Final Environmental Impact Statement for the Disposal and Reuse of Naval Air Station Brunswick, Maine

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DEPARTMENT OF THE NAVY

Cooperating Agency:
FEDERAL AVIATION ADMINISTRATION

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FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE DISPOSAL AND REUSE OF NAVAL AIR STATION BRUNSWICK, MAINE NOVEMBER 2010

Abstract

This Environmental Impact Statement (EIS) presents an analysis of the U.S. Department of the Navy's (Navy) proposed action to dispose of NAS Brunswick, Maine, in a manner consistent with the *Brunswick Naval Air Station Reuse Master Plan* (Reuse Master Plan), as approved by the Brunswick Local Redevelopment Authority. In addition to the NAS Brunswick property, the EIS also evaluates the disposal of the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station. The Navy is required to close NAS Brunswick in accordance with Public Law 101-510, the Defense Base Closure and Realignment Act of 1990, as amended in 2005. The EIS examines the potential human and natural environmental consequences of the proposed action and any impacts associated with the reasonably foreseeable reuse of the property. Two alternatives and the No-Action Alternative were considered. Alternative 1, the preferred alternative, is the reuse of the property in a manner consistent with the Reuse Master Plan. Alternative 2 consists of a higher density of residential and mixed-use development and no reuse of the airfield. The No-Action Alternative is the retention of the NAS Brunswick property by the U.S. government in caretaker status. The Navy is the lead agency for the proposed action, with the Federal Aviation Administration serving as a cooperating agency.

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Executive Summary

This Environmental Impact Statement (EIS) presents an analysis of the U.S. Department of the Navy's (Navy) proposed action to dispose of Naval Air Station (NAS) Brunswick, Maine in a manner consistent with the *Brunswick Naval Air Station Reuse Master Plan* (Reuse Master Plan), as approved by the Brunswick Local Redevelopment Authority (BLRA). The Navy is required to close NAS Brunswick in accordance with Public Law 101-510, the Defense Base Closure and Realignment Act of 1990, as amended in 2005 (BRAC Closure Law). To comply with the BRAC Closure Law, the installation must be closed on or before September 15, 2011.

This EIS was prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, as amended; the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] 1500-1508); and Navy procedures for implementing NEPA (32 CFR 775). The Navy is the lead agency for the proposed action, with the Federal Aviation Administration (FAA) serving as a cooperating agency.

ES.1 Description of the Proposed Action

The purpose of the proposed action is to provide for the disposal of NAS Brunswick and the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station by the Navy in a manner consistent with the Reuse Master Plan. The need for the proposed action is to provide the local communities the opportunity for economic development and job creation.

ES.2 Background

NAS Brunswick is situated on approximately 3,137 acres in the town of Brunswick, Cumberland County, Maine. The facility is approximately 27 miles northeast of Portland and 31 miles south of Augusta, the state capital. The main gate is located on Bath Road, approximately 2 miles east of the downtown Brunswick business district. In addition to the NAS Brunswick property, the EIS also evaluates the disposal of:

- McKeen Street Housing Annex (70 acres, Brunswick, Maine)
- East Brunswick Radio Transmitter Site (66 acres, Brunswick, Maine)

- Sabino Hill Rake Station (0.23 acre, Phippsburg, Maine)

The current mission of NAS Brunswick is to provide facilities, services, and materials to support the various activities of its tenants and support units. The primary tenant at NAS Brunswick is Patrol and Reconnaissance Wing Five, which includes four squadrons of P-3 aircraft and a squadron of C-130 aircraft.

ES.3 Scope of the EIS

This EIS evaluates the potential direct, indirect, short-term, and long-term impacts on the human and natural environments resulting from the disposal of NAS Brunswick and the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station. Resource areas examined in this EIS and potentially impacted include land use and zoning, socioeconomics, community facilities and services, transportation, environmental management, air quality, noise, infrastructure, cultural resources, topography, geology, soils, water resources, and biological resources. The EIS also addresses potential cumulative impacts that may result from reasonably foreseeable projects in the region, including other disposal or realignment actions.

This EIS addresses impacts based on a phased (5-, 10-, 15-, and 20-year) build-out of the approved Reuse Master Plan and assumptions regarding foreseeable reuse of the property.

ES.4 Cooperating Agency

The Navy is the lead agency for the proposed action, with the FAA serving as a cooperating agency. As a cooperating agency, the FAA has participated in the review of draft versions of the EIS and provided technical expertise. The FAA has the option of adopting this EIS for any major federal actions it takes as a result of this project. The FAA could then issue its own Record of Decision without recirculation of this EIS.

ES.5 Alternatives Considered in the EIS

The proposed action is the disposal of NAS Brunswick in a manner consistent with the Reuse Master Plan. The primary approach to development of the proposed action and alternatives was to (1) focus on the Navy's disposal of surplus property with the Reuse Master Plan as the reasonably foreseeable reuse of the property and then (2) consider a range of reasonable disposal alternatives and assess the human and natural environmental effects in the context of the reasonably foreseeable reuse of the property.

To access the potential impacts of the proposed action, the Navy evaluated two property disposal and build alternatives—Alternative 1 and Alternative 2—and the No-Action Alternative. These alternatives are described below.

Alternative 1 (Preferred Alternative)

Alternative 1 includes the disposal of NAS Brunswick by the Navy in a manner consistent with the Reuse Master Plan. This alternative has been identified as the preferred alternative by the Navy. Full build-out of Alternative 1 is proposed to

be implemented over a 20-year period. Alternative 1 calls for the development of approximately 1,630 acres (51%). In addition, approximately 1,570 acres (49%) would be dedicated to a variety of active and passive uses, including recreation, open space, and natural areas. This alternative is based upon reuse of the existing airfield and its supporting infrastructure, a mix of land use types and densities, and the preservation of open space and natural areas.

Under Alternative 1, the McKeen Street Housing Annex would remain residential, and the East Brunswick Radio Transmitter Site would be utilized as recreational, open space, and natural areas. The Sabino Hill Rake Station property would be utilized for parks and recreation.

Alternative 2

Alternative 2 provides for disposal of NAS Brunswick and its outlying properties by the Navy with a higher density of residential and community mixed-use development. This alternative does not have an airfield component or the Airport Operations, Aviation-related Business, and Professional Office land use districts that are included in Alternative 1. However, office space is present under Alternative 2 within the Community-Mixed Use, Business and Technology Industries, and Educational land use districts. Full build-out of Alternative 2 would be implemented in stages over a 20-year period. The alternative calls for the development of approximately 1,580 acres (49%). In addition, approximately 1,620 acres (51%) would be dedicated to active and passive recreation, open spaces, and natural areas. This alternative is based upon a combination of the two non-airport alternatives originally developed by the BLRA.

Under Alternative 2, the McKeen Street Housing Annex would remain residential, and the East Brunswick Radio Transmitter Site would be utilized as recreational, open space, and natural areas. The Sabino Hill Rake Station property would be utilized for parks and recreation. The reuse of these properties is the same under Alternative 1 and Alternative 2.

No-Action Alternative

The No-Action Alternative is the retention of the NAS Brunswick property by the U.S. government in caretaker status. No reuse or redevelopment would occur at the installation under this alternative. The existing Public Private Venture (PPV) residential housing would be expected to be occupied per the lease agreement. The No-Action Alternative is evaluated in this EIS as prescribed by CEQ regulations.

ES.6 Summary of Potential Environmental Consequences

The EIS examines the potential human and natural environmental consequences of the proposed action and any impacts associated with the reasonably foreseeable reuse of the property. Potential environmental impacts associated with Alternative 1, Alternative 2, and the No-Action Alternative are discussed below.

Land Use

Alternatives 1 and 2 would both result in changes to existing land use conditions on the installation, including a more intensively built environment; new land uses (i.e., professional office district); and open public access to the formerly secure and restricted military property. The local government would also be responsible for providing municipal services (i.e., education, police, and fire protection) and administration (i.e., land use zoning) of the former federal property.

Alternative 1, the preferred alternative, is consistent with the objectives of the *Town of Brunswick 2008 Comprehensive Master Plan* and *Zoning Ordinance*.

Alternative 2 would conflict with the locally developed *Brunswick Naval Air Station Reuse Master Plan* and with the land use regulations identified in the amended Town of Brunswick Zoning Ordinance. Alternative 2 would require a reevaluation of the Town's zoning ordinance. The No-Action Alternative would result in property being left unused or underutilized.

Socioeconomics

Population. At full build-out, considering losses due to the disposal of NAS Brunswick and projected population gains from reuse of the property, Alternative 1 would result in a net increase of 127 individuals in the Brunswick Labor Market Area (LMA) over existing (2008) baseline conditions. Alternative 2 would result in a net gain of 9,545 individuals in the Brunswick LMA. The No-Action Alternative would have the greatest population impact, with a net loss of 3,607 individuals. The estimated off-base, indirect employment impacts associated with the redevelopment are not expected to significantly change the overall population of the Brunswick LMA.

Income and Employment. Initial disposal of NAS Brunswick under either Alternatives 1 or 2 would result in a short-term reduction of income and employment, which would be mitigated through construction spending and new development. This includes positive short-term construction-related spending and long-term new business development. There would also be off-base indirect and induced impacts on employment and income resulting from both the short-term construction spending and the long-term build-out and repopulation of the installation

The No-Action Alternative would result in the loss of income and employment due to disposal of NAS Brunswick.

Housing. Alternative 1 would provide a maximum of 2,946 housing units, while Alternative 2 could result in a maximum of 8,220 housing units. Under the No-Action Alternative, the existing 573 Public Private Venture (PPV) housing units would continue to be occupied, per the lease agreement. Under each of the alternatives, there is the potential for short-term impacts due to the closure of NAS Brunswick, which would involve an initial loss of population and an increase in the housing supply. However, these impacts would be mitigated by the anticipated population growth and redevelopment of the property at full build-out. Un-

der the No-Action Alternative, it is expected that all PPV housing units will be reoccupied by the non-military population by 2031.

Taxes and Revenue. Currently, the installation is comprised of non-taxable federal property. Under both Alternatives 1 and 2, property not transferred to other federal agencies, would transfer from the Navy to the future property owner, and reuse of the property would be subject to local property taxes. Even though specific uses and tax rates have not yet been defined, it is expected that reuse of the installation would generate new property tax revenue for the Town of Brunswick. Under the No-Action Alternative, there would be no transfer of federal land, and there would be no increase in the tax revenue generated by reuse.

Environmental Justice. There would be no disproportionately high and adverse human health or environmental effect on minority or low-income populations. There are small pockets of low-income populations within both the town of Brunswick and the Brunswick LMA; however, they do not constitute an environmental justice community as defined by EPA or necessitate further analysis when measured against the community of comparison (State of Maine). In addition, there are no specific human health-related impacts that would adversely or disproportionately effect the surrounding population.

Community Facilities and Services

Educational Facilities. Alternative 1 is projected to result in a net loss of 250 school students from existing (2008) baseline conditions. Alternative 2 is projected to result in a net gain of 751 school students, and the No-Action Alternative is projected to result in a net loss of 460 school students. Any growth in the school-aged population would be offset by the capacity created by the loss of military-dependent students. However, Alternative 2 would be expected to require an expansion in school system capacity. In the short-term the Brunswick School District would lose any Federal Impact Aid received for providing educational services to military dependant students. In the long-term, reuse of the installation would expand the municipal tax base, offsetting a loss of Federal Impact Aid and any expenses associated with providing educational services to new students living on the prior installation property.

Healthcare and Medical Services. Alternative 1 would result in an increased demand on local and regional healthcare and medical services. Alternative 2 would have the greatest impact, potentially resulting in a greater increase in demand for local and regional healthcare and medical services. The No-Action Alternative would not result in an adverse impact on local and regional healthcare and medical services.

Public Safety and Emergency Services. The Town of Brunswick Police and Fire Departments would be expected to expand their respective service areas to meet additional demands associated with reuse under Alternatives 1 and 2. In the long-term, reuse of the installation would expand the municipal tax base, offsetting costs associated with an expansion of municipal services. The Town of

Brunswick Police and Fire Departments' responsibility for safety and emergency services will remain unchanged under the No-Action Alternative.

Parks and Recreation. Alternatives 1 and 2 would result an increase in recreational, open space, conservation, and natural areas located in the town of Brunswick. New recreation, park, and conservation space would represent a beneficial impact in the availability of such facilities to the neighboring communities. Under the No-Action Alternative, no new parks or recreational facilities would be developed, and there would be no public use of existing recreational amenities, including ball fields, hiking trails, and the golf course.

Transportation

Both Alternatives 1 and 2 would open the formerly secure military installation to public access and would be expected to increase total weekday traffic near the installation. Existing vehicle trips on roadways adjacent to the installation during the P.M. peak hour is 1,257 trips. At full build-out under Alternative 1, it is projected that 6,474 vehicle trips (an increase of 5,217 vehicle trips) would occur during the P.M. peak hour on adjacent roadways and a total of 10,593 vehicle trips (an increase of 9,336 vehicle trips) would occur at full build-out under Alternative 2. The No-Action Alternative is projected to result in a total of 210 vehicle trips on roadways adjacent to the installation during the P.M. peak hour (1,047 fewer vehicle trips).

The traffic analysis consisted of an examination of a scenario where the proposed Route 1 Connector project is constructed and a scenario where the connector project is not constructed; the latter results in several road segments and intersections in the vicinity of the installation failing level of service ratings.

No significant impact would be expected on the level of service (LOS) of the adjacent roadway system, assuming implementation of appropriate mitigation. Traffic conditions (i.e., LOS) would be expected to improve over existing conditions. However, one intersection at Bath Road and Jordan Avenue is projected to have an LOS rating of "F" upon the full build-out of Alternative 2. Only short-term construction-related traffic impacts would be expected with the implementation of Alternatives 1 or 2. The No-Action Alternative would have no construction-related impacts.

Environmental Management

Hazardous Waste and Materials. Under both Alternatives 1 and 2, it would be expected that that the quantity of hazardous materials used/generated, stored, and disposed of would be less than the quantity generated during the Navy's operation at NAS Brunswick and the outlying properties. Under the No-Action Alternative, the property would be retained by the U.S. Government in caretaker status. The Navy would close all facilities in accordance with Resource Conservation and Recovery Act (RCRA) standards and other applicable federal and state standards.

Environmental Restoration Program. The Navy would continue in its role as lead agency for site investigations and remediation, with oversight by the U.S.

Environmental Protection Agency and Maine Department of Environmental Protection (MEDEP), at all sites identified through the Environmental Restoration Program. Currently, planned cleanup activities at all Environmental Restoration Program sites would continue in order to achieve the cleanup standards established under RCRA, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the Superfund Amendments and Reauthorization Act (SARA).

Air Quality

Construction Emissions. Construction-related air emissions for the build-out under both Alternatives 1 and 2 would be short-term and primarily occur within the boundaries of NAS Brunswick. The No-Action Alternative would have no construction-related impacts on air quality since no new construction would take place.

Total Emissions. Both Alternatives 1 and 2 would potentially result in an increase in emissions upon full build-out. Under Alternative 1, it is expected that VOC, NO_X, and PM_{10}/$PM_{2.5}$ emissions would be reduced due to the discontinuation of Navy aircraft operations and maintenance. However, CO and SO_2 emissions would be expected to increase, primarily due to the use of heating fuels for the large residential development, emissions from the new aircraft, and vehicle use. Alternative 2 would be expected to result in a greater increase in emissions than Alternative 1. It is estimated that VOC, PM_{10}, and $PM_{2.5}$ emissions would be reduced under this alternative due to the discontinuation of aircraft operations and associated maintenance. However, NO_X, CO, and SO_2 emissions would be expected to increase, the result of an increase in the use of energy in buildings and vehicle use. Under the No-Action Alternative, air emissions would be reduced for all criteria pollutants, representing a beneficial impact on air quality.

Greenhouse Gas Emissions. The operation of stationary and mobile sources using fossil fuels for both Alternatives 1 and 2 would result in an increase of greenhouse gas (GHG) emissions, mostly as carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Under Alternative 1, the total GHG emissions would represent a small percentage of total emissions from the U.S. (0.0018%) or the State of Maine (0.6%). Under Alternative 2, the total GHG emissions would also represent a small percentage of total emissions from the U.S. (0.0031%) or the State of Maine (1.0%). The No-Action Alternative would result in a reduction of all criteria pollutant air emissions, including GHG emissions, representing a beneficial impact on air quality.

Noise

Under Alternative 1, annual aircraft operations are projected to increase to 45,500 operations per year, up from 24,709 operations in 2008. Noise associated with future aircraft operations would not be expected to have a significant impact on resources located outside of the airfield operations area. While the number of annual operations is projected to increase, the noise impact from aircraft operations is expected to decrease compared to existing conditions. This is because the majority of future aircraft operations are assumed to involve smaller, quieter aircraft

as opposed to the large military aircraft (e.g., P-3C Orion) that currently operate at NAS Brunswick. There is no aviation reuse component under Alternative 2 and the No-Action Alternative. Alternatives 1 and 2 would both be expected to result in short-term construction-related noise impacts, which would be managed to meet local noise standards. No traffic noise impacts would be expected.

Infrastructure

Water Supply. Under Alternatives 1 and 2, water demand would be expected to exceed existing demand. Alternative 1 is projected to result in a net increase of 1.10 million gallons per day (gpd) over existing (2008) baseline conditions. The existing Brunswick Topsham Water District (BTWD) system is expected to have sufficient capacity to meet any future water supply demands associated with Alternative 1. Alternative 2 would result in a net increase of 2.65 million gpd over existing (2008) conditions, requiring a small increase in district capacity (70,000 gpd). Both alternatives would require upgrading the existing water supply infrastructure on the installation to meet BTWD and Town of Brunswick standards. Under the No-Action Alternative, no reuse or redevelopment would occur at the installation; thus, the No-Action Alternative would have no impact.

Wastewater. Upon full build-out, Alternatives 1 and 2 would require an expansion of the Brunswick Sewer District's treatment processing and intake infrastructure. At full build-out, Alternative 1 is projected to generate a net increase of 872,153 gpd of wastewater and Alternative 2 would generate a net increase of 2.27 million gpd. Currently, the Brunswick Sewer District does not have the capacity to sufficiently process the projected volume of wastewater that would be generated by either alternative. Both alternatives would require an upgrade of the installation's existing wastewater system and construction of new wastewater infrastructure. Under the No-Action Alternative, no reuse or redevelopment would occur at the installation; thus, there would be no impact.

Storm Water. Full build-out of Alternative 1 is projected to result in a total of 859 acres of impervious surface area (27% of total land area), which would be predominately comprised of building roofs, parking areas, and roadways. This would be a net increase of approximately 343 acres over the existing (2008) baseline condition (516 acres, or 16% of total land area). This represents an 11% increase in total impervious surface area. Full build-out of Alternative 2 is projected to result in a total of 944 acres of impervious surface area (30% of total land area), which would be predominately comprised of building roofs, parking areas, and roadways. This would be a net increase of approximately 428 acres over existing (2008) baseline conditions (516 acres, or 16% of total land area), representing a 14% increase in the total impervious surface area.

Any impacts would be mitigated by the developer through storm water management. The developer of the installation will be required to prepare a storm water management plan to control the volume and quality of storm water runoff in a manner consistent with MEDEP storm water management policy. The developer will also be required to implement best management practices (BMPs) during construction activities to control the release of storm water runoff from exposed

construction sites. Under the No-Action Alternative, no reuse or redevelopment would occur at the installation; thus, there would be no impact.

Other Utility Systems. Under Alternatives 1 and 2, it would be expected that the electric and gas utility infrastructure systems on the installation would need to be either expanded or relocated to accommodate the final design at full build-out. Under the No-Action Alternative, no reuse or redevelopment would occur at the installation; thus, there would be no impact.

Cultural Resources

There would be an adverse effect on cultural resources under both Alternatives 1 and 2, but the adverse effect would be mitigated through the implementation of a Programmatic Agreement (PA) titled *Programmatic Agreement Between the United States Navy and the Maine State Historic Preservation Officer (SHPO) on the Lease and Property Transfer of Properties Located at Naval Air Station Brunswick, Maine and Topsham Annex, Topsham, Maine,* dated September 2010 (U.S. Navy 2010) (see Appendix O). Under the No-Action Alternative, no reuse or redevelopment would occur at the installation; thus, there would be no effect.

Topography, Geology, and Soils

Soils would be impacted under both Alternatives 1 and 2, but the impacts would be mitigated through the implementation of erosion and sediment control measures, storm water management measures, and appropriate building site location and design. Under the No-Action Alternative, no reuse or redevelopment would occur at the installation; thus, there would be no impact.

Water Resources

Under Alternatives 1 and 2, redevelopment of the property would not significantly impact surface water during construction or operation, based on planning efforts to minimize disturbance of surface waters and the developers' adherence to federal and state regulations and use of appropriate BMPs. Under Alternative 2, the 0.6-mile portion of Mere Brook that currently flows through culverts under the runways would be incorporated into the natural areas land use district. Under this alternative, the culverts could be removed and the stream banks and channel could be restored to their natural state. Therefore, implementation of Alternative 2 could result in beneficial impacts on some surface water resources.

It would be expected that Alternatives 1 and 2 would have no significant impact on groundwater and floodplains. Under Alternative 1, 338 acres of wetlands (located around Harpswell Cove and Buttermilk Cove) would be excluded from future development. An additional 51 acres of wetlands scattered throughout the property could be potentially impacted by future development. Under Alternative 2, 265 acres of wetlands would be preserved. An additional 124 acres of wetlands scattered throughout the property could be potentially impacted by future development. Any wetland disturbance resulting from implementation of Alternatives 1 or 2 would require that the developer obtain a permit from the MEDEP and the U.S. Army Corps of Engineers. In addition, per the Maine Natural Resources Protection Act (NRPA), any encroachment within a 75-foot buffer around a wetland would require a permit. In accordance with the Clean Water Act and NRPA,

wetland alterations must be avoided where possible. Compensation (mitigation) may be required for any lost functions and values of the wetlands. The No-Action Alternative would not impact water resources.

Biological Resources

Vegetation. At full build-out under Alternative 1, 1,146 acres of undeveloped land, including 690 acres of upland forest, could be affected, and 25 acres of critically imperiled Sandplain Grassland and 46 acres of maintained grass could be developed. A total of 1,060 acres would be preserved. Under Alternative 2, 1,068 acres of undeveloped land, including 578 acres of upland forest, could be removed, and 65 acres of critically imperiled Sandplain Grassland and 301 acres of maintained grass could be developed. A total of 1,280 acres would be preserved. Any party proposing development or other land disturbance in the districts containing the Sandplain Grassland would be required to consult with the Maine Department of Inland Fisheries and Wildlife (MDIFW) and Maine Natural Areas Program (MNAP) to receive the appropriate permits and clearances.

The McKeen Street Housing Annex would remain residential. Any redevelopment of this site would primarily impact existing maintained lawn and landscaped areas. At the East Brunswick Radio Transmitter Site, 66 acres of critically imperiled Sandplain Grassland could be impacted under Alternatives 1 and 2. Any party proposing development or other land disturbance in the Sandplain Grassland would be required to consult with MDIFW and MNAP to receive the appropriate permits and clearances. At the Sabino Hill Rake Station, all 0.23 acre would be impacted under Alternatives 1 and 2, as it would become a gravel parking lot.

Under the No-Action Alternative, vegetation maintenance would be limited to prevention of fire hazards and damage to buildings and utility lines. The grassland habitat surrounding the airfield would no longer be maintained as part of the BASH management program, but would be mowed once annually according to *The Department of the Navy Base Realignment and Closure Implementation Guidance* (DoN 2007), which would maintain the grassland habitat. There would be no impact on vegetation at the McKeen Street Housing Annex. The grassland habitat at the East Brunswick Transmitter site would not be maintained and would eventually succeed into forest. The Sabino Hill Rake Station would eventually integrate into the adjacent Oak-Pine Woodland.

Wildlife. Under Alternatives 1 and 2, small terrestrial mammals, amphibians, and reptiles could be potentially impacted during construction. Upon completion of construction, recolonization would be expected. Alternative 1 could result in the permanent removal of approximately 25 acres of critically imperiled Sandplain Grassland, which is important habitat for several rare bird species, including the state-listed grasshopper sparrow. Any party proposing development or other land disturbance in this habitat would be required to consult with MDIFW and MNAP. Alternative 2 could result in a significant impact on important bird areas, as 366 acres of grassland habitat, including 301 acres of maintained short grass areas around the runways and 65 acres of critically imperiled Sandplain Grassland could be removed, as the bird strike hazard program would no longer be needed

when airfield operations cease. The Sandplain Grassland community is important habitat for several rare bird species including the state-listed grasshopper sparrow. Any party proposing development or other land disturbance in this habitat would be required to consult with MDIFW and MNAP. In the long-term, the No-Action Alternative would likely result in an increase in wildlife abundance due to decreased human activity. Diversity would likely remain constant as the variety of habitats at the installation would be maintained. Although Alternatives 1 and 2 may impact small numbers of migratory bird species through loss or mortality of young during construction activities and loss of habitat, neither alternative would result in significant adverse effects on populations of migratory bird species covered under the Migratory Bird Treaty Act (MBTA). None of the alternatives would be expected to have a significant impact on aquatic wildlife or essential fish habitat.

Threatened or Endangered Species. No federally listed threatened or endangered species are located on NAS Brunswick or its outlying properties. Three state-listed species are present: the upland sandpiper, the grasshopper sparrow, and the clothed sedge. Under Alternative 1, up to approximately 25 acres of critically imperiled Sandplain Grassland habitat, or approximately 12% of the total available Sandplain Grassland habitat on the installation, may be permanently removed to develop the professional office, education, and aviation-related uses land use districts. Any party proposing development or other land disturbance in these districts would be required to consult with the Maine Natural Areas Program to receive the appropriate permits and clearances. Under Alternative 2, a potentially significant impact on the grasshopper sparrow and state species of concern (e.g., Horned Lark, Prairie Warbler, and Eastern Meadowlark) could occur, as 366 acres of grassland habitat, including identified grasshopper sparrow breeding habitat, could be permanently removed. The No-Action Alternative would not impact state-listed threatened or endangered species as the grassland habitat around the airfield would be maintained through annual mowing.

Bald and Golden Eagle Protection Act. None of the alternatives would impact nesting and foraging areas.

Significant Wildlife Habitat. The MDIFW has identified Significant Wildlife Habitat at NAS Brunswick, including threatened and endangered species habitats, tidal waterfowl and wading bird habitats, and deer wintering areas.

Threatened and Endangered Species Habitats. Under Alternative 1, it is expected that impacts on most of the grassland habitat would be avoided by continued use of the airfield and management of the airfield Clear Zones by the future airport operator. Furthermore, the developer would be required to obtain a permit from the MEDEP under NRPA for any potential development plans within this grassland habitat. Under Alternative 2, the loss of up to approximately 366 acres of grassland habitat would result in the reduction of breeding pairs of grasshopper sparrows and upland sandpipers and the possible extirpation of both species from the installation. Under the NRPA, the developer would be required to obtain a permit from the MEDEP for any proposed development plans within the grassland habitat. Under the No-Action Alternative, the grassland habitat around the

airfield supporting the state-listed threatened and endangered species would be maintained through annual mowing, resulting in no impact.

Vernal Pools. Significant vernal pools (i.e., those that support a certain abundance of indicator species [i.e., wood frogs, spotted salamander, blue-spotted salamander, or fairy shrimp] or support a threatened, endangered, or rare species for a critical part of its life history) are also protected as Significant Wildlife Habitat. Thirty significant vernal pools were recently identified on NAS Brunswick. Under Alternative 1, 15 of these significant vernal pools are located within the professional office, business and technology industries, community mixed use, recreation/open space, and educational/natural areas districts. Thirteen significant vernal pools are located in the natural area districts and would be preserved from future development. The remaining two significant vernal pools are located in a parcel which will be transferred to the Department of the Army. Impacts to these pools will be analyzed in separate Army NEPA documentation following property transfer.

Under Alternative 2, 12 significant vernal pools are located within the proposed professional office, business and technology industries, community mixed use, recreation/open space, and educational/natural areas districts. Sixteen significant vernal pools are located in the natural area districts and would be preserved from future development. The remaining two significant vernal pools are located in a parcel which will be transferred to the Department of the Army. Impacts to these pools will be analyzed in separate Army NEPA documentation following property transfer. There would be no impact on significant vernal pools under the No Action Alternative.

The filling in of vernal pools during development or the loss of the forested buffer around a given pool for the terrestrial portion of an amphibian's life cycle would lead to the loss of amphibian populations in a given area. The developer would likely avoid these pools or, alternatively, be required to perform further surveys and consult with the MEDEP and USACE. The MEDEP regulates vernal pools up to 500 feet from the edge of the pool depression, while the USACE regulates vernal pools up to 750 feet from the edge of the pool depression. An NRPA permit would be required prior to impacting a vernal pool or constructing within the regulated buffer. The consultation process and the requirement for obtaining an NRPA permit would result in avoiding, minimizing, or mitigating any impacts on vernal pools or significant vernal pools.

Deer Wintering Area. Under Alternative 1, the mapped deer wintering area is located within the proposed open space/recreation district. Development of the 18-hole golf course in this district would likely remove a portion of the deer wintering area on the property. Prior to impacting this area, the developer would be required to consult with the MEDEP. An NRPA permit would be required prior to clearing any portion of the deer wintering area. Under Alternative 2, the mapped deer wintering area is located within the proposed open space/recreation and natural areas districts. It is expected that sensitive natural resource habitats within these districts, such as the deer wintering area, would be avoided by the developer. Currently, the wintering area is bisected by a high perimeter fence de-

lineating the installation's boundary. It is anticipated that this fence would be removed as part of the installation's reuse, thereby joining the two fragmented habitats and having a positive affect on the wintering area.

Waterfowl and Wading Bird Habitat. Under Alternatives 1 and 2, the tidal waterfowl and wading bird habitat located at the southern end of the installation would be preserved as a natural area; therefore, this habitat would not be impacted.

ES.7 Summary of Potential Cumulative Impacts

Potential cumulative impacts that could result from the disposal of NAS Brunswick, the McKeen Housing Annex, and the East Brunswick Radio Transmitter Site were analyzed. Under all alternatives, no new buildings or residential units would be constructed at the Sabino Hill Rake Station; therefore, this property was not included in the cumulative impacts analysis. Research, literature reviews, and contacts with applicable government and non-government agencies were used to identify reasonably foreseeable actions, determine the geographic range and timeframe of implementation, and assess potential cumulative impacts by resource area.

Three federal transfers were examined in the cumulative impacts analysis. The U.S. Army, U.S. Coast Guard, and FAA collectively received 72 acres of installation property through the BRAC process. Other federal actions analyzed include the disposal and reuse of the Topsham Annex, the removal of the Casco Bay pipeline and the Downeaster Expansion project. Foreseeable future actions in the Town of Brunswick included: Stowe Elementary School, McKeen Street; safe routes to school; Brunswick Maine Street Station redevelopment; 9 Industrial Parkway redevelopment; Brunswick nursing home; and the Brunswick Commerce Center. A Maine Department of Transportation project (I-295 construction from Brunswick to Gardiner) was also included in the analysis. In addition, the Reuse Master Plan suggests future projects reliant on the reuse of NAS Brunswick, and these projects were included in the cumulative impact analysis. These projects included: the U.S. Route 1 access roadway, a passenger/freight rail spur, relocation of the Main Gate access, a new access to Bath Road, widening of Bath Road, and the primary access on Forrestal Drive.

Cumulative Impacts were examined for the following resource areas: socioeconomics (population, income and employment, housing, and taxes and revenue); community facilities and services (education, healthcare and medical facilities, public safety and emergency services, and parks and recreation); transportation; air quality (construction emissions, building use emissions, mobile sources, and GHG emissions); water resources; and biological resources (vegetation, wildlife, threatened or endangered species, and significant wildlife habitat). Cumulative impacts were found to be significant for biological resources, due to impacts on the critically imperiled Little Bluestem-Blueberry Sandplain Grassland community and the state-listed threatened and endangered species the community supports. Cumulative impacts on the remaining resource areas analyzed were offset by differing geographic area or duration of the build-out, or reduced due to

regulatory requirements or mitigation measures, leading to no significant cumulative impacts. Beneficial cumulative impacts, including job creation and tax generation, could be realized. More details on the cumulative impact analysis process and findings are presented in Section 5.

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List of Abbreviations and Acronyms

AMSL	above mean sea level
ASR-8	airport surveillance radar-8
ATC	airport traffic control
BASH	Bird Aircraft Strike Hazard
BLRA	Brunswick Local Redevelopment Authority
BRAC Closure Law	Defense Base Closure and Realignment Act
BRAC PMO	BRAC Program Management Office
BRAC	Base Realignment and Closure
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CWA	Clean Water Act
DEIS	Draft Environmental Impact Statement
DoD	U.S. Department of Defense
E & E	Ecology and Environment, Inc.
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EISA	Energy Independence and Security Act
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Difference
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
FRA	Federal Railroad Administration
INRMP	Integrated Natural Resources Management Plan

List of Abbreviations and Acronyms (cont.)

LRA	Local Redevelopment Authority
MDEP	Maine Department of Environmental Protection
MDIFW	Maine Department of Inland Fisheries and Wildlife
MEARNG	Maine Army National Guard
MESA	Maine Endangered Species Act
MNAP	Maine Natural Areas Program
MNRPA	Maine Natural Resources Protection Act
MRRA	Midcoast Regional Redevelopment Authority
NAS	Naval Air Station
Navy	U.S. Department of the Navy
NBHC	Naval Branch Health Clinic
NEPA	National Environmental Policy Act
NHCNE	Naval Health Clinic New England
NHPA	National Historic Preservation Act
NLCD	National Land Cover Data
NNEPRA	Northern New England Passenger Rail Authority
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
PBC	public benefit conveyance
ppt	parts per thousand
PPV	Public Private Venture
RAPCON	radar approach control
RCRA	Resource Conservation and Recovery Act
Reuse Plan	Brunswick Naval Air Station Reuse Master Plan
ROD	Record of Decision
RONA	Record of Non-Applicability
RPZ	runway protection zone
RTR	remote transmitter/receiver

List of Abbreviations and Acronyms (cont.)

SIP	State Implementation Plan
SLDA	Site Location of Development Act
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USMCR	U.S. Marine Corps Reserve

1 Purpose of and Need for the Proposed Action

The U.S. Department of the Navy (Navy) is required to close Naval Air Station (NAS) Brunswick, Maine, in accordance with Public Law 101-510, the Defense Base Closure and Realignment Act of 1990, as amended in 2005 (BRAC Closure Law).

The proposed action is the disposal of NAS Brunswick, including the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and the Sabino Hill Rake Station by the Navy in a manner consistent with the *Brunswick Naval Air Station Reuse Master Plan* (Reuse Master Plan). This Environmental Impact Statement (EIS) evaluates the potential human and natural environmental consequences of the disposal and redevelopment of the property and any impacts associated with the reasonably foreseeable reuse of the property. The decision to close NAS Brunswick has been made and is not part of the NEPA process.

The EIS was prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, as amended; the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] 1500-1508); and Navy procedures for implementing NEPA (32 CFR 775). The Navy is the lead agency for the proposed action, with the Federal Aviation Administration (FAA) serving as a cooperating agency.

1.1 Purpose and Need

The purpose of the proposed action is to provide for the disposal of NAS Brunswick, the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station by the Navy in a manner consistent with the Reuse Master Plan. The need for the proposed action is to provide the local communities the opportunity for economic development and job creation.

1.2 Background

NAS Brunswick is situated on approximately 3,137 acres in the town of Brunswick, Cumberland County, Maine. The facility is approximately 27 miles northeast of Portland and 31 miles south of Augusta, the state capital. The main gate is located on Bath Road, approximately 2 miles east of the downtown Brunswick business district. Several properties managed by NAS Brunswick are also impacted by the BRAC decision (see Figure 1-1), including:

- Topsham Annex (74 acres, Topsham, Maine)
- McKeen Street Housing Annex (70 acres, Brunswick, Maine)
- East Brunswick Radio Transmitter Site (66 acres, Brunswick, Maine)
- Sabino Hill Rake Station (0.23 acre, Phippsburg, Maine)
- Small Point Rake Station (0.23 acre, Phippsburg, Maine)

This EIS examines only the disposal of NAS Brunswick, the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station. A separate environmental assessment (EA) has been prepared to address potential impacts resulting from the disposal of the Topsham Annex. This action was considered a separate NEPA action because the reuse plan was prepared by the Topsham Local Redevelopment Authority, whereas the Brunswick Local Redevelopment Authority prepared the Brunswick Reuse Master Plan. Subsequently, the Midcoast Regional Redevelopment Authority assumed responsibility for both reuse plans. The Small Point Rake Station property will revert to the previous landowner and is not included in this EIS. See Section 1.6 for further definition of the scope of this EIS.

The site of the present NAS Brunswick was originally a municipal airfield constructed in the mid-1930s. The Navy acquired the airfield in response to World War II, and NAS Brunswick was commissioned on April 15, 1943. During World War II, NAS Brunswick provided air and surface patrols in the Atlantic to protect the coast of the United States. After World War II ended in 1945, the Station was placed in caretaker status, and facilities on the station were leased to a variety of organizations, including Bowdoin College, the University of Maine, and the town of Brunswick. In 1951, the station was recommissioned to support regular operations of fleet reconnaissance and anti-submarine aircraft. As a result, NAS Brunswick's facilities were expanded, including the construction of the two 8,000-foot runways, which still exist. Since the late 1950s, the station's aircraft have continued to conduct patrols over the North Atlantic using the P3-Orion aircraft.

The current mission of NAS Brunswick is to provide facilities, services, and materials to support the various activities of its tenants and support units. As of 2008, the primary tenant located at NAS Brunswick has been Patrol and Reconnaissance Wing Five, which includes four squadrons of P-3 aircraft and a squadron of C-130 aircraft. Other large tenant organizations include Naval Air Reserve Brunswick, Fleet Aviation Specialized Operational Training Group Atlantic Fleet, the Navy Medical and Dental Clinic, and Naval Mobile Construction Battalion 27 (U.S. Navy 2002a).

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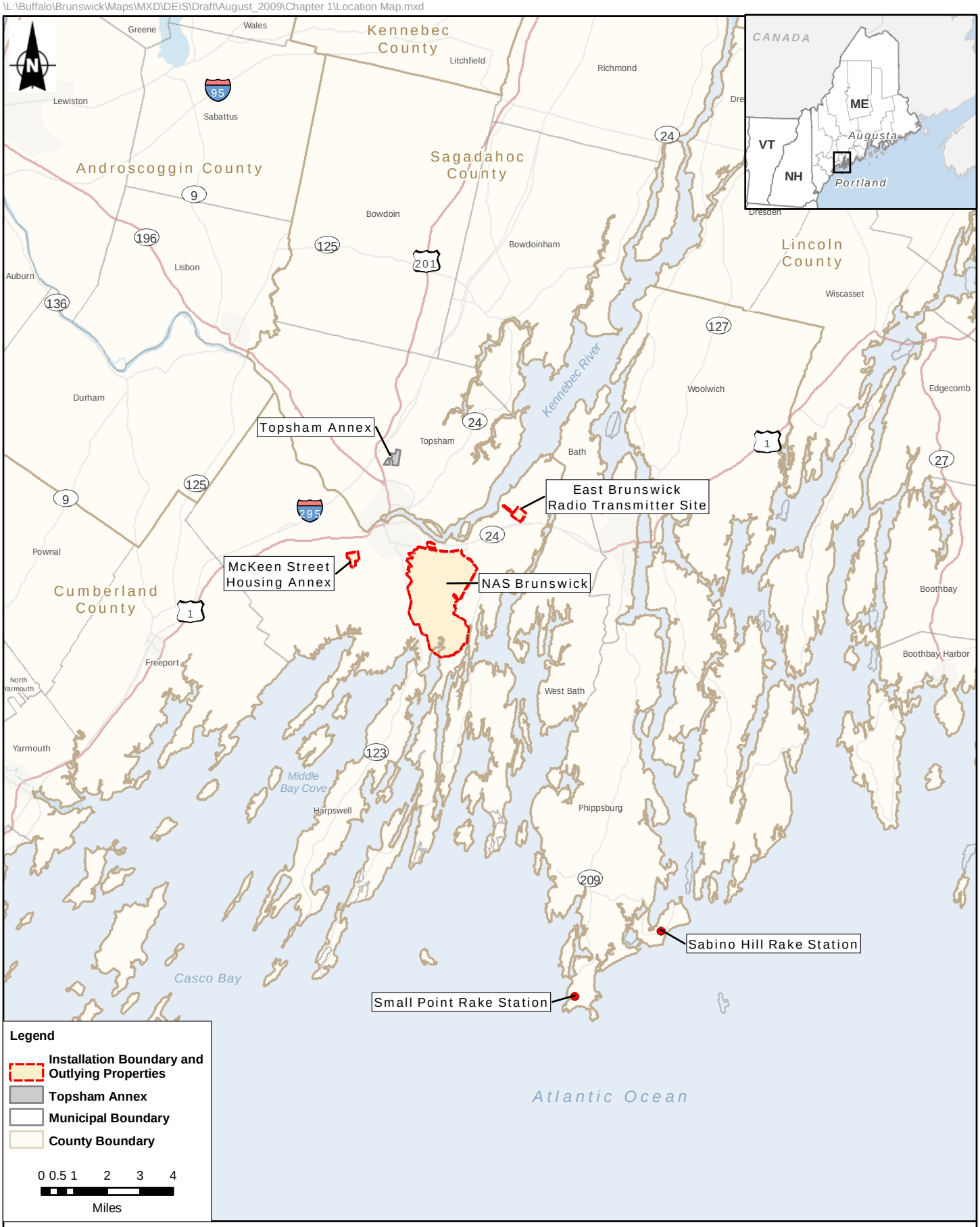


Figure 1-1
Location Map
NAS Brunswick and Outlying Properties
NAS Brunswick, Maine

1.3 BRAC Process

Base Closure and Realignment (BRAC) is the process used by the Department of Defense (DoD) to reorganize its installation infrastructure to more efficiently and effectively support its forces, increase operational readiness, and facilitate new ways of doing business. The BRAC process is established by the provisions of Title II of the Defense Authorization Amendments and Base Closure and Realignment Act, Public Law 100-526, and the BRAC Closure Law.

Congress authorized a 2005 round of BRAC by amending the BRAC Closure Law of 1990. The amendment created the 2005 BRAC Commission and a timetable for the 2005 BRAC decision-making process. The Commission conducted its analysis of DoD recommendations, held public hearings, and made recommendations to the President for closures and realignments, including the closure of NAS Brunswick. The President approved and forwarded this recommendation to Congress on September 15, 2005, which became effective as public law on November 9, 2005.

The approved 2005 BRAC Commission recommendation for the closure of NAS Brunswick is as follows: "Close Naval Air Station Brunswick, ME. Relocate its aircraft along with dedicated personnel, equipment, and support to Naval Air Station Jacksonville, FL. Consolidate Aviation Intermediate Maintenance with Fleet Readiness Center Southeast Jacksonville, FL" (Defense Base Closure and Realignment Commission 2005). To comply with the BRAC Closure Law, the installation must be closed on or before September 15, 2011.

1.4 Disposal Procedures

The Navy established the BRAC Program Management Office (Navy BRAC PMO) to oversee and manage the implementation of BRAC actions throughout the Navy. Under BRAC, the Navy acts as the disposal agency and employs the following procedures:

1.4.1 Phase 1: Base Redevelopment and Disposal Planning

Transfer and redevelopment planning is a multi-phase process, most of which is specified by law. For NAS Brunswick, Phase 1 began on November 9, 2005, when the recommendation to close the air station became law. The first step in the planning process involved offering the properties to federal agencies for reuse through a federal transfer process. As a result of the federal transfer process, approximately 72.2 acres have been or are planned to be transferred from the Navy to the following federal agencies:

- The Department of the Army (51.0 acres)
- U.S. Coast Guard (11.2 acres)
- The FAA (10.0 acres)

Following the federal transfers, the remaining property may be declared surplus and made available for reuse.

1.4.2 Phase 2: Surplus Property Disposal Decision Making

Phase 2 includes the Local Reuse Authority's (LRA's) redevelopment planning. The redevelopment plan is a critical component of the Navy's environmental analysis required by NEPA.

On August 25, 2005, the State of Maine established the Brunswick Local Redevelopment Authority (BLRA) to develop the reuse plan for the property (State of Maine 2005). On December 1, 2005, the BLRA was recognized by the Secretary of Defense as the entity responsible for preparing the redevelopment plan with respect to the installation. Over a two-year planning process that involved significant public participation, the BLRA developed the Reuse Master Plan. The Reuse Master Plan was adopted on December 19, 2007. Following adoption of the Reuse Master Plan, the BLRA was disbanded and the Midcoast Regional Redevelopment Authority (MRRA) was established by the State of Maine to acquire and manage the properties within the geographic boundaries of NAS Brunswick (State of Maine Sec. 1.5 MRSA c. 383, sub-c. 3, art. 2-B). The MRRA is also responsible for the implementation of the Reuse Master Plan, which is discussed in more detail in Section 2. Following adoption of the Reuse Master Plan, the Navy began the NEPA process, in this case, the preparation of an EIS.

1.4.3 Phase 3: Property Disposal

Upon completion of the NEPA process, the Navy will issue its final disposal decisions, and the redevelopment process will enter the implementation phase. This phase includes the Navy's conveyance of installation property (or property "disposal"). Any future development of properties not transferred to other federal agencies would need to be consistent with the Reuse Master Plan and would fall under the jurisdiction of the local government where the development is located. The use of land, the reuse of existing buildings and facilities, and the development of new buildings on NAS Brunswick, the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station would be regulated by the local government, its zoning ordinance, and other applicable plans and regulations.

1.5 The NEPA Process and Public Involvement

BRAC disposal actions are subject to compliance with NEPA, as implemented by CEQ regulations (40 CFR Parts 1500-1508). NEPA establishes an environmental review process for actions undertaken by federal agencies. The review process is intended to help public officials make decisions that are based on an understanding of environmental consequences and to take actions that protect, restore, and enhance the environment (40 CFR 1500.1). NEPA provides the means to carry out these goals by:

- Mandating that every federal agency prepare a detailed statement of the effects of "major Federal actions significantly affecting the quality of the human environment."

- Establishing the need for agencies to consider alternatives to those actions.

- Requiring the use of an interdisciplinary process to develop alternatives and analyze environmental effects.

- Requiring that each agency consult with and obtain comments from any federal agency that has jurisdiction, either by law or special expertise, with respect to any environmental impact involved.

- Requiring that detailed statements, comments, and views of the appropriate federal, state, tribal, and local agencies be made available to the public.

In accordance with NEPA, the Navy prepared this EIS for the disposal of NAS Brunswick, the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station. Before disposing of any real property, the Navy must analyze the environmental effects of the disposal of the NAS Brunswick property. The Navy has identified and considered the proposed action, which includes implementing the Reuse Master Plan, and has considered a reasonable range of alternatives to assess the environmental effects in the context of the reasonably foreseeable reuse of the property. This EIS analyzes the proposed property disposal and planned community redevelopment.

The NEPA process included the following steps:

1. The first step in the NEPA process was the publication of a Notice of Intent **(NOI)** in the *Federal Register*. The NOI was published on October 24, 2008, and provided basic information on the proposed action. The NOI formally opened the public scoping process.

2. **Public Scoping** included a public comment period and public scoping meetings. Comments received during the public scoping period were used to determine the scope of issues to be addressed in the EIS. Federal, state, and local expert agencies and members of the public were encouraged to provide comments on issues that need to be addressed in the EIS. The public scoping period began on October 24, 2008, and concluded on November 28, 2008, for a total of 35 calendar days. A public scoping notification letter was mailed to approximately 120 federal, state, and local expert agencies and members of the public. Media announcements for the public scoping period and public meetings dates and locations were published in regional newspapers (*Times Record, Portland Press Herald, Lewiston Sun Journal, and the Bangor Daily News*), on public radio (*Maine Public Broadcast Network Radio*), and on local public access television (*Brunswick TV3*).

   Two public scoping meetings were held in Brunswick, Cumberland County, Maine. The public scoping meetings were conducted in an open house format open to the general public. The public scoping meetings were used to inform the public on the EIS process, enable community members to ask questions, and solicit written comments regarding issues to be addressed in the EIS. The meetings featured displays, fact sheets, and interaction between Navy staff and the public. The meetings were scheduled as follows:

- Wednesday, November 12, 2008 (4 P.M. - 8 P.M.), Brunswick Junior High School Gymnasium, 65 Columbia Avenue, Brunswick, Maine 04011.

- Thursday, November 13, 2008 (10 A.M. - 2 P.M.), Brunswick Municipal Meeting Facility (Old High School), 44 McKeen Street, Brunswick, Maine 04011.

Based on comments received during the public scoping period, the scope of the EIS was modified to include an examination of greenhouse gases (GHGs), phased impacts, and an expanded analysis of vernal pools, wetlands, and state-listed threatened and endangered bird species.

3. The **Draft EIS (DEIS)** was prepared and made available for public review and comment. The DEIS documented the methodologies and analyses used to identify and assess potential impacts associated with implementing the preferred reuse plan and other alternatives, and presented the results of the assessment. The DEIS is supported by various environmental studies, including but not limited to bird and wetland surveys, a noise study, a socioeconomic analysis, vernal pool surveys, an ecological communities report, and a traffic study. Many of these supporting studies are provided as appendices to the DEIS and Final EIS (FEIS).

4. The **Public Comment Period** included **Public Information Sessions/Public Hearings**. This period provides stakeholders (including government agencies, special interest groups, and private citizens) the opportunity to review the DEIS and determine whether it adequately addresses environmental issues and/or the alternatives. Throughout the public comment period, comments on the DEIS were received and compiled for consideration during the preparation of the FEIS. During this period, the DEIS was made available to the public for comment for a minimum of 45 days. The public comment period began when the **Notice of Availability (NOA)** and **Notice of Public Hearings (NOPH)** were published in the *Federal Register* on May 4, 2010.

   Subsequent to the publishing of the NOA in the *Federal Register*, the Navy released several notifications that the NOA and NOPH had been issued and invited members of the pubic to comment on the DEIS. Specifically, the Navy sent notification letters to federal, state, and local government agencies; elected officials; and additional interested agencies, organizations, and individuals that had identified themselves by submitting comments during the scoping process or by requesting notification. The notifications included information contained in the NOA and the public information session/public hearing schedule (i.e., dates, times, and locations).

   Notification of the NOA's release and the public information session/public hearing schedule were published in local and regional papers (*Times Record*, *Portland Press Herald*, *Lewiston Sun Journal*, and *Bangor Daily News*) and advertised on public radio (*Maine Public Broadcasting Network*) and local access television (*Brunswick TV3*). These media announcements were published

the first weekend following the publishing of the NOA in the *Federal Register* and again during the week and weekend prior to the public information sessions/public hearings (see Table 1-1). The DEIS was also made available for public review at http://www.brunswickeis.com, and the Web site address was provided in the NOA and other announcements. The project Web site provided electronic copies of the DEIS, locations where electronic and paper copies of the DEIS were available locally, the public hearing schedule and locations, and options for members of the public to provide comments on the DEIS.

Table 1-1 Notification of Public Hearings Publication/Airing Schedule

Media Outlet	Publication/Airing Dates
The Times Record	May 7, 2010 May 28, 2010 June 1, 2010
Portland Press Herald	May 9, 2010 May 30, 2010 May 31, 2010
Lewiston Sun Journal	May 9, 2010 May 29, 2010 May 30, 2010
Bangor Daily News	May 8, 2010 May 29, 2010 May 31, 2010
Maine Public Broadcasting Network	May 27, 2010 through June 1, 2010
Brunswick TV3	May 25, 2010 through June 3, 2010

Two **Public Information Sessions/Public Hearings** were held in the Town of Brunswick, Cumberland County, Maine. The Public Information Session was conducted in an open house format and was open to the general public. The public information sessions were used to inform the public on the EIS process, present the DEIS findings, and enable community members to ask questions and solicit written comments on the DEIS. The meetings featured displays, fact sheets, and interaction between Navy staff and the public.

The Public Hearings were held in a town hall format and were also open to the general public. The public hearings were used to allow the public to verbally submit comments on the DEIS, which were recorded by a court reporter. The meetings were scheduled as follows:

- Wednesday, June 2, 2010 (**Information Session** – 4:30 P.M. to 6:30 P.M.; **Public Hearing** – 7:00 P.M. to 9:00 P.M.), Brunswick Jr. High School Gymnasium, 65 Columbia Avenue, Brunswick, Maine 04011.

- Thursday, June 3, 2010 (**Information Session** – 10:00 A.M. to 12:00 P.M.; **Public Hearing** – 12:30 P.M. to 2:30 P.M.), Town of Brunswick, Parks and Recreation Building, 30 Federal Street, Brunswick, Maine 04011.

The evening meeting was attended by 65 individuals and the daytime meeting was attended by 21 individuals. However, some chose to attend both meetings; thus, when accounting for attendance at multiple meetings, 80 unique individuals attended the meetings. At these sessions a total of seven individuals provided verbal comments and three individuals provided written comments.

In total during the public comment period that ended June 28, 2010, seven speakers provided verbal comments and 16 comment letters were received via mail, e-mail, fax, or comment sheet at the public hearings. The number of comment letters/statements received is summarized in Table 1-2.

Table 1-2 Summary of Comment Statements Received during the Public Comment Period

	Number of Comment Statements
Federal agencies	4
State agencies	3
Local government	2
Organizations	4
Concerned citizens	10
Total Comment Statements[1]	**23**

Note:
[1] A comment statement could include a comment letter received, verbal statements made during one of the two public hearings, or comment forms submitted.

The Navy reviewed the comment statements received and identified 153 comments within those statements that were addressed in the FEIS. Comments from members of the public and federal, state, and local agencies are summarized below and categorized by resource area addressed in the FEIS. (Some of the comments resulted in changes to or covered more than one resource area; as a result, the total below does not add up to 153.) Comments received during the public comment period, and the Navy's responses to those comments, are included in Appendix A. In addition, a summary of changes from the DEIS to the FEIS is presented in Section 1.9

- **Land Use (14 Comments).** Comments on land use included clarification on the aviation land use district, including specifications for the clear zone; corrections on the content of the Town of Brunswick zoning and comprehensive plan; clarification on uses of land transferred as a Public Benefit Conveyance (PBC); and the request for inclusion of summaries of addition land use plans (i.e., Gateway 1 Corridor Action Plan).

- **Socioeconomics (5 Comments).** Comments on socioeconomics included clarification of environmental justice; impacts on housing values; and the inclusion of indirect, off-base impacts on population, housing, and employment.

- **Transportation (26 Comments).** Transportation comments included the need for an analysis of the traffic conditions without the construction of the proposed US Route 1 Connector, comments on the number of access points, and the Level of Service (LOS) of existing routes.

- **Environmental Management (9 Comments).** Environmental management comments were made regarding the status and need for updates of the Environmental Restoration Program.

- **Air Quality (5 Comments).** Air quality comments included the need for a general conformity analysis for the future civilian airport under Alternative 1 and general air quality concerns due to redevelopment.

- **Noise and Flight Tracks (9 Comments).** Concern was expressed regarding noise levels outside of the aviation-related land use district; safety issues associated with the future civilian airport under Alternative 1; and the location of proposed future flight tracks.

- **Infrastructure (7 Comments).** Comments on infrastructure were made with regard to storm water management and permitting requirements.

- **Cultural Resources (1 Comment).** The Maine Historic Preservation Office commented on and concurred with the cultural resource consultation process outlined in the DEIS.

- **Water Resources (5 Comments).** Water resources comments included the locations of additional wetlands and clarification on the analysis of wetlands provided in the DEIS.

- **Biological Resources (59 Comments).** Comments on biological resources included major concerns about potential development in the Sandplain Grassland habitat; clarification on consultation procedures regarding future bird aircraft strike hazard (BASH) programs; locations and buffer zones in regard to significant vernal pools; request to show another bald eagle nest along the Androscoggin River on the figure; and other general editorial comments and requests for clarifying language within the biological resources sections.

- **Cumulative Impacts (11 Comments).** Cumulative impact comments included concerns about the loss of the critically imperiled Little Bluestem-Blueberry Sandplain Grassland and Pitch Pine-Heath Barren habitats and impacts on the state-listed threatened and endangered species that rely on these habitats; the expansion of the significant wildlife habitat analysis to include an examination of the potential impacts to deer wintering areas; and the request for the inclusion of the Downeaster Train Service to Brunswick as an action in the cumulative impacts section.

- **General (9 Comments).** General comments included procedural questions regarding the NEPA and EIS process as well as comments in favor of or against alternatives being evaluated and/or the Reuse Plan.

5. The **Final EIS (FEIS)** was completed after considering the public comments received on the DEIS. Changes from the DEIS to the FEIS are summarized in Section 1.9.

6. No less than 30 days after publication of the FEIS, a **Record of Decision (ROD)** will be issued. The ROD will indicate which disposal action has been selected, the alternatives that were considered, the potential environmental impacts, and any specific mitigation activities to support the decision. Publication of the ROD will complete the NEPA process.

1.6 Scope of the EIS

This EIS evaluates the potential direct, indirect, short-term, and long-term impacts on the human and natural environments resulting from the disposal of NAS Brunswick. In addition to the main NAS Brunswick property, the EIS also evaluates the disposal of the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station, hereafter referred to as the Outlying Properties. Other properties managed by NAS Brunswick, including the Topsham Annex (Town of Topsham, Maine) and Small Point Rake Station (Town of Phippsburg, Maine), are not evaluated in this EIS. In addition, approximately 72.2 acres of the NAS Brunswick property are designated for federal transfer (to the FAA, U.S. Department of the Army for use by the Maine Army National Guard, and U.S. Coast Guard). The FAA New England Region will use this EIS to develop a Record of Decision in accordance with NEPA to support the following federal actions:

- Creation of a new civilian airport location under Alternative 1

- Approval of the Airport Layout Plan prepared by MRRA

The FAA would also need to include the airfield site in the National Plan for an Integrated Airport System and concur with the Public Benefit Transfer of DoD lands, facilities, and equipment for creation of a civilian airport and associated revenue-producing property. The property and equipment are part of the federal transfer to the FAA, and the property includes a parcel where the current airport traffic control (ATC) tower and radar approach control (RAPCON) equipment are located. The FAA will not operate the ATC tower. The FAA, as the recipient of this parcel and buildings, intends to use only the RAPCON equipment. Due to the comingled nature of the ATC tower and RAPCON equipment and the need for a secure facility, it is not feasible to transfer the RAPCON equipment without the ATC tower. Therefore, the ATC tower building will be transferred to the FAA; however, it will no longer serve as the ATC tower for the airfield operated by FAA or any other entity. In addition to RAPCON/tower building and equipment, the federal transfer to the FAA will also include the remote transmitter/receiver

(RTR) site with equipment and the airport surveillance radar-8 (ASR-8) site with equipment, all of which are located on the same 10-acre parcel.

Reuse of these properties by the Army and Coast Guard is not included in the proposed action and will be subject to NEPA compliance. These two property transfers are assessed in this EIS for potential cumulative impacts in Section 5.

Resource areas examined in this EIS and potentially impacted include land use and zoning, socioeconomics, community facilities and services, transportation, environmental management, air quality, noise, infrastructure, cultural resources, topography, geology, soils, water resources, and biological resources. The EIS also addresses potential cumulative impacts that may result from reasonably foreseeable projects in the region, including other disposal or realignment actions.

This EIS addresses impacts based on a phased (5-, 10-, 15-, and 20-year) build-out of the approved Reuse Master Plan and assumptions made regarding foreseeable reuse of the property. The assumptions were based on the Reuse Master Plan, current property use, existing and proposed land use and zoning regulations, and the build-out time line and development mix.

The information and data used in the preparation of this EIS were obtained by reviewing existing documents and studies, including literature, maps, and planning documents; conversations and coordination with local, state, and federal stakeholders, officials, and the public; and fieldwork.

1.7 Agency Coordination

NEPA requires that federal agencies responsible for preparing NEPA analyses and documentation do so “in cooperation with State and local governments” and other agencies with jurisdiction by law or special expertise (42 U.S.C. §§ 4331(a), 4332 (2)). To do this, the Navy worked closely with the community, local and state agencies, and other federal agencies during the preparation of this EIS.

1.7.1 Cooperating Agency

On November 28, 2008, the FAA New England Region requested to participate as a cooperating agency in the preparation of the EIS for the disposal of NAS Brunswick. On April 13, 2009, the Navy concurred with the FAA’s request to participate as cooperating agency in the preparation of the EIS. The FAA New England Region will use this EIS to develop a Record of Decision in accordance with NEPA to support the following federal actions:

- Creation of a new civilian airport location under Alternative 1
- Approval of the Airport Layout Plan prepared by MRRA

The FAA would also need to include the airfield site in the National Plan for an Integrated Airport System and concur with the Public Benefit Transfer of DoD lands, facilities, and equipment for creation of a civilian airport and associated revenue-producing property. As a cooperating agency, the FAA has participated

in the review of draft versions of the EIS and provided technical expertise. The Navy serves as lead agency. A copy of the FAA's request and the Navy's concurrence is included in Appendix B.

1.7.2 Other Agency Coordination

Navy coordination with applicable local, state, and federal agencies in the development of this EIS included the following:

1.7.2.1 Interagency Scoping Meeting

An interagency meeting was held in the town of Brunswick, Maine, on November 14, 2008, to introduce local, state, and federal agencies to the Brunswick EIS project. Attendees included representatives from the FAA, U.S. Environmental Protection Agency (EPA), Maine Department of Environment Protection (MEDEP), Brunswick School Department, Town of Brunswick, Maine Department of Inland Fisheries and Wildlife, Brunswick Sewer Department, and Maine Department of Transportation.

1.7.2.2 Interagency Consultation

Consultation letters were sent via U.S. Mail to appropriate representatives from the Maine Department of Inland Fisheries and Wildlife (MDIFW), Maine Natural Areas Program, U.S. Fish and Wildlife Service (USFWS), and National Marine Fisheries Service. The letters were sent to initiate a consultation process to identify populations of federal and state-listed or candidate rare, threatened, or endangered species, unique natural communities, or other significant wildlife communities at or near NAS Brunswick. A consultation letter also was sent to the Maine Historic Preservation Commission to initiate the Section 106 process as required under the National Historic Preservation Act (NHPA). In addition, a copy of this EIS was filed with the U.S. Environmental Protection Agency (EPA). Copies of agency consultation letters and responses are included in Attachment A.

1.8 Regulatory Framework

The Navy intends to dispose of NAS Brunswick, including the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station. Disposal of the properties is the responsibility of the Navy. The MRRA is responsible for the implementation of the Reuse Master Plan. The future developer or owner of the property will be responsible for acquiring applicable building permits, zoning approvals, and environmental permits for development of the property.

In addressing environmental consequences, the Navy is guided by relevant statutes (and their implementing regulations) and by Executive Orders that establish standards and provide guidance on environmental and natural resources management and planning (Table 1-3). Consistency with other federal, state, and local plans, policies, and regulations is further described in Section 6 (Other Considerations) of this EIS.

Table 1-3 Applicable Regulatory Requirements and Approvals

Regulation	Agency	Permit/Approval	Regulated Activity
National Environmental Policy Act (NEPA), 42 U.S.C. § 4321 *et seq.*	Navy	Record of Decision (ROD)	Federal action
Clean Air Act (CAA), 42 U.S.C. § 7401 *et seq.*	U.S. Environmental Protection Agency	Compliance with National Ambient Air Quality Standards	Federal actions that result in air emissions.
Clean Water Act, 33U.S.C 1251, *et seq.*	U.S. Army Corps of Engineers	Sections 401 and 404	Impacts on jurisdictional wetlands and/or other waters of the U.S.
National Historic Preservation Act of 1966 as amended (16 U.S.C. § 470 and amendments)	■ Advisory Council on Historic Preservation ■ State Historic Preservation Office	Section 106 consultation	Federal undertakings that affect properties listed on or determined to be eligible for listing on the National Register of Historic Places.
Endangered Species Act (ESA), 16 U.S.C. §§ 1531-1544	■ U.S. Fish and Wildlife Service ■ National Marine Fisheries Service ■ Maine Department of Inland Fisheries and Wildlife	Agency consultation for presence of threatened and endangered species	Federal action potentially impacting threatened and endangered species.
Coastal Zone Management Act (CZMA), 16 U.S.C. §§ 1451-1464	Maine State Planning Office	Maine Coastal Program - Coastal Consistency Determination	Actions by federal or state agencies that may affect coastal resources in Maine.
Comprehensive Environmental Response, Compensation, and Liability Act , as amended 42 U.S.C. 9601 *et seq.*	U.S. Environmental Protection Agency	Cleanup of hazardous waste contamination from abandoned hazardous waste disposal sites or accidental spills.	Ongoing responsibility for the investigation and cleanup of IR and other sites.
Resource Conservation and Recovery Act, 42 U.S.C. 6901 *et seq.*	U.S. Environmental Protection Agency	Procedures for hazardous waste management and corrective action.	Ongoing responsibility for waste management and corrective actions.

It should be noted that this NEPA analysis does not contain a Section 4(f) analysis, even though the FAA is a cooperating agency. Section 4(f) refers to the original section within the U.S. Department of Transportation Act of 1966 that established the requirement for consideration of park and recreational lands, wildlife and waterfowl refuges, and historic sites in transportation project development. The law is now codified in 49 U.S.C. §303 and 23 U.S.C. §138 and is implemented by the Federal Highway Administration (FHWA) in 23 CFR 774. Section 4(f) states that the Secretary of Transportation will not approve any program that requires the use of any publicly owned land or park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance unless there is no feasible and prudent alternative to the use of such land and such program, and the project includes all possible planning to minimize harm resulting from the use.

Section 4(f) would apply only if Alternative 1 were selected, as the FAA approval of an Airport Layout Plan would trigger a Section 4(f) determination.

1.9 Changes from the DEIS to the FEIS

As described in Section 1.5, on May 4, 2010, the Navy published an NOA in the *Federal Register* on the availability for public review of the DEIS for the Disposal and Reuse of NAS Brunswick, Maine. Following that release and the formal public comment period on the DEIS, updates to technical data and studies were incorporated into the analysis in this FEIS. These changes include the following:

- Indirect employment impacts were included in the employment analysis under Alternative 1 and Alternative 2. The indirect employment impact was added to Section 4.2 (Socioeconomics) and Appendix N (Methodology, Assumptions, and Multipliers). The analysis includes the impact of the addition of indirect, off-base jobs resulting from the redevelopment of the former installation.

- Section 4.4 (Transportation) was expanded in the FEIS to evaluate the potential impacts under Alternative 1 or Alternative 2 where the proposed US Route 1 Connector would not be constructed. The transportation section also was revised to include off-base transportation impacts. Impacts at various intersections and roadways was updated due to new data and information from decisions and planning documents that became available following the completion of the Traffic Impact Study in mid-2009. In addition, the text portion of the 2009 Traffic Impact Study and the revised technical memo based on comments received on the DEIS are included as Appendix D in this FEIS.

- Future flight tracks under Alternative 1 were included. A new figure (Figure 4.7-2) was added to the FEIS showing potential future flight tracks overlayed on a road map with landmark features.

- Clarification was added regarding the storm water permitting process, including outlining what the developer would need to include in its application for a National Pollutant Discharge Elimination System (NPDES) Multi-sector General Permit for storm water discharges associated with industrial activities. Also included in Sections 4.8.1.3 and 4.8.2.3 of the FEIS is a more thorough discussion of the Urban Impaired Stream Standard, as well as a discussion of Section 438 of the Energy Independence and Security Act (EISA) of 2007.

- On September 27, 2010, the Navy signed a *Programmatic Agreement (PA) between the United States Navy and the Maine State Historic Preservation Officer (SHPO) on the Lease and Property Transfer of Properties Located at Naval Air Station Brunswick, Maine and Topsham Annex, Topsham, Maine*. This PA has been added to the FEIS as Appendix O. Sections 3.9 and 4.9 have been updated to include details and results from the signed PA.

- The sections regarding wetlands (Sections 4.11.1.4 and 4.11.2.4) and significant vernal pools (Sections 4.12.1.4 and 4.12.2.4) were expanded in the FEIS. These included more comprehensive descriptions of applicable buffer areas, permits and regulations, and the addition of two significant vernal pools to the discussion.

- Expanded and revised discussions regarding the critically imperiled Sandplain Grassland are presented in FEIS Sections 3.12 and 4.12 - Biological Resources, and Section 5.3.7 - Cumulative Impacts. The changes incorporate responses to comments regarding consultations with the Maine Department of Inland Fisheries and Wildlife (MDIFW) that would be required prior to development of final design plans, permits, and mitigation measures, including best management practices. The FEIS is designed as a planning document. Therefore, once final designs are established, any party proposing development or other land disturbance in districts containing Sandplain Grassland habitat would be required to consult with the MDIFW and MNAP prior to receiving the appropriate permits and clearances.

- The following new appendices were added: Comments and Responses on the DEIS (Appendix A); *Traffic Impact Study* (2009) and *Traffic Impact Study Updates* (2010) (Appendix D); *Ecological Communities and Wetland Resources Report* (Appendix F); *Vernal Pool Survey Report* (Appendix H); Airport Layout Plan (Appendix K); and the *Programmatic Agreement (PA) between the United States Navy and the Maine State Historic Preservation Officer (SHPO) on the Lease and Property Transfer of Properties Located at Naval Air Station Brunswick, Maine and Topsham Annex, Topsham, Maine* (Appendix O).

2 Alternatives, Including the Proposed Action

This section provides a detailed description of the proposed action and alternatives. The proposed action is the disposal of NAS Brunswick by the Navy in a manner consistent with the Reuse Master Plan. A second build alternative is also evaluated in this EIS. The range of land uses and development intensities represented by these two alternatives allows for an analysis of potential impacts that could result with the disposal and reuse of NAS Brunswick.

In accordance with NEPA regulations, this EIS also addresses a No-Action Alternative. The No-Action Alternative is the retention of NAS Brunswick by the U.S. Government in caretaker status. No reuse or redevelopment would occur at the installation under this scenario.

2.1 Development of the Reuse Master Plan

In response to the BRAC recommendation to close NAS Brunswick, Maine, Governor Baldacci issued an EO on August 25, 2005, establishing the Brunswick Local Redevelopment Authority (BLRA) to develop a reuse plan, as required by BRAC Closure Law. The BLRA developed the Reuse Master Plan based on their Guiding Principles for development (see Section 2.1.1), existing conditions on the installation and in the region, properties available for redevelopment, and public involvement. Proposed land uses consider past use of the property, existing property conditions, needs of the homeless in the communities in the vicinity of the installation, and needs of the communities in the vicinity of the installation for economic redevelopment and other development.

2.1.1 Reuse Master Plan Goals and Objectives

In the early stages of the reuse planning effort, the BLRA defined a series of Guiding Principles to provide general guidance for development of the Reuse Master Plan. The Guiding Principles were adopted on May 17, 2006, and, as stated in the Reuse Master Plan (BLRA 2007a), included the following:

> "The LRA Board will be actively engaged in all aspects of the reuse planning efforts and will complete the final Master Reuse Plan for BNAS by December 2007"(BLRA 2007b).
>
> "The planning process will include an extensive, open, and inclusive public participation program, including numerous community-wide vi-

sioning sessions and other opportunities to provide meaningful input. The LRA will not pre-judge what the plan will be, but will consider all the studies, analyses, and community views before making decisions about the Master Reuse Plan."

"The reuse plan will accommodate the needs and values of the community, the region, and the State of Maine, and be consistent with the policies of the Brunswick Comprehensive Plan. Redevelopment of the base provides an opportunity to re-connect the base with the community, both geographically and economically."

"The reuse plan will have sufficient flexibility to accommodate both short term (less than 10 years) and long term (10 to 50 years) needs and values."

"The reuse plan will consider "smart growth" strategies that promote sustainable development and balance economic development, environmental protection, and the preservation or enhancement of the quality of life for Brunswick residents."

"The reuse plan will consider a mix of land uses, including, but not limited to, the following: businesses with potential for high employment growth, capital investment and tax revenue; open space and public recreation uses; academic and research facilities; governmental/public services; housing; and aviation."

"The reuse plan will make the adequate provision for environmental cleanup and remediation, including a goal that base clean-up is to the standard necessary to support the proposed reuse of the land and facilities."

"The reuse plan will seek to develop local and regional economic and employment viability and sustainability similar to or better than the economic health of the region before the BRAC closure announcement."

"Development on the base should be integrated with the economic development of the Town, the region and the State of Maine."

"The reuse plan will optimize the use of existing facilities and infrastructure, including the integration of a multi-modal transportation system with designated land uses."

"The reuse plan will recognize and optimize the skills of the available civilian workforce at BNAS and the region."

2.1.2 Evaluation of Existing Conditions and Properties Available for Redevelopment

Once the Guiding Principles were established, the BLRA conducted an existing conditions analysis of the NAS Brunswick property available for redevelopment. Specifically, the BLRA evaluated the environmental condition of the property, existing infrastructure, transportation networks, and the local and regional mar-

kets. Restrictions needed to protect human health and the environment were also identified.

As discussed in Section 1, approximately 72.2 acres of NAS Brunswick property are being allocated to other federal agencies. Therefore, these parcels are not available for redevelopment. Existing residential housing areas at NAS Brunswick also may not be available for redevelopment. Residential housing is currently managed by a Public Private Venture (PPV) agreement, through a 50-year lease. While the Navy has the ability to dispose of the land under procedures commonly used in the BRAC process, improvements on that land are currently managed per a PPV lease agreement. For development of the reuse scenarios, the BLRA assumed that residential areas would remain the same as under existing conditions.

For the remaining available parcels, the BLRA conducted a state- and local-level screening process to assess the potential for property transfer through a mechanism known as public benefit conveyance (PBC). Through a PBC, surplus military property may be conveyed to public agencies and not-for-profit organizations to provide public goods and services. As of 2008, approximately 1,469 acres and 18 existing buildings have been approved by the U.S. Department of Education and the U.S. Department of Interior and are pending transfer by PBC. The PBCs are further discussed in Section 4.1.

2.1.3 Public Participation

Public participation was essential to development of the Reuse Master Plan. To engage the public in the reuse planning process, the BLRA held a series of public workshops, meetings, and surveys over a 16-month period beginning in June 2006 and ending in October 2007. Over this period, the BLRA planning team was introduced to the public; installation tours were provided to over 300 people; multiple visioning, plan development, and public comment meetings were held; over 250 people attended topical seminars on issues such as housing, transportation, the environment, and alternative energy; a smart growth design workshop was held; and a community telephone survey was conducted. Additional public outreach efforts included a BLRA e-newsletter, a public Web site, and press releases and newspaper inserts.

2.1.4 Reuse Alternatives and Plan Selection

The BLRA initially presented four reuse concepts to public and town representatives at two public meetings in August of 2007. The concepts included two airport scenarios and two non-airport scenarios. The concepts were designed to provide a variety of development strategies, density considerations, and land use and transportation configurations for redevelopment of NAS Brunswick. The BLRA reuse alternatives are illustrated on Figure 2-1, and major components of each are described below.

