CHAPTER 12. CULTURAL RESOURCES

12.1 AFFECTED ENVIRONMENT

12.1.1 Definition of Resource

Cultural resources are defined as any district, site, building, structure, or object considered to be important to a culture, subculture, or community for scientific, traditional, religious, or any other reason. Cultural resources include pre-Contact (before European contact) and post-Contact archaeological resources, architectural resources, and traditional cultural properties. The cultural resources discussed in this chapter include those that meet the specific criteria of the National Historic Preservation Act (NHPA) and its associated regulations. However other cultural resources such as plants, animals, or geological materials may be important to a culture, but are not eligible under the NHPA. Impacts to these resources are discussed as impacts under NEPA. Information on traditionally used plants and animals is presented in Volume 9, Appendix G.

Pre-Contact and post-Contact archaeological resources are areas or locations (sites) where human activity measurably altered the earth or left deposits of physical remains. Archaeological resources can be identified and evaluated for significance according to each site's cultural importance, integrity, and ability to yield important information. Architectural resources are standing buildings, dams, canals, bridges, and other structures of historic or aesthetic significance. Traditional cultural properties are resources associated with cultural practices and beliefs of a living community that are rooted in its history and are important in maintaining the continuing cultural identity of the community; such properties may not always be represented by archaeological or architectural resources. In general, specific locations of archaeological sites and traditional cultural properties are not revealed to the public because of the concern of vandalism or cultural sensitivity. Therefore, figures with specific locations of archaeological sites are not presented in this chapter. However, figures with commonly known sites are presented in Volume 2, Chapter 9, Recreational Resources of this Environmental Impact Statement (EIS).

12.1.1.1 Regulatory Review

Archaeological and architectural resources determined to be significant under cultural resource legislation such as the NHPA and the Archaeological Resources Protection Act (ARPA) are subject to protection or consideration by a federal agency. Other laws and Executive Orders (E.O.) may apply, such as the Abandoned Shipwreck Act of 1987; Historic Sites Act of 1935; Archeological and Historic Preservation Act of 1974; Abandoned Shipwreck Act of 1987; E.O. No. 11593 Protection and Enhancement of the Cultural Environment (1971); and E.O. No. 13287 Preserve America (2003). Additional regulations include Curation of Federally-Owned and Administered Archeological Collections (36 CFR 79), Preservation of American Antiquities (43 CFR 3), and National Historic Landmarks Program (36 CFR 65).

For the purposes of the NHPA, significant cultural resources, known as historic properties, are those that are listed or eligible for listing on the National Register of Historic Places (NRHP). The criteria for significance are contained in Federal Regulation 36 Code of Federal Regulations (CFR) 60.4 and include cultural resources that:

A. are associated with events that have made a significant contribution to the broad pattern of history, or

B. are associated with the lives of persons significant in the past, or
C. embody the distinctive characteristics of a type, period, or method of construction, represent the work of a master, possess high artistic value or represent a significant and distinguishable entity whose components may lack individual distinction, or
D. have yielded, or may be likely to yield information important in prehistory or history.

According to National Register Bulletin 15, *How to Apply the National Register Criteria for Evaluation* (National Park Service [NPS] 2002), a cultural resource must meet at least one of the NRHP significance criteria (A, B, C, or D) and must also retain integrity in order to be listed on or determined eligible for listing on the NRHP.

Historic properties can include sites and structures like Latte Stone Park, Asan Invasion Beach, Agat Bridge, and Orote Field. Other types of historic properties such as archaeological sites comprised of pottery sherds, stone tools or their remains, are significant because they may yield important information about prehistory or history through the study of artifacts (Criterion D). Determinations of eligibility to the NRHP can be made either by submitting appropriate documentation to the Keeper of the National Register or through consensus between the federal agency and the State Historic Preservation Office (SHPO). The consensus can be informed by input from other stakeholders. Section 106 of the NHPA requires federal agencies to consider the effects of their actions on historic properties. The implementing regulations for Section 106 (36 CFR 800) specify a consultation process to assist in satisfying this requirement, while Section 110 of the NHPA includes responsibilities for stewardship. This approach is in accordance with the Secretary of the Navy's Instruction 4000.35A, Department of Navy Cultural Resources Program and Marine Corps Order (MCO) P5090.2A, Ch 2, Chapter 8: Cultural Resource Management.

National Historic Landmarks (NHL) are cultural resources of national historic importance and are automatically listed on the NRHP. Under the implementing regulations for Section 106 (36 CFR 800.10), special consideration to minimize harm to an NHL is required, and both the Advisory Council for Historic Preservation (ACHP) and the Secretary of the Interior are consulted if any adverse effects may occur to such resources.

Historic properties usually must be at least 50 years old; however, certain structures at technical or scientific facilities associated with important periods such as the Cold War, the Space Age, or the Nuclear Age, may be considered to be eligible for listing on the NRHP. Guidelines for determining the significance of traditional cultural properties are contained in *Bulletin 38: Guidelines for Evaluating and Documenting Traditional Cultural Properties* (NPS 1998); however, in order to be considered a historic property under the NHPA, they must meet the criteria in 36 CFR 60.4.

Section 4(f) of the Department of Transportation Act of 1966 (49 United States (U.S.) Code [USC] 303) also offers protection to historic properties, which are resources that are eligible for or listed on the NRHP. The Transportation Administration (Federal Highway Administration [FHWA] or Federal Transit Administration [FTA]) may not permit the use of historic properties unless it has been determined through evaluation that no prudent and feasible alternative to the use exists or unless it has been determined that the impact is considered *de minimis,* meaning trivial. The Transportation Administration may consider use of a historic Section 4(f) property *de minimis* if Section 106 consultation with the SHPO results in a finding of No Adverse Effect or No Historic Properties Affected.

The laws and regulations related to the management and preservation of cultural resources on Guam consist of Title 21 Guam Code Annotated (GCA), Chapter 76, Historical Objects and Sites, codified as Public Law 12-126, which establishes public policy to implement a comprehensive program of historic

preservation; Public Law 20-151, which establishes authority for preservation review of all government permits or licenses and provides authority to stop projects in violation of preservation requirements; Executive Order 89-9, which requires consideration of historic preservation for any action needing an approval of the Territorial Land Use Commission (now known as the Guam Land Use Commission); and Executive Order 89-24, which establishes policies for the disposition of archaeologically recovered human remains. The *Comprehensive Historic Preservation Plan for Guam* (Belt Collins 2007) and *Guidelines for Archaeological Burials* (Parks and Recreation n.d.) further define specific procedures and consultation requirements. These laws pertain to non-federal lands on Guam. Federal agencies are required to comply with federal laws, which supersede local laws. NHPA requirements are met on all federal lands and lands managed by federal agencies, while ARPA only applies to federally owned lands. Procedures for reburial and repatriation of human remains have been developed through consultation with the Guam SHPO and adopted as standard operating procedures in Integrated Cultural Resources Management Plans (ICRMPs).

Section 106 of the NHPA also provides guidelines for public involvement for federal undertakings. Meetings to solicit public input started in 2007, including a meeting with the Department of Chamorro Affairs. Several agency meetings were held in Guam and Saipan beginning in 2007 and continuing until 2009. These meetings were attended by the Guam SHPO, Commonwealth of the Northern Mariana Islands (CNMI) SHPO, and representatives from the NPS. Ten public meetings were held in conjunction with this EIS. Four public meetings were held in Guam during the scoping process prior to the release of the Draft EIS. An additional six meetings were held after the Draft EIS was published (see Appendix G, Cultural Resources). Public and agency input from the early meetings helped shape the Area of Potential Effect (APE) for the cultural resources analysis, and meetings were conducted to identify and evaluate previously unknown historic properties. As part of the Section 106 consultation process for the proposed action, a Programmatic Agreement (PA) for all proposed military training activities, construction, and operations, which includes additional mitigation measures and procedures on public access, is being prepared.

12.1.1.2 Research Methodology

The region of influence (ROI) for cultural resources includes areas subject to construction, training maneuvers, firing and non-firing ranges, road improvements, and Landing Zones (LZs), among other activities. Because the EIS is also used for Section 106 consultation, this section uses APE as defined under the NHPA to determine the geographic extent of cultural resource impacts. The APE is "the geographic area or areas within which the undertaking (project) may directly or indirectly cause changes to the character or use of historic properties, if they exist" (36 CFR 800.16(d)). This would include areas affected by setting (visual or audible), ground disturbance, or public access. As noted above, the APE was defined during the consultation process early in the planning stages of this EIS in consultation with the Guam SHPO. Maps of the APEs for projects on Guam are included in Volume 9, Appendix G, Chapter 4, Cultural Resources. The APE discussed in this chapter does not include areas related to cumulative impacts under NEPA.

The methodology for identifying historic properties within the APE was based on a combination of existing data and completion of additional studies. DoN assessed the adequacy of existing data (Tomonari-Tuggle et al. 2007) and conducted extensive archaeological and architectural surveys in Guam (Athens. 2009; Welch et al. 2010). These studies included:

- Complete surveys and assessment of resources in Naval Computer and Telecommunications Site (NCTS) Finegayan, South Finegayan, Former Federal Aviation Administration (FAA)

parcel, Guam Land Use Plan (GLUP) 77 parcel, Naval Munitions Site (NMS), portions of Andersen Air Force Base (AFB), Andersen South, Navy Barrigada, Air Force Barrigada, and southeast of Route 15.

- Subsurface testing at Naval Base Guam and Dadi and Tipalao Beaches.
- Underwater surveys at Dadi and Tipalao Beaches.
- World War II (WWII) oral histories and archival studies.
- Traditional cultural property studies.

Three types of data on traditional cultural properties on Guam have been collected to identify traditional cultural properties in the study areas:

- Legendary association – myths, legends, or stories from the written record.
- Archaeological association – sites or other resources documented by archaeological investigations such as surveys, testing or excavations, or mitigation.
- Ethnographic association – information from the oral histories, as well as contemporary accounts from readily accessible sources, and current inventories of resources (marine or terrestrial) deemed important to traditional practices (Griffin et al. 2009a, b, c).

More detailed information on plants and fish of cultural significance has been added to this final EIS following the publication of the Draft EIS. Chamorro names and traditional uses for plants and their locations on Guam are discussed in detail in Volume 9, Appendix G, Chapter 4. Traditional fishing species and general locations are also discussed in Volume 9, Appendix G, Chapter 4. Information on subsistence fishing is included in Volume 2, Chapter 16, Socioeconomics and General Services.

Additional information on cultural resources was provided by the Regional ICRMP for Commander Navy Region (COMNAV) Marianas Lands (Tomonari-Tuggle et al. 2005), the Andersen AFB ICRMP (Tomonari-Tuggle and Tuggle 2003), numerous survey reports, and traditional cultural property studies from Andersen AFB (Welch and Prasad 2006). Where potential impact areas could not be surveyed because of a lack of permission from current landowners or tenants, the best available information from previous surveys was used to assess impacts.

12.1.1.3 Historical Overview

Guam's oldest archaeological sites are from the Pre-Latte and Latte Periods of Chamorro occupation, prior to western contact in 1521. Other archaeological and architectural resources show evidence of Guam's status as a former possession of Spain and as an American territory, while numerous structures and relics attest to the island's occupation by Japan and subsequent reoccupation by the U.S. during WWII. Other areas on Guam are important to the Chamorro people because of their historical and traditional use. The following discussions first present a brief overview of regional prehistory and history, followed by a presentation of the type of investigations conducted in each area, the type and number of historic properties, and the potential for finding historic properties in the APE. Locations of archaeological sites on U.S. title fee land are protected under ARPA to prevent vandalism to sites; therefore, as previously noted, figures with site locations are not included in this section. However, sites commonly known to the public are presented in Volume 2, Chapter 9, Recreational Resources.

Pre-Contact in the Mariana Archipelago

At the time of Western contact, the Mariana Islands were inhabited by a group of people that came to be known to the rest of the world as the Chamorro. The first European contact in this archipelago is considered to have taken place in 1521, the year that Ferdinand Magellan and his crew landed on Guam

after a 99-day voyage across the Pacific from South America. The inhabitants of all of the Mariana Islands were found to share similar customs, technology, and artifact styles. They spoke a non-Oceanic Austronesian language with dialect differences between islands (Levesque 1995).

Chamorro is one of only two non-Oceanic languages within the Austronesian family in remote Oceania, the other is Palauan. Examination of Chamorro syntax, phonology, and lexicon, when compared with other Austronesian languages and discounting post-European contact influences, indicates divergence from a distant Austronesian ancestry prior to the development of more than 450 related Oceanic Austronesian languages in Melanesia, Micronesia, and Polynesia (Carson and Tuggle 2007). Linguistic evidence favors the central or northern Philippines as the most likely origin of populations initially settling the Mariana Islands.

Initial Settlement

The main Mariana Islands were settled by at least 1500 years Before Christ (B.C.) according to archaeological data. However, some paleoenvironmental evidence suggests initial settlement of Guam by as much as 300 to 900 years earlier, as yet uncorrobrated by archaeological data. Far from the Marianas being an accidental discovery, it appears many of the islands of southeast Asia were being populated at roughly the same time in what has been termed a "swarm" of maritime exploration (Peterson 2009), perhaps coinciding with a global high sea stand between 5,000 and 3,500 years Before Present (B.P.).

Early Settlement: Pre-Latte Period

This period dates from the time of initial settlement circa 1500 B.C. to Anno Domini (A.D.) 1000. Moore (2002 *in* Tomonari-Tuggle et al. 2007) subdivides the Pre-Latte Period into four phases based on pottery styles: Early Unai, Middle Unai, Late Unai, and Huyong. Archaeological sites dating to the early Pre-Latte Period are limited, but are usually found in coastal calcareous sand deposits and typically contain small numbers of redware pottery sherds (some with lime-filled stamping or incising) associated with marine midden or food remains, consisting mainly of bivalve shells. Site integrity is frequently compromised as a result of both natural shoreline processes reworking of the deposits and later human activities (Carson 2008).

Due to poor site integrity, evidence of residency and community composition is difficult to identify. However, the basic settlement pattern appears to have been one of small population groups living along the back of sandy embayments, especially near coastal lagoons with easy access to marine resources (Graves and Moore 1985). Caves and rock overhangs near shore were used for shelter, presumably during inclement weather. Considering the increasing quantity of shellfish and reef fish remains found in middle to late Pre-Latte coastal sites, it appears that subsistence practices still focused primarily on ocean resources, with an emphasis on exploitation of the shallow water, fringing reef, and lagoon areas (Reinman 1977, Kurashina and Clayshulte 1983, Hunter-Anderson 1989, Burtchard 1991). Activities that took place in the interior of the island are evident archaeologically, including burial of the dead and foraging for resources not available on the coast after typhoons or during prolonged droughts, such as birds, fruit bats, and forest fruits and nuts.

Latte Period

The Latte Period is distinguished from earlier periods by the presence of *latte* sets or stone structures (Figure 12.1-1). The earliest and generally smallest *latte* structures date to between A.D. 1000 and 1300, while most of the largest *latte* sets date to between A.D. 1450 and 1650 (Russell 1998). These sites are also accompanied by a change in pottery technology, from small bowls and griddles to larger jars, suggesting a change from baking to boiling techniques (Moore and Hunter-Anderson 1996). During this period populations increased and settlements expanded into areas outside of the optimal coastal environments (Dye and Cleghorn 1990, Hunter-Anderson and Moore 1994). Latte Period sites are more abundant than Pre-Latte sites on all of the Mariana Islands, and are present in virtually all environmental settings.

Figure 12.1-1. Latte Site at NMS

Lattes are large upright pillars of limestone, each topped by a semi-hemispherical capstone (Morgan 1988). These pillars were placed in two parallel rows of even numbered uprights forming a single set, supporting an A-framed superstructure of wood and thatch. *Latte*s served as foundations for house and storage structures of varying size and function, according to early Spanish records (Barratt 2003). Variation in the number and size of *latte* may reflect growing differentiation in the relative status of some occupants within late pre-Contact communities (Graves 1986). Burial areas are more commonly associated with larger *latte* sets, for instance. Individuals were buried beneath the structure and within the area formed by the pillars, although Spanish clergy noted the veneration of ancestral skulls within some structures above (Coomans 1997).

Latte Period sites generally consist of clusters of individual structures forming what the early Spanish called villages, although single *latte* sets are found in isolation too. They are most commonly found along the shorelines of the major Mariana Islands and in inland settings near permanent water or arable soils. Marine resources, such as fish and shellfish, continued to provide protein during this period, as did birds, fruit bats, lizards, and turtles. But the presence of *lusong* or boulder mortars near many *latte* sets (Dixon et al. 2006) suggests the increased consumption of rice (Butler 1990), while rock-filled ovens nearby are assumed to have been used to bake tubers such as taro or yams (Bulgrin 2006), or forest products such as breadfruit (Petersen 2006). Spanish clergy noted individual plots worked by Chamorro farmers well inland from coastal communities (Driver 1993), and the ubiquitous Latte Period pottery scatter in these settings may well be the archaeological signature of this agricultural landscape (Bulgrin 2009).

Post-Contact Period

European Contact

The Contact Period is the interval between Magellan's landing in 1521 and the first Spanish settlement on Guam in 1668. Latte stone structures continued to be built (Driver 1993), but Spanish-introduced materials are also found at a few sites dating to this period including iron, fragments of glass, and Asian or European ceramics traded to the islanders by visiting Sailors.

Breadfruit, coconuts, yams, and taro were traded to passing vessels during this time period (Coomans 1997), as were bananas, sugarcane, and rice, plus fish caught both inshore and offshore. Chamorros were noted for their *proa,* a unique outrigger canoe, and for their superlative skills at handling these (Barratt 2003), even in rough conditions.

Spanish Missions

Spanish missionaries of the Jesuit order arrived on Guam in 1668 with a small group of soldiers, intent on establishing a permanent colony for the glory of God and King. The Spanish changed native life in the Marianas drastically by 1700 as part of the *reduccion*, a deliberate effort to gather together all indigenous people of the archipelago into a few communities on Guam and Rota (Coomans 1997). They were initially assisted by a local leader on Guam named Quipuha who gave them land for a mission and garrison in what is now Agana (Garcia 1980), and helped them to convert some of the local population to Christianity. But when the Spanish clergy began systematic baptism of children, some of whom succumbed to recently introduced diseases, several influential missionaries were killed and many Chamorro moved to the northern part of the island or fled to other islands.

New diseases and ensuing war with the Spanish decimated the local population of Guam, from an estimated pre-Contact level of between 20,000 and 40,000 to a total of 1,800 in 1690 (Abella 1962 as cited in Tomonari-Tuggle et al. 2007) and only 1,600 by 1693 (Russell and Fleming 1990, as cited in Tomonari-Tuggle et al. 2007). Maize was introduced during this period and it soon became a staple food crop, being processed into *tortillas* or *atol* using a *metate*. Rice also increased in importance after the introduction of the water buffalo as draft animals, and pigs, goats, and deer were added to the diet.

The Marianas in the 19th Century

The Philippines assumed administrative control over the Marianas in 1817, after Spain and New Spain (Mexico after 1821) relinquished control. Sometime between 1815 and 1820, after severe storms devastated the Caroline Islands, Carolinian refugees began arriving in the Marianas (Driver and Brunal-Perry 1993), as they may have also done periodically in prehistory. During this period they established trading networks with the Spanish on Guam. By the 1880s, more Carolinians immigrated to the Marianas and were resettled to the northern islands of Saipan and Tinian, where they assisted in rounding up and salting feral cattle for sale to Guam, and provided inter-island transportation for the government.

While the Carolinians proved themselves to be an asset to the Marianas economy, the arrival on Guam of hundreds of deported Spanish and Filipino political prisoners during the 1870s became a serious impediment to local self-sufficiency (Madrid 2006); during this period, these often unsavory prisoners needed to be housed and fed by the residents of Agana and surrounding villages. In response to local privations, some prisoners were then sent to Saipan and Tinian where they often led a life of destitution. Such deportations eventually ceased and most of the remaining prisoners were repatriated, after which a period of relative political calm prevailed in Spain and its colonies.

Guam in the 20th Century

Guam was ceded by Spain to the U.S. government in 1898, but did not become a U.S. territory until 1950. Between 1898 and 1941 Guam served as a coaling and fueling station for Naval ships, as the site of the trans-Pacific cable station, as the base for a strategic naval radio station, and a landing place for the Pan-American trans-Pacific air clippers flying between San Francisco and Hong Kong. Despite being surrounded by Japanese controlled islands, the U.S. did little in terms of military defense development (Peattie 1988) under terms of their agreement with other colonial powers in the Pacific after World War I.

A few hours after the attack on Pearl Harbor in December of 1941, Japanese planes from Saipan attacked Guam. Japanese planes first bombed the Pan American building and the Standard Oil fuel tank in Sumay. Then the Japanese turned to bombing military targets at the Piti navy yard, the Libugon radio towers, and the few vessels in and around Apra Harbor (Rogers 1995).

Two days later Japanese forces landed on Guam where they met with limited resistance. For the next two years the Japanese Navy controlled the island and its economy (Higuchi 2008). In January of 1942, all remaining Americans on the island were shipped to Japan as prisoners of war, with the exception of an individual named George Tweed, who managed to hide for 31 months with the help of the Chamorros. In 1944, Japanese reinforcements came to Guam from Manchuria and began fortifying the beaches and strategic overlooks in an attempt to deter an inevitable invasion by the Americans and their allies (Denfield 1997). The local population was forced into labor to build these defenses and feed the soldiers, and eventually into internment camps when combat began (Sanchez 1979 *in* Tomonari-Tuggle et al. 2007).

In 1944, the U.S. began air raids over Japan-occupied Saipan, Tinian, Rota, and Guam. As a response, the Japanese ordered the Chamorro to construct air-raid shelters and to stock them with food. Most of these air-raid shelters were dugouts topped with coconut logs as well as tunnels dug into cliffs and hillsides (Rogers 1995).

The U.S. commenced an intensive bombardment of Guam that started on July 8, 1944 and lasted for 13 days. The 3rd Marine Division and the 1st Provisional Brigade landed on Asan Beach on July 21. The Army 77th Infantry Division followed on July 22. By July 27, American sovereignty over Guam was proclaimed and by August 10 all organized resistance had ceased (Lodge 1954 as cited in Tomonari-Tuggle et al. 2007); however, small groups of Japanese stragglers trying to avoid surrender were able to remain hidden for months, and even years, in the tunnels and caves on Guam and other Mariana islands (Fukimi and Cross 1969, Jones 1986, Kahn 1962). Many Chamorro were killed during the American recapture of Guam, both by Japanese defenders in blatant acts of atrocity (Blas 2008, Palomo 1984), and inadvertently during U.S. bombing and urban combat.

After recapturing the island, there was a massive buildup of American forces and new facilities in support of air attacks on Japan, and in preparation for what was thought to be the inevitable and necessary invasion of Japan. The new facilities included a major port and ship repair facility at Apra Harbor and five airfields, Northwest Field (Figure 12.1-2), North Field, Harmon, Agana, and Orote.

Figure 12.1-2. Northwest Field 1945

The Mariana Islands also became the platform for the strategic bombing campaign against Japan that was to employ the new VHB/VLR B-29 Superfortress. Five B-29 airfields were built in the Mariana Islands, and Northwest Field and North Field were constructed on Guam, in the area that is now Andersen AFB. After WWII, Northwest Field was decommissioned, but North Field continued to be used and additional facilities were added in response to military needs arising from the Cold War, Korean War, and Vietnam War (Rogers 1995).

In 1946, a civilian government under U.S. Navy administration was established on Guam, and in 1950 the Guam Organic Act passed by the U.S. Congress made the island an unincorporated U.S. territory and gave Guamanians American citizenship, with significant amendments implemented in 1970. Since the late 1960s, tourism particularly from Japan and other Asian countries has become the mainstay of the Guam economy, alongside local government employment (see Chapter 16, Socioeconomics and General Services). Resorts have been developed in the Tumon and Agana Bay areas on the west coast, with a few inland golf courses as well. The American military presence on the island has also remained significant to the economy, through federal subsidies, civilian employment, and military personnel expenditures.

12.1.2 North

12.1.2.1 Andersen AFB

Andersen AFB is one of the largest airfields in Air Force jurisdiction. It covers 15,500 acres (ac) (6,273 hectares [ha]) and occupies a mostly flat, uplifted limestone plateau in the northern portion of the island. To the north, west, and east of the plateau, steep cliffs drop 500 to 600 feet (ft) (152 to 183 meters [m]) to a coastal terrace that extends 300 to 900 ft (91 to 274 m) to a rocky shoreline. The Tarague Embayment is a coastal flat along the north shore that offers the only direct access to the ocean from the base.

The eastern third of the base includes the main active airfield and an array of operations, maintenance, and community support facilities, most of which are located along the South Ramp. The North Ramp area includes operations of the Navy's HSC-25, munitions storage in the former Strategic Command storage area, and a parking apron space for contingency operations (U.S. Pacific Command [PACOM] 2006:2-6). The central third of the base is a Munitions Storage Area (MSA). The western third is Northwest Field (NWF), which is currently used for helicopter training, various field exercises, and bivouac.

This summary of surveys and resources on Andersen AFB is derived primarily from Tomonari-Tuggle and Tuggle (2003) and Tomonari-Tuggle et al. (2007). There have been 41 cultural resources surveys on Andersen AFB since the 1920s. Two major cultural resource projects in the 1990s were the preparation of a Cultural Resources Management Plan (Schilz et al. 1996) and a study of the Tarague Embayment (Camacho et al. 1996 as cited in Tomonari-Tuggle et al. 2007, Liston 1996, Randall and Siegrist 1996 as cited in Tomonari-Tuggle et al. 2007, Tomonari-Tuggle and Olmo 1996 in Tomonari-Tuggle et al. 2007). The Cultural Resources Management Plan was updated in 2003 (Tomonari-Tuggle and Tuggle 2003). Other work included an overview survey of archaeological and architectural resources on Andersen AFB (Yoklavich et al. 1996 as cited in Tomonari-Tuggle et al. 2007), an assessment of proposed military training activities on Guam (McNeill and Welch 1998), identification of cultural resource improvement projects that could be implemented over the period Fiscal Year 2002 through 2007 (Tomonari-Tuggle and Welch 2001 in Tomonari-Tuggle et al. 2007), additional post-Contact sites documentation (Yoklavich 2003 in Tomonari-Tuggle and Welch 2007), and a surface survey along Route 9 (Yee et al. 2004).

Cultural resources on Andersen AFB include pre-Contact and post-Contact sites, historic structures, and pictographs. The Pati Point Complex and the Tarague Beach Historic District are listed on the Guam Register (GRHP 2008). Historic properties include the Tarague Beach Historic District, the Pati Point Complex, a Spanish oven and well, a stone pier, NWF, a farmhouse, water catchment features, a Japanese bunker, and reservoirs. There are a number of architectural resources on Andersen AFB that are considered historic properties.

