

Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
GEOLOGICAL AND SOIL RESOURCES				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<p><u>Topography</u> LSI Less than significant direct, long-term impacts to topography and slope stability from minor changes in surface elevations due to excavation and filling. Earthwork would include an estimated 3,159,000 yd³ (2,415,230 m³) of cut and 2,483,000 yd³ (1,898,391 m³) of fill, less than all other alternatives except Alternative C. Construction BMPs would reduce impacts to a less than significant level.</p>	<p><u>Topography</u> LSI Direct, long-term impacts to topography and slope stability similar to Alternative A. Earthwork would include 3,245,000 yd³ (2,480,980 m³) of cut and 2,731,000 yd³ (2,087,999 m³) of fill, more than Alternatives A and C but less than Alternative D and the No-Action Alternative. Construction BMPs would reduce impacts to a less than significant level.</p>	<p><u>Topography</u> LSI Direct, long-term impacts to topography and slope stability similar to Alternative A. Earthwork would include 3,088,000 yd³ (2,360,945 m³) of cut and 2,485,700 yd³ (1,900,454 m³) of fill, the least amount of excavation of any of the alternatives. Construction BMPs would reduce impacts to a less than significant level.</p>	<p><u>Topography</u> LSI Direct, long-term impacts to topography and slope stability similar to Alternative A. Earthwork would include 3,510,000 yd³ (2,683,589 m³) of cut and 2,618,000 yd³ (2,001,606 m³) of fill, resulting in a net cut of 892,000 yd³ (681,983 m³) and including grading a steep slope for a water tank. Alternative D would involve the largest excavation volume of all four action alternatives, but substantially less than the No-Action Alternative. Construction BMPs would reduce impacts to a less than significant level.</p>	<p><u>Topography</u> LSI Direct, long-term impacts to topography and slope stability from minor changes in surface elevations due to excavation and filling. Specific cut/fill estimates are not available but the construction footprint would be 78% larger than for Alternative A and would involve a substantially larger amount of excavation. Construction BMPs would reduce impacts to a less than significant level.</p>
<p><u>Soils</u> LSI Less than significant direct, short-term impacts to soils from erosion. No indirect short-term impacts expected. Potential increase in construction-related erosion minimized with engineering controls per 22 GAR, Chapter 10 Guam Soil Erosion and Sediment Control Regulations and construction stormwater BMPs as per the Construction General Permit.</p> <p>NI No prime farmland is identified in the development footprint. No direct or indirect impacts to agricultural soils.</p>	<p><u>Soils</u> LSI Direct, short-term impacts to soils similar to Alternative A. No indirect short-term impacts expected. Less construction/ development (approximately 320 acres [130 ha]) would occur in a previously undeveloped area as compared with Alternative A.</p> <p>NI No prime farmland is identified in the development footprint. No direct or indirect impacts to agricultural soils.</p>	<p><u>Soils</u> LSI Direct, short-term impacts to soils similar to Alternative A. No indirect short-term <u>impacts</u> expected.</p> <p>NI No prime farmland is identified in the development footprint. No direct or indirect impacts to agricultural soils.</p>	<p><u>Soils</u> LSI Direct, short-term impacts to soils similar to Alternative A. No indirect short-term impacts expected.</p> <p>NI No prime farmland is identified in the development footprint. No direct or indirect impacts to agricultural soils.</p>	<p><u>Soils</u> LSI The No-Action Alternative's larger construction footprint would result in higher potential for direct and indirect impacts to soils from erosion, though still less than significant with implementation of BMPs to reduce and control runoff. More runoff potential over the longer term due to substantially larger impervious surface area (883 acres [357 ha]) compared to the action alternatives.</p> <p>NI No prime farmland is identified in the development footprint. No direct or indirect impacts to agricultural soils.</p>

Legend: **SI** = significant impact; **SI-M** = significant impact-mitigable; **LSI** = less than significant impact; **NI** = no impact; **BI** = beneficial impact.

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<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
<p><u>Sinkholes</u> LSI There are 43 topographic features that may contain sinkholes in the Alternative A footprint. For any sinkholes discovered before or during construction, BMPs would include compliance with 22 GAR Chapter 10 Section 10106 F, including an environmental and hydrogeologic assessment to ensure adverse effects will not result. With these BMPs, and since no sinkholes would be filled that would adversely affect site drainage, no adverse impacts to sinkholes would occur. Construction of Alternative A would have less than significant direct, short-term impacts to sinkholes.</p>	<p><u>Sinkholes</u> LSI Under Alternative B, 41 features were preliminarily identified as topographic features that may contain sinkholes. Impacts and BMPs would be as described for Alternative A. No adverse impact given compliance with 22 GAR Chapter 10 Section 10106 F.</p>	<p><u>Sinkholes</u> LSI Under Alternative C, 28 features were preliminarily identified as topographic features that may contain sinkholes. Impacts and BMPs would be as described for Alternative A. No adverse impact given compliance with 22 GAR Chapter 10 Section 10106 F.</p>	<p><u>Sinkholes</u> LSI Under Alternative D, 15 features were preliminarily identified as topographic features that may contain sinkholes. Impacts and BMPs would be as described for Alternative A. No adverse impact given compliance with 22 GAR Chapter 10 Section 10106 F.</p>	<p><u>Sinkholes</u> LSI Approximately 62 features were preliminarily identified as sinkholes or depressions that may contain sinkholes within or on the perimeter of the No-Action Alternative footprint. By comparison, 43 similar features have been identified for Alternative A (the most of all action alternatives). The No-Action Alternative BMPs would include compliance with 22 GAR Chapter 10 Section 10106 F for protection of sinkholes, so there would be no adverse impacts to sinkholes.</p>
<p><u>Geologic Hazards</u> LSI Potential direct and indirect short-term impacts associated with geologic hazards during construction of cantonment and family housing facilities, schools and utilities. Facilities would be on level areas not subject to slope instability. Structural hazards associated with earthquake-generated fault rupture/ground shaking (there are 3 minor bedrock faults mapped in the Alternative A footprint) would be minimized with application of Unified Facilities Criteria 3-310-04 Seismic Design of Buildings dated June 1, 2013 (USACE 2013) during design and construction. Compliance with 22 GAR Chapter 10 Section 10106 F would minimize potential geologic hazards associated with sinkholes.</p>	<p><u>Geologic Hazards</u> LSI Direct and indirect short-term impacts associated with geologic hazards and the application of BMPs would be similar to Alternative A, except there are no faults mapped within the Alternative B footprint.</p>	<p><u>Geologic Hazards</u> LSI Direct and indirect short-term impacts associated with geologic hazards and the application of BMPs would be similar to Alternative A, except there are 2 minor bedrock faults mapped within the Alternative C footprint.</p>	<p><u>Geologic Hazards</u> LSI Direct and indirect short-term impacts associated with geologic hazards and the application of BMPs would be similar to Alternative A, except there are no known bedrock faults mapped within the Alternative D footprint.</p>	<p><u>Geologic Hazards</u> LSI Direct and indirect short-term impacts associated with geologic hazards and the application of BMPs would be similar to Alternative A (there are 3 minor bedrock faults mapped within the development footprint for the No-Action Alternative).</p>

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<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<u>Topography</u> <i>NI</i> No direct or indirect impacts to topography because no large scale grading or changes to elevation would occur during operations.	<u>Topography</u> <i>NI</i> No direct or indirect impacts to topography because no large scale grading or changes to elevation would occur during operations.	<u>Topography</u> <i>NI</i> No direct or indirect impacts to topography because no large scale grading or changes to elevation would occur during operations.	<u>Topography</u> <i>NI</i> No direct or indirect impacts to topography because no large scale grading or changes to elevation would occur during operations.	<u>Topography</u> <i>NI</i> No direct or indirect impacts to topography because no large scale grading or changes to elevation would occur during operations.
<u>Soils</u> <i>LSI</i> Potential direct long-term impacts to soils from erosion associated with minimal surface disturbance during maintenance activities. Impacts would be reduced by implementation of construction stormwater BMPs. <i>NI</i> No prime farmland is identified in the cantonment or family housing area footprint and no direct or indirect impacts to agricultural soils would occur from operation of utilities and schools.	<u>Soils</u> <i>LSI</i> Potential for erosion impacts during maintenance activities as described for Alternative A. BMPs would be applied to keep impacts less than significant. <i>NI</i> No prime farmland is identified in the cantonment or family housing area footprint and no direct or indirect impacts to agricultural soils would occur from operation of utilities and schools.	<u>Soils</u> <i>LSI</i> Potential for erosion impacts during maintenance activities as described for Alternative A. BMPs would be applied to keep impacts less than significant. <i>NI</i> No prime farmland is identified in the cantonment or family housing area footprint and no direct or indirect impacts to agricultural soils would occur from operation of utilities and schools.	<u>Soils</u> <i>LSI</i> Potential for erosion impacts during maintenance activities as described for Alternative A. BMPs would be applied to keep impacts less than significant. <i>NI</i> No prime farmland is identified in the cantonment or family housing area footprint and no direct or indirect impacts to agricultural soils would occur from operation of utilities and schools.	<u>Soils</u> <i>LSI</i> Potential for erosion impacts during maintenance activities as described for Alternative A. BMPs would be applied to keep impacts less than significant. <i>NI</i> No prime farmland is identified in the cantonment or family housing area footprint and no direct or indirect impacts to agricultural soils would occur from operation of utilities and schools.
<u>Sinkholes</u> <i>LSI</i> BMPs and compliance with 22 GAR Chapter 10 Section 10106 F would reduce potential impacts if maintenance activities would occur near topographic features that may contain sinkholes (43 such features have been identified in the Alternative A footprint).	<u>Sinkholes</u> <i>LSI</i> Potential impacts and application of BMPs would be as described for Alternative A (except that 41 features that may contain sinkholes have been identified in the Alternative B footprint).	<u>Sinkholes</u> <i>LSI</i> Potential impacts and application of BMPs would be as described for Alternative A (except that only 28 features that may contain sinkholes have been identified in the Alternative C footprint).	<u>Sinkholes</u> <i>LSI</i> Potential impacts and application of BMPs would be as described for Alternative A (except that only 15 features that may contain sinkholes have been identified in the Alternative D footprint).	<u>Sinkholes</u> <i>LSI</i> Potential impacts and application of BMPs would be as described for Alternative A (except that 62 features that may contain sinkholes have been identified in the No-Action Alternative footprint).

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<u>Geologic Hazards</u> LSI Operations would result in less than significant direct and indirect long term impacts associated with geologic hazards. Minimal hazards would be associated with slope instability and liquefaction. Potential structural damage or injuries during operations from seismic ground-shaking and fault rupture would be minimized by adherence to Unified Facilities Criteria 3-310-04 Seismic Design of Buildings dated June 1, 2013 (USACE 2013) during design and construction. Sinkhole BMPs during maintenance operations would minimize potential geologic hazards associated with sinkholes.	<u>Geologic Hazards</u> LSI Due to consistency in operations and application of BMPs regardless of alternative, and relatively small differences in site conditions, impacts associated with geologic hazards during operations would be similar to the description for Alternative A.	<u>Geologic Hazards</u> LSI Due to consistency in operations and application of BMPs regardless of alternative, and relatively small differences in site conditions, impacts associated with geologic hazards during operations would be similar to the description for Alternative A.	<u>Geologic Hazards</u> LSI Due to consistency in operations and application of BMPs regardless of alternative, and relatively small differences in site conditions, impacts associated with geologic hazards during operations would be similar to the description for Alternative A.	<u>Geologic Hazards</u> LSI Due to consistency in operations and application of BMPs regardless of alternative, and relatively small differences in site conditions, impacts associated with geologic hazards during operations would be similar to the description for Alternative A.
WATER RESOURCES				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<u>Surface Water</u> NI No surface waters are located within or near the construction area. No structures would be constructed within a flood zone.	<u>Surface Water</u> NI No surface waters are located within or near the construction area. No structures would be constructed within a flood zone.	<u>Surface Water</u> NI No surface waters are located within or near the construction area. No structures would be constructed within a flood zone.	<u>Surface Water</u> LSI Potential short-term increase in stormwater runoff, erosion, and sedimentation could have indirect effects on wetlands. Impacts would be minimized with SWPPPs and BMPs. No facilities would be constructed in flood zones, but some stormwater detention basins may be constructed.	<u>Surface Water</u> NI No surface waters are located within or near the construction area. No structures would be constructed within a flood zone.
<u>Groundwater</u> LSI Short-term, direct impacts from potential for stormwater to reach NGLA. Stormwater runoff and sinkhole protection measures would serve to protect groundwater quality. Siting and construction of wells	<u>Groundwater</u> LSI Impacts would be similar to Alternative A.	<u>Groundwater</u> LSI Impacts would be similar to Alternative A.	<u>Groundwater</u> LSI Impacts would be similar to Alternative A.	<u>Groundwater</u> LSI Impacts would be similar to Alternative A.

