CHAPTER 17. HAZARDOUS MATERIALS AND WASTE

17.1 AFFECTED ENVIRONMENT

17.1.1 Definition of Resource

The potential impacts hazardous materials and waste have on human health and the environment is largely dependent upon their types, quantities, toxicities, and associated management practices. There is cause for concern if the use of these substances violates applicable federal, state, or local laws and/or regulations. This includes potential non-compliance with Department of Defense (DoD) guidelines and policies for handling hazardous materials and waste. There is also cause for concern if the use of these substances increases risks to human health or the environment. This chapter describes current conditions resulting from past and present use of these substances and potential environmental consequences of the proposed Marine Corps relocation to Guam.

The current DoD region of influence (ROI) on Guam for hazardous materials and waste includes Air Force and Navy properties. Air Force properties include Andersen Air Force Base (AFB), which is composed of the main base, the munitions storage area, Northwest Field, Andersen Administration Annex (Andersen South), and the Andersen Communications Annex Barrigada site near Guam International Airport (IAP). Navy properties include Naval Base Guam at Apra Harbor, Naval Computer and Telecommunications Station (NCTS) Finegayan, Finegayan South Housing Area, NCTS Barrigada Transmitter Site, Naval Hospital area, Nimitz Hill, and the Naval Munitions Site.

Section 17.1.2 provides a summary of federal, DoD, and local Guam laws and regulations related to hazardous materials and waste that the DoD must comply with regardless of whether or not any military expansion occurs. Section 17.1.3 discusses the affected environment or present conditions on Guam prior to the proposed military buildup. Section 17.2 discusses potential hazardous materials and waste environmental consequences and proposed mitigation measures associated with the proposed military expansion.

17.1.2 Regulatory Framework

The phrase "hazardous substance" is used in this document to describe any item or agent (i.e., biological, chemical, or physical) that has the potential to cause harm to humans, animals, or the environment. "Hazardous materials," "toxic substances," and "hazardous wastes," broadly defined, can all be classified as "hazardous substances" because they may present a threat to human health and/or the environment.

Hazardous substances are controlled in the United States (U.S.) primarily by laws and regulations administered by the U.S. Environmental Protection Agency (USEPA), the U.S. Occupational Safety and Health Administration (OSHA), and the U.S. Department of Transportation (DOT). Each agency incorporates hazardous substance safeguards according to its unique Congressional mandate. USEPA regulations focus on the protection of human health and the environment. OSHA regulations primarily protect employee and workplace health and safety. DOT regulations promote the safe transportation of hazardous substances used in commerce. Additionally, the U.S. territory of Guam oversees and administers its environmental laws and regulations through the Guam EPA (GEPA).

DoD installations are required to comply with all applicable federal, territorial (e.g., GEPA), and DoD laws and regulations and Executive Orders (EOs).

17.1.2.1 Federal Environmental Laws and Regulations

Hazardous substance federal laws and regulations that Guam DoD installations must comply with include, but are not limited to:

- Comprehensive Environmental Response, Compensation, and Liability Act (42 United States Code (USC) §9601–9675; 40 Code of Federal Regulations (CFR) 300-311; 40 CFR 373)
- Resource Conservation and Recovery Act (42 USC §6901-6992k and 40 CFR 260-272 as it relates to hazardous waste management)
- Emergency Planning and Community Right-to-Know Act (42 USC §11001et seq.; 40 CFR 350-372)
- Toxic Substances Control Act (15 USC §2601 et seq.; 40 CFR 700-723; 40 CFR 745-766; 40 CFR 790-799)
- Oil Pollution Act (33 USC § 2701 et seq.)
- Pollution Prevention Act (42 USC § 13101 – 13109)
- OSHA laws and regulations
- DOT laws and regulations, including the Transportation Safety Act (49 CFR 100 – 185)
- Federal Insecticide, Fungicide, and Rodenticide Act (7 USC § 136 et seq.)
- Federal Environmental Pesticide Control Act (7 USC § 136 – 136y)
- Federal Facilities Compliance Act (Public Law 102 – 386)
- Underground Storage Tank Regulations (40 CFR 280, 281, 282, and 283)

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

Under the CERCLA of 1980, as amended by the Superfund Amendments and Reauthorization Act, a hazardous substance is defined as one that poses a potential hazard to human health or the environment by virtue of its quantity, concentration, or physical/chemical characteristics. CERCLA has established a national process to identify, characterize, and clean-up hazardous waste sites.

Resource Conservation and Recovery Act (RCRA)

The RCRA of 1976, as amended by the Hazardous and Solid Waste Amendments (HSWA), define hazardous waste as:

- A solid waste not specifically excluded from being classified as a hazardous waste under 40 CFR 261.4(b) that exhibits any of the characteristics (i.e., ignitability, corrosivity, reactivity, and toxicity) described in 40 CFR 261 or
- Is listed in 40 CFR 261 Subpart D or
- Is a mixture containing one or more listed hazardous wastes from 40 CFR 261 Subpart D.

Hazardous wastes may take the form of a solid, liquid, contained gas, or semi-solid. In general, any combination of wastes that poses a substantial present or potential hazard to human health or the environment that has been discarded or abandoned is a hazardous waste.

RCRA requires that all hazardous waste be systematically tracked from cradle-to-grave. This hazardous waste tracking system mandates the collection and retention of key information including: the generator of the waste, how the waste is routed to the receiving facility, a description of the waste, the quantity of the waste, identification of the facility that receives the waste, and other relevant data.

RCRA grants USEPA, authorized states, and U.S. territories the authority to regulate hazardous waste management facilities that treat, store, or dispose of hazardous waste. Furthermore, the RCRA Corrective

Action Program compels responsible parties of active facilities to investigate and clean up hazardous waste releases.

Military Munitions Rule (MMR) under RCRA

The MMR was published as a final rule in 1997 and identifies when conventional and chemical military munitions become RCRA hazardous waste. Military munitions include, but are not limited to: confined gases, liquids, or solid propellants; explosives; pyrotechnics; chemical and riot agents; and smoke canisters (USEPA 2008b). Under the MMR, wholly inert items and non-munitions training materials are not defined as military munitions (USEPA 1997).

DoD has historically conducted live-firing, ordnance testing, and training exercises to ensure military readiness. Decades of these munitions-related activities have resulted in the presence of unexploded ordnance (UXO), discarded military munitions (DMM), and munitions constituents (MC). UXO, DMM, and MC all present potential explosive hazards and are collectively referred to as munitions and explosives of concern (MEC). In 1997, the Final MMR (40 CFR 266, Subpart M) was published defining MEC handling requirements.

Military munitions that are used for their "intended purposes" are not considered waste per the MMR (40 CFR 266.202). In general, military munitions become subject to RCRA transportation, storage, and disposal requirements (i.e., judged not to have been used for their "intended purposes") when:

- Transported off-range for storage
- Reclaimed and/or treated for disposal
- Buried or land filled on- or off-range or
- Munitions land off-range and are not immediately rendered safe or retrieved.

MEC is found on active, inactive, and closed military training ranges. Active ranges include areas being used on a periodic, ongoing basis for training purposes. Inactive ranges are: 1) not currently being used, 2) still are under military control and therefore may be used in the future as a military range, and 3) have not been put to a new use that is "incompatible" with range activities. Closed ranges are areas that have been taken out of service and put to a new use "incompatible" with range activities.

According to USEPA interpretation, the MMR "…applies only to the recovery, collection, and on-range destruction of UXO and munitions fragments during range clearance activities at active or inactive ranges. With regard to closed ranges, USEPA did not generally intend to include these range clearance activities to be within the scope…of the intended use …exception to Subtitle C of RCRA granted by the MMR…" MEC located on closed ranges therefore "…would at some point become a solid waste potentially subject to RCRA and also may include hazardous substances, pollutants or contaminants subject to CERCLA…" In summary, MEC at closed ranges are classified as solid waste and would likely be subject to RCRA Subtitle C hazardous waste handling and disposal requirements as well and therefore subject to regulatory oversight (USEPA 2005).

Emergency Planning and Community Right-to-Know Act (EPCRA)

The EPCRA of 1986, requires businesses and governments to report the use of hazardous and toxic chemicals. EPCRA also requires that workers be trained as to safe chemical handling protocols and specific chemical hazards and controls for substances used in the workplace. In addition, EPCRA requires that state and local communities be prepared to respond to potential chemical accidents through the development of emergency response plans and other measures.

Toxic Substances Control Act (TSCA)

The TSCA, of 1976, addresses concerns regarding chemical substances and mixtures whose manufacturing and use may pose an unreasonable risk of injury, adverse health, or adverse environmental consequences. TSCA is designed to regulate these substances and mixtures used in interstate commerce.

TSCA requires that prior to the manufacturing of a new substance(s), a pre-manufacture notice be filed with USEPA. This notice provides information describing the toxicity of the substance(s). Toxic chemical substances regulated under TSCA include asbestos, lead, polychlorinated biphenyls (PCBs), and radon as well as numerous other substances. The TSCA chemical substances inventory contains information on over 62,000 compounds.

Oil Pollution Act (OPA)

The OPA of 1989 requires oil storage facilities and vessels to develop plans describing how spills or releases would be addressed. Specifically, OPA requires that facilities prepare and implement spill prevention, control, and countermeasures (SPCC) plans and facility response plans (FRP). These plans specify how these facilities would assess and respond to spills/releases. DoD is subject to OPA requirements to report spills and releases to applicable regulators. OPA also obligates DoD to properly contain, control, and remediate all spills/releases.

Pollution Prevention Act (PPA)

The PPA focuses on pollution source(s) reduction and promotes the implementation of new and innovative practices to conserve and protect natural resources. These measures may include, but are not limited to reducing pollution through process modifications and the use of different, less toxic materials and substances.

OSHA Regulations

OSHA requirements are designed to protect workers and prevent workplace accidents, injuries, or illnesses. One such requirement is the Hazard Communication Regulation (29 CFR 1910.1200) which defines a hazardous chemical as one that poses a physical or health hazard and requires that workers are trained and notified of specific hazards associated with hazardous workplace substances. The definition includes:

- Carcinogens, toxins, toxic agents, irritants, corrosives, and sensitizers
- Agents which act on the hematopoietic system
- Agents that damage the lungs, skin, eyes, or mucous membranes
- Chemicals which are combustible, explosive, flammable, unstable (reactive), or water-reactive
- Oxidizers
- Pyrophorics
- Chemicals which in the course of normal handling, use, or storage may produce or release dusts, gases, fumes, vapors, mists, or smoke that may have any of the previously mentioned characteristics

Currently, OSHA regulates workplace exposure to approximately 400 substances, including dusts, mixtures, and common materials such as paints, fuels, and solvents.

DOT Regulations

The DOT Hazardous Materials Regulations (49 CFR 171) define a hazardous material as a substance capable of posing an unreasonable risk to health, safety, and property when transported in commerce. The DOT definition includes hazardous wastes and marine pollutants. DOT regulations require the implementation of various protective and preventative measures designed to promote the safe transportation of hazardous materials in commerce.

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

FIFRA first passed in 1947, provides pesticide regulations designed to protect applicators, consumers, and the environment. Among other things, FIFRA establishes a registration process for all pesticides and provides strict pesticide labeling and application requirements.

Federal Environmental Pesticide Control Act (FEPCA)

FEPCA, enacted as Public Law 92-516, amended FIFRA and provides controls for the sale, use, distribution, and application of pesticides through an administrative registration process.

Federal Facilities Compliance Act (FFCA)

FFCA enacted as Public Law 102-386 provides that all federal agencies are subject to all substantive and procedural requirements of federal, state, and local solid and hazardous waste laws in the same manner as any private party. Substantive and procedural requirements include administrative orders, civil and administrative fines and penalties, and reasonable charges imposed for issuing and reviewing permits, plans and studies, and inspecting facilities.

Underground Storage Tank (UST) Regulations

UST regulations set forth various requirements to prevent unintended releases through the use of double walled tanks and associated piping, leak detection methods, inventory control procedures, and various other administrative and engineering design controls.

Ship-Borne Hazardous Substance Regulations (SBHSR)

Existing environmental laws and regulations presented above are applicable to DoD land-based facilities and activities in Guam. However, these regulations are not applicable to Navy activities "at sea" defined as beyond three nautical miles from shore. However, certain international treaties apply to Navy activities while at sea. The primary international treaty regarding vessel waste disposal is the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (i.e., MARPOL 73/78 treaty).

Generally, Navy ships are exempt from MARPOL 73/78 requirements; however, the Navy is required to comply with Annex V of the MARPOL 73/78 treaty. Under Annex V, non-food solid waste materials controlled include: paper and cardboard, metal, glass, and plastics. Per Annex V, none of these materials may be discharged overboard by Navy vessels in "Special Areas" and plastics may not be discharged in the ocean anywhere. "Special Areas" are specifically designated ocean regions where it is deemed that more stringent discharge standards are required. Table 17.1-1 summarizes Navy discharge restrictions.

Table 17.1-1. Navy Discharge Restrictions

Area	*Sewage*[1]	*Graywater* [1]	*Oily Waste* [2]
U.S. Internal Waters and Territorial Seas 0-3 nautical miles (nm) (0-3.5 miles [mi])	No discharge of raw sewage from collecting and holding tank. Discharge of marine sanitation device- treated effluent allowed.	If capable of collecting and treating graywater do so. Otherwise, discharge allowed. [3]	No dumping of sheen allowed. Discharge must be through OWS and oil content monitor and contain less than 15 parts per million (ppm) of oil. [4]
U.S. Contiguous Zone (3-12 nm) (3.5 -13.8 mi)	Discharge allowed.	Discharge allowed.	Same as 0-3 nm (-3.5 mi).
12-25 nm (13.8 -28.8 mi)	Discharge allowed.	Discharge allowed.	Discharge must be through OWS and OCM and contain less than 15 ppm of oil.
25 - 50 nm (28.8-57.5 mi)	Discharge allowed.	Discharge allowed.	Same as 12-25 nm (13.8-28.5 mi).
> 50 nm (57.5 mi)	Discharge allowed.	Discharge allowed.	Discharge must be through OWS and OCM and contain less than 15 ppm of oil. Discharge of cargo wastes allowed if ship is enroute and discharging less than 30 liters of oil per nm.
MARPOL *"Special Areas"* [5]	Not applicable.	Not applicable.	No discharge if practical. If not practical, discharge must be through OWS and OCM and be as far from shore as feasible.
Foreign Countries (0-12 nm) (0-13.8 mi)	Discharge of marine sanitation device -treated effluent allowed. Also comply with COMSC policy. [3]	If capable of collecting and treating graywater through marine sanitation device, do so. Otherwise, discharge allowed. Also comply with COMSC policy. [3]	Discharge must be through OWS and OCM and contain less than 15 ppm of oil. Also comply with COMSC policy. [3]
General Requirements	Exemption allowed (direct discharge) to ensure safety of ship or those onboard. Also comply with COMSC policy. [3]	Contact local port authorities for local discharge guidelines. Obey state regulations regarding discharge of graywater. Exemption allowed to ensure safety of ship or those onboard. In the event local port authorities state the ship may not discharge graywater, coordinate the issue with local legal counsel.	State/local rules may vary; check with port authorities. Exemption is allowed to ensure safety of ship or those onboard. Ships must log discharges of oily wastes.

Legend: COMSC- Commander, Military Sealift Command; OCM= oil content monitor; OWS= oil water separator.
Notes: [1] Governing regulations include 33 CFR 159.
[2] Governing regulations include MARPOL Annex I, 33 CFR 155.
[3] Requirement imposed by COMSC policy.
[4] If operating properly, OWS discharge will typically be less than 15 ppm.
[5] Special Areas where these restrictions currently apply: Mediterranean Sea, Baltic Sea, Black Sea, and Antarctic Ocean.
Source: Navy 2004.

17.1.2.2 Guam Environmental Protection Agency Laws and Regulations

The GEPA has been authorized by the USEPA to manage hazardous waste under its regulations. All public and Private Entities (PE) located on Guam are subject to GEPA environmental requirements. The

GEPA Hazardous Waste Management Program (GEPA HWMP) has statutory authority based upon Title 10 Guam Code Annotated (GCA).

GEPA regulates hazardous substances through Title 10 GCA, Chapter 51, Solid Waste Management and Litter Control Act; and Title 10 GCA, Chapter 76, Underground Storage of Hazardous Substances Act. GEPA's Water Pollution Control Program (WPCP) administers Facility Response Plans (FRP)/SPCC plan requirements under OPA for affected facilities per 40 CFR 112. GEPA has full authority to enforce RCRA and HSWA regulations.

The GEPA HWMP requires the permitting of hazardous waste collection, treatment, storage, and disposal facilities. The GEPA HWMP also mandates inspection, compliance monitoring, enforcement, and corrective action of all hazardous waste-related activities in Guam. In addition, the GEPA has a TSCA Compliance Guide and online service that consists of a five volume set and online support for environmental managers, regulatory compliance officers, and legal counsel to keep abreast of and in compliance with TSCA relative to PCBs, asbestos, lead, radon, and other toxic substances.

In addition, Public Law (PL) 29-26 addresses the importation, handling, use, and application of pesticides on Guam. DoD operations conducted on Guam are required to fully comply with all applicable federal and Guam laws and regulations.

17.1.3 Hazardous Materials and Waste on Guam

This section discusses the current status of hazardous substances on Guam and how these substances are being managed prior to any proposed military expansion.

17.1.3.1 Hazardous Materials Storage, Use, and Handling

Routine operations at DoD installations require the storage, use, and handling of a variety of hazardous materials. When discussed in this document, hazardous materials include petroleum, oils, and lubricants (POL), cleaning agents, adhesives, and other products necessary to perform essential functions. Bulk quantities of fuels and other POLs are stored and distributed in aboveground storage tanks (ASTs) and USTs, pumps, and pipelines. Fueling operations to support aircraft, watercraft, vehicle operations, and emergency power generation require the storage of these bulk quantities of this POL. These POL storage areas represent potential sources of leaks, releases, or spills. For the purpose of this EIS, the reference to POLs is intended to include various fuels such as gasoline, jet fuels, and diesel fuels; kerosene; and a variety of oils and other lubricant products.

DoD installations have management plans for fuels management, spill containment, and clean up of POL spills and releases. These plans specify that fuel storage facilities have primary and secondary containment and leak detection features to identify and contain unintended releases, spills, and leaks. In addition, these plans require that the use of hazardous materials be minimized by substituting less toxic products, modifying processes, and designing processes to be more efficient, thus requiring the use of less hazardous substances.

The Defense Reutilization and Marketing Office (DRMO) through its contractors manages, stores, ships, and disposes of hazardous materials associated with all DoD installations and operations. DRMO maintains all hazardous materials documentation. Furthermore, DRMO contracts with licensed firms for proper disposal of these materials at permitted facilities. Currently, the DRMO disposes of approximately 32,389 pounds (lbs) (14,691 kilograms [kg]) of hazardous materials annually from Marine Okinawa operations (DRMO Okinawa 2009). This quantity is applicable to this document because of the proposed Marine Corps relocation.

Air Force Hazardous Material Management

The 36th Civil Engineering Squadron Environmental Flight (CES/CEV) is responsible for overseeing the management of hazardous materials (and hazardous waste) at Andersen AFB, Andersen South, and the Andersen Communications Annex Barrigada site. CES/CEV's mission statement and operating policy is to (Andersen AFB 2008):

- Maintain a safe and healthy operation and environment
- Comply with all applicable laws and regulations
- Minimize the generation of all waste types and substitute less toxic materials when possible
- Implement process changes that result in a reduced amount of waste used and recycle to the maximum practical extent

Air Force Instruction (AFI) 32-7086, *Hazardous Materials Management*, establishes procedures for the management of hazardous materials at all Air Force installations. AFI 32-7086 incorporates the requirements of federal regulations, other AFIs, and DoD directives for reducing the use of hazardous materials. Andersen AFB has a Hazardous Materials Management Plan (HMMP) pursuant to the AFI designed to guide and instruct all Air Force personnel involved in authorizing, procuring, using, managing, or disposing of hazardous materials. This plan specifically addresses hazardous materials management, transportation, spill/release control and containment, and clean up.

Hazardous materials are managed by the base's hazardous materials pharmacy. This facility was established with the mission of overseeing, procuring, and minimizing the use of hazardous materials. The Andersen AFB pharmacy reduces the need to store large quantities of hazardous materials elsewhere on base and allows these materials to be efficiently reordered on an as-needed basis. The resulting outcome is more effective control over the use of these materials.

Numerous fueling operations to support aircraft, vehicle operation, and emergency power generation are performed at Andersen AFB. The majority of fuel handled at Andersen AFB is aviation fuel. The base has the capacity to store approximately 66,000,000 gallons of aviation fuel (Andersen AFB 2005). Fuel storage facilities on the base have the primary and secondary containment and leak detection features required to contain unintended leaks, spills, and releases. Bulk jet fuel is sent to Andersen AFB from fuel facilities at Apra Harbor via pipelines. Diesel and gasoline are delivered to the base by tanker truck.