In 2004 a study was conducted to retrieve additional information about the land on which Andersen AFB is located and identify the presence of any traditional cultural properties that may exist on Andersen AFB (Welch and Prasad 2006). No traditional cultural properties were identified on Andersen AFB during the

course of the research. While the study succeeded in identifying and interviewing Chamorro and part-Chamorro informants with close ties to the lands within and around Andersen AFB, these informants were unable to identify places of traditional importance at the base; this inability to identify places of traditional importance is a likely result of alienation of the native peoples from the lands dating back to the arrival of Spanish missionaries and soldiers in the late 1600s. The Spanish forced all the occupants to leave their villages in the north of Guam and resettle in the south, and only gradually in the nineteenth century were the northern lands reoccupied. These new settlers frequently worked and lived on their "ranchos" while retaining permanent residence in a southern town; they were also Christianized and gradually lost much of their spiritual knowledge connecting them to the land (Welch and Prasad 2006). However, later studies have identified two traditional cultural properties in the Andersen AFB region. The Tarague Historic District is a traditional property with archaeological, legendary and ethnographic associations. The Jinapsan Complex is a traditional cultural property with archaeological and ethnographic associations (Griffin et al. 2009). All of these resources are eligible for listing on the NRHP and are therefore historic properties.

Natural resources of cultural significance concern (e.g., that are used for medicinal, traditional, or economic purposes) located at Andersen AFB include those found within the limestone forest, including:. trees such as the yoga (*Elaeocarpus joga)* and ifit (*Intsia bijug);*the dukduk tree (*Artocarpus mariannensis*); and medicinal plants, such as the nunu *(Ficus prolix)*, sumak (*Aidia cochinchinensis)*, and fadang (*Cycas micronesica;)*. Coastal areas are also found at Andersen AFB, which support traditionally used plants like the akangkang (*Canavalia spp.)*, amot tumaga' (*Cassia occidentalis),* gaso'so (*Colubrina asiatica)*, and nonnak (*Hernandia sonora).* All of these plants are used for medicinal purposes (see Volume 9, Appendix G, Chapter 4).

North Ramp

Previous surveys in the North Ramp area are listed in Table 12.1-1 (Tomonari-Tuggle et al. 2007). Portions of the North Ramp area had been previously surveyed for archaeological resources by Geo-Marine (2006). None of the sites recorded by Geo-Marine were eligible for listing in the NRHP.

Table 12.1-1. Archaeological Surveys in the North Ramp Area

Year of Work	*Reference*	*Type of Work*	*Location*
1992	Tuggle 1993	Surface survey of two areas near Andersen Airfield; no sites located	Adjacent of Beddown parcel
1992	Yoklavich et al. 1996*	Overview survey; field search for selected sites, based on documentary research	All of Andersen AFB
1996	McNeill and Welch 1998	Assessment of training areas	All of Andersen AFB
2002	Tomonari-Tuggle and Tuggle 2003	ICRMP, 2003 update	All of Andersen AFB
2003	Yoklavich 2003**	Documentation of three post-Contact sites	North Field
2004	Yee et al. 2004	Surface survey of Route 9 corridor between Main Gate and Potts Junction; relocation of previously identified sites	Northwest of APE
2005	Welch and Prasad 2006	Assessment of potential traditional cultural properties, including interviews with Chamorro with ties to the land in the Andersen AFB area	All of Andersen AFB
2006	Geo-Marine 2006	Survey of Air Force Guam FOL Ramp area	Guam FOL Ramp
2007	Welch et al. 2010	Survey of North Ramp Area north of North Field Complex	North of North Field Complex

Notes: * As cited in Tomonari-Tuggle et al. 2007
**As cited in Tomonari-Tuggle and Welch 2007

The remaining portions of the APE were surveyed in 2007; thirteen additional sites were recorded, and three previously recorded sites were reevaluated (Welch et al. 2010). Twelve sites in the Air Combat Element (ACE) Beddown Area consist of five complexes of WWII-era and/or post-war concrete

slabs/structures, the remains of a fuel tank farm, two WWII-era artifact concentrations, and four pre-Contact artifact scatters. Additionally, one pre-Contact artifact scatter was found in the Air Force Fighter Town Area. Five of these sites are eligible for inclusion on the NRHP (Table 12.1-2). Given modern disturbance and the condition of resources found to date, the likelihood of finding previously undocumented sites in the North Ramp area is low.

Table 12.1-2. Historic Properties in the North Ramp Area

Guam SHPO Number	*Temporary Number*	*Site Description*	*NRHP/GR Status**
66-07-2319	1044	Ceramic/artifact scatter	Eligible
66-07-2320	1045	Ceramic/artifact scatter	Eligible
66-07-2321	1046	Ceramic/artifact scatter	Eligible
66-07-2322	1049	Ceramic/artifact scatter	Eligible
66-07-2323	1050	Ceramic/artifact scatter	Eligible
66-07-1064	3	North Field	Eligible
66-07-2128		Concrete pads associated with North Field	Eligible

Legend: *GR= GRHP; Eligible= Eligible for the GR and NRHP.

Munitions Storage Area (MSA)

Portions of the MSA were surveyed by Davis (1983) and no sites were recorded. Other surveys and assessments are presented in Table 12.1-3. Approximately 30% of the MSA has been surveyed (Hokanson et al. 2007).

Table 12.1-3. Archaeological Surveys in the MSA

Year of Work	*Reference*	*Type of Work*	*Location*
1983	Davis 1983	Survey of Andersen Air Field	Main Operations Area
2003	Hunter-Anderson and Moore 2003	Survey of fenceline	MSA
2004	Mason Architects 2004	Historic Building Inventory	MSA 1 and 2
2006	DeFant and Leon Guerrero 2006	Survey within the MSA	MSA
2008	Hokanson et al. 2007	Survey within the MSA	MSA
2009	Dixon et al. 2010	Survey within the MSA	MSA
2009	Church et al. 2009	Surveys at Andersen AFB	MSA

Table 12.1-4 lists the previously recorded historic properties in the MSA (Tomonari-Tuggle and Tuggle 2003, Tomonari-Tuggle et al. 2007).

Table 12.1-4. Historic Properties in the MSA

Guam SHPO Number	*Temporary Number*	*Site Description*	*NRHP/GRHP Status**
08	PN-6	Spanish (?) Oven	Eligible
	Site 1	*Latte* site	Eligible
	Site 2	Limestone gravel mound	Eligible
	Site 2	Sherd scatter	Eligible
	Site 4	Sherd scatter with *lusong*	Eligible
	Site 6	Sherd scatter	Eligible
	Site 7	Sherd scatter	Eligible
66-08-2155		Artifact scatter	Eligible
66-08-2156		Artifact scatter	Eligible
	T-9-1	Artifact scatter	Eligible
	T-9-2	Pre-Contact and WWII artifact scatter	Eligible
	T-15-1	Pre-Contact artifact scatter with *lusong*	Eligible
	T-3-1	Pre-Contact artifact scatter	Eligible

Legend: Eligible= Eligible for the GR and NRHP.

Although the MSA has been developed, archaeological resource potential is considered moderate. The survey by DeFant and Leon Guerrero in 2006 recorded eight sites in 70 ac (28 ha). Four of those sites are eligible for inclusion on the NRHP. Surveys by Hunter-Anderson and Moore (2003) and Hokanson and others (2007) recorded sherd and artifact scatters along the fenceline and within the MSA. All facilities in the MSA built prior to 1950 have been surveyed and found ineligible for listing on the NRHP. Structures dating from 1950 to 1956 were inventoried in 2004. Three storage igloos (Facilities 8400, 8408, and 8617) within MSA1 are eligible for inclusion on the NRHP (Mason Architects 2004).Surveys conducted for the current project within the MSA include one by Dixon et al. (2010). They surveyed eight isolated parcels throughout the munitions storage area that would be impacted by the proposed action. Dixon and others located four sites within the MSA during their surveys that are historic properties and were given the following temporary site numbers: T-9-1 (pre-Contact artifact scatter), T-9-2 (pre-Contact and WWII artifact scatter), T-15-1 (pre-Contact artifact scatter with *lusong*), and T-3-1 (pre-Contact artifact scatter).

Northwest Field

Portions of NWF and areas surrounding NWF were surveyed by Kurashina et al. (1987), and Haun (1988, 1989). Table 12.1-5 lists the surveys associated with NWF (Tomonari-Tuggle et al. 2007). Previously recorded sites, as listed in the Andersen AFB ICRMP (Tomonari-Tuggle and Tuggle 2003) are presented in Table 12.1-6.

Table 12.1-5. Archaeological Surveys in the NWF Area

Year of Work	*Reference*	*Type of Work*	*Location*
1987	Kurashina et al. 1987	Surface Survey	NWF
1988	Haun 1988	Reconnaissance Survey	NWF
1989	Haun 1989	Reconnaissance Survey	NWF
1992	Yoklavich et al. 1996*	Overview survey; field search for selected sites, based on documentary research	All of Andersen AFB
1996	McNeill and Welch 1998	Assessment of training areas	All of Andersen AFB
2002	Tomonari-Tuggle and Tuggle 2003	ICRMP, 2003 update	All of Andersen AFB
2005	Welch and Prasad 2006	Assessment of potential traditional cultural properties, including interviews with Chamorro with ties to land the Andersen AFB area	All of Andersen AFB
2009	Church et al. 2009	Surveys at Andersen AFB	NWF
2008-2009	Dixon et al. 2010	Survey of NWF area	NWF

Notes: As cited in Tomonari-Tuggle et al. 2007

Table 12.1-6. Historic Properties in the NWF Area

Guam SHPO Number	*Temporary Number*	*Site Description*	*NRHP/GRHP Status**
08-100+		Sherd Scatters	Eligible
08-200+		Sherd Scatters	Eligible
08-01065		NWF Runways	Eligible
08	PN-5	Sherd Scatters	Eligible
08	PN-8+	Water Catchments	Eligible
08-2299		Pre-Contact pottery scatter	Eligible
08-2300		Pre-Contact pottery scatter and midden soil	Eligible
08-2301		Pre-Contact pottery scatter and *lusong*	Eligible
08-2302		Pre-Contact pottery scatter and midden soil	Eligible
	T-SP-1	WWII-era Japanese defensive position	Eligible
	T-SP-2	WWII-era Japanese defensive position	Eligible
	T-SP-3	WWII-era Japanese defensive position	Eligible
	T-90-2	Pre-Contact artifact scatter and WWII-era artifact scatter	Eligible
	T-90-3	Pre-Contact Artifact scatter	Eligible
	T-SP-4	Pre-Contact pottery scatter	Eligible
	T-NW-2	Pre-Contact pottery scatter, midden soil, shell adze	Eligible
	T-NW-4	Pre-Contact pottery scatter	Eligible
	T-NW-7	Pre-Contact pottery scatter	Eligible
	T-NW-11	Pre-Contact pottery scatter	Eligible
	T-NW-12	Pre-Contact pottery scatter	Eligible
	T-NW-13	Pre-Contact pottery scatter	Eligible
	T-NW-14	Pre-Contact pottery scatter	Eligible
	T-NW-18	Pre-Contact pottery scatter	Eligible
	T-NW-19	Pre-Contact pottery scatter and midden soil	Eligible

Guam SHPO Number	*Temporary Number*	*Site Description*	*NRHP/GRHP Status**
	T-NW-20	Pre-Contact pottery scatter and pumice tool	Eligible
	T-NW-21	Pre-Contact pottery scatter	Eligible
	T-NW-22	Pre-Contact pottery scatter	Eligible
	T-NW-23	Pre-Contact pottery scatter	Eligible
	T-NW-24	Pre-Contact pottery scatter	Eligible
	T-NW-26	Pre-Contact pottery scatter	Eligible
	T-NW-27	Pre-Contact pottery scatter	Eligible
	T-NW-28	Pre-Contact pottery scatter	Eligible
	T-NW-29	Pre-Contact pottery scatter	Eligible
	T-NW-34	Pre-Contact pottery scatter, one marine shell, one bomb fragment	Eligible
	T-NW-36	Pre-Contact pottery scatter	Eligible
	T-NW-39	Pre-Contact pottery scatter	Eligible
	T-NW-40	Pre-Contact pottery scatter	Eligible
	T-NW-9	Pre-Contact pottery scatter	
	T-NW-15	Pre-Contact pottery scatter and WWII-era artifact scatter	
	T-NW-5	Pre-Contact pottery scatter	Eligible
	T-NW-6	Pre-Contact pottery scatter, midden soil, shell adze	Eligible
	T-A3-1	Rockshelter with midden soil	Eligible
	T-A4S-2	Pre-Contact pottery scatter	Eligible
	T-A4S-4	Latte Period agricultural features and pottery	Eligible
	T-A-1	Latte Period pottery scatter	Eligible
	T-A-3	Latte Period pottery scatter	Eligible
	T-A- 4	Latte Period pottery scatter	Eligible
	T-A-5	Latte Period pottery scatter	Eligible
	T-A-6	Latte Period pottery scatter	Eligible
	T-A-8	Latte Period pottery scatter	Eligible
	T-A-10	Latte Period pottery scatter	Eligible
	T-A-11	Latte Period pottery scatter	Eligible
	T-A-12	Latte Period pottery scatter	Eligible
	T-A-13	Latte Period pottery scatter	Eligible
	T-A-14	Latte Period pottery scatter	Eligible
	T-A-15	Latte Period pottery scatter	Eligible
	T-A-16	Latte Period pottery scatter	Eligible
	T-A-17	Latte Period pottery scatter	Eligible
	T-A-18	Latte Period pottery scatter	Eligible
	T-A-19	Latte Period pottery scatter	Eligible
	T-A-20	Latte Period pottery scatter	Eligible
	T-A-21	Japanese artifacts	Eligible
	T-A-22	Latte Period pottery scatter	Eligible
	T-A-23	Latte Period pottery scatter	Eligible
	T-A-27	Latte Period pottery scatter	Eligible
	T-A-28	Latte Period pottery scatter	Eligible
	T-A-31	Latte Period pottery scatter	Eligible
	T-A-33	Latte Period pottery scatter	Eligible
	T-A-34	Latte Period pottery scatter	Eligible
	T-A-35	Latte Period pottery scatter	Eligible

Guam SHPO Number	*Temporary Number*	*Site Description*	*NRHP/GRHP Status**
	T-A-36	Latte Period pottery scatter	Eligible
	T-A-U1	Latte Period pottery scatter	Eligible
	T-A-U2	Latte Period pottery scatter	Eligible

Legend: Eligible= Eligible for the GR and NR.

All facilities in the NWF area built prior to 1950 have been surveyed and found ineligible for listing on the NRHP. NWF itself (site 08-01065), which is eligible for listing on the NRHP for its role in the strategic bombing of Japan in 1945, remains in use as an active training site for fixed-wing and helicopter units. The NWF site has been fully documented in the Historic American Engineering Record as part of the mitigation for the Memorandum of Agreement for the NWF Beddown Initiatives in 2006 (Aaron et al. 2007).

Current protective measures at Andersen AFB include a PA regarding the implementation of military training on Guam that was signed and executed in 2009 as part of the Mariana Islands Range Complex (MIRC) EIS/Overseas Environmental Impact Statement (OEIS) (Navy 2009). The PA specifies that any area of NWF that has not been previously surveyed and in which training involves construction or ground-disturbing activities would be surveyed and inventoried for pre-Contact or post-Contact resources. Any archaeological sites within the affected area would be evaluated for inclusion on the NRHP. Any site(s) determined eligible for the NRHP that cannot be avoided would be subjected to data recovery. The PA also specifies that certain areas of NWF are designated for certain training activities, such as LZs and drop zones, bivouac, and driver training areas (Navy 2009).

Surveys conducted for the current project within the NWF vicinity by Dixon and others (Dixon et al. 2010) include a 90-ac (36- ha) area in the southeast corner of the NWF and a 200-ac (101 ha) area in the northwest corner of the NWF. In the 90-ac (36 ha) area, Dixon and others located two sites eligible to the NRHP, which were given the following temporary site numbers: T-90-2 (pre-Contact agricultural zone and WWII artifact scatters), and T-90-3 (pre-Contact agricultural zone and artifact scatters).

Within the 200-ac (101 ha) area, 42 sites were recorded by Dixon and others (Dixon et al. 2010), including 25 pre-Contact pottery scatters considered to be eligible to the NRHP (T-SP-4, and T-NW-2, 4-7, 11-14, 18-24, 26-29, 34, 36, 39, and 40), two pre-Contact pottery scatters with WWII artifacts considered to be eligible to the NRHP (T-NW-9 and 15), a rock shelter (T-A3_1), and three WWII Japanese defensive sites eligible to the NRHP (T-SP-1 through 3).

The Marine Training Area was surveyed in 2008 (Athens 2009). This area is part of Guam's forested limestone plateau, which contains natural resources of cultural concern. Four pre-Contact archaeological sites were discovered during this survey (Guam SHPO numbers 08-2299, 08-2300, 08-2301, and 08-2302). All of these sites are eligible for the NRHP. An additional 200-ac (81-ha) area north of the Marine Training Area and a 100-acre (40-ha) area within NWF were surveyed in 2010 (Dixon et al. 2010). A total of 31 sites eligible for listing on the NRHP were recorded.

South Ramp

The South Ramp area was surveyed by Davis in 1983; however, information on sites from that survey is limited. Because of development in this area, resource potential in the South Ramp area is considered low. An additional survey of this area was completed in 2009 for the Air Embarkation project (Dixon et al. 2010). No sites were located during this survey.

North Gate Construction Access Road

This 1.5-mile (mi) (2.4 kilometers [km]) long roadway was surveyed in 2008 for this EIS (Athens 2009). No historic properties were located during the survey.

Secondary Access Road

The 37-ac (15-ha) Secondary Access Road project area was surveyed in 2008 for this EIS (Athens 2009). The area surveyed was located along existing roadways. No historic properties were located during the survey of this area.

Potts Junction

The 50-ac (20.2-ha) Potts Junction APE was surveyed in 2007 (Welch et al. 2010). The area had been substantially disturbed as a result of its development as a fuel storage tank farm. No archaeological sites were identified in the APE.

Water Wells

Dixon and Walker (Dixon et al. 2010) also surveyed 22 well locations located in the southern portion of Andersen AFB for the current project, only three of which were located within the MSA. Four previously unrecorded sites were located outside the MSA and were given temporary site numbers: T-W-4 (WWII era artifact scatter), T-W-5 (post-WWII artifact scatters and concrete pad), T-W-7 (pre-Contact artifact scatter), and T-W-14 (post WWII artifact scatter and aircraft remains). Of these sites, only T-W-4 and T-W-7 were found eligible to the NRHP (Table 12.1-7).

Table 12.1-7. Historic Properties in the South Andersen AFB

Guam SHPO Number	*Temporary Number*	*Site Description*	*NRHP/GRHP Status**
	T-W-4	WWII-era artifact scatter	Eligible
	T-W-7	Pre-Contact artifact scatter	Eligible
	T-U-4	*Lancho* (farm)	Eligible
	T-U-8	*Lancho* (farm)	Eligible
	T-U-11	*Lancho* (farm)	Eligible

Utility Survey

Proposed utilities lines in Andersen AFB were surveyed in 2009 and 2010 (Dixon et al. 2010). Eleven sites were recorded (sites T-U-1 through T-U-11), all pertaining to WWII-era and in some cases Cold War dumping of military residential refuse or former construction debris. Of particular note is the concentration of traditional farms or *lanchos* located northeast of Pott's Junction, which appear to be related to the WWII agricultural use of pockets of arable soil by Chamorro farmers. Indigenous Chamorro socioeconomic information at the Micronesian Area Research Center and artifacts present in the 4 WWII-era *lanchos* (T-U-4, T-U-8, T-U-11, and T-W-4) indicate they are eligible for listing in the NRHP under Criterion D.

12.1.2.2 Finegayan

Comprising about 2,952 ac (1,195 ha), NCTS Finegayan and South Finegayan are located in northwestern Guam, west of Route 3 and south of NWF at Andersen AFB. The limestone plateau area of NCTS Finegayan supports headquarters activities, communications center activities, and provides communications receiving operations for the Navy. South Finegayan contains family housing. Table 12.1-8 provides a summary of the surveys that have taken place at NCTS Finegayan (Tomonari-Tuggle et al. 2007). Three traditional cultural properties have been recorded in Finegayan (two in NCTS

Finegayan and one in South Finegayan). Haputo Beach and Pugua Point (NCTS Finegayan) are traditional properties with both archaeological and ethnographic associations (Griffin et al. 2009). Latte Stone Park (South Finegayan) has archaeological associations.

Table 12.1-8. Summary of the Surveys that Have Taken Place at NCTS Finegayan

Year of Work	*Reference*	*Type of Work*	*Location*
1921-4	Hornbostel n.d*, Thompson 1932	Survey	Coast
1952	Reed 1952*	Survey	Coast
1965-6	Reinman 1967*	Survey	Coast
1986	Kurashina et al. 1987	Survey boundary with Andersen AFB; 17 sherd scatters recorded; Post-Contact sites not recorded	NCTS Finegayan
1988	Haun 1988	Survey boundary with Andersen AFB; sherd scatters found, only some recorded	NCTS Finegayan (northern area)
1988	Haun 1989	Reconnaissance survey near boundary with Former FAA parcel	NCTS Finegayan (southern area)
1990	Highness and Haun 1990*	Inventory survey of facility in northern area of NCTS Finegayan	NCTS Finegayan (northern area)
1992	Craib and Yoklavich 1996c*	Overview survey	All of NCTS Finegayan
1993	Lauter-Reiman 1997	Management plan for WWII resources	All of NCTS Finegayan
1996	McNeill and Welch 1998	Assessment of training area	All of NCTS Finegayan
1998	Tuggle and Welch 2000	Archival research, reconnaissance survey, assessment	FAA Parcel
1998	Olmo et al. 2000*	Phase II survey and detailed recording; complete survey of coastal shelf, reconnaissance survey of limestone plateau	NCTS Finegayan
2000	Hunter-Anderson et al. 2001	Survey, limited archaeological testing	FAA parcel
2001-5	Welch et al. 2005*	Synthesis of Guam prehistory and history	All of Guam
2001-5	Tomonari-Tuggle et al. 2005	Regional ICRMP for Navy lands	All NCTS Finegayan
2007	Welch et al. 2010	Survey, limited testing	NCTS Finegayan, GLUP 77
2008	Athens 2009	Survey	South Finegayan, Former FAA Parcel

Notes: *As cited in Tomonari-Tuggle et al. 2007

Limestone forests and coastal area traditional plant resources like those described for Andersen AFB can also be found at Finegayan.

NCTS Finegayan

Four surveys in NCTS Finegayan on the limestone plateau were conducted in the late 1980s (Kurashina et al. 1987; Haun 1988, 1989; Highness and Haun 1990 as cited in Tomonari-Tuggle et al. 2007). Ceramic scatters were identified by Kurashina et al. (1987) and Haun (1988). These surveys overlapped Andersen AFB property. More recent surveys had difficulty re-identifying these scatters, primarily due to the nature of the sites and the dense ground cover in the area.

A Phase II archaeological survey including archival research, field survey, and subsurface testing was conducted by Olmo et al. (2000 *in* Tomonari-Tuggle et al. 2007) in portions of NCTS Finegayan and

South Finegayan. This study included a complete survey of the coastal shelf and a partial survey of the limestone plateau. The study identified over 20 sites of significance.

Previous surveys at NCTS Finegayan have recorded 28 sites that are considered to be eligible or need further evaluation (Tomonari-Tuggle et al. 2005).

At total of 1,400 ac (565 ha) at NCTS Finegagan on the limestone plateau were surveyed in 2007 (Welch et al. 2010). The survey resulted in the identification of 19 previously unrecorded archaeological sites: 13 pre-Contact and six post-Contact period sites. The pre-Contact sites consist of ten artifact scatters, five with possible middens, two isolated mortars found near bulldozed mounds filled with post-Contact or modern debris, and one large site that includes three *lusong* (grinding stone), several *latte* stone pillars and capstones, three possible quarry areas, and at least four possible midden areas with ceramics, other ceramic scatters, and numerous basalt artifacts (Tomonari-Tuggle et al. 2005, Welch et al. 2010). All of these sites are eligible for inclusion on the NRHP (Table 12.1-9).

Table 12.1-9. Historic Properties in the NCTS Finegayan Area

Guam SHPO Number	*Temporary Number*	*Site Name/Description*	*NRHP/GRHP Status*
08-0007	370	Haputo Complex Large pre-Contact/post-Contact village	NRHP/GR
08-0008	373	Paugua Point Complex: includes 20 sites, extends 450 m	Eligible
	374	Tweed's Cave	Eligible
	375	Ceramic scatter	Eligible
	376	Ceramic scatter	Eligible
	377	Ceramic scatter	Eligible
	378	Ceramic scatter	Eligible
	379	Ceramic scatter	Eligible
	380	Artifact scatter	Eligible
	381	Ceramic scatter	Eligible
	687	Pugua Point 1	Eligible
	688	Pugua Point 2	Eligible
	689	Pugua Point 3	Eligible
	690	Pugua Point 4	Eligible
	691	Pugua Point 5	Eligible
	693	Pugua Point 7	Eligible
	694	Pugua Point 8	Eligible
	695	Pugua Point 9	Eligible
	696	Sinkhole and rockshelter complex	Eligible
	697	Rockshelter	Eligible
	698	Rockshelter	Eligible
	699	Cave	Eligible
	700	Rockshelter	Eligible
	701	Rockshelter	Eligible
	702	Rockshelter	Eligible
	703	Artifact Scatter	Eligible
	704	Artifact Scatter	Eligible
	705	Rockshelter complex, pictographs	Eligible
66-08-2310	1031	Artifact scatter	Eligible
	1024	Mortar/*lusong*	Eligible
66-08-2303	1026	Habitation site/artifact scatter	Eligible
	1032	Mortar/*lusong*	Eligible
66-08-2305	1028	Encampment	Eligible
66-08-1350	1029	Water catchment structure	Eligible

Guam SHPO Number	*Temporary Number*	*Site Name/Description*	*NRHP/GRHP Status*
66-08-2306	1030	Artifact scatter	Eligible
66-08-2307	1033	Artifact scatter	Eligible
66-08-2308	1034	Artifact scatter	Eligible
66-08-2309	1035	Artifact scatter	Eligible
66-08-2295	1012	Artifact scatter	Eligible
66-08-2297	1019	Artifact scatter	Eligible
66-08-2298	1020	Artifact scatter	Eligible
66-08-2299	1021	Artifact scatter/Concrete pad	Eligible
66-08-2301	1022	Artifact scatter	Eligible
66-08-2300	1023	4 defense structures	Eligible

Legend: Eligible= Eligible for the GRHP and NRHP.
Notes: See Welch et al. 2005 (as cited in Tomonari-Tuggle et al. 2007): Appendix A (Guam Sites in the Navy Retained Lands Presented in Geographic Information System Assigned Map Number Order).

There are no NRHP-listed or eligible architectural resources in NCTS Finegayan APE (Welch et. al. 2005 as cited in Tomonari-Tuggle et al. 2007).

