EXECUTIVE SUMMARY

ES-1 INTRODUCTION

In September 2010, the United States (U.S.) Department of the Navy (DON) signed a Record of Decision (ROD) (77 Federal Register [FR] 60438, September 30, 2010) regarding the 2010 Final Environmental Impact Statement (EIS) for the Guam and Commonwealth of the Northern Mariana Islands (CNMI) Military Relocation; Relocating Marines from Okinawa, Visiting Aircraft Carrier Berthing, and Army Air and Missile Defense Task Force (DON 2010). The ROD documented the DON’s decision to implement the preferred alternatives identified in the 2010 Final EIS for the main base (cantonment), aviation, and waterfront operations to support relocation of approximately 8,600 Marines and approximately 9,000 dependents from Okinawa to Guam. The ROD deferred a decision on the development of a live-fire training range complex (LFTRC) along Route 15 in the northeastern part of Guam.

In the months following issuance of the ROD, the DON formally committed that if the Route 15A area was selected for the LFTRC, the DON would provide for 24 hours a day, 7 days a week access to Pågat Village and Pågat Cave historical sites, to include the existing trail from Route 15A leading to both (DON 2011; Department of Defense [DoD] 2011). The DON, to meet this commitment, applied a probabilistic methodology to more precisely model the size of the surface danger zone (SDZ) associated with the Multi-Purpose Machine Gun (MPMG) Range, which would be part of the LFTRC. Application of this methodology reduced the size of the overall footprint and enabled the DON to take another look at potential LFTRC locations on Guam, including those locations previously considered but not carried forward for detailed analysis. This reevaluation resulted in the identification of additional LFTRC preliminary alternatives. In light of this information, the DON initially elected to prepare a Supplemental Environmental Impact Statement (SEIS) limited solely to the evaluation of potential impacts associated with the construction and operation of an LFTRC on Guam (hereinafter “LFTRC SEIS”). The DON issued a Notice of Intent (NOI) to prepare the LFTRC SEIS in February 2012 (77 FR 6787, February 9, 2012) and held public scoping meetings on Guam in March 2012.

On April 27, 2012, the U.S.-Japan Security Consultative Committee issued a joint statement announcing its decision to adjust the plans outlined in the May 2006 Roadmap for Realignment Implementation. In accordance with these “2012 Roadmap Adjustments,” the DoD adopted a new force posture in the Pacific providing for a materially smaller and reconfigured force on Guam. In conjunction with changes to the mix of personnel involved in the relocation, the force adjustments would reduce the originally planned relocation of approximately 8,600 Marines with 9,000 dependents to a force of approximately 5,000 Marines with approximately 1,300 dependents. That decision prompted the DON’s review of the actions previously planned for Guam and approved in the September 2010 ROD. This review concluded that while some actions remained unchanged, others, such as the size and location of the cantonment and family housing areas, could significantly change as a result of the modified force. Therefore, the DON published a new NOI (77 FR 61746, October 11, 2012) and amended the scope of the ongoing LFTRC SEIS to add those actions that materially changed as a result of the new force posture. The DON conducted additional public scoping meetings for this expanded SEIS in November 2012.

The DON prepared this SEIS in accordance with the National Environmental Policy Act (NEPA) (42 U.S. Code [USC] §§ 4321, et seq.) and the Council on Environmental Quality’s (CEQ’s) implementing regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508). Pursuant to 40 CFR § 1502.9, the DON prepared this SEIS for the purpose of supplementing the portions of the 2010 Final EIS regarding the establishment on Guam of a cantonment area, family housing, an LFTRC, and associated
infrastructure to support the relocation of a substantially reduced number of Marines and dependents than
was previously analyzed. By supplementing the 2010 Final EIS, the SEIS advances NEPA’s purpose of
informing decision-makers and the public about the environmental effects of the DON’s proposed action.

The proposed change in size and composition of the new force structure under the 2012 Roadmap
Adjustments and the reconsideration of the LFTRC SDZ footprint did not affect all of the decisions made
in the September 2010 ROD. For example, the location of Aviation Combat Element (ACE) facilities, the
air embarkation facilities (Air Mobility Command Complex), the development of the North Gate and
access road at Andersen Air Force Base (AAFB), the wharf improvements at the U.S. Navy (hereinafter
“Navy”) base at Apra Harbor, and the non-live fire and maneuver training ranges on Andersen South
remain unaffected by the changes in force structure resulting from the April 2012 Roadmap Adjustments.
For those decisions that are not affected by the new force structure, the September 2010 ROD stands as
the final agency action for those actions. The expanded scope of this SEIS does not include the transient
aircraft carrier berthing in Apra Harbor or the U.S. Army (hereinafter “Army”) Air and Missile Defense
Task Force deployment that were addressed in the 2010 Final EIS. The disposition of those projects is
independent of the SEIS proposed action.

ES-2 PURPOSE AND NEED

The purpose of the proposed action evaluated in this SEIS is to ensure that the relocated Marines are
organized, trained, and equipped as mandated by 10 USC § 5063, to satisfy individual live-fire training
requirements as described in the 2010 Final EIS and associated ROD, and to establish an operational U.S.
Marine Corps (hereinafter “Marine Corps”) presence on Guam in accordance with the 2012 Roadmap
Adjustments. The purpose remains unchanged from the 2010 Final EIS, albeit to support a materially
smaller relocating Marine Corps force.

The proposed action is needed to ensure consistency with the new force posture adopted by the DoD in
accordance with the April 2012 Roadmap Adjustments, which provide for a materially smaller force on
Guam than was originally proposed in the 2010 Final EIS, while fulfilling U.S. national security
obligations to provide mutual defense, deter aggression, and dissuade coercion in the Western Pacific
Region.

ES-3 PROPOSED ACTION

The proposed action is to construct and operate a cantonment area, family housing, and an LFTRC on
Guam to support the Marine Corps relocation. To meet the purpose of and need for the proposed action,
the Marine Corps requires facilities that can fully support the missions of the relocated units. These
requirements include a cantonment area, family housing and community support facilities of sufficient
size and functional organization to accommodate the reduced and reconfigured number of Marines
relocating to Guam per the 2012 Roadmap Adjustments, and an LFTRC that allows for simultaneous use
of firing ranges to support individual skills training and related operations of the relocated Marines. The
proposed action also includes the provision of on-site utilities, access roads, and related off-site
infrastructure to support the proposed cantonment/family housing and LFTRC. The DON’s preferred
alternative is to construct and operate the proposed cantonment at the Naval Base Guam, Telecommunications Site at Finegayan (hereinafter “Finegayan”), the proposed family housing on AAFB, and the proposed LFTRC at Northwest Field (NWF) on AAFB (see Section ES-6 Preferred Alternative for more information). The chart below highlights some of the key differences between the 2010 Final EIS and this SEIS.
<table>
<thead>
<tr>
<th>Key Differences Between 2010 Final EIS and 2015 Final SEIS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2010 Final EIS</strong></td>
</tr>
<tr>
<td>Approximately 8,600 Marines and 9,000 dependents relocating over 5 years</td>
</tr>
<tr>
<td>7-year intense construction boom followed by sharp decline</td>
</tr>
<tr>
<td>More than 79,000 new Guam residents at peak</td>
</tr>
<tr>
<td>More than 33,000 additional Guam residents</td>
</tr>
<tr>
<td>2,580 acres at Finegayan preferred alternative</td>
</tr>
<tr>
<td>Acquisition of 688 acres of non-federal land at Finegayan preferred alternative</td>
</tr>
<tr>
<td>5,529 acres for Route 15 preferred alternative (4,439 acres in SDZs, mostly over ocean)</td>
</tr>
<tr>
<td>Acquisition of more than 1,000 acres of non-federal land at Route 15 preferred alternative</td>
</tr>
<tr>
<td>20 megawatts</td>
</tr>
<tr>
<td>5.82 million gallons/day</td>
</tr>
<tr>
<td>2.6 million gallons/day</td>
</tr>
<tr>
<td>165,600 pounds/day</td>
</tr>
<tr>
<td>4 alternative sites in EIS analysis, all in same vicinity</td>
</tr>
<tr>
<td>2 alternative sites in EIS analysis, both in same vicinity</td>
</tr>
</tbody>
</table>
ES-3.1 RELOCATION OF MARINES AND ASSOCIATED POPULATION CHANGE

The proposed Marine Corps relocation to implement the 2012 Roadmap Adjustments would consist of approximately 5,000 Marines accompanied by approximately 1,300 dependents, a 64% reduction in the relocated Marine Corps population compared to the proposed relocation in the 2010 Final EIS. The direct population influx associated with Marine Corps uniformed personnel would be supplemented by civilian military workers and off-island construction workers, as well as indirect and induced population that would be associated with economic growth from the proposed action (along with dependents for each). Figure ES-1 compares the population increase associated with the current proposed action to the increase that was projected in the 2010 Final EIS. The analysis of population growth in the 2010 Final EIS showed a rapid increase in the first 5 years of the relocation, a peak, and then a sharp decline to a steady state population increase of more than 33,000 new residents compared to the baseline population. The sharp increase and decline were forecast because the original planned construction period was intense and extremely short (which would have required the influx and subsequent outflow of large numbers of off-island construction workers over a relatively short period), and would have coincided with the arrival of Marines and their families.

The proposed action for the SEIS includes a relatively longer and more gradual construction period (13 years compared to 7 years for the 2010 Final EIS), resulting in a smaller requirement to bring off-island construction workers. This extended construction period and reduced number of relocated personnel are forecast to generate a much smaller and more gradual overall increase in population, rather than a peak, as shown in Figure ES-1. The eventual steady state (post construction) increase in island population related to the current proposed action would be approximately 7,400 additional Guam residents, a 78% reduction compared to the steady state population increase described in the 2010 Final EIS.

![Figure ES-1: Comparison of Project-Related Population Increase on Guam: 2010 Final EIS and 2012 Roadmap Adjustments SEIS](image-url)
ES-3.2 CANTONMENT AND FAMILY HOUSING

This component of the proposed action includes construction and operation of essential headquarters and administrative support facilities; base operations; supply, service, maintenance, and other support functions; housing for unaccompanied and accompanied personnel; and on base roadways, utilities, and similar infrastructure. These categories of facilities and functions are consistent with those included in the proposed action for the 2010 Final EIS, but the relative size and scope of the cantonment area is considerably reduced in the SEIS proposed action given the reduced size and adjusted composition of the relocating force. For example, the development footprint of the cantonment/family housing area that was selected in the 2010 ROD (which also represents the No-Action Alternative in this SEIS) is almost 78% larger than a representative SEIS alternative at Finegayan (Figure ES-2).

In addition to proposed construction of the various facilities and functions within the cantonment/family housing, the proposed action also includes expansion of the DoD Education Activity High School located at the Naval Hospital site on central Guam, and either expansion or (in the case of the alternative at AAFB) repurposing and replacement of the existing Andersen Middle School on AAFB.

