

## CHAPTER 3. OVERVIEW OF ALTERNATIVES

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### 3.1 INTRODUCTION

As described in Chapter 1, the proposed actions consists of: (1) development and construction of facilities and infrastructure to support approximately 8,600 Marines and their dependents relocated from Okinawa to Guam, and development and construction of facilities and infrastructure to support training and operations on Guam and Tinian for the relocated Marines; (2) construction of a new deep-draft wharf with shoreside infrastructure improvements creating the capability in Apra Harbor, Guam to support a transient nuclear powered aircraft carrier; and (3) development and construction of facilities and infrastructure on Guam to support relocating approximately 600 military personnel and their dependents to establish and operate an Army Air and Missile Defense Task Force (AMDTF). Each major project component (i.e., the U.S. Marine Corps on Guam, the Marine Corps on Tinian [Commonwealth of the Northern Mariana Islands {CNMI}], the Navy, and the Army) has its own sets of alternatives. In addition, related actions include utilities and roadway projects necessary to implement the proposed actions. Below is a summary of alternatives for each of the major project components.

#### ***Chapter 3:***

##### *3.1 Introduction*

##### *3.2 Marine Corps Relocation – Guam (Volume 2)*

##### *3.3 Marine Corps Relocation – Training on Tinian (Volume 3)*

##### *3.4 Aircraft Carrier Berthing (Volume 4)*

##### *3.5 Army Air and Missile Defense Task Force (Volume 5)*

##### *3.6 Utilities & Roadway Projects -Guam (Volume 6)*

## 3.2 MARINE CORPS RELOCATION – GUAM (VOLUME 2)

Alternatives 1, 2, 3, and 8 were retained for analysis and are being evaluated for the development and construction of facilities and infrastructure to support Marine Corps relocation on Guam for the Main Cantonment and training are shown in Figure 3.2-1. (Alternatives 4 through 7 were eliminated from further consideration through the process discussed in Volume 2.) Land parcels for the Main Cantonment are depicted in Figure 3.2-1a. Figure 3.2-2 depicts proposed actions and alternatives carried forward for the Marine Corps relocation on Guam. In addition to the Main Cantonment alternatives, there are alternatives for firing ranges for live and inert ordnance, range access roads, and non-firing maneuver ranges. Figure 3.2-1 also displays the locations for waterfront projects in Apra Harbor, ammunition storage locations at the Naval Munitions Site (NMS) and Munitions Storage Area, Andersen Air Force Base (AFB), and aviation facilities and embarkation facilities at Andersen AFB. These projects are associated with the relocation and remain the same for all alternatives. Main Cantonment alternatives are discussed below and the land parcels are compared in Table 3.2-1.

### 3.2.1 Alternative 1

Alternative 1 includes: Naval Computer Telecommunications Station (NCTS) Finegayan (1,090 acres [ac] [441 hectares {ha}]), South Finegayan (290 ac [117 ha]), acquisition of the Federal Aviation Administration (FAA) parcel (680 ac [275 ha]), and acquisition Harmon Annex (328 ac [133 ha]), for a total of 2,388 ac [966 ha]. Of the total Overlay Refuge (2,095 ac [848 ha]) in the Finegayan area, this alternative would develop approximately 29% (599 ac [242 ha]). The Overlay Refuge that is managed pursuant to a Memorandum of Agreement with the United States Fish and Wildlife Service (USFWS) (Navy and USFWS 1994). “Overlay Refuge” refers to specific areas on Guam that were established through a cooperative program centered on the protection of endangered and threatened species and other native flora and fauna, maintenance of native ecosystems, and the conservation of native biological diversity in cooperation with Guam Department of Agriculture Division of Aquatic and Wildlife Resources that is consistent with the national defense mission of the DoN and Air Force.

The site of this alternative would be bounded to the north by Andersen AFB Northwest Field (NWF) and Route 3; and on the west by a cliff line (within Department of Defense [DoD] property) and the Philippine Sea. It would be bounded to the east by limited residential development and to the south by the Harmon Village residential area (non-DoD property). Although DoD property extends to the waterline, the Main Cantonment area would be situated on the upper area of NCTS Finegayan and would not encroach on the cliff line leading to the ocean.

### **Chapter 3:**

#### *3.1 Introduction*

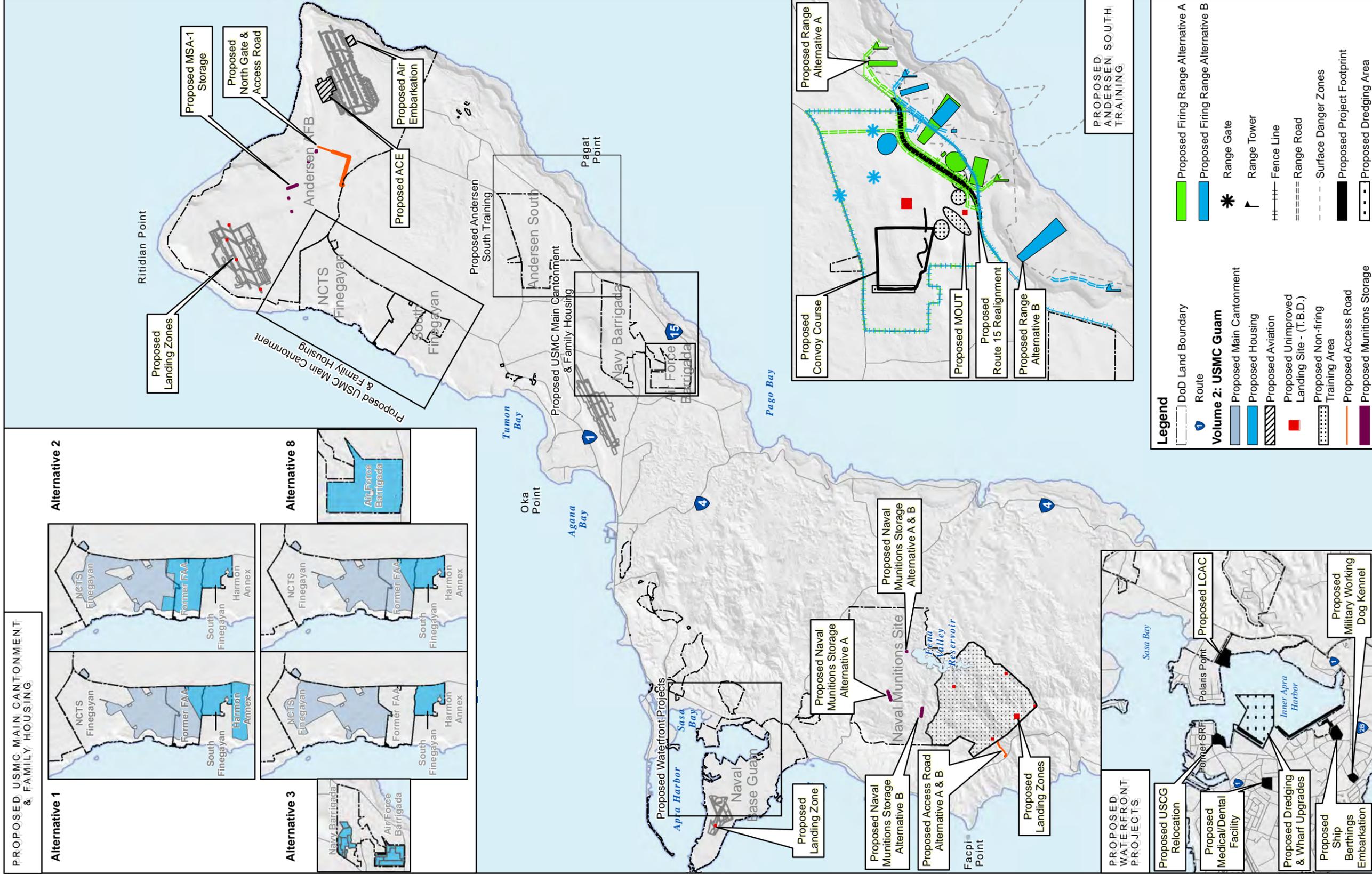
#### *3.2 Marine Corps Relocation – Guam (Volume 2)*

#### *3.3 Marine Corps Relocation – Training on Tinian (Volume 3)*

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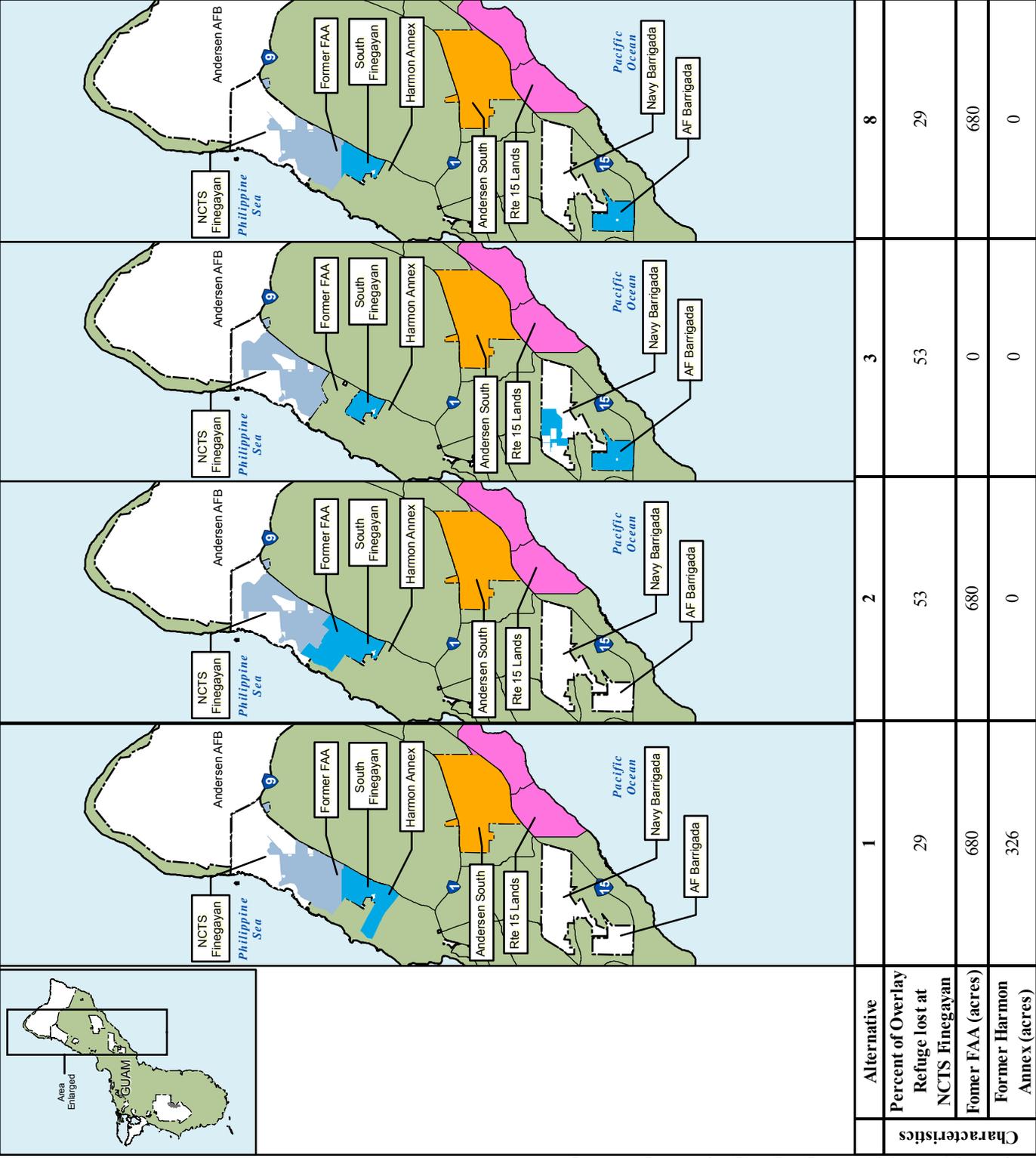
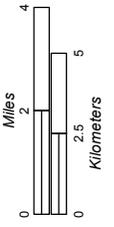
**Figure 3.2-1**  
**Volume 2: Marine Corps Relocation Alternatives (Guam)**



