CHAPTER 18. HAZARDOUS MATERIALS AND WASTE

18.1 INTRODUCTION

This chapter discusses the potential environmental consequences associated with implementing the alternatives within the region of influence (ROI) for this resource. For a description of the affected environment for all resources, including current hazardous substance handling, storage, transportation, and management plans; techniques; approaches; and proposed mitigation measures, refer to the respective chapter of Volume 2 (Marine Corps Relocation – Guam). The locations described in Volume 2 include the ROI for the utilities projects. The chapters are presented in the same order as the resource areas discussed in Volume 6.

18.2 ENVIRONMENTAL CONSEQUENCES

18.2.1 Approach to Analysis

18.2.1.1 Methodology

Utilities

Potential environmental consequences and mitigation measures related to the expansion of the utilities infrastructure on Guam were evaluated regarding the following:

- Utilities infrastructure construction impacts
- Utilities operational impacts

Both direct impacts (i.e., effects from the construction and operation of utilities provided for the new military facilities on base) and indirect impacts (i.e., effects that occur off base from the influx of construction workers and an induced population) are described in this chapter. For more information on direct and indirect impacts, see Volume 6, Chapter 1.

These potential impacts (direct and indirect) were assessed for the site workers, the general public, and various media (i.e., soils, surface water, groundwater, air, and biota). Potential hazardous substance-related indirect impacts of proposed utilities projects result primarily from:

- The increased demands placed on public utility systems and their associated operations.
- Construction workforce housing, and the associated increased housing and development.
- The increased population that is expected to migrate to Guam because of the economic growth brought about by the United States (U.S.) Department of Defense (DoD) relocation.

Roadway Projects

Hazardous substances are controlled in the U.S. primarily by laws and regulations administered by 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 controls and 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. In addition, the U.S. Territory of Guam oversees and administers its environmental laws and regulations through Guam Environmental Protection Agency (GEPA). All public

and Special Purpose Entities located on Guam are subject to the GEPA environmental requirements. The GEPA Hazardous Waste Management Program and statutory authority is based primarily on Title 10 Guam Code Annotated.

This contamination screening was prepared pursuant to the Federal Highway Administration Technical Advisory T 6640.8, dated October 30, 1987 (Federal Highway Administration 1987). This advisory provides guidance on the evaluation of hazardous waste sites that would have an effect on the proposed roadway improvements. This advisory recommends that hazardous waste sites be identified and mapped in relation to the location of project alternatives under consideration.

The potential presence of polychlorinated biphenyls (PCBs) would also be a concern because of the presence of pole-mounted transformers on electrical transmission poles throughout the island.

A contamination screening of the roadway projects within the study area was conducted to determine the potential for contamination of the corridor right-of-way (ROW) and intersection improvements from adjacent properties and business operations. The screening included a review of an environmental database search, document and file reviews, a review of previous studies, a review of aerial photography, a review of company websites, and field visits. The impacts to the proposed roadway alternatives, and evaluation of hazardous material and hazardous waste generation associated with the roadway construction, are discussed in Section 18.2.6 of this chapter.

Environmental Database Review

An environmental database search was performed by Environmental Data Resources (EDR). The resulting EDR ZIP/Plus reports identified potential hazardous materials and petroleum contamination sites that are listed in USEPA databases (EDR 2009). This database search utilized a geographic information system-integrated database that included federal- and state-regulated sites.

The EDR ZIP/Plus reports provided information on potential contamination sites within the study area by zip codes. Maps to locate the sites were not available. Locally known sites previously documented in the land use review or known military facilities that were identified by the EDR ZIP/Plus reports were located and field verified. The remaining EDR information was cross referenced with additional potential contamination sites identified in the field to include available regulatory information in the site descriptions. After field verification, potential contamination sites were eliminated from further consideration if they were not within 0.25-mile (0.40-kilometers) of the centerline of the proposed roadway or intersection improvement.

The agency list descriptions define the regulatory databases reviewed for this report, along with the dates that each database was last updated by the respective agency and EDR. The following USEPA databases provided support documentation for the evaluation process:

National Priorities List (NPL), January 26, 2009 – The NPL was devised to prioritize sites for the purpose of taking remedial action as funded by the Hazardous Waste Substance Superfund program, (initially established under the Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] of 1980).

- Proposed NPL, January 26, 2009 – Proposed NPL Sites.
- NPL Deletions, January 26, 2009 – A listing of sites that have been deleted from the NPL. The National Oil and Hazardous Substance Pollution Contingency Plan established the criteria that USEPA uses to delete sites from the NPL.
- NPL Liens, February 16, 2009 – Federal Superfund Liens.

- Comprehensive Environmental Response, Compensation, and Liability Information Systems (CERCLIS), January 30, 2009 – This list contains facilities or locations that USEPA is investigating to determine if an existing or threatened release of hazardous substance is present.
- CERCLIS-No Further Remedial Action Planned (NFRAP) List, January 26, 2009 – As of February 15, 1995, CERCLIS no longer includes sites that USEPA has assessed and designated as an NFRAP site. An NFRAP designation means that, to the best of USEPA's knowledge, USEPA (or its agent) has completed assessment activities at the site and has determined that no further steps to list this site on the NPL would be taken unless information indicating this decision was not appropriate or other considerations make a recommendation for listing appropriate at a later time.
- Liens 2, March 3, 2009 – CERCLA Lien Information.
- Resource Conservation and Recovery Act (RCRA) Information System National Oversite Database Handlers With Corrective Action Activity, March 3, 2009 – This database is a listing of hazardous waste handlers that have undergone RCRA corrective action activity.
- RCRA Information System, February 20, 2009 – This list identifies those facilities or locations that have notified USEPA of their activities relative to the handling of hazardous wastes. It includes facilities that generate, transport, store, treat, and/or dispose of hazardous waste as defined by the RCRA. Transporters are individuals or Special Purpose Entities that move hazardous waste from the generator off site to a facility that can recycle, treat, store, or dispose of the waste. Large quantity generators generate more than 1,000 kilograms (kg) of hazardous waste, or more than 1-kg of acutely hazardous waste per month. Small quantity generators generate between 100 kg and 1,000 kg of hazardous waste per month. Conditionally exempt small quantity generators generate less than 100 kg of hazardous waste, or less than 1-kg of acutely hazardous waste per month.
- Engineering Controls Sites List, December 29, 2008 – A listing of sites with engineering controls in place.
- Sites with Institutional Controls, December 29, 2008 – A listing of sites with institutional controls in place.
- Emergency Response Notification System, January 30, 2009 – This database is used to store information on the notification of oil discharges and hazardous substance releases. This report is a compilation of data from 1987 to present.
- Hazardous Materials Information Reporting System, January 30, 2009 – This system contains hazardous material spill incidents reported to DOT.
- DOT, Office of Pipeline Safety Incident and Accident Data, February 24, 2009 – DOT incident and accident data.
- Clandestine Drug Labs, October 31, 2008 – A listing of clandestine drug lab locations. Provided by the U.S. Department of Justice, this listing contains addresses of some locations where law enforcement agencies reported chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites.
- U.S. Brownfields, February 10, 2009 – A listing of Brownfields sites.
- Formerly Used Defense Sites (FUDS), December 29, 2008 – Includes locations of FUDS where the U.S. Army Corps of Engineers is actively working or would take necessary cleanup actions.

- Land Use Control Information Systems, March 9, 2009 – Contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.
- Superfund Consent Decrees, January 19, 2009 – Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites.
- Record of Decision, December 29, 2009 – Record of Decision documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.
- Toxic Release Inventory System List, September 19, 2008 – The Toxic Release Inventory System List identifies facilities that are required to submit annual reports relative to the estimated release of toxic chemicals to the environment.
- Toxic Substance Control Act (TSCA), February 18, 2009 – TSCA identifies manufacturers and importers of chemical substance included on the TSCA Chemical Substance Inventory list.
- Federal Insecticide, Fungicide, and Rodenticide Act/TSCA Tracking System, December 2007 and December 2008 Files – Federal Insecticide, Fungicide, and Rodenticide Act/TSCA Tracking System tracks administrative cases and pesticide enforcement actions and compliance activities related to an Emergency Planning and Community Right-to-Know Act.
- Biennial Reporting System, February 19, 2009 – The Biennial Reporting System is a national system administered by USEPA that collects data on the generation and management of hazardous waste.
- Facility Index System, December 29, 2008 – The Facility Index System is a historical database that identifies facilities and/or locations that are subject to regulation under certain USEPA programs, due to operations conducted at these sites.
- Section Seven Tracking System, December 12, 2008 – Section 7 of the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, requires all registered pesticide-producing establishments to submit a report to USEPA by March 1 each year. Each establishment must report the types and amounts of pesticides, active ingredients, and devices being produced and those having been produced and sold or distributed in the past year.
- Integrated Compliance Information System, January 12, 2009 – This system supports the information of the national enforcement and compliance program, as well as the unique needs of the National Pollutant Discharge Elimination System.
- PCB Activity Database System, January 2, 2009 – This system identifies generators, transporters, commercial storers, and/or brokers and disposers of PCBs who are required to notify USEPA of such activities.
- Material Licensing Tracking System, December 29, 2008 – This system is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites that possess or use radioactive materials and that are subject to Nuclear Regulatory Commission licensing requirements.
- Radiation Information Database, January 30, 2009 – This database contains information about facilities that are regulated by USEPA regulations for radiation and radioactivity.
- RCRA Administrative Action Tracking System, June 2, 2008 – This system contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by USEPA. For administration actions after September 30, 1995, data entry in the database was discontinued.