ES-3.3 LIVE-FIRE TRAINING RANGE COMPLEX

This component of the proposed action includes the construction and operation of five live-fire training ranges and associated range operation and control facilities and access roads at a single consolidated location to meet the individual weapons training/qualification requirements of the relocating Marine Corps force. It also includes construction and operation of a stand-alone Hand Grenade (HG) Range at a single location on federally-owned land at Andersen South and U.S. Fish and Wildlife Service (USFWS) replacement facilities (including new beach access) within the Ritidian Unit of the Guam National Wildlife Refuge (NWR). The characteristics (though not the specific layout or footprint) of all proposed training ranges are consistent with the descriptions contained in the 2010 Final EIS, with the exception of a revised probabilistic SDZ configuration for the largest range in the LFTRC (i.e., the MPMG Range) and updated estimates of range utilization and ammunition usage.

Each range in the proposed LFTRC is designed to meet different training requirements. The usage of each individual range would primarily be dependent upon the number of individuals requiring training on the associated weapon system and the frequency of training required by appropriate training directives. The LFTRC utilization analyzed in this SEIS is up to 39 weeks (273 days) per year, with the remaining 13 weeks of the year unavailable for training due to weather, range maintenance, and holidays. However, each individual range is anticipated to be used less than the entire LFTRC’s planned total of 39 weeks. Training at the LFTRC would typically occur during weekdays but periodic weekend use could also occur as needed.

The estimated annual ammunition usage at the LFTRC under the 2012 Roadmap Adjustments would be approximately 47% less than the amount analyzed in the 2010 Final EIS. This reduction would result from the changed composition and reduced numbers of Marine Corps personnel that would be relocated to Guam.
SEIS Cantonment/Family Housing Alternative
Impacted Area* = 1,495 ac
No acquisition of non-DoD land

2010 ROD Selected Alternative (also SEIS No-Action Alternative)
Impacted Area* = 2,580 ac
Acquisition of 688 ac of non-DoD land

**Impacted Area**: includes notional cantonment/family housing features and on-site utilities (water, wastewater, and electrical) plus construction buffer area.

Legend:
- Property under the custody and control of DoD
- Former FAA Parcel
- SEIS Finegayan Cantonment/Family Housing Alternative
- 2010 ROD Selected Alternative (SEIS No-Action Alternative)

Figure ES-2
Comparison of an SEIS Cantonment/Family Housing Alternative to the Alternative Selected in the 2010 ROD

Source: NAVFAC Pacific 2013
ES-3.4 Utilities and Infrastructure

The DON updated the utilities assessment studies prepared for the 2010 Final EIS to reflect the reduced Marine Corps population and reduced facilities requirements associated with the 2012 Roadmap Adjustments. The updated studies focused on power, potable water, wastewater, and solid waste disposal, and the DON conducted a new evaluation for information technology and communications (IT/COMM) requirements. The studies factored in the anticipated increase in population and associated utility demand, including direct, indirect, induced, and natural growth. Utilities requirements for the proposed action include: (1) on-site DoD utilities to support the cantonment, family housing, and LFTRC facilities under each project alternative; (2) off-site DoD utilities required to connect the proposed facilities to existing military and civilian utilities infrastructure; and (3) upgrade or augmentation of existing military and civilian utilities infrastructure where necessary and appropriate to support the relocation.

ES-4 Alternatives Considered

ES-4.1 Alternatives Development Methodology

Because of the reduced acreage requirements for the cantonment and family housing facilities, as well as other factors (e.g., the reconfigured SDZ footprint for the proposed LFTRC, consideration of public input, refinement of range designs, criteria changes, and a reassessment of operational requirements, conflicts, and opportunities), the DON considered a broad range of siting alternatives in this SEIS. Some of these siting alternatives were not feasible under the conditions evaluated in the 2010 Final EIS but were reconsidered for the 2012 Roadmap Adjustments SEIS.

For the SEIS, the DON applied a methodology for identifying and evaluating alternatives that was similar to the one described in the 2010 Final EIS. This methodology included the identification of preliminary alternatives based on a search for land areas on Guam that are large enough to accommodate the proposed cantonment/family housing and the application of appropriate screening criteria to represent the essential operational and mission requirements of the relocating forces. The DON derived initial screening criteria from the “Marine Corps Guam Cantonment Guiding Principles” (hereinafter “Guiding Principles”) developed at Headquarters Marine Corps for the planning and establishment of Marine Corps Base Guam. Additional screening criteria were derived from input provided by the Chief of Staff of the U.S. Air Force (hereinafter “Air Force”) and Commander, Navy Installations Command (CNIC). All screening criteria are described in detail in Section 2.3 of the SEIS.

Based on the Guiding Principles, and in consideration of Air Force and CNIC input, the DON developed a two-step screening process for evaluating potential alternatives using the initial screening criteria and additional screening criteria. Initial screening criteria represented fundamental requirements that must be met for an alternative to be considered for further analysis. Alternatives that satisfied the initial screening criteria were subsequently evaluated qualitatively in terms of their strengths and weaknesses relative to a defined set of additional screening criteria (e.g., mission impacts or proximity to compatible functions). The DON developed separate sets of screening criteria for the cantonment, family housing, and LFTRC components of the proposed action.
The flowchart outlines the alternatives development process that was followed for this SEIS.

**ES-4.1.1 Evaluation of Preliminary Cantonment/Family Housing Alternatives**

The DON first applied this methodology for considering alternatives to evaluate an initial set of four preliminary site alternatives for the cantonment\(^1\) and a set of five preliminary site alternatives for family housing and associated facilities.\(^2\) After considering the Guiding Principles, the DON consolidated these preliminary alternatives into five combined cantonment/family housing preliminary alternatives for purposes of public scoping. The five preliminary alternatives for cantonment/family housing were:

- Finegayan Cantonment/Family Housing
- Finegayan Cantonment/South Finegayan Family Housing
- AAFB Cantonment/Family Housing
- Barrigada Cantonment/Family Housing
- Apra Harbor Cantonment/Family Housing

All five of these preliminary alternatives are located on property that is under the custody and control of the DoD.

Despite some partial commonality and overlap with the site layouts analyzed in the 2010 Final EIS, the first two preliminary site alternatives listed above (involving Finegayan and South Finegayan) differ substantially from those previous alternatives. The preliminary alternatives above would require a substantially smaller development footprint than was analyzed in the 2010 Final EIS, and would not require the use of the adjacent former Federal Aviation Administration (FAA) parcel (see Figure ES-2).

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\(^1\) Finegayan, AAFB, Barrigada, and Apra Harbor.
\(^2\) Finegayan, South Finegayan, AAFB, Barrigada, and Apra Harbor
ES-4.1.2 Evaluation of Preliminary LFTRC Alternatives

A similar approach was used to identify preliminary site alternatives for the LFTRC on Guam, except that an associated acreage requirement was not developed for the LFTRC because the footprint would be dependent on specific site conditions. The land area required would need to include the space for the range facilities (including firing points, berms, and impact areas) and associated SDZs. The quantity and quality of land that would need to be acquired and the current ownership of such land were also considered in the evaluation. The DON first reviewed previous LFTRC alternatives that had been considered and eliminated in the 2010 Final EIS to determine if any of those sites could be considered a reasonable alternative following application of the probabilistic methodology for a site-specific range SDZ layout. As a result of this review, the DON identified five preliminary alternatives for the range complex: two adjacent to Route 15 in northeastern Guam, and three located at or immediately adjacent to the Naval Magazine (NAVMAG) area.

Comments received during scoping for the LFTRC SEIS (February-April 2012) suggested that the DON should also consider NWF at AAFB as an alternative location for the LFTRC. Although the DON had previously analyzed and dismissed NWF as a potential LFTRC alternative primarily due to operational conflicts, the DON worked with the Air Force to develop a NWF LFTRC alternative. The proposed NWF alternative does not eliminate all operational and environmental challenges; however, as presented in this SEIS it is a reasonable alternative based on the screening criteria defined for the LFTRC. In addition, because cantonment/family housing alternatives other than Finegayan are now being considered (see Section 2.4), a potential LFTRC alternative at Finegayan was also developed that merited further consideration. As a result, the DON identified seven preliminary alternatives for the LFTRC for purposes of public scoping for this SEIS. The seven preliminary alternatives for the proposed LFTRC were:

- Route 15A
- Route 15B
- NAVMAG (East/West)
- NAVMAG (North/South)
- NAVMAG (L-Shaped)
- NWF
- Finegayan

ES-4.2 No-Action Alternative

Under the No-Action Alternative, the DON would continue to implement the September 2010 Final EIS and ROD. The decision to construct and operate the LFTRC would remain deferred, and the DON would establish a cantonment/family housing area for a larger force of approximately 8,600 Marines and approximately 9,000 dependents on federally-controlled lands at Finegayan and South Finegayan and by acquiring land known as the former FAA parcel. The No-Action Alternative is not a reasonable alternative as it would not meet the purpose and need for the proposed action as defined above. Foremost, it would be inconsistent with the new force posture adopted by the DoD in accordance with the April 27, 2012 Roadmap Adjustments, which provide for a materially smaller relocated force on Guam. Furthermore, the No-Action Alternative would neither satisfy the training requirements for the relocated Marines as mandated by 10 USC § 5063 nor satisfy the individual live-fire training requirements as described in the 2010 Final EIS and ROD. Although the No-Action Alternative presumes the present course of action identified in the September 2010 ROD, for purposes of assessing the environmental impacts of the proposed alternatives in this SEIS, the DON compared the impacts of the proposed action
to the baseline conditions identified in the July 2010 Final EIS. The DON updated baseline conditions, as appropriate, based upon the availability of new information.

**ES-4.3   ALTERNATIVES CONSIDERED BUT DISMISSED**

The DON’s objective in applying the alternatives development process was to systematically identify and evaluate the reasonable action alternatives that would be carried forward for NEPA analysis. For the purposes of this SEIS, an alternative was considered reasonable if it would satisfy the purpose of and need of the proposed action and was practical and feasible from both a technical and economic standpoint. After a thorough evaluation of each preliminary alternative relative to the defined screening criteria, the DON eliminated Apra Harbor as a preliminary cantonment/family housing alternative and both Route 15B and Finegayan as preliminary LFTRC alternatives. These alternatives were not deemed reasonable because they did not satisfy the screening criteria identified by the Marine Corps, Air Force, and CNIC. The DON recognizes that not carrying forward the Route 15B preliminary LFTRC alternative presents an apparent inconsistency with the 2010 Final EIS. Coordination with the FAA during the development of this SEIS resulted in the determination that potential airspace impacts associated with the Route 15B preliminary alternative could not be mitigated. Sections 2.4.2 and 2.5.2 of the SEIS describe in more detail (for cantonment/family housing and LFTRC alternatives, respectively) why specific preliminary alternatives were eliminated from further analysis.

**ES-4.4   ALTERNATIVES CARRIED FORWARD FOR ANALYSIS IN THE SEIS**

Figure ES-3 shows the five cantonment/family housing alternatives that are analyzed in this SEIS:

- Alternative A – Finegayan Cantonment/Family Housing
- Alternative B – Finegayan Cantonment/South Finegayan Family Housing
- Alternative C – AAFB Cantonment/Family Housing
- Alternative D – Barrigada Cantonment/Family Housing
- Alternative E – Finegayan Cantonment/AAFB Family Housing

Section 2.4.4 of the SEIS describes each cantonment/family housing alternative in more detail. Each of the alternatives includes development of associated off-site utilities and modifications at two existing DoD schools. All five alternatives involve land parcels that are already under the custody and control of the federal government, and therefore no acquisition of non-federal lands would be required. In addition, two of the proposed alternatives are in locations on Guam other than Finegayan and one alternative is only partially located on Finegayan. In comparison, the 2010 Final EIS evaluated four site alternatives for cantonment that all involved the use of Finegayan (as well as various combinations of non-contiguous parcels to accommodate family housing) and three of the four required the acquisition of non-federal land.