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would be implemented according to GEPA regulations.				
<p><u>Nearshore Waters</u> SI-M Short-term, direct impact from increased wastewater discharge from the Northern District WWTP that is not compliant with the recently revised NPDES permit. Increasing the wastewater flow to a non-compliant treatment plant would be a significant direct impact.</p> <p>Potential Mitigation Measures The DoD would assist GWA in locating funding for Northern District WWTP upgrades. The FY2014 NDAA directed the Secretary of Defense to convene the EAC in part to develop an implementation plan which will address assistance to support public infrastructure requirements necessary to support the preferred alternative, and may address WWTP upgrades. Additionally, the FY2014 Consolidated Appropriations Act appropriated \$106,400,000 for civilian water and wastewater improvements on Guam. As appropriate, the EAC process will support the identification of specific projects utilizing these funds to support public infrastructure requirements.</p>	<p><u>Nearshore Waters</u> SI-M Impacts would be similar to those described under Alternative A.</p> <p>Potential Mitigation Measures Mitigation would be the same as Alternative A.</p>	<p><u>Nearshore Waters</u> SI-M Impacts would be similar to those described under Alternative A.</p> <p>Potential Mitigation Measures Mitigation would be the same as Alternative A.</p>	<p><u>Nearshore Waters</u> SI-M Short-term, direct impact from increased wastewater discharge from the Northern District and Agana WWTPs that are not compliant with the recently revised NPDES permit. Increasing the wastewater flow to a non-compliant treatment plant would be a significant direct impact. With the potential mitigation to assist with locating funding to upgrade the Agana WWTP and Northern District WWTP to secondary treatment, the impact to nearshore waters would be beneficial in the long-term because wastewater discharge from the Agana WWTP and Northern District WWTP would improve over existing conditions with upgrades to secondary treatment.</p> <p>Potential Mitigation Measures Mitigation would be the same as Alternative A, but would include assistance with locating funding to upgrade both the Agana WWTP and Northern District WWTP.</p>	<p><u>Nearshore Waters</u> SI-M Impacts would be similar to those described under Alternative A, except that with the larger population projection as compared to the 2012 Roadmap Adjustments, the related increase in wastewater discharge from the Northern District WWTP would be significantly larger under the No-Action Alternative.</p> <p>Potential Mitigation Measures Mitigation would be the same as Alternative A.</p>

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<i>NI</i> Short-term increase in Stormwater runoff would not discharge to nearshore waters with adherence to the Construction General Permit, BMPs, and SWPPPs.	<i>NI</i> Impacts would be similar to Alternative A.	<i>NI</i> Impacts would be similar to Alternative A.	<i>NI</i> Impacts would be similar to Alternative A.	<i>LSI</i> Impacts would be similar to Alternative A.
<u>Wetlands</u> <i>NI</i> No wetlands are located within or near the construction areas.	<u>Wetlands</u> <i>NI</i> Impacts would be similar to Alternative A.	<u>Wetlands</u> <i>NI</i> Impacts would be similar to Alternative A.	<u>Wetlands</u> <i>SI-M</i> Direct impact (fill) of approximately 0.1 acre of potentially jurisdictional wetland area. Potential Mitigation Measures If LEDPA, a Section 404 permit would be obtained for unavoidable impacts to jurisdictional wetlands and direct impacts would be mitigated by creating new wetlands, restoring or enhancing existing wetlands, or preserving existing wetland areas on Guam to, at a minimum, replace the area filled. <i>LSI</i> Short-term, indirect impact from potential increase in construction-related runoff and sedimentation to down gradient wetlands.	<u>Wetlands</u> <i>NI</i> Impacts would be similar to Alternative A.
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<u>Surface Water</u> <i>NI</i> No surface waters are located within or near the project area. Implementation of BMPs and LID measures to ensure no off-site transport of excess runoff, sediment, or pollutants.	<u>Surface Water</u> <i>NI</i> Impacts and application of BMPs and LID measures would be as described for Alternative A.	<u>Surface Water</u> <i>NI</i> Impacts and application of BMPs and LID measures would be as described for Alternative A.	<u>Surface Water</u> <i>LSI</i> Indirect impacts on wetlands from potential increase in stormwater runoff and associated pollutants.	<u>Surface Water</u> <i>SI-M</i> Indirect impact from increased potential for sewage spill with increased demand on central sewer collection system. Potential Mitigation Measures Mitigation would be the same as defined in the 2010 ROD.

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				<p>LSI Total amount of impervious area would increase by 883 acres, resulting in potential increase in stormwater runoff, erosion, and sedimentation.</p>
<p><u>Groundwater</u> SI-M Long-term increase in annual groundwater production of 1.7 MGd could result in a localized significant impact to the NGLA.</p> <p>Potential Mitigation Measures 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, use existing wells, and/or increase the use of surface water from Fena Reservoir, in order to reduce withdrawals from the NGLA.</p> <p>The DoD would continue to support the Guam Water Resources Development Group and would support USGS's recommendation to rehabilitate and expand the hydrologic data collection network and monitoring necessary to ensure sustainable management of NGLA.</p> <p>The FY2014 NDAA directed the Secretary of Defense to convene the EAC in part to develop an implementation plan which will address assistance to support</p>	<p><u>Groundwater</u> SI-M Similar to Alternative A. However, less area converted to impervious area than under Alternative A. The increased groundwater withdrawal rate would be the same.</p> <p>Potential Mitigation Measures Mitigation would be the same as under Alternative A.</p>	<p><u>Groundwater</u> SI-M Similar to Alternative A. However, less area converted to impervious area than under Alternative A. The increased groundwater withdrawal rate would be the same.</p> <p>Potential Mitigation Measures Mitigation would be the same as under Alternative A.</p>	<p><u>Groundwater</u> SI-M Similar to Alternative A. However, more area converted to impervious area than under Alternative A. The increased groundwater withdrawal rate would be the same.</p> <p>Potential Mitigation Measures Same as Alternative A.</p>	<p><u>Groundwater</u> SI-M Long-term increase in annual groundwater production of 5.8 MGd would result in a localized significant impact to the NGLA.</p> <p>Potential Mitigation Measures Mitigation would be the same as Alternative A.</p> <p>SI-M Indirect impact from increased potential for sewage spill with increased demand on central sewer collection system.</p> <p>Potential Mitigation Measures Mitigation would be the same as under Alternative A.</p>

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public infrastructure requirements necessary to support the preferred alternative, and may address groundwater-related issues.				
<i>LSI</i> Minor long-term increase in aquifer recharge rates with an additional 273 acres of impervious area; direct impact from increase in pollutant loading potential.	<i>LSI</i> Minor long-term increase in aquifer recharge rates with an additional 176 acres of impervious area; direct impact from increase in pollutant loading potential.	<i>LSI</i> Minor long-term increase in aquifer recharge rates with an additional 126 acres of impervious area; direct impact from increase in pollutant loading potential.	<i>LSI</i> Minor long-term increase in aquifer recharge rates with an additional 319 acres of impervious area; direct impact from increase in pollutant loading potential.	<i>LSI</i> Minor long-term increase in aquifer recharge rates with an additional 883 acres of impervious area; direct impact from increase in pollutant loading potential.
<u>Nearshore Waters</u> <i>SI-M</i> Impacts associated with WWTP discharge to nearshore waters would be similar to those described under Alternative A, Construction (Nearshore Waters). <i>Potential Mitigation Measures</i> Mitigation would be the same as described under Alternative A, Construction (Nearshore Waters).	<u>Nearshore Waters</u> <i>SI-M</i> Impacts associated with WWTP discharge to nearshore waters would be similar to those described under Alternative A, Construction (Nearshore Waters). <i>Potential Mitigation Measures</i> Mitigation would be the same as described under Alternative A, Construction (Nearshore Waters).	<u>Nearshore Waters</u> <i>SI-M</i> Impacts associated with WWTP discharge to nearshore waters would be similar to those described under Alternative A, Construction (Nearshore Waters). <i>Potential Mitigation Measures</i> Mitigation would be the same as described under Alternative A, Construction (Nearshore Waters).	<u>Nearshore Waters</u> <i>SI-M</i> Impacts associated with WWTP discharge to nearshore waters would be similar to those described under Alternative D, Construction (Nearshore Waters). <i>Potential Mitigation Measures</i> Mitigation would be the same as under Alternative A, Construction (Nearshore Waters), but would include assistance with locating funding to upgrade both the Agana WWTP and Northern District WWTP.	<u>Nearshore Waters</u> <i>SI-M</i> Impacts associated with WWTP discharge to nearshore waters would be similar to those described under Alternative D, Construction (Nearshore Waters). <i>Potential Mitigation Measures</i> Mitigation would be the same as described under No-Action Alternative, Construction (Nearshore Waters). <i>SI-M</i> Indirect impact from increased potential for sewage spill with increased demand on central sewer collection system. <i>Potential Mitigation Measures</i> Mitigation would be the same as defined in the 2010 ROD.
<i>NI</i> No direct or indirect impact from stormwater runoff discharge from the project area to nearshore waters.	<i>NI</i> Impacts would be similar to Alternative A, except that there would be greater vegetative cover than under Alternative A.	<i>NI</i> Impacts would be similar to Alternative A.	<i>NI</i> Impacts would be similar to Alternative A	<i>LSI</i> Minor increase in runoff volume and pollutant loading potential.

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<p><u>Wetlands</u> <i>NI</i> No wetlands are located within or near the project area.</p>	<p><u>Wetlands</u> <i>NI</i> Same as Alternative A.</p>	<p><u>Wetlands</u> <i>NI</i> Same as Alternative A.</p>	<p><u>Wetlands</u> <i>LSI</i> Indirect, long-term impact on wetlands from potential minor increase in stormwater runoff and associated pollutants.</p>	<p><u>Wetlands</u> <i>SI</i> Indirect impact from increased potential for sewage spill with increased demand on central sewer collection system.</p> <p>Potential Mitigation Measures Mitigation would be the same as defined in the 2010 ROD.</p> <p><i>NI</i> No wetlands are located within or near the No-Action Alternative project area.</p>
AIR QUALITY				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<p><i>LSI</i> The construction phase direct short-term increase in emissions would be below the impact significance threshold. On-base construction site hot-spot particulate matter impact analysis estimated the total PM levels would be well below respective NAAQS, resulting in less than significant direct, short-term PM impacts during construction years. Construction phase off-base roadway hot-spot particulate matter, carbon monoxide, and mobile source air toxics impact conclusion found predicted levels would be well below the NAAQS, resulting in less than significant direct, short-term CO, PM, and MSAT impacts.</p>	<p><i>LSI</i> The construction phase direct short-term increase in emissions would be below the impact significance threshold. Construction phase increase in sulfur dioxide emissions within the Tanguisson nonattainment area (South Finegayan housing area) would be below the general conformity <i>de minimis level</i> and no formal conformity rule determination is required. On-base construction site hot-spot particulate matter impact analysis found the total PM levels predicted would be below respective NAAQS resulting in less than significant direct, short-term PM and MSAT impacts during construction years. Construction phase off-base roadway hot-spot particulate matter, carbon monoxide, and mobile source air</p>	<p><i>LSI</i> The construction phase direct short-term increase in emissions would be below the impact significance threshold. Short-term on-site hot spot PM impacts around construction sites would be less or similar to those under Alternative A. Project impacts of all carcinogenic and non-carcinogenic MSATs are considered acceptable. Off-site on road vehicle CO, PM, and MSATs hot-spot impact concentrations for Alternative C would be similar in magnitude to those predicted for Alternative A; predicted levels of PM and CO would be below the NAAQS.</p>	<p><i>LSI</i> The construction phase direct short-term increase in emissions would be below the impact significance threshold. Short-term on-site hot-spot PM impacts around construction sites would be anticipated as less or similar to those under Alternative A. Off-site on road vehicle CO, PM, and MSATs hot-spot impact concentrations for Alternative D would be similar to those predicted for Alternative A; predicted levels of PM and CO would be below the NAAQS. Project impacts of all non-carcinogenic MSATs are considered acceptable.</p>	<p><i>LSI</i> Impacts would be slightly greater than each proposed alternative given the greater scale of construction activities. The construction phase increase in sulfur dioxide emissions within both Piti and Tanguisson nonattainment areas would be below the general conformity <i>de minimis level</i> and no formal conformity rule determination is required. Impact conclusions would remain the same as described in the 2010 Final EIS.</p>

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
	toxics impact conclusion found predicted levels would be well below the NAAQS, resulting in less than significant direct, short-term CO, PM, MSAT impacts.			
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<i>LSI</i> Direct and indirect impacts associated with long-term operational phase off-base roadway hot-spot particulate matter, carbon monoxide, and mobile source air toxics from increased traffic congestion.	<i>LSI</i> Similar impacts as Alternative A.	<i>LSI</i> Similar impacts as Alternative A. In addition, because AAFB is a Prevention of Significant Deterioration source, a permit modification could be required as a result of the proposed project. This determination would be made during the final design stage to ensure that the development on AAFB would be in compliance with applicable regulatory requirements.	<i>LSI</i> Similar impacts as Alternative A.	<i>LSI</i> Impacts would be slightly greater than each proposed alternative given the greater scale of operational activities. Impact conclusions would remain the same as described in the 2010 Final EIS.
NOISE				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<i>LSI</i> Direct and indirect impacts from construction noise. Short-term construction noise affecting the nearest receptors at Finegayan would be 65.4 dB L _{eq} , which is below United States Environmental Protection Agency threshold guideline of 75 dBA L _{eq} . Receptors include 20 houses (70-75 people) along Route 3. Long-term noise emanating from the center of the cantonment/family housing area would be 54.5 and 51.5 dBA L _{eq} , respectively, and be well below FICUN guidelines.	<i>LSI</i> Direct and indirect impacts from construction noise. Short-term construction noise affecting the nearest receptors at Finegayan would be 65.4 dB L _{eq} , which is below United States Environmental Protection Agency threshold guideline of 75 dBA L _{eq} . This alternative impacts 10 more houses (36 people) than under Alternative A. Long-term noise emanating from the center of the cantonment/family housing area would be 54.5 and 57.8 dBA L _{eq} , respectively, and be well below FICUN guidelines.	<i>LSI</i> Direct and indirect impacts from construction noise. Short-term construction noise affecting the nearest receptors at Andersen Air Force Base would be 74.8 dB L _{eq} for family housing and 59 dB L _{eq} for cantonment. Similar to Alternative 1, 20 houses (75 people) would be impacted. Long-term noise emanating from the center of the cantonment/family housing area would be 50.4 and 57.8 dBA L _{eq} , respectively, and be well below FICUN guidelines.	<i>LSI</i> Direct and indirect impacts from construction noise. Short-term construction noise affecting the nearest receptors at Barrigada would be 74.8 dB L _{eq} and within acceptable limits. 25 homes (92 people) would be impacted, which is the greatest and only slightly more than Alternative A. The extended construction period would further lessen impacts. Long-term noise emanating from the center of the cantonment/family housing area would be 62.4 and 56.4 dBA L _{eq} , respectively, and be well below FICUN guidelines.	<i>SI-M</i> Construction noise would impact residences along Route 3. Impacts would be less than significant or significant but mitigable, depending on the location of construction activities. Potential Mitigation Measures Construction sequencing, sound barriers, installation and periodic inspection of sound reducing devices on construction machinery, and shutting off idling equipment to reduce impacts to less than significant.

Legend: *SI* = significant impact; *SI-M* = significant impact-mitigable; *LSI* = less than significant impact; *NI* = no impact; *BI* = beneficial impact.

Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<i>LSI</i> Long-term direct impact. Traffic noise would be below 66 dB and comply with Guam Department of Public Works standards. Long-term operations would be similar to an office park/residential setting.	<i>LSI</i> Similar impacts as Alternative A. However, there would be slightly more traffic in a one mile stretch.	<i>LSI</i> Similar impacts as Alternative A. However, steady state noise would be primarily due to ongoing aircraft noise. Traffic noise would be less than other alternatives. Traffic noise would be less than other alternatives.	<i>LSI</i> Similar impacts as Alternative A. However, steady state noise would primarily be from traffic noise near gates.	<i>SI-M</i> Significant operational impacts under No-Action Alternative would occur as a result of traffic noise. Potential Mitigation Measures Traffic noise would be reduced using sound walls at selected locations where the impacts are greatest and would reduce noise impacts to less than significant levels.
AIRSPACE				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<i>NI</i> Construction associated with the cantonment/family housing facilities consist of support, maintenance/storage, housing, and non-live fire training functions; there would be no changes to airspace.	<i>NI</i> Same as Alternative A.	<i>NI</i> Same as Alternative A.	<i>NI</i> Same as Alternative A.	<i>NI</i> Same as Alternative A.
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<i>NI</i> Operation and functions associated with the cantonment/family housing facilities consist of support, maintenance/storage, housing, and non-live fire training functions; there would be no changes to airspace.	<i>NI</i> Same as Alternative A.	<i>NI</i> Same as Alternative A.	<i>NI</i> Same as Alternative A.	<i>NI</i> Same as Alternative A.

