143342.746**	**5.495**	**1.102**	**143808.646**
Waters of U.S. (3-12 nm offshore) [< 3,000 ft altitude]				
Aircraft	14,919.438	0.623	0.122	14,971.456
Total	**14,919.438**	**0.623**	**0.122**	**14,971.456**
High Seas (>12 nm offshore) [< 3,000 ft altitude]				
Aircraft	8,203.306	0.333	0.067	8,231.524
Total	**8,203.306**	**0.333**	**0.067**	**8,231.524**
> 3,000 ft Altitude				
Aircraft	489,813.914	20.393	4.011	491,519.058
Total	**489,813.914**	**20.393**	**4.011**	**491,519.058**
Combined Alternative 2 + Construction Total	**656,279.403**	**26.844**	**5.303**	**658,530.683**
Increase from No Action Alternative	**61,154.843**	**2.350**	**0.486**	**61,358.307**

Legend: < = less than; > = greater than; CH_4 = methane; CO_2 = carbon dioxide; CO_2e = carbon dioxide equivalent; ft = feet; N_2O = nitrous oxide; nm = nautical miles; U.S. = United States.

4.10 Public Health and Safety

4.10.1 Approach to Analysis

The analysis focuses on the Proposed Action's potential impacts on Tinian to public health and safety from ground training, aviation training and civilian aviation, radio frequency and microwave emissions, natural hazards, construction, and protection of children from environmental health and safety risks. For each of these categories, the subsections below evaluate potential impacts relative to the existing conditions described in Section 3.10, taking into account regulatory standards, established safety protocols, and best management practices as applicable.

The Proposed Action also includes the establishment of a new lease and the reuse of existing facilities, including up to four communication towers at the former USAGM site on Saipan. However, no military training is proposed to occur on Saipan, and public access to the site would remain restricted. Therefore, no impacts to public health and safety are anticipated in association with the Saipan site.

4.10.2 No Action Alternative

Under the No Action Alternative, ground and aviation training events would continue on Tinian with the same or similar types of activities and tempo as described in previous NEPA documents