- Risk Management Plans, February 16, 2009 – When Congress passed the Clean Air Act Amendments of 1990, it required USEPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule was written to implement Section 112(r) of these amendments. The rule is built on existing industry codes and standards, and it requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program that includes a hazard assessment that details the potential effects of an accidental release, an accident history of the last 5 years, and an evaluation of worst-case and alternative accidental releases; a prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and an emergency response program that spells out emergency health care, employee training measures, and procedures for informing the public and response agencies (e.g., fire department) should an accident occur.

Document and File Review

File reviews also included databases that were not a part of the EDR and were obtained from federal and state agencies concerning past, present, and future enforcement actions that could impact the proposed roadway improvement projects. Useful records in regulatory agency files included compliance inspection reports, enforcement notices, and contamination assessment reports. Other databases used in the evaluation included:

- Enforcement and Compliance History Online – This online database helps determine whether compliance inspections have been conducted by USEPA or state/local governments, if violations were detected or enforcement actions were taken, and if penalties were assessed in response to environmental law violations.
- Clean Water Act Significant Non-Compliance (SNC) – The National Pollutant Discharge Elimination System program uses the term SNC. Examples of events that could result in an SNC code include unauthorized discharges; failure of a Publicly Owned Treatment Works to enforce its approved pretreatment program; failure to meet a construction deadline; failure to file a Discharge Monitoring Report; filing a Discharge Monitoring Report more than 30 days late; or violating any judicial or administrative order. Removal of the SNC designation occurs once the facility's Discharge Monitoring Report reports show a consistent pattern of compliance with permit limits or if USEPA or a state agency issues a formal enforcement order to address the violations that resulted in the SNC and the facility has returned to compliance.
- RCRA SNC is a term used to describe a site determined to cause actual exposure or has a substantial likelihood of causing exposure to a hazardous waste or constituent; is a chronic or recalcitrant violator; or deviates substantially from the terms of a permit, order, or agreement, or from RCRA statutory or regulatory requirements. Under the RCRA program, the SNC is removed when the site is in full physical compliance with statutory and/or regulatory requirements.
- High Priority Violations is a term used in the Clean Air Act program. This is the most serious level of violation noted in USEPA databases.

Previous Studies

Several potential contamination sites (e.g., former landfills) are located within the property boundary of DoD lands and are adjacent to the roadway ROW or proximal to the proposed roadway projects. These

sites were investigated due to the potential for contamination migration if there is a need for construction dewatering, possibly drawing contaminants toward the proposed roadway improvements.

The reports and studies completed for the Andersen Air Force Base (AFB) Installation Restoration Program (IRP) Management and the Navy Military Munitions Response Program (MMRP), USEPA, GEPA, and other federal and local environmental regulatory programs were reviewed to obtain information on potential contamination sites that are within DoD lands and are adjacent or proximal to the proposed improvements.

The current DoD ROI on Guam for hazardous materials and waste includes Air Force and Navy properties. Air Force properties include Andersen AFB, comprised of the main base, the munitions storage area, and Northwest Field; Andersen Administration Annex (Andersen South); and the Andersen Communications Annex Barrigada site near the Guam International Airport. Navy properties include Naval Base Guam, 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.

In 1986, Congress created the Defense Environmental Restoration Program (DERP). The DERP addresses the identification and cleanup of hazardous substances and military munitions remaining from past activities at DoD lands and FUDS. Within the DERP, the DoD created two program categories: the IRP and the MMRP.

On Guam, the USEPA, DoD, and Government of Guam have ongoing cleanup activities of DERP sites. 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 cleanup work on Guam. Under the DSMOA program, GEPA maintains regulatory oversight of environmental restoration efforts undertaken on Guam by the DoD to ensure compliance with applicable local and federal laws and regulations. The DSMOA oversees the following three DoD programs:

- Base Realignment and Closure – A cleanup program to ensure the environmental suitability of properties planned for subsequent transfer to the Government of Guam.
- IRP – The IRP focuses on cleaning up releases of hazardous substances that pose risks to the public and/or the environment at active, as well as Base Realignment and Closure and FUDS, military sites owned or used by the DoD. The IRP is the main DoD environmental restoration program that covers on base actions, such as the Orote Landfill at Commander Navy Region Marianas, Construction Battalion Landfill at South Finegayan and Landfills # 1 and #2 at NCTS Finegayan, and Andersen AFB CERCLA actions.
- FUDS – A program managed by U.S. Army Corps of Engineers that is designed to clean up military sites that are no longer owned by the U.S. Government.

Munitions Response Program

In September 2001, the DoD established the MMRP to address hazards associated with munitions and explosives of concern (MEC) within areas no longer used for operational range activities. These training areas that are no longer used as operational ranges are called munitions response areas. Munitions response areas often contain one or more discrete munitions response sites (Andersen AFB 2007a). In December 2001, Congress passed the National Defense Authorization Act. This Act required the 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, the DoD is coordinating with GEPA to conduct preliminary assessments and site inspections of areas of concern on Guam (GEPA 2009). As a result of these efforts, several munitions response areas on Guam have been identified to date. The munitions response areas include, but are not necessarily limited to, the following locations:

- Naval Magazine 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

Aerial Photography Review

A desktop review of project roadway plans and aerials was conducted (Google Earth 2009).

Web Site Review

Available information on government Web sites was reviewed (OSHA 2006, GEPA 2007, Navy 2007, Andersen AFB 2009).

Field Reviews

Field reviews were conducted by Parsons Brinckerhoff in March/April 2008 and March 2009 to verify locations of potential contamination sites identified in previous reports, and to identify other potential contamination sites not included in previous studies. Since the EDR database reports did not provide exact sites addresses (only zip codes) the identification of potential contamination sites heavily relied on the field review. Project team members walked the properties, where accessible, to identify potential contamination. The sites were evaluated for possible contamination risks to roadway ROW and potential construction activities. Sites were also researched for evidence of documented contamination, apparent changes to the ground surface and landscaping, ground staining, standing liquids, odors, ventilation pipes, drums and other storage containers, and other indications of current or previous petroleum and hazardous materials use and/or storage. Limited telephone and onsite interviews were also conducted.

Potential petroleum and hazardous material sites adjacent to the proposed roadway improvements were identified and accessed when permission was given by the property owners. Potential contamination sites at DoD lands adjacent to the proposed improvements were observed and documented from the roadway ROW. Except for potential contamination sites within DoD lands or sites proximal to DoD lands, site photographs were obtained from potential petroleum and hazardous material sites that would be adjacent to proposed roadway improvements.

18.2.1.2 Determination of Significance

The determination of significance is based on existing hazardous substance management practices, proposed mitigation measures, and expected or potential impacts and environmental consequences with the planned actions. This determination evaluated the overall ability to mitigate or control environmental 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 system 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.

18.2.1.3 Issues Identified during Public Scoping Process

As part of the analysis, concerns related to hazardous materials and waste that were mentioned by the public, including regulatory stakeholders, during the public scoping meetings were addressed. These concerns included:

- Addressing management practices for hazardous substances, including hazardous wastes, toxic substances, hazardous materials, and MEC;
- Describing the potential overall impacts of hazardous substances from construction and operation of proposed projects;
- Identifying the projected hazardous waste types and volumes;
- Identifying expected hazardous substance storage, disposal, and management plans;
- Evaluating measures to mitigate generation of hazardous waste including pollution prevention;
- Discussing how hazardous substances would be managed;
- Discussing the potential for impacts to environmental media from spills, accidents, and/or releases of hazardous substances; and
- Identifying existing installation restoration sites.

18.2.2 Power

Waste Sites

As described in Volume 2, Section 17.1.3; Volume 9, Appendix G; and shown in the various associated figures in Volume 2, Chapter 17, sites are undergoing characterization and/or restoration under various DoD environmental programs. During the project design phases and before construction begins, careful consideration and attention must be given to avoid overlap with these sites. If it is not possible to relocate proposed construction projects that may overlap with these waste sites, then various Best Management Practices (BMPs) and construction operational protocol must be followed to protect human health and the environment. In addition, special design techniques and methodology would be required to ensure the long-term structural integrity of proposed construction projects.

Explosives Safety Hazards

The proposed expansion areas may contain MEC (Naval Facilities Engineering Command [NAVFAC] Marianas 2010). Naval Ordnance Safety and Security Activity (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. To comply with this instruction, an islandwide ESS is being prepared (NAVFAC Marianas 2010). When the ESS has been endorsed by NOSSA and approved by the DoD Explosive Safety Board, Standard Operating Procedures (SOPs) and operational protocol would be developed to address explosive safety hazards of MEC in the proposed construction areas (NAVFAC Marianas 2010).

18.2.2.1 Basic Alternative 1 (Preferred Alternative)

Basic Alternative 1 would recondition existing Combustion Turbines (CTs) and upgrade and install some new Transmission and Distribution (T&D) systems within existing utility corridors and would not require enlargement of the existing footprint of the facilities. This work would be undertaken by the Guam Power Authority (GPA) on its existing permitted facilities. Reconditioning would be made to existing permitted facilities at the Marbo, Yigo, Dededo (two units), and Macheche CTs. These CTs are not currently being used up to permit limits and after reconditioning would be used for peaking and reliability reserve power. T&D system upgrades and new lines would be within existing utility corridors and involve both above ground and underground transmission lines. This alternative supports Main Cantonment Alternatives 1 and 2. Main Cantonment Alternatives 3 and 8 would require additional upgrades to the T&D system.

