

## 4.5 NOISE

Section 4.5 addresses the potential noise impacts to the environment from the proposed action. Potential noise impacts can be generated from construction activities and during training operations. This section focuses on the human aspect of noise generated by the proposed action. Other aspects of noise impacts are covered in Section 4.7, *Land and Submerged Land Use*; Section 4.8, *Recreation*; Section 4.9, *Terrestrial Biology*; Section 4.10, *Marine Biology*; Section 4.11, *Cultural Resources*; and Section 4.15, *Socioeconomics*.

### 4.5.1 Approach to Analysis

The following is a summary of the methodology used to analyze the potential noise impacts associated with the proposed action. Specific and more detailed information on methodology is presented in Appendix H, *Noise Study*. This noise analysis addresses changes in the noise environment resulting from the proposed action and uses modeling software to determine the breadth of impacts from audible noise (i.e., sound perceived by human hearing) generated by construction activities and training operations.

Direct impacts are those associated with elevated noise levels that can cause annoyance and/or hearing loss. Indirect noise impacts are those which occur after the noise event such as non-auditory health effects. Studies have been conducted to examine the effects of military noise exposure, focusing primarily on stress response, blood pressure, birth weight, mortality rates, and cardiovascular health. However, results of most of these cited studies are inconclusive, and it cannot be stated that a causal link exists between military noise exposure and the various type of non-auditory health effects that were studied at noise levels below 75 decibels A-weighted day-night average sound levels (Department of Defense Noise Working Group 2013).

Representative points of interest, population numbers, and acres exposed to proposed action noise levels were identified and the results compared to baseline conditions. To determine the population counts, this analysis used aerial photography to count actual houses and the U.S. Census population multiplier for Tinian (Marpo Heights) of 3.77 people per household.

Noise generated by construction and operations at the airfields, in the airspace, and at the training facilities are calculated using different modeling software because different noise metrics apply to the different activities as described in Section 3.5.1. The following summarizes the noise modeling software used for calculating proposed noise levels, and identifies the criteria applied to determine impact significance.

#### 4.5.1.1 Construction

The Federal Highway Administration's Road Construction Noise Model was used for vehicles and equipment to determine noise levels at user specified distances from the source. The U.S. Environmental Protection Agency recommends permissible construction noise levels for residents living adjacent to construction activities. These levels are based on noise averaged over 8- and 24-hour periods. Because daily construction durations are about 8 hours, the limit for 365 days per year exposure is 75 decibels. This 75-decibel exposure recommendation applies when ambient (i.e.,

background) noise levels outside of working hours are less than 60 decibels (as found on Tinian and Pagan); otherwise, the 24-hour standard of 70 decibels is used.

### **4.5.1.2 Operations**

Noise zones (defined in Section 3.5.1) are used by the U.S. military as guidelines for planning on installations and as recommendations for local communities in their planning efforts. While not specifically regulatory standards, zones are used to identify land areas of compatibility and incompatibility (see Table 3.5-1) with noise generated from military activities (Army 2007). Refer to Table 3.5-2, which identifies, by noise zone, land use compatibilities for noise levels generated by military activities, and refer to Table 3.5-3 for the probabilities of risk complaints.

#### **4.5.1.2.1 Ground-Based Operations**

The following noise modeling software was used for calculating proposed noise levels for ground-based operations:

- Small Arms Range Noise Assessment Model (Version 2.6.2003-06-06) calculated live-fire small arms of .50 caliber or less.
- Blast Noise Impact Assessment modeling program (Version 1.3.2003-07-03) modeled live-fire large caliber explosives 20 millimeter or greater.
- Non-live-fire training noise was evaluated on a case-by-case basis using equipment noise data.

For munitions, the significance criterion of 62 decibels C-weighted day-night average sound level scale was applied. Although A- and C-weighted values cannot be combined, the C-weighted criterion correlates well to the A-weighted criterion for determining compatibility with land uses (DoN 2008a). To supplement the discussion of impacts for impulsive ordnance noise (a single noise event), Peak 15 (or Peak) was used to account for the increased risk of noise complaints from people exposed to Peak noise levels exceeding 115 decibels. The low frequency peak noise from large-caliber weapons can be influenced by weather to a much greater extent than other types of noise generating activities. Unfavorable weather is a condition when the wind is blowing from the noise source towards populated areas. Conversely, neutral weather conditions occur when there is little wind and/or the wind is blowing away from populated areas towards the noise source.

#### **4.5.1.2.2 Airfield and Airspace Based Operations**

The following noise modeling software was used for calculating proposed noise levels for aircraft operations:

- NOISEMAP calculated noise levels in the airfield environment at Tinian International Airport, North Field, and the Pagan airfield (Moulton 1990).
- MRNMAP modeled, aircraft-generated noise levels in Special Use Airspace (Lucas 1995).
- Rotorcraft Noise Model was used for rotary-wing Landing Zones, Drop Zones, and general hovering activities (Page et al. 2008).

For aircraft-generated noise at the airfields, landing zones, and airspace, a criterion of 65 decibels A-weighted day-night average sound level scale was used to determine significance (DoN 2008b). Impacts

would be considered significant if sensitive receptors; people living in residential areas and occupying sensitive land uses such as schools and hospitals, were exposed to noise levels in Zones II and III (see Table 3.5-1). The analysis applied herein uses the 65-decibel threshold; however, the Federal Aviation Administration considers a 1.5-decibel increase in noise sensitive areas (e.g., schools, hospitals, and places of worship) over 65 decibels as a significance criterion.

#### **4.5.1.2.3 Traffic**

The following noise modeling software was used for calculating proposed noise levels for traffic operations:

- Traffic on Tinian roads was modeled using the Federal Highway Administration's Traffic Noise Model Version 2.5 (Federal Highway Administration 2004).
- On Pagan, noise generated by vehicles would be negligible and because of the lack of population and relatively few vehicles being proposed for use on Pagan traffic noise was not modeled.

As presented in Section 3.5.1, several noise metrics were used in the modeling and include:

- *A-weighted Scale*. Applied to noise sources such as aircraft, small-caliber weapons, and vehicles.
- *C-weighted Scale*. Measured the low-frequency components of noise and applied to impulsive noise and vibrations generated by explosive charges and large-caliber weapons.
- *Peak 15*. Measured impulsive sounds generated by munitions, explosions, and sonic booms. It represents a single event where the Peak noise level is likely to be exceeded 15% of the time. Peak was also used to gauge the potential risk for receiving complaints and hereafter referred to as Peak.

#### **4.5.1.2.4 Supplemental Noise Metrics**

Supplemental metrics identify potential noise effects from aircraft overflights. These impacts include potential hearing loss, speech interference, classroom interruptions, and sleep disturbance. This approach is taken because noise levels generated by aircraft operations are most likely to affect receptors. According to U.S. Environmental Protection Agency (1974), changes in the hearing level of less than 5 decibels would not be considered noticeable or significant (see Appendix H, *Noise Study* for further explanation). For classroom interruption analysis, a threshold for the indoor background, equivalent noise level of 40 decibels was applied. The equivalent noise level, averaged over the 9 hours of normal school hours (i.e., 8:00 a.m. to 5:00 p.m.) was used for determining classroom disruption. Refer to Appendix H, *Noise Study*, for detailed information on these supplemental noise metrics.

#### **4.5.1.2.5 Occupational Noise**

For occupational noise, the significance level derives from a National Institute for Occupational Safety and Health (Institute) criteria document published in the early 1970s. It recommended an exposure limit of 85 decibels as an 8-hour time-weighted average. This exposure limit was reevaluated in 1998, when the Institute made recommendations that went beyond conserving hearing, by focusing on the prevention of occupational hearing loss. Using a then new risk assessment technique, the Institute published another criteria document which reaffirmed the 85 decibel recommended exposure limit (National Institute for Occupational Safety and Health 1998).

#### **4.5.1.2.6 Underwater Noise**

For underwater noise, there is no set significance level for human receptors. See Section 4.10, *Marine Biology* for significance criteria for marine biological resources.

### **4.5.2 Resource Management Measures**

These resource management measures apply to Tinian because there is a permanent population on Tinian. Pagan does not have a permanent population; therefore, resource management measures to reduce impacts of noise on human populations are not necessary except those for worker safety.

#### **4.5.2.1 Construction**

##### **4.5.2.1.1 Avoidance and Minimization Measures**

- Minimizing night time construction activities to the extent practical.
- A construction perimeter could be set up to prevent recreational divers from being in the vicinity during pile driving activities at Unai Chulu.
- Sequencing work to minimize the number of loud construction equipment when working near residences.

##### **4.5.2.1.2 Best Management Practices and Standard Operating Procedures**

- Assuring all noise muffling equipment is installed and working properly.
- Shutting off idling equipment when not in use.
- Adhering to all Occupational Safety and Health Act noise reduction and hearing protection requirements and regulations.

#### **4.5.2.2 Operation**

##### **4.5.2.2.1 Avoidance and Minimization Measures**

- Limiting night time expenditures of large-caliber weapons use to only 4% of the total planned expenditures.
- Shifting some large-caliber operations from the southernmost firing points to points farther away from Tinian receptors.
- On Tinian, limiting normal departure and arrival procedures to areas over the Military Lease Area to the north of the runway. On occasion, infrequent exceptions may occur and flights may be directed to south of the runway.
- Assuring that operations to the south would occur only in case of a missed approach or during the rare westerly winds when take-offs and landings are oriented to the west.

##### **4.5.2.2.2 Best Management Practices and Standard Operating Procedures**

- Adhering to all Occupational Safety and Health Act noise reduction and hearing protection requirements and regulations.

### **4.5.3 Tinian**

Noise-generating activities associated with the proposed action include construction of support facilities and operation of the RTA. Specifically, operations include training within the Military Lease Area; aircraft activities at Tinian International Airport, North Field, landing zones, and in Special Use Airspace and local airspace; waterborne operations at the port, designated beaches in the Military Lease Area, and in adjacent waters; and heavy- and light-vehicle traffic between the port and airport and the Military Lease Area.

Construction, aircraft noise, waterborne noise, traffic, and occupational noise impacts are similar among the three alternatives. Noise generated by live-fire weapons varies by alternative because of the different locations of some training facilities (e.g., Battle Area Complexes). The following is a synopsis of the impact analysis; refer to Appendix H, *Noise Study*, for the specific data input used and the results generated by the noise modeling.

#### **4.5.3.1 Tinian Alternative 1**

##### **4.5.3.1.1 Construction Impacts**

###### **4.5.3.1.1.1 On Land**

Noise modeling from construction activities used the A-weighted scale, and determined the noise levels by identifying the type of equipment and how long it would run. Earth-moving equipment (e.g., graders, excavators, dozers) and impact devices (e.g., pile drivers and jackhammers) are examples of heavy (large) equipment that would be used for construction. Smaller construction equipment includes generators, concrete saws, and compressors. Equipment and other construction activities typically generate noise levels ranging from 70 to 90 decibels at a distance of 50 feet (15 meters), see Appendix H, *Noise Study* (see Table 2.4-1) for specific equipment noise levels (U.S. Department of Transportation 2006). Noise modeling of construction activities averaged noise levels over 1 hour, assumed consistent equipment numbers throughout the workday, and that the equipment operated in the same location.

RTA construction and improvement activities within the Military Lease Area are too distant to generate elevated noise levels outside of its boundaries. Therefore, construction noise levels would not be detectable in any residential areas on Tinian.

At Tinian International Airport, noise generated from military airport facilities and infrastructure construction and improvement activities may be perceptible to residents of San Jose. Assuming 20 pieces of construction equipment would be active in one general location and at the same time, noise levels of 82 decibels at 100 to 500 feet (30 to 152 meters) from the airport construction site would be generated. The nearest point of interest is Tinian Middle/High School, located about 6,400 feet (1,950 meters) from the proposed construction area. Noise levels at the school would be 49 decibels, far below the significance criterion of 65 decibels.

At the Port of Tinian, proposed improvement activities would occur closer to San Jose, thereby increasing the potential to expose the population to construction-related noise; however, port improvement activities could generate noise levels no greater than 65.6 decibels at the nearest residents in the port area, still within acceptable levels of noise. Construction noise impacts would be compatible with residential areas, and would not affect schools, places of worship, or hospitals (i.e., sensitive receptors). Therefore, construction noise levels on land would be less than significant.

#### **4.5.3.1.1.2 Underwater**

Noise would be caused by shore-based construction equipment dredging the nearshore substrate at Unai Chulu to construct an in-water landing ramp for Amphibious Assault Vehicles. The dredging would require the use of a crane dredge and an excavator. Sheet piles would be driven to create a causeway for access and steel piles would be driven to build a temporary trestle for the dredging equipment. No blasting would be required. The duration for the proposed construction could take approximately 8 months.

Comparative operations that measured dredging noise with a limestone bottom were used to estimate dredging noise levels. The highest typical in-water noise levels for excavation dredging of limestone material measured a root mean squared noise at 179 decibels referenced to 1 micro Pascal at 3 feet (1 meter) (Reine et al. 2014). Underwater noise is based upon sound pressure levels with a base reference pressure of 1 micro Pascal. This differs from airborne noise that references 20 micro Pascal, thus in-water noise is expressed as “decibels referenced to 1 micro Pascal.” Estimated noise levels for either a 24 inch (0.6 meter) steel pipe or 24 inch (0.6 meter) sheet pile using recent measurements from other projects for impact pile driving indicate Sound Exposure Levels of approximately 190 decibels referenced to 1 micro Pascal at 33 feet (10 meters) and approximately 177 decibels referenced 1 micro Pascal root mean squared (Illinworth and Rodkin 2007). Vibratory pile driving of steel sheet piles yielded noise level results 25-30 decibels quieter than impact pile driving.

Underwater noise would not affect human receptors and a perimeter would be established to prevent recreational divers from entering areas of high in-water noise levels. Therefore, noise impacts to human receptors due to in-water construction would be less than significant.

Refer to Section 4.10, *Marine Biology* for information on noise effects to marine biological resources.

#### **4.5.3.1.2 Operation Impacts**

Training operations generate two different noise types: higher frequency from small-caliber munitions and lower frequency from large-caliber ordnance, explosives, and artillery blasts. For small-caliber weapons use, as well as aircraft and vehicle operations, the A-weighted scale was applied. The C-weighted scale was used to model impulsive noise generated by explosions and large-caliber weapons. Peak was applied to single-event percussive events generated by small- and large-caliber weapons. As noted in Section 3.5 and in Appendix H, *Noise Study*, a 10-decibel penalty was applied to operations occurring during nighttime hours, between 10:00 p.m. and 7:00 a.m.

#### 4.5.3.1.2.1 Ground-Based Operations

##### *Small-caliber Weapons*

The small-caliber weapons proposed for use include .50 caliber and smaller caliber. Training facilities supporting small-caliber weapons would generate 5,049,643 rounds fired annually (see Appendix H, *Noise Study*; Table 6.2-1). [Figure 4.5-1](#) presents Tinian Alternatives 1, 2, and 3 A-weighted day-night average sound level contours and [Figure 4.5-2](#) illustrates Peak sound levels generated by small arms (Army Public Health Command 2014).

[Table 4.5-1](#) provides the area and population affected by small-caliber weapons noise in A-weighted day-night average sound levels and [Table 4.5-2](#) provides Peak noise levels. All three alternatives generate similar average noise levels, and are presented together for easy comparison of acres and population affected. However, single-event noise levels at representative points of interest can still vary among the alternatives. Representative points of interest exposed to small-caliber weapons noise levels because of Tinian Alternative 1 operations are presented in [Table 4.5-3](#). Schools were identified to evaluate potential effects to children and non-school points of interest were identified to evaluate noise effects to people and locations.

For Tinian Alternative 1, small-caliber (A-weighted) noise generated within the Military Lease Area would potentially expose 5,553 acres (2,247 hectares) in Zones II and III, but no residential population would be affected. Also within the Military Lease Area, two points of interest would be exposed to Noise Zone II or III levels: Mount Lasso Overlook and the Bateha Isolated Wetlands. However, the public would not be exposed to these noise levels because public access would be prohibited when the RTA is operational. Noise levels outside the Military Lease Area would be less than 50 decibels A-weighted, compatible with land uses.

For Peak noise exposure from Tinian Alternative 1, six points of interest within the Military Lease Area would be exposed to Noise Zone III, but exposure would be considered compatible with exposed land uses because these points are military facilities, other non-human resources, or are recreational sites where access during RTA training operations would be restricted. Therefore, the public would not be exposed to Noise Zone III levels. Outside the Military Lease Area, noise generated by small-caliber weapons from Tinian Alternative 1 operations would affect neither people nor lands on Tinian or Saipan.

Outside of the Military Lease Area, land uses exposed to A-weighted day-night average sound levels would be considered compatible. Small-caliber Peak noise levels would also be considered compatible. Therefore, Tinian Alternative 1 operations would result in less than significant direct and indirect noise impacts from small-caliber weapons use.

**Table 4.5-1. Area and Population on Tinian Affected by Small-caliber Weapons Noise for All Tinian Alternatives(A-weighted)**

Zone	Noise Levels (in decibels)	Acres/Hectares		
		Alternative 1	Alternative 2	Alternative 3
<b>Within the Military Lease Area</b>				
II	65 – 69	2,532/1,025	2,696/1,091	2,914/1,179
	70 – 74	1,459/590	1,769/716	1,645/666
III	75 – 79	693/280	862/349	810/328
	80 – 84	444/180	570/231	533/216
	85+	425/172	530/214	548/222
<b>Total</b>		<b>5,553/2,247</b>	<b>6,427/2,601</b>	<b>6,444/2,610</b>
<b>Area and Population Outside the Military Lease Area</b>				
II	65 – 69	0/0 and 0 population all alternatives		
	70 – 74			
III	75 – 79	0/0 and 0 population all alternatives		
	80 – 84			
	85+			
<b>Total</b>		<b>0/0</b>	<b>0/0</b>	<b>0/0</b>
<b>Off Shore</b>				
Zones Not Applicable	65 – 69	15/6	15/6	15/6
	70 – 74	12/5	12/5	12/5
	75 – 79	5/2	5/2	5/2
	80 – 84	2/1	2/1	2/1
	85+	2/1	2/1	2/1
<b>Total</b>		<b>36/15</b>	<b>36/15</b>	<b>36/15</b>

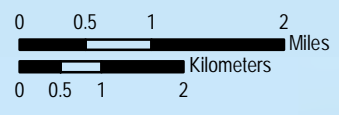
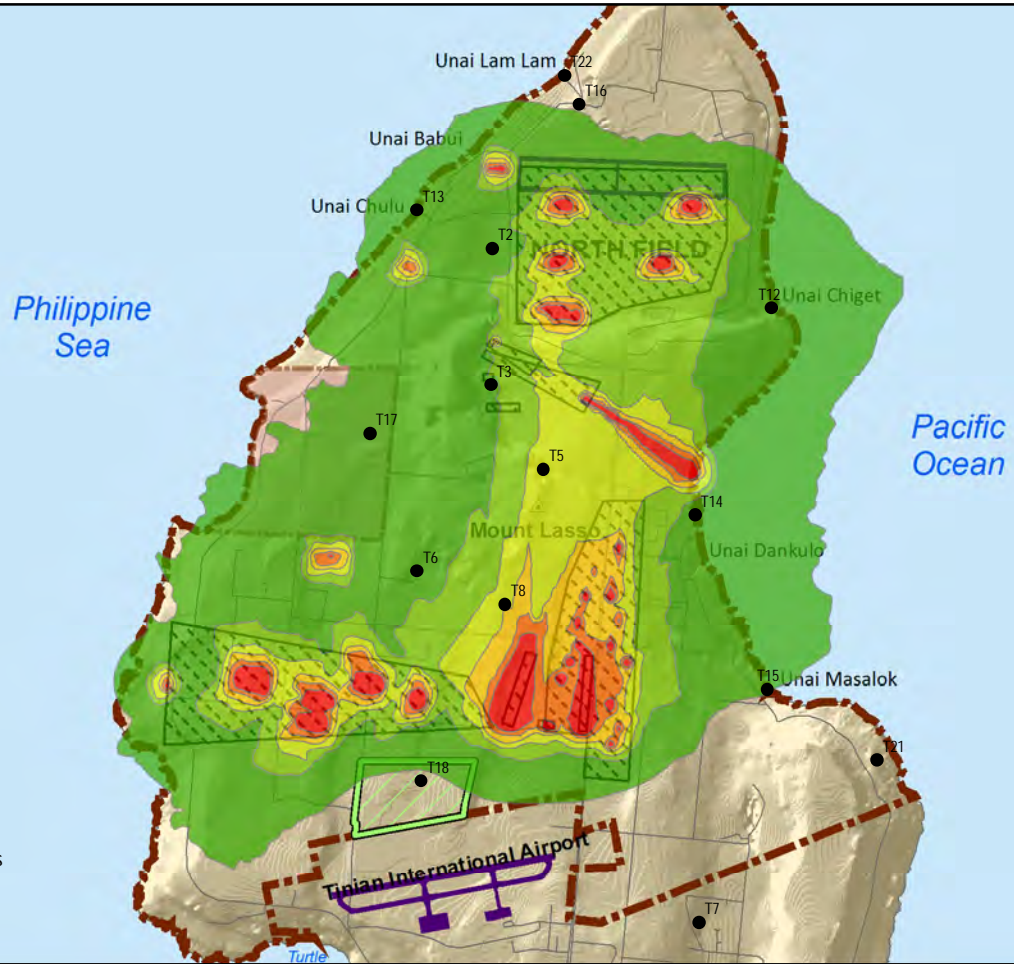
**Table 4.5-2. Area and Population on Tinian Affected by Small-caliber Weapons Noise for All Tinian Alternatives (Peak)**

Noise Levels (in decibels)	Acres/Hectares		
	Alternative 1	Alternative 2	Alternative 3
<b>Within the Military Lease Area</b>			
<b>Zone II</b>			
87-104	7,897/3,196	6,010/2,432	6,422/2,599
<b>Zone III</b>			
>104	6,898/2,792	9,032/3,655	8,623/3,490
<b>Total Zones II and III</b>	<b>14,795/5,988</b>	<b>15,042/6,087</b>	<b>15,045/6,089</b>
<b>Area and Population Outside the Military Lease Area</b>			
<b>Zone II</b>			
87-104	411/166 0 population	600/243 0 population	600/243 0 population
<b>Zone III</b>			
>104	0/0	0/0	0/0
<b>Total Zones II and III</b>	<b>411/166</b>	<b>600/243</b>	<b>600 /243</b>
<b>Off Shore</b>			
87-104	26,025/10,532	28,362/11,478	27,316/11,054
>104	607/246	492/199	672/272
<b>Total</b>	<b>26,632/10,788</b>	<b>28,854/11,677</b>	<b>27,988/11,326</b>