The antenna (Facility 203, or "elephant cage") at Finegayan has been partially dismantled and does not retain sufficient integrity for inclusion on the NRHP. The majority of the innermost ring of supports (except for five supports that are missing from the original 80) and wiring for the low-band antenna reflector screen remain. Gone, however, are the three outer rings; low-band antenna, high-band-antenna reflector screen, and high-band antenna. Only their foundations (and presumably the underground wiring) remain (Welch et al. 2010).

An additional 150 ac (61 ha) was surveyed at NCTS Finegayan in 2008 near the northern boundary of NCTS Finegayan (Athens 2009). Two post-Contact and four pre-Contact sites were recorded; however, because of poor condition, none are eligible for inclusion on the NRHP. The pre-Contact sites were pottery scatters and the post-Contact sites were concrete pads.

South Finegayan

A Phase II archaeological survey including archival research, field survey, and subsurface testing was conducted by Olmo et al. (2000 as cited in Tomonari-Tuggle et al. 2007) in portions of NCTS Finegayan and South Finegayan. This study included a complete survey of the coastal shelf and a partial survey of the limestone plateau. One site was listed on the NRHP (Table 12.1-10) (Tomonari-Tuggle et al. 2007).

Table 12.1-10. Historic Properties in the South Finegayan Area

Guam SHPO Number/Temporary Number	*Site Name/Description*	*NRHP/GRHP Status**
08-0141/811	Latte Stone Park; *latte* set, cultural deposit	NRHP, GRHP

Archaeological surveys completed in 2008 of South Finegayan encountered no intact archaeological resources (Athens 2009). This area has been highly disturbed by bulldozing and clearing activities. In addition, there is no NRHP-listed or eligible architectural resources in South Finegayan project area (Welch et al. 2010).

12.1.2.3 Non-DoD Land

Former FAA Parcel

The Former FAA parcel was subject to a reconnaissance survey by Tuggle and Welch in 1998 (Tuggle and Welch 2000). They conducted ground surveys along the coastal cliffs and in selected areas of the

limestone plateau. At Ague Cove they documented three rock shelters, a cave with rock art, and a midden scatter. The previously recorded Hilan'an Rock Shelter was also relocated during this survey. The WWII-era Navy Communications Camp was recorded on the limestone plateau. As a follow-up to this survey Hunter-Anderson et al. (2001) conducted a survey and did limited archaeological excavations. They identified four pre-Contact sites and a post WWII site.

New resource potential in the Former FAA parcel is low (Tomonari-Tuggle et al. 2007). During the 2008 survey no new cultural resources were located (Athens 2009). However, the previously recorded cultural resources were relocated and are eligible for inclusion on the NRHP (Table 12.1-11).

Table 12.1-11. Historic Properties in the Harmon Annex

Guam SHPO Number/Temporary Number	*Site Name/Description*	*NRHP/GRHP Status**
/T-H-8	Pre-Contact pottery and *lancho* elements	Eligible

Harmon Annex Area

The Harmon Annex area was surveyed in 2009 (Dixon et al. 2010). One historic property was encountered during the survey, T-H-8, which contained pre-Contact pottery and WWII and post-WWII *lancho* elements (Table 12.1-12).

Table 12.1-12. Historic Properties in the Former FAA Parcel

Guam SHPO Site#/Temporary Number	*Site Name/Description*	*NRHP/GRHP Status***
/GL-12	Partially disturbed cultural deposits; ceramics, burned limestone	Eligible
08-0066	FAA rock shelter, deposit, Latte Period ceramics on surface	Eligible
08-1672	Rock shelter; ceramics on surface	Eligible
08-1673	Ceramics scatter	Eligible
08-1674	Rock shelter, ceramics on surface	Eligible
08-1675	Cave with pictographs	Eligible
08-1676	Rock shelter	Eligible
08-1677	Rock shelter	Eligible
08-1678	Ceramic scatter	Eligible
08-1680	Mortar	Eligible
08-1681	Ceramic scatter	Eligible

12.1.2.4 Off Base Roadways

The proposed action includes on base roadway construction projects that would be implemented by the DoD. An affected environment description for on base roadway construction projects is included beneath the appropriate subheadings in other sections of this chapter. The following section describes the affected environment for off base roadway construction projects that would be implemented by the FHWA.

Sixteen roadway improvement projects are located in the north region along existing Routes 1, 3, 9, 28, and 15, including new road construction between Route 1 and Finegayan South. No known historic properties are located within the APE of any project in the north region.

12.1.3 Central

12.1.3.1 Andersen South

Andersen South covers approximately 2,000 ac (809 ha) in east-central Guam (Kaschko and Welch 2002:1 as cited in Tomonari-Tuggle et al. 2007). The Andersen South Housing Area is no longer in use for housing; family housing and bachelor quarter facilities that remain on-site are in poor condition. However, power and water related infrastructure and roadways are maintained by Andersen AFB. The

abandoned housing area is currently used for military training. The northern portion of Andersen South contains the remnants of the Army Air Corps Base Command. Andersen AFB considers all of Andersen South as a training area without cultural resources constraints (Navy 2009). Table 12.1-13 summarizes previous surveys that have taken place in the Andersen South parcel (Tomonari-Tuggle et al. 2007).

Table 12.1-13. Archaeological Surveys at Andersen South Parcel

Year of Work	*Reference*	*Type of Work*	*Location*
1947	Osborne 1947*	Survey	All of Guam
1952	Reed 1952*	Survey	All of Guam
1992	Yoklavich et al. 1996*	Overview survey, field search for selected sites, based on documentary research	All of Guam
2002	Kaschko and Welch 2002*	Assessment survey	All of Guam
2001-5	Welch et al. 2005*	Summary of Guam prehistory and history	All of Guam
2001-5	Tomonari-Tuggle et al. 2005	Regional ICRMP for Navy lands	All of Navy lands on Guam
2007	Welch et al. 2010	Survey and limited testing	All of Andersen South
2009	Dixon et al. 2010	Survey	Eastern portion of Andersen South

Notes: *As cited in Tomonari-Tuggle et al. 2007

Kaschko and Welch (2002 as cited in Tomonari-Tuggle et al. 2007) conducted a study of Andersen South which included field inspections to evaluate the potential presence of cultural resources, and to predict the kind and density of cultural resources likely to be found and the geographic location where these resources may be situated.

A 2007 survey of Andersen South covered approximately 1,700 ac (688 ha) (Welch et al. 2010). The Andersen South archaeological sites consist of: 1) ; an area of scattered Latte Period subsurface deposits; and 2) a second area of scattered Latte Period subsurface deposits (Welch et al. 2010). Both of these sites are eligible for inclusion on the NRHP (Table 12.1-14).

Table 12.1-14. Historic Properties at Andersen South Parcel

Guam SHPO Number	*Temporary Number*	*Site Description*	*NRHP/GRHP Status*
04-2326		Former WWII structure	Eligible
66-04-2324	1063	Subsurface pre-Contact artifact scatter	Eligible
66-04-2325	1065	Subsurface pre-Contact artifact scatter (former T-13)	Eligible
	T-2008-01	Disturbed *latte* sets and pottery scatter	Eligible
	T-2008-04	Pre-Contact pottery scatter	Eligible

Legend: Eligible=Eligible for the GRHP and NRHP.

is one The small portion of the Andersen South area that was not surveyed in 2007 was surveyed in 2008 (Dixon et al. 2010). An additional two pre-Contact sites were recorded during this survey. They include a pottery scatter and a bulldozed, displaced *latte* set. Both of these sites are historic properties.

12.1.3.2 Barrigada

Navy Barrigada

Navy Barrigada covers 1,850 ac (749 ha) in east-central Guam. The two main uses of Navy Barrigada are former and active communications facilities, which occupy the eastern half and western edge of Navy

Barrigada, and the Barrigada Golf Course, which is in the middle of Navy Barrigada. Table 12.1-15 summarizes the previous surveys that have taken place at Navy Barrigada (Tomonari-Tuggle et al. 2007).

Table 12.1-15. Archaeological Surveys at Navy Barrigada

Year of Work	*Reference*	*Type of Work*	*Location*
1984	Kurashina and Sinoto 1984*	Inventory survey of Loran-C station site southeast of golf course	Adjacent area
1991	Craib and Yoklavich 1996a*	Overview survey of NCTAMS Westpac	All of Navy Barrigada
1993	Lauter-Reinman 1997	Cultural Resources Management Plan for WWII resources	All of Guam
1996	McNeill and Welch 1998	Assessment of training area	All of Navy Barrigada
1998	Olmo et al. 2000*	Phase II survey and detailed recording in undeveloped areas	East of Navy Barrigada
1999	Tuggle and Welch 2000	Archival research, reconnaissance survey, assessment for GLUP	All of Guam
2000	Hunter-Anderson et al. 2001	Survey, limited testing	Adjacent areas
2001-5	Welch et al. 2005*	Synthesis of Guam prehistory and history	All of Guam
2001-5	Tomonari-Tuggle et al. 2005	Regional ICRMP for Navy lands	All of Navy lands on Guam
2008	Athens 2009	Survey, limited testing	100 ac (40 ha) within Navy Barrigada

Notes: *As cited in Tomonari-Tuggle et al. 2007

Four field surveys have been conducted in and near Navy Barrigada. The first was by Kurashina and Sinoto (1984 as cited in Tomonari-Tuggle et al. 2007). No evidence of pre-Contact sites was found during the survey, although an informant suggested that two *latte* stones had once been in the area. Tuggle and Welch (2000) conducted a survey of selected portions of Navy Barrigada and Hunter-Anderson et al. (2001) completed surface surveys and limited tests based on the Tuggle and Welch study. Olmo et al. (2000 *in* Tomonari-Tuggle et al. 2007) conducted an archaeological survey (Phase II) of portions of Navy Barrigada that included subsurface testing. Two sites are currently eligible for inclusion in the NRHP (Table 12.1-16) (Tomonari-Tuggle et al. 2007). Both of these historic properties are outside of the installation boundaries.

Table 12.1-16. Historic Properties in the Vicinity of Navy Barrigada

Guam SHPO Number	*Temporary Number*	*Site Description*	*NRHP/GRHP Status**
04-1059	367	Barrigada Battlefield; site of battle August 2-3, 1944; includes Barrigada Well and reservoir, which were the objective of the battle	Eligible
04-1705	371	Officers Country Gates; includes entry pillars and other remains of U.S. officers' quarters; distinctive masonry of entry gates indicates possible construction by Japanese prisoners in 1945	Eligible

Legend: Eligible= Eligible for the GRHP and NRHP.

A 2008 survey of Navy Barrigada (Athens 2009) encountered human bone fragments and a metate, which is a flat stone that has a shallow depression in the upper surface for holding maize or other grains so they can be more easily ground. One traditional cultural property has been identified on the Navy Barrigada (Mount Barrigada). Mount Barrigada is tied to the origin myth of the Chamorro people (Griffin et al. 2009).

Utility Lines

A small survey was conducted for proposed utilities at Navy Barrigada in 2009 (Dixon et al.2010). No resources eligible for the NRHP were identified.

Air Force Barrigada

An archaeological survey of the Air Force Barrigada APE took place in 2008. No archaeological sites were identified in the APE during the survey. The survey area had already been highly disturbed by bulldozing activity.

12.1.3.3 Non-DoD Land

Route 15 Valley and Escarpment

The proposed firing ranges for Alternatives A and B associated with the proposed action are located on the Route 15 valley and escarpment east of Andersen South. Approximately 60% of the Route 15 impact area has been surveyed. The remainder could not be surveyed because of a lack of permission by landowners and tenants. The unsurveyed areas are considered to be medium probability areas for archaeology because archaeological sites are known from the vicinity, but none are known from within the APE. Based on best available information from previous surveys in the area, resource potential in the Route 15 survey area is high. Near the coast outside the project area, the Pagat Site Complex (Site 04-0022) is contemporary with the historically known Pagat Village, where a Spanish church was built in 1672 (Table 12.1-17). The Pagat Site Complex includes at least 20 *latte* sets, more than 50 mounds of artifacts and midden, remnants of trails, more than 30 mortars and grinding areas, an unknown number of caves and rock shelters, and other features (Carson and Tuggle 2007). Limited test excavations revealed a widespread and dense Latte Period deposit associated with the surface-visible remains, and remnants of an earlier occupation period were present in some locations (Carson and Tuggle 2007). Surveys of the Route 15 impact area indicate as least three other historic properties are located within this area (Dixon et al. 2010). They include sites 04-0021, 04-0024, and 04-0642. Two of these sites are also traditional cultural properties, including the Pagat site and Marbo Cave, already identified in the Route 15 area (Griffin et al. 2009). Areas near the Pagat site have been used to gather traditional plants of the limestone forest and coastal areas like those described above for Andersen AFB. Juan Cepeda, a traditional *suruhanu* (healer), lived near the Pagat site and collected medicinal plants from the surrounding area. A table of medicinal plants collected by Juan Cepeda is included in Volume 9, Appendix G, Chapter 4 (McMakin 1975, 1976).

Table 12.1-17. Historic Properties at Route 15 Parcel

Guam SHPO Number	*Temporary Number*	*Site Name/Description*	*NRHP/GRHP Status*
04-0024		Marbo Site	Eligible
04-0642		Rock shelter	Eligible
04-0021		Pagat Site	Eligible
04-0022		Pagat Site (main)	NRHP
	MaG-Ma-5	*Latte* Period Site	Eligible
	MaG-Ma-6	*Latte* Period Site	Eligible
	AS-T-2007-07	*Latte* Period Site	Eligible
	AS-T-2007-20	*Latte* Period Site	Eligible

Legend: Eligible=Eligible for the GR and NRHP.

Coastal areas off the Pagat site area are also used for fishing by locals. A list of traditionally harvested fish and where they are harvested can be found in Volume 9,Appendix G, Chapter 4. Traditional fishing practices used by the Chamorro include using hooks and line with bait, spearing, *poio* (chum bag), using a decoy fish (to catch parrotfish), and nets and weirs. Most subsistence fishing in Guam is done on the western coastal bays, lagoons, channels, reef flats, and off shore waters northwest to Urunao. However, when waters are calm enough, typically July through September, fisherman will also fish off the coast near the Pagat site and numerous eastern coastal areas of Guam.

Cabras Point

Surveys of the Cabras Point project area were conducted in 2008 (Dixon et al. 2010). No archaeological resources were recorded during the survey, although the area has been subject to considerable disturbance since at least 1898.

12.1.3.4 Off Base Roadways

The proposed action includes on base roadway construction projects that would be implemented by the DoD. An affected environment description for on base roadway construction projects is included beneath the appropriate subheadings in other sections of this chapter. The following section describes the affected environment for off base roadway construction projects that would be implemented by the FHWA.

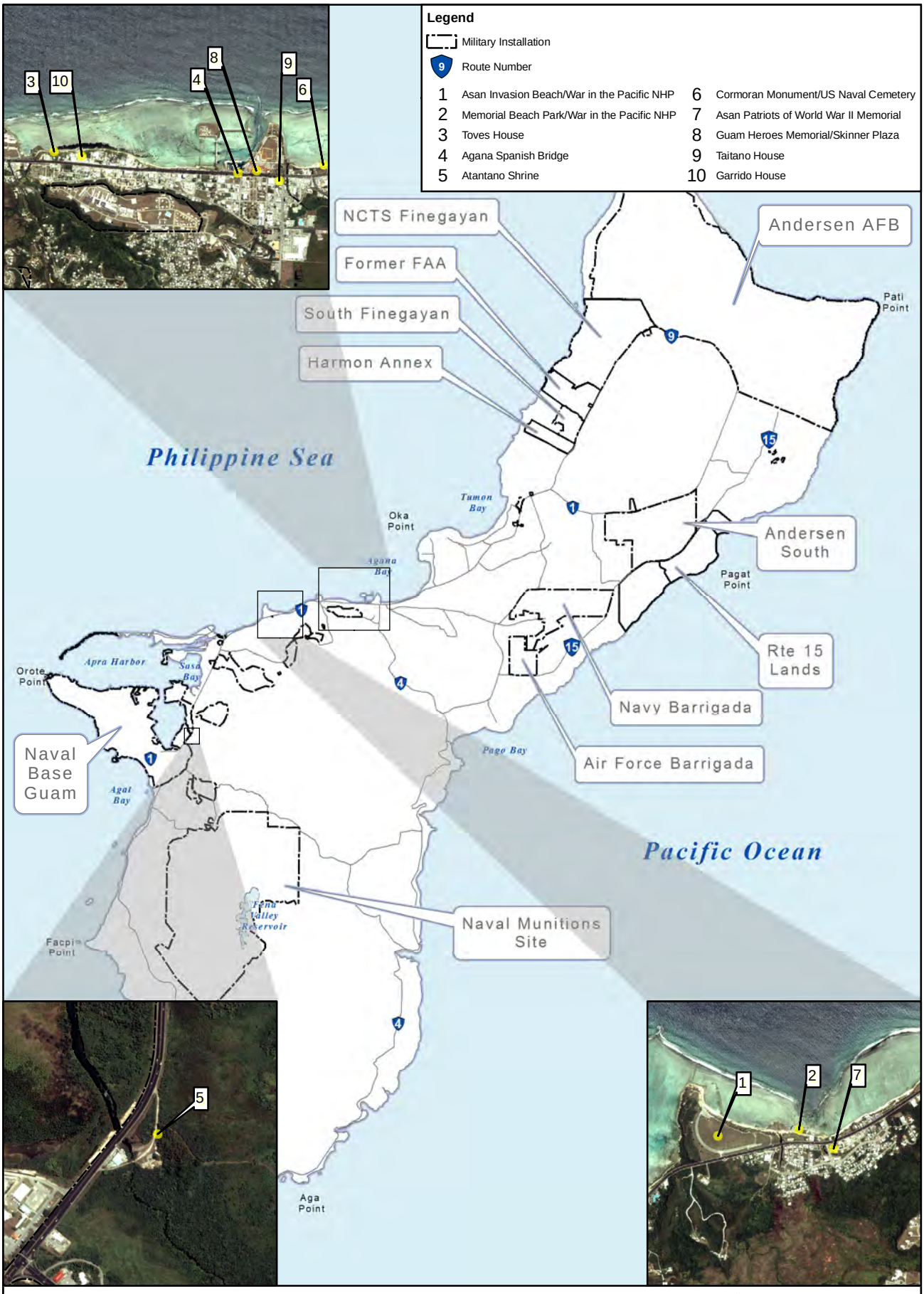
Thirty-three (33) roadway improvement projects are located in the central region along existing Routes 1, 8, 8A 10, 15, 16, 25, 26, and 27, Alageta-Lily, and Chalan Lujuna Road. Several known historic properties are within the APE for these projects. Historic properties are listed in Table 12.1-18 and Figure 12.1-3 illustrates the location of well known historic properties in the APE.

Table 12.1-18. Historic Properties within the APE of Central Region Projects

Historic Property	*Description*	*Guam Road Network (GRN) #*
Cormoran Monument	The Cormoran Monument is a monument to the Sailors lost aboard the *Cormoran*. It is located within the U.S. Naval Cemetery It was listed on the Guam Register of Historic Places (GRHP) July 24, 1974	1
U.S. Naval Cemetery	The U.S. Naval Cemetery in Agana is listed on the NRHP and GRHP	1
Hagåtña (Agana) Bridge	The bridge was built in 1945, during the rehabilitation of Hagåtña after World War II	3
Asan Invasion Beach	Asan Invasion Beach is listed as on the NRHP and GRHP It is the site of the U.S. invasion, July 21, 1944 Part of this property is included within the War in the Pacific National Historic Park (NHP)	13
Memorial Beach Park	Memorial Beach Park is listed on the NRHP and GRHP It is the site of the U.S. invasion, July 21, 1944 It is included within the War in the Pacific NHP	13
War in the Pacific National Historic Park	This park was listed on the NRHP and GRHP in 1978 This unique National Park is the only site in the National Park System that honors the bravery and sacrifices of all those who participated in the Pacific Theater of World War II	13
Aspaalas #675	Archaeological site	13
Adelup RT Burial #300	Archaeological site	14
Asan Patriots of World War II Memorial	Asan Patriots of World War II Memorial is listed on the GRHP, and it is eligible for listing on the NRHP	14
Asan archaeological site	Archaeological site	14

Table 12.1-18. Historic Properties within the APE of Central Region Projects

Historic Property	*Description*	*Guam Road Network (GRN) #*
Guam Heroes Memorial / Skinner Plaza	Eligible for the NRHP/GRHP	15
Taitano House	Eligible for the NRHP/GRHP	15
Garrido House	Listed on the GRHP in 1984	15
Toves House	Listed on the NRHP and GRHP	15
Agana Spanish Bridge	Listed on the NRHP and GRHP. Stone arch bridge ca. 1800	15
Agana-Hagatna Pillbox	Listed on the NRHP and GRHP Japanese coastal defense fortifications.	15
Battle of Finegayan Battlefield	3 August 1944 Battle between American and Japanese troops Private First Class Frank Peter Witek received the Medal of Honor for his actions during this battle, NRHP/GRHP eligible	18
Route 1 Archaeological Site	Archaeological site	33
Unnamed Archaeological Site	Archaeological site	36
Mesa House	1930 two-story house listed on the NRHP	113



Printing Date: May 24, 2010, M:\projects\GIS\8806_Guam_Buildup_EIS\figures\Current_Deliverable\Vol_2\12.1-3.mxd

Figure 12.1-3
Historic Properties in the Area of Potential Effect (APE)

GRN #1 passes by the U.S. Naval Cemetery and Fortification along Route 1. Cormoran Monument is also located within the cemetery boundary. GRN # 3 would replace the Hagåtña (Agana) Bridge. GRN #13 passes by the Asan Invasion Beach and Memorial Beach Park, which are adjacent to the north side to Route 1, along the Philippine Sea. Both of these properties are included within the War in the Pacific NHP. The NHP has a much larger boundary and straddles Route 1 at Asan Point. GRN #13 also passes by one archaeological site. GRN #14 is adjacent to the Asan Patriots of World War II Memorial and two archaeological sites. GRN #15 is adjacent to parcels holding the San Nicholas Bridge, the Guam Heroes Memorial, historic Skinner Plaza, Taitano House, Garrido House, Toves House, and the Agana Spanish Bridge. GRN # 18 is a pavement-strengthening project that extends towards the Battle of Finegayan Battlefield. The precise boundaries of the battlefield are uncertain but likely extend into the APE. GRN #33 passes by an archaeological site discovered during previous reconstruction. An unnamed archaeological site is located within the APE of GRN #36 (Route 15 relocation). Mesa House is in or near the APE for GRN #113.

War in the Pacific National Park

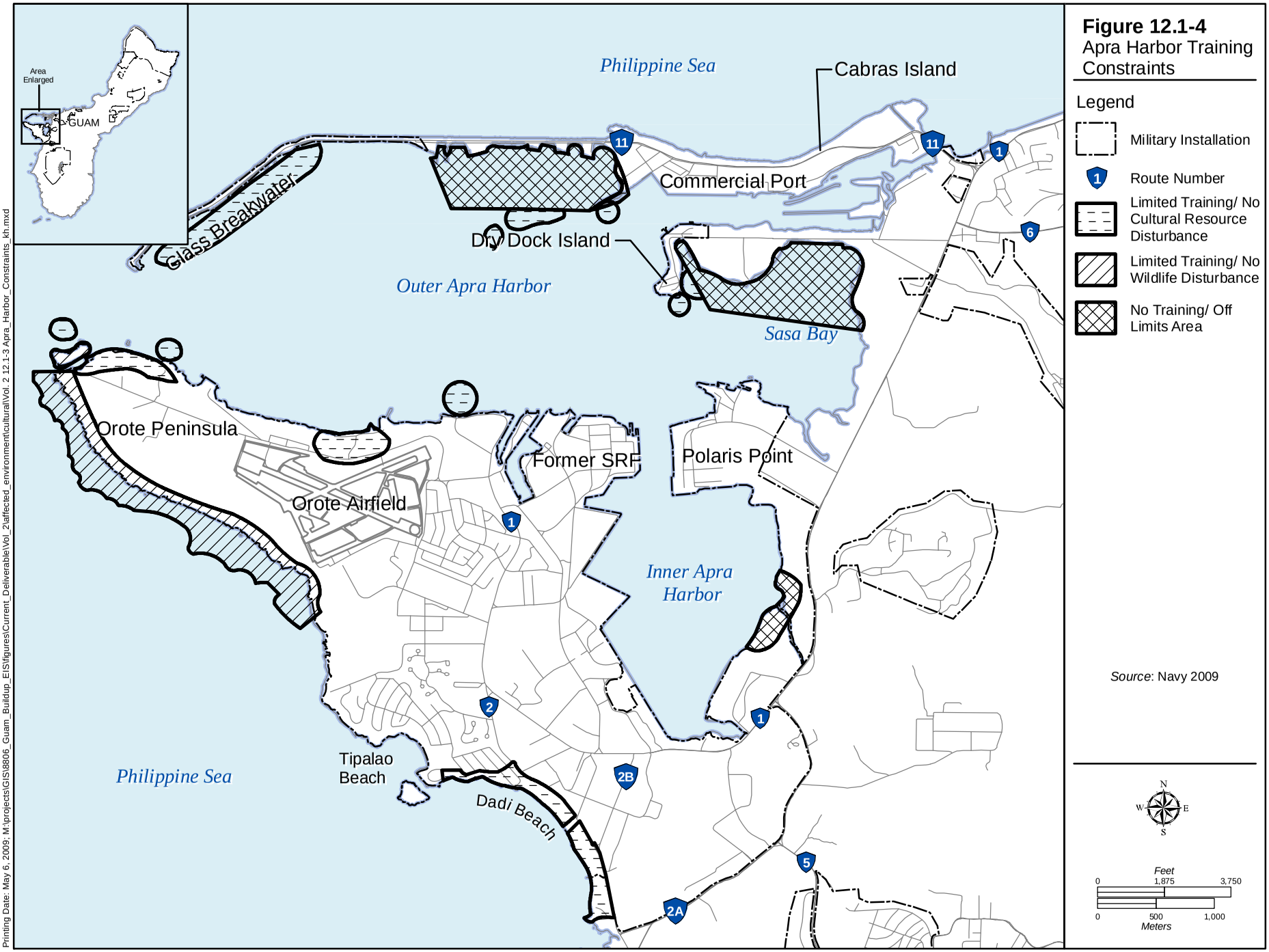
War in the Pacific National Park includes, Asan Bay Overlook, the 20 cm short-barrel Japanese Coastal Defense Gun and the Japanese Twin Mount 25mm Anti Aircraft Gun that are located at Ga'an Point, Liberator's Memorial commemorates the 50th anniversary of the Liberation of Guam, over 3,500 marine species and 200 species of coral that are located within the scuba and snorkeling areas of park waters including the endangered hawksbill sea turtle and the threatened green sea turtle and over 100 historical sites, caves, bunkers, pill boxes, emplacements, latrine foundations, plaques, and structures that can be seen throughout War in the Pacific's landscape.