**Figure 3.2-1a**  
Comparison of Main  
Cantonment Area  
Alternatives

Legend

-  DoD-No Planned Landuse
-  Non-DoD Lands
-  Main Cantonment
-  Family Housing/Community Support
-  Firing Range Alternative (A, B)
-  Non-Fire Training

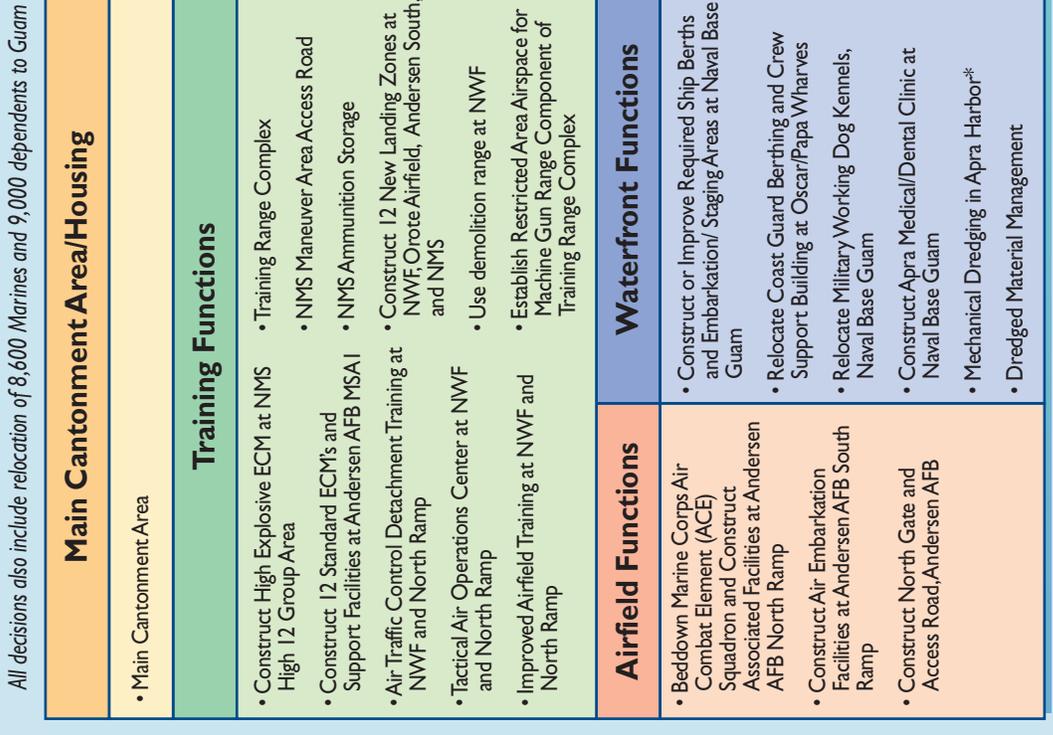


Alternative	1	2	3	8
Percent of Overlay	29	53	53	29
Refuge lost at NCTS Finegayan	680	680	0	680
Fomer FAA Annex (acres)	326	0	0	0

LEGEND

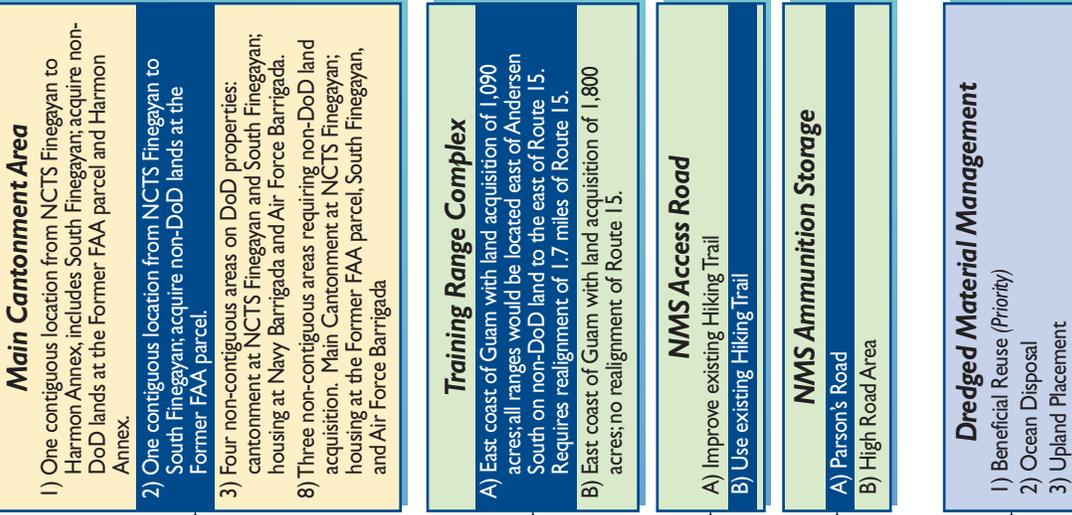
Preferred Alternative

PROPOSED ACTION



**VOLUME 2:  
Marine Corps  
Relocation**

**ALTERNATIVES CARRIED FORWARD**  
(excludes no-action alternative)



\*Note: Analysis assumed dredging by mechanical means as an environmental maximum potential adverse affect method and is the method historically used at Apra Harbor. Hydraulic dredge may be used in final design and permitting.

Figure 3.2-2  
Summary of Proposed Action and Alternatives Carried Forward for the Marine Corps Relocation, Guam

**Table 3.2-1. Summary of Parcels for Each Main Cantonment Alternative (Alternative 2–Preferred)**

Alternative	Total Land (ac/ha)	DoD Lands				Private Lands		Finegayan Overlay Refuge <sup>1</sup> (ac/ha)
		NCTS Finegayan <sup>1,2</sup> (ac/ha)	South Finegayan <sup>3</sup> (ac/ha)	Navy Barrigada <sup>2</sup> (ac/ha)	Air Force Barrigada <sup>4</sup> (ac/ha)	Former FAA <sup>5</sup> (ac/ha)	Harmon Land <sup>6</sup> (ac/ha)	
1	2,388/966	1,090/441	290/117			680/275	328/133	599/242
2	2,580/1,044	1,610/652	290/117			680/275		1,106/448
3	2,707/1,096	1,610/652	290/117	377/153	430/174			1,106/448
8	2,490/1,008	1,090/441	290/117		430/174	680/275		599/242

Notes: <sup>1</sup>Based on calculations for vegetation cover in Chapter 10.

<sup>2</sup>Proposed developed area only.

<sup>3</sup>Assumes entire parcel is developed.

<sup>4</sup>Excludes Next Generation Weather Radar (NEXRAD).

<sup>5</sup>Total acquisition area, including planned open space.

<sup>6</sup>Total acquisition area.

### 3.2.2 Alternative 2 (Preferred Alternative)

Alternative 2 includes: NCTS Finegayan (1,610 ac [652 ha]), South Finegayan (290 ac [117 ha]), and acquisition of the FAA parcel (680 ac [275 ha]), for a total of 2,580 ac [1,044 ha]. Of the total Overlay Refuge (2,095 ac [848 ha]) in the Finegayan area, this alternative would develop approximately 53% (1,106 ac [448 ha]). Under Alternative 2, the Main Cantonment area would also be configured such that all facilities would be on one contiguous parcel of land, including the family housing area.

The site of Alternative 2 would be also bounded on the north by Andersen AFB NWF, and by Route 3; on the west by a cliff line (within DoD property) and the Philippine Sea. It would be bounded to the east by a limited residential development and to the south by the Harmon Village residential area (non-DoD property).

### 3.2.3 Alternative 3

Alternative 3 includes: NCTS Finegayan (1,610 ac [652 ha]), South Finegayan (290 ac [117 ha]), with portions of the military housing and quality of life (QOL) services at Air Force and Navy Barrigadas (430 and 377 ac, respectively [174 ha and 153 ha]), for a total of 2,707 ac (1,096 ha). Of the total Overlay Refuge (2,095 ac [848 ha]) in the Finegayan area, this alternative would develop approximately 53% (1,106 ac [448 ha]). Under this alternative, the Main Cantonment area would be configured such that the housing would not be contiguous to the Main Cantonment area.

This configuration of the Main Cantonment area would be bounded on the north by Andersen AFB, on the west by a cliff line and the Philippine Sea, by Route 3 and limited residential development to the east, and by the former FAA area to the south. South Finegayan would be used for housing; it is located south of the former FAA area. The Navy and Air Force Barrigadas are located approximately 9 miles (mi) (14 kilometers [km]) from the proposed Main Cantonment area on the eastern side of Guam. Navy and Air Force Barrigadas have Route 15 bordering the site to the east, and Routes 10 and 16 bordering the site to the west. Navy Barrigada is largely used to support DoD communications high frequency transmitting activities. Headquarters facilities for the Guam Army National Guard are located adjacent to Navy land at the Barrigada. The Navy Barrigada is 1,418 ac (574 ha) and of that, 250 ac (101 ha) are available for development. The Air Force Barrigada is a 433 ac (175 ha) parcel used by the Air Force to accommodate the Next Generation Weather Radar weather satellite receiver. It has been estimated that 400 ac (162 ha) of this parcel would be available for development. The Navy Barrigada and the Air Force Barrigada are

currently connected by the Navy Golf Course. The golf course would be removed if it was determined that the two parcels should be connected.