2.1.4.1 Airport Concept Plan A-1

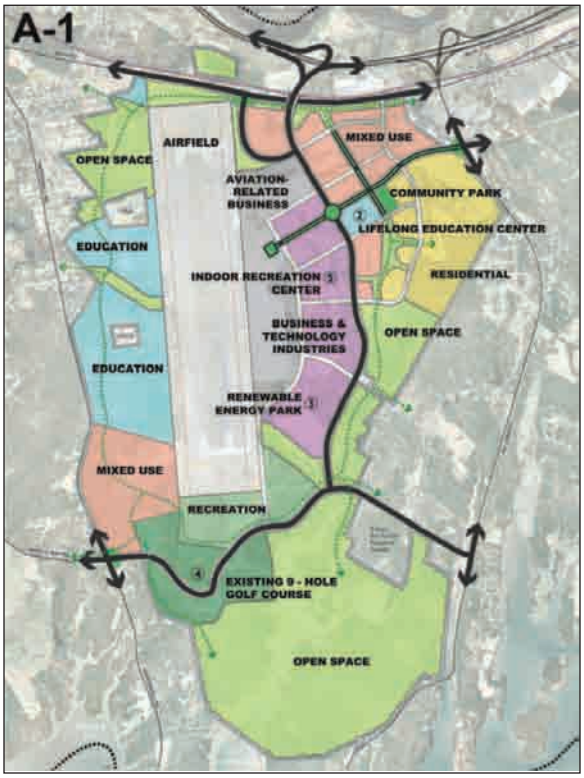
- Reuse of airfield
- U.S. Route 1 interchange
- Primary entry at Bath Road, with mixed-use business focus
- Central transportation spine separates aviation, business, and technology industries from mixed-use area
- Campus-oriented business and office parks
- Renewable energy park
- Maintain existing 9-hole golf course
- Direct east-west connector road from Gurnet Road to Harpswell Road

2.1.4.2 Airport Concept Plan A-2

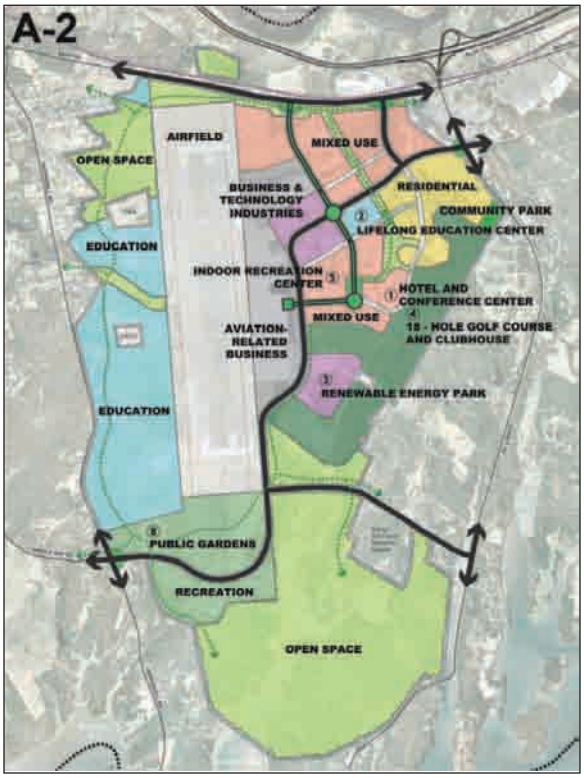
- Reuse of airfield
- No U.S. Route 1 interchange
- Primary entry at Bath Road, with mixed-use community focus
- Hotel and conference center
- New 18-hole golf course along eastern edge
- Renewable energy park
- Recreation complex and public gardens
- Indirect east-west connector road from Gurnet Road to Harpswell Road

2.1.4.3 Non-Airport Concept Plan N-1

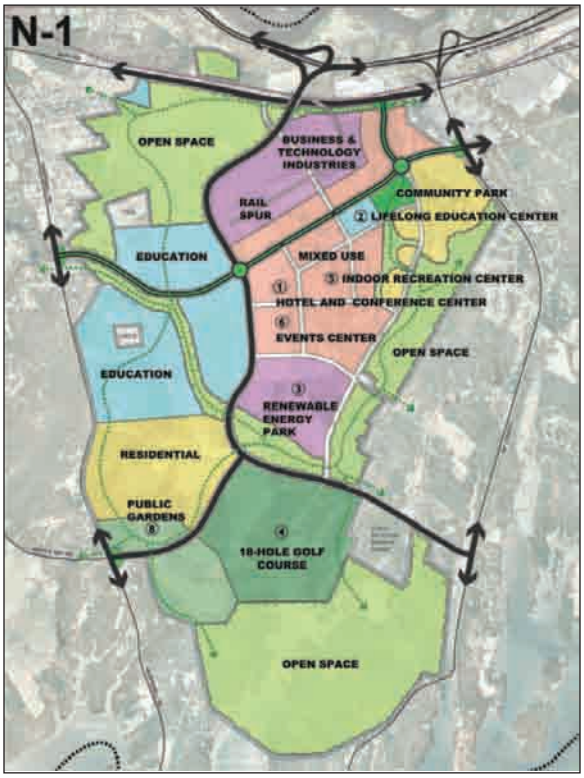
- No airfield reuse
- U.S. Route 1 interchange
- West-central transportation spine separates business- and community-oriented uses from education and open space areas
- Primary east-west travel route
- Targeted rail-oriented business and technology development along Bath Road



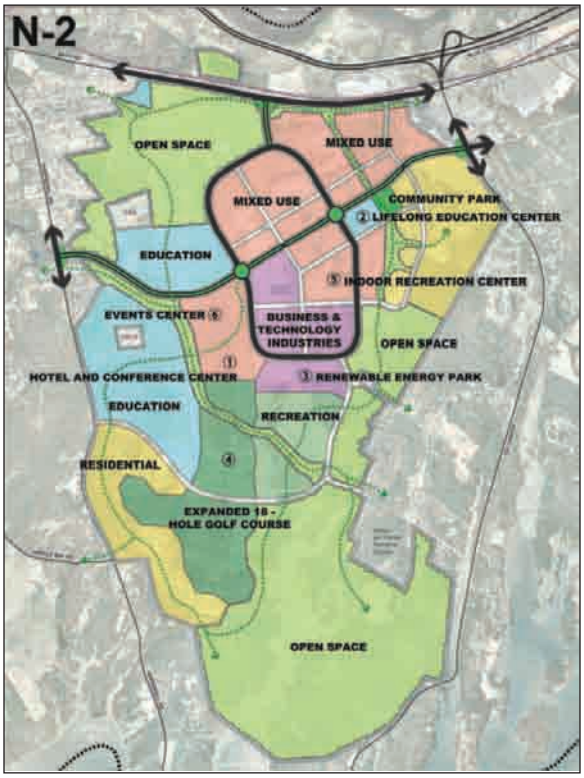
Airport Concept A-1



Airport Concept A-2



Airport Concept N-1



Airport Concept N-2

SOURCE: BLRA 2007a

Figure 2-1
BLRA Concept Plans
NAS Brunswick, Maine

- Expanded 18-hole golf course
- 2nd home/retirement development near golf course and education area
- Indirect east-west connector road from Gurnet Road to Harpswell Road

2.1.4.4 Non-Airport Concept Plan N-2

- No airfield reuse
- No U.S. Route 1 interchange
- Central transportation loop separates higher-density mixed-use and business and technology uses from surrounding lower-density uses
- Expanded 18-hole golf course
- Indirect east-west connector road from Gurnet Road to Harpswell Road

After a public review period, the BLRA voted on August 15, 2007, to include an aviation component in the Reuse Master Plan, eliminating the two non-airport concepts. The BLRA then proceeded to further refine the two airport concepts. Modifications were also made to the land use districts, with the primary change being the introduction of a "Professional Office" district. The two final plans were presented for public review at a public meeting on September 2, 2007. Based on public feedback and other factors, the BLRA Board of Directors voted on September 19, 2007, to adopt the *Brunswick Naval Air Station Master Reuse Plan* as the preferred redevelopment plan. During September and October, the planning team, in consultation with BLRA staff and the Board of Directors, continued to refine the plan. On November 28, 2007, the final Reuse Master Plan was presented for community feedback at a Public Hearing, and on December 19, 2007, the BLRA Board of Directors unanimously voted to approve the plan (BLRA 2007a).

2.2 Identification of Alternatives

The proposed action is the disposal of NAS Brunswick in a manner consistent with the Reuse Master Plan. The Navy's primary approach to development of the proposed action and alternatives was to (1) focus on the Navy's disposal of surplus property with the Reuse Master Plan as the reasonably foreseeable reuse of the property and then (2) consider a range of reasonable disposal alternatives and assess the human and natural environmental effects in the context of the reasonably foreseeable reuse of the property.

To assess the potential impacts of the proposed action, the Navy has evaluated two property disposal and build alternatives—Alternative 1 and Alternative 2 — and the No-Action Alternative. Alternative 1 is the reuse of the property in a manner consistent with the Reuse Master Plan, as adopted by the BLRA. Alternative 2 consists of a higher density of residential and mixed-use development and

no reuse of the airfield. Alternative 2 includes elements of the non-airport scenarios developed by the BLRA and incorporates revisions made during the BLRA reuse planning process described above. The No-Action Alternative is evaluated in detail in this EIS as prescribed by CEQ regulations.

Alternatives that were considered but excluded from further analysis included reuse of the property in a single land use rather than mixed use, such as only conservation, residential, or industrial. These alternatives did not meet the basic BLRA Guiding Principles and were not considered as reasonably foreseeable reuses of the property. The range of land uses and development intensities presented in the alternatives allows for an impact analysis of the range of likely potential impacts that could occur with the disposal of NAS Brunswick.

2.3 Alternatives Considered in the EIS

2.3.1 Alternative 1 (Preferred Alternative)

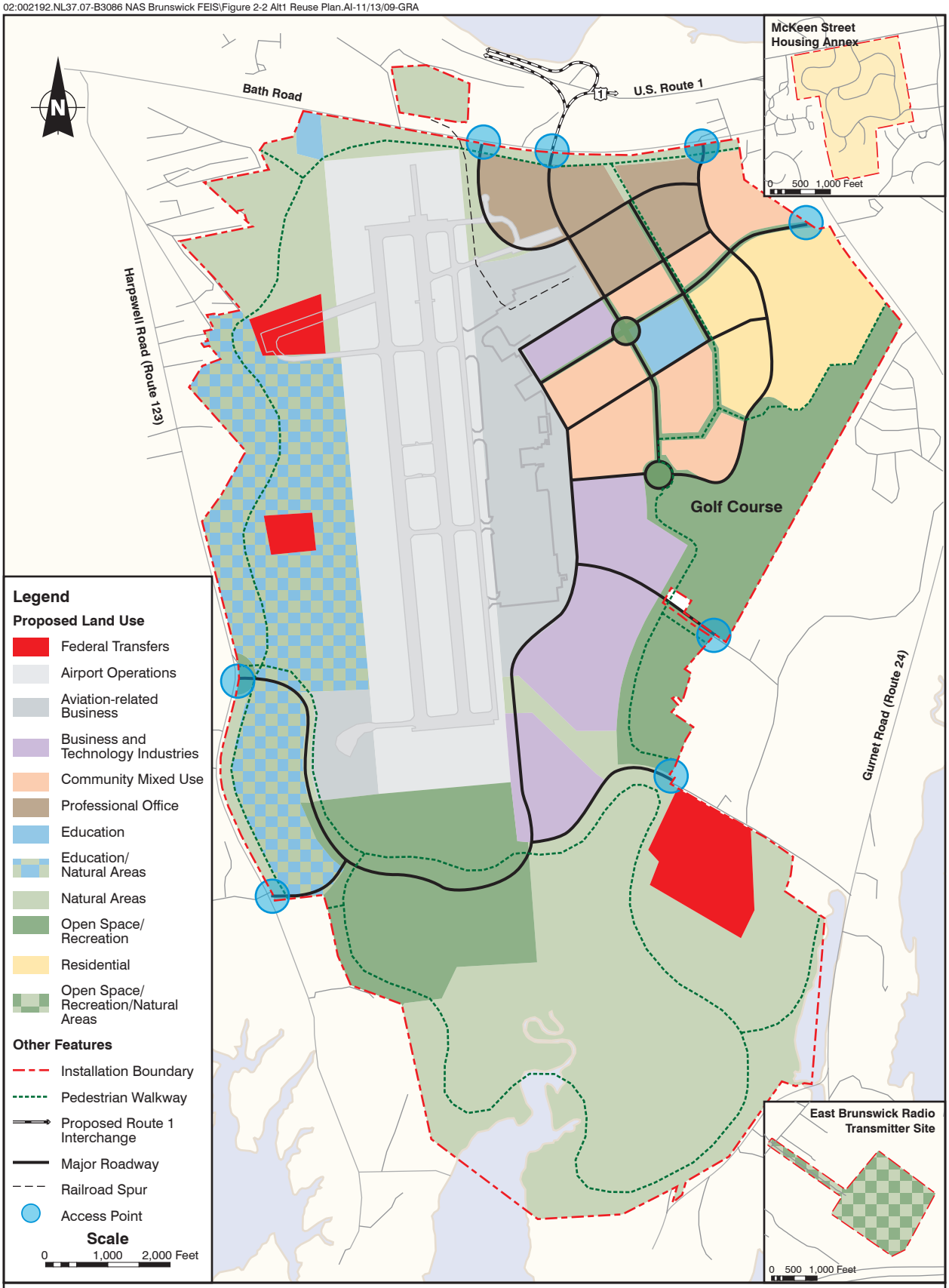
Alternative 1 includes the disposal of NAS Brunswick by the Navy in a manner consistent with the adopted Reuse Master Plan. This alternative has been identified as the preferred alternative by the Navy. Full build-out of Alternative 1 is proposed to be implemented over a 20-year period. Alternative 1 calls for the development of approximately 1,630 acres (51%). In addition, approximately 1,570 acres (49%) would be dedicated to a variety of active and passive uses, including recreation, open space, and natural areas. This alternative is based upon reuse of the existing airfield and its supporting infrastructure, a mix of land use types and densities, and the preservation of open space and natural areas. Alternative 1 includes the reuse of 43 existing non-residential structures containing approximately 1,289,000 square feet of usable space and 653 existing residential units. Alternative 1 also incorporates smart-growth principles such as pedestrian-friendly transportation features (e.g., walkable neighborhoods and bike lanes), compact development, open spaces, and a mix of land use types.

Under Alternative 1, the McKeen Street Housing Annex would remain residential, and the East Brunswick Radio Transmitter Site would be utilized as recreational, open space, and natural areas. The Sabino Hill Rake Station property would be utilized for parks and recreation.

Redevelopment of NAS Brunswick under Alternative 1 would involve the reuse of existing structures and targeted development within nine different land use districts. Table 2-1 identifies the composition of development under Alternative 1, and Figure 2-2 provides an illustration of Alternative 1 at full build-out. A description of each land use district and proposed on- and off-site transportation improvements is provided below.

- **Airport Operations.** This 500-acre area contains two existing 8,000-foot runways, taxiways, and adjacent buffer zones surrounding the airfield.

02:002192.NL37.07-B3086 NAS Brunswick FEIS\Figure 2-2 Alt1 Reuse Plan.AI-11/13/09-GRA



NOTE: Education/Natural Area totals 320 acres, of which an undefined 175 acres have been assigned to Education and 145 acres to Natural Areas

SOURCE: BLRA 2007a

Figure 2-2
Alternative 1
NAS Brunswick, Maine

- **Aviation-related Business.** This 230-acre area would be dedicated to aviation-related business, industry, transportation and distribution, technology-based employment, and other uses that rely upon proximity to airport facilities and operations. Uses could include general and corporate aviation, aircraft maintenance/repair/overhaul, and aviation-related manufacturing.

- **Professional Office.** This 120-acre district would include professional office space and areas for retail and community-support services. Primary uses would include administrative, corporate, and professional offices. In addition, the district would support some retail and community uses such as restaurants and day care.

- **Community Mixed Use.** This 175-acre area would provide space for a mix of compact, pedestrian-oriented development, including a mix of retail space, professional offices, business and support services, restaurants, hotels and conference centers, civic and cultural uses, parks, and government buildings. This area also would include higher-density attached residential housing such as townhomes, condominiums, apartments, and assisted-living/independent-care senior housing.

- **Business and Technology Industries.** This 190-acre area would include space for technology-based research and development, energy parks, laboratories, light manufacturing, and warehousing and distribution.

- **Education District.** This 200-acre area is designated for higher education academic space and administrative and support facilities.

- **Residential District.** This 215-acre area would be used for residential housing. The district would consist of a mix of existing single-family attached and detached PPV family housing and new detached/attached single-family housing, multi-family apartments, senior housing, and retirement/second homes. Approximately 70 acres of this district is located at the McKeen Street Housing Annex.

- **Recreation and Open Space District.** This district would provide 510 acres of land for a variety of commercial and public outdoor active and passive recreation, including an 18-hole golf course, public gardens, public parks, sports fields, and bicycle trails. Approximately 33 acres of this district is located at the East Brunswick Radio Transmitter Site.

- **Natural Areas.** The Reuse Master Plan includes the conservation and preservation of 1,060 acres of the property as designated natural areas. The natural areas would include pedestrian trails, nature centers, and other non-intrusive, passive outdoor recreation. Approximately 33 acres of this district is located at the East Brunswick Radio Transmitter Site.

- **Transportation**. On-site transportation improvements under this alternative include eight roadway access points onto the property, including new secondary access points onto the adjacent street systems at Bath Road/Gurnet

Road/Harpswell Road; a new east-west connector surface road linking Gurnet and Harpswell Roads; and creation of a new network of pedestrian/bicycle trails. Changes to the existing street and roadway network would include a system of street hierarchy and development of new local streets to provide access to individual parcels. The on-base roadways identified under Alternative 1 show only "major roadways" proposed under each development scenario. There would also be a network of secondary roadways that would allow access to various areas of the former installation; however, until the final design is determined, all roadways and access points are proposed and subject to alteration as needed.

Off-site transportation improvements include development of a connector spur (road) and interchange that would connect to U.S. Route 1 west of the present interchange at Cook's Corner and the widening of Bath Road (along the northern boundary of the property). This alternative also includes development of a passenger/freight rail spur connecting the property to an existing rail line north of the property boundary. The off-site transportation improvements, including the U.S. Route 1 interchange, would be located on private property, outside of the federally owned NAS Brunswick property being disposed; however, the U.S. Route 1 interchange would be integrated with the roadway system to be constructed on-site. The Navy would have no role or responsibility in the funding, planning, design, or construction of any off-site public highways. Accordingly, this EIS evaluates the U.S. Route 1 interchange as a cumulative impact (see Section 5).

Table 2-1 Alternative 1 – Land Use

Land Use District	Acres	Percent of Total
Airport Operations	500	16%
Aviation-related Business	230	7%
Professional Office	120	4%
Community Mixed Use	175	5%
Business and Technology Industries	190	6%
Education District	200	6%
Residential District	215	7%
Recreation and Open Space	510	16%
Natural Areas	1,060	33%
Total	**3,200**	**100%**

Source: BLRA 2007a.

Notes:
[1] Land use calculations have been rounded and include the NAS Brunswick, McKeen Street Housing Annex, and East Brunswick Radio Transmitter Site properties. Sabino Hill Rake Station (0.23 acre) is not included in these land use calculations.
[2] This development mix is an estimate of the final development mix; however, the mix is subject to change based on market conditions and other factors.

A phased development approach could be used to implement Alternative 1. The intent would be to redevelop the property in stages over a 20-year period with flexibility to accommodate market conditions and as improvements in on-site and

off-site infrastructure capacity (e.g., roads, utilities) would be developed (Boundy 2009). Table 2-2 identifies the conceptual stages of development used for impact analysis within this EIS.

Table 2-2 Alternative 1 – Proposed Development Time Line

Land Use District	5 Years	10 Years	15 Years	20 Years
Aviation-related Business	75% reuse of existing buildings	100% reuse of existing buildings; 10% of new in-fill development	50% of new in-fill development	100% of new infill development
Community Mixed Use	50% reuse of existing buildings; 10% of new in-fill development	100% reuse of existing buildings; 25% of new in-fill development	50% of new in-fill development	100% of new infill development
Professional Office	no activity expected	25% of new in-fill development	50% of new infill development	100% of new infill development
Business and Technology Industries	50% reuse of existing buildings; 10% of new in-fill development	100% reuse of existing buildings; 25% of new in-fill development	50% of new infill development	100% of new infill development
Education	50% reuse of existing buildings; 10% of new in-fill development	100% reuse of existing buildings; 25% of new in-fill development	50% of new in-fill development	100% of new in-fill development
Residential	25% reuse of existing buildings	50% reuse of existing buildings	75% reuse of existing buildings	100% reuse of existing buildings
Road Improvements	Widening of Bath Road and U.S. Route 1 Interchange (complete)	Internal Road System (complete)	-	-

Source: Boundy 2009.

Notes:
[1] Land use calculations include the NAS Brunswick, McKeen Street Housing Annex, and East Brunswick Transmitter Site properties.
[2] This development mix is an estimate of the final development mix; however, the mix is subject to change based on market conditions and other factors.

For a more detailed description of the Reuse Master Plan, refer to the *Brunswick Naval Air Station Reuse Master Plan, December 2007* (BLRA 2007a).

2.3.2 Alternative 2

The purpose of Alternative 2 is to evaluate the potential impacts of property reuse incorporating a higher density of residential and mixed-use development and no reuse of the airfield. The alternative is based upon a combination of the two non-airport alternatives (N-1 and N-2) originally developed by the BLRA (see Section 2.1.4). In addition, Alternative 2 incorporates and adheres to the basic BLRA Guiding Principles, which were used to develop the Reuse Master Plan (see Section 2.1.1). Alternative 2 provides for disposal of NAS Brunswick and its outlying properties by the Navy with a higher density of residential and community mixed-use development. Similar to Alternative 1, this alternative includes a mix

of land use types, preserves open space and natural areas, and incorporates smart-growth principles that include pedestrian-friendly transportation and compact development. Full build-out of the Alternative 2 would be implemented in stages over a 20-year period. The alternative calls for the development of approximately 1,580 acres (49%) of the total air station property. In addition, approximately 1,620 acres (51%) of the air station would be dedicated to active and passive recreation, open spaces, and natural areas. Although this alternative would involve less developed acreage, the total acreage of residential and community mixed uses would be higher than under Alternative 1.

Redevelopment of NAS Brunswick under Alternative 2 would involve the reuse of existing structures and targeted development within six different land use districts. This alternative does not include an airfield component or the Airport Operations, Aviation-related Business, and Professional Office land use districts as included in Alternative 1.

Under Alternative 2, the McKeen Street Housing Annex would remain residential, and the East Brunswick Radio Transmitter Site would be utilized as recreational, open space, and natural areas. The Sabino Hill Rake Station property would be utilized for parks and recreation.

Table 2-3 identifies the composition of development and Figure 2-3 provides an illustration of Alternative 2 at full build-out. A description of each land use district and proposed on- and off-site transportation improvements is presented below.

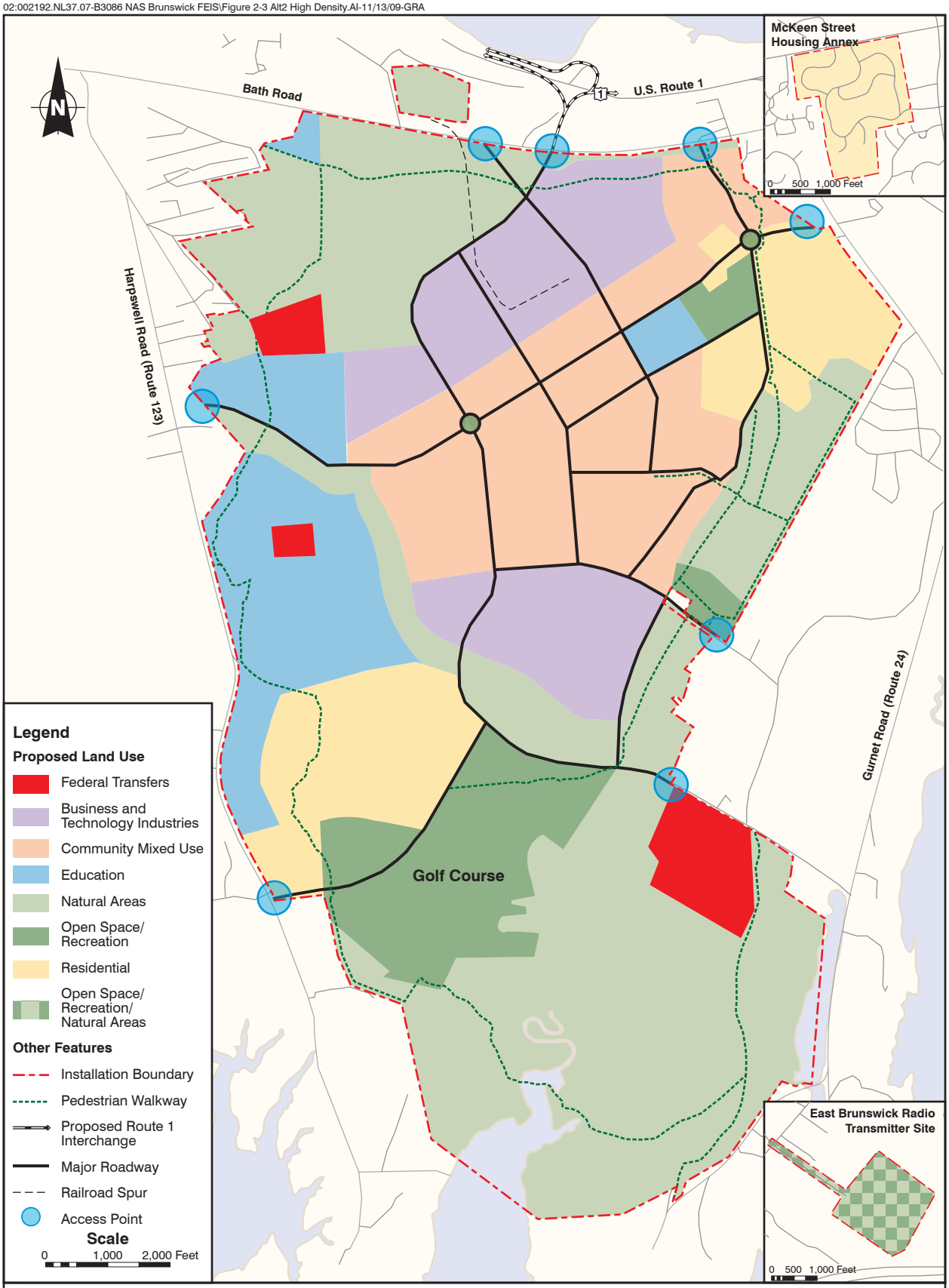
- **Community Mixed Use.** This 490-acre area would provide space for a mix of compact, pedestrian-oriented development, including a mix of retail space, professional offices, business and support services, restaurants, hotels and conference centers, civic and cultural uses, parks, and government buildings. In addition, this area would include higher-density attached residential housing such as townhomes, condominiums, and apartments.

- **Business and Technology Industries.** This 375-acre area would include space for technology-based research and development, energy parks, laboratories, light manufacturing, and warehousing and distribution.

- **Education District.** This 315-acre area is designated for higher education academic space and administrative and support facilities. This district would allow for the expansion of Bowdoin College, Southern Maine Community College, and other private education institutions.

- **Residential District.** This 400-acre area would be used for residential housing, including the existing PPV family housing areas. The district would consist of a mix of existing single-family attached and detached PPV family housing and new detached/attached single-family housing, multi-family apartments, senior housing, and retirement/second homes. Approximately 70 acres if this district is located at the McKeen Street Housing Annex.

02:002192.NL37.07-B3086 NAS Brunswick FEIS\Figure 2-3 Alt2 High Density.AI-11/13/09-GRA



SOURCE: BLRA 2007a

Figure 2-3
Alternative 2
NAS Brunswick, Maine

- **Recreation and Open Space District.** This district would provide 340 acres of land for a variety of commercial and public outdoor active and passive recreation, including an 18-hole golf course, public gardens, public parks, sports fields, and bicycle trails. Approximately 33 acres of this district is located at the East Brunswick Radio Transmitter Site.

- **Natural Areas.** Alternative 2 includes the conservation and preservation of 1,280-acres of the property as designated natural areas. The natural areas would include pedestrian trails, nature centers, and other non-intrusive, passive outdoor recreation. Approximately 33 acres of this district is located at the East Brunswick Radio Transmitter Site.

- **Transportation.** On-site transportation improvements include roadway access points onto the property, including east-west travel routes between Gurnet Road and Harpswell Road, and creation of a network of pedestrian/bicycle trails. Changes to the existing street and roadway network would include a system of street hierarchy and development of new local streets to provide access to individual parcels. The on-base roadways identified under Alternative 2 show only "major roadways" proposed under each development scenario. There would also be a network of secondary roadways that would allow access to various areas of the former installation; however, until the final design is determined, all roadways and access points are proposed and subject to alteration as needed.

  Off-site transportation improvements would include a proposed connector spur (road) and interchange that would connect to U.S. Route 1 west of the present interchange at Cook's Corner. This alternative also includes development of a passenger/freight rail spur connecting the property to an existing rail line north of the property boundary. Similar to Alternative 1, the off-site transportation improvements, including the U.S. Route 1 interchange, are located outside the federally owned NAS Brunswick property being disposed, on private lands. However, the U.S. Route 1 interchange would be integrated with the roadway system to be constructed on-site. The Navy would have no role or responsibility in the funding, planning, design, or construction of any public off-site roadways. Accordingly, this EIS evaluates the U.S. Route 1 interchange as a cumulative impact (see Section 5).

As with Alternative 1, the intent would be to implement Alternative 2 in stages over a 20-year period with flexibility to accommodate market conditions and as improvements in on-site and off-site infrastructure capacity (e.g., roads, utilities) are developed. Table 2-4 identifies the conceptual stages of development used within this EIS.

Table 2-3 Alternative 2 – Land Use

Land Use District	Acres	Percent of Total
Community Mixed Use	490	15%
Business and Technology Industries	375	12%
Education District	315	10%
Residential District	400	13%
Recreation and Open Space	340	10%
Natural Areas	1,280	40%
Total	**3,200**	**100%**

Notes:
[1] Land use calculations have been rounded and include the NAS Brunswick, McKeen Street Housing Annex, and East Brunswick Radio Transmitter Site properties. Sabino Hill Rake Station (0.23 acre) is not included in these land use calculations.
[2] This development mix is an estimate of the final development mix; however, the mix is subject to change based on market conditions and other factors.

Table 2-4 Alternative 2 – Proposed Development Time Line

Land Use District	5 Years	10 Years	15 Years	20 Years
Community Mixed Use	50% reuse of existing buildings; 10% of new in-fill development	100% reuse of existing buildings; 25% of new in-fill development	50% of new in-fill development	100% new of in-fill development
Business and Technology Industries	50% reuse of existing buildings; 10% of new in-fill development	100% reuse of existing buildings; 25% of new in-fill development	50% of new in-fill development	100% of new in-fill development
Education	50% reuse of existing buildings; 10% of new in-fill development	100% reuse of existing buildings; 25% of new in-fill development	50% of new in-fill development	100% new of in-fill development
Residential	25% reuse of existing buildings; 10% of new in-fill development	50% reuse of existing buildings; 25% of new in-fill development	75% reuse of existing buildings; 50% of new in-fill development	100% reuse of existing buildings; 100% of new in-fill development
Road Improvements	Widening of Bath Road and U.S. Route 1 Interchange (complete)	Internal Road System (complete)	-	-

Source: Boundy 2009.

Notes:
[1] Land use calculations include the NAS Brunswick, McKeen Street Housing Annex, and East Brunswick Transmitter Site properties.
[2] This development mix is an estimate of the final development mix; however, the mix is subject to change based on market conditions and other factors.

2.3.3 No-Action Alternative

The No-Action Alternative is the retention of the NAS Brunswick property by the U.S. government in caretaker status. Existing structures and land would not be reused or developed. Under this alternative, existing PPV residential housing would be expected to be occupied, per lease agreement. The No-Action Alterna-

tive would not take advantage of the site's location, physical characteristics, and infrastructure and would not foster the local redevelopment of NAS Brunswick. The No-Action Alternative is evaluated in detail in this EIS as prescribed by CEQ regulations.

2.4 Build-Out Analysis

As part of this EIS, a full build-out analysis of the NAS Brunswick property was conducted for both Alternatives 1 and 2. The build-out analysis is a projection of the maximum number of residential housing units and total floor area of commercial, business, industrial, and educational building space allowed under current Town of Brunswick zoning regulations. The zoning regulations establish a framework (i.e., minimum lot size, maximum building height, and maximum impervious area per building lot) that can be used to identify and project the maximum allowable development under Town of Brunswick land use laws, which after disposal regulates the use and development of the installation. The results of the build-out analysis were used in this EIS to assess impacts on human and natural environmental resources. The analysis was necessary because the Reuse Master Plan does not identify specific conditions (e.g., scale of development, number of residential units, square footage of non-residential floor space) that would result from full build-out of the property under Alternative 1. Without this data on future build-out conditions, analysis of some resource areas (i.e., land use, transportation) is not possible. The build-out analysis is only a projection of the maximum conditions allowed under current zoning regulations and based on standard land use planning assumptions. The build-out numbers identified are used in this EIS only for planning and assessment purposes and should not be interpreted as a definitive and absolute definition of conditions upon full build-out of either Alternative 1 or Alternative 2. The final build-out of the installation is subject to many variables, including future market conditions, changes to local and state land use regulations, and other development factors.

To ensure that the build-out analysis represents reasonable foreseeable conditions, the build-out methodology and final projections were reviewed by MRRA. In addition, planning assumptions, including a build-out time line and development mix, were provided by MRRA. Section 4.1 provides a summary of the build-out projections for Alternative 1 and Alternative 2 over the 20-year implementation period. The full build-out analysis is included in Appendix C.

2.5 Comparison of Alternatives

Table 2-5 presents a comparison of the environmental consequences of the alternatives being evaluated as part of this EIS.

Table 2-5 Comparison of Environmental Consequences

Resource	Alternative 1	Alternative 2	No-Action Alternative
Land Use	Land Use and Zoning: Reuse of the existing airfield and mix of land use types, including: ■ Airport operations (500 acres). ■ Aviation-related business (230 acres). ■ Professional office (120 acres). ■ Community mixed-use (175 acres). ■ Business and technology industries (190 acres). ■ Education district (200 acres). ■ Residential district (215 acres). ■ Recreation and open space (510 acres). ■ Natural areas (1,060 acres). The majority of proposed redevelopment is concentrated on approximately 1,630 acres of land in areas that have already been developed by the Navy. Full build-out would provide the land area to develop a maximum of: ■ 2,946 residential units. ■ 9.19 million square feet of non-residential floor space. ■ 250 hotel rooms. ■ 1,570 acres of recreation, open space, and natural areas.	Land Use and Zoning: No reuse of the existing airfield and mix of land use types, including: ■ Airport operations (0 acres). ■ Aviation-related business (0 acres). ■ Professional office (0 acres). ■ Community mixed-use (490 acres). ■ Business and technology industries (375 acres). ■ Education district (315 acres). ■ Residential district (400 acres). ■ Recreation and open space (340). ■ Natural areas (1,280 acres). The majority of redevelopment proposed is concentrated on approximately 1,580 acres of land, in areas that have already been developed by the Navy. Full build-out would provide the land area to develop a maximum of: ■ 8,220 residential units. ■ 11.01 million square feet of non-residential floor space. ■ 250 hotel rooms. ■ 1,620 acres of recreation, open space, and natural areas.	Land Use and Zoning: No reuse or redevelopment would occur at the installation under this alternative. Existing PPV residential housing would be expected to be occupied per the lease agreement. Would result in property being left unused or underutilized.
	Consistency with Local Planning (full build-out): Consistent with the objectives of the Reuse Master Plan Guiding Principles, *Town of Brunswick 2008 Comprehensive Master Plan*, and *Town of Brunswick Zoning Ordinance*.	Consistency with Local Planning (full build-out): Consistent with the objectives of the Reuse Master Plan Guiding Principles and *Town of Brunswick 2008 Comprehensive Master Plan*. However, it conflicts with the locally developed *Brunswick Naval Air Station Reuse Master Plan* and with the land use regulations identified in the amended *Town of Brunswick Zoning Ordinance*. Alternative 2 would require a reevaluation of the Town's zoning ordinance.	Consistency with Local Planning: Not consistent with the objectives of the Reuse Master Plan Guiding Principles, *Town of Brunswick 2008 Comprehensive Master Plan*, and *Town of Brunswick Zoning Ordinance*. Installation would remain federal property. Existing town zoning and land use plans would not be enforceable since the properties are owned by the federal government and are outside the jurisdiction of the Town of Brunswick.
Socioeconomics	Population (full build-out): ■ 5,082 people (net increase of 127 people over existing [2008] baseline conditions).	Population (full build-out): ■ 14,500 people (net increase of 9,545 people over existing [2008] baseline conditions).	Population: ■ 1,348 people (net decrease of 3,607 people from existing [2008] baseline conditions).
	Income and Employment (full build-out): ■ 14,160 direct jobs (net increase of 10,500 jobs over existing [2008] baseline conditions). ■ Net Present Value (NPV) of $397.7 million in new construction (including supplies and labor). ■ Positive off-base, indirect and induced employment and income impacts in both short and long term.	Income and Employment (full build-out): ■ 20,769 direct jobs (net increase of 17,109 jobs over existing [2008] baseline conditions). ■ NPV of $774.9 million in new construction (including supplies and labor). ■ Positive off-base, indirect and induced employment and income impacts in both short and long term.	Income and Employment: ■ 0 jobs (net loss of 3,660 jobs from existing [2008] baseline conditions). ■ No construction spending. ■ Negative off-base, indirect and induced employment and income impacts in both short and long term.
	Housing (full build-out): ■ 2,946 residential units.	Housing (full build-out): ■ 8,220 residential units	Housing: ■ 573 residential units (PPV housing only).

Table 2-5 Comparison of Environmental Consequences (continued)

Resource	Alternative 1	Alternative 2	No-Action Alternative
	Taxes and Revenue (full build-out): ■ Addition of 2,946 residential units to the property tax base. ■ Addition of 9.19 million square feet of non-residential space to tax base.	Taxes and Revenue (full build-out): ■ Addition of 8,220 residential units to the property tax base. ■ Addition of 11.01 million square feet of non-residential space to tax base.	Taxes and Revenue: ■ No change in property tax base; all property remains federally owned.
	Environmental Justice: No disproportionately high or adverse human health or environmental effects on minority or low-income populations.	Environmental Justice: No disproportionately high or adverse human health or environmental effects on minority or low-income populations.	Environmental Justice: No disproportionately high or adverse human health or environmental effects on minority or low-income populations.
Community Facilities and Services	Educational Facilities (full build-out): ■ 453 students (net loss of 250 students from existing [2008] baseline conditions). ■ No need to expand existing school capacity. ■ 200-acre educational district, which is targeted for the development of college-level academic, administrative, and support facilities.	Educational Facilities (full build-out): ■ 1,454 students (net gain of 751 students over existing [2008] baseline conditions). ■ Additional school capacity would be needed. ■ 315-acre educational district, which is targeted for the development of college-level academic, administrative, and support facilities.	Educational Facilities: ■ 243 students (net loss of 460 students from existing [2008] baseline conditions). ■ No need to expand existing school capacity. ■ No reuse or redevelopment of non-PPV property, and no new educational district.
.	Healthcare and Medical (full build-out): ■ Demand on local healthcare and medical services expected to increase.	Healthcare and Medical (full build-out): ■ Demand on local healthcare and medical services expected to increase.	Healthcare and Medical: ■ Demand on local healthcare and medical services expected to decrease.
	Public Safety and Emergency (full build-out): ■ Would expand the service area of the Brunswick police and fire departments by approximately 3,200 acres. ■ The town would lose some shared resources currently provided by the Navy. ■ Would be expected to result in an increase in the demand for public safety and emergency services provided by the town of Brunswick.	Public Safety and Emergency (full build-out): ■ Would expand the service area of the Brunswick police and fire departments by approximately 3,200 acres. ■ The town would lose some shared resources currently provided by the Navy. ■ Would be expected to result in an increase in the demand for public safety and emergency services provided by the town of Brunswick.	Public Safety and Emergency: ■ No changes to existing (2008) baseline conditions would be expected, and the Town of Brunswick Police and Fire Departments' responsibility for safety and emergency services would remain unchanged.
	Parks and Recreation (full build-out): ■ 510 acres of recreational and open space and 1,060 acres of conservation and natural areas. ■ New recreation, park, and conservation space represents a beneficial increase in the availability of such facilities to the neighboring communities. ■ No direct or indirect impacts would occur to 4(f) resources.	Parks and Recreation (full build-out): ■ 340 acres of recreational and open space and 1,280 acres of conservation and natural areas. ■ New recreation, park, and conservation space represents a beneficial increase in the availability of such facilities to the neighboring communities. ■ There is no airfield proposed under Alternative 2; thus, no Section 4(f) analysis is required.	Parks and Recreation: ■ No new recreation, park, or conservation spaces. Loss of recreational facilities due to no public use of existing recreational amenities, including ball fields, hiking trails, and the golf course. ■ There is no airfield proposed under the No-Action Alternative; thus, no Section 4(f) analysis is required.
Transportation	Access and Road Network (full build-out): ■ Opens the formerly secure military installation to public access. ■ Includes 8 access points.	Access and Road Network (full build-out): ■ Opens the formerly secure military installation to public access. ■ Includes 8 access points.	Access and Road Network: ■ No changes from existing (2008) baseline conditions.
	Traffic Volume (full build-out): ■ Projected 6,474 vehicle trips during the P.M. peak hour on the existing network of roads near NAS Brunswick (a net increase of 5,217 trips over existing [2008] baseline conditions).	Traffic Volume (full build-out): ■ Projected 10,593 vehicle trips during the P.M. peak hour on the existing network of roads near NAS Brunswick (a net increase of 9,336 trips over existing [2008] baseline conditions).	Traffic Volume: ■ Projected 210 vehicle trips during the P.M. peak hour on the existing network of roads near NAS Brunswick (a net decrease of 1,047 trips from existing [2008] baseline conditions).
	Construction-Related Traffic: Short-term impact.	Construction-Related Traffic: Short-term impact.	Construction-Related Traffic: No impact.

Table 2-5 Comparison of Environmental Consequences (continued)

Resource	Alternative 1	Alternative 2	No-Action Alternative
Environmental Management	Hazardous Waste and Materials: The quantity of hazardous materials used/generated, stored, and disposed of would be expected to be less than the quantity generated during the Navy's operation at NAS Brunswick and the outlying properties. Future operations or activities may use hazardous materials and generate hazardous wastes. These hazardous materials and wastes would be managed in accordance with federal and state regulations.	Hazardous Waste and Materials: The quantity of hazardous materials used, generated, stored, and disposed of would be less than the quantity generated during the Navy's operation at NAS Brunswick and the outlying properties. Since there would be no aviation component under this alternative, processes needed to support air operations that may use hazardous materials or generate hazardous waste would no longer be required. Future operations or activities may use hazardous materials and generate hazardous wastes. These hazardous materials and wastes would be managed in accordance with federal and state regulations.	Hazardous Waste and Materials: The property would be retained by the Navy in caretaker status. The Navy would close all facilities in accordance with federal and state regulations.
	Environmental Restoration Program: The Navy will continue in its role as lead agency for site investigations and remediation, with oversight by the EPA and MEDEP, at all sites identified through the Environmental Restoration Program. Currently planned cleanup activities at all Environmental Restoration Program sites will continue in order to achieve the cleanup standards established under RCRA, CERCLA, and SARA.	Environmental Restoration Program: The Navy will continue in its role as lead agency for site investigations and remediation, with oversight by the EPA and MEDEP, at all sites identified through the Environmental Restoration Program. Currently planned cleanup activities at all Environmental Restoration Program sites will continue in order to achieve the cleanup standards established under RCRA, CERCLA, and SARA.	Environmental Restoration Program: The Navy will continue in its role as lead agency for site investigations and remediation, with oversight by the EPA and MEDEP, at all sites identified through the Environmental Restoration Program. Currently planned cleanup activities at all Environmental Restoration Program sites will continue in order to achieve the cleanup standards established under RCRA, CERCLA, and SARA.
Air Quality	Construction Emissions: Construction-related emissions would not be permanent and primarily occur within the boundaries of NAS Brunswick, and impact would depend on construction activities and schedule yet to be determined by the MRRA. Emissions can be mitigated through best management practices.	Construction Emissions: Construction-related emissions would not be permanent and primarily occur within the boundaries of NAS Brunswick, and impact would depend on construction activities and schedule yet to be determined by the MRRA. Emissions can be mitigated through best management practices.	Construction Emissions: No adverse impact, as no reuse or redevelopment would take place.
	Cumberland County, Maine, is currently in attainment for all criteria pollutants, but is subject to a maintenance plan for ozone attainment. The federal action is a transfer of property and is therefore exempt from a Conformity Rule Determination under 40 CFR 93.153(c)(2)(xiv). 2016 represents the Maine SIP maintenance plan attainment year and corresponds with the completion of Phase 1, when total emissions would have decreased compared to existing emissions. Final Buildout in 2031 would result in an increase in emissions compared to existing conditions.	Cumberland County, Maine, is currently in attainment for all criteria pollutants, but is subject to a maintenance plan for ozone attainment. The federal action is a transfer of property and is therefore exempt from a Conformity Rule Determination under 40 CFR 93.153(c)(2)(xiv). 2016 represents the Maine SIP maintenance plan attainment year and corresponds with the completion of Phase 1, when total emissions would have decreased compared to existing emissions. Final Buildout in 2031 would result in an increase in emissions compared to existing conditions.	Cumberland County, Maine, is currently in attainment for all criteria pollutants, but is subject to a maintenance plan for ozone attainment. The federal action is a transfer of property and is therefore exempt from a Conformity Rule Determination under 40 CFR 93.153(c)(2)(xiv). Total Annual Emissions: Air emissions would be reduced for all criteria pollutant emissions, representing a beneficial impact on air quality.

Table 2-5 Comparison of Environmental Consequences (continued)

Resource	Alternative 1	Alternative 2	No-Action Alternative
	In 2016, annual emissions under Alternative 1 would represent a decrease in all NAAQS emissions except CO. In 2031, VOC and $PM_{10}/PM_{2.5}$ emissions would decrease from existing emission levels as a result of the discontinuation of Navy aircraft operations. However, CO, NO_X, and SO_2 emissions are estimated to increase, primarily the result of an increase in the use of energy in new building space, operations of the new aircraft and increased vehicle use. Mitigation measures would reduce emissions and partially offset impacts due to an increase in CO and SO_2. Specific analysis of the development projects and mitigation strategies would be necessary during build-out to accurately assess and effectively mitigate impacts during construction and operation of the new facilities. If applicable, emission sources would be required to meet MEDEP permitting requirements prior to construction and during operation.	In 2016, annual air emissions under Alternative 2 would represent a decrease in overall emissions from existing conditions, a result of the discontinuation of aircraft operations. In 2031, it is estimated that VOC, $PM_{10,}$ and $PM_{2.5}$ emissions would decrease from existing levels. However, NO_X, CO, and SO_2 emissions are estimated to increase because of an increase in the use of energy in buildings and vehicle use. The increases in NO_X, CO and SO_2 emissions could have an impact on air quality in the region. Mitigation measures would reduce emissions and partially offset impacts due to an increase in NOx, CO and SO_2. Specific analysis of the development projects and mitigation strategies would be necessary during build-out to accurately assess and effectively mitigate impacts during construction and operation of the new facilities. If applicable, emission sources would be required to meet MEDEP permitting requirements prior to construction and during operation.	
	Greenhouse Gas Emissions: The operation of stationary and mobile sources using fossil fuels would result in an increase in GHG emissions, mostly carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Total GHG emissions would represent a small percentage of total emissions from the U.S. (0.0018%) or the State of Maine (0.6%).	Greenhouse Gas Emissions: The operation of stationary and mobile sources using fossil fuels would result in an increase of GHG emissions, mostly carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Total GHG emissions would represent a small percentage of total emissions from the U.S. (0.0031%) or the State of Maine (1.0%).	Greenhouse Gas Emissions: GHG emissions would be reduced, representing a beneficial impact on air quality.
Noise	Traffic Noise: No impact.	Traffic Noise: No impact.	Traffic Noise: No adverse impact.
	Aircraft Noise: Annual aircraft operations are projected to increase to 45,500 operations per year, up from 24,709 operations in 2008. Noise associated with future aircraft operations would not be expected to have an impact on resources located outside of the airfield operations area. While the number of annual operations would be projected to increase, the noise impact from aircraft operations would be expected to decrease compared to existing conditions. This is because the majority of future aircraft operations are assumed to involve smaller, quieter aircraft compared to the military aircraft (e.g., P-3C Orion) that operated at NAS Brunswick.	Aircraft Noise: No impact; this Alternative does not include an aviation component.	Aircraft Noise: No adverse impact; the airfield would not be utilized.
	Construction Noise: Only short-term noise impacts would be expected during construction activities.	Construction Noise: Only short-term noise impacts would be expected during construction activities.	Construction Noise: No impact; no redevelopment or construction would take place.
Infrastructure	Water Supply (full build-out): ■ Water demand: 1.31million gpd (a net increase of 1.10 million gpd over existing [2008] baseline conditions).	Water Supply (full build-out): ■ Water demand: 2.85 million gpd (a net increase of 2.65 million gpd over existing [2008] baseline conditions).	Water Supply: No adverse impact. No reuse or redevelopment would occur at the installation under this alternative.

Table 2-5 Comparison of Environmental Consequences (continued)

Resource	Alternative 1	Alternative 2	No-Action Alternative
	■ Projected water demand within safe pumping capacity of Brunswick Topsham Water District (BTWD). ■ Would require upgrading the existing water supply infrastructure on the installation to meet BTWD and Town of Brunswick standards.	■ Projected water demand exceeds safe pumping capacity of BTWD by 70,000 gpd. ■ Would require upgrading the existing water supply infrastructure on the installation to meet BTWD and Town of Brunswick standards.	
	Wastewater (full build-out): ■ Wastewater volume: 1.20 million gpd (a net increase of 872,153 gpd over existing [2008] baseline conditions). ■ Exceeds future processing and infrastructure capacity of the Brunswick Sewer District. ■ An expansion of the district's processing capacity and intake infrastructure would likely be needed upon the implementation of Alternative 1. ■ Would require an upgrade of the existing installation wastewater system and the construction of new wastewater infrastructure.	Wastewater (full build-out): ■ Wastewater volume: 2.60 million gpd (a net increase of 2.27 million gpd over existing [2008] baseline conditions). ■ Exceeds future processing and infrastructure capacity of the Brunswick Sewer District. ■ An expansion of the district's processing capacity and intake infrastructure would likely be needed upon the implementation of Alternative 2. ■ Would require an upgrade of the existing installation wastewater system and the construction of new wastewater infrastructure.	Wastewater: No adverse impact. No reuse or redevelopment would occur at the installation under this alternative.
	Storm Water (full build-out): ■ 859 acres of impervious surface area (a net increase of approximately 343 acres over existing [2008] baseline conditions). ■ The majority of the impervious surface area would be concentrated in land areas that have already been developed by the Navy. ■ 11% increase in total impervious surface area over existing (2008) baseline conditions.	Storm Water (full build-out): ■ 944 acres of impervious surface area (a net increase of approximately 428 acres over existing [2008] baseline conditions). ■ The majority of the impervious surface area would be concentrated in land areas that have already been developed by the Navy. ■ 14% increase in total impervious surface area over existing (2008) baseline conditions.	Storm Water: No adverse impact. No reuse or redevelopment would occur at the installation under this alternative.
	■ Although a portion of existing structures and built areas would be reused, new storm water infrastructure may be necessary to offset new impervious surfaces associated with redevelopment under this alternative.	■ Although a portion of existing structures and built areas would be reused, new storm water infrastructure may be necessary to offset new impervious surfaces associated with redevelopment under this alternative.	
	Other Utility Systems: Electric: ■ At 5-year build-out: 22.21 million kilowatt hours (kWh) of electricity usage (9% decrease from existing [2008] baseline conditions). ■ At full build-out: 156.42 million kWh (538% increase over existing [2008] baseline conditions). ■ Electric utility infrastructure on the installation would need to be expanded, upgraded, or relocated to accommodate the final design at full build-out.	Other Utility Systems: Electric: ■ At 5-year build-out: 33.51 million kWh of electricity usage (37% increase over existing [2008] baseline conditions). ■ At full build-out: 207.89 million kWh (748% increase over existing [2008] baseline conditions). ■ Electric utility infrastructure on the installation would need to be expanded, upgraded, or relocated to accommodate the final design at full build-out.	Other Utility Systems: No adverse impact. No reuse or redevelopment would occur at the installation under this alternative.

Table 2-5 Comparison of Environmental Consequences (continued)

Resource	Alternative 1	Alternative 2	No-Action Alternative
	Natural gas: ■ At 5-year build-out: 754 thousand ccf (hundred cubic feet) of natural gas usage (34% decrease from existing [2008] baseline conditions). ■ At full build-out: 4.97 million ccf (335% increase over existing [2008] baseline conditions). ■ Natural gas utility infrastructure on the installation would need to be expanded, upgraded, or relocated to accommodate the final design at full build-out.	Natural gas: ■ At 5-year build-out: 1.02 million ccf of natural gas usage (11% decrease from existing [2008] baseline conditions). ■ At full build-out: 7.44 million ccf (551% increase over existing [2008] baseline conditions). ■ Natural gas utility infrastructure on the installation would need to be expanded, upgraded, or relocated to accommodate the final design at full build-out.	
Cultural Resources	Archaeological: Comprehensive archaeological surveys conducted by the Navy identified 27 sites that have been recommended for Phase II testing to evaluate their NRHP-eligibility. The Navy and the Maine SHPO have finalized and executed a Programmatic Agreement that identifies measures to avoid, reduce, or mitigate the adverse effects of the proposed action on these historic properties.	Archaeological: Comprehensive archaeological surveys conducted by the Navy identified 27 sites that have been recommended for Phase II testing to evaluate their NRHP-eligibility. The Navy and the Maine SHPO have finalized and executed a Programmatic Agreement that identifies measures to avoid, reduce, or mitigate the adverse effects of the proposed action on these historic properties.	Archaeological: No impact. No reuse or redevelopment would occur at the installation under this alternative.
	Architectural: The Navy conducted a comprehensive architectural identification update, which identified 20 properties that are NRHP-eligible under the 2006 Program Comment for World War II and Cold War Era (1939-1974) Ammunition Storage Facilities. Under the Program Comment, these properties require no further compliance under Section 106 of the NHPA; no additional mitigation measures are required.	Architectural: The Navy conducted a comprehensive architectural identification update, which identified 20 properties that are NRHP-eligible under the 2006 Program Comment for World War II and Cold War Era (1939-1974) Ammunition Storage Facilities. Under the Program Comment, these properties require no further compliance under Section 106 of the NHPA; no additional mitigation measures are required.	Architectural: No effect. No reuse or redevelopment would occur at the installation under this alternative.
Topography, Geology, and Soils	Topography: ■ Development would largely occur in areas that have already been developed by the Navy. ■ Some alteration of existing topography would be expected as a result of grading and associated cut-and-fill activities necessary to accommodate new building sites. ■ The remaining portion of the installation, about 1,570 acres, would be dedicated to preserving open space and natural areas.	Topography: ■ Development would largely occur in areas that have already been developed by the Navy. ■ Some alteration of existing topography would be expected as a result of grading and associated cut-and-fill activities necessary to accommodate new building sites. ■ The remaining portion of the installation, about 1,620 acres, would be dedicated to preserving open space and natural areas.	Topography: No impact. No reuse or redevelopment would occur at the installation under this alternative.
	Geology: No impact.	Geology: No impact.	Geology: No impact. No reuse or redevelopment would occur at the installation under this alternative.
	Soils: ■ The majority of redevelopment would be concentrated on approximately 1,630 acres of land, in areas that have already been developed by the Navy. ■ New construction could impact soils with erosion potential, hydric soils, soils with limited constructability, and soils identified as farmland of statewide importance. ■ 1,570 acres would be dedicated to preserving open space and natural areas.	Soils: ■ The majority of redevelopment would be concentrated on approximately 1,580 acres of land, in areas that have already been developed by the Navy. ■ New construction could impact soils with erosion potential, hydric soils, soils with limited constructability, and soils identified as farmland of statewide importance. ■ 1,620 acres would be dedicated to preserving open space and natural areas.	Soils: No impact. No reuse or redevelopment would occur at the installation under this alternative.

Table 2-5 Comparison of Environmental Consequences (continued)

Resource	Alternative 1	Alternative 2	No-Action Alternative
Water Resources	Surface Water: ■ Surface waters could be directly impacted by the construction of roads, the proposed 18-hole golf course, and pedestrian trails. ■ Surface waters are located in all of the proposed land use districts.	Surface Water: ■ Surface waters could be directly impacted by the construction of roads and pedestrian trails. ■ Surface waters are located in all of the proposed land use districts. ■ Unlike Alternative 1, the existing runways would be removed and redeveloped into residential and natural areas land uses, which could result in beneficial impacts on some surface water resources. ■ Development of the business and technology industries, education, and residential districts, expansion of the existing 9-hole golf course, construction of roads and pedestrian trails, and removal of the existing airfield could have the greatest potential for impacting surface waters.	Surface Water: No adverse impact. No reuse or redevelopment would occur at the installation under this alternative.
	Groundwater: The creation of new impervious surface at NAS Brunswick and the outlying properties (a net increase of approximately 343 acres over existing [2008] baseline conditions) located in the town of Brunswick could impact groundwater recharge in the area.	Groundwater: The creation of new impervious surfaces at NAS Brunswick and the outlying properties (a net increase of approximately 428 acres over existing [2008] baseline conditions) located in the town of Brunswick could impact groundwater recharge in the area.	Groundwater: No adverse impact. No reuse or redevelopment would occur at the installation under this alternative.
	Floodplains: ■ Proposed land uses within the natural areas land use district and education/natural areas would not impact floodplains. ■ Development in the other land use districts (airport operations and a small portion of the business and technology district) that may be located within a floodplain would be regulated by the Town of Brunswick.	Floodplains: ■ Proposed land uses within the natural areas land use district would not impact floodplains. ■ Development in the other land use districts (education and open space/recreation [golf course]) that may be located within a floodplain would be regulated by the Town of Brunswick.	Floodplains: No adverse impact. No reuse or redevelopment would occur at the installation under this alternative.
	Wetlands: There are a total of approximately 389 acres of wetlands located on NAS Brunswick. ■ Approximately 338 acres of wetlands, including approximately 17 acres of subtidal estuary, are located within the recreation/open space and natural area land use districts and would have limited potential for future development. ■ An additional 51 acres of wetlands scattered throughout the property may be potentially impacted by future development.	Wetlands: There are a total of approximately 389 acres of wetlands located on NAS Brunswick. ■ Approximately 265 acres of wetlands, including approximately 17 acres of subtidal estuary, are located within the recreation/open space and natural area land use districts and would have limited potential for future development. ■ An additional 124 acres of wetlands scattered throughout the property may be potentially impacted by future development.	Wetlands: No adverse impact. No reuse or redevelopment would occur at the installation under this alternative.

Table 2-5 Comparison of Environmental Consequences (continued)

Resource	Alternative 1	Alternative 2	No-Action Alternative
Biological Resources	Vegetation: At full build-out, 1,146 acres of undeveloped land, including 690 acres of upland forest, could be affected, and 25 acres of critically imperiled Sandplain Grassland and 50 acres of maintained grass could be developed. Long-term conservation and preservation of 1,060 acres of natural ecological communities. At the McKeen Street Housing Annex, there would be no impact. At the East Brunswick Radio Transmitter Site, 64 acres of critically imperiled Sandplain Grassland could be impacted. At the Sabino Hill Rake Station, all 0.23 acre would be impacted as it would become a gravel parking lot.	Vegetation: At full build-out, 1,068 acres of undeveloped land, including 578 acres of upland forest, could be affected, and 65 acres of critically imperiled Sandplain Grassland and 301 acres of maintained grass could be developed. Long-term conservation and preservation of 1,280 acres of natural ecological communities. At the McKeen Street Housing Annex, there would be no impact. At the East Brunswick Radio Transmitter Site, 64 acres of critically imperiled Sandplain Grassland could be impacted. At the Sabino Hill Rake Station, all 0.23 acres would be impacted as it would become a gravel parking lot.	Vegetation: No redevelopment would occur. The grassland habitat around the airfield would be maintained by annual mowing. At the McKeen Street Housing Annex, there would be no impact. At the East Brunswick Radio Transmitter Site, unmanaged grasslands would eventually turn into scrub-shrub communities and woody vegetation could encroach. At the Sabino Hill Rake Station, the site would eventually integrate into adjacent Oak-Pine Woodland.
	Wildlife: Small terrestrial mammals, amphibians, and reptiles would be the wildlife most likely to be impacted. Upon completion of construction, recolonization would be expected. No impact on aquatic wildlife would be expected. No impact on important bird areas or essential fish habitat. No significant adverse effects on populations of migratory bird species covered under the MBTA.	Wildlife: Small terrestrial mammals, amphibians, and reptiles would be the wildlife most likely to be impacted. Upon completion of construction, recolonization would be expected. No impact on aquatic wildlife would be expected. There could be impacts on important bird areas as 366 acres of habitat could be removed. No impact would be expected on essential fish habitat. No significant adverse effects on populations of migratory bird species covered under the MBTA.	Wildlife: No redevelopment would occur. Wildlife abundance would likely increase due to decreased human activity. Diversity would likely remain constant, as the variety of habitats would be maintained. No impacts on important bird areas, as grassland habitat around the airfield would be maintained by annual mowing.
	Threatened or Endangered Species: ■ Federal - None ■ State - three listed species (the upland sandpiper, grasshopper sparrow, and the clothed sedge). Potential impact as prime habitat could be permanently removed. Any party proposing development or other land disturbance in these districts would be required to consult with the MDIFW to receive the appropriate permits and clearances. ■ Areas around the airfield would continue to be maintained in accordance with FAA requirements and would remain suitable habitat for state-listed species. ■ 25 acres of critically imperiled Sandplain Grassland habitat could be removed, impacting the grasshopper sparrow and other grassland bird species, including state species of special concern.	Threatened or Endangered Species: ■ Federal - None ■ State - three listed species (the upland sandpiper, grasshopper sparrow, and the clothed sedge). Potential impact as prime habitat could be permanently removed. Any party proposing development or other land disturbance in these districts would be required to consult with the MDIFW to receive the appropriate permits and clearances.	Threatened or Endangered Species: ■ Federal - None ■ State - three state-listed species (the upland sandpiper, grasshopper sparrow, and the clothed sedge). No impact, as the Sandplain Grassland habitat around the airfield would be maintained by annual mowing.
	Bald and Golden Eagle Protection Act: ■ No impact on nesting and foraging areas.	Bald and Golden Eagle Protection Act: ■ No impact on nesting and foraging areas.	Bald and Golden Eagle Protection Act: ■ No impact on nesting and foraging areas.

Table 2-5 Comparison of Environmental Consequences (continued)

Resource	Alternative 1	Alternative 2	No-Action Alternative
	Significant Wildlife Habitat: ■ Potential impact on 34 vernal pools and 15 significant vernal pools and associated buffer areas. The MEDEP consultation process and the requirement for obtaining an NRPA permit would result in avoidance, minimizing, or mitigating any impacts on vernal pools or significant vernal pools. ■ Potential impact on deer wintering area. ■ Potential impact on 25 acres of critically imperiled Sandplain Grassland and 7 acres of Pitch Pine-Heath Barren.	Significant Wildlife Habitat: ■ Potential impact on 33 vernal pools and 12 significant vernal pools and associated buffer areas. The MEDEP consultation process and the requirement for obtaining an NRPA permit would result in avoidance, minimizing, or mitigating any impacts on vernal pools or significant vernal pools. ■ Potential impact on 366 acres of grassland, including 65 acres of critically imperiled Sandplain Grassland. ■ Potential impact on 7 acres of critically imperiled Pitch Pine-Heath Barren.	Significant Wildlife Habitat: ■ No impact.

3 Existing Environment

This section summarizes the existing environment for each relevant human and natural environmental resource potentially impacted by the proposed action. Resource areas examined include land use and zoning (Section 3.1); socioeconomics (Section 3.2); community facilities and services (Section 3.3); transportation (Section 3.4); environmental management (Section 3.5); air quality (Section 3.6); noise (Section 3.7); infrastructure (Section 3.8); cultural resources (Section 3.9); topography, geography, and soils (Section 3.10); water resources (Section 3.11); and biological resources (Section 3.12).

The study area examined includes NAS Brunswick and the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station (the latter three of which are referred to in this EIS as the Outlying Properties). The study area also includes, where applicable, the town of Brunswick, the Brunswick Labor Market Area (LMA), and the State of Maine.

The year 2008 represents existing baseline conditions[1]. This is based on the fact that 2008 was the last full year of operations at NAS Brunswick. This baseline year best represents existing conditions and provides a meaningful point from which to compare potential future environmental, social, and economic effects of the proposed action. The condition of the human and natural resources during this year performs the important function of serving as an environmental baseline against which the environmental consequences of the alternatives considered in this EIS are measured and compared. The environmental impacts on each resource are described in Section 4, Environmental Consequences.

The information and data used in the preparation of this EIS were obtained by reviewing existing documents and studies, including literature, maps, and planning documents; conversations and coordination with local, state, and federal stakeholders and officials; and fieldwork and studies conducted specifically in support of this EIS.

[1] In a typical NEPA document the No- Action Alternative serves as the baseline to compare potential environmental consequences. However, in this document, the baseline consists of DoD operations in 2008 at the installation, whereas the No-Action Alternative is closure of the installation with no redevelopment of the property. Only the existing PPV housing would be reoccupied.

3.1 Land Use

This section summarizes the existing land use conditions at NAS Brunswick, the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station. Also provided is a discussion of the land use and zoning surrounding the installation and the regulations that dictate the development and use of this land.

3.1.1 Existing Land Use

3.1.1.1 NAS Brunswick

NAS Brunswick comprises approximately 3,137 acres in the town of Brunswick, Cumberland County, Maine. The installation is situated between the Androscoggin River, Coastal Highway (U.S. Route 1), and Maine Route 24 to the north and Casco Bay inlet to the south.

NAS Brunswick is a multi-functional military installation that has evolved over many years to serve various missions. The installation is divided into several distinct land uses (i.e., residential, industrial/maintenance, community services and administration, recreational, and undeveloped), and its two active 8,000-foot runways and associated aviation infrastructure are the principal land use features. The built environment consists of a variety of buildings, including aviation support facilities, administrative and training areas, recreation and retail establishments, medical facilities, storage areas, and housing. Construction of these facilities spans from the 1940s to the present day.

The surface road network within NAS Brunswick is comprised of several main arterial roads and smaller roads that provide access to individual buildings and residences throughout the installation. The installation contains approximately 100,000 feet of paved roadway, ranging in width from 12 feet to 80 feet (Town of Brunswick 2005).

Access to NAS Brunswick is provided via two active gates, which are restricted to military personnel, military family members, retirees, contractors, and employees. The Main Gate, which is located south of the intersection of Fitch Avenue and Bath Road (ME Route 24), provides primary access to the installation. A second gate, Dyer's Gate, provides secondary access to the western portion of the installation. Dyer's Gate is used for contractors, trucks, and vehicle security inspections and is located along Merriconeag Road, which intersects Harpswell Road (ME Route 123) on the western boundary of NAS Brunswick. In addition to these two active gates, three inactive gates exist but have been closed since 2001. Two of the inactive gates are located on the eastern boundary of the installation at the western end of Forrestal Drive (Forrestal Gate) and the western end of Purinton Road. The third inactive gate is located along Harpswell Road on the western boundary of the installation. Figure 3.1-1 identifies the location of these access points. Additional information on transportation resources is presented in Section 3.4.

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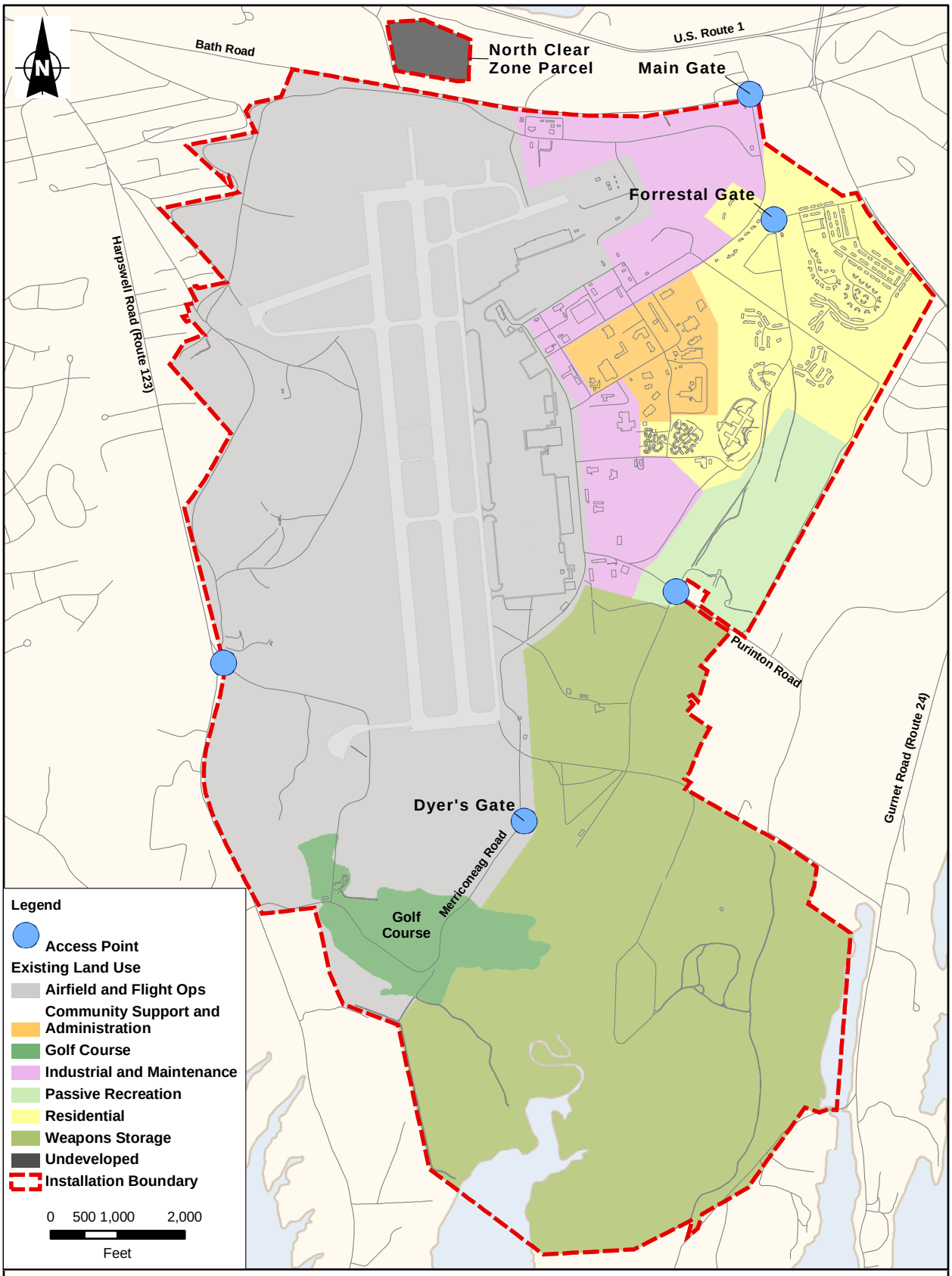

Source: Adapted from NAS Brunswick Master Plan (Prosser Hallock, Inc. 2002).

Figure 3.1-1
Existing Land Use
NAS Brunswick, Maine

The land areas that compromise NAS Brunswick are broadly classified by activity into several land use categories, which are discussed below. Figure 3.1-1 identifies the locations of these land uses at NAS Brunswick.

- **Airfield and Flight Operations Area.** The largest portion of the installation's land area, approximately 1,427 acres, is dedicated to airfield and flight operations. The primary focus of activities in this area centers on the use and maintenance of the installation's parallel runways and apron areas. The airfield includes two parallel runways, each 8,000 feet long and 200 feet wide; a 75-foot-wide parallel taxiway to the east of the runways; six taxiways perpendicular to the runways; the airfield lighting system; a navigation system; approximately 134 acres of concrete parking aprons; a helicopter landing area; a weapons loading area; and support facilities. The runways, taxiways, and aircraft parking apron were upgraded in 2001 (Town of Brunswick 2005).

  Airfield support facilities include a control tower, administration area, aircraft hangars (Hangars 5 and 6), a ground-support equipment, deicing, and other aircraft-related facilities. A fuel farm is located at the northern end of this land use area and includes two fuel tanks, which are surrounded by containment berms, and other aviation fuel support facilities. A large portion of the airfield operations area is preserved as open space, which acts as a protective buffer for flight activities. This area includes portions of the clear zones and accident potential zones located at either end of the runways. The majority of the airfield operations area is enclosed by perimeter fencing.

- **Community Support and Administration Area.** This area is located in the northeast portion of the installation and compromises approximately 73 acres. The area contains numerous community and administrative services and functions, including the Navy Exchange, Navy Lodge, Recreation Mall, Commander Patrol and Reconnaissance Wing Five Headquarters, and the medical center. This area also includes day care, recreational, training, and educational facilities.

- **Golf Course Area.** An approximately 93-acre golf course (Mere Creek) with clubhouse and snack bar is located on the southern end of the installation. The area includes a 9-hole golf course, putting practice area, driving range, 3,000-square-foot clubhouse area, a 2,800-square-foot maintenance building, and gravel parking area. The golf course is open to the public and can be accessed from Harpswell Road.

- **Industrial and Maintenance Area.** This area occupies approximately 240 acres in the northeastern portion of the installation. Most of the installation's industrial, warehouse, and maintenance facilities are located in this area. A large portion of this area, located between Bath Road and Fitch Avenue, is comprised of undeveloped land.

- **Passive Recreation.** This area includes approximately 103 acres of passive recreation land and is utilized for outdoor recreation activities. Recreational amenities in this area include baseball/softball fields, picnic areas, and a trail

system. A portion of this area is undeveloped natural woodlands. In addition to this area, other ball fields, a soccer field, and passive recreational amenities are scattered throughout the installation.

- **Undeveloped Area.** This 26-acre parcel of undeveloped land is known as the North Clear Zone Parcel. It is located in the town of Brunswick, directly north of NAS Brunswick and opposite Bath Road. Development within the North Clear Zone Parcel is limited to protect installation aircraft operations and to limit the public's exposure to aircraft noise and accident potential.

- **Residential Area.** Residential land uses occupy approximately 255 acres in the northeast portion of the installation. This area contains 342 single- and multi-family residential units. The residential units are grouped into several neighborhoods, including Mariners Landing, Brunswick Gardens, Midway Terrace, Station Quarters, and Woodland Village I & II. An additional 70 acres of residential land use is located at the McKeen Street Housing Annex. The single- and multi-family residential housing units located at NAS Brunswick (342 units) and the McKeen Street Housing Annex (231 units) are managed through a PPV agreement. Under a 50-year lease agreement, the housing units are owned, operated, and managed through a PPV, but the land underlying the housing units is owned by the federal government.

  In addition to the single- and multi-family residential units, bachelor enlisted quarters (266 dormitory-style housing units) and transient visitor facilities (351 hotel-style housing units) are also located at NAS Brunswick, south of the single- and multi-family residential areas. The bachelor and transient quarters are not managed through the PPV agreement. Table 3.1-1 provides a list of the residential areas and the number of units.

Table 3.1-1 Residential Units at NAS Brunswick and the McKeen Street Housing Annex

Name	Number of Dwelling Units
Single- and Multi-Family PPV Housing	
Mariners Landing	126
Woodland Village	72
Midway Terrace	62
Brunswick Gardens	44
Station Quarters	16
Woodland Village II	22
McKeen Street Housing Annex	231
Total	**573**
Bachelor Quarters	
Buildings 730-749	266
Total	**266**
Transient Quarters	
Building 31 (Navy Lodge)	26
Building 512 (Orion Inn)	75
Building 750 (Transient Visitors Quarters)	250
Total	**351**

Source: BLRA 2007c.

- **Weapons Storage Area.** A 920-acre weapons compound is located in the southeast portion of the installation. The majority of this area is comprised of a large, undeveloped buffer area consisting of natural woodlands and tidal wetlands surrounding the fenced weapons compound. The weapons compound includes ordnance storage buildings; an administrative area; and a former explosive ordnance disposal area.

3.1.1.2 Outlying Properties

Several outlying properties, which include the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station, are also part of the BRAC action. These properties are described below and identified on Figure 3.1-2.

- **McKeen Street Housing Annex.** This 70-acre complex, which is located within a residential area in the town of Brunswick, is a fully developed residential neighborhood that includes single- and multi-unit housing. The Annex is located approximately 3.3 miles west of NAS Brunswick's main gate. With 231 single- and multi-family housing units, the McKeen Street Housing Annex is almost fully built-out as a residential area. The single- and multi-family residential housing units located in the Annex are managed through a PPV agreement. Table 3.1-1 provides a list of the residential areas and number of units. The Annex is accessible from McKeen Street and Baribeau Drive.

- **East Brunswick Radio Transmitter Site.** This 66-acre site is located in the town of Brunswick, approximately 2 miles northeast of NAS Brunswick, between U.S. Route 1 and Old Bath Road. The property is comprised of undeveloped open space. The site had contained a radio transmitter antenna and several buildings, but these were dismantled in 1998 (Geo-Marine 2001). The unsecured site is located within a rural/low-density residential/forested area and is accessible from Old Bath Road.

- **Sabino Hill Rake Station.** The Sabino Hill Rake Station is located in the town of Phippsburg, approximately 14 miles southeast of NAS Brunswick's main gate. The station is situated on approximately 0.23 acre of undeveloped land. An unused, secure, and gated observation tower is located on the station. The remainder of the property is comprised of open space and is unsecured. The site is situated along Perkins Farm Lane, which is accessible from Popham Road.

3.1.2 Surrounding Land Use and Zoning

The land outside the NAS Brunswick, the McKeen Street Housing Annex, and the East Brunswick Radio Transmitter Site property boundaries lies within the jurisdiction of the town of Brunswick. Land use and development within the town is regulated by the *Town of Brunswick Zoning Ordinance* (Town of Brunswick 2009a) and guided by the *2008 Town of Brunswick Comprehensive Plan* (Town of Brunswick 2008a). The land area surrounding NAS Brunswick, the McKeen Street Housing Annex, and the East Brunswick Radio Transmitter Site is comprised of a mix of residential, commercial, and educational land uses, natural ar-

eas, and town-regulated zoning districts. These land uses and zoning districts are designated in the Comprehensive Plan as either "growth areas" and/or "rural areas." No national forests are located in the study area or the vicinity of NAS Brunswick or the outlying properties.

The growth and rural planning areas are intended to guide the pattern and intensity of current development and planned future land use. Growth areas are intended to accommodate most future residential and non-residential development in the town. Rural areas are where intensive and dense land uses are discouraged in order to maintain the rural character of these areas and protect their significant natural resources and scenic values. The growth and rural areas are identified in the *2008 Town of Brunswick Comprehensive Plan* (Town of Brunswick 2008a). Land use within the growth and rural areas is dictated by the *Town of Brunswick Zoning Ordinance* (Town of Brunswick 2009a), which regulates the use of land and the location, design, construction, alteration, occupancy, and use of structures.

Figure 3.1-3 identifies land uses surrounding NAS Brunswick, the McKeen Street Housing Annex, and the East Brunswick Transmitter Site. These uses are located in the town of Brunswick growth and rural planning areas as specified below:

- **Brunswick Naval Air Station Planning Area.** In the existing baseline year, 2008, the northern portion of the NAS Brunswick property is located within an area zoned "I5" (Business and Industry 5/BNAS). The southern portion of the installation is located within an area zoned "Farm-Forest 2." However, in anticipation of the reincorporation of the properties back into the town and to support the implementation of the Reuse Master Plan, the Town of Brunswick has amended its zoning ordinance to include three new zoning districts that incorporate uses proposed at NAS Brunswick (Town of Brunswick 2009a). The three zoning districts—BNAS Reuse District, BNAS Conservation District, and College Use/Town Conservation District—are described in more detail in Section 4.1.1.1.

  In addition to the zoning districts, the Town's "Aquifer Protection Zone 2" and "Natural Resource Protection Zone (NRPZ)" extend onto the installation property. These overlay districts establish an additional layer of zoning. Aquifer Protection Zone 2 extends over the northwestern corner of the installation property and the North Clear Zone Parcel. Multiple fingers of the NRPZ extend across the northern, eastern, southern, and western boundaries of the installation. However, current town zoning is not enforceable since the installation property is owned by and under the jurisdiction of the federal government.