Navy Hazardous Material Management

Naval Facilities Engineering Command (NAVFAC) is responsible for overseeing the management of hazardous materials at all Navy installations on Guam. Specific written protocol for the management of hazardous materials at all Navy installations is provided by the following documents:

- Office of the Chief of Naval Operations Instruction (OPNAVINST) 5100.23G, Chapter 7- *Hazardous Material Control and Management.*
- Commander, Military Sealift Command Instruction (COMSCINST) 5090.1C, *Military Sealift Command Environmental Protection Program*, Chapter 4 §6- *Hazardous Materials and Hazardous Waste Control and Management Policy*.

OPNAVINST and COMSCINST incorporate the requirements of federal regulations and DoD directives for the reduced use of hazardous materials and the substitution of less toxic materials when possible. COMSCINST 5090.1C, Chapter 5- *Oil and Hazardous Substance Spill Response Readiness*, establishes procedures for addressing oil and hazardous substance spill response activities. Navy operations on Guam are required to comply with these environmental procedures (Navy 1998 and 2004).

In addition, Naval Supply Systems Command Publication 573 - *Storage and Handling of Hazardous Materials*, establishes uniform procedures for the receipt, storage, and handling of hazardous materials and wastes by Navy installations. Publication 573 is to be used in conjunction with other pertinent procedures, regulations, and guidance manuals to support the safe, effective, and environmentally sound management of hazardous materials throughout their life cycle (Navy 2002).

NAVFAC has a comprehensive SPCC guidance manual. This document is required by 40 CFR 112, the Oil Pollution Prevention regulation, and OPNAVINST 5090.1C, for areas meeting the criteria in 40 CFR 112. Spill control measures are required for storage areas regulated by either 40 CFR 264 or 40 CFR 265. Additionally, spill control measures are required for USTs regulated by 40 CFR 280 (Navy 1999).

Hazardous substances spill contingency plans are provided to all ships operating in Guam waters pursuant to COMSCINST 5090.1C Chapter 5 §4-*Contingency Planning*. These plans specify procedures for reporting, containing, controlling, recovering, and disposing of all types of ship-born spills and releases. These plans provide detailed information regarding the use of protective clothing, spill clean-up materials (e.g., oil booms and other spill prevention materials and equipment), oil and hazardous substances properties, and appropriate emergency spill/release response telephone numbers.

Guam Hazardous Material Management

GEPA stipulates regulations for the management of hazardous materials on Government of Guam (GovGuam) lands. The GCA enforces federal and local regulations for management of hazardous substances. Title 10 GCA 76, *Underground Storage of Hazardous Substances Act*, establishes requirements for the management of hazardous substances stored underground.

DoD operations conducted on Guam must comply with all GEPA hazardous material management requirements.

Toxic Substances Management

Toxic substances associated with DoD operations in Guam include asbestos containing materials (ACM), lead-based paint (LBP), PCBs, and radon. LBP and PCBs in Guam are taken by licensed transporters and disposed of in permitted landfill facilities in accordance with applicable federal, state, and local laws and regulations. ACM is disposed of at federal facilities on Guam. Disposal contracts specifically prohibit DoD contractors from the import and use of hazardous or toxic substances.

The collection, transportation, and disposal of these toxic substances are arranged by DRMO. DRMO coordinated the disposal of approximately 27,585 lbs (12,512 kg) of toxic substances annually from Marine Okinawa operations (DRMO Okinawa 2009). This quantity is applicable to this document because of the proposed Marine personnel transfer from Okinawa to Guam.

Asbestos

Asbestos is the name of a group of naturally occurring minerals that may separate into very fine fibers, which are extremely heat-resistant and durable. Asbestos and ACM have been used in a variety of applications, including being used to insulate boilers and pipes, and as a component of various construction and industrial materials.

Asbestos becomes a health hazard when microscopic-sized fibers become liberated or released into the air. Once emitted to the atmosphere, these fibers may remain suspended in the air for long periods of time. When ACM is inhaled, these fibers may become lodged in body tissues, especially the lungs. Inhalation of asbestos fibers is known to cause asbestosis, a chronic disease of the lungs, and

mesothelioma, a cancer of chest membranes. Other cancers, primarily of the digestive tract, have also been associated with exposure to asbestos.

DoD facilities scheduled for maintenance, renovation, remodeling, and demolition are inspected for the presence of ACM. When required by law, or as a precautionary measure, ACM is removed by licensed asbestos abatement firms. ACM is disposed of at federal facilities in Guam. DRMO arranges for these ACM disposal actions.

In accordance with DoD policy, ACM-free materials are to be used for new construction and the repair or maintenance of shore facilities. With regard to Navy ships, when suitable substitutes exist, ACM-free substitute materials are to be used during new construction, repair, or renovation activities.

LBP

In the past, lead pigments were used to increase the durability of paint and provide added anti-corrosion properties. Exposure to LBP is associated with adverse health effects, including permanent damage to the central nervous system. Lead exposure can result from the ingestion of paint chips or associated dust generated from deteriorating paints or from improper paint removal processes. Young children are at greatest risk from LBP exposure.

To ensure that DoD employees engaged in the maintenance and repair of surfaces with LBP are adequately protected, personnel involved in these activities where there is a potential exposure to LBP are required to attend annual LBP training. This training is designed to ensure use of appropriate engineering controls and work processes to reduce the risk of lead exposure.

The federal government banned the use of LBP in 1978. Consequently, DoD buildings constructed on Guam prior to 1978 may contain LBP (USEPA 2007). The LBP in these facilities is generally managed in place in accordance with accepted industry guidelines and practices. These guidelines focus upon minimizing the potential for LBP dust creation, direct contact with the LBP surfaces, and contamination of the surrounding environment. The future renovation of DoD facilities or construction of new facilities on Guam would not include the use of LBP.

DoD policy regarding LBP is to manage and dispose of it in a manner that is protective of human health and the environment and to comply with all applicable federal and local laws and regulations. LBP disposal is arranged by the DRMO.

PCBs

PCBs are highly stable organic chemical compounds with low flammability, high heat capacity, and low electrical conductivity. In the past, PCBs were extensively used as a component of many materials, most notably as heat insulating materials and as dielectric fluids used in electrical transformers and capacitors. In addition, prior to 1978, PCBs may be present in some building materials, such as concrete, caulk, and paint. Due to these past uses, PCBs are known to exist at various identified waste sites and/or older facilities discussed later in this chapter.

PCBs are known to cause skin irritation and cancer and are highly persistent in the environment. In 1979, USEPA banned most uses of PCBs. In addition, effective controls have been mandated related to existing PCB-containing equipment.

As part of existing DoD waste management plans, fluids that potentially contain PCBs are analyzed to ensure that they are properly disposed of in accordance with all federal, DoD, and local laws and regulations by licensed disposal contractors. DoD would not introduce new sources of PCBs to Guam and

is currently addressing existing PCB sources in accordance with federal, local and DoD laws and regulations. DoD-related PCB disposal on Guam is arranged by DRMO.

Radon

Radon is naturally occurring on Guam and is a colorless, odorless, radioactive gas produced by the decay of uranium in rock and soil.

Radon is a known carcinogen, responsible for increasing the risk of lung cancer when inhaled. Electrically charged radon atoms can attach to indoor air dust particles. Subsequently, these dust particles may be inhaled and adhere to lining in the lungs. The deposited atoms decay by emitting radiation that has the potential to cause cellular damage. Typically, outside air contains very low levels of radon (USEPA 2008a), but radon tends to accumulate in enclosed indoor spaces. When present, radon gas would typically concentrate in relatively airtight buildings with little outside air exchange.

Although there are no federal regulations that mandate an acceptable level of radon exposure, USEPA recommends the voluntary radon action level developed and issued by the American Society for Testing and Materials International (ASTMI), *Standard Practice for Installing Radon Mitigation Systems in Existing Low-Rise Residential Buildings,* ASTMI E-2121.

The USEPA recommended action level for radon is 4 picocuries per liter. Various areas on Guam encompass a radon zone (Figure 17.1-1) (USEPA 2008a). According to GEPA, approximately 27% of homes on the island have elevated levels of radon (GEPA 2008). As an educational measure, GEPA conducts public radon awareness workshops designed to instruct participants on how to minimize potential radon exposures. As a proactive measure, DoD has ongoing radon monitoring and abatement programs to ensure that its existing facilities meet USEPA radon health recommendations (ATSDR 2002). In addition, for new facilities, radon resistant construction techniques, radon testing, and the installation of radon mitigation systems as appropriate are employed.

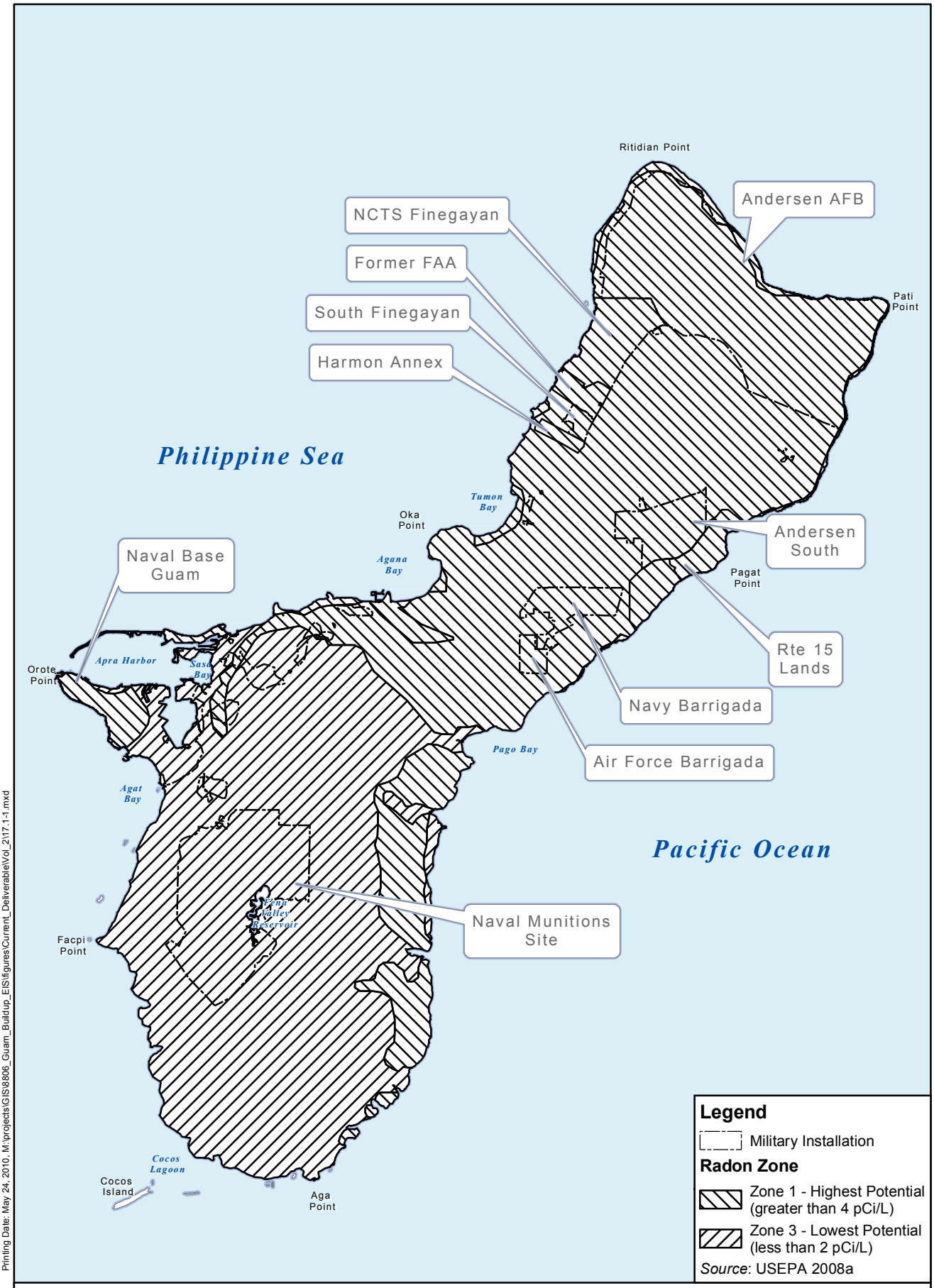

Figure 17.1-1
Guam Radon Zones

17.1.3.2 Hazardous Waste Generation and Disposal

Introduction

Operations at DoD installations generate a variety of hazardous wastes, including, but not limited to: medical and dental supplies, adhesives, solvents, lubricants, contaminated absorbents, corrosive liquids, aerosols, herbicides, pesticides, and sludges. In accordance with DoD policies, all facilities must seek to reduce or eliminate hazardous waste generation by implementing Best Management Practices (BMPs), Standard Operating Procedures (SOPs), and best available technologies. *DOD 4160.21-M, Defense Material Disposition Manual, August 1997,* sets forth DoD policy and prescribes uniform procedures for the disposition of DoD waste, including hazardous waste. DoD instruction 4715.4, *Pollution Prevention*, contains general hazardous waste policy. By policy, the generation and subsequent disposal of hazardous waste is considered by DoD to be a means of last resort. There are numerous BMPs and SOPs used by DoD to minimize or eliminate the generation of hazardous waste. These are discussed in Volume 7 of this EIS. Disposal of hazardous waste generated at DoD facilities in Guam is arranged by DRMO. Specifically, licensed hazardous waste contractors transport and dispose of hazardous waste at permitted facilities. Under this arrangement, DRMO maintains all hazardous waste documentation and ensures that all disposal actions are performed in accordance with pertinent federal, state, and local laws and regulations.

As part of the DRMO waste management system, centralized accumulation points and satellite accumulation points are utilized at DoD installations on Guam. The accumulation points often contain a variety of wastes, typically stored in 5-gallon (19 liters [L]) pails, 55-gallon (208 L) drums, and other approved hazardous waste containers. DRMO arranges for the disposal of approximately 594,494 lbs (269,658 kg) of hazardous wastes annually from DoD Guam operations (Table 17.1-2).

Table 17.1-2. Annual DoD DRMO Guam Hazardous Waste Disposal Quantities

Waste Category	*Total Waste Volume (in lbs)*	*Waste Codes*
Hazardous Waste	20	D001 and D022
Hazardous Waste	9,374	D001 and D007
Hazardous Waste	728	D001and D008
Hazardous Waste	71	D001and D009
Hazardous Waste	24,103	D001 and D018
Hazardous Waste	429	D001 and D002
Hazardous Waste	2,020	D001and D021
Hazardous Waste	10,320	D001 and D035
Hazardous Waste	238,622	D001
Hazardous Waste	13,576	D001 and D005
Hazardous Waste	15	D001 and D043
Hazardous Waste	24	D001 and U154
Hazardous Waste	58	D001 and U159
Hazardous Waste	320	D001 and F003
Hazardous Waste	6,872	D001 and D003
Hazardous Waste	1,124	D002 and D006
Hazardous Waste	256	D002 and D007
Hazardous Waste	10	D002 and D003
Hazardous Waste	930	D002 and D009
Hazardous Waste	60,312	D002
Hazardous Waste	2,364	D003
Hazardous Waste	2,868	D004
Hazardous Waste	248	D004 and D006

Waste Category	*Total Waste Volume (in lbs)*	*Waste Codes*
Hazardous Waste	44	D005 and D007
Hazardous Waste	2,016	D005
Hazardous Waste	36,268	D006
Hazardous Waste	7,984	D006 and D007
Hazardous Waste	220	D006 and D009
Hazardous Waste	16,542	D007
Hazardous Waste	5,032	D007 and D008
Hazardous Waste	12,966	D007 and D011
Hazardous Waste	300	D007 and D035
Hazardous Waste	691	D008 and D009
Hazardous Waste	31,438	D008
Hazardous Waste	1,862	D021
Hazardous Waste	55,411	D009
Hazardous Waste	6,769	D011
Hazardous Waste	33,422	D018
Hazardous Waste	60	D021 and D035
Hazardous Waste	906	D035
Hazardous Waste	800	F001
Hazardous Waste	920	F002
Hazardous Waste	4,078	F003
Hazardous Waste	620	F005
Hazardous Waste	284	F003 and F005
Hazardous Waste	18	U002
Hazardous Waste	14	U112
Hazardous Waste	20	U133
Hazardous Waste	153	U151
Hazardous Waste	81	U154
Hazardous Waste	316	U159
Hazardous Waste	203	U220
Hazardous Waste	144	U239
Hazardous Waste	248	High Mercury
Total Hazardous Waste	**594,494**	**All Hazardous Waste Codes**

Notes: Ignitability (D001): If the waste flashpoint is less than 140°F, the waste is "ignitable" and thus a hazardous waste. Corrosivity (D002): If the waste pH less than or equal to 2 or greater than or equal to 12.5, the waste is "corrosive" and thus a hazardous waste. Reactivity (D003): If a waste exhibits any of the criteria associated with the characteristic of "reactivity," it is a hazardous waste by virtue of its "reactivity". Toxicity (D004 through D043): Compare individual analytical results to corresponding regulatory limits. If the reported value is equal or greater than specified regulatory limits for particular compounds, then the waste exhibits the characteristic of "toxicity" and is therefore a hazardous waste. F-listed hazardous waste is generated from non-specific sources such as solvents, plating solutions, and chemical manufacturing processes and can be found in 40 CFR § 261.31. U-listed wastes include discarded commercial chemical products and/or residues in which the generic name of the product matches any chemical listed in 40 CFR §261.33 with an USEPA Waste Number beginning with the letter "U". Data are for the year 2007 (DRMO Guam 2009).

Defense Environmental Restoration Program (DERP)

In 1986, Congress created the DERP. The DERP addresses the identification and cleanup of hazardous substances and military munitions remaining from past activities at DoD installations and formerly used defense sites (FUDS). Within DERP, DoD created two program categories, the Installation Restoration Program, (IRP) and the Military Munitions Response Program (MMRP).

Installation Restoration Program

The IRP focuses on cleaning up releases of hazardous substances that pose risks to the public and/or the environment at active, base realignment and closure (BRAC), and FUDS military sites owned or used by the DoD, including the Navy and Air Force.

On Guam, Navy and Air Force have ongoing DERP site cleanup activities with GEPA and EPA oversight. The DoD and State/Territorial Memorandum of Agreement (DSMOA) established a program where GEPA staff work closely with DoD representatives to discuss and facilitate environmental restoration and clean-up work on Guam. Under the DSMOA program, GEPA maintains regulatory oversight of environmental restoration efforts undertaken on Guam by DoD to ensure compliance with applicable local and federal laws and regulations. The DSMOA oversees the following three DoD programs:

- BRAC – A clean-up program to ensure the environmental suitability of DoD properties planned for transfer
- IRP – The main DoD environmental restoration program which includes activities, such as investigations and cleanups at the Orote landfill at COMNAV Marianas, Construction Battalion (CB) Landfill at South Finegayan and Landfills # 1 and # 2 at NCTS Finegayan, and various sites at Andersen AFB
- FUDS – The U.S. Army Corps of Engineers managed program designed to clean up military sites that are no longer owned by the U.S. government

In addition, to facilitate hazardous waste site restoration, the DoD has established restoration advisory boards (RABs). RABs are established to improve overall communications between all interested parties and expedite hazardous waste site cleanup. RABs act as a focal point for information exchange between DoD and the local community. RAB members typically include DoD and regulatory agency representatives and community members and meet to discuss ongoing environmental studies and cleanup activities. RAB members in turn serve as a liaison to the overall local community to address issues of concern. RAB meetings are open to the general public and the community is actively encouraged to participate.

Air Force Environmental Restoration Sites

In 1983, Andersen AFB began an investigation to identify and correct environmental contamination from past hazardous waste activities. Early stages of this investigation show that waste from past day-to-day operations contaminated areas at the base. Andersen AFB was placed in the USEPA National Priorities List (NPL) on October 14, 1992. Additionally, the Air Force entered into a formal federal facilities agreement with USEPA and GEPA to expedite installation environmental restoration efforts on March 30, 1993.

Appendix G in Volume 9 contains tables that summarize select Andersen AFB environmental restoration sites, solid waste management units (SWMUs), and Areas of Concern (AOC) in the vicinity of the potential DoD expansion. Figure 17.1-2 through Figure 17.1-4 depicts Air Force site locations in the vicinity of the potential DoD expansion.