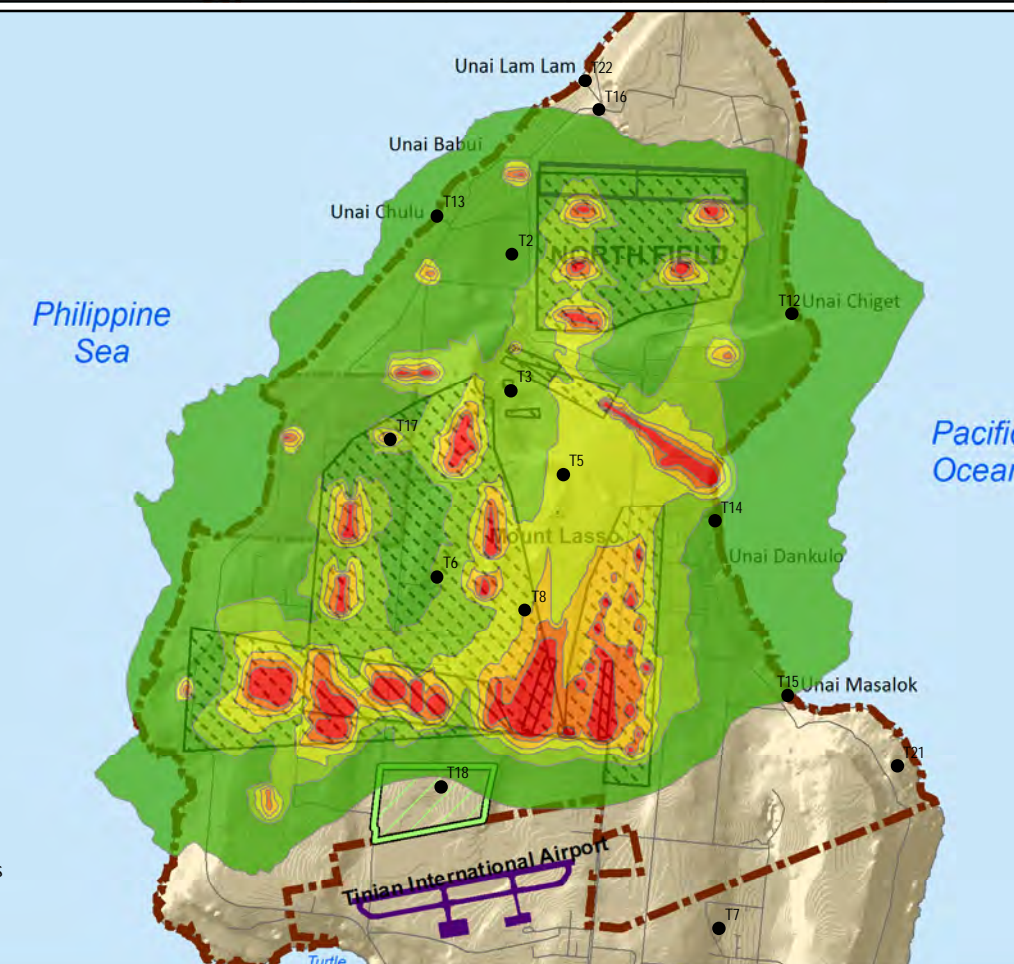


Representative Points of Interest	
T1	Tinian High School
T2	Lake Hagoi
T3	Mahalang Ephemeral Ponds
T4	Marpo Heights
T5	Mount Lasso / Overlook Area
T6	Bateha 1 - Isolated Wetlands
T7	Northeast of Marpo Heights
T8	Bateha 2 - Isolated Wetlands
T9	San Jose
T10	San Jose Catholic Church
T11	Tinian Elementary School
T12	Unai Chiget
T13	Unai Chulu
T14	Unai Dankulo
T15	Unai Masalok
T16	North Field National Historic Landmark
T17	International Broadcasting Bureau
T18	Proposed Base Camp (Old West Field)
T19	Northern Marianas College - Tinian
T20	Ushi Point
T21	Native Limestone Forest
T22	Unai Lam Lam

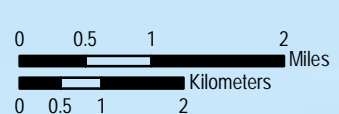
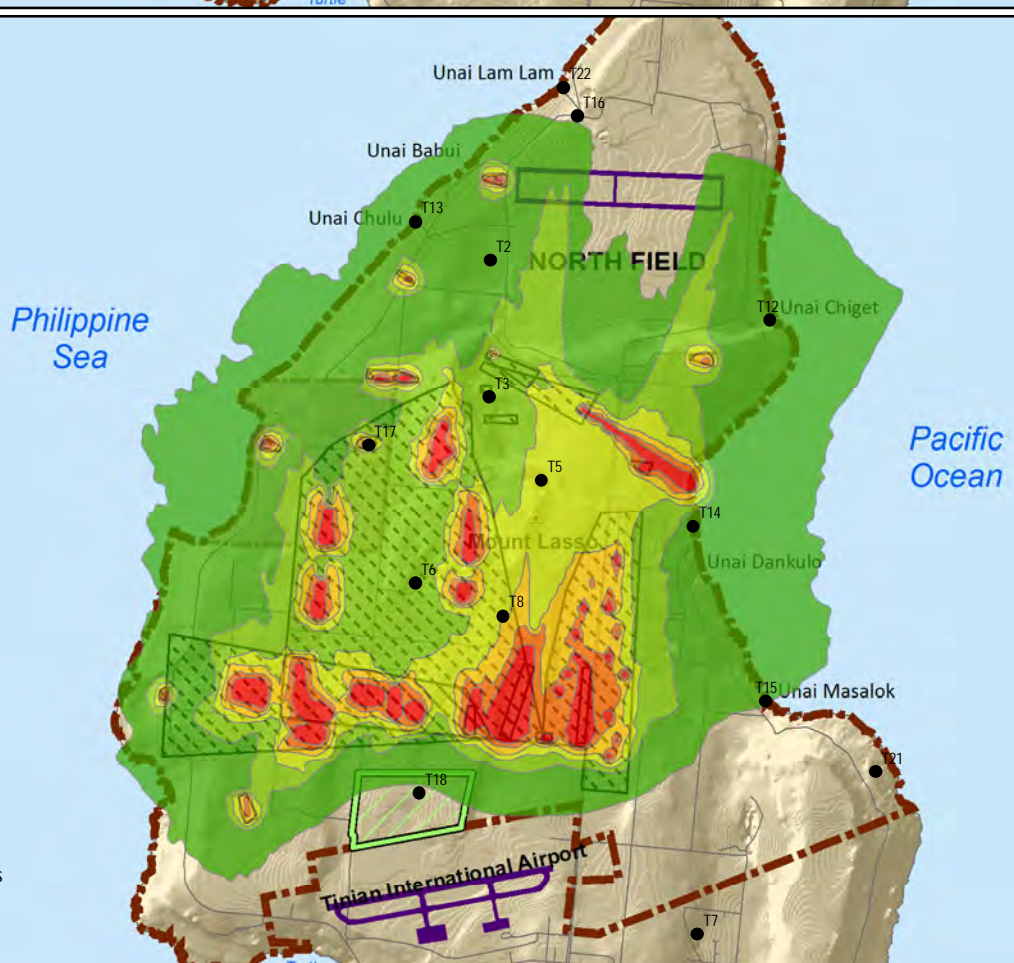
Alternative 1



Alternative 2



Alternative 3



**Legend**

- Points of Interest
- ▲ Mount Lasso
- ▭ Base Camp
- ▨ Range Areas
- ▭ Military Lease Area
- ▭ International Broadcasting Bureau (IBB)

**Decibels, A-Weighted Day-Night Average Sound Level**

Zone I  
55 - 64

Zone II  
65 - 69

Zone III  
70 - 74

75 - 79

80 - 84

>85

Figure 4.5-1. All Tinian Alternatives Small-Caliber Weapons Noise Levels (A-weighted)



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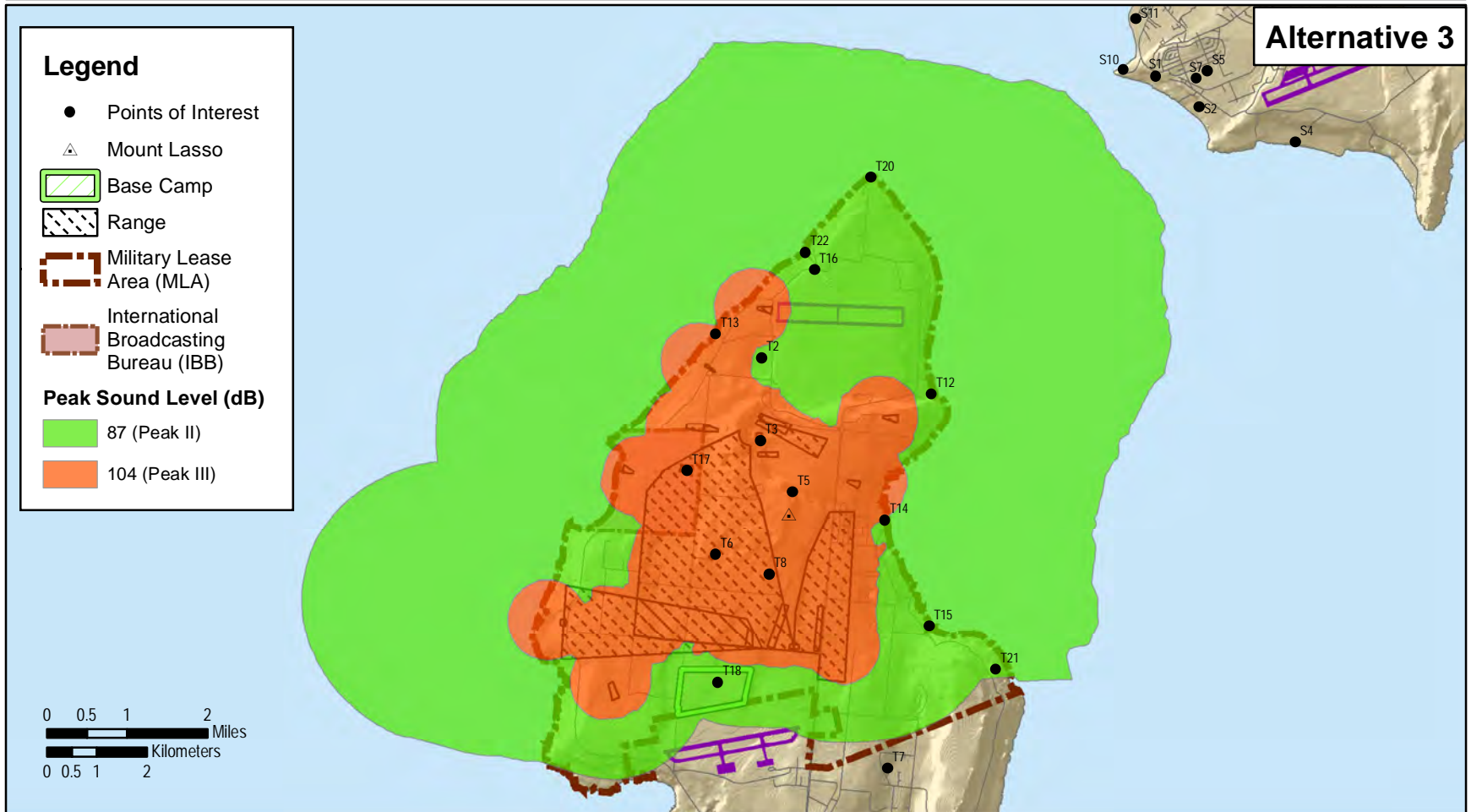


Figure 4.5-2. All Tinian Alternatives Small-Caliber Weapons Noise Levels (Peak)



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**Table 4.5-3. Tinian Alternative 1 Representative Points of Interest on Tinian Affected by Small-caliber Weapons Noise (A-weighted and Peak)**

Point of Interest (POI)			A-Weighted Day-Night Average Sound Levels (ADNL)			Peak		
Identification Number	Description	Type	Decibel	Zone	POI Conflict	Decibel	Zone	POI Conflict
T1	Tinian High School	School	< 50	I	No	< 80	I	No
T2	Lake Hagoi	Other	63	I	NA	108	III	NA
T3	Mahalang Ephemeral Ponds	Other	63	I	NA	102	II	NA
T4	Marpo Heights	Residential	< 50	I	No	< 80	I	No
T5	Mount Lasso Overlook Area	Other	71	II	NA	106	III	NA
T6	Bateha 1 - Isolated Wetlands	Other	63	I	NA	105	III	NA
T7	Northeast of Marpo Heights	Residential	< 50	I	No	83	I	No
T8	Bateha 2 - Isolated Wetlands	Other	75	III	NA	108	III	NA
T9	San Jose	Residential	< 50	I	No	< 80	I	No
T10	San Jose Catholic Church	Church	< 50	I	No	< 80	I	No
T11	Tinian Elementary School	School	< 50	I	No	< 80	I	No
T12	Unai Chiget	Other	60	I	NA	96	II	NA
T13	Unai Chulu	Other	61	I	NA	106	III	NA
T14	Unai Dankulo	Other	64	I	NA	104	III	NA
T15	Unai Masalok	Other	55	I	NA	96	II	NA
T16	North Field National Historic Landmark	Other	55	I	NA	98	II	NA
T17	International Broadcasting Bureau	Administrative	57	I	NA	95	II	No
T18	Proposed Base Camp (Old West Field)	Transient Lodging	54	I	NA	92	II	No
T19	Northern Marianas College	School	< 50	I	No	< 80	I	No
T20	Ushi Point	Other	< 50	I	NA	97	II	NA
T21	Native Limestone Forest	Other	< 50	I	NA	91	II	NA
T22	Unai Lam Lam	Other	54	I	NA	95	II	NA

Notes: Shading denotes POIs inside the Military Lease Area

<sup>1</sup>Other includes sites with cultural, biological, historical, or recreational concerns that are not related to human factors such as health or annoyance and will be addressed in the applicable resource section of this EIS/OEIS.

<sup>2</sup>Noise level threshold is 50 decibels A-weighted day-night average sound level (or decibel ADNL).

<sup>3</sup>U.S. military small-caliber decibel ADNL Noise Zones defined as: Zone III (75-79 decibel ADNL; 80-84 decibel ADNL; > 85 ADNL), Zone II (65-69 decibel ADNL; 70-74 decibel ADNL), and Zone I (< 55 decibel ADNL; 55-64 decibel ADNL).

Legend: NA = not applicable, see annotation number 1.

Source: Army Public Health Command 2014.

### Large-caliber Weapons

Large-caliber weapons proposed under Tinian Alternative 1 include: live hand grenades, mortars, howitzers, tanks, and amphibious assault vehicles. Under Tinian Alternative 1, 101,135 large-caliber rounds of ground-delivered munitions and an additional 50,000 large-caliber rounds of air-delivered

munitions would be fired in an average year. Large-caliber weapons use during the nighttime hours of 10:00 p.m. to 7:00 a.m. constitutes only 4% of total munitions expended. Large-caliber artillery firing points would be located primarily at the north end of the Military Lease Area and near the proposed base camp (i.e., away from populated areas outside the Military Lease Area). As presented in [Table 4.5-4](#) and illustrated in [Figure 4.5-3](#), while three alternatives are proposed, C-weighted noise results would be identical for population affected, but vary slightly in the number of acres impacted. On Tinian, the acreage differences lie completely within the Military Lease Area or off shore. No areas on Saipan would be exposed to C-weighted day-night average sound levels in Noise Zones II or III.

**Table 4.5-4. Area and Population on Tinian and Saipan Affected by Large-caliber Weapons Noise for All Tinian Alternatives (C-weighted)**

Noise Levels (in decibels)	Acres/Hectares				Population <sup>1</sup>	
	Tinian Military Lease Area	Tinian Non-Military Lease Area	Off Shore	Saipan	Tinian	Saipan
<b>Tinian Alternative 1</b>						
<b>Noise Zone II</b>						
62-70	5,644/2,284	1,300/526	27,681/11,202	0/0	0/0	0/0
<b>Noise Zone III</b>						
>70	8,861/3,586	0/0	2,557/1,035	0/0	0/0	0/0
<b>Total</b>	<b>14,505/5,870</b>	<b>1,300/526</b>	<b>30,238/12,237</b>	<b>0/0</b>	<b>0/0</b>	<b>0/0</b>
<b>Tinian Alternative 2</b>						
<b>Noise Zone II</b>						
62-70	6,045/2,446	1,267/513	26,369/10,671	0/0	0/0	0/0
<b>Noise Zone III</b>						
>70	8,599/3,480	0/0	2,322/940	0/0	0/0	0/0
<b>Total</b>	<b>14,644/5,870</b>	<b>1,267/513</b>	<b>28,691/11,611</b>	<b>0/0</b>	<b>0/0</b>	<b>0/0</b>
<b>Tinian Alternative 3</b>						
<b>Noise Zone II</b>						
62-70	5,986/2,422	1,300/526	26,559/10,748	0/0	0/0	0/0
<b>Noise Zone III</b>						
>70	8,680/3,513	0/0	2,338/946	0/0	0/0	0/0
<b>Total</b>	<b>14,666/5,935</b>	<b>1,300/526</b>	<b>28,897/11,694</b>	<b>0/0</b>	<b>0/0</b>	<b>0/0</b>

Note: <sup>1</sup>Population on Tinian is outside Military Lease Area on Non-Military Lease Area lands.

Source: Army Public Health Command 2014.

In terms of risk of complaints, large-caliber Peak noise levels, when neutral weather conditions persist (as illustrated on [Figure 4.5-4](#) and shown in [Table 4.5-5](#)), would expose 521 acres (211 hectares) outside of Military Lease Area boundaries to Peak noise conditions of 115 decibels. This would have the potential for increased risk of complaints (i.e., people may be annoyed and complain about noise generated within the RTA). No areas on Saipan would be exposed under neutral weather conditions. However, under unfavorable weather conditions (as illustrated in [Figure 4.5-5](#) and listed in [Table 4.5-6](#)), population and areas exposed to increased risk of complaints increases to 1,223 people (80 on Tinian and 1,143 on Saipan) exposed to Peak noise levels of 115 decibels under Tinian Alternative 1. Although the affected population would be the same for all alternatives, the acres affected under Tinian Alternatives 2 and 3 vary slightly.