### 3.2.4 Alternative 8

Alternative 8 includes: NCTS Finegayan (1,090 ac [441 ha]), acquisition of the FAA parcel (680 ac [275 ha]), South Finegayan (290 ac [117 ha]), and portions of military housing and QOL services at Air Force Barrigada (430 ac [174 ha]), for a total of 2,490 ac (1,008 ha). Of the total Overlay Refuge (2,095 ac [848 ha]) in the Finegayan area, this alternative would develop approximately 29% (599 ac [242 ha]). In Alternative 8, as with Alternative 3, the Main Cantonment area would be configured such that a portion of the housing would not be contiguous to the Main Cantonment area.

### 3.2.5 Additional Projects Required for Marine Corps Relocation – Guam

#### 3.2.5.1 Training Range Complex

##### Range Alternative A (Preferred Alternative)

Alternative A for the Training Range Complex includes all ranges located east of Andersen South on non-DoD land to the east of Route 15 as shown on Figure 3.2-1. The total land area, not including submerged lands, is estimated at 1,090 ac (441 ha). This alternative would require the realignment/reconstruction of a portion of Route 15. An approximately 1.7 mi (2.8 km)-long segment of Route 15 would be relocated to the north into Andersen South.

##### Range Alternative B

Range Alternative B would not require realignment of Route 15, and the land for this alternative is estimated at 1,800 ac (728 ha) as shown on Figure 3.2-1. Land acquisition would be required for control of lands associated with the Surface Danger Zones (SDZs) east of Route 15. Special Use Airspace (SUA) (restricted area) would also be required above the SDZs in the vicinity of Route 15.

#### 3.2.5.2 Naval Munitions Site Access Road Alternatives (NMS Access Road Alternative B Preferred)

The access road alternatives are located outside NMS property and would require acquisition of a right-of-way extending approximately 300 ft (91 m) from the road centerline. The access road alternatives are as follows:

- NMS Access Road Alternative A: This existing hiking trail is 0.4 mi (0.6 km) long, would cover 0.8 ac (0.3 ha) at a 16-ft (5-m) width, and includes no stream crossings. Under Alternative A, the trail would be improved. Vegetation would be cleared for the road shoulder for a total estimated width of disturbance of 50 ft (15 m). Locked, unmanned gates would be placed at the beginning of the access road and at the entrance to the NMS.
- NMS Access Road Alternative B (preferred): Under this alternative, the road would not be improved and would be used by foot traffic.

These access road alternatives are depicted on Figure 3.2-1.

##### Ammunition Storage Alternatives

The candidate sites for ammunition storage in support of the proposed action are the NMS and Andersen AFB Munitions Storage Area (MSA).

##### NMS (Preferred Alternative)

One high explosive earth-covered magazine (ECM) (providing up to 500,000 pounds [lb] net explosive weight [NEW] storage) would be sited in the High 12 Group area of NMS that contains other high

explosive magazines. Ten other ECMs would be co-located at the NMS based on operational efficiency. Two locations were considered as potential sites for these ECMs: the Parson's Road Area and the High Road Area.

- Parson's Road Area (Ammunition Storage Alternative 1-Preferred): this area has two configurations for layout of 10 ECMs that would allow for a combined capacity of 360,000 lb NEW.
- High Road Area (Ammunition Storage Alternative 2): this area has one site that could accommodate 10 ECMs in a configuration that would allow for a combined capacity of 500,000 lb NEW.

Construction of one ECM at the High 12 Group area and 10 additional ECMs at either the Parson's Road (Alternative 1) or High Road (Alternative 2) area would occur within existing munitions area boundaries and would not alter the existing ESQD arcs at NMS. Land use constraints at each site include natural resources and proximity to other magazines. Although there may be opportunities for using older magazines with appropriate upgrades or replacing existing magazines with the proposed ECMs, the EIS evaluates the development of ammunition storage facilities in currently undeveloped areas. This does not preclude replacement or upgrade alternatives within implementation, but rather conservatively estimates potential impacts for the purposes of this EIS.

#### Andersen AFB MSA

Within MSA 1 (Andersen AFB), one alternative was identified for the placement of ECMs, work areas, administrative/inert warehouse building, and storage for ammunition, chaff, and flares. The proposed ECMs would be sited within the existing grid of ECMs at MSA while the storage for ammunition, chaff, and flares would be satisfied with an addition to an existing building. All proposed munitions facilities would be sited within existing munitions area boundaries and would not alter the existing ESQD arcs. An administration and inert warehouse facility would be constructed in the southeast corner of the MSA adjacent to the Air Force 36<sup>th</sup> Munitions Squadron administrative facility. Land use constraints at each site include natural resources and proximity to other ammunition storage facilities and infrastructure. As with the NMS alternative, although there may be opportunities for using older magazines with appropriate upgrades or replacing existing magazines with the proposed ECMs, the EIS evaluates development of the ECMs in currently undeveloped areas. This does not preclude replacement or upgrade alternatives within implementation, but rather conservatively estimates potential impacts for the purposes of this EIS.

#### 3.2.5.3 Airfield Projects

Airfield projects associated with the Marines relocation would be located at Andersen AFB North Ramp and include: beddown and construction of associated facilities for the Marine Corps Air Combat Element; construction of air embarkation facilities, construction of entry control point and associated facilities to control access to the Marine Corps facilities at the airfield (refer to Figure 3.2-1).

#### 3.2.5.4 Waterfront Projects

Waterfront projects associated with the Marines relocation would be consolidated with existing Marine Corps and U.S. Navy activities at Apra Harbor. Certain infrastructure improvements and facility relocations, however, would be required to accommodate the additional functions. Some wharfs would be refurbished and infrastructure improved. An embarkation and staging area would also be created. The U.S. Coast Guard ship berthing and crew support building would be relocated to a different wharf. The Apra Medical/Dental Clinic would be relocated on Naval Base Guam. The Military Working Dog Kennel would also be relocated. These proposed projects are depicted on Figure 3.2-1.

### 3.3 MARINE CORPS RELOCATION – TRAINING ON TINIAN (VOLUME 3)

Alternatives evaluated for training on the island of Tinian related to the Marine Corps relocation are shown in Figure 3.3-1. Figure 3.3-2 shows the proposed action and alternatives carried forward for the Marine Corps relocation training actions on the island of Tinian.

#### 3.3.1 Alternative 1 (Preferred Alternative)

This alternative includes development of four live-fire training ranges within the leaseback area on the island of Tinian. Three ranges would be oriented north, with the fourth, the Platoon Battle Course, oriented northeast. All four range footprints partially overlay the FAA Mitigation Area. The associated notional SDZs for these ranges would overlap to a large extent. They would extend over the FAA Mitigation Area, DoD “No Wildlife Disturbance” Mount Lasso escarpment area, and a segment of Broadway. No SDZs would extend beyond land and into the ocean.

#### 3.3.2 Alternative 2

Under the Range Training Area Alternative 2, no ranges would be located south of 86<sup>th</sup> Street. Compared to Alternative 1 there would be more range footprint encroachment on the FAA Mitigation Area.

The Platoon Battle Course would be located south of its Alternative 1 location. The orientation would be aligned toward the northeast, similar to Alternative 1. The Field Firing Range would be located east of Broadway and oriented to the northeast within the SDZ extending over the ocean.

#### 3.3.3 Alternative 3

Alternative 3 configuration is notably different from Alternatives 1 and 2 due to three of the ranges being sited south of 86<sup>th</sup> Street and north of West Field. These three ranges are the Field Firing Range, Automated Combat Pistol/Military Police Firearms Qualification Course and the Rifle Known Distance Range. All three ranges are sited along the southern Military Lease Area boundary and aligned generally to the north. None of these range footprints is within the FAA Mitigation Area. None of the SDZs under Alternative 3 extend into the ocean.

#### **Chapter 3:**

3.1 Introduction

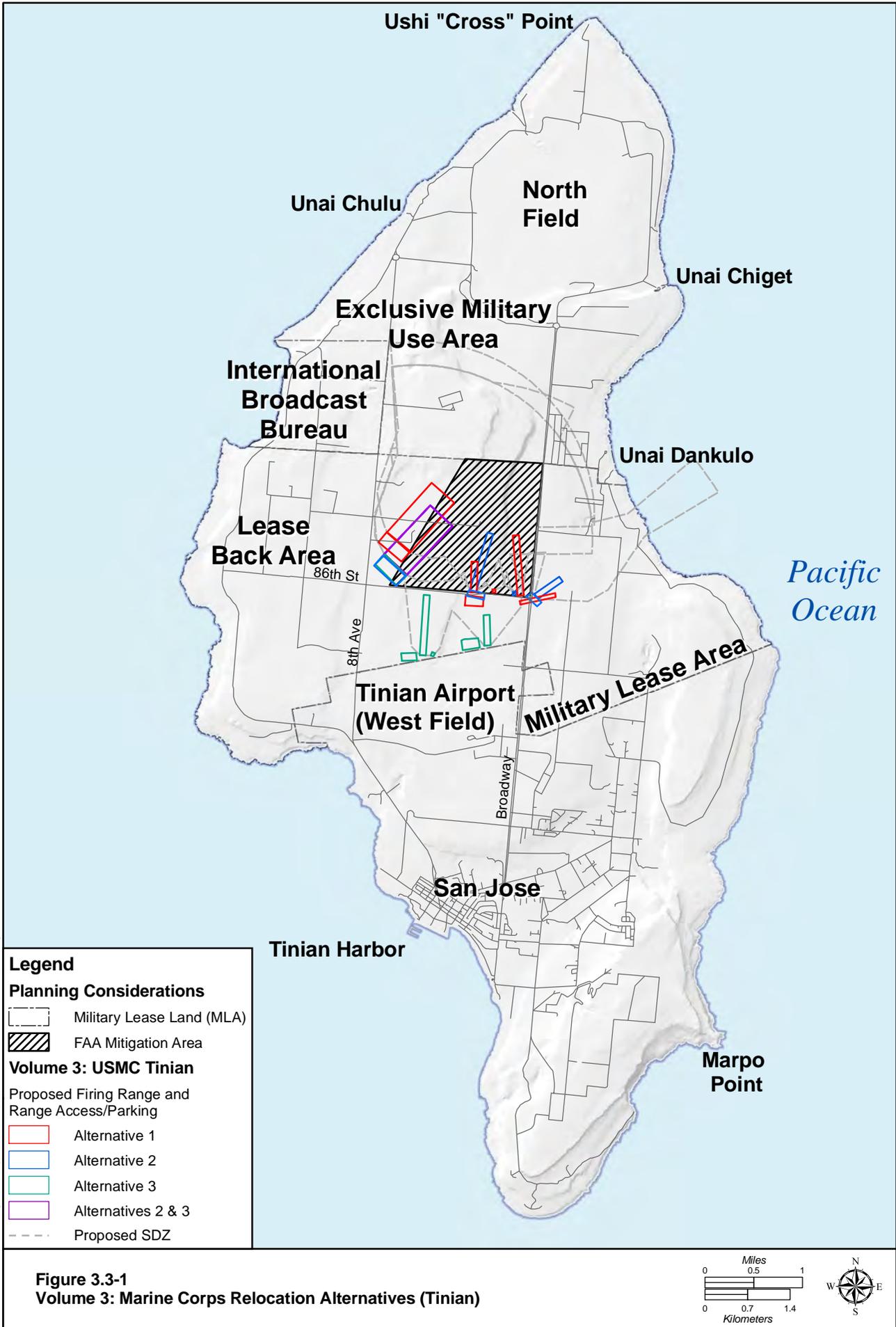
3.2 Marine Corps Relocation – Guam (Volume 2)

