CHAPTER 5. RELATIONSHIP BETWEEN SHORT-TERM USE OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

National Environmental Policy Act Section 101 2(c)(iv) requires a detailed statement on the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity.

Short-term uses of the environment associated with the alternatives include changes to the physical environment and energy and utility use during the construction of facilities associated with all alternatives except for the no-action alternative. Construction would involve short-term increases in fugitive emissions and construction-generated noise and would increase the use of fossil fuels to power equipment. In addition, expenditures of public funds and the use of labor would be required.

Long-term changes would include the alterations to land use on both Guam and Tinian that would exist for the life of the new facilities and the alteration to the dredged depth of the turning basin and entrance channel and federal navigation channel in Apra Harbor.

There are numerous plans, procedures, protocols, regulations, and laws that have been established to protect human health and the environment. Compliance with these regulatory mandates by the Department of Defense (DoD) and its contractors would reduce both short-term and long-term impacts.

5.1 GEOLOGICAL AND SOIL RESOURCES

5.1.1 Short-Term

Construction staging areas for specific projects are assumed to be within the project footprint. Short-term use of geological and soil resources would include temporary increases in localized erosion during the construction process.

5.1.2 Long-Term

Agriculturally productive soils would not be lost and the long-term productivity of these soils would be preserved. Topographic or landscape features would not be substantially changed by proposed construction activities. Areas containing karst geologic features such as Guam's unique karst caves and sinkholes would be avoided and preserved.

5.2 WATER RESOURCES

5.2.1 Short-Term

Construction staging areas for specific projects are assumed to be within the project footprint. Construction and operational activities associated with the proposed actions would result in the potential for a temporary increase in localized runoff and total suspended solids in stormwater. To minimize these potential impacts, construction-specific Best Management Practices (BMPs) would be implemented and mandates of pollution prevention regulations would be followed to reduce the associated potential for erosion, runoff, sedimentation, and associated water quality and wetland impacts. Temporary increases in turbidity and sedimentation would occur in wetlands during construction activity. These potential impacts would be minimized through the use of BMPs. Project designs would avoid direct impacts to wetlands.

The act of offshore disposal of dredged material at a U.S. Environmental Protection Agency (USEPA)-approved Ocean Dredged Material Disposal Site would be a short-term use of the environment that would affect the water quality of the area at the time of disposal. The release of dredged material into the water column during disposal events has been demonstrated to cause short-term changes in dissolved oxygen, pH and turbidity with ambient conditions returning shortly after disposal operations cease.

5.2.2 Long-Term

With the implementation of BMPs, low-impact development actions and low impact development-comparable technologies, sustainable measures, and compliance with federal and Government of Guam guidelines, surface water quality on Guam and Tinian would be protected from impacts resulting from the proposed actions.

While long-term groundwater production rates would increase, implementation of sustainability practices would reduce the amount of groundwater needed, which would help minimize impacts to groundwater availability. The resulting total annual groundwater production would be less than the sustainable yield. Monitoring of groundwater chemistry and soils would ensure no harm to existing or beneficial use.

Wetland areas would potentially be subject to localized, temporary impacts from training activity (i.e., foot traffic). However, existing training protocols encourage the avoidance of wetland areas. Vehicle traffic would avoid wetland areas during training activities. While short-term minor impacts to wetlands would occur from personnel operations, impacts would be less than significant due to the transient and low-impact nature of the activity. In addition, transient training operations would not alter the water flow to wetland areas and BMPs and compliance with federal and Government of Guam guidelines would reduce potential long-term impacts to wetlands.

The dredging associated with the proposed actions would result in long-term productivity improvements in efficient utilization of existing and proposed assets at Apra Harbor, Guam in support of the mission of the U.S. Navy Pacific Fleet. Long-term changes affecting water resources would include the alteration to the dredged depth of Apra Harbor wharf berths and navigation channel and the creation of a turning basin.