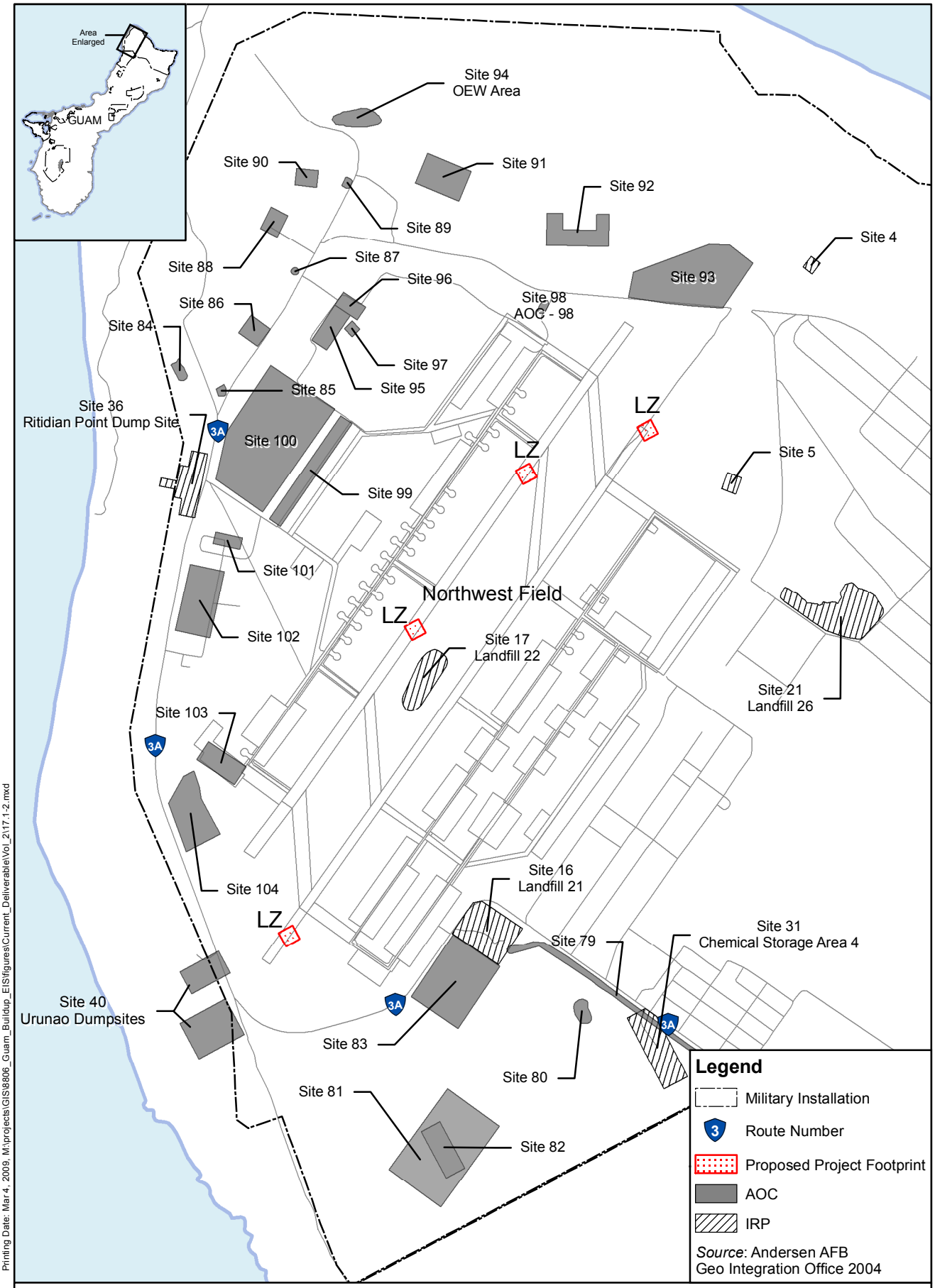

Figure 17.1-2
IRP Sites-Northwest Field

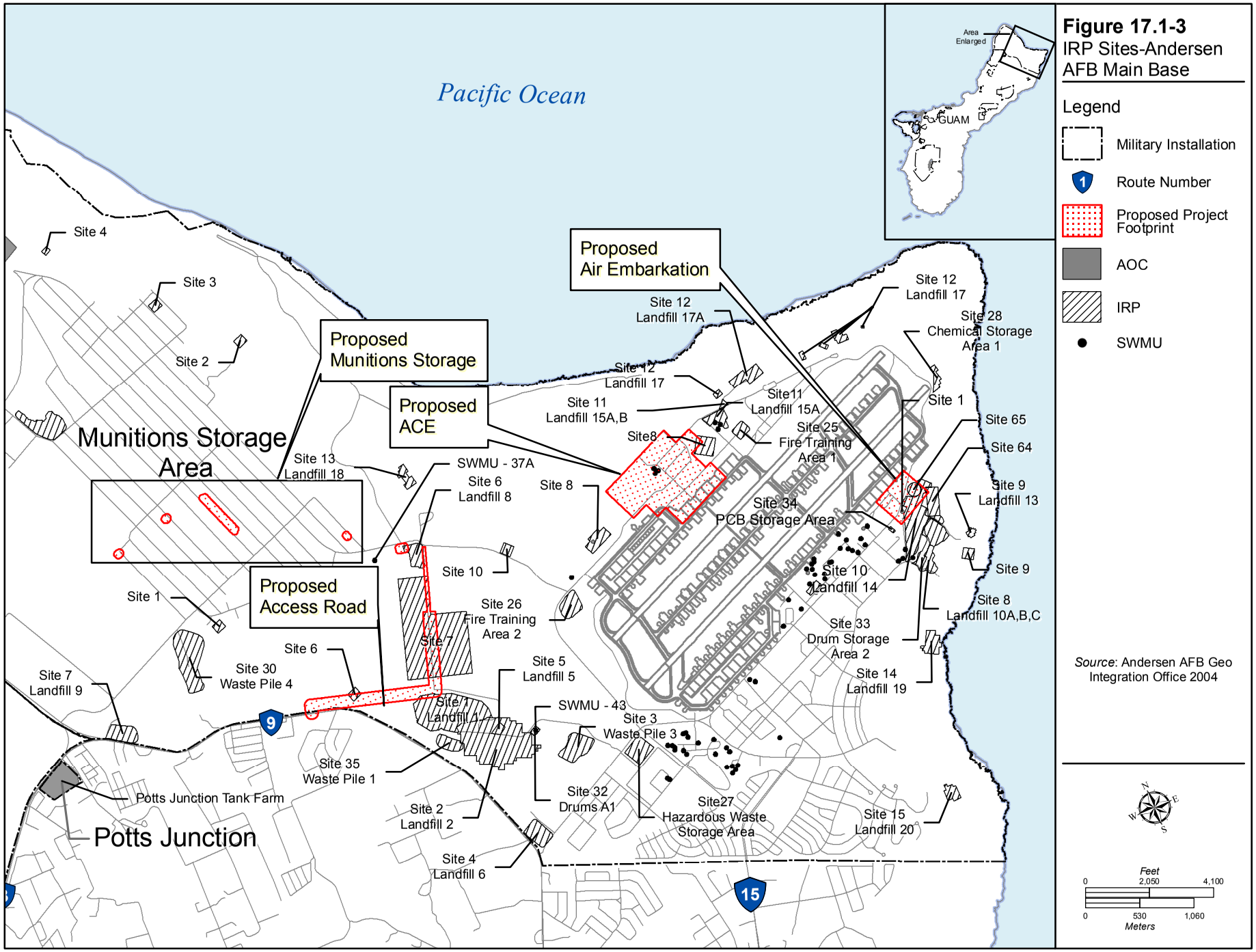

Figure 17.1-3
IRP Sites-Andersen AFB Main Base

Legend

- Military Installation
- Route Number
- Proposed Project Footprint
- AOC
- IRP
- SWMU

Source: Andersen AFB Geo Integration Office 2004

Feet
0 2,050 4,100
0 530 1,060
Meters

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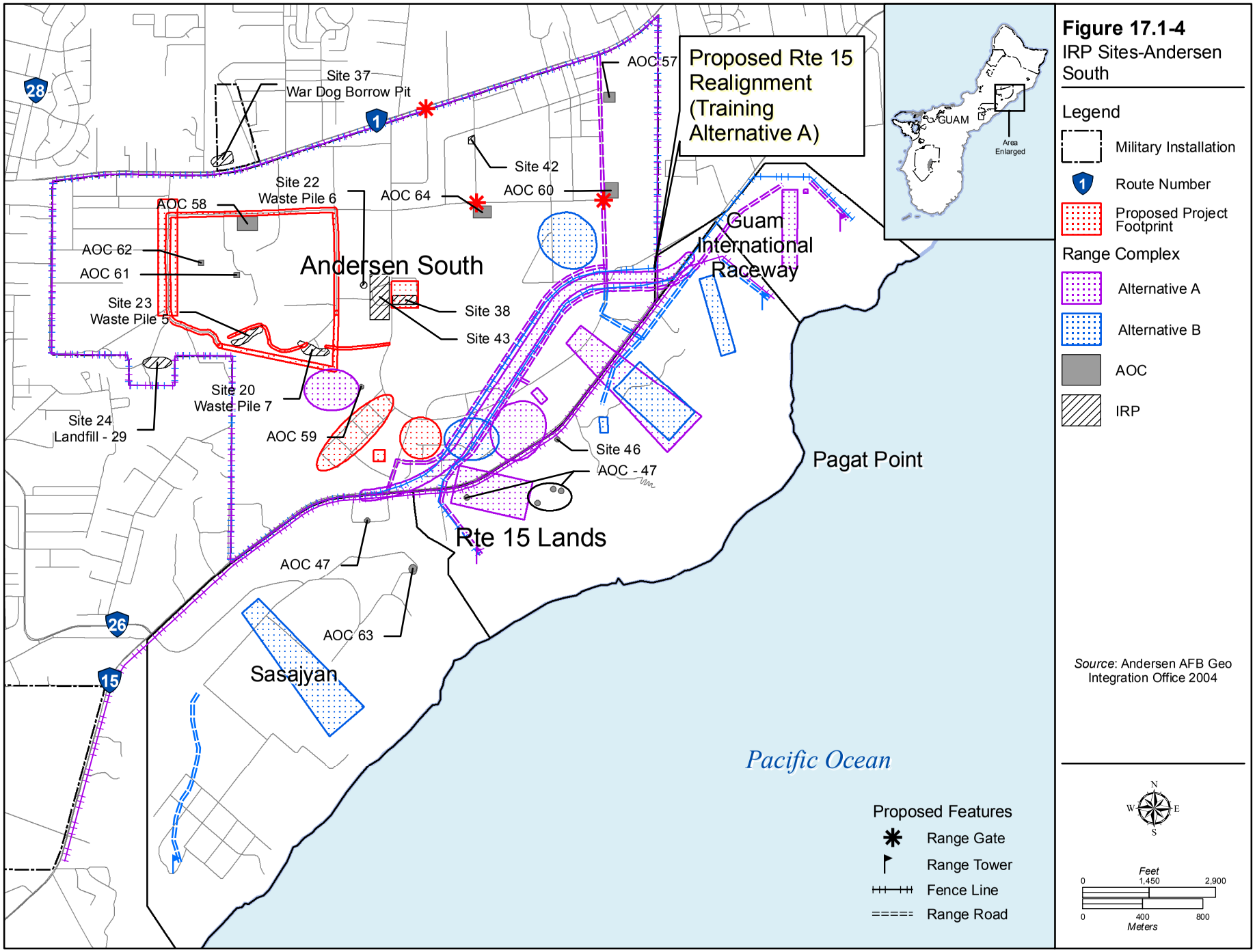

Figure 17.1-4
IRP Sites-Andersen South

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Navy Active Environmental Restoration Sites

The Navy is also in the process of investigating and remediating environmental restoration sites that occurred as a result of past hazardous waste management practices at various Navy facilities located throughout Guam. Appendix G in Volume 9 contains tables that summarize the Navy's active Guam environmental restoration sites. Figure 17.1-5 through Figure 17.1-10 shows the locations of these active Navy sites.

MMRP

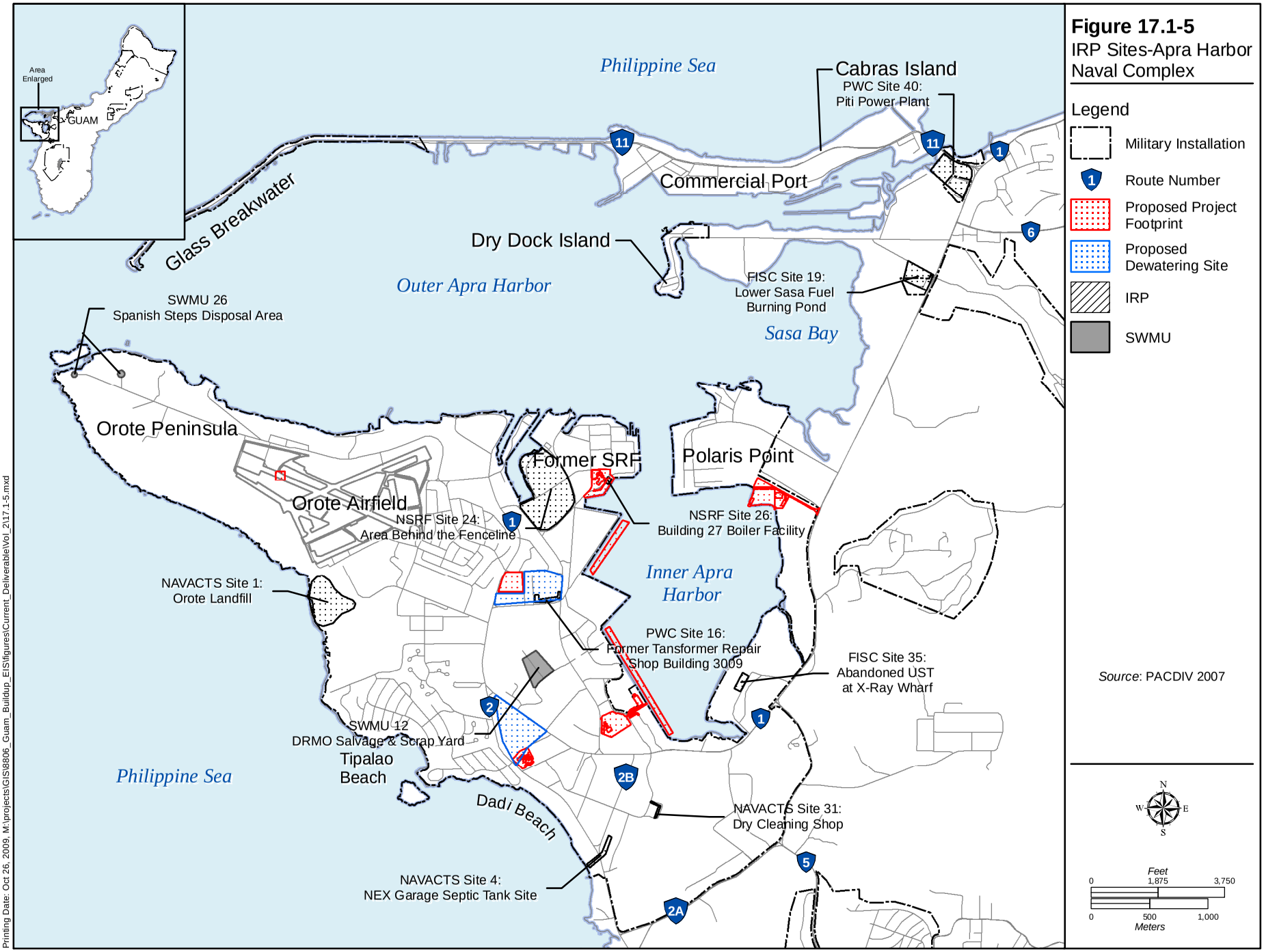
In September 2001, DoD established the MMRP to address hazards associated with MEC within areas no longer used for operational range activities. These former range training areas are called munitions response areas (MRAs). MRAs often contain one or more discrete munitions response sites (MRSs). In December 2001, Congress passed the National Defense Authorization Act (NDAA). This Act required DoD to develop an initial inventory of areas not located within operational ranges (i.e., active or inactive ranges) that are known or suspected to contain MEC. As part of this inventory process, DoD is coordinating with GEPA to conduct preliminary assessments and site inspections of AOCs on Guam. Figure 17.1-11 shows the locations of these MRAs currently under investigation. To address these and potential future DoD joint range sites Marine Corps Orders (MCO) (i.e., MCO 3550.10 – Range Management, MCO 3550.12 – Operational Range Clearance Program, and MCO – 3570.1B – Range Safety) would be followed. In addition, Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8020.15B Explosives Safety Review, Oversight, and Verification of Munitions Responses would be followed.

The following Navy MRA sites on Guam have been identified to date (NAVFAC Pacific 2007a):

- Naval Munitions Site Small Arms Range
- Spanish Steps Skeet and Trap Ranges
- Orote Point Rifle and Pistol Range
- Naval Computer and Telecommunications Main Station Finegayan Skeet Range
- Naval Computer and Telecommunications Main Station Small Arms Range

Air Force Hazardous Waste Management

Andersen AFB is a Large Quantity Generator (40 CFR 262.34 [d], [e], and [f]) of hazardous wastes with USEPA identification handler number GU6571999519. DRMO arranges for all hazardous waste collection, transportation, and disposal via licensed contractors who ultimately dispose of the hazardous waste at permitted off-island disposal facilities (Andersen AFB 2007).



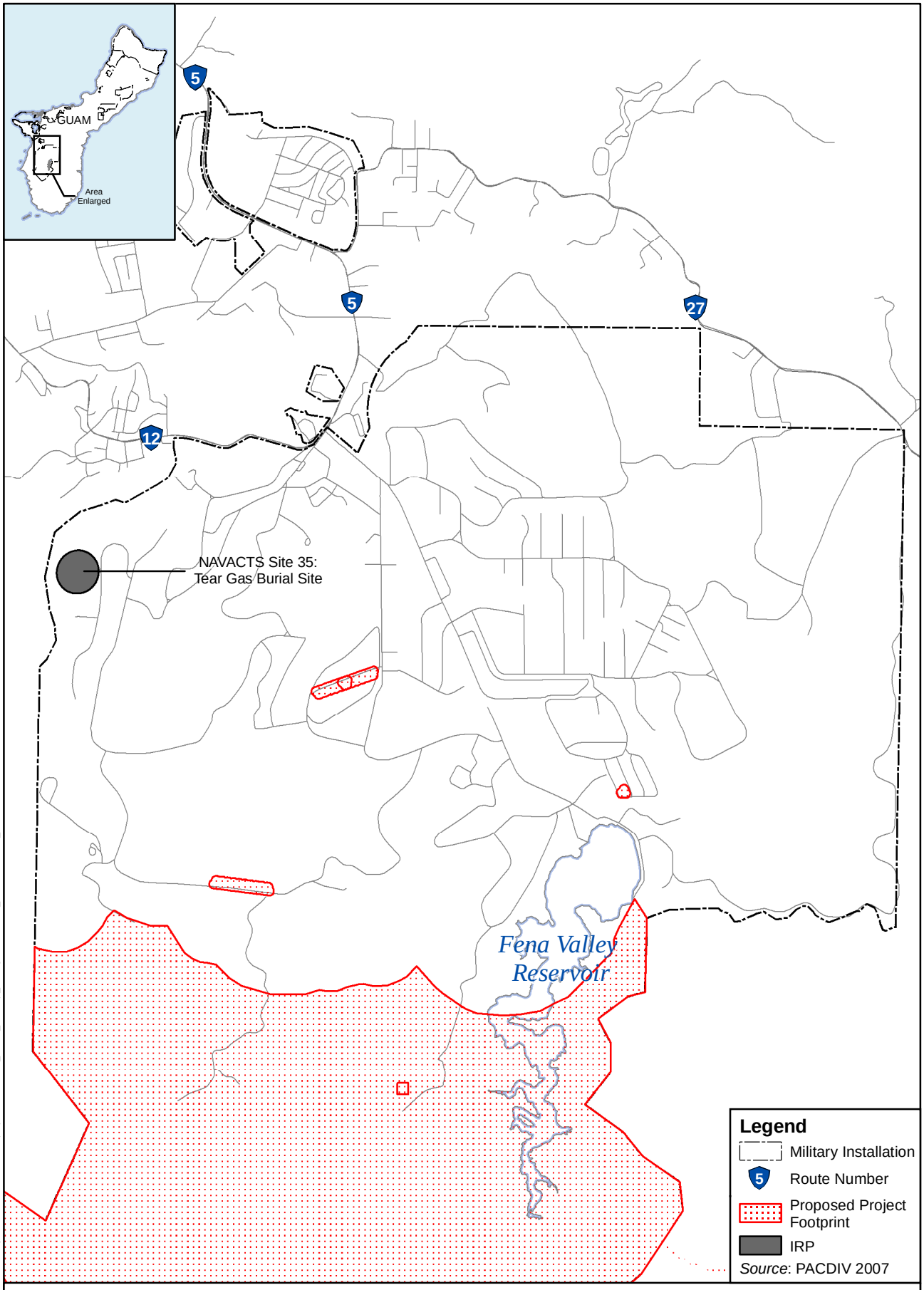
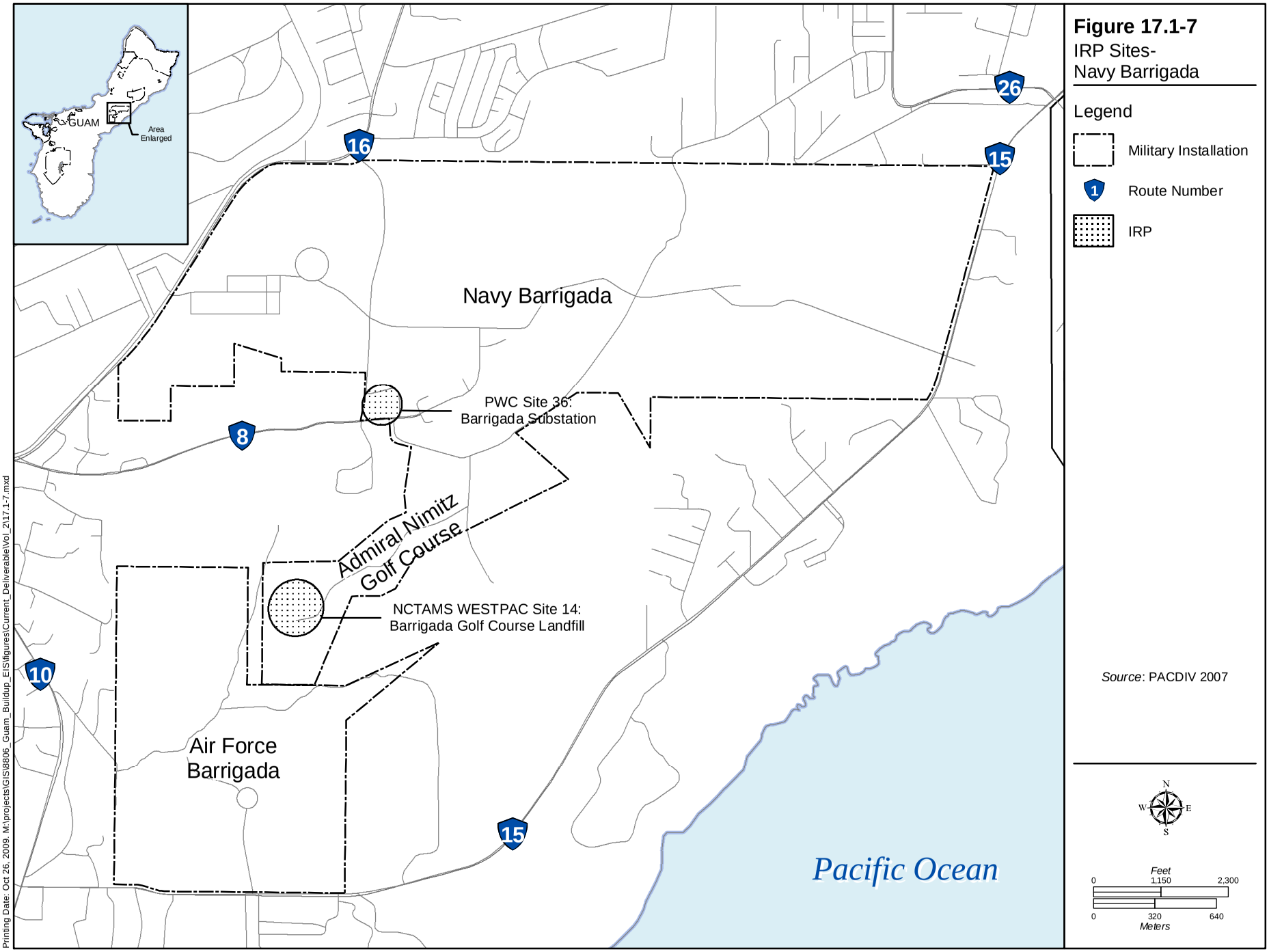