Direct Impacts. As further discussed in Volume 6, Chapters 2 and 3, implementation of the proposed action would require additional power generation at GPA facilities to meet the power demands of the new base, resulting in potential direct impacts. These potential direct impacts are discussed below in terms of potential direct impacts from (1) hazardous materials; (2) toxic substances; and (3) hazardous waste.

Hazardous Materials

The proposed activities for this alternative would use slightly more hazardous materials, particularly from petroleum, oil, and lubricants (POL)/fuels for heavy equipment, vehicles, generators, and related activities. Operation of the upgraded facilities would require POL/fuels, primarily for replacement, repair, or renovation activities. The conventional power plant fuel would be diesel No. 2 fuel.

It is estimated that about 1,500 pounds (lbs) (681 kg) of hazardous materials would be generated annually from reconditioning/upgrade and operational activities. This estimate was based on professional judgment and Defense Reutilization and Marketing Office (DRMO) Guam hazardous material disposal data.

Land-disturbing activities would trigger the requirement to seek coverage under the construction general permit (CGP). A site-specific Stormwater Pollution Prevention Plan (SWPPP) would be prepared and implemented in accordance with the CGP. The SWPPP would identify site-specific BMPs (Volume 2, Chapter 4, Table 4.2.1) that would be implemented as part of Basic Alternative 1 to reduce the potential for erosion, runoff, sedimentation, and subsequent control of hazardous waste impacts.

BMPs and SOPs would be used to:

- Prevent, contain, and/or clean up spills and leaks to protect the human health and environment.
- Provide personnel training and operational protocol and procedures to protect human health and environment.
- As necessary, expand DRMO's sufficient hazardous materials storage, transportation, and disposal capacity prior to any expected increases.
- Protect overall human health, welfare, and the environment.

This alternative 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, these potential impacts would be less than significant through implementation of BMPs and SOPs (see Volume 7) that would include, but not be limited to, the following:

- Update/implement Hazardous Materials Management Plans (HMMPs).
- Update/implement Facility Response plans.

- Update/implement Spill Prevention, Control, and Countermeasures (SPCC) plans (e.g., training, spill containment and control procedures, cleanup, and notifications).
- Ensure that DoD and subcontractor personnel are trained in proper labeling, container, storage, staging, and transportation requirements for hazardous materials. Ensure personnel are trained in accordance with SPCC methods.
- Implement aggressive hazardous materials minimization plans that substitute non-hazardous materials for hazardous materials.
- As necessary, expand DRMO's sufficient hazardous materials storage, transportation, and disposal capacity prior to any expected increases.
- Verify through surveillance 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 spills and releases through industry-accepted methods for spill prevention, containment, control, and abatement.
- Minimize the use of contaminated sites for new construction. When new projects are planned on sites where contamination and/or MEC has been identified, ensure that the risk of human exposure to contaminated media is minimized through site-specific health and safety plan, engineering and administrative controls, and appropriate personal protective equipment (PPE). In addition, as appropriate, conduct Phase I and II Environmental Site Assessments prior to construction activities and ensure that designs consider and address contaminated sites.
- Ensure that site planning and activities are conducted in accordance with NOSSA Instruction 8020.15B Explosives Safety Review, Oversight, and Verification of Munitions Responses.

BMPs and SOPs are not considered "mitigation measures." Thus, consequences and mitigation tables within this section state that no proposed mitigation measures are identified.

Table 18.2-1 summarizes potential hazardous material impacts associated with reconditioning/upgrade activities and subsequent operations.

Table 18.2-1. Basic Alternative 1 Hazardous Material Consequences and Mitigation

Potential Activity (Cause)	*Potential Effect*	*Potential Impacts*	*Proposed Mitigation Measures*
Hazardous materials use during upgrade projects and subsequent operations	• Increased hazardous materials storage, use, handling, generation, and disposal • Increased fueling and POL operations • Possible use of contaminated site footprints for upgrade projects • Potential increased site runoff	• Spill, leak, or release impacts during construction activities • Impacts and increased risks to human health and/or the environment (soils, surface water, groundwater, or air), including terrestrial and ecosystems • Violations of applicable federal, state, or local laws and regulations or DoD requirements during construction and demolition operations	• No proposed mitigation measures are identified

Legend: DoD = Department of Defense; POL = petroleum, oil, and lubricants.

Toxic Substances

Toxic substances being addressed on Guam regardless of any DoD expansion include asbestos-containing materials (ACM), lead-based paint (LBP), polychlorinated biphenyls (PCBs), and radon gas. LBP and PCBs originating in Guam are transported by licensed transporters and disposed of in permitted facilities in accordance with applicable federal, state, and local regulations and DoD requirements. ACM is disposed of at federal facilities on Guam. Most uses of PCBs were banned by the USEPA in 1979 and LBP was banned in 1978. The CTs proposed for upgrade under Basic Alternative 1 were all installed in the 1990s. Additionally, the reconditioning of the CTs would not involve handling of ACM. Therefore, impacts from those toxic substances are not anticipated. However, in the event that these substances are encountered, licensed contractors would be used to ensure that all DoD, federal, state, and local PCBs, ACM, and/or LBP testing, handling, and disposal protocol, procedures, and requirements are followed. Additionally, the proposed alternative would not require any new structure or facility at the GPA owned facilities and would not require radon resistant construction techniques. Therefore, the impacts from toxic substances would be less than significant.

Hazardous Waste

Expected increases in the generation of hazardous wastes are estimated to be relatively small as a result of these upgrade and operation activities. It is estimated that about 750 lbs (341 kg) of hazardous waste would be generated annually from these activities. These wastes are anticipated to include pesticides, herbicides, adhesives, lubricants, solvents, and corrosive liquids. This estimate was based on professional judgment and DRMO Guam hazardous waste disposal data.

Required BMPs and SOPs (see Volume 7) for handling and disposing of these hazardous wastes include, but are not limited to:

- Personnel training;
- Proper use of spill prevention and control plans;
- Implementation of hazardous waste management plans;
- Implementation of the comprehensive Integrated Pest Management Plan (IPMP);
- Avoidance of known areas of contamination and/or MEC;
- Use of site-specific health and safety plans;
- Use of engineering and administrative controls and appropriate PPE when necessary;
- Use of applicable DoD protocol regarding MEC; and
- Proper execution of existing DRMO hazardous waste handling, transportation, use, storage, and disposal protocol.

Therefore, through the use of these BMPs and SOPs, the impacts from the increase in hazardous waste would be less than significant.

Indirect Impacts. Data provided by GPA indicate that there is sufficient power capacity at power plants to meet the power demands from workforce housing and the associated potential population. Increased power demands may result from the workforce housing and its associated population. The potential types of indirect impacts from construction activities and operations associated with the workforce housing and its population would be similar to those described as potential direct impacts. There may be localized needs for power T&D upgrades among the civilian distribution system, but GPA is positioned to provide this service; thus, indirect impacts to the power utility on Guam are deemed less than significant.

18.2.2.2 Summary of Impacts

Table 18.2-2 summarizes the potential impacts of the Basic Alternative 1. A text summary is provided below.

Table 18.2-2. Summary of Potential Hazardous Materials and Waste Impacts-Power

*Basic Alternative 1**
Soils, Surface Water, Groundwater, Air, and/or Biota Impacts (construction and operations impacts would be the same; direct and indirect impacts would be the same)
LSI • Less than significant 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. *Preferred Alternative.

In summary, the proposed increased power upgrade and operations would have the potential to result in increased environmental impacts. These potential impacts would result from increased transportation, handling, use, and disposal of hazardous materials and hazardous wastes. It is expected that the largest increases of hazardous materials would result from the use of POL/fuels. However, as per regulatory requirements, various BMPs and SOPs would be used to prevent unintended releases of these substances. These BMPs and SOPs include, but are not limited to, the following:

- Spill prevention control and countermeasures plans;
- Facility response plans;
- Waste management plans;
- SWPPPs;
- Hazardous material/waste management plans;
- Mandatory personnel hazardous material and hazardous waste training;
- Waste minimization plans;
- Waste labeling, storage, packaging, staging, and transportation procedures;
- Adherence with DoD waste management requirements;
- Compliance with federal and territorial laws and regulations; and
- Guarantee that site planning and activities are conducted in accordance with NOSSA Instruction 8020.15B Explosives Safety Review, Oversight, and Verification of Munitions Responses.

Despite expected increases in hazardous materials and hazardous wastes, less than significant impacts are anticipated as long as the BMPs and SOPs discussed above and in Volume 7 would be implemented and related plans and procedures updated and modified as appropriate to meet the potential increased demand on DRMO regarding hazardous substance transportation, handling, storage, use, and disposal. Also, 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). 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. Therefore, Basic Alternative 1 would result in less than significant hazardous materials/hazardous waste impacts.

18.2.3 Potable Water

As discussed in Volume 6, Chapter 2, potable water basic alternatives 1 and 2 are not distinguished as interim or long-term as they meet the requirements for both interim and long-term.

Direct Impacts. Potential direct impacts regarding potable water are discussed below in terms of (1) hazardous materials; (2) toxic substances; and (3) hazardous waste.

Waste Sites

As described in Volume 2, Section 17.1.3 and Volume 9, Appendix G and shown in the various associated figures in Volume 2, Chapter 17, there are sites undergoing characterization and/or restoration under various DoD environmental programs. During the project design phases, careful consideration and attention must be given prior to construction to avoid overlap with these sites. If it is not possible to relocate proposed construction projects that may overlap with these waste sites, then various BMPs and construction operational protocol must be followed to protect human health and the environment. In addition, special design techniques and methodology would be required to ensure the long-term structural integrity of proposed construction projects.