5.3 AIR QUALITY

5.3.1 Short-Term

Short-term changes in air quality would result from construction activities that are predicted to run from 2011 through 2014. Construction of new facilities would result in short-term increases in air emissions, but these increases would not exceed the 250 tons per year (TPY) major source threshold established in the USEPA Prevention of Significant Deterioration (PSD) regulations. PSD regulations are chosen as an emission impact significance threshold for the purposes of this EIS. Air permits for all potential existing major source or major stationary source modifications would be obtained as required by law. The PSD regulations were established to ensure that air quality in attainment areas does not significantly deteriorate as a result of construction and operation of major stationary sources and to allow future industrial growth to occur. The potential air emissions for all action alternatives were considered to have a less than significant impact if emissions for regulated pollutants were below the 250 TPY threshold established under the PSD regulations. The emissions threshold was applied for all relevant emissions from the individual components of the proposed action and the cumulative effects of the entire action.

The short-term impacts from all individual components of the actions discussed in Volumes 2 to 6 were categorized as having a less than significant impact. However, if the emissions level from aggregated actions exceeds 250 TPY level, a further impact concentration dispersion modeling was conducted to

further demonstrate that there is no significant air quality impact would occur during the interim construction period with the comparison of either National Ambient Air Quality Standards or other applicable impact significance levels.

Based on the results of the analyses, air emissions associated with construction are not expected to violate air quality regulations designed to protect human health and the environment and, therefore, would not degrade the short-term quality of air resources.

5.3.2 Long-Term

Long-term operational emissions (2015 and after) from components of the proposed actions were evaluated to determine the significance of overall potential air emissions impacts using the impact thresholds described for short-term impacts. Operational emissions from both mobile and stationary sources were considered. The use of low sulfur diesel fuel relies on the islandwide implementation process as compared to the action Navy has to commit independently. The issue has been described in detail in Volume 6. The nonattainment status for Guam is also described in multiple Volumes of this EIS in detail given its complex designation status. Greater power production would increase overall emissions above existing conditions at existing utility sources. However, such an increase is common for any development project and does not produce long-term changes in air quality if the emissions from the power increase do not exceed the permit conditions for those sources providing extra power demand.

Mobile sources include aircraft, training vehicles, vessels, aircraft carriers, and off base and on base roadway vehicles. The predicted emissions or applicable pollutant concentrations indicate that the operation of these sources would have a less than significant impact.

Administration, maintenance, housing, and quality of life operations would receive power from stationary utility sources. However, the affected stationary utility sources would be operated below their permitted capacity under the proposed action. Therefore operating these affected sources would be in compliance with the applicable NAAQS resulting in a less than significant impact.

Based on the analyses performed for both stationary and mobile sources, from various project components described in Volumes 2 through 6, the combined impacts of air emissions due to the proposed actions are not expected to violate air quality regulations designed to protect human health and the environment and, therefore, would not degrade the long-term productivity of the air environment.

5.4 NOISE

5.4.1 Short-Term

Noise associated with construction activities would result in short-term increases in the ambient noise environment.

5.4.2 Long-Term

Sources of noise associated with long-term operations would increase as result of increased vehicle use, aircraft operations, training range activities, vessel traffic and base operations. However, with the exception of training range noise, the long-term productivity of operations would not be affected by this increase in noise. Mitigation measures are proposed to alleviate traffic noise impacts. However, in certain areas due to existing physical conditions, sound walls are not proposed to mitigate traffic noise as they do not meet the feasible and reasonable criteria under Guam's Traffic Noise Abatement Policy. Areas with significant traffic noise that cannot be mitigated would have an affect on long-term productivity. Mitigation measures proposed for the firing ranges would reduce the impacts to long-term productivity

due to small arms range noise. The proposed hand grenade range cannot be mitigated and would have an effect on long-term productivity.

5.5 AIRSPACE

5.5.1 Short-Term

Airspace requirements for the proposed actions would have no impacts on the short-term use of existing airspace.