As per CEQ regulations, the DON also analyzed a No-Action Alternative in this SEIS, which as described in Section ES-4.2 would involve development of the cantonment/family housing alternative that was selected in the 2010 ROD.

Figure ES-4 shows the following five LFTRC alternatives that are analyzed in this SEIS:

- Alternative 1 – Route 15
- Alternative 2 – NAVMAG East/West

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3 Alternative E – Finegayan Cantonment/AAFB Family Housing was added after publication of the Draft SEIS and review of public comments. A full explanation is provided in Section ES-6 and Section 2.7 of the Final SEIS.
Figure ES-3
Cantonment/Family Housing Alternatives Carried Forward for Analysis

Legend
- DoD Property
- Cantonment/Family Housing Alternatives:
  - Alternative A
  - Alternative B
  - Alternative C
  - Alternative D
  - Alternative E

Note: Associated utility infrastructure for each alternative not shown.

Source: NAVFAC Pacific 2013
**Legend**

- Property under custody and control of DoD
- Route 15 Realignment (Alternative 1)
- Range Roads (All Alternatives)

**LFTRC Alternatives:**
- Route 15 Alternative 1
- NAVMAG (East/West) Alternative 2
- NAVMAG (North/South) Alternative 3
- NAVMAG (L-Shaped) Alternative 4
- Northwest Field Alternative 5
- Hand Grenade Range (All Alternatives)

**Surface Danger Zones:**
- Route 15 Alternative 1
- NAVMAG (East/West) Alternative 2
- NAVMAG (North/South) Alternative 3
- NAVMAG (L-Shaped) Alternative 4
- Northwest Field Alternative 5
- Hand Grenade Range (All Alternatives)

**Note:** Utility infrastructure alignments that are also part of the proposed action under each alternative are not shown on this map.

**Figure ES-4**
SEIS Live-Fire Training Range Complex Alternatives

Source: NAVFAC Pacific 2013
• Alternative 3 – NAVMAG North/South
• Alternative 4 – NAVMAG L-Shaped
• Alternative 5 – NWF

Section 2.5.4 of the SEIS describes each of the LFTRC alternatives in more detail. All of the alternatives include a proposed stand-alone HG Range location at Andersen South. Alternative 1 is similar to the Route 15A alternative studied in the 2010 Final EIS, except that it now avoids encumbering public access to the Pågat Village and Pågat Cave historical sites and the existing trail from Route 15 leading to both. The remaining four LFTRC alternative sites were not evaluated in the 2010 Final EIS. Of the five LFTRC alternatives, only the alternative at NWF can be implemented without acquisition of additional nonfederal land. The alternative at NWF is also unique because it would include the relocation of USFWS facilities within the Ritidian Unit of the Guam NWR that would otherwise be encumbered by the proposed range SDZs.

ES-4.4.1 Comparison of Cantonment/Family Housing Alternatives

Table ES-1 provides a comparison of the land area involved for each cantonment/family housing alternative and for the No-Action Alternative. The potentially impacted area for the cantonment (not including off-site utilities and school expansions/construction) varies from 1,074 acres (435 hectares [ha]) at Barrigada (Alternative D) to 1,309 acres (530 ha) at AAFB (Alternative C). The potentially impacted area for the proposed family housing varies from 115 acres (47 ha) at Barrigada (Alternative D) to 510 acres (206 ha) at AAFB (Alternative C or E). As shown in the table, any of the five SEIS alternatives for cantonment and family housing require substantially less acreage than the No-Action Alternative. For all alternatives, additional areas would be impacted by implementation of off-site utilities specific to each cantonment/family housing alternative, and the school expansions or construction (except for the No-Action Alternative, for which no DoD school construction was identified). Estimates of the area potentially affected, especially for off-site utilities, are worst case estimates that reflect the current lack of detail in the exact placement of underground utility lines (in most instances a 50-foot (15-meter) wide corridor has been assumed even though the eventual ground disturbance may be only a few feet wide).

Table ES-1. Summary Comparison of Land Area Potentially Impacted by Cantonment/Family Housing Alternatives (acres / ha)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Finegayan Alternative A</th>
<th>Finegayan/South Finegayan Alternative B</th>
<th>AAFB Alternative C</th>
<th>Barrigada Alternative D</th>
<th>Finegayan/ AAFB Alternative E</th>
<th>No-Action Alternative ¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cantonment</td>
<td>1,165 / 471</td>
<td>1,191 / 482</td>
<td>1,309 / 530</td>
<td>1,074 / 435</td>
<td>1,213 / 491</td>
<td>2,580 / 1,044</td>
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<tr>
<td>Family Housing Area</td>
<td>330 / 134</td>
<td>290 / 117</td>
<td>510 / 206</td>
<td>115 / 47</td>
<td>510 / 206</td>
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<tr>
<td>Offsite Utilities</td>
<td>30 / 12</td>
<td>42 / 17</td>
<td>21 / 8</td>
<td>90 / 36</td>
<td>48 / 19</td>
<td>188 / 76</td>
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<tr>
<td>Utilities - Electric and Water Lines</td>
<td>107 / 43</td>
<td>81 / 33</td>
<td>117 / 47</td>
<td>86 / 35</td>
<td>105 / 42</td>
<td>not reported</td>
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<tr>
<td>Utilities - Water Well Area</td>
<td>45 / 18</td>
<td>45 / 18</td>
<td>45 / 18</td>
<td>45 / 18</td>
<td>45 / 18</td>
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<tr>
<td>School Expansion/Construction</td>
<td>17 / 7</td>
<td>17 / 7</td>
<td>28 / 11</td>
<td>17 / 7</td>
<td>28 / 11</td>
<td>0 / 0</td>
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<tr>
<td>Total Area</td>
<td>1,694 / 686</td>
<td>1,666 / 674</td>
<td>2,030 / 817</td>
<td>1,427 / 557</td>
<td>1,949 / 789</td>
<td>2,768 / 1,120</td>
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</table>

Notes: ¹As defined by Alternative 2 selected in the 2010 ROD. Cantonment and housing area acreages are combined for the No-Action Alternative.
²The differences in cantonment acreage between Alternatives A, B, and E are due to differences in utility configuration.
³The size of the impacted area for constructing housing under either Alternative C or E is larger than for other alternatives because of the need to replace 912 existing family housing units in addition to new units for relocating Marines.
⁴Not including IT/COMM lines between specific combinations of a cantonment/family housing alternative and an LFTRC Alternative, which are described in Section 2.6. Assumes a worst-case corridor of potential impact for underground utility lines whose precise location has not yet been determined. Actual area of impact along the underground lines is likely to be much less than acreages estimated here.
⁵Acreage of off-site utilities were not reported in the 2010 Final EIS; however, for purposes of this comparison, it is conservatively assumed that the acreage for the No-Action Alternative would be the same as the SEIS alternatives.
ES-4.4.2 Comparison of LFTRC Alternatives

The five LFTRC alternatives would require between 3,572 acres (1,446 ha) for NAVMAG (North/South) Alternative 3 and 4,918 acres (1,990 ha) for NAVMAG (L-Shaped) Alternative 4. This includes the construction footprint for the ranges and associated facilities; the additional SDZ area required that would not be impacted by construction, including lands and submerged lands; the stand-alone HG Range proposed at Andersen South; and the access roads required for Alternatives 2, 4, and 5. Table ES-2 provides a comparison of the land area required for each LFTRC alternative. Table ES-3 provides a summary comparison of non-federal land acquisition requirements for each LFTRC alternative.

Table ES-2. Summary Comparison of Land Area Included in LFTRC Alternatives (acres / ha)

<table>
<thead>
<tr>
<th></th>
<th>Alternative 1 Route 15</th>
<th>Alternative 2 NAVMAG (East/West)</th>
<th>Alternative 3 NAVMAG (North/South)</th>
<th>Alternative 4 NAVMAG (L-Shaped)</th>
<th>Alternative 5 NWF</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFTRC Construction Footprint</td>
<td>383 / 155</td>
<td>275 / 111</td>
<td>370 / 150</td>
<td>356 / 144</td>
<td>256 / 104</td>
</tr>
<tr>
<td>LFTRC SDZ</td>
<td>3,379 / 1,367</td>
<td>3,433 / 1,389</td>
<td>3,179 / 1,286</td>
<td>4,418 / 1,788</td>
<td>3,701 / 1,498</td>
</tr>
<tr>
<td>Access Road</td>
<td>0 / 0</td>
<td>107 / 43</td>
<td>0 / 0</td>
<td>121 / 49</td>
<td>59 / 24</td>
</tr>
<tr>
<td>Total Area</td>
<td>3,785 / 1,532</td>
<td>3,838 / 1,553</td>
<td>3,572 / 1,446</td>
<td>4,918 / 1,990</td>
<td>4,039 / 1,635</td>
</tr>
</tbody>
</table>

Notes: 1 The No-Action Alternative is not included in this or the following table because a decision regarding the LFTRC would continue to be deferred under the No-Action Alternative, as it was in the 2010 ROD.

Table ES-3. Summary Comparison of Non-Federal Land Acquisition Requirements for LFTRC Alternatives (acres / ha)

<table>
<thead>
<tr>
<th></th>
<th>Alternative 1 Route 15</th>
<th>Alternative 2 NAVMAG (East/West)</th>
<th>Alternative 3 NAVMAG (North/South)</th>
<th>Alternative 4 NAVMAG (L-Shaped)</th>
<th>Alternative 5 NWF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Land Acquisition (Parcels Subdivided)1</td>
<td>896 / 363</td>
<td>1,894 / 766</td>
<td>252 / 102</td>
<td>914 / 370</td>
<td>0</td>
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<tr>
<td>Maximum Land Acquisition (Parcels Not Subdivided)2</td>
<td>915 / 370</td>
<td>3,648 / 1,476</td>
<td>905 / 366</td>
<td>3,671 / 1,486</td>
<td>0</td>
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</tbody>
</table>

Notes: 1 Assumes that the minimum amount of land required could be acquired, which would require subdividing larger parcels. 2 Assumes that subdivision of larger parcels encompassing the required land would not be achievable and larger parcels would need to be acquired.