Figure 17.1-6
IRP Sites-Tear Gas Burial Site


GUAM
Area Enlarged
Navy Barrigada
PWC Site 36:
Barrigada Substation
Admiral Nimitz
Golf Course
NCTAMS WESTPAC Site 14:
Barrigada Golf Course Landfill
Air Force
Barrigada
Pacific Ocean
16
26
15
8
10
15
Figure 17.1-7
IRP Sites-
Navy Barrigada
Legend
Military Installation
Route Number
IRP
Source: PACDIV 2007
N
W
E
S
Feet
0
1,150
2,300
0
320
640
Meters
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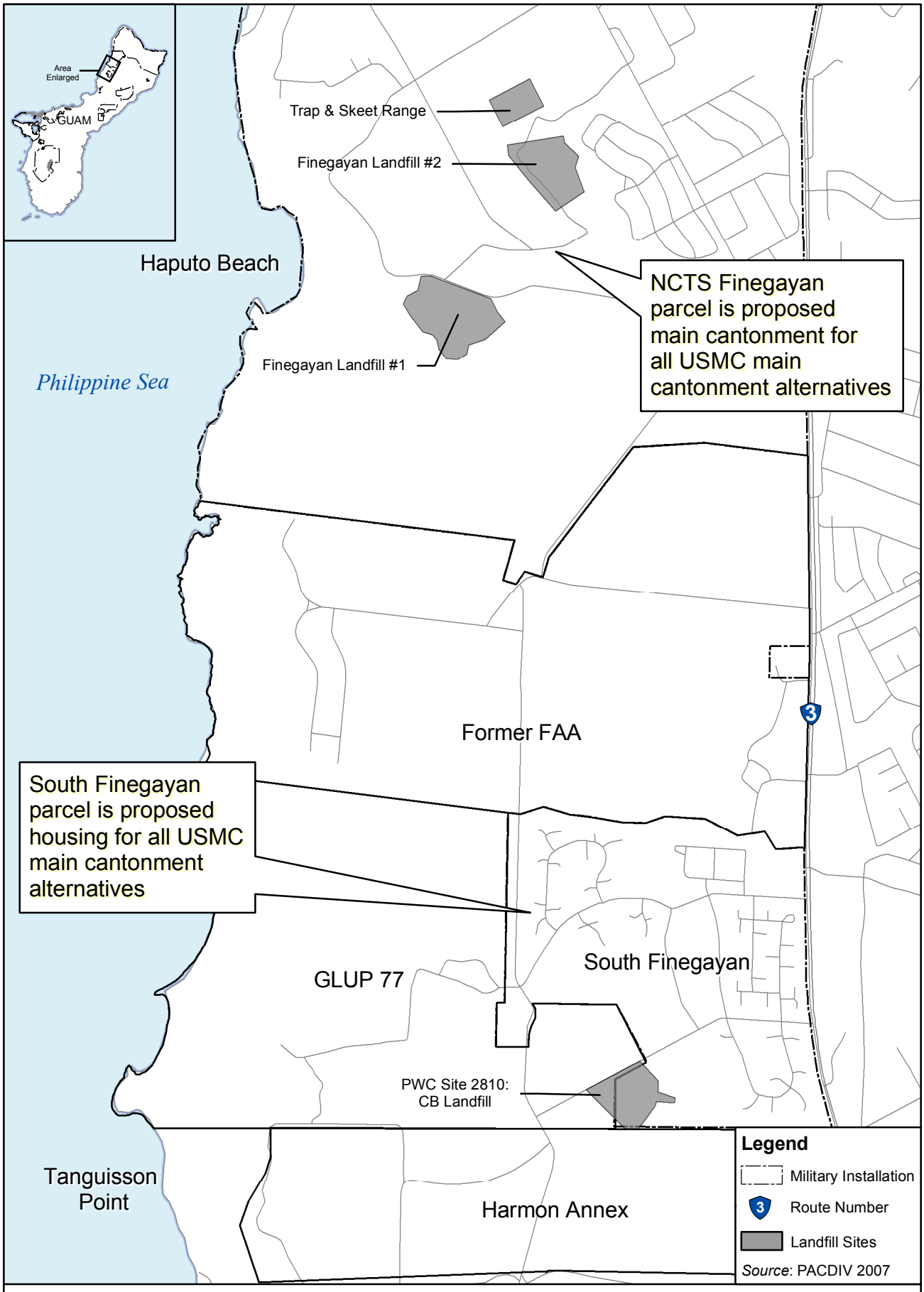

Figure 17.1-8
PWC Site 2810: CB Landfill, Finegayan Landfill #1, Finegayan Landfill #2, and Trap & Skeet Range

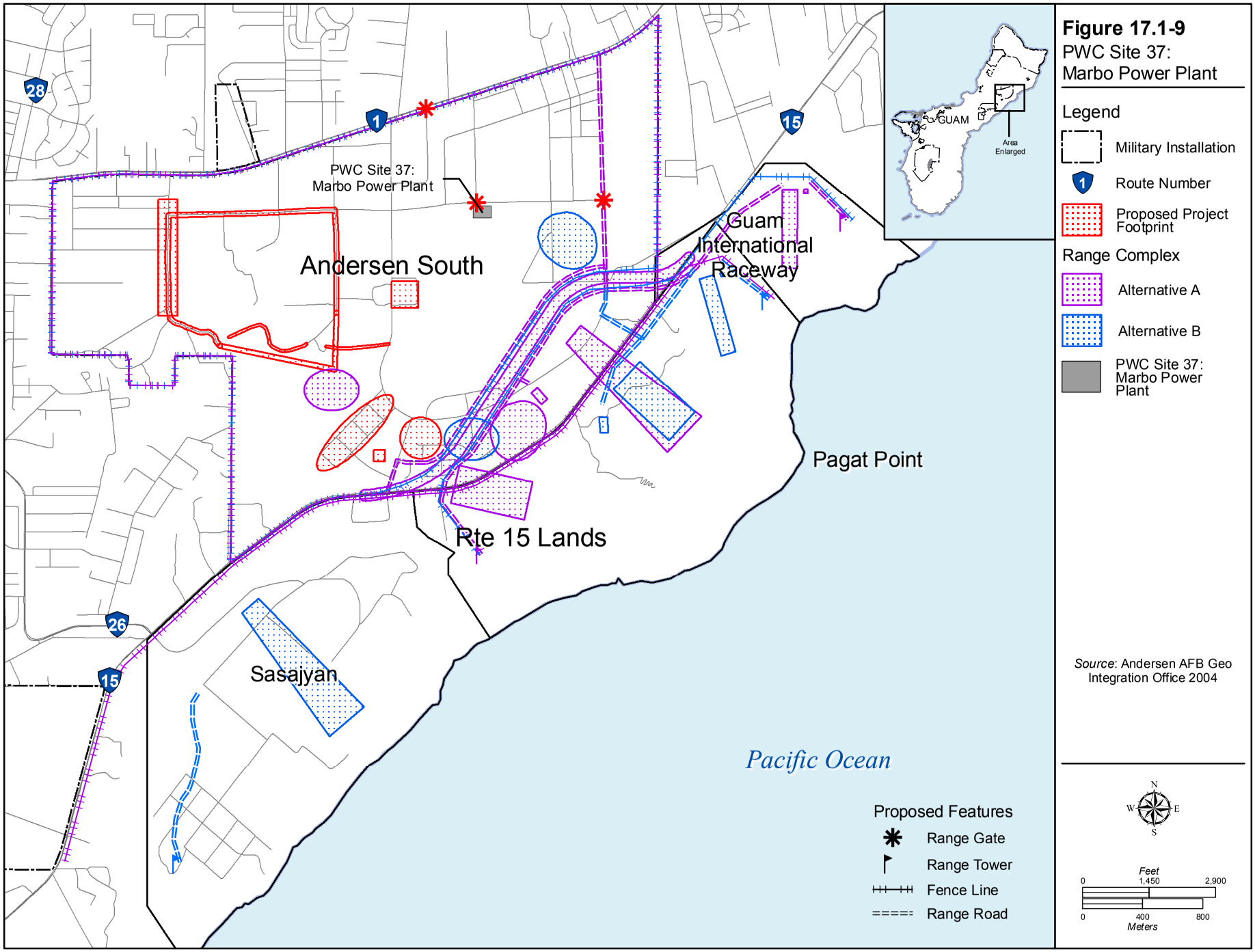

Figure 17.1-9
PWC Site 37:
Marbo Power Plant

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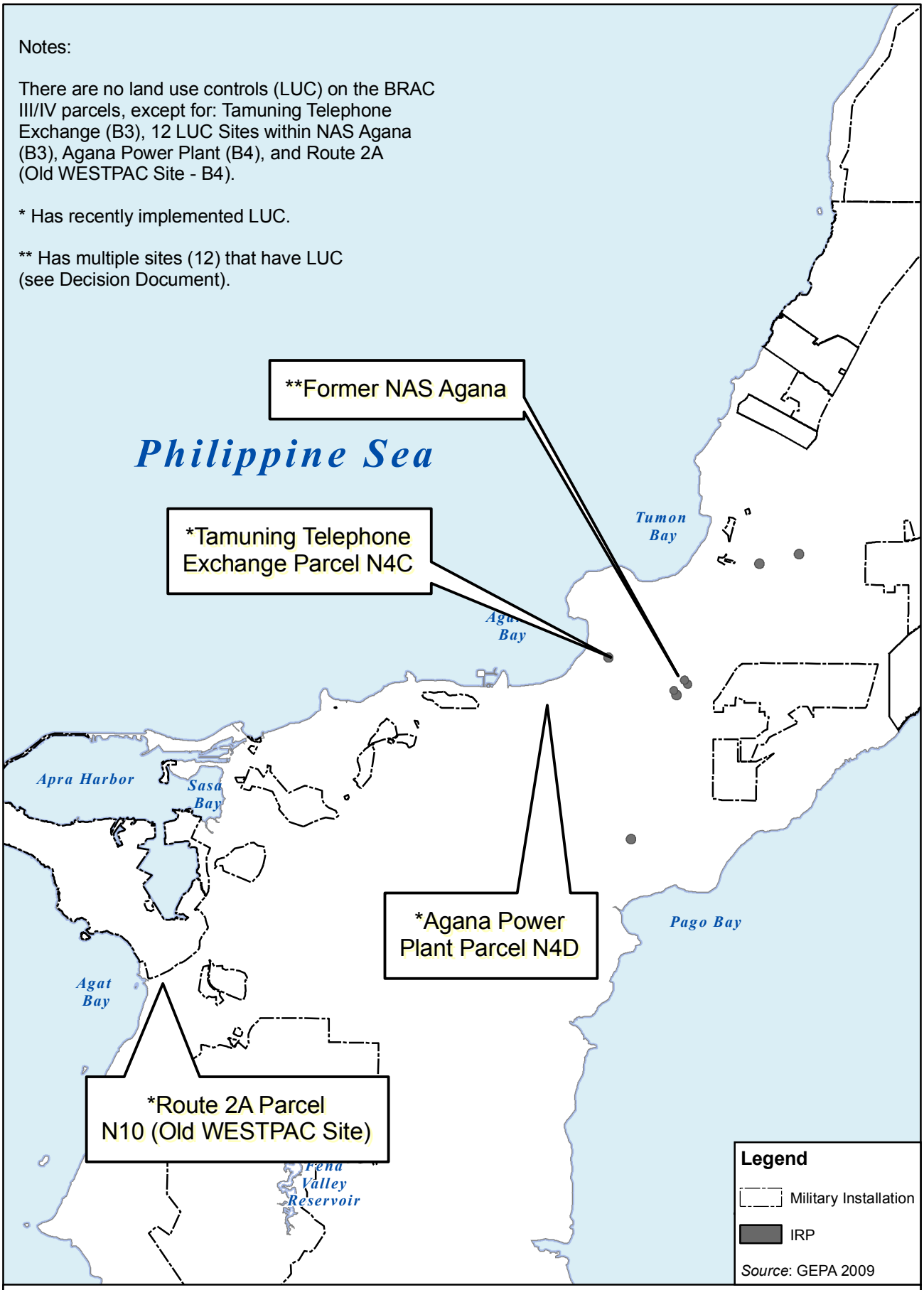

Figure 17.1-10
IRP Sites - Other Navy Sites

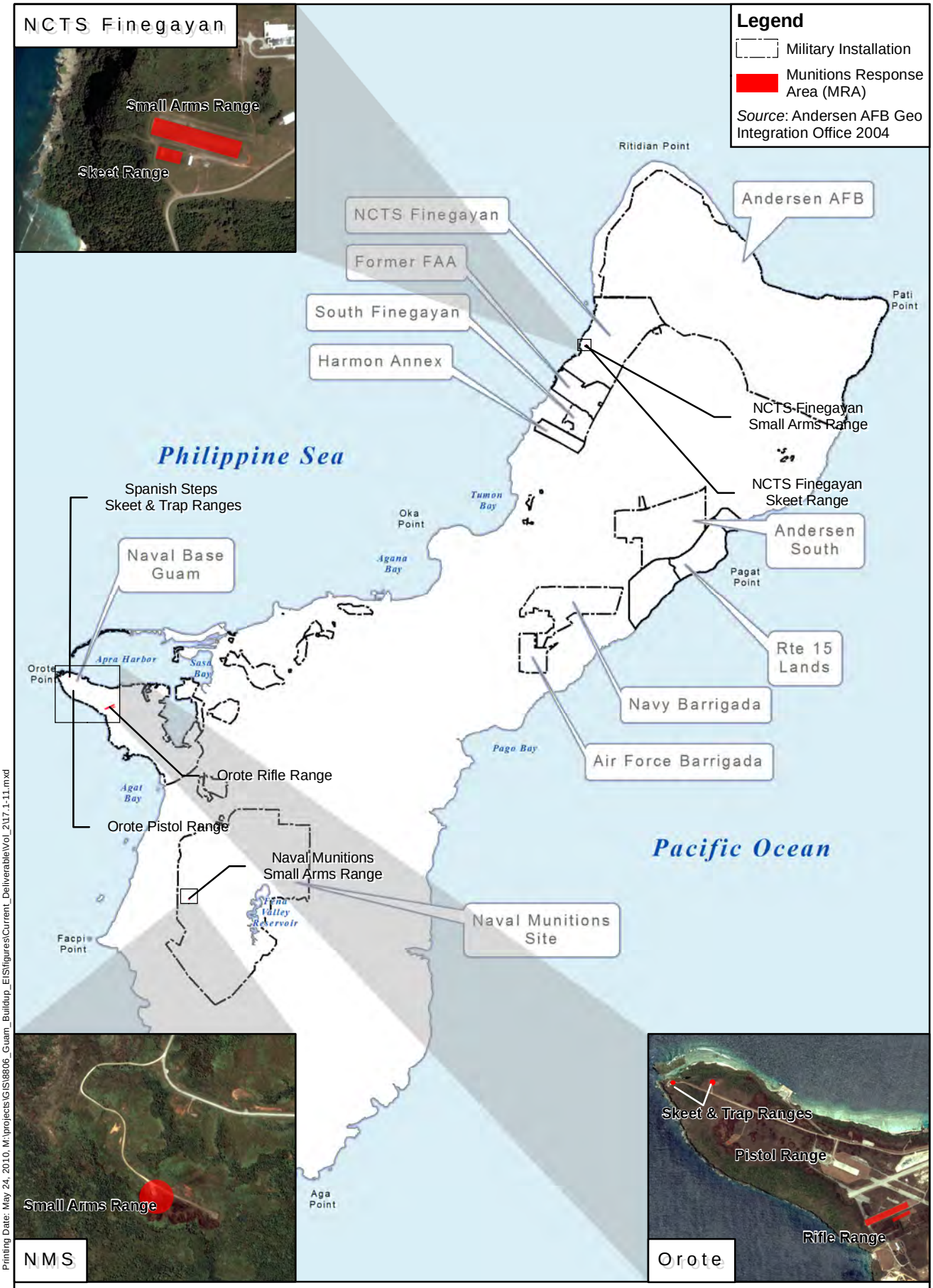

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Figure 17.1-11
Navy MRAs

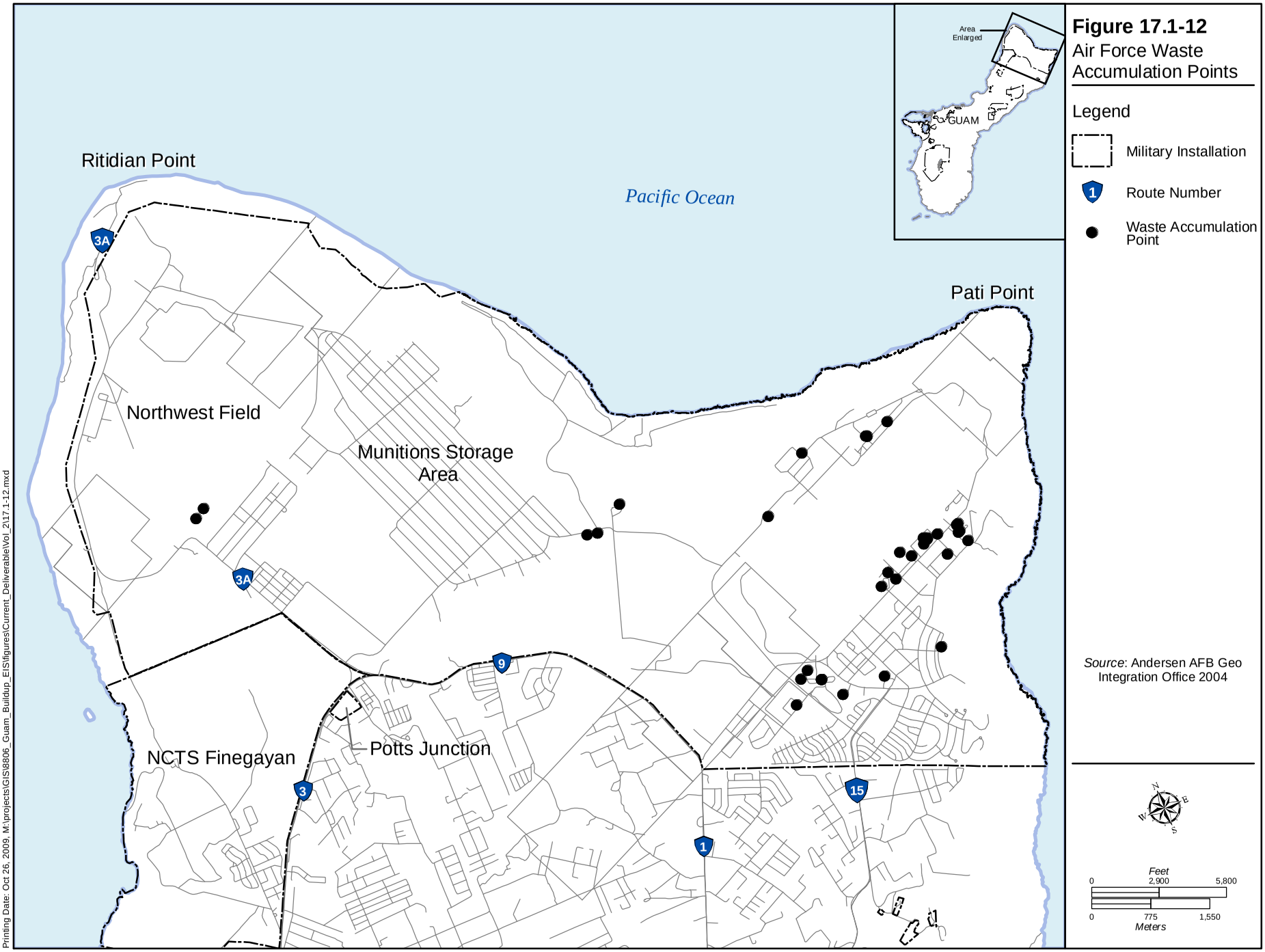
The management of hazardous waste at Andersen AFB is established primarily by AFI 32-7086, *Hazardous Materials Management.* Specifically, this AFI incorporates the requirements of federal regulations, other AFIs, and DoD directives. Additionally, Andersen AFB has a HWMP pursuant to the AFI. The HWMP provides guidance for personnel regarding the proper handling, storage, and disposal of hazardous waste. Furthermore, the HWMP implements the USEPA and DOT "cradle-to-grave" requirements regarding hazardous waste generated as a result of base operations (Andersen AFB 2007). The Air Force has various waste accumulation points as depicted in Figure 17.1-12. Andersen AFB holds a Guam RCRA Operating Permit for a hazardous waste management treatment facility located within the boundaries of Andersen AFB at the extreme reach of Tarague Beach. The hazardous waste management facility is permitted to conduct open burning and open detonation to treat MEC that is either reactive (D003) or toxic characteristic leaching procedure hazardous waste. The facility is known as the Explosive Ordnance Disposal (EOD) Range. The Facility Identification Number is GU6571999519 and the Permit Number is GUS002.