5.5.2 Long-Term

The required consultation and review process with the Federal Aviation Administration (FAA) on all matters affecting airspace use would eliminate the possibility of direct adverse impacts on airspace use in the regions of influence. Activities would be wholly contained within the proposed Special Use Airspace (SUA). The required scheduling process for the SUA by the military would eliminate the potential for adverse cumulative impacts. Increased flights by military pilots operating outside the SUA would still follow FAA regulations, minimizing the potential for adverse cumulative airspace use impacts. Individually, the proposed action would have no impact on airspace. Reduction of the amount of navigable airspace due to the establishment of new SUA for a ground firing range would be minimal and would not impact existing airspace use at either Andersen Air Force Base (AFB) or Antonio Borja Won Pat International Airport. There would be no requirement for changes to the existing arrivals and departures or flight paths within the Guam flying environment.

5.6 LAND AND SUBMERGED LAND USE

5.6.1 Short-Term

Construction staging areas for specific projects are assumed to be within the project footprint. Upland dewatering sites are considered temporary, but they may exist for an indeterminate amount of time and are considered a long-term impact on land use.

5.6.2 Long-Term

The primary long-term land use impact is the federal acquisition of a large amount of non-federal land involving multiple land owners on Guam to support the Marine Corps Relocation. No submerged land would be acquired. Access to the acquired land would be limited to authorized military personnel, except for the proposed training range area east of Route 15. It is the intent of DoD to allow public access to the cultural and historic sites at Pagat and Marbo, during non-training periods. Restricting access to the training ranges is required to maintain public safety. Final plans concerning access to sites potentially impacted by the proposed action have not been developed. The Army and Navy proposed actions do not require land acquisition.

The proposed land uses on federal land are generally compatible with land use plans for adjacent property. The notable exception is live-fire training ranges being sited adjacent to land use plan-designated residential development. Noise contours at levels (Zone II) considered to be incompatible with residential use that would be generated by the training ranges would encroach on the community. The areas within the Zone II noise contour are generally vacant but future development would likely be impacted by the encroachment. Loss of open space would be most notable at NCTS Finegayan. The Route 15 training range would largely remain undeveloped, naturally vegetated open space because

development is not permitted within the surface danger zones for the training ranges. The proposed action, including roadway improvements would require relocation of some businesses.

Although there would be no submerged land acquired, access to submerged lands within the training range surface danger zones would be restricted throughout most of the year.

The upland dewatering sites would represent a long-term land use. Beneficial reuse of the existing stockpiled materials and future dredge spoils would minimize the land requirement.

On Tinian, the long-term land use impacts are associated with the new firing ranges that would 1) restrict access to the training ranges during training activities; and 2) result in some agricultural leases in the lease back area not being renewed. Leases west of 8th Avenue and east of the Rifle Known Distance Range would be retained since they are outside of the surface danger zone. There would be an increased frequency of restricted public access to the training ranges. Recreational access to the land inside the surface danger zone would be allowed during non-training periods. No land or submerged land acquisition is proposed.

5.7 RECREATIONAL RESOURCES

5.7.1 Short-Term

Construction staging areas for specific projects are assumed to be within the project footprint. Construction activities would result in short-term impacts involving traffic diversion and increased congestion on the roads accessing recreational areas. During the construction period, the population increase due to the anticipated temporary (H2B) workers and the indirect population would result in increase use of existing recreational areas, potentially stressing the public recreational areas.

5.7.2 Long-Term

Although a population decrease from the construction peak would occur, the number of recreational resources users on Guam—on installations and off base—would likely increase over the course of the proposed actions. Increases in recreational resources use would likely occur at beaches and parks, scenic points, historic and cultural sites, dive spots, trails, day use resorts, golf courses, sailing venues, on installations and the rest of the island alike. Foreseeable impacts include inadequate or overcrowded facilities, such as parking, picnic shelters, restrooms, showers, boat mooring facilities, etc. Moreover, an eroded sense of enjoyment due to increased competition for opportunities among users would result at most recreational facilities (e.g., golf courses on installations, popular dive spots etc.). An increase in the number of users would accelerate deterioration of existing facilities. Furthermore, over the long-term, recreational resources will see a reduction in productivity due to increased use from population growth from both military relocation and from organic growth, unless these resources are properly maintained. Recreational resources that would be reduced in size (e.g. Dededo Buffer Strip Park reduced by roadway widening) would have a permanent long-term reduction in productivity.