3.3 Marine Corps Relocation – Training on Tinian (Volume 3)

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3.5 Army Air and Missile Defense Task Force (Volume 5)

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LEGEND  
Preferred Alternative

**PROPOSED ACTION**

**Live-Fire Training Ranges**  
(All within the Military Lease Area)

- Rifle Known Distance Range (KD)
- Automated Combat Pisto//Military Police Firearm Qualification Course (Pisto//MP)
- Platoon Battle Course (Platoon)
- Field Firing Range (Field)
- Surface Danger Zones (SDZs)

**Airspace Use**

- The vertical hazard area associated with the proposed firing ranges would be managed to ensure threat aircraft could safely operate in airspace overlying the proposed firing ranges.

**VOLUME 3:  
Training on Tinian**

Choose One

**ALTERNATIVES CARRIED FORWARD**  
(excludes no-action alternative)

**Alternative 1**

- KD – alignment north/northeast
- Pisto//MP – alignment north
- Platoon – alignment northeast
- Field – alignment north
- SDZs – none over ocean or south of 86th Street

**Alternative 2**

- KD – alignment north/northeast
- Pisto//MP – alignment north
- Platoon – alignment northeast
- Field – alignment north
- SDZs – one over ocean, none south of 86th Street

**Alternative 3**

- KD – alignment north
- Pisto//MP – alignment north
- Platoon – alignment northeast
- Field – alignment north
- SDZs – none over ocean, some south of 86th Street

Figure 3.3-2  
Summary of Proposed Action and Alternatives Carried Forward for the Marine Corps Relocation – Training, Tinian

### 3.4 AIRCRAFT CARRIER BERTHING (VOLUME 4)

Alternatives being evaluated for the aircraft carrier berthing are shown in Figure 3.4-1. The flow chart shown in Figure 3.4-2 depicts the proposed action and alternatives carried forward for the Navy aircraft carrier berthing on Guam.

The wharf alternatives are located on either side of the entrance to the Inner Apra Harbor channel. The wharf concepts would be pile supported marginal wharfs that would be constructed parallel to shore. Each shares the same navigational approach through Outer Apra Harbor. The aircraft carrier would come through Outer Apra Harbor using the minimum power required to achieve forward motion and assisted by tugboats to provide lateral guidance. Ship navigation into the new berth would require a turning basin in front of the wharf. The turning basin for either alternative are similarly aligned.

#### 3.4.1 Alternative 1 (Preferred Alternative)

This alternative would construct a new deep-draft wharf at Polaris Point with shoreside infrastructure improvements. The existing Outer Apra Harbor Channel would be widened to 600 feet (ft) (183 meters [m]) with minor adjustments to channel centerline and navigational aids. No dredging would be required to widen the Outer Apra Harbor east-west portion of the navigation channel. There is a sharp southward bend in the existing channel toward Inner Apra Harbor that would require widening to 600 ft (183 m) and dredging to meet aircraft carrier requirements. A new ship turning basin would be established that would require dredging to -49.5 ft (-15.1 m) Mean Lower Low Water plus 2 ft (.6 m) overdraft. The turning basin would be located near the wharf and north of the Inner Apra Harbor entrance channel. The eastern edge of the new wharf would not have the required full 600 ft (183 m) of distance from the wharf face and care would be necessary to nudge the carrier into position. However, Commander, U.S. Pacific Fleet requirements show that ships can safely navigate the reduced clearance at this site.

It is anticipated that a transient aircraft carrier and its escort ships would rely on shoreside utility infrastructure for water, wastewater, and solid waste after 2015. Electric power would be provided in accordance with customer service agreements (CSA) between Guam Power Authority (GPA) and the U.S. Navy. Any GPA commitments for additional power to support the aircraft carrier and its escort ships will be determined by future CSA modifications. Any required changes in the shoreside power infrastructure or their operations to meet the requirements for the aircraft carrier and its escort ships may require additional NEPA review. A new Port Operations support building and various utility buildings would be constructed on a staging area at the wharf. There would be an area established for morale, welfare, and recreation activities and vehicle parking.

The aircraft carrier would be assisted by tug boats, pivoted within the minimum radius turning basin to be aligned starboard (i.e., right side when facing the front or “bow” of the ship) to the wharf and the bow would be facing east. On departure, the aircraft carrier would follow the same route.

#### **Chapter 3:**

3.1 Introduction

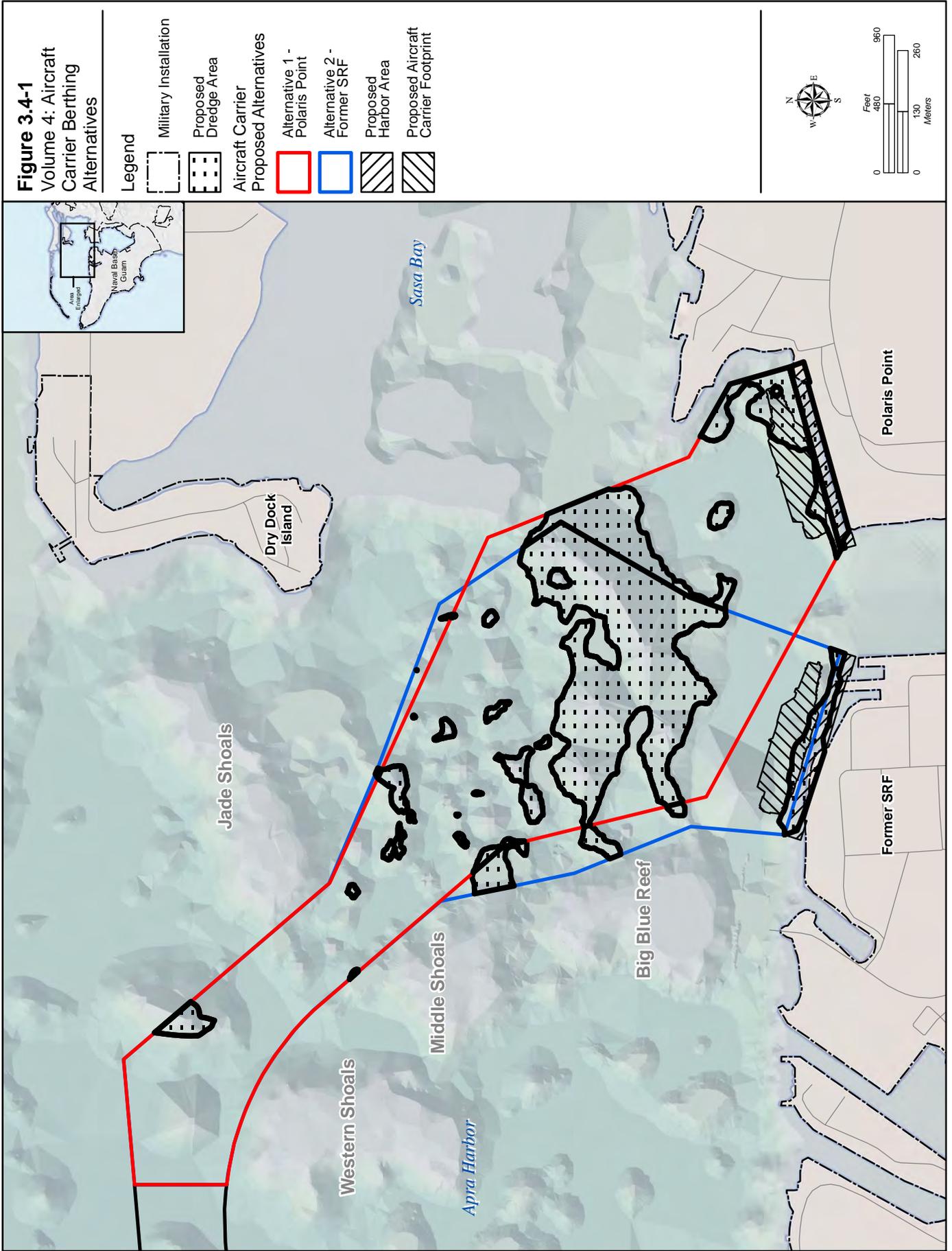
3.2 Marine Corps Relocation –  
Guam (Volume 2)

3.3 Marine Corps Relocation –  
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3)

3.4 Aircraft Carrier Berthing  
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3.5 Army Air and Missile  
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(Volume 5)