12.1.4 Apra Harbor

12.1.4.1 Harbor

Thirty-one known locations of shipwreck sites and submerged objects are located in Outer Apra Harbor. These include 29 shipwrecks consisting of fishing boats, yachts, barges, tugs, landing craft utility vessels, British passenger ships, WWII Japanese freighters or transport ships, and two plane wrecks with a total of 3 planes (Navy 2009). The SMS Cormoran and the Tokai Maru are listed on both the Guam Register (GRHP 2008) and the NRHP (National Register Information System 2008). The SMS Cormoran was a German ship anchored in Apra Harbor near the beginning of World War I. When the U.S. joined the war in 1917, the SMS Cormoran's crew was ordered to turn over the ship; they destroyed it instead with nine crewmen dying in the incident. The Tokai Maru, a Japanese passenger-cargo freighter built in 1930, was used to transport military supplies during WWII. The Tokai Maru was sunk in Apra Harbor in 1943 by a U.S. submarine.

Current protective measures at the Apra Harbor include a PA regarding the implementation of military training on Guam that was signed and executed in 2009 (Navy 2009). These restrictions on training exercises correspond to mapped constrained areas designated as no training or limited training /no cultural resource damage (Figure 12.1-4). No training areas identify areas that would be completely avoided with no training exercises allowed. Limited training areas are primarily designated as pedestrian traffic areas with vehicular access limited to designated roadways and/or with the use of rubber-tired vehicles. However, no pyrotechnics, demolition, or digging are allowed without prior consultation with the appropriate SHPO. Two areas within Outer Apra Harbor are designated as no training areas; seven additional areas within the harbor are designated as limited training (Navy 2009).



12.1.4.2 Naval Base Guam

Naval Base Guam covers about 4,500 ac (1,821 ha) on the west-central coast of Guam. It surrounds Apra Harbor and includes all of Orote Peninsula, as well as a low, largely marshy area along the east side of the harbor. The APE consists largely of lands that were created by dredging during and immediately after WWII. Only the areas immediately west of Marine Drive on the west side of the inner harbor are part of the original landform. There are over two thousand buildings and structures/facilities at Naval Base Guam, built between 1944 and 2008.

A variety of facility types are present at Naval Base Guam, including housing quarters, administrative buildings, quality of life facilities, utility facilities, commercial buildings, sidewalks, bridges, and roadways. Facilities built prior to 1965 have been evaluated for NRHP-eligibility. Those facilities built after 1965 were evaluated as part of a Cold War-era study by Mason Architects, Inc. and Weitze Research (2009). Table 12.1-19 summarizes the previous surveys that have taken place at Naval Base Guam (Tomonari-Tuggle et al. 2007).

Table 12.1-19. Archaeological Surveys at Naval Base Guam

Year of Work	*Reference*	*Type of Work*	*Location*
1991	Craib and Yoklavich 1996a*	Overview survey of FISC	Littoral Warfare Training Center
1991	Craib and Yoklavich 1996b*	Overview survey of Main Base	All of Naval Base Guam
1991	Yoklavich and Craib 1996*	Overview survey of Public Works Center	Marine Corps embarkation area
1993	Lauter-Reinman 1997	Cultural Resources Management Plan for WWII resources	All of Naval Base Guam
1993	Lauter-Reinman 1998	CRMP for Apra Harbor Naval Complex	All of Naval Base Guam
1996	Henry et al. 1998b*	Phase I survey, testing of Sumay caves	Sumay Cove
1996	McNeill and Welch 1998	Assessment of training areas	All of the Naval Base Guam
1997	Fulmer et al. 1999*	Detailed recording and test excavations at Orote Point Site, Fort Santiago, Sumay Village	Sumay Cove
2000-1	Hunter-Andersen and Moore 2002	Survey and detailed mapping of Waterfront and NMS; 300 ac (121 ha)	Sumay Cove
2002	Dixon et al. 2004b	Inventory survey, testing	Marine Corps embarkation area, Littoral Warfare Training Center
2001-5	Welch et al. 2005*	Synthesis of Guam pre-Contact and history	All of Naval Base Guam
2001-5	Tomonari-Tuggle et al. 2005	Regional ICRMP for Navy lands on Guam	All of Naval Base Guam
2007	Welch et al. 2010	Survey and backhoe trenching	Sumay Village Area
2008	Athens. 2009	Survey and limited testing	Tipalao/Dadi Beach
2008	Dixon et al. 2010	Survey and limited testing	Military Working Dog Kennel Amphibious Landing Training Area Overland Options Training Routes

Notes: *As cited in Tomonari-Tuggle et al. 2007

Fulmer et al. (1999), as cited in Tomonari-Tuggle et al. 2007, conducted testing at Sumay Village. Sumay was a documented 17th century village on the north coast of the Orote Peninsula, at the western mouth of

the inner lagoon. It was occupied much earlier, from at least the Late Unai Phase of pre-Contact occupation and continuing through the Latte Period (Welch et al. 2005:70 as cited in Tomonari-Tuggle et al. 2007). Dixon et al. (2004b) conducted a survey of the Victor Wharf area, although much of the area could not be surveyed due to the presences of hazardous materials. See Volume 2, Chapter 17, Hazardous Materials and Waste for more information on hazardous materials. Other surveys include cultural resource management plans by Lauter-Reinman (1997, 1998) and Tomonari-Tuggle et al. (2005).

Post-Contact properties in the Naval Base Guam represent all periods of Guam history, although most are related to WWII and post-war construction. One hundred twenty-two resources are listed, considered eligible for inclusion on the NRHP or need further evaluation (Tomonari- Tuggle et al. 2005). The Cable Station Remains, the Japanese Midget Submarine, Orote Airfield, Orote Historical Complex, and Sumay Cemetery are listed on the Guam Register (GRHP 2008); the Cable Station Remains, Orote Airfield, and the Orote Historical Complex are also listed on the NRHP (National Register Information System 2008).

In the area on the west side of Sumay Cove are two sites: Sumay Village (Site 03-1038) and the Pan American Airways seaplane channel/ramp (International Archaeological Research Institute, Inc. map no. 270). Sumay Village was occupied through the First American Period (from 1898 to WWII). It also contains materials dating to the Pre-Latte and Latte Periods, albeit intermingled with historical and modern debris. During the pre-Contact occupation, the site was situated on a level sandy shore facing north and northeast "to a quiet lagoon with extensive reef flats. Inland of the site are limestone terraces which once were forested and likely contained a variety of useful species" (Hunter-Andersen and Moore 2002:6 as presented in Tomonari-Tuggle et al. 2007). Sumay Village is also considered a traditional property by the Chamorro people (Griffin et al. 2009). The Pan American Airways seaplane channel/ramp was originally built in the 1920s as part of the Marine Aviation base and later used by Pan American Airways in the 1930s; it was also used as an important landing area during the last months of WWII. Sites and structures located adjacent to Apra Harbor that are listed or eligible for inclusion on the NRHP are presented in Table 12.1-20 (Tomonari-Tuggle et al. 2007).

Table 12.1-20. Historic Properties in the Naval Base Guam Area

*Guam SHPO Site #/Map #**	*Site Name/Description*	*NRHP/GRHP Status***
/194	Cable Station Remains	Listed
03-1126/221	Fort San Luis	Eligible
03-1128; 03-1346; 03-1347/227	Gab Gab Beach Fortifications	Eligible
/229	Gab Gab Beach Site	Eligible
/231	Glass breakwater	Eligible
03-1088/251	Japanese midget submarine	Listed
/253	Japanese steps and wall	Eligible
/254	Lathe from New York Shipyard – ship repair operations area	Eligible
/261	NOB Hill Bowl Theatre	Eligible
03-1066/264	Orote Airfield	Listed
03-1009/265	Orote Historical Complex	Listed
/267	Orote Village	Eligible
/270	Pan American Airways Seaplane Channel/Ramp – west of Sumay Cove	Eligible
01-1337/275	Leepers Look Pottery and Lithic Scatter	Eligible
03-1038/319	Sumay Cemetery	Listed
02-1853/706	Harbor facilities	Eligible
03-1854/707	Japanese defensive position	Eligible
/710	Japanese WWII defensive position	Eligible
/719	Guam Dredging Contractors	Eligible

*Guam SHPO Site #/Map #**	*Site Name/Description*	*NRHP/GRHP Status***
/726	Gab Gab Beach fortification	Eligible
/727	Pottery scatter	Eligible
/729	Gab Gab Beach far west fortification	Eligible
/734	Post-Contact site	Eligible
/737	Post-Contact site	Eligible
/740	Pre-Contact site	Eligible
/741	Site 7 (post-Contact site)	Eligible
/742	Post-Contact site	Eligible
03-1863/743	Luis P. Garrido House	Eligible
/744	Site 8 (post-Contact site)	Eligible
/746	Post-Contact site	Eligible
/753	Post-Contact site	Eligible
/754	Post-Contact site	Eligible
/756	Post-Contact site	Eligible

Legend: Eligible= Eligible for the GR and NRHP.

Marine Corps Embarkation Area

Archaeological work in 2007 involved surface survey and excavation of 22 backhoe test trenches in the proposed impact areas near the Marine Corps Embarkation Area (Welch et al. 2010). These revealed no NRHP- listed or eligible archaeological deposits. The Sierra, Tango Uniform, and Victor Wharves are located at the Marine Corps Embarkation Area. None of these wharves are eligible for listing on the NRHP (Tomonari-Tuggle et al. 2007). The wharves of Inner Apra Harbor are evaluated as not eligible for listing on the National Register due to "changes in design, materials and workmanship [that] have affected their integrity" (Lauter-Reinman 1998: E-13 as quoted in Tomonari-Tuggle et al. 2007). Although they retain their original alignments, they have been rebuilt in concrete. The original wharves were sheet-pile with wooden fenders.

At the southwest corner of Inner Apra Harbor is the possible location of the Chamorro village of Apra. Like Sumay Village, this village would have been situated on the edge of the embayment. This location is based on map analysis (Tuggle 1993), but the possibility of finding intact cultural remains is low due to the extent of war-era and modern construction.

Medical-Dental Clinic Site

No historic properties occur in the central portion of Naval Base Guam (Tomonari-Tuggle et al. 2005).

Military Working Dog Kennel (MWDK)

Several cultural resource sites have been documented in the vicinity of the MWDK (Table 12.1-21), but only one has been identified specifically within the two project areas. Several Japanese WWII defensive sites and remnants of concrete pads are in the vicinity, and limited subsurface testing has revealed Latte Period and earlier cultural materials in sandy deposits nearby at Dadi Beach. Subsurface testing of this area was completed in 2009 (Dixon et al. 2010). No intact cultural features were recovered in the MWDK, although surface remains of WWII-era Camp Bright (Guam Site 2-1300) were present.

Table 12.1-21. Historic Properties in the Vicinity of the MWDK

Guam SHPO Number/Temporary Number	*Site Name/Description*	*NRHP/GRHP Status***
/PS-14	Gun emplacement	Eligible
/TN-8	Concrete pads	Eligible
/TN-19	Concrete foundation	Eligible
/TN-20	Water system	Eligible
/TN-21	Stone wall and steps	Eligible
66-02-1300	Camp Bright/Japanese bunker and cave	Eligible
66-02-1301	Japanese bunker and cave	Eligible
66-02-1302	Dadi Beach Rock Shelter	Eligible
66-02-1303	Atypical Japanese bunker	Eligible
66-02-1305	Japanese defensive cave	Eligible
66-02-1306	Japanese defensive cave	Eligible
66-02-1307	Japanese defensive cave	Eligible
66-02-1308	Japanese defensive cave	Eligible
66-02-1309	Japanese defensive cave	Eligible
66-02-1310	Japanese defensive cave	Eligible
66-03-1129	Japanese bunker and cave	Eligible
66-03-1305	Japanese defensive cave	Eligible

Legend: Eligible=Eligible for the GR and NRHP.

Surveys of the Tipalao and Dadi Beach areas for this EIS were completed in 2008 (Athens 2009). Six backhoe trenches were excavated at Tipalao and nine trenches at Dadi Beach. Cultural deposits were recovered in trenches at both beaches. Additional trenches were excavated on the terrace above Dadi Beach in 2009 (Dixon et al. 2010). Excavation of the these trenches demonstrate the presence of WWII era or later cultural material related to WWII-era Camp Bright (Guam Site 2-1300) in all 11 trenches, but only secondary depositional evidence of earlier historic or pre-Contact occupation nearby.

Overland Options Training Routes

Mechanical excavations along the proposed Overland Options Training Routes situated between Dadi Beach and Inner Apra Harbor encountered primary depositional evidence of pre-Contact Chamorro occupation and probable human burial in one excavation, Trench 1. These deposits included three probable Late Pre-Latte or Transitional Period earth ovens likely dating between 500 B.C. and A.D. 500, overlain by a probable Latte Period midden likely dating between A.D. 1,000 and 1,500. The intact ovens and midden demonstrate that this back dune setting was once situated further inland than is Dadi Beach today, and was favorable to native Chamorro occupation given its proximity to coastal resources. In fact, it is possible that these remains represent the antecedents of the late 17th century traditional village of Orote.

Additional trenching to the north on the Overland Option area exposed the buried remains of destroyed concrete structures and associated refuse related to WWII-era Camp Bright (Guam Site 2-1300) in Trenches 2 and 3, two extant concrete foundations of the same era on the surface, modern refuse from a former landfill in Trenches 4 through 6, construction fill associated with the access road to the former Camp Bright laundry in Trench 7, and a metal sewer pipe entering this facility from the Camp Covington direction in Trench 8.

Polaris Point

The Alpha and Bravo Wharves are located on the southwest corner of Polaris Point. These wharves date to the WWII era. None of these wharves is eligible for listing on the NRHP (Tomonari-Tuggle et al.

2005). Because it is a man-made construction of fill, Polaris Point has no potential for archaeological resources (Tomonari-Tuggle et al. 2005).

12.1.4.3 Off Base Roadways

The proposed action includes on base roadway construction projects that would be implemented by the DoD. An affected environment description for on base roadway construction projects is included beneath the appropriate subheadings in other sections of this chapter. The following section describes the affected environment for off base roadway construction projects that would be implemented by the FHWA.

Five roadway improvement projects are located in the Apra Harbor Region along existing Routes 1, 2A, and 11. One known historic property, the Atantano Shrine, is within the APE for these projects. It is described in Table 12.1-22, and Figure 12.1-3 illustrates its location. The Shrine itself is east of Route 1, but the parcel is adjacent to the road, and an access road to the shrine intersects Route 1.

Table 12.1-22. Historic Properties within the APE of Apra Harbor Region Projects

Historic Property	*Description*	*GRN #*
Atantano Shrine	Listed on the NRHP and GRHP. This shrine marks the location where Piti villagers honored 18th century Spanish Governor Felipe Cerain for constructing a road that connected the southern half of the island with the capital of Hagåtña.	24

12.1.5 South

12.1.5.1 Naval Munitions Site

NMS comprises approximately 8,800 ac (3,561 ha) and is situated within the inland volcanic hills, valleys, and mountains of southern Guam. The terrain in the site is mountainous and rugged. See Volume 2, Chapter 3, Geological and Soil Resources, for a discussion of geological resources. This area has been physically isolated and, therefore, more protected from construction and destruction than any of the other Navy areas. The modern landscape retains many elements of native forest and, in the more remote sections, has only been slightly modified by twentieth century introductions.

Natural resources of cultural significance in the NMS include those of the limestone forest and savanna. Trees such as the da'ok (*Callophyllum inophyllum*) are found in savanna contexts. Da'ok trees are used for timber. Plants such as the agasi or dodder (*Cassytha filiformis)* are also found in savanna contexts. Agasi is a medicinal plant. Neti or swordgrass (*Miscanthus floridulus)* is a savanna plant that is used for cordage, thatch, and weaving.

Cultural resources identified in NMS include pre-Contact, post-Contact, and multi-component archaeological sites and facilities (Tomonari-Tuggle et al. 2005). Three hundred and eighty-seven resources are listed or eligible for the NRHP or need further evaluation. At least 146 *latte* sites, containing over 350 *latte* sets, have been identified in NMS, ranging from single, isolated *latte* structures to complexes of multiple *latte* sets combined with other features. Where identifiable, *latte* sets in complexes exhibit 6, 8, 10, and 12 pillars each in two paired rows. Also found in NMS are quarries, cliff overhangs, caves, artifact scatters, and isolated objects such as sling stones, stone tools, mortars, and a grooved boulder. Forty-six post-Contact resources considered historic properties are located on NMS and include an airplane crash location, a baseball field, depressions, concrete blocks, and artifact scatters. Three resources, the Bona Site, the Fena Massacre Site, and the West Bona Site are listed on the Guam Register (GRHP 2008); the West Bona site is also listed on the NRHP (National Register Information System 2008). Table 12.1-23 summarizes the previous surveys that have taken place at NMS (Tomonari-Tuggle et al. 2007).

Table 12.1-23. Archaeological Surveys at the NMS

Year of Work	*Reference*	*Type of Work*	*Location*
1921-4	Hornbostel (n.d.)*,Thompson 1932	Islandwide survey	Central NMS
1947	Osborne 1947*	Islandwide survey	Central NMS
1952	Reed 1952*	Islandwide survey	Central NMS
1965-6	Reinman 1967*	Islandwide survey	Central NMS
1988	Shun 1988*	Survey	Portion of magazine area
1991	Craib and Yoklavich 1997*	Overview survey	New magazine area
1992	Tuggle 1993	Survey and testing	All of NMS
1993	Lauter-Reinman 1997	Cultural Resources Management Plan for WWII resources	All of NMS
1993	Caruccci 1993	Survey	Magazine area
1994	Craib and Nees 1998	Survey and subsurface testing; revisited *latte* areas identified by Hornbostel and Osborne	Central and northeastern NMS
1996	McNeill and Welch 1998	Assessment of training areas	All of NMS
1996	Henry et al. 1998a*	Survey and subsurface testing; southern portion of Annex	Southern NMS
1997	Henry et al. 1999*	Survey and subsurface testing;	Central NMS
1997	Craib 1997	Survey	Surveys in northeast portion of NMS
1998	Allen et al. 2002	Survey and testing in four areas, total	North and Central NMS
2000	DeFant 2000*	Cultural Resources Management Plan	All of NMS
2001-5	Welch et al. 2005*	Summary of Guam pre-Contact and history	All of NMS
2001-5	Tomonari-Tuggle et al. 2005	Regional ICRMP for Navy Lands	All of NMS
2002	Hunter-Anderson and Moore 2002*	Survey	Southwest portion of NMS
2002	Dixon et al. 2004a	Survey and limited testing	Northeast NMS Lost River
2007	Welch et al. 2010	Survey and limited testing	Southwest portion of NMS

Notes: *As cited in Tomonari-Tuggle et al. 2007

Survey and auger testing was conducted by Tuggle (1993) just north of Dealey Road. No pre-Contact sites were found in this parcel. The central portion of NMS was surveyed by Craib and Nees (1998). They note that use of this area began as early as Anno Domini 400, with Latte Period construction and habitation.

Approximately 2,850 ac (1,153 ha) in the southern portion of NMS was surveyed by Henry et al. (1998a as cited in Tomonari-Tuggle et al. 2007). Henry et al. (1999, as cited in Tomonari-Tuggle et al. 2007) suggest that specific activities that took place in NMS including resource procurement, cooking, storage, ceramic manufacturing, shelter, stone tool manufacturing, *latte* construction, plant processing, woodworking/fiber craft, hearth construction, oven construction, marine exploitation, hunting, warfare, food production, and mortuary activities. This variety indicates that inland sites were not just for occasional use or collection of resources, but were used for long-term habitation and activities.

Allen et al. (2002) conducted a survey of approximately 365 ac (148 ha) in four parcels in the northern and central portions of NMS. They located artifact scatters, *latte* sets, military sites, overhangs and cave

shelters, and early 20th century habitations. Welch et al. (2010) surveyed the southwestern portion of NMS.

A traditional cultural properties study of Guam was completed in 2009 (Griffin et al. 2009). Two traditional cultural properties were identified in NMS. The Fena Massacre Site has archaeological and ethnographic associations. The Fena Watershed contains numerous archaeological sites and has legendary, archaeological, and ethnographic associations. Concerns over the possible disturbance and disposition of pre-Contact human remains are likely and the presence of petroglyphs and pictographs may indicate past or present ceremonial or religious activities. Pre-Contact human remains have been recovered from caves and rockshelters as well as near *latte* sites.

Specific areas known to have traditional importance to the Chamorro include Almagosa Springs area of Fena on NMS. The Fena Massacre Caves on NMS are the location of annual commemoration ceremonies by the Chamorro.

Munitions Storage

In the northeastern portion of NMS, a surface survey in 2007 identified several abandoned magazines, a recently renovated bridge, one *latte* site, an isolated stone artifact fragment, and the displaced remnants of a damaged Armco structure. One *latte* site is eligible for listing on the NRHP. Of the facilities present in the area, the abandoned Armco Magazines are eligible for listing on the NRHP (Welch et al. 2010). Bridge 705 was not eligible for listing on the NRHP (Welch et al. 2010).

Lost River

In 2002, Dixon et al. (2004a) surveyed approximately 205 hectares of the Naval Magazine, in the region called Lost River or Area 5. The southwest 1/3 of Area 5 consists of deep sinkholes with narrow ridges between them, leaving almost no flat terrain except in the marshy sink bottoms and along the Tolaeyuus River floodplain on its northern and eastern boundary. Sites here included shallow rock shelters (Sites T-4, 8-10, 12, 13, 15, 16, 20, 21, 23, 24, 51-53, 79, and 81) and caves (Sites T-2, 3, 5-7, 11, 17, 19, 22, 54, and 80) located along the sides of the sinks and Tolaeyuus River floodplain. Two components of a mid-20th century water management system were located along the west bank of the Tolaeyuus River floodplain (Site T-18 and T-27), and historic remains likely deposited by WWII Japanese stragglers were encountered within some of the prehistorically utilized caves and rock shelters already mentioned above (Sites T-13, T-22, T-51, and T-53).

The northeast 1/3 of Area 5 consists of steep N/S trending limestone ridges with some sinkholes, surrounded by the floodplains of the Maemong and Mahlac Rivers with interconnected marshes. Sites here included *latte* sets (Sites T-67, 68, 82), shallow rock shelters (Sites T-26, 27-29, 32, 69, 70, 72-76, 78, and 83-85), and caves (Sites T-30, 31, 71, 77, and PHRI-15) located along the ridge tops and sides immediately above the marshes and floodplains. Historic remains likely deposited by Japanese stragglers between 1944 and 1945 were encountered within some of the prehistorically utilized caves and rock shelters mentioned above (Sites T-30, 31, 78, and PHRI-15).

The southeast 1/3 of Area 5 consists of rolling hills and occasional sinks, bracketed by the Maagas River floodplain to the south, the Mahlac floodplain to the northeast, and marshes above the Maemong and Tolaeyuus River floodplains to the northwest. Sites here included *latte* sets (Sites T-1, 55, 56, 64, and 65), shallow rockshelters (Sites T-57 and 58), and caves (Sites T-63) located on the tops and flanks of wide ridges above the marshes and floodplains. Permanent habitation is assumed at the large village of Site T-55 and likely at the other *latte* sets in this zone, given their proximity to Site T-55. Site T-56, a low three-pair *latte* set, was located just above the Maagas River marsh.

South Area NMS

In 1996, Henry et al. (1998a as cited in Tomonari-Tuggle et al. 2007) conducted an inventory survey of about 2,850 ac (1,153 ha) in the southern portion of the NMS (Table 12.1-24). Of the 122 documented sites, 114 are pre-Contact, seven are post-Contact, and one is modern. Testing provided subsurface evidence of early Pre-Latte to Spanish Period occupations. According to the Regional ICRMP for Guam, most of the southern portion of the NMS has a low to medium sensitivity for archaeological sites (Tomonari-Tuggle et al. 2005).

Table 12.1-24. Historic Properties in the NMS

Guam SHPO Number/Temporary Number	*Site Name/Description*	*NRHP/GRHP Status***
/T-4	Rock shelter	Eligible
/T-8	Rock shelter	Eligible
/T-9	Rock shelter	Eligible
/T-10	Rock shelter	Eligible
/T-12	Rock shelter	Eligible
/T-13	Rock shelter	Eligible
/T-15	Rock shelter	Eligible
/T-16	Rock shelter	Eligible
/T-20	Rock shelter	Eligible
/T-21	Rock shelter	Eligible
/T-23	Rock shelter	Eligible
/T-24	Rock shelter	Eligible
/T-51	Rock shelter	Eligible
/T-52	Rock shelter	Eligible
/T-53	Rock shelter	Eligible
/T-79	Rock shelter	Eligible
/T-81	Rock shelter	Eligible
/T-2	Cave	Eligible
/T-3	Cave	Eligible
/T-5	Cave	Eligible
/T-6	Cave	Eligible
/T-7	Cave	Eligible
/T-11	Cave	Eligible
/T-17	Cave	Eligible
/T-19	Cave	Eligible
/T-22	Cave	Eligible
/T-54	Cave	Eligible
/T-80	Cave	Eligible
/T-67	*Latte* set	Eligible
/T-68 /T-82	*Latte* set	Eligible
/T-26	Shallow rock shelter	Eligible
/T-27	Shallow rock shelter	Eligible
/T-28	Shallow rock shelter	Eligible
/T-29	Shallow rock shelter	Eligible
/T-32	Shallow rock shelter	Eligible
/T-69	Shallow rock shelter	Eligible
/T-70	Shallow rock shelter	Eligible
/T-72	Shallow rock shelter	Eligible
/T-73	Shallow rock shelter	Eligible
/T-74	Shallow rock shelter	Eligible
/T-75	Shallow rock shelter	Eligible
/T-76	Shallow rock shelter	Eligible

Guam SHPO Number/Temporary Number	*Site Name/Description*	*NRHP/GRHP Status***
/T-78	Shallow rock shelter	Eligible
/T-83	Shallow rock shelter	Eligible
/T-84	Shallow rock shelter	Eligible
/T-85	Shallow rock shelter	Eligible
/T-30	Cave	Eligible
/T-31	Cave	Eligible
/T-71	Cave	Eligible
/T-77	Cave	Eligible
/PHRI-15	Cave	Eligible
/T-1	*Latte* set	Eligible
/T-55	*Latte* set	Eligible
/T-56	*Latte* set	Eligible
/T-64	*Latte* set	Eligible
/T-65	*Latte* set	Eligible
/T-57	Shallow rock shelter	Eligible
/T-58	Shallow rock shelter	Eligible
/T-63	Cave	Eligible

Current Protective Measures at NMS include a PA regarding the implementation of military training on Guam that was signed and executed in 2009 (Navy 2009) as part of the MIRC EIS/OEIS. The 2009 restrictions on training exercises correspond to mapped constrained areas designated as no training or limited training /no cultural resource damage. "No training" areas designate complete avoidance, with no training exercises allowed. "Limited training" areas are primarily designated as pedestrian traffic areas with vehicular access limited to designated roadways and/or with the use of rubber-tired vehicles. However, no pyrotechnics, demolition, or digging are allowed without prior consultation with the appropriate SHPO. Five areas in NMS are designated as "no training". Most of the southern and eastern portion of NMS are designated as "limited training" (Navy 2009) (Figure 12.1-5).