A long-term trade-off of the short-term impacts would be improvement of roadways for use by recreational resources users. Additionally, within the Main Cantonment, recreational areas would be provided, thus lessening the impacts to off-site public recreational areas. Mitigation measures to develop and/or improved recreational areas for the public can reduce these impacts.

The implementation of either training alternative would result in the loss of use of Guam International Raceway, and the loss is expected to be significant because the use is unique to the island. The duration of the impact is contingent on the completion and the availability of another raceway site. The absence of the

Raceway may result in recreational users recreating the current Raceway uses on the streets (e.g., drag races).

5.8 TERRESTRIAL BIOLOGICAL RESOURCES

5.8.1 Short-Term

There would be minimal impacts from short-term uses of biological resources such as habitat areas since few wildlife and special-status species are currently present in proposed construction areas and surveys would be conducted prior to construction for any special-status species that might be present. Construction staging areas for specific projects are assumed to be within the project footprint (footprint areas would include long-term removal of habitat areas). Short-term impacts would not preclude long-term maintenance or enhancement of biological resources.

5.8.2 Long-Term

Long-term impacts would remove small amounts of primary limestone forest and ravine forest and would remove large areas of potential habitat for special-status species, including several federal, Guam, and Commonwealth of Northern Mariana Islands-listed species. However, most project areas are unoccupied by special-status species at present. Long-term impacts would also include noise, lighting and disturbance impacts on special-status species and other factors during operations. Other long-term impacts could reduce habitat quality, such as the potential for fire and spread of non-native species. These would be balanced by the implementation of plans and procedures for wildland and fire control, biosecurity and ungulate management and by enlarging or creating new ecological reserves. Implementation of the plans would improve the overall quality of habitat over current conditions.

5.9 MARINE BIOLOGICAL RESOURCES

5.9.1 Short-Term

Short-term uses of the environment include in-water or nearshore land-based construction activities (dredging, new aircraft carrier wharf construction, wharf refurbishing and associated utilities) and in-water vessel movement that would affect marine biological resources through decreased water quality (increased turbidity, sediment deposition, increased potential for pollutants and debris in the water, and general affects on water chemistry), increased vessel strikes, and noise and in-water reverberations. These short-term uses of the environment would affect Endangered Species Act-listed species and sensitive management unit species present in the essential fish habitat of Apra Harbor and Guam.

5.9.2 Long-Term

Long-term changes to the environment include changes in dredged depths in Apra Harbor, including: the federal navigation channel; aircraft carrier turning basin and new wharf; Inner Apra Harbor Entrance Channel; and Inner Apra Harbor Wharves (Sierra and Tango). New depths would remain as such. Additionally, long-term uses of the environment include in-water or nearshore land-based operational activities (increased frequency of Marine Expeditionary Unit ships and fueling vessel transport movement and aircraft carrier visits in Apra Harbor), including recreation and recreational activities (specifically Haputo Ecological Reserve Area) that would affect marine biological resources through decreased water quality (increased ammonia nitrogen levels in wastewater discharges, increased turbidity, sediment deposition, increased potential for pollutants and debris in the water, and affects on water chemistry), increased vessel strikes, and noise and in-water reverberations. Lastly, there would be long-term uses of the coastal waters along the east coasts of Guam and Tinian where the surface danger zones for the

training ranges training extend off-shore. These long-term uses of the environment would affect Endangered Species Act-listed species and sensitive management unit species present in the essential fish habitat of Apra Harbor and Guam, and possibly Tinian. Therefore, the long-term productivity of marine biological resources may be compromised.

5.10 CULTURAL RESOURCES

5.10.1 Short-Term

Construction staging areas for specific projects are assumed to be within the project footprint. Short-term effects to the environment associated with the alternatives include temporary restriction from areas containing historic properties and the possibility of inadvertent or accidental damage from the temporary increased use of an area.

5.10.2 Long-Term

Long-term changes would include the direct loss and disturbance of 40 historic properties on both Guam and Tinian from construction and demolition, and the long-term restriction from potential traditional cultural properties as a result of training and safety requirements relating to firing ranges. With the implementation of proposed mitigation measures including data recovery and procedures for public access to certain areas, there would be a long-term benefit from the increase in knowledge of the past and the distribution of this knowledge to the public. However, the long-term productivity of cultural resources may be compromised.