3.6 Utilities & Roadway  
Projects -Guam (Volume 6)



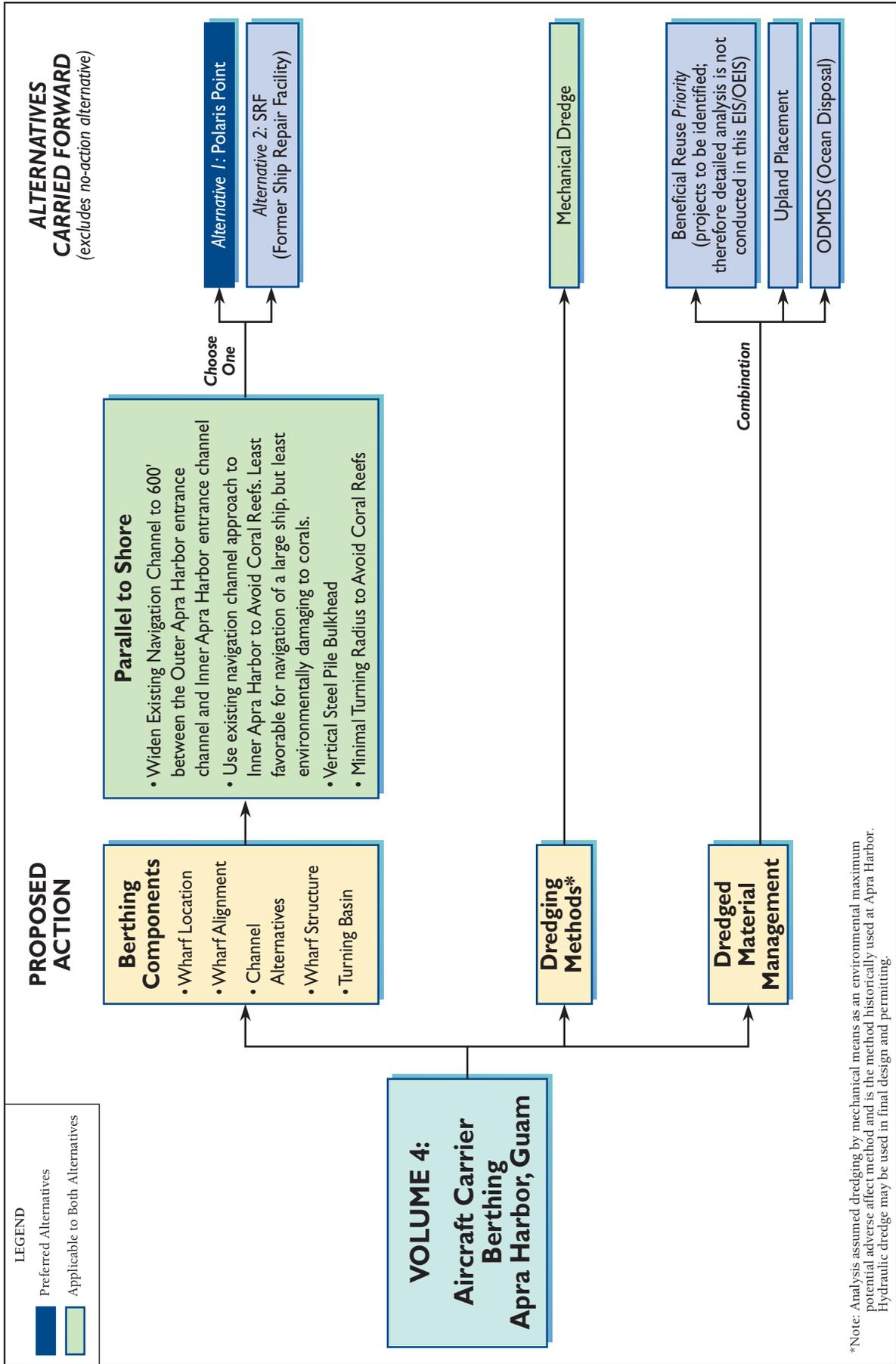


Figure 3.4-2  
Summary of Proposed Action and Alternatives Carried Forward for the Navy Aircraft Carrier Berthing, Guam

Least Environmentally Damaging Practicable Alternative. In addition to being the preferred alternative, Alternative 1 is considered the *least environmentally damaging practicable alternative* (LEDPA). Specifically, § 404(b)(1) of the Clean Water Act stipulates that no discharge of dredged or fill material into waters of the United States, which include wetlands, shall be permitted if there is a practicable alternative which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant environmental consequences. Furthermore, an alternative is considered practicable if it is available and capable of being implemented after taking into consideration cost, existing technology, and logistics in light of overall project purposes. Section 404 permitting is applicable to the proposed new berthing of the aircraft carrier on Guam for the proposed work within Apra Harbor. Permitting decisions are based on guidelines (“404(b)(1) Guidelines”) developed jointly with the USEPA that are now part of 40 CFR 230.

A Section 404 Permit would be applied for and obtained prior to construction. An analysis was conducted during this EIS process to illustrate the screening and selection process used in the development of this EIS has identified the LEDPA consistent with the § 404(b)(1) guidelines (see Volume 4, Section 2.4.1). Following the Record of Decision, the Navy would provide design level detail with its permit application in accordance with the USACE permit process. The USACE would make the final LEDPA determination during its Section 404 permit decision.

### **3.4.2 Alternative 2**

This alternative would have the aircraft carrier berthing at the former Ship Repair Facility. The Outer Apra Harbor channel improvements would be as described in Alternative 1. The turning basin location would be similar to Alternative 1, with a slight shift to the west. Unlike Alternative 1, the full 600-ft (183-m) approach distance in front of the wharf would be accommodated. The aircraft carrier would be pivoted within the minimum radius turning basin to be aligned starboard to the wharf and the bow would be facing east. On departure, the aircraft carrier would follow the same route with assistance by tugs.

### 3.5 ARMY AIR AND MISSILE DEFENSE TASK FORCE (VOLUME 5)

The Navy and Army have conferred and identified three action alternatives to be considered for the proposed Army AMDTF facilities and operations on Guam in addition to the no-action alternative. The two lesser components (the munitions storage magazines and the weapons emplacement sites) each have their own set of alternatives. All three alternatives, discussed below, have been evaluated with regard to stated purpose and need for the proposed AMDTF action and are shown in Figure 3.5-1. Figure 3.5-2 shows the proposed action and alternatives carried forward for the AMDTF facilities on Guam.

The preferred alternative for the proposed headquarters/housing facilities is Alternative 1, the preferred alternative for munitions storage is Alternative 1, and the preferred alternative for the weapons emplacement sites is Alternative 4. Weapon platform siting is classified and is assessed in a Classified Appendix (Appendix L) to this public EIS. This classified information will be reviewed by regulatory agency personnel with the appropriate security clearance.

#### 3.5.1 Headquarters/Housing Alternative 1 (Preferred Alternative)

- The administration/headquarters (HQ), maintenance operations, and housing facilities for unaccompanied personnel would be co-located in the eastern portion of NCTS Finegayan and would be compatible with adjacent proposed Marine Corps land uses.
- Accompanied personnel housing facilities would be co-located with the Main Cantonment housing areas in South Finegayan, while recreational and QOL facilities would be co-located within and adjacent to the housing areas.

#### 3.5.2 Headquarters/Housing Alternative 2

- The administration/HQ and maintenance operations would not be co-located with the Marine Corps Main Cantonment facilities. The administration/HQ and maintenance element would be located within Navy Barrigada adjacent to the NCTS antenna farms.
- Accompanied and unaccompanied personnel housing facilities would be located within Navy Barrigada, with recreational and QOL facilities included in the housing areas.