12.1.5.2 Non-DoD Lands

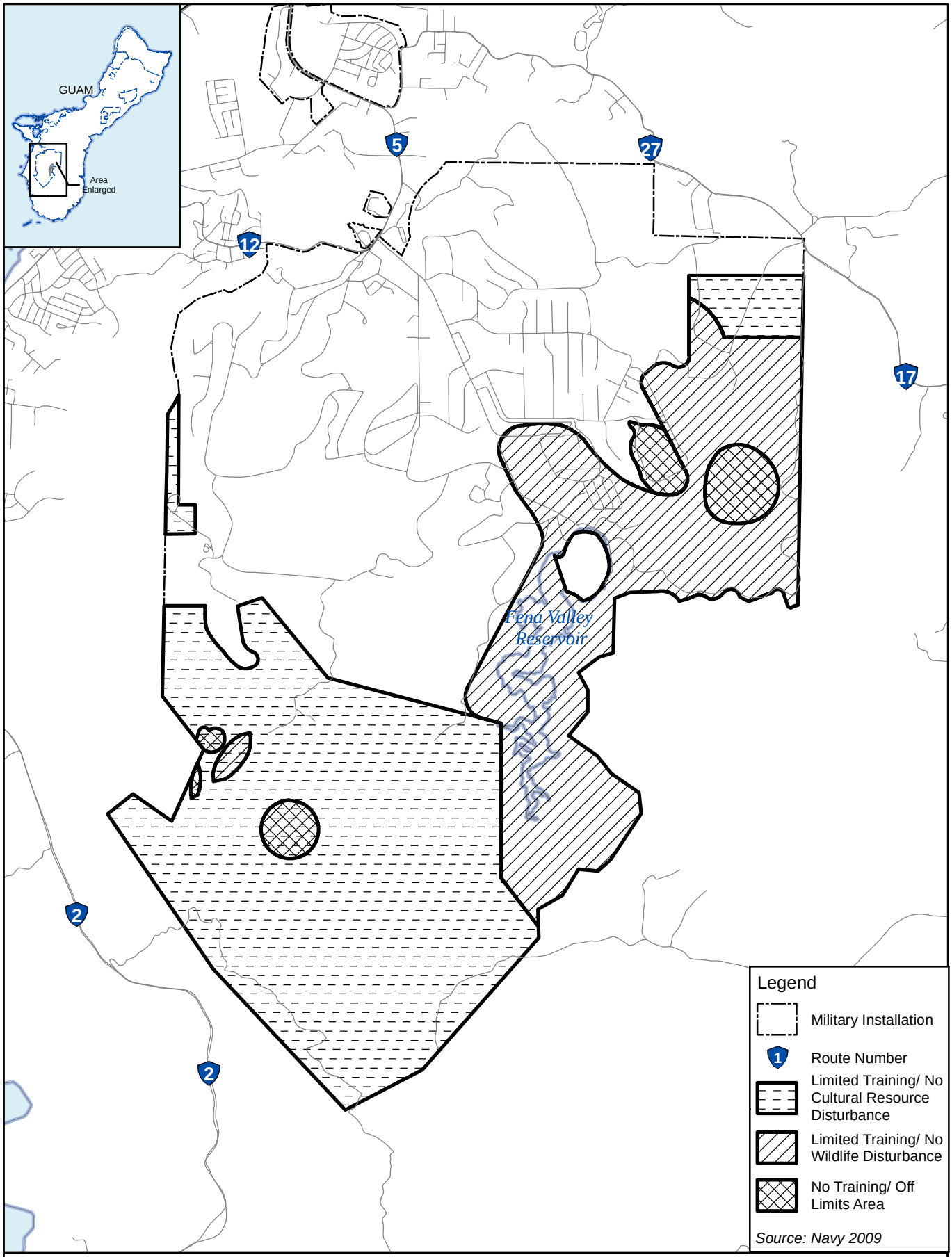
Access Road

Access road Alternative A was surveyed in 2008 (Dixon et al. 2010). No archaeological sites were recorded along this existing foot path.

12.1.5.3 Off Base Roadways

The proposed action includes on base roadway construction projects that would be implemented by the DoD. An affected environment description for on base roadway construction projects is included beneath the appropriate subheadings in other sections of this chapter. The following section describes the affected environment for off base roadway construction projects that would be implemented by the FHWA.

Four roadway improvement projects are proposed within the south region – two pavement strengthening projects, one intersection improvement project, and one Military Access Point (MAP). No known historic properties are located within the APE of any project in the south region.



Printing Date: MTH DAY, YEAR, LOCATION

Figure 12.1-5
Naval Munitions Site Training Constraints

12.2 ENVIRONMENTAL CONSEQUENCES

This description of environmental consequences addresses all components of the proposed action for the Marine Corps on Guam. The components addressed include: Main Cantonment, Training, Airfield, and Waterfront. There are multiple alternatives for the Main Cantonment, Training-Firing Range, Training-Ammunition Storage, and Training-NMS Access Road. Airfield and Waterfront do not have alternatives. Although organized by the Main Cantonment alternatives, a full analysis of each alternative, Airfield, and Waterfront is presented beneath the respective headings. A summary of impacts specific to each alternative, Airfield, and Waterfront is presented at the end of this chapter. An analysis of the impacts associated with the off base roadways is discussed in Volume 6.

12.2.1 Approach to Analysis

12.2.1.1 Methodology

The methodology for identifying, evaluating, and mitigating impacts to cultural resources has been established through federal laws and regulations including the NHPA and the ARPA.

Under the NHPA, a significant resource is a cultural resource listed or eligible for listing on the NRHP or a historic property. A project affects a historic property when it alters the resource's characteristics, including relevant features of its environment or features that qualify it for inclusion on the NRHP. Adverse effects may include the following: physical destruction, damage, or alteration of all or part of the resources; alteration of the character of the surrounding environment that contributes to the resource's qualifications for the NRHP; introduction of visual, audible, or atmospheric elements that are out of character with the resource; neglect of the resource resulting in its deterioration or destruction; and transfer, lease, or sale of the property (36 CFR 800.5(a)(2)) without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

Analysis of potential impacts to historic properties considers both direct and indirect impacts. Direct impacts are those that may occur from the project, such as the destruction of the property" (NPS 1997:1.. Indirect impacts "may be visual, audible, or atmospheric changes which effect the setting of the property" (NPS 1997:1). Cumulative impacts on historic properties under NEPA result from the incremental impact of the action when added to other past, present, and future actions. Cumulative impacts are discussed in Volume 7.

Vandalism is considered to be a significant impact because it damages the integrity of the site, which is the major determinant of NRHP-eligibility. Physical evidence left in historic properties is finite and cannot renew itself once it has been disturbed. For this reason, federal activities that open areas up to the public or that involve personnel traveling through an area may have an adverse impact, especially if vandalism to historic properties in the vicinity occurs. Determination of Significance under NEPA.

A historic property is a property that is eligible for or listed on the NRHP. For cultural resources found eligible to the NRHP, a significant adverse impact is one that disturbs the integrity of a historic property. If a project disturbs intrinsic characteristics that make the property eligible for or listed on the NRHP (other than its integrity), then it is also considered to have a significant adverse impact.

The Regional ICRMP for Navy property on Guam has established Standard Operating Procedures for protecting known historic properties; procedures for managing the inadvertent discovery of archaeological resources, inadvertent discovery of human remains, inadvertent disturbance to historic properties; and distributing permits for archaeological investigations (Tomonari-Tuggle et al. 2005) on Navy property. In addition, agreements on limitations in training have been made as part of the MIRC

EIS/OEIS PA (Navy 2009). Areas with limited or no training stipulations at Apra Harbor are presented in Figure 12.1-3 and at NMS in Figure 12.1-5. Lands managed by the Marine Corps would comply with all cultural resources management requirements in accordance with MCO P5090.2A, Ch 2, Chapter 8: Cultural Resource Management on both federal and leased lands.

As part of the ongoing Section 106 consultation process for the proposed action, a PA for all proposed military training activities, construction, and operations, which includes additional mitigation measures and procedures, is being prepared. Current signatories to this PA are: the Department of Defense (Joint Region Marianas); DoD Representative Guam, CNMI, Federated States of Micronesia, and Republic of Palau; Marines; Navy; Army; Air Force, other federal agencies (the Federal Highway Administration, ACHP, and the NPS), and local government agencies (Guam SHPO, CNMI Historic Preservation Officer [HPO]). Currently the stipulations in the proposed PA include the following:

- DoD would ensure the identification and evaluation of historic properties within the APE before the project is completed or prior to the initiation of any part of the project with the potential to affect historic properties. Newly discovered properties would be avoided where possible.
- For portions of the APE that have not been previously inventoried for historic properties, DoD would record surface sites and, when possible, areas would also be archaeologically sampled for subsurface sites, when data are easily obtainable without having to demolish existing facilities or infrastructure unless this demolition is required for the project.
- Any properties not evaluated shall be assessed for NRHP eligibility. Information on eligible properties would be incorporated into existing ICRMPs as they are revised or updated or if a new ICRMP is developed in consultation with the appropriate SHPOs.

In recognition of the significance that traditional cultural properties within the APE of the proposed action have to various cultural groups, DoD would allow access to individuals and organizations that attach significance to these historic properties, where security requirements are not prohibitive. The proposed PA also provides stipulations for treatment in case of emergencies, inadvertent discoveries, the review process, and report requirements. The Standard Operating Procedures in the current Regional ICRMP would be updated, revised, and attached to the proposed PA.

12.2.1.2 Issues Identified during Public Scoping Process

The following analysis focuses on possible impacts to cultural resources—archaeological, architectural, and traditional cultural properties—that could be impacted or affected by the proposal. As part of the analysis, concerns relating to cultural resources that were mentioned by the public, including regulatory stakeholders, during scoping meetings were addressed. These include:

- Access to cultural sites Construction impacts to cultural resources
- Conduct thorough and adequate data collection
- Involve public participation in the planning process relating to cultural resources

Other cultural issues indentified included:

- Access to traditional plant and fishing areas
- Curation of artifacts off island and storage issues associated with the Guam Museum

12.2.2 Alternative 1

Alternative 1 contains construction of the main cantonment at Finegayan (originally known as Gugagon) and adjacent non-DoD lands (the Former FAA parcel and the Harmon Annex). In addition, this section discusses impacts from the construction and operation of waterfront improvements at Apra Harbor; aviation training at Andersen AFB, Orote Field, and Andersen South; live-fire training south of Route 15; and non-firing training at Andersen South and NMS. Under all alternatives, activities associated with the proposed action (training and non-training related) include increased personnel in the area. This increase in personnel, whether civilian or military, could increase the potential for inadvertent or accidental damage to historic properties.

The order of the discussions of impacts mirrors the organization in Section 12.1. Actions in northern and central Guam, Apra Harbor, and southern Guam are discussed in the following sections.

12.2.2.1 North

Andersen AFB

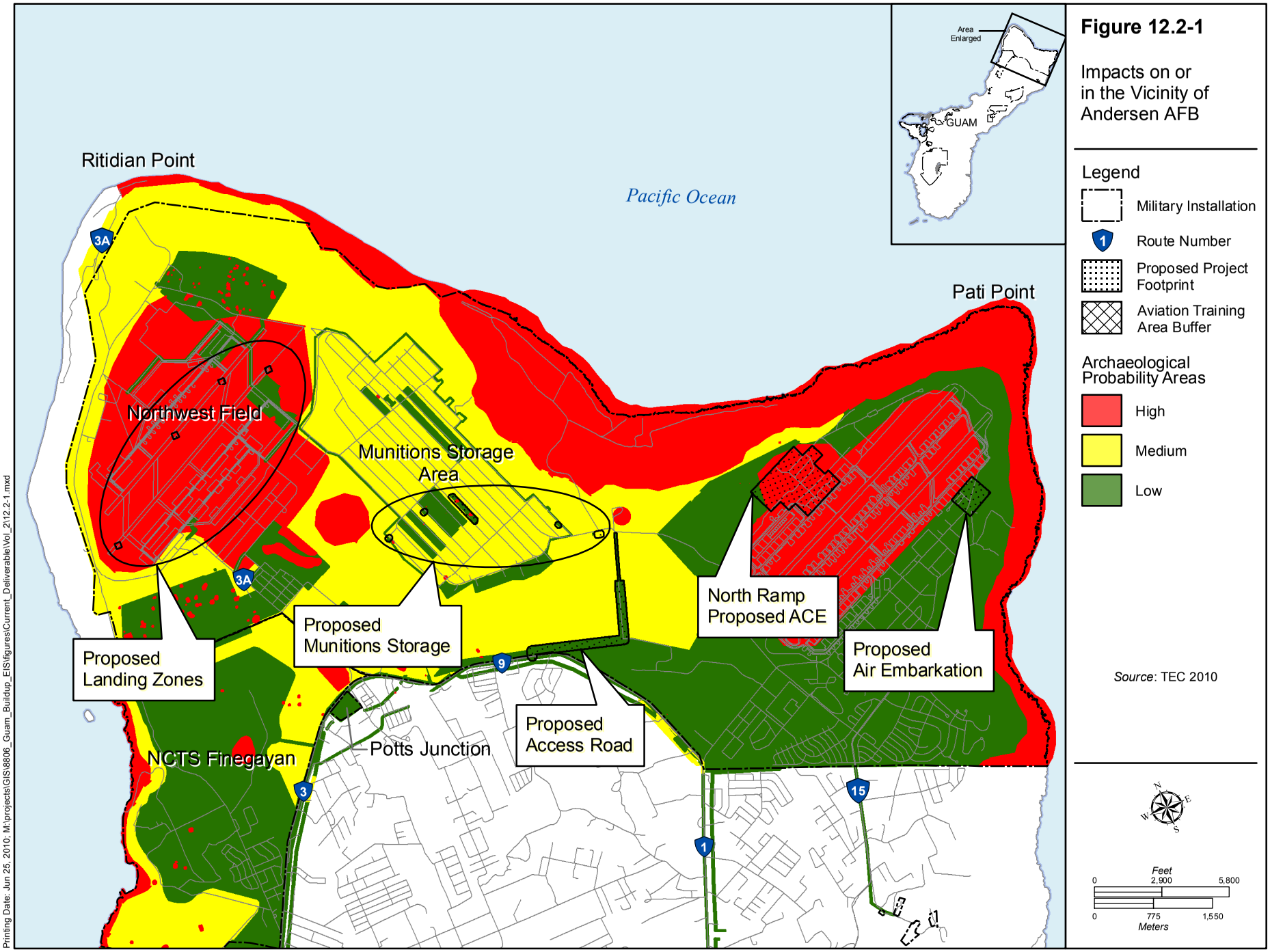
In addition to previous investigations, including architectural surveys, archaeological surveys, and traditional cultural property studies, DoD conducted historic property surveys in 2008 through 2010 of all project areas on Andersen AFB for the proposed action (Athens 2009; Dixon, Walker, and Carson 2009; Dixon et al, 2010; Griffin et al. 2009; Welch 2010). These inventories included a study of traditional cultural properties and intensive archaeological surveys, including subsurface investigations, of APEs. Architectural studies on Andersen AFB had been completed for much of the installation and existing information was used for these resources. All work plans were approved by the Guam SHPO prior to survey and all draft reports were submitted for review. Review comments were received for the draft version of Welch 2010 (February 5, 2009). Site numbers were issued and site forms accepted by the Guam SHPO for the following reports: Athens 2009 (December 2009) and Welch 2010 (March 2010). Two reports, Dixon, Walker, and Carson 2009 and Dixon et al. 2010 are in review.

Construction

Construction projects at Andersen AFB include the ACE Beddown, the North Gate and Access Road, and the Secondary Access Road, the ECMs, and the land zones at NWF. All of the APEs for these projects have been intensively surveyed for archaeological, architectural, and traditional resources. The ACE Beddown project construction would take place near North Ramp (Figure 12.2-1). Given the level of development in the area, it was assumed that 100% of the area would be disturbed. Ground excavation and soil removal associated with buildings and utilities construction would adversely impact seven historic properties in the project area, sites 07-2319 (artifact scatter) 07-2321 (artifact scatter), 07-2323 (ceramic scatter), 07-2320 (artifact scatter), 07-2128 (concrete pads associated with North Field), 07-2322 (ceramic scatter), and 07-1064 (North Field).

No historic properties were identified within the APE for the Air Embarkation, the North Gate and Access Road, and the Secondary Access Road project areas.

Four LZs would be established at the airfield at NWF. Use of these LZs has been previously analyzed in the MIRC EIS/OEIS; consultations for the MIRC undertaking were concluded with a PA in 2009 (Navy 2009).


Ritidian Point
Pacific Ocean
Pati Point
Area Enlarged
GUAM
Northwest Field
Munitions Storage Area
Proposed Landing Zones
Proposed Munitions Storage
North Ramp Proposed ACE
Proposed Air Embarkation
Proposed Access Road
NCTS Finegayan
Potts Junction
3A
3A
9
3
1
15
Figure 12.2-1
Impacts on or in the Vicinity of Andersen AFB
Legend
Military Installation
Route Number
Proposed Project Footprint
Aviation Training Area Buffer
Archaeological Probability Areas
High
Medium
Low
Source: TEC 2010
Feet
0
2,900
5,800
0
775
1,550
Meters
Printing Date: Jun 25, 2010; M:\projects\GIS\8806_Guam_Buildup_EIS\figures\Current_Deliverable\Vol_2\12.2-1.mxd

Construction of 12 standard earth-covered magazines (ECMs) and associated support facilities (two concrete pads and a concrete support building) at MSA 1 would occur under the proposed action. Ground excavation and soil removal associated with buildings and utilities construction would adversely impact two historic properties, sites T-9-1 (artifact scatter) and T-9-2 (artifact scatter).

Operation

Additional traffic on NWF due to increased aviation activities could adversely impact the runway surface.

Finegayan

In addition to previous investigations, including architectural surveys and archaeological surveys, DoD conducted historic property surveys in 2007 through 2009 of all project areas on Finegayan for the proposed action (Athens et al. 2009, Dixon et al. 2009; Griffin et al. 2009; Welch 2010). These inventories included a study of traditional cultural properties, architectural surveys and evaluations, and intensive archaeological surveys, including subsurface investigations, of APEs.

Construction

Construction of the main cantonment, family housing, and community support would take place at Finegayan under Alternative 1 (Figure 12.2-2). A variety of land uses/functions would be sited at NCTS Finegayan and South Finegayan including: housing, quality of life facilities, administration, training, and education.Construction would adversely impact 10 historic properties, including sites 08-2299 (artifact scatter), 08-2301 (artifact scatter), 08-2300 (four WWII defensive structures), 08-2303 (habitation site and artifact scatter), 381(ceramic scatter), 08-2295 (artifact scatter), 08-2297 (artifact scatter), 08-2298 (artifact scatter), 08-1678 (ceramic scatter), and 08-1681 (ceramic scatter). Site 08-0141 (Latte Stone Park) is located within the ROI/APE of the housing and education facilities, but the site will be avoided, therefore no direct impacts would occur.

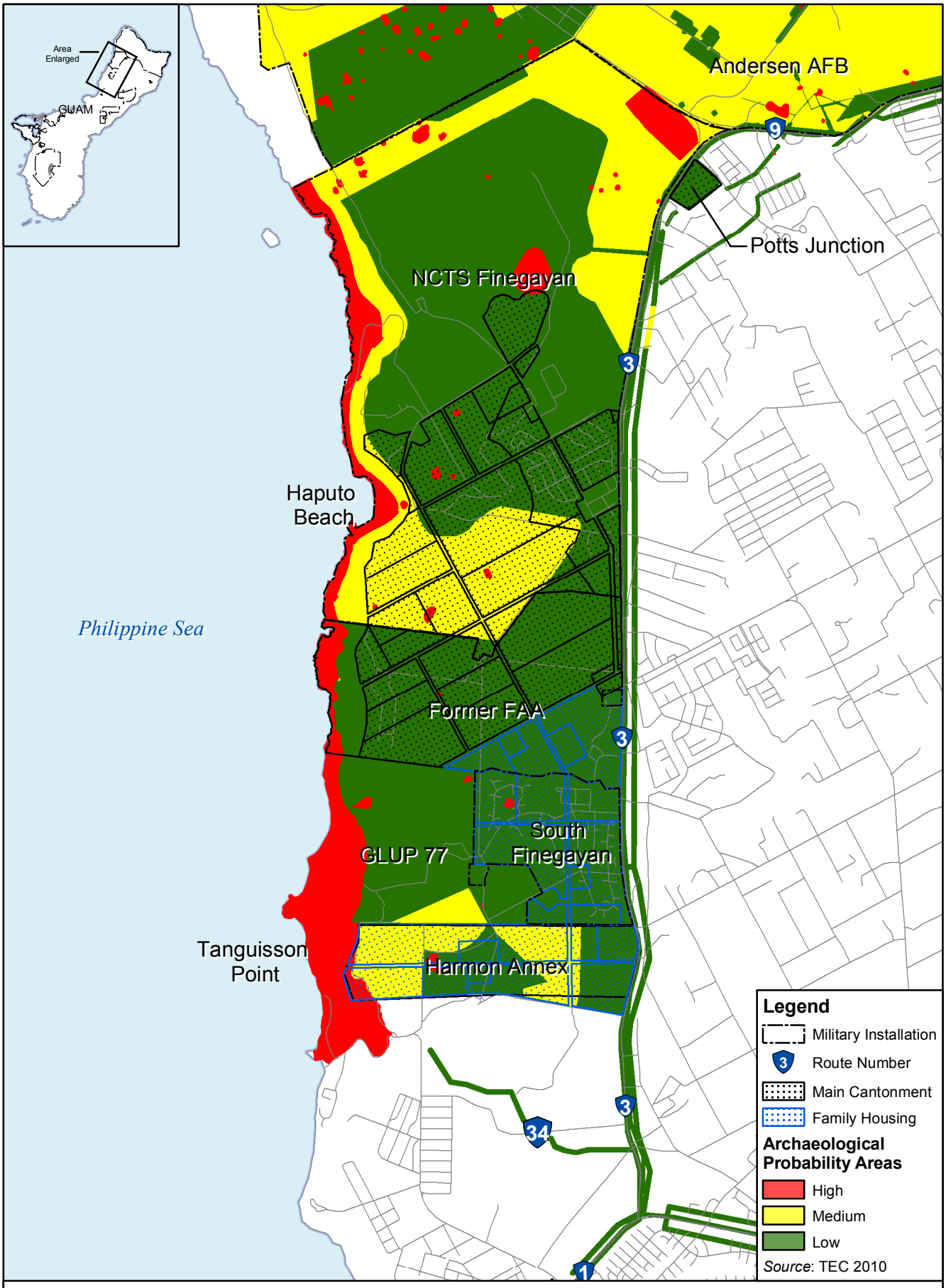
Construction at Finegayan has the potential to require the removal of limestone forest vegetation where natural resources of cultural concern are located. However, forests at Finegayan have limited public access, materials in the forest are not currently collected by the public and thus no adverse impact would occur.

Operation

No direct impacts would result from operations associated with the main cantonment. The potential for inadvertent or accidental damage to 08-0141 (Latte Stone Park) and 08-007 (Haputo) could increase.

Non-DoD Land

Non-DoD land impacted by Alternative 1 includes the Former FAA parcel and the Harmon Annex. The Former FAA parcel was completely surveyed for archaeological resources, while approximately 75% of the Harmon Annex was intensively surveyed for archaeological resources (Dixon et al 2009). Lack of landowner permission to access the property prevented surveys on the remaining portion. Information on potential impacts was derived from historic maps and on evidence of modern disturbance.



Printing Date: Jun 25, 2010: M:\projects\GIS\8806_Guam_Buildup_EIS\figures\Current_Deliverable\Vol_2\12.2-2.mxd

Figure 12.2-2
Construction at Main Cantonment Alternative 1

Construction

Based on recent archaeological surveys, construction would impact two historic properties, sites 08-1678 (ceramic scatter) and 08-1681 (ceramic scatter). Construction of facilities at the Harmon Annex would impact one historic property, site T-H-8 (ceramic scatter and WWII era *lancho)*. In the unsurveyed areas because of extensive disturbance, impacts to historic properties are unlikely.

Operation

No direct impacts to historic properties would result from operations of the main cantonment.

12.2.2.2 Central

Andersen South

In addition to previous investigations, including architectural surveys and archaeological surveys, DoD conducted historic property surveys in 2007 through 2008 of all project areas on Andersen South for the proposed action (Dixon, Carson, and Walker 2009; Griffin et al. 2009; Welch 2010). These inventories included a study of traditional cultural properties and intensive archaeological surveys, including subsurface investigations, of APEs. The Guam SHPO approved work plans before the surveys and reviewed and provided comments on draft survey reports, which included recommendations on the determinations of eligibility to the NRHP. Therefore DoD assumes Guam SHPO concurrence on the NRHP eligibility of these sites.