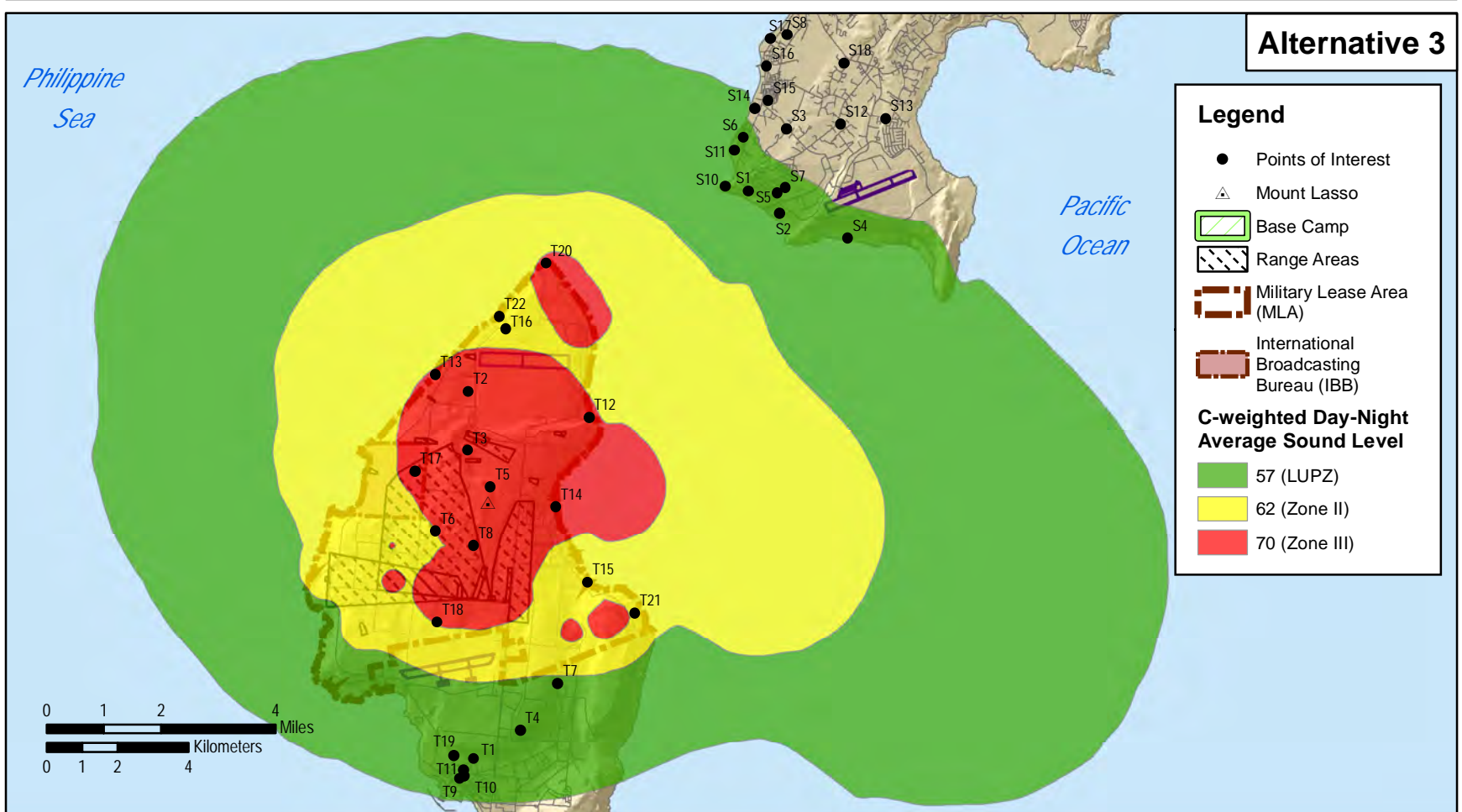
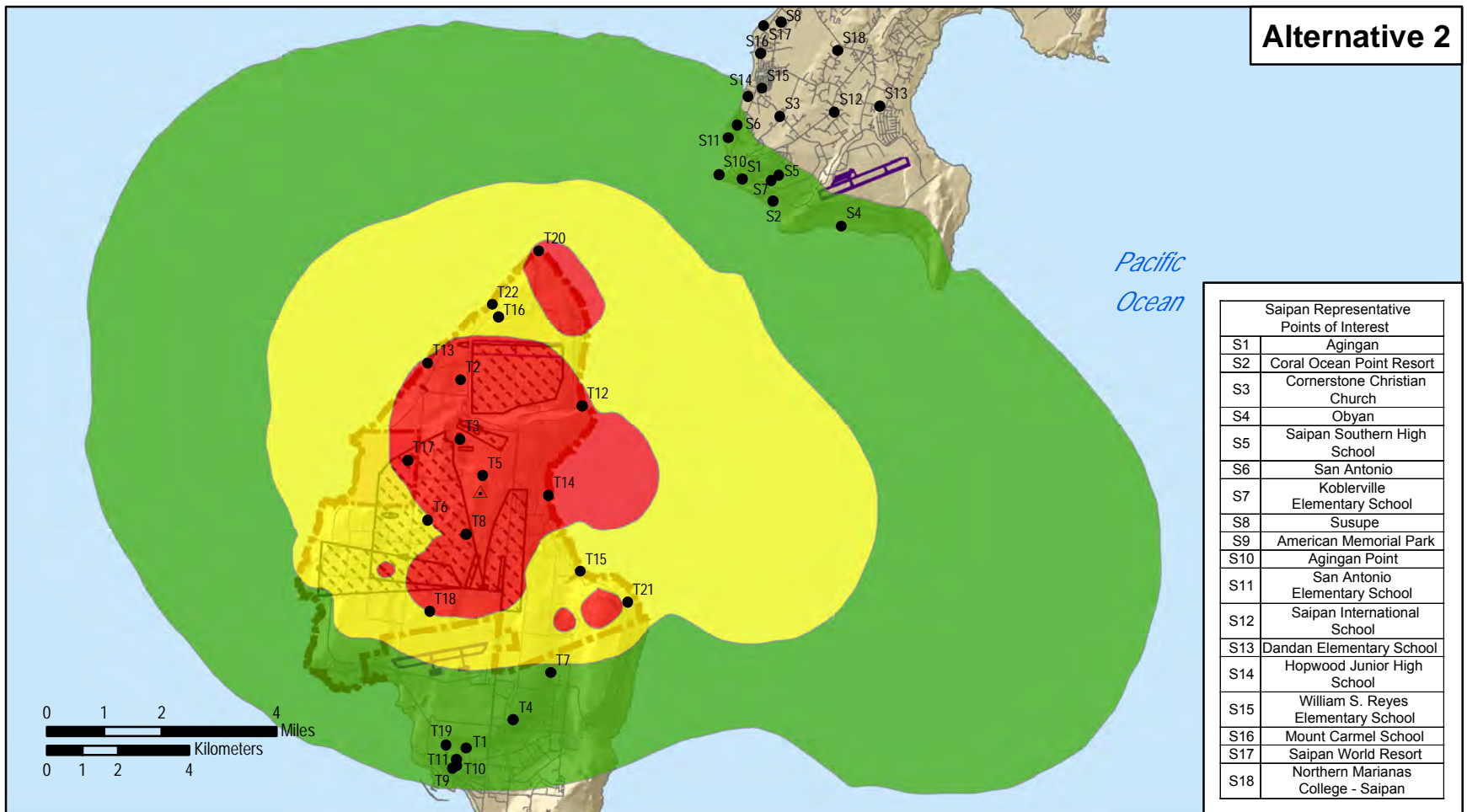
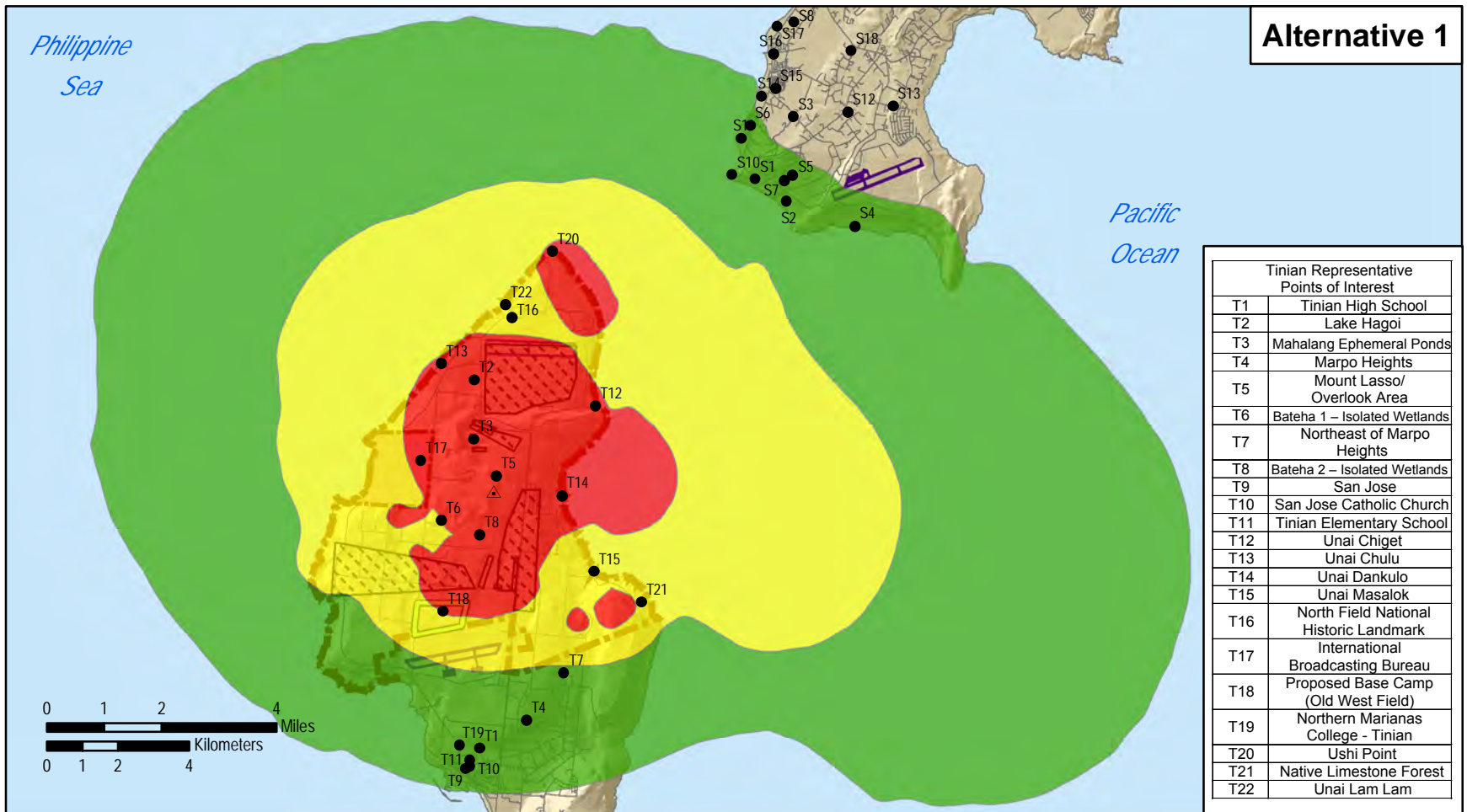


Figure 4.5-3. All Tinian Alternatives Large-Caliber Weapons Noise Levels (C-weighted)



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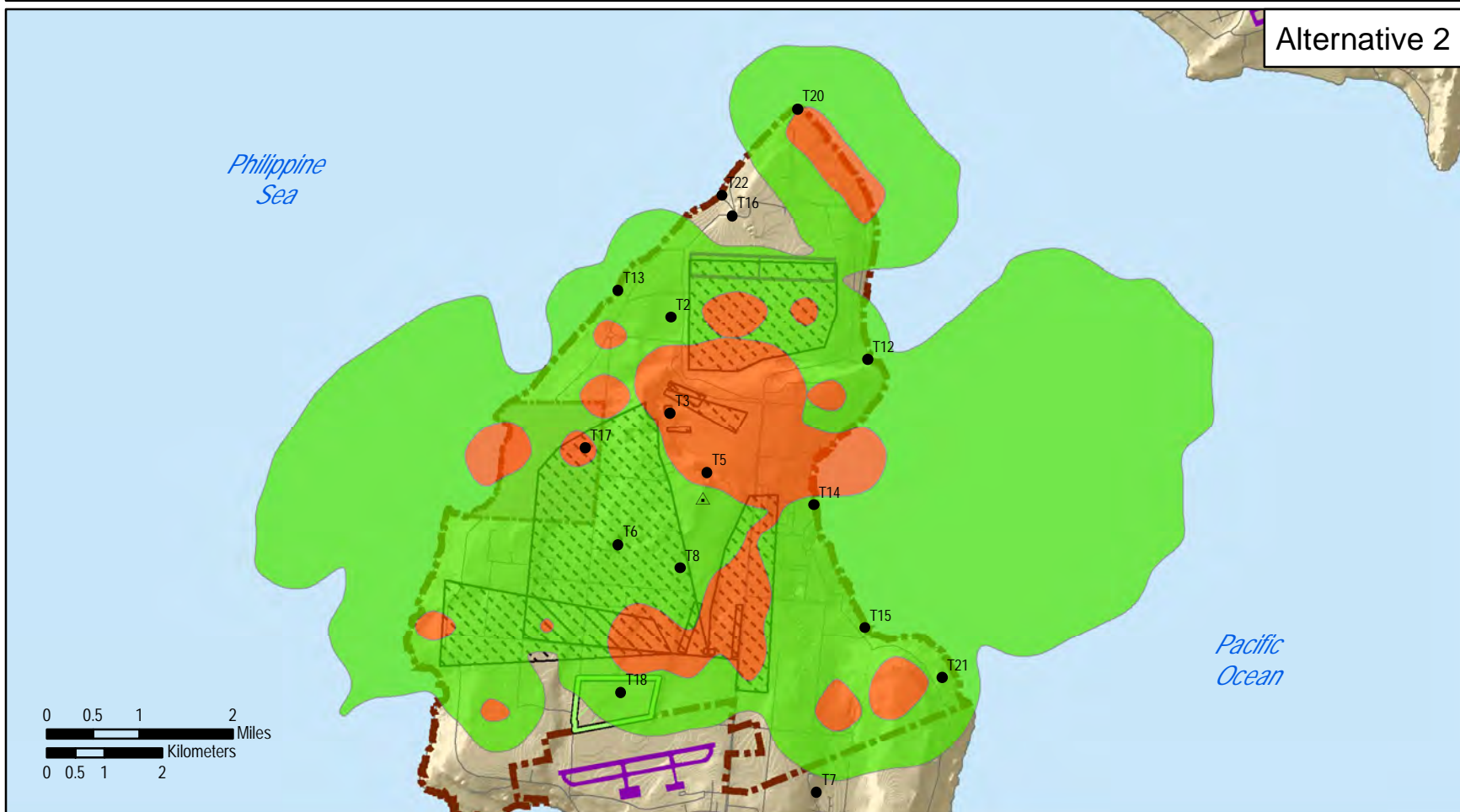
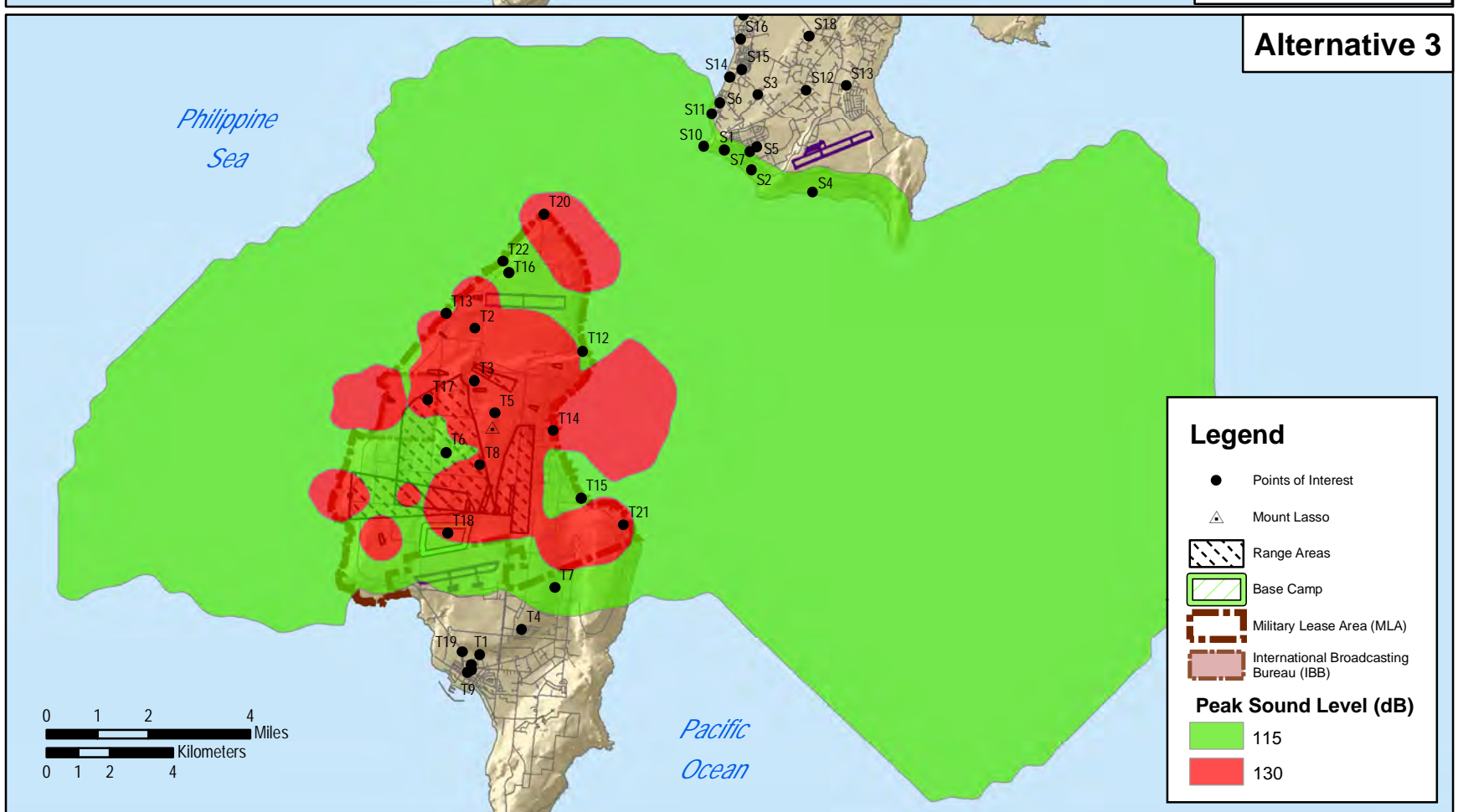
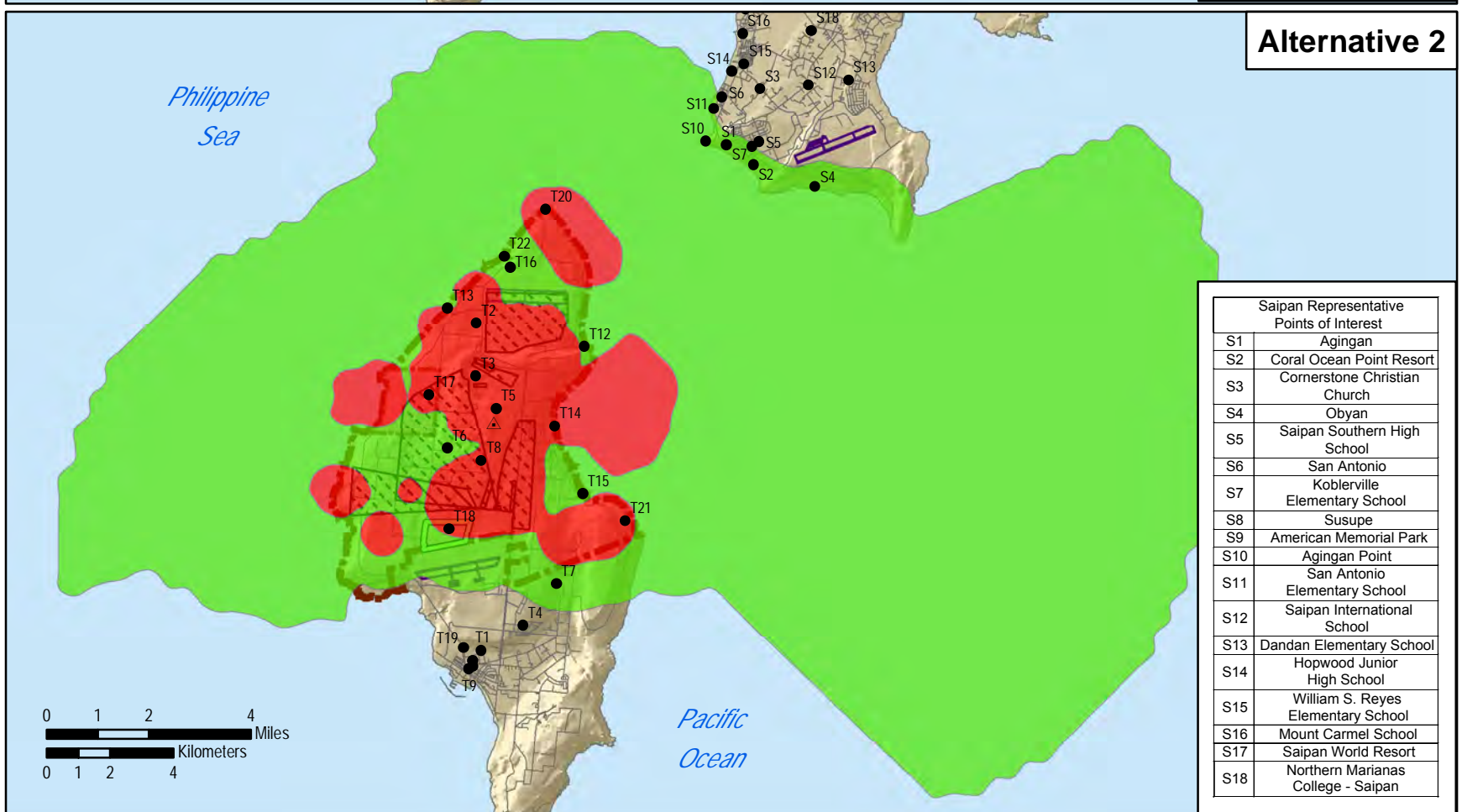
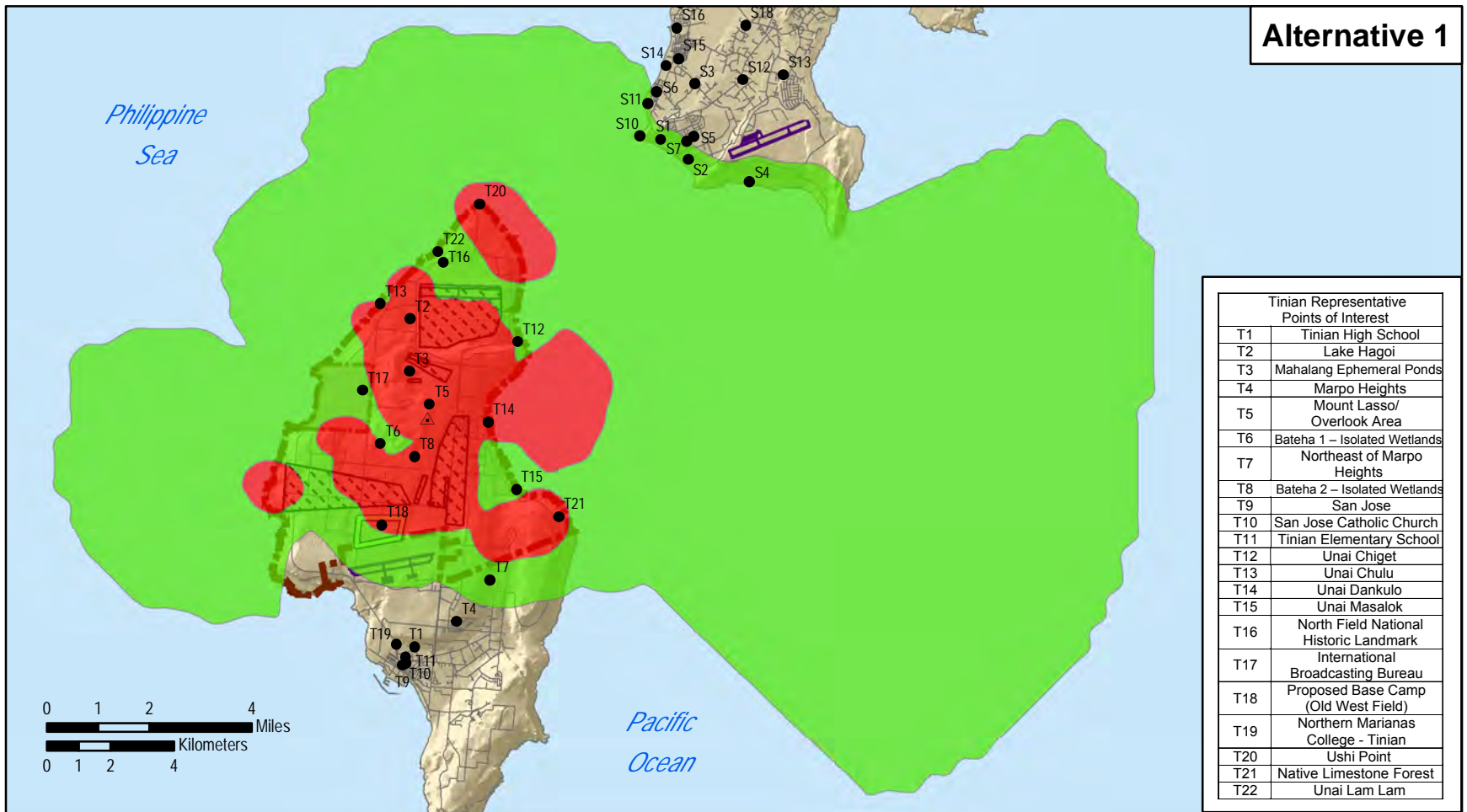


Figure 4.5-4. All Tinian Alternatives Large-Caliber Peak Noise Levels under Neutral Weather Conditions (Peak)



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**Figure 4.5-5. All Tinian Alternatives Large-Caliber Peak Noise under Unfavorable Weather Conditions (Peak)**



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**Table 4.5-5. Area and Population on Tinian and Saipan Affected by Large-caliber Weapons Noise - Risk Complaint Neutral Weather for All Tinian Alternatives (Peak)**