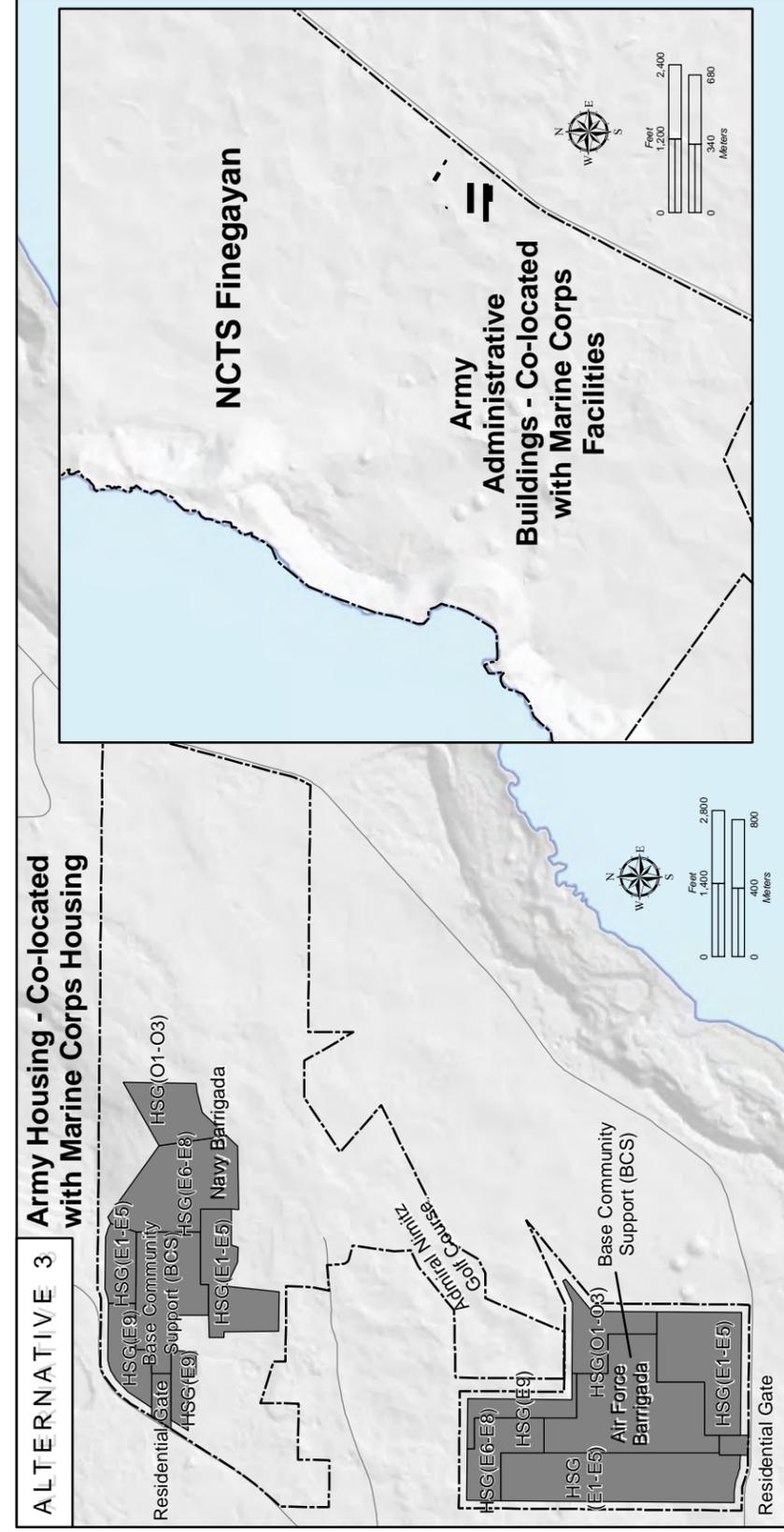
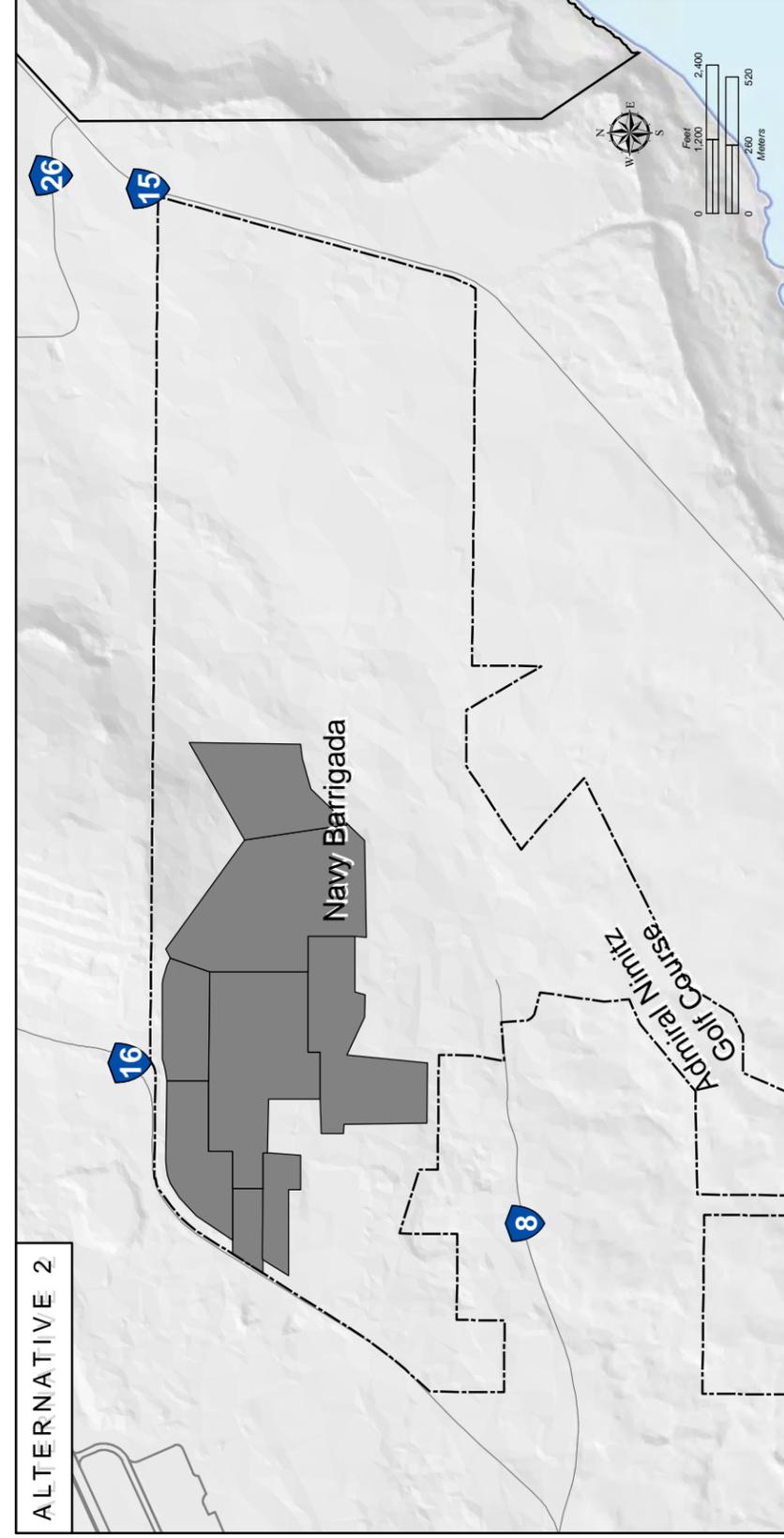
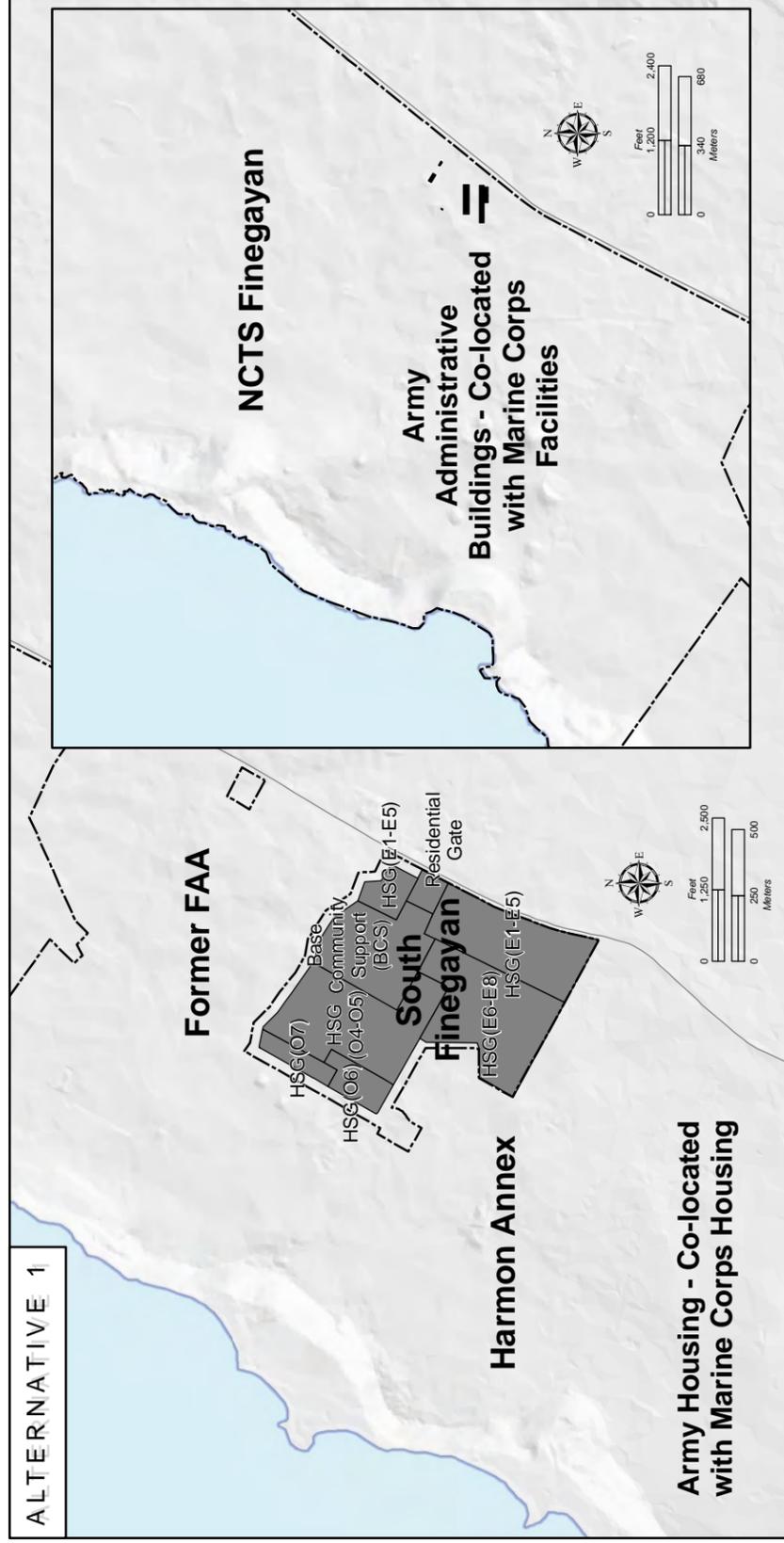
#### 3.5.3 Headquarters/Housing Alternative 3

- The administration/HQ, maintenance, and unaccompanied personnel housing would be co-located in the eastern portion of NCTS Finegayan and would be compatible with adjacent proposed U.S. Marine Corps land uses.
- Accompanied personnel housing facilities would be co-located with Marine Corps housing within Navy Barrigada and Air Force Barrigada. Recreational and QOL facilities would be included in the housing areas.

#### **Chapter 3:**

- 3.1 *Introduction*
- 3.2 *Marine Corps Relocation – Guam (Volume 2)*
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**Figure 3.5-1**  
**Volume 5: Army AMDTF Alternatives**



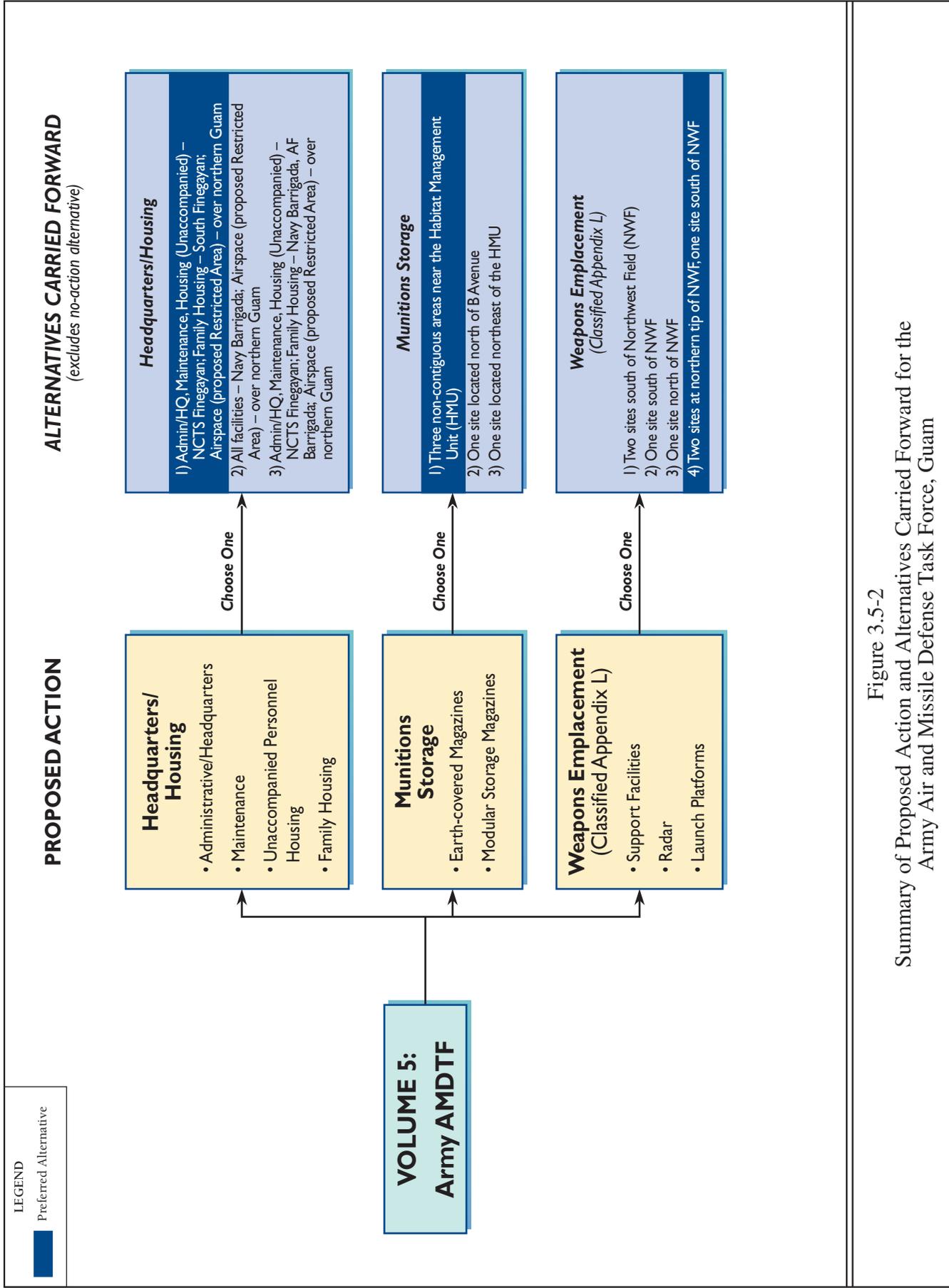


Figure 3.5-2  
Summary of Proposed Action and Alternatives Carried Forward for the Army Air and Missile Defense Task Force, Guam

### 3.5.4 Munitions Storage Alternatives

#### 3.5.4.1 Munitions Storage Alternative 1 (Preferred Alternative)

Munitions storage would be in three non-contiguous areas near the Habitat Management Unit (HMU) at MSA 1 at Andersen AFB. The proposed magazines would be constructed at these two sites (requiring demolition) and at a third site located east of the HMU across an unnamed roadway. The area of ground disturbance including a buffer is estimated to be 6.2 ac (2.5 ha). The existing ESQD arc(s) at MSA 1 would be expanded approximately 400 ft (122 m) to the north to provide the required safety distances for the new munitions storage facilities.