5.11 VISUAL RESOURCES

5.11.1 Short-Term

Construction staging areas for specific projects are assumed to be within the project footprint. During the construction period, views in various parts of Guam and Tinian would likely include clearing and construction activities and construction traffic (including materials being transported to a construction site from the Port of Guam or Tinian Harbor).

5.11.2 Long-Term

There are no projects adjacent to identified public viewsheds that would directly add to or cumulatively affect visual resources. However, there are numerous projects throughout north and central Guam that would potentially be adding new buildings, structures, and roadways to the landscapes in these areas. Essentially, over time, the visual environment in these areas would become suburban-urban in character and generally more cluttered overall. Additionally, worker housing projects that are proposed off-base would also provide a more urbanized setting, especially in areas that propose to house large worker housing are proposed. Development of the ranges on Tinian would result in large cleared areas and a change to the central area of Tinian. This would primarily affect views from Mount Lasso, the tallest point on the island, as well as views along Broadway and 8th Avenue. Therefore, the projects on Guam and on Tinian, when combined with the various elements of the proposed actions would likely have a negative impact on the visual resources in these areas.

5.12 TRANSPORTATION

5.12.1 Short-Term

5.12.1.1 Onshore

There would be substantial short-term effects on the environment during the construction of the many roadway improvement projects envisioned in the proposed actions. The proposed roadway and bridge improvements on Guam would occur throughout the island both on existing military property and off these properties. The temporary effects during the construction phase would include the disruptions of normal traffic patterns through re-routing and congestion.

5.12.1.2 Offshore

Short-term uses of the environment that would affect marine transportation include restrictions to the movement of ships during the construction of the aircraft carrier pier adjacent to the Inner Apra Harbor entrance channel and the dredging in Outer Apra Harbor of the federal navigation channel, turning basin, and pier area.

5.12.2 Long-Term

5.12.2.1 Onshore

Following the construction phase, if all proposed roadway projects are funded under the Defense Access Road or other federal program(s) there would be long-term benefits to Guam from the proposed upgrading of numerous public roads and bridges throughout the island. Under current funding commitments, traffic conditions will remain similar to existing conditions.

5.12.2.2 Offshore

Long-term changes that would affect marine transportation include the new aircraft carrier pier that would be constructed adjacent to the entrance channel to Inner Apra Harbor. While the aircraft carrier is at the pier, security barriers around the ship may impact the movement of other ships into and out of Inner Apra Harbor. The newly dredged areas in Outer Apra Harbor of the federal navigation channel, turning basin, and aircraft carrier pier area would provide a beneficial impact to the long-term productivity of marine transportation.

5.13 UTILITIES

5.13.1 Short-Term

There would be minimal construction activities associated with the proposed action on Tinian, and there would be less than significant short-term impacts to local utilities. The following description focuses on the effects on Guam.

5.13.1.1 Power

The proposed facilities for military relocation would require reconditioning up to five existing Guam Power Authority (GPA) Combustion Turbines, and upgrades to the existing transmission and distribution system on Guam. Establishing the power demand system for Navy requirements is not anticipated to affect the short-term productivity of the environment since there would be excess power supply of 12.62 megawatts in the peak demand year of 2015 (Volume 6 Chapter 2 Table 2.1-2). Volume 6, Chapters 2 and 3 detail the demand and supply of power.

The transmission and distribution system would require replacement of existing lines that would become overloaded, installation of a redundant supply line to Andersen AFB, installation of capacitor banks to support anticipated low voltage due to increased loads and upgrades at existing substations to increase capacity.

The transmission and distribution improvements would be along existing electrical easements and would entail replacing one existing overhead electrical line with a new underground electrical line. The construction would require excavation for installation of this line (approximately 4 feet (1 meter) deep) and would have impacts along the route.

Larger substation transformers would be installed near Andersen AFB and the Navy base to support increased loads in those areas. The transformers would be located at existing GPA substation sites and are not expected to have a significant impact on the area. They would be physically larger, but would be installed near the current location to minimize impacts.