Peak Noise Levels (in decibels)	Acres/Hectares						Population	
	Alternative 1		Alternative 2		Alternative 3		All Action Alternatives	
	Tinian	Saipan	Tinian	Saipan	Tinian	Saipan	Tinian	Saipan
<b>Off shore</b>								
115	11,582/4,687		15,115/2,070		15,115/2,070		NA	NA
130	408/165		552/223		547/221		NA	NA
<b>Total</b>	<b>11,990/4,852</b>		<b>15,667/2,293</b>		<b>15,662/2,291</b>		<b>NA</b>	<b>NA</b>
<b>On Shore</b>								
<b>Within the Military Lease Area</b>								
115	8,592/3,477	0	9,902/4,007	0	10,157/4,110	0	0	0
130	3,669/1,485	0	3,938/1,594	0	3,683/1,490	0	0	0
<b>Total</b>	<b>12,261/4,962</b>	<b>0</b>	<b>13,840/5,601</b>	<b>0</b>	<b>13,840/5,600</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Outside the Military Lease Area</b>								
115	521/211	0	521/211	0	519/210	0	0	0
130	0	0	0	0	0	0	0	0
<b>Subtotal</b>	<b>521/211</b>	<b>0</b>	<b>521/211</b>	<b>0</b>	<b>519/210</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Total</b>	<b>12,782/5,173</b>		<b>14,361/5,812</b>		<b>14,359/5,810</b>		<b>0</b>	

**Table 4.5-6. Area and Population on Tinian and Saipan Affected by Large-caliber Weapons Noise - Risk Complaint Unfavorable Weather for All Tinian Alternatives (Peak)**

Peak Noise Levels (in decibels)	Acres/Hectares						Population	
	Alternative 1		Alternative 2		Alternative 3		All Alternatives	
	Tinian	Saipan	Tinian	Saipan	Tinian	Saipan	Tinian	Saipan
<b>Off shore</b>								
115	105,272/42,602		111,014/44,926		111,014/44,926		NA	NA
130	4,518/1,828		5,233/2,118		5,223/2,114		NA	NA
<b>Total</b>	<b>109,790/44,430</b>		<b>116,247/47,044</b>		<b>116,237/47,040</b>		<b>NA</b>	<b>NA</b>
<b>On Shore</b>								
<b>Within the Military Lease Area</b>								
115	4,884/1,976	NA	5,032/2,036	0	5,074/2,053	0	0	0
130	9,879/3,998	NA	10,201/4,128	0	10,159/4,111	0	0	0
<b>Total</b>	<b>14,763/5,974</b>	<b>NA</b>	<b>15,233/6,164</b>	<b>0</b>	<b>15,233/6,164</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Outside the Military Lease Area</b>								
115	2,297/930	1,552/628	2,399/970	1,552/628	2,398/970	1,552/628	80	1,143
130	130/53	0	130/53	0	130/53	0	0	0
<b>Subtotal</b>	<b>2,427/983</b>	<b>1,552/628</b>	<b>2,529/1,023</b>	<b>1,552/628</b>	<b>2,528/1,023</b>	<b>1,552/628</b>	<b>80</b>	<b>1,143</b>
<b>Total</b>	<b>18,742/7,585</b>		<b>19,314/7,816</b>		<b>19,313/7,815</b>		<b>1,223</b>	

Table 4.5-7 presents the Tinian points of interest exposed to large-caliber C-weighted day-night average sound levels and Table 4.5-8 presents the same information for Saipan. No incompatibilities with residential land uses or other points of interest outside the Military Lease Area on Tinian or Saipan would be exposed to C-weighted day-night average sound levels exceeding 65 decibels. Several points of interest within the Military Lease Area would be exposed to Noise Zone III levels; however, these levels would be considered compatible with exposed land uses because these points are military tactical training facilities, other non-human resources, or recreational areas where public access would be

restricted during those times that large-caliber weapon noise would be generated. Under Alternative 1, the International Broadcast Bureau facility would be exposed to noise levels of 72 decibels C-weighted day-night average sound level. These levels would not pose risks to workers because they are below Occupational Safety and Health standards. They are outdoor levels and most employees work indoors. In addition, the facility is considered industrial and would be compatible with these noise levels.

**Table 4.5-7. Representative Points of Interest on Tinian Affected by Large-caliber Weapons Noise under All Tinian Alternatives (C-weighted)**

Point of Interest (POI)			C-weighted Day-Night Average Sound Levels (CDNL)		
Identification Number	Description	Type <sup>1</sup>	Decibel	Zone <sup>2</sup>	POI Conflict
T1	Tinian High School	School	58	LUPZ	No
T2	Lake Hagoi	Other	77	III	NA
T3	Mahalang Ephemeral Ponds	Other	89	III	NA
T4	Marpo Heights	Residential	59	LUPZ	No
T5	Mount Lasso Overlook Area	Other	85	III	NA
T6	Bateha 1 - Isolated Wetlands	Other	70	III	NA
T7	Northeast of Marpo Heights	Residential	61	LUPZ	No
T8	Bateha 2 - Isolated Wetlands	Other	71	III	NA
T9	San Jose	Residential	58	LUPZ	No
T10	San Jose Catholic Church	Church	58	LUPZ	No
T11	Tinian Elementary School	School	58	LUPZ	No
T12	Unai Chiget	Other	72	III	NA
T13	Unai Chulu	Other	71	III	NA
T14	Unai Dankulo	Other	78	III	NA
T15	Unai Masalok	Other	66	II	NA
T16	North Field National Historic Landmark	Other	68	II	NA
T17	International Broadcasting Bureau	Administrative	72	III	No <sup>3</sup>
T18	Proposed Base Camp (Old West Field)	Transient Lodging	70	III	No <sup>4</sup>
T19	Northern Marianas College - Tinian	School	58	LUPZ	No
T20	Ushi Point	Other	73	III	NA
T21	Native Limestone Forest	Other	67	II	NA
T22	Unai Lam Lam	Other	67	II	NA

Notes: Shading denotes POIs inside the Military Lease Area

Noise levels are similar for all three alternatives only T8 and T18 varied by 1 decibel.

<sup>1</sup>Other includes sites with cultural, biological, historical, or recreational concerns that are not related to human factors such as health or annoyance and will be addressed in the applicable resource section of this EIS.

<sup>2</sup>Demolition and large caliber Noise Zones defined as: Land Use Planning Zone (LUPZ) (57-62 decibel CDNL); Zone I (<62 decibel CDNL); Zone II (62-70 decibel CDNL); and Zone III (>70 decibel CDNL). See Section 3.5.1 for more details on Land Use noise zones.

<sup>3</sup>No = This is not classified as a noise-sensitive land use because it is of an industrial nature.

<sup>4</sup>No = This is not classified as a noise-sensitive land use because it is considered a tactical training location.

Legend: NA = not applicable, see annotation number 1.

Source: Army Public Health Command 2014.

**Table 4.5-8. Representative Points of Interest on Saipan  
Affected by Large-caliber Weapons Noise under All Tinian Alternatives (C-weighted)**

Point of Interest (POI)			C-weighted Day-Night Average Sound Levels (CDNL)		
Identification Number	Description	Type <sup>1</sup>	Decibel	Zone <sup>2</sup>	POI Conflict
S1	Agingan	Residential	59	LUPZ	No
S2	Coral Ocean Point Resort	Resort	59	LUPZ	No
S3	Cornerstone Christian Church	Church	56	I	No
S4	Obyan	Residential	59	LUPZ	No
S5	Saipan Southern High School	School	58	LUPZ	No
S6	San Antonio	Residential	58	LUPZ	No
S7	Koblerville Elementary School	School	59	LUPZ	No
S8	Susupe	Residential	55	I	No
S9	American Memorial Park	Other	51	I	NA
S10	Agingan Point	Other	60	LUPZ	NA
S11	San Antonio Elementary School	School	58	LUPZ	No
S12	Saipan International School	School	55	I	No
S13	Dandan Elementary School	School	54	I	No
S14	Hopwood Junior High School	School	57	LUPZ	No
S15	William S. Reyes Elementary School	School	56	I	No
S16	Mount Carmel School	School	56	I	No
S17	Saipan World Resort	Transient Lodging	56	I	No
S18	Northern Marianas College - Saipan	School	54	I	No

Notes: The POI noise levels are the same for all three alternatives.

<sup>1</sup>Other includes sites with cultural, biological, historical, or recreational concerns that are not related to human factors such as health or annoyance and will be addressed in the applicable resource section of the EIS.

<sup>2</sup>Demolition and large caliber Noise Zones defined as: Land Use Planning Zone (LUPZ) (57-62 decibel CDNL); Zone I (<62 decibel CDNL); Zone II (62-70 decibel CDNL); Zone III (>70 decibel CDNL). See Section 3.5.1 for more details on Land Use noise zones.

Legend: NA = not applicable, see annotation number 1.

Source: Army Public Health Command 2014.

Peak noise levels under neutral and unfavorable weather conditions are presented in [Table 4.5-9](#) for Tinian and in [Table 4.5-10](#) for Saipan. Peak noise levels and their associated complaint risk are provided to assist the reader to understand noise levels better and provide the answer to “how loud is it?” However, no established significance criteria are associated with large-caliber weapons Peak noise levels. Munitions containing the greatest amount of explosives generate the loudest Peak noise levels and generate the greatest risk of noise complaints. On Tinian, the largest munitions proposed for use are the 155 millimeter high explosive artillery rounds.

Under neutral weather conditions and within the Military Lease Area ([Table 4.5-9](#)), 12 points of interest would be exposed to Peak levels of 115 decibels or greater. These areas would only be open to the public when the training facilities would not be in use; therefore, human receptors would not be present when noise-producing activities are occurring. On Saipan, no points of interest would be exposed to elevated Peak noise levels when weather conditions are neutral.

**Table 4.5-9. Representative Points of Interest on Tinian Affected by Large-caliber Weapons Noise for All Tinian Alternatives (Peak)**

Point of Interest (POI)			Neutral Weather			Unfavorable Weather		
Identification Number	Description	Type <sup>2</sup>	Decibel <sup>3</sup>	Zone	POI Conflict	Decibel	Zone	POI Conflict
T1	Tinian High School	School	< 110	Low	Low	110	Low	Low
T2	Lake Hagoi	Other	124	Moderate	NA	135	High	NA
T3	Mahalang Ephemeral Ponds	Other	138	High	NA	147	High	NA
T4	Marpo Heights	Residential	100	Low	Low	111	Low	Low
T5	Mount Lasso Overlook Area	Other	134	High	NA	145	High	NA
T6	Bateha 1 - Isolated Wetlands	Other	117	Moderate	NA	130	Moderate	NA
T7	Northeast of Marpo Heights	Residential	112	Low	Low	123	Moderate	Moderate
T8	Bateha 2 - Isolated Wetlands	Other	119	Moderate	NA	131	High	NA
T9	San Jose	Residential	< 110	Low	Low	110	Low	Low
T10	San Jose Catholic Church	Church	< 110	Low	Low	< 110	Low	Low
T11	Tinian Elementary School	School	< 110	Low	Low	< 110	Low	Low
T12	Unai Chiget	Other	119	Moderate	NA	129	Moderate	NA
T13	Unai Chulu	Other	116	Moderate	NA	131	Moderate	NA
T14	Unai Dankulo	Other	127	Moderate	NA	138	High	NA
T15	Unai Masalok	Other	116	Moderate	NA	127	Moderate	NA
T16	North Field National Historic Landmark	Other	112	Low	NA	122	Moderate	NA
T17	International Broadcasting Bureau <sup>1</sup>	Administrative	118	Moderate	Moderate	128	Moderate	Moderate
T18	Proposed Base Camp (Old West Field)	Transient Lodging	121	Moderate	NA <sup>4</sup>	133	High	NA <sup>4</sup>
T19	Northern Marianas College - Tinian	School	< 110	Low	Low	110	Low	Low
T20	Ushi Point	Other	129	Moderate	NA	140	High	NA
T21	Native Limestone Forest	Other	123	Moderate	NA	135	High	NA
T22	Unai Lam Lam	Other	110	Low	NA	121	Moderate	NA

Notes: Shading denotes POIs inside the Military Lease Area

The POI noise levels are nearly identical for all three alternatives, only POI T6 varied (126 decibels for both Alternatives 2 and 3).

<sup>1</sup>Under Alternatives 2 and 3 the International Broadcasting Bureau mission is relocated.

<sup>2</sup>Other includes sites with cultural, biological, historical, or recreational concerns that are not related to human factors such as health or annoyance and will be addressed in the applicable resource section of this EIS/OEIS.

<sup>3</sup>Noise level threshold is 110 decibels Peak (or decibel Peak).

<sup>4</sup>Complaint risk areas defined as: low risk of complaints <115 decibel Peak; moderate risk of complaints 115-130 decibel Peak; high risk of complaints > 130 decibel Peak.

<sup>5</sup>POI is considered a Tactical Training location and complaint risk correlation does not apply.

Legend: NA = not applicable, see annotation number 2.

Source: Army Public Health Command 2014.



**Table 4.5-10. Representative Points of Interest on Saipan Affected by Large-caliber Weapons Noise for All Tinian Alternatives (Peak)**

Point of Interest (POI)			Neutral Weather			Unfavorable Weather		
Identification Number	Description	Type	Decibel	Zone	POI Conflict	Decibel	Zone	POI Conflict
S1	Agingan	Residential	< 110	Low	Low	117	Moderate	Moderate
S2	Coral Ocean Point Resort	Resort	< 110	Low	Low	117	Moderate	Moderate
S3	Cornerstone Christian Church	Church	< 110	Low	Low	< 110	Low	Low
S4	Obyan	Residential	< 110	Low	Low	120	Moderate	Moderate
S5	Saipan Southern High School	School	< 110	Low	Low	113	Low	Low
S6	San Antonio	Residential	< 110	Low	Low	114	Low	Low
S7	Koblerville Elementary School	School	< 110	Low	Low	115	Moderate	Moderate
S8	Susupe	Residential	< 110	Low	Low	< 110	Low	Low
S9	American Memorial Park	Other	< 110	Low	Low	< 110	Low	NA
S10	Agingan Point	Other	< 110	Low	NA	117	Moderate	NA
S11	San Antonio Elementary School	School	< 110	Low	Low	115	Moderate	Moderate
S12	Saipan International School	School	< 110	Low	Low	< 110	Low	Low
S13	Dandan Elementary School	School	< 110	Low	Low	< 110	Low	Low
S14	Hopwood Junior High School	School	< 110	Low	Low	112	Low	Low
S15	William S. Reyes Elementary School	School	< 110	Low	Low	< 110	Low	Low
S16	Mount Carmel School	School	< 110	Low	Low	112	Low	Low
S17	Saipan World Resort	Transient Lodging	< 110	Low	Low	111	Low	Low
S18	Northern Marianas College – Saipan	School	< 110	Low	Low	< 110	Low	Low

Notes: The POI noise levels are the same for all three alternatives.

<sup>1</sup>Other includes sites with cultural, biological, historical, or recreational concerns that are not related to human factors such as health or annoyance and will be addressed in the applicable resource section of this EIS/OEIS.

<sup>2</sup>Noise level threshold is 110 decibels Peak (or decibel Peak).

<sup>3</sup>Complaint risk areas defined as low risk of complaints <115 decibel Peak; moderate risk of complaints 115-130 decibel Peak; high risk of complaints > 130 decibel Peak.

Legend: NA = not applicable, see annotation number 1.

Source: Army Public Health Command 2014.

Unfavorable weather conditions occur when the wind blows in the opposite direction of normal trade winds. It was estimated that this condition would occur a maximum of 10-15% of the total training time, equaling about 2-3 weeks per year. Under any of the three alternatives, numerous points of interest would be impacted by elevated Peak noise levels within the Military Lease Area. However, these locations are military training facilities, other non-human resources, or sites where public access would be restricted during munitions operations producing these Peak noise levels. Outside of the Military Lease Area, one Tinian point of interest (T7) would have a moderate potential for risk of complaints when weather conditions are unfavorable (see [Table 4.5-9](#)). On Saipan (see [Table 4.5-10](#)), five points of interest (S1, S2, S4, S7, and S11) would be exposed to elevated Peak noise levels and thus have the potential for increased risk of noise complaints.

Tinian Alternative 1 large-caliber weapons operations would have less than significant direct and indirect impacts on the noise environment and would be compatible with sensitive land uses and points of interest.

#### 4.5.3.1.2.2 Airfield and Airspace Based Operations

[Table 4.5-11](#) presents the proposed number of annual military operations at Tinian International Airport and North Field under all Tinian alternatives. At the airfields and Landing Zones, an operation consists of either a take-off or a landing, each of which counts as one operation. Within the airspace, a flight through one unit of Special Use Airspace is considered an operation. These projected operations would be in addition to those flown under baseline at Tinian International Airport. As described in Section 3.5, *Noise*, the baseline is represented by total aircraft operations flown in 2012. Based on the 2014 to 2040 year-over-year growth rate estimated by the Federal Aviation Administration Terminal Area Forecast (Federal Aviation Administration 2013), air traffic operations for Tinian International Airport would not be expected to change (see also Appendix O, *Transportation Study*). Aircraft operations occurring during the nighttime hours, between 10:00 p.m. and 7:00 a.m., are identified because they receive a 10-decibel penalty. This penalty is applied to A-weighted day-night average sound level. Of the 11,664 annual operations, 75% occur during the day and 25% during the night.

**Table 4.5-11. Annual Airfield Operations<sup>1</sup>  
at Tinian International Airport and North Field for All Tinian Alternatives**

Aircraft Type <sup>2</sup>	Tinian International Airport			North Field			Total		
	Day	Night	Total	Day	Night	Total	Day	Night	Total
Transport Tilt-rotor	720	280	1,000	320	80	400	1,040	360	1,400
Transport Rotary Wing	680	280	960	280	80	360	960	360	1,320
Attack Helicopter	520	240	760	120	40	160	640	280	920
Transport Fixed Wing	800	400	1,200	800	400	1,200	1,600	800	2,400
Unmanned	200	100	300	200	100	300	400	200	600
Fighter	1,600	400	2,000	NA			1,600	400	2,000
Heavy commercial transport	24	0	24	NA			24	0	24
Fighter – Field Carrier Landing Practice	2,500	500	3,000	NA			2,500	500	3,000
<b>Total</b>	<b>7,044</b>	<b>2,200</b>	<b>9,244</b>	<b>1,720</b>	<b>700</b>	<b>2,420</b>	<b>8,764</b>	<b>2,900</b>	<b>11,664</b>

Notes: <sup>1</sup>Operations include a takeoff or a landing.

<sup>2</sup>Examples of aircraft types: Transport Tilt-rotor = MV-22, Transport Rotary Wing, CH-53, Attack Helicopter = AH-1, AH-64, Transport Fixed Wing = C-130, KC-135, C-17, Unmanned = RQ-7, Fighter = FA-18, AV-8, and F-35.

Legend: NA = not applicable.

Noise contour bands for baseline and all Tinian alternatives are illustrated in [Figure 4.5-6](#). These noise contours include both the projected operations listed above and the baseline operations that would continue at Tinian International Airport. Also included are noise levels generated from operations at North Field, at the Landing Zones, and by aircraft flying overhead in the proposed Tinian Military Operations Area and Restricted Areas, R-7203 A/B/C/X/Y/Z.

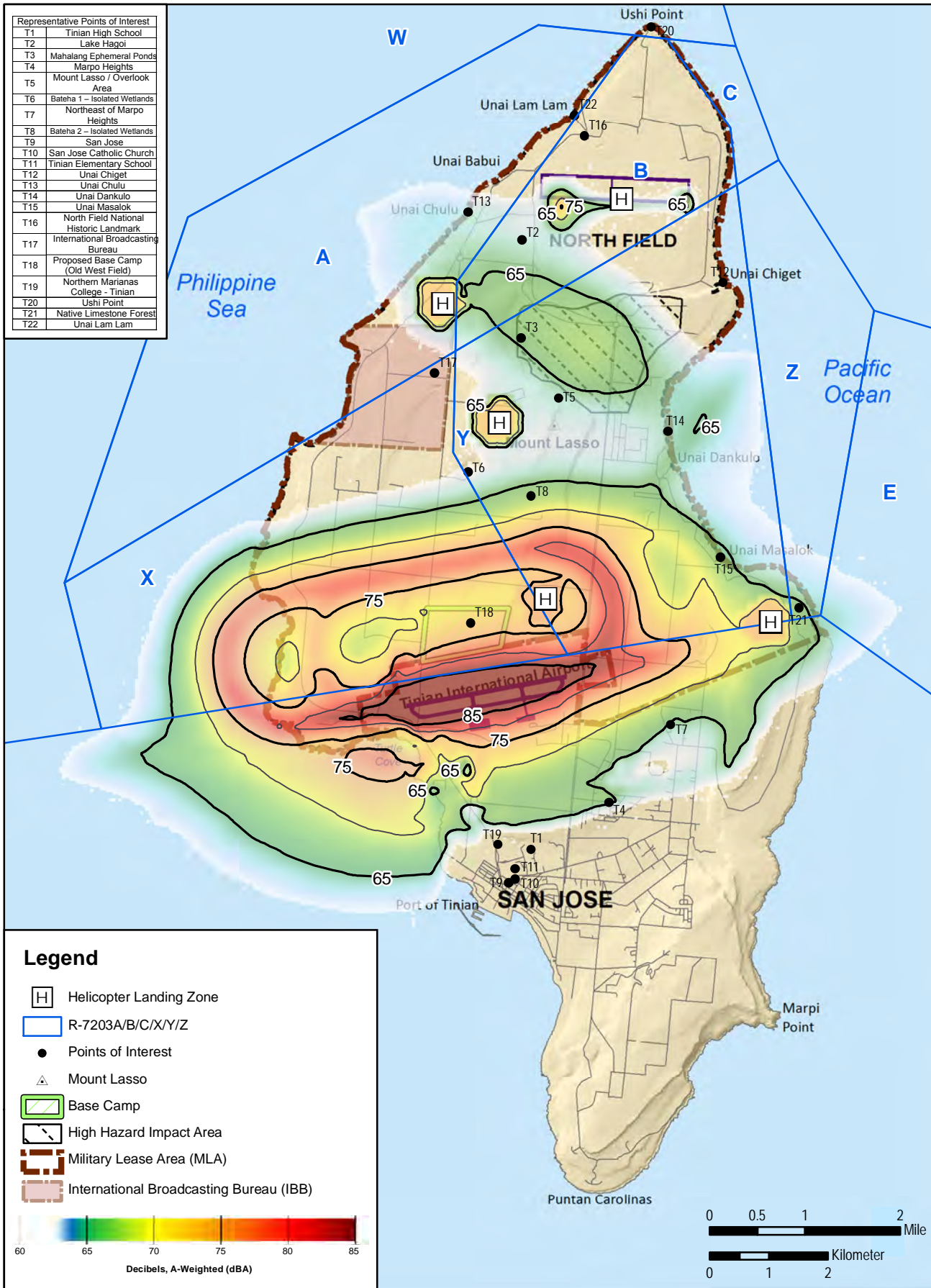


Figure 4.5-6. Airfield and Airspace Noise Levels for All Tinian Alternatives (A-weighted)



[Table 4.5-12](#) presents the acres and population affected by proposed noise levels for areas within the Military Lease Area, outside the Military Lease Area, and offshore exposed to A-weighted day-night average sound levels equal to or greater than 65 decibels. Most of the acreage exposed to 65 decibels or greater outside the Military Lease Area is on Tinian International Airport property (see [Figure 4.5-6](#)). However, a small portion borders the edge of Marpo Heights (see point of interest T4 on [Figure 4.5-6](#)). Similar to the ground-based weapons noise calculations, to determine the population by contour band, this analysis used aerial photography and counted actual houses.