#### 3.5.4.2 Munitions Storage Alternative 2

Munitions storage magazines would be consolidated at one site that is located north of B Avenue at MSA 1. The area of ground disturbance including a buffer is estimated to be 2.3 ac (0.9 ha). The existing ESQD arc(s) at MSA 1 would be expanded approximately 1,100 ft (330 m) to the north to provide the required safety distances for the new munitions storage facilities.

#### 3.5.4.3 Munitions Storage Alternative 3

Munitions storage magazines would be consolidated at a site located northeast of the HMU and an unnamed road at MSA 1. The area of ground disturbance including a buffer is estimated to be 2.3 ac (0.9 ha). The existing ESQD arc(s) at MSA 1 would be expanded approximately 200 ft (60 m) to the south to provide the required safety distances for the new munitions storage facilities.

### 3.5.5 Weapons Emplacement Alternatives (Analysis in Classified Appendix)

There are four alternatives for weapons emplacement sites near NWF at Andersen AFB for the weapons emplacement sites. The general areas of the proposed weapons emplacement sites are not classified, but the proposed configurations within the areas are classified. The alternatives are:

1. Two sites south of NWF
2. One site south of NWF
3. One site north of NWF
4. Two sites at the northern tip of NWF and one site south of NWF

Detailed information on the weapons emplacements is contained in a Classified Appendix (Appendix L) that is only available to regulatory agency reviewers with the appropriate security clearance.

### 3.5.6 Airspace

During Terminal High Altitude Area Defense radar operation, there is a potential hazard to military and civilian aircraft. Therefore, a proposed SUA would be located along and off the northwest coast of Guam. The SUA would consist of a proposed Restricted Area to accommodate hazards associated with Terminal High-Altitude Area Defense radar operations. The proposed Restricted Area (to be called R-7205) would be from the surface up to 22,000 ft (6,700 m) above mean sea level (Flight Level [FL] 220) and would be activated based on FAA approved airspace periods required for system maintenance, training, certification, and contingency operations. Planned preventive maintenance would require a minimum continuous period of 45 minutes daily Monday through Friday. Training and certification periods would be processed to the FAA for approval to use the R-7205 airspace. The FAA would issue a Notice to Airmen (NOTAM) prior to scheduled use of the airspace. There would be no restrictions to off-base ground activities (e.g. use of public roadways) during these preventive maintenance operations.

### 3.6 UTILITIES AND ROADWAY PROJECTS (VOLUME 6)

Alternatives being evaluated for the utilities projects and roadway projects on Guam are described below. Figure 3.6-1 shows the proposed action and alternatives carried forward for utilities on Guam.

#### 3.6.1 Power

##### 3.6.1.1 Basic Alternative 1 (Preferred Alternative)

Basic Alternative 1 would recondition up to 5 existing combustion turbines for reliability/reserve power and upgrade transmission and distribution (T&D) systems. This would not require construction of new baseload power generation facilities or enlargement of the existing footprint of the combustion turbines. This work would be undertaken by the GPA on its existing permitted facilities or by a Special Purpose Entities (SPEs). Reconditioning would be made to existing GPA permitted facilities at the Marbo, Yigo, Dededo (2 units), and Macheche combustion turbines to provide required peaking power/reserve capacity. These combustion turbines are not currently being used up to permit limits. T&D system upgrades would be on existing above ground and underground transmission lines. This alternative supports Main Cantonment Alternatives 1 and 2 and Main Cantonment Alternatives 3 and 8 would require additional upgrades to the T&D system.

Other alternatives considered in the Draft EIS are no longer considered necessary due to revised information from GPA and DoD. With the reevaluation of increased power demands associated with the proposed DoD relocation (including induced civilian growth, normally expected civilian growth, and the construction workforce), revised power demand from transient ships, and the revised approach to provide power to the transient CVN, plus the revised current demand on the GPA system (from GPA data), the current GPA generating resources have been shown to be adequate to meet the increased demand as well as required reserve capacity to ensure reliable service. Thus, Basic Alternative 1 is now the only power alternative evaluated.

#### 3.6.2 Potable Water

##### 3.6.2.1 Basic Alternative 1 (Preferred Alternative)

Basic Alternative 1 would provide additional water capacity of 11.3 million gallons per day (MGd), which is anticipated to be met by an estimated 22 new wells at Andersen AFB, rehabilitation of existing wells, interconnect with the Guam Waterworks Authority (GWA) water system, and associated treatment, storage and distribution systems. Two new 2.5 million gallon (MG) (9.5 million liter [MI]) water storage tanks would be constructed at ground level at NCTS Finegayan. Up to two new elevated 1 MG (3.8 MI) water storage tanks would be constructed at Finegayan within the Main Cantonment footprint.

#### **Chapter 3:**

*3.1 Introduction*

*3.2 Marine Corps Relocation – Guam (Volume 2)*

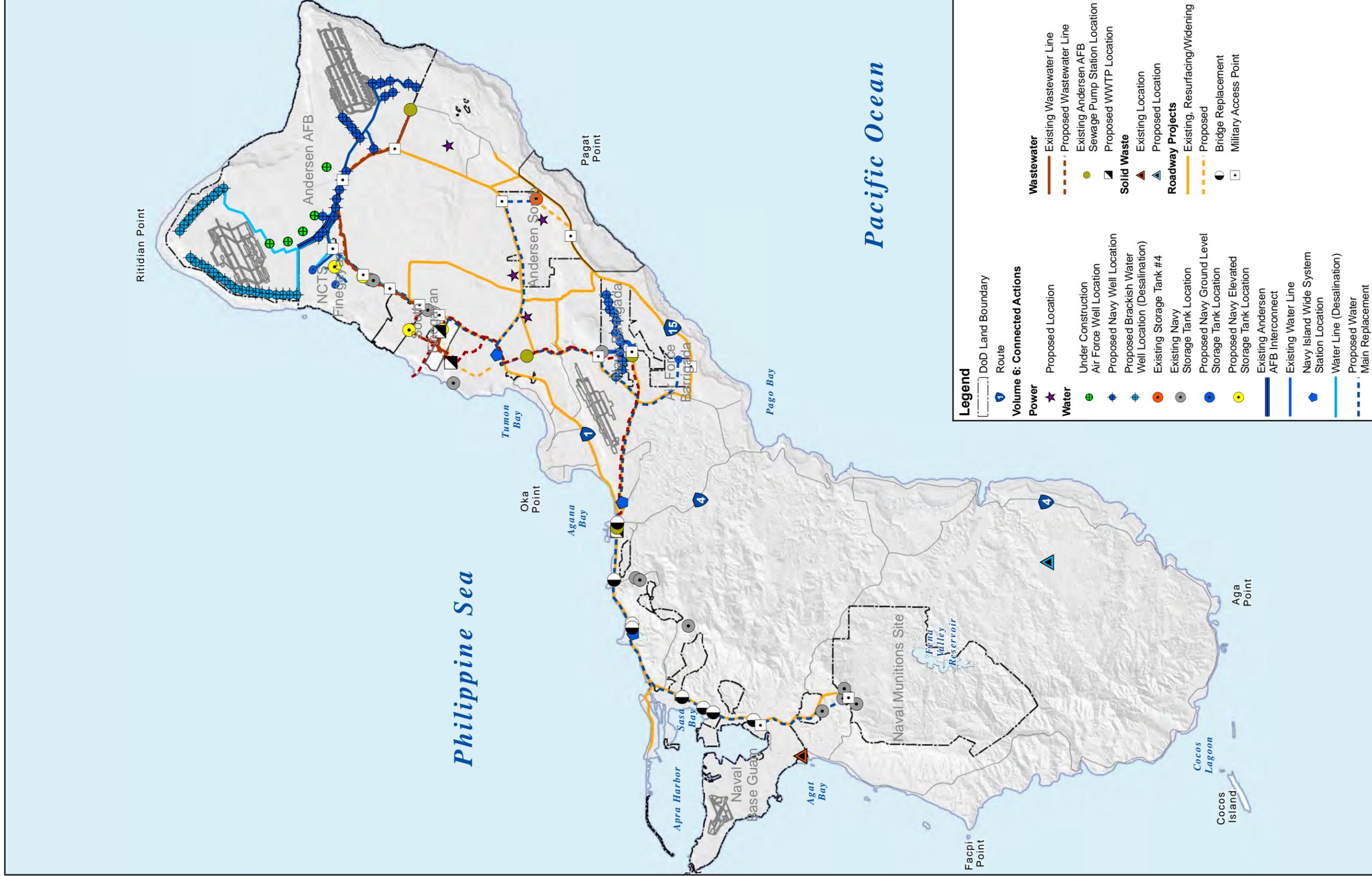
*3.3 Marine Corps Relocation – Training on Tinian (Volume 3)*

*3.4 Aircraft Carrier Berthing (Volume 4)*

*3.5 Army Air and Missile Defense Task Force (Volume 5)*

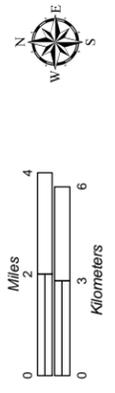
*3.6 Utilities & Roadway Projects (Volume 6)*