Explosives Safety Hazards

The proposed expansion areas may contain MEC (Naval Facilities Engineering Command [NAVFAC] Marianas 2010). NOSSA Instruction 8020.15B establishes the ESS process to provide effective review, oversight, and verification of the explosives safety aspects of munitions responses. To comply with this instruction, an islandwide ESS is being prepared (NAVFAC Marianas 2010). When the ESS has been endorsed by NOSSA and approved by the DoD Explosive Safety Board, SOPs and operational protocol would be developed to address explosive safety hazards of MEC in the proposed construction areas (NAVFAC Marianas 2010).

18.2.3.1 Basic Alternative 1 (Preferred Alternative)

Basic Alternative 1 would provide additional water capacity of 11.3 MGd (42.8 MLd), which is anticipated to be met by an estimated 22 new wells at Andersen Air Force Base (AFB), rehabilitate existing wells, interconnect with the Guam Waterworks Authority (GWA) water system, and associated treatment, storage and distribution systems. Two new 2.5 MG (9.5 ML) water storage tanks would be constructed at ground level at NCTS Finegayan. Up to two new elevated 1 MG (3.8 ML) water storage tanks would be constructed at Finegayan within the Main Cantonment footprint.

Hazardous Materials

The proposed activities for this alternative would use slightly more hazardous materials as compared with existing quantities. These increases are expected particularly from POL/fuels for heavy equipment, vehicles, generators, and related activities. Operation of the upgraded facilities would require POL/fuels, primarily for replacement, repair, or renovation activities, and for emergency generators associated with the water facilities. It is estimated that about 750 lbs (341 kg) of hazardous materials would be generated annually from these activities. This estimate was based on professional judgment and DRMO Guam hazardous material disposal data.

Land-disturbing activities would trigger the requirement to seek coverage under the CGP. A site-specific SWPPP would be prepared and implemented in accordance with the CGP. The SWPPP would identify site-specific BMPs (Volume 2, Chapter 4, Table 4.2.1) that would be implemented as part of Basic

Alternative 1 to reduce the potential for erosion, runoff, sedimentation, and subsequent control of hazardous waste impacts.

BMPs and SOPS would be used to:

- Prevent, contain, and/or clean up spills and leaks to protect the human health and environment.
- Provide personnel training and operational protocol and procedures to protect human health and environment.
- As necessary, expand DRMO's sufficient hazardous materials storage, transportation, and disposal capacity prior to any expected increases.
- Protect overall human health, welfare, and the environment.

This alternative would have the potential to result in significant impacts to human health and the environment (i.e., soils, surface water, groundwater, air, and biota), but through implementation of BMPs and SOPs (see Volume 7), the impacts would be less than significant. BMPs and SOPs that would be used include, but are not limited to, the following:

- Update/implement HMMPs.
- Update/implement facility response plans.
- Update/implement SPCC plans (e.g., training, spill containment and control procedures, cleanup, notifications).
- Ensure that DoD and construction subcontractor personnel are trained in proper labeling, container, storage, staging, and transportation requirements for hazardous materials. Ensure personnel are trained in accordance with SPCC methods.
- Implement aggressive hazardous materials minimization plans that substitute non-hazardous materials for hazardous materials.
- As necessary, expand DRMO's sufficient hazardous materials storage, transportation, and disposal capacity prior to any expected increases.
- Verify through surveillance and inspections full compliance with federal, state, and local regulations and adherence to DoD requirements. Implement corrective actions as necessary.
- Verify that proper erosion control methods are used during construction activities. Implement corrective actions as necessary.
- Minimize the risk of uncontrolled spills and releases through industry-accepted methods for spill prevention, containment, control, and abatement.
- Minimize the use of contaminated sites for new construction. When new projects are planned on sites where contamination and/or MEC has been identified, ensure that the risk of human exposure to contaminated media is minimized through site-specific health and safety plan, engineering and administrative controls, and appropriate PPE. In addition, as appropriate, conduct Phase I and II Environmental Site Assessments prior to construction activities and ensure that designs consider and address contaminated sites.
- Ensure that site planning and activities are conducted in accordance with NOSSA Instruction 8020.15B Explosives Safety Review, Oversight, and Verification of Munitions Responses.

Table 18.2-3 summarizes potential hazardous material impacts associated with these upgrade activities and subsequent operations.

Table 18.2-3. Basic Alternative 1 Hazardous Material Construction Consequences and Mitigation

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

Legend: DoD = Department of Defense; POL = petroleum, oil, and lubricants.

Toxic Substances

The primary toxic substances being addressed on Guam regardless of any DoD expansion include ACM, LBP, PCBs, and radon gas. ACM, LBP, and PCBs are not expected to result in additional impacts because LBPs were banned in 1978, most uses of PCBs banned in 1979, and ACM would not be used in new utilities infrastructure facilities.

Radon gas could seep into facilities and/or structures. However, radon resistant construction techniques would be used and DoD would periodically test facilities constructed in known radon zones to verify that no unacceptable radon gas buildup occurs. As appropriate, radon mitigation measures would be installed. Therefore, the impacts from toxic substances would be less than significant.

Hazardous Waste

Expected increases in the generation of hazardous waste are judged to be negligible as a result of these existing potable water upgrade activities. It is estimated that about 375 lbs (171 kg) of hazardous waste would be generated annually from these upgrade and operational activities. These wastes are anticipated to include pesticides, herbicides, adhesives, lubricants, solvents, and corrosive liquids. This estimate was based on professional judgment and DRMO Guam hazardous waste disposal data. No proposed mitigation measures would be required.

Required BMPs and SOPs (see Volume 7) for these hazardous wastes include, but are not limited to:

- Personnel training;
- Proper use of spill prevention and control plans;
- Implementation of hazardous waste management plans;
- Implementation of the comprehensive Integrated Pest Management Plan (IPMP);
- Avoidance of known areas of contamination and/or MEC;
- Use of site-specific health and safety plans;
- Use of engineering and administrative controls and appropriate PPE when necessary;

- Use of applicable DoD protocol regarding MEC; and
- Proper execution of existing DRMO hazardous waste handling, transportation, use, storage, and disposal protocol.

Therefore, through the use of BMPs and SOPs, the impacts from the increase in hazardous waste would be less than significant.

Indirect Impacts. Increased potable water demands may result from the workforce housing and its associated population and relocation induced civilian population growth. The potential types of indirect impacts from construction activities and operations associated with the upgrades to the civilian water utility to meet the needs of the workforce housing and its population and induced civilian population would be similar to those described as potential direct impacts.

18.2.3.2 Basic Alternative 2

Basic Alternative 2 would provide additional water capacity of 11.7 MGd (44.3 MLd), which is anticipated to be met by an estimated 20 new wells at Andersen Air Force Base (AFB) and 11 new wells at Air Force Base Barrigada, rehabilitate existing wells, interconnect with the Guam Waterworks Authority (GWA) water system, and associated treatment, storage and distribution systems. Two new 1.8 MG (6.8 ML) water storage tanks would be constructed at ground level at NCTS Finegayan and one 1 MG (3.8 ML) water storage tank would be construction at Air Force Base Barrigada. Up to two new elevated 1 MG (3.8 ML) water storage tanks would be constructed at Finegayan within the Main Cantonment footprint.

Potential impacts to hazardous materials and waste from implementing Basic Alternative 2 would be similar to those discussed under Alternative 1. Estimated quantities of hazardous materials and waste for Alternative 2 would vary less than 2 percent (%) of the Alternative 1 estimates.

18.2.3.3 Summary of Impacts

Table 18.2-4 summarizes the potential impacts of each action alternative. A text summary is provided below.

Table 18.2-4. Summary of Potential Hazardous Materials and Waste Impacts-Potable Water

*Basic Alternative 1**	*Basic Alternative 2*
Soils, Surface Water, Groundwater, Air, and/or Biota Impacts (construction and operations impacts would be the same; direct and indirect impacts would be the same)	
LSI • Less than significant 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 Basic Alternative 1

Legend: LSI = Less than significant impact. *Preferred Alternative.

In summary, the proposed potable water upgrade project would have the potential to result in increased environmental impacts. These potential impacts would result from increased transportation, handling, use, and disposal of hazardous materials and hazardous wastes. It is expected that the largest increases of hazardous materials would result from the use of POL/fuels. Expected increases in the generation of hazardous waste are judged to be negligible, but could include pesticides, herbicides, solvents, corrosive or toxic liquids, and aerosols.

Various BMPs and SOPs are in place to prevent unintended spills, releases, or leaks of these substances (see Volume 7). These BMPs and SOPs include, but are not limited to:

- Spill prevention control and countermeasures plans;
- Facility response plans;
- Waste management plans;
- SWPPPs;
- Hazardous material/waste management plans;
- Mandatory personnel hazardous material/waste training;
- Waste minimization plans;
- Waste labeling, storage, packaging, staging, and transportation procedures;
- Adherence with DoD waste management requirements;
- Compliance with federal and territorial laws and regulations; and
- Guarantee that site planning and activities are conducted in accordance with NOSSA Instruction 8020.15B Explosives Safety Review, Oversight, and Verification of Munitions Responses.