Navy Hazardous Waste Management

The Navy on Guam is a Large Quantity Generator (LQG) (40 CFR 262.34 [d], [e], and [f]) of hazardous wastes with USEPA identification handler number GU5170022680. Disposal of Navy hazardous waste is arranged through DRMO and performed by its' licensed contractors. DRMO maintains all required hazardous waste documentation and contracts with licensed contractors for proper off-island disposal of the waste at permitted facilities (Navy 2007). The Navy has various waste accumulation points as designated in its approved HWMP. The locations of these waste accumulation points are depicted in Figure 17.1-13.

OPNAVINST 5090.1C requires all Navy facilities that generate hazardous waste to have a HWMP. The HWMP provides guidance for personnel on the proper handling, storage, and disposal of hazardous waste. Furthermore, the HWMP ensures the proper implementation the USEPA and DOT "cradle-to-grave" management requirements for hazardous waste.

Navy ships are not considered hazardous waste generators, but rather generate what is termed as "used hazardous material". This material is not considered hazardous waste until the receiving shore entity declares it "waste" and subjects it to applicable regulations. This policy applies only for material generated aboard ships. When "used hazardous material" is offloaded and determined to have "no further use" it then becomes regulated waste and is subject to all applicable regulations.



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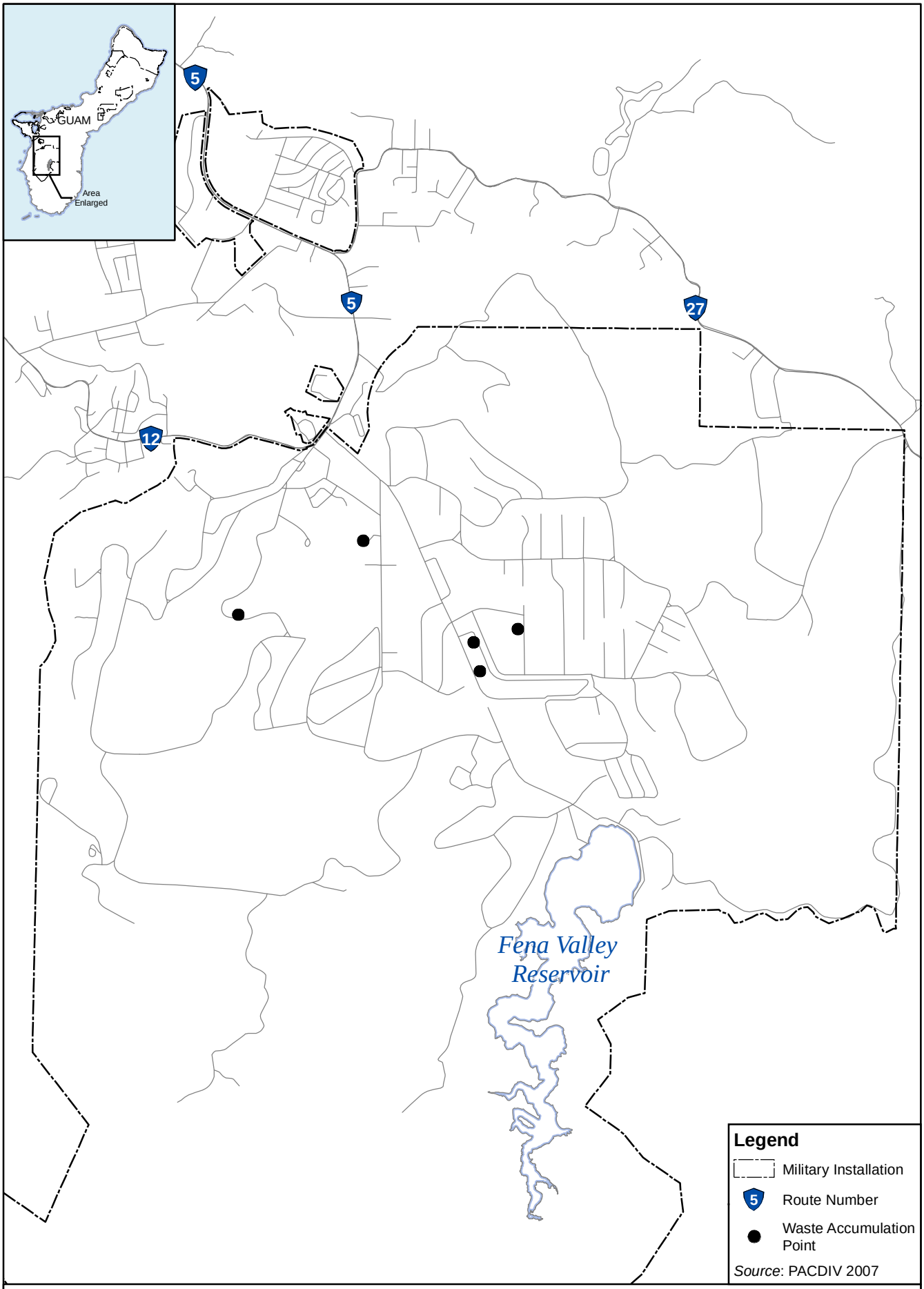

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Figure 17.1-13
Navy Waste Accumulation Points

GovGuam Hazardous Waste Management

GovGuam accumulates hazardous wastes from a multitude of waste streams. GEPA imposes regulations to control the generation and disposal of hazardous waste (GEPA 2008). The GEPA Permit Guidebook Chapter 2 - *Hazardous Waste Permits and Notification* and the Guam Hazardous Waste Management Regulations were developed as guidance for:

> "…individuals and organizations in the proper methods and procedures for handling, transporting, storing, disposing, and treating hazardous wastes. It is also the objective of the regulation to establish a program that identifies hazardous wastes and provides for the regulation of the above mentioned activities to include the transport or transfer of wastes through program capabilities for inspection, permit review, and enforcement. The primary goal of the regulations is to protect human health and carry out management activities in an environmentally sensitive and sound manner. Certain sections of the CFRs dealing with hazardous wastes have been adopted under Guam's regulations by reference to provide for comprehensive coverage. The Administrator of Guam EPA serves as the primary certification and regulatory authority for hazardous waste management in Guam."

The GEPA Guidebook includes information concerning:

- Storage of hazardous waste
- Treatment of hazardous waste
- Disposal of hazardous waste
- Notification of hazardous waste activity
- USTs
- Hazardous waste importers
- *Hasso Guam!* – Guam's household hazardous waste cleanup program

In addition, PL 29-26 addresses the importation, handling, use, and application of pesticides on Guam. The transportation of hazardous wastes in Guam is regulated consistent with DOT requirements through the Guam Department of Public Works (GDPW), Highway Division.

17.1.3.3 Off Base Roadways

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

North

Four potential contamination sites are located adjacent or proximal to the proposed road improvement projects in the North Region (Figure 17.1-14). Table 17.1-3 provides a key to locations of potentially contaminated sites near the specific Guam Road Network (GRN) project locations. Each of the potentially contaminated sites is described herein.

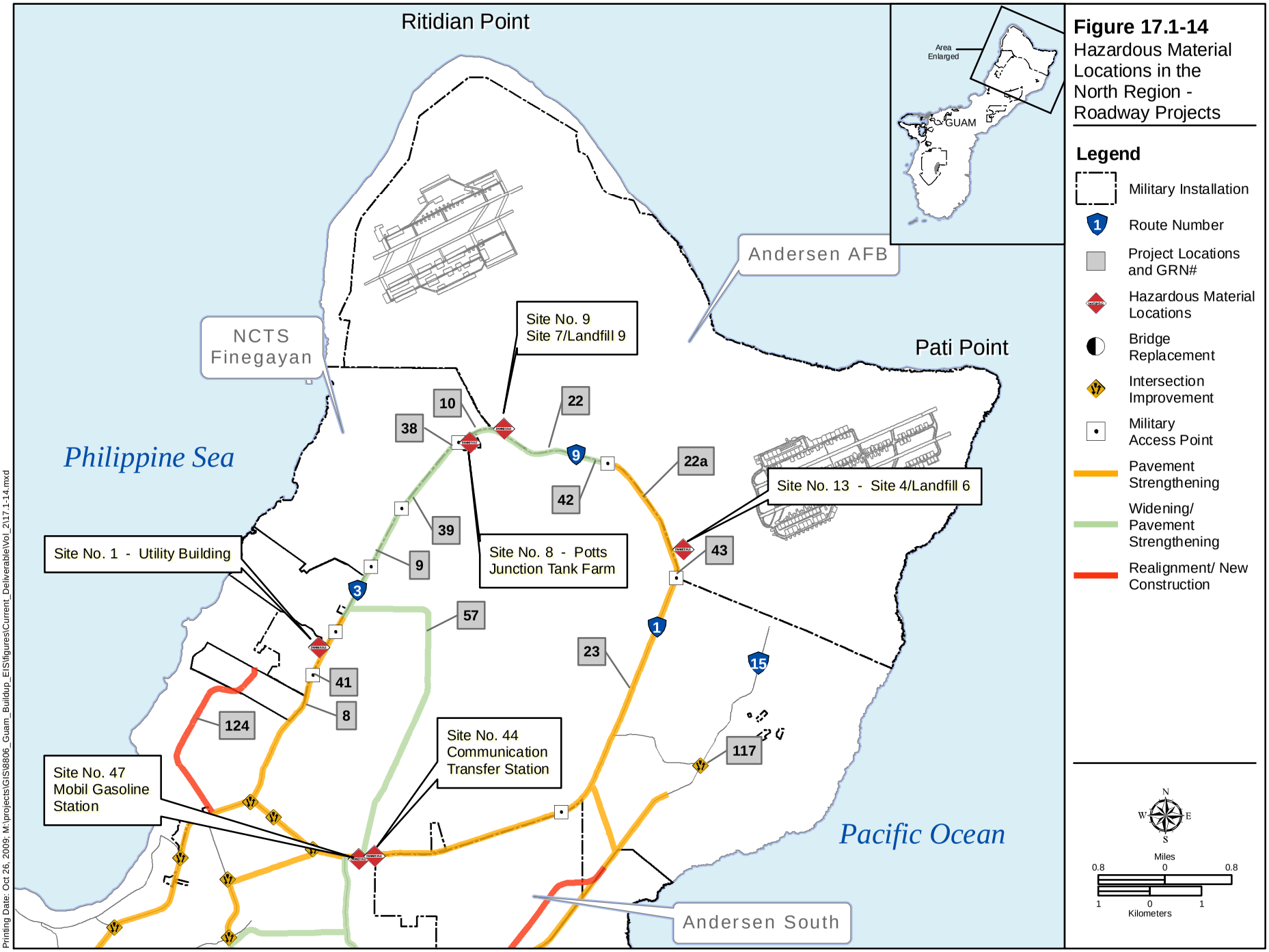

Figure 17.1-14
Hazardous Material Locations in the North Region - Roadway Projects

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Table 17.1-3. Potentially Contaminated Sites near GRN Roadway Project Sites in the North Region

GRN #	*Route and Segment*	*Site Number*	*Description*	*Environmental Concern*
8	Route 28 to Route 1	1	Utility Building	Site conditions suggest likely soil and/or groundwater contamination. Adjacent Comprehensive Environmental Response, Compensation, and Liability Act Information Systems (CERCLIS), RCRA Subtitle C site planned for reassessment. The March 2009 site visit identified one aboveground storage tank (AST) in service and posted "chlorine gas" sign.
10	NCTS Finegayan to Route 9	8	Potts Junction Tank Farm	Adjacent tank farm included in the Andersen Air AFB IRP. Access was not available during the March 2009 site visit. No current environmental disposition. On- or off-site contamination is unknown; however, historical site use and its inclusion in the Andersen AFB IRP suggest likely soil and/or groundwater contamination.
22A	Andersen AFB North Gate to Route 1 (Andersen AFB Main Gate)	9	Site 7/Landfill 9	Adjacent landfill included in the Andersen AFB IRP. Access was not available during the March 2009 site visit. No current environmental disposition. On- or off-site contamination is unknown; however, historical site use and its inclusion in the Andersen AFB IRP suggest likely soil and/or groundwater contamination
		13	Site 4/Landfill 6	Adjacent landfill included in the Andersen AFB IRP. Access was not available during the March 2009 site visit. No current environmental disposition. On- or off-site contamination is unknown; however, historical site use and its inclusion in the Andersen AFB IRP suggest likely soil and/or groundwater contamination.

Source: Parsons Brinckerhoff 2009.

PCB Contamination

A cursory field review of power pole and pad-mounted transformers in the North Region was conducted during inspections of substations and Guam Power Authority (GPA) utility buildings. Non-PCB-containing transformers or capacitors would be clearly labeled and are typically painted blue by the manufacturer. Clear white labeling typically indicates the use of non-PCB fluids for the breakers. Labeling for non-PCB-containing transformers was not identified during the limited field review. While any wooden pole with mounted transformers is likely to contain PCBs, individual pole-mounted or pad-mounted transformers in the region were not checked. The GPA has a PCB management program, and recent upgrades may have replaced some of the PCB-containing transformers. Most of the power poles on the island of Guam appear to have been upgraded, but replacement of PCB-containing capacitors and transformers may not have been completed at all locations. For this reason, existing pole- and pad-mounted transformers in the North Region may contain PCBs.

SWMU

The Andersen AFB SWMUs are located more than 0.25-mi (0.40-kilometer [km]) from the proposed roadway improvements in the north and central regions (i.e., roadway improvements proximal to the mentioned military installations) and are not close enough the proposed improvements to warrant further discussion.

Central

Eight potential contamination sites are located adjacent or proximal to the proposed road improvement projects in the Central Region Figure 17.1-15. Table 17.1-4 provides a key to locations of potentially contaminated sites near the specific GRN project locations. Each of the potentially contaminated sites is described herein.

Table 17.1-4. Potentially Contaminated Sites Near GRN Roadway Project Sites in the Central Region

GRN #	*Route and Segment*	*Site Number*	*Description*	*Environmental Concern*
13	Route 11 to Asan River	14	Former Mobil Gasoline Station	No documented record of contamination; however an UST pad and associated monitoring wells suggest likely soil and/or groundwater contamination.
15	Route 6 (Adelup) to Route 4	25	Mobil Gasoline Station	Reworked pavement and monitoring wells identified during March 2009 site visit suggest undocumented UST removal and possible soil and/or groundwater contamination.
33	Route 8 to Route 3	33	Mobil Gasoline Station, Building #101	Three monitoring wells associated with USTs located as near as 35 feet (ft) (11 meters [m]) from project improvements suggest undocumented soil and/or groundwater contamination.
6	Route 27 to Chalan Lujuna	44	Communication Transfer Station	An AST and five monitoring wells identified during March 2009 site visit. Undocumented soil and/or groundwater contamination is likely as no evidence of remediation activities were observed.
		47	Mobil Gasoline Station	Three monitoring wells, two test wells, and drums labeled "hazardous waste" were identified during March 2009 site visit suggest undocumented soil and/or groundwater contamination.
17	Route 10 to Tiyan Parkway/Route 33 (east) Tiyan Parkway/ Route 33 (east) to Route 1	57	Mobil Mart	Six fuel islands and a tank farm located within 40 ft (12 m) of project improvements with eight groundwater monitoring wells located on site. No indication of remediation identified during March 2009 site visit. Site conditions suggest likely soil and/or groundwater contamination.
		58	Shell Gasoline Station	Site conditions in March 2009 included one AST without secondary containment; a fuel island and tank pad located within 30 ft (9 m) of project improvements; and active remediation equipment in use. Site conditions suggest likely soil and/or groundwater contamination.
		62	Shell Gasoline Station	Site conditions in March 2009 included one AST; a fuel island located within 25 ft (8 m) of project improvements; and active remediation equipment on site. Site conditions suggest likely soil and/or groundwater contamination.

Source: Parsons Brinckerhoff 2009.

PCB Contamination

A cursory field review of power pole and pad-mounted transformers in the central region was conducted during inspections of substations and GPA utility buildings. As discussed for the north region, existing pole- and pad-mounted transformers in the central region may contain PCBs.

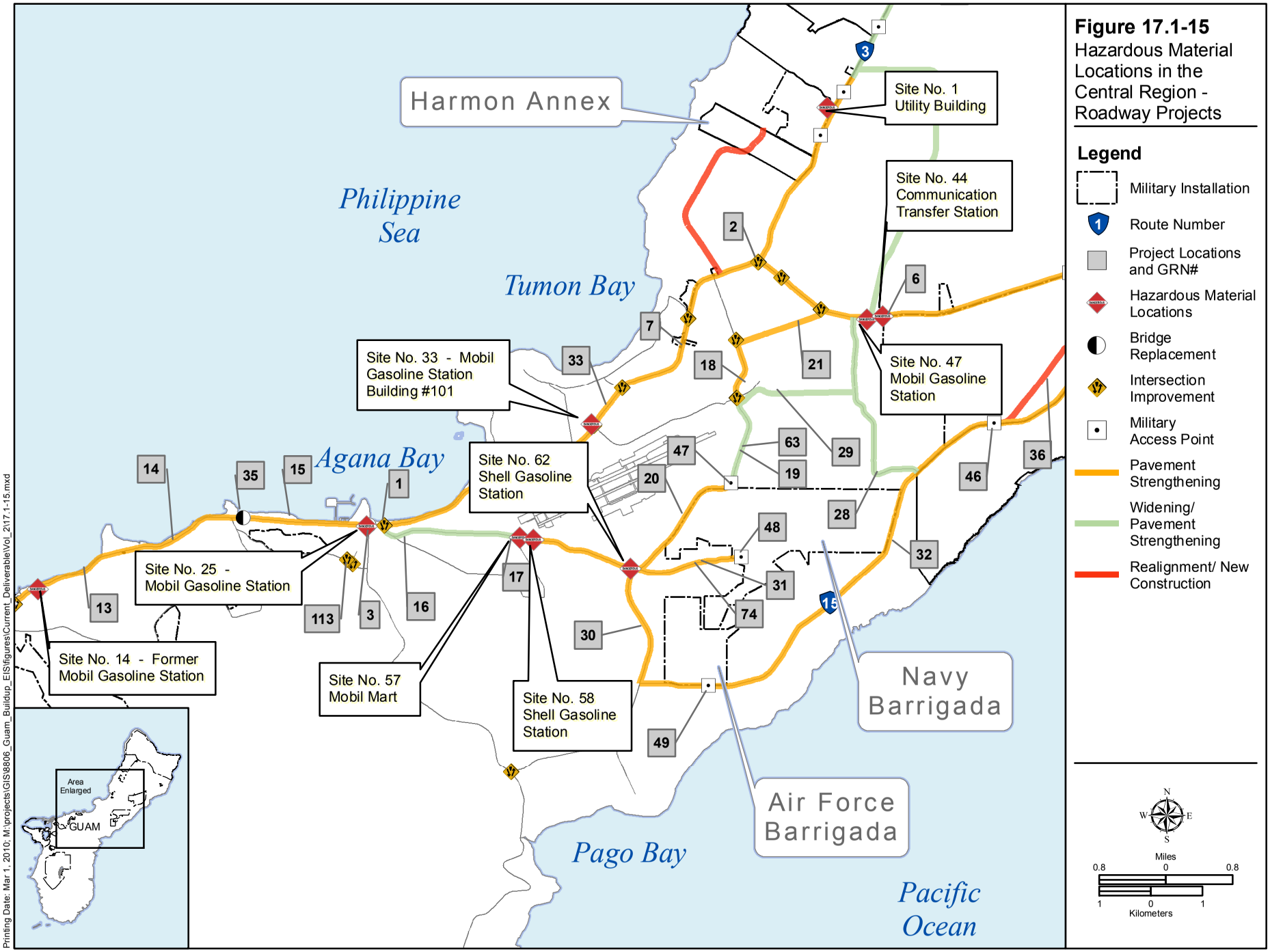


Figure 17.1-15
Hazardous Material Locations in the Central Region - Roadway Projects

Apra Harbor

Five potential contamination sites are located adjacent or proximal to the proposed road improvement projects in the Apra Harbor Region (Figure 17.1-16). Table 17.1-5 provides a key to locations of potentially contaminated sites near the specific GRN project locations in the Apra Harbor Region. Each of the potentially contaminated sites is described herein.