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
LAND AND SUBMERGED LAND USE				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<i>NI</i> All changes in land use are considered long-term operational impacts. Therefore, there is no construction-phase analysis for this resource.	<i>NI</i> Same as Alternative A.	<i>NI</i> Same as Alternative A.	<i>NI</i> Same as Alternative A.	<i>NI</i> Same as Alternative A.
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<u>Loss of Valued Use</u> <i>NI</i> No change to a land use valued by the community.	<u>Loss of Valued Use</u> <i>NI</i> Same as Alternative A.	<u>Loss of Valued Use</u> <i>NI</i> Same as Alternative A.	<u>Loss of Valued Use</u> <i>NI</i> Same as Alternative A.	<u>Loss of Valued Use</u> <i>NI</i> Same as Alternative A.
<u>Public Access</u> <i>NI</i> There would be no new access restrictions imposed on the public.	<u>Public Access</u> <i>SI-M</i> Short- and long-term direct impact from restriction of public access to Latte Stone Park. This alternative would have a greater impact than Alternatives A, C, or D. Potential Mitigation Measures The DoD may work with the community to provide access to Latte Stone Park to the extent practical.	<u>Public Access</u> <i>NI</i> Same as Alternative A.	<u>Public Access</u> <i>NI</i> Public access to the ballfield in the southern portion of the site would be restricted; however, The new access restriction is not considered an impact because the ballfield is not unique and there are other fields in proximity.	<u>Public Access</u> <i>SI</i> New public access restrictions to the Latte Stone Park at South Finegayan and the jogging trail at Former FAA parcel. Potential Mitigation Measures The DoD may work with the community to provide access to Latte Stone Park to the extent practical.
<u>Compatibility with Current and Future Use</u> <i>LSI</i> Long-term impact from increase in land use density and decrease in open space on-base.	<u>Compatibility with Current and Future Use</u> <i>LSI</i> Similar impacts as Alternative A, except more open space would remain at Finegayan.	<u>Compatibility with Current and Future Use</u> <i>LSI</i> The land use density would increase on-base with a decrease in open space. There would be more of an impact within the installation boundary than other alternatives but there would be a less than significant impact on the adjacent community, similar to Alternative A.	<u>Compatibility with Current and Future Use</u> <i>LSI</i> Similar impacts as Alternative A.	<u>Compatibility with Current and Future Use</u> <i>LSI</i> Same as Alternative A.

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
<i>NI</i> Compatible with existing and proposed land uses in the vicinity.	<i>NI</i> Similar impacts as Alternative A	<i>LSI</i> The long-term impact of the existing noise levels at AAFB on the proposed housing would be less than significant.	<i>NI</i> Similar impacts as Alternative A.	<i>NI</i> Same as Alternative A.
RECREATIONAL RESOURCES				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<i>LSI</i> Short-term slowed access to recreational resources during the construction phase with use of public roads by construction vehicles.	<i>LSI</i> Same impacts as Alternative A.	<i>LSI</i> Same impacts as Alternative A.	<i>LSI</i> Same impacts as Alternative A.	<i>LSI</i> Same as Alternative A.
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<i>LSI</i> Considerably smaller number of Marines and dependents representing recreational users. Direct impacts from long-term increase in user demand of recreational resources and accelerated deterioration of resources. Impacts would be less than Alternative D (which has the greatest impact).	<i>LSI</i> Similar impacts as Alternative A, except there would also be impacts to Latte Stone Park. Impacts would be less than Alternative D (which has the greatest impact).	<i>LSI</i> Same as Alternative A.	<i>SI</i> Direct impacts from removal of Eagle Field from public use could result in a long-term significant impact to recreational resources in central Guam. Potential Mitigation Measures Mitigation measures have not been identified at this time.	<i>SI-M</i> Reduction of recreational opportunities off-base due to the increase in the number of users. Accelerated deterioration of resources. Diminished user satisfaction due to reduced recreational opportunities. Conflicts between users and uses. Potential Mitigation Measures GovGuam to update Guam Comprehensive Outdoor Recreation Plan that addresses recreational user use, demand, preference, conflicts, and conditions. (This measure would fall within GovGuam authority to implement). Collaborate with the Guam Division of Aquatic and Wildlife Resources to establish outreach programs and docent (person who leads guided tours) programs for the five marine preserves and other environmentally sensitive areas on Guam.

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
				Provide for improvements and maintenance of federally owned portions of Tanguisson Beach, along with the management of the coastline to the north of Hilaan that contains significant natural, cultural, scenic, and recreational resources.
TERRESTRIAL BIOLOGICAL RESOURCES				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<u>Vegetation</u> <i>SI-M</i> Conversion of 1,020 acres (413 ha) of limestone forest to developed area. <i>Potential Mitigation Measures</i> Forest enhancement on a minimum of 1,020 acres (413 ha) of limestone forest.	<u>Vegetation</u> <i>SI-M</i> Conversion of 850 acres (344 ha) of limestone forest to developed area. <i>Potential Mitigation Measures</i> Forest enhancement on a minimum of 850 acres (344 ha) of limestone forest.	<u>Vegetation</u> <i>SI-M</i> Conversion of 1,204 acres (488 ha) of limestone forest to developed area. <i>Potential Mitigation Measures</i> Forest enhancement on a minimum of 1,204 acres (488 ha) of limestone forest.	<u>Vegetation</u> <i>SI-M</i> Conversion of 266 acres (107 ha) of limestone forest to developed area. <i>Potential Mitigation Measures</i> Forest enhancement on a minimum of 266 acres (107 ha) of limestone forest.	<u>Vegetation</u> <i>SI-M</i> Conversion of 1,336 acres (541 ha) of limestone forest to developed area. <i>Potential Mitigation Measures</i> See the 2010 Final EIS, Volume 7, Chapter 2: Overview of Best Management Practices and Proposed Mitigation Measures, Table 2.2-1: Summary of Proposed Mitigation Measures (mitigations specific to Volume 2), Pages 2-25-2-45.
<u>Terrestrial Conservation Areas</u> <i>SI-M</i> Conversion of 1,250 acres (441 ha) of Overlay Refuge lands to developed area. <i>Potential Mitigation Measures</i> <ul style="list-style-type: none"> • Submit a proposal to designate an ERA on NAVMAG. • Expansion of Orote Peninsula ERA. 	<u>Terrestrial Conservation Areas</u> <i>SI-M</i> Conversion of 977 acres (395 ha) of Overlay Refuge lands to developed area. <i>Potential Mitigation Measures</i> Mitigation would be the same as under Alternative A.	<u>Terrestrial Conservation Areas</u> <i>SI-M</i> Conversion of 924 acres (374 ha) of Overlay Refuge lands to developed area. <i>Potential Mitigation Measures</i> Mitigation would be the same as under Alternative A.	<u>Terrestrial Conservation Areas</u>	<u>Terrestrial Conservation Areas</u> <i>SI-M</i> Conversion of 1,129 acres (453 ha) of Overlay Refuge lands to developed area. <i>Potential Mitigation Measures</i> See the 2010 Final EIS, Volume 7, Chapter 2: Overview of Best Management Practices and Proposed Mitigation Measures, Table 2.2-1: Summary of Proposed Mitigation Measures (mitigations specific to Volume 2), Pages 2-25-2-45.

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
<i>NI</i> Haputo ERA – Haputo ERA would not be directly impacted; use of Haputo ERA would not increase as a result of construction activities.	<i>NI</i> Haputo ERA – Haputo ERA would not be directly impacted; use of Haputo ERA would not increase as a result of construction activities.		<i>LSI</i> Conversion of 75 acres (30 ha) of Overlay Refuge lands to developed area within the support areas.	
<u>Native Wildlife</u> <i>LSI</i> Direct impacts to 1,078 acres (436 ha) of potential wildlife habitat. Wildlife currently present is either widespread on Guam or prefers open spaces, which would not be reduced. With implementation of BMPs, potential introduction of new or spread of existing non-native species on Guam during proposed construction activities is considered unlikely.	<u>Native Wildlife</u> <i>LSI</i> Direct impacts to 979 (396 ha) acres of potential wildlife habitat. Wildlife currently present is either widespread on Guam or prefers open spaces, which would not be reduced. With implementation of BMPs, potential introduction of new or spread of existing non-native species on Guam during the proposed construction activities is considered unlikely.	<u>Native Wildlife</u> <i>LSI</i> Direct impacts to 1,288 acres (521 ha) of potential wildlife habitat. Wildlife currently present is either widespread on Guam or prefers open spaces, which would not be reduced. With implementation of BMPs, potential introduction of new or spread of existing non-native species on Guam during the proposed short-term construction activities is considered unlikely.	<u>Native Wildlife</u> <i>LSI</i> Direct impacts to 1,251 acres (506 ha) of potential wildlife habitat. Wildlife currently present is either widespread on Guam or prefers open spaces, which would not be reduced. With implementation of BMPs, potential introduction of new or spread of existing non-native species on Guam during the proposed short-term construction activities is considered unlikely.	<u>Native Wildlife</u> <i>LSI</i> Direct impacts to 1,611 acres of potential wildlife habitat. Wildlife currently present is either widespread on Guam or prefers open spaces, which would not be reduced. With implementation of BMPs, potential introduction of new or spread of existing non-native species on Guam during the proposed short-term construction activities is considered unlikely.
<u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> <i>SI-M</i> Mariana fruit bat – impacts to 977 acres (395 ha) of fruit bat recovery habitat. Mariana crow – impacts to 978 acres (396 ha) of crow recovery habitat. Guam rail – impacts to 458 acres (185 ha) of rail recovery habitat. Guam Micronesian kingfisher – impacts to 977 acres (395 ha) of kingfisher recovery habitat. <i>Serianthes</i> tree – impacts to 661 acres (268 ha) of <i>Serianthes</i> recovery habitat. <i>Potential Mitigation Measures</i> • Implementation of the potential mitigation measures under Construction Impacts, Vegetation would also benefit	<u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> <i>SI-M</i> Mariana fruit bat – impacts to 791 acres (320 ha) of fruit bat recovery habitat. Mariana crow – impacts to 791 acres (257 ha) of crow recovery habitat. Guam rail – impacts to 565 acres (229 ha) of rail recovery habitat. Guam Micronesian kingfisher – impacts to 791 acres (320 ha) of kingfisher recovery habitat. <i>Serianthes</i> tree – impacts to 661 acres (268 ha) of <i>Serianthes</i> recovery habitat. <i>Potential Mitigation Measures</i> • Implementation of the potential mitigation measures under Construction Impacts, Vegetation would also benefit	<u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> <i>SI-M</i> Mariana fruit bat – impacts to 1,197 acres (484 ha) of fruit bat recovery habitat. Mariana crow – impacts to 1,201 acres (486 ha) of crow recovery habitat. Guam rail – impacts to 221 acres (89 ha) of rail recovery habitat. Guam Micronesian kingfisher – impacts to 1,197 acres (484 ha) of kingfisher recovery habitat. <i>Serianthes</i> tree – impacts to 1,139 acres (461 ha) of <i>Serianthes</i> recovery habitat. <i>Potential Mitigation Measures</i> • Implementation of the potential mitigation measures under Construction Impacts,	<u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> <i>SI-M</i> Guam rail – impacts to 849 acres (344 ha) of rail recovery habitat. Guam tree snail – impacts to 266 acres (107 ha) of limestone forest. <i>Potential Mitigation Measures</i> • Implementation of the potential mitigation measures under Construction Impacts, Vegetation would also benefit these species. • Brown treesnake research and suppression.	<u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> <i>SI-M</i> Mariana fruit bat – impacts to 1,248 acres (505 ha) of fruit bat recovery habitat. Mariana crow – impacts to 1,248 acres (505 ha) of crow recovery habitat. Guam rail – impacts to 654 acres (265 ha) of rail recovery habitat. Guam Micronesian kingfisher – impacts to 1,248 acres (505 ha) of kingfisher recovery habitat. <i>Serianthes</i> tree – impacts to 358 acres (144 ha) of <i>Serianthes</i> recovery habitat. <i>Potential Mitigation Measures</i> See the 2010 Final EIS, Volume 7, Chapter 2: Overview of Best Management Practices and Proposed Mitigation Measures,

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
<p>these species.</p> <ul style="list-style-type: none"> • Brown treesnake research and suppression. <p><i>LSI</i> Mariana eight-spot butterfly, sea turtles – implementation of BMPs would avoid and minimize impacts to butterflies, host plants, and sea turtles.</p> <p><i>NI</i> Tree snails –located only within Haputo ERA which would not be impacted.</p>	<p>these species.</p> <ul style="list-style-type: none"> • Brown treesnake research and suppression. <p><i>LSI</i> Mariana eight-spot butterfly, sea turtles – implementation of BMPs would avoid and minimize impacts to butterflies, host plants, and sea turtles.</p> <p><i>NI</i> Tree snails - located only within Haputo ERA which would not be impacted.</p>	<p>Vegetation would also benefit these species.</p> <ul style="list-style-type: none"> • Brown treesnake research and suppression. <p><i>LSI</i> Mariana eight-spot butterfly, sea turtles – implementation of BMPs would avoid and minimize impacts to butterflies, host plants, and sea turtles; implementation of BMPs (e.g., shielded lights) would avoid and minimize impacts to coastal areas.</p>	<p><i>LSI</i> Mariana fruit bat – impacts to 83 acres (34 ha) of fruit bat recovery habitat. Mariana crow – impacts to 83 acres (34 ha) of crow recovery habitat. Guam Micronesian kingfisher – impacts to 83 acres (34 ha) of kingfisher recovery habitat. <i>Serianthes</i> tree – impacts to 81 acres (33 ha) of <i>Serianthes</i> recovery habitat. Mariana common moorhen – loss of golf course pond previously used by moorhen would be less than significant impact.</p>	<p>Table 2.2-1: Summary of Proposed Mitigation Measures (mitigations specific to Volume 2), Pages 2-25-2-45.</p> <p><i>LSI</i> Mariana eight-spot butterfly – butterflies or host plants not found in impacted areas; implementation of BMPs would avoid and minimize impacts to butterflies, host plants, and sea turtles.</p> <p><i>NI</i> Tree snails –located only within Haputo ERA which would not be impacted.</p>