ES-4.4.3 Information Technology/Communications Links Between Alternatives

IT/COMM would require inter-base connections between the new Marine Corps cantonment and family housing areas and other existing bases, the LFTRC, and training facilities at Andersen South (covered by the 2010 Final EIS and ROD). Off-site conduits would be installed along existing roads between the facilities. The size of the potential construction footprint for the IT/COMM lines associated with each pairing of a cantonment/family housing alternative with an LFTRC alternative is shown in Table ES-4.
Table ES-4. Construction Footprint for Routing of IT/COMM Links between Alternatives (acres / ha)

<table>
<thead>
<tr>
<th>Cantonment/Family Housing Alternatives</th>
<th>LFTRC Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Alternative 1 Route 15</td>
</tr>
<tr>
<td>Alternative A: Finegayan</td>
<td>416 / 168</td>
</tr>
<tr>
<td>Alternative B: Finegayan/South Finegayan</td>
<td>416 / 168</td>
</tr>
<tr>
<td>Alternative C: AAFB</td>
<td>352 / 142</td>
</tr>
<tr>
<td>Alternative D: Barrigada</td>
<td>431 / 174</td>
</tr>
<tr>
<td>Alternative E: Finegayan/AAFB</td>
<td>416 / 168</td>
</tr>
</tbody>
</table>

**ES-5 BEST MANAGEMENT PRACTICES**

Regardless of the alternative considered, the proposed action would include the implementation of Best Management Practices (BMPs) to proactively reduce, minimize, or avoid impacts. BMPs are existing policies, practices, and measures that the DON would adopt to reduce the environmental impacts of designated activities, functions, or processes. Although BMPs mitigate potential impacts by avoiding, minimizing, or reducing/eliminating impacts, BMPs are distinguished from potential mitigation measures because BMPs are (1) existing requirements for the proposed action, (2) ongoing, regularly occurring practices, or (3) not unique to this proposed action. In other words, the BMPs identified in this SEIS are inherently part of the proposed action and are not potential mitigation measures proposed as a function of the NEPA environmental review process for the proposed action. The application of BMPs is, however, factored into the environmental impact analysis for each resource category and may influence the conclusions resulting from such analyses. Specific BMPs that would be included in the proposed action are described in Section 2.8.

**ES-6 PREFERRED ALTERNATIVE**

According to the CEQ, the agency’s preferred alternative is the alternative that the agency believes best fulfills its statutory mission and responsibilities, giving consideration to economic, environmental, technical and other factors (40 CFR 1502.14(e)). The DON considered military requirements, known infrastructure and environmental impacts and constraints, and input from the public, resource agencies, and the Government of Guam (GovGuam) to identify a preferred alternative. The DON’s preferred alternative is to construct and operate a cantonment at Finegayan and a family housing area at AAFB (Alternative E), plus an LFTRC at NWF (Alternative 5). This preferred alternative is different than what was identified in the Draft SEIS. Similar to the Draft SEIS preferred alternative (Alternative A [cantonment and family housing at Finegayan]), this new preferred alternative still meets Marine Corps operational requirements, maximizes the use of federal land on Guam, and optimizes operational efficiencies due to the relative proximity of the cantonment and LFTRC to one another. Additionally, compared to the preferred alternative in the Draft SEIS, this new preferred alternative would reduce the amount of vegetation that would have to be cleared, present additional opportunity for forest enhancement mitigation, maintain the natural buffer area between developed areas and nearby sensitive coastal resources, and leverage existing family housing support facilities already in place at AAFB. Figure ES-5 illustrates the components of the preferred alternative.
Figure ES-5
Preferred Alternative

Legend
- Federal Property
- Potential Impact Area for Cantonment/Family Housing Alternative E
- LFTRC Alternative 5
- Stand-alone HG Range

School Expansions and Off Base Utilities for all Cantonment/Family Housing Alternatives:
- Proposed Routing of IT/COMM Links (see figure 2.6-5, panel 1)
- Potential Impact Area for Water Well Development Area
- Water Development - Wells and Lines (notional; not to scale)
- DODEA High School Expansion
- Andersen Middle School to Elementary School Conversion (Alternatives C and E)
- New Andersen Middle School Construction (Alternatives C and E)
- Electrical & Water Off Site Utilities

0 0.8 16 Miles
0 0.8 16 Kilometers

Source: NAVFAC Pacific 2013
The preferred alternative with Finegayan cantonment/AAFB family housing would comprise approximately 1,751 acres (709 ha) of federally-owned land. The cantonment area at Finegayan is bounded on the north by NWF and Route 3, and on the west by a cliffline (within DoD property), the Haputo Ecological Reserve Area (ERA), and the Philippine Sea. The site is also bounded to the east by limited residential development and to the south by the Dos Amantes planned area, also known as the former Harmon Village (non-federal property). Although DoD property descends to the coastline, the cantonment would be situated on the upper area of Finegayan and would not encroach on the cliffline leading to the ocean or the adjacent ERA.

The family housing area would be located at the current AAFB family housing area, approximately 4.2 miles (6.8 kilometers) east of the proposed cantonment area. The proposed housing density at AAFB is 5.5 units per acre. The family housing area would be accessed by the existing family housing gate (the Santa Rosa Gate) at the northern end of Route 15 or from the AAFB Main Gate off Route 9. Existing family housing would be demolished and a maximum of 912 family housing units would be constructed as replacements for existing AAFB housing in addition to the 535 family housing units required for Marine Corps families. The total of up to 1,447 family housing units would be integrated into one large housing pool where all eligible personnel and families would live.

On-site DoD utilities development under Alternative E would include buried electrical, communications, water, and wastewater lines generally along existing or proposed roadways; a new electrical substation at Finegayan; two communication area distribution nodes; one ground level water storage tank at Finegayan; wastewater pump stations at both Finegayan and the AAFB family housing site; and a recycling facility and solid waste transfer facility at Finegayan. In addition, tie-ins of electrical, water, and wastewater lines would be implemented (mostly along existing roadway corridors for Routes 3 and 9 and along portions of interior AAFB roadway corridors) to connect the new on-base infrastructure to existing utility networks.

The LFTRC preferred alternative at NWF would comprise approximately 4,016 acres (1,626 ha) (not including the HG Range at Andersen South). Although Alternative 5 would not require acquisition of lands, access to areas within the Ritidian Unit of the Guam National Wildlife Refuge (NWR) that fall within the boundaries of range SDZs would be restricted when ranges are in use. The Ritidian Unit of the Guam NWR is owned and managed by the USFWS. The DON would pursue an agreement with USFWS in accordance with the provisions of Section 2822 of the Fiscal Year (FY) 2015 National Defense Authorization Act (NDAA) which would allow for the continued management of the Ritidian Unit consistent with the purposes for which it was established and the operation of the range SDZs associated with the LFTRC preferred alternative at NWF. The DON anticipates that access restrictions will be addressed in this agreement. Construction of Alternative 5 would cause direct disturbance to approximately 315 acres (128 ha). This would include approximately 256 acres (104 ha) for the construction of the individual ranges, range support building, range towers, internal range access roads, and a perimeter fence, as well as the relocation of USFWS facilities within the Ritidian Unit of the Guam NWR that would be encumbered by the range SDZs. As proposed and analyzed in this SEIS, approximately 59 additional acres (24 ha) would be disturbed by construction to improve existing roadways from the intersection of Routes 3, 3A, and 9 to the Ritidian Unit of the Guam NWR. Any decisions regarding the relocation of USFWS facilities and/or construction to improve beach access at the Ritidian Unit of the Guam NWR are dependent upon the outcome of consultations under section 7 of the Endangered Species Act (ESA) and negotiation of the agreement authorized by Section 2822 of the FY 2015 NDAA. The remaining project area for Alternative 5 would include lands and submerged lands under the exclusive custody and control of the DON and the USFWS within the SDZ that would not be affected by construction. Power to the site would extend from an existing overhead line at NWF. Potable
water service to two range buildings would require installation of a water main to connect to the existing
distribution system off site. Wastewater collection requirements for two range buildings and the relocated
USFWS facility would include a combination of gravity sewer line, septic tank, and a self-contained
vegetated effluent disposal basin.

ES-7 OVERVIEW OF ENVIRONMENTAL IMPACTS

ES-7.1 SUMMARY OF IMPACT DETERMINATIONS FOR ALL ALTERNATIVES

The SEIS analyzes the affected environment and potential environmental consequences for 18 distinct
resource areas. These details are presented in the following chapters of the SEIS:

- **Chapter 3** introduces each of the 18 resource areas, including a discussion of key characteristics,
  relevant issues of concern given the nature of the proposed action, the regulatory framework
  established on behalf of each resource area, and the approach to analysis and impact assessment
  criteria that were applied in the analysis of potential environmental consequences of the action.

- **Chapter 4** describes the impact analyses associated with each of the five cantonment/family
  housing alternatives plus the No-Action Alternative, and includes for each alternative a
  discussion of the affected environment and the potential impacts for each of the 18 resources.

- **Chapter 5** describes the affected environment and impact analyses associated with each of the
  five LFTRC alternatives, including an analysis of all 18 resources for each of the alternatives.

- **Chapter 6** evaluates the “additive” impacts (i.e., those in addition to the impacts described in
  Chapters 4 and 5) that would result when a particular cantonment/family housing alternative is
  paired with a particular LFTRC alternative (e.g., the traffic generated between the cantonment
  and the LFTRC, or the effects of installing IT/COMM infrastructure between a specific
  cantonment/family housing area, an LFTRC, and other DoD facilities on Guam).

- **Chapter 7** evaluates the cumulative effects of implementing the 2012 Roadmap Adjustments in
  conjunction with those projects that remained final under the 2010 ROD and other past, present,
  and reasonably foreseeable future projects on Guam.

Table ES-5 consolidates and summarizes the findings of the impact analyses contained in Chapter 4
(cantonment/family housing alternatives) and Chapter 5 (LFTRC alternatives) for all action alternatives
and for the No-Action Alternative. The findings for the preferred alternative (i.e., Alternative E for
cantonment/family housing and Alternative 5 for LFTRC) are shaded in blue in the table. The impact
determinations for all alternatives are abbreviated as follows:

- **SI – Significant Impact.** These impacts would be significant and either no mitigation measures
  have been identified that could reduce the impact to a less than significant level or the impact
  would remain significant even with the application of potential mitigation measures. Impacts that
  have been identified as SI are shown in **bold red** print in Table ES-5. The significant impacts
  identified for the preferred alternative (and any associated potential mitigation measures) are
  summarized later in this section.

- **SI-M – Significant Impact-Mitigable.** These impacts would be significant but may be reduced to
  a less than significant level with the application of potential mitigation measures. Such impacts
  are shown in **bold red** print in Table ES-5 and these impacts for the preferred alternative (along
  with the potential mitigation measures) are summarized later in this section.

- **LSI – Less than Significant Impact.** These impacts were determined to be less than significant
  for various reasons (e.g., because the impact did not exceed a regulatory threshold or because the
proactive implementation of BMPs as part of the proposed action would reduce the degree of impact). BMPs are discussed in Section 2.8 of the SEIS.

- **NI – No Impact.**
- **BI – Beneficial Impact.**

For most resource areas, impacts were assessed separately for both the construction phase of the proposed action and for ongoing (post-construction) operations. In some cases, resource impacts were assessed separately for component resources (e.g., in the case of water resources, impacts were assessed independently for surface water, groundwater, nearshore waters, and wetlands). Table ES-5 is organized to illustrate these distinctions in the reporting of impact results. In a few rare cases, impacts associated with a specific component resource are designated as not applicable (NA) (e.g., land acquisition impacts only apply to certain LFTRC alternatives and not to Alternative 5 or any of the cantonment/family housing alternatives). In the case of certain component resources of socioeconomics the analysis was island-wide and not location-dependent, so the impacts for LFTRC alternatives are designated in Table ES-5 as “included” (abbreviated as “Incl.”) in the findings for the cantonment/family housing alternatives.