Provided all planned reconditioning of generating facilities and transmission and distribution improvements occur in a timely fashion, there would be no power shortfall during the short-term relocation period.

5.13.1.2 Potable Water

The proposed facilities for military relocation would require upgrades to the existing water production, treatment, storage, and distribution systems on Guam in order to meet additional potable water demands. The proposed DoD water supply expansion includes development of up to an anticipated 22 potable water wells at Andersen AFB and rehabilitation of the Navy Regional Medical Center wells. In order to meet the projected increase in demand on the Guam Waterworks Authority (GWA) water system, GWA would also need to expand their potable water supply through development of additional potable water wells. Lacking that expansion, DoD would have adequate excess water production capability to provide water to GWA if requested. Existing DoD and GWA groundwater well production is currently approximately an average of 45 million gallons per day (mgd) (172 million liters per day [mld]). The estimated average potable water demand for the DoD expansion is 5.43 mgd (20.8 mld). The production demand growth estimate for GWA is 7.89 mgd (30.1 mld). Total estimated groundwater demand from the Northern Guam Lens Aquifer (DoD and GWA) is approximately 52 mgd (196 mld). Total estimated groundwater demand from the Northern Guam Lens Aquifer (DoD and GWA) is approximately 62.5 mgd (236 mld). This is below the estimated sustainable yield of the aquifer of 81 mgd (308 mld) and thus would not impact the short-term productivity of the environment. However, in the short-term, the GWA water system would be unable to meet the estimated demand due to insufficient production wells and a higher-than-normal percentage of system water loss. There are several proposed mitigations to this condition, among which are the transfer of excess water production from the DoD system to the GWA system, acceleration of the GWA program to find and correct system leaks, and water conservation initiatives by GWA.

With DoD providing excess water production capacity to GWA at numerous strategic points in the GWA transmission system, water supply would be mitigated. However, the GWA distribution system (smaller pipes from transmission system to end users) would still be potentially inadequate and an impact on civilian growth. The construction work camp would be anticipated to be supplied with DoD water transferred to GWA in close proximity to major work camp areas and the work camps provided with new distribution systems, so the work camps should be well taken care of. Other civilian growth may have inadequate distribution capabilities without localized upgrades/repairs performed by GWA.

5.13.1.3 Wastewater

Refurbishment of the Northern District Wastewater Treatment Plant (NDWWTP) to its original primary treatment design capacity and installation of secondary treatment would meet projected interim and year 2020 wastewater flows. Early and peak year flows would need some modification to operations to allow for a somewhat higher overflow rate. That could be addressed with chemical enhanced treatment to accelerate solids settling. No short-term use of the environment is required to accomplish the required refurbishment or installation of secondary treatment processes other than uses resulting from the procurement of construction materials and/or operation of construction tools and/or equipment.

Use of the Navy wastewater treatment plant (WWTP) at Apra Harbor would be increased primarily due to the transient ship activities. This WWTP has adequate capacity. Some treatment of metals currently does not meet required standards. This would be handled by several actions and would be expected to be resolved. Thus, no short-term use of the environment is required to accomplish the utilization of the Navy WWTP at Apra Harbor to accommodate the proposed relocation.

Impacts from induced civilian growth would be felt in other areas of Guam, such as the Hagatna WWTP and its collection system, the NDWWTP collection system. DoD is seeking sources of funds to assist GWA with secondary treatment upgrades to the Hagatna WWTP and collection systems associated with the Hagatna WWTP and the NDWWTP. Provided timely resolution of collection system needs occur, no short-term use of the environment is required to accomplish the utilization of the Hagatna WWTP and collection systems for the Hagatna WWTP and the NDWWTP.

Small southern WWTPs would be impacted to a small extent from induced civilian growth, but that impact is not deemed significant per the analysis in Volume 6 Chapter 3.

5.13.1.4 Solid Waste

The solid waste management alternative would not involve any change to existing facilities. The existing Navy sanitary landfill at Apra Harbor would continue to be utilized for municipal solid waste until the new public landfill at Layon is completed and open for use, which is anticipated to be by July 2011. At that time, all DoD municipal solid waste would be disposed at the new Layon Landfill per the agreement with GovGuam. Other waste streams that are not accepted by Layon would continue to be disposed at the Apra Harbor Landfill. Implementing this solid waste alternative is not anticipated to affect the short-term productivity of the environment.