Despite expected increases in hazardous materials and hazardous wastes, the BMPs and SOPs discussed above and in Volume 7 would be implemented and related plans and procedures would be updated and modified as appropriate to meet the potential increased demand on DRMO regarding hazardous substance transportation, handling, storage, use, and disposal. 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). 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. Therefore, less than significant impacts would be caused by hazardous materials/hazardous waste for the proposed potable water alternatives.

18.2.4 Wastewater

Waste Sites

As described in Volume 2, Section 17.1.3 and Volume 9, Appendix G and shown in the various associated figures in Volume 2, Chapter 17, there are sites undergoing characterization and/or restoration under various DoD environmental programs. During the project design phases, careful consideration and attention must be given prior to construction to avoid overlap with these sites. If it is not possible to relocate proposed construction projects that may overlap with these waste sites, then various BMPs and construction operational protocol must be followed to protect human health and the environment. In addition, special design techniques and methodology would be required to ensure the long-term structural integrity of proposed construction projects.

Explosives Safety Hazards

The proposed expansion areas may contain MEC (Naval Facilities Engineering Command [NAVFAC] Marianas 2010). NOSSA Instruction 8020.15B establishes the ESS process to provide effective review, oversight, and verification of the explosives safety aspects of munitions responses. To comply with this instruction, an islandwide ESS is being prepared (NAVFAC Marianas 2010). When the ESS has been endorsed by NOSSA and approved by the DoD Explosive Safety Board, SOPs and operational protocol

would be developed to address explosive safety hazards of MEC in the proposed construction areas (NAVFAC Marianas 2010).

18.2.4.1 Basic Alternative 1a (Preferred Alternative) and 1b

Basic Alternative 1 (Basic Alternative 1a supports Main Cantonment Alternatives 1 and 2; and Basic Alternative 1b supports Main Cantonment Alternatives 3 and 8) combines upgrade to the existing primary treatment facilities and expansion to secondary treatment at the Northern District Wastewater Treatment Plant. The difference between Basic Alternatives 1a and 1b is a requirement for construction of a new sewer line from Barrigada housing to Northern District Wastewater Treatment Plant for Basic Alternative 1b.

Direct Impacts. Potential direct impacts regarding wastewater are discussed below in terms of (1) hazardous materials; (2) toxic substances; and (3) hazardous waste.

Hazardous Materials

The proposed activities for this alternative would use slightly more hazardous materials, particularly from POL/fuels for heavy equipment, vehicles, generators, and related activities. Operation of the upgraded facilities would require POL/fuels, primarily for replacement, repair, or renovation activities. It is estimated that about 525 lbs (238 kg) of hazardous materials would be generated annually from these upgrade and operational activities. This estimate was based on professional judgment and DRMO Guam hazardous material disposal data. No proposed mitigation measures would be required.

Land-disturbing activities would trigger the requirement to seek coverage under the CGP. A site-specific SWPPP would be prepared and implemented in accordance with the CGP. The SWPPP would identify site-specific BMPs (Volume 2, Chapter 4, Table 4.2.1) that would be implemented as part of Basic Alternative 1 to reduce the potential for erosion, runoff, sedimentation, and subsequent control of hazardous waste impacts.

BMPs and SOPs would be used to:

- Prevent, contain, and/or clean up spills and leaks to protect the human health and environment.
- Provide personnel training and operational protocol and procedures to protect human health and environment.
- As necessary, expand DRMO's sufficient hazardous materials storage, transportation, and disposal capacity prior to any expected increases.
- Protect overall human health, welfare, and the environment.

This alternative would have the potential to result in less than significant impacts to human health and the environment (i.e., soils, surface water, groundwater, air, and biota) through implementation of BMPs and SOPs (see Volume 7) that would include, but are not limited to:

- Update/implement HMMPs.
- Update/implement Facility Response plans.
- Update/implement SPCC plans (e.g., training, spill containment and control procedures, cleanup, notifications).
- Ensure that DoD and subcontractor personnel are trained in proper labeling, container, storage, staging, and transportation requirements for hazardous materials. Ensure personnel are trained in accordance with SPCC methods.

- Implement aggressive hazardous materials minimization plans that substitute non-hazardous materials for hazardous materials.
- As necessary, expand DRMO's sufficient hazardous materials storage, transportation, and disposal capacity prior to any expected increases.
- Verify through surveillance and inspection that contractors fully implement federal, local, and DoD regulations including the use, storage, treatment, and disposal of hazardous materials. Verify that proper erosion control methods are used during construction activities. Implement corrective actions as necessary.
- Minimize the risk of uncontrolled spills and releases through industry-accepted methods for spill prevention, containment, control, and abatement.
- Minimize the use of contaminated sites for new projects. When new projects are planned on sites where contamination and/or MEC has been identified, ensure that the risk of human exposure to contaminated media is minimized through the use of a site-specific health and safety plan, engineering and administrative controls, and appropriate PPE. In addition, as appropriate, conduct Phase I and II Environmental Site Assessments prior to construction activities and ensure that designs consider and address contaminated sites.
- Ensure that site planning and activities are conducted in accordance with NOSSA Instruction 8020.15B Explosives Safety Review, Oversight, and Verification of Munitions Responses.

Table 18.2-5 summarizes potential hazardous material impacts associated with these upgrade activities and subsequent operations.

Table 18.2-5. Basic Alternative 1 Hazardous Material Construction

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

Legend: LSI = Less than significant impact. *Preferred Alternative.

Toxic Substances

The primary toxic substances being addressed on Guam regardless of any DoD expansion include ACM, LBP, PCBs, and radon. ACM, LBP, and PCBs are not expected to result in additional impacts because LBPs were banned in 1978, most uses of PCBs were banned in 1979, and ACM would not be used in new utilities infrastructure facilities.

Radon could seep into the facilities and/or structures. However, radon resistant construction techniques would be used and DoD would periodically test facilities constructed in known radon zones to verify that no unacceptable radon gas buildup occurs. As appropriate, radon mitigation measures would be installed. Therefore, the impacts from toxic substances would be less than significant.

Hazardous Waste

Expected increases in the generation of hazardous wastes are judged to be small as a result of the proposed wastewater facility upgrades. It is estimated that about 160 lbs (73 kg) of hazardous waste would be generated annually from these activities. These wastes are anticipated to include adhesives, lubricants, solvents, and corrosive liquids. This estimate was based on professional judgment and DRMO Guam hazardous waste disposal data. No proposed mitigation measures would be required.

Required BMPs and SOPs (see Volume 7) for these hazardous wastes include, but are not limited to:

- Personnel training;
- Proper use of spill prevention and control plans;
- Implementation of hazardous waste management plans;
- Implementation of the comprehensive Integrated Pest Management Plan (IPMP);
- Avoidance of known areas of contamination and/or MEC;
- Use of site-specific health and safety plans;
- Use of engineering and administrative controls and appropriate PPE when necessary;
- Use of applicable DoD protocol regarding MEC; and
- Proper execution of existing DRMO hazardous waste handling, transportation, use, storage, and disposal protocol.

Therefore, through the use of BMPs and SOPs, the impacts from the increase in hazardous waste would be less than significant.

Indirect Impacts. Increased wastewater demands would result from the workforce housing and its associated population and induced civilian population growth. The potential types of indirect impacts from construction activities and operations associated with upgrades to the GWA wastewater systems to meet the needs of the workforce housing and its population and increased induced civilian population would be similar to those described as potential direct impacts.

18.2.4.2 Summary of Impacts

Table 18.2-6 summarizes the potential impacts of each basic alternative. A text summary is provided below.

Table 18.2-6. Summary of Potential Hazardous Materials and Waste Impacts-Wastewater

*Basic Alternative 1a**	*Basic Alternative 2a*
Soils, Surface Water, Groundwater, Air, and/or Biota Impacts (construction and operations impacts would be the same; direct and indirect impacts would be the same)	
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 • 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. *Preferred Alternative.

In summary, the proposed wastewater project would have the potential to result in increased environmental impacts. These potential impacts would result from increased transportation, handling, use, and disposal of hazardous materials and hazardous wastes. It is expected that the largest increases of hazardous materials would result from the use of POL/fuels. Expected increases in the generation of hazardous waste are judged to be negligible, but could include solvents, corrosive or toxic liquids, and aerosols. However, various BMPs and SOPs are in place to prevent unintended releases, spills, or leaks of these substances and this would result in less than significant impacts. These BMPs and SOPs (Volume 7) include, but are not limited to, the following:

- Spill prevention control and countermeasures plans;
- Facility response plans;
- Waste management plans;
- SWPPPs;
- Hazardous material management plans;
- Mandatory personnel hazardous material and hazardous waste training;
- Waste minimization plans;
- Waste labeling, storage, packaging, staging, and transportation procedures;
- Adherence with DoD waste management requirements;
- Compliance with federal and territorial laws and regulations; and
- Guarantee that site planning and activities are conducted in accordance with NOSSA Instruction 8020.15B Explosives Safety Review, Oversight, and Verification of Munitions Responses.

Despite expected increases in hazardous materials and hazardous wastes, the BMPs and SOPs discussed above and in Volume 7 would be implemented and related plans and procedures would be updated and modified as appropriate to meet the potential increased demand on DRMO regarding hazardous substance transportation, handling, storage, use, and disposal. 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). 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. Therefore, there would be less than significant hazardous materials/waste impacts related to the proposed wastewater alternatives.