**Table 4.5-12. Noise Area and Population Generated by Aircraft Operations for All Tinian Alternatives Compared to Baseline (2012) Levels (A-weighted)**

Zone	Noise Levels (in decibels)	Baseline		Alternatives 1, 2, and 3	
		Acres/Hectares	Population	Acres/Hectares	Population
<b>Within the Military Lease Area</b>					
II	65 – 69	59/24	NA	2,733/1,106	NA
	70 – 74	0/0	NA	2,775/1,123	NA
III	75 – 79	0/0	NA	1,636/662	NA
	80 – 84	0/0	NA	334/135	NA
	>85	0/0	NA	3/1	NA
<b>Total</b>		<b>59/24</b>	<b>NA</b>	<b>7,481/3,029</b>	<b>NA</b>
<b>Area and Population Outside the Military Lease Area</b>					
II	65 - 69	361/146	0	1,292/523	40
	70 - 74	194/79	0	375/152	0
III	75 - 79	133/54	0	334/165	0
	80 - 84	31/13	0	389/157	0
	>85	0/0	0	547/221	0
<b>Total</b>		<b>719/291</b>	<b>0</b>	<b>2,937/1,189</b>	<b>40</b>
<b>Off Shore</b>					
NA	65 - 69	0	NA	1,621/656	NA
	70 - 74	0	NA	1,099/445	NA
	75 - 79	0	NA	506/205	NA
	80 - 84	0	NA	1/0	NA
	>85	0	NA	0/0	NA
<b>Total</b>		<b>0</b>	<b>NA</b>	<b>3,227/1,306</b>	<b>NA</b>

Legend: NA = not applicable.

When compared to baseline conditions, A-weighted noise levels of 65 decibels or greater would increase and potentially affect 2,937 acres (1,189 hectares) outside the Military Lease Area. Review of aerial photography revealed that approximately 10 households and 40 people in Marpo Heights (see point of interest T4 on [Figure 4.5-6](#)) would be affected by aircraft noise levels 65 decibels and greater. This represents 1.3% of the total population of Tinian. Noise exposure to these residences would also exceed the Federal Aviation Administration criterion of 1.5-decibel increase in areas over 65 decibels. The Federal Aviation Administration requires reporting 3 decibel increases between 60 and 65 decibels, and 5 decibel increases from 45 to 60 decibels for residential areas. Residents in the area northeast of Marpo Heights and in San Jose would have noise increases above these criteria but would remain below 65 decibels.

Under Tinian Alternative 1, most flight operations would be directed to flight tracks along a path in line with the runway or north of the runway that correspond to operations occurring while normal trade winds persist. However, operations causing the impacts to the 10 residences in Marpo Heights would occur when wind blows counter to the normal trade winds. This opposite wind condition causes aircraft to fly to the south upon approach to the Tinian International Airport and to conduct missed aircraft approaches to the south. Opposite wind conditions were modeled to occur as often as 15% of the time but actual operations would be expected to be less than 15%. A missed approach occurs during a low-visibility, instrument procedure when the pilot does not have the runway lined up correctly, or is traveling at the incorrect speed, or does not have the proper approach altitude. If any of these occur, the pilot flies to a known point at a radio direction transmitter and sets up specific control points back to the runway. One of the points would be south of the airport to safely turn the aircraft in the correct direction. Missed approaches would be very infrequent considering the reliability of the trade winds, the good visibility that normally occurs on Tinian, and training involves experienced pilots.

[Table 4.5-13](#) shows A-weighted noise levels for representative points of interest on Tinian potentially affected by aircraft operations. Of the 22 points of interest affected, six would experience increases of noise levels above 65 decibels when compared to baseline conditions. These six include one residential receptor (T4), four non-residential receptors (T3, T7, T8, and T21), and the proposed base camp (T18). All receptors would see an increase of over 15 decibels except Ushi Point (T20). While there would be increases in noise levels for residential areas (T4, T7, and T9), they would still be at or below 65 decibels and be considered compatible land uses. However, because the increases over baseline conditions exceed Federal Aviation Administration reportable changes in exposure limits, noise increases would be considered significant.

Tinian Alternative 1 aircraft operations would introduce significant direct noise impacts to ten residences housing about 40 people in the Marpo Heights area because the increase would result in noise levels greater than 65 decibels and have an increase of almost 20 decibels above baseline conditions. While this represents a significant change from baseline conditions, operations causing these impacts would rarely occur. No indirect noise impacts to human receptors would result from airfield or airspace operations.

**Table 4.5-13. All Tinian Alternatives Points of Interest Noise Level Exposure Generated by Aircraft Operations (A-weighted)**

Identification Number	Points of Interest		Decibels		
	Description	Type	Baseline	Proposed	Change from Baseline
T1	Tinian High School	School	37.6	55.6	18.0
T2	Lake Hagoi	Other	44.1	63.4	19.3
T3	Mahalang Ephemeral Ponds	Other	39.5	65.4	25.9
T4	Marpo Heights	Residential	45.4	65.2	19.8
T5	Mount Lasso Overlook Area	Other	40.7	63.9	23.2
T6	Bateha 1 - Isolated Wetlands	Other	38.8	61.9	23.1
T7	Northeast of Marpo Heights	Residential	48.5	64.8	16.3
T8	Bateha 2 - Isolated Wetlands	Other	45.6	66.6	21.0
T9	San Jose	Residential	37.3	54.1	16.8
T10	San Jose Catholic Church	Church	37.1	54.3	17.2
T11	Tinian Elementary School	School	36.9	54.8	17.9
T12	Unai Chiget	Other	35.4	57.8	22.4
T13	Unai Chulu	Other	44.0	63.4	19.4
T14	Unai Dankulo	Other	47.0	64.0	17.0
T15	Unai Masalok	Other	48.8	66.0	17.2
T16	North Field National Historic Landmark	Other	41.2	57.9	16.7
T17	International Broadcasting Bureau	Administrative	41.8	60.8	19.0
T18	Proposed Base Camp (Old West Field)	Transient Lodging	54.6	72.4	17.8
T19	Northern Marianas College – Tinian	School	37.2	58.0	20.8
T20	Ushi Point	Other	36.3	49.6	13.3
T21	Native Limestone Forest	Other	50.0	65.5	15.5
T22	Unai Lam Lam	Other	39.0	56.7	17.7

Notes: Bold indicates human receptor.

<sup>1</sup>Access to sites would only occur when adjacent ranges are not in use and noise levels would be lower during human occupation.

<sup>2</sup>Point of interest is human but would be considered a Tactical Training location and not incompatible.

#### 4.5.3.1.2.3 Supplemental Noise Metrics

Under the three Tinian alternatives, no population would be exposed to the 24-hour equivalent noise level of 80 decibels or greater noise contour. There would be no potential for hearing loss.

Speech interference, classroom interruptions, and sleep disturbance noise analyses are provided to assist the reader in understanding noise impacts from experiences that are more common rather than a rare annoyance. Although aircraft noise would create significant impacts, the noise levels would be generally compatible and the supplemental analyses reveal only a few events per training day where noise events could be intrusive for speech interference, classroom interruptions, and sleep disturbance. Specific details regarding the supplemental analyses are provided in Appendix H, *Noise Study*.

#### 4.5.3.1.2.4 Traffic

Vehicular traffic associated with the proposed action would include permanently based vehicles and trips between the port and base camp by units arriving for training. [Table 4.5-14](#) shows the

representative number of vehicles a generic Marine expeditionary unit and battalion landing team requires and [Table 4.5-15](#) shows the proposed unit permanently based vehicles.

**Table 4.5-14. Representative Unit Level Vehicle Requirements**

<b>Vehicle Type</b>	<b>Generic Marine Expeditionary Unit</b>	<b>Generic Battalion Landing Team</b>
HMMWV (Humvee)	63	78 (8 with TOW Missile mounts)
Light Armored Vehicles	7	7
MTRV 7-ton Trucks	30	12
Amphibious Assault Vehicles (on Trailers)	14	15
Logistic Vehicle Systems	4	0
M77 155mm Howitzers (on Tow Trailers)	6	6
D7 Bulldozer	0	3
MTRV Dump Truck	0	1
<b>Total</b>	<b>124</b>	<b>122</b>

*Notes:* Generic Marine Expeditionary Unit with 1,214 personnel. Generic Battalion Landing Team with 1,257 personnel.

*Legend:* HMMWV = High Mobility Multi-purpose Wheeled Vehicles; mm = millimeter; MTRV = Medium Tactical Vehicle Replacements; TOW = Tube-launched, Optically-tracked, Wire-guided.

*Source:* DoN 2014, Appendix O, *Transportation Study*.

**Table 4.5-15. All Tinian Alternatives Proposed Base Vehicles**

<b>Vehicle Type</b>	<b>Number of Vehicles</b>
Buses (for troop transport)	8
Sedans (for use by permanent staff)	2
4-Wheel Drive Trucks (Light) - Service pick-ups for use by permanent staff (facilities and range maintenance)	15
Medium Tactical Vehicle Replacement 7-ton Trucks (range maintenance)	5
Commercial Flat Bed Trucks	5
D7 Bulldozer	2
Front End Loader	2
Medium Tactical Vehicle Replacement 7-ton Dump Truck	2
Rough Terrain Forklift	1
(Rough Terrain) Material Handling Equipment (for port and airfield use)	1
Extended Boom Forklift	1
<b>Total</b>	<b>44</b>

*Source:* DoN 2014, Appendix O, *Transportation Study*.

Most vehicle traffic outside the Military Lease Area would be prior to and at the end of a 2-week training cycle, with occasional trips by Amphibious Assault Vehicles conducting training within the port. Vehicles would be required to pass biosecurity inspection at the proposed military biosecurity and wash-down facility at the port. As a result, vehicle traffic would be light and dispersed throughout the training period and each day. The only instance that vehicles would be moved in a concentrated period of time would be at the end of the training cycle when all vehicles and personnel are transported from base camp to the port for loading onto the High Speed Vessel or other marine transport.

Including round trips by buses and autos, the hourly maximum would be approximately 237 vehicles. This would result in hourly equivalent noise levels of 64, 59, 56, and 54 decibels at 50, 100, 150, and 200 feet, respectively, from the roadway. Along the planned roadway, there are only a few homes within 100 feet (30 meters) from the roadway. Noise levels would be below Federal Highway Administration level guidelines and U.S. Environmental Protection Agency guidelines and would potentially occur at these levels once every 2 weeks for a limited time. The most likely scenario would be for a more

dispersed movement from base camp lasting most of the day and noise levels would be appreciably lower.

Traffic-generated noise resulting from Tinian Alternative 1 operations would have less than significant direct and indirect noise impacts to land uses and people.

#### **4.5.3.1.2.5 Waterborne Operations**

Waterborne activities would include Amphibious Assault Vehicles, Landing Craft Air Cushion, and Landing Craft Utility. In addition, large vessel operations of ships, a High Speed Vessel, and a barge would occur for transporting personnel and equipment to Tinian.

##### *Landing Craft Air Cushion Operations*

Of all the vessels planned for use, the Landing Craft Air Cushion operations would be the loudest. These vessels ride on a cushion of air generated by powerful engines, driving fans that elevate the vessel above the water. Landing Craft Air Cushions generate maximum noise levels of 98 decibels at 200 feet (61 meters) during ground run-up conditions, and sound exposure levels up to 104 A-weighted decibels at 40 knots (74 kilometers per hour) on water (DoN 2009). For safety purposes, visitors would not have access to beach when training exercises are occurring. However, visitors may be allowed to have access to adjacent beaches. Under any of the Tinian alternatives, Landing Craft Air Cushion vehicles that would operate at one of the amphibious landing beaches and near shore of the Military Lease Area would generate noise audible at the nearest adjacent beach. For example, Landing Craft Air Cushion vehicles operating at Unai Babui would generate noise levels of about 74 decibels during ground run-up conditions and 80 decibels at 40 knots (74 kilometers per hour) at Unai Chulu. However, the public would not have access to the amphibious landing beach training areas when these vessels are operating and, therefore, they would not be exposed to elevated noise levels created by these activities. Noise for Landing Craft Air Cushion vessels could be audible to visitors, but noise impacts to the public would be less than significant.

Amphibious Assault Vehicles have sound exposure levels of about 87-88 decibels moving on water or land, and around 72 decibels at a distance of 100 feet (30 meters) while at idle. Amphibious Assault Vehicles could come ashore four at a time. Therefore, noise levels in these situations would be higher, approximately 96 decibels at 100 feet (30 meters). Landing Craft Utility and Light Armored Vehicles would be used but are smaller and have less horsepower. This would result in noise levels lower than either the Landing Craft Air Cushion or the Amphibious Assault Vehicles. For safety purposes, visitors would not have access to beach or nearby areas when training exercises are occurring, and therefore no noise impacts to the public would occur.

##### *Tinian Port Operations*

Operations would primarily occur prior to and at the end of a 2-week training cycle period, as one of the potential transportation options for marine personnel and equipment embarkation/debarkation points. Harbor operations would include one Joint High Speed Vessel, other ships, a barge, and Landing Craft Utility that could be in port simultaneously. Port arrivals and departures would occur at low-engine speeds of 5 knots or less. Noise from visiting vessels would be consistent with normal port vessels and persist when loading and unloading for a day or two. Amphibious Assault Vehicles would also use the port and generate noise levels of 72 decibels at 100 feet (30 meters). The nearest residence would be



over 200 feet (60 meters) from the planned route for the vehicle to transit from the port to the training area and the noise levels would be less than 66 decibels.

### *Underwater*

Underwater operational noise generated by sea-going vessels' engines would not create noise levels affecting people or sensitive land uses.

Tinian Alternative 1 waterborne operations would generate less than significant direct and indirect noise impacts to land uses and people.

## **4.5.3.2 Tinian Alternative 2**

### **4.5.3.2.1 Construction Impacts**

Construction noise levels from implementation of Tinian Alternative 2 would be similar to those described for Tinian Alternative 1 because differences between the construction activities for the Tinian Alternatives would occur away from sensitive receptors. Activities sufficiently close to receptors that can have a potential noise impact are identical for each alternative. The North and South Battle Area Complexes and five additional Convoy Engagement Areas would be established and the mission of the International Broadcasting Bureau would be moved when compared to Tinian Alternative 1. Construction noise would not fall outside military boundaries; therefore, impacts would be compatible with residential areas, and not affect schools, places of worship, or hospitals (i.e., sensitive receptors).

Tinian Alternative 2 construction activities would result in less than significant direct or indirect noise impacts on land and underwater.

### **4.5.3.2.2 Operation Impacts**

#### **4.5.3.2.2.1 Ground Based Operations**

##### *Small-caliber Weapons*

Noise generated from Tinian Alternative 2 small-caliber weapons operations would be similar to Tinian Alternative 1. Acreage and population affected by small-caliber weapons were presented in [Table 4.5-1](#) and illustrated in [Figure 4.5-1](#) for A-weighted day-night average sound levels. The analysis indicated that no acreage or population outside of the Military Lease Area would be affected by A-weighted noise levels 65 decibels or greater (or Noise Zones II and III). [Table 4.5-2](#) and [Figure 4.5-2](#) presented Peak noise levels and indicated that while no population would be exposed to elevated Peak noise levels, about 200 more acres (81 hectares) would be exposed to 87-104-decibel Peak noise levels when compared to Tinian Alternative 1. Potential A-weighted and Peak noise effects at points of interest under Tinian Alternative 2 are listed in [Table 4.5-16](#) and shown in [Figure 4.5-1](#) and [Figure 4.5-2](#). Noise levels would not be perceptibly different from those modeled under Tinian Alternative 1.

Small-caliber weapons operations associated with Tinian Alternative 2 would result in less than significant direct and indirect noise impacts. Neither A-weighted nor Peak noise levels would be incompatible with the points of interest.

**Table 4.5-16. Tinian Alternative 2 Representative Points of Interest Affected by Small-caliber Weapons Noise on Tinian (A-weighted and Peak)**

Point of Interest			A-weighted Day-Night Average Sound Levels (ADNL)			Peak		
Identification Number	Description	Type	Decibel	Zone	Points of Interest Conflict	Decibel	Zone	Points of Interest Conflict
T1	Tinian High School	School	< 50	I	No	< 80	I	No
T2	Lake Hagoi	Other	63	I	NA	100	II	NA
T3	Mahalang Ephemeral Ponds	Other	67	II	NA	104	III	NA
T4	Marpo Heights	Residential	< 50	I	No	< 80	I	No
T5	Mount Lasso Overlook Area	Other	71	II	No	106	III	No
T6	Bateha 1 - Isolated Wetlands	Other	65	II	NA	107	III	NA
T7	Northeast of Marpo Heights	Residential	< 50	I	No	83	I	No
T8	Bateha 2 - Isolated Wetlands	Other	75	III	NA	108	III	NA
T9	San Jose	Residential	< 50	I	No	< 80	I	No
T10	San Jose Catholic Church	Church	< 50	I	No	< 80	I	No
T11	Tinian Elementary School	School	< 50	I	No	< 80	I	No
T12	Unai Chiget	Other	59	I	No	96	II	No
T13	Unai Chulu	Other	61	I	No	106	III	No
T14	Unai Dankulo	Other	64	I	No	104	III	No
T15	Unai Masalok	Other	55	I	No	96	II	No
T16	North Field National Historic Landmark	Other	55	I	No	98	II	No
T17	International Broadcasting Bureau	Administrative	***	***	No	***	***	No
T18	Proposed Base Camp (Old West Field)	Transient Lodging	54	I	No	95	II	No
T19	Northern Marianas College	School	< 50	I	No	< 80	I	No
T20	Ushi Point	Other	< 50	I	NA	97	II	NA
T21	Native Limestone Forest	Other	< 50	I	NA	91	II	NA
T22	Unai Lam Lam	Other	54	I	NA	95	II	NA

Notes: NA – not applicable, see annotation number 1 and shading denotes points of interest inside the Military Lease Area.

\*\*\*Under Alternatives 2 and 3 the International Broadcasting Bureau mission is relocated.

<sup>1</sup>Other includes sites with cultural, biological, recreational, or other concerns that are unrelated to human factors and are addressed in the applicable resource sections of the CJMT EIS/OEIS.

<sup>2</sup>Noise level threshold is 50 decibel ADNL and 80 decibel Peak.

<sup>3</sup>Small-caliber Peak Noise Zones defined as: Zone I (< 55 decibel ADNL; 55-64 decibel ADNL); Zone II (65-69 decibel ADNL; 70-74 decibel ADNL); and Zone III (75-79 decibel ADNL; 80-84 decibel ADNL; > 85 decibel ADNL).

Source: Army Public Health Command 2014.

### *Large-caliber Weapons*

Noise impacts on acres and population would be similar to Tinian Alternative 1 (see [Table 4.5-4](#)); however, outside the Military Lease Area boundaries, Tinian Alternative 2 would affect 33 fewer acres (13 hectares) exposed to Noise Zone II and III levels (62-70 decibels C-weighted) when compared to Tinian Alternative 1. However, as with Tinian Alternative 1, people would not be impacted by either Noise Zone II or III C-weighted noise levels on Tinian. On Saipan, neither acreage nor people would be impacted by C-weighted day-night average sound levels under Tinian Alternative 2 (see [Table 4.5-4](#)). Peak noise levels under Tinian Alternative 2 (see [Table 4.5-5](#)), when weather conditions are neutral, would affect the same number of acres on Tinian as found under Tinian Alternative 1 (521 acres/211 hectares). On Saipan, no acres or people would be affected by Peak noise levels when weather conditions are neutral. When weather conditions are unfavorable, however, Peak noise impacts (see [Table 4.5-6](#)) on Tinian would affect 102 more acres (41 hectares) when compared to Tinian Alternative 1. On Saipan, the same 1,552 acres (628 hectares) would be exposed to Peak noise levels of 115 decibels. Under Tinian Alternative 2, 80 people on Tinian and 1,143 on Saipan would be exposed to elevated Peak noise levels. [Table 4.5-7](#) and [Table 4.5-8](#) presented C-weighted day-night average sound levels to points of interest on Tinian and Saipan, respectively. [Table 4.5-9](#) and [Table 4.5-10](#) presented the Peak noise levels under neutral and unfavorable weather conditions at points of interest on Tinian and Saipan. Figures [4.5-3](#), [4.5-4](#), and [4.5-5](#) illustrate these potential noise levels. As found with Tinian Alternative 1, one Tinian point of interest (T7) would have a moderate potential for risk of complaints when weather conditions are unfavorable (see [Table 4.5-9](#)). On Saipan (see [Table 4.5-10](#)), five points of interest (S1, S2, S4, S7, and S11) would be exposed to elevated Peak noise levels and thus have the potential for increased risk of noise complaints.

Large-caliber weapons use associated with Tinian Alternative 2 operations would result in less than significant direct or indirect noise impacts and noise levels would be considered compatible with land uses and sensitive receptors.

#### **4.5.3.2.2.2 Airfield and Airspace Based Operations**

Tinian Alternative 2 aircraft and airspace operations are the same as Tinian Alternative 1. Proposed annual military operations at Tinian International Airport and North Field were presented in [Table 4.5-11](#) and noise contour bands illustrated in [Figure 4.5-6](#). When compared to baseline conditions, A-weighted noise levels of 65 decibels and greater would potentially affect 2,937 acres (1,189 hectares) outside the Military Lease Area under Tinian Alternative 2. Review of aerial photography revealed that approximately 10 residences and 40 people in Marpo Heights (see point of interest T4 on [Figure 4.5-6](#)) would be affected by aircraft noise levels of 65 decibels and greater.