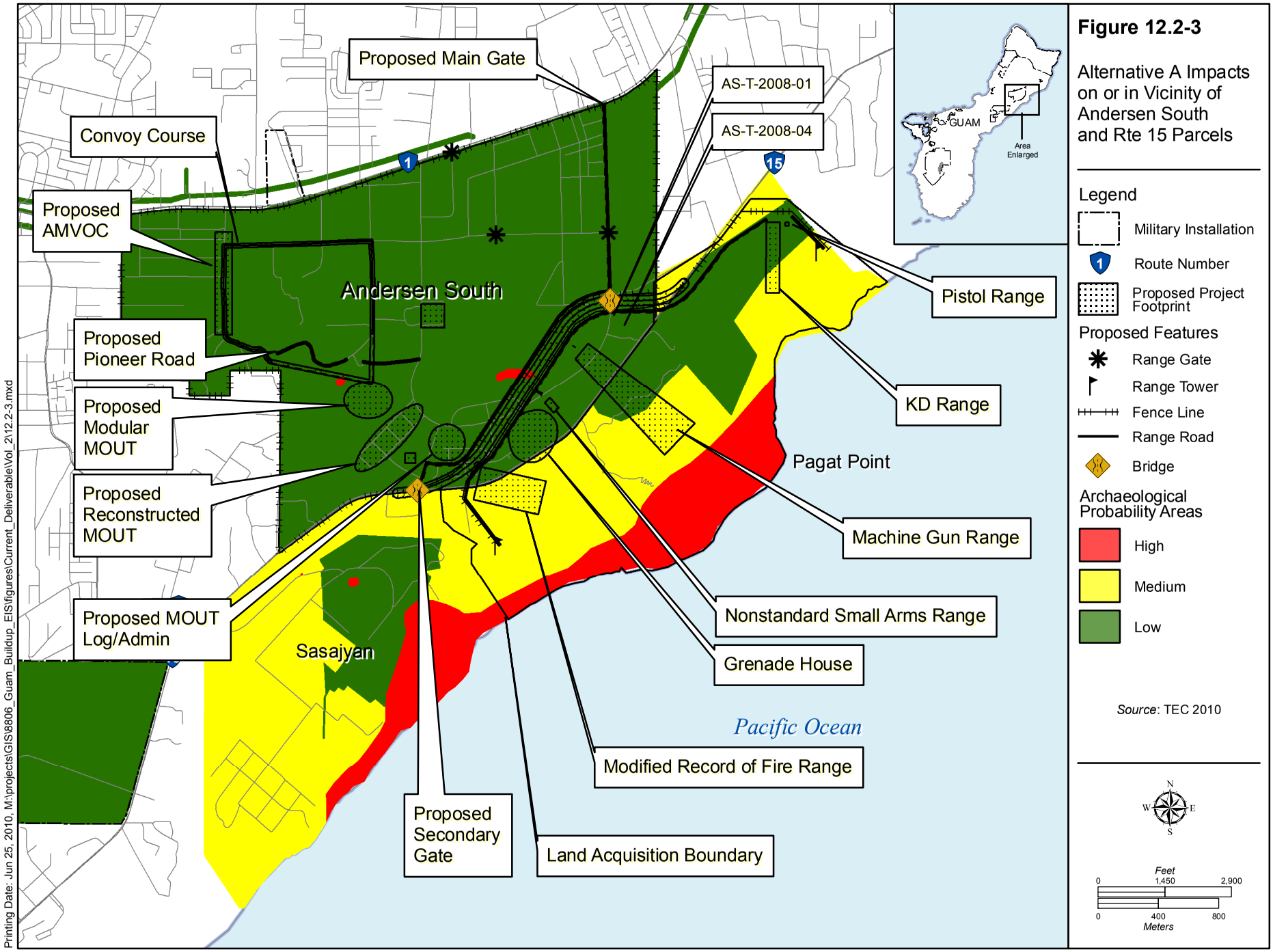
Construction

Training at Andersen South would involve reuse of the existing barracks and demolition of the family housing located in this area. None of the facilities to be reused or demolished are historic properties. It would also involve construction of a Driver's Course and a Convoy Course for a total of 35 ac (14 ha), clearing for two LZs, and other training facilities (Figure 12.2-3).Two historic properties, sites 04-2324 (subsurface pre-Contact artifact scatter) and 04-2325 (subsurface pre-Contact artifact scatter), would be impacted by clearing of the training areas and construction of the Driver's Course and convoy course. Clearing for the LZs would involve an area of 100 ft (30 m) square. As the LZs would be used by MV-22 aircraft, the buffer area around the LZ for analysis purposes was 300 ft (100 m) in keeping with impact areas defined in the MV-22 Final EIS (Navy 2010) . There are no cultural resources in either of the LZs in Andersen South. Therefore, there would be no impacts. No historic properties would be impacted by the construction of the LZs or the Grenade Range and House.

Construction at Andersen South would require the removal of limestone forest vegetation where natural resources of cultural concern are located. However, access to the forests at Andersen South is currently limited to the public, and thus no adverse impact would occur.

Operation

In addition, a 2,000 ac (809 ha) area would be used for maneuver training by 300 personnel for over 45 weeks per year. This increase in personnel could increase the potential for inadvertent or accidental damage to historic properties. However, as there are only two historic properties in the area, an adverse impact to historic properties from operations is negligible.


Proposed Main Gate
AS-T-2008-01
AS-T-2008-04
Convoy Course
Proposed AMVOC
Andersen South
Proposed Pioneer Road
Proposed Modular MOUT
Proposed Reconstructed MOUT
Proposed MOUT Log/Admin
Sasajyan
Pistol Range
KD Range
Pagat Point
Machine Gun Range
Nonstandard Small Arms Range
Grenade House
Pacific Ocean
Modified Record of Fire Range
Proposed Secondary Gate
Land Acquisition Boundary
GUAM
Area Enlarged
Figure 12.2-3
Alternative A Impacts on or in Vicinity of Andersen South and Rte 15 Parcels
Legend
Military Installation
Route Number
Proposed Project Footprint
Proposed Features
Range Gate
Range Tower
Fence Line
Range Road
Bridge
Archaeological Probability Areas
High
Medium
Low
Source: TEC 2010
N
W
E
S
Feet
0
1,450
2,900
0
400
800
Meters
Printing Date: Jun 25, 2010, M:\projects\GIS\8806_Guam_Buildup_EIS\figures\Current_Deliverable\Vol_2\12.2-3.mxd

Non-DoD Land

Non-DoD land in the APE includes the proposed firing ranges near Route 15. There are two possible locations for the training ranges, Alternative A and Alternative B. Under both alternatives, DoD would acquire lands that include the range construction areas and the associated lands within the SDZs.

In addition to previous investigations in the APE, DoD conducted historic property surveys in 2008 and 2009 (Dixon, Carson, and Walker 2009; Griffin et al. 2009). Both of these reports are currently under review by the Guam SHPO. These inventories included a study of traditional cultural properties and archaeological surveys of the APE. Due to lack of access, approximately 70% of the APE has been surveyed for archaeological resources. Information on the remaining areas was obtained from previous archaeological surveys.

Construction

The proposed firing ranges associated with the proposed action are located on the Route 15 valley and escarpment east of Andersen AFB South. Approximately 70% of the Route 15 impact area has been surveyed. The remainder could not be surveyed because of a lack of permission by landowners and tenants. Based on best available information from previous surveys in the area, resource potential in the Route 15 survey area is high.

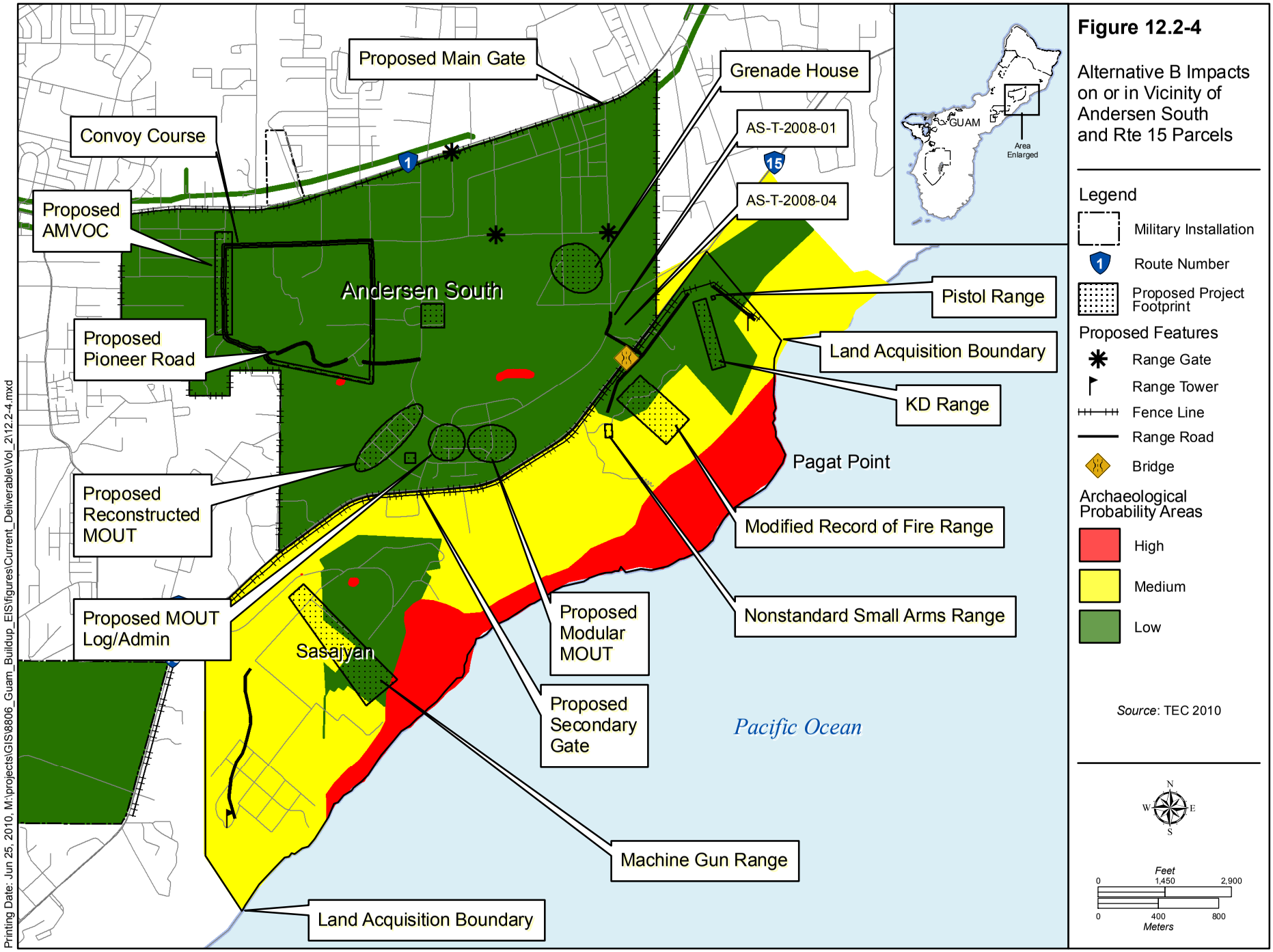
For both alternatives, construction would include a fence around the range complex to restrict access to the ranges.

Alternative A includes a pistol range, a known distance (KD) range, a machine gun range, a Modified Record of Fire range, and a Nonstandard small arms range. Alternative A would also include the realignment of a portion of Route 15 to go through Andersen South with a fence constructed on either side of the road. Because only portions of the proposed construction footprint have been surveyed for archaeological resources, and the probability that archaeological resources are present in this area is considered to be high, the analysis of this alternative acknowledges that construction of Alternative A has the potential to disturb previously unrecorded archaeological sites. Construction of the realigned road would have adverse impacts to site 04-2324 (artifact scatter).

Alternative B includes a similar number and type of firing ranges as Alternative A, but would not require the realignment of Route 15. As with Alternative A, the analysis of this alternative acknowledges that construction of Alternative B has the potential to disturb previously unrecorded archaeological sites.

Construction of Alternatives A and B also have the potential to require the removal of limestone forest vegetation where natural resources of cultural significance are gathered, especially near the Pagat Site Complex. However, other areas of the limestone forest on Guam also contain these resources.

Construction of Alternatives A and B would not have a direct or indirect impact on the Pagat Site Complex or Marbo Cave. Under both alternatives, the ranges would be located on the limestone plateau west and more than 300 ft (91 m) in altitude above the Pagat site (Figure 12.2-5).


Proposed Main Gate
Grenade House
Convoy Course
AS-T-2008-01
AS-T-2008-04
Proposed AMVOC
Andersen South
Pistol Range
Land Acquisition Boundary
Proposed Pioneer Road
KD Range
Pagat Point
Proposed Reconstructed MOUT
Modified Record of Fire Range
Proposed MOUT Log/Admin
Nonstandard Small Arms Range
Sasajyan
Proposed Modular MOUT
Proposed Secondary Gate
Pacific Ocean
Machine Gun Range
Land Acquisition Boundary
GUAM
Area Enlarged
Figure 12.2-4
Alternative B Impacts on or in Vicinity of Andersen South and Rte 15 Parcels
Legend
Military Installation
Route Number
Proposed Project Footprint
Proposed Features
Range Gate
Range Tower
Fence Line
Range Road
Bridge
Archaeological Probability Areas
High
Medium
Low
Source: TEC 2010
N
W
E
S
Feet
0
1,450
2,900
0
400
800
Meters
Printing Date: Jun 25, 2010, M:\projects\GIS\8806_Guam_Buildup_EIS\figures\Current_Deliverable\Vol_2\12.2-4.mxd

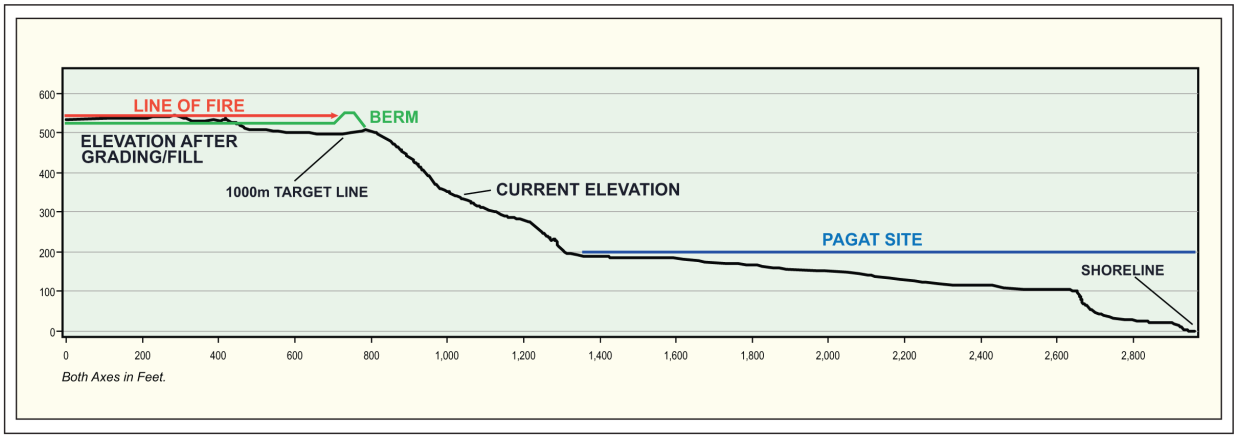


Figure 12.2-5. Firing Range Alternative A, Profile of Elevation from Firing Range to Pagat Site

Operation

Although no DoD training would occur on the coastal plain below the cliff or within the boundaries of the historic properties at Pagat, access would be restricted to this area when the ranges are in use. As a result, the operation of the training facilities at Alternative A would have an indirect effect on the historic properties on the coastal plain at Pagat (04-0021 & 04-0022).

Below is a rough analysis in regards to the number of rounds and ricochet fragments that leave the range footprint. It should be noted that an analysis can vary widely based on range type, range configuration, terrain profiles, soil composition, vegetation types, training methodology, target type, and weapon type. The 1995 U.S. Army study cited in other chapters listed a range of probabilities from 1:100,000 to 1:10,000,000 that a projectile or projectile fragment would leave the target area but remain in the SDZ. For estimation of potential impacts, this EIS uses an even more conservative estimate of 1:10,000. Estimated calculations regarding the probability of rounds leaving the range footprint are discussed in detail in Volume 2, Chapter 2. The following discussion will attempt to quantify what the 1:10,000 means specifically for the Pagat village archaeological site based on the following scenario:

- 1:10,000 ratio of a round/fragment ending up in the SDZs
- Rounds/fragments have an equal probability of landing in anywhere in the SDZ area
- All ranges were used to their maximum capacity over the course of one year
- Pagat village and other sites are spread out across the lower plateau but take up less than 1%
- The features and artifacts that make up the of Pagat village archaeological site comprises less than 1% of area encompassed by the overall area that they are spread out over

These numbers represent a very rough estimate as they involve many assumptions, but the calculations indicate that the number of fragments expected to contact any of the features or artifacts in the Pagat village archaeological site would likely be very small. Based on the information above, it is estimated there could be a 1:1,000,000 chance that a round/fragment could land near any of the archaeological sites on the lower coastal plain, and a 1:100,000,000 chance that a round/fragment could actually strike the remnants of Pagat village if the maximum range operation capabilities were sustained throughout the year. As mentioned previously, these are hypothetical numbers but are described here to give the reader some reference point to what the 1:10,000 ratio means in relation to Pagat village archaeological site.

The second factor in predicting impacts to the Pagat site from rounds or fragments is the severity of each impact. Use of a 50-ft (15-m) berm at the end of the range combined with the steep drop in elevation from the end of the range to the Pagat site make it also unlikely that a high velocity round or fragment

would strike the components of the archaeological site directly. It would be more likely that the impacts would be from fragments of rounds that ricochet off a target or berm. The reaction of a round to striking a target or berm varies greatly based on a number of factors, to include target composition, angle of impact, and velocity at impact. While it is impossible to definitively describe the nature of any individual ricochet, they can be generally characterized as lower in velocity than directly fired bullets, as a portion of the energy is lost in initial contact with the target or other object. Reduced velocity and potentially reduced weight due to fragmentation would result in reduced impact of any individual strike event. Based on the discussion above, taking into account the low probability of impacts, and low potential of each individual impact to cause damage, potential effects of munitions rounds/fragments to features or artifacts in the Pagat village archaeological site would be negligible. Therefore, impacts to the Pagat site would be less than significant.

In addition to the minimal chance of impacts from stray rounds, noise associated with the operation of the training range would have a less than significant impact on the Pagat site. Currently noise impacts in the Pagat area come from the nearby race track and live music concerts (approximately 100 dBA at the raceway). With the range use in the area, the noise impacts would instead come from range use, but would occur more frequently during the week. Currently, noise more frequently occurs during the weekends. Mitigation of noise impacts by the construction of berms would reduce noise, as would maintaining vegetation in the area near the coast (approximately 65 to 69 dB A with barriers and other noise attenuation; see Volume 2, Chapter 6, Noise).

The Pagat site (04-0022 and 04-0020) and Marbo Cave (04-0642 and 04-0024). would not be impacted by cleanup activities associated with the operations at the Alternative B range because the sites are located outside of the any potential impact areas. Mitigated noise levels would be similar to Alternative A. As discussed under Alternative A, limiting access to these sites would be an adverse impact due to their traditional importance.

Barrigada

No new Marine Corps-related construction or training activities are planned at Navy or Air Force Barrigada under Alternative 1. Therefore, Alternative 1 Marine Corps related-projects would have no impact on historic properties on Navy or Air Force Barrigada.

12.2.2.3 Apra Harbor

Apra Harbor and Naval Base Guam have been inventoried for archaeological and architectural resources and traditional cultural properties (Griffin et al. 2009; Mason Architects and Weitze Research 2009; Tomonari-Tuggle, Tuggle and Welch 2005; Welch 2010; Dixon et al. 2010). As the major portion of Naval Base Guam has been constructed on fill materials, the likelihood of intact archaeological materials is very low. Mechanical testing in 2007 and 2009 confirmed the lack of subsurface materials within the APE (Dixon et al. 2010; Welch 2010).

Harbor

Activities in Apra Harbor under Alternative 1 include dredging near Sierra Wharf and increased ship traffic in inner Apra Harbor.

Construction

Dredging would take place in inner Apra Harbor in the vicinity of Sierra and Tango Wharves. Underwater surveys in the 1990s identified 30 historic properties within Apra Harbor; however, none are known in the

dredging area and no cultural resources impacts would occur. Proposed dredging material placement areas also do not contain any historic properties.

Operation

Operations within Apra Harbor would not adversely impact any historic properties, because none of these resources occur within the APE.

Naval Base Guam

Construction

Several projects would be implemented at Naval Base Guam associated with Alternative 1: ship berthing and embarkation/staging area at Victor Wharf; amphibious craft laydown area at Victor Wharf; relocation of the U.S. Coast Guard (USCG) berthing and crew support facilities to Oscar/Papa Wharves; relocation of the MWDK; and construction of the Apra Medical/Dental clinic. In addition, several wharves would be repaired and improved—Victor, Uniform, Sierra, and Tango.

No historic properties have been recorded within the APEs for the ship berthing and embarkation staging area or the amphibious craft laydown area at Polaris Point (Figure 12.2-6). . Since Polaris Point is constructed entirely of manmade fill, there is no potential for subsurface historic properties. No demolition of existing facilities is required as this parcel is undeveloped.

No historic properties have been recorded within the APEs for the proposed construction of the relocated USCG berthing and crew support facilities at Oscar and Papa wharves, for the proposed location of the MWDK, and the Apra/Medical Dental clinic. Therefore, no impacts to historic properties would occur due to construction at Apra Harbor..

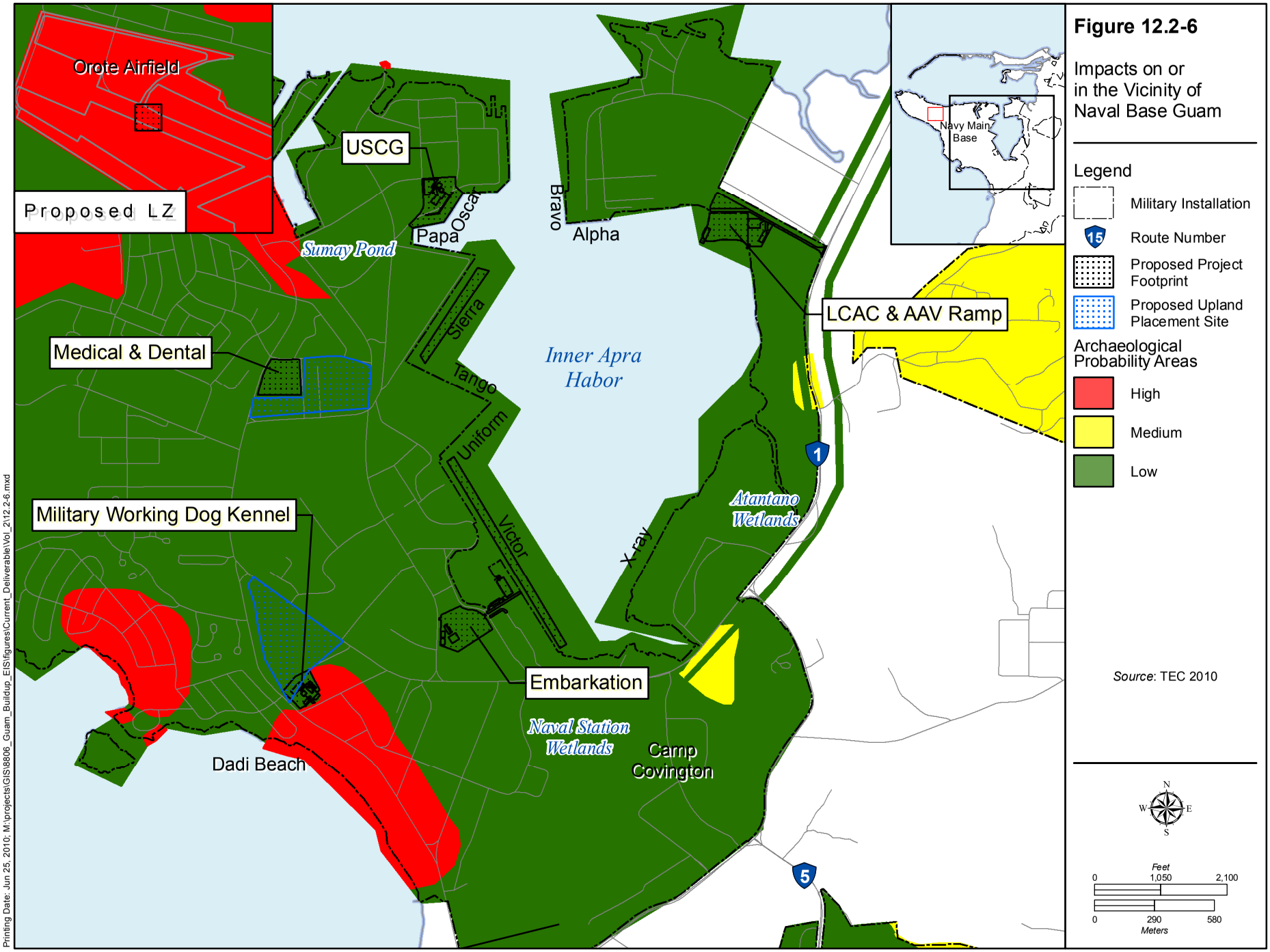
Archaeological testing was conducted for the new MDWK area in 2009 and no historic properties were identified.

Operation

Use of the MWDK, the USCG berthing, the amphibious laydown area, and the Apra Medical/Dental clinic, would not impact historic properties. Five potential dredged material storage areas would be located at Naval Base Guam. Dredged material would be temporarily stored in these areas, although no construction is associated with creating the dredged material storage areas. Three of these storage areas, Fields 3, 5 and Polaris Point, have been analyzed in a previous NEPA document. The other two storage areas, Field 4 and PWC Compound, analyzed in this document do not contain no historic properties.

War in the Pacific National Park

None of the projects associated with the proposed action would have a direct impact on the War in the Pacific National Park. The closest projects associated with the proposed action to the War in the Pacific National Park would be at Apra Harbor, approximately 0.75 miles (mi) away from the Piti Guns Unit portion of the park. The NPS has expressed concerns about adverse indirect effects due to an increase in population from the Marine relocation. This indirect impact is discussion in Volume 1, Chapter 4.



Printing Date: Jun 25, 2010; M:\projects\GIS\8806_Guam_Buildup_EIS\figures\Current_Deliverable\Vol_2\12.2-6.mxd

12.2.2.4 South

Naval Munitions Site

Activities at NMS would include munitions storage, aviation training, and non-firing maneuver training.

Construction

The NMS munitions area would be expanded by constructing 11 ECMs under Alternative 1. There are two alternatives for locating these storage areas. In Alternative A (Preferred Alternative), 10 ECMs would be located on Parson's Road. Under Alternative B, 10 ECMs would be located at the High Road area. Under either alternative, one ECM would be placed within the High 12 Group. Alternative A would not impact any historic properties. Alternative B would adversely impact six historic properties that are WWII-era open munitions pads (Facilities 618, 619, 620, 623, 626, and 628).

Five LZs would be placed within the southern portion of the NMS. All of these locations have been surveyed for archaeological resources (Tomonari-Tuggle, Tuggle, and Welch 2005). Three LZs do not contain historic properties, while two, NMS 1 and NMS 4, would adversely impact two historic properties (Site 43 and Site 83). Clearing associated with the preparation of the LZs could have an adverse impact on these sites. Site 43 is a partially disturbed habitation site with two latte sets and Site 83 is a pre-Contact artifact scatter. Site 43 is within a buffer zone of the LZ and would be avoided, if feasible.

Construction at NMS has the potential to require the removal of limestone forest and savanna vegetation where natural resources of cultural concern occur. However, access to these resources is currently limited and thus no adverse impact would occur.

Non-firing maneuver training is planned for NMS in areas with numerous historic properties (Figure 12.2-7).(A 3,000 ac (1,214 ha) area would host 120 personnel 12 times a year. All of these training areas are protected by the PA associated with the MIRC EIS/OEIS signed in 2009 (Navy 2009) as light training/ no cultural resource damage areas. The proposed maneuver training would be in accordance with the PA and would not adversely impact historic properties.