18.2.5 Solid Waste

18.2.5.1 Basic Alternative 1 (Preferred Alternative)

The Preferred Alternative would be to continue to use the Navy Landfill at Apra Harbor for municipal solid waste (MSW) until the new GovGuam Layon Landfill at Dandan is available for use. Disposal of other waste streams excluded from Layon Landfill would continue at the Navy Landfill. Construction and demolition (C&D) debris would continue to be disposed at the Navy hardfill. This alternative does not involve any construction activities.

Hazardous Materials

Since there would be no construction activities and operations would not differ from current practice, there would be less than significant potential impact in the generation of hazardous materials. The proposed activities would result in the use of approximately the same quantity of hazardous materials. These would include POL/fuels for heavy equipment used in landfill operations, generators, and related

activities. Operation of the facilities would require POL/fuels, primarily for replacement, repair, or renovation activities. It is estimated that about 450 lbs (204 kg) of hazardous materials would be generated annually from these operational activities. This estimate was based on professional judgment and DRMO Guam hazardous material disposal data.

However, BMPs and SOPs would be used to do the following:

- Prevent, contain, and/or clean up spills and leaks to protect the human health and environment.
- Provide personnel training and operational protocol and procedures to protect human health and environment.
- As necessary, expand DRMO's sufficient hazardous materials storage, transportation, and disposal capacity prior to any expected increases.
- Protect overall human health, welfare, and the environment.

This alternative would have the potential to result in impacts to human health and the environment (i.e., soils, surface water, groundwater, air, and biota). However, these potential impacts would be less than significant through implementation of BMPs and SOPs (see Volume 7) that would include, but not be limited to, the following:

- Update/implement HMMPs.
- Update/implement facility response plans.
- Update/implement SPCC plans (e.g., training, spill containment and control procedures, cleanup, notifications).
- Ensure that DoD and subcontractor personnel are trained in proper labeling, container, storage, staging, and transportation requirements for hazardous materials. Ensure personnel are trained in accordance with spill prevention, control, and cleanup methods.
- Implement aggressive hazardous materials minimization plans that substitute non-hazardous materials for hazardous materials.
- As necessary, expand DRMO's sufficient hazardous materials storage, transportation, and disposal capacity prior to any expected increases.
- Verify through surveillance and inspection that contractors fully implement federal, local, and DoD regulations including the use, storage, treatment, and disposal of hazardous materials. Verify that proper erosion control methods are used during construction activities. Implement corrective actions as necessary.
- Minimize the risk of uncontrolled spills and releases through industry-accepted methods for spill prevention, containment, control, and abatement.
- Ensure that site planning and activities are conducted in accordance with NOSSA Instruction 8020.15B Explosives Safety Review, Oversight, and Verification of Munitions Responses (Navy 2009).

Table 18.2-7 summarizes potential hazardous material impacts associated with these operations activities.

Table 18.2-7. Hazardous Material Consequences and Mitigation

Potential Activity (Cause)	*Potential Effect*	*Potential Impacts*	*Proposed Mitigation Measures*
Hazardous materials use during operations activities	• Continued use hazardous materials storage, use, handling, generation, and disposal • Continued fueling and POL operations	• Adverse impacts and increased risks to human health and/or the environment, including terrestrial and marine ecosystems • Violations of applicable federal, state, or local laws and regulations or DoD requirements • Increased risk of contamination of environmental media	• No proposed mitigation measures are identified

Legend: DoD = Department of Defense; POL = petroleum, oil, and lubricants.

Toxic Substances

The primary toxic substances being addressed on Guam regardless of any DoD expansion include ACM, LBP, PCBs, and radon. ACM, LBP, and PCBs are not expected to result in additional impacts because LBPs were banned in 1978, most uses of PCBs banned in 1979, and ACM would not be used in new utilities infrastructure facilities.

Radon could seep into facilities and/or structures. DoD would periodically test facilities located in known radon zones to verify that no unacceptable radon gas buildup occurs. As appropriate, radon mitigation measures would be installed. Therefore, the impacts from toxic substances would be less than significant.

Hazardous Waste

It is estimated that about 250 lbs (113 kg) of hazardous waste would be generated annually from these activities. These wastes are anticipated to include adhesives, lubricants, solvents, and corrosive liquids. This estimate was based on professional judgment and DRMO Guam hazardous waste disposal data.

Required BMPs and SOPs (see Volume 7) for these hazardous wastes include, but are not limited to:

- Personnel training;
- Proper use of spill prevention and control plans;
- Implementation of hazardous waste management plans;
- Implementation of the comprehensive Integrated Pest Management Plan (IPMP);
- Avoidance of known areas of contamination and/or MEC;
- Use of site-specific health and safety plans;
- Use of engineering and administrative controls and appropriate PPE when necessary;
- Use of applicable DoD protocol regarding MEC; and
- Proper execution of existing DRMO hazardous waste handling, transportation, use, storage, and disposal protocol.

Therefore, the impacts from the increase in hazardous waste would be less than significant.

18.2.5.2 Summary of Impacts

Table 18.2-8 summarizes the potential impacts of Basic Alternative 1. A text summary is provided below.

Table 18.2-8. Summary of Potential Hazardous Materials and Waste Impacts-Solid Waste

*Basic Alternative 1**
Soils, Groundwater, Surface Water, Air, and Biota (no construction impacts, and direct and indirect impacts would be the same) 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. *Preferred Alternative.

In summary, the proposed solid waste alternatives would have the potential to result in increased environmental impacts. These potential impacts would result from increased transportation, handling, use, and disposal of hazardous materials and hazardous wastes. It is expected that the largest increases of hazardous materials would result from the use of POL/fuels. Expected increases in the generation of hazardous wastes are judged to be negligible, but could include solvents, corrosive or toxic liquids, and aerosols. However, various BMPs and SOPs are in place to prevent unintended releases, spills, or leaks of these substances that would result in less than significant impacts. These BMPs and SOPs include, but are not limited to, the following:

- Spill prevention control and countermeasures plans;
- Facility response plans;
- Waste management plans;
- SWPPPs;
- Hazardous material/waste management plans;
- Mandatory personnel hazardous material and hazardous waste training;
- Waste minimization plans;
- Waste labeling, storage, packaging, staging, and transportation procedures;
- Adherence with DoD waste management requirements;
- Compliance with federal and territorial laws and regulations; and
- Guarantee that site planning and activities are conducted in accordance with NOSSA Instruction 8020.15B Explosives Safety Review, Oversight, and Verification of Munitions Responses.

Despite expected increases in hazardous materials and hazardous wastes, the BMPs and SOPs discussed above and in Volume 7 would be implemented and related plans and procedures would be updated and modified as appropriate to meet the potential increased demand on DRMO regarding hazardous substance transportation, handling, storage, use, and disposal. 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). 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. Therefore, there would be less than significant hazardous materials/hazardous waste impacts.

18.2.6 Off Base Roadways

The proposed roadway, bridge, and intersection improvements may involve the use of hazardous materials and the generation of hazardous materials and hazardous wastes. Waste can be generated during bridge demolition, bridge construction and painting, roadway pavement markings, wall and fence

painting, construction equipment/machinery maintenance and repair, and demolishing of structures acquired from ROW acquisition, and from excavation of materials containing hazardous substances. The following discussion of hazardous materials use and hazardous waste generation applies to all of the action alternatives.

Potential hazardous materials associated with roadway and bridge construction include, but are not limited to, the following:

- Product paint for bridges, poles, fences, walls, and roadway pavement markings
- Penetrating sealer (i.e., Methaylmethacrylate), modified mortar, and litex
- Coal tar epoxy for injecting in cracks
- Painting equipment cleaning solvents
- Diesel fuel contained in aboveground storage tanks to fuel construction equipment
- Unleaded gasoline contained in aboveground storage tanks to fuel vehicles
- Engine solvents and degreasers
- Motor oil, gear oil, and other engine lubricants
- Potentially hazardous dredged material
- Potentially hazardous drill cuttings

Potential hazardous substances generated by roadway and bridge construction include, but are not limited to, the following:

- Excavated underground storage tanks containing POL
- Excavated electrical transformers and capacitors containing PCBs
- Petroleum-contaminated soil and groundwater
- Asbestos and ACMs
- Sandblasting wastes not determined to be hazardous wastes
- Potentially hazardous dredged material not determined to be hazardous wastes
- Potentially hazardous drill cuttings not determined to be hazardous wastes

Potential hazardous wastes that could be generated from roadway and bridge construction include:

- Waste paint
- Paint and sealant removal wastes
- Waste paint cleaning solvents and rags
- Waste fuel removed from machinery
- Waste engine solvents and degreasers
- Used oil and lubricants
- Waste antifreeze

The management, use, and storage of these hazardous materials and hazardous wastes on roadway projects are governed under the provisions of the American Association of State Highway and Transportation Officials (AASHTO) Guidelines for Painting Structures (1997), AASHTO Standard Specifications for Transportation Material and Method of Sampling and Testing (2005), and AASHTO Policy on Geometric Design of Highways and Streets, Maintenance of Traffic Through Construction Areas (2001).

The management, storage, and disposal of hazardous wastes are regulated under the USEPA RCRA and Hazardous and Solid Waste Amendments, and are enforced by the GEPA Hazardous Waste Management Program (USEPA 1997, 2005, 2007, 2008a, 2008b; Andersen AFB 2007b).

Hazardous materials disposal and the disposal of POL, PCBs, ACMs, and other hazardous substances are regulated by GEPA.

With implementation of BMPs and SOPs (see Volume 7), impacts would be less than significant for hazardous materials used and hazardous wastes generated during roadway construction.