Identical to Tinian Alternative 1, Tinian Alternative 2 aircraft operations would introduce significant direct noise impacts to approximately 40 people residing in 10 residences in the Marpo Heights area. While this represents a significant change from baseline conditions, operations causing these impacts would occur infrequently. No indirect noise impacts to human receptors would result from airfield or airspace operations.

#### **4.5.3.2.2.3 Waterborne Operations**

Noise generated by waterborne activities would be the same as Tinian Alternative 1 operations. Therefore, Tinian Alternative 2 waterborne operations would generate less than significant direct and indirect impacts to land uses and receptors (e.g., people, residential areas, hospitals, and schools).

#### **4.5.3.2.2.4 Traffic**

Traffic noise generated by operations would be similar to Tinian Alternative 1 because vehicle operations that have the potential to cause noise that can be heard by San Jose residents would be nearly identical to Alternative 1. Under this alternative there would be slightly less trips by International Broadcasting Bureau employees, but that would have negligible effects of traffic noise. There would be less than significant direct and indirect noise impacts to land uses and receptors with Tinian Alternative 2.

### **4.5.3.3 Tinian Alternative 3**

#### **4.5.3.3.1 Construction Impacts**

Construction noise levels under Tinian Alternative 3 would be similar to those described for Tinian Alternatives 1 and 2 because differences between the construction activities for the Tinian Alternatives would occur away from sensitive receptors. Activities sufficiently close to receptors that can have a potential noise impact are identical for each alternative. When compared to Tinian Alternative 1, the southern Battle Area Complex and five additional Convoy Course Engagement Areas would be established and the mission of the International Broadcasting Bureau would move. There would be less than significant direct or indirect construction noise impacts on land or underwater resulting from RTA, airport, or port construction and improvements under Tinian Alternative 3.

#### **4.5.3.3.2 Operation Impacts**

##### **4.5.3.3.2.1 Ground Based Operations**

###### *Small-caliber Weapons*

Noise generated under Tinian Alternative 3 would be similar to Tinian Alternative 1. Acreage and population affected by small-caliber weapons were presented in [Table 4.5-1](#) and illustrated in [Figure 4.5-1](#) for A-weighted day-night average sound levels. The analysis indicated that no acreage or population outside of the Military Lease Area would be affected by A-weighted noise levels 65 decibels or greater (or Noise Zones II and III). [Table 4.5-2](#) and [Figure 4.5-2](#) presented potential Peak noise levels and indicated that while no population would be exposed to elevated Peak noise levels, about 200 more acres (81 hectares) would be exposed to 87-104 Peak noise levels when compared to Tinian Alternative 1. Potential A-weighted and Peak noise effects at points of interest for Tinian Alternative 3 are listed in [Table 4.5-17](#) and shown in [Figure 4.5-1](#) and [Figure 4.5-2](#). Noise would not be perceptibly different when compared to Tinian Alternative 1.

Tinian Alternative 3 would have less than significant direct and indirect operations noise impacts resulting from small-caliber weapons use, and these noise levels would be considered compatible with sensitive receptors. Small-caliber A-weighted noise levels would not be incompatible to any points of interest.

**Table 4.5-17. Tinian Alternative 3 Representative Points of Interest Affected by Small-caliber Weapons Noise on Tinian (A-weighted and Peak)**

Point of Interest			A-weighted Day-Night Average Sound Levels			Peak		
Identification Number	Description	Type	Decibel	Zone	Points of Interest Conflict	Decibel	Zone	Points of Interest Conflict
T1	Tinian High School	School	< 50	I	No	< 80	I	No
T2	Lake Hagoi	Other	62	I	NA	100	II	NA
T3	Mahalang Ephemeral Ponds	Other	66	II	NA	105	III	NA
T4	Marpo Heights	Residential	< 50	I	No	< 80	I	No
T5	Mount Lasso Overlook Area	Other	71	II	NA	106	III	NA
T6	Bateha 1 - Isolated Wetlands	Other	67	II	NA	106	III	NA
T7	Northeast of Marpo Heights	Residential	< 50	I	No	83	I	No
T8	Bateha 2 - Isolated Wetlands	Other	75	III	NA	108	III	NA
T9	San Jose	Residential	< 50	I	No	< 80	I	No
T10	San Jose Catholic Church	Church	< 50	I	No	< 80	I	No
T11	Tinian Elementary School	School	< 50	I	No	< 80	I	No
T12	Unai Chiget	Other	58	I	NA	96	II	NA
T13	Unai Chulu	Other	61	I	NA	103	II	NA
T14	Unai Dankulo	Other	64	I	NA	104	III	NA
T15	Unai Masalok	Other	55	I	NA	96	II	NA
T16	North Field National Historic Landmark	Other	55	I	NA	98	II	NA
T17	International Broadcasting Bureau	Administrative	***	***	***	***	***	***
T18	Proposed Base Camp (Old West Field)	Base Camp	54	I	No	95	II	No
T19	Northern Marianas College	School	< 50	I	No	< 80	I	No
T20	Ushi Point	Other	< 50	I	NA	97	II	NA
T21	Native Limestone Forest	Other	< 50	I	NA	91	II	NA
T22	Unai Lam Lam	Other	57	I	NA	95	II	NA

Notes: NA – not applicable, see annotation number 1 and shading denotes points of interest inside the Military Lease Area.

\*\*\*Under Alternatives 2 and 3 the International Broadcasting Bureau mission is relocated.

<sup>1</sup>Other includes sites with cultural, biological, recreational, or other concerns that are unrelated to human factors and are addressed in the applicable resource sections of the CJMT EIS/OEIS.

<sup>2</sup>Noise level threshold is 50 decibels A-weighted day-night average sound level (or decibel ADNL).

<sup>3</sup>Small-caliber ADNL Noise Zones defined as: Zone I (< 55 decibel ADNL; 55-64 decibel ADNL); Zone II (65-69 decibel ADNL; 70-74 decibel ADNL); and Zone III (75-79 decibel ADNL; 80-84 decibel ADNL; > 85 decibel ADNL).

Source: Army Public Health Command 2014.

### *Large-caliber Weapons*

Noise impacts from large-caliber weapons to acres and population would be similar to Tinian Alternative 1 (see [Table 4.5-4](#)). For Tinian Alternative 3, outside the Military Lease Area boundaries, there would be the same amount of area (1,300 acres/526 hectares) exposed to Noise Zone II and III levels (62-70 decibels C-weighted) on Tinian as found under Tinian Alternative 1. Additionally, as with Tinian Alternative 1, no people would be impacted by either Noise Zone II or III C-weighted noise levels on Tinian. On Saipan, neither acreage nor people would be impacted by C-weighted day-night average sound levels under Tinian Alternative 3 (see [Table 4.5-4](#)). Peak noise levels (see [Table 4.5-5](#)), when weather conditions are neutral, would affect a slightly lesser amount of area—519 acres (210 hectares)—on Tinian when compared to Tinian Alternative 1 (521 acres/211 hectares). On Saipan, no acres or people would be affected by Peak noise levels when weather conditions are neutral. When weather conditions are unfavorable; however, Peak noise levels of 115 decibels (see [Table 4.5-6](#)) would affect 101 more acres (a little less than 41 hectares) on Tinian when compared to Tinian Alternative 1. The same 80 people would be exposed to Peak noise levels under Tinian Alternative 3 operations as found with the other alternatives. On Saipan, 1,552 acres (628 hectares) and 1,143 people would be exposed to Peak noise levels of 115 decibels as found under the other two alternatives. Similar to Tinian Alternative 1, one Tinian point of interest (T7) would have a moderate potential for risk of complaints when weather conditions are unfavorable (see [Table 4.5-9](#)) for Tinian Alternative 3. On Saipan (see [Table 4.5-10](#)), five points of interest (S1, S2, S4, S7, and S11) would be exposed to elevated Peak noise levels and thus have the potential for increased risk of noise complaints.

Large-caliber weapons operations associated with Tinian Alternative 3 would result in less than significant direct and indirect noise impacts, and noise levels would be considered compatible with land uses and sensitive receptors.

#### **4.5.3.3.2.2 Airfield and Airspace Based Operations**

Tinian Alternative 3 aircraft operations would be identical to Tinian Alternative 1. Proposed annual military operations at Tinian International Airport and North Field are presented in [Table 4.5-11](#) and noise contour bands illustrated in [Figure 4.5-6](#). Under Tinian Alternative 3, A-weighted noise levels of 65 decibels and greater would potentially affect 2,937 acres (1,189 hectares) outside the Military Lease Area. As found under the other two alternatives, approximately 10 residences and 40 people in Marpo Heights (see point of interest T4 on [Figure 4.5-6](#)) would be infrequently affected by aircraft noise levels exceeding 65 decibels A-weighted. Because airfield and airspace operations are identical to Tinian Alternative 1, Tinian Alternative 3 aircraft operations would introduce significant direct noise impacts to 10 residences and 40 people in the Marpo Heights area (the same as found under Tinian Alternatives 1 and 2). While this represents a significant change from baseline conditions, operations causing these impacts would occur infrequently. No indirect noise impacts to human receptors would result from airfield or airspace operations.

#### **4.5.3.3.2.3 Waterborne Operations**

Noise generated by waterborne activities would be the same as Tinian Alternative 1. Therefore, Tinian Alternative 3 waterborne operations would generate less than significant direct and indirect impacts to land uses and receptors (e.g., people, residential areas, hospitals, and schools).

#### **4.5.3.3.2.4 Traffic**

Tinian Alternative 3 operations generating traffic noise would be the same as Tinian Alternative 2. There would be less than significant direct and indirect noise impacts to land uses and receptors.

### **4.5.3.4 Tinian No-Action Alternative**

The periodic non-live-fire military training exercises that occur in the Military Lease Area on Tinian generate noise in association with troop maneuvering, ground vehicles, helicopter and fixed-wing aircraft operations. These military exercises are of short duration (1 to 2 weeks) and have only occurred four times in the past 3 years. If implemented, the four live -fire training ranges included in the Guam and CNMI Military Relocation EIS (DoN 2010a) would produce noise. Military activities on the four ranges would generate less than significant noise levels near existing sensitive receptors (i.e., below 65 decibels A-weighted day-night average sound level) (see Table 6.2-7; DoN 2010a). Similarly, noise generated by aircraft operations within the Mariana Islands Range Complex are not anticipated to elevate noise levels above the established threshold 65 decibels A-weighted day-night average sound level near existing sensitive receptors (see Table 3.5-4; DoN 2010b). Therefore, the Tinian no-action alternative would result in less than significant noise impacts.

### 4.5.3.5 Summary of Impacts for Tinian Alternatives

[Table 4.5-18](#) provides a comparison of the potential impacts to noise resources for the three Tinian alternatives and the no-action alternative.

**Table 4.5-18. Summary of Impacts for Tinian Alternatives**

Resource Area	Tinian (Alternative 1)		Tinian (Alternative 2)		Tinian (Alternative 3)		No-Action Alternative	
	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation
Noise								
On Land	LSI	Not applicable	LSI	Not applicable	LSI	Not applicable	LSI	LSI
In-water	LSI	Not applicable	LSI	Not applicable	LSI	Not applicable	Not applicable	LSI
Ground-Based Operation	Not applicable	LSI	Not applicable	LSI	Not applicable	LSI	LSI	LSI
Airfield and Airspace Based Operations	Not applicable	SI	Not applicable	SI	Not applicable	SI	Not applicable	LSI
Waterborne Operation	Not applicable	LSI	Not applicable	LSI	Not applicable	LSI	Not applicable	Not applicable
Traffic	Not applicable	LSI	Not applicable	LSI	Not applicable	LSI	LSI	LSI
Occupational Noise	Not applicable	NI	Not applicable	NI	Not applicable	NI	NI	NI

Legend: NI = no impact; LSI = less than significant impact; SI = significant impact. Shading is used to highlight the significant impacts.



## 4.5.4 Pagan

### 4.5.4.1 Pagan Alternative 1

#### 4.5.4.1.1 Construction Impacts

Construction activities and airfield improvements would not affect any residential properties or noise-sensitive receptors such as schools, and hospitals because none currently exist on Pagan. Construction activities would generate noise due to heavy construction machinery, such as graders, excavators, and some explosive blasting of lava rock. Visitors would be allowed on Pagan but noise levels generated by construction activities at the airfield would be approximately 55-60 decibels at Red Beach and about 68 decibels at Green Beach. No underwater construction is proposed. Pagan Alternative 1 would have less than significant direct or indirect noise impacts generated by construction.

#### 4.5.4.1.2 Operation Impacts

##### 4.5.4.1.2.1 Ground Based Operations

###### *Small-caliber Weapons*

The small-caliber weapons proposed for both Pagan alternatives include 9 millimeter and .45 caliber pistols, M16/M4 rifles, and M240 and M249 machine guns. Small caliber weapons expenditures under Pagan Alternative 1 would generate 665,455 rounds fired annually. [Figure 4.5-7](#) and [Figure 4.5-8](#) present the small-caliber A-weighted day-night average sound level contours and the Peak noise levels, respectively. [Table 4.5-19](#) provides the acres affected by small arms noise in Noise Zones II and III. Both alternatives are presented together because they generate very similar noise levels and for easy comparison of area affected.

Pagan Alternative 1, small-caliber munitions expenditures would have the potential to expose, onshore, 1,813 acres (732 hectares) to 65 decibels and greater A-weighted day-night average sound levels. Peak noise levels would affect 8,536 acres (3,456 hectares).

Small-caliber weapons operations would result in no direct or indirect impacts for Pagan Alternative 1. No noise-sensitive land uses (e.g., residences, schools) or people would be affected by A-weighted and Peak noise levels.

Points of Interest	
P1	FB Colony 1
P2	FB Colony 2
P3	FB Colony 3
P4	Main Camp/Airstrip Area
P5	Upper Lake
P6	Southern Pagan
P7	South Beach
P8	Lower Lake
P9	Cultural Location 1
P10	Cultural Location 2
P11	Cultural Location 3
P12	Cultural Location 4
P13	Gold Beach
P14	North Beach

### Alternative 1



**Legend**

- Points of Interest
- ▲ Mounts
- ▨ High Hazard Impact Area

**A-weighted Day-Night Average Sound Level**

Zone I

- 55 - 64

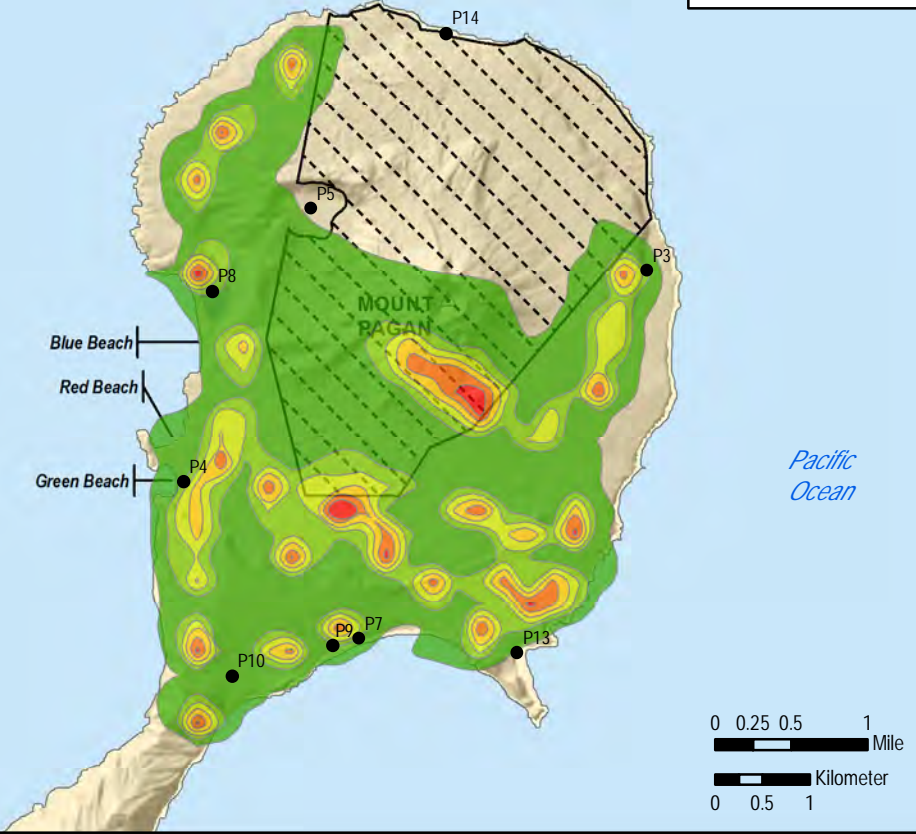
Zone II

- 65 - 69
- 70 - 74

Zone III

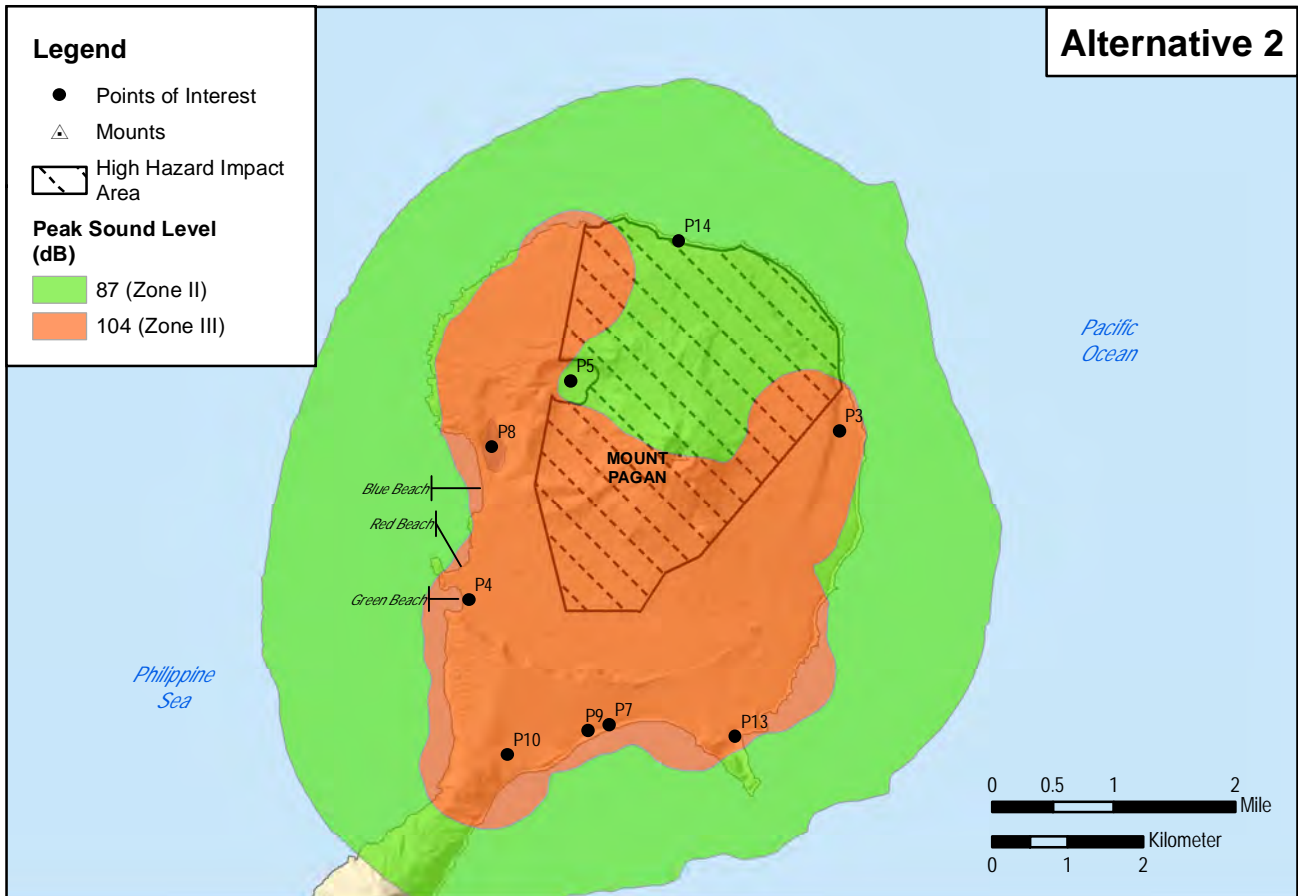
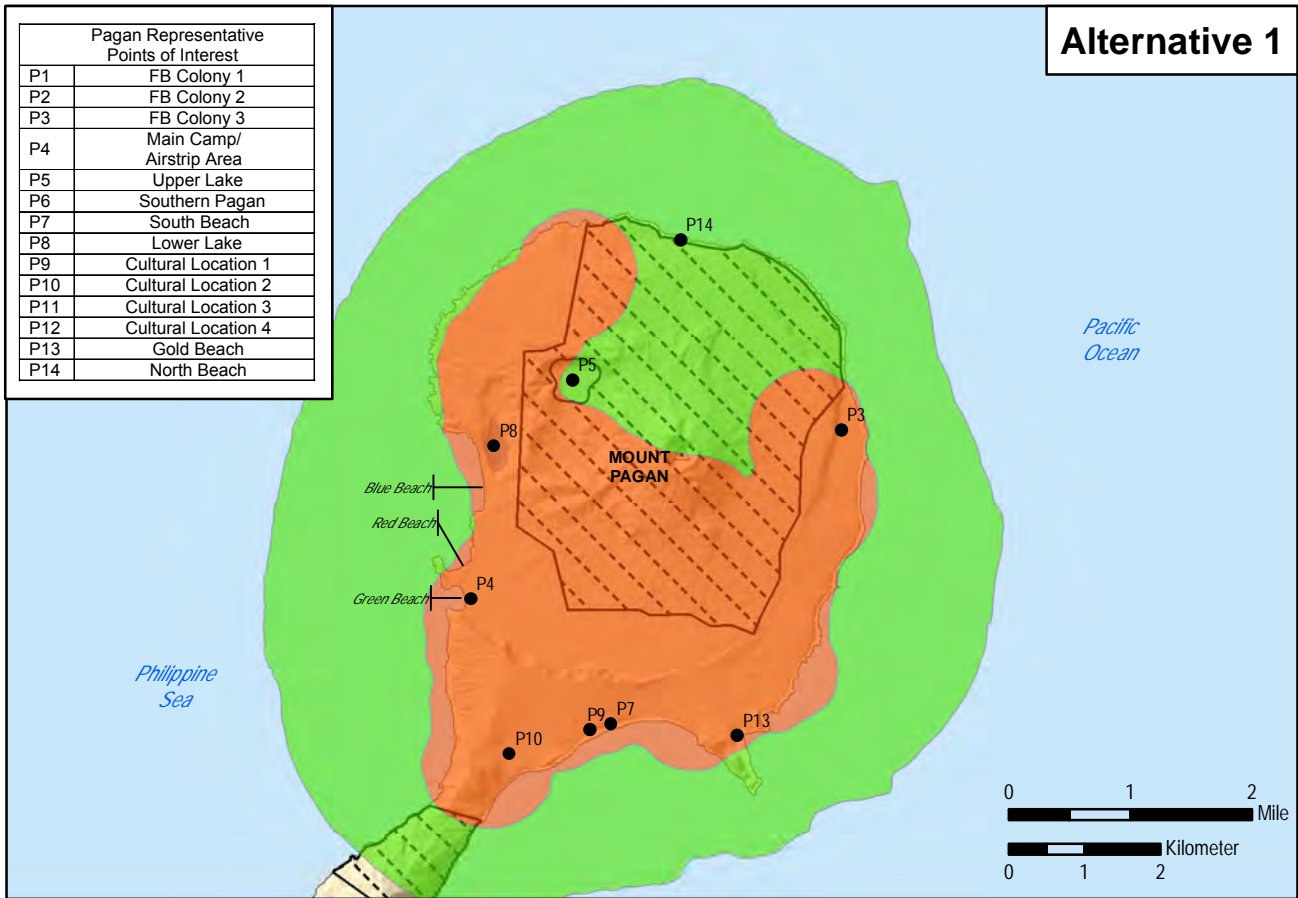
- 75 - 79
- 80 - 84
- >85