- **Coastal Protection Area.** The Coastal Protection Area is located to the southwest, south, and southeast of the installation. A designated rural area, it includes large blocks of natural areas such as forests and wetlands. The limited development found in this area is primarily scattered single-family residences on large lots. Permitted uses include low-density residential and farming uses. Commercial use is limited. With respect to development in this area, emphasis is placed on regulating and managing water resources and

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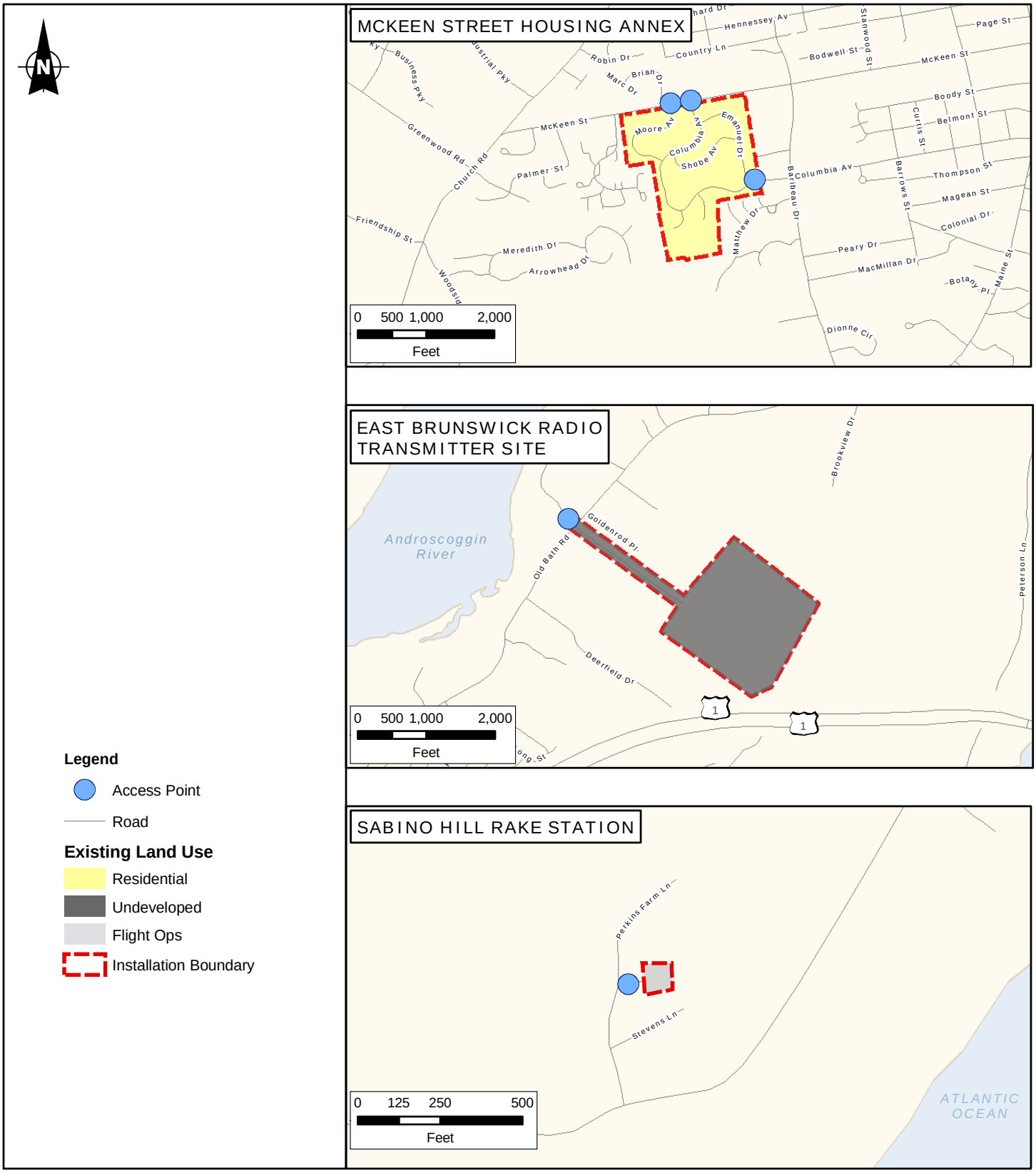

Source: Adapted from NAS Brunswick Master Plan (Prosser Hallock, Inc. 2002).

Figure 3.1-2
Outlying Properties, Existing Land Use
NAS Brunswick, Maine

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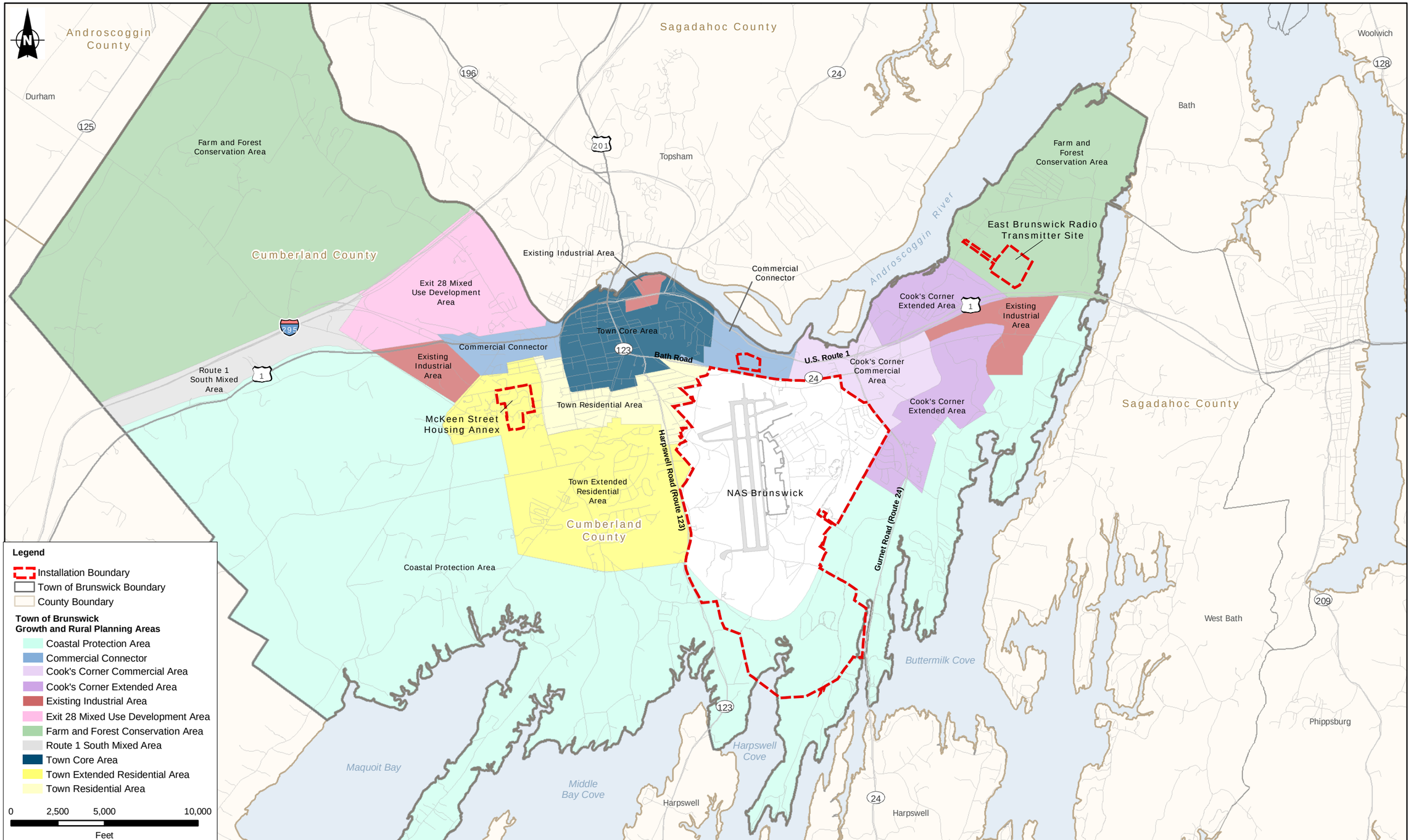

Source: Adopted from Town of Brunswick 2008a

Figure 3.1-3
Town of Brunswick Planning Areas
Brunswick, Maine

preserving environmental systems and rural resources. The Coastal Protection Area includes land that is adjacent to Maquoit Bay, Mere Point Bay, and Middle Bay, as well as the areas adjacent to the New Meadow River south of U.S. Route 1.

- **Commercial Connector.** This growth area is located directly to the north of the installation boundary and is currently zoned for highway commercial land uses. This area also includes the 26-acre North Clear Zone parcel, which is owned by the federal government.

- **Cook's Corner Commercial Hub.** This growth area is located adjacent to the northeast corner of the installation and includes the commercial areas around the intersection of Bath and Gurnet Roads. The area is currently zoned as the Cook's Corner Center district and includes a mix of commercial and retail land uses.

- **Cook's Corner Extended Area.** Located to the northeast of the installation, the Cook's Corner Extended Area is zoned for residential and mixed land uses.

- **Farm and Forest Conservation Area.** This rural area surrounds the East Brunswick Radio Transmitter Site and is comprised of low-density residential, agricultural, and rural business land uses.

- **Town Core Area.** This growth area is located to the northwest of the installation and encompasses the downtown Brunswick business district. The Town Core is the center of the community and includes a dense mixed-use area where civic services, retail and commercial businesses, and higher density residential uses are located. The area also includes a large portion of the Bowdoin College campus. This area includes the Town Center, In-town Residential, College Use (i.e., classroom facilities, dormitories, and educational support buildings), and Mixed Use zoning districts.

- **Town Extended Residential.** Located adjacent to the western boundary of the installation, the Town Extended Residential area includes the Meadowbrook-Parkview, Maquoit Road, Merredith-McKeen, and River Road neighborhoods. The growth area is currently zoned for residential land uses. Two hospitals (the Parkview Adventist Medical Center and facilities associated with Mid Coast Health Services) are located in this area within the town's Medical Use Overlay Zone. The McKeen Street Housing Annex is also located within the Town Extended Residential area.

- **Town Residential Area.** Located directly northwest of the installation, this growth area includes older residential neighborhoods and a portion of the Bowdoin College Campus. This area is zoned for Residential, In-town Residential, Mixed, and College land use districts.

- **Sabino Hill Rake Station.** This rake station is located in the town of Phippsburg. Land use and development within the town is regulated by the *Town of*

Phippsburg Land Use Ordinance and guided by the *2005 Town of Phippsburg Comprehensive Plan* (Town of Phippsburg 1993, 2006). The rake station property is zoned for "Business" and is located within the town of Phippsburg's Popham growth planning area. The area surrounding the Rake Station is comprised of mostly woodlands and is zoned as "Public Lands" (Town of Phippsburg 2004). The majority of the land within the Popham planning area is owned and managed by the State of Maine Department of Conservation (Town of Phippsburg 2006). Figure 3.1-3 identifies the land uses surrounding the Sabino Hill Rake Station.

Gateway 1 Corridor Action Plan

The Town of Brunswick recently contributed to the 2009 Gateway Corridor Action Plan, which was developed by the Gateway 1 Steering Committee. The Committee includes representatives from the U.S. DOT, MaineDOT, and the Maine State Planning Office, and community members in Mid-Coast Maine. The purpose of the plan was to address regional and local land use character and transportation issues along Routes 1 and 90. The corridor encompasses 20 municipalities and extends from Brunswick to Stockton Springs, Maine (Gateway 1 Steering Committee 2009). The Town of Brunswick is an end point on the corridor and is designated as an area for concentrated growth. The Town of Brunswick has adopted the Gateway 1 Corridor Action Plan (Brown 2010).

The plan describes the historic, low-density development land use patterns, alternative patterns of development, and the resulting affects on community character, job growth, infrastructure, and transportation. The preferred development concept involves concentrating job growth within compact areas defined for each of the 20 Gateway 1 communities. These growth areas were based on the Comprehensive Plans, availability of sewer and water service, existing development, and relative absence of wetlands, floodplains, and similar restrictions to development (Gateway 1 Steering Committee 2009). The compact residential, commercial, and mixed-use core growth areas were connected to a variety of transportation methods, including ride-sharing, transit, multi-modal freight, passenger rail where available, walking, and bicycling. This concept also emphasizes rural preservation across large areas between the core growth areas of development (Gateway 1 Steering Committee 2009).

The Gateway 1 Corridor Action Plan suggests a coordinated effort for transportation improvement projects to meet forecasted (year 2030) transportation needs along Routes 1 and 90 in the Gateway 1 Corridor study area. Each municipality would identify and endorse transportation projects and provide ideas to the Gateway 1 Corridor Coalition. The Gateway 1 Corridor Coalition, creation of which was recommended by the Gateway Steering Committee, would be established when at least 12 municipalities, MaineDOT, and the Maine State Planning Office voluntarily enter into a cooperative agreement to work together to implement the Plan on a regional level. The Gateway 1 Corridor Coalition would serve to share and fine tune land use and transportation planning and share ideas with MaineDOT and the State Planning Office. Although the Coalition does not hold any land use planning authority, the municipalities along the corridor signed an endorsement letter and agreed to implement the concepts of the plan.

3.1.3 Coastal Zone Management

The Coastal Zone Management Act (CZMA) of 1972 (16 U.S.C., Section 1451, et seq., as amended) provides assistance to states, in cooperation with federal and local agencies, for developing land and water use programs in coastal zones. Section 307 of the CZMA stipulates that when a federal project initiates reasonably foreseeable effects on any coastal use or resource (land or water use, or natural resource), that action must be consistent to the maximum extent practicable with the enforceable policies of the affected state's federally approved coastal management plan. Federal agencies must also give consideration to management program provisions that are in the nature of recommendations.

The State of Maine has a federally approved Coastal Zone Management Program known as the Maine Coastal Program (MCP). The State Planning Office administers the program. The State of Maine's federally approved coastal zone extends from the inland boundary of all 147 coastal towns that contain tidal waters to the outer limit of the State's territorial jurisdiction, which is 3 nautical miles (NM) into the Atlantic Ocean. The enforceable policies of the MCP are contained in the following twenty "core laws":

(1) Natural Resources Protection Act;

(2) Mandatory Shoreland Zoning Law;

(3) Site Location of Development Act;

(4) Erosion Control and Sedimentation Law;

(5) Storm Water Management Law;

(6) Subdivision Law;

(7) Maine Rivers Act;

(8) Maine Waterway Development and Conservation Act;

(9) Coastal Management Policies Act;

(10) Protection and Improvement of Air Law;

(11) Protection and Improvement of Waters Act;

(12) Nutrient Management Act;

(13) Land Use Regulation Law;

(14) Maine Hazardous Waste, Septage and Solid Waste Management Act;

(15) Nuclear Facility Decommissioning Laws;

(16) Oil Discharge and Pollution Control Law;

(17) Maine Resources Law;

(18) Coastal Barrier Resources System Act;

(19) Maine Endangered Species Act; and

(20) Fee Schedule.

NAS Brunswick is located within the State of Maine's federally approved coastal zone; however, federal lands (such as NAS Brunswick) are excluded from being assessed for coastal zone consistency. If, however, federal activity on these properties has reasonably foreseeable effects on any land or water use or natural resource in Maine's coastal zone, a federal consistency review must still be completed.

3.2 Socioeconomics

This section provides a discussion of the socioeconomic conditions (population, income, employment, and housing) at NAS Brunswick, the McKeen Street Housing Annex and the communities surrounding these properties. The East Brunswick Radio Transmitter Site and the Sabino Hill Rake Station do not house or employ any personnel (civilian or military) and, therefore, are not discussed in this section. NAS Brunswick and McKeen Street Housing Annex are located within the Brunswick Labor Market Area (LMA) (as defined below) and are assumed to be included in any discussion of the Brunswick LMA. Also provided in this section is a discussion of Executive Order 12898 (Environmental Justice) as it applies to these areas.

The socioeconomic study area is defined as the Brunswick LMA. A labor market area (also known as a Micropolitan Statistical Area) is defined by the U.S. Department of Labor, Bureau of Labor Statistics, as an economically integrated geographic area that contains at least one urban cluster with a population of at least 10,000 but less than 50,000, plus adjacent territory that has a high degree of social and economic integration with the core as measured by commuting ties. (If the urban cluster has over 50,000 people, it would be considered a Metropolitan Statistical Area.) The urban cluster, or largest municipality, within the Brunswick LMA is the town of Brunswick. The Brunswick LMA also includes 15 other municipalities, including: the city of Bath, Perkins Township, and the towns of Arrowsic, Bowdoin, Bowdoinham, Georgetown, Phippsburg, Richmond, Topsham, West Bath, and Woolwich (all within Sagadahoc County); the town of Harpswell (within Cumberland County); and the towns of Dresden, Westport, and Wiscasset (all within Lincoln County). Figure 3.2-1 identifies the Brunswick LMA and the municipalities contained within the LMA.

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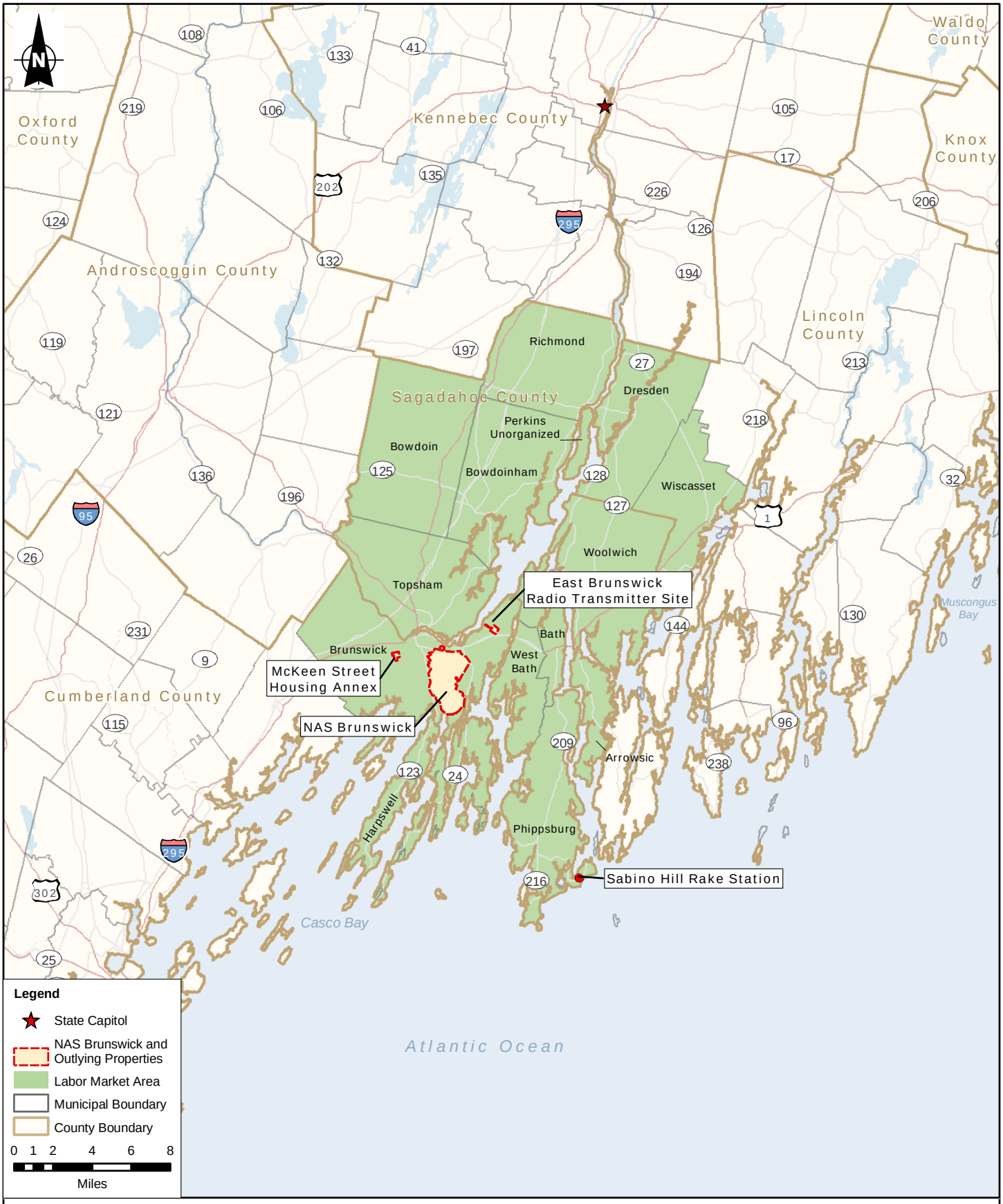

Source: Maine Department of Labor 2010.

Figure 3.2-1
Brunswick Labor Market Area
Maine

Although the baseline for this EIS is defined as 2008, as explained in the introduction to Section 3, data from 2007 was used to develop some portions of Section 3.2 as it is the most current data available from the U.S. Census Bureau.

Local sources were used to obtain data for the period beyond the 2008 baseline. Specifically, population projections (Section 3.2.1) and employment projections (Section 3.2.3) were obtained from the Maine State Planning Office (Maine State Planning Office 2008) and Maine Department of Labor (Maine Department of Labor 2008), respectively. No similar reports were available from which to obtain projections for income, housing, or taxes and revenues; thus, only the 2008 baseline figures are presented.

3.2.1 Population

The Brunswick LMA had a total estimated population of 68,836 in 2007 (U.S. Census Bureau 2009a), and the town of Brunswick, the largest municipality within the Brunswick LMA, had a population of 21,160. Since 2000, the town of Brunswick has experienced a 0.06% decrease in total population, and the Brunswick LMA has experienced an approximate 1.8% increase in total population. This is a lower growth rate than the 3.1% increase experienced overall in the State of Maine since 2000. Table 3.2-1 shows the population estimates for the town of Brunswick, the Brunswick LMA, and the State of Maine from 1990 to 2007.

Table 3.2-1 Study Area Population (1990, 2000, and 2007)

	1990	2000	2007	% Change 2000 to 2007
Town of Brunswick	20,906[a]	21,172[a]	21,160[b]	-0.06%
Brunswick LMA[1]	64,781[a]	67,598[a]	68,836[b]	+1.83%
State of Maine	1,227,928[a]	1,274,923[a]	1,314,780[b]	+3.13%

Sources:
[a] U.S. Census Bureau 1990, 2000.
[b] U.S. Census Bureau 2009a.

Note:
[1] The Brunswick LMA was not a designated area during the 2000 Census. The data utilized in this study for the Brunswick LMA for the year 2000 are a summation of the 2000 Census population statistics for each of the 16 municipalities included in the LMA.

As of 2008, approximately 2,234 active-duty and 868 reserve military personnel were stationed at NAS Brunswick (Joy 2009a). The military personnel and their family members either reside in military-provided housing units or in housing units in the surrounding socioeconomic study area. In addition, a substantial number of active-duty military personnel, retired military personnel, and military family members live in proximity to NAS Brunswick. According to the Defense Eligibility Enrollment Reporting System (DEERS), in 2008 approximately 3,615 active-duty military personnel and their 4,668 family members, and 1,735 retired military personnel and their 2,548 family members were living within 10 miles of NAS Brunswick (see Table 3.2-2). The DEERS system is a database of military sponsors, families, and others worldwide who are entitled to military benefits. These personnel are not all associated with operations at NAS Brunswick and represent all major branches of the military service. However, the majority of active-duty military personnel and retired military personnel living in proximity to the

installation currently serve or have served in the Navy. Of note, the exact number of NAS Brunswick military associated family members (i.e., spouses and children) is unknown and not documented by the Navy.

Table 3.2-2 Estimated Number of Active-duty Military Personnel, Retired Personnel, and Their Family Members Living within 10 miles of NAS Brunswick (2008)

	Active[1]	Retired
Army		
Military	278	173
Family Members	302	187
Air Force		
Military	2	172
Family Members	77	210
Marine Corps		
Military	29	56
Family Members	61	71
Navy		
Military	2,722	1,173
Family Members	3,315	1,734
U.S. Coast Guard		
Military	1	47
Family Members	32	60
Reserve		
Military	583	114
Family Members	881	286
Total		
Military	**3,615**	**1,735**
Family Members	**4,668**	**2,548**

Source: Joy 2009a.

Note:
[1] Some ratios between military and family members may appear incorrect; however, this may represent situations where a service member is not colocated with family members (e.g., due to deployment, etc.) and the family members are accounted for in these figures while the military service member is not.

The Maine State Planning Office developed population projections for counties and municipalities in February of 2008. County-level projections were based on a general model that evaluated birth, death, and migration rates by gender and age. Municipality projections were then derived from the countywide projections (Maine State Planning Office 2008).

Population projections for the study area are shown in Table 3.2-3. The population of the Brunswick LMA is projected to increase by slightly over 4,000 between 2010 and 2030. The town of Brunswick is projected to experience an increase in population until 2010 followed by a slight decrease. The population of the State of Maine is expected to increase by over 100,000 between 2010 and

2030. Table 3.2-3 presents population projections for the town of Brunswick, the Brunswick LMA, and the State of Maine.

Table 3.2-3 Population Projections (2010, 2020, and 2030)

Municipality	2000	2010	% Change (2000 to 2010)	2020	% Change (2010 to 2020)	2030	% Change (2020 to 2030)
Town of Brunswick	21,172	21,749	+2.73%	21,607	-0.65%	20,811	-3.68%
Brunswick LMA	67,598	72,149	+6.73%	75,290	+4.35%	76,334	+1.39%
State of Maine	1,274,923	1,362,938	+6.90%	1,434,404	+5.24%	1,469,211	+2.43%

Source: Maine State Planning Office 2008.

3.2.2 Income

For 2007, the median household incomes of both the town of Brunswick and the Brunswick LMA were higher than that of the State of Maine. Since 1999, however, the median household income, when adjusted for inflation, has decreased in all three areas. Table 3.2-4 presents the household income data for the study area and the State of Maine.

Table 3.2-4 Median Household Income (1999 and 2007)

Municipality	1999 Median Household Income[a,2] (adjusted to 2007 dollars)[b]	2007 Median Household Income (dollars)[c]	Change	
			Net (dollars)	%
Town of Brunswick	$50,282	$49,786	-$496	-1.0%
Brunswick LMA[1]	$53,280	$51,954	-$1,326	-2.5%
State of Maine	$46,347	$45,211	-$1,136	-2.5%

Sources:
[a] U.S. Census Bureau 2000.
[b] U.S. Department of Labor 2009.
[c] U.S. Census Bureau 2009a.

Notes:
[1] The Brunswick LMA was not a designated area during the 2000 Census. The data utilized in this study for the Brunswick LMA for the year 2000 are derived from a combination of the 2000 Census income statistics for each of the 16 municipalities included in the LMA.
[2] The 1999 median household income is adjusted for inflation to allow for comparison with 2007 median household income statistics.

For the purposes of this analysis, the U.S. Census Bureau's definition and measure of poverty was used. The U.S. Census Bureau follows the Office of Management and Budget's (OMB) Statistical Policy Directive 14, whereby a set of money income thresholds that vary by family size and composition are used to determine who is in poverty. If the family's total income is less than the family's threshold, then that family—and each member of the family—is considered in poverty (U.S. Census Bureau 2009b).

The percentage of individuals below the poverty level is lower in the town of Brunswick and the Brunswick LMA than in the state as a whole. Since 2000, the Brunswick LMA has experienced a slight decrease in the percentage of families below the poverty level, while both the town of Brunswick and the state have experienced a small growth in the percentage of families below the poverty level.

Table 3.2-5 presents the 2000 and 2007 poverty rates for the town of Brunswick, the Brunswick LMA, and the State of Maine.

Table 3.2-5 Poverty Status (2000 and 2007)

Municipality	Persons Below Poverty Level in 2000 (% of total)[a]	Persons Below Poverty Level in 2007 (% of total)[b]	% Change from 2000 to 2007
Town of Brunswick	8.0%	11.4%	+3.4%
Brunswick LMA[1]	8.5%	9.7%	+1.2%
State of Maine	10.9%	12.8%	+1.9%

Sources:
[a] U.S. Census Bureau 2000.
[b] U.S. Census Bureau 2009a.

Note:
[1] The Brunswick LMA was not a designated area during the 2000 Census. The data utilized in this study for the Brunswick LMA for the year 2000 are derived from a combination of the 2000 Census poverty status statistics for each of the 16 municipalities included in the LMA.

3.2.3 Employment

Approximately 3,660 people were employed or stationed at NAS Brunswick in 2008. This includes 558 civilian employees, 2,234 active-duty military personnel, and 868 reserve military personnel (Joy 2009a). The installation is one of the principal employers in the study area. The installation provides an estimated $187 million to the local economy, including $115 million in salaries, $38 million in contracts and material purchases, and $34 million in medical purchases (ERA 2007). Other major employers include the Bath Iron Works, educational and healthcare institutions, banking, and retail businesses. Table 3.2-6 identifies the major employers in the town of Brunswick. In regard to the number of civilian employees at NAS Brunswick in 2008, it should be noted that the Town of Brunswick and NAS Brunswick provided slightly different figures; however, employment at the installation can fluctuate from the beginning to the end of the year, and this may account for the difference in civilian employment figures.

Table 3.2-6 Town of Brunswick, Principal Employers (2000 and 2008)

Employer	Number of Employees 2000	Number of Employees 2008	Net Difference
1. Bath Iron Works	1,100	1,500	+400
2. Mid Coast Health Services	702	1,200	+498
3. Bowdoin College	705	875	+170
4. NAS Brunswick (civilian)	657	700	+43
5. Town of Brunswick	655	690	+35
6. Wal-Mart Stores, Inc.	230	373	+143
7. L.L. Bean, Inc., Manufacturing Division	435	338	-97
8. Parkview Memorial Hospital	345	230	-115
9. Bank of America	300	200	-100
10. Hannaford Brothers	177	197	+20

Source: Town of Brunswick 2008b.

The total civilian labor force (population age 16 years and over) within the study area has increased since 2000. This growth has resulted in a civilian labor force of approximately 9,681 in the town of Brunswick and 36,643 in the Brunswick LMA, an increase of 11.1% and 8.1%, respectfully, since 2000 (see Table 3.2-7). These increases are larger than the percentage increase experienced at the state level.

Table 3.2-7 Employment Status (2000 and 2007)

Labor Force Statistic	Town of Brunswick		Brunswick LMA[1]		State of Maine	
	2007[a]	% Change Since 2000[b]	2007[a]	% Change Since 2000[b]	2007[a]	% Change Since 2000[b]
Population 16 years and over	17,117	+1.7%	55,499	+4.6%	1,069,271	+5.8%
in labor force	10,687	+5.0%	37,690	+5.9%	700,027	+6.2%
■ Civilian labor force	9,681	+11.1%	36,643	+8.1%	696,567	+6.3%
– Employed	9,312	+10.4%	34,932	+6.7%	656,374	+5.2%
– Unemployed	369	+30.4%	1,711	+46.5%	40,193	+29.0%
■ Armed Forces	1,006	-54.0%	1,047	-37.5%	3,460	-17.3%
Not in labor force	6,152	-4.2%	17,809	+1.8%	369,244	+5.2%

Sources:
[a] U.S. Census Bureau 2009a.
[b] U.S. Census Bureau 2000.

Note:
[1] The Brunswick LMA was not a designated area during the 2000 Census. The data utilized in this study for the Brunswick LMA for the year 2000 are derived from the 2000 Census for employment status for each of the 16 municipalities included in the LMA.

The unemployment rate within the Brunswick LMA is less than that of the state as a whole. The study area and the State of Maine are currently experiencing the highest unemployment rates since 1992 (Maine Department of Labor 2009). These high unemployment rates are consistent with current national unemployment rate, which, due to the current economic recession, is at the highest level in 16 years (U.S. Department of Labor 2009). Table 3.2-8 presents annual unemployment rates for the Brunswick LMA and the State of Maine. Comparable data are not available for the town of Brunswick.

Table 3.2-8 Brunswick LMA and Maine Unemployment Rates (2000 to 2008)

Year	Brunswick LMA	State of Maine
2009[1]	7.4	8.8
2008	4.5	5.4
2007	3.9	4.6
2006	4.0	4.6
2005	4.3	4.9
2004	3.7	4.6
2003	4.0	5.0
2002	3.6	4.3
2001	3.1	3.7
2000	2.7	3.3

Source: Maine Department of Labor 2009.
Note:
[1] Only partial data are available for 2009 (January through March).

The largest industries, in terms of employment, in the town of Brunswick are retail trade; professional, scientific, management, administrative, and management services; and education, health care, and social assistance. Each of these industries has experienced double-digit growth in employment since 2000.

Within the Brunswick LMA, the largest industries include construction; manufacturing; retail trade; finance, insurance, real estate and leasing; professional, scientific, management, administrative, and management services; education, health care, and social assistance; arts, entertainment, recreation, accommodation; and food services. Since 2000, the study area has experienced a decline in the number employed in manufacturing; transportation, warehousing, and utilities; information; and public administration. In the Brunswick LMA, small seasonal peaks (May through November) are experienced in agriculture, construction, transportation, and the leisure and hospitality industries (Maine Department of Labor 2008). Table 3.2-9 identifies employment by industry sector within the town of Brunswick, the Brunswick LMA, and the State of Maine.

Table 3.2-9 Employment by Industry Sector (2007)

	Town of Brunswick		Brunswick LMA[1]		State of Maine	
Industry Sector	2007[a]	Change since 2000[b]	2007[a]	Change since 2000[b]	2007[a]	Change since 2000[b]
Civilian Employed Population (16 years of age and over)	**10,279**	**+10.4%**	**34,932**	**+6.7%**	**656,374**	**+5.2%**
Agriculture, forestry, fishing, hunting, and mining	77	-18.1%	802	+5.7%	16,185	+0.6%
Construction	624	+47.5%	2,788	+22.7%	54,550	+27.1%
Manufacturing	862	-7.3%	3,906	-22.4%	69,069	-22.3%
Wholesale trade	336	+92.0%	839	+31.9%	19,326	-10.0%
Retail trade	1,805	+25.9%	5,865	+21.6%	88,818	+5.2%
Transportation, warehousing, and utilities	86	-67.3%	853	-23.0%	25,690	-4.3%
Information	125	-60.1%	495	-36.9%	13,463	-12.0%
Finance, insurance, real estate, and leasing	436	-6.6%	1,782	+14.5%	40,678	+5.8%
Professional, scientific, management, administrative, and management services	1,009	+27.1%	2,573	-3.7%	50,973	+18.3%
Education, health care, and social assistance	3,283	+22.5%	8,832	+19.1%	168,425	+16.2%
Arts, entertainment, recreation, accommodation, and food services	949	+4.4%	3,022	+15.6%	52,663	+18.1%
Other services (except public administration)	365	+3.7%	1,694	+13.5%	28,641	-1.9%
Public administration	322	-32.8%	1,481	-5.3%	27,893	+0.1%

Sources:
[a] U.S. Census Bureau 2009a.
[b] U.S. Census Bureau 2000.

Note:
[1] The Brunswick LMA was not a designated area during the 2000 census. The data utilized in this study for the Brunswick LMA for the year 2000 are derived from the 2000 census for employment by industry sector for each of the 16 municipalities included in the LMA.

Statewide, between 2006 and 2016, Maine Department of Labor expects employment to shift away from the industrial and technology sectors, and employment opportunities are projected to be concentrated in service-providing industries. Education and health services, retail trade, and leisure and hospitality services are expected to create about 75% of all new jobs (Maine Department of Labor 2008). Table 3.2-10 identifies the projected employment by industry for the State of Maine.

Table 3.2-10 Employment by Industry for State of Maine (Projected for 2016)

Industry	Projected Employment Change from 2006 to 2016	
	Net	% Change
Agriculture, forestry, fishing, hunting, and mining	+208	+3.6%
Construction	+1,288	+4.1%
Manufacturing	-7,671	-12.8%
Wholesale trade	+1,691	+7.8%
Retail trade	+2,689	+3.1%
Transportation, warehousing, and utilities	+1,041	+7.3%
Information	+198	+1.8%
Finance, insurance, real estate, and leasing	+1,094	+3.4%
Professional, scientific, management, administrative, and management services	+5,890	+11.4%
Education, health care, and social assistance	+18,988	+18.1%
Arts, entertainment, recreation, accommodation, and food services	+5,651	+9.5%
Other services (except public administration)	+290	+1.8%
Public administration (government, non-military)	-233	-0.2%

Source: Maine Department of Labor 2008.

3.2.4 Housing

3.2.4.1 Military Housing

The Maine State Planning Office estimates that over 68% of the civilian employees and 77% of the military personnel stationed at NAS Brunswick live within the Brunswick LMA (Renski and Reilly 2007).

Approximately 1,190 units of single-family, multi-family, bachelor quarters, and transient quarters are located on NAS Brunswick and the McKeen Street Housing Annex. The military housing is currently utilized by a portion of the military personnel and their family members stationed at NAS Brunswick, the balance of whom reside in the off-installation housing in the community. The single- and multi-family residential housing units located on NAS Brunswick (342 units) and the McKeen Street Housing Annex (231 units) are managed through a PPV agreement (BLRA 2007a). Under a 50-year lease agreement, the housing units are owned, operated, and managed through a PPV, but the land underlying the housing units is still owned by the Navy. The 617 bachelor and transient quarters are not managed by PPV agreement. Additional information about installation housing is presented in Section 3.1 of this EIS. Table 3.2-11 presents a list of the residential areas and number of associated housing units.

Table 3.2-11 Residential Units, NAS Brunswick and McKeen Street Housing Annex (2007)

Name	Number of Dwelling Units
Single- and Multi-Family PPV Housing	
Mariners Landing	126
Woodland Village	72
Midway Terrace	62
Brunswick Gardens	44
Station Quarters	16
Woodland Village II	22
McKeen Street Housing Annex	231
Total	**573**
Bachelor Quarters	
Buildings 730-749	266
Total	**266**
Transient Quarters	
Building 31 (Navy Lodge)	26
Building 512 (Orion Inn)	75
Building 750 (Transient Visitors Quarters)	250
Total	**351**

Source: BLRA 2007a.

3.2.4.2 Regional Housing Inventory

In 2007 the State of Maine had a total of 690,572 housing units, of which 21.5% were vacant. Outside of NAS Brunswick and the McKeen Street Housing Annex there are approximately 34,173 housing units in the Brunswick LMA, of which 9,459 housing units are located within the town of Brunswick (U.S. Census Bureau 2009c). The town of Brunswick, the Brunswick LMA, and the State of Maine have all experienced a net increase in the number of housing units since 2000. Approximately 6.4% of housing units in the town of Brunswick and 17.5% of housing units in the Brunswick LMA are vacant. The numbers of occupied and vacant housing units within the study area are identified in Table 3.2-12.

The majority of housing units in the study area are owner-occupied. The town of Brunswick has a larger proportion of renter-occupied housing units than the Brunswick LMA. On average, the household size of owner-occupied units is larger than renter-occupied units. Table 3.2-13 identifies the housing tenure and average household size of owner- and renter-occupied housing units in the town of Brunswick, the Brunswick LMA and the State of Maine.

Table 3.2-12 Housing Units and Vacancy Rates (2000 and 2007)

Municipality	2000[a]	2007[b]	Change	
			Net	Percent
Town of Brunswick	**8,720**	**9,459**	**+739**	**+8.5%**
Occupied	8,150	8,849	+699	+8.6%
Vacant	570	610	+40	+7.0%
Vacancy rate	6.5%	6.4%	-	-
Brunswick LMA	**31,771**	**34,173**	**+2,402**	**+7.6%**
Occupied	27,039	28,186	+1,147	+4.2%
Vacant	4,732	5,987	+1,255	+26.5%
Vacancy rate	14.9%	17.5%	-	-
State of Maine	**651,901**	**690,572**	**+38,671**	**+5.9%**
Occupied	518,200	524,424	+6,224	+1.2%
Vacant	133,701	148,148	+14,447	+10.8%
Vacancy rate	20.5%	21.5%	-	-

Sources:
[a] U.S. Census Bureau 2000.
[b] U.S. Census Bureau 2009a.

Note:
[1] The Brunswick LMA was not a designated area during the 2000 census. The data utilized in this study for the Brunswick LMA for the year 2000 are derived from the 2000 Census data for each of the 16 municipalities included in the LMA.

Table 3.2-13 Housing Tenure – Occupied Housing Units (2007)

	Town of Brunswick	Brunswick LMA	State of Maine
Housing Tenure			
Owner-occupied units	5,760 (65.1%)	20,648 (73.3%)	395,213(72.9%)
Renter-occupied units	3,089 (34.9%)	7,538 (26.7%)	147,211 (27.1%)
Total	**8,849**	**28,186**	**542,424**
Average Household Size (people per unit)			
Owner-occupied units	2.39	2.46	2.46
Renter-occupied units	1.92	2.19	2.06

Source: U.S. Census Bureau 2009a.

Most housing units in the State of Maine, town of Brunswick, and Brunswick LMA consist of single-family detached units. The town of Brunswick has a lower percentage of single-family detached units (51%) than the Brunswick LMA (68%). The town of Brunswick also has a higher percentage of attached multi-units (29%) than the Brunswick LMA (17%) and has experienced an approximately 42.8% growth in multi-units with 10 or more units since the year 2000. The majority of attached multi-units in both the town and Brunswick LMA have three or more units per structure. About 10% of all housing units are comprised of mobile homes; however, there has been an almost 12% decline in the proportion of mobile homes since the year 2000. Table 3.2-14 identifies the composition of housing in the State of Maine, town of Brunswick, and Brunswick LMA.

Table 3.2-14 Number of Housing Units by Type (2007)

Type of Structure	Town of Brunswick		Brunswick LMA		State of Maine	
	2007[a]	% Change Since 2000[a,b]	2007[a]	% Change Since 2000[a,b]	2007[a]	% Change Since 2000
Single-family detached	4,810	+13.3%	23,370	+12.2%	472,848	+7.6%
Attached – 1 unit	715	+2.4%	1,719	+27.0%	15,357	+6.7%
Attached – 2 units	613	-1.6%	1,609	+5.1%	37,167	+1.6%
Attached – 3 to 9 units	1,291	+6.9%	2,738	-7.9%	70,335	+6.6%
Attached – 10 or more units	801	+42.8%	1,341	+19.5%	30,708	+42.1%
Mobile home	1,229	-11.2%	3,396	-12.5%	64,001	+0.2%
Total	**9,459**	**+8.5%**	**34,173**	**+7.8%**	**690,572**	**+5.9%**

Sources:
[a] U.S. Census Bureau, 2009a.
[b] U.S. Census Bureau 2000.

The majority of housing units in the State of Maine, town of Brunswick, and Brunswick LMA have two or three bedrooms. Since the year 2000, in the town of Brunswick, there has been a 58.9% increase in the number of units without a bedroom and a 43.6% increase in the number of one-bedroom units. Table 3.2-15 presents a breakdown, by number of bedrooms, of housing units in the town of Brunswick, Brunswick LMA, and the State of Maine.

Table 3.2-15 Number of Housing Units by Number of Bedrooms (2007)

Number of Bedrooms	Town of Brunswick	Brunswick LMA	State of Maine
No bedroom	267	654	12,068
1 bedroom	1,738	4,127	91,032
2 bedrooms	2,571	10,435	209,531
3 bedrooms	3,263	13,352	258,972
4 bedrooms	1,302	4,480	92,656
5 or more bedrooms	318	1,125	26,313
Total	**9,459**	**34,173**	**690,572**

Source: U.S. Census Bureau 2009a.

3.2.4.3 Regional Housing Market Value and Rental Rates

The 2007 median home price in the town of Brunswick was $225,000, which is slightly higher than in the Brunswick LMA, and the State of Maine. The town of Brunswick had the third-highest median housing price in the Brunswick LMA; only the towns of Harpswell and Phippsburg had higher median housing prices. Similarly, according to the Maine State Housing Authority's affordability index, homeownership is slightly more affordable in the Brunswick LMA as a whole than in the town of Brunswick. The affordability index essentially takes into account the median home price and the median household income for the area. In the Brunswick LMA, 68.7% of households are unable to afford the median price of a home, compared to 75.5% of households in the town of Brunswick (Maine State Housing Authority 2007a). Table 3.2-16 provides the median home price and affordability of homeownership in the town of Brunswick, Brunswick LMA, and State of Maine.

Table 3.2-16 Median Home Price and Affordability of Homeownership (2007)

Municipality	Median Home Price	Income Needed to Afford Median Home Price	Households Unable to Afford Median Home Price
Town of Brunswick	$225,000	$79,780	75.5%
Brunswick LMA	$210,000	$69,249	68.7%
State of Maine	$185,900	$61,568	65.7%

Source: Maine State Housing Authority 2007a, 2008a.

The average 2007 rents for apartments in the Brunswick LMA are presented in Table 3.2-17. According to the Maine State Housing Authority's affordability index, a 2-bedroom apartment is slightly more affordable in the Brunswick LMA than in the town of Brunswick. In the State of Maine, 57.7% of households are unable to afford the median price of a 2-bedroom apartment, compared to 56.5% of households in the Brunswick LMA and 57.1% of households in the town of Brunswick (Maine State Housing Authority 2007b; King 2009). Table 3.2-18 presents the median price and affordability of 2-bedroom apartments in the State of Maine, town of Brunswick, and Brunswick LMA.

Table 3.2-17 Average Rents for Apartments in the Brunswick LMA (2007)

Number of Bedrooms	Average Rent
Efficiency	$551
1	$712
2	$920
3	$1,055
More than 4	$1,320

Source: Maine State Housing Authority 2007b.

Table 3.2-18 Median 2-Bedroom Rent Price and Rental Affordability (2007)

Municipality	Median 2-Bedroom Rent	Income Needed to Afford Median 2-Bedroom Rent	Households Unable to Afford Median 2-Bedroom Rent
Town of Brunswick	$955	$38,195	57.1%
Brunswick LMA	$920	$36,801	56.5%
State of Maine	$842	$33,678	57.7%

Source: Maine State Housing Authority 2007b; King 2009.

Approximately 20% of all rental units in the Brunswick LMA receive government-subsidized housing assistance. The majority of the subsidized units are family units and senior housing units. Table 3.2-19 identifies the number of subsidized housing units in the Brunswick LMA.

Table 3.2-19 Subsidized Housing Units in the Brunswick LMA (2007)

Population	Number of Units	Percent of all Rental Units
Family units	806	9.7%
Senior units	698	8.4%
Disabled units	19	0.2%
Special needs units	137	1.6%
Total	**1,660**	**20.0%**

Source: Maine State Housing Authority 2007b.

3.2.4.4 Regional Housing Market Sales Transactions and Prices

Since 2001 the housing market in the study area surrounding NAS Brunswick has been relatively stable (see Figures 3-2.2 and 3-2.3). Real estate transaction data for the town of Brunswick were obtained from the town's tax assessor's office (Donovan 2009a, 2009b). These transactions were organized by real estate type (i.e., single-family homes, commercial, etc.). In order to make a comparison of similar property types, single-family homes were used for this analysis (it also offered the highest number of real estate transactions). In addition, the town of Brunswick represents almost 30% of the housing units in the Brunswick LMA, and the results of the analysis on this sample data set were assumed to represent the Brunswick LMA in its entirety.

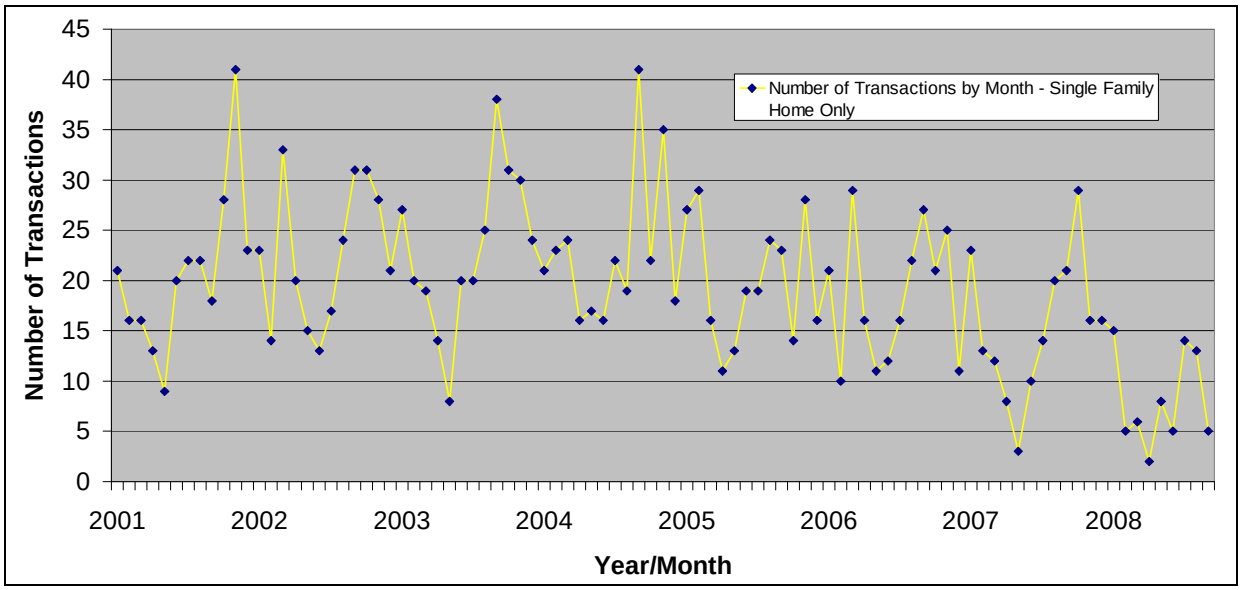

Figure 3.2-2 Town of Brunswick, Housing Market Sales Transactions (October 2001 to June 2009)

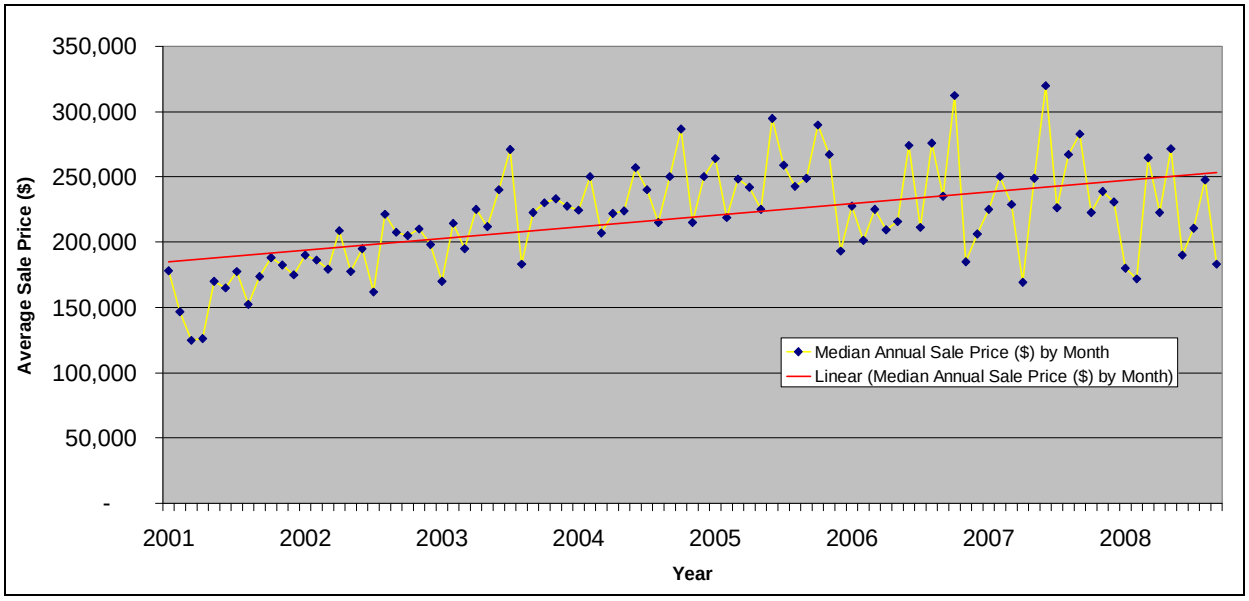

Figure 3.2-3 Town of Brunswick, Single-Family Home, Median Sales Price (October 2001 to June 2009)

Real estate transactions for single-family homes were analyzed for the period from October 2001 through June 2009. Figure 3.2-2 presents the number of transactions, by month, in the town of Brunswick. There is a cyclical nature to the transactions, with more transactions typically occurring in the spring, summer, and fall.

Figure 3.2-3 presents the median sale price of single-family home transactions, by month, in the town of Brunswick during the same mid-2001 to mid-2009 time frame. In general, the area has seen a gradual increase in home prices over this period, especially from 2001 until 2006. In the following years (2007-2009), the median sale price becomes more erratic from month to month, and the most recent months show a slight decline.

As with the town of Brunswick, the housing market in the State of Maine has been relatively stable since 2001 (see Figures 3-2.4 and 3-2.5). Real estate transaction data for the State of Maine were obtained from the Maine Association of Realtors (Guild 2009). The data capture the total number of single-family homes sold per month, which corresponds with the data presented for the town of Brunswick. In addition, data from the same period (October 2001 to June 2009) were analyzed to better compare real estate activity between the State of Maine and the town of Brunswick. Figure 3-2.4 presents the number of transactions, by month, in the State of Maine (Guild 2009). As with the sales trends in the town of Brunswick, there is a cyclical nature to the transactions, with more transactions typically occurring in the spring, summer, and fall.

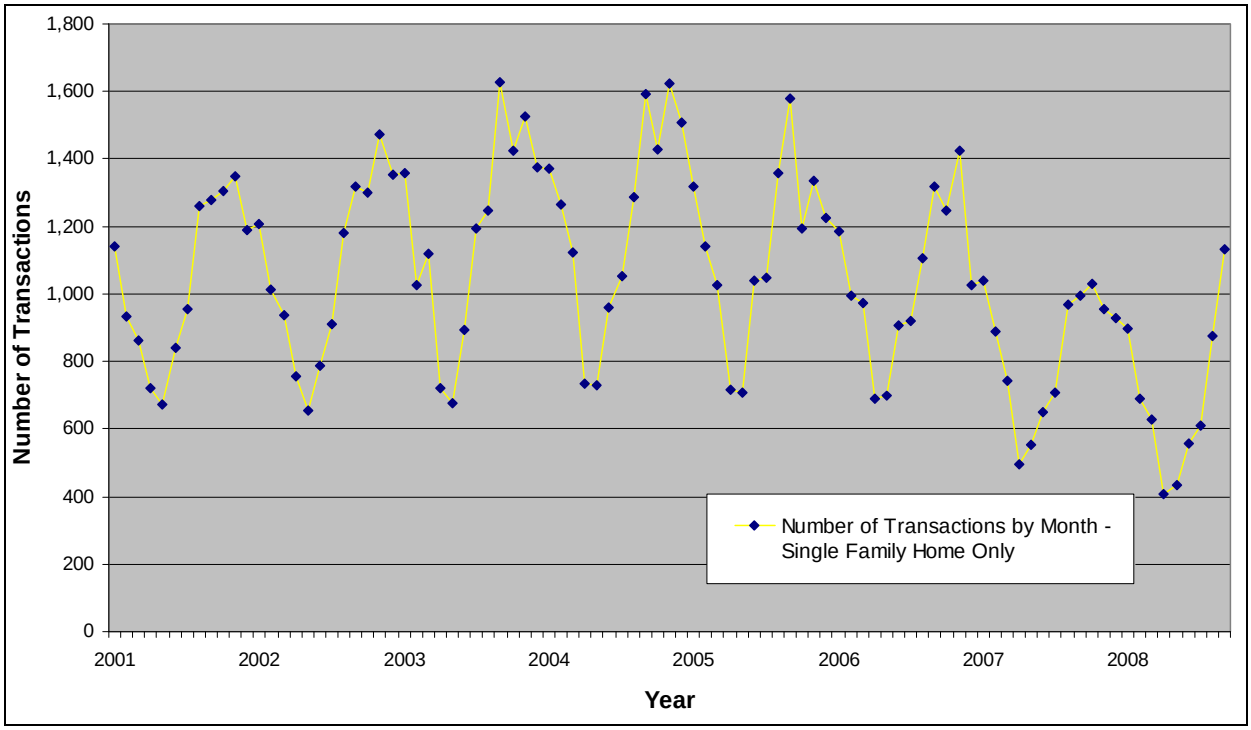

Figure 3.2-4 State of Maine, Housing Market Sales Transactions (October 2001 to June 2009)

Figure 3.2-5 presents the median sale price of single-family home, by month, in the State of Maine during the same time frame (October 2001 to June 2009) (Guild 2009). Similar to the Town of Brunswick, the State of Maine has experienced a gradual increase in home prices over this period, especially from 2001 until 2006. From 2007 to 2008 there was a slight decline in the median sales price, and from 2008 to 2009 there was a sharper decline. In the beginning of 2009 there was a slight increase in the median sales price, but it has yet to return to the peak median sale price reached in 2006.

3.2.5 Taxes and Revenue

NAS Brunswick is located in the town of Brunswick, which is a part of Cumberland County. The proposed Cumberland County budget for the fiscal year (FY) ending June 30, 2009, was $15,634,952, a 2.4% increase from the actual FY 2008 budget. The Cumberland County budget would be funded through property taxes and other revenue sources. Of this $15.6 million, the County assumes that approximately $10.6 million would be generated through property taxes, of which and estimated $1.1 million would be paid by property owners in the town of Brunswick (County of Cumberland n.d.).

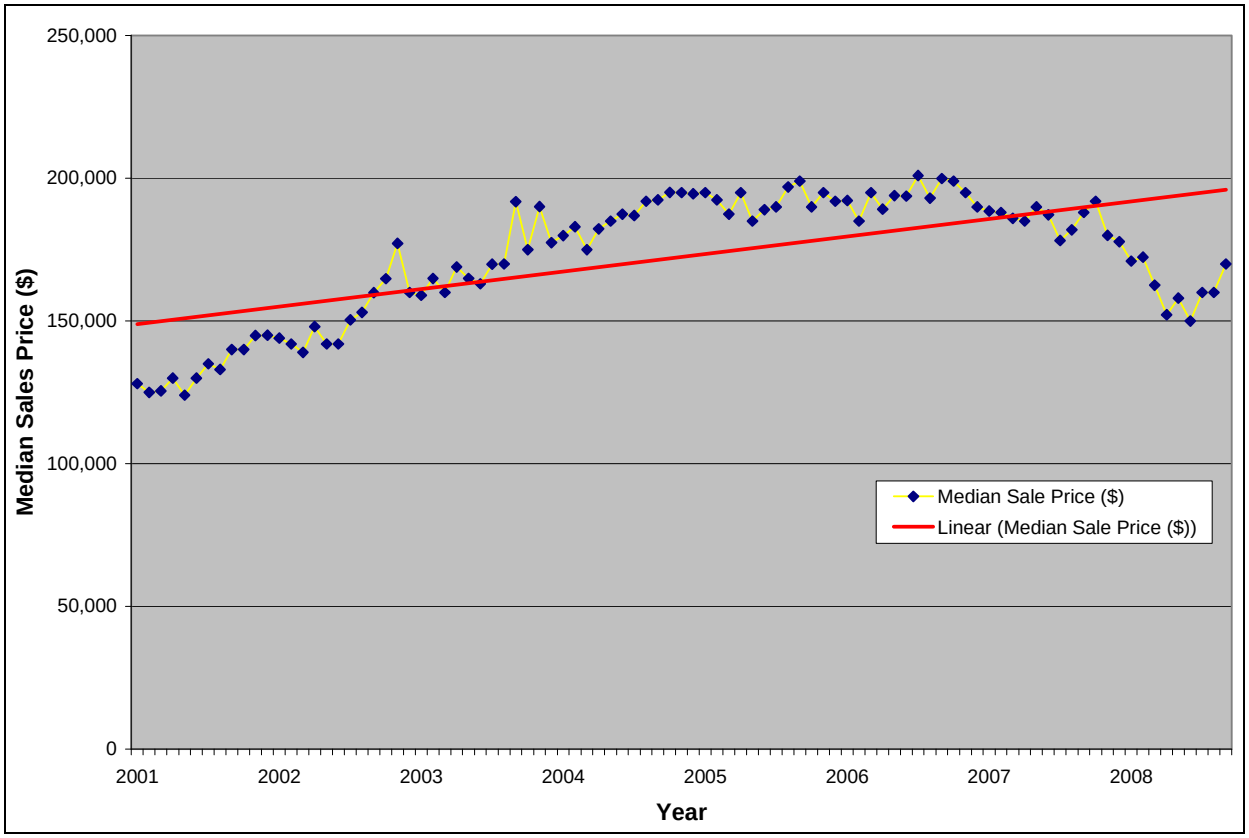

Figure 3.2-5 State of Maine, Single-Family Home, Median Sales Price (October 2001 to June 2009)

The proposed annual budget for the town of Brunswick for the FY ending June 2009 is $54,018,761, a decrease of 4.1% from the actual FY ending June 2008 budget of $56,335,242 (Town of Brunswick 2008b, 2009b). Property taxes, including municipal, school, and county, will account for 53.1% ($28,684,697) of the total revenue in the budget for FY ending June 30, 2009 (Town of Brunswick 2009b). Based on the Town's proposed annual budget for FY ending June 30, 2009, and the estimated 2007 population (21,160), the local per capita tax burden is approximately $1,350 for town-related taxes.

Other sources of revenue for the town include excise taxes; intergovernmental revenue; charges for services (including public works, ambulances, and public safety services); licenses, permits, and fees; and investment income. These sources of revenue account for about 46.9% of the town's annual budget. The town's annual expenditures include public safety; general government; public works; human services; education; recreation and culture; debt service; county tax; and unclassified expenditures such as promotion and development, assistance to St. Johns School, cemetery care, tax abatement interest, salaries, wage and benefits reserve, contingency, and expenditures on the old high school (Town of Brunswick 2009b).

Because NAS Brunswick is federally owned, the property is not subject to local taxation and does not contribute to the town of Brunswick's or the County of Cumberland's annual tax revenues.

3.2.6 Environmental Justice

Consistent with Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994), the U.S. Navy's policy is to identify and address any disproportionately high and adverse human health or environmental effects of its actions on minority and low-income populations.

The Council on Environmental Quality (CEQ 1997) has issued guidance to federal agencies on the terms used in Executive Order 12898, as follows:

- **Low-income Population.** Low-income populations in an affected area should be identified using the annual statistical poverty thresholds from the U.S. Bureau of the Census's Current Population Reports, Series P-60, on Income and Poverty.
- **Minority.** Individual(s) who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin, or Hispanic.
- **Minority Population.** Minority populations should be identified where either: (a) the minority population of the affected area exceeds 50%, or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.
- **Disproportionately High and Adverse Human Health Effects.** When determining whether human health effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable:

  1. Whether the health effects, which may be measured in risks and rates, are significant (as employed by NEPA), or above generally accepted norms;

  2. Whether the risk or rate of hazard exposure to a minority population, low-income population, or Indian tribe to an environmental hazard is significant (as employed by NEPA) and appreciably exceeds or is likely to appreciably exceed the risk or rate to the general population or other appropriate comparison group; and

  3. Whether health effects occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposure to environmental hazards.

- **Disproportionately High and Adverse Environmental Effects.** When determining whether environmental effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable:

1. Whether there is or will be an impact on the natural or physical environment that significantly (as employed by NEPA) and adversely affects a minority population, low-income population, or Indian tribe. Such effects may include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or Indian tribes when those impacts are interrelated to impacts on the natural or physical environment;

2. Whether environmental effects are significant (as employed by NEPA) and are or may be having an adverse impact on minority populations, low-income populations, or Indian tribes that appreciably exceed or are likely to appreciably exceed those on the general population or other appropriate comparison group; and

3. Whether the environmental effects occur or would occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards.

Table 3.2-20 presents statistics on low-income, ethnic, and minority population characteristics for the town of Brunswick, the Brunswick LMA, and the State of Maine.

Table 3.2-20 Environmental Justice Population Characteristics (2000)

Municipality	Total Population	Percent Minority	Percent Hispanic or Latino	Percent Below Poverty
Town of Brunswick	21,172	5.1%	1.8%	8.0%
Brunswick LMA	67,598	3.8%	1.5%	8.5%
State of Maine	1,274,923	3.0%	0.7%	10.9%

Source: U.S. Census Bureau 2000.

Note:
[1] The Brunswick LMA was not a designated area during the 2000 census. The data utilized in this study for the Brunswick LMA for the year 2000 are a summation of the 2000 Census statistics for each of the 16 municipalities included in the LMA.

3.3 Community Facilities and Services

This section summarizes the existing community facilities and services (i.e., educational facilities, healthcare and medical facilities, public safety and emergency facilities, and parks and recreational resources) located in the study area. The study area includes the town of Brunswick, where NAS Brunswick, the McKeen Street Housing Annex, and the East Brunswick Radio Transmitter Site are located. The Sabino Hill Rake station, a 0.23-acre parcel comprising an unused observation tower and open space, is located in the Town of Phippsburg, and is not examined in this section.

3.3.1 Educational Facilities

3.3.1.1 Town of Brunswick

The town of Brunswick operates its own public school district, the Brunswick School Department, which includes seven schools: four elementary schools (grades K-5), one middle/junior high school (grades 6-8), one high school (grades

9-12), and one regional vocational school (Brunswick School Department 2009a). The vocational school (Maine Vocational Region Ten) provides vocational training to high school students from the towns of Brunswick, Freeport, and Topsham. For the 2008 school year, 3,093 students were enrolled in the Brunswick School Department. Since the 2003 school year, annual enrollments in the department have ranged from 3,093 to 3,347 students. Within this time period, there have been no large changes in student enrollment rates. In addition to the public schools, there is one private school in the town of Brunswick, St. John's Catholic School (K-8), which had a total 2008 enrollment of 227 students. Public and private school enrollment data (K-12) are presented in Table 3.3-1. The locations of the schools are identified on Figure 3.3-1.

Table 3.3-1 Town of Brunswick Public/Private School Enrollment (2003-2008)

	Enrollment						Capacity
	2003	2004	2005	2006	2007	2008	2008
Brunswick School Department (Public)							
Elementary and Middle School (grades K-8)	2,182	2,190	2,136	2,113	2,038	1,990	2,134[1]
High School (grades 9-12)	1,018	1,039	1,099	1,064	1,018	985	1,113
Maine Vocational Region Ten, Brunswick High School Students Only (grades 9-12)	147	139	101	150	148	118	NA[2]
Subtotal	**3,347**	**3,368**	**3,336**	**3,327**	**3,204**	**3,093**	**3,247**
St. John's Catholic School (Private)							
Elementary and Middle School (grades K-8)	226	223	220	216	224	227	250
Total	**3,573**	**3,591**	**3,556**	**3,543**	**3,428**	**3,320**	**NA**

Sources: Oikle 2008a; Gardener 2009; Underwood 2009; Maderal 2009a, 2009b.

Notes:
1 Total K-8 capacity includes portable classroom space for 125 students.
2 Maine Vocational Region Ten has a regional capacity for a total of 416 students. Since it is a regional school providing services to students from the town of Brunswick, Freeport, and Topsham, available capacity is not limited by geographic region and cannot be defined only for Brunswick School District students.

As shown in Table 3.3-1, in 2008 the Brunswick School Department and St. John's Catholic School operated below total school capacity; however, Brunswick School Department grades K-8 enrollment has exceeded capacity in the past.

No major changes to school capacity are planned by the Brunswick School Department or St. John's Catholic School in the immediate future. However, the Brunswick School Department is currently planning to build a new 600-student elementary school. The new school is expected to be completed in 2011 and would be built on the site of the old high school, which was closed in 1995 when a new high school was constructed. The new elementary school will not add any additional capacity, since the department will close two existing elementary schools with a combined capacity of 600 students (Oikle 2008b).

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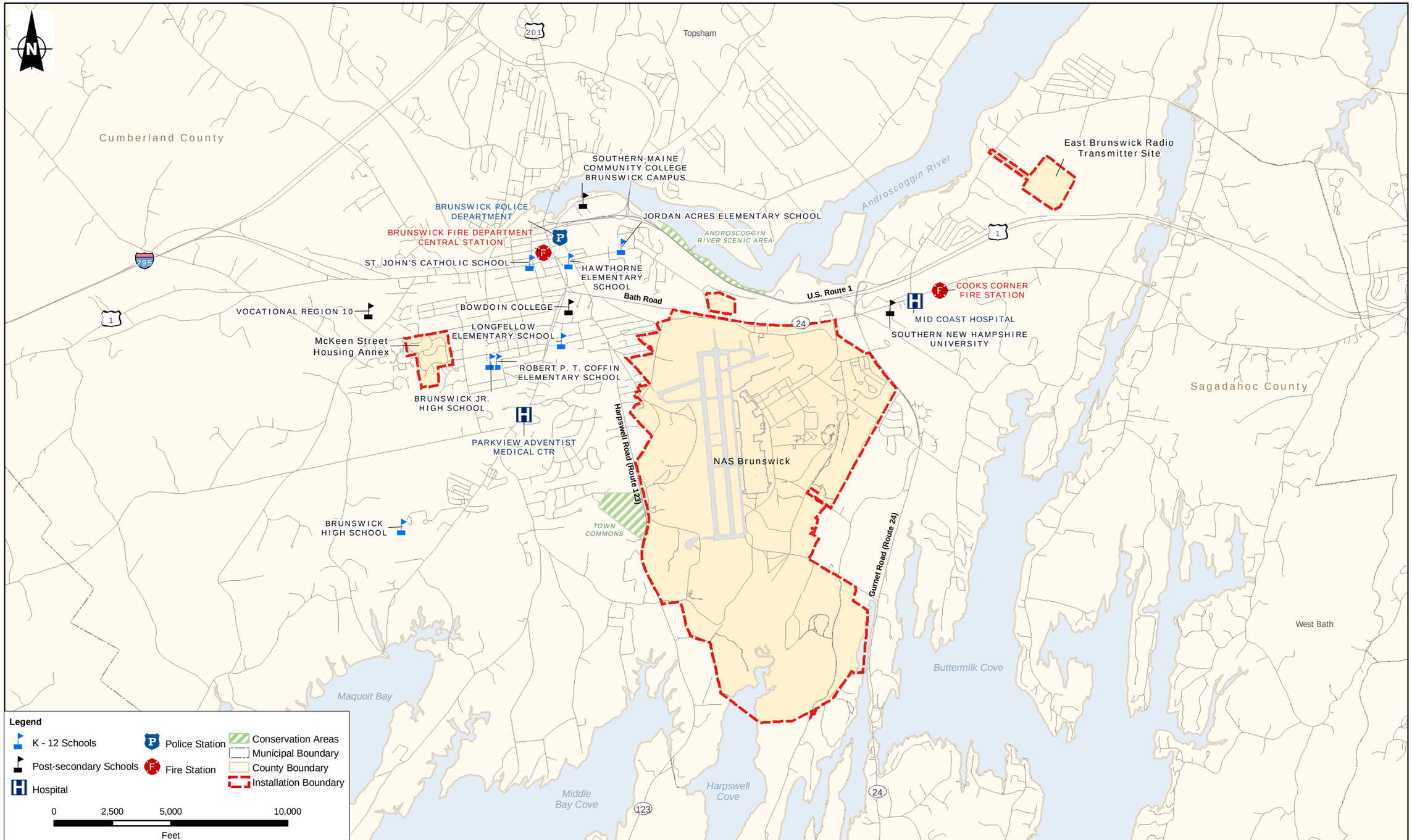

Source: MEGIS 2007; Health Forum, L.L.C. and ESRI 2008.

Figure 3.3-1
Community Facilities and Services
Brunswick, Maine

3.3.1.2 NAS Brunswick

No elementary, middle, or high schools are located within the boundaries of NAS Brunswick or are run by the federal government for students from military families at NAS Brunswick or its outlying properties. Therefore, school-aged military family members living at NAS Brunswick and the McKeen Street Housing Annex attend public or private schools located in the town of Brunswick. For the 2008 school year, approximately 673 students from military families (21.8% of total public school population) attended public schools operated by the Brunswick School Department (Underwood 2009). Approximately 30 students from military families (13.2% of total private school population) attended St. John's Catholic School for the 2008 school year. Tables 3.3-2 and 3.3-3 identify the enrollment of military family members in the Brunswick School District and St. John's Catholic School for school years 2003 through 2008.

Table 3.3-2 Military Family Member Enrollment – Brunswick School Department (2003-2008)

	School Year					
	2003	2004	2005	2006	2007	2008
Total Enrollment	3,347	3,368	3,336	3,327	3,204	3,093
Military Family Members	643	657	698	664	690	673
Percent Military Family Members	19.2%	19.5%	20.9%	19.9%	21.5%	21.8%

Sources: Oikle 2008b; Underwood 2009.

Table 3.3-3 Military Family Member Enrollment – St. John's Catholic School (2003-2008)

	School Year					
	2003	2004	2005	2006	2007	2008
Total Enrollment	226	223	220	216	224	227
Military Family Members	NA	NA	18	23	23	30
Percent Military Family Members	-	-	8.1%	10.6%	10.3%	13.2%

Source: Maderal 2009a.

To compensate the Brunswick School Department for the costs incurred providing educational services to the children of military personnel, the Town of Brunswick receives federal aid under the Federal Impact Aid Program. The impact aid assists local public school districts that have lost property tax revenue due to the presence of tax-exempt federal property or have experienced increased expenditures due to the enrollment of family members of federal personnel (U.S. Department of Education 2009). During the 2008 school year, the Town of Brunswick received approximately $1.4 million in Federal Impact Aid (Town of Brunswick 2009b). Table 3.3-4 identifies the Federal Impact Aid received and the annual school budget for the Brunswick School Department since 2003. St. John's Catholic School does not receive Federal Impact Aid since it is a private institution. Private tuition is paid by students attending St. John's Catholic School.

Table 3.3-4 Federal Impact Aid Received by the Brunswick School Department (2003-2008)

School Year	Total School Budget	Federal Impact Aid Received	Proportion of Total School Budget
2008	$32,734,737	$1,447,000	4.4%
2007	$31,538,703	$1,197,000	3.8%
2006	$29,662,948	$1,086,000	3.7%
2005	$27,753,926	$1,192,000	4.3%
2004	$26,092,558	$1,061,000	4.1%
2003	$25,052,302	$878,000	3.5%

Sources: Town of Brunswick 2009b.

3.3.1.3 Post-Secondary Education

In addition to the elementary and secondary educational facilities in the town of Brunswick, two post-secondary educational institutions—Bowdoin College and Southern New Hampshire University—have facilities in the town (see Figure 3.3-1). The main campus of Bowdoin College is located in the town, and Southern New Hampshire University has one educational center at Cook's Corner in the town of Brunswick and one center located on NAS Brunswick, which serves military personnel and their family members. The number of students attending post-secondary institutions in the town of Brunswick is identified in Table 3.3-5.

Table 3.3-5 Post-secondary School Enrollment (2008)

School	Number of Full- and Part-time Students
Bowdoin College	1,723
Southern New Hampshire University	250
Total	**1,973**

Source: Bowdoin College 2009; Yerxa 2009.

3.3.2 Healthcare/Medical Facilities

3.3.2.1 Town of Brunswick

Two hospitals—Parkview Adventist Medical Center and Mid Coast Hospital—and multiple general and specialist medical facilities are located in the town of Brunswick (see Figure 3.3-1). Parkview Adventist Medical Center, located on Maine Street, is less than a mile away from NAS Brunswick. Parkview Adventist Medical Center is a full-service hospital, providing cardiopulmonary services, diagnostic and screening services, emergency services, medical services, outpatient programs, pastoral care, physician practices, rehabilitation, surgical services, and women's health programs (Parkview Adventist Medical Center 2008a). The acute-care hospital has a 55-bed capacity (Parkview Adventist Medical Center 2008b).

Mid Coast Hospital has multiple facilities within a 2-mile radius of NAS Brunswick, including an addiction resource center, a senior health center, and a consolidated general hospital. The hospital's consolidated facility, located on Medical Center Drive, opened in 2001 (Mid Coast Hospital 2008a). Clinical services offered by the hospital include addiction services, behavioral health services, a

breast health center, cancer services, cardiac services, diagnostics, hospice services, laboratory services, hearing and speech services, maternity and nursing services, rehabilitation, sleep services, surgical services, and wellness services (Mid Coast Hospital 2008b).

Mid Coast Hospital is located in the town of Brunswick, with satellite facilities located in the neighboring towns of Bath and Topsham. The general hospital currently has an in-patient capacity of 76 beds, and the hospital plans to expand its in-patient capacity to 94 beds (Mid Coast Hospital 2008c). The planned expansion also includes the addition of a redesigned emergency room and expanded rooms for diagnostic preparation, consultation, and recovery. The expansion is projected to be complete in late 2010 (Mid Coast Hospital 2008d).

In the town of Brunswick, more than 10 dental facilities also provide services to the residents of the town of Brunswick and Cumberland County. These dental facilities offer services ranging from general dentistry to oral surgery (Health Forum, LLC and ESRI 2008).

In addition to the healthcare facilities located in the town of Brunswick, other medical and dental facilities and resources located in the immediate region are available to the local population. Two hospitals (St. Mary's Regional MedCenter in Lewiston, and St. Andrews Hospital in Boothbay Harbor) and numerous doctors' offices, and dental facilities are located within a 20-mile radius of the center of the town of Brunswick (Health Forum, LLC and ESRI 2008).

Statewide per capita health service levels, including the number of hospital beds, emergency room visits, and outpatient and inpatient visits, are identified in Table 3.3-6.

Table 3.3-6 State of Maine Average per Capita Health Service Levels (2007)

Hospital Beds	Emergency Room Visits per Year	Outpatient Visits per Year	Inpatient Visits per Year
2.7 per 1,000 residents	545 per 1,000 residents	3,569 per 1,000 residents	638 per 1,000 residents

Source: Kaiser Family Foundation 2009.