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
<p><u>Special-Status Species –Guam-Listed and SOGCN</u></p> <p><i>SI-M</i> Moth skink and Pacific slender-toed gecko – loss of 1,020 acres (413 ha) of occupied habitat.</p> <p><i>Potential Mitigation Measures</i></p> <ul style="list-style-type: none"> • Cat control on a minimum of 1,020 acres (413 ha) of limestone forest. • Implementation of the potential mitigation measures under Construction Impacts, Vegetation would also benefit these species. <p><i>LSI</i> <i>Tabernaemontana rotensis</i> – occurrence of species within impacted areas would be avoided to the maximum extent practicable. <i>Cycas micronesica</i> – not observed within impacted areas. Implementation of BMPs (avoidance and translocation) would reduce and avoid impacts to both plant species.</p> <p><i>NI</i> Micronesian starling, white-throated ground dove – species are very rarely recorded within project areas.</p>	<p><u>Special-Status Species –Guam-Listed and SOGCN</u></p> <p><i>SI-M</i> Moth skink and Pacific slender-toed gecko – loss of 850 acres (344 ha) of occupied habitat.</p> <p><i>Potential Mitigation Measures</i></p> <ul style="list-style-type: none"> • Cat control on a minimum of 850 acres (344 ha) of limestone forest. • Implementation of the potential mitigation measures under Construction Impacts, Vegetation would also benefit these species. <p><i>LSI</i> Same as Alternative A.</p> <p><i>NI</i> Same as Alternative A.</p>	<p><u>Special-Status Species –Guam-Listed and SOGCN</u></p> <p><i>LSI</i> Micronesian starling – temporary loss of small area of existing urban habitat. Moth skink – known occurrence only within proposed AAFB utility corridor. <i>Tabernaemontana rotensis, Cycas micronesica</i> – implementation of BMPs (avoidance and translocation) would reduce and avoid impacts to both plant species.</p> <p><i>NI</i> White-throated ground dove – species does not occur within project areas.</p>	<p><u>Special-Status Species –Guam-Listed and SOGCN</u></p> <p><i>LSI</i> Moth skink – species does not occur within Barrigada; known occurrence only within proposed AAFB utility corridor.</p> <p><i>NI</i> Micronesian starling – species does not occur in project areas.</p>	<p><u>Special-Status Species –Guam-Listed and SOGCN</u></p> <p><i>SI-M</i> Moth skink and Pacific slender-toed gecko – loss of 1,336 acres of occupied habitat.</p> <p><i>Potential Mitigation Measures</i> See the 2010 Final EIS, Volume 7, Chapter 2: Overview of Best Management Practices and Proposed Mitigation Measures, Table 2.2-1: Summary of Proposed Mitigation Measures (mitigations specific to Volume 2), Pages 2-25-2-45.</p> <p><i>NI</i> Micronesian starling, white-throated ground dove, <i>Tabernaemontana rotensis, Cycas micronesica</i> – species do not occur within project areas.</p>

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<u>Vegetation</u> LSI With implementation of BMPs, potential introduction of new or spread of existing non-native species on Guam during operations of cantonment/ housing area is considered unlikely.	<u>Vegetation</u> LSI Same as Alternative A.	<u>Vegetation</u> LSI Same as Alternative A.	<u>Vegetation</u> LSI Same as Alternative A.	<u>Vegetation</u> LSI Same as Alternative A.
<u>Terrestrial Conservation Areas</u> SI-M Haputo ERA – potential increased usage by military and civilian personnel. Potential Mitigation Measures <ul style="list-style-type: none"> • Fencing. • Info/educational signage. • Educational materials regarding sensitive biological resources. • Monitoring of visitor use. 	<u>Terrestrial Conservation Areas</u> SI-M Haputo ERA – potential increased usage by military and civilian personnel. Potential Mitigation Measures Mitigation would be the same as under Alternative A.	<u>Terrestrial Conservation Areas</u>	<u>Terrestrial Conservation Areas</u>	<u>Terrestrial Conservation Areas</u>
NI Overlay Refuge – with implementation of BMPs, there would be no impacts to Overlay Refuge from operations.	NI Same as Alternative A.	NI Same as Alternative A.	NI No terrestrial conservation areas within Barrigada.	LSI Although Overlay Refuge-specific BMPs were not identified within the 2010 Final EIS, BMPs proposed for other terrestrial biological resources would be applicable and relevant to avoid and minimize impacts to Overlay Refuge lands.
<u>Native Wildlife</u> LSI With implementation of BMPs, potential impacts to wildlife from operations would be reduced to less than significant.	<u>Native Wildlife</u> LSI Same as Alternative A.	<u>Native Wildlife</u> LSI Same as Alternative A.	<u>Native Wildlife</u> LSI Same as Alternative A.	<u>Native Wildlife</u> LSI Same as Alternative A.

Legend: **SI** = significant impact; **SI-M** = significant impact-mitigable; **LSI** = less than significant impact; **NI** = no impact; **BI** = beneficial impact.

Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
<p><u>Special-Status Species – Federal ESA-Listed and Candidate Species</u></p> <p>SI-M Mariana fruit bat – impacts to fruit bat habitat due to operations (e.g., lights, noise, human activity).</p> <p>Potential Mitigation Measures</p> <ul style="list-style-type: none"> • 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. 	<p><u>Special-Status Species – Federal ESA-Listed and Candidate Species</u></p> <p>SI-M Mariana fruit bat – impacts to fruit bat habitat due to operations (e.g., lights, noise, human activity).</p> <p>Potential Mitigation Measures</p> <ul style="list-style-type: none"> • 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. 	<p><u>Special-Status Species – Federal ESA-Listed and Candidate Species</u></p> <p>SI-M Mariana fruit bat – impacts to fruit bat habitat due to operations (e.g., lights, noise, human activity).</p> <p>Potential Mitigation Measures</p> <ul style="list-style-type: none"> • Continued implementation of the potential mitigation measures under Construction Impacts, Vegetation would also benefit the Mariana fruit bat. 	<p><u>Special-Status Species – Federal ESA-Listed and Candidate Species</u></p>	<p><u>Special-Status Species – Federal ESA-Listed and Candidate Species</u></p> <p>SI-M Mariana fruit bat. Mariana crow, Guam Micronesian kingfisher, Guam rail – impacts to habitat due to operations (e.g., lights, noise, human activity).</p> <p>Potential Mitigation Measures See the 2010 Final EIS, Volume 7, Chapter 2: Overview of Best Management Practices and Proposed Mitigation Measures, Table 2.2-1: Summary of Proposed Mitigation Measures (mitigations specific to Volume 2), Pages 2-25-2-45.</p>
<p>NI Mariana Crow, Guam Rail, and Guam Micronesian Kingfisher – no impacts as these species no longer occur in the wild on Guam.</p> <p>LSI Sea turtles, tree snails – species only found within Haputo ERA; implementation of BMPs (e.g., shielded lights) would avoid and minimize impacts to coastal areas; implementation of potential mitigation measures for Vegetation and Terrestrial Conservation Areas would also benefit sea turtles and tree snails.</p> <p>NI Mariana eight-spot butterfly – cantonment/housing operations would not impact butterflies or host plants.</p>	<p>NI Mariana Crow, Guam Rail, and Guam Micronesian Kingfisher – no impacts as these species no longer occur in the wild on Guam.</p> <p>LSI Same as Alternative A.</p> <p>NI Same as Alternative A.</p>	<p>NI Mariana Crow, Guam Rail, and Guam Micronesian Kingfisher – no impacts as these species no longer occur in the wild on Guam.</p> <p>LSI Sea turtles – suitable beach habitat not within impacted areas; implementation of BMPs (e.g., shielded lights) would avoid and minimize impacts to coastal areas.</p> <p>NI Same as Alternative A.</p>	<p>NI Mariana Crow, Guam Rail, and Guam Micronesian Kingfisher – no impacts as these species no longer occur in the wild on Guam.</p> <p>NI Mariana common moorhen, Guam tree snail – after construction, no suitable habitat within Barrigada so species would not occur.</p>	<p>LSI Sea turtles, tree snails – species only found within Haputo ERA; implementation of potential mitigation measures for fruit bat would benefit sea turtles and tree snails.</p> <p>NI Mariana eight-spot butterfly – cantonment/housing operations would not impact butterflies or host plants.</p>

Legend: **SI** = significant impact; **SI-M** = significant impact-mitigable; **LSI** = less than significant impact; **NI** = no impact; **BI** = beneficial impact.

Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

Finegayan (Alternative A)	Finegayan/South Finegayan (Alternative B)	Andersen Air Force Base (Alternative C)	Barrigada (Alternative D)	No-Action Alternative
<i>NI</i> <i>Serianthes</i> tree – no operational impacts to <i>Serianthes</i> or recovery habitat due to cantonment/housing operations.	<i>NI</i> <i>Serianthes</i> tree – no operational impacts to <i>Serianthes</i> or recovery habitat due to cantonment/housing operations.	<i>NI</i> <i>Serianthes</i> tree – no operational impacts to <i>Serianthes</i> or recovery habitat due to cantonment/housing operations.	<i>NI</i> <i>Serianthes</i> tree – no operational impacts to <i>Serianthes</i> or recovery habitat due to cantonment/housing operations.	<i>NI</i> <i>Serianthes</i> tree – no operational impacts to <i>Serianthes</i> or recovery habitat due to cantonment/housing operations.
<u>Special-Status Species –Guam-Listed and SOGCN</u> <i>NI</i> Micronesian starling, white-throated ground dove – species do not occur within project area. Moth skink, Pacific slender-toed gecko, <i>Tabernaemontana rotensis</i> , <i>Cycas micronesica</i> – cantonment/housing operations would not impact these species.	<u>Special-Status Species –Guam-Listed and SOGCN</u> <i>NI</i> Same as Alternative A.	<u>Special-Status Species –Guam-Listed and SOGCN</u> <i>NI</i> Micronesian starling, moth skink, <i>Tabernaemontana rotensis</i> – cantonment/housing operations would not impact these species. White-throated ground dove – species does not occur within project area.	<u>Special-Status Species –Guam-Listed and SOGCN</u> <i>NI</i> Micronesian starling, moth skink – cantonment/housing operations would not impact these species.	<u>Special-Status Species –Guam-Listed and SOGCN</u> <i>NI</i> Moth skink, Pacific slender-toed gecko, <i>Cycas micronesica</i> – cantonment/housing operations would not impact these species.
MARINE BIOLOGICAL RESOURCES				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<u>Marine Biological Resources in General</u> <i>SI-M</i> Increasing wastewater flow to a non-compliant treatment plant could result in significant direct impacts to marine biological resources during the period of non-compliance. With the potential mitigation to assist with locating funding to upgrade the Northern District WWTP to secondary treatment, the impact to marine biological resources via water quality could be beneficial in the long-term because wastewater discharge from the Northern District WWTP would improve over existing conditions with upgrades to secondary treatment. <i>Potential Mitigation Measures</i> The DoD would assist GWA in	<u>Marine Biological Resources in General</u> <i>SI-M</i> Impacts would be similar to Alternative A. <i>Potential Mitigation Measures</i> Mitigation would be the same as under Alternative A.	<u>Marine Biological Resources in General</u> <i>SI-M</i> Impacts would be similar to Alternative A. <i>Potential Mitigation Measures</i> Mitigation would be the same as under Alternative A.	<u>Marine Biological Resources in General</u> <i>SI-M</i> Increasing wastewater flow to a non-compliant treatment plant could result in significant direct impacts to marine biological resources during the period of non-compliance. With the potential mitigation to assist with locating funding to upgrade the Agana WWTP and Northern District WWTP to secondary treatment, the impact to marine biological resources via water quality could be beneficial in the long-term because wastewater discharge from the Agana WWTP and Northern District WWTP would improve over existing conditions with upgrades to secondary treatment.	<u>Marine Biological Resources in General</u> <i>SI-M</i> Impacts would be similar to those described under Alternative A, except that with the larger population projection as compared to the 2012 Roadmap Adjustments, the related increase in wastewater discharge from the Northern District WWTP would be significantly larger under the No-Action Alternative. <i>Potential Mitigation Measures</i> Mitigation would be the same as Alternative A.

Legend: *SI* = significant impact; *SI-M* = significant impact-mitigable; *LSI* = less than significant impact; *NI* = no impact; *BI* = beneficial impact.

Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
<p>locating funding for Northern District WWTP upgrades. The FY2014 NDAA directed the Secretary of Defense to convene the EAC in part to develop an implementation plan which will address assistance to support public infrastructure requirements necessary to support the preferred alternative. Additionally, the FY2014 Consolidated Appropriations Act appropriated \$106,400,000 for civilian water and wastewater improvements on Guam. As appropriate, specific projects utilizing these funds will be coordinated with the EAC in their plan to support public infrastructure requirements.</p>			<p><i>Potential Mitigation Measures</i> Mitigation would be the same as under Alternative A but would include locating funding to upgrade both the Agana WWTP and Northern District WWTP.</p>	
<p><u>Marine Flora and Invertebrates</u> <i>LSI</i> Potential indirect impacts on marine flora and invertebrates may occur from increased recreational use (damage to reefs typically caused by anchors, reef-walkers, or reckless scuba diving, snorkeling, and fishing activities) by the construction workforce, but are avoided or minimized to less than significant impacts with the implementation of BMPs.</p>	<p><u>Marine Flora and Invertebrates</u> <i>LSI</i> Similar impacts as Alternative A, except slightly reduced since housing would be developed further from the coast, thus minimizing impact.</p>	<p><u>Marine Flora and Invertebrates</u> <i>LSI</i> Similar impacts as Alternative A.</p>	<p><u>Marine Flora and Invertebrates</u> <i>LSI</i> Similar impacts as Alternative A, except slightly reduced since housing would be developed further from the coast, thus minimizing impact.</p>	<p><u>Marine Flora and Invertebrates</u> <i>LSI</i> Less than significant impacts to marine flora and invertebrates are expected from construction activities for the no-action alternative with the implementation of BMPs.</p>
<p><u>Fish</u> <i>LSI</i> Potential indirect impacts on fish may occur from increased recreational use as mentioned above, but are avoided or minimized to less than significant impacts with the implementation of BMPs.</p>	<p><u>Fish</u> <i>LSI</i> Similar impacts as Alternative A, except slightly reduced since housing would be developed further from the coast, thus minimizing impact.</p>	<p><u>Fish</u> <i>LSI</i> Similar impacts as Alternative A. In addition, AAFB permits hook and line fishing and swimming at designated locations, which reduce potential impact.</p>	<p><u>Fish</u> <i>LSI</i> Similar impacts as Alternative A, except slightly reduced since housing would be developed further from the coast, thus minimizing impact.</p>	<p><u>Fish</u> <i>LSI</i> Less than significant impacts to fish are expected from construction activities for the no-action alternative with the implementation of BMPs.</p>

Legend: *SI* = significant impact; *SI-M* = significant impact-mitigable; *LSI* = less than significant impact; *NI* = no impact; *BI* = beneficial impact.

Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
<p><u>Essential Fish Habitat</u> LSI Potential indirect impacts on essential fish habitat may occur from increased recreational use as mentioned above, but are avoided or minimized to less than significant impacts with the implementation of BMPs.</p>	<p><u>Essential Fish Habitat</u> LSI Similar impacts as Alternative A, except slightly reduced since housing would be developed further from the coast, thus minimizing impact.</p>	<p><u>Essential Fish Habitat</u> LSI Similar impacts as Alternative A.</p>	<p><u>Essential Fish Habitat</u> LSI Similar impacts as Alternative A, except slightly reduced since housing would be developed further from the coast, thus minimizing impact.</p>	<p><u>Essential Fish Habitat</u> LSI Less than significant impacts to EFH are expected from construction activities for the no-action alternative with the implementation of BMPs.</p>
<p><u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> LSI Potential short-term impact to the green sea turtle from disturbance resulting from increased activity in the area. Potential indirect impact on special-status species from increased recreational use as mentioned above, but are avoided or minimized to less than significant impacts with the implementation of BMPs.</p>	<p><u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> LSI Similar impacts as Alternative A, except slightly reduced since housing would be developed further from the coast, thus minimizing impact.</p>	<p><u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> LSI Similar impacts as Alternative A.</p>	<p><u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> LSI Similar impacts as Alternative A, except reduced since housing would be developed further from the coast where special-status species would not be expected to be affected by construction activities, only increased recreational use of marine biological resources.</p>	<p><u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> LSI Less than significant impacts to the green sea turtle or hawksbill sea turtle are expected from construction activities for the No-Action Alternative with the implementation of BMPs.</p>
<p><u>Marine Conservation Areas</u> NI With implementation of access restrictions for construction personnel, use of Haputo ERA is not expected to increase as a result of the construction workforce. Therefore, no direct or indirect impacts to marine conservation areas are expected.</p>	<p><u>Marine Conservation Areas</u> LSI Similar impacts as Alternative A, except slightly reduced since housing would be developed further from the coast, thus minimizing impact.</p>	<p><u>Marine Conservation Areas</u> LSI Direct and indirect impacts from increased recreational use to conservation and management activities at the AAFB Marine Resource Preserve, the Pati Point Marine Preserve, and the submerged lands bordering the Guam NWR at Ritidian Point. Impacts minimized with the implementation of BMPs.</p>	<p><u>Marine Conservation Areas</u> NI There are no anticipated impacts to marine conservation areas as a result of the construction of the proposed alternative.</p>	<p><u>Marine Conservation Areas</u> LSI Construction activities for the no-action alternative are expected to result in less than significant direct and indirect impacts to conservation efforts and management activities at the Haputo ERA with the implementation of BMPs.</p>

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<u>Marine Biological Resources in General</u> SI-M Impacts would be similar to those described under Alternative A, Construction (Marine Biological Resources in General). Potential Mitigation Measures Mitigation would be the same as described under Alternative A, Construction (Marine Biological Resources in General).	<u>Marine Biological Resources in General</u> SI-M Impacts would be similar to those described under Alternative A, Construction (Marine Biological Resources in General). Potential Mitigation Measures Mitigation would be the same as described under Alternative A, Construction (Marine Biological Resources in General).	<u>Marine Biological Resources in General</u> SI-M Impacts would be similar to those described under Alternative A, Construction (Marine Biological Resources in General). Potential Mitigation Measures Mitigation would be the same as described under Alternative A, Construction (Marine Biological Resources in General).	<u>Marine Biological Resources in General</u> SI-M Impacts would be similar to those described under Alternative D, Construction (Marine Biological Resources in General). Potential Mitigation Measures Mitigation would be the same as under Alternative A, Construction (Marine Biological Resources in General), but would include locating funding to upgrade both the Agana WWTP and Northern District WWTP.	<u>Marine Biological Resources in General</u> SI-M Indirect impact from increased potential for sewage spill with increased demand on central sewer collection system. Potential Mitigation Measures Mitigation would be the same as defined in the 2010 ROD.
<u>Marine Flora and Invertebrates</u> LSI Potential indirect impacts to marine flora and invertebrates may occur from increased recreational use, as described above for construction impacts, but are avoided or minimized to less than significant impacts with the implementation of BMPs. NI No impact from stormwater, sedimentation, or non-point source pollution.	<u>Marine Flora and Invertebrates</u> LSI Similar impacts as Alternative A, except slightly reduced since housing would be developed further from the coast, thus minimizing impact.	<u>Marine Flora and Invertebrates</u> LSI Similar impacts as Alternative A.	<u>Marine Flora and Invertebrates</u> LSI Similar impacts as Alternative A; however, potential increased recreational use of marine biological resources would likely be lower in intensity but more widespread given this alternative's location is further from the coast.	<u>Marine Flora and Invertebrates</u> LSI Less than significant impacts to marine flora and invertebrates are expected from operational activities for the no-action alternative with the implementation of BMPs.
<u>Fish</u> LSI Potential indirect impacts to fish may occur from increased recreational use as mentioned above, but are avoided or minimized to less than significant impacts with the implementation of BMPs.	<u>Fish</u> LSI Similar impacts as Alternative A, except slightly reduced since housing would be developed further from the coast, thus minimizing impact.	<u>Fish</u> LSI Similar impacts as Alternative A. In addition, AAFB fishing and swimming regulations would minimize impact.	<u>Fish</u> LSI Similar impacts as Alternative A, except lower in intensity but more widespread given this alternative's location is further from the coast.	<u>Fish</u> LSI Less than significant impacts to fish are expected from operational activities for the no-action alternative with the implementation of BMPs.

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
<i>NI</i> No impact from stormwater, sedimentation, or non-point source pollution.				
<u>Essential Fish Habitat (EFH)</u> <i>LSI</i> Potential indirect impacts to EFH may occur from increased recreational use, as described above for construction impacts, but are avoided or minimized to less than significant impacts with the implementation of BMPs. <i>NI</i> No impact from stormwater, sedimentation, or non-point source pollution.	<u>Essential Fish Habitat (EFH)</u> <i>LSI</i> Similar impacts as Alternative A, except slightly reduced since housing would be developed further from the coast, thus minimizing impact.	<u>Essential Fish Habitat (EFH)</u> <i>LSI</i> Similar impacts as Alternative A.	<u>Essential Fish Habitat (EFH)</u> <i>LSI</i> Similar impacts as Alternative A, except lower in intensity but more widespread given this alternative's location is further from the coast	<u>Essential Fish Habitat (EFH)</u> <i>LSI</i> Less than significant impacts to EFH are expected from operational activities for the no-action alternative with the implementation of BMPs.
<u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> <i>LSI</i> Potential indirect impacts to the green sea turtle and hawksbill sea turtle may occur from increased recreational use, as described above for construction impacts, but are avoided or minimized to less than significant impacts with the implementation of BMPs. <i>NI</i> No impact from stormwater, sedimentation, or non-point source pollution.	<u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> <i>LSI</i> Similar impacts as Alternative A, except slightly reduced since housing would be developed further from the coast, thus minimizing impact.	<u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> <i>LSI</i> Same as Alternative A.	<u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> <i>LSI</i> Similar impacts as Alternative A, except slightly reduced since housing would be developed further from the coast, thus minimizing impact.	<u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> <i>LSI</i> Less than significant impacts to the green sea turtle and hawksbill sea turtle are expected from operational activities for the No-Action Alternative with the implementation of BMPs.
<u>Marine Conservation Areas</u> <i>LSI</i> Operational activities for the proposed action are expected to result in less than significant direct and indirect impacts to conservation efforts and management activities at	<u>Marine Conservation Areas</u> <i>LSI</i> Similar impacts as Alternative A, except slightly reduced since housing would be developed further from the coast, thus minimizing impact.	<u>Marine Conservation Areas</u> <i>LSI</i> Operational activities for the proposed action are expected to result in less than significant direct and indirect long-term impacts to conservation and management	<u>Marine Conservation Areas</u> <i>NI</i> There are no anticipated impacts to marine conservation areas as a result of the operation of the proposed alternative.	<u>Marine Conservation Areas</u> <i>LSI</i> Operational activities for the no-action alternative are expected to result in less than significant direct and indirect impacts to conservation efforts and management activities at

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
the Haputo ERA with the implementation of BMPs. Indirect impacts from recreational activities would be minimized.		activities at the AAFB Marine Resource Preserve, the Pati Point Marine Preserve, and the submerged lands bordering the Guam NWR at Ritidian Point with the implementation of BMPs.		the Haputo ERA with the implementation of BMPs.
CULTURAL RESOURCES				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<i>SI-M</i> Potential direct adverse effects to 24 historic properties and undetermined effects to 10 unevaluated buildings. Potential impacts to culturally important natural resources from vegetation removal. <i>Potential Mitigation Measures</i> Proposed mitigation through 2011 PA processes, including data recovery and contractor measures, and coordination with SHPO, concurring parties, and knowledgeable traditional practitioners.	<i>SI-M</i> Potential direct adverse effects to 21 historic properties and undetermined effects to 10 unevaluated buildings. Potential impacts to culturally important natural resources from vegetation removal. <i>Potential Mitigation Measures</i> Proposed mitigation through 2011 PA processes, including data recovery and contractor measures, and coordination with SHPO, concurring parties, and knowledgeable traditional practitioners.	<i>SI-M</i> Potential direct adverse effects to 20 historic properties and undetermined effects to 15 unevaluated buildings. Potential impacts to culturally important natural resources from vegetation removal. <i>Potential Mitigation Measures</i> Proposed mitigation through 2011 PA processes, including data recovery and contractor measures, and coordination with SHPO, concurring parties, and knowledgeable traditional practitioners.	<i>SI-M</i> Potential direct adverse effects to 13 historic properties, and undetermined effects to 13 unevaluated archaeological locations and 11 unevaluated buildings. Potential impacts to culturally important natural resources from vegetation removal. <i>Potential Mitigation Measures</i> Proposed mitigation through 2011 PA processes, including data recovery and contractor measures, and coordination with SHPO, concurring parties, and knowledgeable traditional practitioners.	<i>SI-M</i> Direct adverse effects to 11 historic properties. Potential impacts to culturally important natural resources from vegetation removal. <i>Potential Mitigation Measures</i> Mitigation through the 2011 PA with data recovery and public interpretation, and coordination with SHPO, concurring parties, and knowledgeable traditional practitioners.
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<i>SI-M</i> Potential indirect adverse effects to one NRHP-eligible archaeological site/potential Traditional Cultural Property due to increased recreation use. <i>Potential Mitigation Measures</i> Proposed mitigation through the 2011 PA stipulation on Cultural Resources Awareness orientation.	<i>SI-M</i> Potential indirect adverse effects to two NRHP-eligible archaeological sites/potential Traditional Cultural Properties due to increase in recreation use. <i>Potential Mitigation Measures</i> Proposed mitigation through the 2011 PA stipulation on Cultural Resources Awareness orientation and educational signage.	<i>NI</i> No effects to historic properties from operations.	<i>NI</i> No effects to historic properties from operations.	<i>SI-M</i> Potential indirect adverse effects to two NRHP-eligible archaeological sites/potential Traditional Cultural Properties due to increased recreation use. <i>Potential Mitigation Measures</i> Proposed mitigation through the 2011 PA stipulation on Cultural Resources Awareness orientation.

Legend: *SI* = significant impact; *SI-M* = significant impact-mitigable; *LSI* = less than significant impact; *NI* = no impact; *BI* = beneficial impact.

Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
VISUAL RESOURCES				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<i>LSI</i> Short-term direct impacts from presence of construction equipment.	<i>LSI</i> Similar impacts as Alternative A.	<i>LSI</i> Similar impacts as Alternative A.	<i>LSI</i> Similar impacts as Alternative A.	<i>LSI</i> Same as Alternative A.
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<i>LSI</i> The Finegayan site is already partially developed and the reduced number of Marines and dependents coming to Guam would result in less development than that proposed in the 2010 Final EIS. Long-term direct impacts from features being publicly visible from roadways, however, no recognized view corridors or sensitive receptors would be impacted.	<i>LSI</i> Long-term, direct impacts from some features being visible to public (e.g., gates, fencing, landscaping). New base features would be consistent with 2011 IAP.	<i>LSI</i> The proposed development at Andersen Air Force Base differs substantially from that proposed and approved under the 2010 Final EIS. Long-term direct impact from more urban development related to the cantonment/family housing. Impacts would be less than significant due to the dominant presence of vegetation throughout the region.	<i>LSI</i> Direct impacts to the visual element in the long-term, but less than significant, since the visual character of the base would not be drastically altered. Usual characteristics would be altered to a more urban appearance.	<i>SI-M</i> The mostly vegetated former FAA parcel and relatively open characteristic of the southern half of Finegayan and South Finegayan would be completely developed. This would represent a major change over the existing visual conditions. However, most of the property is already under DoD ownership, and there are few, if any, sensitive views or receptors that currently exist. Potential Mitigation Measures Prepare Installation Appearance Plan and implement design guidelines for all buildings. Minimize impact by using native flora to create a natural-appearing “screen” around the cleared range areas, outside of the firebreaks/perimeter roads. Develop and implement a landscape plan focused on retention of mature specimen trees during construction (where possible) and the establishment of a full suite of vegetation representing Guam’s native flora.

Legend: *SI* = significant impact; *SI-M* = significant impact-mitigable; *LSI* = less than significant impact; *NI* = no impact; *BI* = beneficial impact.

Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
GROUND TRANSPORTATION				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<i>LSI</i> Short-term, direct impacts from construction workers and construction-related vehicle trips resulting in congestion on on-base roadways. Implementation of appropriate work zone traffic management strategies and BMPs would minimize impacts.	<i>LSI</i> Similar impacts as Alternative A. Under this alternative, there would be two separate contiguous development areas unlike Alternative A.	<i>LSI</i> Similar impacts as Alternative A. Under this alternative, there would be two separate contiguous development areas unlike Alternative A.	<i>LSI</i> Similar impacts as Alternative A.	<i>LSI</i> Same as Alternative A.
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<i>NI</i> There would be no long-term direct impacts to on-base (internal) roadways or intersections, transit conditions, pedestrian and bicycle conditions, All on-base (internal) roadway segments and intersections have been designed with the capacity required to accommodate the expected travel demand.	<i>NI</i> Same as Alternative A.	<i>NI</i> Same as Alternative A.	<i>NI</i> Same as Alternative A.	<i>LSI</i> The impacts to ground transportation remain the same as those described in the 2010 Final EIS (Volume 6, Chapter 4: Roadways, Section 2.5.3.2: Alternative 2, page 2-151). Identified impacts would be less than significant through implementation of potential mitigation measures, specifically, the roadway improvements identified in the 2010 Final EIS (Volume 6, Chapter 4: Roadways, Section 2.5.1.7: Table 2.5-3. Guam Road Network Projects by Island Region, pages 2-140 through 2-144).
MARINE TRANSPORTATION				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<i>LSI</i> Construction would result in an increase in vessel traffic that would cause a less than significant short-term, direct impact to port traffic and processing times.	<i>LSI</i> Same impacts as Alternative A.	<i>LSI</i> Same impacts as Alternative A.	<i>LSI</i> Same impacts as Alternative A.	<i>LSI</i> Same impacts as Alternative A.