### Alternative 2



**Figure 4.5-7. All Pagan Alternatives Small-Caliber Weapons Noise Levels (A-weighted)**





**Legend**

- Points of Interest
  - ▲ Mounts
  - ▨ High Hazard Impact Area
- Peak Sound Level (dB)**
- 87 (Zone II)
  - 104 (Zone III)

**Figure 4.5-8. All Pagan Alternatives Small-Caliber Weapons Noise Levels (Peak)**



**Table 4.5-19. All Pagan Alternatives Affected by Small-caliber Weapons Noise (A-weighted and Peak)**

<b>Noise Levels (in decibels)</b>					
<b>On Shore</b>					
<b>Zone II</b>					
<b>A-weighted Day-Night Sound Levels</b>	<b>Acres/Hectares</b>		<b>Peak Noise Levels</b>	<b>Acres/Hectares</b>	
	<b>Alternative 1</b>	<b>Alternative 2</b>		<b>Alternative 1</b>	<b>Alternative 2</b>
65 – 69	819/331	961/398	87-104	2,112/855	2,152/871
70 – 74	530/214	605/245			
<b>Total Zone II</b>	<b>1,349/545</b>	<b>1,566/634</b>	<b>Peak Total Zone II</b>	<b>2,112/855</b>	<b>2,152/871</b>
<b>Zone III</b>					
75 – 79	302/122	318/128	> 104	6,424/2,601	6,384/2,585
80 – 84	142/57	152/62			
>85	220/8	31/13			
<b>Total Zone III</b>	<b>464/187</b>	<b>500/203</b>	<b>Total Zone III</b>	<b>6,424/2,601</b>	<b>6,384/2,585</b>
<b>Total On shore</b>	<b>1,813/732</b>	<b>2,066/837</b>	<b>Total On shore</b>	<b>8,536/3,456</b>	<b>8,536/3,456</b>
<b>Off shore</b>					
<b>Zone II</b>					
65 – 69	4/2	4/2	87-104	10,745/4,350	10,802/4,373
70 – 74	0	0			
<b>Total Zone II</b>	<b>4/2</b>	<b>4/2</b>	<b>Peak Total Zone II</b>	<b>10,745/4,350</b>	<b>10,802/4,373</b>
<b>Zone III</b>					
75 – 79	0	0	> 104	893	837/339
80 – 84	0	0			
>85	0	0			
<b>Total Zone III</b>	<b>0</b>	<b>0</b>	<b>Total Zone III</b>	<b>893/362</b>	<b>837/339</b>
<b>Total Off shore</b>	<b>4/2</b>	<b>4/2</b>	<b>Total Off shore</b>	<b>11,638/4,712</b>	<b>11,639/4,712</b>

*Large-caliber Weapons*

Large-caliber weapons include live hand grenades, mortars, artillery, and aviation ordnance. Under Pagan Alternative 1, 13,748 large-caliber rounds of ground-delivered ordnance and an additional 13,670 large-caliber rounds of air- and naval-delivered ordnance would be fired in an average year. [Table 4.5-20](#) presents noise generated from Pagan Alternative 1 for C-weighted and Peak (neutral and unfavorable weather conditions); again, both Pagan alternatives are presented. Illustrated in [Figure 4.5-9](#) are the C-weighted day-night average sound level noise contour bands. [Figure 4.5-10](#) illustrates Peak noise levels under neutral weather conditions and [Figure 4.5-11](#) shows Peak noise contours under unfavorable weather conditions. Under Pagan Alternative 1, large-caliber expenditures would expose 8,883 acres (3,595 hectares) of land to noise levels exceeding 62 decibels C-weighted. Visitors may be on Pagan outside of surface danger zones during training activities; however, there would not be any permanent noise-sensitive land uses (e.g., residences, schools) to be affected by C-weighted and Peak noise levels.

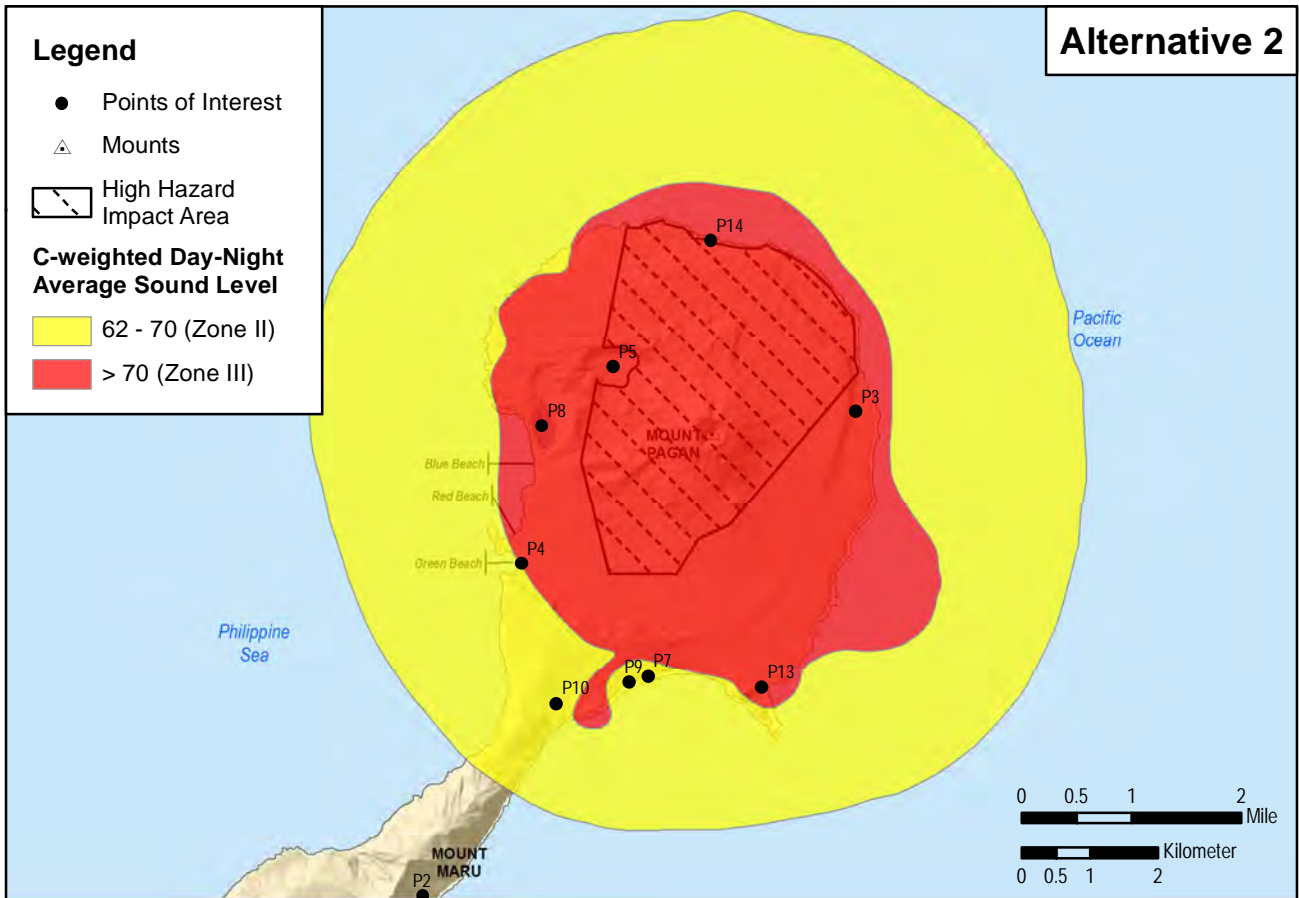
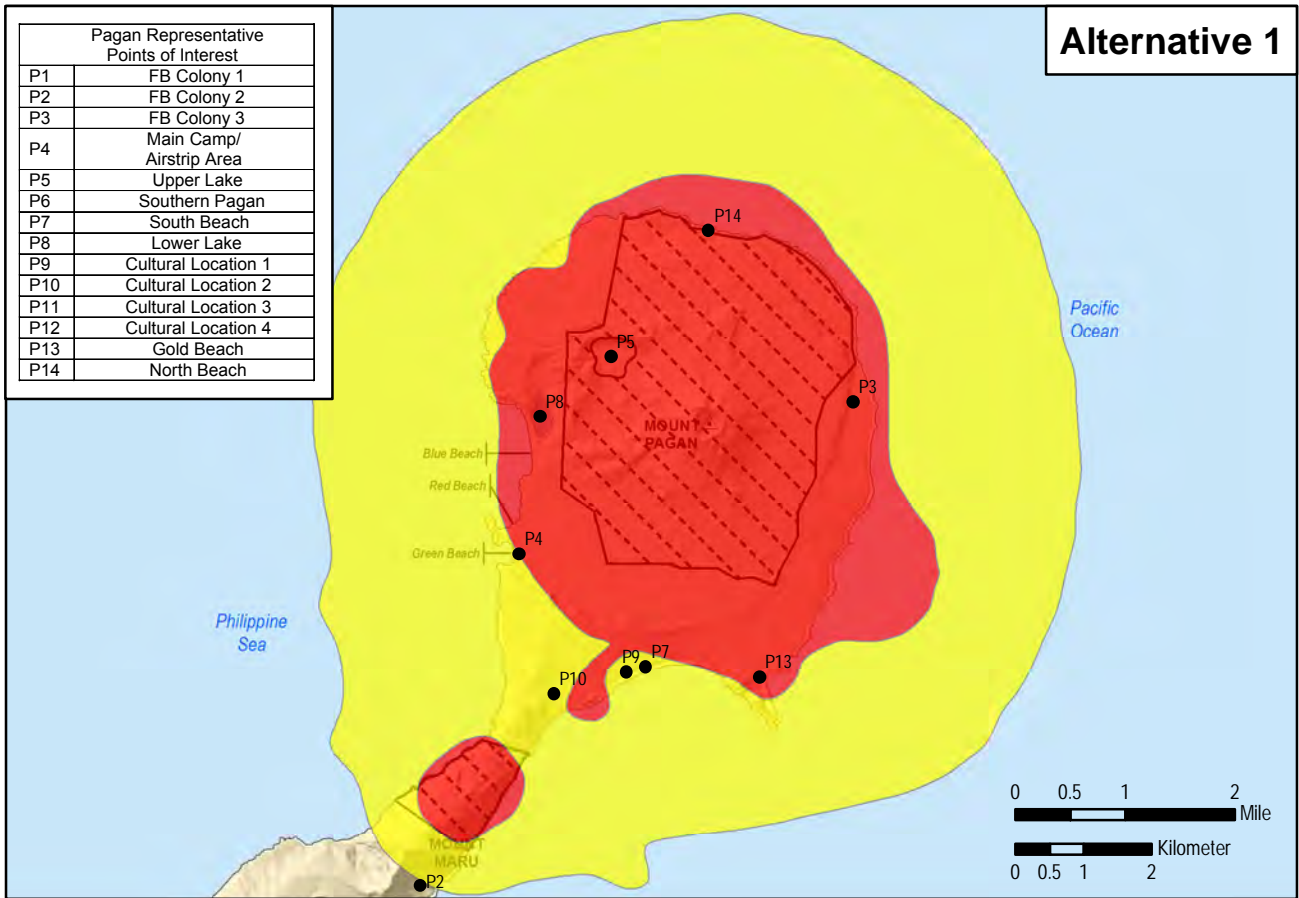
**Table 4.5-20. All Pagan Alternatives Area Affected by Large-caliber Weapons Noise (C-weighted and Peak)**

Noise Zone	Acres/Hectares		
	C-Weighted Day-Night Average Sound Level	Peak Neutral	Peak Unfavorable
<b>Alternative 1</b>			
<b>On Shore</b>			
Zone II/Moderate Complaint Risk	1,120/453	744/301	2,655/1,075
Zone III/High Complaint Risk	7,763/3,142	8,749/3,542	9,138/3,700
<b>Total</b>	<b>8,883/3,595</b>	<b>9,493/3,843</b>	<b>11,793/4,774</b>
<b>Off Shore</b>			
Zone II/Moderate Complaint Risk	17,846/7,222	17,357/7,027	108,855/44,071
Zone III/High Complaint Risk	1,880/761	100,315/40,613	112,072/45,373
<b>Total</b>	<b>19,726/7,983</b>	<b>117,672/47,640</b>	<b>220,927/89,444</b>
<b>Alternative 2</b>			
<b>On Shore</b>			
Zone II/Moderate Complaint Risk	943/382	1,069/433	3,521/1,426
Zone III/High Complaint Risk	7,401/2,995	7,393/2,993	8,272/3,349
<b>Total</b>	<b>8,344/3,377</b>	<b>8,462/3,426</b>	<b>11,793/4,774</b>
<b>Off Shore</b>			
Zone II/Moderate Complaint Risk	16,618/6,725	19,127/7,744	119,492/48,377
Zone III/High Complaint Risk	1,822/737	88,996/36,031	101,436/41,067
<b>Total</b>	<b>18,440/7,462</b>	<b>108,123/43,774</b>	<b>220,928/89,445</b>

Notes: Zone II = 62-70 decibels, Zone III >70 decibels for C-Weighted day-night average sound level.

Moderate Complaint Risk = 115-130 decibels, High Complaint Risk is >130 decibels for Peak Noise Level.

Source: Army Public Health Command 2014.

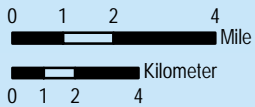
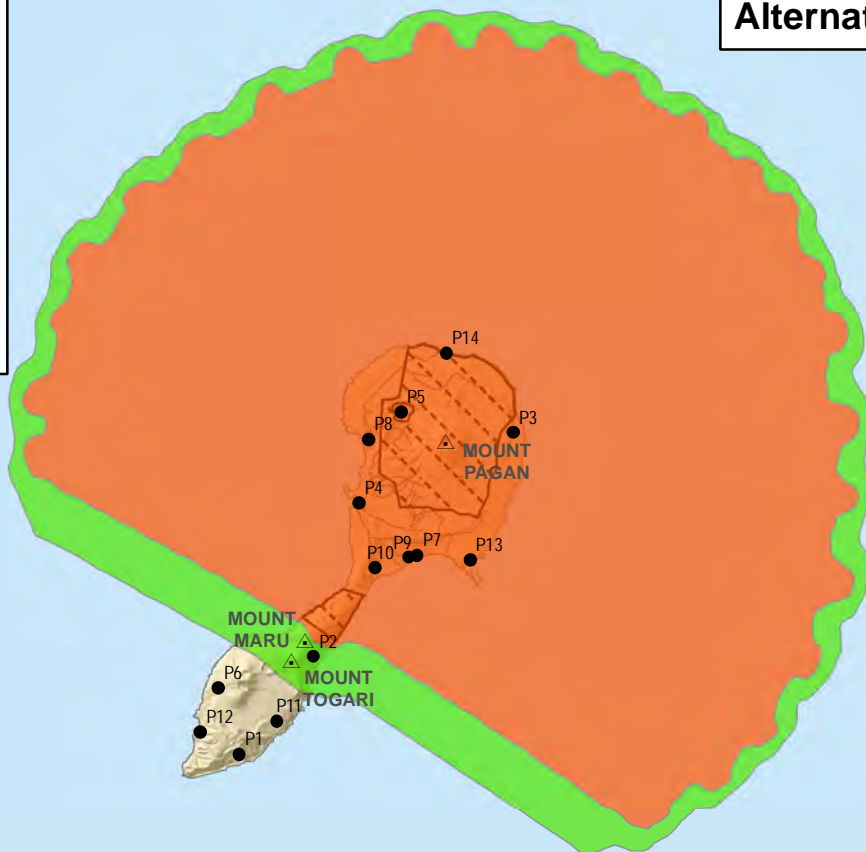


**Figure 4.5-9. All Pagan Alternatives Large-Caliber Weapons Noise Levels (C-weighted)**



Pagan Representative Points of Interest	
P1	FB Colony 1
P2	FB Colony 2
P3	FB Colony 3
P4	Main Camp/Airstrip Area
P5	Upper Lake
P6	Southern Pagan
P7	South Beach
P8	Lower Lake
P9	Cultural Location 1
P10	Cultural Location 2
P11	Cultural Location 3
P12	Cultural Location 4
P13	Gold Beach
P14	North Beach

### Alternative 1



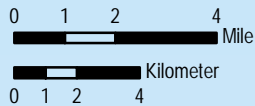
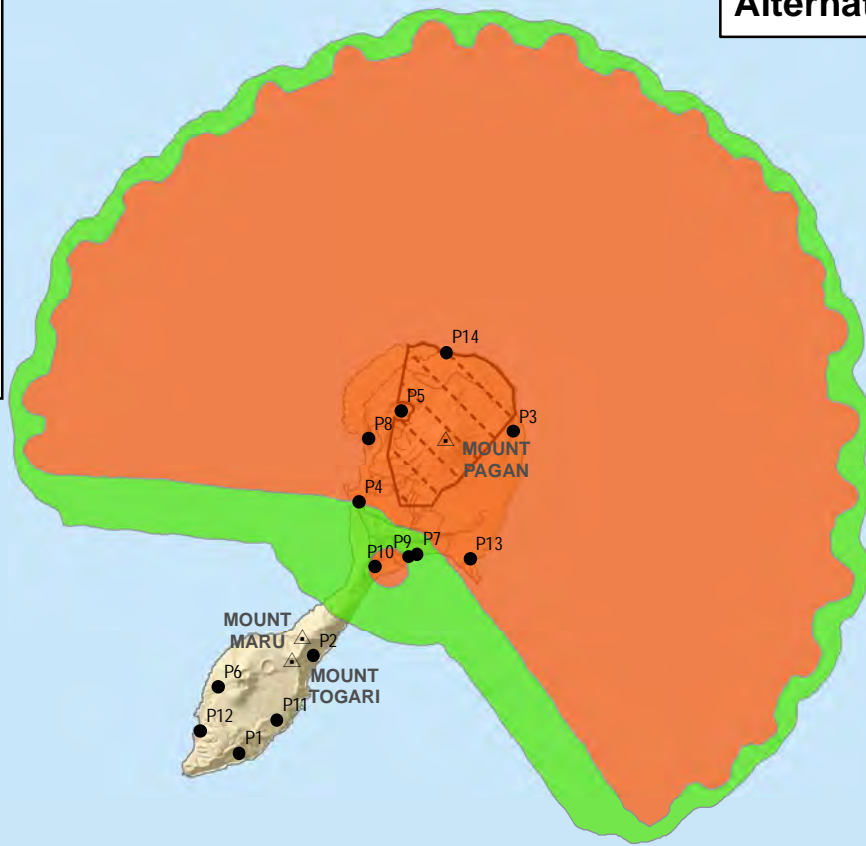
### Legend

- Points of Interest
- ▲ Mounts
- ▭ High Hazard Impact Area

### Peak Noise Level (dB)

- 115 (Zone II)
- 130 (Zone III)

### Alternative 2

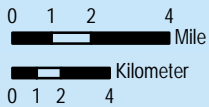
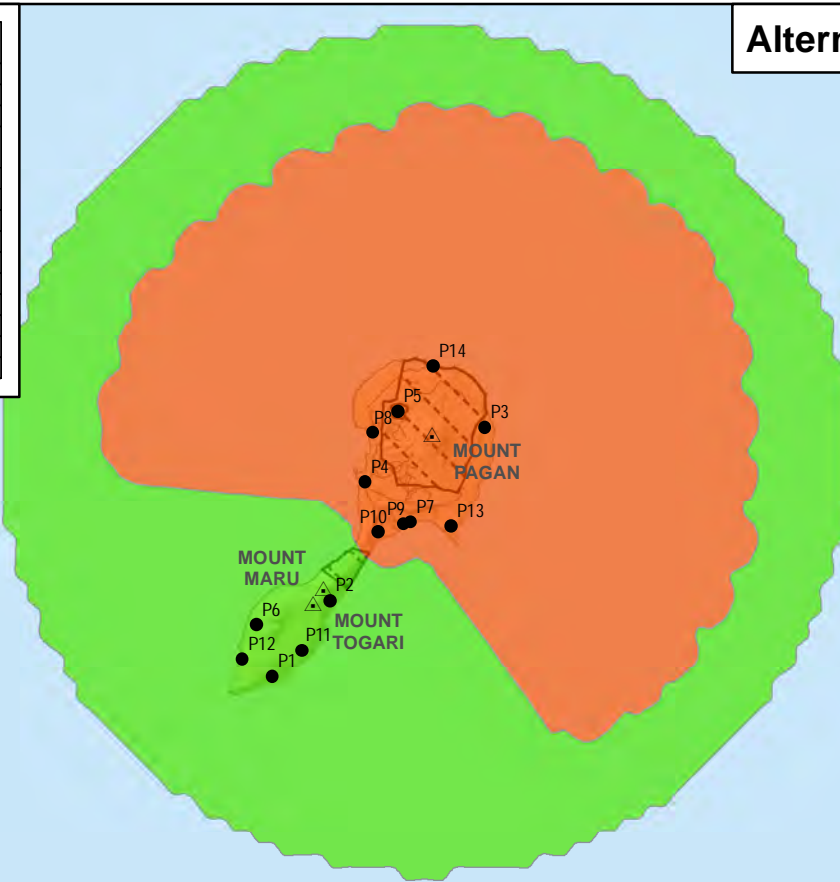