3.3.2.2 NAS Brunswick

The primary source of medical and dental services for military personnel stationed at NAS Brunswick and their family members is the Naval Branch Health Clinic Brunswick, which is located on NAS Brunswick. The clinic provides primary outpatient medical care, dental care, and emergency care, and coordinates access to other levels of health care services for active-duty personnel, retirees, and eligible family members. Clinic services are available during weekdays. After-hours urgent care is also provided. The clinic is identified as a one of the three TRICARE Service Centers in the New England Region (Naval Health Clinic New England 2009). TRICARE is the health-care program serving active-duty service members, National Guard and Reserve members, retirees, their families, and certain former spouses worldwide. Patients requiring inpatient care are transported or referred to local hospitals located in the town of Brunswick or elsewhere in the Mid-Coast region. Approximately 21,158 patients visited Naval Branch Health

Clinic Brunswick for medical care during fiscal year (FY) 2008. The majority (79%) of patients seeking medical care at the clinic were active-duty military members and their family members. The remaining patients included national guard/military reservist and their family members (12%), military retirees and family members (7%), and other (2%). Since FY 2005, the clinic has experienced a 37% (12,408) net decline in total patient visits. Table 3.3-7 identifies the numbers of patients who visited the health clinic from FY 2005 through FY 2008.

Table 3.3-7 Naval Branch Health Clinic Brunswick Medical Visits (FY 2005-FY 2008)

	FY 2005	FY 2006	FY 2007	FY 2008
Active Duty				
Military	17,337	16,157	17,586	13,695
Family Member	7,254	6,481	5,854	2,947
Subtotal	24,591	22,638	23,440	16,642
Guard/Reserve				
Military	4,980	4,509	3,489	2,357
Family Member	782	721	669	238
Subtotal	5,762	5,230	4,158	2,595
Retired Military				
Military	1,154	989	958	717
Family Member	1,430	1,205	1,203	813
Subtotal	2,584	2,194	2,161	1,530
Other				
Subtotal	**629**	**600**	**517**	**391**
Total	**33,566**	**30,662**	**30,276**	**21,158**

Source: Joy 2009b.

In addition to medical care, the Naval Branch Health Clinic Brunswick provides dental care to military personnel and their family members. The clinic experienced approximately 10,808 dental visits during FY 2008. The clinic has experienced a 13% decline in dental care visits since FY 2005. Table 3.3-8 identifies the total number of dental visits from FY 2005 through FY 2008.

Table 3.3-8 Naval Branch Health Clinic Brunswick Dental Visits (FY 2005-FY 2008)

Fiscal Year	FY 2005	FY 2006	FY 2007	FY 2008
Number of Dental Visits	12,494	12,066	12,898	10,808

Source: Joy 2009b.

3.3.3 Public Safety and Emergency Services

3.3.3.1 Town of Brunswick

The Brunswick Police Department provides police services in the town of Brunswick. In addition, through an agreement with the Navy, the Department also provides police services within the PPV housing area located in the northeast corner of NAS Brunswick and the McKeen Street Housing Annex. The Department consists of multiple divisions, including the Communications Division and Patrol Division, which handle most routine and emergency service requests. The department operates from a single police station, which is located in the basement of

Town Hall at 28 Federal Street in the town of Brunswick (see Figure 3.3-1). There are approximately 1.7 sworn police officers for every 1,000 residents (see Table 3.3-9).

Table 3.3-9 Uniformed Personnel for Public Safety and Emergency Services

Number of Residents	Number of Officers	Officer per 1,000 Residents
Police Department		
21,160[a]	37[b]	1.7
Fire Department		
21,160[a]	32[c]	1.5

Sources:
[a] U.S. Census Bureau 2009a.
[b] Rizzo 2009.
[c] Labbe 2009.

In the town of Brunswick, fire protection services are provided by the Town of Brunswick Fire Department. The Department's two fire stations are located at 21 Town Hall Place and 284 Bath Road, in the town of Brunswick (see Figure 3.3-1). The Fire Department is staffed by 32 uniformed firefighters (Labbe 2009). There are approximately 1.5 firefighters for every 1,000 residents in the town of Brunswick. All firefighters employed by the Department are also licensed Emergency Medical Technicians and respond to emergency medical calls in the town of Brunswick (Brunswick Fire Department 2000). Under a fire protection agreement, the Town of Brunswick Fire Department provides fire protection services to the PPV housing area located in the northeast corner of NAS Brunswick and the McKeen Street Housing Annex.

Table 3.3-9 identifies the ratios of police officers and firefighters to residents of NAS Brunswick and the town of Brunswick.

3.3.3.2 NAS Brunswick

NAS Brunswick is a secure military facility. Access is limited to military personnel, civilian employees, military retirees, and military family members. Installation security and police services are provided by the NAS Brunswick Security Department, which includes civilian and military security forces. Fire protection services on the installation are provided by the NAS Brunswick Fire Department, which responds to on-base Aircraft, Rescue, and Firefighting operations; structure fires; hazardous materials and petroleum, oil, and lubricant spills; and confined-space rescues. In addition, the NAS Brunswick Fire Department, through a mutual aid agreement, provides emergency support services (i.e., EMS, fire, HazMat, and other specialty services) within the town of Brunswick, as requested. Through this agreement, the NAS Brunswick Fire Department provides 'automatic support' services on a regular basis to areas located in the town and adjacent to the NAS Brunswick property (Labbe 2009).

3.3.4 Parks and Recreation

3.3.4.1 Town of Brunswick

The Town of Brunswick operates a variety of public recreational facilities throughout the community. These include the Androscoggin River Bicycle and Pedestrian Path, a paved trail extending along 2.63 miles of the Androscoggin River from Water Street, near the Water Street Boat Landing, to Cook's Corner; Coffin Pond, a pond with beaches located on River Road that allows swimming in summer and ice skating in winter; and Town Commons. Two other ice skating rinks—the Mall Ice Skating Rink and Lishness Hockey Rink—are open to the public and local hockey leagues during the winter. Additional indoor and outdoor recreational facilities are located throughout the town, including community parks, playgrounds, athletic fields, and public water access points. Indoor recreation facilities include the Brunswick Recreation center and amenities provided by the Brunswick School Department. The Brunswick Parks and Recreation Department runs multiple recreational programs throughout the year, including basketball, bowling, open gym, skiing and snowboarding, swimming, and soccer (Town of Brunswick Parks and Recreation Department 2009). A number of private recreational facilities also are available, including indoor fitness centers, an indoor skating rink, an indoor ice arena, and golf courses. Figure 3.3-1 identifies conservation areas in the town of Brunswick.

3.3.4.2 NAS Brunswick

Various indoor and outdoor recreational facilities and amenities are located on NAS Brunswick. These amenities are available to military personnel, their families, and retired military personnel. Indoor facilities include an auto hobby shop, recreational mall (includes bowling alley, indoor playground, and a 30-person theater), fitness center (includes a gym and racquetball courts), and field house (includes a gym, basketball courts, and indoor track). Outdoor facilities include three lighted softball fields, a lighted multi-purpose soccer field, and a picnic area (includes shelters, grill pits, picnic tables, playground, multi-purpose court, restroom buildings, and a non-lighted softball field). An approximately 93-acre golf course (Mere Creek) with clubhouse and snack bar is located on the southern end of the installation. This facility includes a nine-hole, full-length golf course, a putting practice area, a driving range, a 3,000-square-foot clubhouse area, a 2,800-square-foot maintenance building, and a gravel parking area. The golf course is open to the public and can be accessed from Harpswell Road (Route 123) (Town of Brunswick 2007). The installation also contains various passive recreation amenities and open space areas, including a nature trail system.

3.4 Transportation

This section describes the traffic study methodology, the local roadway network, and current traffic conditions (traffic volume and level of service [LOS]) in the vicinity of NAS Brunswick. LOS is a measure used by traffic engineers that incorporates numerous factors (e.g., speed, travel time, traffic interruptions, operating costs, etc.) for a specific roadway or intersection under different operating conditions.

The local roadway network is also described for outlying properties, including the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station. Traffic conditions are not presented for the outlying properties because they are considered rural and residential and typically operate at an acceptable LOS. The information presented in this section is based on the *Traffic Impact Study* prepared by Gorrill-Palmer Consulting Engineers, Inc. (Gorrill-Palmer 2009). The report section of the *Traffic Impact Study* is presented in the EIS as Appendix D.

In addition to the *Traffic Impact Study* that was completed for this EIS, several regional transportation planning documents have recently been developed within the Town of Brunswick or the Brunswick LMA. The *Traffic Impact Study* (Gorill-Palmer 2009), which was developed for the purposes of the EIS, was designed to meet the requirements of NEPA; however, the MaineDOT is currently developing a comprehensive traffic impact study (*Transportation Feasibility Study: Redevelopment of Naval Air Station Brunswick*) that will promote transportation improvement strategies that support the redevelopment of NAS Brunswick. Another regional planning document, the *Gateway 1 Corridor Action Plan*, was prepared by the Gateway 1 Steering Committee (consisting of representatives from the U.S. DOT, Maine State Planning Office, MaineDOT, and community members in Mid-Coast Maine) as a master plan for the Route 1 Corridor that extends from Brunswick to Stockton Springs, Maine. For more details on the *Gateway 1 Corridor Action Plan*, see Section 3.1.2 (Surrounding Land Uses and Zoning). The corridor encompasses 20 municipalities and extends from Brunswick to Stockton Springs, Maine (Gateway 1 Steering Committee 2009). The Town of Brunswick is an endpoint on the corridor and is designated as an area for concentrated growth. Thus, some of the strategies and traffic mitigation measures proposed in the *Gateway 1 Corridor Action Plan* are incorporated into the EIS, but not all recommendations are applicable to the proposed action. The Town of Brunswick has adopted the Gateway 1 Corridor Action Plan (Brown 2010).

3.4.1 Study Area and Methodology

The traffic study encompassed the roadway network in the vicinity of NAS Brunswick (see Figures 3.4-1 and 3.4-2). NAS Brunswick is located southwest of the intersection of Bath Road and Gurnet Road, both of which are part of ME Route 24. ME Route 24 connects the towns of Brunswick and Bath and provides access to the main gate for NAS Brunswick. The intersection of Bath Road and Gurnet Road is known locally as Cook's Corner, a regional commercial/retail corridor that comprises various retail strip plazas and "big box" retail outlets. Highway access to NAS Brunswick is provided via the Route 1 Connector, which links Cook's Corner to U.S. Route 1. Harpswell Road provides access to the west side of the installation. The principal roads within the roadway network are described below.

- **Bath Road.** Bath Road defines the northern boundary of NAS Brunswick. The road is primarily a two-lane highway connecting the towns of Brunswick and Bath. Bath Road widens to seven lanes as it approaches Cook's Corner. The speed limit in the vicinity of the installation is 35 miles per hour.

- **Gurnet Road.** Gurnet Road connects the Cook's Corner area with the town of Harpswell and forms the eastern boundary of NAS Brunswick. Gurnet Road is primarily a two-lane road, but it widens to four lanes as it approaches Cook's Corner. The speed limit in the vicinity of the installation is 35 miles per hour.

- **Harpswell Road.** Harpswell Road defines NAS Brunswick's western boundary. This two-lane road connects the towns of Brunswick and Harpswell. The speed limit in the vicinity of the installation is 35 miles per hour.

- **U.S. Route 1.** U.S. Route 1 is accessible via the Route 1 Connector, which intersects Bath Road. U.S. Route 1 is a major north-south highway serving the eastern part of the state of Maine and links to U.S. Interstate 295 (I-295). I-295 serves as a major link between the cities of Portland to the south and Augusta to the north.

Locations for manual traffic counts consisted of 16 intersections along six roadway segments in the immediate vicinity of NAS Brunswick. The 16 locations are identified on Figure 3.4-1 and included:

- Route 123 at:
  - Mountain Road (unsignalized)
  - Golf Course/Middle Bay Road (unsignalized)
  - Jonathan Street (unsignalized)
  - Bath Road (signalized)

- Route 24 at:
  - Coombs Road South (unsignalized)
  - Coombs Road North (unsignalized)
  - Forrestal Drive (unsignalized)
  - Bath Road (Cooks Corner) (signalized)

- Bath Road at:
  - Rotary area around Church (unsignalized)
  - Federal Street (signalized)
  - Jordan Street (unsignalized)
  - Merry Meeting Plaza (signalized)
  - Existing Main Gate for NASB (signalized)
  - Cook's Corner Mall (signalized)
  - Tibbetts Drive (Wal-Mart) (signalized)
  - Lowe's/Old Bath Road (signalized)

Peak hour turning movement volumes were collected by Gorrill-Palmer on August 27 and 28, 2008, from 2:30 P.M. to 6:00 P.M. The collected data were then adjusted based on factors provided by MaineDOT (Department of Transportation). These factors are based on traffic counts conducted by MaineDOT and incorporate the type of roadway, month of traffic data collection, and potential for seasonal fluctuation (e.g., tourist and school traffic).

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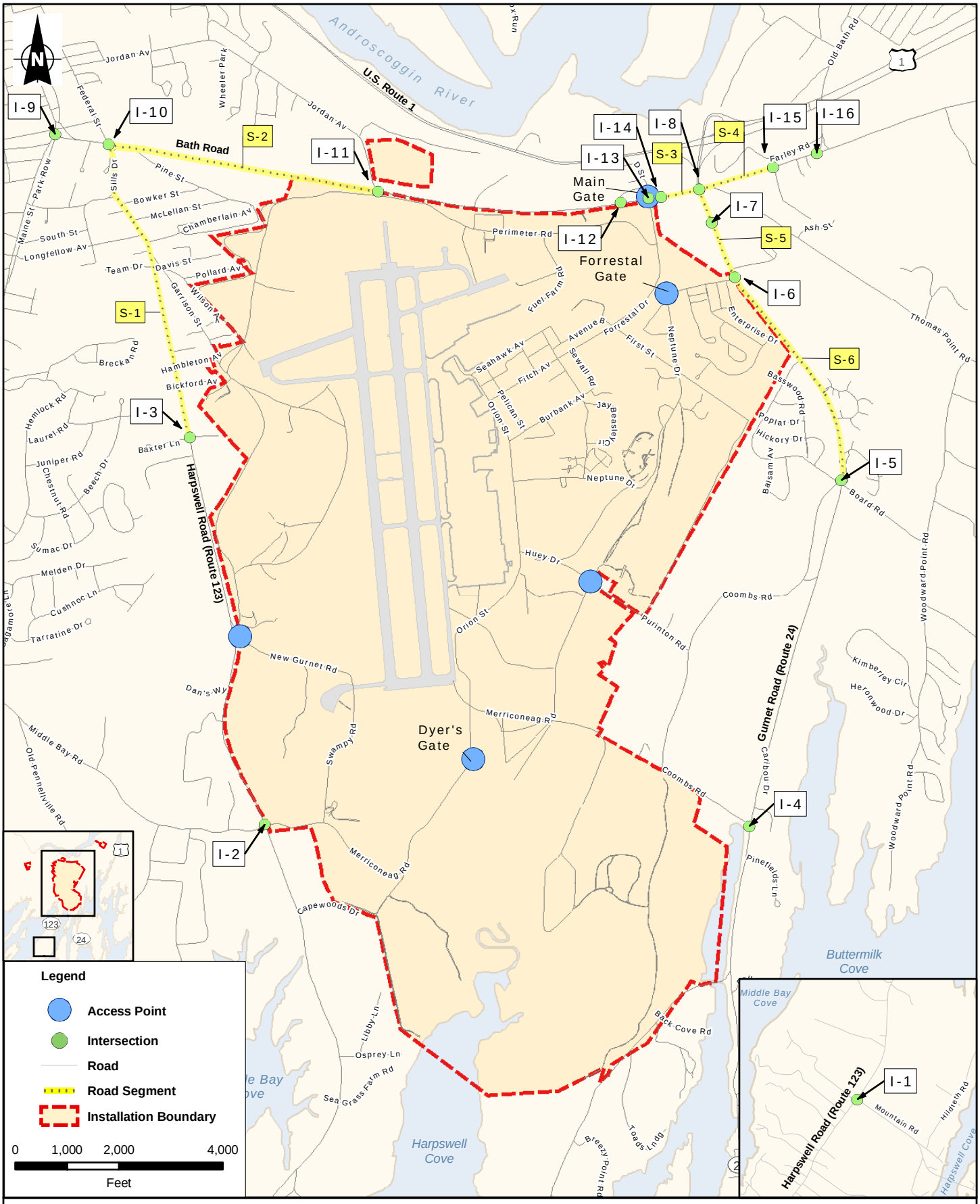

Source: Gorrill-Palmer 2009.

Figure 3.4-1
Traffic Study Area
NAS Brunswick, Maine

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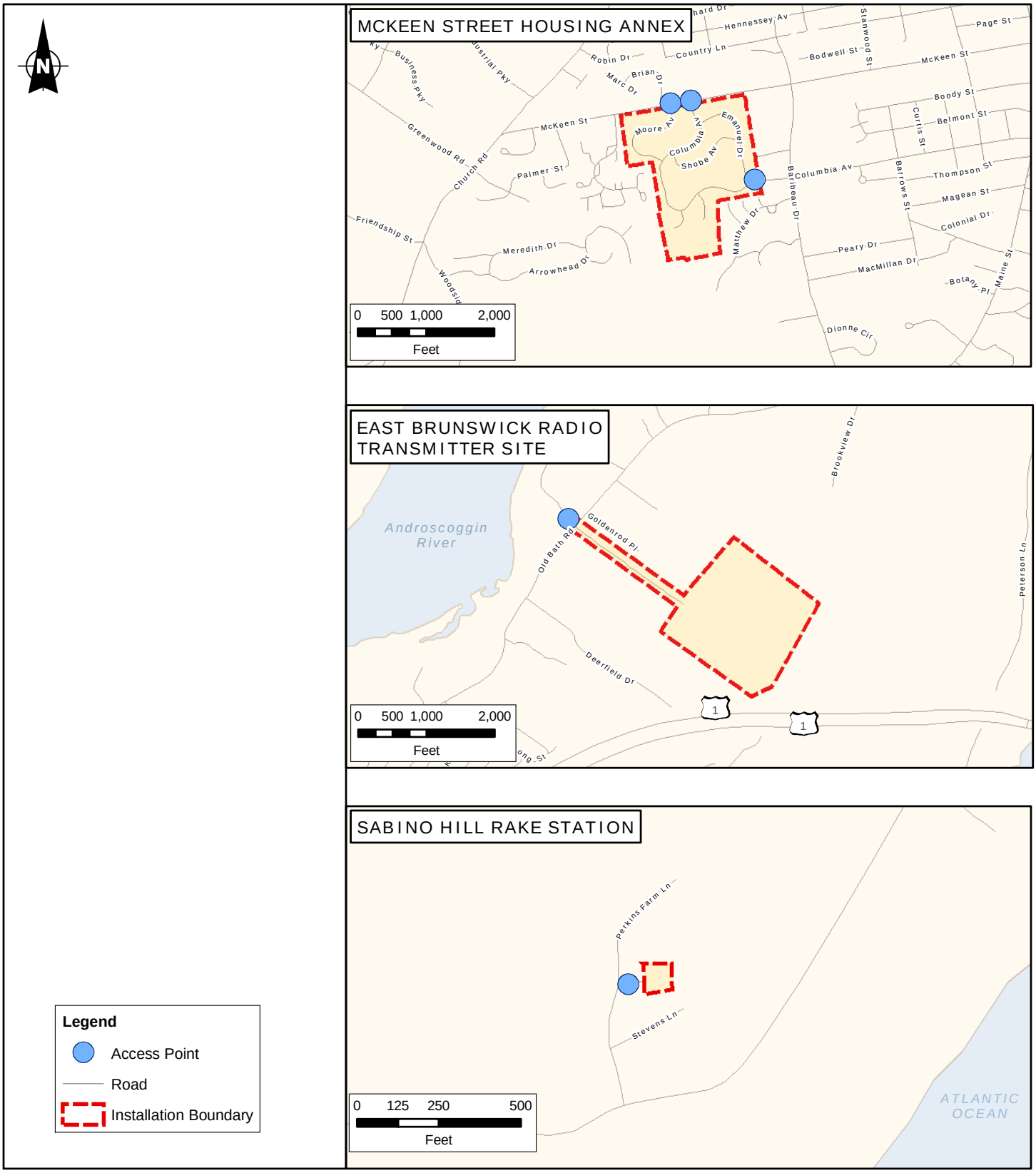

Source: Gorrill-Palmer 2009.

Figure 3.4-2
Traffic Study Area, Outlying Properties
NAS Brunswick, Maine

MaineDOT classifies highways as I, II, or III for state and local roadways. Group I roadways are defined as urban roadways, or those roads that typically contain commuter traffic and experience little fluctuation from week to week throughout the year. Group II roadways, or arterial roadways, are those that see a combination of commuter and recreational traffic and, therefore, experience moderate fluctuations during the year. Group III roadways are typically used for recreational purposes and experience seasonal fluctuations. Route 24 is a Group I roadway and Route 123 is a Group II roadway.

3.4.2 Road Network and Access

NAS Brunswick is presently served by a system of internal roadways, which are owned and maintained by the federal government. The surface road network within NAS Brunswick is comprised of several main arterial roads, as well as smaller roads that provide access to particular buildings and residences throughout the installation. The installation contains approximately 100,000 feet of paved roadway, ranging in width from 12 feet to 80 feet (Town of Brunswick 2005).

Access to NAS Brunswick, which is limited to military personnel, military family members, retirees, contractors, and employees, is provided via two active gates. The Main Gate, which is located south of the intersection of Fitch Avenue and Bath Road, provides the primary access to the installation. A second gate, Dyer's Gate, provides secondary access to the western portion of the installation. Dyer's Gate, which is used by contractors and trucks and for vehicle security inspections, is located along Merriconeag Road, which extends from Harpswell Road on the western boundary of NAS Brunswick. In addition to these two active gates, three inactive gates exist but have been closed since 2001. Two of the inactive gates are located on the eastern boundary of the installation at the western end of Forrestal Drive (Forrestal Gate) and the western end of Purinton Road. The third inactive gate is located along Harpswell Road on the western boundary of the installation. See Figure 3.4-1 for the locations of these access points.

The McKeen Street Housing Annex is located approximately 3.3 miles west of the installation's main gate, within a residential area of the town of Brunswick. The 70-acre annex is a fully developed residential neighborhood that includes single- and multi-unit housing. It is served by a system of internal roadways, which are owned and maintained by the federal government. The surface road network within the McKeen Street Housing Annex provides access to the commissary and residences and includes Moore Avenue, Columbia Avenue, Shobe Avenue, and Emanuel Drive. Access to the annex, which is open to installation personnel and the general public, is from McKeen Street and Baribeau Drive.

The East Brunswick Radio Transmitter Site is located in the town of Brunswick, approximately 2 miles northeast of the installation's main gate, between U.S. Route 1 and Old Bath Road. The unsecured 66-acre site is undeveloped and is located within a rural/low-density residential/forested area. Access to the transmitter site is provided by Goldenrod Place, an unpaved drive that runs off Old Bath Road.

The Sabino Hill Rake Station is located in Phippsburg, approximately 14 miles southeast of the installation's main gate. The site is situated along Perkins Farm Lane, which is accessible from Popham Road (Route 209).

See Figure 3.4-2 for the locations of access points to these outlying properties.

3.4.3 Existing Traffic Volume

Roadway traffic volume data were collected to determine existing peak-period and daily traffic conditions in the traffic study area. Traffic count locations and existing traffic volumes and peak-hour traffic volumes are identified in Table 3.4-1. The busiest roadway segments in the traffic study area, by daily traffic and P.M. peak-hour volumes, include Bath Road between Cook's Corner Mall and Gurnet Road (21,180 trips) and Bath Road between Gurnet Road and Tibbetts Drive (24,310 trips). The intersections of Bath Road and Harpswell Road/Federal Street (2,281 trips) and Bath Road and Gurnet Road (4,175 trips) experience the highest volumes of traffic during the P.M. peak-hour time (Gorrill-Palmer 2009).

Table 3.4-1 Existing Roadway Traffic Volume (2008)

Figure Label	Traffic Count Location	Daily Volume[1]	P.M. Peak Hour Volume[2,3]
Roadway Segment			
S-1	Harpswell Road between Jonathan Street and Bath Road	10,970	1,097
S-2	Bath Road between Federal Street and Jordan Avenue	15,320	1,532
S-3	Bath Road between Cook's Corner Mall and Gurnet Road	21,180	2,118
S-4	Bath Road between Gurnet Road and Tibbetts Drive	24,310	2,431
S-5	Gurnet Road between Bath Road and Forrestal Drive	11,690	1,169
S-6	Gurnet Road between Forrestal Drive and Coombs Road North	10,370	1,037
Intersection			
I-1	Harpswell Road and Mountain Road (unsignalized)	-	583
I-2	Harpswell Road and Middle Bay Road/NAS Brunswick Dyer Gate (unsignalized)	-	691
I-3	Harpswell Road and Jonathan Street/Baxter Lane (unsignalized)	-	491
I-4	Gurnet Road and Coombs Road South (unsignalized)	-	770
I-5	Gurnet Road and Coombs Road North (unsignalized)	-	782
I-6	Gurnet Road and Forrestal (unsignalized)	-	1,182
I-7	Gurnet Road and Cinema/Plaza (signalized)	-	1,659
I-8	Bath Road and Gurnet Road (signalized)	-	4,175
I-9	Bath Road and Maine Street Rotary (unsignalized)		1,443
I-10	Bath Road and Harpswell Road/Federal Street (signalized)		2,281
I-11	Bath Road and Jordan Street	-	1,694
I-12	Bath Road and Merry Meeting Plaza (signalized)	-	2,064
I-13	Bath Road and NAS Brunswick Main Gate (signalized)	-	2,422
I-14	Bath Road and Cook's Corner Mall (signalized)	-	2,458

Table 3.4-1 Existing Roadway Traffic Volume (2008) (continued)

Figure Label	Traffic Count Location	Daily Volume[1]	P.M. Peak Hour Volume[2,3]
I-15	Bath Road and Tibbetts Drive (signalized)	-	2,469
I-16	Bath Road and Old Bath Road (signalized)	-	2,198

Source: Gorrill-Palmer 2009.

Notes:
1 The "Daily Volume" represents the two-directional traffic volumes going through a segment of roadway on a daily basis.
2 The intersection P.M. Peak-Hour Volume is the sum of the traffic volume entering into the intersection from each approach during the P.M. peak-hour period for a weekday.
3 P.M. peak hour = weekday from 2:30 P.M. to 6:00 P.M.

3.4.4 Roadway Intersection Level of Service

The adequacy of a roadway network is characterized in terms of LOS, which describes the flow of traffic on a roadway or through an intersection. It is an aggregate measure of travel delay, travel speed, congestion, driver discomfort, convenience, and safety based on a comparison of roadway system capacity to roadway system travel demand. LOS is reported on a scale of 'A' to 'F', with an 'A' representing the best operating conditions and 'F' representing the worst operating conditions. LOS A represents free-flow or uncongested conditions with little or no delay to motorists, while LOS F represents a forced-flow condition with long delays and traffic demands exceeding roadway capacity. Capacity analyses for the intersections were analyzed using the Synchro/SimTraffic Version 7 and the SimTraffic software package (Gorrill-Palmer 2009).

The traffic study examined the LOS at 10 intersections within the traffic study area. Seven of the 10 intersections currently operate at an LOS equal to or greater than C during peak P.M. periods, and four operate at LOS D during the P.M. peak period (Gorrill-Palmer 2009). None of the intersections currently operate at an LOS of F. Table 3.4-2 identifies the LOS and Figure 3.4-1 identifies the locations of the ten intersections.

Table 3.4-2 Existing Intersection Level of Service (2008)

Intersection	LOS at Peak P.M. Hour
Gurnet Road and Forrestal Drive (unsignalized)	A
Gurnet Road and Cinema (signalized)	B
Bath Road and Gurnet Road (signalized)	D
Bath Road and Harpswell Road/Federal Street (signalized)	C
Bath Road and Jordan Street (unsignalized)	A
Bath Road and Merry Meeting Plaza (signalized)	D
Bath Road and NAS Brunswick Main Gate (signalized)	C
Bath Road and Cook's Corner Mall (signalized)	D
Bath Road and Tibbetts Drive (signalized)	B
Bath Road and Old Bath Road (signalized)	D

Source: Gorrill-Palmer 2009.

3.4.5 Public Transportation

There are no existing local public transportation services located in or operated within the town of Brunswick; however, a fixed-route public transit bus service, the *Brunswick Explorer*, is expected to launch service in the fall of 2010 (Brown 2010). The *Brunswick Explorer* will run service daily from 7:30 A.M. to 5:30 P.M. and will stop once an hour at each stop in each direction (Brunswick Explorer 2010). As currently planned, the *Brunswick Explorer* would not transit through NAS Brunswick but would have stops to the north at Merrymeeting Plaza and along Gurnet Road, by request, near Cooks Corner (Brunswick Explorer 2010).

3.5 Environmental Management

This section discusses ongoing environmental management and restoration programs, including petroleum storage, at NAS Brunswick utilizing 2008 as a baseline year. The management, investigation, and cleanup activities are ongoing; therefore, this section presents the latest data available at the time of preparation. The most current data regarding the cleanup activities are published as part of the environmental restoration process and can be found in the local information repository at the Brunswick local library (Curtis Memorial Library) or on NAS Brunswick's Environmental Restoration Program Web site (http://nasbrunswick.navy-env.com/index.htm).

3.5.1 Regulatory Overview

NAS Brunswick is managing hazardous wastes, hazardous materials and substances, and is remediating any contamination resulting from past operations in accordance with the requirements of the following regulatory programs:

- The **Resource Conservation and Recovery Act** (RCRA) regulates the treatment, storage, transportation, handling, labeling, and disposal of hazardous waste. The Hazardous and Solid Waste Amendments of 1984 added the requirement for treatment, storage, and disposal facilities with permits issued after November 8, 1984, to include corrective actions.

- Under the **Ongoing Regulatory Compliance Program**, NAS Brunswick is required to manage hazardous materials and hazardous substances, including materials stored in tanks and oil-water separators, asbestos-containing materials, lead-based paint (LBP), polychlorinated biphenols, radon, and pesticides and herbicides.

- The **Comprehensive Environmental Response, Compensation, and Liability Act** (CERCLA) requires federal agencies to conduct any needed response actions to clean up contamination from past releases of hazardous substances causing an unacceptable risk to human health and the environment. The **Installation Restoration (IR) Program** is the program for military bases to manage inactive hazardous waste sites and hazardous material spills in compliance with CERCLA. NAS Brunswick is also cleaning up areas of potential soil and groundwater contamination associated with past operations as well as petroleum contamination from releases associated with former underground storage tanks. Cleanup of past contamination from USTs and corrective ac-

tions for past contamination of RCRA sites could also be part of the IR Program.

In 1976, the EPA promulgated RCRA to regulate the treatment, storage, transportation, handling, labeling, and disposal of hazardous waste. RCRA requires that permits be obtained for owners and operators of treatment, storage, and disposal facilities. The Hazardous and Solid Waste Amendments of 1984 requires treatment, storage, and disposal facilities with permits issued after November 8, 1984, to include the requirements for corrective actions. Under these amendments, the EPA can issue administrative orders requiring corrective actions to remediate releases of hazardous waste or hazardous waste constituents from solid waste management units.

In 1979, the Maine Legislature enacted the Maine Hazardous Waste, Septage and Solid Waste Management Act. The MEDEP was directed to issue state regulations for the safe management and transportation of hazardous wastes. The resulting rules (Maine Hazardous Waste Management Regulations, Chapters 850 through 857) incorporated the federal rules but tailored them to Maine's reliance on groundwater as a source of drinking water.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), passed in 1980, created the legal mechanism for cleaning up abandoned or uncontrolled hazardous waste sites. CERCLA requires a response, where necessary to protect human health and the environment, when there is a release or threat of release of a hazardous substance into the environment or when there is a release of any pollutant or contaminant which may present an imminent and substantial danger to public health or welfare. Under CERCLA, the EPA developed a National Priorities List (NPL) of sites that present the greatest risk to public health and the environment.

In 1986, Congress passed the Superfund Amendments and Reauthorization Act (SARA), which mandated that DoD follow the same cleanup regulations that apply to private entities. SARA also established the Defense Environmental Restoration Program (DERP). Through the DERP, the DoD conducts environmental restoration activities at sites on active installations, installations undergoing BRAC, and formerly utilized defense sites (FUDS).

The Navy established the Environmental Restoration (ER) Program to reduce the risk to human health and the environment from past waste disposal operations and hazardous substance spills at DON activities, including certain oil spills that are not addressed by the CERCLA regulatory framework. The program goal is to provide for cost-effective and timely site assessment, planning, and remediation of identified releases consistent with DERP requirements. The ER Program has been organized into three program categories, one of which is the Installation Restoration (IR) Program. The IR Program addresses releases of hazardous substances, pollutants, or contaminants that pose toxicological risks to human health or the environment. CERCLA remedy selection takes into account reasonably anticipated future land use to determine the appropriate extent of remediation, which must be protective of human health and the environment.

Under the provisions of CERCLA §120(h), any transfer of federal real property owned by the United States to non-federal entities is subject to the following requirements:

- A notice of hazardous substance activity must be given to the grantee,
- A covenant must be included in the deed that "all remedial action necessary to protect human health and the environment with respect to any such substance remaining on the property has been taken before the date of such transfer,"
- The deed covenant must also include a provision that the federal government will return and perform any additional response action that may be required in the future, and
- The government retains a perpetual right of access necessary to do such additional response actions.

These requirements apply only to fee conveyances of real property out of federal ownership. They do not apply to interagency federal real property transfers or to leases, licenses, or easements granted for the use of federal land.

3.5.2 Management of RCRA Hazardous Waste

Hazardous waste is generated by a variety of processes at NAS Brunswick, including aircraft, ground vehicle, and facility maintenance. Universal wastes (e.g., batteries, pesticides, mercury-containing equipment, cathode ray tubes, or lamps) are generated on a routine basis and consist primarily of batteries and fluorescent lamps. NAS Brunswick's Hazardous Waste Management Plan describes procedures to be followed for the generation, storage, and disposal of hazardous and non-hazardous chemical wastes, universal wastes, used oil, and unused JP-8 aviation fuel (U.S. Navy 2006a). The Hazardous Waste Contingency Plan describes response actions in the event of any unplanned release of hazardous material or hazardous waste (U.S. Navy 2006b).

NAS Brunswick is classified by the EPA as a Large Quantity Generator (No. ME8170022018). A large quantity generator is defined as a facility that generates more than 2,200 pounds (lbs) (1,000 kilograms [kg]) of hazardous waste, or over 2.2 lbs (1 kg) of acutely hazardous waste, per month (EPA 1996). In 2008, NAS Brunswick generated approximately 1,943 lbs (881 kilograms) of hazardous waste per month, for an annual total of 23,316 lbs (10,576 kilograms) (Smith 2009). This total excludes the one-time generation of 980,242 lbs of contaminated soil as a result of the cleanup of IR Site 9 (Joy 2009c).

Hazardous waste generated at NAS Brunswick is collected in satellite accumulation (storage) areas (SAAs) and then consolidated in a 90-day accumulation area at Building 45. The SAAs are housed in specially designed buildings with secondary containment and full weather enclosure (U.S. Navy 2006a). Activities that frequently generate waste streams are assigned an SAA in which to collect "work station" wastes (U.S. Navy 2006b). SAAs can accumulate up to 55 gallons of

hazardous waste. Full containers must be moved within 72 hours to the 90-day accumulation facility. Hazardous waste is disposed of within 90 days in compliance with federal and state regulations.

Universal waste is collected in universal waste storage areas (UWSAs). Universal waste is stored in approved areas and transferred to the 90-day storage building during the same work shift that the waste is generated (U.S. Navy 2006a). The transport and final disposal of universal wastes accumulated at NAS Brunswick are regulated under federal and state regulations.

Hazardous waste is neither stored nor generated at the East Brunswick Radio Transmitter Site or the Sabino Hill Rake Station. Hazardous waste is not stored at the McKeen Street Housing Annex; however, any hazardous waste generated at the McKeen Street Housing Annex is managed by Northeast Housing LLC in accordance with its Hazardous Materials Management Plan (Steele 2009).

3.5.3 Management of Hazardous Materials and Substances

Hazardous materials are used for routine and specialized purposes at NAS Brunswick. These materials are distributed in limited quantities from the Building 81 Consolidated Hazardous Material Reutilization and Inventory Management Program (CHRIMP) center to various work centers around the installation.

3.5.3.1 Underground Storage Tanks

Operation of underground storage tanks (USTs) is regulated under 40 CFR Part 280 (Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks) and 40 CFR Part 281 (Approval of State Underground Storage Tank Programs). The State of Maine's UST program is approved under 40 CFR Part 282.69, under Subtitle 1 of RCRA. All USTs on NAS Brunswick are registered with the MEDEP, and the Navy notifies the MEDEP if any USTs are removed, repaired, or installed. In addition, the Navy conducts annual inspections of all USTs in accordance with MEDEP regulations (Navy BRAC PMO 2006). NAS Brunswick maintains a compliance and annual inspection record for each tank.

As of 2008, 13 active USTs are being used at NAS Brunswick, with a total of 525 current and former USTs having been identified (Joy 2009d). The former USTs were either removed and not replaced or removed and replaced with aboveground storage tanks (ASTs). ASTs with underground piping are also registered with the MEDEP. As of 2008, NAS Brunswick operates four ASTs with underground piping (Joy 2009e). The active USTs and ASTs with underground piping are classified into six categories (see Table 3.5-1).

Two sites at NAS Brunswick—the Old Navy Fuel Farm (ONFF) and the Navy Exchange (NEX) Gas Station—contained multiple storage tanks and materials. Although numerous USTs historically existed at NAS Brunswick, only two areas have been subject to ongoing investigation and remediation because of known releases. These sites have been investigated and cleanup actions are ongoing. A discussion of these two sites is provided in Section 3.5.4.

Table 3.5-1 Underground Storage Tanks

Category	Number
Storage of unleaded fuel	5
Storage of fuel oils Nos. 1 and 2	5
Storage of diesel fuel	4
Storage of propylene glycol	2
Storage of jet fuel (product recovery tank)	1

Source: Joy 2009d, 2009e.

No USTs are located at the outlying properties. Between 1983 and 1995, all heating fuel USTs for the housing units at the McKeen Street Housing Annex were removed and replaced with ASTs, which have been subsequently removed. The Annex is currently served by natural gas (Navy BRAC PMO 2006). Tanks were formerly located at the East Brunswick Radio Transmitter Site. Fuel-oil and diesel USTs were removed in 1989 (U.S. Navy 2009a). No tanks are located at the Sabino Hill Rake Station.

3.5.3.2 Aboveground Storage Tanks

Operation of ASTs is regulated under 40 CFR 112 (Oil Pollution Prevention), which establishes requirements to prevent the discharge of oil from aboveground containers (40 CFR 112.1(a)(1)). Under 38 Maine Revised Statutes Annotated (MRSA) § 570-K(5) (Aboveground Oil Storage Facilities, Spill Prevention and Control), the MEDEP has the authority to oversee compliance with the federal requirements for aboveground oil storage facilities with capacities exceeding 1,320 gallons (MEDEP 2005a). In addition, the facilities must develop a Spill Prevention, Control, and Countermeasure (SPCC) Plan for applicable oil facilities in compliance with the Oil Pollution Act of 1990 and the Clean Water Act (CWA). An Oil SPCC Plan is required under CWA for "oil storage facilities with an aggregate storage capacity greater than 1,320 gallons and where a discharge could reach a navigable water body, either directly or indirectly" (MEDEP 2005a). The ASTs at NAS Brunswick meet the criteria under 40 CFR Part 112 because a tributary of the Androscoggin River and Mere Brook flow through the facility and because their aggregate capacity exceeds 1,320 gallons. NAS Brunswick has the capacity to store more than 2 million gallons (as of 2008) of various oils, predominantly JP-8 aviation fuel, Nos. 1 and 2 fuel oil, gasoline, and diesel fuel. NAS Brunswick's SPCC Plan documents establish spill prevention procedures and equipment at NAS Brunswick and recommends corrective actions to prevent the discharge of petroleum-based substances into the environment (U.S. Navy 2004a). The SPCC Plan is reviewed at least annually.

As of 2008, 158 active ASTs are present at NAS Brunswick; three active ASTs are empty (lube oil and diesel fuel). Table 3.5-2 identifies the number of active ASTs, by content. All ASTs are inspected at least annually in accordance with NAS Brunswick's SPCC Plan (U.S. Navy 2004a). The tank capacities vary from 10 to 880,000 gallons (Navy BRAC PMO 2006; Joy 2009f). Most tanks have a capacity of less than 500 gallons.

The Jet Fuel Storage Installation (JFSI) contains two tanks, each with the capacity to store 880,000 gallons of JP-8 fuel (one tank was permanently closed in December 2008). The JP-8 tanks are supplied by tanker truck via aboveground piping. Adjacent to the pump house is a 3,000-gallon product-recovery UST (U.S. Navy 2004a).

No ASTs are located on the outlying properties.

Table 3.5-2 Aboveground Storage Tanks

Category	Number
Storage of fuel oil No. 1	48
Storage of diesel fuel	32
Storage of used oil	26
Storage of hydraulic and lube oil	26
Storage of ethylene glycol	2
Storage of JP-8 aviation fuel	5
Storage of gasoline	8
Storage of cooking grease	3
Storage of other chemicals (hydrogen peroxide, potassium acetate, propylene glycol)	5
Empty tanks	3
Total	**158**

Source: Joy 2009f.

3.5.3.3 Oil/Water Separators

As of 2008, 17 oil/water separators (OWS) are located at NAS Brunswick (Joy 2009g). After processing in the OWS, wastewater is discharged into the sanitary sewer system (14 of the OWS) or storm drainage system (three OWS). No OWSs are located on the outlying properties.

3.5.3.4 Asbestos-containing Materials

Asbestos abatement is regulated under Title II of the Toxic Substances Control Act (TSCA) (Asbestos Hazard Emergency Response), which authorized the EPA to determine the extent of the risk to human health posed by asbestos in public and commercial buildings and the means to respond to any risk (Navy BRAC PMO 2006). Asbestos was used in the building construction industry (e.g., roofing shingles, ceiling and floor tiles, cement, textiles, coatings, etc.) (EPA 2009a). NAS Brunswick Public Works Department Shop personnel have been trained to perform maintenance operations in accordance with regulatory requirements (Sanders 2009a).

Several surveys were conducted to determine whether asbestos-containing materials (ACM) and presumed asbestos-containing materials (PACM) are present in non-housing buildings at NAS Brunswick, and if present, to what extent. A 1989 survey found that 68 of 73 surveyed buildings contained either ACM or PACM, and a 1999 survey found that 93 of 184 surveyed buildings contained ACM or PACM (Navy BRAC PMO 2006). The most recent survey (2005) found that 142 of 210 buildings contained ACM or PACM (Navy BRAC PMO 2006).

In conjunction with a Lead-Based Paint (LBP) survey and risk assessment, NAS Brunswick conducted an asbestos survey and risk assessment at a representative number of residential properties at the installation in 2004 (Navy BRAC PMO 2006). This survey was conducted in part due to the transition of the housing to PPV. ACM was identified in all four units surveyed in the Midway Terrace; in both the single-family and multi-family units surveyed in the Brunswick Gardens; and in all 15 units surveyed in the Station Quarters Housing Area. Brunswick Gardens has been demolished and replaced with Mariners Landing housing since the survey was conducted. ACM was identified at the seven single-family housing units and two multi-family housing units surveyed at the McKeen Street Housing Annex. In all cases, ACM was in good condition and not considered an asbestos hazard.

The Casco Bay Pipeline is an approximately 12-mile (mi) long, 50-foot (ft) wide pipeline easement that runs from the Defense Fuel Support Point – Casco Bay Terminal to the NAS Brunswick property that will be transferred back into private ownership (GZA 1997). The northernmost 3 miles of the pipeline are on NAS Brunswick property and will not be part of the transfer. The steel pipeline has a tar exterior coating and a fire-resistant asbestos wrapping. The pipeline has been inactive since 1991, at which time the pipeline was reportedly drained and cleaned by a local contractor. After being cleaned the pipeline was pressurized with nitrogen. The pressurization continued through August 1995, at which time pressure was lost due to demolition of the valve system at the NAS Brunswick fuel farm (at the northern terminus of the pipeline). This action opened the pipeline to atmospheric pressure. The end of the pipeline in the Casco Bay tank farm was welded shut in June 1996 (GZA 1997).

There may be other sources of asbestos including the steam distribution system and other utility lines. Asbestos-lined pipe from the demolition of buildings was found at some of the IR Program sites including the Orion Street Asbestos Disposal Area and the Sandy Road Rubble and Asbestos Disposal Area. The Merriconeag Extension Debris Site contained asbestos cement pipe.

No ACM has been identified at the Sabino Hill Rake Station. At the East Brunswick Radio Transmitter Site, pre-demolition ACM abatement of the buildings was conducted in 1998 (U.S. Navy 2009a).

3.5.3.5 Lead-Based Paint/Lead

LBP is regulated under Title IV of TSCA. Most buildings at NAS Brunswick were coated with paint containing lead at various concentrations (Sanders 2009b). Military housing, however, has very few lead-based painted building components remaining in the units (Sanders 2009a).

As referenced in the previous section, the Navy conducted a LBP inspection and risk assessment at residential properties on the base in 2004 in conjunction with an asbestos survey (Navy BRAC PMO 2006). The inspection was conducted on a representative number of housing units in each housing area; it did not include a walk-through inspection of all the units. Eleven single-family housing units and

one multiple-family housing unit were inspected for LBP hazards. The risk assessment determined that there was a hazard due to deteriorated paint conditions in 13 of the 15 units within the Station Quarters Housing Area. No LBP hazards due to paint conditions or dust wipe samples were indentified in any of the units inspected within Brunswick Gardens (Navy BRAC PMO 2006). Brunswick Gardens was demolished and has been replaced with Mariners Landing housing since the survey was conducted. At the McKeen Street Housing Annex, LBP hazards due to paint conditions were identified at 10 single-family housing units and six multiple-family units. Where a LBP hazard was found, follow-up actions were established and/or completed to abate those hazards.

At NAS Brunswick, LBP hazards have been inspected and hazard levels have been assessed for areas with the greatest potential for exposure. LBP surveys are generally not performed on commercial or office buildings unless the building is to be renovated or demolished (Sanders 2010). However, all painted surfaces are assumed to contain some level of lead unless a negative determination has been made (Navy BRAC PMO 2006).

A baseline survey of the East Brunswick Radio Transmitter Site conducted in 1996 determined that LBP had likely been used during the original construction of the facilities (based on the age of the buildings) and found the remains of an apparent lead-acid storage battery adjacent to perimeter fencing near the buildings (HRP Associates 1996). The buildings were demolished in 1998 (U.S. Navy 2009a). Additional soil sampling at the East Brunswick Radio Transmitter Site will be conducted prior to transfer (U.S. Navy 2009a).

Soil and paint samples were collected at the Sabino Hill Rake Station in 2007. Lead was detected in soil samples and at higher levels in the paint sample (NAS Brunswick 2007a). This rake station is scheduled for demolition and soil removal in late 2009.

Drinking water at NAS Brunswick is obtained from the Brunswick and Topsham Water District and from one on-site well. Water from the on-site drinking water well and the one non-potable well has been tested to determine whether it contains lead above the federal and state residential drinking water standards (Navy BRAC PMO 2006). The test results show that the water from both wells is in compliance with federal and state standards.

3.5.3.6 Polychlorinated Biphenyls (PCBs)

PCBs are regulated by the EPA under TSCA. Transformers used in the delivery of electrical service are a potential source of PCB contamination. No transformers currently at NAS Brunswick and owned by the Navy contain PCBs at concentrations greater than 50 ppm. Prior to 1995, approximately 300 transformers containing PCBs had been used at NAS Brunswick (Navy BRAC PMO 2006). The Navy subsequently removed all transformers and capacitors that were known or suspected to contain PCBs. In accordance with TSCA regulations, no transformers or other equipment at NAS Brunswick contain oil with PCB concentrations greater than 50 ppm.

Two Installation Restoration (IR) sites at NAS Brunswick—the Orion Street Landfill North and the Hazardous Waste Burial Site—were determined to contain PCB-contaminated soil, groundwater, sediments, surface water, and leachate. Section 3.5.4 provides a discussion of investigations and remedial activities associated with these sites.

In May 2007, soil and paint samples from the Sabino Hill Rake Station site were collected for PCB analysis. PCB concentrations were less than 1 ppm, while the concentration in soils was non-detectable. Higher concentrations in paint and soil would be expected if the tower's paint contained PCBs (NAS Brunswick 2007a).

3.5.3.7 Radon

In 1990, the Navy Radon Assessment and Mitigation Program (NAVRAMP) conducted a study to determine radon levels in representative samples of the child care center (Building 21) and BEQ (Building 384) at NAS Brunswick (Joy 2009h). These buildings had radon levels below the EPA's radon action level of 4 picocuries per liter (pCi/L). As a follow up to the 1990 screening effort, radon assessments conducted at NAS Brunswick from 1991 to 1992 found that no housing units at NAS Brunswick or the McKeen Street Housing Annex had radon levels above the EPA's action level (Navy BRAC PMO 2006).

3.5.3.8 Pesticides/Herbicides

Pesticide use at NAS Brunswick is regulated by the EPA under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), which provides the basis for the regulation, sale, distribution, and use of pesticides in the United States. Current pest management activities at NAS Brunswick are conducted in accordance with the Pest Management Plan, which relies on regular monitoring to determine if and when treatments are needed and employs physical, mechanical, cultural, biological, and educational tactics to keep pest numbers low enough to prevent intolerable damage or annoyance (NAS Brunswick 2007b). When applied, pesticides can be applied only by DoD-certified pest control operators and are mixed at Building 647 (the pest control shop) and Building 39 (the golf course maintenance building). Pesticides used within the housing areas must be authorized by Northeast Housing LLC and applied by a state-licensed pest control vendor (Steele 2009).

Past pesticide use at NAS Brunswick resulted in soil and groundwater contamination. CERCLA and IR Program investigations identified soil contamination associated with IR Site 17, which consisted of Building 95 (the former pesticide shop in use from 1955 to 1985) and a storage area. In addition, pesticides and herbicides have been identified as contaminants of concern (COCs) in soil, groundwater, sediments, surface water, and leachate at the Orion Street Landfill North and South (IR Sites 1 and 2) and the Hazardous Waste Burial Area (IR Site 3). Section 3.5.4 presents a description of past pesticide uses, disposal areas, and remediation activities.

Herbicides may have been used historically at the East Brunswick Radio Transmitter Site for control of vegetation around the antennas (HRP 1996). At the McKeen Street Housing Annex, any pesticide use must be authorized by North-

east Housing LLC, and the pesticides must be applied by a licensed pest control vendor in accordance with federal and state laws (Steele 2009). There is no history of pesticide application at the Sabino Hill Rake Station (Silver 2009).

3.5.4 Environmental Restoration Program

NAS Brunswick was listed on the NPL on July 22, 1987, bringing the installation under the Federal Facilities provisions of CERCLA Section 120(e) (ECC 2008). NAS Brunswick is listed on the NPL as EPA ID ME8170022018, Site ID 0101073 (Navy BRAC PMO 2006). The sites/AOCs at NAS Brunswick that have been, or are being, investigated are identified on Table 3.5-3. Cleanup of these sites is being conducted under the Navy's IR Program and meets the requirements of CERCLA and SARA (ECC and EA 2005). NAS Brunswick's IR Program also adheres to MEDEP regulations. On October 19, 1990, the Navy entered into a Federal Facility Agreement (FFA) with the EPA and the MEDEP (U.S. Navy, EPA, and State of Maine 1990). The FFA establishes goals and responsibilities among the Navy and the regulatory agencies and sets enforceable cleanup schedules for the IR sites at NAS Brunswick. A Restoration Advisory Board (RAB) consisting of community representatives and state and federal regulators advises the Navy on environmental cleanup issues and strategies (NAS Brunswick 2009a). The IR Program, which is structured similarly to the CERCLA program, is described in Section 3.5.1.

Additional AOCs at NAS Brunswick outside the scope of the IR Program have been identified as containing petroleum, oil, and lubricant (POL) contamination under the Navy's POL Program, or as potentially containing munitions-related contamination under the Military Munitions Response Program (MMRP). The investigation and cleanup of past contamination at POL areas and MMRP AOCs are conducted in a manner consistent with the IR Program (U.S. Navy 2007). POL areas are discussed in Section 3.5.4.2, and MMRP AOCs are discussed in Section 3.5.4.3.

No IR sites or AOCs have been identified at any of the outlying properties. Therefore, these properties are not discussed further in this section.

3.5.4.1 Installation Restoration (IR) Program

The Navy's IR Program is structured in accordance with CERCLA guidelines. CERCLA specifies a number of sequential procedures for initiating and carrying out the remedial process under the IR Program. The Navy's steps for implementing these procedures are identified on Figure 3.5-1. The EPA, MEDEP, and the public have opportunities to review and comment on assessments/studies and proposals for removal/remedial actions throughout the remedial process. A Record of Decision (ROD) is prepared after public review of the Proposed Remedial Action Plan. The ROD explains the remedy selection process and identifies the remedy selected based on information and technical analysis presented in the Remedial Investigation/Feasibility Study (RI/FS) report. A site may be removed from the NPL when the final ROD requirements are attained and the site is operational and functional. No site may be deleted from the NPL without an EPA-approved Close Out Report (COR) (NAS Brunswick 2009b).

Table 3.5-3 Environmental Restoration Program Sites, NAS Brunswick

Site Number	Site Name	Current Status[1]
IR Sites		
Sites 1 and 3	Orion Street Landfill and Hazardous Waste Burial Area	Landfill capped and slurry wall and extraction wells installed. Long-term monitoring and institutional controls in place.
Site 2	Orion Street Landfill South	Metal debris removed and landfill slope was stabilized. Long-term monitoring and institutional controls in place.
Site 4	Acid/Caustic Pit	Closed. Groundwater contamination is being addressed by the Eastern Plume groundwater remedy. Institutional Controls and long-term monitoring in place.
Site 5	Orion Street Asbestos Disposal Area	Closed. No Further Action.
Site 6	Sandy Road Rubble and Asbestos Disposal Area	Closed. No Further Action.
Site 7	Old Acid Caustic Pit	Soil removed and additional investigations underway. Institutional Controls and long-term monitoring in place.
Site 8	Perimeter Road Disposal	Closed. No Further Action.
Site 9	Neptune Drive Disposal Area	Soil removed. Investigations underway and long-term monitoring and institutional controls in place.
Site 11	Fire Training Area	Closed. Soil removal action completed. No Further Action for soils. Institutional Controls in place. Groundwater contamination is being addressed by the Eastern Plume groundwater remedy. Infiltration Gallery is located at this site.
Site 12	Explosive Ordnance Disposal Area	Preliminary Assessment conducted in 2007. Further investigations are planned. Currently being reviewed under the IR Program and MMRP.
Site 13	Defense Reuse and Marketing Office	Closed. Institutional Controls in place.
Site 14	Old Dump Number 3	Closed. No Further Action.
Site 15	Merriconeag Extension Debris Area	Closed. No Further Action.
Site 16	Swampy Road Debris Area	Closed. No Further Action.
Site 17	Former Building 95	Building 95 demolished and soils removed. Long-term monitoring in place and additional investigations ongoing.
Site 18	Westside Runway Operable Unit	Closed. No Further Action.
	Eastern Plume Operable Unit	Groundwater remedy, institutional controls, and long-term monitoring in place.
POL Areas		
UST 001	Old Navy Fuel Farm	Tanks, piping, and soils removed. Long-term monitoring in place.
UST 002	Navy Exchange Service Station	Soil removal action is being conducted. Long-term monitoring in place.
MMRP AOCs		
	Main Base MEC Areas	Initial evaluations are underway.
	Quarry Site	Initial evaluations are planned.

Source: ECC 2008.

Note:
[1] Current Status is as of 2008.

Key:
Shading = undergoing remediation or investigation.

(1)	Site discovery and Notification
(2)	Preliminary Assessment (PA)
(3)	Site Inspection (SI)
(4)	Remedial Investigation/Feasibility Study (RI/FS)
(5)	Record of Decision (ROD)
(6)	Remedial Design (RD)
(7)	Remedial Action Construction (RA-C)
(8)	Remedy in Place (RIP)
(9)	Remedial Action Operation (RA-O)
(10)	Response Complete (RC)
(11)	Long-term Management (LTMgt)
(12)	Site Closeout (SC)

Source: U.S. Navy 2007.

Figure 3.5-1 Navy IR Process: Phases and Milestones

Eighteen IR sites have been identified at NAS Brunswick since it was added to the NPL in 1987 (ECC 2008). Figure 3.5-2 indicates the locations of all IR sites. Remedies and institutional controls in place at the known IR sites are considered protective of human health and the environment in the short term; therefore, there are no current exposure risks associated with current land use. Further investigation or long-term monitoring is necessary at eight sites to determine what, if any, additional action may be required to address long-term protection. A Finding of No Further Action has resulted from investigation and remedial or removal action at eight sites (Sites 5, 6, 8, 13, 14, 15, 16, and 18) (ECC and EA 2005). At two additional sites (Sites 4 and 11), a finding of No Further Action has been made only for the soils; the groundwater at these locations is being evaluated as part of the Eastern Plume Operable Unit. The past uses of each IR site and the associated contamination and remediation activities are described below. The remediation activities discussed below for each site are as of the existing baseline year of 2008.

Sites 1 and 3: Orion Street Landfill North and Hazardous Waste Burial Site

The Orion Street Landfill North (Site 1) is an unlined, 8.5-acre landfill located within the restricted area on the east side and at the southern end of the runway. The landfill consisted of two unlined trenches and was used from the 1955 to 1975 for disposing of waste oil, solvents, pesticides, petroleum products, paint, aircraft and automobile parts, domestic waste, and other unidentified chemicals and materials, including pharmaceutical wastes, photography-related chemicals, and empty hazardous waste (chemical, herbicide, and pesticide) containers (Navy BRAC PMO 2006). Site 1 was also used as a borrow pit before and during its use as a landfill, but no specific information is available as to the location(s) where soil was reused as fill.

The Hazardous Waste Burial Site (Site 3) is a 1.5-acre area adjacent to the southwest side of Site 1. From 1960 to 1973, solvents, pesticides, paint, isopropyl alcohol, petroleum products, and non-corrosive decontaminating agents (composed primarily of tetrachloroethane) were buried at Site 3 (ECC 2008).

Sites 1 and 3 were grouped together based on their proximity and common historical land use as landfills (ECC 2008). Based on field observations, approximately 300,000 cubic yards of wastes are estimated to have been disposed of at the two sites.

Contaminants of concern (COCs) identified in the 1992 ROD (U.S. Navy 1992a) for these sites include volatile organic compounds (VOCs) and metals in groundwater; VOCs, metals, and dichlorodiphenyltrichloroethane (DDT) in leachate; metals in surface waters; and VOCs, semi-volatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons (PAHs), and metals in sediments (U.S. Navy 1992b).

Various remediation activities have been performed at Sites 1 and 3 since the ROD. A slurry wall, a low-permeability cap, and a groundwater treatment system, including two groundwater extraction wells, were installed in 1994 (ECC 2008). The wells were deactivated in 1997 when water levels dropped below the level of landfill debris. Periodic groundwater and gas monitoring has occurred since the initial wells were deactivated. Additional wells were installed at the mouth of the slurry wall in 2005 to continue monitoring activities. A long-term monitoring plan is in place to continually monitor the groundwater, surface water, leach seeps, sediment, and landfill gas emissions. Evaluation of long-term monitoring data is ongoing to gauge the success of the remedy and to determine whether additional monitoring or modifications to the plan are necessary (ECC 2008).

Site 2: Orion Street Landfill South

The Orion Street Landfill South (Site 2) is an unlined, 2-acre landfill adjacent to Sites 1 and 3. It is located in a restricted area east of the southern end of the runway. The site was used as NAS Brunswick's primary landfill from 1945 to 1955; however, its operational time was less than 10 years because the base was closed from 1946 to 1951 (ECC 2008). Generic refuse, including drums, office furniture, and domestic waste, was disposed of at the site, along with solvents, paint, oil, toluene, methyl ethyl ketone (MEK), and medical wastes. Waste volume was reduced using an on-site incinerator, and materials were placed in a former borrow pit before being covered with soil and planted with pine trees. The volume of waste disposed of at Site 2 is unknown.

The 1998 ROD for this site identified the following COCs: metals in surface water; polycyclic aromatic hydrocarbons (PAHs) and metals in sediments; and DDT, dichlorodiphenyldichloroethylene (DDE), and metals in leachate (U.S. Navy 1998a).

The ROD-selected remedy for this site was Minimal Action. The risk assessment for the site concluded that there were no unacceptable human health risks (carcinogenic or non-carcinogenic) (U.S. Navy 1998a). In 1999, following the risk assessment, surface debris was removed, the depression was backfilled, and a soil cap was installed (Navy BRAC PMO 2006). The analytical results for groundwater, surface water, leachate seep, and sediment samples collected periodically at

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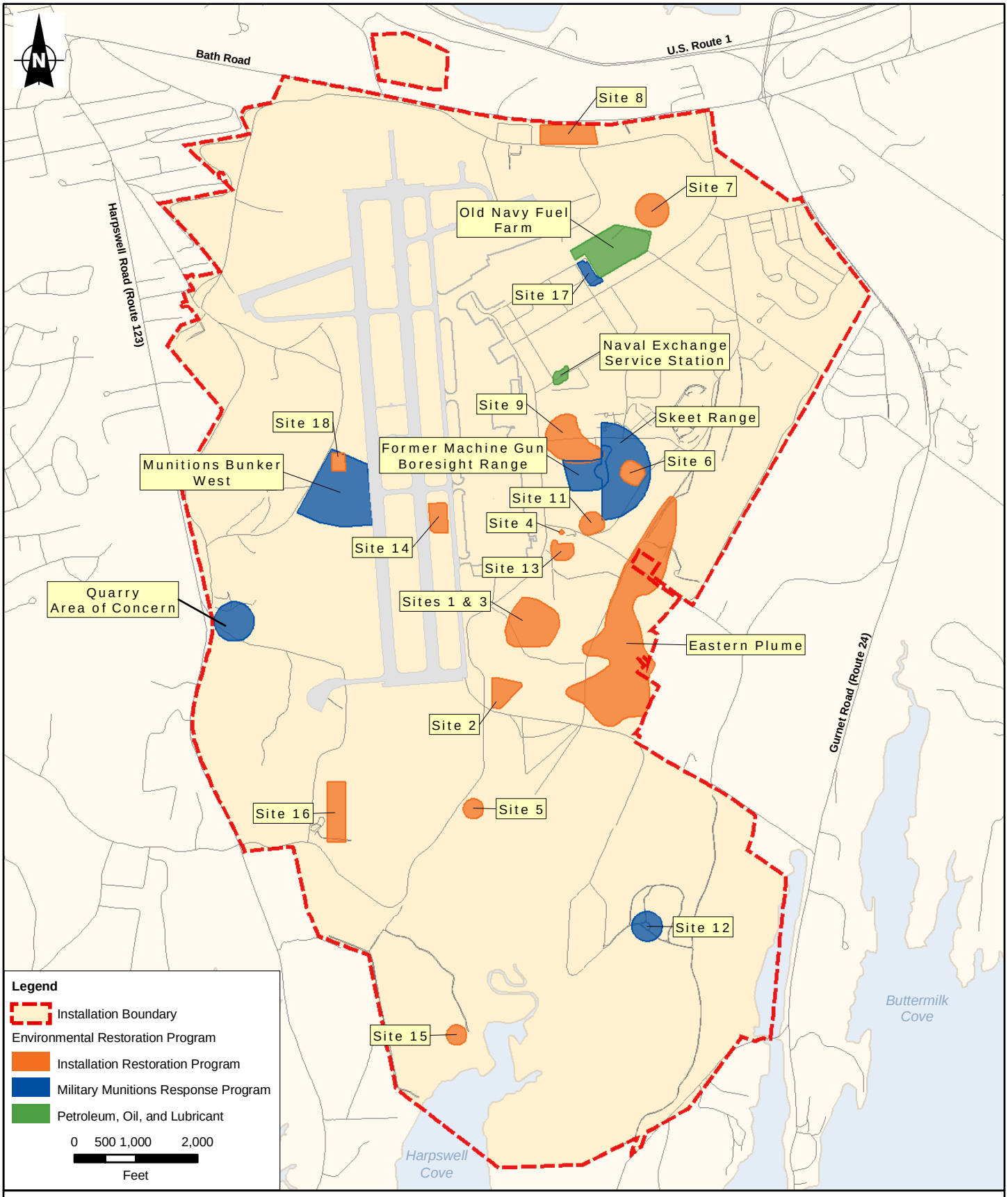

Source: ECC 2008.

Figure 3.5-2
Environmental Restoration Program Sites
NAS Brunswick, Maine

the site since 2000 indicate that most contaminants are below EPA threshold levels. An evaluation of the results of the long-term management plan is on-going to determine whether additional actions are required.

Site 4: Acid/Caustic Pit

The Acid/Caustic Pit (Site 4) is located near the intersection of Orion Street and Sandy Road, beneath the eastern portion of Building 584. The site is within several hundred feet of Sites 11 and 13, and NAS Brunswick combined these sites when addressing soil and groundwater contamination (ECC 2008). The site, which covers an area of 4 square feet and is approximately 3 feet deep, was used from 1969 through 1974 for the disposal of liquid wastes, including acids, solvents, and transformer oils.

An RI/FS of Site 4 conducted in the 1980s identified metals and trichloroethane (TCE) in groundwater and halocarbon gases in soils adjacent to Building 584 (E.C. Jordan 1991a). The TCE groundwater contamination is considered comingled with contamination at Sites 1, 3, and 11 as part of the Eastern Plume (see Eastern Plume Operational Unit). In 1992, an interim ROD selected remedial actions to address the Eastern Plume on a whole (U.S. Navy 1992a), including activating a groundwater extraction and treatment system in 1995. The final ROD for Site 4, issued in 1998, determined that there would be No Further Action for the soils at Site 4 because contaminants were below EPA and MEDEP target levels (U.S. Navy 1998b). The final ROD noted that, as an Institutional Control, if Building 584 is removed, further investigations and remedial action may be required. Groundwater contamination is being monitored and evaluated through the operation of the Eastern Plume groundwater system (ECC 2008).

Site 5: Orion Street Asbestos Disposal Site

The Orion Street Asbestos Disposal Site (Site 5) is a 0.25-acre area located south of Merriconeag Road and the runways on NAS Brunswick. The site comprises two 30-foot-long trenches that, in 1979, were used to dispose of 14 asbestos-lined pipes from building demolitions (ECC 2008).

No asbestos was detected in soil or groundwater samples collected during the RI/FS, and the risk to human health and the environmental was deemed to be minimal (E.C. Jordan 1991b). A 1993 ROD combined both Sites 5 and 6 (another asbestos disposal area; see below) when proposing remedial actions for the sites (asbestos was the only COC for each site) (U.S. Navy 1993a). The ROD detailed the excavation, containerization, and transportation of all ACM, including the pipes and soils from Site 5, and construction debris, pipes, and soils from Site 6, to Sites 1 and 3 for use as sub-grade fill material (Navy BRAC PMO 2006). The area was then backfilled and seeded. No further action is planned for Site 5.

Site 6: Sandy Road Rubble and Asbestos Disposal Site

The Sandy Road Rubble and Asbestos Disposal Site (Site 6) was used for the disposal of construction/demolition debris, aircraft parts, and asbestos-lined pipes. The site covers approximately 1 acre and is located northwest of Sandy Road. The aforementioned materials were disposed of in a depression on this site, along with approximately 250 cubic yards of fill material containing asbestos (ECC

2008). Similar to Site 5, no asbestos was detected in soil samples collected during the 1991 RI/FS, and the risk to human health and the environmental was deemed to be minimal (E.C. Jordan 1991b). The ROD and remedial activity for this site are discussed above for Site 5. No further action is planned for Site 6.

Site 7: Old Acid/Caustic Pit Site

Site 7 is located in the northeast portion of NAS Brunswick, northeast of the Old Navy Fuel Farm and north of Fitch Avenue. It encompasses approximately 1.4 acres and was used for the disposal of liquid waste from 1952 to 1969 (ECC 2008). The precise location of the pit is unknown, though the footprint in the source area is estimated to be 3,800 square feet (Navy BRAC PMO 2006). Materials suspected to have been disposed of include transformer oil, battery acid, caustics, solvents, and other liquids.

In 1983, an Initial Assessment Study (IAS) was completed and Site 7 was identified as a site of potential hazard. A Remedial Investigation/Feasibility Study (RI/FS) was completed for Site 7 in 1990 (ECC 2008). In an attempt to identify the location of the pit, subsequent investigations were conducted that included a soil gas survey, the use of ground-penetrating radar, a terrain conductivity survey, the collection of soil test borings, test pit excavations, and well installations. During these investigations, both soil and groundwater contamination was detected (ECC 2008).

The primary COCs identified in the ROD included PAHs and DDT in soils and metals in groundwater (U.S. Navy 2002b). The associated risk assessment concluded that the risk to either human or ecological receptors was low. The selected remedy for the site was institutional controls, consisting of groundwater and soil use restrictions and groundwater monitoring. Periodic groundwater monitoring has been on-going since 2005 as part of the long-term management plan for the site. A Sampling and Analysis Plan was finalized in 2008 to determine the source of elevated metal concentrations in groundwater and to collect additional data to better characterize the site (ECC 2008). Additional evaluation will include limited site investigations to determine whether impacted soil and/or materials remain on the site.

Site 8: Perimeter Road Disposal Site

The Perimeter Road Disposal Site (Site 8) covers 0.5 acre along the northern boundary of NAS Brunswick. The site is separated into north and south areas. From 1964 to 1974 the site was used to dispose of construction and demolition debris, including concrete, scrap metal, asphalt rubble, as well as solvents, TCE, MEK, and toluene. A ravine to the northeast of the site was also filled with landfill debris.

The ROD issued in 1993 identified metals (in surface waters, sediments, and leachate) and PAHs (in soils and leachate) as COCs for Site 8, though the levels of contamination represented low risks to human health and the environment (U.S. Navy 1993b). The remediation activity for the site included the removal of all construction debris, rubble, and PAH-contaminated soils, which were then

transported to Sites 1 and 3 for use as subgrade material below the landfill cap (Navy BRAC PMO 2006). No further action is planned for the site.

Site 9: Neptune Drive Disposal Site

The Neptune Drive Disposal Area (Site 9) is located on approximately 20 acres east of Orion Street, though only 5 acres were used for disposal. Neptune Drive divides Site 9 on an east-west axis, and Orion Street borders its western edge (ECC 2008). Three retention ponds were constructed in the mid-1990s and border Building 201 on the south and southeast.

Site 9 was the first landfill used at NAS Brunswick. From 1943 to 1953, there was an incinerator on the site near the former location of Building 220. Solid waste was burned in the incinerator, and the ash was deposited in trenches in the landfill near the former locations of Buildings 218 and 219 (Navy BRAC PMO 2006). In total, approximately 16,000 cubic yards of ash were deposited in the two disposal areas. In addition, liquid wastes and solvents were poured on the ground and burned in the vicinity of Building 201. Building 201 contained a septic system, which also was a potential source of contamination (ECC 2008). A 42-inch drain pipe, extending between Buildings 201 and 293, discharged to an outfall on a local, unnamed stream. Nine barracks were constructed on the site north of Neptune Drive in 1953, during which time the drain pipe was reportedly excavated and the site was capped with soil (Navy BRAC PMO 2006).

In 1990, three distinct areas of contamination were identified on Site 9: the former incinerator (Building 220), the disposal sites (Buildings 201, 218, and 219), and the adjacent streams and the retention ponds. Contaminants identified on Site 9 included metals, VOCs (including vinyl chloride), pesticides, and hydrocarbons in groundwater and leachate; PAHs in sediments; and hydrocarbons in surface water (ECC 2008). A risk assessment for Site 9 found a high potential for direct contact with contaminated soil and sediment due to the recreational land use in the area, as well as potential public health risks from two VOCs in groundwater if ingested (1,1 dichloroethane and vinyl chloride) (E.C. Jordan 1990). A subsequent ecological assessment found the potential for impacts from PAHs and pesticides in stream sediments (E.C. Jordan 1990). In 1999, the final ROD recommended natural attenuation and long-term monitoring with institutional controls (land use restrictions) for the site (U.S. Navy 1999a). The ROD also concluded that, if the barracks were demolished, the remedy would need to be reassessed.

In 2001, the Navy began demolition of the barracks on Site 9, starting with Building 216. Soil and ash removal were determined to be the appropriate remedy for the site at that time. After demolition of the final barracks in 2005, ash from the landfill/disposal area was slated for removal from the site. Approximately 36,000 cubic yards of ash, impacted soil, construction debris, demolition debris, and loam and overburden were excavated from Site 9 and sent to an approved disposal facility in 2007/2008 (NAS Brunswick 2008).

Investigations to better delineate the edge of the impacted soil in the landfill area were completed in 2008. Groundwater monitoring wells were replaced in 2008 after removal actions were completed. Evaluation of the results of the long-term

management plan (for groundwater), the various site investigations, and removal activities are on-going to determine whether additional actions are needed.

Site 11: Fire Training Area

The former Fire Training Area (Site 11) is located off Old Gurnet Road, between Orion Street and Sandy Road. It is within several hundred feet of Sites 4 and 13. The site was used regularly from the 1950s until 1990 for firefighting exercises (Navy BRAC PMO 2006). Combustible liquids, including fuels, waste oils, solvents, and other miscellaneous liquids were used during the exercises. Unburned liquids were stored in a UST located on site. Because the burns were initially conducted on the grass substrate, the site was identified as a contributor to the Eastern Plume and was combined with Sites 4 and 13 when addressing soil and groundwater contamination.

Contaminants identified at Site 11 include TCE and DCE in groundwater, and chlorinated solvents and PAHs in soils. During two separate removal actions in 1994 and 1995, buried drums, debris, and soils were excavated (Navy BRAC PMO 2006). No Further Action was recommended for Site 11 in 1998 due to the removal of soils and, therefore, the elimination of exposure risks from soils.

No Further Action is planned for this site (ECC and EA 2005). Even though the aforementioned materials were removed, TCE was detected in post-excavation soils, and the site was subsequently combined with Sites 4 and 13 as part of the Eastern Plume. (See Eastern Plume Operable Unit below for a discussion of current remedial activities.) Contaminated soils potentially exist below the groundwater table, which could impact groundwater. The groundwater treatment system installed for the Eastern Plume addresses any additional groundwater contamination from Site 11. Currently, the infiltration gallery associated with the groundwater treatment system is located at this site.

Site 12: Explosive Ordnance Detonation (EOD) Training Area

The Explosive Ordnance Detonation (EOD) Training Area (Site 12) is located in the southeast portion of NAS Brunswick, in a restricted area. Due to its past use, Site 12 is considered a Munitions and Explosives of Concern (MEC) area and is investigated under the Navy's MMRP. See Section 3.5.4.3 for a description of past uses and remediation activities at the site.

Site 13: Defense Reutilization and Marketing Office Area

The Defense Reutilization and Marketing Office Area (Site 13) is located in a paved area off of Huey Drive, immediately south of Building 584 and Sites 4 and 11. Three USTs were installed on the site during the 1970s (one for diesel and two for storing waste fuels, oils, and degreasing solvent) (ECC 2008). All three tanks were removed in the 1980s; the steel diesel tank was replaced with a fiberglass tank in 1986, which was subsequently replaced with an AST.

Contaminants identified at Site 13 in 1988 and 1989 included pesticides in surface soils, SVOCs in subsurface soils, and VOCs in groundwater (Navy BRAC PMO 2006). The ROD for Site 13 recommended No Further Action for soils on the site as the site contained a paved parking lot, making the soils inaccessible (U.S. Navy

1998b). Institutional controls for Site 13 restrict soil excavation in the parking area in order to preserve the pavement that currently limits soil exposure pathways.

Site 13 is currently inactive. Groundwater contamination at Site 13 was linked to the Eastern Plume, and any further groundwater impacts are being treated by the Eastern Plume groundwater treatment system (see Eastern Plume Operable Unit below).

Site 14: Old Dump No. 3

Old Dump No. 3 (Site 14) was likely a landfill that operated in the 1940s, prior to World War II (Navy BRAC PMO 2006). The area is now surrounded by Runway I-19 and Taxiways A and D. The 1991 Supplemental RI (E.C. Jordan Company 1991a) found no detectable levels of contaminants in soils on the site, and no further investigations were conducted. The report concluded that the site was likely excavated during construction of the runways. No further action is planned for this site (ECC 2008; EPA 2001).

Site 15: Merriconneag Extension Debris Site

The Merriconneag Extension Debris Site (Site 15) is located southeast of the NAS Brunswick golf course, near Harpswell Cove. The site was reported by a NAS Brunswick employee in 1990 and consisted of a rubble and soil dam creating a 0.75-acre pond. Miscellaneous debris items were removed from the site. A Site Investigation conducted in 1992 identified the presence of ferrous debris, and three test pits were dug. Soil, surface water, and sediment sampling was conducted; however, none of the detected contaminant concentrations exceed applicable state or federal standards. Little or no debris was encountered in subsequent test pits (NAS Brunswick 2000). All asbestos cement pipe sections and scrap metal debris was removed from the site in 1999 (ECC 2008). No formal FS or RA was conducted for Site 15 because debris was found on the surface and there was no indication of buried waste. No further action is planned for this site (ECC 2008).

Site 16: Swampy Road Debris Site

The Swampy Road Debris Site (Site 16) is located along the west bank of an unnamed stream that flows through the NAS Brunswick golf course. Although there are no historical records of any dumping activity at the site, an NAS Brunswick employee observed unidentified debris along 1,700 feet of the stream in 1990 (ECC 2008). The initial Site Investigation found ferrous debris on the site, and elevated lead levels were reported in soil samples. Subsequent sampling confirmed lead contamination, but at a lower level. Additional debris items were identified and removed in 2000. As with Site 15, no formal FS or RA was conducted due to the nature of the waste found on site. No further action is planned for Site 16 (ECC 2008).