Legend: *SI* = significant impact; *SI-M* = significant impact-mitigable; *LSI* = less than significant impact; *NI* = no impact; *BI* = beneficial impact.

Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<i>LSI</i> Operation would result in an increase in vessel traffic that would cause a less than significant long-term, direct impact to port traffic and processing times.	<i>LSI</i> Same impacts as Alternative A.	<i>LSI</i> Same as Alternative A.	<i>LSI</i> Same impacts as Alternative A.	<i>LSI</i> Same impacts as Alternative A.
UTILITIES				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<u>Electrical Power</u> <i>LSI</i> Potentially short-term power outages during construction of the expanded system could occur. Advance notice and other measures would minimize impacts.	<u>Electrical Power</u> <i>LSI</i> Similar impacts as Alternative A, except for the addition of an underground distribution cable from Finegayan to South Finegayan along Route 3 to provide power to the South Finegayan family housing area.	<u>Electrical Power</u> <i>LSI</i> Similar impacts as Alternative A. There could be short-term power outages during construction of the expanded system. Advance notice and other measures would minimize impacts.	<u>Electrical Power</u> <i>LSI</i> Similar impacts as Alternative A. There could be short-term power outages during construction of the expanded system. Advance notice and other measures would minimize impacts.	<u>Electrical Power</u> <i>LSI</i> Reconditioning of existing combustion turbine generators would be required to support the construction phase and operations phase. Upgrades to off-base electrical transmission systems would also be required to support the No-Action Alternative, while no upgrades to existing generating facilities would be required under the proposed action alternatives where the total estimated increase in electrical demand would be about one-third that under the No-Action Alternative.
<u>Potable Water</u> <i>LSI</i> Short-term impacts to DoD potable water system during water main replacement and/or system modifications. The replacement main would be installed adjacent to the existing mains and switched over in phases to minimize water service interruptions to current customers and existing storage tanks around Guam should be adequate to provide sufficient water to current customers during modifications. The proposed	<u>Potable Water</u> <i>LSI</i> Similar impacts as Alternative A. Potentially short water outages during construction of the expanded and modified system could occur. Construction phasing, temporary water lines, customer notifications, off hours construction work, or other potential mitigations would be utilized to mitigate outages.	<u>Potable Water</u> <i>LSI</i> Similar impacts to Alternative A. Potentially short water outages during construction of the expanded and modified system could occur. Construction phasing, temporary water lines, customer notifications, off hours construction work, or other potential mitigations would be utilized to mitigate outages.	<u>Potable Water</u> <i>LSI</i> Similar impacts to Alternative A. Potentially short water outages during construction of the expanded and modified system could occur. Construction phasing, temporary water lines, customer notifications, off hours construction work, or other potential mitigations would be utilized to mitigate outages.	<u>Potable Water</u> <i>SI – GWA Distribution</i> The GWA distribution system is plagued by high, unaccounted-for water, low pressure areas, leaks, and frequent outages and boil water notices. The construction force and induced population influx will put greater strain on this system’s ability to deliver water to its customers. <i>SI-M – GWA Supply and Transmission</i> Impact to existing overburdened

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
system would supplement any lost water production.				<p>utilities infrastructure on Guam would be exacerbated by workforce and induced population. Projected potable water demand would not exceed sustainable yield of the NGLA.</p> <p>Potential Mitigation Mitigation would be the same as defined in the 2010 ROD.</p> <p>LSI – NGLA The sustainable yield of the NGLA is adequate to provide required water during the construction period should adequate number of properly spaced wells be provided.</p>
<p>Wastewater</p> <p>SI-M Direct short-term impact from additional wastewater demand during the construction peak. The Northern District WWTP is not in compliance with the 2013 NPDES permit. Alternative A would result in significant direct impacts during the period of non-compliance with the permit.</p> <p>Potential Mitigation Measures To mitigate the impact from increased wastewater flow, the DoD would assist GWA in locating funding. The FY2014 NDAA directed the Secretary of Defense to convene the EAC in part to develop an implementation plan which will address assistance to support public infrastructure requirements necessary to support the preferred alternative.</p>	<p>Wastewater</p> <p>SI-M Similar impacts as Alternative A.</p> <p>Potential Mitigation Measures Mitigation would be the same as under Alternative A.</p>	<p>Wastewater</p> <p>SI-M Similar impacts as Alternative A.</p> <p>Potential Mitigation Measures Mitigation would be the same as under Alternative A.</p>	<p>Wastewater</p> <p>SI-M Similar impacts as Alternative A, except that impacts would affect both the Northern District WWTP and Agana WWTP during the period of non-compliance with the NPDES permit.</p> <p>Potential Mitigation Measures Mitigation would be the same as under Alternative A.</p>	<p>Wastewater</p> <p>SI-M Similar to action alternatives. Long-term direct impact since the Northern District WWTP currently would not be able to meet secondary treatment discharge limits.</p> <p>Potential Mitigation Measures Mitigation would be the same as defined in the 2010 ROD.</p>

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
<p>Additionally, the FY2014 Consolidated Appropriations Act appropriated \$106,400,000 for civilian water and wastewater improvements on Guam. As appropriate, specific projects utilizing these funds will be coordinated with the EAC in their plan to support public infrastructure requirements. Additional potential mitigation measures during construction would include constructing sewers during low flow periods, by-pass pumping, and having pump trucks on stand-by.</p>				
<p>LSI Short-term, direct impact from potential service outages to current customers and sewage spills. Impacts minimized with BMPs.</p>	<p>LSI Short-term, direct impact from potential service outages to current customers and sewage spills. Impacts minimized with BMPs.</p>	<p>LSI Short-term, direct impact from potential service outages to current customers and sewage spills. Impacts minimized with BMPs.</p>	<p>LSI Short-term, direct impact from potential service outages to current customers and sewage spills. Impacts minimized with BMPs.</p>	<p>LSI Wastewater (direct) DoD Apra Harbor WWTP treatment capacity. Wastewater (indirect) GWA Agana WWTP treatment capacity. Wastewater (indirect) GWA Agana WWTP effluent quality. Wastewater (indirect) GWA southern Guam WWTPs.</p>
<p><u>Solid Waste</u> LSI The new Layon Landfill has the capacity to accommodate the projected municipal solid waste for the reduced levels of the current proposed action. The C&D debris that cannot be recycled or reused, and wastes that are prohibited at Layon Landfill would be disposed at the Naval Base Guam Landfill and permitted private hardfill facilities. All green waste would be processed for reuse. The DON is currently coordinating with the GEPA</p>	<p><u>Solid Waste</u> LSI Similar impacts as Alternative A.</p>	<p><u>Solid Waste</u> LSI Similar impacts as Alternative A, except that Alternative C would generate greater quantities of C&D debris during construction.</p>	<p><u>Solid Waste</u> LSI Similar impacts as Alternative A, except that Alternative D would generate greater quantities of C&D debris during construction</p>	<p><u>Solid Waste</u> LSI The quantities of solid wastes generated by the No-Action Alternative would be similar to that described in the 2010 Final EIS (Volume 6, Chapter 3) and would be substantially greater than that of the current proposed action.</p>

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
regarding the status of the permit for the Naval Base Guam Landfill. The proposed action would be consistent with solid waste permit terms and conditions.				
<u>IT/COMM</u> LSI Short-term interruption to commercial service during rerouting of duct banks during construction. Commercial IT/COMM would need to be expanded into the proposed new development and would add users, presenting a minimal short-term, direct impact to current users.	<u>IT/COMM</u> LSI Similar impacts as Alternative A.	<u>IT/COMM</u> LSI Similar impacts as Alternative A. Minimal potential for short- or long-term adverse environmental consequences to the existing DoD IT/COMM facilities at AAFB. Direct impact from short-term lack of commercial service during the construction phase.	<u>IT/COMM</u> LSI Similar impacts as Alternative A. For the proposed housing area at Barrigada, there are several existing DoD IT/COMM lines, but no commercial lines. The proposed housing area has been designed around those existing lines using the best available information on their locations. It is possible that these lines could be impacted during construction. Should the locations of these existing lines be different from available information, the lines might require relocation or the proposed development might require revisions to avoid the existing lines.	<u>IT/COMM</u> LSI Similar impacts as Alternative A. IT/COMM would have slightly more on base routings for the No-Action Alternative due to the increased size of the proposed cantonment/family housing.
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<u>Electrical Power</u> LSI No long-term, direct impacts as electrical power distribution system has been developed to handle the increased demand from the proposed action and proposed improvements to electrical transmission systems would accommodate future demand. The island-wide electrical power generating system owned and operated by the GPA has adequate capacity to provide for the additional demands from the proposed action. With the proposed improvements to electrical transmission systems and	<u>Electrical Power</u> LSI Similar impacts as Alternative A.	<u>Electrical Power</u> LSI Similar impacts to Alternative A.	<u>Electrical Power</u> LSI Similar impacts to Alternative A.	<u>Electrical Power</u> LSI Off-base electrical transmission and generation systems would be upgraded to support the No-Action Alternative.

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
measures to minimize outages during construction, long- and short-term direct impacts to the electrical systems would be less than significant.				
<p>Potable Water <i>SI-M (local) LSI (overall) NGLA Impact</i> Short-term, localized significant impacts to the affected subbasin 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 NGLA.</p> <p><i>Potential Mitigation Measures</i> 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, use existing wells, and/or increase the use of surface water from Fena Reservoir to reduce withdrawals from the NGLA. The DoD would continue to support the Guam Water Resources Development Group 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 FY2014 NDAA directed the</p>	<p>Potable Water <i>SI-M</i> Similar impacts as Alternative A.</p> <p><i>Potential Mitigation Measures Same as Alternative A.</i></p>	<p>Potable Water <i>SI-M</i> Similar impacts as Alternative A.</p> <p><i>Potential Mitigation Measures Same as Alternative A.</i></p>	<p>Potable Water <i>SI-M</i> Similar impacts as Alternative A.</p> <p><i>Potential Mitigation Measures Same as Alternative A.</i></p>	<p>Potable Water <i>SI</i> <i>GWA Water System</i> Significant indirect impact from increased water demand beyond system capacity. GWA has limited resources to provide water system supply improvements needed to meet indirect demand increases.</p> <p><i>Potential Mitigation Measures Mitigation would be the same as defined in the 2010 ROD.</i></p>

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
<p>Secretary of Defense to convene the EAC in part to develop an implementation plan which will address assistance to support public infrastructure requirements necessary to support the preferred alternative. Additionally, the FY2014 Consolidated Appropriations Act appropriated \$106,400,000 for civilian water and wastewater improvements on Guam. As appropriate, specific projects utilizing these funds will be coordinated with the EAC in their plan to support public infrastructure requirements.</p>				
<p>LSI Long-term increased demand to DoD and GWA systems. The DoD would have excess capacity until the Marine Corps fully occupies the proposed installation. Long-term operation of approximately 11 new wells would not impact the NGLA overall and localized short term impacts of SI-M are discussed above. Indirect impacts to GWA water system would occur due to the small increase in demand from the proposed action.</p>	<p>LSI Similar impacts as Alternative A. The proposed water infrastructure has been designed to meet the needs of the proposed action.</p>	<p>LSI Similar impacts as Alternative A. The proposed water infrastructure has been designed to meet the needs of the proposed action.</p>	<p>LSI The current water system for existing facilities would remain in service but be integrated with the proposed expanded water system for operational efficiency. Similar to Alternative A, the proposed water infrastructure has been designed to meet the needs of the proposed action.</p>	<p>SI-M (local) LSI (overall) NGLA Impact Localized Impacts to NGLA Recent initial in-progress results from the aquifer study (USGS, WERI, and others) indicate that localized increased salinity could result during drought years from this increased extraction rate, which can be limited by shifting water extraction among available wells. For the overall NGLA, total forecast water extraction demands from the NGLA are within estimated sustainable yields with proper aquifer management. The in-progress aquifer study would need to be updated for the higher estimated extraction rate under the no action alternative, which could result in a potentially greater impact to the NGLA.</p>

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
				<p>Potential Mitigation Measures Mitigation would be the same as defined in the 2010 ROD.</p> <p>LSI DoD Water System (direct impact) For DoD water systems, direct impact would be LSI since the DoD water systems would be upgraded to serve the increased needs.</p>
<p><u>Wastewater</u> SI-M The Northern District WWTP currently does not meet effluent requirements of the 2013 NPDES permit. Thus there would be significant direct impacts to the operations at the Northern District WWTP until it is properly upgraded and its operation meets those permit requirements. Until these upgrades are implemented, increased volume of effluent would occur and cause a significant direct impact.</p> <p>Potential Mitigation Measures The DoD would assist GWA in locating funding for Northern District WWTP upgrades. The FY2014 NDAA directed the Secretary of Defense to convene the EAC in part to develop an implementation plan which will address assistance to support public infrastructure requirements necessary to support the preferred alternative. Additionally, the FY2014 Consolidated Appropriations Act appropriated</p>	<p><u>Wastewater</u> SI-M Similar impacts as Alternative A. The long-term, direct impact to the wastewater utility is deemed significant but mitigable for the Northern District WWTP</p> <p>Potential Mitigation Measures Same as Alternative A.</p>	<p><u>Wastewater</u> SI-M Similar impacts as Alternative A.</p> <p>Potential Mitigation Measures Same as Alternative A.</p>	<p><u>Wastewater</u> SI-M Similar impacts as Alternative A. However, impacts would result from upgrades needed for both Northern District WWTP and Agana WWTP.</p> <p>Potential Mitigation Measures Same as Alternative A.</p>	<p><u>Wastewater</u> SI-M The Northern District WWTP is not in compliance with the relevant court order at the time of the 2010 ROD. Increased flow to a non-compliant WWTP is a significant impact. Also the capacity of the Northern District WWTP would be inadequate to handle the estimated increased wastewater flow.</p> <p>Potential Mitigation Measures Mitigation would be the same as defined in the 2010 ROD.</p>

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
\$106,400,000 for civilian water and wastewater improvements on Guam. As appropriate, specific projects utilizing these funds will be coordinated with the EAC in their plan to support public infrastructure requirements.				
LSI Agana WWTP and GWA southern WWTPs would be indirectly impacted by wastewater flows from the induced civilian growth. The minor additional flows from indirect impacts, the long-term, direct impact to each would be less than significant.	LSI Similar to Alternative A, there would be less than significant long-term impacts for the collection system and for other wastewater treatment plants and collection systems during operations.	LSI Similar to Alternative A, there would be less than significant long-term impacts for the collection system and for other wastewater treatment plants and collection systems during operations.	LSI Similar to Alternative A, there would be less than significant long-term impacts for the collection system and for other wastewater treatment plants and collection systems during operations.	
<u>Solid Waste</u> LSI The new Layon Landfill has the capacity to accommodate the projected municipal solid waste from Alternative A. The long-term increase in solid waste generated by the additional DoD population would be managed by the new transfer station, recycling center, and planned additional solid waste handling trucks/equipment. The proposed action would be consistent with solid waste permit terms and conditions.	<u>Solid Waste</u> LSI Similar impacts as Alternative A, except there would be a small increase in transport of municipal solid waste from family housing at South Finegayan to the transfer facility at Finegayan cantonment.	<u>Solid Waste</u> LSI Similar impacts as Alternative A. Since new facilities serving the proposed cantonment/family housing would be provided, the existing solid waste capabilities at AAFB would not be impacted.	<u>Solid Waste</u> LSI Similar impacts as Alternative A.	<u>Solid Waste</u> LSI The quantities of solid wastes generated by the No-Action Alternative would be similar to that described in the 2010 Final EIS (Volume 6, Chapter 3) and would be substantially greater than that of the current proposed action. The solid waste disposal capacity on Guam has changed since the 2010 Final EIS due to the opening of the new GovGuam Layon Landfill.
<u>IT/COMM</u> LSI Long-term, direct impacts to current DoD operations would be less than significant by designing the additional expanded system in an integrated way. Current commercial IT/COMM facilities have adequate capacity within nearby	<u>IT/COMM</u> LSI Similar impacts as Alternative A. IT/COMM infrastructure has been designed to meet project needs.	<u>IT/COMM</u> LSI Similar impacts as Alternative A. There would be minimal potential for short- or long-term adverse environmental consequences to the existing DoD IT/COMM facilities at AAFB. Existing Building 112 at Finegayan has adequate current	<u>IT/COMM</u> LSI Similar impacts as Alternative A. The proposed IT/COMM infrastructure has been developed to meet the requirements for the proposed action. However, for the proposed cantonment/housing area at Barrigada, there is no existing	<u>IT/COMM</u> LSI IT/COMM would have slightly more on base routings for the No-Action Alternative due to the increased size of the proposed cantonment/family housing.