**Figure 4.5-10. All Pagan Alternatives Large-Caliber Noise Levels Under Neutral Weather Conditions (Peak)**



Pagan Representative Points of Interest	
P1	FB Colony 1
P2	FB Colony 2
P3	FB Colony 3
P4	Main Camp/ Airstrip Area
P5	Upper Lake
P6	Southern Pagan
P7	South Beach
P8	Lower Lake
P9	Cultural Location 1
P10	Cultural Location 2
P11	Cultural Location 3
P12	Cultural Location 4
P13	Gold Beach
P14	North Beach

### Alternative 1



### Legend

- Points of Interest
- ▲ Mounts
- ▭ High Hazard Impact Area

### Peak Noise Level (dB)

- 115 (Zone II)
- 130 (Zone III)

### Alternative 2

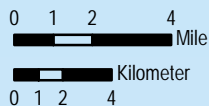
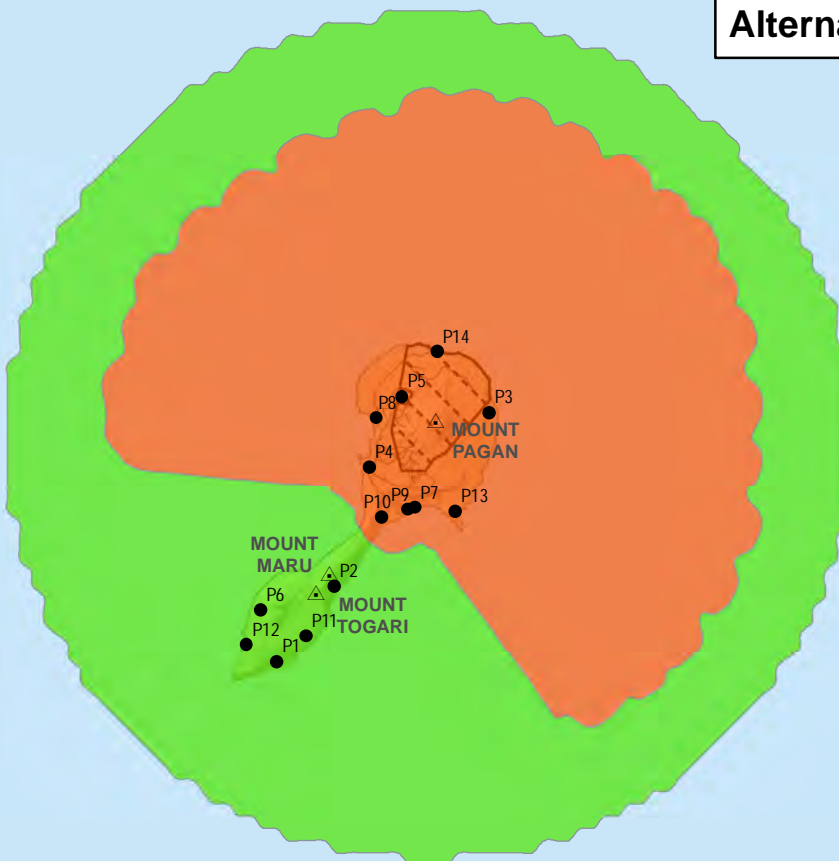


Figure 4.5-11. All Pagan Alternatives Large-Caliber Noise Levels under Unfavorable Weather Conditions (Peak)





[Table 4.5-21](#) presents the C-weighted day-night average sound levels and [Table 4.5-22](#) lists Peak noise levels, respectively, at representative points of interest on Pagan. All points of interest would be exposed to Noise Zones II and III. However, these C-weighted noise levels would be compatible because there are no residences, schools, or hospitals on the island. While there may be visitors on Pagan, the number of visitors is unknown, they would be present for short periods of time, and they are not present outside of southern Pagan during training events. Therefore, estimates for affected population were not included.

Large-caliber weapons operations associated with Pagan Alternative 1 would result in no direct or indirect noise impacts that would cause incompatibilities to sensitive land uses (i.e., residences or schools) or points of interest.

**Table 4.5-21. All Pagan Alternatives Points of Interest from Large-caliber Weapon Activity (C-weighted)**

Identification Number	Point of Interest (POI)	Type of POI <sup>1</sup>	Alternative 1			Alternative 2		
			Decibels	Noise Zone <sup>2</sup>	Noise-Sensitive POI Conflict	Decibels	Noise Zone <sup>1</sup>	Noise-Sensitive POI Conflict
P1	Fruit Bat Colony 1	Other	55	I	NA	55	I	NA
P2	Fruit Bat Colony 2	Other	62	II	NA	58	I	NA
P3	Fruit Bat Colony 3	Other	74	III	NA	74	III	NA
P4	Main Camp/ Airstrip Area	Transient Lodging	70	III	No <sup>3</sup>	70	III	No <sup>3</sup>
P5	Upper Lake	Other	76	III	NA	77	III	NA
P6	Southern Pagan	Other	56	I	NA	55	I	NA
P7	South Beach	Other	69	II	NA	69	II	NA
P8	Lower Lake	Other	74	III	NA	74	III	NA
P9	Cultural Location 1	Other	69	II	NA	69	II	NA
P10	Cultural Location 2	Other	69	II	NA	69	II	NA
P11	Cultural Location 3	Other	56	I	NA	56	I	NA
P12	Cultural Location 4	Other	55	I	NA	54	I	NA
P13	Gold Beach	Other	74	III	NA	74	III	NA
P14	North Beach	Other	78	III	NA	79	III	NA

Notes: NA – not applicable, see annotation number 1.

<sup>1</sup>Other includes sites with biological, cultural, recreational, or other concerns that are not related to human factors and are addressed in the applicable resource sections of the CJMT EIS/OEIS.

<sup>2</sup>Demolition and large-caliber Noise Zones defined as: LUPZ (57-62 decibel CDNL); Zone I (<57 decibel CDNL); Zone II (62-70 decibel CDNL); and Zone III (>70 decibel CDNL)

<sup>3</sup>POI is human but is a tactical training location and, therefore, considered compatible with these noise levels.

Source: Army Public Health Command 2014.

**Table 4.5-22. All Pagan Alternatives Representative Points of Interest Affected by Large-caliber Weapons Noise (Peak)**

Point of Interest (POI)			Alternative 1		Alternative 2	
			Unfavorable Weather Conditions	Neutral Weather Conditions	Unfavorable Weather Conditions	Neutral Weather Conditions
Identification Number	Description	Type <sup>1</sup>	Decibel <sup>2</sup>	Decibel <sup>2</sup>	Decibel <sup>2</sup>	Decibel <sup>2</sup>
P1	Fruit Bat Colony 1	Other	120	< 110	120	< 110
P2	Fruit Bat Colony 2	Other	136	125	124	112
P3	Fruit Bat Colony 3	Other	> 150	147	> 150	147
P4	Main Camp/Airstrip Area	Transient Lodging	139 <sup>2</sup>	131 <sup>2</sup>	139 <sup>2</sup>	128 <sup>2</sup>
P5	Upper Lake	Other	> 150	> 150	> 150	> 150
P6	Southern Pagan	Other	121	< 110	121	< 110
P7	South Beach	Other	137	134	137	126
P8	Lower Lake	Other	> 150	146	> 150	146
P9	Cultural Location 1	Other	139	134	139	127
P10	Cultural Location 2	Other	145	134	145	134
P11	Cultural Location 3	Other	121	< 110	121	< 110
P12	Cultural Location 4	Other	119	< 110	119	< 110
P13	Gold Beach	Other	> 150	145	> 150	145
P14	North Beach	Other	> 150	> 150	> 150	> 150

Notes: <sup>1</sup>Other includes sites with cultural, biological, recreational, or other concerns that are unrelated to human factors and are addressed in the applicable resource sections of the CJMT EIS/OEIS.

<sup>2</sup>Noise level threshold is 110 decibel Peak.

<sup>3</sup>Complaint risk areas defined as: low risk of complaints <115 decibel Peak; moderate risk of complaints 115-130 decibels Peak; and high risk of complaints > 130 decibel Peak.

<sup>4</sup>POI is considered a tactical training location and complaint risk correlation does not apply.

Source: Army Public Health Command 2014.

#### 4.5.4.1.2.2 Airfield and Airspace Based Operations

Acres exposed to noise levels exceeding 65 decibels (A-weighted) at and around the airfield are presented in [Table 4.5-23](#) for Pagan Alternatives 1 and 2. [Figure 4.5-12](#) illustrates the noise contour bands. While there are visitors on Pagan, they are not permanent residents, and therefore estimates for affected population were not included.

**Table 4.5-23. All Pagan Alternatives Noise Exposure Area at and Around the Airfield (A-weighted)**

Contour Band (in decibels)	Acres/Hectares	
	On Shore	Off Shore
65 – 70	4,608/1,866	1,331/539
70 – 75	153/62	0
75 – 80	0	0
80 – 85	0	0
85+	0	0
<b>Total</b>	<b>4,761/1,928</b>	<b>1,331/539</b>

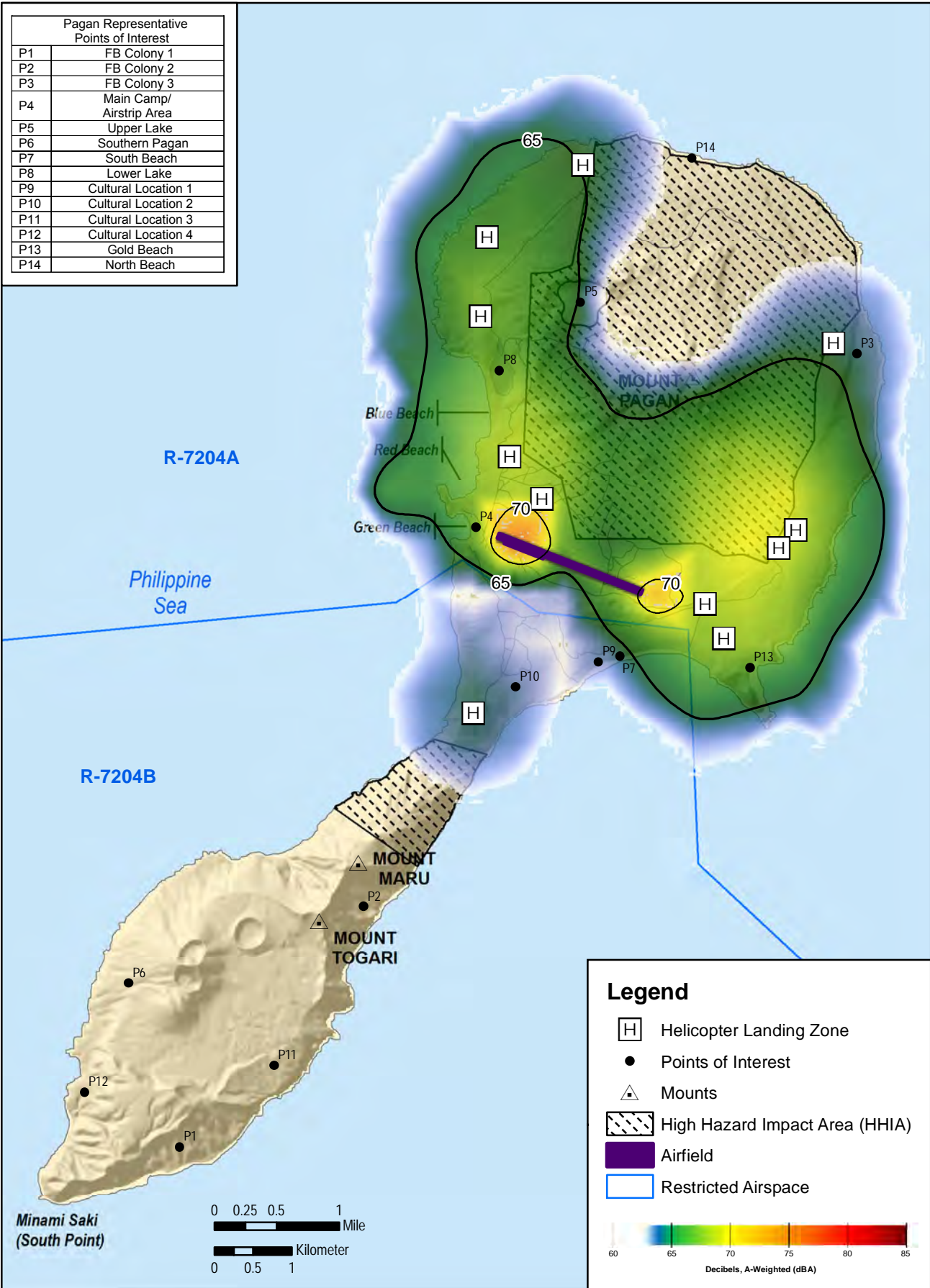


Figure 4.5-12. All Pagan Alternatives Airfield and Airspace Noise Levels (A-weighted)



Under Pagan Alternative 1, 4,761 acres (1,928 hectares) would be exposed to noise levels between 65 and 75 decibels, A-weighted day-night average sound levels generated by airfield activities. Subsonic (i.e., aircraft flying slower than the speed of sound) noise levels resulting from overland aircraft training is depicted in [Figure 4.5-12](#). No sensitive receptors (e.g., schools or hospitals) would be affected and no people live permanently on the island. Supersonic activities (i.e., aircraft flying faster than the speed of sound) would be allowed immediately above and in Special Use Airspace around Pagan. Supersonic activities would be infrequent, occurring about 30 times per year, for approximately 1 minute each time, and above 10,000 feet (3,048 meters) MSL.

Pagan Alternative 1 aircraft operations would result in no direct or indirect noise impacts. No sensitive receptors (e.g., schools or hospitals) or people would be exposed to subsonic or supersonic noise levels.

#### **4.5.4.1.2.3 Waterborne Operations**

Waterborne activities would include Amphibious Assault Vehicles, Landing Craft Air Cushion vessels, and Landing Craft Utility for transporting personnel and equipment to Pagan. Of all the vessels planned for use, the Landing Craft Air Cushion operations would be the loudest. During ground run-up conditions Landing Craft Air Cushions generate maximum noise levels of 98 decibels at 200 feet (61 meters), and on water sound exposure levels could be up to 104 A-weighted decibels at 40 knots (74 kilometers per hour) (DoN 2009).

Landing Craft Air Cushion vessels would operate at amphibious landing beaches and near shore of Pagan and generate noise levels of about 74 decibels during ground run-up conditions and 80 decibels at 40 knots (74 kilometers per hour). Amphibious Assault Vehicles would be the next loudest vessels, with sound exposure levels of about 87-88 decibels moving on water or land, and around 72 decibels at a distance of 100 feet (30 meters) while at idle. Landing Craft Utility and Light Armored Vehicles would be used but are smaller and have less horsepower. This would result in noise levels lower than either the Landing Craft Air Cushion or the Amphibious Assault Vehicles.

Underwater operational noise generated by sea-going vessels' engines would not create noise levels affecting people or sensitive land uses.

Waterborne operations would generate no direct and indirect noise impacts for Pagan Alternative 1 because there are no residences, schools, or hospitals to affect. While there are visitors on Pagan, they do not permanently reside there at the time of this study, and therefore estimates for affected population were not included.

#### **4.5.4.1.2.4 Traffic**

Vehicular traffic associated with Pagan Alternative 1 would include movement across the island on equipment brought by the training units, such as wheeled and tracked vehicles.

Pagan Alternative 1 traffic operations would result in no direct or indirect noise impacts because there are neither sensitive receptors (e.g., schools or hospitals) nor people that permanently reside on Pagan at the time of this study who could be affected.

## 4.5.4.2 Pagan Alternative 2

### 4.5.4.2.1 Construction Impacts

Noise impacts associated with Pagan Alternative 2 construction activities and airfield improvements would be similar to Pagan Alternative 1. The only differences, which would not change any construction activities identified in Pagan Alternative 1, are that the High Hazard Impact Area on the isthmus would not be established and the northern High Hazard Impact Area would be smaller. Construction activities (including all training and support facilities) and airfield improvements would not affect any permanent residential properties or noise-sensitive receptors such as schools, places of worship, and hospitals, and no underwater construction is proposed as of the time of this study.

Pagan Alternative 2 would result in no direct or indirect noise impacts generated by construction activities.

### 4.5.4.2.2 Operation Impacts

#### 4.5.4.2.2.1 Ground Based Operations

##### *Small-caliber Weapons*

Pagan Alternative 2 small-caliber weapons expenditures would be the same as Pagan Alternative 1. [Table 4.5-19](#) provides the acres affected by small-caliber weapons noise in Noise Zones II and III. [Figure 4.5-7](#) and [Figure 4.5-8](#) present the small-caliber A-weighted day-night average sound level contours and Peak noise levels, respectively. Pagan Alternative 2, A-weighted noise levels would affect 2,066 acres (837 hectares) on shore, an increase of the 253 acres (102 hectares) when compared to Pagan Alternative 1. Peak noise levels would be the same as Pagan Alternative 1 and affect 8,536 acres (3,456 hectares). No permanent noise-sensitive land uses (e.g., residences, schools) or people permanently reside on Pagan at the time of this study that would be affected.

Pagan Alternative 2 small-caliber weapons operations would result in no direct or indirect significant noise impacts. No permanent noise-sensitive land uses (e.g., residences, schools) or people permanently reside on Pagan at the time of this study that would be affected by A-weighted and Peak noise levels.

##### *Large-caliber Weapons*

Pagan Alternative 2 large-caliber weapons expenditures would be the same as Pagan Alternative 1. [Table 4.5-20](#) presents noise generated from Pagan Alternative 2 for C-weighted and Peak (neutral and unfavorable weather conditions). [Figure 4.5-9](#) shows the C-weighted day-night average sound level contours, [Figure 4.5-10](#) depicts the Peak noise levels under neutral weather conditions, and [Figure 4.5-11](#) shows the Peak noise contours under unfavorable weather conditions. Under Pagan Alternative 2, large-caliber expenditures would expose 8,344 acres (3,377 hectares) of land to noise levels exceeding 62 decibels C-weighted. When compared to Pagan Alternative 1, this is a decrease of 539 acres (218 hectares). No noise-sensitive land uses (e.g., residences, schools) or people would be impacted by these C-weighted and Peak noise levels. In respect to points of interest (see [Table 4.5-21](#)), all would be exposed to Noise Zones II and III. However, these C-weighted noise levels would be considered compatible because there are no permanent residences, schools, or hospitals to affect, and no people

permanently reside on Pagan at the time of this study that are present to impose increased risks of complaints from elevated Peak noise levels.

Large-caliber weapons operations would result in no direct or indirect noise impacts for Pagan Alternative 2. No permanent noise-sensitive land uses (e.g., residences, schools) or people permanently reside on Pagan at the time of this study that would be affected by C-weighted and Peak noise levels.

#### **4.5.4.2.2.2 Airfield and Airspace Based Operations**

Pagan Alternative 2 aircraft operations would be the same as Pagan Alternative 1. For Pagan Alternative 2, the acres exposed to noise levels exceeding 65 decibels A-weighted, at and around the airfield, are presented in [Table 4.5-23](#); [Figure 4.5-12](#) illustrates the noise contour bands. Pagan Alternative 2 A-weighted day-night average sound levels generated by airfield activities would expose 4,761 acres (1,928 hectares) to noise levels between 65 and 75 decibels, the same as Pagan Alternative 1.

Pagan Alternative 2 aircraft operations would result in no direct or indirect noise impacts. No permanent sensitive receptors (e.g., schools or hospitals) or people permanently reside on Pagan at the time of this study that would be exposed to subsonic or supersonic noise levels.

#### **4.5.4.2.2.3 Waterborne Operations**

Underwater operational noise generated by sea-going vessels' engines would not create noise levels affecting people or noise-sensitive land uses.

Pagan Alternative 2 waterborne operations would not generate any direct or indirect noise impacts because there are no permanent residences, schools, or hospitals to affect, and no people permanently reside on Pagan at the time of this study that are present.

#### **4.5.4.2.2.4 Traffic**

Vehicular traffic associated with Pagan Alternative 2 would be the same as Pagan Alternative 1. Vehicular traffic would include travel and training across the island by training personnel and their associated equipment.

Pagan Alternative 2 traffic operations would have no direct or indirect noise impacts. There are neither permanent sensitive receptors (e.g., schools or hospitals) nor people permanently reside on Pagan at the time of this study that that would be affected.

### **4.5.4.3 Pagan No-Action Alternative**

The Pagan no-action alternative assumes non-live-fire training on Pagan. Only infrequent visitation of eco-tourism customers or scientific survey personnel would be expected to continue. Military personnel have periodically visited Pagan for search and rescue training and this activity would be expected to continue. The no-action alternative would consist of short term and infrequent activities and would have no noise impacts.

#### 4.5.4.4 Summary of Impacts for Pagan Alternatives

Table 4.5-24 provides a comparison of the potential impacts to noise resources for the two Pagan alternatives and the no-action alternative.

**Table 4.5-24. Summary of Impacts for Pagan Alternatives**

Resource Area	Pagan (Alternative 1)		Pagan (Alternative 2)		No-Action Alternative	
	Construction	Operation	Construction	Operation	Construction	Operation
Noise						
On Land	<i>LSI</i>	<i>Not applicable</i>	<i>LSI</i>	<i>Not applicable</i>	<i>NI</i>	<i>Not applicable</i>
In Water	<i>NI</i>	<i>Not applicable</i>	<i>NI</i>	<i>Not applicable</i>	<i>NI</i>	<i>Not applicable</i>
Ground-Based Operation	<i>Not applicable</i>	<i>NI</i>	<i>Not applicable</i>	<i>NI</i>	<i>Not applicable</i>	<i>NI</i>
Airfield and Airspace Based Operations	<i>Not applicable</i>	<i>NI</i>	<i>Not applicable</i>	<i>NI</i>	<i>Not applicable</i>	<i>NI</i>
Waterborne Operation	<i>Not applicable</i>	<i>NI</i>	<i>Not applicable</i>	<i>NI</i>	<i>Not applicable</i>	<i>NI</i>
Traffic	<i>Not applicable</i>	<i>NI</i>	<i>Not applicable</i>	<i>NI</i>	<i>Not applicable</i>	<i>NI</i>
Occupational Noise	<i>Not applicable</i>	<i>NI</i>	<i>Not applicable</i>	<i>NI</i>	<i>Not applicable</i>	<i>NI</i>

Legend: *LSI* = less than significant impact; *NI* = no impact.