Site 17: Former Pesticide Shop (Former Building 95)

The Former Pesticide Shop (Site 17) is located one block north of Fitch Avenue at the corner of Avenue B (ECC 2008). The site is bounded by the Old Navy Fuel Farm to the northeast, Avenue B to the southeast, and Fifth Street to the south and

northwest. The site is the location of the former pesticides and herbicides storage area and distribution center on NAS Brunswick. Storage, mixing, and disposal of pesticides and herbicides occurred at the site from 1955 to 1985. During operation, pesticides were released over a 1-acre area at the site. After 1985, most structures at Site 17 were demolished and the area was seeded over.

In 1992, herbicides and pesticides, including DDT and DDE, were identified in soils and groundwater samples collected at Site 17 as part of site investigations in support of an Engineering Evaluation/Cost Analysis (EE/CA) (ABB-ES 1992). Remediation was initiated in 1994 with the excavation and removal of 50 cubic yards of soil (BLRA 2007a). Three buildings were demolished in 1996, and an additional 1,260 cubic yards of soil were excavated from the site. A permeable geotextile liner was placed in the excavation pit and covered with clean fill. Some excavated soils were placed south of Avenue B and subsequently removed in 2009 (NAS Brunswick 2009c).

The NAS Brunswick long-term management plan is currently monitoring groundwater. Sampling has been conducted to assess any residual soil contamination at the site, and soil removal action is being planned. An RI/FS and ROD are expected to be developed in the near future.

Site 18: West Runway Study Area

The West Runway Study Area (Site 18) is located in a seep approximately 650 feet west of Runway I-19, between Mere Brook and Ordnance Road No. 3. The seep was identified during runway setback clearing in 1992.

Site 18 is located near a former ordnance bunker that was dismantled in the mid-1970s (Navy BRAC PMO 2006). A surface sheen was noted on water leeching from the hillside near Ordnance Road No. 3. A Site Investigation conducted in 1993 identified several areas that potentially indicated buried debris (ECC 2008; EPA 2001). Subsequent sampling found no indication of contamination, and a formal RA was not conducted at the site. No further action is planned for this site.

Eastern Plume Operable Unit

The Eastern Plume extends under a 0.6-mile-long section of NAS Brunswick, along Weapons Compound Road (see Figure 3.5-2). The northern portion is located in the woods north of Huey Drive, and the southern portion extends into the Weapons Compound (ECC 2008).

The groundwater contamination in the Eastern Plume originated at Sites 4, 11, and 13. Sites 4 and 13 are no longer considered to be contributing to the contamination. Specific contamination at each of these sites is discussed above. Over time the Eastern Plume has slowly migrated to the south and southeast.

Six VOCs were identified as the primary COCs in groundwater from the three sites connected to the Eastern Plume. The interim ROD released in 1992 selected four components to be used as the final remedy for the Eastern Plume, each focusing on hydraulic containment and removal of the contamination associated with

the Eastern Plume (U.S. Navy 1992a). These components included: the operation of a groundwater extraction system; discharge of treated water to the aquifer through an infiltration gallery (constructed in 2000); long-term groundwater monitoring; and continued five-year reviews (ECC 2008). A groundwater extraction system has operated continuously since 1995; an additional extraction well was installed in 1998; equipment changes were made in 2001; and additional, ongoing investigations initiated in 2003 have included sampling for 1,4-dioxane.

In 2007, an investigation of the shallow groundwater in the floodplain of Mere Brook and Merriconeag Stream on the eastern portion of the Eastern Plume found that the primary contaminants present in the Eastern Plume were, to some extent, being discharged into the surface waters (NAS Brunswick 2007c, 2007d). A Sampling and Analysis Plan (SAP) for 1,4-dioxane and VOCs was initiated in 2008 to identify appropriate remedies and treatment (ECC 2008). Monitoring and additional site investigations of the Eastern Plume are ongoing. Groundwater is monitored twice a year as part of the long-term management plan. New monitoring wells, an extraction well, and several bedrock couplet wells were installed in fall 2008 and spring 2009. The Navy is working with the MEDEP and EPA to optimize the groundwater-extraction-and-treatment-system (GWETS) and intrusion well network to further address the treatment of VOCs and 1,4-dioxane. A second Explanation of Significant Difference (ESD) is planned for GWETS optimization, which includes the installation of a HiPOx unit for 1,4-dioxane treatment. A final ROD for no further action at Sites 4, 11, and 13 and for a remedial action for the Eastern Plume was completed in February 1998 (U.S. Navy 1998b).

3.5.4.2 Petroleum, Oil, and Lubricant (POL) Areas

Two areas at NAS Brunswick contained multiple storage tanks and materials and were investigated in the Navy's Petroleum, Oil, and Lubricant (POL) Program. These two areas were subject to investigation because of known releases. A discussion of current and historical ASTs and USTs at NAS Brunswick is provided in Section 3.5.3.

Old Navy Fuel Farm

The Old Navy Fuel Farm is located in the northeast portion of NAS Brunswick, between Fitch Avenue to the south, Sixth Street to the west, and undeveloped land to the north and east. Sites 7 and 17 are within several hundred feet of the Old Navy Fuel Farm (ECC 2008). The site currently consists of two ball fields, an open grassy area, and paved access roads (Navy BRAC PMO 2006).

From 1943 to 1993, this site was operated as the NAS Brunswick petroleum bulk storage facility and contained nine USTs in two separate storage tank farms. Five tanks in the western farm were used to store unleaded gasoline, aviation gasoline, petroleum sludge, and ethylene glycol; and four tanks in the eastern farm stored JP-5 (aviation fuel). The Old Navy Fuel Farm was decommissioned in 1993, and all tanks, piping, and associated appurtenances were removed.

Two distinct dissolved hydrocarbon plumes were associated with the two tank farms. Both plumes consisted primarily of benzene, toluene, ethylbenzene, and xylene (BTEX) compounds. In the spring of 1996, a soil vapor extraction/air

sparging (SVE/AS) system was installed with a goal of remediating both plumes. Before the system could be started, it was discovered that the water table was at or above the lateral soil vapor extraction intake screens. As a result, the MEDEP approved the installation of a biosparging system to enhance in situ bioremediation (i.e., use of controlled natural processes to clean up contaminants), which operated from 1996 until 1998. In 1998, the biosparging system was de-activated to allow completion of system modifications of the SVE/AS system. The SVE/AS system was completed in 1999 and operated for a short period of time until the activated-carbon emission treatment system became saturated (Navy BRAC PMO 2006). Due to the rapid saturation of the carbon, soil excavation and monitored natural attenuation were determined to be the most suitable remediation option. Therefore, 15,000 tons of petroleum-contaminated soil were excavated in 2000 and disposed of off-site, and a groundwater VOC monitoring program was implemented to evaluate the effectiveness of the removal (ECC 2008). This remedial program has resulted in decreases in the levels of BTEX, methyl tert-butyl ether (MTBE), total petroleum hydrocarbon (TPH)-diesel range, and TPH-gasoline range compounds. In 2004, no VOC exceedances were reported. A long-term management plan is in place to monitor groundwater conditions. Evaluation of long-term monitoring data is ongoing to gauge the success of the remedy and to determine whether additional monitoring or modifications to the site remedy are necessary (ECC 2008).

Navy Exchange Service Station

The NEX Service Station is bounded by Building 538 to the north and by the northwestern corner of Building 27. The NEX Service Station began operation in 1957 as a location for the storage and distribution of gasoline and included two 5,000-gallon, single-walled, steel USTs (Navy BRAC PMO 2006). In 1974, these USTs were replaced by three 10,000-gallon, single-walled, steel USTs for gasoline storage. An additional 1,000-gallon fuel oil UST was installed and then replaced with a 550-gallon fuel oil AST in 1975. In 1993, the three gasoline USTs were replaced by three 10,000-gallon, double-walled, steel jacketed, fiberglass USTs containing regular, mid-grade, and premium unleaded gasoline.

Various releases of POL occurred, mainly due to corroded steel product lines used from 1975 to 1992. These releases caused soil and groundwater contamination in the gasoline UST and distribution area; contaminants include petroleum hydrocarbons, specifically, gasoline-range organics (GRO) (ECC 2008). Two areas of GRO contamination in subsurface soil and two plumes of contaminated groundwater were identified on the site.

Remediation of the site began in 1984 when a groundwater recovery system was operated for one year to mitigate gasoline odors. In 1992, 440 tons of petroleum-contaminated soils were excavated and disposed of off-site. An SVE/AS system operated at the site from 1993 to 2003. The system was effective at removing some petroleum hydrocarbons from the subsurface soil, but it was not effective in removing the remaining petroleum hydrocarbons in the saturated soils to acceptable levels (Navy BRAC PMO 2006). An in situ chemical oxidation pilot test was conducted in 2002 to address the sorbed-phase mass, but the test resulted in the unwanted mobilization of GROs. From 2003 to 2005, additional pilot tests

were conducted to evaluate the biodegradation potential of the site and the applicability of a denitrification-based biodegradation system (ECC 2008). The site was found to have an abundant denitrifying microbial community capable of degrading aromatic hydrocarbons. The system, however, was not effective at removing petroleum hydrocarbons in saturated soils to an acceptable level.

It was then concluded that soil excavation with groundwater monitoring was the best course of action for this site. Soil excavation occurred in the fall of 2009, and a long-term management plan is in place to monitor groundwater. Evaluation of long-term monitoring data is ongoing to gauge the success of the remedy and to determine whether additional monitoring or modifications to the site remedy are necessary (ECC 2008).

3.5.4.3 Military Munitions Response Program Areas of Concern

The Navy established the MMRP to address potential contamination from munitions and explosives of concern (MEC), including unexploded ordnance (UXO) and discarded military munitions as well as munitions constituents (ECC 2008). The following is a description of AOCs at NAS Brunswick that are being evaluated under the MMRP.

Main Base MEC Areas

Three principal areas at NAS Brunswick are being investigated under the MMRP: the former Munitions Bunker West; the former Machine Gun Boresight Range; and the former Skeet Range (see Figure 3.5-2).

- **Former Munitions Bunker West.** This site covers 29 acres and was located west of the runways at NAS Brunswick. Between 1980 and 2000, the area was used to conduct munitions-related security training (Navy BRAC PMO 2006). Grenades, flares, and M82 cartridges are a few of the known munitions used. The entire area is a suspected MEC site. However, the likelihood of encountering MECs is considered low because Marine Corps-conducted sweeps removed munitions debris from the ground surface during training activities.

- **Former Machine Gun Boresight Range.** This site was located in the central portion of the base, near Building 55. The area was used to align and test aircraft-mounted guns during the 1940s and 1950s (Navy BRAC PMO 2006). Expended ammunitions are not considered MECs; however, there is the potential for metals contamination.

- **Former Skeet Range.** This range was originally located on a 73.2-acre area east of Building 55 and is currently located in an area south of the retention ponds (ECC 2008). The site was used in the 1940s and 1950s for training military personnel in the use of 12-gauge shotguns (Navy BRAC PMO 2006). Expended ammunitions are not considered MECs; however, there is the potential for metals contamination.

  The Navy is working with the EPA and MEDEP to assess future actions at the three MEC AOCs (ECC 2008).

Explosive Ordnance Disposal Area (IR Site 12)

The EOD training area is located in a restricted area in the southeast portion of NAS Brunswick, approximately 4,300 feet southeast of Building 539. The site is being evaluated in both the IR Program and MMRP. The 600-square-foot site contains a 5- to 6-foot-high berm (ECC 2008). A control bunker is located approximately 100 feet from the berm area. From 1981 to 2004, the site was used as a training area and a facility for destroying small quantities of ordnance, pyrotechnics, and privately manufactured explosive devices (Navy BRAC PMO 2006). The EOD training area has been considered inactive since 2004.

A draft supplemental RI completed in 1991 identified mercury and nitrate/nitrite levels above applicable state and federal standards in soil samples, but no explosive materials were present (E.C. Jordan 1991b). The concentrations of most inorganic compounds were at background levels. Further site evaluations are ongoing (ECC 2008). The Navy is working with the EPA and MEDEP to determine the appropriate next steps for further evaluation of this site.

Quarry Area of Concern

The Quarry AOC is located west of the southern portion of the runways at NAS Brunswick. The AOC falls under the MMRP because the quarry may have been used as an EOD area prior to the 1980s. Debris dumping also occurred during its operation (Burgio 2009). In the mid-1990s, the area was used for land-farming of petroleum-contaminated soils in accordance with MEDEP guidelines. The Navy is working with the EPA and MEDEP to determine the appropriate next steps for further evaluation of this site.

3.6 Air Quality

3.6.1 Air Quality Regulations

3.6.1.1 National Ambient Air Quality Standards

The Clean Air Act (CAA) of 1970, 42 U.S.C. §7401 et seq., amended in 1977 and 1990, is the primary federal statute governing the control of air quality. In accordance with the CAA, the EPA Office of Air Quality Planning and Standards has set National Ambient Air Quality Standards (NAAQS) for six principal pollutants, which are called "criteria" pollutants. The criteria pollutants include carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), particulate matter (PM_{10} and $PM_{2.5}$), ozone (O_3), and sulfur dioxide (SO_2). The NAAQS have been promulgated to protect public health and welfare (EPA 2009b).

The CAA established two types of NAAQS. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings (EPA 2009b). Table 3.6-1 presents the primary and secondary NAAQS for each of the six pollutants. Units of measure for the standards are parts per million (ppm) by volume, milligrams per cubic meter of air (mg/m^3), and micrograms per cubic meter of air ($\mu g/m^3$).

Table 3.6-1 National Ambient Air Quality Standards

Pollutant	Description	Primary Standards		Secondary Standards	
		Level	Averaging Time	Level	Averaging Time
Carbon monoxide (CO)	Carbon monoxide is an odorless, colorless gas that is formed by the incomplete combustion of fuels. The primary sources of this pollutant are automobiles, aircraft, and other on- and off-road vehicles.	9 ppm (10 mg/m^3)	8-hour[1]	None	
		35 ppm (40 mg/m^3)	1-hour[1]		
Lead (Pb)	Lead is a metal that had many uses in the past, including as an ingredient in fuel and paint. Since lead is no longer allowed in gasoline and household paint, there are no emissions from painting operations and vehicles. Emissions may result from painting operations if old lead-based paint is removed as part of the process.	0.15 µg/m^3 [2]	Rolling 3-month average	Same as primary	
		1.5 µg/m^3	Quarterly average	Same as primary	
Nitrogen Dioxide (NO_2)	Nitrogen dioxide is a gas that forms when nitric oxide (NO) reacts with atmospheric oxygen (O_2). Most sources of NO_2 are man-made, and the primary source is high-temperature combustion. The principal sources of this pollutant are automobiles, aircraft, and fossil fuel-powered electricity generating plants.	0.053 ppm (100 µg/m^3)	Annual (arithmetic mean)	Same as primary	
Particulate matter (PM_{10})	Particulate matter consists of solid and liquid particles of dust, soot, aerosols, and other matter small enough to remain suspended in the air for a long period of time. PM_{10} refers to particulate matter less than or equal to 10 microns in diameter, and $PM_{2.5}$ refers to particulate matter less than or equal to 2.5 micrometers in diameter. A portion of the particulate matter in the air comes from natural sources such as windblown dust and pollen. Other sources of particulate matter include material combustion, automobiles, construction activities, or other man-made disturbances of unpaved areas, and photochemical reactions in the atmosphere.	150 µg/m^3	24-hour[3]	Same as primary	
Particulate matter ($PM_{2.5}$)		15.0 µg/m^3	Annual[4] (arithmetic mean)	Same as primary	
		35 µg/m^3	24-hour[5]	Same as primary	
Ozone (O_3)	Ozone is formed in the atmosphere rather than being directly emitted from pollutant sources. Ozone forms as a result of volatile organic compounds (VOCs) and oxides of nitrogen (NO_X) reacting in the presence of sunlight in the atmosphere. VOCs and NO_X are termed "ozone precursors," and their emissions are regulated in order to control the creation of ozone.	0.075 ppm (2008 standard)	8-hour[6]	Same as primary	
		0.08 ppm (1997 standard)	8-hour[7]	Same as primary	
		0.12 ppm	1-hour[8] (applies only in limited areas)	Same as primary	

Table 3.6-1 National Ambient Air Quality Standards (continued)

Pollutant	Description	Primary Standards		Secondary Standards	
		Level	Averaging Time	Level	Averaging Time
Sulfur Dioxide (SO_2)	Sulfur dioxide is produced when any sulfur-containing fuel (e.g., coal, diesel, residual fuel oil) is burned. Fossil fuel-powered electricity-generating plants are the primary source of SO_2. Since the sulfur content of mobile vehicle fuels has been significantly reduced in the United States, aircraft and automobiles are no longer significant sources of this pollutant.	0.03 ppm	Annual (arithmetic mean)	0.5 ppm (1,300 µg/m^3)	3-hour[1]
		0.14 ppm	24-hour[1]		

Source: EPA 2009b.

Notes:

1 Not to be exceeded more than once per year.

2 Final rule signed October 15, 2008.

3 Not to be exceeded more than once per year on average over 3 years.

4 To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m^3.

5 To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m^3 (effective December 17, 2006).

6 To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective May 27, 2008).

7 (a) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.

(b) The 1997 standard—and the implementation rules for that standard—will remain in place for implementation purposes as EPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.

8 (a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is $\leq$ 1.

(b) As of June 15, 2005, EPA revoked the 1-hour ozone standard in all areas except the 8-hour ozone nonattainment Early Action Compact (EAC) Areas. For one of the 14 EAC areas (Denver, CO), the 1-hour standard was revoked on November 20, 2008. For the other 13 EAC areas, the 1-hour standard was revoked on April 15, 2009.

Areas that meet the NAAQSs are designated as in "attainment"; areas where the ambient pollutant concentration exceeds one or more of the NAAQSs are designated as "nonattainment" for each criteria pollutant that is exceeded. The number of exceedances and their concentrations determine the nonattainment classification of an area. There are six classifications of O_3 nonattainment— transitional, marginal, moderate, serious, severe, and extreme; and two classifications of CO and PM_{10} nonattainment—moderate and serious. The CAA requires state and local air quality control agencies to adopt State Implementation Plans (SIPs) that prescribe measures to eliminate or reduce the severity of the number of NAAQS violations and to achieve and maintain attainment of the NAAQS. Maine has adopted these federal standards, and all counties in Maine are currently in attainment for all NAAQS (EPA 2009c).

Cumberland County is subject to a maintenance plan for ozone under Section 110(a)(1) of the CAA anti-backsliding provisions, which are intended to ensure that areas that have returned to attainment status remain in attainment (EPA 2009d). On January 29, 2008, the EPA approved the SIP revision submitted by the State of Maine, which demonstrates how Maine will maintain the ozone standard for the four separate 8-hour ozone maintenance areas in the state. Maine's maintenance plans include an emissions inventory, in which MEDEP has projected emissions from 2002 until 2016 and which demonstrates that the 8-hour ozone standard will be maintained for the ten-year period between 2004 and 2014, even though a specific inventory was not prepared for 2014 (EPA 2008). The final year of MEDEP's analysis was 2016; therefore, General Conformity Analysis will compare emission inventory totals in 2016 rather than the ten-year period (Federal Register 2008).

3.6.1.2 General Conformity Rule

The 1990 Amendments to Section 176 of the CAA require the EPA to promulgate rules to ensure that federal actions conform to the appropriate SIP. These rules, known as the General Conformity Rule (40 CFR §§ 51.850-.860 and 40 CFR §§ 93.150-.160), require any federal agency responsible for an action in a nonattainment area or maintenance area to determine that the action conforms to the applicable SIP or that the action is exempt from the General Conformity Rule requirements. This means that federally supported or funded activities will not (1) cause or contribute to any new air quality standard violations, (2) increase the frequency or severity of any existing standard violation, or (3) delay the timely attainment of any standard, interim emission reduction, or other milestone. In regions that are in attainment for the NAAQS, the General Conformity Rule is not applicable (EPA 2008); however, it is applicable where maintenance areas have been established.

Only federal actions are subject to Conformity Rule requirements; therefore, only the disposal of the facility would be required to meet Conformity Rule requirements. Since reuse of the facilities would be completed under private development, the Conformity Rule is not applicable to redevelopment of the most of these properties. In accordance with revisions to 40 CFR 93.153, published on April 5,

2010, General Conformity requirements shall not apply to federal actions that involve the transfer of ownership, interests, and titles in land, facilities, and real and personal properties, regardless of the form or method of transfer (40 CFR 93.153(c)(2)(xiv) (Federal Register 2010). Establishment of a commercial airport as proposed under Alternative 1 would be subject to the Conformity Rule.

Under 40 CFR Part 51, transportation conformity determinations are required for Federal Highway Authority (FHWA) projects in nonattainment areas. Transportation conformity determinations are not generally required for individual projects that are not FHWA projects; however, Section 93.121 applies to such projects if they are regionally significant (40 CFR 93.102).

3.6.1.3 Permit Programs

In addition to general requirements to protect air quality, the CAA also requires the EPA to regulate certain types and sizes of air emission sources. The EPA has delegated air permitting, or licensing, for the State of Maine to the MEDEP Bureau of Air Quality. Maine statutes specific to air emissions permitting are found in 38 M.R.S.A. §§581 through 608-A; the regulations implementing the air emissions program are found in Department Regulations Chapters 100 through 138. Specific regulations provide pollution control, operation, and reporting requirements for emission sources such as turbines, boilers, paint-booth operations, fuel tanks, and mineral-processing operations. Licensing covers New Source Review, Major Title V Sources, and Minor Sources. The purpose of an air emissions license is to compile all requirements, regulations, and consents relating to air pollution for a facility into a single document (MEDEP 2009a).

3.6.2 Existing Air Quality at NAS Brunswick

Air quality in the vicinity of NAS Brunswick (Cumberland County) is currently in attainment for all NAAQS (EPA 2009c). Ambient levels of particulates measured in Portland, Maine, and ozone levels measured throughout the region have demonstrated compliance with newly revised NAAQS (MEDEP 2006); therefore, the county will likely remain under attainment status when the EPA re-designates attainment areas in 2010.

Military aircraft are the primary source of air emissions at NAS Brunswick, although mobile sources are not tracked, permitted, or monitored. The annual emissions associated with aircraft flight operations have been estimated based on the average annual airfield operations. Estimates of existing aircraft emissions are included in Appendix E. Other mobile emissions include various mobile equipment and vehicles that operate on and off NAS Brunswick.

3.6.3 Stationary Sources at NAS Brunswick

Stationary source emissions at NAS Brunswick result from operation of the facilities and stationary equipment. To comply with CAA permitting requirements administered by the MEDEP, NAS Brunswick operates under a Synthetic Minor Air Quality Permit (license number A-268-71-AA-R) issued by the MEDEP on December 7, 2004 (U.S. Navy 2006). Because this five-year license limits emissions from fuel-burning equipment and VOC sources, NAS Brunswick is not sub-

ject to Title V requirements. Emission sources include fuel-burning equipment (e.g., boilers, water heaters, emergency electrical generators, storage tanks, fuel dispensing, degreasers, paint-booth operations, and jet engine test cells). None of the fuel-burning equipment is rated at more than 10 million British thermal units her hour (MBtu/hr); thus, none of the equipment is subject to New Source Performance Standards. Permit conditions require the reporting of the criteria pollutants CO, Pb, NO_2, PM_{10}, and SO_2. Since ozone is not an emitted criteria pollutant, emissions of the precursors of NO_2 and VOCs are reported to determine their potential to produce ozone. As shown in Table 3.6-2, existing reported annual emissions were below permit thresholds.

Table 3.6-2 Reported Annual Direct Criteria Emissions, NAS Brunswick (2008)

	Emissions of Criteria Pollutants (tons)						
	SO_2	NO_X	CO	PM_{10}	VOC	TSP/PM	Lead
Reported Emissions	1.85	14.22	8.80	2.44	11.82	2.44	5.53E-05
Licensed Thresholds	88.2	74.6	23.5	21.5	48.0	21.5	9.9

Source: U.S. Navy 2009b.

In addition to the mobile and stationary sources, there are other emission sources associated with operations at NAS Brunswick, including deicing, fuel dispensing, road dust, and landscaping maintenance activities. Similar to mobile emissions, these emissions are not from a stationary source and stack and are, therefore, considered fugitive emissions. These sources are small compared to existing stationary and mobile sources at NAS Brunswick.

3.6.4 Existing Emissions at NAS Brunswick

3.6.4.1 Direct and Indirect Emissions from Building Use at NAS Brunswick

Direct emissions are emissions that result from an action that occurs on a site; indirect emissions result from actions associated with a site, such as electricity generation or use of commuter vehicles, but that does not occur on the site. Reported emissions listed in Table 3.6-2 represent all direct emissions tracked from operations at NAS Brunswick from all stationary and fugitive emission sources. To calculate indirect emissions from the use of electricity in operational facilities at NAS Brunswick, U.S. averages for energy use per square foot were obtained from the Energy Information Administration (EIA) for specific types of building use (EIA 2003). These averages were used to estimate total electricity use for existing operations. Direct and indirect emissions resulting from existing operational facilities are identified in Table 3.6-3. The calculations used to derive these estimates are presented in Appendix E.

NAS Brunswick housing is not owned by the Navy; therefore, the associated emissions are not included in this analysis.

Table 3.6-3 Existing Building Use Emissions, NAS Brunswick (2008)

Emission Source	Emissions (tpy)				
	CO	NO_X	VOCs	SO_2	PM_{10}
Operational Facilities (1.3 million square feet)					
Reported (direct)[1]	8.80	14.22	11.82	1.85	2.44
Electricity (indirect)	NA	16.61	NA	34.40	NA
Total Emissions from Building Use[2]	**8.80**	**30.83**	**11.82**	**36.25**	**2.44**

Notes:
1 Direct emissions from NAS Brunswick are reported annually to the MEDEP (see Table 3.6-2) and include emissions from all stationary and fugitive sources.
2 Column totals may not be exact due to rounding.

3.6.4.2 Mobile Sources at NAS Brunswick

Mobile sources of air emissions at NAS Brunswick include aircraft, ground support equipment, automobiles, and trucks. Existing aircraft emissions were estimated using the FAA's Emissions and Dispersion Modeling System (EDMS), version 5.1.2 (FAA 2009a) for all NAAQS emissions except for particulate matter (PM). EDMS 5.1.2 does not provide emission factors for PM; therefore, a Navy Aircraft Environmental Support Office emission index is used (see Appendix E). Emissions were based upon existing operations of the various aircraft that currently use NAS Brunswick (ATAC Corp. 2004). Total emissions consider departures, arrivals, touch-and-go operations, ground taxi times, and use of ground support equipment. Aircraft operations in 2004 were analyzed because 2004 is the latest year with the specific data on annual aircraft operations necessary to complete the analysis. Table 3.6-4 lists NAAQS emissions from existing aircraft operations at NAS Brunswick. See Appendix E for EDMS modeling input and output information, including hazardous air pollutant (HAP) emission estimates.

Table 3.6-4 Existing Mobile Emissions, NAS Brunswick (2008)

Source	Emissions (tpy)				
	CO	NO_X	VOCs	SO_2	PM_{10}
Aircraft	71.42	75.15	36.43	11.55	33.79
Vehicle	38.83	4.06	3.01	0.07	0.12
Total	**110.25**	**79.21**	**39.44**	**11.62**	**33.91**

Notes:
1 See Appendix E for calculation of annual emissions.
2 Column totals may not be exact due to rounding.

Existing vehicle emissions were estimated using EPA's MOBILE6 emission model (EPA 2003). Existing traffic volumes used to model traffic emissions were obtained from the *Traffic Impact Study, Disposal and Reuse of Property at Naval Air Station Brunswick, Brunswick, Maine* (Gorrill-Palmer 2010), which is provided as Appendix D. The MOBILE6 model and the average emission factors computed using registered vehicle data for the State of Maine from the MEDEP (MEDEP 2005b) were used to calculate vehicle emissions. Average vehicle miles traveled (VMT) were estimated based on an average 25-mile round-trip commute). Table 3.6-4 identifies existing mobile source emissions at NAS Brunswick. See Appendix E for detailed analysis.

3.6.4.3 Total Existing Emissions at NAS Brunswick

Table 3.6-5 summarizes emission totals provided in Tables 3.6-3 and 3.6-4 above and lists total annual estimates of direct, indirect, stationary, and mobile emissions associated with existing operations at NAS Brunswick.

Table 3.6-5 Total Annual Emissions, NAS Brunswick (2008)

Source	Emissions (tons per year)				
	CO	NO_X	VOCs	SO_2	PM_{10}
Building Use	8.80	30.83	11.82	36.25	2.44
Mobile	110.25	79.21	39.44	11.62	33.91
Total	**119.05**	**110.05**	**51.26**	**47.87**	**36.35**

Notes:
[1] See Appendix E for calculation of annual emissions.
[2] Column totals may not be exact due to rounding.

3.6.5 Greenhouse Gas Emissions

In February of 2010, the White House Council on Environmental Quality (CEQ) issued draft guidance on the types of projects that should consider the effects of climate change and GHG emissions in agency decision making (CEQ 2010). The draft guidance explains that if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO2-equivalent GHG emissions on an annual basis, then agencies should consider this as an indicator that a quantitative and qualitative assessment may be meaningful to the decision maker and the public. This is not meant to be a NEPA significance threshold, but rather a reference point to serve as an indicator of a minimum level of GHG emissions that may warrant some description in the appropriate NEPA analysis.

GHGs consist primarily of carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). The presence of these gases in the atmosphere reduces the ability of the atmosphere to allow long-wave radiation (heat) to escape to space. CO_2, CH_4, N_2O, and water vapor are produced by natural processes (e.g., volcanic activity and the decay of vegetable matter) and human activities. The largest man-made sources of GHGs are stationary and mobile sources that burn fossil fuels, which emit primarily CO_2, N_2O, and CH_4 (EPA 2009e).

Human activities also result in the emission of other GHGs that contribute to global warming, including hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Each of these gases has a different contribution to global climate change. For example, a molecule of methane has 28 times the global-warming impact of a molecule of carbon dioxide (IPCC 2007). Since CO_2 is emitted in much larger quantities than the other five listed gases, GHG inventories report emissions in units of carbon dioxide equivalents (CO_2e), which helps balance the varying impacts of each gas into a common unit, and are reported in metric tons (MT).

For this analysis, GHG emissions have been calculated for existing buildings, aircraft, and vehicles. Direct GHG emissions are reported for fuel oil and natural gas use, but indirect emissions are not reported. Indirect emissions from electricity use were calculated at NAS Brunswick using average EIA energy intensity factors (EIA 2003, 2005) and EPA emission factors for GHG emissions (EPA

2009f). GHG emissions from vehicles were calculated using MEDEP vehicle data (MEDEP 2005b) and MOBILE6 emission factors (EPA 2003). The model EDMS 5.0.2 provides emission factors for fuel use associated with operations at the airfield. These emission factors were multiplied by fuel emission factors to estimate CO_2 emissions from the aircraft. See Appendix E for details and calculations. Estimated GHG emissions resulting from existing operations at NAS Brunswick are provided in Table 3.6-6.

Table 3.6-6 Estimated Existing Greenhouse Gas Emissions, NAS Brunswick (2008)

Emission Source		GHG Emissions, Metric Tons per Year ($MTCO_2e$)			
		CO_2	N_2O	CH_4	Total[1]
Stationary					
Operational Facilities (1.4 million square feet)	Reported Emissions[1]	6,734	4	6	6,744
	Electricity	9,145	87	15	9,247
Total Stationary GHG Emissions		**15,879**	**91**	**21**	**15,991**
Mobile					
Aircraft		24,039	NA	NA	24,039
Vehicles		3,890	NA	NA	3,890
Total Mobile GHG Emissions		**27,930**	**NA**	**NA**	**27,930**
Total Annual GHG Emissions					**43,921**

Notes:
[1] Total also includes 2 $MTCO_2e$ from HFC-134a as reported in the 2008 Air Emissions Inventory (U.S. Navy 2009b).
[2] Column totals may not be exact due to rounding.

Key:
CO_2e = Carbon dioxide equivalent.

3.7 Noise

This section summarizes the existing (2008) baseline noise conditions at NAS Brunswick. The section includes an examination of the existing background sound levels, traffic noise, and noise resulting from exiting aircraft operations. In addition, the section defines NAS Brunswick's existing 2008 aircraft operational levels, airfield and operational areas, and presents the installation's 2008 aircraft noise zones.

The McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station are located in a less densely developed area and generally experience less traffic and noise than NAS Brunswick and the land area surrounding its boundary. Therefore, these properties are not examined in detail in this section.

3.7.1 Noise Fundamentals

Noise is defined as unwanted sound. Sound is produced by the vibration of sound pressure waves in the air. Sound pressure levels are used to measure the intensity of sound and are described in terms of decibels. The decibel (dB) is a logarithmic unit which expresses the ratio of the sound pressure level being measured to a standard reference level. Sound is composed of various frequencies, but the human ear does not respond to all frequencies. Units of sound pressure adjusted to the range of human hearing are measured in A-weighted decibels (dBA). A-weighted decibels place a greater emphasis on frequencies that are detected by

people with a normal auditory range by de-emphasizing the very low and very high frequency components of sound.

Examples of potential sources of noise include roadway traffic, construction activities, and aircraft operations. Whether sound becomes noise depends on the listener, but sound can become noise when it interferes with normal activities (e.g., sleeping, conversation) or disrupts or diminishes one's quality of life. A sound may be perceived as noise based on its loudness (amplitude), frequency (pitch), and/or duration.

Ambient sound levels in urban areas typically range from 60 to 70 dBA and can be as high as 80 dBA or greater; quiet suburban neighborhoods experience ambient noise levels of approximately 45 to 50 dBA (EPA 1971). Generally, the human auditory system begins to experience discomfort at sound levels above 120 dBA, and the threshold of pain is at about 140 dBA (Berglund and Lindvall 1995). Examples of typical sound levels are listed in Table 3.7-1.

Table 3.7-1 Sound Level Examples

Sound Source or Activity	dBA
Gunshot (at source)	140-150
Military jet aircraft take-off from aircraft carrier with afterburner at (250 feet)	125-135
Jackhammer (50 feet)	120-125
Chain saw (operating)	105-115
Live rock concert	105-110
Circular saw (operating)	100-105
Garbage disposal (3 feet)	80
Passenger car at 65 mph (25 feet) Vacuum cleaner (3 feet)	70-80
Normal conversation (5 feet)	60-65
Large electrical transformers (100 feet) Quite suburb	45-55
Bird calls (distant) Library	35-45
Soft whisper (5 feet) Quite rural area	25-35
Human breathing	10-20
Threshold of human hearing	0

Sources: Modified from AgriSafe 2009 and Industrial Noise Control, Inc. 2007.

Human response to changes in sound levels depends on a number of factors, including the quality of the sound, the magnitude of the changes, the time of day at which the changes take place, whether the noise is continuous or intermittent, and the individual's ability to perceive the changes. Human ability to perceive changes in noise levels varies widely with the individual. Generally, changes in noise levels less than 3 dBA will be barely perceptible to most listeners, whereas a 10 dBA change is normally perceived as a doubling (or halving) of noise levels. As the change in dBA increases, the individual perception is greater, as shown in Table 3.7-2.

Table 3.7-2 Subjective Response to Sound

Change (dBA)	Relative Loudness
+/- 3	Barely perceptible change
+/- 5	Readily perceptible change
+/- 10	Half or twice as loud

Source: FHWA 1995.

The sound that humans may experience typically varies from moment to moment. Therefore, the following metrics are used in this EIS to evaluate noise:

- **Equivalent Sound Level (L_{eq}).** A measure of sound energy over a period of time, or a sound level which, in a stated period of time, would contain the same acoustical energy as the time-varying sound during the same period.

- **Day-Night Average Sound Level (DNL).** The DNL, expressed in decibels, represents the average sound exposure during a 24-hour period and does not represent the sound level for a specific noise event. The DNL also includes a 10-decibel penalty for nighttime sound events (10:00 P.M. to 7:00 A.M.) because people are more sensitive to noise during sleeping hours, when ambient noise levels are lower. The DNL has been determined to be a reliable measure of community annoyance with aircraft noise and has become the standard metric used by the FAA for assessing aircraft noise.

3.7.2 Noise Standards and Criteria

The State of Maine does not have noise regulations that set community noise exposure criteria. The State laws pertaining to noise allow individual communities to establish noise regulations through community by-laws. Chapter one, Section 109.4 of the Town of Brunswick Zoning Ordinance establishes the maximum equivalent sound levels that may be experienced at any point beyond the lot line resulting from any activity, with some exceptions (Town of Brunswick 2009a). Table 3.7-3 presents these limits for various types of land use.

Table 3.7-3 Town of Brunswick Maximum Equivalent Sound Level Limits

District/Area	Equivalent Sound Level (dBA)[1]	
	Day[2]	Night
Rural areas	50	40
Residential districts	55	45
Town residential districts	55	45
Town center, college use districts, mixed-use districts, and I1 District	60	50
Highway commercial and Cook's Corner Center Districts	70	60
Large-scale business and institutional districts, excluding I1 District[3]	70	60

Source: Town of Brunswick 2009a.

Notes:
[1] Equivalent sound level measured in dBA over a one-hour period.
[2] Daytime hours extend from 6:00 A.M. to 8:00 P.M.
[3] District I1 is Industry Road Industrial Park.

Exceptions to the limits include parades, farming, forestry, emergency signals, water craft, and automobile traffic. Noise associated with construction may achieve a maximum equivalent sound level of 75 dBA between the hours of 7:00 A.M. and 7:00 P.M.

3.7.3 Existing (2008) Baseline Noise Conditions

3.7.3.1 Average Background Sound Levels

Sound Measurement and Methodology

Ambient sound levels are a function of local traffic, farm machinery, barking dogs, birds, insects, lawnmowers, children playing, and the interaction of the wind with groundcover, buildings, trees, shrubs, power lines, etc. Sound levels vary with time of day, wind speed and direction, and the level of human activity.

A background sound level survey was conducted to establish the existing ambient sound levels in the vicinity of NAS Brunswick. Sound levels were measured statistically in consecutive 10-minute intervals at a number of locations across the survey area. The survey period began at 9:15 A.M. on October 7, 2008, and continued 24 hours a day for 3 days, until 10:30 A.M. on October 10, 2008.

Measurement locations were identified using topographical maps, current aerial photographs, and by driving the roads on and around the installation. The measurement locations were selected at exterior locations in residential areas. The background noise measurement locations are identified on Figure 3.7-1. Each measurement location is described below.

- Location 1, Opposite 34 Wildwood Drive, Town of Brunswick.
- Location 2, 794 Antietam Drive, Town of Brunswick.
- Location 3, Opposite 14 Purchase Street, Town of Brunswick.
- Location 4, Neptune Drive and Starflower Lane, Town of Brunswick.

Baseline Survey Results

Table 3.7-4 identifies the average existing DNL. The 10-minute, A-weighted equivalent sound levels for all four measurement locations are plotted on Figure 3.7-2 for the entire survey period. These levels are characteristic of suburban residential areas affected mainly by weather conditions and street noise. With the exception of some elevated events at Wildwood Drive and Antietam Drive, the results for all four locations follow similar trends and generally have similar values at any given time. Neptune Drive is a more heavily traveled street, which is reflected in the more elevated line graph for that measurement location.

Table 3.7-4 Average Existing Day and Night Sound Level by Location (2008)

Number	Location	Daytime Average Equivalent Sound Level (dBA)	Nighttime Average Equivalent Sound Level (dBA)
1	Opposite 34 Wildwood Drive	51	39
2	794 Antietam Drive	52	44
3	Opposite 14 Purchase Street	48	39
4	Neptune Drive and Starflower Lane	54	46

3.7.3.2 Traffic

In addition to the measurement of the average background sound level, the existing level of traffic noise was measured. Traffic noise is dependent upon the volume and speed of traffic and the number of trucks in the flow of the traffic. Vehicle noise is a combination of the noises produced by the engine, exhaust, and tires. Highway traffic noise levels are constantly changing with the number, type, and speed of the vehicles producing the noise.

The Federal Highway Administration (FHWA) provides policies and guidance for the analysis of highway traffic noise that were adopted by the Maine Department of Transportation (MaineDOT). The current FHWA procedures for highway traffic noise analysis and abatement are contained in 23 CFR 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise*. FHWA-determined noise levels for various land uses and activities are identified in Table 3.7-5.

Table 3.7-5 Traffic Noise Abatement Criteria, Hourly A-weighted Sound Level in dBA

Activity Category	Equivalent Sound Level	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	–	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: FHWA 1995.

To determine existing traffic noise levels, four roadway segments in the vicinity of the installation were selected and modeled. Figure 3.7-1 identifies the four traffic noise receptor locations. Traffic volumes and vehicle mix data utilized to model traffic noise was obtained from the *Traffic Impact Study, Disposal and Reuse of Property at Naval Air Station Brunswick, Brunswick, Maine* (Gorrill-Palmer 2009). The noise receptor height was set at 5 feet in all noise models. Table 3.7-6 presents the measured noise levels for the four locations selected.

Table 3.7-6 Existing Traffic Noise (2008)

Receptor	Receptor Location	Measured Results (dBA)
1	Gurnet Road and Coombs Road (north)	66.3
2	Gurnet Road and Coombs Road (south)	65.1
3	Maine Pine Racquet and Fitness (120 Harpswell Road)	66.1
4	Harpswell Road and Merriconeag Road	63.8

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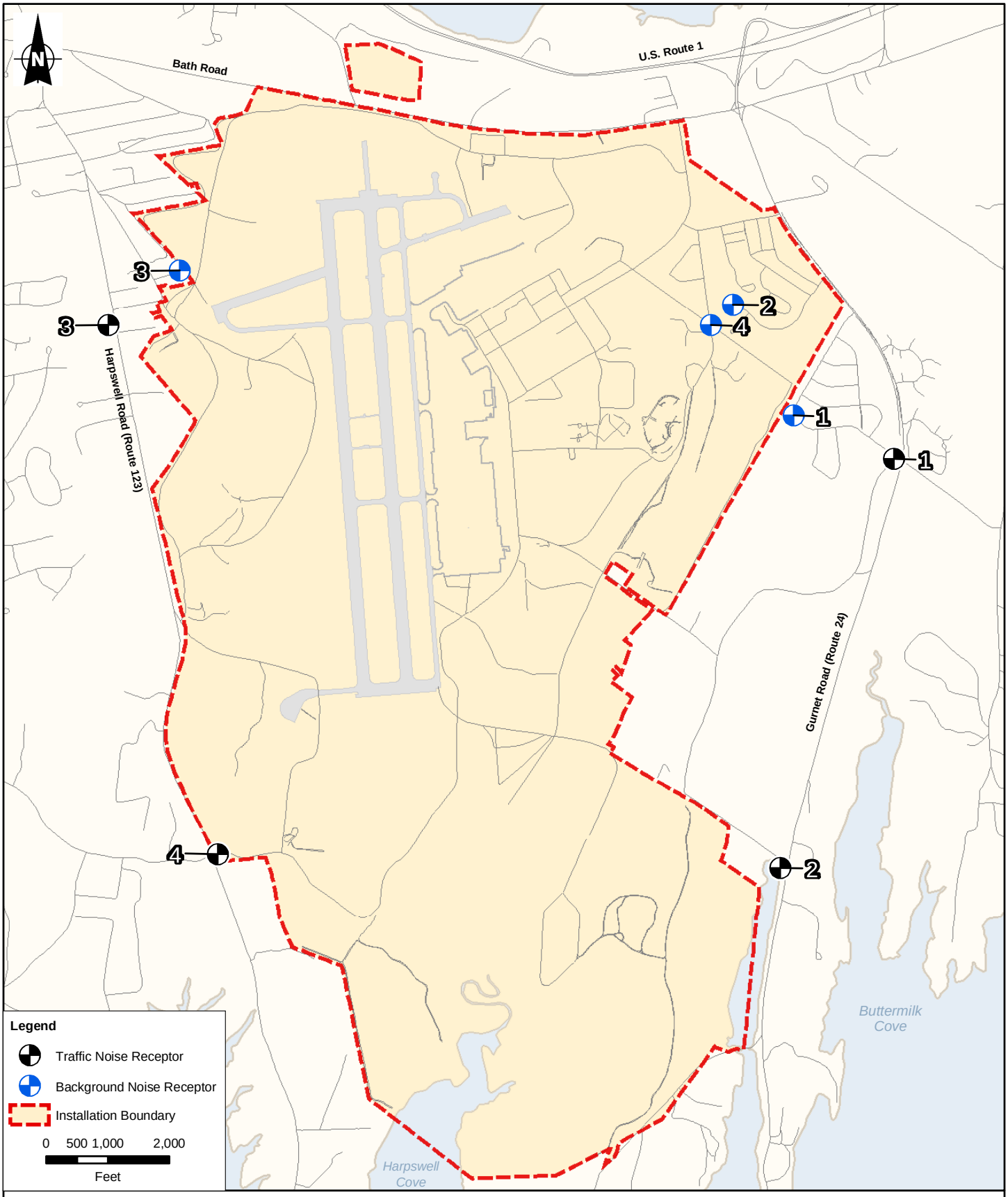


Figure 3.7-1
Traffic and Noise Receptor Locations
NAS Brunswick, Maine

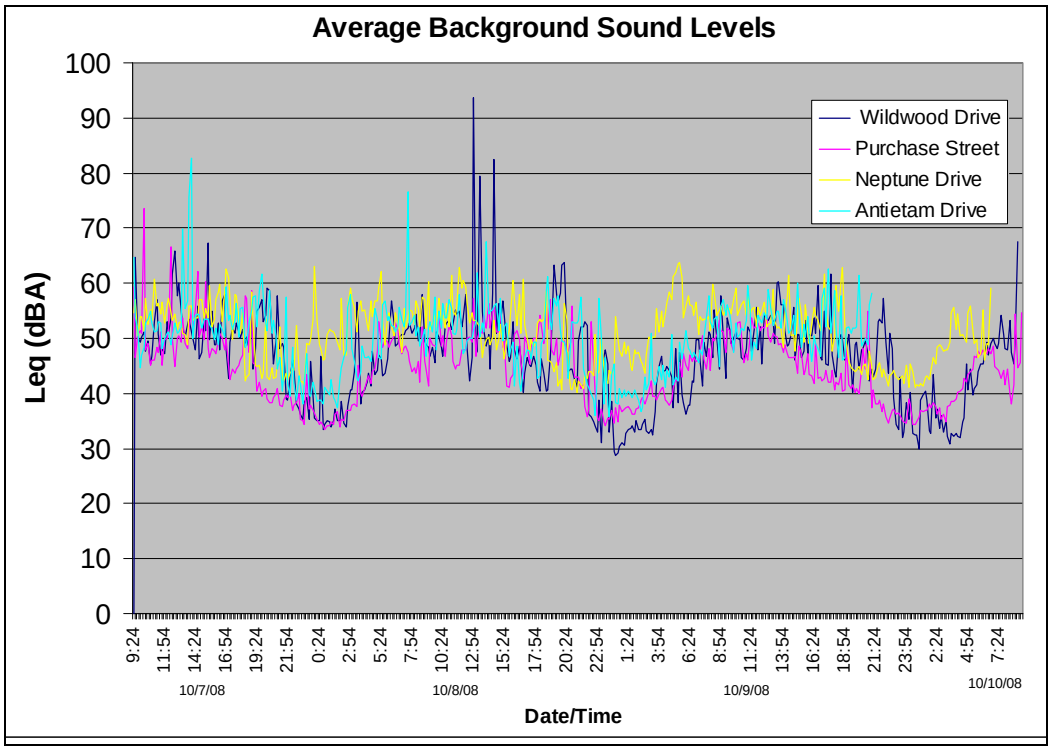


Figure 3.7-2 Average Existing Day and Night Sound Level by Location (2008)

3.7.3.3 Aircraft

Existing Aircraft Operations

The year 2008 represents existing baseline conditions. This is based on the fact that 2008 was the last full year of operations at NAS Brunswick, and although it may not reflect the historical "average" operations at the installation, it is the best available information. The baseline year best represents existing conditions and provides a meaningful point from which to compare potential future effects. During calendar year 2008, there were 24,709 annual operations at NAS Brunswick (U.S. Navy 2009c).

Existing aircraft operations at NAS Brunswick include flight arrivals, departures, and touch-and-go operations. The airfield is open for flight operations 24 hours a day, 365 days a year. An operation consists of any time an aircraft crosses over the runway threshold. The majority of aviation operations were performed by Navy aircraft squadrons based at NAS Brunswick. During 2008 approximately 93% of all tower operations involved Navy and Marine Corps aircraft, 2% other military aircraft, and 5% civilian air carrier and general aviation aircraft. Annual tower operations for 2008 are shown in Table 3.7-7. No aircraft operations take place at the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, or Sabino Hill Rake Station.

Table 3.7-7 Annual Air Operations, NAS Brunswick (2008)

Tower Operations	Navy/Marine Corps	Other Military	Air Carrier	General Aviation	Total
Airport	22,890	532	117	1,170	24,709

Source: U.S. Navy 2009c.

NAS Brunswick is used primarily by fixed-wing turbo-prop aircraft. The P-3C Orion and C-130 Hercules are the predominant aircraft operating at the installation (see Figure 3.7-3) (Wagner 2009). Five operational squadrons were based at NAS Brunswick during 2008, including four P-3C squadrons (VP-10, VP-8, VP-26, VPU-1) with a maximum of 17 aircraft and one C-130 squadron (VR-62) with three aircraft (Krauss 2009). In addition, a military-dependent flying club operates from the airfield. The club, which operates a Cessna 152 fixed-wing turbo-prop aircraft, provides private flight training to military members, their dependants, DoD civilian employees, and other federal personnel (NAS Brunswick Navy Flying Club 2009).

P-3C Orion

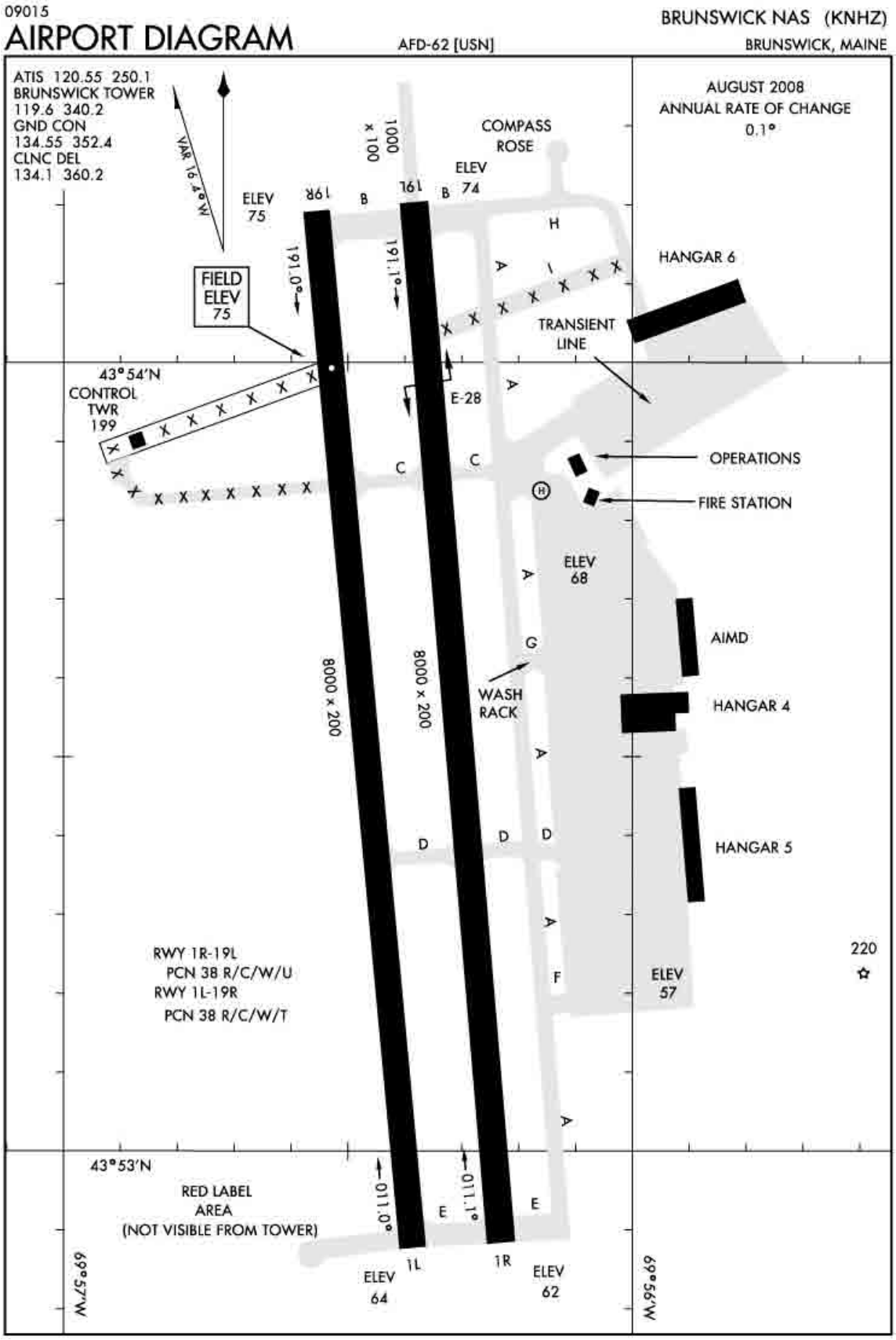
C-130 Hercules

Photos: U.S. Navy 2009d.

Figure 3.7-3 Existing Aircraft Operating at NAS Brunswick (2008)

Airfield and Operational Areas

Aircraft operational areas consist of the installation's airfield and designated airspace above and in the vicinity of NAS Brunswick. The airfield at NAS Brunswick consists of two runways, 01L/19R and 19 L/01R. In addition, nine taxiways and one helicopter pad are located at the intersection of taxiways Alpha and Charlie. Runway 19L/01R is designated the primary instrument runway, and Runway 01 is the preferred calm wind runway (ATAC 2004). Runway 19L/01R was built in 1951 and resurfaced most recently in 2004. Runway 01L/19R was built in 1952 and resurfaced most recently in 2001 (Wyman 2010). Table 3.7-8 provides the dimensions of the two runways, and Figure 3.7-4 depicts their layout. Current runway utilization by aircraft at NAS Brunswick is shown in Table 3.7-9.



Source: FAA 2009b.

Figure 3.7-4 Airfield Diagram, NAS Brunswick

Table 3.7-8 NAS Brunswick Runway Description

Runway	Dimensions
01L/19R	8,000 x 200 feet
19L/01R	8,000 x 200 feet

Source: ATAC 2004.

Table 3.7-9 Runway Utilization, NAS Brunswick

Runway	Utilization[1]
01L	23%
01R	26%
19L	36%
19R	15%

Source: ATAC 2004.

Note:
[1] Runway utilization percentages are average runway utilization in 2004. It should be noted that future runway utilization may vary depending upon several factors, and the use of a runway depends upon air traffic control and pilot considerations.

NAS Brunswick has cleared, drained, and graded surfaces surrounding the runways, but they do not necessarily meet the official definition of runway safety areas (RSAs). These cleared areas do not meet the "stabilized" criteria, where under dry conditions they would be capable of supporting the passage of aircraft without causing major damage to the aircraft (Wyman 2010).

The use of airspace over NAS Brunswick is dictated by the FAA's National Airspace System. Air traffic control at the airfield is shared, depending upon time of day, by NAS Brunswick, Portland International Jetport, and Boston Center air traffic control (ATAC 2004). Aircraft operating from NAS Brunswick utilize the airspace around the air station and numerous operating areas, mostly located over the Atlantic Ocean. Aircraft approaching or departing from the air station are assigned specific routes, or flight tracks. Flight tracks are represented as single lines, but actual flight paths vary due to aircraft performance, pilot technique, and weather conditions, such that the actual flight track is a band, often one-half to several miles wide. Figure 3.7-5 depicts typical aircraft pattern flight tracks for aircraft operating at NAS Brunswick. The flight tracks presented in this EIS are idealized representations.

Aircraft Noise

Aircraft operations are the main source of noise at NAS Brunswick. Aircraft noise results primarily from flight operations and ground engine maintenance "run-ups," the latter of which are associated with pre-flight and maintenance checks. The level of noise exposure is related to a number of variables, including aircraft type, engine power settings, altitudes at which aircraft fly, direction of aircraft during run-ups, duration of run-ups, flight tracks, temperature, relative humidity, and frequency and time of operations. Generally, these factors fluctuate from year to year. Small fluctuations in the annual number of operations of aircraft per year are typical and do not result in changes to the modeled noise zones.

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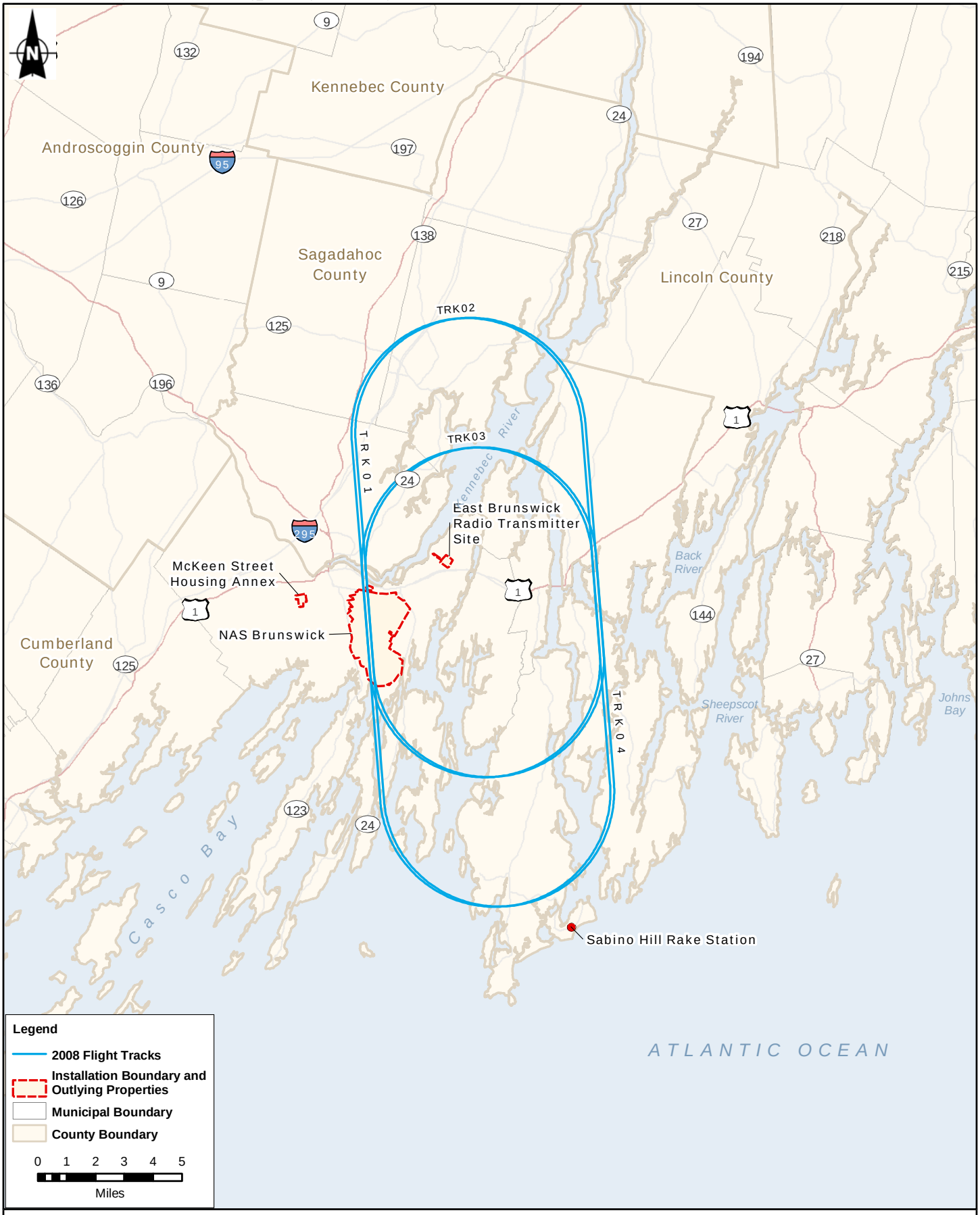

Figure 3.7-5
Aircraft Operational Areas
NAS Brunswick, Maine

Aircraft noise consists of a series of single events over time. The FAA recommends using the DNL noise descriptor to delineate "noise contours" between the source and any receptor located near an airport or in the flight path.

Integrated Noise Model

In support of this EIS, a noise study was conducted to define noise zones for existing and proposed future aircraft operations at NAS Brunswick. The Navy, with input from the FAA as a cooperating agency, utilized Integrated Noise Model (INM) 7.0 to quantify existing and future airfield noise impacts.

Using INM and airfield-specific data (i.e., runway utilization, flight track use, aircraft fleet mix, aircraft performance and thrust settings, topographic information, and atmospheric conditions), existing and future noise exposure contours were modeled. The noise contours connect points of equal value and graphically illustrate where aircraft noise occurs in and around an airfield and at what sound level. The noise contours are depicted in 5-dBA increments (65, 70, and 75 DNL) and generally follow the flight paths of aircraft. The calculated noise contours do not represent exact scientific measurements. The area between two specific contours is known as a noise zone. The following noise zones were used in this study are:

- Less than 65 DNL;
- 65 to 70 DNL;
- 70 to 75 DNL; and
- Greater than 75 DNL.

Existing noise contours were modeled using 2008 aviation operational data provided by NAS Brunswick (Wagner 2009). Future aviation activity projections, including number of operations, aircraft type, type of operation, and runway and flight track utilization rates, were provided by MRRA (Jordan 2009). The aviation projections were reviewed and approved by the FAA (Nicosia-Rusin 2009). More details on future aircraft operations are provided in Section 4.7.

2008 Noise Exposure Contours

Existing noise contours were modeled based on average daily 2008 aircraft operations at NAS Brunswick. The average daily operations in 2008 included touch-and-go operations for the C-130 and P-3C type aircraft, as presented in Table 3.7-10. These operations counts were identified by NAS Brunswick air operations personnel to represent average daily aviation activity at the installation (Wagner 2009). A complete operational count of aviation activities for the year 2008, including operations type, aircraft type, and flight track utilization was not available or documented by NAS Brunswick (Ivezic 2009).

Table 3.7-10 Average Daily Touch-and-Go Operations

Aircraft Type	Day	Night	Total
C-130	3	1	4
P-3C	9	3	12
Total Operations	**12**	**4**	**16**

Source: Wagner 2009.

Overall, the area covered by the noise zones encompasses approximately 554 acres, as shown in Table 3.7-11. The contours are located primarily within the property boundary of the installation, primarily over the existing airfield and flight operations area. The contours include two small arms of 65 DNL that extend past the airfield operations area to the north, crossing over the installation boundary onto Bath Road, and to the south. The greater-than-65- DNL noise zones associated with existing aircraft operations are not located within any land use areas sensitive to noise, including residential, educational, health, and religious structures and sites, and parks, recreational areas (including areas with wilderness characteristics), wildlife refuges, and cultural and historical sites. The 2008 noise zones for NAS Brunswick are shown on Figure 3.7-6.

Table 3.7-11 Land Area (acres) within Noise Zones (2008)

Noise Zone	Acres[1]
65 to 70 DNL	355
70 to 75 DNL	178
Greater than 75 DNL	21
Total	**554**

Note:
[1] Acreage calculations are approximate and are rounded to the nearest acre.

3.8 Infrastructure

This section describes the existing infrastructure and utility systems (i.e., water supply, wastewater, storm water, electric, natural gas, and telecommunications) in the town of Brunswick, NAS Brunswick, and the McKeen Street Housing Annex. The Sabino Hill Rake Station and East Brunswick Radio Transmitter Site are not discussed in this section as they do not currently require any infrastructure or utility systems.

3.8.1 Water Supply

3.8.1.1 Town of Brunswick

Water Supply Distribution System

The majority of potable water for drinking and fire protection is provided to the town of Brunswick by the Brunswick and Topsham Water District (BTWD). The BTWD owns and operates three pumping and treatment facilities. The newest facility, at the Jordan Avenue Station, was constructed in 2001. Potable water supplies are obtained from four well stations located in either Brunswick or Topsham.

In addition to the four well stations, the BTWD also owns and operates (BTWD 2008a):

- Three storage tanks, with a combined capacity of over 7 million gallons,
- Approximately 115 miles of water lines, and
- 800 private and public fire hydrants.

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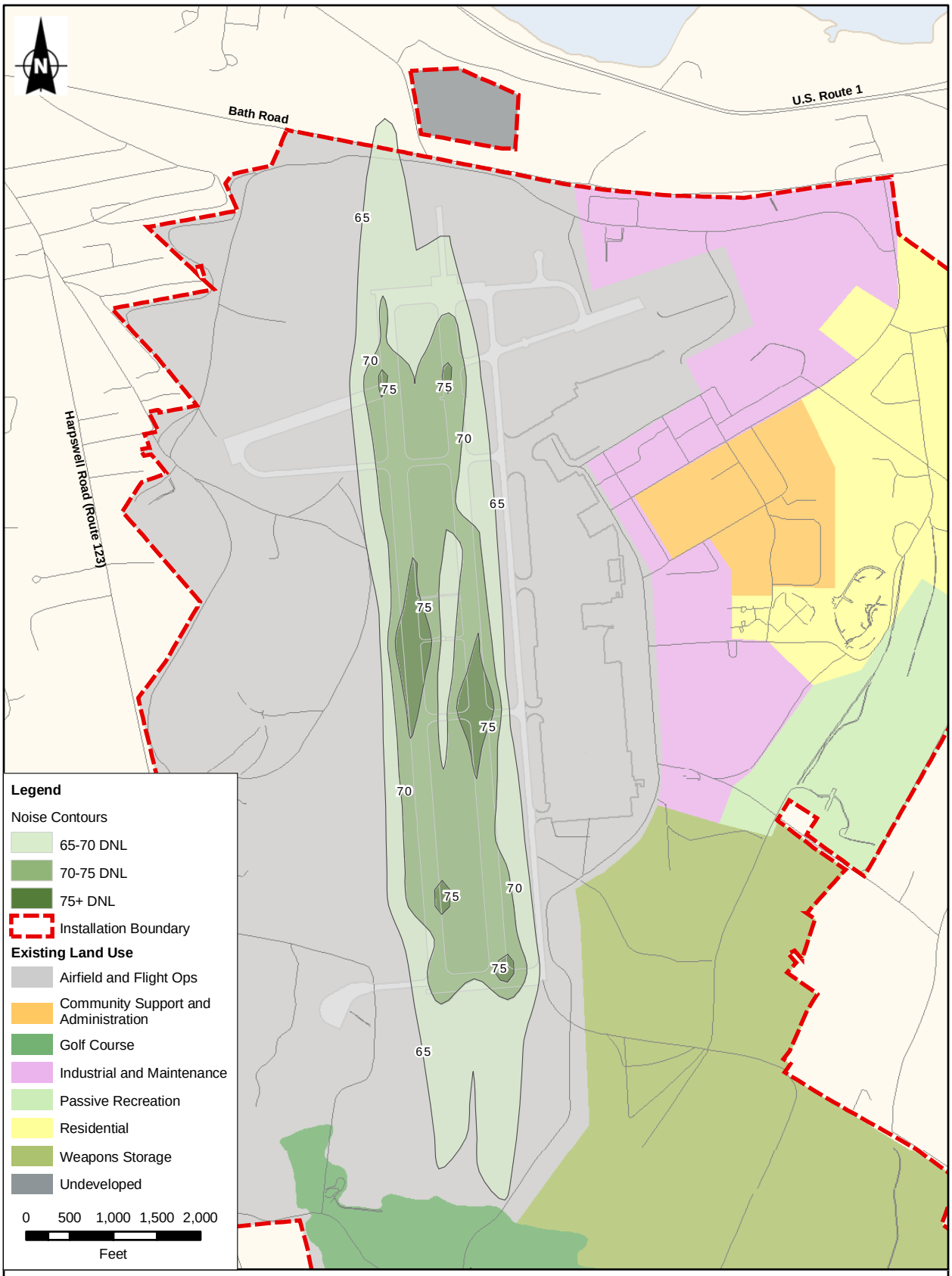

Figure 3.7-6
2008 Airfield Noise Contours
NAS Brunswick, Maine

In 2005 the BTWD improved its water supply system by constructing a 4-million-gallon concrete storage tank in Topsham and a new 24-inch-diameter groundwater well at the Jackson Station, located on River Road in Topsham. This well provides a backup water supply in the event of an equipment failure (BTWD 2006). An additional 24-inch-diameter well (Taylor Well No. 5) was constructed at the Taylor Station, located at Taylor Farm in Brunswick, and became operational in November 2008 (BTWD 2008b; BTWD 2008c; Douglas 2009a).

Water Supply Capacity and Usage

In 2008 the BTWD supplied an average of 1.83 million gallons per day (gpd) to approximately 7,000 customers, well below the BTWD total safe pumping capacity of approximately 4.80 million gpd (Frasier 2009). Table 3.8-1 shows average daily water use from 2005 to 2008.

Table 3.8-1 Brunswick and Topsham Water District, Average Daily Flow (2005 to 2008)

Year	Gallons per Day
2005	2.45 million
2006	2.02 million
2007	2.03 million
2008	1.83 million

Source: Douglas 2008, 2009b.

3.8.1.2 NAS Brunswick

The Navy has a contract with the BTWD to supply potable water to NAS Brunswick and the McKeen Housing Annex. The Navy pays the BTWD a fee for the service depending on total usage. NAS Brunswick maintains a water use agreement with the BTWD. There are no existing limitations on the amount of water consumed by the installation or any of its satellite properties (Joy 2009i). The installation's water use is metered at the two points where water lines enter the property (BLRA 2007a). Structures on the installation are not individually metered. The Navy also owns and operates the water supply infrastructure located on the McKeen Street Housing Annex, and the housing units are not individually metered.

Water Supply and Distribution System

NAS Brunswick's water supply system is serviced by two 12-inch-diameter potable water lines, which tie into the BTWD water supply and distribution system at two locations along Bath Road (Town of Brunswick 2005).

The Navy owns and maintains the water supply system located on its property. The installation's existing water supply infrastructure includes approximately 187 fire hydrants and over 74,000 linear feet of underground piping, which ranges from 6 to 18 inches in diameter (Town of Brunswick 2005).

The installation's water distribution system extends throughout the developed portions of the installation, including the community support, administrative, industrial, and residential areas east of the airfield. Limited water supply infrastruc-

ture is located in the western and southern portions of the installation (see Figure 3.8-1).

The majority of the existing on-site water distribution system was installed prior to 1980, and the mainline piping is made of asbestos-cement pipe. Mainlines, services, hydrants, and valves were added as new facilities were constructed on the installation (Town of Brunswick 2005).

In addition to the water supply system in the northern portion of NAS Brunswick, two groundwater wells serve isolated facilities in the southern portion of the installation. The first well, classified by the State of Maine Drinking Water Program as a "transient non-community drilled public water supply," is a public drinking water well that serves the golf course clubhouse and restaurant (Navy BRAC PMO 2006). This well is located in the southwest corner of the installation, near the golf course. The golf course is not irrigated by this well; irrigation water is provided by a local pond and pump house on the course.

The second groundwater well is classified by the Maine Drinking Water Program as "non-public," which is defined by the EPA as a water supply system serving fewer than 25 people (EPA 1998). This non-potable well is located near the southeast corner of the runway and serves about 10 security personnel at the Dyer's Gate guardhouse (Navy BRAC PMO 2006). No other public or private water supply aquifers, wells, or treatment facilities are located on the installation.

Fire hydrants on the installation are connected to the potable water supply system. A separate, non-potable, high-pressure fire protection system serves the installation's five aircraft hangars. This system consists of a water storage facility, fire pumps, and distribution pipelines (Town of Brunswick 2005).

Water Supply Capacity and Usage

The current water demand for existing uses on NAS Brunswick is approximately 151,000 gpd. In 2008 average daily water use at the McKeen Street Housing Annex area was about 58,000 gpd (Douglas 2009b). Average daily water use at NAS Brunswick and the McKeen Street housing area comprised 11.4% of the total daily water use in the towns of Brunswick and Topsham. Table 3.8-2 compares the average daily flow of water supply to NAS Brunswick (including McKeen Street Housing Annex) and the Town of Brunswick as well as the current total capacity of the BTWD water supply system. The BTWD is a user-supported service and the Navy pays for the water supplied to the installation.

Table 3.8-2 Average Daily Flow for Water Usage and Supply (2008)

NAS Brunswick and McKeen Street Housing Annex Average Daily Flow	BTWD Total Annual Average Daily Flow	BTWD Safe Pumping Capacity Average Daily Flow
209,000 gpd	1.83 million gpd	4.80 million gpd

Source: Frasier 2009; BTWD 2008a.

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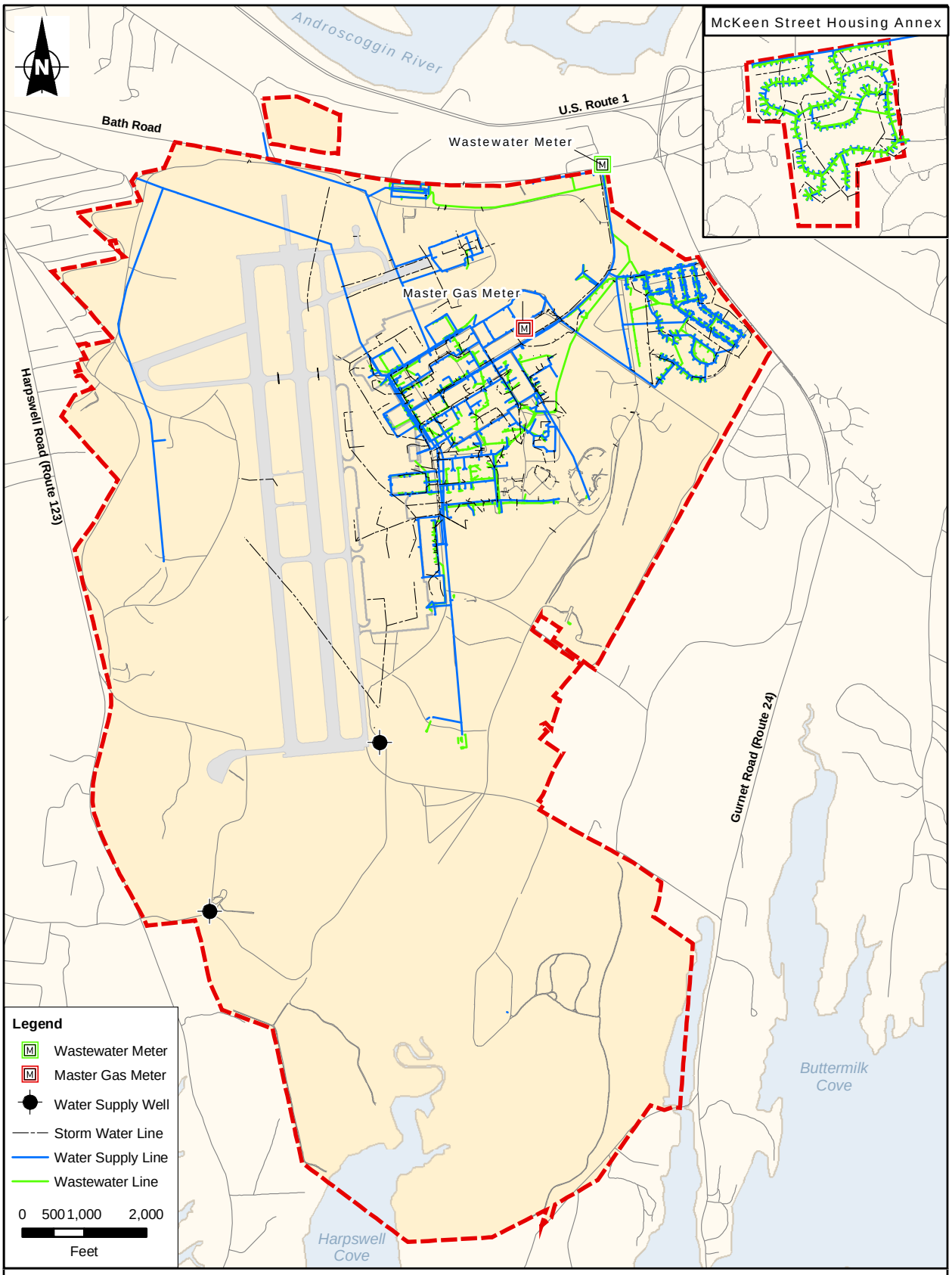

Source: Town of Brunswick 2005.

Figure 3.8-1
Water Supply, Wastewater, and Storm Water Infrastructure
NAS Brunswick, Maine

3.8.2 Wastewater

3.8.2.1 Town of Brunswick

Wastewater System

Municipal wastewater collection and treatment for the town of Brunswick is provided by the Brunswick Sewer District. The Brunswick Sewer District owns and operates approximately 60 miles of sanitary sewer gravity and pressure mains and 18 wastewater pumping stations with capacities ranging from 100 to 2,300 gallons per minute (gpm) (Blanchette 2009a). The installation's storm and sanitary sewer systems were separated in 1955 (Blanchette 2009a). A single wastewater treatment plant serves the town of Brunswick, including NAS Brunswick and the McKeen Street Housing Annex. The plant also accepts and treats septic and holding tank wastes from 22 other communities in the region.

Wastewater Generation and Capacity

During 2008, the Brunswick Sewer District processed approximately 2.99 million gpd of wastewater district-wide. The licensed (i.e., permitted) capacity of the Brunswick Sewer District's wastewater treatment plant is 3.85 million gpd. However, the sensitivity level of the plant is 3.08 million gpd (Blanchette 2009a). The sensitivity level is defined, per the Brunswick Sewer Districts discharge permit, as more than 80% of the treatment plant's design average daily flow for 90 consecutive days (Blanchette 2009b).