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
infrastructure.		capacity to handle additional connections for IT/COMM required. The current commercial IT/COMM facilities have adequate capacity within nearby infrastructure. No permanent or long-term environmental consequences to the commercial IT/COMM infrastructure.	IT/COMM infrastructure so there would be no environmental impacts to users of that resource.	
SOCIOECONOMICS AND GENERAL SERVICES				
Construction and Operation Impacts	Construction and Operation Impacts	Construction and Operation Impacts	Construction and Operation Impacts	Construction and Operation Impacts
<p><u>Population Change</u> <i>SI</i> 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, as noted in the following subsections.</p> <p><i>Potential Mitigation Measures</i> 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,</p>	<p><u>Population Change</u> <i>SI</i> The impacts would be island-wide and would be the same as described under Alternative A.</p> <p><i>Potential Mitigation Measures</i> Same as Alternative A.</p>	<p><u>Population Change</u> <i>SI</i> The impacts would be island-wide and would be the same as described under Alternative A.</p> <p><i>Potential Mitigation Measures</i> Same as Alternative A.</p>	<p><u>Population Change</u> <i>SI</i> The impacts would be island-wide and would be the same as described under Alternative A.</p> <p><i>Potential Mitigation Measures</i> Same as Alternative A.</p>	<p><u>Population Change</u> <i>SI</i> Population increase during construction would be both beneficial and adverse; population growth fuels economic expansion but sudden population growth would strain government services and the social fabric.</p> <p><i>Potential Mitigation Measures</i> See the 2010 Final EIS, Volume 7, Chapter 2: Overview of Best Management Practices and Proposed Mitigation Measures, Table 2.2-1: Summary of Proposed Mitigation Measures (mitigations specific to Volume 2), Pages 2-25-2-45.</p>

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
<p>and the estimated increases in GovGuam tax revenues would likely compensate for any increased demand on public services that would occur.</p>				
<p><u>Economic Activity</u> LSI There would not be a significant impact related to civilian housing demand because there would not be a substantial change to baseline conditions. Effect on rate payers for utilities would be minimal since the estimated increase in power demand could be handled by existing generating capacity. Impacts to tourism would be considered mixed (partially beneficial and partially adverse) and, overall, less than significant. Compared to the overall number of annual visitor arrivals to Guam, the number of construction-related business visitor arrivals would be expected to be small and thus impacts would be considered less than significant. Impacts to Guam’s tourism industry from loss of workforce and/or wage increases would be considered less than significant. BI Economic impacts would be beneficial, leading to increased employment and standards of living. In 2021, civilian labor force demand with the proposed action would be 11.9% higher than it otherwise</p>	<p><u>Economic Activity</u> LSI The impacts would be island-wide and would be the same as described under Alternative A. BI The impacts would be island-wide and would be the same as described under Alternative A.</p>	<p><u>Economic Activity</u> LSI The impacts would be island-wide and would be the same as described under Alternative A. BI The impacts would be island-wide and would be the same as described under Alternative A</p>	<p><u>Economic Activity</u> LSI The impacts would be island-wide and would be the same as described under Alternative A. BI The impacts would be island-wide and would be the same as described under Alternative A</p>	<p><u>Economic Activity</u> SI Beneficial economic and tourism impacts. Rate payer increase for utilities and off-base roads due to indirect population (workforce population and induced). Potential Mitigation See the 2010 Final EIS, Volume 7, Chapter 2: Overview of Best Management Practices and Proposed Mitigation Measures, Table 2.2-1: Summary of Proposed Mitigation Measures (mitigations specific to Volume 2), Pages 2-25- 2-45.</p>

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
<p>would have been, without the project. At 2028, the difference would decline to 2.4% - both representing a beneficial impact. Civilian labor force income would also be higher than it otherwise would have been, during the construction and operations phases. During the operations phase, it is likely that the increase in military personnel would generate more visits from friends and family, as well as more business travel, beneficially impacting the tourism industry. There would be a beneficial impact from increase in civilian labor force income, increase in Gross Island Product, and tax revenues during the construction and operations phases.</p>				
<p><u>Public Services</u> <i>SI-M</i> During construction, all categories of public services agencies combined would require an estimated 130 additional employees, an increase of 2.9% over baseline staffing levels. This maximum increase in staffing levels would be temporary, lasting from approximately 2021 through 2023. The increase in Guam’s population from the proposed action would not likely put excessive strain on Guam’s public services and permitting agencies. However, staffing requirements for many public service agencies would increase by more than 2% indicating significant impacts. A total of 14 agencies would be affected by the increase in Guam’s population</p>	<p><u>Public Services</u> <i>SI-M</i> The impacts would be island-wide and would be the same as described under Alternative A. Potential Mitigation Mitigation would be the same as under Alternative A.</p>	<p><u>Public Services</u> <i>SI-M</i> The impacts would be island-wide and would be the same as described under Alternative A. Potential Mitigation Mitigation would be the same as under Alternative A.</p>	<p><u>Public Services</u> <i>SI-M</i> The impacts would be island-wide and would be the same as described under Alternative A. Potential Mitigation Mitigation would be the same as under Alternative A.</p>	<p><u>Public Services</u> <i>SI</i> Adverse impacts to public services due to increased requirements for staffing and services. Potential Mitigation See the 2010 Final EIS, Volume 7, Chapter 2: Overview of Best Management Practices and Proposed Mitigation Measures, Table 2.2-1: Summary of Proposed Mitigation Measures (mitigations specific to Volume 2), Pages 2-25-2-45.</p>

Legend: *SI* = significant impact; *SI-M* = significant impact-mitigable; *LSI* = less than significant impact; *NI* = no impact; *BI* = beneficial impact.

Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
<p>during the construction phase.</p> <p>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. As directed by the FY2014 NDAA, the DoD would convene the EAC to consider assistance necessary to support the preferred alternative and develop an implementation plan coordinated by all 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. The DoD would continue to support existing programs that contribute and/or donate excess equipment to local agencies.</p>				

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
<p>LSI At steady-state (operations phase), GovGuam public services agencies would require an additional 55 staff, an increase of 1.2% over baseline levels, resulting in a less than significant impact.</p>	<p>LSI At steady-state (operations phase), the impacts would be island-wide and would be the same as described under Alternative A.</p>	<p>LSI At steady-state (operations phase), the impacts would be island-wide and would be the same as described under Alternative A.</p>	<p>LSI At steady-state (operations phase), the impacts would be island-wide and would be the same as described under Alternative A.</p>	
<p>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.</p> <p>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</p>	<p>Sociocultural Issues SI-M The impacts would be island-wide and would be the same as described under Alternative A.</p> <p>Potential Mitigation Mitigation would be the same as under Alternative A.</p>	<p>Sociocultural Issues SI-M The impacts would be island-wide and would be the same as described under Alternative A.</p> <p>Potential Mitigation Mitigation would be the same as under Alternative A.</p>	<p>Sociocultural Issues SI-M The impacts would be island-wide and would be the same as described under Alternative A.</p> <p>Potential Mitigation Mitigation would be the same as under Alternative A.</p>	<p>Sociocultural Issues SI There would be adverse sociocultural impacts.</p> <p>Potential Mitigation See the 2010 Final EIS, Volume 7, Chapter 2: Overview of Best Management Practices and Proposed Mitigation Measures, Table 2.2-1: Summary of Proposed Mitigation Measures (mitigations specific to Volume 2), Pages 2-25-2-45.</p>

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
<p>workforce population levels and indirectly influence induced population growth to address sociocultural issues. See Section 2.9 for further discussion on the CMCC.</p> <p>As directed by the FY2014 NDAA, the DoD would convene the EAC to consider assistance necessary to support the preferred alternative and develop an implementation plan coordinated by all 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.</p> <p>The \$12,000,000 appropriated under FY2012 Consolidated Appropriations Act for a Guam Cultural Repository facility remains in place. The appropriation provides funding for a repository for curation of archaeological collections on Guam and serve as a source of information on Guam history and culture.</p>				
HAZARDOUS MATERIALS AND WASTE				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<p><u>Hazardous Materials Management</u> <i>LSI</i></p> <p>Short-term increased hazardous waste generation, storage, handling, and disposal would have short-term direct impacts to human health and the environment. Direct impacts to two existing Installation Restoration</p>	<p><u>Hazardous Materials Management</u> <i>LSI</i></p> <p>Similar impacts as Alternative A, with the exception that there would be potential direct impacts to one existing Installation Restoration Program site.</p>	<p><u>Hazardous Materials Management</u> <i>LSI</i></p> <p>Similar impacts as Alternative A, with the exception that there would be potential direct impacts to six existing Installation Restoration Program sites and one MMRP site.</p>	<p><u>Hazardous Materials Management</u> <i>LSI</i></p> <p>Similar impacts as Alternative B.</p>	<p><u>Hazardous Materials Management</u> <i>LSI</i></p> <p>Short-term increased hazardous waste generation, storage, handling, and disposal would have the potential to result in direct impacts to human health and the environment. Although, considered</p>

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
Program sites. Indirect, long-term beneficial impact to fuel storage and conveyance infrastructure from being brought into compliance.				less than significant, the potential direct impacts would be considerably more for the No-Action Alternative when compared to the SEIS alternatives.
<u>Hazardous Waste Management</u> LSI Short-term increase in generation, transport, storage and handling of hazardous waste. Direct adverse impacts to human health and the environment from short-term increase in hazardous waste. Adherence to applicable BMPs and SOPs would minimize potential direct impact. No long-term direct or in-direct impact on the management of hazardous waste at DoD facilities on Guam.	<u>Hazardous Waste Management</u> LSI Similar to impacts under Alternative A.	<u>Hazardous Waste Management</u> LSI Similar to impacts under Alternative A.	<u>Hazardous Waste Management</u> LSI Similar to impacts under Alternative A.	<u>Hazardous Waste Management</u> LSI Similar to impacts under Alternative A. Although, considered less than significant, the potential direct impacts would be considerably more for the No-Action Alternative when compared to the SEIS alternatives.
<u>Contaminated Sites</u> LSI Project design would avoid overlap with contaminated sites. Various BMPs and construction operational protocol would be followed if relocation of construction projects is not possible. Special design techniques and methodology would be required to ensure the long-term structural integrity of proposed construction projects.	<u>Contaminated Sites</u> LSI Similar to impacts under Alternative A., except No MMRP sites were identified in the area of South Finegayan proposed for development for family housing under Alternative B.	<u>Contaminated Sites</u> LSI Similar to impacts under Alternative A.	<u>Contaminated Sites</u> LSI Similar to impacts under Alternative A.	<u>Contaminated Sites</u> LSI Similar to impacts under Alternative A.
<u>Toxic Substances</u> LSI Demolition of older buildings and/or utilities may result in encountering PCBs, ACM and LBP that were used in the older building materials. Toxic substances would not be utilized for new construction. Because the proposed construction areas are	<u>Toxic Substances</u> LSI Similar to impacts under Alternative A.	<u>Toxic Substances</u> LSI Similar to impacts under Alternative A.	<u>Toxic Substances</u> LSI Similar to impacts under Alternative A.	<u>Toxic Substances</u> LSI Similar to impacts under Alternative A.

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
located in a USEPA Radon Zone 1, it is possible that new buildings, facilities, and structures could encounter radon intrusion. To minimize this impact, radon resistant construction techniques and potential mitigation systems would be incorporated into the building/facility designs. In addition, DoD would periodically test facilities constructed in known radon zones to verify that no unacceptable radon gas buildup occurs and install radon mitigation systems as appropriate.				
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<u>Hazardous Materials Management LSI</u> Long-term, direct impact from increase in transport/transfer of hazardous materials, primarily from use of POL. Current hazardous materials handling, storage, and disposal capacity is sufficient. BMPs and SOPs would minimize potential direct or indirect impacts. Training use would be in compliance with MCO P5090.2A. Existing hazardous waste accumulation sites would be maintained to support the proposed cantonment/family housing area and a 90-day accumulation area would be provided. In addition, an undetermined number of satellite accumulation sites would be created, as needed, in proximity to hazardous materials use and hazardous waste generation to support cantonment activities.	<u>Hazardous Materials Management LSI</u> Similar impacts as Alternative A.	<u>Hazardous Materials Management LSI</u> Similar impacts as Alternative A.	<u>Hazardous Materials Management LSI</u> Similar impacts as Alternative A.	<u>Hazardous Materials Management LSI</u> Long-term increased hazardous materials storage, handling, and disposal. Increase potential for minor spill, leak, or release direct impacts from long-term increased vehicular traffic.