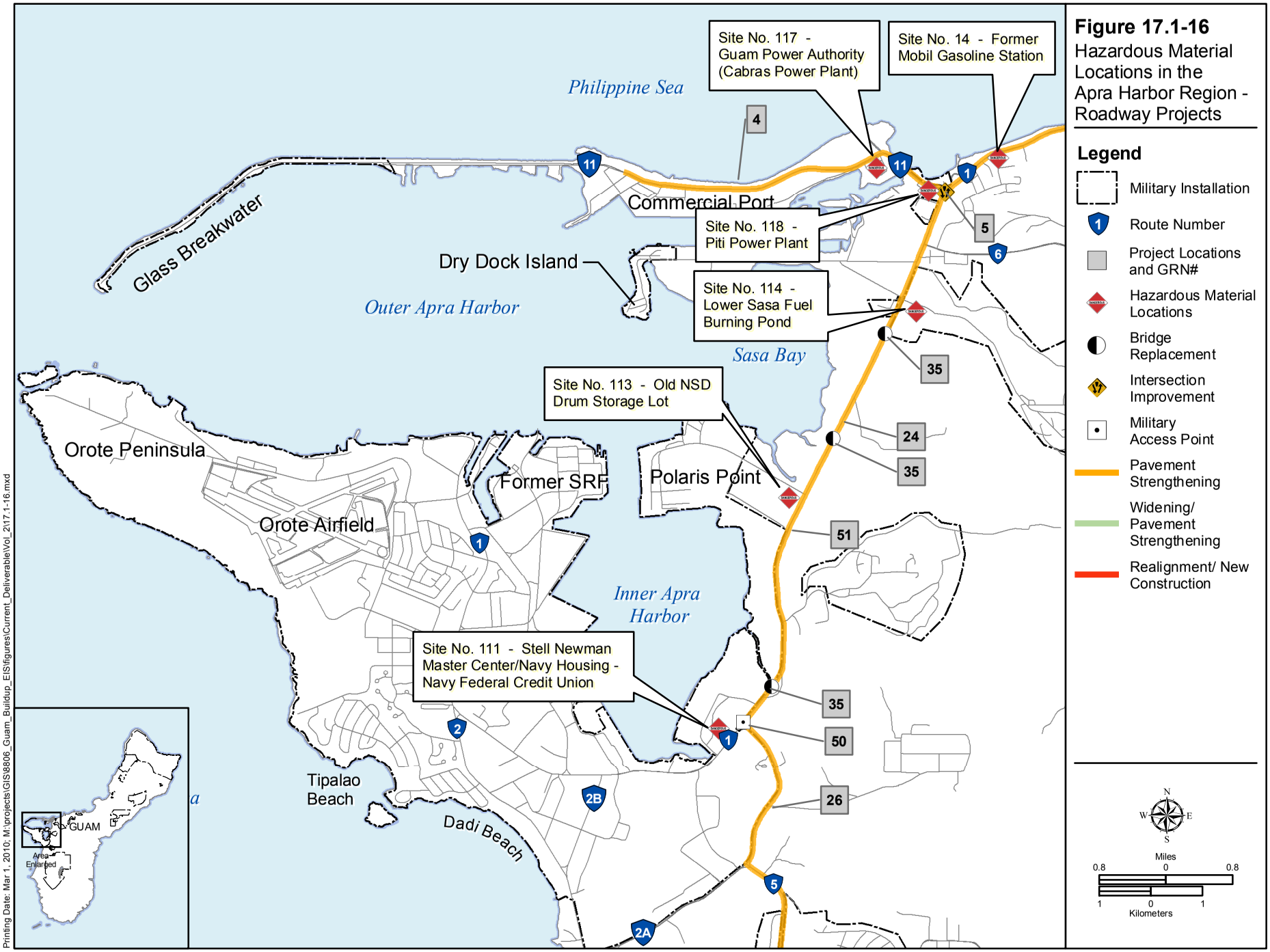
Table 17.1-5. Potentially Contaminated Sites near GRN Roadway Project Sites in the Apra Harbor Region

GRN #	*Route and Segment*	*Site Number*	*Description*	*Environmental Concern*
26	Route 1 to Route 5	111	Stell Newman Master Center/ Navy Housing – Navy Federal Credit Union	Included in the Apra-Harbor Naval Complex IRP as location of abandoned UST with petroleum contaminants on site. No current environmental disposition; however, the documented site history suggests likely soil and/or groundwater contamination.
		113	Old NSD Drum Storage Lot	Included in the Apra-Harbor Naval Complex IRP and designated as a Solid Waste Management Unit. The March 2009 site visit identified a possible disposal site at or near this site. Documentation suggests likely soil and/or groundwater contamination.
		114	Lower Sasa Fuel Burning Pond	Included in the Apra-Harbor Naval Complex IRP and formerly managed wastewater and fuels on site. Current environmental disposition is land use control. Site history suggests likely soil and/or groundwater contamination.
4	Port to Intersection with Route 1	117	GPA (Cabras Power Plant)	Currently considered to be in significant non-compliance in connection with former PCB disposal. Several ASTs were observed on site during March 2009 site visit. Documented site history and site conditions suggest likely soil and/or groundwater contamination.
		118	Piti Power Plant	Included in the Apra-Harbor Naval Complex IRP as location of abandoned UST with petroleum contaminants on site. No current environmental disposition; however, the documented site history suggests likely soil and/or groundwater contamination.

Source: Parsons Brinckerhoff 2009.

PCB Contamination

A cursory field review of power pole and pad-mounted transformers in the Apra Harbor Region was conducted during inspections of substations and GPA utility buildings. As discussed for the north region, existing pole- and pad-mounted transformers in the Apra Harbor Region may contain PCBs.


Site No. 117 - Guam Power Authority (Cabras Power Plant)
Site No. 14 - Former Mobil Gasoline Station
Philippine Sea
Commercial Port
Site No. 118 - Piti Power Plant
Glass Breakwater
Dry Dock Island
Site No. 114 - Lower Sasa Fuel Burning Pond
Outer Apra Harbor
Sasa Bay
Site No. 113 - Old NSD Drum Storage Lot
Orote Peninsula
Former SRF
Polaris Point
Orote Airfield
Inner Apra Harbor
Site No. 111 - Stell Newman Master Center/Navy Housing - Navy Federal Credit Union
Tipalao Beach
Dadi Beach
GUAM
Area Enlarged
Figure 17.1-16
Hazardous Material Locations in the Apra Harbor Region - Roadway Projects
Legend
Military Installation
Route Number
Project Locations and GRN#
Hazardous Material Locations
Bridge Replacement
Intersection Improvement
Military Access Point
Pavement Strengthening
Widening/ Pavement Strengthening
Realignment/ New Construction
N
W
E
S
Miles
0.8 0 0.8
1 0 1
Kilometers
Printing Date: Mar 1, 2010; M:\projects\GIS\8806_Guam_Buildup_EIS\figures\Current_Deliverable\Vol_2\17.1-16.mxd

South

There are no potential contamination sites adjacent or proximal to the proposed road improvement projects in the South Region.

PCB Contamination

A cursory field review of power pole and pad-mounted transformers in the south region was conducted during inspections of substations and GPA utility buildings. As discussed for the north region, existing pole- and pad-mounted transformers in the south region may contain PCBs.

17.2 ENVIRONMENTAL CONSEQUENCES

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

17.2.1 Approach to Analysis

17.2.1.1 Methodology

The evaluation of potential environmental consequences related to the proposed military expansion on Guam is discussed in this section. These impacts were assessed for the general public as well as various media (i.e., soils, surface water, groundwater, air, and biota).

Phases of the proposed military buildup assessed for each alternative are: (1) transportation to and within Guam; (2) the construction phase; and (3) the operational phase. The operational phase has been subdivided into Main Cantonment, aviation operations, waterfront operations, and training operations. The proposed action and alternatives require that infrastructure be developed to safely and responsibly store, dispense, handle, and dispose of additional hazardous materials, toxic substances, and/or hazardous wastes. A Joint Military Master Plan provides specific details regarding several new facilities that would be required to store, handle, and dispose of the estimated increases in hazardous substances.

17.2.1.2 Determination of Significance

The determination of significance is based upon existing hazardous substance management practices, expected or potential impacts and environmental consequences of the proposed action and alternatives and proposed mitigation measures to reduce the severity of impacts. This determination evaluated the overall ability to mitigate or control hazardous materials and waste impacts and consequences to soils, surface water, groundwater, air, and biota. This determination considers current conditions and potential consequences relative to the anticipated ability of the hazardous substance management infrastructure to accommodate added hazardous substance demand on the overall system. Specifically, for hazardous substances to be considered a significant impact, the following would have to occur:

- Leaks, spills, or releases of hazardous substances to environmental media (i.e., soils, surface water, groundwater, air, and/or biota) resulting in unacceptable risks to human health or the environment.

- Violation of applicable federal, state, or local laws or regulations regarding the transportation, storage, handling, use, or disposal of hazardous substances.

17.2.1.3 Issues Identified during Public Scoping Process

As part of the analysis, concerns relating to hazardous substances that were mentioned by the public, including regulatory stakeholders, during the public scoping meetings were addressed.

These include:

- Address management practices for hazardous substances including hazardous wastes, toxic substances, hazardous materials, and munitions and explosives of concern (MEC)
- Describe the potential overall impacts of hazardous substances from construction and operation of proposed projects
- Identify the projected hazardous waste types and volumes
- Identify expected hazardous substance storage, disposal, and management plans
- Evaluate measures to mitigate generation of hazardous waste including pollution prevention
- Discuss how hazardous substances on land and from ships would be managed
- Discuss the potential for impacts to environmental media from spills, accidents, and/or releases of hazardous substances
- Identify existing installation restoration sites

17.2.2 Alternative 1

17.2.2.1 Transportation to and on Guam

This subsection describes potential environmental consequences and proposed mitigation related to the relocation of approximately 8,600 Marines and 9,000 dependents from Okinawa to Guam. This personnel transfer includes the transport of all necessary supplies, materials, equipment, expendable, and non-expendable resources needed to perform the expanded mission. In addition, this analysis considers the routine transfer and use of hazardous substances within various DoD on-island installations.

Hazardous Materials

The proposed influx of DoD personnel and dependents to Guam would increase the transport/transfer of hazardous materials on Guam. It is expected that the largest increases of hazardous materials on Guam would occur from the use of POL which includes gasoline, aviation fuels, diesel, oil, grease, kerosene, and other related products. Table 17.2-1 summarizes potential effects, impacts, and mitigation measures associated with hazardous materials transport to Guam and transfer on Guam. Note that BMPs and SOPs (see Volume 7) would be implemented as a part of Alternative 1 and are not considered "mitigation measures" thus consequences and mitigation tables within this section state that no mitigation measures are identified.

Table 17.2-1. Hazardous Materials Transport Consequences and Mitigation

Potential Activity (Cause)	*Potential Effect*	*Potential Impacts*	*Proposed Mitigation Measures*
Hazardous materials transport to Guam and transfer within Guam	• Increased transport of hazardous materials to Guam • Increased hazardous materials transfer and use within Guam	• Spill, leak, or release impacts during transport/transfer between DoD locations • Adverse impacts and increased risks to human health and/or the environment including terrestrial and marine ecosystems • Adverse impacts to DRMO's hazardous materials storage, handling, and disposal capacity • Increased risk of environmental media contamination	• No proposed mitigation measures are identified

Table 17.2-2 provides the quantities of hazardous materials used by the Marines on Okinawa.

Table 17.2-2. Annual Marine DRMO Okinawa Waste Disposal Quantities

Waste Category	*Total Waste Volume (in lbs)*	*Waste Codes*
Hazardous Materials	32,389	POL/Fuels and contaminated wastes
Toxic Substances	27,585	PCBs and PCB contaminated wastes
Hazardous Waste	628	D001 and D0018
Hazardous Waste	250	D001, D002, D003, and D035
Hazardous Waste	250	D001, D002, and D026
Hazardous Waste	1,661	D001 and D002
Hazardous Waste	41	D001, D006, and D018
Hazardous Waste	973	D001, D006, D007, and D008
Hazardous Waste	50,313	D001 and D007
Hazardous Waste	2,910	D001, D007, and D008
Hazardous Waste	205,011	D001, D007, D008, and D018
Hazardous Waste	830	D001 and D018
Hazardous Waste	376	D001 and D022
Hazardous Waste	728	D001, D035, and D043
Hazardous Waste	2,633	D001 and D035
Hazardous Waste	13,189	D001
Hazardous Waste	436	D001, D005, and D018
Hazardous Waste	171,473	D006 and D008
Hazardous Waste	3,853	D007
Hazardous Waste	11,180	D008
Hazardous Waste	842	J005
Hazardous Waste	20,344	D001 and D003
Hazardous Waste	145	D001 and D009
Hazardous Waste	1,840	D002 and D004
Hazardous Waste	5,463	D002 and D005
Hazardous Waste	2,889	D002 and D006
Hazardous Waste	5,522	D002 and D007
Hazardous Waste	16,043	D002 and D008
Hazardous Waste	249	D002 and D009
Hazardous Waste	37,759	D002
Hazardous Waste	996	D003
Hazardous Waste	1,609	D004 and D005
Hazardous Waste	97	D004, D005, D006, and D007
Hazardous Waste	635	D004 and D006
Hazardous Waste	821	D004 and D008
Hazardous Waste	1,429	D005 and D007
Hazardous Waste	598	D005
Hazardous Waste	10,524	D006 and D007
Hazardous Waste	1,398	D006, D007, and D008
Hazardous Waste	90	D006, D007, and D009
Hazardous Waste	24,590	D006 and D007
Hazardous Waste	2,968	D006, D008, and D009
Hazardous Waste	2,984	D006 and D008
Hazardous Waste	4,293	D006
Hazardous Waste	1,047	D007 and D008
Hazardous Waste	170	D007 and D010
Hazardous Waste	140	D007 and D011
Hazardous Waste	232	D007 and D019
Hazardous Waste	324	D007 and D035

Waste Category	*Total Waste Volume (in lbs)*	*Waste Codes*
Hazardous Waste	174	D007 and D039
Hazardous Waste	11,679	D007
Hazardous Waste	23	D007, J003, and F005
Hazardous Waste	10	D008 and D009
Hazardous Waste	8,824	D008
Hazardous Waste	11	D009 and D011
Hazardous Waste	3,783	D009
Hazardous Waste	3,664	D011
Hazardous Waste	83	D018
Hazardous Waste	116	D026
Hazardous Waste	624	D035
Hazardous Waste	218	D040
Hazardous Waste	37	J002
Hazardous Waste	813	J003
Hazardous Waste	408	J011
Hazardous Waste	402	U080
Hazardous Waste	147	U080 and J003
Hazardous Waste	151	U151
Hazardous Waste	126	U188
Hazardous Waste	148	W001
Total Hazardous Waste	**644,217**	**All Hazardous Waste Codes**

Notes: Ignitability (D001): If the waste flashpoint is less than 140°F, the waste is "ignitable" and thus a hazardous waste. Corrosivity (D002): If the waste pH less than or equal to 2 or greater than or equal to 12.5, the waste is "corrosive" and thus a hazardous waste. Reactivity (D003): If a waste exhibits any of the criteria associated with the characteristic of "reactivity," it is a hazardous waste by virtue of its "reactivity". Toxicity (D004 through D043): Compare individual analytical results to corresponding regulatory limits. If the reported value is equal or greater than specified regulatory limits for particular compounds, then the waste exhibits the characteristic of "toxicity" and is therefore a hazardous waste. F-listed hazardous waste is generated from non-specific sources such as solvents, plating solutions, and chemical manufacturing processes and can be found in 40 CFR § 261.31. U-listed wastes include discarded commercial chemical products and/or residues in which the generic name of the product matches any chemical listed in 40 CFR §261.33 with an USEPA Waste Number beginning with the letter "U" (DRMO Okinawa 2009).

It is estimated that the proposed transfer of Marines to Guam would result in an increase to the Guam hazardous materials disposal volume of 50% of the known Okinawa DRMO disposal rate, or approximately 16,000 lbs (7,257 kg) annually (DRMO Okinawa 2009).

Although this is a substantial increase, human health, welfare, and the environment would be protected through the use of proven and effective BMPs and SOPs to:

- Prevent, contain, and/or clean up spills and leaks
- Provide personnel training and operational protocol and procedures
- Ensure DMRO's ability to properly arrange for and coordinate the disposal of anticipated hazardous materials
- Properly identify, manage and dispose of MEC associated with construction and operation of the expanded mission facilities

Increases in hazardous materials may require DRMO on Guam to expand its hazardous materials handling, storage, and disposal capacity. Due to the projected increase in hazardous materials, Alternative 1 would have the potential to result in significant impacts to human health and the environment (i.e., soils, surface water, groundwater, air, and biota). However, the increase in hazardous materials would be handled and disposed per applicable BMPs and SOPs (Volume 7). The BMPs and SOPs that would be

used include, but are not limited to those listed on Table 17.2-3. Therefore, the increase in volume would result in less than significant impacts.

Table 17.2-3. Summary of BMPs and SOPs

Alternatives 1, 2, 3, and 8
For Soils, Water, Air, and Biota Relative to Transportation, Construction, and Operations Functions
• Update/implement HMMPs and HWMPs. • Update/implement Facility Response Plans • Update/implement SPCC plans (training, spill containment and control procedures, clean up, notifications, etc.). • Update/implement stormwater pollution prevention plans (SWPPPs) • Ensure all DoD personnel and contractors are trained in accordance with Guam PL 29-26 regarding the importation, handling, use, and application of pesticides (e.g., during maintenance, pre and post construction, and general operations activities). In addition, DoD will develop and implement a comprehensive Integrated Pest Management Plan (IPMP). This IPMP will encompass all activities regarding the importation, handling, storage, use, and application of pesticides as well as address prevention of the introduction of potential invasive species to Guam. • Ensure all DoD personnel and contractor personnel are trained as to proper labeling, container, storage, staging, and transportation requirements for hazardous substances. Also, ensure they are trained in accordance with spill prevention, control, and cleanup methods. • Perform all maintenance activities off-range at existing DoD maintenance shops. • Implement aggressive hazardous waste and hazardous material minimization plans that substitute hazardous waste for non-hazardous or less toxic waste as applicable, maximize recycling, and use Leadership in Energy and Environmental Design (LEED) green building criteria. • Ensure that DRMO has sufficient hazardous substance storage, transportation, and disposal capacity prior to any expected increases. Note that a Joint Military Master Plan provides specific details regarding several new facilities (e.g., operations and maintenance facilities, bilge and oily wastewater pump station, fuel storage areas, POL storage areas, warehousing facilities, munitions magazine storage facilities, hazardous waste storage facilities, waste storage facilities, hazardous material storage, etc.). These new facilities would be required to store, handle, and dispose of the estimated increases in hazardous substances that would occur from the potential DoD unit transfers to Guam. • Verify through surveillances and inspections full compliance with federal, state, and local regulations and adherence to DoD requirements. Implement corrective actions as necessary. Minimize the risk of uncontrolled leaks, spills, and releases through industry accepted methods for spill prevention, containment, control, and abatement. • Implement routine firing range clearance operations (e.g., annually or as needed), perform sampling and analysis as deemed necessary, and implement all applicable DoD MEC operations guidance to minimize or eliminate potential MEC explosion hazards and other adverse impacts (including depositions with potential to leach into the subsurface). • Implement land use controls, fencing, signage, periodic inspections, and other means to ensure no unauthorized access to firing ranges, MEC, former landfills, and/or hazardous substances. • Implement public awareness education seminars and workshops regarding the dangers of MEC, the importance of staying off firing ranges, and what to do if possible MEC is found. • Conduct site investigation(s) to define existing conditions of all known or suspected waste sites (e.g., former Landfill Site# 1). • Ensure any work conducted in the area of known or suspected waste sites (e.g., former Landfill # 1) is conducted in accordance with 29 CFR 1910.120 (hazardous waste operations and emergency response operations). • Minimize the use of contaminated sites for new construction. When new construction occurs on sites where contamination and/or MEC has been identified, ensure that the risk of human/ecological risk and exposure is minimized via the use of a site-specific health and safety plans, engineering and administrative controls, and personal protective equipment (PPE). These site-specific health and safety plans must specifically address how these controls will be implemented to ensure the protection of human health and the environment. In addition, as appropriate conduct Phase I and II Environmental Site Assessments prior to construction activities and ensure designs consider and address contaminated sites as required. Note that these projects would be subject to regulatory oversight from GEPA and/or USEPA. • Ensure that sediments to be dredged and soils to be excavated are well characterized, properly handled, and disposed of in accordance with all applicable federal, state and local regulations and DoD requirements to minimize dispersal of any contaminants that may be present. • Ensure that site planning and activities are conducted in accordance with NOSSA Instruction 8020.15B Explosives Safety Review, Oversight, and Verification of Munitions Responses.