Table 3.8-3 shows average daily wastewater generation from 2005 to 2008. The changes in wastewater generation during the years shown are largely due to fluctuations in local precipitation levels during those years. During and following precipitation events, water enters the sewer system in two ways. The first is through inflow, in which water drains into sump pumps, roof drains, or catch basins. The second is through infiltration, in which groundwater leaks into old pipe joints or cracked pipes. This means that in wetter years the amount of wastewater handled by the system increases, while in drier years the amount decreases (Blanchette 2009b).

Table 3.8-3 Brunswick Sewer District, Average Daily Flow (2005 to 2008)

Year	Wastewater Generation (gpd)
2005	3.43 million
2006	3.16 million
2007	2.60 million
2008	2.99 million

Source: Blanchette 2009b.

3.8.2.2 NAS Brunswick

Wastewater collection and treatment for NAS Brunswick and the McKeen Street Housing Annex is provided by the Brunswick Sewer District. NAS Brunswick's agreement with the Brunswick Sewer District places no limitations on the amount of water generated at the installation or any of its satellite properties. The amount of wastewater generated is limited only by the capacity of the Brunswick Sewer District's system (Joy 2009i).

Wastewater System

By agreements, wastewater from the installation is discharged into the Brunswick Sewer District municipal wastewater collection system via an 18-inch-diameter main at the intersection of Fitch Avenue and Bath Road (see Figure 3.8-1). Wastewater generation at the installation is metered at this connection (BLRA 2007a; Navy BRAC PMO 2006). As with its water supply system, the installation's wastewater collection system extends throughout the developed portions of the installation, including the community support, administrative, industrial, and residential areas east of the airfield. Limited wastewater infrastructure is located in the western and southern portions of the installation (see Figure 3.8-1). The Navy owns and maintains the wastewater collection infrastructure located on its property. The wastewater collection system also includes 23,800 linear feet of gravity sewer mains, 5,510 linear feet of force mains, 20 oil/water separators, and four pump stations. Pipelines made of vitrified clay were installed prior to 1960, and asbestos-cement lines were installed between 1960 and 1980. The newest pipelines, installed after 1980, are made of polyvinyl chloride (Town of Brunswick 2005). NAS Brunswick owns and maintains the wastewater collection system at the McKeen Street Housing Annex, which connects to the Brunswick Sewer District's municipal wastewater collection system.

Wastewater generated at NAS Brunswick flows into the following key components of the Brunswick Sewer District's wastewater collection system:

- A single wastewater flow meter serving NAS Brunswick, which has a maximum capacity of 450,432 gpd. Current average wastewater flow is 277,000 gpd.

- The Cook's Corner interceptor, which conveys all of the flow from the east side of the town of Brunswick and has a capacity of 3.10 million gpd. The current average flow is approximately 400,000 gpd.

- The Cook's Corner pump station, which accepts all flow from the Cook's Corner interceptor and has a capacity of approximately 768,000 gpd. The current average flow is approximately 400,000 gpd.

In addition to the NAS Brunswick system that discharges to the municipal wastewater collection system, the installation operates seven septic systems that are not connected to the municipal system (Navy BRAC PMO 2006). These septic systems serve individual facilities include but are not limited to the Dyer's Gate guardhouse and vehicle inspection facility, the weapons administration facility, the recycling center, and the golf course clubhouse and restaurant.

Wastewater Generation and Capacity

In 2008 wastewater generation at NAS Brunswick and the McKeen Street Housing Annex averaged 328,652 gpd. In 2008, the Brunswick Sewer District recorded average daily flows of 270,265 gpd from NAS Brunswick and 58,387 gpd from the McKeen Street Housing Annex. The total amount of wastewater generated by NAS Brunswick and the McKeen Street Housing Annex in 2008 was ap-

proximately 120 million gallons, or 11% of the total wastewater flow handled by the Brunswick Sewer District wastewater treatment plant (Blanchette 2009a). The Brunswick Sewer District collected about $666,400 in revenue from the Navy in 2008, representing 21.6% of the district's total annual operating revenue (Blanchette 2009a).

3.8.3 Storm Water

Section 402 of the Clean Water Act (CWA) established the National Pollutant Discharge Elimination System (NPDES) to regulate the discharge of effluents into waters of the United States. The MEDEP is responsible for administering the State's storm water management program, which includes NPDES permits.

3.8.3.1 Town of Brunswick

The Department of Public Works maintains the storm water drainage systems in the town of Brunswick. The town's storm and wastewater sewers were separated in 1955 (Blanchette 2009a). The Town of Brunswick's Comprehensive Plan (Town of Brunswick 2008a) states that future growth will be concentrated in the Growth Area. High-density growth in the town is expected to form around areas where infrastructure, including storm water drainage systems, already exists (Town of Brunswick 2008a).

3.8.3.2 NAS Brunswick

NAS Brunswick is currently authorized by a general permit under Maine's storm water management program to address storm water discharges associated with industrial activities (Permit MER05B247, issued July 27, 2006). NAS Brunswick's storm water drainage systems are maintained and monitored by the Navy in accordance with applicable permits.

NAS Brunswick has a NPDES permit for the discharge of storm water into surrounding waterbodies. As part of the permit program, NAS Brunswick has prepared a Storm Water Pollution Prevention Plan (SWPPP) to control storm water discharges from the installation that may adversely impact water quality in the surrounding waters. The SWPPP identifies potential sources of storm water contamination and current best management practices (BMPs) that are used to prevent or minimize pollutants in storm water. The SWPPP also identifies storm water BMPs for construction activities. Numerous structural BMPs are employed on-base at industrial and process areas such as vehicle and aircraft maintenance areas, wash racks and fueling areas; material storage, loading and unloading areas; and waste disposal areas that are exposed to storm water. Structural BMPs include erosion and sediment controls, oil/water separators, containment/retention structures, grass-lined swales, and leak detection systems. Non-structural BMPs include preventative maintenance practices, regular inspections, spill prevention and response, and procedures and practices for significant materials storage and handling (U.S. Navy 2008).

There are no existing storm water permits for the Sabino Hill Rake Station, East Brunswick Radio Transmitter Site, or McKeen Street Housing Annex. However, the BMPs identified in the NAS Brunswick SWPPP apply to these outlying properties (U.S. Navy 2008).

Storm Water Drainage System

Impervious surfaces cover approximately 15% of the land area at NAS Brunswick. Surface runoff from NAS Brunswick flows north to the Androscoggin River or south to Harpswell Cove and eventually out to Casco Bay. Figure 3.8-1 identifies the storm water lines on the installation and McKeen Annex used to convey runoff. The Androscoggin River and the Harpswell Cove watersheds both contain waters designated as "Urban-Impaired" streams under Chapter 502 of Maine's Stormwater Management Law (06-096 Code of Maine Rules [CMR] Chapter 502). The two streams, an unnamed tributary of the Androscoggin River located in the town of Brunswick near Jordan Avenue and Mere Brook, are discussed in Section 3.11.1 - Surface Water.

Three natural drainage systems have been altered by the construction of retention ponds that holds and treats storm water. The largest of these systems, referred to as the Picnic Pond system, receives over 80% of the storm water discharged from the industrial portion of the installation, including the airfield.

The Picnic Pond storm water system is comprised of four ponds that range in size from 0.2 acre to 4.5 acres (see Figure 3.8-2). The western-most pond in this system is referred to as Pond A. Pond A is approximately 0.33 acre in size and receives runoff from approximately 190 acres in the flight line area, parking areas, and most of the eastern half of NAS Brunswick. Pond A discharges northeast into Pond B, which is approximately 1.6 acres in size and receives runoff from Pond A and an additional 85 acres of the surrounding area. Pond C is southeast of Pond B and is approximately 0.2 acre in size. Pond C collects runoff from Pond A, Pond B, and an additional 43 acres of property on NAS Brunswick. South of Pond C is Picnic Pond, which, at approximately 4.5 acres in size, is the largest retention pond in the Mere Brook watershed. Picnic Pond is fed by Ponds A, B, and C, as well as an additional 250 acres in the eastern half of the installation (Woodard and Curran 2002). Flow exits Picnic Pond and discharges to a tributary of Mere Brook, which eventually discharges into Harpswell Cove (see Figure 3.8-2). There is an ongoing evaluation of the water quality in the Picnic Pond storm water system.

A small retention pond located at the south end of the airfield has been altered for storm water treatment and is also located in the Mere Brook watershed. This pond is situated adjacent to Mere Brook, on the east side of the airfield and within the Weapons Compound. The primary use of this pond is for water treatment; however, the outlet structure also provides protection to Mere Brook in the event of a large spill. The pond allows for some wet treatment of storm water and serves as a polycyclic aromatic hydrocarbon (PAH) settling pond.

The third drainage system that has been altered for storm water treatment is referred to as the Northern Runway/Taxiway and Jet Fuel Storage Installation (JFSI) storm water management system. This system of three ponds is located in the Androscoggin River Watershed and collects storm water from the northern portion of the installation, including the north end of the airfield and the JFSI. The water eventually exits the installation through a single tributary of the

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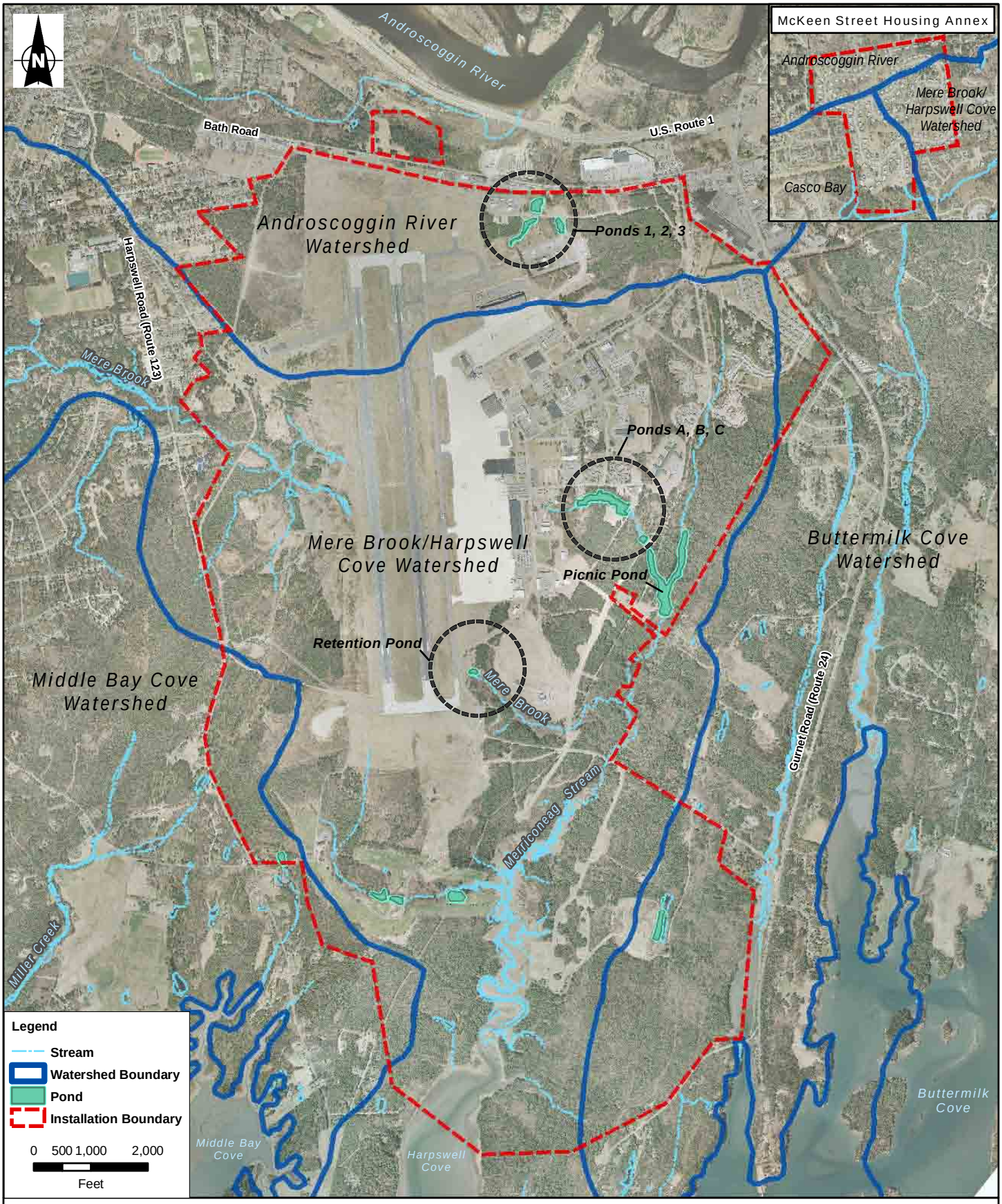

Source: Adapted from USGS 1999.

Figure 3.8-2
Watersheds, Surface Waters, and
Storm Water Retention Ponds
NAS Brunswick, Maine

Androscoggin River (see Figure 3.8-2). Pond 1 is located in the northeastern section of NAS Brunswick and receives drainage from an oil/water separator from the JFSI. Pond 1 is small, occupying approximately 80 square feet, and collects runoff from 11 acres. Pond 2 is located west of Pond 1 and is approximately 0.5 acre in size. This pond receives runoff from approximately 44 acres, including an area to the south of the JFSI. Pond 1 and Pond 2 do not drain adjoining areas or flow in a series; they flow separately into Pond 3. Pond 3 is located north of Perimeter Road and is approximately 0.6 acre in size. Pond 3 receives separate flows from Ponds 1 and 2 as well as runoff from an additional 8 acres of NAS Brunswick property, giving it a total drainage area of 63 acres (Woodward and Curran 2002). The flow from Pond 3 exits NAS Brunswick property, crosses Route 24, and eventually reaches the Androscoggin River (see Figure 3.8-2).

Storm water lines in the McKeen Street Housing Annex are connected to the Town of Brunswick's municipal storm water system (see Figure 3.8-1).

Other Discharge and Potential Pollutants

A non-storm-water discharge is associated with the deicing facility's wash rack (located at Taxiway "G") where saltwater from the ocean is rinsed off aircraft. The effluent passes through an oil/water separator and discharges into the Mere Brook watershed's series of retention ponds (see Figure 3.8-2). Some of the substances that are discharged include oil, grease, and other petroleum-based substances from vehicle and aircraft activity (U.S. Navy 2008). In June 2007, the MEDEP granted a de minimis ruling on this discharge so that it could be covered under the NPDES permit (U.S. Navy 2008).

3.8.4 Other Utility Systems

3.8.4.1 Town of Brunswick

- **Electric.** The Central Maine Power Company is the primary electrical utility providing connection and distribution services in the town of Brunswick. This is a user-supported utility service (i.e., the customers pay for the service and electricity supplied).

- **Natural Gas.** The town of Brunswick and the surrounding region is serviced in part by Maine Natural Gas. This is a user-supported utility service, and the customers pay for service and natural gas supplied.

3.8.4.2 NAS Brunswick

- **Electric.** The electrical distribution system on NAS Brunswick is owned by the Navy; however, the Central Maine Power Company provides electric power to the installation. Electric power enters NAS Brunswick's distribution system and is metered at two points, one from the east along Route 24, and one from the west along Route 123. The eastern distribution system serves facilities east of the runway, while the western system serves facilities west of the runway (BLRA 2007a). During calendar year 2008, it is estimated that the total electric usage through these two meters served by Central Maine Power Company was 24,523,440 kWh of electricity (Mead 2010). In addition, sev-

eral facilities have emergency electric generators. Electricity is also provided to the McKeen Street Housing Annex by the Central Maine Power Company. Individual housing units are not metered by the power company.

- **Natural Gas.** Natural gas service is provided to the installation by Maine Natural Gas. Construction of the installation's natural gas distribution system was completed in 2002, and the system has been owned and operated by Maine Natural Gas since its construction (BLRA 2007a). The natural gas distribution system serves the operational facilities and housing east of the runway and has been extended to serve the Dyer's Gate guardhouse and the air traffic control tower. Most of the installation is metered by a master gas meter located on the installation (see Figure 3.8-1), although some industrial and commercial facilities are metered individually. During calendar year 2008, it is estimated that the total natural gas usage for NAS Brunswick was 1,142,117 ccf (Mead 2010). On-base residential housing units are individually metered. The Maine Natural Gas metering and regulator station serving NAS Brunswick is located on installation property, along Bath Road (BLRA 2007a). Natural gas is provided to the McKeen Street Housing Annex by Maine Natural Gas. Individual housing units are not metered by Maine Natural Gas.

3.9 Cultural Resources

This section describes the existing cultural resources that are located within the area of potential effects (APE), which includes NAS Brunswick and the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station. According to 36 CFR 800.16(d), the APE is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of cultural resources, if such resources exist. Cultural resources consist of archaeological resources (prehistoric and historic archaeological sites) and architectural resources (historic districts, buildings, and other structures such as roads, bridges, radio towers, etc.).

For the purposes of compliance with Section 106 of the National Historic Preservation Act (NHPA) and the requirements of 36 CFR 800, the proposed action is considered a single undertaking that is being assessed for its overall effects on historic properties. Historic properties are those cultural resources that are listed in, or have been determined to be eligible for listing in, the National Register of Historic Places (NRHP).

The following discussion of cultural resources in the APE is based on information presented in the following:

- The Draft *Historic and Archaeological Resources Protection Plan, Naval Air Station Brunswick* (Louis Berger and Associates, Inc. [LBA] 1996);

- The Draft *Cultural Resources Survey, Naval Air Station Brunswick* (LBA 1999);

- The Draft *Comprehensive Archaeological Identification Survey at NAS Brunswick, Brunswick, Maine* (SEARCH 2010a);

- The Final *Historic Architecture Comprehensive Survey Update of Buildings and Structures at NAS Brunswick, Brunswick, Maine* (SEARCH 2010b);

- The Draft *Executive Summary, Modification 01: Comprehensive Archaeological Identification Survey at NAS Brunswick, Brunswick, Maine* (SEARCH 2010c);

- Correspondence between the U.S. Department of the Navy and the Maine State Historic Preservation Office (Maine SHPO) (Shettleworth 1998a, 1998b, 1998c, 2009; Speiss 2009; Drozd 2009; Mohney 2010); and

- Web sites and online databases maintained by the National Park Service (NPS), and the NRHP (NPS 2009a, 2009b; NRHP 2009).

In general, the APE contains cultural resources that are associated with a variety of cultural periods of human occupation. Archaeological sites or archaeologically sensitive areas are located in the general vicinity of the APE, and indicate prehistoric and historic settlement and/or use of the general project area. Extant buildings and structures within the APE document more recent occupation and use of the area as a Naval installation associated with World War II, the Cold War, and the post-Cold War period.

3.9.1 Existing Cultural Resources and Historic Properties

Cultural resources within the APE consist of archaeologically sensitive areas and previously identified and evaluated architectural resources. Archaeological and architectural resources are discussed in greater detail in Sections 3.9.1.1 and 3.9.1.2, respectively.

3.9.1.1 Archaeological Resources

In September 2009 and May 2010, the Navy initiated comprehensive archaeological identification surveys, the findings of which are presented in *Comprehensive Archaeological Identification Survey at NAS Brunswick, Brunswick, Maine*, dated February 2010, and *Modification 01: Comprehensive Archaeological Identification Survey at NAS Brunswick, Brunswick, Maine*, dated June 2010 (SEARCH 2010a, c). These surveys included the main NAS Brunswick property, the East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station. The McKeen Street Housing Annex was not included in these surveys based on findings from pervious surveys, which indicated a low sensitivity for archaeological resources (LBA 1996). The project included Phase I archaeological surveys at 29 areas that were considered archaeologically sensitive for potential Native American archaeological resources (ASAs) and at 44 areas that were considered sensitive for potential Euroamerican archaeological resources (HSAs) (SEARCH 2010a, c). All 73 archaeologically sensitive areas are within the boundaries of the main NAS Brunswick property.

Prior to the 2009 and 2010 surveys, limited investigations were completed to inventory archaeological resources within the APE. These investigations were conducted in accordance with Section 106 of the NHPA of 1966 and were largely based on environmental and topographic conditions, historic map and other documentary research, and the presence or absence of prior disturbance in the project area. These previous investigations are summarized in the *Historic and Archaeological Resources Protection Plan, Naval Air Station Brunswick* (LBA 1996). No archaeological sites were identified in the limited areas that underwent Phase I archaeological investigations (Gramly 1980; TAMS Consultants, Inc. 1999; LBA 2000).

The Navy consulted with and entered into an agreement with the Maine SHPO, housed within the Maine Historic Preservation Commission (MHPC), regarding the work plan for the 2009 survey (Shettleworth 2009). The comprehensive archaeological identification surveys included the following:

- A comprehensive archaeological overview of NAS Brunswick and the East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station;
- A field reconnaissance survey of all areas in the APE identified as having moderate to high probability for containing Native American sites;
- A survey of specific site locations for historic archaeological sites;
- The identification of any archaeological resources that are potentially eligible for inclusion in the NRHP, which will be used to update the assessment of the eligibility recommendations contained in the 1996 *Historic and Archaeological Resources Protection Plan, Naval Air Station Brunswick* (LBA 1996); and
- A comprehensive assessment of the archaeological resources at NAS Brunswick, the East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station, which will be used by the Navy for the Section 106 consultation for the BRAC disposal of NAS Brunswick (Drozd 2009).

Fieldwork for the comprehensive archaeological identification surveys was completed in spring of 2010. The results are summarized below.

NAS Brunswick

The combined efforts of the 2009 and 2010 comprehensive archaeological identification surveys resulted in the recordation of 35 archaeological sites, 27 of which were recommended for Phase II archaeological evaluation for NRHP eligibility as per Maine guidelines (SEARCH 2010a,c). The Maine SHPO concurred with the recommended eligibility of these historic resources at NAS Brunswick (U.S. Navy 2010).

Nineteen of the 35 recorded archaeological sites are prehistoric Native American archaeological sites. Recovered materials at these sites include a projectile point fragment, fire-cracked rock and rhyolite, a scraper fragment, modified and utilized flakes, quartz, and chert debitage. Some of the sites were recorded on the

basis of a single artifact, while other sites were identified by several positive shovel tests and numerous artifacts. Based on Maine SHPO guidelines, all 19 prehistoric archaeological sites were recommended for Phase II evaluation (SEARCH 2010a, c).

Sixteen of the 35 recorded archaeological sites are historic Euroamerican archaeological sites. Eight of these 16 sites were recommended for Phase II testing. Phase II testing and associated historic research may demonstrate one or more of these sites as eligible for listing in the National Register under Criterion D. The cluster of former farmsteads, salt-marsh dikes, family cemeteries, and a school suggests that the sites recommended for Phase II testing may be eligible for listing in the NRHP as a multiple property constituting a historic rural landscape or district. Sites not recommended for additional archaeological investigation were those whose subsurface deposits lacked evidence of undisturbed 19th century contexts, or whose surficial/structural remains exhibit significant loss of integrity (SEARCH 2010a, c).

McKeen Street Housing Annex

The 1996 Phase IA archaeological survey of the McKeen Street Housing Annex indicated that this area has low sensitivity for archaeological resources (prehistoric and historic) (LBA 1996).

The McKeen Street Housing Annex was not included in the 2009 and 2010 comprehensive archaeological identification surveys because it was previously determined to have low sensitivity for archaeological resources (LBA 1996).

East Brunswick Radio Transmitter Site

The 1996 Phase IA archaeological survey of the East Brunswick Radio Transmitter Site indicated that this area has low sensitivity for archaeological resources (prehistoric and historic) (LBA 1996).

According to the 2009 comprehensive archaeological identification survey, maps and documentation indicated no high or medium prehistoric or historic archaeological probability areas in the East Brunswick Radio Transmitter Site (SEARCH 2010a).

Sabino Hill Rake Station

Based on the result of previous investigations, both prehistoric and historic archaeologically sensitive areas have been identified within the Sabino Hill Rake Station (LBA 1996, 1999). However, none of the previous archaeological investigations identified any archaeological sites (Gramly 1980; TAMS Consultants, Inc. 1999; LBA 2000).

According to the 2009 comprehensive archaeological identification survey, maps and documentation indicated no high or medium prehistoric or historic archaeological probability areas in the Sabino Hill Rake Station (SEARCH 2010a).

3.9.1.2 Architectural Resources

In July 2009, the Navy conducted an historic architecture comprehensive survey update of NAS Brunswick, the findings of which are presented in *Architecture Comprehensive Survey Update of Buildings and Structures at NAS Brunswick, Brunswick, Maine*, dated May 2010 (SEARCH 2010b). This investigation was an update to the architectural survey and NRHP-eligibility evaluations conducted in 1996 (LBA 1996, 1999). The McKeen Street Housing Annex was not included in the study because previous investigations determined that no NRHP-eligible architectural resources were present, and none were previously recommended for re-evaluation upon reaching 50 years of age (LBA 1996, 1999). The East Brunswick Radio Transmitter Site was not included in the study because no structures are located at the East Brunswick Radio Transmitter Site. The Sabino Hill Rake Station was also not included in the study, as there are no NRHP-eligible structures at the Sabino Hill Rake Station and the Navy, under a separate action, demolished the rake station tower (Mohney 2009). The Navy consulted with the Maine SHPO regarding the work plan associated with the architectural survey (SEARCH 2010b). The final report conforms to the SHPO's requirements for architectural survey projects in Maine. The 2009 historic architecture comprehensive survey update for NAS Brunswick included the following:

- A comprehensive architectural overview of NAS Brunswick using the previously completed 1996 Louis Berger & Associates architectural survey as a baseline data source (LBA 1996, 1999);
- A field reconnaissance survey of all structures and buildings at NAS Brunswick not included in the 1999 survey. This updated survey indicated if any resources were potentially eligible for inclusion in the National Register of Historic Places;
- A completed inventory using State of Maine recordation format; and
- A comprehensive assessment of the built environment up to 1989.

The 2009 historic architecture comprehensive survey update for NAS Brunswick also included the use of Program Comments for Cold War Era Unaccompanied Personnel Housing (2006), World War II and Cold War Era Ammunition Storage Facilities (2006), and Capehart-Wherry Housing (2004). These Program Comments provided the DoD with an alternative way to comply with their responsibilities under Section 106 of the NRHP.

The fieldwork for the architectural survey was completed in the fall of 2009. As part of the surveys and assessments, the architectural resources within the APE were evaluated to determine their eligibility for listing in the NRHP. The results are summarized below.

NAS Brunswick

According to the 1996 architectural survey, three facilities are considered eligible for listing in the NRHP: Facilities 44, 63 and 64. These facilities were identified as potentially individually NRHP-eligible under Criterion C as somewhat unusual

and increasingly rare examples of World War II Naval ordnance magazines constructed of steel. They represent a metal version of the all-concrete "igloo" type of magazine developed by the Navy in 1928 and used extensively thereafter by both the Navy and the Army (LBA 1996). The use of steel construction appears to have been a departure from standard Navy practice for World War II Naval ordnance magazines. These earth-covered steel buildings were constructed in 1943, remain in their original locations, retain integrity of location and setting, and demonstrate excellent integrity of design, materials, and workmanship (LBA 1999). After consultation, the Maine SHPO and the Navy concurred that Buildings 44, 63, and 64 are NRHP-eligible (Shettleworth 1998c).

The 2009 survey update documented 76 facilities, including two aircraft, two cemeteries, four roads, and the remains of a rail road spur. Of the 76 resources surveyed, 12 additional ammunition magazines were recommended as eligible for listing in the NRHP under the Program Comment for World War II and Cold Era (1939-1974) Ammunition Storage Facilities (2006): Facilities 285, 286, 287, 288, 289, 290, 291, 543, 544, 548, 549, and SEARCH-1 (SEARCH 2010b). Facilities 285-290, 543, and 544 are earth-covered igloo magazines with a single exposed concrete headwall consisting of a rounded apex and sloping sides that serve as wing walls. Facilities 291, 548, and 549 are beehive magazines, which are similar to the igloos, but they do not have headwalls. SEARCH-1 is a high explosive igloo magazine that has been stripped of its earth-covering. Facilities 285-291 were built in 1956, Facilities 543 and 544 were built in 1958, Facilities 548 and 549 were built in 1959, and Search-1 was built circa-1943 (SEARCH 2010b).

An additional five magazines (59, 60, 62, 71, and 626) not documented as part of the 2009 survey were also recommended as eligible for listing in the NRHP under the 2006 Program Comment (SEARCH 2010b). The 1996 survey concluded that Facilities 59, 60, 62, and 71 were not eligible for listing in the NRHP due to loss of integrity, as they were relocated (LBA 1999). Facility 626 is an additional magazine constructed during the 1970s.

The remaining 61 facilities, excluding Facilities 4, 63, and 64, within the fence line of NAS Brunswick documented during the 2009 survey lack the characteristics of a type, period, or method of construction to distinguish from other installations and fail to communicate the historic mission of the installation (SEARCH 2010b).

The 1996 survey also identified several other buildings, including Buildings 226, 227, 517, and 518 as potentially eligible upon reaching 50 years of age (LBA 1999). Having now turned 50, these facilities were reevaluated for NRHP listing. The facilities served an important role for NAS Brunswick's patrol mission as transmitters and receivers of communications. These resources were designed to act as a unit, but that relationship has been disrupted by the demolition of the towers and their associated aboveground cables that physically and visually linked the buildings to the towers. Facilities 227 and 518 served a secondary support role within the grouping as backup generator buildings. These resources are not eligible for the NRHP either individually or as a district due to the loss of historic integrity (SEARCH 2010b).

The Capehart-Wherry housing at NAS Brunswick was not included in the 2009 historic architecture comprehensive survey update for NAS Brunswick because of an agreement between the Navy and the Advisory Council on Historic Preservation (ACHP), developed as a result of the 2004 Program Comments for Capehart-Wherry Housing, which concluded the transfer of the buildings would not have an adverse effect on historic properties (SEARCH 2010b). The Capehart-Wherry housing is currently outleased to Balfour Beatty Communities, a public-private venture (PPV) partner.

McKeen Street Housing Annex

Previous investigations determined that no NRHP-eligible architectural resources were located at the McKeen Street Housing Annex, and none were previously recommended for re-evaluation upon reaching 50 years of age (LBA 1996, 1999). Therefore, the McKeen Street Housing Annex was not included in the 2009 historic architecture comprehensive survey update for NAS Brunswick.

East Brunswick Radio Transmitter Site

The East Brunswick Radio Transmitter Site is an undeveloped open area. The site had contained a radio transmitter antenna and several buildings, but these were dismantled in 1998 (Geo-Marine 2001). Currently, no buildings or structures are located on the site. Therefore, the East Brunswick Radio Transmitter Site was not included in the 2009 historic architecture comprehensive survey update for NAS Brunswick.

Sabino Hill Rake Station

Building 558 (the Sabino Hill Rake Tower) is the only structure located at the Sabino Hill Rake Station. The Navy has determined that the Sabino Hill Rake Tower is not NRHP-eligible, as it does not meet National Register Significance Criteria A through D; that alterations to this relatively recent resource have lessened its physical integrity; and earlier, perhaps more intact, examples are extant elsewhere in the United States (Cook 2009). After consultation, the Maine SHPO concurred with the Navy's determination (Mohney 2009). The Navy, under separate action, plans to demolish the rake station tower before disposal of the property. Therefore, the Sabino Hill Rake Station was not included in the 2009 historic architecture comprehensive survey update for NAS Brunswick.

3.9.2 NRHP-Listed or -Eligible Historic Properties

In accordance with Section 106 of the NHPA, the Navy is required to consider the effects of this undertaking on historic properties (36 CFR 800.1(a)). Historic properties are defined as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. The term historic properties include artifacts, records, and remains that are related to and located within such properties. The term historic properties includes properties of traditional religious and cultural importance to a federally recognized Indian tribe or Native Hawaiian organization and that meet the National Register criteria" (36 CFR 800.16(l)).

The 2009 and 2010 comprehensive archaeological identification surveys identified 27 newly recorded archaeological sites that were recommended for archaeological Phase II testing to determine their eligibility status for listing on the National Register of Historic Places (NRHP). These sites include 19 prehistoric Native American sites and 8 historic Euroamerican archaeological sites.

The 2009 historic architecture comprehensive survey update recommended 15 ammunition magazines as eligible for listing in the NRHP under the Program Comment for World War II and Cold Era (1939-1974) Ammunition Storage Facilities (2006): Facilities 44, 63, 64, 285, 286, 287, 288, 289, 290, 291, 543, 544, 548, 549, and SEARCH-1 (SEARCH 2010b). Facilities 44, 63, and 64 were previously identified as NRHP-eligible, in consultation with Maine SHPO, by the 1996 survey (Shettleworth 1998c). These 15 facilities were recognized as potentially individually NRHP-eligible under Criterion C, as the World War II and Cold War era magazines appear to be the most intact structures associated with the Navy's use and development of this property during the historic period of significance. As a group, they also illustrate the evolution of design concepts for such facilities in the two periods (Shettleworth 1998c, Mohney 2010).

An additional five magazines (59, 60, 62, 71, and 626) not documented as part of the 2009 survey were also recommended as eligible for listing in the NRHP under the 2006 Program Comment (SEARCH 2010b).

3.10 Topography, Geology, and Soils

This section summarizes the existing topography, geology, and soil conditions at NAS Brunswick, and the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station.

3.10.1 Topography

NAS Brunswick is generally characterized by flat, sandy plains with minimal topographic relief. Elevations range from mean sea level at its southern boundary (Harpswell Cove) to approximately 130 feet above mean sea level (AMSL) at its southeastern boundary (Buttermilk Mountain). Four distinct topographic features within NAS Brunswick are: the outwash sandplain (50 to 75 feet AMSL), the bedrock ridges (70 to 134 feet AMSL), the lower Mere Brook drainage (30 to 55 feet AMSL), and the tidal shoreline (Geo-Marine, Inc. 2001).

The developed portions of the installation are within the outwash sandplain, which covers approximately 80% of the installation (USGS 1980). Bedrock ridges occur on the southeastern and southwestern portions of NAS Brunswick and are forested and sparsely developed (Geo-Marine, Inc. 2001).

The East Brunswick Radio Transmitter Site is relatively flat, with elevations ranging from 20 to 45 feet AMSL (USGS 1980). The McKeen Street Housing Annex property is also relatively flat, with elevations ranging from 80 to 90 feet AMSL (USGS 1980).

Sabino Hill Rake Station property ranges in elevation from mean sea level on the north-northwestern side of the property to approximately 120 feet AMSL on the east side of the property (USGS 1990). The highest peak is at the center of the site, with steeper slopes on the east side and gentler slopes on the western side, which level out into the tidal flats of Atkins Bay.

3.10.2 Geology

NAS Brunswick, the McKeen Street Housing Annex, the East Brunswick Radio Transmitter Site, and the Sabino Hill Rake Station lie within the Appalachian Highlands Physiographic Province. These properties are characterized as glacial-marine till (mostly of sand and gravel with some silt and clay), deposited during the glacial advances and retreats during the Late Pleistocene and Holocene (MEDC 2003). Beneath this layer is a thick glaciomarine mud overlying sand and till (a compacted non-sorted mix of clay, sand, gravel, and boulders) over bedrock (Weddle 2001).

Bedrock consists of Precambrian to Ordovician volcanic and marine sedimentary rocks that were subjected to extreme temperatures and pressures to become metamorphic rocks, such as gneiss and schist (MEDC 2002). The metamorphosed volcanic rocks (bedrock) are of the Cushing Formation. Most of the area is covered by glacial till and glacial marine sediments from the previous Late Pleistocene and Holocene glaciations.

NAS Brunswick and the outlying properties lay in a region of folds and faults within the Norumbega Fault Zone. The Flying Point Normal Fault runs directly under NAS Brunswick from southwest to northeast. Other faults in the vicinity of the site include the Nonesuch Thrust Fault and the Cape Elizabeth Fault (Geo-Marine, Inc. 2001).

3.10.3 Soils

3.10.3.1 Soil Types

NAS Brunswick

Soil types present on NAS Brunswick are listed in Table 3.10-1. The soils are of glacial origin: soils derived primarily from glaciofluvial parent material are found primarily in the northern half of the site, and soils derived primarily from glaciomarine parent material are found primarily in the southern half of the site. Other soil types present on the site include Urban land, Udorthents, and Haplaquents (Normandeau Associates 1998a; Geo-Marine, Inc. 2001). The Urban land, Udorthents, and Haplaquents soils of NAS Brunswick are considered man-made or urban soil units that are developed from cutting, filling, building construction, and paving. Because the urban/man-made soils have been highly modified from their original condition, ratings for limitations for such soils complexes are based on the characteristics of the other soils in the complexes that have not been highly modified. For example, ratings for the Udorthents-Adams complex are based on characteristics of the Adams soils that are included in the complex. No ratings are possible for the Urban land-Udorthents-Haplaquents association, due to the variability of the soils and the extent of modifications from the original conditions.

Table 3.10-1 Soil Types, NAS Brunswick, Maine

Soil Name	Slope Gradient of Dominant Component %	Acres
Urban land-Udorthents-Haplaquents assoc	3	589
Udorthents-Adams complex	3	442
Buxton silt loam	6	171
Windsor loamy sand	4	163
Lamoine silt loam	3	136
Adams loamy fine sand	3	133
Deerfield loamy sand	2	114
Hollis fine sandy loam	12	114
Udorthents-Croghan complex	3	108
Deerfield loamy sand	6	101
Saugatuck loamy sand	2	99
Hollis fine sandy loam	2	91
Scantic silt loam	2	78
No Data	n/a	69
Swanton fine sandy loam	2	67
Gouldsboro silt loam	2	65
Haplaquents-Scantic complex	3	60
Windsor loamy sand	12	58
Buxton silt loam	12	55
Tunbridge fine sandy loam	15	45
Udorthents-Croghan complex	8	45
Haplaquents-Finch complex	3	38
Tunbridge fine sandy loam	8	36
Woodbridge fine sandy loam	4	29
Belgrade very fine sandy loam	4	25
Naumburg loamy fine sand	3	19
Adams loamy fine sand	8	19
Au Gres loamy sand	2	25
Haplaquents-Lamoine complex	3	18
Rumney fine sandy loam	2	16
Haplaquents-Naumburg complex	3	15
Belgrade very fine sandy loam	12	12
Udorthents-Adams complex	30	9
Walpole fine sandy loam	2	8
Lyman fine sandy loam	12	7
Adams-Lyman complex	8	7
Lyman fine sandy loam	6	6
Windsor loamy sand	23	8
Elmwood fine sandy loam	4	5
Adams-Lyman complex	12	4
Hollis fine sandy loam	20	3
Suffield silt loam	20	2
Suffield silt loam	12	2
Tidal marsh	1	1
	Total	**3,137**

Source: USDA 2006; Normandeau Assoc. 1998a; Geo-Marine 2001.

Impervious areas that are included within these soil units include buildings, the runways, parking lots, and other features related to urban use. Such modifications can impact the suitability of an area for any given use. For such soils, planning changes in land use may require additional site-specific data on the nature of the soils.

Outlying Properties

Soils at the McKeen Street Housing Annex are primarily Deerfield loamy sand and Windsor loamy sand. These soils cover approximately 99% of the site. Deerfield loamy sand is a moderately well drained soil, with slopes ranging from 3 to 8%. This soil forms on outwash terraces and develops from sandy glaciofluvial deposits derived from granite and gneiss. Windsor loamy sand is a somewhat excessively drained soil with a slope of 0 to 8%. Walpole fine sandy loam, which covers the rest of the site, is poorly drained with a slope of 0 to 3 percent. The Walpole soils are considered to have very limited constructability due to the shallow depth to the saturated zone and frost action.

The East Brunswick Radio Transmitter Site is comprised of open space and natural areas with minimal Urban land (such as impervious surfaces); a single paved road traverses the site. Approximately 91% of the site is composed of Windsor loamy sand, with slopes that range from 0 to 8%. This is a somewhat excessively drained soil that forms on outwash terraces and originates from sandy glaciofluvial deposits derived from granite and gneiss. Approximately 8% of the site has Au Gres loamy sand, a poorly drained soil with slopes of 0 to 3%, and 1% of the site is gravel pits (USDA 2006). The Au Gres soils are considered to have very limited constructability due to shallow depth to a saturated zone.

The Sabino Hill Rake Station is composed entirely of the Hollis very rocky fine sandy loam. Slopes range from 8% to 15% (USDA 2009a).

Soil types present within the outlying properties are listed in Table 3.10-2.

Table 3.10-2 Soil Types, Outlying Properties

Soil Type	Slope Gradient of Dominant Component (%)	Acres
McKeen Street Housing Annex		
Deerfield loamy sand	6	65
Walpole fine sandy loam	2	1
Windsor loamy sand	4	4
	Total	**70**
East Brunswick Radio Transmitter Site		
Windsor loamy sand	4	60
Au Gres loamy sand	2	5
Gravel pits	2	1
	Total	**66**
Sabino Hill Rake Station		
Hollis very rocky fine sandy loam	12	<1

Source: USDA 2006; Normandeau Assoc. 1998a; Geo-Marine 2001.

3.10.3.2 Soil Characteristics and Limitations

The USDA rates soils according to characteristics that could limit development. These characteristics include:

- **Erosion Potential**. In general, soils with steeper slopes have a greater potential for erosion by water from precipitation. Soils with a moderate or severe erosion potential require a higher level of water management and vegetative-cover best management practices (BMPs) than soils with low erosion potential.
- **Hydric Soils**. Hydric soils are those soils that remain saturated at or near the surface for sufficient periods during the growing season. Hydric soils may require special measures during construction or other uses to overcome limitations caused by wetness. Limitations may include a high water table or low strength for supporting construction equipment and structures.
- **Constructability**. Constructability refers to the relative suitability of a soil for the construction of buildings, roads, and other infrastructure. The soils of NAS Brunswick vary in constructability.

  Constructability limitations arise from a variety of physical properties, such as shrink-swell potential, or features such as whether the soil is subject to ponding or flooding. Specific design and construction practices can be employed to overcome the constructability limitations of the soil on a site. The more common sources of constructability limitations on NAS Brunswick include shallow depth to saturation, frost action, low strength, and the likelihood that excavated cutbanks would cave in. Shallow depth to saturation may require dewatering during excavation and construction and other measures to facilitate construction in a saturated environment. Frost action can destabilize roadways and shallow excavations unless specific design and construction measures are taken to manage dimensional changes due to freezing and thawing of water in the soil. Soil strength, which refers to a soil's inherent ability to withstand loading (e.g., from heavy equipment, buildings, roads, and other structures), is influenced by wetness, mineralogy, soil-particle shape and size distribution, and soil structure; consequently, different soils have different strengths. Soils also vary in their ability to maintain a steep or vertical bank when excavated. Sandy soils often require less steep cutbanks or more shoring to prevent collapse during excavation compared to loamy or clayey soils.

  Such limitations do not necessarily mean the soil cannot be used for a given purpose, but rather that the construction methods and structural designs may require additional elements to overcome the limitations. Costs usually increase in order to address the limiting soil qualities.

Approximately 10% of the site has soils with a moderate erosion potential due to slopes, and less than 1% of the site has soils with severe potential for erosion due to steep slopes. To varying degrees, all soils may require specific measures to control soil erosion and limit runoff of sediment during clearing and construction activities.

Hydric soils may be associated with wetlands that are subject to regulation by federal and/or state regulation (see Section 3.11). The wet conditions associated with hydric soils may also present limitations to development activities such as excavation and the movement of heavy equipment.

Nearly 70% of the soils on NAS Brunswick are considered to have very limited constructability. However, because much of the area within those soils may be highly modified, it is not possible to determine the severity of the limitations based on available information. Some limitations may be easier and less costly to overcome than others.

Table 3.10-3 identifies the characteristics and limitations of soil at NAS Brunswick, the McKeen Street Housing Annex, the East Brunswick Radio Transmitter Site, and the Sabino Hill Rake Station.

Table 3.10-3 Soil Characteristics and Limitations, NAS Brunswick and Outlying Properties, Maine

Management Consideration	Soil Name[1]	Reason for Constructability Limitation[2]	Acres	Percent of NAS Property
Erosion Potential-Moderate	Adams-Lyman complex, 8% to 15% slopes	n/a	297	10
	Belgrade very fine sandy loam, 8% to 15% slopes	n/a		
	Buxton silt loam, 8% to 15% slopes	n/a		
	Hollis fine sandy loam, 8% to 15% slopes	n/a		
	Hollis very rocky fine sandy loam, 8% to 15% slopes	n/a		
	Lyman fine sandy loam, 8% to 15% slopes	n/a		
Erosion Potential-Severe	Suffield silt loam, 8% to 15% slopes	n/a	22	<1
	Tunbridge fine sandy loam, 8% to 15% slopes	n/a		
	Windsor loamy sand, 8% to 15% slopes	n/a		
	Windsor loamy sand, 15% to 25% slopes	n/a		
Hydric Soils	Haplaquents-Naumburg complex, 0% to 3% slopes	n/a	614	20
	Haplaquents-Lamoine complex, 0% to 3% slopes	n/a		
	Naumburg loamy fine sand, 0% to 3% slopes	n/a		
	Gouldsboro silt loam, (2)	n/a		
	Lamoine silt loam, 0% to 3% slopes	n/a		
	Haplaquents-Scantic complex, 0% to 3% slopes	n/a		
	Au Gres loamy sand, (2)	n/a		
	Rumney fine sandy loam, (2)	n/a		
	Saugatuck loamy sand, (2)	n/a		
	Scantic silt loam, (2)	n/a		
	Swanton fine sandy loam, (2)	n/a		
	Tidal marsh, (1)	n/a		
	Walpole fine sandy loam, (2)	n/a		
Constructability very limited	Adams loamy fine sand, 0% to 3% slopes	f	2,144	69
	Adams loamy fine sand, 3% to 8% slopes			
	Adams-Lyman complex, 3% to 8% slopes	f		
	Adams-Lyman complex, 8% to 15% slopes			
	Au Gres loamy sand, 0% to 3% slopes	f, h		
	Belgrade very fine sandy loam, 0% to 8% slopes			
	Belgrade very fine sandy loam, 8% to 15% slopes	f, h		

Table 3.10-3 Soil Characteristics and Limitations, NAS Brunswick and Outlying Properties, Maine (continued)

Management Consideration	Soil Name[1]	Reason for Constructability Limitation[2]	Acres	Percent of NAS Property
Constructability very limited (continued)	Buxton silt loam, 3% to 8% slopes		2,144	69
	Buxton silt loam, 8% to 15% slopes	a		
	Elmwood fine sandy loam, 0% to 8% slopes	b		
	Gouldsboro silt loam, 0% to 2% slopes			
	Haplaquents-Finch complex, 0% to 3% slopes	b		
	Haplaquents-Lamoine complex, 0% to 3% slopes			
	Haplaquents-Scantic complex, 0% to 3% slopes	b, d		
	Hollis fine sandy loam, 3% to 8% slopes	b, d		
	Hollis fine sandy loam, 8% to 15% slopes	b		
	Hollis fine sandy loam, 15% to 25% slopes			
	Hollis very rocky fine sandy loam, 8% to 15% slopes	a, b, c, d		
	Lamoine silt loam, 0% to 3% slopes	a, g		
	Lyman fine sandy loam, 3% to 8% slopes			
	Lyman fine sandy loam, 8% to 15% slopes	a, b, d		
	Rumney fine sandy loam, 0% to 3% slopes			
	Saugatuck loamy sand, 0% to 3% slopes	a, b, d		
	Scantic silt loam, 0% to 3% slopes			
	Suffield silt loam, 8% to 15% slopes	h		
	Suffield silt loam, 15% to 25% slopes			
	Swanton fine sandy loam, 0% to 3% slopes	h		
	Tidal marsh, 0% to 2% slopes			
	Udorthents-Adams complex, 0% to 3% slopes	h, i		
	Udorthents-Adams complex, 15% to 25% slopes			
	Udorthents-Croghan complex, 0% to 3% slopes	h, i		
	Udorthents-Croghan complex, 3% to 8% slopes			
	Walpole fine sandy loam, 0% to 3% slopes	a, b, d		
	Windsor loamy sand, 15% to 25% slopes	h		
	Woodbridge fine sandy loam, 3% to 8% slopes			

Source: USDA 2009a.

Notes:
[1] Soil complexes are composed of multiple soils
[2] Reasons for constructability limitation:
a – depth to saturated zone
b – frost action
c – flooding
d – low strength
e – shrink-swell
f – cutbanks cave
g – depth to thick cemented pan
h – depth to hard bedrock
I - slope
j – ponding

3.10.3.3 Farmland

The purpose of the Farmland Protection Policy Act (FPPA) (7 U.S.C) is to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses. In accordance with the FPPA and its implementing regulations (7 CFR 658 et seq), federal agencies are to consider proposed actions and alternatives to lessen any adverse effects on farmlands and, to the extent practicable, be compatible with state and local programs to protect farmland.

According to the FPPA, protected farmland includes prime farmland and statewide or locally important farmlands:

- **Prime Farmland**. Soils that are particularly well suited for use as farmland are classified by the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) as prime farmland. Some soils that are naturally wet in their undisturbed state may be considered prime farmland if drained.

- **Farmland of Statewide Importance**. Soils important for farming use may be considered farmland of statewide importance. Farmlands of statewide importance are not typically as ideal for farmland use as prime farmland but are productive and are used widely within a given state.

Although the installation has over 1,000 acres of soils designated as farmland of statewide importance, none of the land within NAS Brunswick or in proximity to NAS Brunswick is currently used for farming. The State of Maine and the Town of Brunswick do not currently regulate the use of prime or statewide important farmland (Yamartino 2009).

Soils on the installation include areas of prime farmland and farmland of statewide importance, which are located primarily along the southeastern, northwestern, and northeastern boundaries (see Figure 3.10-1). Prime farmland soils include Elmwood (fine sandy loam) and Woodbridge (fine sandy loam), which covers 1% of the site. Farmland of statewide importance include Udorthents-Croghan complex, Adams-Lyman complex, Adams (loamy fine sand), Tunbridge (fine sandy loam), Belgrade (very fine sandy loam), Buxton (silt loam), Deerfield (loamy sand), Hollis (fine sandy loam), Lyman (fine sandy loam), and Windsor (loamy sand) (USDA 2006, 2009b, 2009c). These soils cover approximately 35% of the site (see Table 3.10-4).

3.11 Water Resources

The following sections provide a summary of the existing conditions and physical characteristics of water resources found on or in the vicinity of NAS Brunswick and the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station. Water resources evaluated in this EIS include surface water, groundwater, floodplains, and wetlands.

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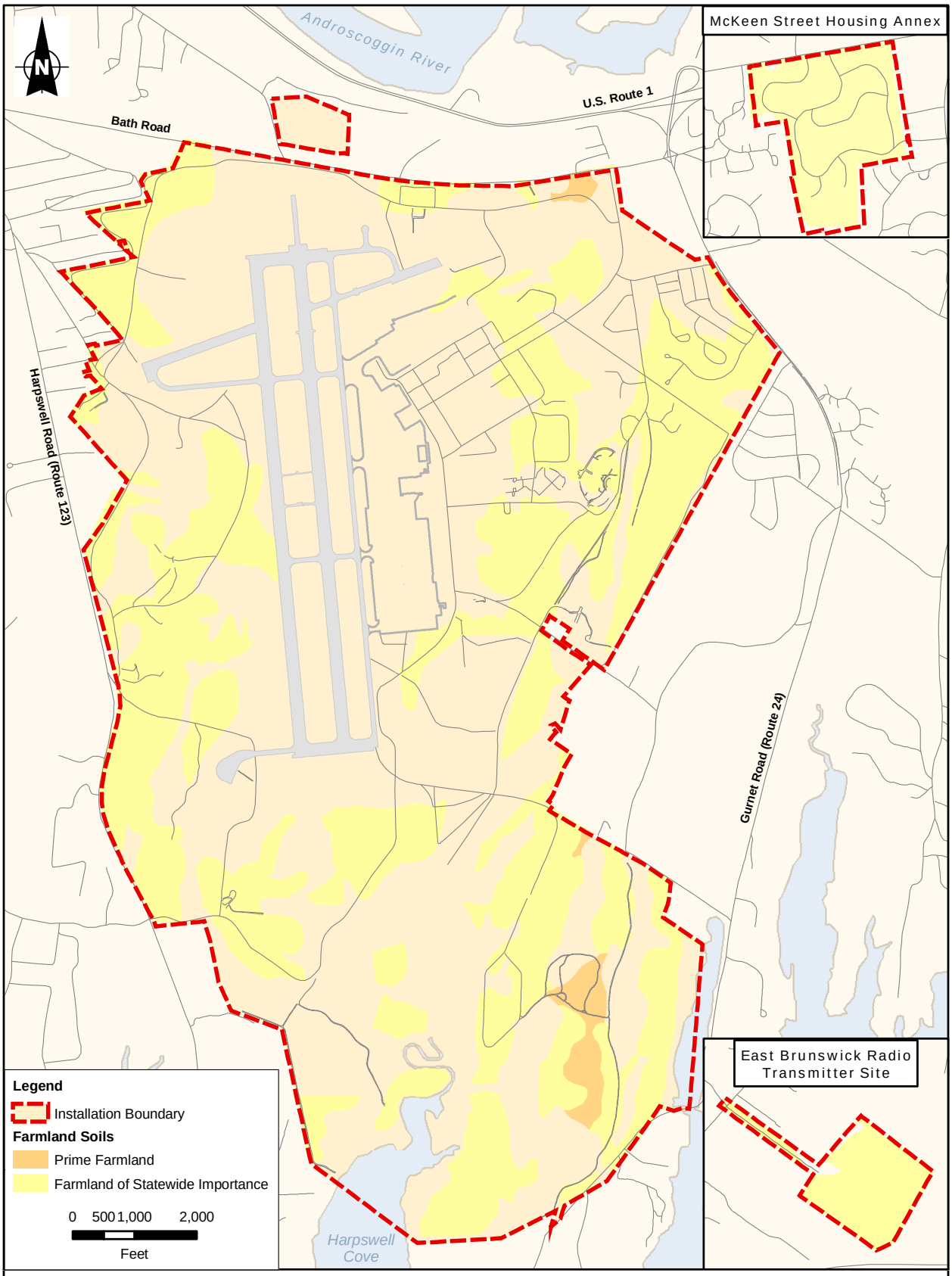

Source: USDA 2009c.

Figure 3.10-1
Prime Farmland Soils and
Soils of Statewide Importance
NAS Brunswick, Maine

Table 3.10-4 Soils Classified as Prime Farmland or Farmland of Statewide Importance

Management Consideration	Soil Name	Acres (percent)
Prime Farmland	Elmwood fine sandy loam, 0% to 8% slopes	34 (1)
	Woodbridge fine sandy loam, 3% to 8% slopes	
Farmland of Statewide Importance	Udorthents-Croghan complex, 0% to 3% slopes	1,068 (35)
	Udorthents-Croghan complex, 3% to 8% slopes	
	Adams-Lyman complex, 8% to 15% slopes	
	Adams-Lyman complex, 8% to 15% slopes	
	Adams loamy fine sand, 0% to 3% slopes	
	Adams loamy fine sand, 8% to 15% slopes	
	Tunbridge fine sandy loam, 3% to 8% slopes	
	Tunbridge fine sandy loam, 8% to 15% slopes	
	Belgrade very fine sandy loam, 0% to 8% slopes	
	Buxton silt loam, 3% to 8% slopes	
	Deerfield loamy sand, 0% to 3% slopes	
	Deerfield loamy sand, 3% to 8% slopes	
	Hollis fine sandy loam, 0% to 3% slopes	
	Lyman fine sandy loam, 3% to 8% slopes	
	Windsor loamy sand, 3% to 8% slopes	

Source: USDA 2009c.

3.11.1 Surface Water

Surface waters include water bodies (lakes, wetlands, ponds, etc.), water courses (rivers and streams), infiltration trenches, and temporary ponds. NAS Brunswick is located within four watersheds: the Mere Brook/Harpswell Cove watershed, Buttermilk Cove watershed, Middle Bay watershed, and the Androscoggin River watershed (see Figure 3.8-2). The installation is located within 0.5 mile of the Androscoggin River and Casco Bay. The East Brunswick Radio Transmitter Site is located within the Androscoggin River watershed and within 0.5 mile of the Androscoggin River. The entire northeast and the majority of the southeast sides of the installation are bounded by ponded water bodies created off-site by sand and gravel mining operations. The McKeen Street Housing Annex is located in the Mere Brook/Harpswell Cove watershed. Sabino Hill Rake Station is located within 0.5 mile of the Atlantic Ocean and drainage from this site enters directly into the Atlantic Ocean.

No surface waters are located at the East Brunswick Radio Transmitter Site or the Sabino Hill Rake Station; therefore, these sites are not discussed further in this section. The McKeen Street Housing Annex is located within the Mere Brook watershed and is discussed under the Mere Brook/Harpswell Cove Watershed heading.

3.11.1.1 Mere Brook/Harpswell Cove Watershed

Approximately 71% NAS Brunswick is within the Mere Brook/Harpswell Cove watershed (Navy BRAC PMO 2006). Mere Brook (also known as Mare Brook) is

a freshwater perennial stream with a sandy and gravel substrate. Mere Brook originates in the town of Brunswick near the McKeen Street Housing Annex and enters NAS Brunswick on the northwestern boundary. It then flows in its natural stream bed for approximately 0.5 mile and is joined by a number of small ephemeral and intermittent tributaries. These tributaries are generally small, have gravel and sandy substrates, and contain flow only during spring runoff and high precipitation events. Mere Brook is then routed through culverts under the airfield for approximately 0.6 mile (see Figure 3.8-2). After exiting the airfield culverts, Mere Brook is joined by a number of small, intermittent streams, including an unnamed tributary from Picnic Pond, to form the relatively narrow and deeply cut Merriconeag Stream. Before discharging into Harpswell Cove, Merriconeag Stream flows through a large expanse of tidal marsh.

On the eastern portion of the watershed, several small tributaries drain into Picnic Pond, which then drains into Mere Brook. Picnic Pond primarily receives waters from two unnamed tributaries. The eastern tributary of Picnic Pond originates in the NAS Brunswick northeastern housing area and flows naturally until discharging into Picnic Pond. The western tributary originates at an outfall east of the airfield, behind Building 201. A series of three ponds, including Picnic Pond, are positioned in this waterbody to treat storm water before it flows off the installation. Section 3.8.3 (Storm Water) provides additional information regarding the storm water retention ponds.

Harpswell Cove is located in the southern portion of NAS Brunswick and encompasses approximately 32.8 acres of NAS Brunswick property. Harpswell Cove is an estuary and a part of Casco Bay. Surrounded by expansive salt marsh and some mudflat habitats, Harpswell Cove receives drainage from a number of unnamed tributaries that originate in the golf course, weapons compound, and the large expanse of undeveloped land encompassing the southern portion of the installation.

The McKeen Street Housing Annex is located approximately 2 miles west of the main property. The annex lies within the uppermost part of the Mere Brook/ Harpswell Cove watershed. A small, ephemeral headwater stream is located in the southeastern portion of the site. This stream flows to the east and enters the main stem of Mere Brook beyond the property line.

3.11.1.2 Buttermilk Cove Watershed

Approximately 8% of the land area of NAS Brunswick is located within the Buttermilk Cove watershed. Buttermilk Cove, which is an estuary located along the southeastern boundary of NAS Brunswick, drains into Casco Bay. Buttermilk Cove collects drainage from the northeast portion of NAS Brunswick, including the housing units referred to as Brunswick Gardens. One unmapped, perennial freshwater stream originating on NAS Brunswick flows into Buttermilk Cove. Unlike Harpswell Cove, Buttermilk Cove has a narrow strip of salt marsh adjacent to the open water of the estuary.

3.11.1.3 Androscoggin River Watershed

Approximately 17% of NAS Brunswick is located in the Androscoggin River watershed. The Androscoggin River flows from west to east along the northern boundary of the town of Brunswick and forms the boundary between the counties of Cumberland and Sagadahoc. At its closest approach, the Androscoggin River is approximately 3,000 feet from the northern boundary of the base. Flows from several small tributaries originating on the base converge to form a single tributary that conveys surface water to the Androscoggin River. These tributaries flow through storm water detention ponds prior to exiting the installation. These ponds collect runoff from the north end of the airfield and the Jet Fuel Storage Installation (JFSI). Section 3.8 (Infrastructure) and Figure 3.8-2 provide additional information regarding these ponds.

3.11.1.4 Middle Bay Cove Watershed

Approximately 4% of NAS Brunswick is located within the Middle Bay Cove watershed. This area includes primarily undeveloped forested communities located on the southwestern side of the installation. Several small, unnamed tributaries of Middle Bay Cove are located on NAS Brunswick within this watershed.

The MEDEP maintains a water quality classification system for bodies of water in the state, including fresh surface waters and estuarine and marine waters. The classification standards establish designated uses and identify criteria necessary to protect these uses. Fresh surface waters are classified into four categories: Class AA, Class A, Class B, and Class C. Class AA is the highest classification. Class C is the lowest water quality classification, but this does not necessarily indicate low water quality. All classes meet the minimum fishable and swimmable standards established in the Clean Water Act (CWA) (MEDEP 2009b).

Mere Brook is a Class B water upstream of the airfield and a Class C water downstream of the confluence of Mere Brook and an unnamed tributary from Picnic Pond (see Figure 3.8-2) (MEDEP 2008). Class B generally indicates good water quality; discharges of well-treated effluent are allowed in these waters, the habitat is unimpaired, and the water quality is sufficient to support life stages of all indigenous aquatic species (38 MRSA Chapter 3, Section 464). Class C has the fewest restrictions on use and the least stringent water quality criteria. The Androscoggin River is also Class C water in the vicinity of NAS Brunswick.

Mere Brook is designated as being in non-attainment for water quality in Maine's 2008 Integrated Water Quality Monitoring and Assessment Report to the EPA under Section 303(d) of the CWA (2008 303[d] list) (MEDEP 2008). Specifically, Mere Brook is listed as in non-attainment for aquatic life standards due to low dissolved oxygen levels and excess nutrients caused by urban non-point source pollution (MEDEP 2008). The discharge from Picnic Pond, the primary repository for storm water from the airfield and industrial area, may be contributing to the lower overall aquatic resource rating of Mere Brook at this location (Navy BRAC PMO 2006; USFWS 1999). In addition, Mere Brook is listed as an "Urban-Impaired" stream under Chapter 502 of Maine's Stormwater Management Law (06-096 Code of Maine Rules [CMR] Chapter 502). A stream is considered urban-impaired if it has reduced water quality because of storm water runoff from

developed land within the watershed. Additional storm water treatment controls are necessary in urban watersheds of impaired streams because proposed storm water sources in urban and urbanizing areas contribute to the further degradation of stream water quality (06-096 Code of Maine Rules [CMR] Chapter 502). Additional discussion on storm water is provided in Section 3.8 (Infrastructure).

An unnamed tributary of the Androscoggin River, located near Jordan Avenue in the town of Brunswick, has also been identified as an "Urban-Impaired" stream (06-096 CMR Chapter 502) and is identified in the 2008 303(d) list as being in non-attainment for the designated use of aquatic life use support based on habitat assessment. The tributary is a Class B water. This stream is located to the west of the northern Clear Zone. It flows to the northeast and then turns to the east, around the northern edge of the property boundary, before entering the Androscoggin River. The northern Clear Zone and a portion of the north end of the airfield are located within the watershed of this urban-impaired stream.

The MEDEP classifies estuarine and marine waters into three categories: SA, SB, and SC. SA waters are typically exceptional natural resources with ecological, social, scenic, economic, or recreational importance (38 MRSA Chapter 3, Section 465-B). Harpswell Cove, Buttermilk Cove, and Middle Bay Cove are classified as SA waters. Class SA waters are suitable for recreation, fishing, aquaculture, propagation, harvesting of shellfish, and navigation and as habitat for fish and other estuarine and marine life.

3.11.2 Groundwater

Groundwater is used as the municipal water supply for the town of Brunswick and also supplies those areas not connected to the public water system. Groundwater in the Brunswick area occurs in underlying bedrock. The depth to groundwater at NAS Brunswick ranges from just below the surface to 20 to 30 feet below the surface. The most productive aquifers in the area are unconsolidated sand and gravel aquifers (USGS 2009a).

Drinking water at NAS Brunswick and the McKeen Street Housing Annex is provided primarily by an off-base municipal water supply system. One domestic water well located on the southern end of the station provides drinking water for the golf course. This well is located outside of the area of groundwater contamination (Navy BRAC PMO 2006). Section 3.5 provides additional discussion of groundwater contamination.

A significant sand and gravel aquifer is located beneath the northwestern portion of the station, including the airfield. An aquifer is considered significant if it is capable of yielding 10 gallons per minute of groundwater to properly installed wells (Maine Geological Survey 2009). The Town of Brunswick has designated two Aquifer Protection Zones for the land overlying this aquifer. Zone 1 is designated as an area in which leachable materials can travel to the public water supply wells within 200 days. Zone 2 is designated as an area in which leachable materials can travel to the public water supply wells in more than 200 days. Both zones have restrictions regarding the types of development that can occur. All uses are prohibited in Zone 1 except for conservation, recreation, pedestrian trails, opera-

tion of public water supplies, timber harvesting, natural gas storage, and transmission facilities. More uses are allowed in Zone 2; however, some activities are prohibited, including the disposal of solid waste, hazardous waste, and other materials; the storage of road salts, petroleum products, or sludge; the use of pesticides; and certain industrial activities. The zones are identified on Figure 3.11-1.

The McKeen Street Housing Annex and East Brunswick Radio Transmitter site are not located within an Aquifer Protection Zone.

The town of Brunswick, which includes NAS Brunswick and these two outlying properties, is located above the Sand and Gravel (Glaciated Regions) National Aquifer (USGS 2009a). National aquifers, or principal aquifers of the United States, are defined as regionally extensive aquifers or aquifer systems that have the potential to be used as a source of potable water (USGS 2009b). The USGS monitors groundwater levels within national aquifers and has a monitoring well located in Brunswick, Maine (USGS 2009c). From April 1958 to March 2009, water levels have been recorded on a quarterly basis and have ranged from 25.46 feet below ground surface to 36.32 feet below ground surface. The most recent recording, in March 2009, was 26.40 feet below ground surface.

The Sabino Hill Rake Station in the town of Phippsburg is not located above a national aquifer (USDA 1970).

3.11.3 Floodplains

Areas within the 100-year floodplain have been mapped by the Federal Emergency Management Agency (FEMA). Most of NAS Brunswick is located outside the 100-year floodplain (see Figure 3.11-2). FEMA flood maps indicate that three areas on NAS Brunswick would be inundated by a 100-year flood event (FEMA 2002). These areas are associated with Mere Brook, Harpswell Cove, and Buttermilk Cove. The McKeen Street Housing Area, East Brunswick Radio Transmitter Site, and the Sabino Hill Rake Station are not located within 100-year floodplains.

3.11.4 Wetlands

3.11.4.1 2008 Reconnaissance Survey

In 2008 the Navy conducted a wetland assessment to map the approximate wetland boundaries at NAS Brunswick and the outlying properties (E & E 2008a). The wetland assessment involved a desktop analysis of existing wetland information and a field reconnaissance. The complete *Ecological Communities and Wetland Resources Report* is presented as Appendix F.

Available resources that were reviewed included: U.S. Geological Survey (USGS) topographic maps, USGS National Land Cover Data (NLCD), USGS National Hydrography Dataset, National Wetland Inventory (NWI) maps, and the most current aerial photographs available (BLRA 2007a). These resources confirmed that open water and large wetland systems are evident throughout the southern, eastern, and western portions of NAS Brunswick. According to NWI maps, approximately 222 acres of wetlands are present at NAS Brunswick. Two NWI-mapped wetlands, comprising approximately 1 acre, were identified within the

southwestern boundary of the McKeen Street Housing Annex. No wetlands or streams were identified on the East Brunswick Radio Transmitter Site or the Sabino Hill Rake Station (E & E 2008a; see Appendix F).

The current wetland assessment also included a review of existing NAS Brunswick studies, plans, and environmental documents and more current published natural resources data to identify the approximate location of wetland areas. Past wetland mapping efforts at NAS Brunswick have been primarily limited to NAS Brunswick and include both wetland assessments and wetland delineations. A wetland delineation is completed according to procedures outlined in the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987) and subsequent guidance. A wetland delineation includes: a similar level of desktop analysis as a wetland assessment combined with a more extensive field effort that includes data collection and the marking of wetland boundaries in the field. Wetland delineations are verified by the USACE and typically are valid for only five years. After five years a new wetland delineation is required.

Wetland assessments and wetland delineations reviewed as part of this current wetland assessment include:

- An installation-wide wetland assessment completed in 1998, which identified approximately 443 acres of wetland at NAS Brunswick (Normandeau 1998b).

- Project-specific wetland delineations completed by the following entities: Stearns and Wheler (1995); Dewberry and Davis, LLC (1999, 2000); U.S. Department of the Navy (1999b); NAS Brunswick (2005); Woodlot Alternatives, Inc. (2005). Based on review of wetland delineation reports and associated mapping, approximately 80 acres of wetlands have been identified at NAS Brunswick. Most of the delineations were conducted more than 5 years ago. Only delineations that have been conducted within the past 5 years are accepted by the MEDEP and USACE for regulatory purposes.

Based on the results of the desktop analysis, specific areas at NAS Brunswick and its outlying properties were identified and targeted for further review in the field.

The 2008 field reconnaissance consisted of walking each of the properties to confirm the approximate locations and extent of wetlands identified during the desktop review. The locations of wetlands and many of the previously mapped boundaries were verified in the field based on a visual assessment of dominant vegetation types, topography, and evidence of hydrologic conditions (e.g., inundation, water-stained leaves, buttressed roots, and drainage patterns). The type of wetland community was also documented in the field. Wetland delineations were not conducted as part of this effort.

According to the 2008 survey, approximately 389 acres of wetlands occur at NAS Brunswick. Of these 389 acres, 109 acres are tidally influenced wetlands (estuarine), most of which are located in Harpswell Cove and Buttermilk Cove. The remaining 280 acres of wetlands are classified as palustrine or freshwater wetlands and are found throughout the property.

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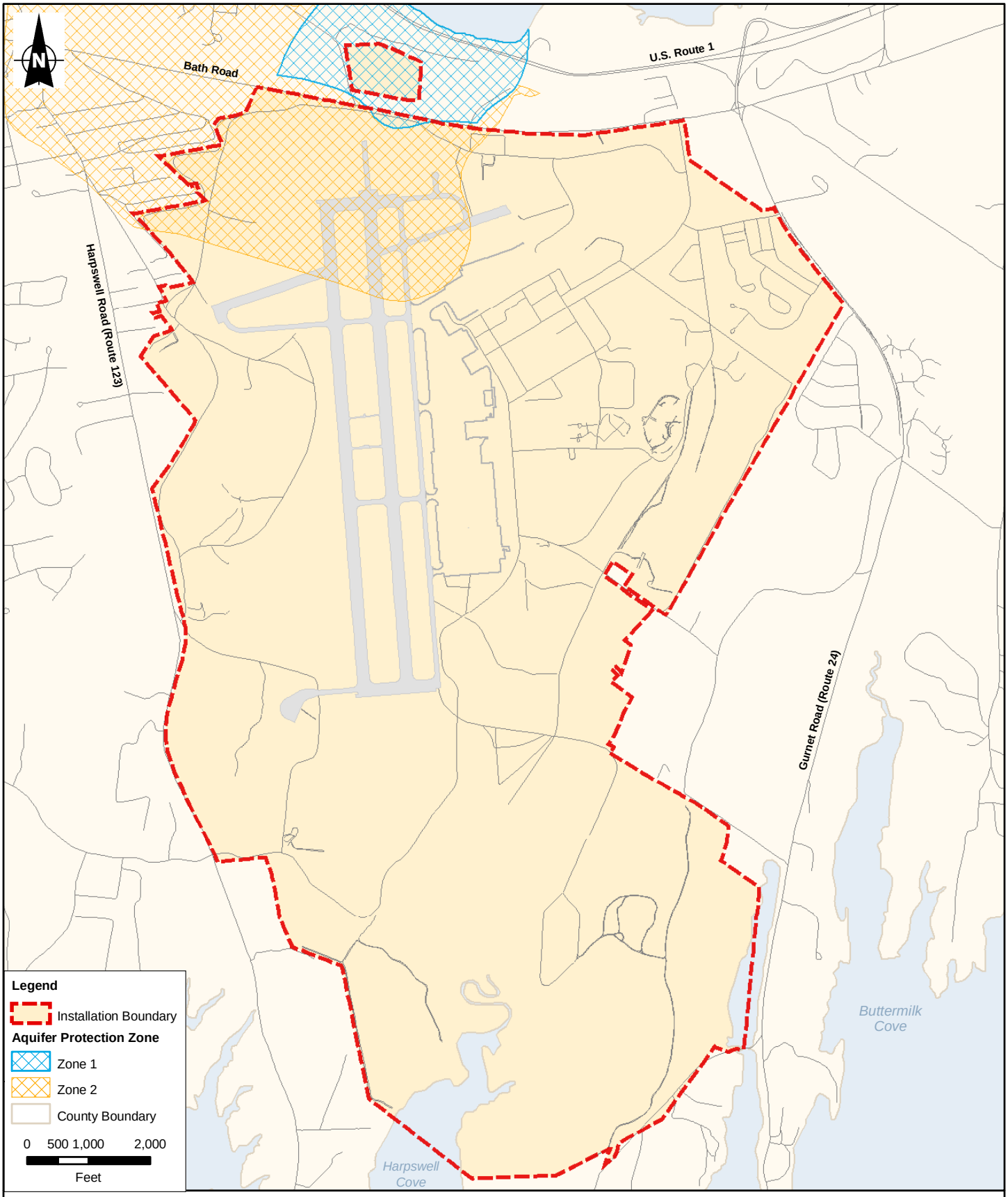

Source: Town of Brunswick 2009a.

Figure 3.11-1
Town of Brunswick Aquifer Protection Zones
NAS Brunswick, Maine

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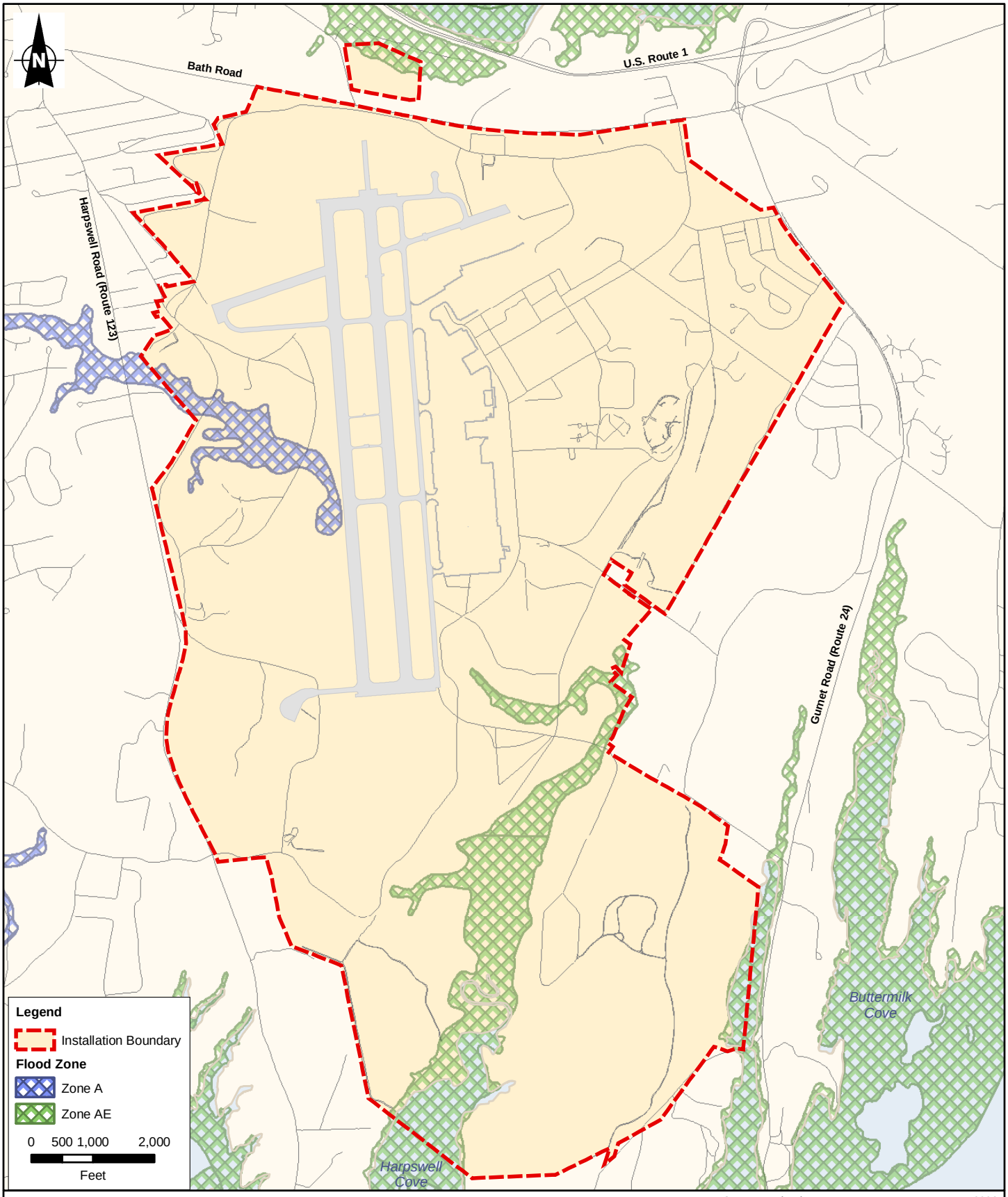

Source: Federal Emergency Management Agency 2002.

Figure 3.11-2
FEMA Flood Zones
NAS Brunswick, Maine

Wetland locations at NAS Brunswick are indicated on Figure 3.11-3. Table 3.11-1 identifies the wetland community types, common wetland species, and acreages.