As shown in Table ES-5, the cantonment/family housing component of the proposed action (all five action alternatives) would yield no significant impacts to the following eight resources: geological and soil resources, air quality, noise, airspace, visual resources, ground transportation, marine transportation, and hazardous materials and waste. Three additional resources would be significantly impacted by only one of the five action alternatives: land use (Alternative B – Finegayan/South Finegayan), recreation (Alternative D – Barrigada), and public health and safety (Alternative C – AAFB).

For the LFTRC component of the action (all five alternatives), no significant impacts were identified for eight of the resource areas: air quality, marine biological resources, ground transportation, marine transportation, utilities, hazardous materials and waste, public health and safety, and environmental justice. For one additional resource (noise), significant impacts would result from only one alternative (Alternative 1 – Route 15).

The summary results in Table ES-5 also indicate that the preferred Alternative 5 is the only LFTRC alternative that would not result in significant operational impacts to civilian airspace, and is one of only two alternatives that would result in no significant impacts to water resources (wetlands) and visual resources (operations impacts).

Following Table ES-5, the SI and SI-M impacts attributed to the preferred alternative are summarized in more detail, along with associated potential mitigation measures. Relevant additive impacts from Chapter 6 and cumulative effects from Chapter 7 are also summarized for the preferred alternative. For further explanation of the findings for other alternatives, refer to the relevant sections of Chapters 4 and 5, or to the more extensive impact summary tables presented at the end of each of those chapters.
### Table ES-5. Summary of Impact Determinations for Cantonment/Family Housing Alternatives and LFTRC Alternatives

<table>
<thead>
<tr>
<th>Resources</th>
<th>Cantonment/Family Housing Alternatives</th>
<th>LFTRC Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Alternative A – Finegayan</td>
<td>Alternative E – Finegayan (Preferred Alternative)</td>
</tr>
<tr>
<td></td>
<td>Alternative B – Finegayan/South Finegayan</td>
<td>Alternative A – Barrigada (Preferred Alternative)</td>
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<td>Alternative E – Finegayan/South Finegayan</td>
<td>Alternative 2 – NAVMAG East/West</td>
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<td>Alternative F – AAFB</td>
<td>Alternative 3 – NAVMAG North/South</td>
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<td></td>
<td>Alternative G – NWF</td>
<td>Alternative 4 – NAVMAG L-Shaped</td>
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<tr>
<td></td>
<td>Alternative H – NWF</td>
<td>Alternative 5 – NAVMAG L-Shaped</td>
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</table>

#### GEOLICAL & SOIL RESOURCES

**Construction**
- Topography: LSI, LSI, LSI, LSI, LSI, LSI, LSI, SI², LSI, SI, SI, SI
- Soils: LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI
- Sinkholes: LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI
- Geological Hazards: LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI

**Operation**
- Topography: NI, NI, NI, NI, NI, NI, NI, NI, NI, NI, NI, NI
- Soils: LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI
- Sinkholes: LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI
- Geological Hazards: LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI

#### WATER RESOURCES

**Construction**

**Operation**

#### AIR QUALITY

**Construction**
- LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI

**Operation**
- LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI, LSI

#### NOISE

**Construction**
- LSI, LSI, LSI, LSI, LSI, LSI, LSI, SI-M, LSI, NI, NI, NI

**Operation**
- LSI, LSI, LSI, LSI, LSI, LSI, LSI, SI-M, SI-M, NI, NI, NI

#### AIRSPACE

**Construction**

**Operation**
### Table ES-5. Summary of Impact Determinations for Cantonment/Family Housing Alternatives and LFTRC Alternatives

<table>
<thead>
<tr>
<th>Resources</th>
<th>Cantonment/Family Housing Alternatives</th>
<th>LFTRC Alternatives</th>
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- **Guam and CNMI Military Relocation (2012 Roadmap Adjustments) SEIS**
- **Final**
- **July 2015**
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<tr>
<td>Toxic Substances</td>
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Table ES-5. Summary of Impact Determinations for Cantonment/Family Housing Alternatives and LFTRC Alternatives

<table>
<thead>
<tr>
<th>Resources</th>
<th>Cantonment/Family Housing Alternatives</th>
<th>LFTRC Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Alternative A – Finegayan</td>
<td>Alternative 1 – Route 15</td>
</tr>
<tr>
<td></td>
<td>Alternative B – Finegayan/South Finegayan</td>
<td>Alternative 2 – NAVMAG East/West</td>
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<td></td>
<td>Alternative C – AAFB</td>
<td>Alternative 3 – NAVMAG North/South</td>
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<td></td>
<td>Alternative D – Barrigada</td>
<td>Alternative 4 – NAVMAG L-Shaped</td>
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<td>LSI</td>
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<tr>
<td>Notifiable Diseases</td>
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<tr>
<td>Mental Illness</td>
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<tr>
<td>Operational Safety</td>
<td>NI</td>
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<tr>
<td>Environmental Health</td>
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<tr>
<td>Hazardous Substances</td>
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<tr>
<td>Unexploded Ordnance</td>
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<td>Traffic Incidents</td>
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<td>Operation</td>
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<td>Notifiable Diseases</td>
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<td>Land Acquisition</td>
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<tr>
<td>Socioeconomics</td>
<td>SI-M</td>
<td>SI-M</td>
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<tr>
<td>Public Health &amp; Safety</td>
<td>SI-M</td>
<td>SI-M</td>
</tr>
</tbody>
</table>

Legend: BI = beneficial impact; NI = no impact; SI = less than significant impact; SI-M = significant impact-mitigable; Incl. = Included (see note 3 below); NA = Not Applicable (see note 4 below); Trans. = Transportation; & = and; SOGCN = Species of Greatest Conservation Need.

Notes:
- Blue shading indicates the Preferred Alternative: Finegayan Cantonment/AAFB Family Housing (Alternative E) and NWF LFTRC (Alternative 5).
- Impact assessments are shown in **bold red print**.
- Impacts that are considered SI or SI-M are shown in **Bold red print**.
- Incl. = Included. The applicable determination of impacts for this resource is not location-dependent and was based on an island-wide analysis. Both the proposed LFTRC and the proposed cantonment/family housing components were factored into a single analysis and so the findings for LFTRC alternatives are included in the results for the cantonment/family housing alternatives.
- NA = Not applicable because land acquisition is not proposed for any of the cantonment/family housing alternatives.
ES-7.2  SUMMARY OF SIGNIFICANT IMPACTS AND POTENTIAL MITIGATION MEASURES FOR THE PREFERRED ALTERNATIVE

As shown in Table ES-5, the preferred cantonment and family housing alternative (Alternative E – Finegayan/AAFB) would result in significant impacts to seven resource areas: water resources, terrestrial biological resources, marine biological resources, cultural resources, utilities, socioeconomics and general services, and environmental justice. The preferred LFTRC alternative (Alternative 5 – NWF) would result in significant impacts to five resource areas: geological and soil resources, land use/submerged land use, recreation, terrestrial biological resources, and cultural resources. These findings are not unique to the preferred alternative, as the analysis in the SEIS indicates that the resource areas noted above would be significantly impacted by all or most of the other alternatives as well. The following subsections provide brief overviews of the significant impacts and associated mitigation measures for each of the primary components of the preferred alternative. Final mitigation measures will be determined after the completion of consultations with appropriate agencies and will be included in the ROD.

ES-7.2.1 Significant Impacts of Preferred Cantonment/Family Housing Alternative E – Finegayan/AAFB

Water Resources

Construction Impacts

Groundwater (SI-M): The Guam Waterworks Authority’s (GWA) interceptor sewer from AAFB to the Northern District WWTP is in a state of deterioration and the number of spills from this system exceeds spill rate norms for similar wastewater systems. Increased wastewater flows associated with the construction/DoD workforce and induced civilian growth during the construction phase of Alternative E would potentially increase the rate of sewage spills, resulting in significant but mitigable indirect impacts to groundwater quality.

Potential Mitigation

- Refurbishment of the GWA interceptor sewer system would mitigate significant impacts to groundwater resources during the construction phase of the proposed action. The FY 2014 NDAA directed the Secretary of Defense to convene the Economic Adjustment Committee (EAC) in part to develop an implementation plan that will address public infrastructure requirements necessary to support the preferred alternative. The implementation plan will detail descriptions of work, costs, and schedules for completion of construction, improvements, and repairs to Guam public infrastructure affected by the realignment, including improvements and upgrades to the Guam wastewater system and expansion/rehabilitation of the Northern Guam Lens Aquifer (NGLA) monitoring network for sustainment of the NGLA. To support the implementation plan, DoD assessed GWA water and wastewater systems that may be affected by the preferred alternative. The water and wastewater assessment recommended the refurbishment of the GWA interceptor sewer from AAFB to the Northern District WWTP. Also, Section 8102 of the FY 2014 Consolidated Appropriations Act (Public Law No. 113-76) appropriated $106.4 million to the Secretary of Defense, acting through the Office of Economic Adjustment (OEA), for civilian water and wastewater improvements on Guam. These funds will remain available until expended.

Nearshore Waters (SI): Increased wastewater flows associated with induced civilian and construction/DoD workforce growth under Alternative E would result in a significant and unmitigable indirect impact to nearshore waters from increased wastewater discharge from the Northern District WWTP outfall. The Northern District WWTP is non-compliant with the current National Pollutant
Discharge Elimination System (NPDES) permit and increasing the wastewater discharge from a non-compliant treatment plant would be a significant indirect impact during the period of noncompliance. Until the WWTP upgrades are completed (not anticipated until early in the operational phase of the proposed action) there would be an indirect and unmitigable significant impact to nearshore waters during construction.

**Operation Impacts**

**Groundwater (SI-M):** Operation of the cantonment/family housing facilities under Alternative E would result in a significant but mitigable impact to groundwater in the form of a long-term increase in annual groundwater production (withdrawal) of 1.7 million gallons per day, which could result in a localized significant impact to the NGLA. In addition, the GWA interceptor sewer from AAFB to the Northern District WWTP is in a state of deterioration that requires refurbishment. Increased wastewater flow from the proposed relocation would accelerate this deterioration. Should this sewer experience a failure, the NGLA could be negatively impacted from failing sewer pipes, exposing the NGLA to raw sewage.

**Potential Mitigation**

- The DoD would, as appropriate, implement enhanced water conservation measures for the proposed action, improve existing DoD potable water systems to reduce system leaks, adjust pumping rates at DoD wells, and increase the use of existing wells and/or surface water from Fena Reservoir in order to reduce withdrawals from the NGLA.

- The DoD would continue to support the Guam Water Resources Development Group (GWRDG) and would support the U.S. Geological Survey’s (USGS’s) recommendation to rehabilitate and expand the hydrologic data collection network and monitoring necessary to ensure sustainable management of NGLA.