Toxic Substances

Toxic substances being addressed on Guam regardless of any DoD expansion include: ACM, LBP, PCBs, and radon. LBP and PCBs originating in Guam are transported by licensed transporters and disposed in permitted facilities in accordance with applicable federal, state, and local regulations and DoD requirements. ACM is disposed of at federal facilities on Guam.

The collection, transportation, and disposal of toxic substances from all DoD operations is arranged by DRMO and performed by licensed contractors. ACM, LBP, PCBs, and radon are discussed as part of the affected environment section because existing DoD facilities and infrastructure on Guam contain these toxic substances.

When assessing the transport, transfer, and future use of these toxic substances associated with the proposed DoD expansion, there are not expected to be any significant environmental consequences from ACM, LBP, and PCBs. This is because LBPs were banned by the USEPA in 1978 and most uses of PCBs were banned by the USEPA in 1979. In addition, ACM and radon gas not already present would not be transported or transferred as a result of these activities. Therefore, because existing BMPs and SOPs (Volume 7) would be followed, toxic substances impacts would be less than significant, and no mitigation measures are required.

Hazardous Waste

Expanded DoD missions on Guam would result in an increase in the off-island transport and inter-island transfer of hazardous waste. Increases in the transport/transfer and use of pesticides, herbicides, solvents, adhesives, lubricants, corrosive liquids, aerosols, and other hazardous wastes are expected. Table 17.2-2 provides quantities of hazardous waste known to be used by the Marine Corps on Okinawa. It is estimated that this activity would result in an increase to the Guam hazardous waste disposal rate of 50% of the known Okinawa rate, or approximately 322,000 lbs (146,057 kg) annually (DRMO Okinawa 2007).

Due to the projected increase in hazardous waste, Alternative 1 would have the potential to result in impacts to human health and the environment (i.e., soils, surface water, groundwater, air, and biota). However, the increase in hazardous waste would be handled and disposed per applicable BMPs and SOPs (see Volume 7) and, therefore, the increase in volume would result in less than significant impacts.

Table 17.2-4 summarizes potential hazardous waste transport/transfer effects, impacts, and mitigation.

Table 17.2-4. Hazardous Waste Transport Consequences and Mitigation

Potential Activity (Cause)	*Potential Effect*	*Potential Impacts*	*Proposed Mitigation Measures*
Hazardous waste transport to Guam and transfer on Guam	• Increased transport of hazardous waste to Guam • Increased hazardous waste transfer and on Guam	• Spill, leak, or release impacts during transport/transfer between DoD locations • Adverse impacts and increased risks to human health and/or the environment including terrestrial and marine ecosystems • Adverse impacts to DRMO's hazardous waste storage, handling, and disposal capacity • Increased risk of environmental media contamination	• No proposed mitigation measures are identified

17.2.2.2 Construction Activities

Construction activities (e.g., demolition, new buildings, structures, and infrastructure improvements) would be required to expand existing DoD operations. This subsection analyzes possible construction-related impacts of the potential expansion.

Anticipated construction activities under Alternative 1 include demolition, site preparation, site grading, trenching and excavation, utilities improvements, installation of foundations and building structures, landscaping, installation or improvement of roads, and other related infrastructure actions. There is a possibility that some of these planned construction project footprints could encounter sites contaminated with hazardous substances and/or MEC. If relocation of various construction projects that may encounter hazardous substances and/or MEC is not possible, several BMPs and SOPs would be used including, but are not limited to: development of site-specific health and safety plans, the use of engineering controls (e.g., dust suppression, etc.) and administrative controls, and the use of PPE.

Hazardous Materials

Proposed construction activities would result in the use and disposal of more hazardous materials. It is expected that the most notable increases of hazardous materials would occur for the use of POLs for heavy construction equipment, construction vehicles, generators, and other construction activities. It is estimated that this construction activity would result in an increase to the Guam hazardous material disposal rate of 10% of the known Okinawa rate, or approximately 3,200 lbs (1,451 kg) annually (DRMO Okinawa).

Due to the projected increase in the volume of hazardous material, Alternative 1 would have the potential to result in significant impacts to human health and the environment (i.e., soils, surface water, groundwater, air, and biota). However, the increase in hazardous materials would be handled and disposed per applicable BMPs and SOPs and, therefore, the increase in volume would result in less than significant impacts (see Table 17.2-3).

Table 17.2-5 summarizes potential hazardous materials effects, impacts, and mitigation of expected construction activities.

Table 17.2-5. Hazardous Material Construction Consequences and Mitigation

Potential Activity (Cause)	*Potential Effect*	*Potential Impacts*	*Proposed Mitigation Measures*
• Possible use of contaminated site footprint(s) for new construction projects • Hazardous materials used during construction activities	• Increased hazardous materials storage, use, handling, generation, and disposal • Increased fueling and POL operations	• Spill, leak, or release impacts during construction activities • Adverse impacts and increased risks to human health and/or the environment including terrestrial and marine ecosystems • Adverse impacts to DRMO's hazardous materials storage, handling, and disposal capacity • Violations of applicable federal, state or local regulations, or DoD requirements during construction and demolition operations • Increased risk of environmental media contamination • Increased construction site erosion runoff	• No mitigation measures are identified

Toxic Substances

There are not expected to be significant environmental consequences from ACM, LBP, and PCBs. This is because LBPs were banned by USEPA in 1978 and most uses of PCBs were banned by USEPA in 1979. In addition, ACM would not be used to construct proposed new facilities on Guam. However, planned demolition of older buildings and/or utilities may result in encountering PCBs, ACM and LBP that were used in the older building materials. If PCBs, ACM, and/or LBP are encountered during demolition, licensed contractors would be used for these projects to ensure that all DoD, federal, state, and local PCBs, ACM, and LBP testing, handling, and disposal protocol, procedures, and requirements are followed. Also, since there are known radon zones on Guam, it is possible that new buildings, facilities, and/or structures could be constructed in these areas. However in this case, radon resistant construction techniques would be used. 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. Because BMPs and SOPs would be used (Volume 7), possible legacy toxic substances would result in less than significant impacts.

Hazardous Waste

Proposed construction activities would result in an increase in the generation of hazardous waste. Construction activities are anticipated to increase the use of pesticides, herbicides, solvents, adhesives, lubricants, corrosive liquids, and aerosols. It is estimated that this construction activity would result in an increase to the Guam hazardous waste disposal rate of 10% of the known Okinawa rate, or approximately 64,400 lbs (29,211 kg) annually (DRMO Okinawa 2009).

Waste Sites

As described in Section 17.1.3; Volume 9, Appendix G; and shown in the various associated Chapter 17 figures, there are waste sites undergoing characterization and/or restoration under various DoD environmental programs located within or in close proximity to the overall areas of the proposed expansion. 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 and construction operational protocol must be followed to protect human health and the environment. In addition, special design techniques and methodology will be required to ensure the long-term structural integrity of proposed construction projects.

As an example, there are three such sites located within NCTS Finegayan: former Finegayan Landfills #1 and # 2, and the former Trap and Skeet Range (Figure 17.1-8). Landfill # 1 on Haputo Road covers about 3 ac (1.2 ha) of land. Used from the 1940s through 1968, the site contains buried metals, scrap wood, solvents and other industrial wastes, as well as municipal refuse. Landfill # 2 is located inside a naturally occurring sinkhole, about 2,000 (610 m) ft northeast of landfill No. 1. From 1968 until 1980, building rubble and demolition debris, waste oils, solvents, insulation materials, PCB-containing oils, and oil filters were disposed at Landfill #2. Concentrations of lead well below the federal maximum contaminant level for drinking water of 0.050 micrograms per liter were detected in 1988 samples from groundwater monitoring wells located downgradient of both landfills (Navy 1990). A 1990 Site Inspection determined that the lead concentrations detected may reflect background levels in the groundwater in northern Guam, and that no contaminants migrated from the landfills into groundwater (Navy 1990). The SI recommended no further action to investigate or remediate groundwater at the two landfill sites, and concurrence was received from Guam EPA and U.S. EPA Region 9 (Navy 1990; NAVFAC Marianas 2010a).

Prior to site preparation, further site investigation of former Landfill #1 would be conducted to better define the existing conditions of the former landfill (NAVFAC Marianas 2010a). Any work in the area of Landfill #1 would be conducted under 29 CFR 1910.120 (hazardous waste operations and emergency response regulations) and any excavated landfill material would be removed and replaced with clean backfill (NAVFAC Marianas 2010a). Due to the expected cost consequences of removing landfill material and replacing with clean backfill, installation of a landfill cap and/or re-siting construction to avoid the former landfill would avoid or minimize environmental concerns in the area. Any re-siting of construction would be accomplished without changing the overall boundaries of proposed construction at NCTS Finegayan.

The former Landfill #2 is at a low point in an area that has many sinkholes and is very heterogeneously porous. Therefore capping, berming, or other engineering methods would have limited ability to isolate stormwater from the landfill. Construction of buildings, roads, and paved areas would result in an increase in stormwater runoff in the area of Landfill #2. Existing and proposed drinking water wells are of a sufficient distance (more than 1,000 ft [300 m]) upgradient, so increased disposal of stormwater into sinkholes near Landfill #2 would not be anticipated to cause contamination to drinking water. Groundwater disposed of at and near former Landfill #2 would be expected to flow downgradient and discharge at the coast. Discharge of heavy metals or PCBs at the coast is not expected to be a concern (NAVFAC Marianas 2010a). Prior to development of this area, various BMPs and SOPs would be implemented (Volume 7).

The former Trap and Skeet Range is located about 500 ft (152 m) north of Landfill #2. A 1990 IRP Site Investigation determined that elevated concentrations of lead and polycyclic aromatic hydrocarbons are present at this site and further study is needed. A remedial investigation for this site is planned for FY 2014 (NAVFAC Pacific 2010). Prior to development of this site the following would take place:

- Conditions and development plans would be evaluated to determine how much stormwater would increase, along with the data from the 1990 Site Investigation.
- A determination would be made regarding potential risks to human health and/or the environment and methods identified and required that would minimize the risks; and
- Development would be planned so as to avoid conflict with future IR activities (NAVFAC Pacific 2010).

Another example of a waste site of concern is located in south Finegayan. This site encompasses part of the former Public Works Center (PWC) 2810 Construction Battalion (CB) Landfill (Figure 17.1-8). This landfill is identified as IRP site PWC Site 2810: CB Landfill. Wastes from the CB Maintenance Shop buried at this site from 1944 through 1957 include scrap metal, aircraft and vehicle parts, tires, concrete rubble, glass, paint cans and small quantities of domestic trash and petroleum wastes (NAVFAC Pacific 2007b). Surface soils at this site present a potentially unacceptable risk to human health and the environment due to concentrations of metals, polycyclic aromatic hydrocarbons and pesticides (NAVFAC Pacific 2007b). To prevent contact with waste and contaminated soil, the landfill has been capped and fenced. Surface drainage has been routed away from the landfill, to minimize the leachate formation and potential groundwater contamination (NAVFAC Pacific 2007b). Land use controls have been implemented to ensure that the there is no unauthorized access to the former landfill and the landfill site is not used. The land use controls also ensure that and the capped waste is not disturbed, excavated or removed unless done in accordance with special handling procedures and prior consent of the Navy and Guam EPA (NAVFAC Pacific 2007b).

Other waste sites of potential concern are discussed in Section 17.1.3; Volume 9, Appendix G; and shown in the various associated Chapter 17 figures.

Explosives Safety Hazards

Based upon information from files maintained by EOD for previous construction projects on Guam, the proposed expansion areas are likely to contain MEC (NAVFAC Marianas 2010b). NOSSA Instruction 8020.15B establishes the Explosive Safety Submission (ESS) process to provide effective review, oversight, and verification of the explosives safety aspects of munitions responses. In order to comply with this instruction, an island wide ESS is being prepared (NAVFAC Marianas 2010b). When the ESS has been endorsed by NOSSA and approved by the DoD Explosive Safety Board, SOPs and operational protocol would be developed for addressing explosive safety hazards of MEC in the proposed construction area (NAVFAC Marianas 2010b).

Due to the projected increase in the volume of hazardous waste, Alternative 1 would have the potential to result in impacts to human health and the environment (i.e., soils, surface water, groundwater, air, and biota). However, the increase in hazardous waste would be handled and disposed in accordance with all federal, state and local regulations, as well as with DoD requirements. BMPs and SOPs that would be used include, but are not limited to those listed on Table 17.2-3 and in Volume 7. Therefore, the impacts from the increase in hazardous waste would be less than significant.

Table 17.2-6 summarizes hazardous waste potential impacts associated with construction activities.

Table 17.2-6. Hazardous Waste Construction Consequences and Mitigation

Potential Activity (Cause)	*Potential Effect*	*Potential Impacts*	*Proposed Mitigation Measures*
• Possible use of contaminated site footprint(s) for new construction projects • Hazardous waste generated during construction activities	• Increased hazardous waste generation, storage, handling, and disposal.	• Spill, leak, or release impacts during construction activities • Increased requirement for off-island hazardous waste disposal • Adverse impacts and increased risks to human health and/or the environment including terrestrial and marine ecosystems • Adverse impacts to DRMO's hazardous waste storage, handling, and disposal capacity. • Violations of applicable federal, state, local, regulations or DoD requirements during construction and demolition operations • Changes in hazardous waste generator status • Increased risk of environmental media contamination	• No proposed mitigation measures are identified

17.2.2.3 Operations

There are various DoD-related operations as a result of the proposed military expansion. For the purpose of this analysis, expected DoD operations have been divided into the following categories:

- Main Cantonment – administrative and support functions associated with the DoD expansion including activities that occur in office facilities, bachelor and family housing, supply

warehouses, community support facilities (e.g., retail, education, medical, recreation, day care, etc.)
- Aviation Operations – fueling, hanger maintenance activities, and other related functions
- Waterfront Operations – high speed vessels, on-island amphibious assault vehicles, and the continued use of transient vessels in support DoD training exercises
- Training Operations – Firing range activities, non-fire range maneuver exercises and aviation training operations (e.g., landing/takeoff training, loading/unloading cargo and personnel, etc.)

Main Cantonment

This subsection discusses the potential impacts related to general support, living, and recreational activities associated with the proposed expansion.

Hazardous Materials

Increases in the use of hazardous materials are judged to be minimal as a result of these Main Cantonment activities. It is estimated that these activities would result in an increase to the Guam hazardous material disposal rate of 1% of the known Okinawa rate, or approximately 320 lbs (145 kg) annually (DRMO Okinawa 2009). Consequently, there would be negligible impacts and no proposed mitigation would be required.

Due to the projected increase in the volume of hazardous materials, Alternative 1 would have the potential to result in impacts to human health and the environment (i.e., soils, surface water, groundwater, air, and biota). However, the increase in hazardous materials would be handled and disposed per applicable BMPs and SOPs; therefore, the increase in volume would result in less than significant impacts (see Table 17.2-3 and Volume 7).

Table 17.2-7 presents a summary of hazardous materials anticipated consequences and mitigation measures.

Table 17.2-7. Hazardous Materials/Waste General Activities Consequences and Mitigation

Potential Activity (Cause)	*Potential Effect*	*Potential Impacts*	*Proposed Mitigation Measures*
Hazardous materials/waste associated with general operations activities	• Negligible increases of hazardous materials/waste generation	• Minor spill, leak, or release impacts • Slight adverse impacts and increased risks to human health and/or the environment • Minimal adverse impacts to DRMO's hazardous materials storage, handling, and disposal capacity	• No proposed mitigation measures are identified

Toxic Substances

ACM, LBP, and PCBs are not expected to result in additional impacts. This is because LBPs were banned by USEPA in 1978 and most uses of PCBs banned by USEPA in 1979. In addition, ACM would not be used in new facilities on Guam. It is possible that new buildings, facilities, and/or structures could encounter radon intrusion; however in this case, radon resistant construction techniques would be used. 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. Therefore, toxic substances impacts would be less than significant.

Hazardous Waste

Expected increases in the generations of hazardous wastes are judged to be negligible as a result of these general activities. It is estimated that these activities would result in an increase to the Guam hazardous waste disposal rate of 1% of the known Okinawa rate, or approximately 6,440 lbs (2,921 kg) annually (DRMO Okinawa). Consequently, less than significant impacts would occur and no proposed mitigation measures would be required (Table 17.2-8). Instead, routine hazardous waste BMPs and SOPs would be implemented (see Table 17.2-3 and Volume 7).

Aviation Operations

This subsection discusses the potential impacts related to proposed aviation operations. These activities include fueling, hanger maintenance activities, and other related functions.

Hazardous Materials

Proposed aviation operations would result in the use of more hazardous materials. It is expected that the largest increases would occur for the use of POL (fuels). Specifically, additional POL would be transported, stored, and dispensed in support of these operations. Expanded aviation maintenance activities would also generate more POL requiring handling and disposal. It is estimated that aviation operations would result in an increase to the Guam hazardous material disposal rate of 25% of the known Okinawa rate, or approximately 8,000 lbs (3,629 kg) annually (DMRO Okinawa 2009).

Due to the projected increase in the volume of hazardous materials, Alternative 1 would have the potential to result in impacts to human health and the environment (i.e., soils, surface water, groundwater, air, and biota). However, the increase in hazardous materials would be handled and disposed per applicable BMPs and SOPs and, therefore, the increase in volume would result in less than significant impacts (see Table 17.2-3 and Volume 7).

Table 17.2-8 summarizes associated potential impacts and mitigation measures.

Table 17.2-8. Hazardous Materials Aviation Operations Consequences and Mitigation

Potential Activity (Cause)	*Potential Effect*	*Potential Impacts*	*Proposed Mitigation Measures*
Hazardous materials associated with expanded aviation operations	• Increased use of hazardous materials	• Spill, leak, or release impacts. • Adverse impacts and increased risks to human health and/or the environment including terrestrial and marine ecosystems • Adverse impacts to DRMO's hazardous materials storage, handling, and disposal capacity	• No proposed mitigation measures are identified

Toxic Substances

ACM, LBP, and PCBs are not expected to result in additional impacts. This is because LBPs were banned by USEPA in 1978 and most uses of PCBs banned by USEPA in 1979. In addition, ACM would not be used as part of expanded aviation operations. Radon resistant construction techniques would be used for

new facilities. 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. Therefore, toxic substances impacts would be less than significant.

Hazardous Waste

Expected increases in the generation of hazardous waste are anticipated to be at a moderate level from expanded aviation operations. Specific increases in hazardous wastes generated would likely include solvents, corrosive or toxic liquids, and aerosols for maintenance purposes. It is estimated that aviation operations would result in an increase to the Guam hazardous waste disposal rate of 25% of the known Okinawa rate, or approximately 161,000 lbs (73,028 kg) annually (DRMO Okinawa 2009).

Due to the projected increase in the volume of hazardous waste, Alternative 1 would have the potential to result in adverse impacts to human health and the environment (i.e., soils, surface water, groundwater, air, and biota). However, the increase in hazardous waste would be handled and disposed per applicable BMPs and SOPs and, therefore, the increase in volume would result in less than significant impacts (see Table 17.2-3 and Volume 7).

Table 17.2-9 discusses these expected impacts.

Table 17.2-9. Hazardous Waste Aviation Operations Consequences and Mitigation

Potential Activity (Cause)	*Potential Effect*	*Potential Impacts*	*Proposed Mitigation Measures*
Hazardous waste generation during aviation operations	• Increased hazardous waste generation, storage, handling, and disposal	• Spill, leak, or release impacts during aviation operations • Increased requirement for off-island hazardous waste disposal • Adverse impacts and increased risks to human health and/or the environment including terrestrial and marine ecosystems • Adverse impacts to DRMO's hazardous waste storage, handling, and disposal capacity • Violations of applicable federal, state, or local regulations or DoD requirements • Changes in hazardous waste generator status • Increased risk of environmental media contamination	• No proposed mitigation measures are identified

Waterfront Operations

This subsection discusses anticipated impacts related to proposed waterfront operations. These operations would use high speed vessels, on-island amphibious assault vehicles, and continue the use of transient vessels to support waterfront training exercises.