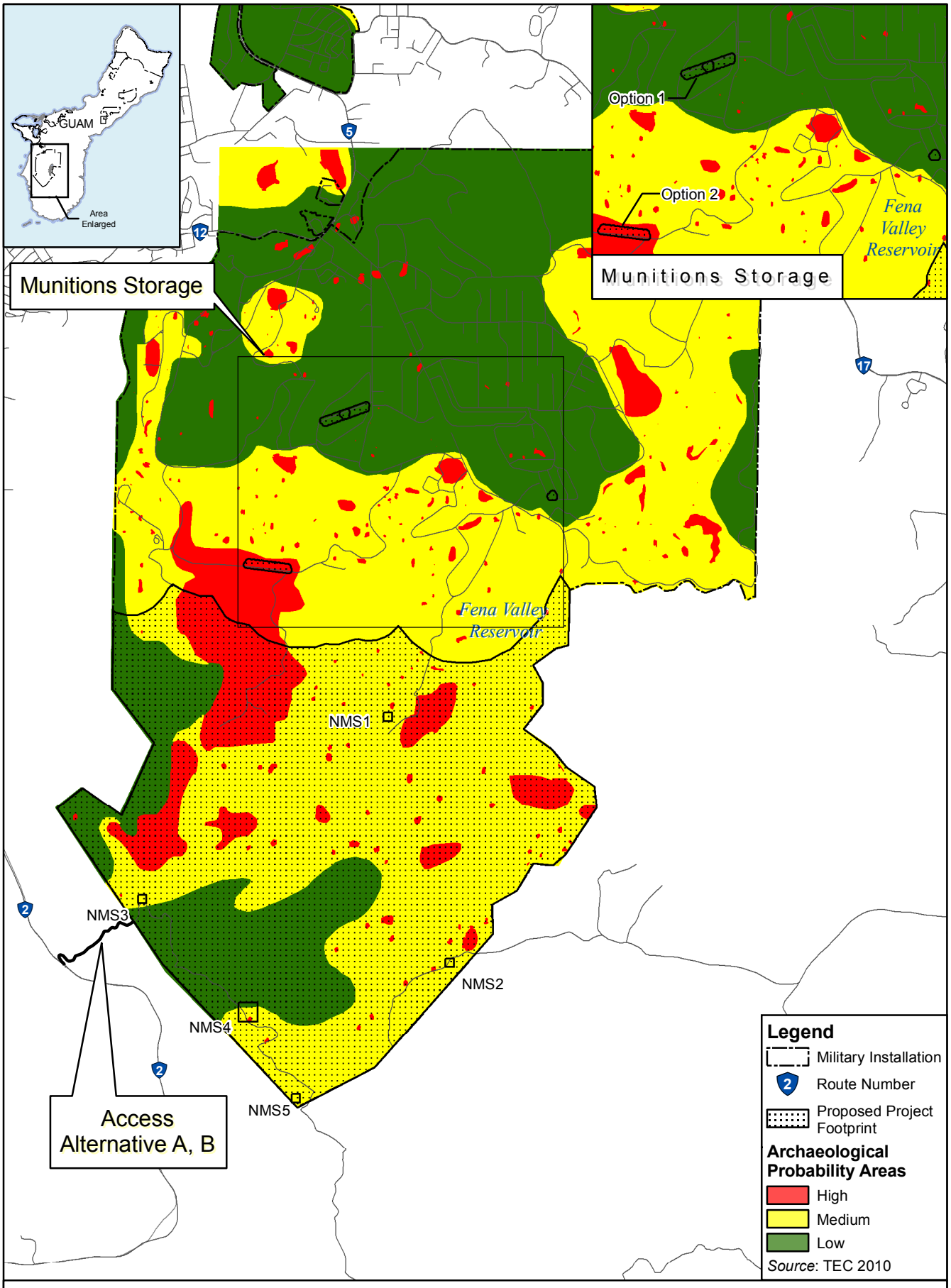
Non-DoD Lands

Construction

An access road would be needed to facilitate transportation to the southern portion of NMS. Under Alternative A, the existing trail would converted to a road, while under Alternative B, it would be slightly improved to prevent erosion, but essentially used in its present condition. The trail (0.4 mi [0.6 km]) has been surveyed and no historic properties have been recorded within the APE.

Operation

This trail is used as part of the procession to Mount Jumullong Manglo, especially during Easter services and as access to Mount Lamlam. Access to this trail would remain open to pedestrians under either alternative when training is not occurring. Therefore, impacts would be considered less than significant.



Printing Date: Jun 25, 2010; M:\projects\GIS\8806_Guam_Buildup_EIS\figures\Current_Deliverable\Vol_2\12.2-7.mxd

Figure 12.2-7
Cultural Resources Impacts on or in the Vicinity of Naval Munitions Site

12.2.2.5 Summary of Impacts

Implementation of Alternative 1 would potentially result in significant adverse direct impacts to 19 historic properties (11 in the Main Cantonment in Finegayan, 2 in the training areas in Andersen South, and 6 in airfield training areas on Andersen AFB and NMS). Six munitions pads would be impacted under Ammunition Storage Alternative B, and indirect impacts to as many as four traditional cultural properties/archaeological sites (two associated with the Main Cantonment and two with Range Complex Alternative B) would occur. No adverse impacts would occur to historic properties at Apra Harbor or Barrigada. No historic architectural properties eligible for the NRHP would be impacted by Alternative 1. Less than significant impacts would occur due to the access road at NMS.

Best Management Practices (BMPs) for cultural resources have been established under existing DoD instructions and through Standard Operating Procedures in Integrated Cultural Resources Management Plans. These BMPs include:

- Monitoring of unsurveyed medium archaeological probability areas during construction in consultation with the SHPO.
- For post review discoveries, an assessment will be made for NRHP eligibility in consultation with the SHPO.
- For areas or properties that have not been inventoried for historic properties, the DoD would follow Standard Operating Procedures as outlined in the Integrated Cultural Resources Management Plan and in any existing agreements.

Procedures for further survey and evaluation will be determined through Section 106 consultation.

12.2.2.6 Proposed Mitigation Measures

Alternative 1 would have significant adverse impacts to 19 historic properties. Direct impacts to two archaeological sites in and around North Ramp at Anderson AFB (sites 08-2319 and 08-1064) would be mitigated through data recovery and documentation. Ground excavation and soil removal associated with construction of MSA facilities and utilities construction would adversely impact two historic properties (T-9-1 and T-9-2), but these impacts would be mitigated by data recovery excavations. Direct impacts to 11 historic properties (381, 08-2295, 08-2297, 08-2298, 08-2299, 08-2301, 08-2300, 08-2303, 08-1678, 08-1681, and T-H-8) in the Main Cantonment and Housing areas would be mitigated through data recovery excavations . Direct impacts to two historic properties (04-2324 and 04-2325) at Andersen South, and two historic properties at NMS (Site 43 and Site 83) would be avoided or, if avoidance is not possible, then data recovery would take place.

Impacts to these historic properties would be primarily mitigated through data recovery as these sites are eligible under Criterion D and recovery efforts would follow the ACHP guidance, "Resolving Adverse Effects through Recovery of Significant Information from Archeological Sites" (ACHP 1999). A table with the area, site number, impact, NRHP criteria of significance, and proposed mitigation measures for each resource is included in Volume 9, Appendix G.

DOD recognizes that mitigation associated with data recovery efforts for archaeological sites impacted by the Undertaking, located on both DoD and non-DoD lands, will result in an increase in archaeological materials that need to be curated. This increased level of archaeological materials will require appropriate curatorial facilities as well as clearly defined procedures for the disposition of artifacts and, if encountered, the respectful and proper handling of human remains. DoD is committed to working with local, state and federal partners to maintain DoD archeological material collections on Guam and CNMI in facilities that meet federal standards and have appropriate capacity. Further, DoD is committed to

ensuring the proper handling and disposition of human remains in accordance with federal statutes. For non-DoD archaeological material collections, DoD will follow local regulations regarding the handling and repatriation of cultural materials or human remains to the extent such local regulations are consistent with federal law and regulations on the subject. DoD is currently working on a capacity analysis of its current collections in Guam and CNMI, and will use that information to develop a plan for the initial and long-term curation needs associated with the Undertaking.

Consultations regarding indirect effects to the Pagat site complex (04-0022 and 04-002) and the general Pagat area are ongoing. Potential mitigation measures for the access restrictions include development of an access plan with the Guam SHPO, the Guam Preservation Trust, and the public. The Range Management Plan for the Live Fire Range would include the access plan that addresses noticing procedures, fencing, signage, and other policies which would be developed and adhered to by DoD, except in cases of documented emergency. Development of the access plan would involve public participation either through a public meeting or public review of the document. In addition, the Pagat Preservation Plan (sites 04-0021 and 04-0022) would be updated and executed. The DoD will continue to consult on the Pagat site to consider additional avoidance, minimization, or mitigation measures. A management plan for Marbo Cave would also be developed to mitigate indirect impacts from Firing Range Alternative B.

As a mitigation under NEPA, if *suruhanus* request access for medicinal plant collection, the DoD will generally look favorably on affording access to these plants for individuals that practice traditional healing methods, if the plants collected are not threatened or endangered species and where security requirements are not prohibitive.

Indirect impacts to the Haputo site (08-007) and the Latte Stone Park (site 08-0141) would be mitigated through replacement and upgrade of existing interpretive signages and preparation of additional documentation. The existing signage at the Latte Stone Park would be replaced with upgraded signage comparable to that developed for National Parks. The Haputo site would be included as part of an ecological reserve; however access to this site by the public would be further limited. As part of the management of the area, the Haputo site would be documented (mapped and photographed) and a preservation plan would be developed to manage the site. In order to mitigate access restrictions, information about the site would be provided to the public in the form of brochures and signs.

The DoD has also identified several general mitigation measures to reduce direct and indirect impacts to cultural resources. Such mitigation measures include the production of a Guam Synthesis. Data gathered during the EIS process would be compiled and synthesized into one document and would be written for the public. Other proposed mitigation could include development of a Cultural Landscape Report for the Northern Limestone Plateau. The Cultural Landscape Report would focus on land and resources within installations impacted by the Marine Relocation EIS in the Northern Limestone Plateau. It would include Finegayan, Andersen AFB, the Route 15 Range areas, Andersen South, and the Barrigada area.

To help mitigate limiting access to, or physical destruction/removal of natural resources that have cultural importance, DoD would work with consulting parties to contact traditional artisans. Prior to commencement of construction activities that would impact these resources, artisans would be given the opportunity to harvest and collect these resources for carving and canoe building.

12.2.3 Alternative 2 (Preferred Alternative)

Alternative 2 differs from Alternatives 1, 3, and 8 by the location of the main cantonment. Under Alternative 2, the main cantonment would be constructed at Finegayan and the Former FAA parcel. Elements of Alternative 2 that are the same as the other alternatives include the aviation training at Andersen AFB, Andersen South, NMS, and Naval Base Guam; the two alternatives for the firing range south of Route 15; and non-firing ranges at Andersen South and NMS.

12.2.3.1 North

Andersen AFB

Construction

Impacts would be the same as those discussed under Alternative 1.

Operation

Impacts would be the same as those discussed under Alternative 1.

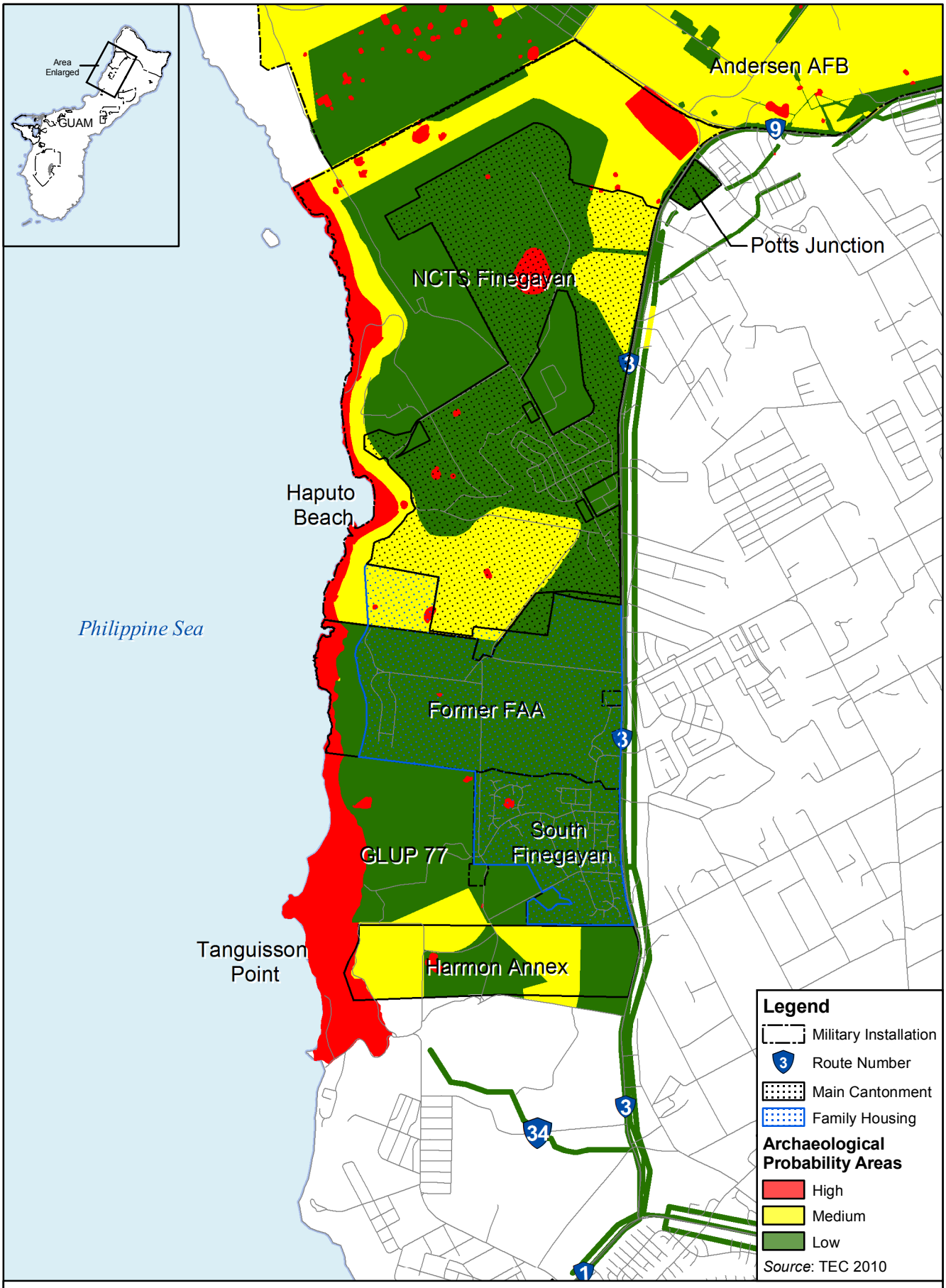
Finegayan

Construction

Construction of the main cantonment and family housing and community support would take place at Finegayan under Alternative 2. A variety of land uses/functions would be sited at NCTS Finegayan and South Finegayan including: housing, training, quality of life facilities, administrative, and educational facilities. A total of 1,610 ac (652 ha) at NCTS Finegayan and 290 ac (117 ha) at South Finegayan could be impacted by construction. For the purposes of this analysis, all of this area would be considered disturbed, although some landscaping and open spaces may occur among the facilities. The entire Finegayan APE has been surveyed for cultural resources (Welch 2010). Initial planning considered the locations of historic properties and avoided impacting the majority of the historic properties in the area. Additional efforts would be made during the final planning stage to avoid all historic properties if possible.

Construction of the MLG, QOL and other facilities would adversely impact the following historic properties: site 08-2303 (habitation site and artifact scatter) 08-2295 (artifact scatter), 381 (ceramic scatter), 08-2297 (artifact scatter), 08-2298 (artifact scatter), 08-2301 (artifact scatter), 08-2307 (artifact scatter), and 08-2308 (artifact scatter) (Figure 12.2-8).. Construction of the BEQ, BOQ, Military Aircraft Wing (MAW), and recreation facilities would impact sites 08-2299 (artifact scatter) and 08-2300 (four defensive structures), also historic properties.

Construction of education facilities would impact 290 ac (117 ha) in South Finegayan. However, site 08-0141 (Latte Stone Park) would be avoided by construction and there would be no direct impacts to this site.



Printing Date: Jun 25, 2010: M:\projects\GIS\8806_Guam_Buildup_EIS\figures\Current_Deliverable\Vol_2\12.2-8.mxd

Figure 12.2-8
Construction at Main Cantonment Alternative 2

Construction at Finegayan has the potential to require the removal of limestone forest vegetation where natural resources of cultural concern occur. However, public access to these resources is currently limited, so no adverse effect would occur.

Operation

Operation of these facilities would bring additional personnel into the area. This increase in personnel could increase accidental or inadvertent damage to historic properties, especially Latte Stone Park.

Non-DoD Land

Non-DoD land under Alternative 2 includes the lands in the Former FAA parcel.

Construction

Under Alternative 2, impacts to cultural resources within the FAA parcel would be similar to those discussed for Alternative 1. Most of the construction that would take place at the FAA Parcel under Alternative 2 would be housing, education, and QOL. Direct impacts from construction would occur to historic properties, including sites 08-1678 (ceramic scatter) and 08-1681 (ceramic scatter). The total area subject to ground disturbance would be 680 ac (275 ha).

Operation

Operation of these facilities would bring additional personnel into the area. This increase in personnel could increase accidental or inadvertent damage to historic properties.

12.2.3.2 Central

Andersen South

Construction

Impacts would be the same as those discussed under Alternative 1.

Operation

Impacts would be the same as those discussed under Alternative 1.

Barrigada

Construction

Impacts would be the same as those discussed under Alternative 1.

Operation

Impacts would be the same as those discussed under Alternative 1.

Non-DoD Land

Construction

Impacts would be the same as those discussed under Alternative 1.

Operation

Impacts would be the same as those discussed under Alternative 1.

12.2.3.3 Apra Harbor

Harbor

Construction

Impacts would be the same as those discussed under Alternative 1.

Operation

Impacts would be the same as those discussed under Alternative 1.

Naval Base Guam

Construction

Impacts would be the same as those discussed under Alternative 1.

Operation

Impacts would be the same as those discussed under Alternative 1.

12.2.3.4 South

Naval Munitions Site

Construction

Impacts would be the same as those discussed under Alternative 1.

Operation

Impacts would be the same as those discussed under Alternative 1.

Non-DoD Land

Construction

Impacts would be the same as those discussed under Alternative 1.

Operation

Impacts would be the same as those discussed under Alternative 1.

12.2.3.5 Summary of Impacts

Implementation of Alternative 2 could potentially result in significant adverse direct impacts to 20 historic properties (12 in the Main Cantonment in Finegayan, 2 in the training areas in Andersen South, and 6 in airfield training areas on Andersen AFB and NMS), six NRHP-eligible munitions pads (at the Ammunition Storage Alternative B on the NMS), and indirect impacts to as many as four traditional cultural properties/archaeological sites (two associated with the Main Cantonment at Finegayan and two with Range Complex Alternative B in the Route 15 area). No adverse impacts would occur to historic properties at Apra Harbor or Barrigada. No historic architectural properties eligible for the NRHP would be impacted by Alternative 2.

BMPs would be the same as discussed under Alternative 1.

Procedures for further survey and evaluation will be determined through Section 106 consultation.

12.2.3.6 Proposed Mitigation Measures

Alternative 2 would result in significant adverse impacts to 20 historic properties. Direct impacts to the following historic properties (sites 381, 08-2295, 08-2297, 08-2298, 08-2299, 08-2301, 08-2300, 08-2303, 08-2307, 08-2308, 1678, and 1681) in the Main Cantonment and Housing areas would be primarily mitigated through data recovery excavations as these historic properties are eligible under Criterion D and recovery efforts would follow the ACHP guidance, "Resolving Adverse Effects through Recovery of Significant Information from Archeological Sites" (ACHP 1999). A table with the area, site number, impact, NRHP criteria of significance, and proposed mitigation measures for each resource is included in Volume 9, Appendix G.

DoD recognizes that mitigation associated with data recovery efforts for archaeological sites impacted by the Undertaking, located on both DoD and non-DoD lands, will result in an increase in archaeological materials that need to be curated. This increased level of archaeological materials will require appropriate curatorial facilities as well as clearly defined procedures for the disposition of artifacts and, if encountered, the respectful and proper handling of human remains. DoD is committed to working with local, state and federal partners to maintain DoD archeological material collections on Guam and CNMI in facilities that meet federal standards and have appropriate capacity. Further, DoD is committed to ensuring the proper handling and disposition of human remains in accordance with federal statutes. For non-DoD archaeological material collections, DoD will follow local regulations regarding the handling and repatriation of cultural materials or human remains to the extent such local regulations are consistent with federal law and regulations on the subject. DoD is currently working on a capacity analysis of its current collections in Guam and CNMI, and will use that information to develop a plan for the initial and long-term curation needs associated with the Undertaking.

Operation impacts would be mitigated through historic property awareness training of DoD personnel working and living in the area to avoid impacts due to inadvertent or accidental damage to archaeological sites. The *lusong* at sites 1024 and 1032 would be avoided if possible and if not, curated or relocated as mitigation under NEPA.

Indirect impacts to the Haputo site (08-007) and the Latte Stone Park (site 08-0141) would be mitigated through replacement and upgrade of existing interpretive signages and preparation of additional documentation. The existing signage at the Latte Stone Park would be replaced with upgraded signage comparable to that developed for National Parks. The Haputo site would be included as part of an ecological reserve; however access to this site by the public would be further limited. As part of the

preservation plan would be developed to manage the site. In order to mitigate access limitations, information about the site would be provided to the public in the form of brochures and signs.

Impacts and mitigations to cultural resources at Andersen AFB, Andersen South, Route 15, NMS, and Apra Harbor would be the same as for Alternative 1. As under Alternative 1, proposed mitigation measures such as production of a Guam Synthesis, Cultural Landscape Report for the Limestone Plateau and Curation Assessment may be implemented.

12.2.3.7 Alternative 3

Alternative 3 differs from Alternatives 1, 2, and 8 by the location of the main cantonment. Under Alternative 3, the main cantonment would be constructed at Finegayan, Air Force Barrigada, and Navy Barrigada. Elements of Alternative 3 that are the same as the other alternatives include the aviation training at Andersen AFB, Andersen South, NMS, and Naval Base Guam; the two alternatives for the firing range south of Route 15; and non-firing ranges at Andersen South and NMS.

12.2.3.8 North

Andersen AFB

Construction

Impacts would be the same as those discussed under Alternative 1.

Operation

Impacts would be the same as those discussed under Alternative 1.

Finegayan

Construction

Construction and operation for the main cantonment and family housing and community support would take place at Finegayan under Alternative 3. A variety of land uses/functions would be sited at NCTS Finegayan and South Finegayan including; housing, training, administration, quality of life facilities, and educational facilities. A total of 1,610 ac (652 ha) at NCTS Finegayan and 290 ac (117 ha) at South Finegayan could be disturbed by construction. For the purposes of this analysis, all of this area would be considered disturbed, although some landscaping and open spaces may occur among the facilities.

The entire Finegayan, Navy Barrigada, and Air Force Barrigada APEs have been surveyed for cultural resources, including archaeological and architectural resources and traditional cultural properties (Athens 2009; Dixon, Walker, and Carson 2009; Griffin et al. 2009; Welch 2010). Initial planning considered the locations of historic properties and avoided impacting the majority of the historic properties in the area. Additional efforts would be made during the final planning stage to avoid all historic properties if possible.

Construction of the these facilities would impact the following historic properties: site 08-2303 (habitation site and artifact scatter), 08-2295 (artifact scatter), 381 (ceramic scatter), 08-2297 (artifact scatter), 08-2298 (artifact scatter), 08-2307(artifact scatter), 08-2308 (artifact scatter), 08-2299 (artifact scatter), and 08-2300 (four defensive structures). Site 08-0141 (Latte Stone Park) would be avoided by construction and there would be no direct impacts to this site.

Construction at Finegayan has the potential to require the removal of limestone forest vegetation where natural resources of cultural concern occur. However, public access to these resources is currently limited, and thus no adverse impact would occur.

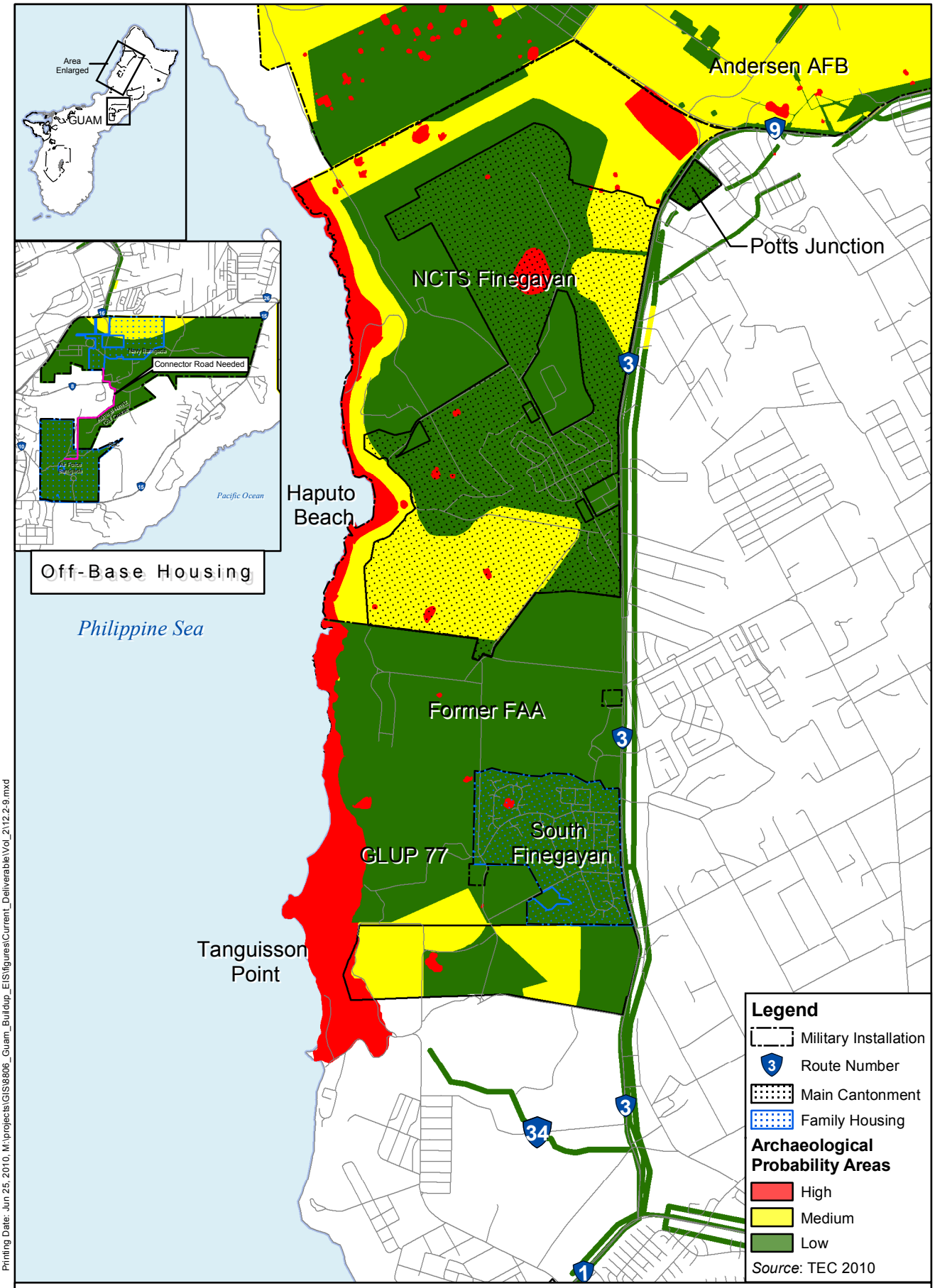


Figure 12.2-9
Construction at Main Cantonment Alternative 3

Operation

Operation of these facilities would bring additional personnel into the area. This increase in personnel could increase accidental or inadvertent damage to historic properties, especially to Latte Stone Park.