5.13.2 Long-Term

All training on Tinian would be considered "expeditionary," in that the Marines would bring all necessary equipment to the ranges, would bivouac onsite, and would remove all equipment following completion of the training activities. No construction of utility infrastructure or tie-ins to public utilities is proposed to support the firing ranges on Tinian. There would be less than significant long-term impacts to local utilities on Tinian. The following description focuses on the effects on Guam.

5.13.2.1 Power

Long-term impacts would arise due to electrical utility upgrades that include the installation of an underground electrical line. Moving the line from overhead to underground would reduce the impact of tropical storms on the electrical system (improve reliability) served by that line. The existing substations for Andersen AFB and Orote would be larger but would be located at existing substations and would have a minimal impact. The transmission and distribution easements for electrical lines that currently exist

would be used for the anticipated line upgrades. Therefore, the long-term productivity and reliability of power infrastructure may be improved.

5.13.2.2 Potable Water

Including the proposed DoD expansion, the total planned well production from the Northern Guam Lens Aquifer (DoD and GWA) is approximately 47 mgd (178 mld) after all relocation activities have been completed. The total sustainable yield estimate for the Northern Guam Lens Aquifer is 81 mgd (307 mld). Therefore, the increased demand on the potable water supply resulting from the proposed military relocation to Guam is consistent with the sustainable yield estimates.

In accordance with DoD Unified Facilities Criteria, DoD water demands used to develop the proposed DoD water system were calculated assuming the maximum daily system capacity. However, the above numbers were based on an approximation of the average daily demand for DoD utilizing conservation and sustainability approaches. GWA estimates for the Guam civilian demand are based on average per capita daily demand plus an estimate of industrial uses. With the estimated average daily demand from NGLA sources of 47 mgd (178 mld) and the estimated sustainable yield of the northern Guam lens aquifer of 81 mgd (308 mld), the development of the proposed DoD water supply to support the military relocation is not expected to adversely impact the long-term productivity of the Northern Guam Lens Aquifer. Therefore, the long-term productivity of potable water infrastructure may not be compromised, and the overall reliability of the potable water system would be improved.

5.13.2.3 Wastewater

Refurbishment of the NDWWTP to its original design capacity, expansion of capacity to between 12 and 18 mgd (45.4 and 68.3 mld) and installation of new secondary treatment plant processes would ensure that increased wastewater flows to the NDWWTP receive adequate treatment prior to discharge of the effluent via the ocean outfall. This improvement in treatment efficiency would be offset during the period of time after primary treatment plant refurbishment has been completed and higher flow rates to the plant begin, but before secondary treatment plant upgrades are completed. The net effect during this interim period of time would likely have a negative impact on a small area of the ocean. However, after secondary treatment plant upgrades are completed, there would be an overall positive on the long-term productivity of the environment due to a reduction in pollutants in the secondary treatment plant discharge as compared to the pollutant loading from the NDWWTP that occurs today.

5.13.2.4 Solid Waste

The long-term solid waste management alternative would include use of the planned new GovGuam landfill (i.e., Layon Landfill), which is currently being constructed.

5.14 SOCIOECONOMICS AND GENERAL SERVICES

5.14.1 Short-Term

Short-term construction is expected to overlap with the arrival of Marine Corps personnel. This overlap, including the effects of spin-off economic growth in the private sector, would generate a Guam "boomtown" situation in that economic opportunities would be characterized by rapid population growth, labor shortages, cost of living increases, temporary demands on general services, and strains on the quality of life for many residents. The end of this "boomtown" period would technically be an economic recession, though its effects would be lessened by the use of many temporary alien laborers who would return to their home countries. Part of the short-term impacts include land acquisition actions that would

affect various private landowners and GovGuam lands due to socio-cultural affiliation to their family property and the need to relocate to other areas in Guam. On Tinian, short-term impacts would be minimal.