Of the 123 potentially contaminated sites on Guam, 17 sites were identified as having known or likely soil and/or water contamination within, or adjacent to, the Guam Road Network (GRN) project areas. The 17 sites were shown by region in figures located in Volume 2, Chapter 17. Detailed information on each of the 123 sites is provided in Volume 9, Appendix G.

To identify the potential environmental impacts from contaminated sites on GRN project construction, the nature of each GRN project activity in the affected area was considered. A key factor in determining the potential for environmental effects was the specific type of roadway project that would occur in a given area where known or likely soil or groundwater contamination may be present.

Each of the four action alternatives would result in construction and operation of a set of individual roadway improvement projects on Guam. Implementation of each alternative would result in construction activities in each of the four geographic regions. Construction activities would consist of intersection improvements, bridge replacements, pavement strengthening, road relocation, road widening, and construction of a new road. While many projects would involve construction work in developed and paved areas, some roadway projects could result in soil intrusion that could encounter areas of contamination. Because all roadway project types would generally require construction activities that would involve the use of heavy construction equipment, the potential for leaks or spills of potentially hazardous materials would be common for all project types. A preliminary screening of project types and potential effects from contaminated soil or groundwater is provided in Table 18.2-9.

Table 18.2-9. Potential Effects from Contaminated Soils for GRN Roadway Project Types

Item	*Project Type*	*Description of Construction Activities*	*Potential Effect from Contaminated Soils*
1	Intersection Improvement (including MAPs)	Installation of new traffic loop sensors, extending lanes through the intersection, striping and paving to include new approach or turn lanes, reconfiguring intersection shapes (i.e., from Y-intersection to T-intersections), combining lanes, creating shared lanes, restriping, signalization modifications or upgrades, and grade separations.	Generally, intersection improvement would not result in contact with subsurface soils. The potential for impacts from contaminated soils would be present only when reconfiguration or grade separations include excavation, trenching, or grading into the subsoil.
2	Bridge and Box Culvert Replacement	Bridge and box culvert replacement would be conducted in phases. The new bridge structure would be lengthened to adequately accommodate the hydraulic flow of the river. The width of the new structure would accommodate more or wider lanes and a median, with sidewalks and barriers on each side. Box culverts would be replaced with new single-cell or multi-cell box culverts.	Bridge and box culvert replacement can include excavation, trenching, or grading into the subsoil. Soils would be affected when foundation work requires excavation beneath the existing bridge structure and utility work would require new trenching. No ROW acquisition would be required because bridges and box culverts would be replaced within their existing footprints.

Item	*Project Type*	*Description of Construction Activities*	*Potential Effect from Contaminated Soils*
3	Pavement Strengthening	Existing asphalt pavement sections would be strengthened by rehabilitating the existing pavement materials in place and placing an asphalt overlay or by reconstructing with new materials. The widened pavement section would be constructed of residual material from the existing pavement rehabilitation, new material, or a combination thereof, and an asphalt overlay. Pavement strengthening would also include matching existing access connections, pavement striping, signing, intelligent traffic systems, and safety lighting. The project would match existing horizontal and vertical alignment as required. Minor realignment of the road may be necessary to accommodate design elements.	Physical disturbance to soils from pavement strengthening would only occur when pavements are widened, new traffic systems or devices are installed, or minor road realignment occurs in previously undisturbed ground. Most activities associated with pavement strengthening would not require soil intrusion. For this reason, the potential for impacts from contaminated sites is considered to be low.
4	Road Relocation (Route 15 only)	Route 15 would be realigned to accommodate the location of military firing ranges. New asphalt pavement would be constructed on the new alignment. The roadway cross section would consist of one lane in each direction, outside shoulders and inside shoulders, with an unpaved median that would accommodate future widening. Bicycles would be accommodated in the outside shoulders of the shared roadway. Alternatively, future widening would be accommodated to the outside, and the roadway cross section would consist of two lanes and outside shoulders with a paved median. Realignment would also include construction of new bridges to grade separate Route 15 and the frontage roads, obliterating existing Route 15 pavement, building removal, connecting to existing roadways or other access roads, utility relocation, pavement striping, signing, property fence, and guardrail installation.	Realignment into previously undisturbed soils may be required to accommodate the design of the roadway. This activity would require building removal and relocation of existing utilities. For this reason, there is a potential for impacts from contaminated sites in the area.
5	Road Widening	New lanes would be added to an existing roadway to accommodate predicted increased traffic volumes and to relieve congestion caused by an increase in traffic volumes due to military relocation activities. Widening would result in rebuilding the entire roadway, including removing the existing roadway segment. A new sub-base, base course, asphalt, and friction course layers would be constructed.	Road widening activities would affect soil when the footprint of the roadway extends into previously undisturbed soils. For this reason, there is a potential for impacts from contaminated sites in the area.
6	Construction of New Road	The Finegayan Connection would be constructed on a new alignment with new asphalt pavement on a compacted base or engineered fill.	New road construction would affect soil when the footprint of the roadway extends into previously undisturbed soils. For this reason, there is a potential for impacts from contaminated sites in the area.

Item	*Project Type*	*Description of Construction Activities*	*Potential Effect from Contaminated Soils*
7	Other	Temporary placement of equipment laydown or construction staging areas may be required.	Equipment laydown or construction staging areas associated with any of the above project types may require clearing and other disturbance of soils. For this reason, there is a potential for impacts from contaminated sites in the area.

Legend: MAP = Military Access Point; ROW = right-of-way.

Potential impacts from hazardous waste contamination in soil or groundwater can be detrimental to roadway construction activities. While it is unlikely that groundwater contamination would lead to direct impacts to roadway construction at the ground level, contaminated soil may require removal or remediation. Direct impacts that result in physical soil loss could occur during construction, while indirect impacts can result from the completed project (e.g., contaminants leach into soils). Based on the anticipated activities associated with each project type, it was determined that:

- Intersection improvements and pavement strengthening projects represent the project types with the lowest potential for impacts from hazardous waste contamination in soil or groundwater. Bridge replacement projects using the same footprint for footings and other structures (i.e., no additional ROW required) would also represent a low potential for impacts. These projects would involve the least amount of physical soil disturbance because most work would occur on existing pavements or developed areas.
- The placement of temporary equipment laydown areas at any of the GRN project work sites would represent a moderate potential for impacts from hazardous waste contamination in soil or groundwater only when the use of previously undisturbed areas are selected. To avoid this impact, previously disturbed (e.g., paved) areas adjacent to the work site would be selected for use as temporary construction staging areas or storage for roadway demolition materials whenever possible. Heavy equipment would be used, and leaks or spills of contaminants could occur at equipment staging areas.
- Road relocation, road widening, and construction of the new road would represent the greatest potential for impacts from hazardous waste contamination in soil or groundwater because these projects would result in the greatest degree of soil intrusion.

Certain proposed roadway improvements in the North and Central Regions would require the acquisition of additional ROW on residential, business, or military land (refer to Volume 6, Chapter 17). The potential for contamination would vary depending on the type of land to be acquired. In some cases, it is possible that the likelihood of contamination may be greater beneath certain business properties than beneath residential properties. The potential for contaminant migration to the roadway ROW would require further assessment after alignment selection to determine the actual presence and/or levels of contamination and the possible need for remedial action. Roadway projects with ROW acquisition may require actions, such as avoidance or minimization during the design phase and before construction.

Indirect impacts from the roadway projects would be associated with contaminants leaching into soils. The potential for contaminants leaching into the soil would be prevented or managed through implementation of spill prevention and emergency spill response procedures.

18.2.6.1 Alternative 1

Roadway projects can be affected by contaminated sites that are in close proximity to the roadway alignments. There are 49 projects that would occur as a result of implementation of Alternative 1. The effects of potentially contaminated sites to these projects are discussed below.

North

Alternative 1 includes 13 projects in the North Region. GRN #8, 10, and 22A are adjacent or proximal to four potentially contaminated sites (Site Nos. 1, 8, 9, and 13). GRN #8 and 22A are pavement strengthening projects, with minimal potential for soil intrusion. Partial ROW acquisition would be required for GRN #22A.

GRN #10 is a road widening project that would require partial ROW acquisition along Route 3. Due to potential contamination from Site No. 8 (Potts Junction Tank Farm), avoidance measures would be required to ensure that construction does not occur on contaminated soil or is managed to avoid ongoing remediation efforts to the maximum extent possible.

Roadway projects in the North Region also include intersection improvements and construction of a new road. Although no known contaminated sites have been identified near any of these projects, some projects may require ROW acquisitions, and temporary construction staging areas may require soil intrusion. Due to the need for ROW acquisition and/or soil intrusion at these project locations, avoidance measures would be required to ensure that construction does not occur on contaminated soil or is managed to avoid ongoing remediation efforts to the maximum extent possible.

Central

Alternative 1 includes 27 projects in the Central Region. GRN #6, 13, 15, 17, and 33 are adjacent or proximal to eight potentially contaminated sites (Site Nos. 14, 25, 33, 44, 47, 57, 58, and 62). All of these GRN projects are pavement strengthening projects with minimal potential for soil intrusion. Partial ROW acquisition would be required for GRN #13, 17, and 33.

Roadway projects in the Central Region also include intersection improvements, bridge replacements, road relocations, and road widening. Although no known contaminated sites have been identified near any of these projects, some projects may require ROW acquisitions, and temporary construction staging areas may require soil intrusion. For these reasons, avoidance measures would be required to ensure that construction does not occur on contaminated soil or is managed to avoid ongoing remediation efforts to the maximum extent possible.