12.2.3.9 Central

Andersen South

Construction

Impacts would be the same as those discussed under Alternative 1.

Operation

Impacts would be the same as those discussed under Alternative 1.

Non-DoD Land

Construction

Impacts would be the same as those discussed under Alternative 1.

Operation

Impacts would be the same as those discussed under Alternative 1.

Barrigada

Construction

Under Alternative 3, HSG and education facilities would be constructed at Navy and Air Force Barrigada. No historic properties have been recorded within the APE at Navy Barrigada and construction and operational impacts are not expected.

Construction near the northern boundary of Navy Barrigada would occur near the southwestern corner of Mount Barrigada or Mount Tuyan, a traditional cultural property. The proposed construction would place the Base Gate, BEQ/BOQ, QOL and all housing facilities at the southwestern side of Mount Barrigada. This setting would visually impact a traditional cultural property.

Operation

Operations at the Navy Barrigada would include the use of administrative, maintenance, and housing by Marine Corps personnel. The occupation of housing in the area would increase the population living in the area. However, historic properties have not been recorded in this area and impacts would not occur. Increased population in this area would not adversely impact Mount Barrigada since the operations would not limit access to the property, or adversely impact its association with Chamorro legends.

12.2.3.10 Apra Harbor

Harbor

Construction

Impacts would be the same as those discussed under Alternative 1.

Operation

Impacts would be the same as those discussed under Alternative 1.

12.2.3.11 South

Naval Munitions Site

Construction

Impacts would be the same as those discussed under Alternative 1.

Operation

Impacts would be the same as those discussed under Alternative 1.

Non-DoD Land

Construction

Impacts would be the same as those discussed under Alternative 1.

Operation

Impacts would be the same as those discussed under Alternative 1.

12.2.3.12 Summary of Impacts

Implementation of Alternative 3 would result in adverse impacts to 17 historic properties (9 in the Main Cantonment in Finegayan, 2 in the range training areas in Andersen South, and 6 in airfield training areas on Andersen AFB and the NMS), six munitions pads in the NMS (at the Ammunition Storage Alternative B), and as many as five traditional cultural properties/archaeological sites (three associated with the Main Cantonment at Finegayan and Barrigada and two with Range Complex Alternative B in the Route 15 area). No adverse impacts would occur to historic properties at Apra Harbor. No historic architectural properties eligible for the NRHP would be affected by Alternative 3.

BMPs would be the same as discussed under Alternative 1. Procedures for further survey and evaluation will be determined through Section 106 consultation.

12.2.3.13 Proposed Mitigation Measures

Alternative 3 would have significant adverse impacts to cultural resources. Direct impacts to the following historic properties: sites 381, 08-2295, 08-2297, 08-2298, 08-2299, 08-2300, 08-2303, 08-2307, and 08-2308 in the Main Cantonment and Housing areas would be primarily mitigated through data recovery excavations as these historic properties are eligible under Criterion D and recovery efforts would follow the ACHP guidance, "Resolving Adverse Effects through Recovery of Significant Information from Archeological Sites" (ACHP 1999). The *lusong* at sites 1024 and 1032 would be avoided if possible, and if not, curated or relocated as mitigation under NEPA. A table with the area, site number, impact, NRHP criteria of significance, and proposed mitigation measures for each resource is included in Volume 9, Appendix G.

DOD recognizes that mitigation associated with data recovery efforts for archaeological sites impacted by the Undertaking, located on both DoD and non-DoD lands, will result in an increase in archaeological materials that need to be curated. This increased level of archaeological materials will require appropriate curatorial facilities as well as clearly defined procedures for the disposition of artifacts and, if encountered, the respectful and proper handling of human remains. DoD is committed to working with local, state and federal partners to maintain DoD archeological material collections on Guam and CNMI in facilities that meet federal standards and have appropriate capacity. Further, DoD is committed to ensuring the proper handling and disposition of human remains in accordance with federal statutes. For

non-DoD archaeological material collections, DoD will follow local regulations regarding the handling and repatriation of cultural materials or human remains to the extent such local regulations are consistent with federal law and regulations on the subject. DoD is currently working on a capacity analysis of its current collections in Guam and CNMI, and will use that information to develop a plan for the initial and long-term curation needs associated with the Undertaking.

Construction of facilities in the north of Navy Barrigada would be a visual impact to the traditional cultural property. Design and construction of new facilities in this area will be undertaken in a manner that reduces adverse impacts on the viewshed of Mount Barrigada.

Operational impacts would be mitigated through historic property awareness training of DoD personnel working and living in the area to avoid impacts to archaeological sites.

Indirect impacts to the Haputo site (08-007) and the Latte Stone Park (site 08-0141) would be mitigated through replacement and upgrade of existing interpretive signages and preparation of additional documentation. The existing signage at the Latte Stone Park would be replaced with upgraded signage comparable to that developed for National Parks. The Haputo site would be included as part of an ecological reserve; however access to this site by the public would be further limited. As part of the management of the area, the Haputo site would be documented (mapped and photographed) and a preservation plan would be developed to manage the site. In order to mitigate access limitations, information about the site would be provided to the public in the form of brochures and signs.

Impacts and mitigations to historic properties at Andersen AFB, Andersen South, Route 15, NMS, and Apra Harbor would be the same as for Alternative 1.

As under Alternative 1, proposed mitigation measures such as a Guam Synthesis, Cultural Landscape Report for the Limestone Plateau, and Curation Assessment would be implemented. Impacts to accidental or inadvertent damage to historic properties from operations would be mitigated through historic property awareness training,. Access to natural resources with cultural concern would be implemented as mitigation under NEPA.

12.2.4 Alternative 8

Alternative 8 differs from Alternatives 1, 2, and 3 by the location of the main cantonment. Under Alternative 8, the main cantonment would be constructed at Finegayan and the Former FAA parcel and at Air Force Barrigada. Elements of Alternative 8 that are the same as the other alternatives include the aviation training at Andersen AFB, Andersen South, NMS, and Naval Base Guam; the two alternatives for the firing range south of Route 15; and non-firing ranges at Andersen South and NMS.

12.2.4.1 North

Andersen AFB

Construction

Impacts would be the same as those discussed under Alternative 1.

Operation

Impacts would be the same as those discussed under Alternative 1.

Finegayan

Construction

Construction of the main cantonment and family housing and community support would take place at Finegayan, the Former FAA parcel, and Air Force Barrigada under Alternative 8. All of these areas have been completely surveyed for archaeological, architectural, and traditional cultural properties (Griffin et al. 2009; Athens 2009; Welch 2010; Dixon, Walker, and Carson 2009). A variety of land uses/functions would be sited at Finegayan and South Finegayan including housing, training, quality of life facilities, administration, and educational facilities. A total of 1,090 ac (441 ha) at NCTS Finegayan and 290 ac (117 ha) at South Finegayan could be impacted by construction. For the purposes of this analysis, all of this area would be considered disturbed, although some landscaping and open spaces may occur among the facilities. Initial planning considered the locations of historic properties resources and avoided impacting the majority of the historic properties in the area. Additional efforts would be made during the final planning stage to avoid all historic properties if possible.

Construction of facilities at the Main Cantonment would impact site the following historic properties: 08-2299 (artifact scatter), 08-2301 (artifact scatter), 08-2300 (four defensive structures), 08-2303 (habitation site and artifact scatter), 381 (ceramic scatter), 08-2295 (artifact scatter), 08-2297, and 08-2298 (artifact scatter).. No historic properties are recorded within the APE for the LTC facilities and the educational facilities at South Finegayan; therefore no impacts would occur. No impacts from construction would occur to Site 08-0141 (Latte Stone Park). .

Construction at Finegayan also would remove limestone forest vegetation where natural resources of cultural concern occur. However, public access to these resources is currently limited, and thus no significant impact would occur.

Operation

Operation of the HQ facilities, education facilities, BASE facilities, and BEQ would bring additional personnel into the area. This increase in personnel could increase accidental or inadvertent damage to historic properties, including Latte Stone Park.

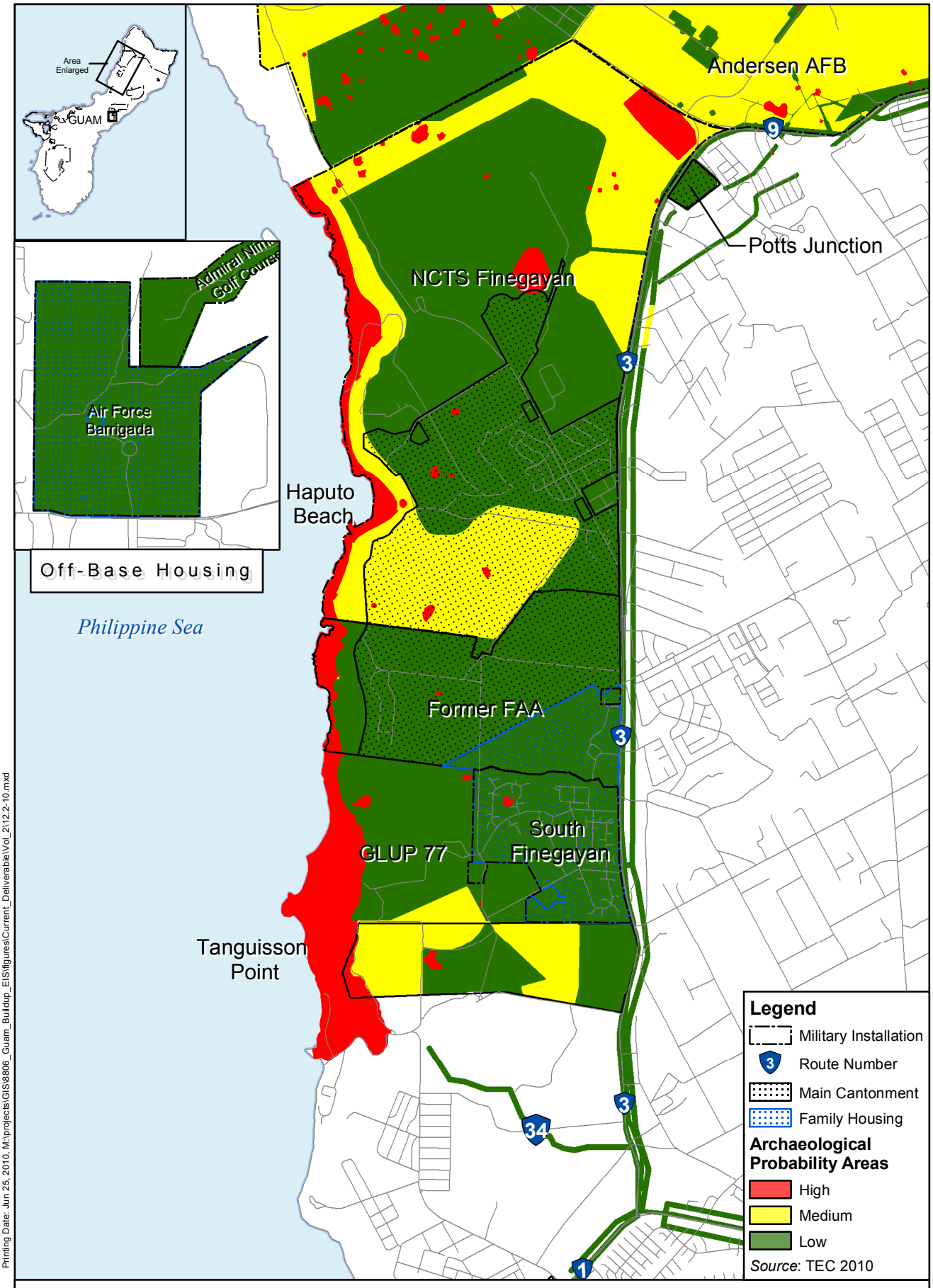
Non-DoD Land

Construction

Under Alternative 8, impacts to the FAA Parcel would be similar to those discussed for Alternative 1. Most of the construction that would take place at the FAA Parcel under Alternative 8 would be associated with facilities such as HSG, education, BOQ, PMO, TRN, and QOL . Construction would impact sites 08-1678 (ceramic scatter) and 08-1681 (ceramic scatter), both historic properties.

Operation

Operation of these facilities would bring additional personnel into the area. This increase in personnel could increase accidental or unintentional damage to historic properties.



Printing Date: Jun 25, 2010, M:\projects\GIS\8806_Guam_Buildup_EIS\figures\Current_Deliverable\Vol_2\12.2-10.mxd

Figure 12.2-10
Construction at Main Cantonment Alternative 8

Central

Andersen South

Construction

Impacts would be the same as those discussed under Alternative 1.

Operation

Impacts would be the same as those discussed under Alternative 1.

Barrigada

Construction

Under Alternative 8, HSG, BASE, QOL and education facilities would be constructed at Air Force Barrigada. Historic properties have not been recorded in this area and no impacts would occur.

Operation

Under Alternative 8, HSG, BASE, QOL and education facilities would be constructed at Air Force Barrigada. Historic properties have not been recorded in this area and no impacts to cultural resources would occur.

Non-DoD Land

Construction

Impacts would be the same as those discussed under Alternative 1.

Operation

Impacts would be the same as those discussed under Alternative 1.

12.2.4.2 Apra Harbor

Harbor

Construction

Impacts would be the same as those discussed under Alternative 1.

Operation

Impacts would be the same as those discussed under Alternative 1.

Naval Base Guam

Construction

Impacts would be the same as those discussed under Alternative 1.

Operation

Impacts would be the same as those discussed under Alternative 1.

12.2.4.3 South

Naval Munitions Site

Construction

Impacts would be the same as those discussed under Alternative 1.

Operation

Impacts would be the same as those discussed under Alternative 1.

Non-DoD Land

Construction

Impacts would be the same as those discussed under Alternative 1.

Operation

Impacts would be the same as those discussed under Alternative 1.

12.2.4.4 Summary of Impacts

Implementation of Alternative 8 would potentially result in significant adverse impacts to 18 historic properties (10 in the Main Cantonment, 2 in the range training areas, and 6 in airfield training areas), six NRHP-eligible munitions pads (at the Ammunition Storage Alternative B), and as many as four traditional cultural properties/archaeological sites (two associated with the Main Cantonment and two with Range Complex Alternative B).. No adverse impacts would occur to historic properties at Apra Harbor. No historic properties that are architectural resources would be impacted by Alternative 8.

BMPs would be the same as discussed under Alternative 1.

Procedures for further survey and evaluation will be determined through Section 106 consultation.

12.2.4.5 Proposed Mitigation Measures

Alternative 8 would have significant adverse impacts to historic properties. Direct impacts to NRHP-eligible sites (381, 08-2295, 08-2297, 08-2298, 08-2299, 08-2301, 08-2300, 08-2303, 08-1678, and 08-1681) in the Main Cantonment and Housing areas would primarily be mitigated through data recovery excavations as these sites are eligible under Criterion D and recovery efforts would follow the ACHP guidance, "Resolving Adverse Effects through Recovery of Significant Information from Archeological Sites" (ACHP 1999). A table with the area, site number, impact, NRHP criteria of significance, and proposed mitigation measures for each resource is included in Volume 9, Appendix G.

DOD recognizes that mitigation associated with data recovery efforts for archaeological sites impacted by the Undertaking, located on both DoD and non-DoD lands, will result in an increase in archaeological materials that need to be curated. This increased level of archaeological materials will require appropriate curatorial facilities as well as clearly defined procedures for the disposition of artifacts and, if encountered, the respectful and proper handling of human remains. DoD is committed to working with local, state and federal partners to maintain DoD archeological material collections on Guam and CNMI in facilities that meet federal standards and have appropriate capacity. Further, DoD is committed to ensuring the proper handling and disposition of human remains in accordance with federal statutes. For non-DoD archaeological material collections, DoD will follow local regulations regarding the handling and repatriation of cultural materials or human remains to the extent such local regulations are consistent with federal law and regulations on the subject. DoD is currently working on a capacity analysis of its

current collections in Guam and CNMI, and will use that information to develop a plan for the initial and long-term curation needs associated with the Undertaking.

Indirect impacts to the Haputo site (08-007) and the Latte Stone Park (site 08-0141) would be mitigated through replacement and upgrade of existing interpretive signages and preparation of additional documentation. The existing signage at the Latte Stone Park would be replaced with upgraded signage comparable to that developed for National Parks. The Haputo site would be included as part of an ecological reserve; however access to this site by the public would be further limited. As part of the management of the area, the Haputo site would be documented (mapped and photographed) and a preservation plan would be developed to manage the site. In order to mitigate access limitations, information about the site would be provided to the public in the form of brochures and signs.

Impacts and mitigations to cultural resources at Andersen AFB, Andersen South, Route 15, NMS, and Apra Harbor would be the same as for Alternative 1.

As under Alternative 1, proposed mitigation measures such as production of a Guam Synthesis, Cultural Landscape Report for the Limestone Plateau or Curation Assessment would be implemented. Historic property awareness training, would mitigate impacts due to accidental damage, and access to natural resources with cultural concern would be included as part of an access plan in the Range Management Plan for the Live Fire Range.No-Action Alternative

Under the no-action alternative, Marine Corps units would remain in Japan and would not relocate to Guam. No construction, dredging, training, or operations associated with the military relocation would occur. Existing operations on Guam would continue. DoD management of cultural resources on non-DoD lands at the Harmon Annex or Route 15 would not occur. Implementation of the no-action alternative would maintain existing conditions. In addition, implementation of the no-action alternative would not meet the mission, readiness, national security and international treaty obligations of the U.S..

12.2.5 Summary of Impacts

Extensive data collection and surveys associated with this EIS have examined more than 5,000 acres in Guam and recorded more than 100 NRHP-eligible archaeological sites and architectural resources. Recent studies have also identified traditional cultural properties, and conducted interviews with individuals knowledgeable about the history of WW II and of traditional practices.

The impact analysis has identified potentially significant adverse direct impacts from the proposed action to between 17 and 20 historic properties that are archaeological sites, 6 NRHP-eligible munitions pads, and indirect impacts to as many as 5 traditional cultural properties. Most of the impacts would occur on DoD lands. This EIS has proposed mitigation measures to reduce those impacts through data recovery, implementation of preservation plans, public education, signs, brochures, and documentation.

In addition, Volume 7, Chapter 2 describes two additional mitigation measures; force flow reduction and adaptive program management of construction. Implementing either of these mitigation measures could further reduce indirect impacts to cultural resources by lowering peak population levels during construction and reducing potential inadvertent damage to historic properties.

Table 12.2-1. Summary of Main Cantonment Impacts – Alternatives 1, 2, 3 and 8

Main Cantonment Alternative 1 (North)	*Main Cantonment Alternative 2 (North)*	*Main Cantonment Alternative 3 (North/Central)*	*Main Cantonment Alternative 8 (North/Central)*
Construction			
SI-M • Significant adverse direct impacts to 10 historic properties on Finegayan, , all mitigated to less than significant through data recovery	SI-M Significant adverse direct impacts to 12 historic properties on Finegayan , all mitigated to less than significant through data recovery	SI-M • Significant adverse direct impacts to 9 historic properties, all mitigated to less than significant through data recovery	SI-M • Significant adverse direct impacts to 10 historic properties, all mitigated to less than significant through data recovery
Operation			
SI-M • Significant adverse indirect impacts to two traditional cultural properties at Finegayan all mitigated to less than significant through public education	SI-M • Significant adverse indirect impacts to two traditional cultural properties at Finegayan all mitigated to less than significant through public education	SI-M • Significant adverse indirect impacts to two traditional cultural properties at Finegayan and one traditional cultural property at Barrigada, mitigated to less than significant through public education and landscaping	SI-M • Significant adverse indirect impacts to two traditional cultural properties at Finegayan, all mitigated to less than significant through public education

Legend: SI = Significant impact, SI-M = Significant impact mitigable to less than significant, LSI = Less than significant impact, NI = No impact.

Table 12.2-2. Summary of Training Impacts – Firing Range Alternatives

Firing Range Alternative A (Central)	*Firing Range Alternative B (Central)*
Construction	
SI-M • Significant adverse direct impacts to 1 historic property from the realignment of Route 15. • Potential disturbance to natural resources of cultural concern (under NEPA) mitigated to less than significant through the development of an access plan through the Range Management Plan	SI-M • Potential disturbance to natural resources of cultural concern (under NEPA) mitigated to less than significant through the development of an access plan through the Range Management Plan
Operation	
SI-M • Significant adverse indirect impacts to Pagat site at Route 15 due to limitation of access	SI-M • Significant adverse indirect impacts to Pagat site and Marbo site at Route 15 due to limitation of access

Legend: SI-M = Significant impact mitigable to less than significant, NI = No impact.

Table 12.2-3. Summary of Training Impacts – Ammunition Storage Alternatives

Ammunition Storage Alternative A (South)	*Ammunition Storage Alternative B (South)*
Construction	
NI • There would be no adverse impacts to historic properties on NMS	SI-M • Significant adverse direct impacts to 6 historic properties on NMS
Operation	
NI • There would be no adverse impacts historic properties on NMS	NI • There would be no adverse impacts to historic properties on NMS

Legend: SI-M = Significant impact mitigable to less than significant, NI = No impact.

Table 12.2-4. Summary of Training Impacts – NMS Access Roads Alternatives

Access Road Alternative A (South)	*Access Road Alternative B (South)*
Construction	
NI • There would be no adverse impacts to historic properties on NMS	NI • No construction
Operation	
NI • There would be no adverse impacts to historic properties on NMS	NI • There would be no adverse impacts to historic properties on NMS

Legend: NI = No impact.

Table 12.2-5. Summary of Other Training, Airfield, and Waterfront Component Impacts

Other Training (North/Central/South)	*Airfield (North)*	*Waterfront (Apra Harbor)*
Construction		
SI-M • Significant adverse direct impacts to 2 historic properties on NMS (Site 43 and Site 83); 2 on Andersen South (04-2324, 04-2325), and 2 on Andersen AFB for construction of • ECMs (T-9-1, T-9-2) • Potential disturbance to natural resources of cultural significance mitigated to less than significant through collection and access	SI-M • Significant adverse direct impacts to 2 historic properties on Andersen AFB (07-2319, 07-1064)	NI • No adverse impacts to historic properties that are archaeological, architectural or traditional resources at Apra Harbor, • No adverse impacts to historic properties that are submerged resources or objects
Operation		
NI • No adverse impacts to historic properties	NI • No adverse impacts to historic properties	NI • No adverse impacts to historic properties

Legend: SI-M = Significant impact mitigable to less than significant, NI = No impact.

12.2.6 Summary of Proposed Mitigation Measures

Table 12.2-6. Summary of Proposed Mitigation Measures

Alternative 1	*Alternative 2*	*Alternative 3*	*Alternative 8*
Archaeological Resources			
• Preparation of a Guam Synthesis. • Preparation of a Cultural Landscape Report for the Northern Limestone Plateau. • Preparation of a Curation Assessment. • Data Recovery of sites eligible under criterion D: 07-2319, 07-1064, 08-2297,08-2299, 08-2301, 08-2300, 08-2295, 381, 08-2298, 08-2303,08-1678, 08-1681, 04-2324, 04-2325, T-9-1, Site 43, Site 83, and T-9-2, T-H-8. • A Preservation Plan would be updated and executed for Pagat, Haputo, and Marbo Cave (Alternative B) • Conduct historic property awareness training of DoD personnel to promote protections of sensitive sites. • Enable traditional artisans and suruhanus to collect resources • Archival research and detailed mapping of 6 munitions pads	• Preparation of a Guam Synthesis. • Preparation of a Cultural Landscape Report for the Northern Limestone Plateau. • Preparation of a Curation Assessment. • Data Recovery of sites 07-2319, 07-1064, 08-2297, 08-2299, 08-2301, 08-2300, 08-2295, 381, 08-2298, , 08-2303, 08-2307, 08-2308,08-1678, 08-1681, 04-2324, 04-2325, Site 43,Site 83, T-9-1, and T-9-2. • Relocation or curation of 1024 and 1032 (under NEPA) • A Preservation Plan would be updated and executed for Pagat, Haputo, and Marbo Cave (Alternative B) • Conduct historic property awareness training of DoD personnel to promote protections of sensitive sites. • Enable traditional artisans to collect resources • Archival research and detailed mapping of 6 facilities	• Preparation of a Guam Synthesis. • Preparation of a Cultural Landscape Report for the Northern Limestone Plateau. • Preparation of a Curation Assessment. • Data Recovery of sites 07-2319, 07-1064, 08-2297, 08-2299, 08-2300, 08-2295, 381, 08-2298, 08-2303, 08-2307, 08-2308, 04-2324, 04-2325, Site 43, Site 83, T-9-1, and T-9-2. • Relocation or curation of 1024 and 1032 (under NEPA) • A Preservation Plan would be updated and executed for Pagat, Haputo, and Marbo Cave (Alternative B) • Conduct historic property awareness training of DoD personnel to promote protections of sensitive sites. • Enable traditional artisans to collect resources • Archival research and detailed mapping of 6 facilities	• Preparation of a Guam Synthesis. • Preparation of a Cultural Landscape Report for the Northern Limestone Plateau. • Preparation of a Curation Assessment. • Data Recovery of sites 08-2319, 07-1064, 08-2297, 08-2299, 08-2301, 08-2300, 08-2295, 381, 08-2298, 08-2303, 08-1678, 08-1681, 04-2324, 04-2325, Site 43,Site 83, T-9-1, and T-9-2. • A Preservation Plan would be updated and executed for Pagat, Haputo, and Marbo Cave (Alternative B) • Conduct historic property awareness training of DoD personnel to promote protections of sensitive sites • Enable traditional artisans to collect resources • Archival research and detailed mapping of 6 facilities
Architectural Resources			
• None	• None	• None	• None
Submerged Resources			
• None	• None	• None	• None
Traditional Cultural Properties			
• Preserve site and upgrade signage for 08-0141 (Latte Stone Park) • Documentation of site, brochure, signs for 08-007 (Haputo Site) • Public access would be granted to the Pagat site and Marbo Cave (Alternative B) when ranges are not in use.	• Preserve site and upgrade signage for 08-0141 (Latte Stone Park) • Documentation of site, brochure, signs for 08-007 (Haputo Site) • Public access would be granted to the Pagat site and Marbo Cave when ranges are not in use.	• public education • Preserve site and upgrade signage for 08-0141 (Latte Stone Park) • Documentation of site, brochure, signs for 08-007 (Haputo Site) • Public access would be granted to the Pagat site and Marbo Cave when ranges are not in use.	• Preserve site and upgrade signage for 08-0141 (Latte Stone Park) • Documentation of site, brochure, signs for 08-007 (Haputo Site) • Public access would be granted to the Pagat site and Marbo Cave when ranges are not in use.