- As required in the FY 2014 NDAA, the EAC implementation plan will address public infrastructure requirements necessary to support the preferred alternative, as well as address groundwater-related issues including technical and financial assistance for an updated and expanded NGLA monitoring well network and the refurbishment of the GWA interceptor sewer from AAFB to the Northern District WWTP. The implementation plan will detail descriptions of work, costs, and schedules for completion of construction, improvements, and repairs to Guam public infrastructure affected by the realignment, including improvements and upgrades to the NGLA monitoring well network. To support this implementation plan, DoD assessed GWA’s water and wastewater systems that may be affected by the preferred alternative. The water and wastewater assessment recommended an updated and expanded NGLA monitoring well network and the refurbishment of the GWA interceptor sewer from AAFB to the Northern District WWTP. Section 8102 of the FY 2014 Consolidated Appropriations Act (Public Law No. 113-76) appropriated $106.4 million to the Secretary of Defense, acting through the OEA, for civilian water and wastewater improvements on Guam. These funds will remain available until expended.

**Nearshore Waters (SI-M):** Operation of the cantonment and family housing facilities under Alternative E would result in a significant but mitigable impact to nearshore waters from increased wastewater discharge from the Northern District WWTP outfall. The Northern District WWTP is non-compliant with the treatment standards required by the current NPDES permit and increasing the wastewater discharge from a non-compliant treatment plant would be a significant indirect impact during the period of non-compliance. However, upgrades to bring the Northern District WWTP into compliance with the permit
are expected to be completed early in the operational phase of the proposed action and such upgrades would mitigate the impact to a less than significant level.

Potential Mitigation

- Upgrading the Northern District WWTP treatment systems (as required by the 2013 NPDES permit) would mitigate significant impacts to the wastewater system on Guam once the upgrades are completed. In addition, refurbishing the main GWA sewer lines from AAFB to the Northern District WWTP along Routes 3 and 9 would mitigate potential failure of the concrete reinforced sewer lines that are in a state of deterioration. The FY 2014 NDAA directed the Secretary of Defense to convene the EAC in part to develop an implementation plan that will address public infrastructure requirements necessary to support the preferred alternative. The implementation plan will detail descriptions of work, costs, and schedules for completion of construction, improvements, and repairs to Guam public infrastructure affected by the realignment, including improvements and upgrades to the Guam wastewater system. The water and wastewater assessment that DoD prepared to support the Implementation Plan recommended upgrades to the Northern District WWTP and the refurbishment of the GWA interceptor sewer from AAFB to the Northern District WWTP. Section 8102 of the FY 2014 Consolidated Appropriations Act (Public Law No. 113-76) appropriated $106.4 million to the Secretary of Defense, acting through the OEA, for civilian water and wastewater improvements on Guam. These funds will remain available until expended.

Terrestrial Biological Resources

Construction Impacts

Vegetation (SI-M): Construction of the cantonment facilities under Alternative E would result in a significant but mitigable impact to vegetation due to the conversion of 780 acres (316 ha) of limestone forest to developed area. Construction of the family housing facilities under Alternative E would have less than significant impact to this resource.

Potential Mitigation

- Forest enhancement on a minimum of 780 acres (316 ha) of limestone forest.

Terrestrial Conservation Areas (SI-M): Construction of the cantonment facilities under Alternative E would result in a significant but mitigable impact to terrestrial conservation areas due to the conversion of 1,065 acres (431 ha) of Overlay Refuge lands to developed area. Construction of the family housing facilities under Alternative E would have less than significant impact to this resource.

Potential Mitigation

- Submit a proposal to designate NAVMAG ERA.
- Submit a proposal for the expansion of Orote Peninsula ERA.

Special-Status Species – Federal ESA-Listed/Proposed Species (SI-M): Construction of the cantonment facilities under Alternative E would result in significant but mitigable impacts to special-status species (Federal ESA-listed/proposed species) as a result of impacts to 719 acres (291 ha) of Mariana fruit bat recovery habitat, 719 acres (291 ha) of Mariana crow recovery habitat, 507 acres (205 ha) of Guam rail recovery habitat, 719 acres (291 ha) of Guam Micronesian kingfisher recovery habitat, and 648 acres (262 ha) of Serianthes recovery habitat. Construction of the family housing facilities under Alternative E would have less than significant impact to this resource.
As part of the ESA section 7 consultation process, the DON and the USFWS entered into a Memorandum of Agreement (MOA) which would, if the preferred alternative is chosen, facilitate Guam Micronesian kingfisher conservation goals. In the MOA, the DON agreed to designate approximately 5,234 acres (2,118 ha) under the custody and control of the DoD in northern Guam to a status that will provide durable habitat protection needed to support native habitat restoration and land management for the survival and recovery of the kingfisher. Consistent with the Joint Region Marianas (JRM) Integrated Natural Resources Management Plan (INRMP) developed in accordance with Section 101 of the Sikes Act, the DON agreed to actively restore native habitat and manage, in collaboration with the USFWS, the 5,234 acres (2,118 ha) consistent with the DoD’s obligations under ESA section 7(a) and the Sikes Act to benefit the survival and recovery of the kingfisher. The DON would work cooperatively with the USFWS to identify, develop and implement specific management activities and projects on these 5,234 acres (2,118 ha) to support the reintroduction and recovery of the kingfisher. These 5,234 acres (2,118 ha) have been identified by the USFWS as habitat for the kingfisher and needed to offset impacts of the proposed action. The DON and USFWS recognize that the designation of the 5,234 acres (2,118 ha) may also provide a conservation benefit to other ESA-listed species with similar habitat requirements (e.g. Mariana crow, Mariana fruit bat).

**Potential Mitigation**

- Brown treesnake research and suppression.
- Implementation of the potential mitigation measures under Construction Impacts, Vegetation would also benefit these species.

**Special-Status Species – Guam-Listed and Species of Greatest Conservation Need (SOGCN) (SI-M):** Impacts and mitigation associated with Guam-listed species that are also federally listed would be the same as described above. Impacts to other Guam-listed species from construction of the cantonment facilities under Alternative E would include significant but mitigable impacts to special-status species (Guam-listed and SOGCN) due to loss of 765 acres (310 ha) of occupied moth skink and Pacific slender-toed gecko habitat. Construction of the family housing facilities under Alternative E would result in less than significant impacts to this resource.

**Potential Mitigation**

- Implementation of the potential mitigation measures under Construction Impacts, Vegetation would also benefit these species.

**Operation Impacts**

**Terrestrial Conservation Areas (SI-M):** Operation of the cantonment/family housing facilities under Alternative E would result in a significant but mitigable impact to terrestrial conservation areas due to potential increased usage of the Haputo ERA by military and civilian personnel.

**Potential Mitigation**

- Fencing.
- Info/educational signage.
- Educational materials regarding sensitive biological resources.
- Monitoring of visitor use.
Special-Status Species – Federal ESA-Listed/Proposed Species (SI-M): Operation of the cantonment/family housing facilities under Alternative E would result in significant but mitigable impacts to special-status species (Federal ESA-listed/proposed species) as a result of impacts to Mariana fruit bat habitat due to lights, noise, and human activity.

Potential Mitigation

- Haputo ERA – fencing, info/educational signage, educational materials regarding sensitive biological resources, and monitoring of visitor use.
- Continued implementation of the potential mitigation measures under Construction Impacts, Vegetation would also benefit the Mariana fruit bat.

Marine Biological Resources

Construction Impacts (SI)

Induced civilian and construction/DoD workforce growth under Alternative E would result in a significant unmitigable indirect impact to marine flora and invertebrates, fish, and Essential Fish Habitat from increased wastewater discharge from the Northern District WWTP outfall. The Northern District WWTP is non-compliant with the standards required by its current NPDES permit and increasing the wastewater discharge from a non-compliant treatment plant would be a significant indirect impact. Upgrading the Northern District WWTP treatment systems (as required by the 2013 NPDES permit) would mitigate the significant indirect impacts once the upgrades are completed. Until the WWTP upgrades are completed (anticipated to be early in the operational phase of the proposed action) there would be an indirect and unmitigable significant impact to nearshore waters during construction.

Operation Impacts (SI-M)

Operation of the cantonment and family housing facilities under Alternative E would result in a significant but mitigable impact to marine flora and invertebrates, fish, and Essential Fish Habitat from increased wastewater discharge from the Northern District WWTP outfall. The Northern District WWTP is non-compliant with the treatment standards required by the current NPDES permit and increasing the wastewater discharge from a non-compliant treatment plant would result in significant indirect impacts during the period of non-compliance. However, upgrades to bring the Northern District WWTP into compliance with the permit are expected to be completed early in the operational phase of the proposed action.

Potential Mitigation

- Upgrading the Northern District WWTP treatment systems (as required by the 2013 NPDES permit) would mitigate significant impacts to marine biological resources. The FY 2014 NDAA directed the Secretary of Defense to convene the EAC in part to develop an implementation plan that will address public infrastructure requirements necessary to support the preferred alternative. The implementation plan will detail descriptions of work, costs, and schedules for completion of construction, improvements, and repairs to Guam public infrastructure affected by the realignment, including improvements and upgrades to the Guam wastewater system. The water and wastewater assessment that DoD prepared to support the Implementation Plan recommended upgrades to the Northern District WWTP and the refurbishment of the GWA interceptor sewer from AAFB to the Northern District WWTP. Section 8102 of the FY 2014 Consolidated Appropriations Act (Public Law No. 113-76) appropriated $106.4 million to the Secretary of
Defense, acting through the OEA, for civilian water and wastewater improvements on Guam. These funds will remain available until expended.

**Cultural Resources**

**Construction Impacts (SI-M)**

Construction of the cantonment/housing family housing facilities under Alternative E would result in significant but mitigable potential direct adverse effects to 17 historic properties (16 National Register of Historic Places [NRHP]-eligible archaeological sites and 1 NRHP-eligible structure) and undetermined effects to 14 unevaluated buildings.

**Potential Mitigation**

- Proposed mitigation through 2011 Programmatic Agreement (PA) processes, including data recovery and contractor measures, and coordination with State Historic Preservation Office (SHPO), concurring parties, and knowledgeable traditional practitioners.

**Operation Impacts (NI)**

Operations associated with Alternative E would not directly affect any historic properties or impact other resources of cultural importance.

**Utilities**

**Construction Impacts**

**Wastewater (SI):** Construction of the cantonment/family housing facilities under Alternative E would result in significant direct impacts during the period of non-compliance with the 2013 NPDES permit at the Northern District WWTP.

**Potential Mitigation**

- Potential mitigation measures during construction would include constructing sewers during low flow periods, by-pass pumping, and having pump trucks on stand-by.

**Operation Impacts**

**Potable Water (NGLA impact) (SI-M):** Operation of the cantonment/family housing facilities under Alternative E would result in significant but mitigable short-term, localized significant impacts to the affected basin within the NGLA but less than significant impacts to the overall NGLA. Increased withdrawal from the NGLA may result in higher levels of chloride concentrations. The chloride concentration spikes could be a localized phenomenon, based on USGS modeling of the NGLA.