Apra Harbor

Alternative 1 includes five projects in the Apra Harbor Region. GRN # 4 and 26 are adjacent or proximal to five potentially contaminated sites (Site Nos. 111, 113, 114, 117, and 118). GRN #4 and 26 are pavement strengthening projects, with minimal potential for soil intrusion. Partial ROW acquisition would be required for both of these GRN projects.

Roadway projects in the Apra Harbor Region also include intersection improvements that would have a low potential for ground intrusion. No ROW acquisition would be required for any projects in the Apra Harbor Region. Avoidance measures would be required only for temporary construction staging areas to ensure that construction does not occur on contaminated soil or is managed to avoid ongoing remediation efforts to the maximum extent possible.

South

Alternative 1 includes four projects in the South Region. No potentially contaminated sites of concern were identified in the South Region. The roadway projects in the South Region are not located in areas where potentially contaminated sites exist or would have influence on the proposed roadway improvements.

Roadway projects in the South Region are limited to pavement strengthening and intersection improvements that would have a low potential for ground intrusion. No ROW acquisition would be required for any projects in the South Region. Avoidance measures would be required only for temporary construction staging areas to ensure that construction does not occur on contaminated soil or is managed to avoid ongoing remediation efforts to the maximum extent possible.

Proposed Mitigation Measures, BMPs, and SOPs

BMPs and SOPs (Volume 7) to avoid or minimize the impact of hazardous substances and/or MEC to less than significant include, but are not limited to, the following:

- Spill prevention control and countermeasures plans;
- Facility response plans;
- Waste management plans;
- SWPPP;
- Hazardous material/waste management plans;
- Mandatory personnel hazardous material and hazardous waste training;
- Waste minimization plans;
- Waste labeling, storage, packaging, staging, and transportation procedures;
- Adherence with DoD waste management requirements;
- Compliance with federal and territorial laws and regulations; and
- Guarantee that site planning and activities are conducted in accordance with NOSSA Instruction 8020.15B Explosives Safety Review, Oversight, and Verification of Munitions Responses.
- These BMPs and SOPs also include, but are not limited to, the following:
- Roadway construction contractors shall be required to manage, store, and dispose of hazardous wastes in accordance with applicable USEPA RCRA and Hazardous and Solid Waste Amendments requirements.
- Roadway construction contractors shall be required to dispose of all POL, PCBs, ACMs, and other hazardous substances in accordance with GEPA regulations.
- A Phase 2 environmental site assessment may be conducted for ROW acquisition associated with GRN #10 (road widening along Route 3 – NCTS Finegayan to Route 9) to determine potential contamination in the vicinity of the Potts Junction Tank Farm. The construction contractor may be required to implement avoidance measures to ensure that construction (a) does not occur on contaminated soil; and (b) is managed to avoid any ongoing remediation efforts to the maximum extent possible.
- A Phase 2 environmental site assessment may be conducted for roadway projects with ROW acquisitions of non-residential property. Roadway construction shall be conducted in accordance with the recommendations of the Phase 2 environmental site assessment. Depending on the extent of contamination at a specific site, excavation and removal of soil

and/or groundwater contamination may be required before roadway construction can commence.

- Final design of roadway projects may include an evaluation of potential contamination for the following categories: (1) intersection improvements and pavement strengthening projects that require ROW acquisition of non-residential property; (2) intersection improvement projects that require reconfiguration or grade separation involving excavation, trenching, or grading into the subsoil; (3) bridge replacement projects that require excavation, trenching, or grading into the subsoil and exceeds the existing footprint of the bridge structure; (4) pavement strengthening that occurs in previously undisturbed ground; (5) road realignment into previously undisturbed soils or that requires building removal and/or relocation of utilities; (6) road widening activities that require a change or enlargement of the footprint of the roadway or that extends into previously undisturbed soils; (7) new road construction that would affect soil when the footprint of the roadway extends into previously undisturbed soils; and (8) new road construction that extends into previously undisturbed soils or requires ROW acquisition.
- Final roadway design would avoid known contaminated sites and/or MEC wherever possible. Avoidance may involve adjustments to the roadway design to completely avoid a contaminated site. Minimization may involve adjustments of the proposed roadway alignment to reduce the resultant ROW acquisition.
- Final roadway design may include coordination with the responsible party to ensure that roadway construction does not interfere with ongoing remediation activities.
- Temporary equipment laydown or construction staging areas would be located in previously disturbed (e.g., paved) areas.
- To prevent leaks or spills of contaminants, all temporary equipment laydown or construction staging areas would be constructed with secondary containment for storage of any hazardous or petroleum products.

With implementation of the above BMPs and SOPs (Volume 7) for contaminated sites, impacts from hazardous materials and wastes for Alternative 1 would be less than significant.

18.2.6.2 Alternative 2 (Preferred Alternative)

There are 49 projects that would be constructed as a result of Alternative 2. The effects of potentially contaminated sites to these projects are discussed below.

North

Alternative 2 includes 13 projects in the North Region. The effects of potentially contaminated sites are similar to those for the North Region of Alternative 1.

Central

Alternative 2 includes 27 projects in the Central Region. The effects of potentially contaminated sites are similar to those for the Central Region of Alternative 1.

Apra Harbor

Alternative 2 includes five projects in the Apra Harbor Region. The effects of potentially contaminated sites are similar to those for the Apra Harbor Region of Alternative 1.

South

Alternative 2 includes four projects in the South Region. The effects of potentially contaminated sites are similar to those for the South Region of Alternative 1.

Proposed Mitigation Measures, BMPs, and SOPs

Potentially contaminated sites that would be associated with Alternative 2 are the same as those listed for Alternative 1. BMPs and SOPs (Volume 7) used to avoid or minimize the impact of potentially contaminated sites to less than significant would be similar to those identified for Alternative 1.

18.2.6.3 Alternative 3

There are 51 projects in Alternative 3. The effects of potentially contaminated sites to these projects are discussed below.

North

Alternative 3 includes 11 projects in the North Region. The effects of potentially contaminated sites are similar to those for the North Region of Alternative 1.

Central

Alternative 3 includes 31 projects in the Central Region. The effects of potentially contaminated sites are similar to those for the Central Region of Alternative 1, with the exception of Site Nos. 64, 65, and 66 that are associated with GRN #20 and 31.

Apra Harbor

Alternative 3 includes five projects in the Apra Harbor Region. The effects of potentially contaminated sites are similar to those for the Apra Harbor Region of Alternative 1.

South

Alternative 3 includes four projects in the South Region. The roadway projects in the South Region are not located in areas where potentially contaminated sites exist or would have influence on the proposed roadway improvements. The effects of potentially contaminated sites are similar to those for the South of Alternative 1.

BMPs and SOPs

Potentially contaminated sites that would be associated with Alternative 3 are the same as those listed for Alternative 1. BMPs and SOPs (Volume 7) used to avoid or minimize the impact of potentially contaminated sites would be similar to those identified for Alternative 1.

18.2.6.4 Alternative 8

There are 50 projects in Alternative 8. The effects of potentially contaminated sites to these projects are discussed below.

North

Alternative 8 includes 13 projects in the North Region. The effects of potentially contaminated sites are similar to those for the North Region of Alternative 1.

Central

Alternative 8 includes 28 projects in the Central Region. The effects of potentially contaminated sites are similar to those for the Central Region of Alternative 1.

Apra Harbor

Alternative 8 includes five projects in the Apra Harbor Region. The effects of potentially contaminated sites are similar to those for the Apra Harbor Region of Alternative 1.

South

Alternative 8 includes four projects in the South Region. The effects of potentially contaminated sites are similar to those for the South Region of Alternative 1.

BMPs and SOPs

Potentially contaminated sites that would be associated with Alternative 8 are the same as those listed for Alternative 1. BMPs and SOPs (Volume 7) used to avoid or minimize the impact of potentially contaminated sites would be similar to those identified for Alternative 1.

18.2.6.5 Summary of Impacts

Table 18.2-10 summarizes the potential impacts of each alternative.

Table 18.2-10. Summary of Potential Hazardous Materials and Waste Impacts-Roadway Project

Potentially Impacted Resource	*Alternative 1*	*Alternative 2**	*Alternative 3*	*Alternative 8*
Leaks and spills of hazardous materials can leach into soils	LSI	LSI	LSI	LSI
Roadway construction adversely affected by contaminated soil and/or groundwater	LSI	LSI	LSI	LSI

Legend: LSI = Less than significant impact. *Preferred Alternative.

In summary, the proposed roadway projects would have the potential to result in increased environmental impacts. These potential impacts would result from increased transportation, handling, use, and disposal of hazardous materials and hazardous wastes. It is expected that the largest increases of hazardous materials would result from the use of POL/fuels. Expected increases in the generation of hazardous waste would include solvents, sealants, paints, degreasers, corrosive or toxic liquids, and aerosols. However, through the use of BMPs and SOPs discussed in this chapter and in Volume 7, the impacts would be less than significant.

18.2.6.6 Summary of Proposed Mitigation Measures

Table 18.2-11 summarizes the proposed mitigation measures for roadway projects impacts on hazardous materials and waste. BMPs and SOPs are not considered “mitigation measures;” thus, no proposed mitigation measures are identified.

Table 18.2-11. Summary of Proposed Mitigation Measures for Roadway Projects Impacts on Hazardous Materials and Waste

Phase	*Proposed Mitigation Measures*
Construction	No proposed mitigation measures are identified
Operation	No proposed mitigation measures are identified