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
<p><u>Hazardous Waste Management</u> LSI Increase in transport/transfer of hazardous waste on Guam from increased population. New satellite hazardous waste storage areas would be created in proximity to hazardous materials use and hazardous waste generation, and would be managed with applicable regulations.</p>	<p><u>Hazardous Waste Management</u> LSI Similar to impacts under Alternative A.</p>	<p><u>Hazardous Waste Management</u> LSI Similar to impacts under Alternative A.</p>	<p><u>Hazardous Waste Management</u> LSI Similar to impacts under Alternative A.</p>	<p><u>Hazardous Waste Management</u> LSI Similar to impacts under Alternative A. Long-term increased requirement for off-island hazardous waste disposal. Long-term increases to DRMO's hazardous waste storage, handling, and disposal capacity. New hazardous waste accumulation areas established.</p>
<p><u>Contaminated Sites</u> LSI Direct or indirect impacts to contaminated sites from operations would be less than significant. Any potentially contaminated sites would be assessed and remediated, as appropriate, for the proposed reuse of the site. Operational activities would not disturb any remediation sites or controls or interfere with monitoring areas.</p>	<p><u>Contaminated Sites</u> LSI Similar to impacts under Alternative A.</p>	<p><u>Contaminated Sites</u> LSI Similar to impacts under Alternative A.</p>	<p><u>Contaminated Sites</u> LSI Similar to impacts under Alternative A.</p>	<p><u>Contaminated Sites</u> LSI Similar to impacts under Alternative A. Potential impacts to existing IRP/MMRP sites.</p>
<p><u>Toxic Substances</u> LSI No significant environmental consequences from ACM, LBP, and PCBs are anticipated. ACM and gases would not be transported or transferred as a result of these activities. Existing BMPs and SOPs would be followed minimizing the potential for releases to the environment. Cantonment operations would have no direct or indirect impact on ACM, LBP, and PCBs. ACM, LBP, and PCBs would not be used in new facilities on Guam. Because the proposed construction areas are located in a USEPA Radon Zone 1, it is possible that new</p>	<p><u>Toxic Substances</u> LSI Similar to impacts under Alternative A.</p>			

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
buildings, facilities, and structures could encounter radon intrusion. To minimize this impact, radon resistant construction techniques and mitigation systems would be incorporated into the building/facility designs. In addition, DoD would periodically test facilities constructed in known radon zones to verify that no unacceptable radon gas buildup occurs and install radon mitigation systems as appropriate.				
PUBLIC HEALTH AND SAFETY				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<u>Notifiable Diseases</u> LSI Potential increase in STDs, notifiable diseases, and mental illness due to increase in population. No adverse impact to health care centers. Implementation of BMPs would reduce potential water-related disease outbreak.	<u>Notifiable Diseases</u> LSI Similar impacts as Alternative A.	<u>Notifiable Diseases</u> LSI Similar impacts as Alternative A.	<u>Notifiable Diseases</u> LSI Similar impacts as A.	<u>Notifiable Diseases</u> LSI Less than significant impacts to health care services from increases in notifiable diseases and mental illness.
<u>Operational Safety</u> NI No direct or indirect impact from exposure to electromagnetic emissions. A Health and Safety program would be implemented for short-term construction activities.	<u>Operational Safety</u> NI Same as Alternative A.	<u>Operational Safety</u> NI Similar to impacts under Alternative A. The areas proposed for the cantonment and housing at AAFB are situated outside of the APZs.	<u>Operational Safety</u> NI Same as Alternative A.	<u>Operational Safety</u> NI Same as Alternative A.
<u>Environmental Health Effects</u> LSI Direct and indirect impact from short-term increase in construction noise. Long-term increased groundwater withdrawal. Avoidance measures would be implemented to	<u>Environmental Health Effects</u> LSI Same as Alternative A. Long-term operational noise from activities occurring within the cantonment and housing areas would be similar to current noise levels.	<u>Environmental Health Effects</u> LSI Same as Alternative A. Long-term operational noise at AAFB would be similar to current noise levels. The area proposed for the cantonment and housing are within the 60 to 70	<u>Environmental Health Effects</u> LSI Same as Alternative A. Long-term operational noise from activities occurring within the cantonment and housing areas would be similar to current noise levels.	<u>Environmental Health Effects</u> LSI Less than significant direct impacts due to short-term construction noise.

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
reduce potential water contamination.		dB noise range and are compatible with residential development.		
<u>Hazardous Substances</u> <i>NI</i> Short and long-term increase in the use, handling, storage, transportation, and disposition of hazardous substances. Existing IRP sites would not affect the proposed development and is not near an off-site population.	<u>Hazardous Substances</u> <i>NI</i> Similar to impacts under Alternative A.			
<u>Unexploded Ordnance</u> <i>LSI</i> UXO may be encountered <i>NI</i> No impact to health care services due to increase in mental illness cases. No impacts to public, military personnel, or worker safety due to short-term construction hazards. No direct or indirect impacts from hazardous substances use during construction. BMPs would ensure safety of workers and the public.	<u>Unexploded Ordnance</u> <i>LSI/NI</i> Similar to impacts under Alternative A.	<u>Unexploded Ordnance</u> <i>LSI/NI</i> Similar to impacts under Alternative A.	<u>Unexploded Ordnance</u> <i>LSI/NI</i> Similar to impacts under Alternative A.	<u>Unexploded Ordnance</u> <i>LSI</i> Less than significant direct impacts due to potential contact with UXO. <i>NI</i> Same as Alternative A.
<u>Traffic Incidents</u> <i>LSI</i> Potential for increased traffic accidents and fatalities.	<u>Traffic Incidents</u> <i>LSI</i> Similar to impacts under Alternative A.	<u>Traffic Incidents</u> <i>LSI</i> Similar to impacts under Alternative A.	<u>Traffic Incidents</u> <i>LSI</i> Similar to impacts under Alternative A.	<u>Traffic Incidents</u> <i>LSI</i> Less than significant impacts due to potential increase in traffic incidents.
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<u>Notifiable Diseases</u> <i>LSI</i> Similar to the construction impacts, operations would result in less than significant impacts to health care services from increases in illnesses related to notifiable diseases and mental illness.	<u>Notifiable Diseases</u> <i>LSI</i> Impacts similar to Alternative A.	<u>Notifiable Diseases</u> <i>LSI</i> Impacts similar to Alternative A.	<u>Notifiable Diseases</u> <i>LSI</i> Impacts similar to Alternative A.	<u>Notifiable Diseases</u> <i>LSI</i> Less than significant impacts to health care services from increases in notifiable diseases.

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
<p><u>Operational Safety</u> <i>NI</i> Similar to construction impacts, operations would result in no impacts to operational safety.</p>	<p><u>Operational Safety</u> <i>NI</i> Impacts similar to Alternative A.</p>	<p><u>Operational Safety</u> <i>NI</i> Impacts similar to Alternative A.</p>	<p><u>Operational Safety</u> <i>NI</i> Impacts similar to Alternative A.</p>	<p><u>Operational Safety</u> <i>NI</i> Similar to construction impacts, operations would result in no impacts to operational safety.</p>
<p><u>Environmental Health Effects</u> <i>LSI</i> Similar to the construction impacts, operations would result in less than significant direct impacts due to long-term operations noise. Operations would result in less than significant direct impacts to water quality as a result of increased long-term demand and potential water related illness.</p>	<p><u>Environmental Health Effects</u> <i>LSI</i> Impacts similar to Alternative A.</p>	<p><u>Environmental Health Effects</u> <i>LSI</i> Impacts similar to Alternative A.</p>	<p><u>Environmental Health Effects</u> <i>LSI</i> Impacts similar to Alternative A.</p>	<p><u>Environmental Health Effects</u> <i>LSI</i> Similar to Alternative A, there would be less than significant long-term direct impacts to water quality and noise.</p>
<p><u>Hazardous Substances</u> <i>NI</i> Similar to construction impacts, operations would result in no impacts to hazardous substances use.</p>	<p><u>Hazardous Substances</u> <i>NI</i> Impacts similar to Alternative A.</p>	<p><u>Hazardous Substances</u> <i>NI</i> Impacts similar to Alternative A.</p>	<p><u>Hazardous Substances</u> <i>NI</i> Impacts similar to Alternative A.</p>	<p><u>Hazardous Substances</u> <i>NI</i> Similar to construction impacts, operations would result in no impacts to hazardous substances use.</p>
<p><u>Unexploded Ordnance</u> <i>LSI</i> Similar to the construction impacts, operations would result in less than significant direct impacts due to potential contact with UXO</p>	<p><u>Unexploded Ordnance</u> <i>LSI</i> Impacts similar to Alternative A.</p>	<p><u>Unexploded Ordnance</u> <i>SI</i> In the event of a munitions transport incident or explosives incident at the North Gate, a significant direct impact related to explosive safety could occur.</p> <p>Potential Mitigation No Mitigation. Siting the proposed cantonment/ housing in another location would be required to eliminate the potential need for evacuations in the event of a munitions transportation mishap.</p>	<p><u>Unexploded Ordnance</u> <i>LSI</i> Impacts similar to Alternative A.</p>	<p><u>Unexploded Ordnance</u> <i>LSI</i> Less than significant direct impacts due to potential contact with UXO.</p>

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
<p><u>Traffic Incidents</u> LSI Similar to the construction impacts, operations would result in less than significant long-term impacts due to potential increase in traffic incidents.</p>	<p><u>Traffic Incidents</u> LSI Impacts similar to Alternative A.</p>	<p><u>Traffic Incidents</u> LSI Impacts similar to Alternative A.</p>	<p><u>Traffic Incidents</u> LSI Impacts similar to Alternative A.</p>	<p><u>Traffic Incidents</u> LSI Less than significant long-term impacts due to potential increase in traffic incidents.</p>
ENVIRONMENTAL JUSTICE AND THE PROTECTION OF CHILDREN				
Construction and Operation Impacts	Construction and Operation Impacts	Construction and Operation Impacts	Construction and Operation Impacts	Construction and Operation Impacts
<p><u>Noise</u> LSI Construction activities would result in short-term, direct noise impacts to surrounding communities, but minority, low-income, or children populations would not be disproportionately affected. Operational noise would not be significant and would not disproportionately affect minority, low-income, or children populations.</p>	<p><u>Noise</u> LSI Impacts are generally island-wide and would be the same as described for Alternative A.</p>	<p><u>Noise</u> LSI Impacts are generally island-wide and would be the same as described for Alternative A.</p>	<p><u>Noise</u> LSI Impacts are generally island-wide and would be the same as described for Alternative A.</p>	<p><u>Noise</u> LSI Environmental justice impacts from noise impacts would be less than significant.</p>
<p><u>Recreation</u> LSI Increased construction traffic would decrease access to recreational sites, but minority, low-income, or children populations would not be disproportionately affected. Operationally, all people of Guam would be affected by impacts to recreational resources, so there would not be a disproportionate effect on minority, low-income, or children populations.</p>	<p><u>Recreation</u> LSI Impacts are generally island-wide and would be the same as described for Alternative A.</p>	<p><u>Recreation</u> LSI Impacts are generally island-wide and would be the same as described for Alternative A.</p>	<p><u>Recreation</u> LSI Impacts are generally island-wide and would be the same as described for Alternative A.</p>	<p><u>Recreation</u> LSI Environmental justice impacts from impacts to recreational resources would be less than significant.</p>

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
<p><u>Socioeconomics and General Services</u></p> <p>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).</p> <p>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</p>	<p><u>Socioeconomics and General Services</u></p> <p>SI-M Impacts are generally island-wide and would be the same as described for Alternative A.</p> <p>Potential Mitigation Mitigation would be the same as under Alternative A.</p>	<p><u>Socioeconomics and General Services</u></p> <p>SI-M Impacts are generally island-wide and would be the same as described for Alternative A.</p> <p>Potential Mitigation Mitigation would be the same as under Alternative A.</p>	<p><u>Socioeconomics and General Services</u></p> <p>SI-M Impacts are generally island-wide and would be the same as described for Alternative A.</p> <p>Potential Mitigation Mitigation would be the same as under Alternative A.</p>	<p><u>Socioeconomics and General Services</u></p> <p>SI The “boom and then bust” cycle of population growth and decline may stress the Guam economy and public services. This would be felt more severely by low-income people, who often do not have resources to buffer hard economic times.</p> <p>Potential Mitigation See the 2010 Final EIS, Volume 7, Chapter 2: Overview of Best Management Practices and Proposed Mitigation Measures, Table 2.2-1: Summary of Proposed Mitigation Measures (mitigations specific to Volume 2), Pages 2-25-2-45.</p>

Legend: *SI* = significant impact; *SI-M* = significant impact-mitigable; *LSI* = less than significant impact; *NI* = no impact; *BI* = beneficial impact.

Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
<p>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 FY2014 NDAA, the DoD would convene the EAC to consider assistance necessary to support the preferred alternative and develop an implementation plan coordinated by all 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.</p>				
<p><u>Public Health and Safety</u> <i>SI-M</i> 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</p>	<p><u>Public Health and Safety</u> <i>SI-M</i> Impacts are generally island-wide and would be the same as described for Alternative A. <i>Potential Mitigation</i> Mitigation would be the same as under Alternative A.</p>	<p><u>Public Health and Safety</u> <i>SI-M</i> Impacts are generally island-wide and would be the same as described for Alternative A. <i>Potential Mitigation</i> Mitigation would be the same as under Alternative A.</p>	<p><u>Public Health and Safety</u> <i>SI-M</i> Impacts are generally island-wide and would be the same as described for Alternative A. <i>Potential Mitigation</i> Mitigation would be the same as under Alternative A.</p>	<p><u>Public Health and Safety</u> <i>SI</i> Guam’s public health care services would not be able to handle potential increases in illnesses of the medically underserved and low income populations. In addition access to public health and social services would be strained by an increase in uninsured and underinsured workers coming to Guam. Construction-related impacts are considered short-term but significant and would have a corresponding significant impact on low-income people. <i>Potential Mitigation</i> See the 2010 Final EIS, Volume 7, Chapter 2: Overview of Best</p>

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
<p>staffing levels, population increase would further strain these resources, causing a significant environmental justice impact.</p> <p><i>Potential Mitigation</i> 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. As directed by the FY2014 NDAA, the DoD would convene the EAC to consider assistance necessary to support the preferred alternative and develop an implementation plan coordinated by all 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. The FY2014 Consolidated Appropriations Act (Public Law No. 113-76) appropriated</p>				<p>Management Practices and Proposed Mitigation Measures, Table 2.2-1: Summary of Proposed Mitigation Measures (mitigations specific to Volume 2), Pages 2-25-2-45.</p>

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Table 4.6-1. Summary of Impacts and Potential Mitigation Measures for the Cantonment/Family Housing Alternatives

<i>Finegayan (Alternative A)</i>	<i>Finegayan/South Finegayan (Alternative B)</i>	<i>Andersen Air Force Base (Alternative C)</i>	<i>Barrigada (Alternative D)</i>	<i>No-Action Alternative</i>
<p>\$13,000,000 for a regional public health laboratory on Guam.</p> <p>LSI There would be less than significant impacts to health care services. Less than significant impacts are anticipated from noise, water quality, UXO, and traffic incidents due to the increase in military personnel and natural population increase. There would be a less than significant environmental justice impacts from impacts to these resources.</p>	<p>LSI Impacts are generally island-wide and would be the same as described for Alternative A.</p>	<p>LSI Impacts are generally island-wide and would be the same as described for Alternative A.</p>	<p>LSI Impacts are generally island-wide and would be the same as described for Alternative A.</p>	

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