5.14.2 Long-Term

Long-term operations are expected to positively impact the Guam economy; although there may be some adjustments related to the tourism industry and military-civilian relations. Because of the increased permanent population, local government would have to increase its level of service in most agencies on a more permanent basis than may be required by the construction stage population boom. Therefore, the long-term socioeconomic productivity may be improved on Guam. On Tinian, long-term impacts on jobs would be minimal. Additional economic impacts could be beneficial if liberty is granted to troops while they are on Tinian. This impact however, may be countered by the loss in economic revenue due to the non-renewal of leases to cattle ranchers in the Lease Back Area.

5.15 HAZARDOUS MATERIALS AND WASTE

5.15.1 Short-Term

There are waste sites undergoing characterization and/or restoration under various environmental programs. Consideration and careful attention during project design phases must be given prior to construction to avoid overlap with these sites. If relocation of proposed construction projects that may overlap these waste sites is not possible, then various BMPs, Standard Operating Procedures (SOPs), and construction operational protocol (Volume 7) must be followed to protect human health and the environment. Construction activities would not interfere with waste site characterization and/or restoration. In addition, special design techniques and methodology will be required to ensure the long-term structural integrity of proposed construction projects. Also, proposed expansion construction areas may contain munitions and explosives of concern (MEC). Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8020.15B establishes the Explosive Safety Submittal Process (ESS) to provide effective review, oversight, and verification of the explosives safety aspects of munitions responses (Navy 2009). Finally, demolition of existing structures could result in the requirement to dispose of asbestos containing materials and/or lead-based paint. However, there are numerous BMPs and SOPs (Volume 7) that would minimize any potential short-term impacts to human health or the environment. Construction staging areas for specific projects are assumed to be within the project footprint.

Given the various BMPs and SOPs (Volume 7) that would be required for the various construction and/or demolition projects, the proposed actions would not be expected to result in any impacts that would pose short-term risks to the general public or the environment.

5.15.2 Long-Term

The proposed actions would result in the increased transportation, handling, use, and disposal of hazardous materials (e.g., petroleum, oils and lubricants/fuels) and hazardous wastes (pesticides, herbicides, solvents, lubricants, heavy metals, etc.). However, through the use of various BMPs and SOPs (Volume 7) long-term impacts would be minimal As a result, the long-term environmental productivity may be improved. The proposed actions would not affect long-term management of hazardous waste sites.

5.16 PUBLIC HEALTH AND SAFETY

5.16.1 Short-Term

The proposed actions would be expected to result in short-term impacts to health care services, protective services, and potable water service.

The island is currently designated a Medically Underserved Area and falls below the national average in terms of health care provider to general population ratio. Based on the potential for an increase in notifiable disease and mental illness cases, a short term impact to health care services is anticipated until funding or other assistance to correct health care service deficiencies is identified.

Without increases in police and fire services (i.e., more personnel and equipment) to compensate for population increases, it would be expected that response times would increase. Because adequate increases in police and fire personnel needed to maintain existing service conditions are not likely, short-term impacts to police and fire services are anticipated until funding or other assistance to correct service deficiencies is identified.

The Guam Waterworks Authority (GWA) water system infrastructure does not meet the basic flow and pressure requirements for some customers. These conditions can result in microbiological and other contaminants entering the distribution system potentially resulting in illness. GWA water distribution system problems also exist, which may result in customers receiving inadequate supply/service. Since it is doubtful that the GWA could fund and implement required upgrades in time for the proposed military relocation to Guam, it is anticipated that short-term public health and safety impacts from increased demand on potable water and potential water-related illnesses would occur.

5.16.2 Long-Term

The proposed actions would not be expected to result in any impacts that would pose long-term risks to health, safety, or the general welfare of the public.

5.17 ENVIRONMENTAL JUSTICE AND THE PROTECTION OF CHILDREN

Environmental justice examines the potential for adverse impacts to disproportionately affect socially disadvantaged groups, including racial minorities, low-income populations, and children. Whether an action is short-term or long-term would not affect the disproportionate nature of an impact. Therefore, the relationship between short-term use of the environment and long-term productivity does not apply to environmental justice.

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