**Potential Mitigation**

- The DoD would, as appropriate, implement enhanced water conservation measures for the proposed action, improve existing DoD water systems to reduce system leaks, adjust pumping rates at DoD wells, and increase the use of surface water in northern Guam from Fena Reservoir in order to reduce withdrawals from the NGLA.
- The DoD would continue to support the GWRDG and would support USGS’s recommendation to rehabilitate and expand the hydrologic data collection network and monitoring necessary to ensure sustainable management of NGLA.
- The FY 2014 NDAA directed the Secretary of Defense to convene the EAC in part to develop an implementation plan that will address public infrastructure requirements necessary to support the
preferred alternative. The implementation plan will detail descriptions of work, costs, and schedules for completion of construction, improvements, and repairs to Guam public infrastructure affected by the realignment, including rehabilitation and expansion of the NGLA monitoring well network. The water and wastewater assessment that DoD prepared to support the Implementation Plan recommended an updated and expanded NGLA monitoring well network. Section 8102 of the FY 2014 Consolidated Appropriations Act (Public Law No. 113-76) appropriated $106.4 million to the Secretary of Defense, acting through the OEA, for civilian water and wastewater improvements on Guam. These funds will remain available until expended.

**Wastewater (SI-M):** Operation of the cantonment/family housing facilities under Alternative E would result in significant direct impacts during the period of non-compliance with the 2013 NPDES permit at the Northern District WWTP. However, upgrades to bring the Northern District WWTP into compliance with the permit are expected to be completed early in the operational phase of the proposed action. This operation would also generate additional wastewater flow from both AAFB family housing facilities and Finegayan cantonment that would utilize the existing GWA interceptor sewer system from AAFB to the Northern District WWTP. This interceptor sewer system is in a state of deterioration that requires rehabilitation. The additional wastewater flow from the proposed action would accelerate this deterioration and could result in sewer system failure.

**Potential Mitigation**

- Upgrading the Northern District WWTP treatment systems (as required by the 2013 NPDES permit) would mitigate significant impacts to the wastewater system on Guam. In addition, refurbishing the main GWA sewer lines from AAFB to the Northern District WWTP along Routes 3 and 9 would mitigate potential failure of the concrete reinforced sewer lines that are in a state of deterioration. The FY 2014 NDAA directed the Secretary of Defense to convene the EAC in part to develop an implementation plan that will address public infrastructure requirements necessary to support the preferred alternative. The implementation plan will detail descriptions of work, costs, and schedules for completion of construction, improvements, and repairs to Guam public infrastructure affected by the realignment, including improvements and upgrades to the Guam wastewater system. The water and wastewater assessment that DoD prepared to support the Implementation Plan recommended upgrades to the Northern District WWTP and refurbishment of the GWA interceptor sewer from AAFB to the Northern District WWTP. Section 8102 of the FY 2014 Consolidated Appropriations Act (Public Law No. 113-76) appropriated $106.4 million to the Secretary of Defense, acting through the OEA, for civilian water and wastewater improvements on Guam. These funds will remain available until expended.

**Socioeconomics and General Services**

**Construction and Operation Impacts**

**Population Change (SI):** The population change associated with the proposed Marine Corps relocation would be considered significant during both the construction and operations phases (given that population change would exceed 2%). Between the years 2021 and 2023 the population with the proposed action is 5.6% higher than it otherwise would have been without the proposed action. At a steady-state the difference would be 4.1%. However, the significant change would not be considered entirely negative. Impacts related to population change would be mixed, with some adverse and some beneficial outcomes.
Potential Mitigation

- No mitigation is proposed as the population increase would not likely result in a sustained increase in demand on Guam’s public services and permitting agencies, and the estimated increases in GovGuam tax revenues would likely compensate for any increased demand on public services that would occur.

Public Services (SI-M): During construction, all categories of public services agencies combined would require an estimated 185 additional employees, an increase of 3.6% over baseline staffing levels. This maximum increase in staffing levels would be temporary, lasting from approximately 2021 through 2023. During this short period, staffing requirements for many public service agencies would increase by more than 2% and, given existing deficiencies at many agencies, significant impacts were identified. However, over the longer term, GovGuam agencies would require an additional 66 staff (an increase of 1.3% over baseline levels), which would be less than significant. From a broad perspective, looking at the entire group of GovGuam public services agencies overall, impacts would be considered significant in the short-term and less than significant in the long-term steady-state. While the total number of additional staff required during the relatively short construction phase may appear manageable (representing only a 3.6% increase over baseline staffing), other factors including existing shortfalls in staffing and deficiencies in facilities and equipment were considered when determining significance. As discussed, no mitigation is proposed as the population increase would not likely result in a sustained increase in demand on Guam’s public services and permitting agencies, and the estimated increases in GovGuam tax revenues would likely compensate for any increased demand on public services that would occur. However, while additional tax revenues to GovGuam associated with the proposed action would compensate for additional costs that would be incurred, and ample time should be available to plan for short-term staff increases, GovGuam agencies may still face challenges. For the short-term significant impacts on public services, the following potential mitigation measures are identified.

Potential Mitigation

- The DoD would continue to support the efforts of the Civilian Military Coordination Council (CMCC) to develop recommendations, as appropriate, regarding adjustment of construction tempo and sequencing to directly influence workforce population levels and indirectly influence induced population growth before infrastructure capabilities are exceeded. Such support may include providing project-related employment and population forecasts, participating in the identification of shortfalls in Guam public services, and assisting in the identification of federal programs and funding sources that may help GovGuam to address shortfalls.

- The DoD would continue to support existing programs that contribute and/or donate excess equipment to local agencies.

Sociocultural Issues (SI-M): There is a potential for sociocultural impact to occur, but the magnitude of the impacts are difficult to predict and could vary substantially based on policy and program choices yet to be made as how to address them. For these reasons, and for the purposes of this SEIS, impacts to sociocultural issues are conservatively classified as significant.
Potential Mitigation

- In accordance with the 2011 PA, the DoD will conduct orientation briefs for all incoming DoD personnel, their families, and contractors regarding cultural sensitivity in the area. All DoD personnel and contractors working on Guam will receive annual briefings. The DoD will develop the briefing in consultation with the appropriate SHPO and will provide SHPO with a copy of the final briefing materials.
- The DoD would continue to support the efforts of the CMCC to develop recommendations, as appropriate, regarding adjustment of construction tempo and sequencing to directly influence workforce population levels and indirectly influence induced population growth to address sociocultural issues. See Section 2.9 for further discussion on the CMCC.
- In accordance with the 2011 PA, the $12,000,000 appropriated under the FY 2012 Consolidated Appropriations Act (Public Law 112-74) for a Guam Cultural Repository facility remains in place. The appropriation provides funding for a repository for curation of archaeological collections on Guam and to serve as a source of information on Guam history and culture. As directed by the FY 2014 NDAA, the DoD would convene the EAC to consider necessary technical and financial assistance and develop an implementation plan coordinated with EAC federal agencies. This plan must be submitted to the congressional defense committees as part of a reporting requirement that is due no later than the date of issuance of the ROD.

Environmental Justice and Protection of Children

Construction and Operation Impacts

Socioeconomics and General Services (SI-M): Temporary population growth may stress some sectors of the Guam economy (e.g., housing, costs of goods and services). In the short-term (during construction), direct and indirect impacts to health services would be significant; during the steady-state period (operational phase), impacts to public health and human service agencies would be less than significant. This would be felt more severely by low-income people, who often do not have resources to buffer hard economic times. However, there would also be some economic benefits due to increased employment opportunities. There would be adverse and disproportionate socioeconomic impacts in terms of environmental justice on low-income populations; however, some of the socioeconomic impacts would be beneficial (e.g., economic impacts).

Potential Mitigation

- The DoD would continue to support the efforts of the CMCC to develop recommendations, as appropriate, regarding adjustment of construction tempo and sequencing to directly influence workforce population levels and indirectly influence induced population growth before infrastructure capabilities are exceeded. Such support would include providing project-related employment and population forecasts, participating in the identification of shortfalls in Guam public services, and assisting in the identification of federal programs and funding sources that would help GovGuam to address shortfalls.
- As directed by the FY 2014 NDAA, the DoD would convene the EAC to consider necessary technical and financial assistance and develop an implementation plan coordinated with EAC federal agencies. This plan must be submitted to the congressional defense committees as part of a reporting requirement that is due no later than the date of issuance of the ROD.
Public Health and Safety (SI-M): Since the number of public health and safety professionals required to maintain current levels of service at public health and safety agencies would increase by more than 2%, and due to existing deficiencies in facilities and equipment at these agencies, there would be short-term, direct and indirect significant impacts to public health agencies and significant direct and indirect impacts on public safety agencies, both short-term (during construction) and during the steady-state period (during operation). Given that public health agencies that serve low-income and uninsured populations already have insufficient staffing levels, population increase would further strain these resources, causing a significant environmental justice impact.

Potential Mitigation

- The DoD would continue to support the efforts of the CMCC to develop recommendations, as appropriate, regarding adjustment of construction tempo and sequencing to directly influence workforce population levels and indirectly influence induced population growth before infrastructure capabilities are exceeded. Such support may include providing project-related employment and population forecasts, participating in the identification of shortfalls in Guam public services, and assisting in the identification of federal programs and funding sources that may help GovGuam to address shortfalls.
- The FY 2014 Consolidated Appropriations Act (Public Law No. 113-76) appropriated $13,000,000 for the construction of a regional public health laboratory on Guam; these funds remain in place. The public health laboratory would alleviate some existing deficiencies in Guam’s public health infrastructure, and bolster Guam’s capability to meet public health demands brought about by project-related population, by providing a facility that would help identify, treat, and control diseases of public health concern.
- As directed by the FY 2014 NDAA, the DoD would convene the EAC to consider necessary technical and financial assistance and develop an implementation plan coordinated with EAC federal agencies. This plan must be submitted to the congressional defense committees as part of a reporting requirement that is due no later than the date of issuance of the ROD.

ES-7.2.2 Significant Impacts of the Preferred LFTRC Alternative 5 – NWF

Geological and Soil Resources

Construction Impacts

Topography (SI): Construction of the LFTRC under Alternative 5 would result in a significant direct, long-term impact to topography in the form of major changes to surface elevation due to excavation and filling for construction of the MPMG Range.

Potential Mitigation

- Mitigation is not considered feasible for this impact because smaller cut/fill volumes would not provide the necessary level surfaces for the MPMG Range.

Operation Impacts

No significant operation impacts have been identified for this resource.

Land and Submerged Land Use

Construction Impacts

No significant construction impacts have been identified for this resource.
Operation Impacts

Public Access (SI): Although the land and submerged land use within the Ritidian Unit of the NWR would remain as Conservation land use, there would be access restrictions to the land and submerged lands within the SDZs while the ranges are in use. Such restrictions would be limited to the minimum SDZ area and period of use required for the LFTRC. Access to non-NWR submerged lands under the custody and control of the DON would be similarly restricted. The DON would pursue an agreement with the USFWS in accordance with the provisions of Section 2822 of the FY 2015 NDAA to ensure that access restrictions to the Ritidian Unit are consistent with the purposes for which the Unit was established. New beach access is proposed near the relocation of the USFWS facilities to partially offset the impact of proposed restrictions on beach access within the SDZ.

Potential Mitigation

- No mitigation measures have been identified.

Recreational Resources

Construction Impacts

No significant construction impacts have been identified for this resource.