Table 3.11-1 Wetlands at NAS Brunswick

Wetland Community	Common Species	Approximate Acreage
Freshwater Wetlands		
Red Maple-Sensitive Fern Swamp	Red maple (*Acer rubrum*), balsam fir (*Abies balsamea)*, yellow birch (*Betula allegheniensis*), sensitive fern (*Onoclea sensibilis)*, and tussock sedge (*Carex stricta*)	172
Spruce-Fir-Cinnamon Fern Forest	Dominated by cinnamon fern (*Osmunda cinnamomea)*	29
Mixed Graminoid-Shrub Marsh	Rice cut grass (*Leersia oryzoides*), reed canary grass (*Phalaris arundinacea*), pussy willow (*Salix discolor)*, steeplebush (*Spirea tomentosa)*, and meadowsweet (*Spirea lattifolia*)	79
	Subtotal	**280**
Estuarine Wetland Communities		
Freshwater Tidal Marsh	Cattail (*Typha* spp.), rice cut grass, and pickerelweed (*Pontederia cordata*)	9
Brackish Tidal Marsh	Saltmeadow cordgrass (*Spartina patens*), smooth cordgrass (*Spartina alternifloria)*, soft-stem bulrush (*Scirpus tabernaemontani*), and black grass (*Juncus gerardii*).	60
Spartina Salt Marsh	Dominated by smooth cordgrass, seaside goldenrod (*Solidago sempervirens*), and sea lavender (*Limonium carolinianum*).	23
Subtidal Estuary	Primarily open-water habitat with submerged and floating plants, including eelgrass (*Zostera marina*), rockweeds (*Ascophyllum nodosum*), and wigeon grass (*Ruppia maritima*)	17
	Subtotal	**109**
	Total	**389**

The freshwater wetland communities identified at NAS Brunswick include Red Maple-Sensitive Fern Swamps, Spruce-Fir-Cinnamon Fern Forests, and Mixed Graminoid Shrub Marshes. Red Maple-Sensitive Fern Swamps are a common forested wetland community type at NAS Brunswick. They are found in several areas, including along the edges of the retention ponds in the eastern portion of the installation; adjacent to Mere Brook in the northwestern portion of the installation; in the weapons compound; and in the northern Clear Zone, north of Bath Road. At NAS Brunswick, this community is composed of red maple, balsam fir, yellow birch, and green ash (*Fraxinus pennsylvanica*). Commonly occurring shrubs and herbs in the Red Maple-Sensitive Fern Swamps on NAS Brunswick include winterberry (*Ilex verticillata)*, sensitive fern, wild raisin (*Viburnum nudum)*, tussock sedge (*Carex stricta*), reed canary grass, iris (*Iris versicolor*), raspberry (*Rubus ideas*), and jewelweed (*Impatiens pratense*).

Spruce-Fir-Cinnamon Fern Forests are forested wetlands dominated by black or red spruce (*Picea mariana, Picea rubens)* and balsam fir. This community, which is mainly found in the southeastern portion of NAS Brunswick, has pronounced pit-and-mound topography, and the forest floor is blanketed with sphagnum moss.

Herbaceous vegetation is dominated by cinnamon fern, but a variety of sedges, grasses, and other common wetland herbs also are present.

Mixed Graminoid-Shrub Marshes are a common wetland community in Maine and at NAS Brunswick. The plant community structure ranges from containing only herbs and no shrubs to having a dominant shrub layer (Gawler and Cutko 2004). Mixed Graminoid-Shrub Marshes dominated by herbs are common throughout the installation. Commonly observed species include rice cut grass, reed canary grass, soft rush (*Juncus effusus*), mannagrass (*Glyceria* spp.), sensitive fern, wool grass (*Scirpus cyperinus*), dark green bulrush (*Scirpus atrovirens*), jewelweed, tear-thumb (*Polygonum sagitatum*), boneset (*Eupatorium perfoliatum*), and Joe-pye weed (*Eupatorium maculatum*). Mixed Gramanoid Shrub Marshes dominated by shrubs were observed in the weapons compound. Shrub species commonly observed in these wetlands include pussy willow (*Salix discolor*), steeplebush (*Spirea tomentosa*), meadowsweet (*Spirea lattifolia*), and red osier dogwood (*Cornus stolonifera*).

Estuarine wetlands were identified as Freshwater Tidal Marsh, Brackish Tidal Marsh, and Spartina Salt Marsh. Freshwater Tidal Marshes are found in the upper reaches of tidal influence and are typically fed by an incoming freshwater stream or river. At NAS Brunswick, this community type is located at the north end of Harpswell Cove, along Mere Brook, and where other smaller tributaries empty into Harpswell Cove and Buttermilk Cove (see Figure 3.11-3). This wetland community type is dominated by herbaceous vegetation, including cattails, rice cut grass, northern water plantain (*Alisma trivale*), and pickerelweed.

Brackish Tidal Marshes are located in the northern portions of Harpswell Cove and Buttermilk Cove (see Figure 3.11-3). Salinity levels within this community range from 0.5 to 18 parts per thousand (ppt) (Gawler and Cutko 2004). The vegetation consists of a mixture of saltmeadow cordgrass, smooth cordgrass, and a variety of rushes and sedges.

A Spartina Salt Marsh is located in the southern portion of NAS Brunswick, in Harpswell Cove. Spartina Salt Marshes are able to tolerate high levels of salinity and provide valuable habitat similar to brackish tidal marshes. These communities are considered rare in the state of Maine, and the Maine Natural Areas Program has identified the community on NAS Brunswick as an exemplary example of this community type (Gannon 2009).

A Subtidal Estuary is located in the southern portion of NAS Brunswick and is part of Harpswell Cove. Subtidal Estuaries are permanently flooded and lack large stable surfaces for plant and animal attachment (Cowardin et al. 1979). This community primarily supports floating and submerged vegetation such as rockweed and eelgrass.

Though formal delineations have not been conducted, no wetlands were identified at the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, or Sabino Hill Rake Station.

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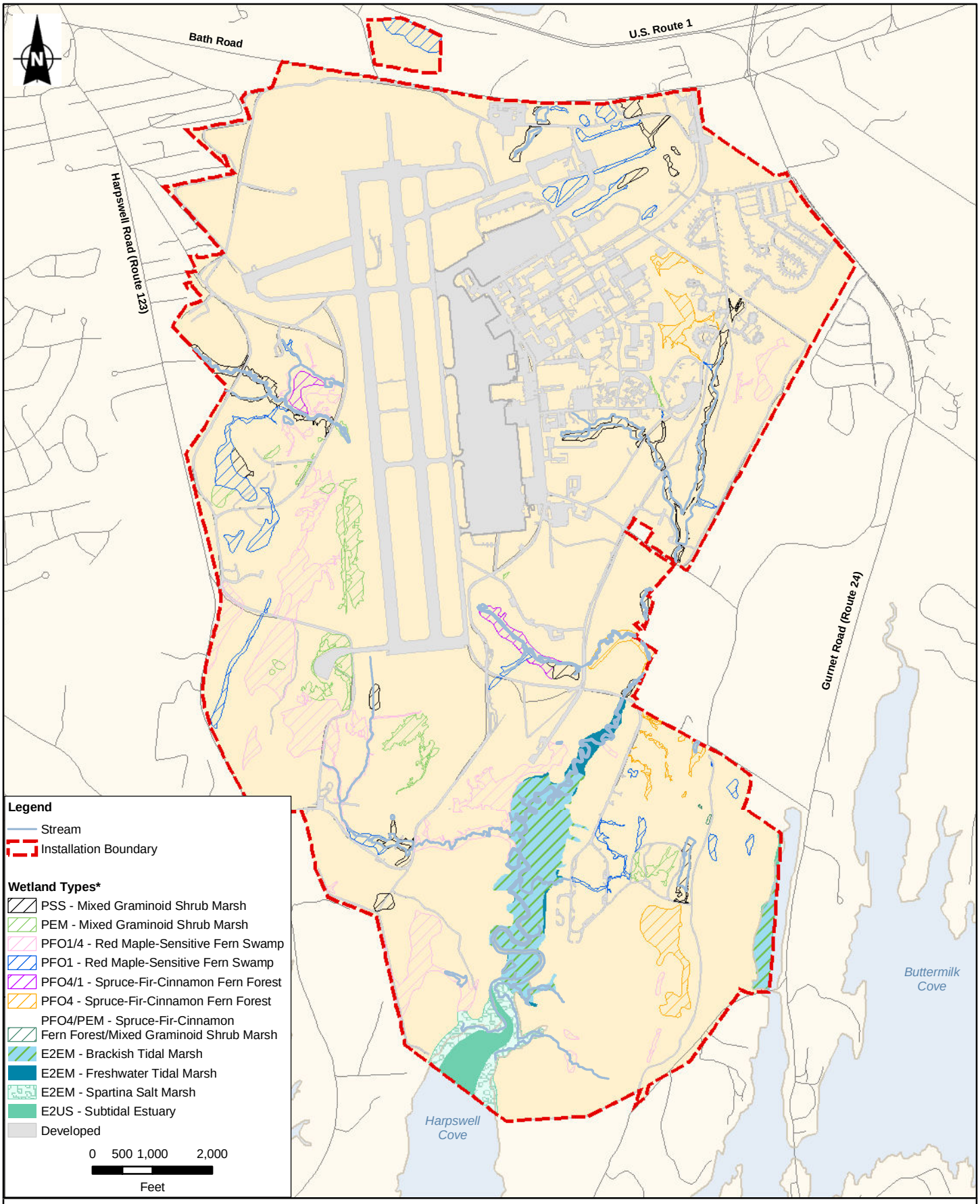

Wetland Classification based on Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979), Brandt 2010.

Figure 3.11-3
2008 Wetland Reconnaissance Survey Results
NAS Brunswick, Maine

3.11.4.2 Functional Wetland Assessment

In the spring of 2009, the Navy conducted a functional assessment of wetlands at NAS Brunswick[2]. The U.S. Army Corps of Engineers (USACE), New England District, recommends the use of the Highway Methodology as a descriptive approach to evaluating wetland functions and values for the Clean Water Act Section 404 Permit Program (USACE 1993). This approach incorporates a qualitative description of the wetland and the identification of wetland functions and values in order to come to conclusions based on wetland science and "best professional judgment." Wetland functions are the dynamic ecological properties provided or performed by a wetland. The benefits that society derives from one or more of the wetland functions are the wetland values.

Using the methodology outlined in the *Highway Methodology Workbook Supplement* (USACE 1999) and the "Modified Functions and Values Assessment for Significant Nexus" datasheet (USACE 2007), a functional assessment of previously identified wetlands was completed at NAS Brunswick in May 2009. A list of functions and values is provided in Table 3.11-2. These wetlands were grouped into clusters based on their geographic proximity and hydrologic connections (see Appendix G: Wetland Functional Assessment). A walkover of each cluster was conducted to assess the function and values of each wetland community type.

Table 3.11-2 Wetland Functions and Values Identified in the Highway Methodology Workbook Supplement

Functions	Values
Groundwater Recharge/Discharge	Recreation
Floodflow Alteration	Education/Scientific Value
Fish and Shellfish Habitat	Uniqueness/Heritage
Sediment/Toxicant/Pathogen Retention	Visual Quality/Aesthetics
Nutrient Removal/Retention/Transformation	Endangered Species Habitat
Production Export	
Sediment/Shoreline Stabilization	
Wildlife Habitat	

Source USACE 1999.

Currently, NAS Brunswick has limited-access; therefore, the wetlands do not provide recreational or educational value to the general public. No known federally endangered or threatened species are known to utilize the wetlands on the installation. However, many of the wetland areas provide valuable wildlife habitat, including significant vernal pools that serve as primary breeding habitat for amphibians (TRC 2008; E & E 2009b). The vernal pool study conducted in support of the EIS is presented as Appendix H. Vernal pools are also discussed further in Section 3.12.

[2] Based on the 2008 wetland reconnaissance survey, no wetlands are located at the outlying properties. Therefore, functional assessments were not conducted at these properties.

At many locations the visual/aesthetic appeal of the landscape has been changed by site development. In addition, many wetlands have been altered to provide storm water detention and drainage. Despite these alterations, the primary wetland functions identified for wetlands at NAS Brunswick include groundwater recharge, floodflow alteration, sediment/toxicant/pathogen retention, nutrient removal/retention/transformation, production export, wildlife habitat, and sediment/shoreline stabilization. A more detailed discussion of the functions and values of wetlands at NAS Brunswick is provided in Appendix G: Wetland Functional Assessment.

3.11.4.3 Federally Regulated Wetlands

Section 404 of the CWA authorizes the USACE to issue permits regulating the discharge of dredged or fill materials into the waters of the U.S., including wetlands. Wetlands with a hydrological connection to waters of the U.S. are regulated under the CWA. Wetlands that do not have a hydrological connection to waters of the U.S. may not be subject to federal jurisdiction and are referred to as isolated. Many of the wetlands found at NAS Brunswick are likely to be under federal jurisdiction. The USACE has not recently issued any jurisdictional determinations on NAS Brunswick or the outlying properties.

3.11.4.4 State-Regulated Wetlands

The state of Maine also regulates wetlands under Chapter 310 of the Maine Natural Resource Protection Act (NRPA). All wetlands are regulated under NRPA; however, some wetlands are afforded more protection than others. "Wetlands of Special Significance" as defined by the state of Maine, are all coastal wetlands, great ponds, and some freshwater wetlands. Freshwater wetlands considered significant include wetlands that: are deemed critically imperiled habitat, are designated as significant wildlife habitat by the Maine Department of Inland Fisheries and Wildlife, are located within 250 feet of a coastal wetland or great pond, have at least 20,000 feet of emergent vegetation or open water, are peatland, are subject to flooding, or are within 25 feet of a waterway. All of the wetlands occurring at NAS Brunswick are under the jurisdiction of the state of Maine. The coastal wetlands are wetlands of special significance, and many are considered significant wildlife habitat (see Section 3.12). Some of the freshwater wetlands are also likely to be considered wetlands of special significance.

3.12 Biological Resources

This section summarizes the existing vegetation and wildlife conditions at NAS Brunswick, and the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station.

3.12.1 Vegetation

NAS Brunswick and its outlying properties are located in the Laurentian Mixed Forest Province of the Humid Temperate Domain Ecoregion of the United States (Bailey 1995). The Laurentian Mixed Forest Province is a transitional zone between boreal forests and broadleaf deciduous forest zones and is characterized by low relief and rolling hills. Elevations range from sea level to 2,400 feet. Vegetation within this province consists primarily of mixed stands of coniferous species

(mainly white pine [*Pinus strobus*] and balsam fir) and deciduous species (mainly birch [*Betula* spp.], maple [*Acer* spp.], and American beech [*Fagus grandifolia*]).

For the purposes of this EIS, vegetation communities on NAS Brunswick and its outlying properties have been classified in accordance with the *Natural Landscapes of Maine* (Gawler and Cutko 2004). The communities were identified based on a review of existing data and current aerial photography and a reconnaissance-level field survey. A detailed description of ecological communities at NAS Brunswick is presented in Appendix F: *Ecological Communities and Wetland Resources Report*. The results of that report are discussed below.

NAS Brunswick

Vegetation communities on NAS Brunswick include upland forests, open land (e.g., grasslands and shrublands), and wetlands. These communities cover approximately 2,316 acres, or 74%, of the installation. The remainder of the installation, 794 acres, is developed land. Cover types on NAS Brunswick are shown on Figure 3.12-1. Table 3.12-1 identifies community types, common vegetation species, and acreages.

Table 3.12-1 Summary of Ecological Community Types at NAS Brunswick and Outlying Properties

Community Type	Common Species	Approximate Acreage
NAS Brunswick		
Upland Forest		
Red Oak-Northern Hardwoods-White Pine Forest	White pine, eastern hemlock, American beech, yellow birch, paper birch, red spruce, white spruce (*Picea glauca*), balsam fir, and red oak	402
Aspen-Birch Woodland	Quacking aspen (*Populus tremuloides*), bigtooth aspen (*P. grandidentata*), gray birch (*Betula populifolia*), pin cherry (*Prunus pennsylvanica*), and black cherry (*P. serotina*)	175
Maritime Spruce-Fir Forest	White pine and either red spruce, eastern hemlock, or balsam fir	387
Oak-Pine Woodland	White pine and red oak (*Quercus rubra*)	49
Pitch Pine Heath Barren	Dominated by pitch pine	59
Hemlock Slope Forest	Dominated by eastern hemlock	9
Pine Plantation	Red pine (*Pinus resinosa*) or white pine	211
	Subtotal	**1,292**
Open Land		
Little Bluestem-Blueberry Sandplain Grassland	Little bluestem (*Schizachyrium scoparium*), poverty oat grass (*Danthonia spicata*), sheep fescue (*Festuca ovina*), low bush blueberry, wood lily (*Lilium philadelphicum*), three-toothed cinquefoil (*Sibbaldiopsis tridentata*), goldenrods (*Solidago* spp.) and brambles (*Rubus* spp.)	211
Successional Shrubland	Dominated by sweet fern, blueberries, brambles (*Rubus* spp.), wild raison and sapling-size gray birch (*B. populifolia*)	53

Table 3.12-1 Summary of Ecological Community Types at NAS Brunswick and Outlying Properties (continued)

Community Type	Common Species	Approximate Acreage
Maintained Land	Areas in which the vegetation is maintained on a regular basis such as lawns and the short grass areas adjacent to the runways. These areas are dominated by cool season grasses, dandelions (*Taraxacum officinale*), hawkweed (*Hieracium* sp.), and English plantain (*Plantago lanceolata*)	355
	Subtotal	**619**
Freshwater Wetlands		
Red Maple Sensitive Fern Swamp	Red maple, balsam fir, yellow birch, sensitive fern, and tussock sedge	172
Spruce-Fir-Cinnamon Fern Forest	Dominated by cinnamon fern	29
Mixed Graminoid-Shrub Marsh	Rice cut grass, Reed canary grass, pussy willow, steeplebush, and meadowsweet	79
	Subtotal	**280**
Estuarine Wetland Communities		
Freshwater Tidal Marsh	Cattail, rice cutgrass, and pickerelweed	9
Brackish Tidal Marsh	Saltmeadow cordgrass, smooth cordgrass, soft stem bulrush, and black grass	60
Spartina Salt Marsh	Dominated by smooth cordgrass, seaside goldenrod, and sea lavender	23
Subtidal Estuary	Primarily open-water habitat with submerged and floating plants, including eelgrass, rockweeds, and wigeon grass	17
	Subtotal	**109**
	NAS Brunswick Total	**2,300**
East Brunswick Radio Transmitter Site		
Little Bluestem-Blueberry Sandplain Grassland	Little bluestem (*Schizachyrium scoparium*), low bush blueberry (*Vaccinium angustifolium*), wood lily (*Lilium philadelphicum*), three-toothed cinquefoil (*Sibbaldiopsis tridentata*), goldenrods and brambles	64
McKeen Street Housing Annex		
Red Oak-Northern Hardwoods-White Pine Forest	Species observed include white pine, eastern hemlock, balsam fir, gray birch, paper birch, red oak, American beech, and red oak	7
Sabino Hill Rake Station		
Oak-Pine Woodland	White pine and red oak	0.01
Maintained Land	Mowed lawn	0.022

Upland forests are the dominant vegetation community on the installation, covering approximately 1,292 acres of the total land area. Seven upland forest communities occur at NAS Brunswick. These include: Red Oak-Northern Hardwoods-White Pine Forest, Aspen-Birch Woodland/Forest, Maritime Spruce-Fir Forest, Oak-Pine Woodland, Pitch Pine-Heath Barren, Hemlock Slope Forest, and Pine Plantation. The most common forest communities at NAS Brunswick are the Red-Oak-Northern Hardwoods-White Pine Forest and the Maritime Spruce-Fir Forest. Large tracts of Red Oak-Northern Hardwoods-White Pine Forests occur in the southern and eastern portions of the installation. The dominant tree

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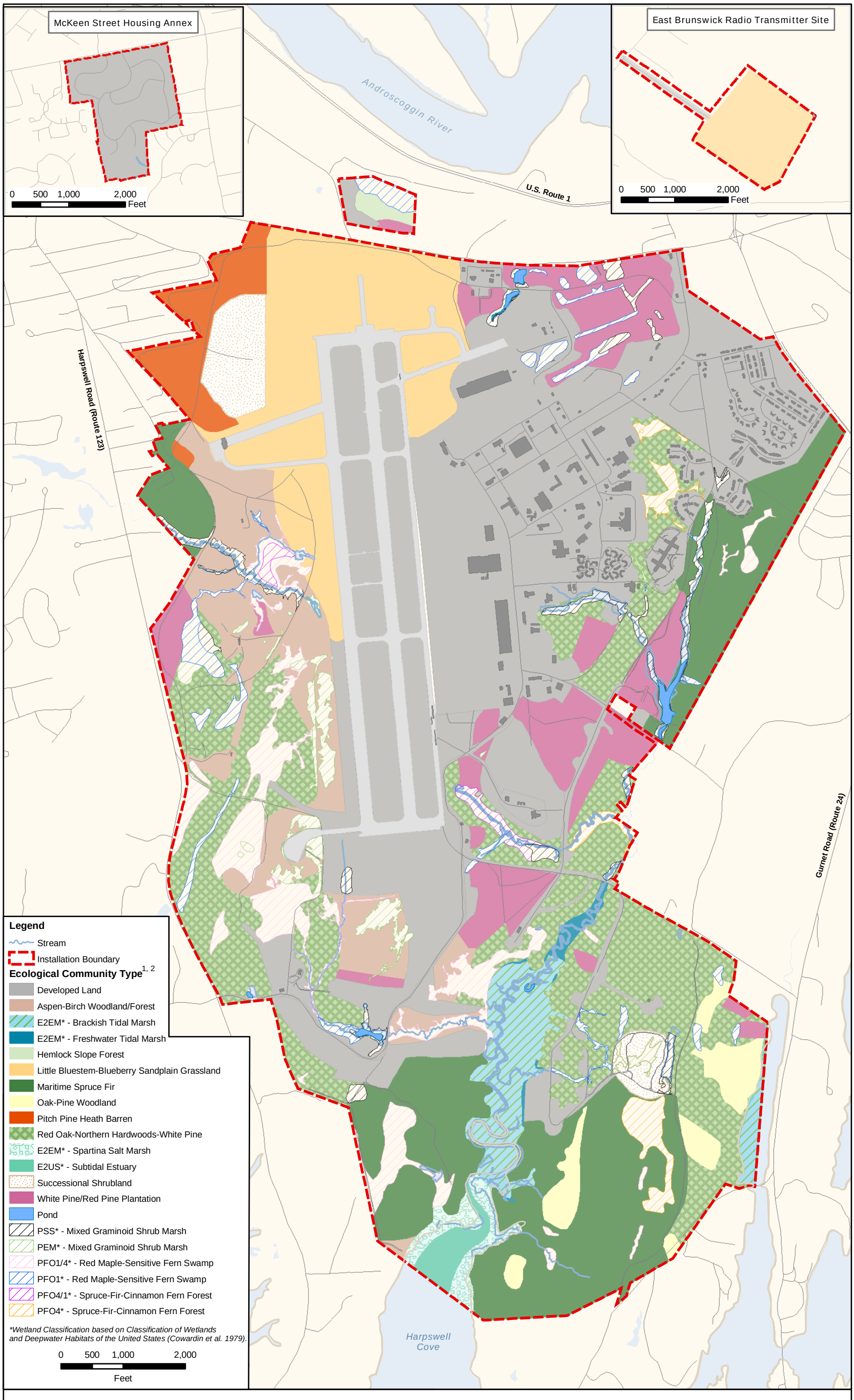

Notes: (1) Ecological Communities based on the Natural Landscapes of Maine (Gawler and Cutko 2004).

(2) The ecological communities depicted in this figure may differ slightly from those mapped by MNAP or MDIFW; however, these ecological communities were mapped for planning purposes for this environmental evaluation using a variety of resources and described in detail in Section 3.12.1 and Appendix F - Ecological Communities and Wetland Resources Report.

Figure 3.12-1
Ecological Community Map
NAS Brunswick, Maine

species of this forest type include red oak (*Quercus rubra*), American beech, sugar maple (*Acer saccharum*), paper birch (*Betula papyrifera*), and white pine. Maritime Spruce-Fir Forests are also dispersed throughout the installation but are mainly located on the southern and eastern portions of the installation. These forests contain large mature trees with a dense, high canopy and sparse understory. Dominant tree species include white pine and either red spruce, eastern hemlock (*Tsuga canadensis*), or balsam fir.

Pine-plantations are scattered throughout the installation and include both red and white pine. These areas were planted in the 1960s in support of base beautification efforts (Prosser Hallock 2002a). Little forest management has been conducted in any of these stands. Most stands are severely overcrowded and have no understory growth (Geo-Marine 2001). Consequently, in its present state, this community offers minimal wildlife habitat value beyond refuge from heavy precipitation and high winds.

A Pitch Pine-Heath Barren has been identified by NAS Brunswick on the northwestern corner of the installation (see Figure 3.12-1). This community is dominated by pitch pine (*Pinus rigida*) and has a sparse understory comprised of shade-tolerant grasses and low bush blueberries (*Vaccinium angustifolium*). Pitch Pine-Heath Barrens are considered critically imperiled ecosystems in the state of Maine and are globally ranked as rare (Gawler and Cutko 2004). The MNAP has not verified the occurrence of this community at NAS Brunswick.

Three types of open-land communities occur at NAS Brunswick: successional shrubland, Little Bluestem-Blueberry Sandplain Grassland, and maintained land (see Figure 3.12-1). Successional shrubland is located in the western portion of NAS Brunswick, adjacent to the airfield (see Figure 3.12-1) and the antenna fields. Successional shrublands are communities that follow disturbances such as forest clearing or colonization of shrubs in open fields following abandonment. The successional shrubland is likely a result of past clearing and disturbance created by the construction and maintenance of the antennae fields. These areas are dominated by sweet fern, blueberries, brambles, wild raison, and sapling-size gray birch.

Little Bluestem-Blueberry Sandplain Grassland (Sandplain Grassland) communities are located to the west and north of the runways, within the airfield Clear Zone. NAS Brunswick's maintenance of the runway protection zone maintains the Sandplain Grassland. The Little Bluestem-Blueberry Sandplain Grassland on NAS Brunswick is typical of this community type in appearance and composition. Sandplain Grasslands are considered critically imperiled in the state of Maine. This community is dominated by grasses such as little bluestem, poverty oat grass (*Danthonia spicata*), sandplain sedge (*Carex lucorum*), and sheep fescue (*Festuca ovina*). Low bush blueberry is also common but does not establish a defined shrub stratum in the community. Without routine maintenance of the Sandplain Grassland community within the runway protection zone (as required in the Bird Aircraft Strike Hazard [BASH] program), the Sandplain Grassland areas would eventually succeed into scrub-shrub vegetation communities. Woody vegetation would encroach on this habitat, which would reduce the habitat for the state-listed

clothed sedge and other grassland plants. Wildlife species of concern that thrive in the Sandplain Grassland habitat may relocate.

Maintained lands occupy approximately 355 acres at NAS Brunswick. These areas are maintained on a routine basis and include residential areas (i.e., lawns), recreational fields, the golf course, and the airfield (not including the Little Bluestem-Blueberry Sandplain Grassland community discussed above). These areas are vegetated with non-native, cool-season grasses and common species such as dandelions, hawkweed, and English plantain. The golf course and residential lawns are mowed frequently. A long-grass maintenance program has been implemented on the airfield in support of the station's BASH program.

Freshwater and estuarine wetlands cover approximately 389 acres at NAS Brunswick. A detailed discussion of the wetland cover types and wetland functions and values is provided in Section 3.11.4.

Outlying Properties

The McKeen Street Housing Annex is surrounded by residential communities and is predominantly developed. The small patch of forest located in the southern portion of the McKeen Street Housing Annex is a Red Oak-Northern Hardwood-White Pine forest. This fragment of forest occupies approximately 7 acres and contains mature white pine, balsam fir, American beech, red oak, and gray birch.

The undeveloped land within the McKeen Street Housing Annex is predominantly maintained land consisting of residential lawns and recreational areas.

The East Brunswick Radio Transmitter Site is surrounded by mixed forest types. Except for the access road, the entire parcel is considered Sandplain Grassland. Sandplain Grasslands are considered critically imperiled in the state of Maine. The Sandplain Grassland community on the East Brunswick Radio Transmitter Site differs from the NAS Brunswick community in appearance, community structure, and dominant species. The community at this site is comprised almost exclusively of blueberries, and a few immature pitch pines have also colonized the site. This difference is likely due to a lack of mowing at the East Brunswick Radio Transmitter Site compared to regular mowing around the airfield at NAS Brunswick.

The Sabino Hill Rake Station is surrounded by white pine-oak woodland and residential property. The majority of the site is developed and contains a tower and a gravel access road. The site is covered with a mix of forest and open land, with open land predominating around the tower. White pine-oak woodlands are a forest type typically found on ridges where bedrock is close to the soil surface and outcrops occur (Gawler and Cutko 2004). The Sabino Hill Rake Station is located on a high coastal ridge and contains a small area of this ecological community type. The tree species composition is co-dominated by white pine and red oak.

3.12.2 Wildlife

Wildlife at NAS Brunswick is described based on a review of existing literature, including but not limited to the installation's INRMP (Geo-Marine 2001), *Status*

of Grasshopper Sparrow and Other Grassland-associated Bird Species at Naval Air Station Brunswick, Maine (Siegel and Kaschube 2005), and collaborative efforts between NAS Brunswick and the MDIFW (MDIFW 2010). In addition, grassland bird surveys were conducted at NAS Brunswick and the East Brunswick Radio Transmitter Site during the summers of 2008 and 2009. The results of these surveys are included in the *Grassland Bird Survey, 2008 Breeding Season* (E & E 2008b) and *Grassland Bird Survey, 2009 Breeding Season* (E & E 2009a), which are included as Appendices I and J, respectively. The results of the literature review and grassland bird survey reports are summarized below. Threatened and endangered species and significant wildlife habitat are discussed in Sections 3.12.3 and 3.12.4, respectively.

The wildlife present at NAS Brunswick and the outlying properties is typical of southeastern Maine. The extensive undeveloped forested areas and wetlands at NAS Brunswick support a variety of terrestrial, aquatic, and semi-aquatic wildlife. The grassland habitat at the East Brunswick Radio Transmitter Site supports a variety of terrestrial wildlife species. Wildlife diversity and abundance is limited at the McKeen Street Housing Annex by the residential development on and surrounding the property. The Sabino Hill Rake Station is a small parcel located within a rural coastal area and is also limited in wildlife diversity.

NAS Brunswick

The white-tailed deer (*Odocoileus virginiana*) is the most abundant large mammal at the installation. Based on a deer survey conducted in 2005, there are approximately 24 deer per square mile at NAS Brunswick (NAS Brunswick 2007e). Higher population densities were observed on the eastern side of the installation (33 deer per square mile) and in the Weapons Compound (36 deer per square mile). Moose (*Alces alces*) are present on the installation but are uncommon. Also present are coyote (*Canis latrans*), bobcat (*Lynx rufus*), red fox (*Vulpes vulpes*), raccoon (*Procyon lotor*), porcupine (*Erethizon dorsatum*), American beaver (*Castor canadensis*), woodchuck (*Marmota monax*), common muskrat (*Ondatra zibethicus*), eastern gray squirrel (*Sciurus carolinensis*), and white-footed mouse (*Peromyscus leucopus*) (Geo-Marine 2001).

With the exception of the species associated with the Sandplain Grassland habitat, most of the birds that may be seen at NAS Brunswick are typical of southern Maine. According to the INRMP, more than 140 bird species, most of which are migratory, have been recorded on the installation (Geo-Marine 2001). Forested habitats exhibit the greatest diversity of species. Some common species found at NAS Brunswick include the black-capped chickadee (*Parus atricapillus*), tufted titmouse (*Parus bicolor*), white-breasted nuthatch (*Sitta carolinensis*), red-eyed vireo (*Vireo olivaceous*), eastern kingbird (*Tyrannus tyrannus* [state species of special concern]), northern cardinal (*Cardinalis cardinalis*), American woodcock (*Scolopax minor*), and wild turkey (*Meleagris gallopavo*). The salt marshes and estuaries are frequented by a variety of wading birds and waterfowl, some of the most common of which include the great blue heron (*Ardea herodias* [state species of special concern]), great egret (*Ardea alba*), snowy egret (*Egretta thula*), osprey (*Pandion haliaetus*), and American black duck (*Anas rubripes*).

During the 2008 grassland bird survey at NAS Brunswick, 453 detections of 46 species were recorded (E & E 2008b). A similar number of detections (330) and species (44) were recorded during the 2009 survey (E & E 2009a). The most abundant species detected during both surveys was the savannah sparrow (*Paserculus sandwichensis*). Other common species recorded were the eastern meadowlark (*Sturnella magna* [state species of special concern]), bobolink (*Dolichonyx oryzivorus*), American crow (*Corvus brachyrhynchos*), and field sparrow (*Spizella pusilla*). Rare grassland bird species observed during the surveys are discussed in Section 3.12.3.

Eighteen species of amphibians and 17 species of reptiles (not including three subspecies) have been documented in Maine (Hunter et al. 1999). Southern Maine tends to have the highest amphibian and reptile diversity, with many species reaching the northern extent of their range. Common amphibian species found on NAS Brunswick include the spotted salamander (*Ambystoma maculatum*), blue-spotted salamander (*Ambystoma laterale*), eastern newt (*Notopthalmus viridescens*), American toad (*Bufo americanus*), and spring peeper (*Pseudacris crucifer*) (Geo-Marine 2001). According to the INRMP, confirmed reptile species include the eastern garter snake (*Thamnophis sirtalis sirtalis*), eastern painted turtle (*Chrysemys picta picta*), and snapping turtle (*Chelydra serpentina*) (Geo-Marine 2001). Additional discussion of amphibian species associated with vernal pools at NAS Brunswick is provided in Section 3.12.4 (Significant Wildlife Habitat).

Aquatic habitats on NAS Brunswick support a variety of fish species. Brook trout (*Salvelinus fontinalis*) have historically been present in Mere Brook; however, this species may no longer be present. A few species that have been identified in Mere Brook include golden shiner (*Notemigonus crysoleucas*), common shiner (*Notropis cornutus*), blacknose dace (*Rhinichthys atratulus*), northern redbelly dace (*Phoxinus eos*), and finescale dace (*Phoxinus neogaeus*) (USFWS 1999). Picnic Pond is known to support populations of three species of fish: golden shiner (*Notemigonus crysoleucas*), emerald shiner (*Notropis atherinoides*), and American eel (*Anguilla rostrata*) (USFWS 1999). No fish species have been documented in the other ponds or any of the intermittent or ephemeral streams located on NAS Brunswick. Recreational fishing is not allowed at NAS Brunswick (Geo-Marine 2001).

Harpswell Cove and Buttermilk Cove contain abundant and diverse fish populations. In addition to resident species, these areas may serve as feeding, spawning, or nursery grounds for anadromous fish species such as Atlantic salmon (*Salmo salar*), striped bass (*Morone saxatilis*), and American shad (*Alosa* spp.). The muddy flats associated with these coves also provide nursing grounds for shellfish such as horseshoe crabs (*Limulus polyphemus*).

Outlying Properties

Mammals occurring at the McKeen Street Housing Annex are limited to those species adapted to urban/suburban conditions, such as the eastern gray squirrel, raccoon, Virginia opossum (*Didelphis virginiana*), and striped skunk (*Mephitis mephitis*). Such species are also likely transient visitors to the Sabino Hill Rake

Station. Small mammals such as the white-footed mouse, meadow vole (*Microtus pennsylvanicus*), deer mouse (*Peromyscus maniculatus*), snowshoe hare (*Lepus americanus*), and woodchuck are likely present at the East Brunswick Radio Transmitter Site, and coyote, white-tailed deer, red fox, raccoon, and Virginia opossum are likely transient visitors.

Bird species typically found in urban/suburban communities in Maine likely occur at the McKeen Street Housing Annex. These species include American Robin (*Turdus migratorius*), black-capped chickadee, house sparrow (*Passer domesticus)*, blue jay (*Cyanocitta cristata)*, and northern cardinal (*Cardinalis cardinalis).*

The Sabino Hill Rake Station may provide habitat for birds typical of forested communities in coastal Maine. Birds such as the downy woodpecker (*Picoides pubescens*), black-capped chickadee, white-breasted nuthatch, blue jay, and northern cardinal are permanent residents, while species such as the broad-winged hawk (*Buteo platypterus*), black-and-white warbler (*Mniotilta varia* [state species of special concern]), and black-throated green warbler (*Dendroica virens*) are transient.

The open land at the East Brunswick Radio Transmitter Site supports a variety of birds, from small songbirds (e.g., American goldfinch [*Carduelis tristis*]) to wild turkey. The species with the highest recorded numbers during the 2008 and 2009 surveys were cedar waxwing (*Bombycilla cedrorum*), prairie warbler (*Dendroica discolor* [state species of special concern]), American goldfinch, eastern towhee (*Pipilo erythrophthalmus* [state species of special concern]), and field sparrow (*Spizella pusilla*) (E & E 2008b, 2009a).

The outlying properties likely support transient populations of amphibians and reptiles found in dry upland communities, such as the eastern garter snake, snapping turtle, and American toad.

There are no surface water features at any of the outlying facilities. Therefore, no fish species occur on these properties.

3.12.2.1 Important Bird Areas

The National Audubon Society has designated two areas within NAS Brunswick as part of the Brunswick/Freeport Important Bird Area (IBA) (Audubon 2009). The salt marsh habitat at the mouth of Harpswell Cove is considered an unusually large and unfragmented block that supports a number of wading birds, such as herons and egrets, as well as two state species of special concern sharp-tailed sparrows—Nelson's sharp-tailed sparrow (*Ammodramus nelsoni*) and the saltmarsh sharp-tailed sparrow (*Ammodramus caudacutus*).

The grassland habitat surrounding the airfield at NAS Brunswick is also considered part of the IBA. This habitat is known to support nesting populations of several state-listed threatened and endangered species, including the state-threatened upland sandpiper (*Bartramia longicauda*) and the state-endangered grasshopper sparrow (*Ammodramus savannarum*), as well as other rare grassland birds, including the horned lark (*Eremophila alpestris* [state species of special concern]),

bobolink (*Dolichonyx oryzivorus*), eastern meadowlark (state species of special concern), eastern towhee (state species of special concern), field sparrow, and vesper sparrow (*Pooecetes gramineus*) (see Section 3.12.3 for a discussion of threatened and endangered species). This site also has the highest concentration of savannah sparrows (*Passerculus sandwichensis*) recorded in the state (Audubon 2009).

3.12.2.2 Bird-Aircraft Strike Hazard

The presence of resident and migratory birds creates a bird-aircraft strike hazard (BASH) at NAS Brunswick. The airfield's proximity to a major river, an expansive estuary, and the grasslands surrounding the airfield enhances the BASH risk. NAS Brunswick Instruction 3750.10A, BASH Plan, provides guidance for reducing the potential for collisions between aircraft and birds or other animals (U.S. Navy 2005). Responsibilities of the BASH program outlined in the instruction include: identification of bird/wildlife hazards, habitat analysis and management, passive and active control methods, strike reporting requirements, and training. Common bird species that present a BASH risk at NAS Brunswick include gulls, crows (*Corvus spp*.), and European starlings (*Sturnus vulgaris)* (U.S. Navy 2005).

3.12.2.3 Essential Fish Habitat

Essential fish habitat (EFH) is defined under the Magnuson-Stevens Fishery Conservation and Management Act (PL 94-265), as amended by the Sustainable Fisheries Act of 1996 (PL 104-267), as "those waters and substrate necessary to fish for spawning, breeding, and feeding or growth to maturity." The Sustainable Fisheries Act A requires that EFH be identified for those species actively managed under federal fishery management plans. This includes species managed by the federally established regional fishery management councils and those managed by the National Marine Fisheries Service (NMFS) under federal fishery management plans developed by the Secretary of Commerce.

EFH designations emphasize the importance of habitat protection to healthy fisheries and serve to protect and conserve the habitat of marine, estuarine, and anadromous finfish, mollusks, and crustaceans. EFH embodies both the water column (including its physical, chemical, and biological growth properties) and its underlying substrate (including sediment, hard bottom, and other submerged structures). Under the EFH definition, necessary habitat is that which is required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem. EFH is designated for a species' complete life cycle, including spawning, feeding, and growth to maturity, and may be specific for each life stage (e.g., eggs, larvae).

EFH that is judged to be particularly important to the long-term productivity of populations of one or more managed species, or to be particularly vulnerable to degradation, may also be identified by NMFS as Habitat Areas of Particular Concern. For types or areas of EFH to be considered Habitat Areas of Particular Concern, the following must be demonstrated: the importance of the ecological function provided by the habitat; the extent to which the habitat is sensitive to human-induced environmental degradation; whether, and to what extent, development activities are, or will be, negatively impacting the habitat type; or the rarity of the

habitat. Habitat Areas of Particular Concern may include high-value intertidal and estuarine habitats, offshore areas of high habitat value or vertical relief, and habitats used for migration, spawning, and rearing of fish and shellfish.

NMFS has summarized EFH in major estuaries, bays, and rivers along the northeast U.S. Coast. Based on the NMFS *Guide to Essential Fish Habitat Descriptions in the Northeast United States* (NMFS 2009), EFH has been designated for the following 17 species in Harpswell Cove and Buttermilk Cove: American plaice (*Hippoglossoides platessoides*), Atlantic cod (*Gadus morhua*), Atlantic halibut (*Hippoglossus hippoglossus*), Atlantic mackerel (*Scomber scombrus*), Atlantic salmon, Atlantic sea herring (*Clupea harengus*), Atlantic sea scallop (*Placopecten magellanicus*), bluefin tuna (*Thunnus thynnus*), bluefish (*Pomatomus saltatrix*), ocean pout (*Macrozoarces americanus*), pollock (*Pollachius virens*), red hake (*Urophycis chuss*), white hake (*Urophycis tenuis*), whiting (*Merluccius bilinearis*), windowpane flounder (*Scopthalmus aquosus*), winter flounder (*Pleuronectes americanus*), and yellowtail flounder (*Pleuronectes ferruginea*). Seven species have designated EFH for each life stage (i.e., eggs, larvae, juvenile, and adults), including Atlantic cod, winter flounder, windowpane flounder, American plaice, ocean pout, Atlantic halibut, and Atlantic sea scallop.

Table 3.12-2 summarizes the EFH for each species, by life stage, within the project area.

3.12.2.4 Marine Mammals

The Marine Mammal Protection Act (MMPA) is administered by the USFWS and the National Oceanic and Atmospheric Administration's (NOAA's) NMFS to protect and manage marine mammals. NMFS, Northeast Region stated that certain Maine coastal waters support marine mammals protected under the MMPA, including several species of seals (Colligan 2009). However, NMFS stated that further evaluation of the presence of marine mammals in coastal waters near NAS Brunswick and its outlying properties is not necessary considering the absence of work in or disturbance to coastal waters associated with the proposed action (Colligan 2009).

3.12.3 Threatened and Endangered Species

The federal Endangered Species Act (ESA) of 1973 and subsequent amendments provides for the conservation of threatened and endangered species of plants and animals and the habitat in which they are found. The Navy ensures consultations are conducted as required under Section 7 of the ESA for any action that "may affect" a federally listed threatened or endangered species. Although protection of species listed at the state level as threatened or endangered is not legally mandated for federal agencies, the Navy encourages cooperation with states to protect such species where such protection is consistent with the installation's mission. The Maine Endangered Species Act provides the MDIFW with a mandate to conserve all of the fish and wildlife species found in the state, as well as the ecosystems upon which they depend (12 MRSA Part 13, Subchapter 3).

Table 3.12-2 EFH at NAS Brunswick

Species	Life Stage	Seasonal Occurrence in the Project Area
American plaice	Egg, larval	Annual; peaks April and May
	Juvenile, adult	Annual
Atlantic cod	Egg	Fall; peaks in winter and spring
	Larval	Spring
	Juvenile, adult	Annual
Atlantic halibut	Egg	Late fall to early spring; peaks in November and December
	Larval	Annual
	Juvenile, adult	Annual
Atlantic mackerel	Egg, larval, juvenile, adult	Annual
Atlantic salmon	Juvenile	Annual
	Adult	Annual
Atlantic sea herring	Larval	August to April; peaks September to November
	Juvenile, adult	Annual
Atlantic sea scallop	Egg	Annual
	Larval	Annual
	Juvenile, adult	Annual
Bluefin tuna	Adult	Annual
Bluefish	Juvenile, adult	June to October
Ocean pout	Egg, Larval	Late fall to spring
	Juvenile, adult	Annual
Pollock	Larval	September to July; peaks December to February
	Juvenile	Annual
Red hake	Juvenile	Annual
	Adult	Annual
White hake	Juvenile	May to September
	Adult	Annual
Whiting/Silver Hake	Egg	Annual; peaks June to October
	Larval	Annual; peaks July to September
	Juvenile, adult	Annual
Windowpane flounder	Egg	February to November; peaks July to August
	Larval	February to November; peaks July to August
	Juvenile, adult	Annual
Winter flounder	Egg	February to June; peaks April
	Larval	March to July; peaks April to May
	Juvenile, adult	Annual
Yellowtail flounder	Egg	March to July; peaks April to June
	Larval	May to July

The USFWS Maine Field Office, the NMFS Northeast Region, the Maine Natural Areas Program (MNAP), and the MDIFW were contacted to obtain current information on protected species on and in the vicinity of NAS Brunswick and its outlying properties. Each of these agencies maintains databases to track the occurrence of threatened and endangered species. Table 3.12-3 lists the federally and state-listed threatened and endangered species and state species of special concern identified as occurring or potentially occurring in the vicinity of NAS Brunswick.

Table 3.12-3 Threatened and Endangered Species and Species of Special Concern Potentially Occurring at NAS Brunswick and its Outlying Properties

Common Name	Scientific Name	Federal Status	Maine Status	Location
Federally Listed Threatened and Endangered Species				
No federally listed threatened or endangered species were identified as potentially occurring at NAS Brunswick or its outlying properties.				
State-Listed Threatened and Endangered Species				
Grasshopper Sparrow	*Ammodramus savannarum*	-	E	NASB
Upland Sandpiper	*Bartramia longicauda*	-	T	NASB
Clothed Sedge	*Carex vestita*	-	E	NASB
Bald Eagle	*Haliaeetus leucocephalus*	SOC	T	NASB
Species of Special Concern				
Great Blue Heron	*Ardea herodias*	-	SC	NASB, EBRT
Eastern Kingbird	*Tyrannus tyrannus*	-	SC	NASB, EBRT
Horned Lark	*Eremophila alpestris*	-	SC	NASB
Tree Swallow	*Tachycineta bicolor*	-	SC	NASB, EBRT
Wood Thrush	*Hylocichla mustelina*	-	SC	NASB, EBRT
Brown Thrasher	*Toxostoma rufum*	-	SC	EBRT
Yellow Warbler	*Dendroica petechia*	-	SC	NASB, EBRT
Chestnut-sided Warber	*Dendroica pensylvanica*	-	SC	NASB, EBRT
Prairie Warbler	*Dendroica discolor*	-	SC	NASB, EBRT
Black-and-white Warbler	*Mniotilta varia*	-	SC	NASB, EBRT
Eastern Towhee	*Pipilo erythrophthalmus*	-	SC	NASB, EBRT
Saltmarsh Sharp-tailed Sparrow	*Ammodramus caudacutus*	-	SC	NASB
Nelson's Sharp-tailed Sparrow	*Ammodramus nelsoni*	-	SC	NASB
Eastern meadowlark	*Sturnella magna*	-	SC	NASB, EBRT
Cobweb Skipper	*Hesperia metea*	-	SC	EBRT
Dry Land Sedge	*Carex siccata*	-	SC	NASB, EBRT
Small Reed-grass	*Calamagrostis cinnoides*	-	SC	NASB

Sources: Camuso 2009; USFWS 2009; Walker 2008, 2009; E & E 2008b, 2009a; Elowe and Docherty 2010; MDIFW 2010a, 2010b.

Key:
E = Endangered.
EBRT = East Brunswick Radio Transmitter Site.
NASB = Naval Air Station Brunswick.
SC = Special Concern (not a legal status).
SOC = Species of Concern (not a legal status).
T = Threatened.

Federally Listed Threatened and Endangered Species

According to the USFWS database, federally listed species known to occur in Cumberland County include the endangered roseate tern (*Sterna dougallii dougallii*) and the threatened piping plover (*Charadrius melodus*). The New England cottontail (*Sylvilagus transitionalis*) is listed as a candidate species in Cumberland County (USFWS 2009). Candidate species receive no statutory protection under the ESA; however, the USFWS encourages cooperative conservation efforts since these species may warrant future protection under the ESA. None of these species has been identified at NAS Brunswick or the outlying properties. In a letter dated December 23, 2008, the USFWS indicated that no federally threatened or endangered species are known to occur in the vicinity of NAS Brunswick (see Appendix B).

NMFS Northeast Region stated that certain Maine coastal waters support various listed species, including sea turtles, whales, and the Gulf of Maine Distinct Population Segment of Atlantic salmon (Colligan 2009). However, NMFS stated that further evaluation of the presence of these species in coastal waters near NAS Brunswick and its outlying properties is not necessary considering the absence of work in or disturbance to coastal waters associated with the proposed action (Colligan 2009).

State-Listed Threatened and Endangered Species

According to the MDIFW and MNAP, three state-listed threatened or endangered species are known to occur at NAS Brunswick (see Appendix B). These include the grasshopper sparrow (state endangered), upland sandpiper (state threatened), and clothed sedge (*Carex vestita*) (state endangered).

The grasshopper sparrow prefers open grassland with few small shrubs (often low-bush blueberry) and patches of bare dirt (Vickery et al. 1992). Currently, this species is known to breed in only four locations in Maine, one of which is NAS Brunswick (Siegel and Kaschube 2005). Specifically, the grasshopper sparrow has been observed in the Sandplain Grassland habitat and other grassy areas located on the north end of the airfield. This location has been identified as the center of territorial activity for grasshopper sparrows (Camuso 2009). The number of pairs breeding at NAS Brunswick has fluctuated considerably from year to year (Siegel and Kaschube 2005). Grasshopper sparrows were last documented at NAS Brunswick in 2005. No grassland bird surveys were conducted in 2006 or 2007; however, surveys were conducted in 2008 and 2009 (E & E 2008b, 2009a). Grasshopper sparrows were not identified during the 2008 or 2009 grassland bird surveys, which may indicate these were poor years for grasshopper sparrows at NAS Brunswick. Grasshopper sparrows may also be avoiding NAS Brunswick due to recent BASH management activities, in particular the use of predator bird calls (Moore 2009). However, the apparent absence of this species for two consecutive years may also be an indication that the grasshopper sparrow has been extirpated from NAS Brunswick.

The upland sandpiper occupies habitat similar to that used by the grasshopper sparrow; however, it prefers a greater mix of low-bush blueberry shrub cover and scattered patches of open ground. Its distribution in Maine is generally restricted

to open lands and barrens in the coastal zone (Geo-Marine 2001), and it is known to breed in about 30 locations in Maine, including NAS Brunswick. Similar to the grasshopper sparrow, populations of the upland sandpiper fluctuate annually. Sixteen individuals were observed during the 2008 grassland bird survey at NAS Brunswick, and six individuals were observed in 2009 (E & E 2008b, 2009a).

The clothed sedge is state-listed as endangered. This plant species is known to occur on the Sandplain Grassland habitat and other grassy areas surrounding the airfield at NAS Brunswick. Previously listed as state historic, this species was rediscovered in the Sandplain Grassland at NAS Brunswick in 1998 (Geo-Marine 2001). Clothed sedge populations are scattered throughout the Sandplain Grassland at NAS Brunswick. Based on the vegetation surveys conducted in 2008, it appears that populations of clothed sedge in the northeastern portion of the Sandplain Grassland may be declining, and the populations in the southwestern portion, adjacent to the airfield, may be expanding (E & E 2008a; see Appendix F).

The MDIFW has not identified any state-listed threatened or endangered species on the outlying properties (Camuso 2009; see also Appendix B). In addition, no threatened or endangered species were identified during the grassland bird surveys completed at the East Brunswick Radio Transmitter Site in 2008 and 2009.

State-Listed Species of Special Concern

A number of state species of special concern have been identified as potentially occurring at NAS Brunswick and the East Brunswick Radio Transmitter Site (see Table 3.12-3). Although these species are not formally protected under federal or state law, they may be future candidates for listing or species that require more information to support listing.

Eleven state species of special concern, including great blue heron, eastern kingbird, horned lark, tree swallow (*Tachycineta bicolor*), wood thrush (*Hylocichla mustelina*), yellow warbler, chestnut-sided warbler, prairie warbler, black-and-white warbler, eastern towhee, and eastern meadowlark, were documented during the 2008 and 2009 grassland bird surveys at NAS Brunswick (E & E 2008b, 2009a). The eastern meadowlark is considered an obligate grassland species by the MDIFW. The saltmarsh sharp-tailed sparrow and Nelson's sharp-tailed sparrow have been observed in the tidal wetlands associated with Harpswell Cove and Mere Brook at NAS Brunswick (Audubon 2009; Camuso 2009). Small reedgrass has been documented in the red maple-sensitive fern swamp southwest of the runway.

According to the MDIFW, the Sandplain Grassland habitat at the East Brunswick Radio Transmitter Site is known to support at least seven bird species ranked as state species of special concern, including the eastern kingbird, brown thrasher, chestnut-sided warbler, prairie warbler, yellow warbler, eastern towhee, and eastern meadowlark (Elowe and Docherty 2010). Of these seven species, all but the brown thrasher were observed during the 2008 and 2009 surveys (E & E 2008b, 2009a). The eastern meadowlark is considered an obligate grassland species and was observed at the site during the 2009 survey. Additional state species of special concern documented at the East Brunswick Radio Transmitter Site during the

2008 and 2009 grassland bird surveys included the great blue heron, tree swallow, wood thrush, and black-and-white warbler. In total, 10 state species of special concern were documented at the East Brunswick Radio Transmitter Site during the 2008 and 2009 surveys.

Two additional state species of special concern—the dry land sedge (*Carex siccata*) and cobweb skipper butterfly (*Hesperia metea*)—have been identified at the East Brunswick Radio Transmitter Site; however the occurrence of the dry land sedge has not been verified by MNAP (Elowe and Docherty 2010). The MDIFW identified the cobweb skipper at this site in the summer of 2007, and this site is one of two locations in the state known to contain populations of this species (Walker 2009).

No state species of special concern have been identified at the McKeen Street Housing Annex or the Sabino Hill Rake Station. MDIFW has not conducted a comprehensive survey of NAS Brunswick and the outlying properties, and the agency believes that other state species of special concern may be present on these properties (Elowe and Docherty 2010).

Bald and Golden Eagle Protection Act

The bald eagle was removed from the federal endangered species list in 2007, but it is still protected by the USFWS under the Bald and Golden Eagle Protection Act (BGEPA). The bald eagle is also listed as a threatened species in Maine. However, the species is currently being considered for delisting by MDIFW.

Three bald eagle (*Haliaeetus leucocephalus*) nests are located near NAS Brunswick (see Figure 3.12-2). One bald eagle nest is located approximately 0.3 mile north of the installation, along the Androscoggin River, and two nests are located approximately 0.75 and 2 miles east of the installation, near Buttermilk Cove. Transient bald eagles may occasionally fly over the installation and feed within the estuaries located in Harpswell Cove and Buttermilk Cove (Nordstrom 2009).

3.12.4 Significant Wildlife Habitat

Significant Wildlife Habitat is protected in Maine under the Natural Resources Protection Act (NRPA). According to the NRPA, Significant Wildlife Habitat includes: habitat for species appearing on the official state or federal lists of endangered or threatened animal species; high- and moderate-value deer wintering areas and travel corridors (as defined by the MDIFW); high- and moderate-value waterfowl and wading bird habitats, including nesting and feeding areas; critical spawning and nursery areas for Atlantic salmon (as defined by the Atlantic Salmon Commission); shorebird nesting, feeding, and staging areas and seabird nesting islands; and significant vernal pools (as defined by the MDIFW) (38 MRSA 480-B Chapter 335). Activity that takes place within Significant Wildlife Habitat or within a defined buffer area around the habitat may require a permit from the MEDEP.

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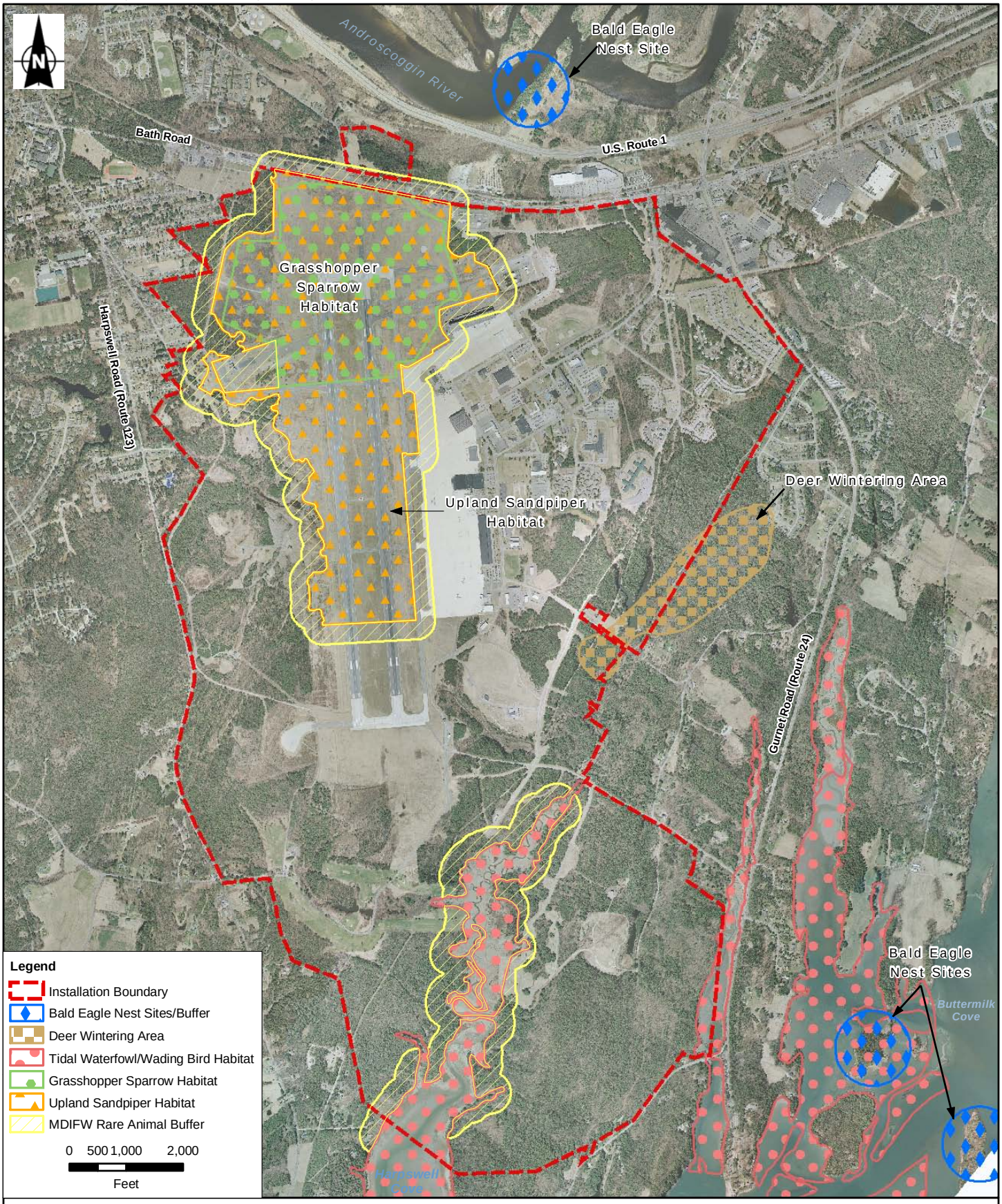

Source: Camuso 2009; Walker 2010a; Walker 2010b.

Figure 3.12-2
MDIFW Significant Wildlife Habitat
NAS Brunswick, Maine

The MDIFW has identified Significant Wildlife Habitats at NAS Brunswick, including threatened and endangered species habitats, deer wintering areas, and tidal waterfowl and wading bird habitats (see Figure 3.12-2). For significant wildlife habitat potentially containing threatened and endangered species, the MDIFW typically evaluates a 100-meter buffer around such habitat for environmental review purposes (Camuso and Walker 2010). Recent surveys for vernal pools have been conducted (TRC 2008; E & E 2009b; see Appendix H); however, the MDIFW has not reviewed the surveys or made a determination of significance regarding the vernal pools surveyed. According to the MDIFW, no Significant Wildlife Habitat exists at the McKeen Street Housing Annex, Sabino Hill Rake Station, or East Brunswick Radio Transmitter Site.

State Threatened and Endangered Habitat

The Sandplain Grassland and other grassy areas surrounding the airfield at NAS Brunswick has been identified as Significant Wildlife Habitat because it has been utilized by the grasshopper sparrow, upland sandpiper, and clothed sedge, all of which are state-listed threatened or endangered species. NAS Brunswick has worked closely with the MDIFW in the past on the maintenance of the grasslands contained within and adjacent to the airfield for the benefit of these species (Camuso 2009; see Appendix B).

Although the East Brunswick Radio Transmitter Site does contain a Sandplain Grassland ecological community type, no federally or state-listed endangered or threatened species are known to occur at this site, although the habitat could potentially support state-listed endangered or threatened species. Therefore, this habitat does not meet the criteria of Significant Wildlife Habitat under the NRPA.

Deer Wintering Areas

The MDIFW defines deer wintering areas as forested areas used by deer when (1) snow depths reach more than 12 inches in the open and in hardwood stands; (2) the depth that deer sink into the snow exceeds 8 inches in the open and in hardwood stands; and (3) the mean daily temperature is below 32 degrees (MDIFW 2009). A deer wintering area of moderate value has been identified by the MDIFW on the eastern portion of NAS Brunswick, between the weapons compound and Coombs Road (see Figure 3.12-2). The deer wintering area is currently divided by the installation's perimeter fence, and the majority of the identified deer wintering area is outside the NAS Brunswick property.

Waterfowl and Wading Bird Habitat

The estuarine wetlands located within Harpswell Cove and Buttermilk Cove are considered high-value tidal wading bird and waterfowl habitat by the MDIFW (Camuso 2009; see Appendix B). The diversity of the wetlands in conjunction with the mudflats bordered by mature forest are the reason for the high value ranking. The brackish tidal marsh and spartina salt marsh located within Harpswell Cove also provide habitat for saltmarsh sharp-tailed sparrow (state species of special concern) and Nelson's sharp-tailed sparrow (state species of special concern) (Camuso 2009; see Appendix B).

Vernal Pools

A vernal pool is a temporary to semi-permanent body of water occurring in a shallow depression that typically fills during the spring or fall and may dry during the summer. Vernal pools may be a part of a larger wetland (commonly forested or scrub-shrub wetlands), or may occur as isolated depressions in upland landscapes. These pools have no obvious direct surface connection to streams or ponds and do not support populations of fish. A vernal pool may provide the primary breeding habitat for wood frogs (*Rana sylvatica*), spotted salamanders, blue-spotted salamanders, and fairy shrimp (*Eubranchipus* sp.) as well as valuable habitat for other plants and wildlife, including several rare, threatened, and endangered species.

In 2005, the State of Maine amended the NRPA to protect significant vernal pools as significant wildlife habitat (38 MRSA 480-B Chapter 335). If a vernal pool supports a certain abundance of vernal pool indicator species (wood frogs, spotted salamander, blue-spotted salamander, or fairy shrimp) or supports a threatened, endangered, or rare species for a critical part of its life history, the pool is considered a "significant" vernal pool by the State of Maine. To be deemed a significant vernal pool, the abundance of wood frog, spotted salamander, and blue-spotted salamander egg masses must reach at least 40, 20, and 10, respectively, within the pool area. Only a single species must meet its critical level for the pool to be considered significant. The presence of fairy shrimp at any life stage meets the requirements for "significant vernal pool" status.

Vernal pool surveys were conducted at NAS Brunswick in the spring of 2008 and spring 2009 (TRC 2008; E & E 2009b; see Appendix H). TRC conducted a survey of vernal pools in the western portion of NAS Brunswick in support of Bowdoin College's Public Benefit Conveyance (PBC) request. The survey identified 59 pooled areas, 19 of which were deemed vernal pools and eight of which were identified as significant vernal pools (see Figure 3.12-3) (TRC 2008). In 2009, for planning purposes and in support of the EIS, the Navy conducted a comprehensive vernal pool survey of the remainder of NAS Brunswick and the outlying properties (E & E 2009b; see Appendix H). The surveys were conducted between early April and early May 2009 and identified a total of 169 pooled areas. Of these 169 pooled areas, 27 were identified as vernal pools and 20 of these were identified as significant vernal pools (see Figure 3.12-3). A 2010 wetland delineation conducted on the 51-acre parcel that is to be transferred to the Department of the Army identified two additional significant vernal pools (Brandt 2010). Combined, the 2008 and 2009 vernal pool surveys and 2010 wetland delineation identified 46 vernal pools and 30 significant vernal pools. No vernal pools were identified at the outlying properties (E & E 2009b).

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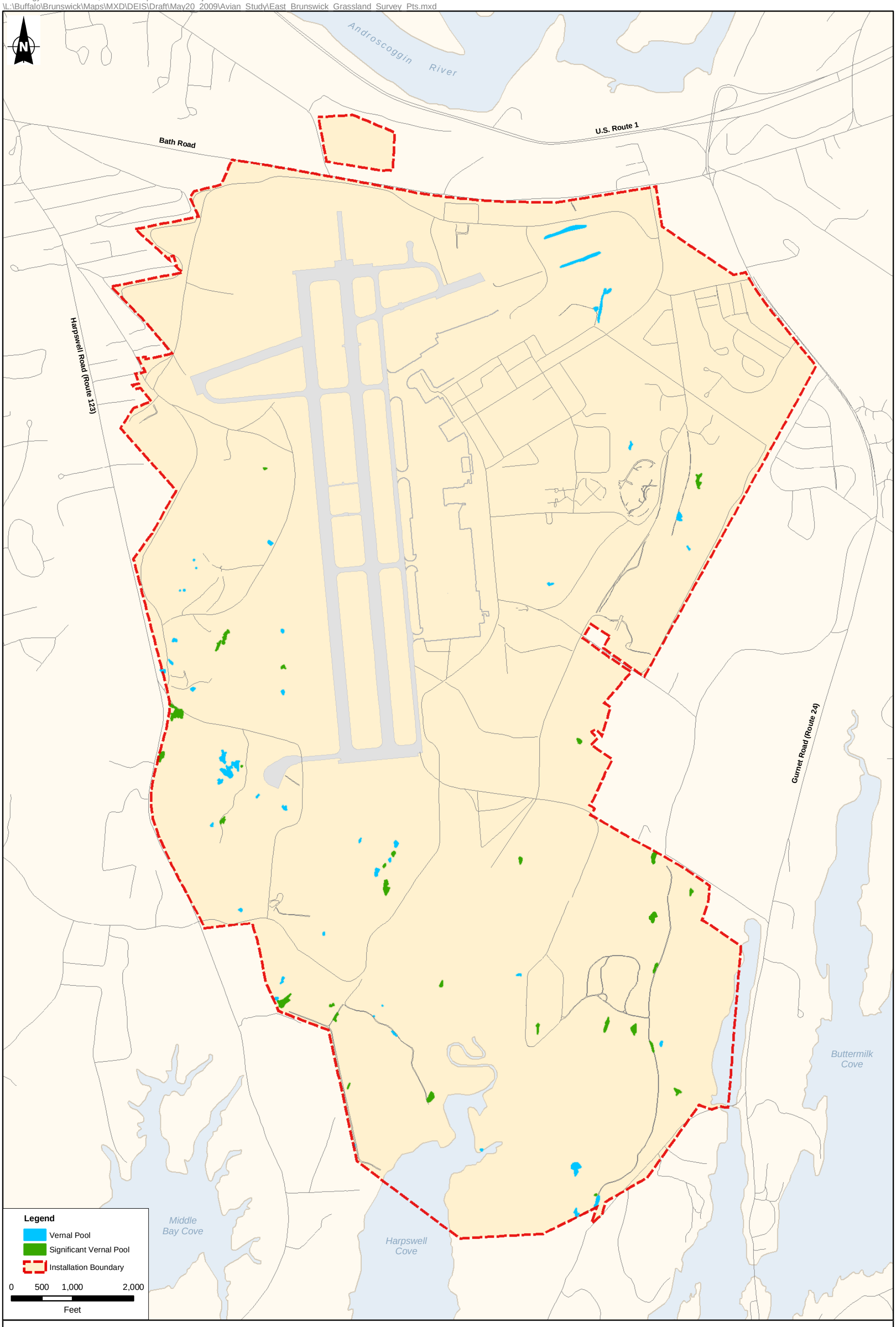


Source: E&E 2009b; TRC 2008; Brandt 2010.

Figure 3.12-3
Vernal Pools and Significant Vernal Pools
NAS Brunswick, Maine

4 Environmental Consequences

This section evaluates the potential direct, indirect, short-term, and long-term impacts on the human and natural environments resulting from the disposal of NAS Brunswick. In addition to the main NAS Brunswick property, this EIS also evaluates the disposal of the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station, referred to herein as the Outlying Properties. An evaluation of the potential cumulative impacts resulting from the disposal of NAS Brunswick, when added to other past, present, and reasonably foreseeable future actions, is presented in Section 5.

This EIS addresses impacts based on a phased (5-, 10-, 15-, and 20-year) build-out of the alternatives and assumptions used to assess foreseeable reuse of the property. The assumptions were based on the Reuse Master Plan (BLRA 2007a), current property use, existing and proposed land use and zoning regulations, and the build-out time line and future development mix.

To examine impacts resulting from the disposal and reuse of the installation, a build-out analysis was conducted for both Alternatives 1 and 2. The build-out analysis is a projection of the maximum number of residential housing units and total floor area of commercial, business, industrial, and educational building space allowed under current Town of Brunswick zoning regulations. Furthermore, other resource-specific planning multipliers were applied to the build-out analysis to project population, employment, construction costs, traffic, water use, wastewater flows, and impervious surface area. The build-out analysis and other resource-specific projections are used in this EIS to assess impacts on human and natural environmental resources. The analysis was necessary because the Reuse Master Plan does not identify specific conditions (e.g., scale of development, number of residential units, square footage of non-residential floor space) that would result from build-out of the property. Without these data on future build-out conditions, analysis of some resource areas (e.g., land use, transportation) is not possible. The build-out analysis is only a projection of the maximum conditions allowed under current zoning regulations and is based on standard land use planning assumptions. The build-out numbers identified are used in this EIS only for planning and assessment purposes and should not be interpreted as an absolute definition of conditions upon full build-out of either Alternative 1 or Alternative 2. The final build-out of the installation is subject to many variables, including future market conditions, changes to local and state land use regulations, and other development factors. The full build-out analysis is presented in Appendix C.

Potential environmental impacts are identified, where applicable, according to their significance. According to the Council on Environmental Quality, the significance of an impact is determined by examining both its context and intensity (40 CFR 1508.27). Context is related to the affected region, the affected interests, and the locality, while intensity refers to the severity of the impact, which is based on the following considerations:

- The degree to which the proposed action affects public health or safety;
- Unique characteristics of the geographic area, such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas;
- The degree to which the effects on the quality of the human environment are likely to be highly controversial;
- The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration;
- The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places (NRHP) or may cause loss or destruction of significant scientific, cultural, or historical resources;
- The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973; and
- Whether the action threatens a violation of federal, state, or local law or requirements imposed for the protection of the environment.

As in Section 3 (Existing Environment), with regard to resource analysis, there is limited discussion of the East Brunswick Radio Transmitter Site and Sabino Hill Rake Station, as no residential development or high-intensity construction is expected at these sites. The primary discussion in each resource area focuses on NAS Brunswick and the McKeen Street Housing Annex. However, where appropriate in certain resource areas (e.g., Land Use and Zoning), there is a short discussion of the East Brunswick Transmitter Site and the Sabino Hill Rake Station.

4.1 Land Use

This section summarizes the potential land use impacts resulting from the implementation of Alternative 1, Alternative 2, or the No-Action Alternative. It includes an examination of site specific land use and zoning, local zoning and land use plans, impacts on surrounding land use and zoning, and coastal consistency management programs. The study area includes NAS Brunswick, McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and the Sabino Hill Rake Station properties and the land immediately adjacent to it.

To assess impacts, local and state planning documents and regulations were examined and a build-out analysis was prepared for each of the alternatives to project the maximum number of residential housing units and total floor area of commercial, business, industrial, and educational building space allowed under current zoning regulations. Refer to Section 2 (Alternatives, Including the Proposed Action) and Appendix C for more information on the build-out analysis.

Upon completion of the BRAC disposal process under both Alternative 1 and 2, the properties not transferred to other Federal agencies would fall under the jurisdiction of the local government in which they are located. The local government would then be responsible for providing municipal services (e.g., education, police, and fire protection) and administration of the former federal property. The use of land, the reuse of existing buildings and facilities, and the development of new buildings on NAS Brunswick, the McKeen Street Housing Annex, and the East Brunswick Radio Transmitter Site would be regulated by the Town of Brunswick, the zoning ordinance, and other applicable plans and regulations. In addition, the future reuse and development would require the review and/or approval of the Town of Brunswick and would be subject to MRRA's Design Guidelines (Town of Brunswick 2009a). However, development review would not be required for the initial non-military re-occupancy of existing buildings on NAS Brunswick provided that:

- The new use is permitted in the reuse subdistrict;
- The re-occupancy maintains the pre-existing pattern of use of the site; the usable floor area of the building is not increased by more than 2,000 square feet;
- The amount of impervious surface on the site is not increased by more than 2,000 square feet;
- Adequate parking is available for the new use; and
- The re-occupancy of the building will not change the primary use of the building from residential to non-residential or from non-residential to residential (Town of Brunswick 2009a).

Reuse of the Sabino Hill Rake Station would conform to the requirements of the Town of Phippsburg zoning ordinance and other applicable plans.

Under the No Action Alternative, the installation would be retained by the federal government in caretaker status. Therefore, town zoning and regulations would not be enforceable since the properties would continue to be owned by the federal government, outside the jurisdiction of the Town of Brunswick.

4.1.1 Alternative 1 (Preferred Alternative)

4.1.1.1 Land Use and Zoning

Implementation of Alternative 1 would result in the redevelopment of NAS Brunswick, McKeen Street Housing Annex, East Brunswick Radio Transmitter

Site, and Sabino Hill Rake Station. Alternative 1 incorporates nine different land use planning districts to create a mixed-use, smart-growth-oriented community and maintains the existing airfield for civilian aviation purposes. Upon full build-out, approximately 3,200 acres of federal land would be reintegrated back into the town of Brunswick, 0.23 acre would be reintegrated back into the town of Phippsburg, and this land would be made available for redevelopment. The majority of redevelopment proposed is concentrated on approximately 1,630 acres of land, in areas that have already been developed by the Navy. The remaining property, about 1,504 acres, would be dedicated to preserving open space and natural areas and providing a variety of active and passive recreation amenities. It is anticipated that full build-out of Alternative 1 would be implemented over a 20-year period. Table 4.1-1 and Figures 4.1-1 and 4.1-2 identify the proposed land uses under Alternative 1.

Table 4.1-1 Alternative 1 – Land Use Districts[1,2]

Land Use District	Acres	Percent of Total
Airport Operations	500	16
Aviation-related Business	230	7
Professional Office	120	4
Community Mixed Use	175	5
Business and Technology Industries	190	6
Education District	200	6
Residential District	215	7
Recreation and Open Space	510	16
Natural Areas	1,060	33
Total	**3,200**	**100**

Source: BLRA 2007a.

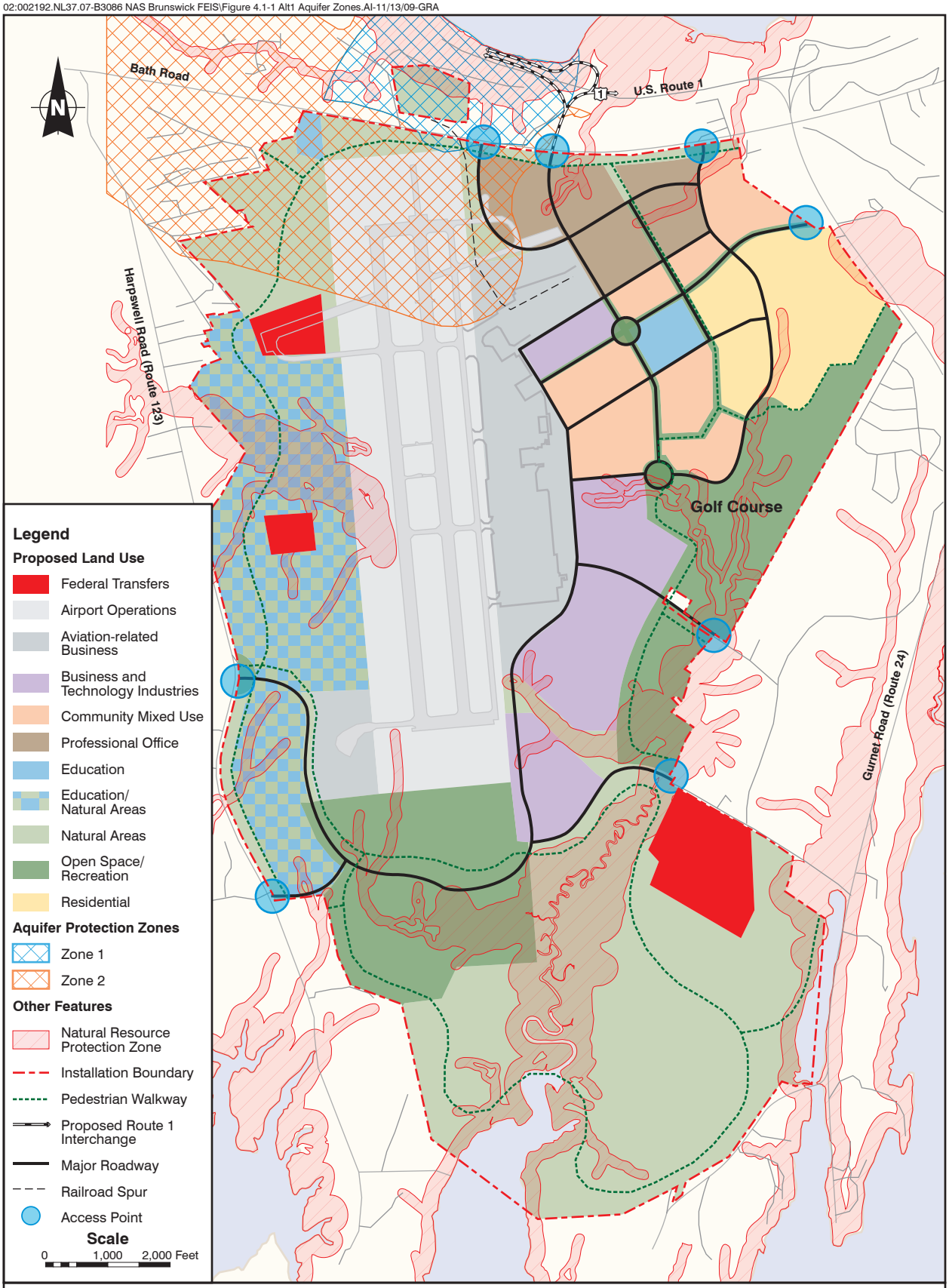
Notes:
[1] Land use calculations include the NAS Brunswick, McKeen Street Housing Annex, and East Brunswick Radio Transmitter Site properties.
[2] This development mix of land uses is an estimate; the final mix of uses is subject to change based on market conditions and other factors.