Hazardous Materials

Proposed waterfront activities would result in the use and subsequent disposal of more hazardous materials. It is expected that the most notable increases of hazardous materials would occur with POL (fuels) used for various vessels and vehicles. However, the expected increased use of POL is estimated to be minimal. Specifically, it is estimated that waterfront operations would result in an increase to the Guam hazardous material disposal rate of 5% of the known Okinawa rate, or approximately 1,600 lbs

(726 kg) annually (DRMO Okinawa 2009). Consequently, there would be less than significant impacts and no proposed mitigation measures would be required. Instead, routine hazardous materials BMPs, and SOPs would be implemented (see Table 17.2-3 and Volume 7)**.**

Table 17.2-10 presents a summary of these potential impacts.

Table 17.2-10. Hazardous Materials Waterfront Operations Consequences and Mitigation

Potential Activity (Cause)	*Potential Effect*	*Potential Impacts*	*Proposed Mitigation Measures*
Hazardous materials associated with waterfront operations	• Slight increases of hazardous materials usage	• Minor spill, leak, or release impacts • Slight adverse impacts and increased risks to human health and/or the environment • Slight adverse impacts to DRMO's hazardous materials storage, handling, and disposal capacity	• No proposed mitigation measures are identified

Toxic Substances

ACM, LBP, and PCBs are not expected to result in additional impacts. This is because LBPs were banned by USEPA in 1978 and most uses of PCBs banned by USEPA in 1979. ACM, if present in small amounts in vessel construction, would result in less than significant impacts. In addition, radon gas buildup is also not a viable concern. Therefore, less than significant impacts are expected and no mitigation measures would be required.

Hazardous Waste

Expected increases in the generation of hazardous waste are anticipated to be minimal. Specific increased hazardous waste generated would likely include: solvents for degreasing and corrosive or toxic liquids and aerosols for maintenance purposes. It is estimated that waterfront operations would result in an increase to the Guam hazardous waste disposal rate of 5% of the known Okinawa rate, or approximately 32,200 lbs (14,606 kg) annually (DMRO Okinawa 2009).

Due to the projected increase in the volume of hazardous waste, Alternative 1 would have the potential to result in adverse impacts to human health and the environment (i.e., soils, surface water, groundwater, air, and biota). However, the increase in hazardous waste would be handled and disposed per applicable BMPs and SOPs and, therefore, the increase in volume would result in less than significant impacts (see Table 17.2-3 and Volume 7).

Table 17.2-11 discusses these potential impacts and mitigation measures.

Table 17.2-11. Hazardous Waste Waterfront Operations Consequences and Mitigation

Potential Activity (Cause)	*Potential Effect*	*Potential Impacts*	*Proposed Mitigation Measures*
Hazardous waste generation during waterfront activities	• Increased hazardous waste generation, storage, use, handling, and disposal	• Spill, leak, or release impacts during waterfront activities. • Increased requirement for off-island hazardous waste disposal • Adverse impacts and increased risks to human health and/or the environment including terrestrial and marine ecosystems • Adverse impacts to DRMO's hazardous waste storage, handling, and disposal capacity • Violations of applicable federal, state or local regulations or DoD requirements • Changes in hazardous waste generator status • Increased risk of environmental media contamination	• No proposed mitigation measures are identified

Training Operations

This subsection discusses possible impacts from proposed training operations. These operations include:

- Firing range operations
- Non-fire range operations
- Aviation training operations (e.g., landing/takeoff training, loading/unloading cargo and personnel, etc.)

Firing Range Operations

DoD has historically conducted live-firing, ordnance testing, and training exercises to ensure military readiness. These munitions-related activities have resulted in the presence of UXO, DMM, and MC. UXO, DMM, and MC are all collectively referred to as MEC. Volume 2, Chapter 2 and Volume 9, Appendix D of this EIS describes these potential firing range operations, including types and quantities of MEC expected to be stored and used.

Hazardous Materials. Activities associated with firing range operations would result in increased hazardous materials in the form of MEC. This is because UXO, DMM, and MC have the potential to contain high explosives, explosives constituents, and potentially leachable compounds. Furthermore, firing range activities would require the use of military transport vehicles and hence an increase in the usage of fuels and POL. It is estimated that firing range operations would result in an increase to the Guam hazardous material disposal rate of 2% of the known Okinawa rate, or approximately 640 lbs (290 kg) annually (DRMO Okinawa 2009). Consequently, there would be negligible impacts and no proposed mitigation measures required.

Due to the projected increase in the volume of hazardous materials, Alternative 1 would have the potential to result in impacts to human health and the environment (i.e., soils, surface water, groundwater, air, and biota). However, the increase in hazardous materials would be handled and disposed per applicable BMPs and SOPs (see Table 17.2-3 and Volume 7). Therefore, the increase in volume would result in less than significant impacts.

Table 17.2-12 presents potential impacts and mitigation measures for hazardous materials.

Table 17.2-12. Hazardous Materials Firing Range Operations Consequences and Mitigation

Potential Activity (Cause)	*Potential Effect*	*Potential Impacts*	*Proposed Mitigation Measures*
Hazardous materials associated with firing range operations	• Increases of hazardous materials usage • Increased MEC disposition within firing ranges	• Minor spill, leak, or release impacts • Adverse impacts and increased risks to human health and/or the environment from MEC, fuels, and POLs • Slight adverse impacts to DRMO's hazardous materials storage, handling, and disposal capacity	• No proposed mitigation measures are identified

Toxic Substances. Activities associated with firing range operations would result in less than significant impacts from toxic substances (i.e., ACM, LBP, PCBs, or radon). BMPs and SOPs would be implemented as appropriate (see Table 17.2-3 and Volume 7).

Hazardous Waste. Andersen AFB holds a Guam RCRA Operating Permit for a hazardous waste management treatment facility located within the boundaries of Andersen AFB at the extreme reach of Tarague Beach. The hazardous waste management facility is permitted to conduct open burning and open

detonation to treat MEC that is either reactive (D003) or toxic characteristic leaching procedure hazardous waste. The facility is known as the EOD Range. The Facility Identification Number is GU6571999519 and the Permit Number is GUS002.

Military munitions that are used for their "intended purposes" are not considered waste per the MMR (40 CFR 266.202). In general, military munitions become subject to RCRA transportation, storage, and disposal requirements (i.e., judged not to have been used for their "intended purposes") when:

- Transported off-range for storage
- Reclaimed and/or treated for disposal
- Buried or land filled on- or off-range
- Munitions land off-range and are not immediately rendered safe or retrieved

MEC at closed ranges are classified as solid waste and would likely be subject to RCRA Subtitle C hazardous waste disposal requirements as well. As long as the proposed firing ranges on Guam remain on "active" or "inactive" status, then the MEC on those ranges would be considered as used for their "intended purposes" and subject to the MMR exception to Subtitle C of RCRA (i.e., likely not classified as a hazardous waste). Therefore, as long as this range remains "active" or "inactive" the disposal of MEC would likely not contribute to increased hazardous waste volumes.

In addition to increased MEC, there may be slightly increased usage of hazardous wastes as a result of expanded firing range operations. Specific increases in hazardous wastes generated could include: pesticides, herbicides, solvents, corrosive or toxic liquids, and aerosols primarily used for firing range maintenance and vehicle maintenance. It is estimated that firing range operations would result in an increase to the Guam hazardous waste disposal rate of 2% of the known Okinawa rate, or approximately 12,880 lbs (5,842 kg) annually (DRMO Okinawa 2009).

Due to the projected increase in the volume of hazardous waste, Alternative 1 would have the potential to result in impacts to human health and the environment (i.e., soils, surface water, groundwater, air, and biota). However, the increase in hazardous waste would be handled and disposed per applicable BMPs and SOPs and, therefore, the increase in volume would result in less than significant impacts (see Table 17.2-3 and Volume 7).

Table 17.2-13 presents possible impacts and mitigation measures for firing range operations.

Table 17.2-13. Hazardous Waste Firing Range Consequences and Mitigation

Potential Activity (Cause)	*Potential Effect*	*Potential Impacts*	*Proposed Mitigation Measures*
Hazardous waste generated from firing range operations	• Increased hazardous waste generation, storage, handling, and disposal	• Minor spill, leak, or release impacts from firing range vehicular traffic • Increased requirement for off-island hazardous waste disposal • Adverse impacts and increased risks to human health and/or the environment including terrestrial and marine ecosystems • Adverse impacts to DRMO's hazardous waste storage, handling, and disposal capacity • Violations of applicable federal, state or local regulations or DoD requirements • Changes in hazardous waste generator status • Increased risks of environmental media contamination • MEC being classified as hazardous waste as a result of closing firing ranges	• No proposed mitigation measures are identified

Non-Fire Range Operations

These range operations involve non-fire maneuvers and troop movement exercises and training. This subsection discusses potential impacts and mitigation measures associated with these activities.

Hazardous Materials. These range activities would require the use of military transport vehicles and hence an increase in the usage of POL (fuels). It is estimated that non-fire range operations would result in an increase to the Guam hazardous material disposal rate of 2% of the known Okinawa rate, or approximately 640 lbs (290 kg) annually (DRMO Okinawa 2009). Consequently, there would be less than significant impacts and no proposed mitigation measures are required. Routine hazardous materials management protocol, BMPs, and SOPs would be implemented (see Table 17.2-3 and Volume 7)**.**

Table 17.2-14 presents anticipated impacts and mitigation measures for these hazardous materials.

Table 17.2-14. Hazardous Materials Non-Fire Range Operations Consequences and Mitigation

Potential Activity (Cause)	*Potential Effect*	*Potential Impacts*	*Proposed Mitigation Measures*
Hazardous materials associated with non-fire range operations	• Increases of hazardous materials usage	• Minor spill, leak, or release impacts • Slight adverse impacts and increased risks to human health and/or the environment from fuels and POLs • Slight adverse impacts to DRMO's hazardous materials storage, handling, and disposal capacity	• No mitigation measures are identified

Toxic Substances. Activities associated with firing range operations would result in less than significant impacts from toxic substances (i.e., ACM, LBP, PCBs, or radon). No mitigation measures would be required; instead, BMPs and SOPs would be implemented as appropriate (see Table 17.2-3 and Volume 7).

Hazardous Waste. There would be minimal generation of hazardous wastes as a result of non-fire range operations. Specific hazardous materials used and wastes generated could include: pesticides, herbicides, solvents, corrosive or toxic liquids, and aerosols primarily used for firing range vehicle maintenance. It is estimated that non-fire range operations would result in an increase to the Guam hazardous waste disposal rate of 2% of the known Okinawa rate, or approximately 12,880 lbs (290 kg) annually (DRMO Okinawa 2009).

Due to the projected increase in the volume of hazardous waste, Alternative 1 would have the potential to result in impacts to human health and the environment (i.e., soils, surface water, groundwater, air, and biota). However, the increase in hazardous waste would be handled and disposed per applicable BMPs and SOPs, therefore, the increase in volume would result in less than significant impacts (see Table 17.2-3 and Volume 7).

Table 17.2-15 summarizes possible impacts related to non-fire range operations.

Table 17.2-15. Hazardous Waste Non-Fire Range Consequences and Mitigation

Potential Activity (Cause)	*Potential Effect*	*Potential Impacts*	*Proposed Mitigation Measures*
Hazardous waste generated from non-fire range operations	• Increased hazardous waste generation, storage, handling, and disposal	• Minor spill, leak, or release impacts from range vehicular traffic • Increased requirement for off-island hazardous waste disposal • Adverse impacts and increased risks to human health and/or the environment including terrestrial and marine ecosystems • Adverse impacts to DRMO's hazardous waste storage, handling, and disposal capacity • Violations of applicable federal, state or local regulations or DoD requirements • Changes in hazardous waste generator status • Increased risks of environmental media contamination • New hazardous waste sites created as a result of vehicular usage and maintenance activities	• No proposed mitigation measures are identified

Aviation Training Operations

Aviation training operations (e.g., landing/takeoff training, loading/unloading cargo and personnel, and other related exercises) would result in relatively small increases in hazardous materials and waste.

Hazardous Materials. Aviation training activities would result in an increase in the usage of fuels and POL. It is estimated that aviation training operations would result in an increase to the Guam hazardous material disposal rate of 5% of the known Okinawa rate, or approximately 1,600 lbs (726 kg) annually (DRMO Okinawa 2009). Consequently, there would be less than significant impacts and no proposed mitigation measures required. Instead, routine hazardous materials BMPs and SOPs would be implemented (see Table 17.2-3 and Volume 7)**.**

Table 17.2-16 presents these anticipated impacts and mitigation measures for these hazardous materials.

Table 17.2-16. Hazardous Materials Aviation Training Operations Consequences and Mitigation

Potential Activity (Cause)	*Potential Effect*	*Potential Impacts*	*Proposed Mitigation Measures*
Hazardous materials associated with aviation training operations	• Increases of hazardous materials usage.	• Minor spill, leak, or release impacts • Slight adverse impacts and increased risks to human health and/or the environment from fuels and POLs • Slight adverse impacts to DRMO's hazardous materials storage, handling, and disposal capacity	• No proposed mitigation measures are identified

Toxic Substances. Activities associated with firing range operations would result in less than significant impacts relative to toxic substances (i.e., ACM, LBP, PCBs, or radon). No mitigation measures would be required; instead, BMPs and SOPs would be implemented (see Table 17.2-3 and Volume 7).

Hazardous Waste. There would be slight generation of hazardous wastes as a result of aviation training operations. Specific increased hazardous waste generated would include: solvents, corrosive or toxic liquids, and aerosols primarily used for maintenance. It is estimated that aviation training operations would result in an increase to the Guam hazardous waste disposal rate of 5% of the known Okinawa rate, or approximately 32,200 lbs (14,606 kg) annually (DRMO Okinawa 2009). Consequently, there would be

less than significant impacts and no proposed mitigation measures would be required. Instead, routine hazardous waste BMPs and SOPs would be implemented (see Table 17.2-3 and Volume 7)**.**

Table 17.2-17 summarizes these potential impacts related to aviation training operations.

Table 17.2-17. Hazardous Waste Aviation Training Consequences and Mitigation

Potential Activity (Cause)	*Potential Effect*	*Potential Impacts*	*Proposed Mitigation Measures*
Hazardous waste generated from aviation training operations	• Increased hazardous waste generation , storage, handling, and disposal	• Minor spill, leak, or release impacts from range vehicular traffic • Increased requirement for off-island hazardous waste disposal • Adverse impacts and increased risks to human health and/or the environment including terrestrial and marine ecosystems • Adverse impacts to DRMO's hazardous waste storage, handling, and disposal capacity • Violations of applicable federal, state or local regulations or DoD requirements during range operations • Changes in hazardous waste generator status • Increased risks of environmental media contamination • New hazardous waste sites created as a result of vehicle use and maintenance activities	• No proposed mitigation measures are identified

17.2.3 Alternative 2 (Preferred Alternative)

The various proposed alternatives involve conducting DoD operations at varying geographic areas on Guam. The usage of hazardous materials, toxic substances and hazardous waste is primarily a function of the magnitude of DoD activities, not the geographic areas where potential expanded operations would be based. Therefore, this chapter's potential environmental consequences and related mitigation measures do not vary from alternative to alternative.

Please refer to Alternative 1 above for a detailed assessment of the potential environmental consequences and mitigation measures applicable to Alternative 2.

17.2.4 Alternative 3

The various proposed alternatives involve conducting DoD operations at varying geographic areas on Guam. The usage of hazardous materials, toxic substances and hazardous waste is primarily a function of the magnitude of DoD activities, not the geographic areas where potential expanded operations would be based. Therefore, this chapter's potential environmental consequences and related mitigation measures do not vary from alternative to alternative.

Please refer to Alternative 1 above for a detailed assessment of the potential environmental consequences and mitigation measures applicable to Alternative 3.

17.2.5 Alternative 8

The various proposed alternatives involve conducting DoD operations at varying geographic areas on Guam. The usage of hazardous materials, toxic substances and hazardous waste is primarily a function of the magnitude of DoD activities, not the geographic areas where potential expanded operations would be based. Therefore, this chapter's potential environmental consequences and related mitigation measures do not vary from alternative to alternative.

Please refer to Alternative 1 above for a detailed assessment of the potential environmental consequences and mitigation measures applicable to Alternative 8.

17.2.6 No-Action Alternative

Under the no-action alternative, Marine Corps units would remain in Japan and would not relocate to Guam. No construction, dredging, training, or operations associated with the military relocation would occur. Existing operations on Guam would continue. Therefore, implementation of the no-action alternative would retain existing conditions, and there would be no impacts associated with the proposed action and alternatives. The no-action alternative means that none of the proposed DoD expansion activities would be implemented on Guam. Implementation of the no-action alternative would not meet the mission, readiness, national security and international treaty obligations of the U.S.

17.2.7 Summary of Potential Impacts

Tables 17.2-18, 17.2-19, 17.2-20, and 17.2-21 summarize the potential impacts of each action alternative associated with the Main Cantonment, training range complex, ammunition storage, and NMS access roads, respectively. Table 17.2-22 summarizes the potential impacts of other training, airfield, and waterfront components of the proposed action. A text summary is provided below.

Table 17.2-18. Summary of Main Cantonment Impacts – Alternatives 1, 2, 3 and 8

Main Cantonment Alternatives 1, 2, 3, and 8
Construction
LSI • Less than significant adverse impacts would occur • As with all operations using hazardous substances, there is a possibility for an inadvertent leak, spill, or release
Operation
LSI • Less than significant adverse impacts would occur • As with all operations using hazardous substances, there is a possibility for an inadvertent leak, spill, or release

Legend: LSI = Less than significant impact.

Table 17.2-19. Summary of Training Impacts – Training Range Complex Alternatives

Training Range Alternatives A and B
Construction
LSI • Less than significant adverse impacts would occur • As with all operations using hazardous substances, there is a possibility for an inadvertent leak, spill, or release
Operation
LSI • Less than significant adverse impacts would occur • As with all operations using hazardous substances, there is a possibility for an inadvertent leak, spill, or release

Legend: LSI = Less than significant impact.

Table 17.2-20. Summary of Training Impacts – Ammunition Storage Alternatives

Ammunition Storage Alternatives A and B
Construction
LSI • Less than significant adverse impacts would occur • As with all operations using hazardous substances, there is a possibility for an inadvertent leak, spill, or release
Operation
LSI • Less than significant adverse impacts would occur • As with all operations using hazardous substances, there is a possibility for an inadvertent leak, spill, or release

Legend: LSI = Less than significant impact.

Table 17.2-21. Summary of Training Impacts – NMS Access Roads Alternatives

Access Road Alternatives A and B
Construction
LSI • Less than significant adverse impacts would occur • As with all operations using hazardous substances, there is a possibility for an inadvertent leak, spill, or release
Operation
LSI • Less than significant adverse impacts would occur • As with all operations using hazardous substances, there is a possibility for an inadvertent leak, spill, or release

Legend: LSI = Less than significant impact.

Table 17.2-22. Summary of Other Training, Airfield, and Waterfront Component Impacts

Other Training (North/Central/South)	*Airfield (North)*	*Waterfront (Apra Harbor)*
Construction		
LSI • Less than significant adverse impacts would occur • As with all operations using hazardous substances, there is a possibility for an inadvertent leak, spill, or release	LSI • The impacts would be the same as for North/Central/South	LSI • The impacts would be the same as for North/Central/South
Operation		
LSI • Less than significant adverse impacts would occur • As with all operations using hazardous substances, there is a possibility for an inadvertent leak, spill, or release	LSI • The impacts would be the same as for North/Central/South	LSI • The impacts would be the same as for North/Central/South

Legend: LSI = Less than significant impact.

The potential environmental impacts related to the proposed Marine Corps relocation include increased transportation, handling, use, and disposal of hazardous materials and hazardous wastes. It is expected that the largest increases of hazardous materials would occur from the use of POL (fuels). Expected increases in hazardous waste include pesticides, herbicides, solvents, corrosive or toxic liquids, and aerosols. Toxic substances are not expected to provide significantly to the expected waste increases. Due

to the projected increase in the volume of the hazardous material and hazardous waste, both are estimated to be about 50% of the known Okinawa rate annually (DRMO Okinawa 2009). Thus, the proposed Marine Corps relocation would have the potential to result in significant impacts to human health and the environment (i.e., soils, surface water, groundwater, air, and biota). However, the increase in hazardous material and hazardous waste would be handled and disposed per applicable regulations, BMPs, and SOPs as discussed in this Chapter (Table 17.2-3) and in Volume 7. There are several waste sites in the general area proposed for Main Cantonment housing development at Finegayan. Due to the implementation of site planning and investigation, BMPs, SOPs and land use controls, hazardous material/waste impacts associated with sites would be less than significant.

Therefore, despite the potential increases in hazardous materials and hazardous wastes, less than significant impacts are anticipated as long as the BMPs, SOPs, and operational controls discussed above are implemented and related plans, procedures, and permits are updated and modified as appropriate to meet the increased demand upon DRMO regarding hazardous substance transportation, handling, storage, use, and disposal.

17.2.8 Summary of BMPs and SOPs

Table 17.2-3 summarizes BMPs and SOPs (also see Volume 7 for a comprehensive listing) that would be implemented relative to hazardous substance transportation, construction, and/or operations activities. BMPs and SOPs are not considered "mitigation measures" and no mitigation measures are identified in this chapter.