Operation Impacts (SI)

Operation of the LFTRC under Alternative 5 would result in significant impacts due to loss of access to existing hiking trails and caves within the Ritidian Unit of the Guam NWR. These trails are currently open for access during normal refuge hours. Access to the areas within the MPMG Range SDZ would be restricted during MPMG Range operational periods. Recreational resources within the MPMG Range SDZ include a portion of existing hiking trails and caves containing ancient Chamorro paintings within the Ritidian Unit of the Guam NWR.

Potential Mitigation

- No mitigation measures have been identified.

Terrestrial Biological Resources

Construction Impacts

Vegetation (SI-M): Construction of the LFTRC under Alternative 5 would result in a significant but mitigable impact to vegetation due to the conversion of 219 acres (89 ha) of limestone forest to developed area.

Potential Mitigation

- Forest enhancement on a minimum of 219 acres (89 ha) of limestone forest.

Terrestrial Conservation Areas (SI-M): Construction of the LFTRC under Alternative 5 would result in a significant but mitigable impact to terrestrial conservation areas due to the conversion of 298 acres (121 ha) of Overlay Refuge lands to developed area.

Potential Mitigation

- Submit a proposal to designate an ERA on NAVMAG.
- Submit a proposal for the expansion of Orote Peninsula ERA.
Special-Status Species – Federal ESA-Listed/Proposed Species and Critical Habitat (SI-M): Construction of the LFTRC under Alternative 5 would result in a significant but mitigable impact to special-status species as a result of impacts to 215 acres (87 ha) of Mariana fruit bat recovery habitat, 215 acres (87 ha) of Mariana crow recovery habitat, 215 acres (87 ha) of Guam Micronesian kingfisher recovery habitat.

Potential Mitigation

- Forest enhancement on a minimum of 219 acres (87 ha) of limestone forest.
- Brown treesnake research and suppression.

Special-Status Species – Guam-Listed and SOGCN (SI-M):

Impacts and mitigations associated with Guam-listed species that are also federally listed would be the same as described above for those species. No additional Guam-listed species are known to occur in the project area for Alternative 5.

Operation Impacts

No significant operation impacts have been identified for this resource.

Cultural Resources

Construction Impacts (SI-M)

Construction of the LFTRC under Alternative 5 would result in significant but mitigable impacts. Twenty historic properties would be directly, adversely affected and culturally important natural resources could be impacted from vegetation removal.

Potential Mitigation

- Proposed mitigation through the 2011 PA process includes the development of a Range Mitigation Plan, archaeological data recovery, development of public education and interpretation materials, and coordination with SHPO, concurring parties, and knowledgeable traditional practitioners for treatment of culturally important natural resources.

Operation Impacts (SI and SI-M)

Operation of the LFTRC under Alternative 5 would result in significant impacts, which are not fully mitigable, due to restricted access to two NRHP-eligible archaeological sites. Significant but mitigable impacts would result from indirect adverse effects to three NRHP-eligible sites due to changes in use that degrades site integrity.

Potential Mitigation

- Partial mitigation of significant impacts resulting from changes in use and reduced access through the 2011 PA process, which includes the development of a Range Mitigation Plan, consultation to identify and evaluate appropriate noise-reducing measures, and amending the existing access plan.
ES-7.2.3 Significant Additive Impacts of the Preferred Alternative

For the purposes of this SEIS, additive impacts are those that would result specifically from the combination of a cantonment/family housing alternative with an LFTRC alternative. Consequently, these project impacts are not addressed in Chapter 4 (cantonment/family housing impacts) or Chapter 5 (LFTRC impacts). The additive impacts resulting from the combination of the preferred cantonment/family housing Alternative E and LFTRC Alternative 5 would yield no additional significant impacts to the following 16 resources: geological and soil resources, water resources, air quality, noise, airspace, land and submerged land use, recreational resources, terrestrial biological resources, marine biological resources, visual resources, marine transportation, utilities, socioeconomic and general services, hazardous materials and waste, public health and safety, and environmental justice and the protection of children.

The additive impacts of the preferred alternative would yield significant but mitigable impacts to two resources: cultural resources and ground transportation. The significant but mitigable additive impacts of the preferred alternative are summarized below.

**Cultural Resources (SI-M)**

There would be significant but mitigable impacts as a result of potential adverse effects to six known historic properties from construction of IT/COMM lines. There would be no adverse effects from operation of IT/COMM.

*Potential Mitigation*

- Measures outlined in the 2011 PA would reduce impacts to a level below significance.

**Ground Transportation (SI-M)**

There would be a slight increase in traffic on segments and intersections between the cantonment at Finegayan, the family housing at AAFB, and the LFTRC at NWF. There would be potentially significant impact on eight segments in at least one direction and ten intersections for weekday a.m. and/or p.m. peak hours.

*Potential Mitigation*

To reduce impacts to less than significant levels on roadway segments, the following eight roadway widening projects are recommended:

- Route 1, from Route 3 to Route 34.
- Route 1, from Route 34 to Route 16.
- Route 3, from Route 3A/9 to Finegayan Main Gate.
- Route 3, from Finegayan Main Gate to Finegayan Residential Gate.
- Route 3, from Finegayan Residential Gate to Route 28.
- Route 3, from Route 28 to South Finegayan Main Gate.
- Route 3, from South Finegayan Main Gate to Route 1.
- Route 28, from Chalan Balako to Route 3.

To reduce impacts to less than significant levels on intersections, improvement projects are recommended at the following intersections:

- Route 3 / 3A / 9.
- Route 3 / Royal Palm Drive.
- Route 1 / Route 3.
- Route 1 / Route 27.
- Route 1 / Route 26.
- Route 16 / Route 27.
- Route 16 / Route 10A.
- Route 1 / Route 14A.
- Route 1 / Route 10A.

**ES-7.2.4 Significant Cumulative Impacts of the Preferred Alternative**

The assessment of cumulative effects presented in Chapter 7 of this SEIS addresses the potential long-term impacts of recently completed, present, and reasonably foreseeable future projects in conjunction with the proposed action. The resources most likely to be adversely affected by projects are terrestrial biology and cultural. This is largely due to the fact that most projects would result in ground disturbance and potential for removal or disturbance of habitat and cultural resources. For these reasons, a brief summary of cumulative impacts to terrestrial biological resources and cultural resources is discussed below. The resource areas that benefit most from the projects listed are ground transportation, utilities, socioeconomic and general services, public health and safety, and environmental justice and the protection of children. This is because many of the GovGuam projects are capital improvement projects designed to support the health and safety of the community. A nearly equal number of projects having adverse and beneficial impacts were identified for geological and soil resources and water resources. Air quality, noise, airspace, land use, recreational resources, and marine transportation resource areas are impacted by fewer projects than other resource areas, either beneficially or adversely. Please refer to Chapter 7 of this SEIS for a detailed cumulative impact analysis.

**Terrestrial Biological Resources**

The following are the general types of projects or activities that may result in cumulative impacts to terrestrial biological resources:

- Loss or conversion of native habitat would reduce the potential recovery and survival of ESA-listed species creating an adverse impact.
- Reductions and management activities (i.e., fencing, removal) of invasive species and/or feral ungulates or their access to habitat would have a beneficial impact.
- Projects involving ground disturbance, such as construction of housing or new and widened roadways, would contribute to an adverse cumulative effect. Projects that are renovations or improvements to existing facilities within the existing facility footprint would have no impact on terrestrial biological resources, such as resurfacing a roadway.

Recently completed projects, present projects, and reasonably foreseeable projects all have the potential to contribute to adverse cumulative effects to terrestrial biological resources. The primary impact from these projects would be the potential loss of native habitat and the increased potential for the spread of invasive species. All five resource areas assessed (e.g., vegetation, terrestrial conservation areas, native wildlife, federal special-status species, Guam special-status species) would be significantly impacted by the direct and indirect impacts of the LFTRC and cantonment combinations, except there would be a less than significant impact on native vegetation for all combinations. The adverse impacts would occur during construction and operations phases. Most of the projects require ground disturbance, and the assumption is that terrestrial biological resources would be affected. The terrestrial biological resource health on Guam would continue to decline, and threatened and endangered species would continue to be vulnerable to natural and anthropogenic stressors.
Potential Mitigation

- GovGuam reviews public, private, and commercial development proposals for potential impacts to terrestrial biological resources. The USFWS monitors GovGuam, private, and commercial development proposals and periodically adjusts the acreage of available recovery habitat island-wide. This adjustment is used to determine the impact of federal development proposals that must comply with section 7 of the ESA and may result in mitigation for federal development proposals. The USFWS and GovGuam review DoD and other federal development proposals and mitigation is developed through the consultation process. There are local and federal initiatives and protocols to prevent the introduction of non-native species. There are local and federal conservation and restoration efforts. No additional mitigation is proposed for cumulative impacts to terrestrial biological resources.

Cultural Resources

The following are the general types of projects that may result in cumulative impacts to cultural resources:

- Projects that result in adverse effects to historic properties can lead to a cumulative loss of the archaeological and built-historical record that could contribute to an adverse cumulative impact.
- Projects that damage culturally important natural resources can lead to an adverse cumulative impact.
- Projects that lead to reduced access to cultural sites can lead to an adverse cumulative impact.

Recently completed projects, present projects, and reasonably foreseeable projects all have the potential to contribute to adverse cumulative effects to cultural resources. The primary impact from these projects would be direct and indirect adverse effects to historic properties, archaeological sites, and impacts to culturally important natural resources. Direct and indirect adverse effects would contribute to the decline in preservation of cultural resources. Other factors unrelated to the project, such as vandalism and weathering, would continue to adversely impact cultural resources. Disturbance or destruction of cultural resources would further diminish the regional historic record, thus decreasing the potential of its overall research contribution. The loss of culturally important natural resources would reduce opportunities for important cultural practices. Reduced access to cultural sites, whether for cultural practices, recreation, tourism, or academic study, would also diminish the cultural resources of Guam.

Potential Mitigation

Potential mitigation for cumulative impacts would include the following:

- Beginning in 2017, update the Guam Synthesis with information from DoD studies in concert with the Guam Historic Preservation Plan.
- Nominate two or more historic properties on DoD land per year for listing in the NRHP.
- In accordance with the 2011 PA, support construction of a Guam Cultural Repository and seek congressional authorization to transfer DoD funding for the construction. The $12,000,000 appropriated under the FY 2012 Consolidated Appropriations Act (Public Law 112-74) for a Guam Cultural Repository facility remains in place. The appropriation provides funding for a repository for curation of archaeological collections on Guam and to serve as a source of information on Guam history and culture.
- Advocate to other federal agencies to provide funding for the Guam Museum Complex.
With the implementation of these measures and processes as outlined in the 2011 PA, it is expected that significant cumulative impacts would be partially mitigated but not to a less than significant level.

**ES-7.2.5 Issues to be Resolved**

**USFWS Replacement Facilities and Public Access to Ritidian Beach**

If Alternative 5 (locating the LFTRC at NWF) is selected, the DON proposes to relocate, as appropriate, the USFWS facilities within the Ritidian Unit of the Guam NWR that would be encumbered by the range SDZs, and provide alternate public access to Ritidian Beach when the range is in use. Any decisions regarding the relocation of the USFWS facilities and/or construction to improve beach access at the Ritidian Unit of Guam NWR are dependent upon the outcome of consultations under section 7 of the ESA and negotiation of the agreement authorized by Section 2822 of the FY 2015 NDAA.