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**Legend**

- DoD Land Boundary
- Route
- Volume 6: Connected Actions**
- Power**
  - Proposed Location
  - Under Construction
  - Air Force Well Location
  - Proposed Navy Well Location
  - Proposed Brackish Water Well Location (Desalination)
  - Existing Storage Tank #4
  - Existing Navy Storage Tank Location
  - Proposed Navy Ground Level Storage Tank Location
  - Proposed Navy Elevated Storage Tank Location
  - Existing Andersen AFB Interconnect
  - Existing Water Line
  - Navy Island Wide System Station Location
  - Water Line (Desalination)
  - Proposed Water
  - Main Replacement
- Water**
  - Proposed Location
  - Under Construction
  - Air Force Well Location
  - Proposed Navy Well Location
  - Proposed Brackish Water Well Location (Desalination)
  - Existing Storage Tank #4
  - Existing Navy Storage Tank Location
  - Proposed Navy Ground Level Storage Tank Location
  - Proposed Navy Elevated Storage Tank Location
  - Existing Andersen AFB Interconnect
  - Existing Water Line
  - Navy Island Wide System Station Location
  - Water Line (Desalination)
  - Proposed Water
  - Main Replacement
- Wastewater**
  - Existing Wastewater Line
  - Proposed Wastewater Line
  - Existing Andersen AFB Sewage Pump Station Location
  - Proposed WWTP Location
- Solid Waste**
  - Existing Location
  - Proposed Location
- Roadway Projects**
  - Existing, Resurfacing/Widening
  - Proposed
  - Bridge Replacement
  - Military Access Point



**Figure 3.6-1**  
**Volume 6: Related Actions – Utilities and Roadway Projects (Guam)**



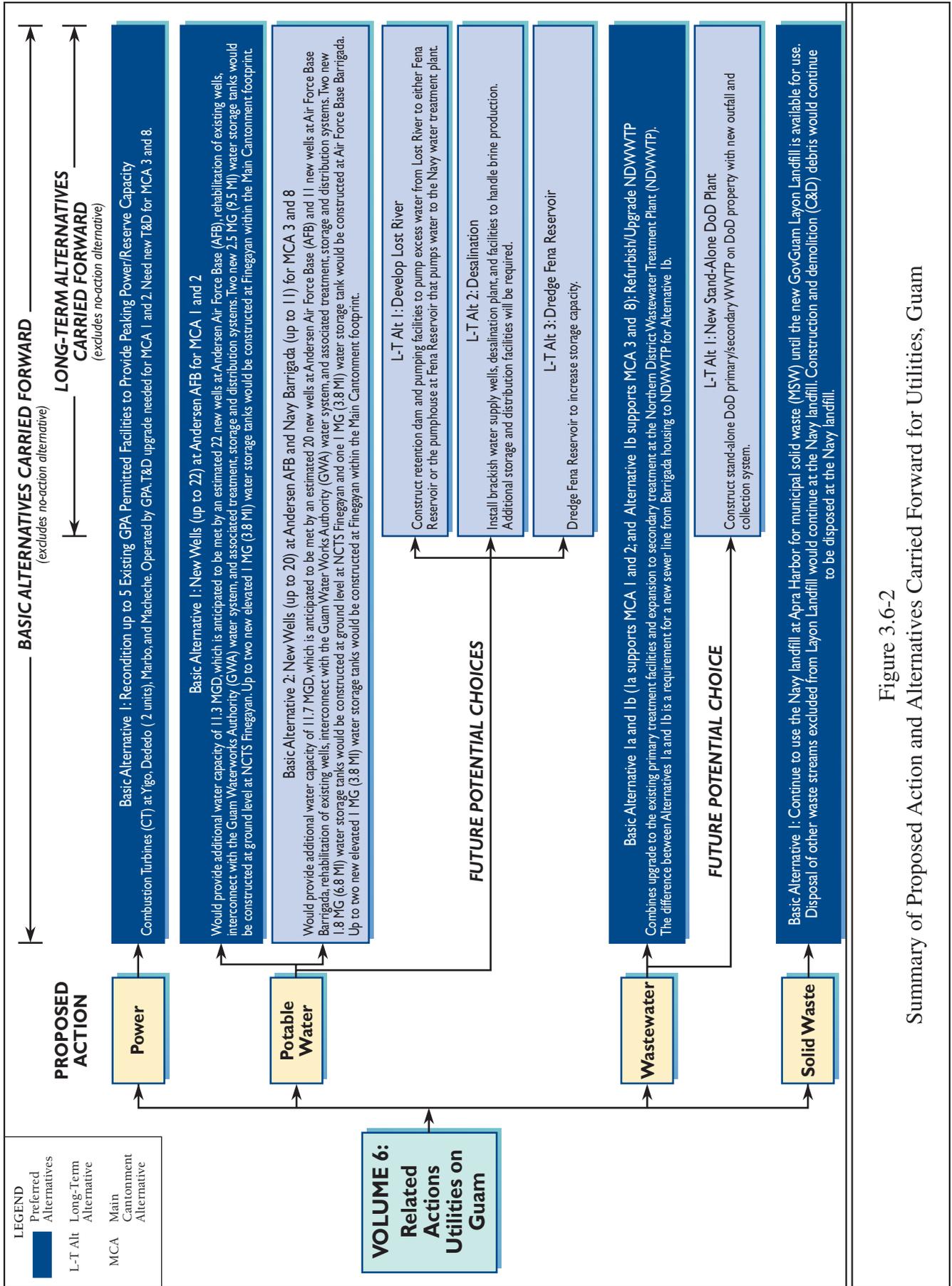


Figure 3.6-2

Summary of Proposed Action and Alternatives Carried Forward for Utilities, Guam

### 3.6.2.2 Basic Alternative 2

Basic Alternative 2 would provide additional water capacity of 11.7 MGd, which is anticipated to be met by an estimated 20 new wells at Andersen AFB and 11 new wells at Air Force Base Barrigada, rehabilitation of existing wells, interconnect with the GWA water system, and associated treatment, storage and distribution systems. Two new 1.8 MG (6.8 MI) water storage tanks would be constructed at ground level at NCTS Finegayan and one 1 MG (3.8 MI) water storage tank would be construction at Air Force Base Barrigada. Up to two new elevated 1 MG (3.8 MI) water storage tanks would be constructed at Finegayan within the Main Cantonment footprint.

### 3.6.2.3 Long-Term Alternative 1

Long-term Alternative 1 would augment water supply by development of surface water resources in the south part of Guam, specifically the Lost River. A retention area would be dredged and water contained with sheetpile or other methods of damming to create an area to extract water via pumping. Excess water would be pumped either into Fena Reservoir for later use or directly to the pump house that pumps water from Fena Reservoir to the Navy water treatment plant.

### 3.6.2.4 Long-Term Alternative 2

Long-term Alternative 2 would augment the water supply by desalination of brackish water which requires the removal of salt water by reverse osmosis. This option would be implemented to meet projected DoD water demands in the event that the supply from freshwater wells is insufficient to meet DoD demand. Desalination plants produce liquid wastes (brine) that may contain the following constituents: high salt concentrations, chemicals used during defouling of plant equipment, and pretreatment residues. These byproducts can be discharged directly into the ocean as long as they are diluted with other discharges, such as cooling water from power plants, they can be discharged directly in to the sewer system, or it can be dried and disposed of in a landfill.

### 3.6.2.5 Long-Term Alternative 3

Long-term Alternative 3 is to dredge Fena Reservoir to restore the original design storage capacity. This would provide additional storage for use during the annual dry periods.

## 3.6.3 Wastewater

### 3.6.3.1 Basic Alternative 1a (Preferred Alternative) and 1b

Basic Alternative 1 (Basic Alternative 1a supports Main Cantonment Alternatives 1 & 2; & Basic Alternative 1b supports Main Cantonment Alternatives 3 & 8) combines upgrades to the existing primary treatment facilities and expansion to secondary treatment at the Northern District Wastewater Treatment Plant (NDWWTP). The difference between Basic Alternatives 1a & 1b is a requirement for a new sewer line from new proposed DoD housing at Barrigada to NDWWTP for Basic Alternative 1b.

### 3.6.3.2 Long-Term Alternative 1

Long-term Alternative 1 would build a new separate DoD secondary treatment plant at the NDWWTP site to treat the DoD loads only. This would support Marine Corps Relocation – Guam Alternatives 1 and 2 in their entirety, and the Finegayan development for Guam Alternatives 3 and 8.

In addition to the above, a new separate DoD secondary treatment plant at the Hagatna wastewater treatment plant (WWTP) site to treat the DoD loads only from Barrigada would be required to support Marine Corps Relocation – Guam Alternatives 3 and 8, if one of those would be chosen.

### 3.6.4 Solid Waste

#### 3.6.4.1 Basic Alternative 1 (Preferred Alternative)

Basic Alternative 1 would be to continue to use the Navy landfill at Apra Harbor for municipal solid waste (MSW) until the new GovGuam Layon Landfill at Dandan is available for use. Disposal of other waste streams excluded from Layon Landfill would continue at the Navy landfill. Construction and demolition (C&D) debris would continue to be disposed at the Navy hardfill.

### 3.6.5 Roadway Projects

Individual projects have been identified from recent transportation and traffic studies on the island of Guam. These consist of 43 Guam Road Network (GRN) (off-base) projects and 15 intersection improvement projects at military access points (MAPs) (i.e., gates). The 43 GRN (off-base) projects are composed of six types of roadway improvements:

- Intersection improvement projects
- Bridge replacement projects (involving eight bridges)
- Pavement strengthening (combined with roadway widening at some locations)
- Roadway relocation (Route 15)
- Roadway widening
- Construction of a new road (Finegayan Connection)

The 58 projects cover four geographic regions on Guam: North, Central, Apra Harbor, and South. Details as to the project specific characteristics of all the projects are contained in Volume 6. Not all 58 projects would be implemented since only a specific combination of roadway projects support each cantonment alternative.

- Main Cantonment Alternative 1: There are 49 GRN projects that would be required for Alternative 1. These projects include 29 pavement strengthening, 8 roadway widening, 14 intersection improvements (includes 8 MAPs), 8 bridge replacements, 1 road relocation, and 1 new road.
- Main Cantonment Alternative 2 (Preferred): A different combination of 49 GRN projects would be required for Alternative 2. These projects include 29 pavement strengthening, 8 roadway widening, 14 intersection improvements (includes 8 MAPs), 8 bridge replacements, 1 road relocation, and 1 new road.
- Main Cantonment Alternative 3: There are 51 GRN projects that would be required for Alternative 3. These projects include 29 pavement strengthening, 10 roadway widening, 17 intersection improvements (includes 11 MAPs), 8 bridge replacements, and 1 road relocation.
- Main Cantonment Alternative 8: A different combination of 51 GRN projects would be required for Alternative 8. These projects include 28 pavement strengthening, 8 roadway widening, 15 intersection improvements (includes 9 MAPs), 8 bridge replacements, 1 road relocation, and 1 new road.

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