The proposed action would impact the existing land use conditions within the boundaries of NAS Brunswick, the McKeen Street Housing Annex, the East Brunswick Radio Transmitter Site, and the Sabino Hill Rake Station. These impacts would include significant changes to the existing built environment including the introduction of a densely populated community mixed-use district and professional office, education, and business/industry technology land uses. Implementation of Alternative 1 would also result in open public access to the formerly secure and restricted military property.

Consistency with Local Zoning and Land Use Plans

In the existing baseline year, 2008, NAS Brunswick property was zoned as “I5” (Business and Industry 5/BNAS) and “Farm-Forest 2.” However, in anticipation of the reincorporation of the properties back into the town and to support the implementation of the Reuse Master Plan, the Town of Brunswick has amended its zoning ordinance to include three new zoning districts that incorporate uses at

02:002192.NL37.07-B3086 NAS Brunswick FEIS\Figure 4.1-1 Alt1 Aquifer Zones.AI-11/13/09-GRA



NOTE: Education/Natural Area totals 320 acres, of which an undefined 175 acres have been assigned to Education and 145 acres to Natural Areas.

SOURCE: BLRA 2007a

Figure 4.1-1
Alternative 1, Land Use
Brunswick, Maine

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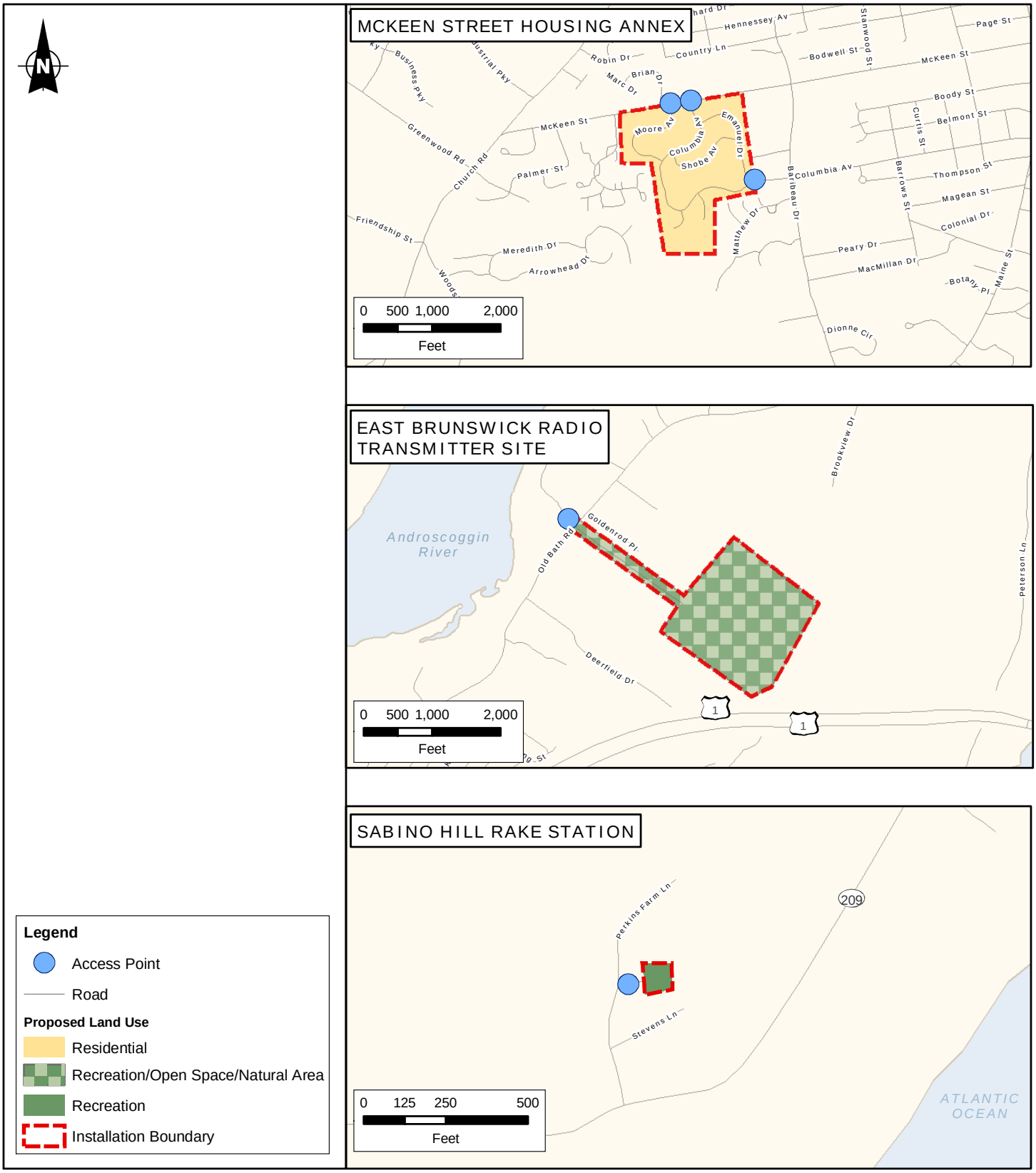

Source: Adapted from BLRA 2007a

Figure 4.1-2
Alternative 1
Outlying Properties Land Use
Brunswick and Phippsburg, Maine

NAS Brunswick (Town of Brunswick 2009a). The three new zoning districts are the BNAS Reuse District, BNAS Conservation District, and College Use/Town Conservation District. The McKeen Street Housing Annex is zoned "Residential Neighborhood 4," and the East Brunswick Radio Transmitter Station is zoned "Country Residential 2." Currently, the existing Town zoning is not enforceable since the properties are owned by the federal government and are outside the jurisdiction of the Town of Brunswick. The above-mentioned zoning amendment regulates land uses and identifies land use dimensional and density standards.

In addition to the three new zoning districts, two of the Town of Brunswick's overlay zoning districts (Aquifer Protection Zone 1 and 2 and the Natural Resource Protection Zone [NRPZ]) extend onto the installation property. The new zoning districts and existing overlay districts are described below and identified in Figure 4.1-3.

- **BNAS Reuse District.** The purpose of this district is to provide for the reuse, redevelopment, and development of the portions of the NAS Brunswick, McKeen Street Housing Annex, and East Brunswick Radio Transmitter Site properties that are designated for development and active use under the adopted Reuse Master Plan.

  The BNAS Reuse District is further divided into six land use zoning subdistricts. The subdistricts are based on the Land Use Districts identified in the Reuse Master Plan and include the BNAS Community Mixed-Use (includes the Reuse Master Plan's Education District), BNAS Professional Office, BNAS Aviation Related (includes the Reuse Master Plan's Aviation Operations Area), BNAS Business and Technology Industries, BNAS Residential, and BNAS Recreation and Open Space Subdistricts. The BNAS Recreation and Open Space Subdistrict could include tourism uses, which would be compatible with the zoning regulations for the subdistrict. The subdistricts identify the allowed uses and set the dimensional and density standards for the property, including minimum lot area, maximum residential density, minimum lot size, maximum impervious surface coverage, and maximum building height (Town of Brunswick 2009a).

- **BNAS Conservation District.** The BNAS Conservation District includes large, undeveloped areas in the southern and northwest portions of the installation, and the North Clear Zone Parcel. When used in the context of an operating airfield, a "clear zone" or "runway protection zone (RPZ)" is an area of land at the end of the runway(s) that, for safety reasons, is kept free of development (e.g., buildings). Both the Navy (applicable under existing conditions) and the FAA (applicable under future conditions for Alternative 1) have specific regulations outlining the dimensions and land use restrictions typically placed upon clear zones/RPZs for airfields under their jurisdiction. The clear zone/RPZ needs to be kept free of:
  - obstructions;
  - objects or activities that could interfere with aircraft operations or navigation by creating smoke, dust, glare and/or electromagnetic interference;
  - wildlife attractants;

- fuel storage; and
- land uses that would cause people to reside or congregate in the area.

In order to control development in this parcel, the FAA would need to coordinate with the redevelopment agency and the Town of Brunswick. The Brunswick and Topsham Water District (BTWD) has applied for and been approved to acquire the 26-acre North Clear Zone Parcel for public health purposes and it will be used for aquifer protection. As such, it is not anticipated that use of this property would result in a conflict with airfield operations or associated clear zone/RPZ.

The purpose of the BNAS Conservation District is to preserve, maintain, and enhance existing natural areas that are designated as Natural Areas in the Reuse Master Plan. Only uses that would not significantly alter the environment and that would provide opportunities to experience the environment are allowed. Allowed uses include pedestrian trails, nature and interpretive centers, environmental education facilities, and other non-intrusive passive outdoor recreational and educational uses (Town of Brunswick 2009a).

- **College Use/Town Conservation District.** This zoning district includes a majority of the installation's western side. Land uses allowed within the district include cultural, educational, and recreational uses (Town of Brunswick 2009a).

- **Town of Brunswick Overlay Districts.** The Town's Aquifer Protection Zone 1 and 2 and the NRPZ extend onto the installation property. These overlay districts establish an additional layer of zoning and may restrict or limit certain land uses. Aquifer Protection Zone 2 extends over the northwestern corner of the installation property and Aquifer Protection Zone 1 extends over the North Clear Zone Parcel. This portion of the installation includes the northern end of the existing airfield and is located within portions of the Airport Operations, Aviation-related Business, Professional Office, Education, and Natural Areas land use districts. The purpose of the Aquifer Protection Zone is to protect the quality of the town's groundwater resources. The intended reuse of property is allowed within Aquifer Protection Zone 1 and 2. A more detailed discussion of impacts on the aquifer protection zone is provided in Section 4.11.

  The NRPZ restricts and limits some land uses and development within identified Town Shoreland and Special Flood Hazard Areas. The NRPZ extends across the northern, eastern, southern, and western boundaries of the installation. The majority of this area is located within the Natural Areas and Recreation and Open Space land use districts on the eastern and southern portions of the installation. However, a portion is located within the Education/ Conservation area located on the western edge of the installation. An additional portion of the NRPZ is located in the Professional Office land use district in the northeastern corner of the installation. Land use development within the NRPZ may be restricted or require a special permit from the Town.

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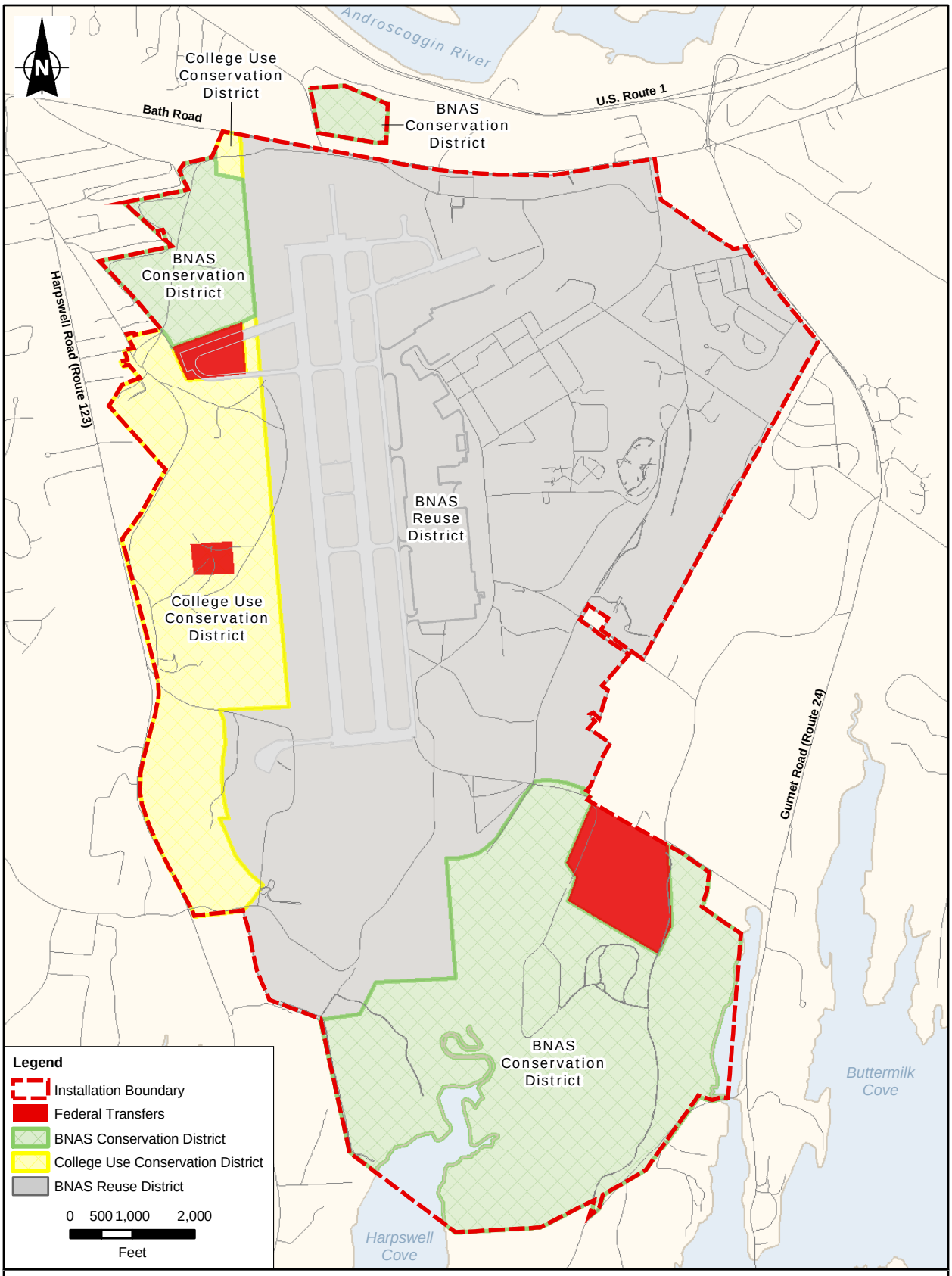

Source: Town of Brunswick 2009a.

Figure 4.1-3
Town of Brunswick Reuse Districts
Brunswick, Maine

A more detailed discussion of impacts on the resources within the NRPZ is provided in Sections 4.11 and 4.12.

The land use plan under Alternative 1 is consistent with the objectives of the *Town of Brunswick 2008 Comprehensive Master Plan*, including reintegrating the NAS Brunswick property back into the community and implementing zoning that is consistent with overall Town policies encouraging denser development in designated growth areas and preserving the rural character outside of these growth areas (Town of Brunswick 2008a). The zoning regulations for the NAS Brunswick, McKeen Street Housing Annex, and East Brunswick Radio Transmitter site properties were specifically designed by the Town of Brunswick, in collaboration with MRRA, to promote the development of the properties in accordance with the Reuse Master Plan and to steer development into the appropriate districts and areas. Therefore, the proposed action is consistent with the Town of Brunswick's Zoning Ordinance and the *Town of Brunswick 2008 Comprehensive Master Plan* and would not have a negative impact on land use and zoning in the Town of Brunswick.

The Sabino Hill Rake Station is currently zoned by the Town of Phippsburg for business land uses. The town proposes to reuse the property as a vehicle parking lot to access an adjacent recreational trail. This would be consistent with current town zoning, and the proposed reuse of the Sabino Hill Rake Station property would have no impact on land use.

Land Use Build-out

Under Alternative 1, the built environment of the NAS Brunswick property would be more densely developed than under existing conditions. The redevelopment would introduce new land uses to the property, including a densely populated community mixed-use district and professional office, education, and business/ industry technology land uses.

Full build-out of Alternative 1 would provide the land area to develop a maximum of 2,96 residential units, over 9 million square feet of non-residential floor space, and 1,570 acres of recreation, open space, and natural areas. The total build-out projection includes the reuse of 43 existing non-residential structures, comprising approximately 1.3 million square feet of useable space and 653 existing residential units. The remaining development would be comprised of new residential and non-residential construction. Of note, no new residential construction is projected to occur within the Residential land use district. All projected growth in residential housing would occur within the Community Mixed-Use land use district, which is zoned to include a maximum of 24 units per acre (high-density residential). The build-out assumes full occupancy of all structures. Table 4.1-2 identifies the maximum build-out in 5-year increments. The Build-out Analysis, including applicable zoning regulations, assumptions, and calculations, is presented in Appendix C.

The full build-out of the installation includes an increase in the density of residential and non-residential development as compared to existing 2008 baseline conditions. This projected density would be allowed under existing zoning and land

use regulations. In addition, the density of development projected would not be expected to occur at once and would be implemented utilizing a phased development approach over a 20-year build-out period. The intent would be to first reuse existing structures and then develop new building space as future market conditions and improvements to on-site and off-site infrastructure capacity dictate (Boundy 2009). As a result of the development being consistent with existing zoning and considering the 20-year build-out period, the development projected under Alternative 1 would not be expected to significantly impact land use and zoning.

Table 4.1-2 Alternative 1 – Projected Maximum Build-out

Land Use	Existing Conditions	Maximum Build-out Projection[1]			
		5 Years	10 Years	15 Years	20 Years
Residential					
Single-family Detached (units)	349[2]	87	175	262	349
Apartments, Townhomes, and Condominiums (units)	490[3]	269	625	1,114	2,035
Senior Housing (units)	0	43	108	216	433
Student Housing (units)	0	65	129	129	129
Total (units)	**839**	**464**	**1,037**	**1,721**	**2,946**
Non-Residential					
Civic and Cultural (sq ft)	--	31,278	99,431	180,277	341,970
Education (sq ft)	--	60,010	127,349	163,992	237,278
Industry, Warehouse, and Storage (sq ft)	--	260,964	690,474	1,582,402	3,006,030
Office (sq ft)	--	197,410	783,553	1,450,986	2,740,608
Retail and Commercial (sq ft)	--	148,747	359,726	543,613	911,385
Transportation Facility (sq ft)	--	385,642	658,452	1,235,502	1,956,815
Total (sq ft)	**1,900,078[4]**	**1,084,052**	**2,725,984**	**5,156,772**	**9,194,085**
Hotel or Motel (rooms)	351[5]	125	250	250	250
Recreation, Open Space, and Natural Areas					
Recreation and Open Space (acres)	196[6]	510	510	510	510
Natural Areas (acres)	1,012[7]	1,060	1,060	1,060	1,060
Total (acres)	**1,208**	**1,570**	**1,570**	**1,570**	**1,570**

Notes:
1 Phased build-out totals are cumulative.
2 Includes only 2008 existing detached PPV housing units.
3 Includes only 2008 existing attached PPV housing (224 units) and Bachelor Quarters (266 units).
4 Includes all 2008 existing non-residential structures.
5 Includes all 2008 existing transient visitor quarters.
6 Includes existing golf course (93 acres) and passive recreation area (103 acres).
7 Includes exiting North Clear Zone Parcel (26 acres), East Brunswick Transmitter Site (66 acres), and the weapons compound (930 acres).

Approved Public Benefit Conveyances

A public benefit conveyance (PBC) is a mechanism used to transfer property at a discount (generally 100% of fair market value) to state and local governments and certain non-profit organizations for public purposes. As part of Alternative 1, approximately 1,469 acres and 18 existing buildings would be provided as a PBC.

The proposed use of the identified PBCs is consistent with the *Town of Brunswick 2008 Comprehensive Master Plan* and the Town of Brunswick Zoning Ordinance, as well as the Town of Phippsburg Zoning Ordinance. Figure 4.1-4 identifies the locations of the PBCs conveyances and the use of property being conveyed as part

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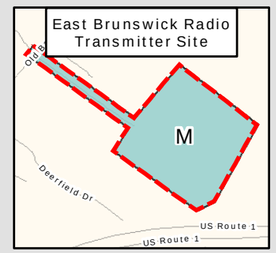
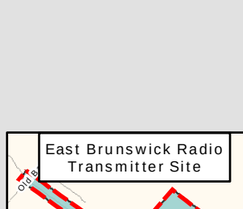
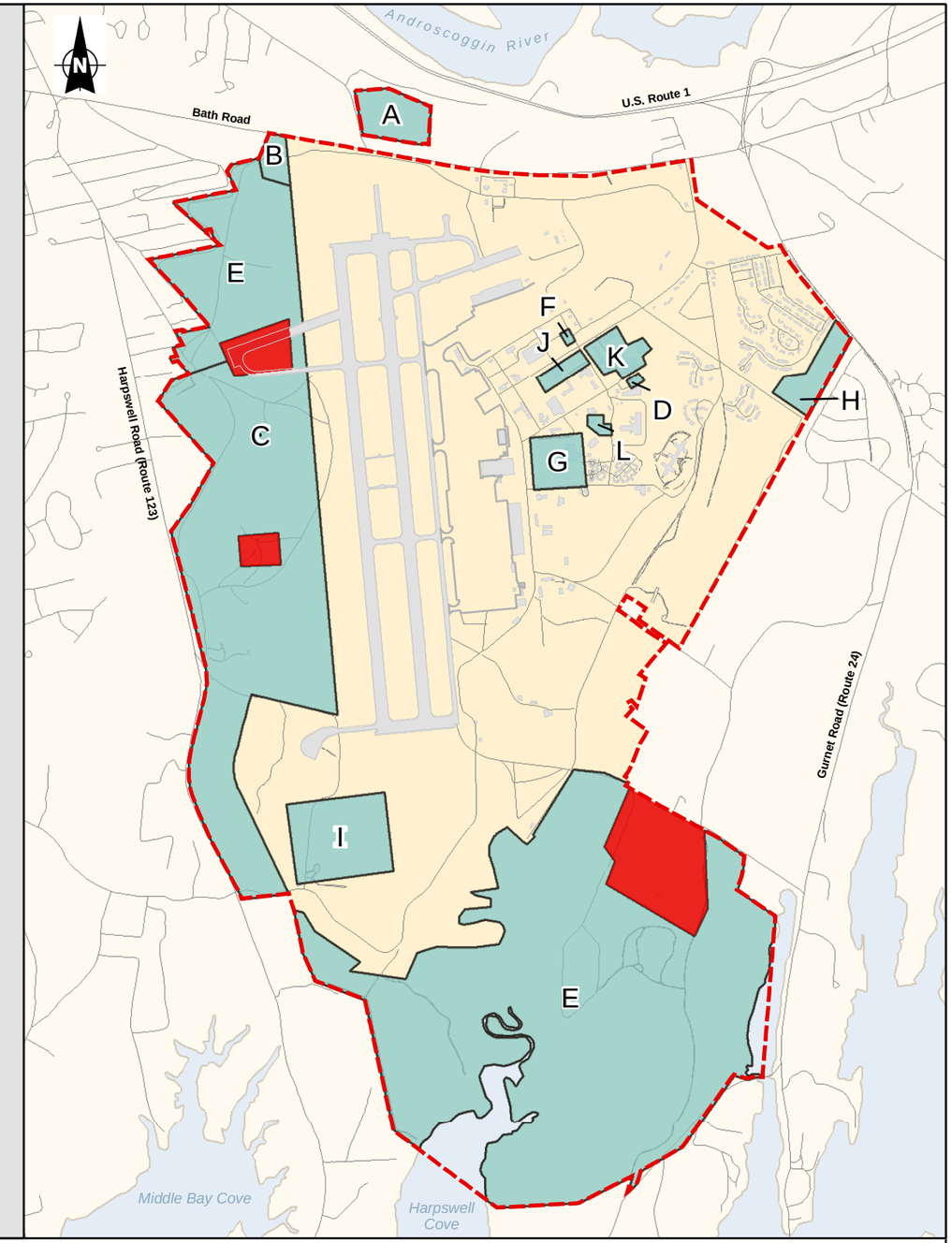
Identifier	Property being Conveyed	Proposed Use of Property
NAS Brunswick		
A	26 acres	Conservation
B	6 acres	Education and Conservation
C	170 acres	Education and Conservation
D	Building 644	Education
E	1,100 acres	Conservation
F	1 acre and Building 102	Public Safety
G	18 acres and Building 211	Recreation
H	15 acres	Recreation
I	50 acres	Recreation
J	6 acres and Building 585	Civic and Cultural
K	11 acres and Buildings 150, 151, 512, and 645	Education
L	Buildings 21 and 26	Child Care
East Brunswick Radio Transmitter Site		
M	66 acres	Conservation and Recreation
Sabino Hill Rake Station		
N	0.23 acre	Recreation

Source: BLRA 2007c.







Source: Zamorski 2009.

Figure 4.1-4
Approved Public Benefit Conveyance
NAS Brunswick, Maine

of Alternative 1. The proposed uses of these PBCs include conservation, education, public safety, recreation, civic and cultural, and child care. Recreational uses could include tourism uses that promote recreation opportunities, cultural activities, and utilization of open space. As identified in the Reuse Master Plan, all PBC development would conform with the policies and objectives identified in the Reuse Master Plan and would be subject to applicable Town of Brunswick and/or Town of Phippsburg land use controls and zoning regulations. Since the proposed uses identified for these PBCs will be consistent with existing zoning, the transfers projected under Alternative 1 would not be expected to significantly impact land use and zoning.

Aviation Land Use Planning

A major component of Alternative 1 is the reuse of the existing airfield for civilian aviation activities. The aviation reuse component includes a 500-acre Aviation Operations land use district, encompassing two 8,000-foot-long runways and associated aircraft movement areas (e.g., taxiways, parking areas) and a 230-acre Aviation-related Business land use district. Alternative 1 also includes the establishment of a general aviation airport. The airfield and associated Airport Operations land use district would be used for general and corporate aviation; aircraft manufacturing, maintenance, repair, and overhaul; government aircraft use; and aerospace research and development. No scheduled commercial passenger or air cargo flight operations are projected (Jordan 2009). Conversion of the existing Navy airfield for civilian aviation would require approval of an Airport Layout Plan (ALP) by the FAA (see Appendix K). In addition, if any commercial air carrier activities were to be established, they would require additional certifications/approvals by the FAA.

The number of future aircraft operations projected at full build-out, including arrivals, departures, and pattern operations, is 45,500 per year (Jordan 2009). This is an increase from the existing 24,709 aircraft operations experienced at the installation during 2008 (U.S. Navy 2009d). However, the majority of existing operations are military operations that utilize the P-3 Orion aircraft. Future aircraft operations are projected to include smaller, propeller- and jet-driven, fixed-wing aircraft, and rotary-wing (helicopter) aircraft (Jordan 2009). Therefore, future aircraft operations would be expected to have less of a noise impact on land use than existing military operations. For more information on aircraft operations, see Section 4.7 (Noise) and Appendix L.

Two major public interest objectives would be served by converting the NAS Brunswick airfield into a civilian facility:

1. **Highest and Best Use of Public Investment.** In 2007, the FAA provided the State of Maine with funds to conduct a State System Plan Update in collaboration with the BLRA. The study found that this site was feasible for the development of a civilian airport that could provide general aviation access to the mid-coast region of Maine north of Portland, serve as a maintenance and repair facility for transport aircraft, and support a variety of other aviation-based industries. While the two 8,000-foot runways exceed the capacity needs of the initial airport forecast of activity, they were recently reconstructed and

aviation is seen as the highest and best use of this public investment through their physical life. The development and operation of a civilian airport for this role was also seen as compatible with existing and future land use plans of the community and the redevelopment of the non-aviation portion of the installation.

2. **State Airport System Requirements.** The approved State System Plan identified a need for corporate aviation access to the Boothbay region. This region includes major export manufacturing industries, such as the Bath Ironworks Naval Shipyard, and prime coastline residential areas. The cost of providing minimum requirements for this access at the current National Plan of Integrated Airport Systems (NPIAS) airport in Wiscasset, Maine, would exceed $20 million, based on FAA estimates for runway safety area improvements, approach clearing, and minor runway extensions. The addition of the former NAS Brunswick to the system will satisfy this need at a lower cost and will add facilities and opportunities for aviation services beyond what would be possible at Wiscasset.

The local government is responsible for land use planning, zoning, and regulations necessary to provide land use compatibility with future airport operations. The Town of Brunswick currently maintains two NAS Brunswick Flight Path Overlay Zones, which limit incompatible development in areas directly to the north and south of the existing airfield. However, these zones are based upon 1986 military aircraft operations, and do not reflect the needs of proposed future civilian aviation operations. In addition, these zones only protect land outside of the installation boundary.

Consequently, there are no specific land use controls or zoning regulations (e.g., aircraft noise, accident potential, and obstruction clearance criteria) within the current installation boundary to prevent incompatible land uses in areas that could be affected by future aircraft operations. Incompatible land uses around an airfield can impact operations and safety. In addition, noise associated with airfield operations may not be compatible with some land uses in proximity to the airfield. Incompatible land uses could include uses that attract birds and wildlife; involve lighting (direct or reflected) that could impair pilots' vision; generate smoke, steam, or dust; generate electromagnetic interference; or involve towers, tall structures, and high vegetation.

To promote public health and safety and to protect the operational capability of the airfield, implementation of Alternative 1 may require the reevaluation of the local zoning ordinance to identify the need for establishing land use controls that would prevent incompatible development from occurring within any aircraft operational areas. It is assumed that the Town of Brunswick will amend the Town of Brunswick Zoning Ordinance and Map to reflect any FAA changes to the existing Flight Path Overlay Zone (Brown 2010; see Appendix A).

Airport development and operations would be further regulated by the FAA and, if applicable, may require implementation of the following federal legislation and airport-related regulations:

- Aviation Safety and Noise Abatement Act of 1979;
- Federal Aviation Regulation Part 150 Noise Compatibility Program;
- Airport and Airway Improvement Act of 1982;
- Airport Noise and Capacity Act of 1990 (National Noise Policy);
- FAA Advisory Circular 150/5200-33, Hazardous Wildlife Attractants on or Near Airports;
- Federal Aviation Regulation Part 77; and
- AC 70/7460-2J, Proposed Construction or Alteration of Objects that May Affect the Navigable Airspace.

Overall, the aviation component is consistent with the Town of Brunswick's Zoning Ordinance and, if applicable, some land use controls would be established to mitigate incompatible development from occurring in the areas surrounding the airfield. As a result, the aviation component of Alternative 1 would not be expected to have a significant impact on land use resources.

4.1.1.2 Surrounding Land Use and Zoning

Implementation of Alternative 1 would not directly impact surrounding land uses, since all proposed development would be located within the boundaries of NAS Brunswick, the McKeen Street Housing Annex, the East Brunswick Radio Transmitter Site, and the Sabino Hill Rake Station. Alternative 1 is consistent with the objectives of the *Town of Brunswick 2008 Comprehensive Master Plan*, including reintegrating the NAS Brunswick property back into the community and implementing zoning that is consistent with overall Town policies encouraging denser development in designated growth areas and preserving the rural character outside of growth areas. The land use plan for Alternative 1 and applicable Town of Brunswick/Town of Phippsburg zoning for the NAS Brunswick, McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station properties complements the surrounding built environment, land uses, zoning, and planning areas. Figure 4.1-5 identifies the land uses surrounding the installation. Proposed land uses that are similar to adjacent land uses outside the installation include the following:

- The Natural Areas and Open Space and Recreation land use district, which is adjacent to the existing Coastal Protection planning area to the south and east. If a portion of the Open Space and Recreation District is developed with tourism attractions (including potentially a park and gardens), that land use would be compatible with surrounding conservation land uses because it would not involve intensive development and would conserve open space.

- The Professional Office, Community Mixed-Use, and Residential land use districts adjacent to the existing Cooks Corner Commercial Area to the north and northeast.

- The Natural Area and Education/Natural Area on the western boundary of the installation, including the Bowdoin College PBC, which is adjacent to the Town's Residential and Extended Residential planning areas.

- The McKeen Street Housing Annex, which is located within the Town Residential planning area.

- The East Brunswick Radio Transmitter Site, which is located within the Farm and Forest Conservation Area.

Full build-out of Alternative 1 would likely generate some indirect off-site land use impacts as a result of the residential, commercial, recreational, and industrial development that would occur on the installation. In addition to directly adding new housing stock and commercial space on the installation, Alternative 1 also would result in an indirect demand for off-site housing and commercial space to serve residents and businesses moving into the immediate project area and tourists that would use recreation facilities and open space and participate in cultural activities.

4.1.1.3 Coastal Zone Management

The Navy has determined that the disposal of NAS Brunswick, the McKeen Street Housing Annex, the East Brunswick Radio Transmitter Site, and the Sabino Hill Rake Station under Alternative 1 would be consistent to the maximum extent practicable with the enforceable coastal zone policies of the Maine Coastal Program. However, the future reuse and development of the installation could be subject to state environmental and land use laws, including the Maine Coastal Program, and other related permit requirements, as well as the potential for federal consistency reviews. Official consultation with the Maine State Planning Office was initiated on January 13, 2010, with a letter outlining the Navy's negative determination and documentation. A copy of the Maine Coastal Zone Consistency Determination is included in Appendix M.

4.1.2 Alternative 2

4.1.2.1 Land Use and Zoning

Implementation of Alternative 2 would result in the redevelopment of NAS Brunswick, the McKeen Street Housing Annex, the East Brunswick Radio Transmitter Site, and the Sabino Hill Rake Station with a higher density of residential and community mixed-use development than under Alternative 1 and no reuse of the existing airfield. Alternative 2 incorporates six different land use planning districts to create a mix of land use types and preserve open space and natural areas (see Figures 4.1-6 and 4.1-7). Approximately 1,580 acres of the total installation property would be redeveloped. The remaining portion of the installation, 1,620 acres, would be dedicated to a variety of active and passive land uses, including recreation, open space, and natural areas. Recreational uses could include tourism developments, which are compatible with redevelopment goals

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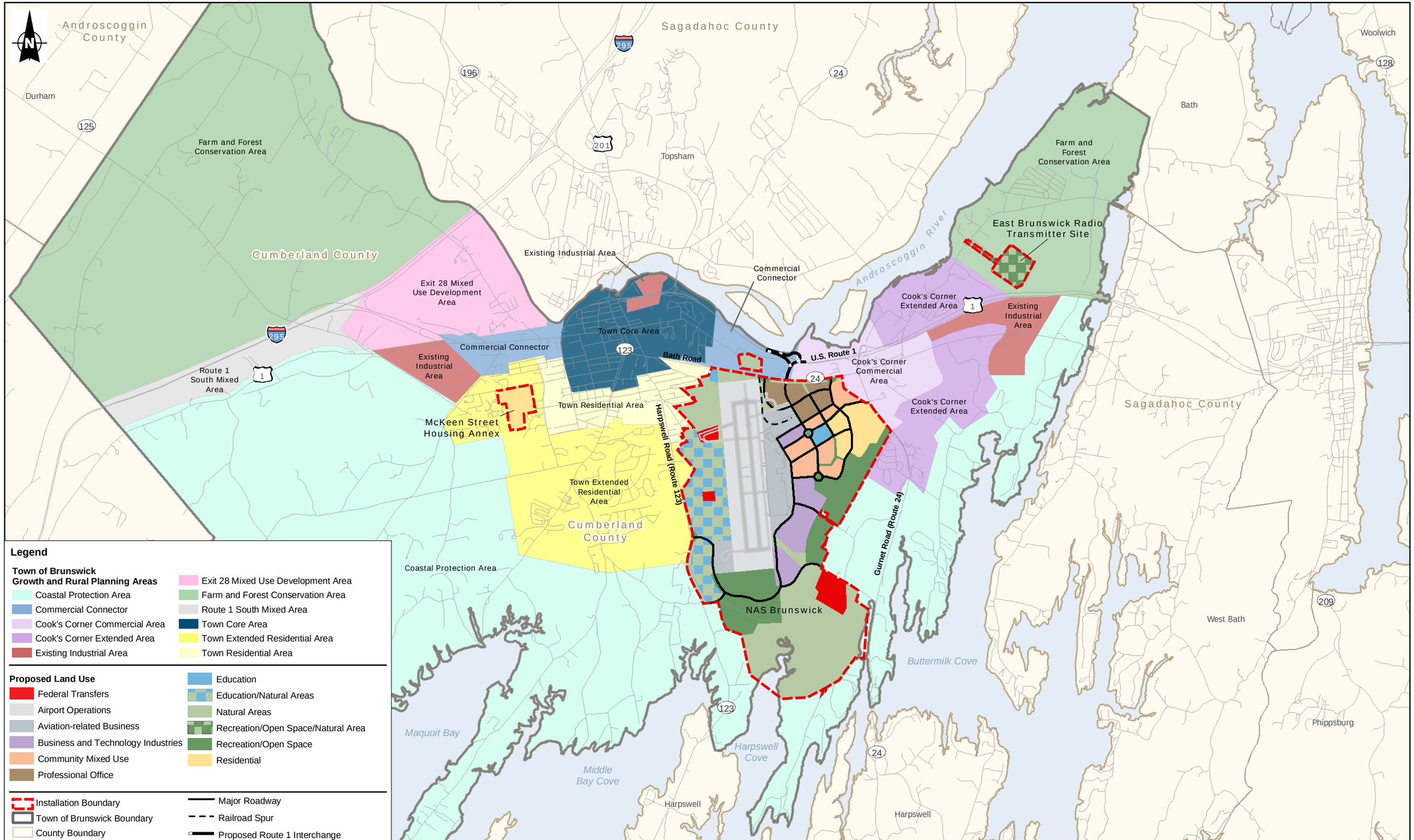
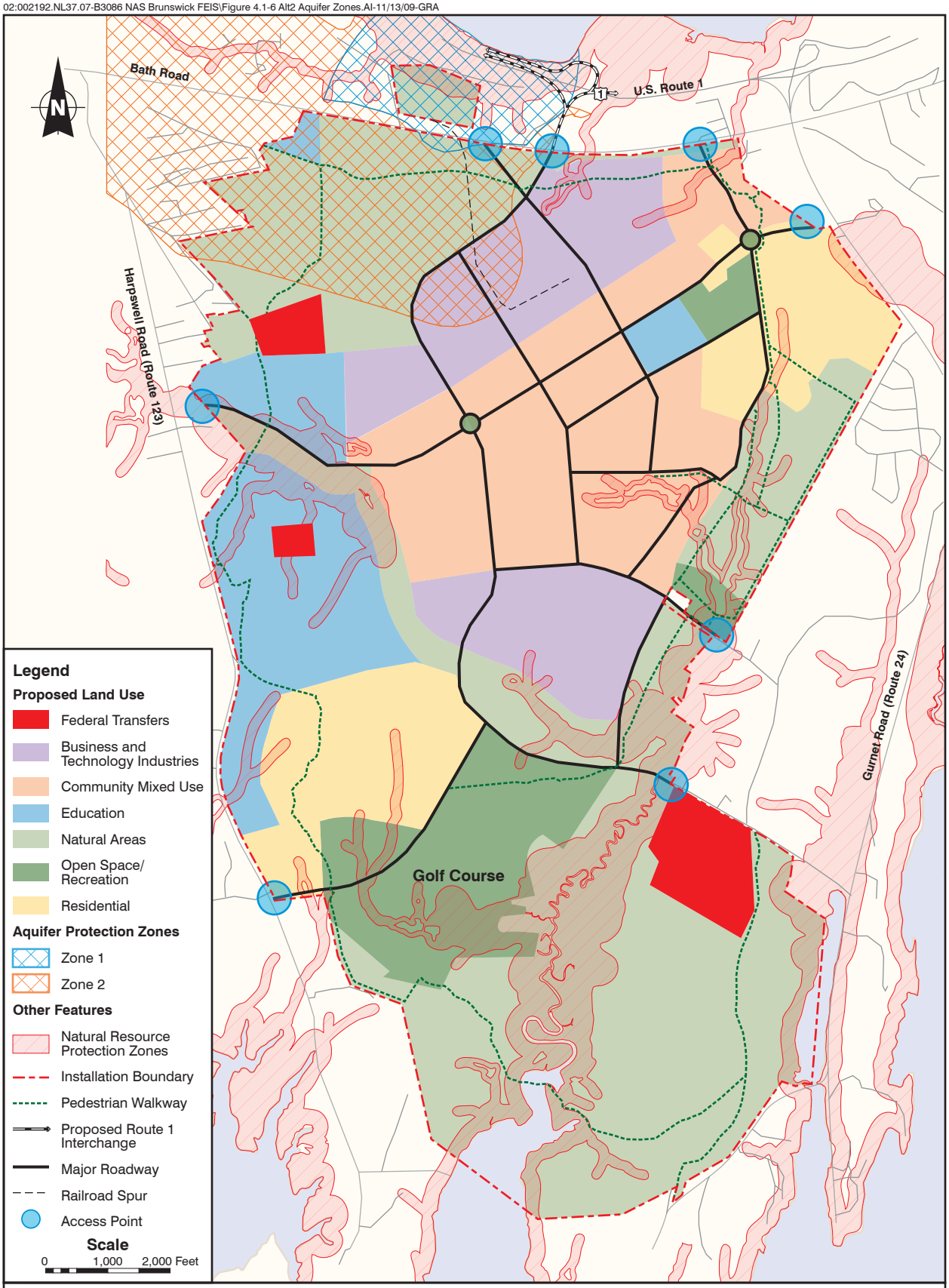


Source: Town of Brunswick 2008a; BLRA 2007a.

Figure 4.1-5
Alternative 1
Surrounding Land Use and Zoning
Brunswick, Maine

02:002192.NL37.07-B3086 NAS Brunswick FEIS\Figure 4.1-6 Alt2 Aquifer Zones.AI-11/13/09-GRA



SOURCE: BLRA 2007a

Figure 4.1-6
Alternative 2, Land Use
Brunswick, Maine

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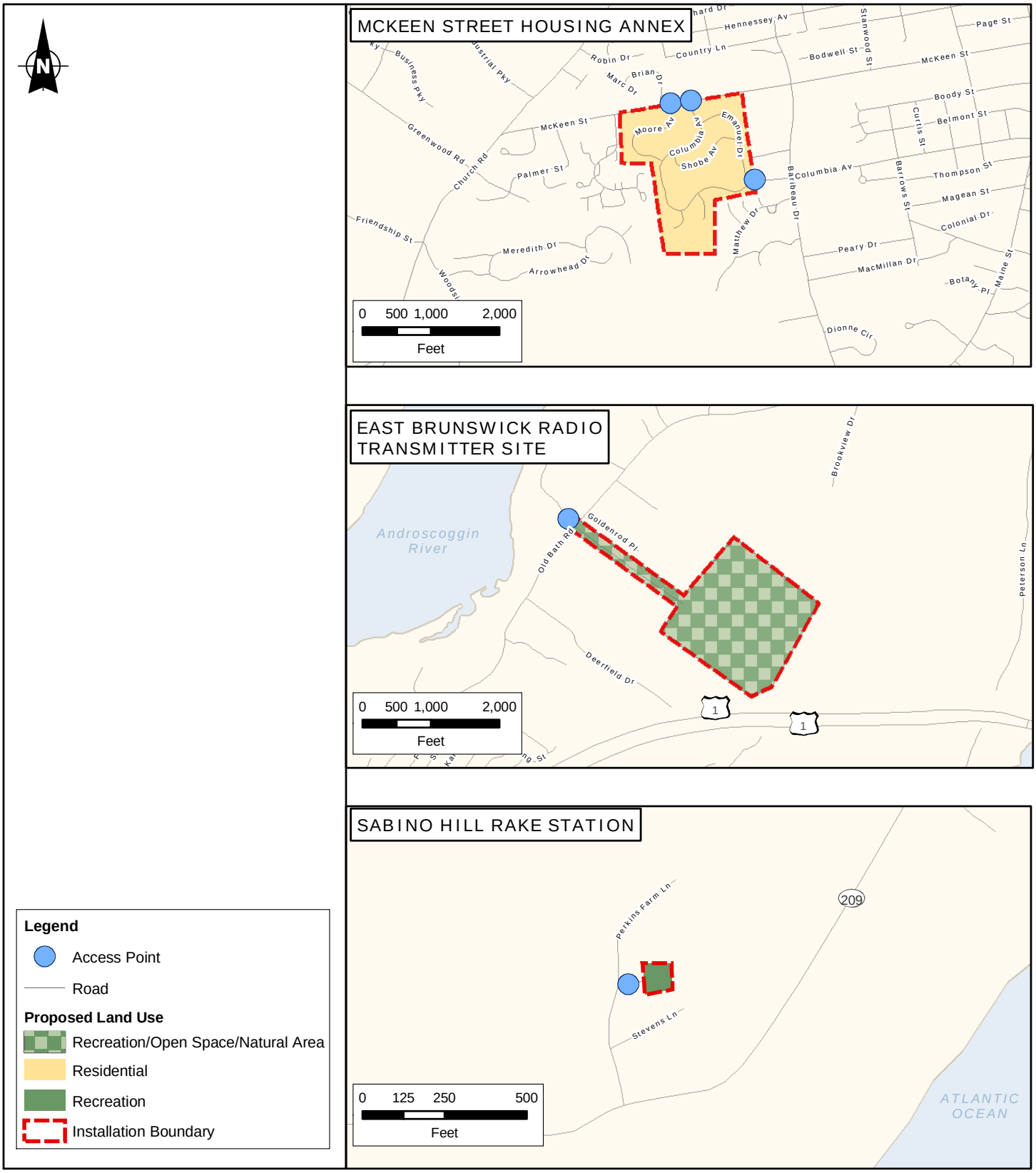

Figure 4.1-7
Alternative 2
Outlying Properties Land Use
Brunswick and Phippsburg, Maine

for the preservation of open space and natural areas. It is anticipated that full build-out of Alternative 2 would be implemented over a 20-year period. Table 4.1-3 identifies the proposed land uses for the property under Alternative 2.

Table 4.1-3 Alternative 2 – Land Use Districts

Land Use District	Acres	Percent of Total
Airport Operations	0	0
Aviation-related Business	0	0
Professional Office	0	0
Community Mixed Use	490	15
Business and Technology Industries	375	12
Education District	315	10
Residential District	400	12
Recreation and Open Space	340	11
Natural Areas	1,280	40
Total	**3,200**	**100**

Notes:
[1] Land use calculations include the NAS Brunswick, McKeen Street Housing Annex, and East Brunswick Radio Transmitter Site properties.
[2] This development mix is an estimate of the final development mix; however, the mix is subject to change based on market conditions and other factors.

Alternative 2 would impact the existing land use conditions within the boundaries of NAS Brunswick, the McKeen Street Housing Annex, the East Brunswick Radio Transmitter Site, and the Sabino Hill Rake Station. These impacts would include a significant change to the existing built environment, including densely populated Community Mixed Use, Business and Technology Industries, Education land use districts, and no reuse of the existing airfield.

Consistency with Local Zoning and Land Use Plans

As with Alternative 1, Alternative 2 is consistent with the objectives of the *Town of Brunswick 2008 Comprehensive Master Plan*, including the reintegration of the NAS Brunswick property back into the community. However, the land use plan for NAS Brunswick, as identified under Alternative 2, conflicts with the Town of Brunswick Zoning Ordinance's BNAS Reuse District and the approved Reuse Master Plan (Town of Brunswick 2009b). Specifically, Alternative 2 does not include the Reuse Master Plan's and Town of Brunswick's Airport Operations, Aviation-related Business, and Professional Office land use districts for the installation. In addition, the boundaries and acreage of each land use district under Alternative 2 is not consistent with the Reuse Master Plan or the Town of Brunswick Zoning Ordinance.

Implementation of Alternative 2 would require a reevaluation of the Reuse Master Plan and the Town of Brunswick Zoning Ordinance. The Town's Zoning Ordinance regulates the reuse and redevelopment of NAS Brunswick based on the Reuse Master Plan. The amendments were designed by the Town of Brunswick, in collaboration with MRRA, to promote redevelopment of the installation in accordance with the Reuse Master Plan.

The land use plan for the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station is consistent with current town zoning, and the proposed reuse of these properties would have no impact on land use.

Land Use Build-out

Under Alternative 2, the built environment of NAS Brunswick would be more intensely developed than under existing conditions or under Alternative 1. The redevelopment would introduce new land uses to the property, including densely populated Community Mixed Use, Business and Technology Industries, and Education land use districts. In addition, Alternative 2 does not include the Airport Operations, Aviation-related Business, or Professional Office districts, as included in Alternative 1. Therefore, Alternative 2 includes more than double the area of Community Mixed Use (315 additional acres), Business and Technology Industries (185 additional acres), Education (115 additional acres), and Residential (185 additional acres) land uses than Alternative 1.

Full build-out of Alternative 2 would provide land area to develop a maximum of 8,220 residential units, over 11 million square feet of non-residential floor space, and 1,620 acres of recreation, open space, and natural areas. The build-out includes the reuse of 43 existing non-residential structures, comprising approximately 1.3 million square feet of useable space, and 653 residential units. The remaining development would consist of new residential and non-residential construction. This is an increase from existing 2008 baseline conditions and the projected build-out of Alternative 1. Table 4.1-4 presents the maximum build-out projections for Alternative 2 in 5-year increments. The Build-out Analysis, including applicable zoning regulations, assumptions, and calculations, is presented in Appendix C.

The full build-out of the installation includes an increase in the density of residential and non-residential development as compared to existing 2008 baseline conditions. The projected density would be allowed under existing zoning and land use regulations. In addition, the density of development projected would not be expected to occur at once and would be implemented utilizing a phased development approach over a 20-year build-out period. As with Alternative 1, the intent would be to first reuse existing structures and then develop new building space as future market conditions and improvements to on-site and off-site infrastructure capacity dictate. As a result of the development being consistent with existing zoning, the ability to reevaluate the Reuse Master Plan and the Town of Brunswick Zoning Ordinance to adjust for the lack of an airfield component, and considering the 20-year build-out period, the development projected under Alternative 2 would not be expected to significantly impact land use and zoning.

Table 4.1-4 Alternative 2 – Projected Maximum Build-out

Land Use	Existing Conditions (2008)	Maximum Build-out Projection[1]			
		5 Years	10 Years	15 Years	20 Years
Residential					
Single-family Detached (units)	349[2]	156	347	608	1,041
Apartments, Townhomes, and Condominiums (units)	490[3]	633	1,535	2,934	5,676
Senior Housing (units)	0	130	325	650	1,300
Student Housing (units)	0	72	148	166	203
Total (units)	**839**	**991**	**2,355**	**4,358**	**8,220**
Non-Residential					
Civic and Cultural (sq ft)	--	75,305	183,617	348,648	678,712
Education (sq ft)	--	122,294	283,058	475,410	860,114
Industry, Warehouse, and Storage (sq ft)	--	443,401	1,060,018	1,926,101	3,658,267
Office (sq ft)	--	638,204	1,439,662	2,255,930	3,888,465
Retail and Commercial (sq ft)	--	269,943	626,648	1,060,455	1,928,070
Transportation Facility (sq ft)	--	0	0	0	0
Total (sq ft)	**1,900,078[4]**	**1,549,147**	**3,593,002**	**6,066,544**	**11,013,628**
Hotel or Motel (rooms)	351[5]	125	250	250	250
Recreation, Open Space, and Natural Areas					
Recreation and Open Space (acres)	196[6]	340	340	340	340
Natural Areas (acres)	1,012[7]	1,280	1,280	1,280	1,280
Total (acres)	**1,208**	**1,620**	**1,620**	**1,620**	**1,620**

Notes:
1 Phased build-out totals are cumulative.
2 Includes only 2008 existing detached PPV housing units.
3 Includes only 2008 existing attached PPV housing (224 units) and Bachelor Quarters (266 units).
4 Includes all 2008 existing non-residential structures.
5 Includes all 2008 existing transient visitor quarters.
6 Includes existing golf course (93 acres) and passive recreation area (103 acres).
7 Includes exiting North Clear Zone Parcel (26 acres), East Brunswick Transmitter Site (66 acres), and the weapons compound (930 acres).

Public Benefit Conveyance Land Use

Similar to Alternative 1, approximately 1,469 acres and 18 existing buildings would be provided as a PBC. The proposed uses of the identified PBCs include conservation, education, public safety, recreation, civic and cultural, and child care. Recreational uses could include tourism uses that promote recreation opportunities, cultural activities, and utilization of open space. The proposed uses are consistent with Alternative 2's land use districts, the *Town of Brunswick 2008 Comprehensive Master Plan*, and the Town of Brunswick Zoning Ordinance.

4.1.2.2 Surrounding Land Use and Zoning

Implementation of Alternative 2 would not directly impact surrounding land uses since all proposed development would be located within the boundaries of NAS Brunswick, the McKeen Street Housing Annex, the East Brunswick Radio Transmitter Station, and the Sabino Hill Rake Station. As with Alternative 1, Alternative 2 is consistent with the objectives of the *Town of Brunswick 2008 Comprehensive Master Plan*, including reintegration of the NAS Brunswick property back into the community and implementation of zoning that is consistent with overall Town policies encouraging denser development in designated growth areas and preserving the rural character outside of growth areas. Alternative 2's

land use districts and applicable Town of Brunswick/Town of Phippsburg zoning for NAS Brunswick, the McKeen Street Housing Annex, the East Brunswick Radio Transmitter Site, and the Sabino Hill Rake Station complement the surrounding built environment, land uses, zoning, and planning areas (see Figure 4.1-8).

Full build-out of Alternative 2 would likely generate indirect off-site land use impacts as a result of the residential, commercial, tourism, and industrial development that would occur on the site. It is expected that Alternative 2 would result in indirect demand for off-site housing and commercial space to serve residents and businesses potentially moving into the immediate project area and tourists that would use recreation facilities and open space and participate in cultural activities.

4.1.2.3 Coastal Zone Management

If Alternative 2 is selected, the Navy would be required to prepare a coastal zone consistency determination and submit it to the Maine State Planning Office for concurrence for development proposed under that alternative.

4.1.3 No-Action Alternative

Under the No-Action Alternative, NAS Brunswick, the McKeen Street Housing Annex, the East Brunswick Radio Transmitter Site, and the Sabino Hill Rake Station would be retained by the U.S. government in caretaker status. Facilities would be maintained in accordance with the *BRAC Program Management Office (PMO) Building Vacating, Facility Layaway, and Caretaker Maintenance Guidance* (March 2007). The existing PPV partner housing area would be expected to be occupied, per lease agreement. No reuse or redevelopment of non-PPV property would occur at the installation under this alternative (see Figure 4.1-9). Implementation of the No-Action Alternative would result in approximately 2,985 acres of installation property being left unused or underutilized.

4.2 Socioeconomics

This section presents an analysis of the potential socioeconomic impacts (on population, income, employment, housing, and environmental justice) from the implementation of Alternative 1, Alternative 2, and the No-Action Alternative. The socioeconomic study area, as previously defined in Section 3.2, is the Brunswick LMA.

For this analysis, the projections for population, housing, and employment were based on resource-specific multipliers and the build-out analysis. Projections were made for each of the alternatives for the maximum number of residential housing units and total floor area of commercial, business, industrial, and educational building space allowed under current zoning regulations. This method of estimating the potential housing and economic development results in very conservative estimates and is typically utilized in environmental impact statements, which identify possible or potential impacts on environmental or natural resources. Other studies, such as for infrastructure planning, use a different set of assumptions and methodologies, and the results cannot be easily compared. This will be explained in more depth in the following sections.

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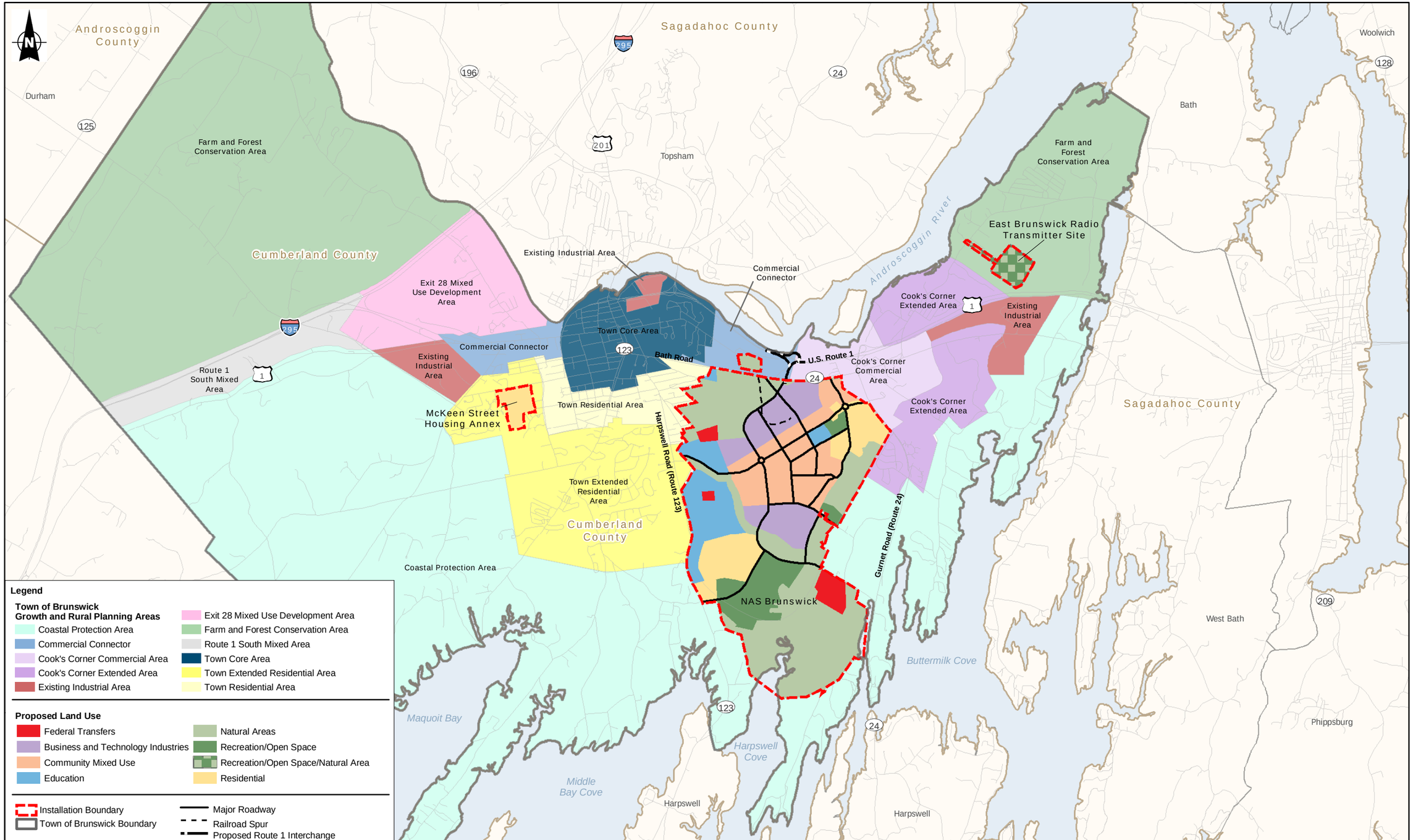

Source: Town of Brunswick 2008a.

Figure 4.1-8
Alternative 2
Surrounding Land Use and Zoning
Brunswick, Maine

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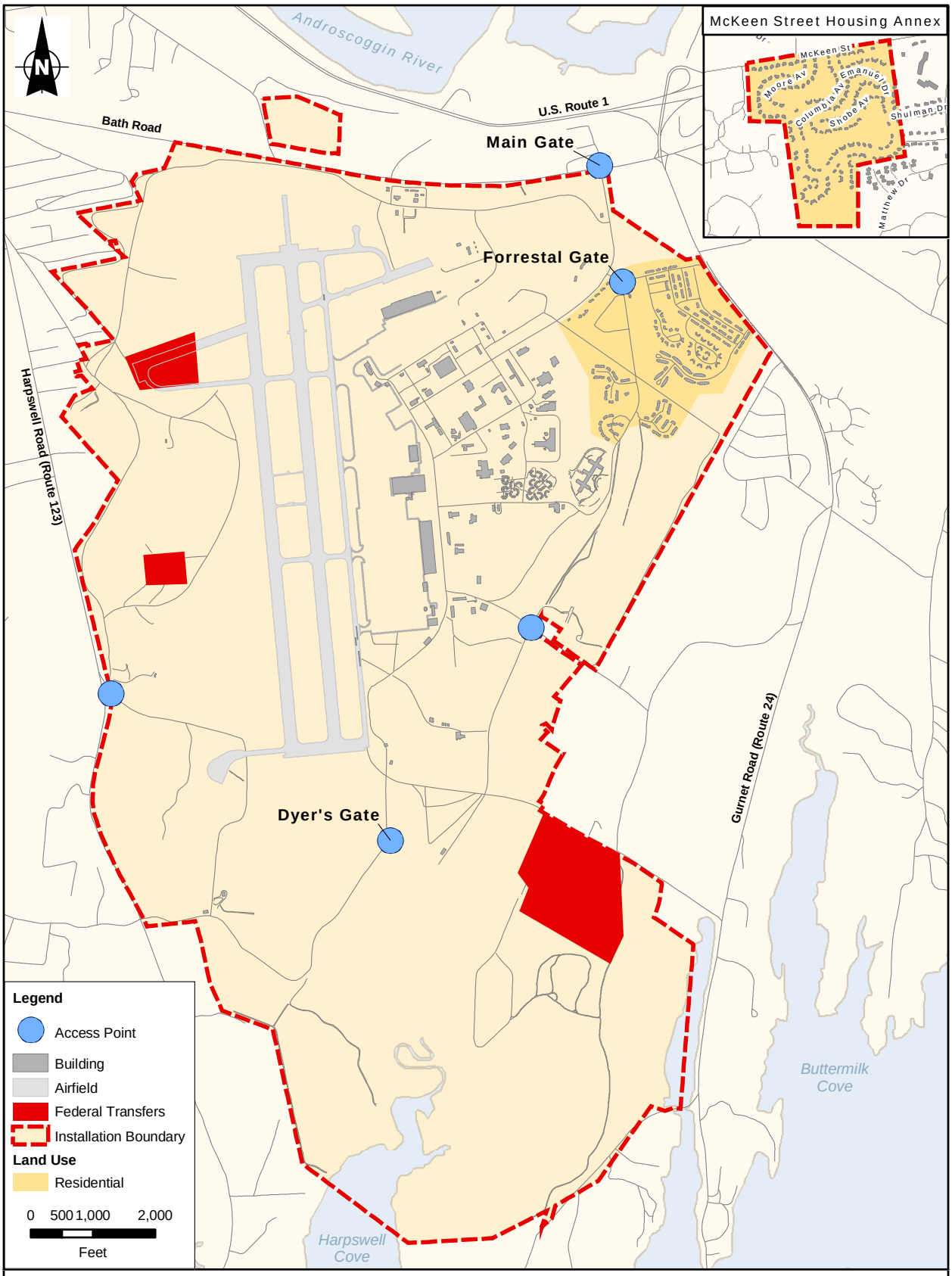

Figure 4.1-9
No-Action Alternative Land Use
NAS Brunswick, Maine

Section 4.2 also presents a description of the methodology used to calculate these projections for the purposes of this environmental impact statement (both direct and indirect/induced), along with the assumptions and definitions of multipliers. A more comprehensive description of the methodology is presented in Appendix N. Refer to Section 2 (Alternatives, Including the Proposed Action) and Appendix C for more information on the build-out analysis.

Under all alternatives, no new buildings or residential units would be constructed at the East Brunswick Radio Transmitter Site or Sabino Hill Rake Station; therefore, these outlying properties are not discussed as part of the socioeconomic analysis. The McKeen Street Housing Annex is included in all residential projections, but it is not specifically discussed otherwise as it would continue to be in a residential district. All of the outlying properties listed above are located within the Brunswick LMA and, therefore, are assumed to be included as part of any discussion of the Brunswick LMA.

4.2.1 Alternative 1 (Preferred Alternative)

Under Alternative 1, the reuse of the existing airfield is a major component of the proposed redevelopment. This includes the conversion of the NAS Brunswick airfield to a civilian facility. As discussed previously in Section 4.1.1.1, Aviation Land Use Planning, two major public interest objectives would be served by this proposed reuse:

1. **Highest and Best Use of Public Investment.** In 2007, the FAA provided the State of Maine with funds to conduct a State System Plan Update in collaboration with the BLRA. The study found that this site was feasible for the development of a civilian airport that could provide general aviation access to the mid-coast region of Maine north of Portland, serve as a maintenance and repair facility for transport aircraft, and support a variety of other aviation-based industries. While the two 8,000-foot runways exceed the capacity needs of the initial airport forecast of activity, they were recently reconstructed and aviation is seen as the highest and best use of this public investment through their physical life. This civilian airport could serve to attract new business to the region or help retain existing businesses and overall have a positive socioeconomic impact on the community.

2. **State Airport System Requirements.** The approved State System Plan identified a need for corporate aviation access to the Boothbay region. This region includes major export manufacturing industries, such as the Bath Ironworks Naval Shipyard, and prime coastline residential areas. The addition of the former NAS Brunswick airfield to the NPIAS system will satisfy this need at a lower cost than making modifications at another nearby existing airport (Wiscasset, Maine) and will add facilities and opportunities for aviation services beyond what would be possible at Wiscasset.

In addition to the aviation component of Alternative 1, other land use districts are proposed. The potential impacts associated with these developments are discussed in the following subsections.

4.2.1.1 Population

In this analysis, population impacts resulting from the reuse and redevelopment of NAS Brunswick were measured by analyzing the build-out and occupation of the proposed residential units on the former installation property. These would be considered the direct population impacts. As discussed in more detail in Section 4.2.1.3 (Employment) and as outlined in Appendix N, there also exists the potential for a change in the off-base population as a result of this action. However, due to a combination of factors, including the projected growth of the Brunswick LMA, the size of the civilian labor force, the unemployment rate, and the number of individuals who commute to the Brunswick area for employment (see Appendix N), it is not expected that the change in off-base employment would significantly alter the overall population of the Brunswick LMA beyond what is presented as a direct impact. The development proposed at NAS Brunswick is a mixed-use community where individuals work, live, and recreate all in the same planned development, and the majority of the impacts on the natural and human environments would be contained on the former installation property.

In terms of direct population impacts, under Alternative 1, a maximum of 2,946 residential housing units would be available upon full build-out of NAS Brunswick and the McKeen Street Housing Annex. Reuse and development of residential units at the installation would be phased over a 20-year period as market conditions and other development factors dictate. At full build-out, it is projected that Alternative 1 would result in 5,082 additional people moving to the area.

Population projections are based on the full build-out of the property under Alternative 1 and the full occupancy of all residential units. Population projections were derived by applying residential demographic multipliers from Rutgers University for the State of Maine to the projected residential units for each 5-year phase of the installation build-out (Rutgers University 2006). The final build-out is a best-case projection of future conditions based on planning assumptions and applicable land use zoning regulations. The actual build-out of the property is subject to change due to market conditions and other development factors.

Table 4.2-1 presents population projections for NAS Brunswick based on the 5-, 10-, 15-, and 20-year build-out of residential units on the installation. For more information on the population demographic multiplier and housing unit types (including number of bedrooms) and corresponding populations under Alternative 1, see Appendix N.

Table 4.2-1 Projected Population under Alternative 1[1]

Residential Units	Projected Population			
	5 Years	10 Years	15 Years	20 Years
Single-Family Detached Homes	249	503	748	996
Townhome/Condo and Apartments	470	1,090	1,922	3,496
Student and Senior Apartments (1 bedroom)	113	248	362	590
Total	**832**	**1,841**	**3,032**	**5,082**

Note:
[1] This table represents a summary of the projected population analysis. For a description of methodology and assumptions and detailed tables, see Appendix N.

In 2008 an estimated 2,722 active-duty Navy personnel (plus 3,315 Navy family members) were living within 10 miles of NAS Brunswick. Approximately 2,234 (based on DEERS) active duty personnel were either stationed at NAS Brunswick or were a family member to someone stationed at NAS Brunswick (Joy 2009a). As noted in Section 3.2, the exact number of associated family members is not available. However, it is assumed that the majority of family members of active-duty Navy identified in the DEERS data (3,315) were associated with active-duty personnel stationed at NAS Brunswick. The number of Navy family members associated with NAS Brunswick was calculated by dividing the number of active-duty personnel assigned to NAS Brunswick (2,234) by the number of active-duty Navy personnel within a 10-mile radius of NAS Brunswick (2,722) and multiplying the result by the number of Navy family members living within 10 miles of NAS Brunswick (3,315). Thus, closure of the installation would result in the loss of approximately 2,234 active duty Navy military personnel and approximately 2,721 associated active duty Navy family members, for a total of 4,955 individuals.

Other military personnel associated with NAS Brunswick, including 868 Navy reservists, would not be expected to relocate from the region. Reservists typically only serve one weekend per month and tend to be comprised of the local population or travel to NAS Brunswick from outside the region. The reservists have other primary employment and would not be expected to relocate from the region because of closure, disposal, and reuse of NAS Brunswick. No regional population impact would be expected under Alternative 1 with regard to reservists.

Upon closure of the installation, some civilian employees may move out of the area through mobility agreements with the Navy or for other job offers. Some employees have been offered early retirements, and others may elect to stay in the Brunswick LMA and search for other employment opportunities. No regional population impact would be expected under Alternative 1 with regard to civilian personnel.

In 2007, the total population of the Brunswick LMA was 68,836. Under Alternative 1, the estimated initial population loss due to the closure of NAS Brunswick (4,955) would be offset by the anticipated increase of 5,082 individuals at full build-out of the installation, resulting in a net population gain of 127. In addition to the population growth on the installation due to the development of residential

units, additional population growth may occur outside of the installation boundary. The estimated population growth under Alternative 1 (5,082) is based on the number of residential units proposed for construction and reuse on the installation, but does not include employment projections or off-installation population changes. Individuals may move into the Brunswick LMA from other regions for employment opportunities on the former installation property. For more information on employment projections under Alternative 1, see Section 4.2.1.3

The Maine State Planning Office projects the population of the Brunswick LMA and the State of Maine as a whole to grow over the next 20 years (Maine State Planning Office 2008) (see Section 3.2.1). An influx of population could stimulate the development proposed in Alternative 1 and foster additional growth. In addition, Section 3.2.1 noted that the overall population of the State of Maine is growing older. This is due to both the aging of the existing population as well as retirees who are able to move to locations of their choosing to live. Coastal Maine is a desirable location to purchase a retirement home for many individuals, and with the on-coming retirement of the "baby-boomer" generation, Maine represents an attractive retirement option.

Thus, implementation of Alternative 1 would result in a slight increase in the overall population of the region. There would be an initial, short-term loss in population; however, as the installation is redeveloped and individuals move to the area, the size of the population is projected to grow and stabilize. With new residential options in the town of Brunswick, there may also be a shift in where people live within the Brunswick LMA.

4.2.1.2 Income

Under Alternative 1, there would be phased development (construction) and expansion of business opportunities over the course of the 20-year proposed build-out of NAS Brunswick following disposal. The design, renovation, and construction jobs created in the short term, immediately following disposal of the installation, would mitigate a small portion of the local personal income lost due to the departure of military and civilian personnel formerly employed at the installation. Under Alternative 1, the estimated construction spending, including construction payroll, would be over $40 million per year, resulting in an increase in personal income in the region related to the construction sector.

In the long term, as full build-out of the installation is realized, there could be a direct net increase of 10,500 employment opportunities and associated personal income resulting from the development proposed under Alternative 1 (see Section 4.2.1.3, Employment). Although specific businesses and employment opportunities have not yet been defined, based on development proposed in the Reuse Master Plan, it is expected that these jobs would be in industries such as technology-based research and development, air operations and aviation-related businesses, laboratory work and testing, expansion of higher education opportunities (i.e., professorships), and opportunities in numerous other professional fields (BLRA 2007a).

Based on the development proposed under Alternative 1, it is expected that the personal income lost due to closure of NAS Brunswick would be mitigated by short-term construction jobs and, in the long-term, replaced through the establishment of new employment opportunities as the installation is fully redeveloped. In addition, as presented in Section 4.2.1.3 and Appendix N, at the end of the 20-year build-out, it is anticipated that an additional 2,071 indirect/induced off-base jobs would be created by the development occurring on the former installation property. This would further mitigate the short-term loss of personal income and increase the projected personal income of those in the civilian labor force of the region.

4.2.1.3 Employment

Maine State Planning Office Report

In 2007 the Maine State Planning Office issued a report titled *Understanding the Impact: Closing Naval Air Station Brunswick* (Renski and Reilly 2007). The report isolates the impact of the installation's closure and does not incorporate any of the mitigating effects of reuse or redevelopment of the installation property. Since redevelopment is not considered in the report, the actual impact of disposal and reuse on employment would likely be less than predicted in the 2007 analysis.

The report estimated that the first major reduction in active-duty military personnel would be expected in FY 2009, when 22% of the military personnel are anticipated to have relocated. Additional force reductions are expected to occur during FY 2010 (62%) and FY 2011 (15%). The civilian workforce is expected to decline more gradually, starting with 4% in FY 2007 and scaling up to 33% in FY 2010 and FY 2011 (Renski and Reilly 2007).

Over 68% of NAS Brunswick's federal civilian workforce and 77% of the military workforce live in the Brunswick LMA. The study reports that in the Brunswick LMA, there will be a loss of 2,686 federal military jobs and 467 federal civilian jobs by FY 2011[1] (a total of 3,153). This decrease in employment would account for approximately 84% of the estimated statewide decrease (Renski and Reilly 2007).

Renski and Reilly reported that the initial impact on employment is associated with relocation of the military and civilian personnel currently employed at NAS Brunswick. It is estimated that, with the direct impact of the above-mentioned 3,153 NAS Brunswick jobs and all indirect regional impacts (i.e. retail, construction, and food services), there would be a loss of approximately 5,593 individuals employed by FY 2011[1].

Employment Projections Based Upon Alternative 1

The Maine State Planning Office report (Renski and Reilly 2007) did not analyze redevelopment of the installation property. Therefore, for the purposes of this EIS, employment projections for the phased redevelopment of the NAS Bruns-

[1] These statistics are assumed under the worst-case scenario: no redevelopment of the base and 10% of retirees move from the area.

wick property were estimated based on the build-out scenario proposed under Alternative 1 and the 2008 baseline of 3,660 individuals (including civilian, active-military, and reservists) employed on the installation (Joy 2009a). The projections were estimated using industry-specific multipliers for each land use district and associated square footages and number of hotel units within those land use districts. In addition, both direct impacts associated with the redevelopment of the former installation and indirect/induced impacts on off-base employment were projected. For this EIS analysis, direct employment impacts include those jobs created on the former installation as a result of the build-out proposed by and consistent with the Reuse Plan. Indirect/induced employment impacts include the jobs created off-base to support either the businesses established on the former installation or to support those individuals employed or living on the former installation property. Indirect impacts are defined as impacts that reflect changes in industry-to-industry purchases as they respond to the new demands of directly impacted industries; induced impacts are defined as impacts that reflect changes in spending from households as income increases/decreases due to the change in production. For the purposes of this analysis, both indirect and induced impacts were combined and considered "off-base impacts." Due to the nature of the mixed-use development proposed on the former installation property, many of the traditional "indirect or induced" employment impacts are captured within the direct effects due to a portion of the businesses supporting development being located on the property. For more information on the methodology, assumptions, and multipliers used in the employment projection process, see Appendix N.

Both short- and long-term and direct and indirect/induced employment impacts would be associated with the disposal and reuse of NAS Brunswick, construction of the new facilities proposed under Alternative 1, and operation and maintenance of the proposed facilities.

Short-term Impacts

Impacts related to construction employment and spending related to the redevelopment of the installation are considered short-term. These impacts are expected to occur throughout the 20-year build-out of the installation and encompass direct, indirect, and induced components, as outlined below.

Initially, 3,660 jobs would be lost when the installation is closed. Redevelopment of the former installation, including construction and renovation of facilities proposed under Alternative 1, would have a positive short-term economic and employment impacts in the Brunswick LMA. Under Alternative 1, 1,570 acres of the approximately 3,200 acres being disposed of are proposed for use as recreational and open space or natural areas. In these areas, some construction and earth-moving activities may be required to construct proposed recreational amenities such as the 18-hole golf course. However, the majority of the construction-related impact would be associated with the balance of the property, consisting of 1,630 acres of airport-related facilities, office and community mixed-use space, educational facilities, and residential units. Some existing facilities would be renovated to accommodate new uses, but other facilities would need to be newly constructed.

Direct Short-term Impacts. To calculate the direct short-term employment impacts under Alternative 1, multipliers were applied to the total construction spending per year (see Appendix N). The total construction costs associated with Alternative 1 were estimated using the build-out analysis performed for Alternative 1 (see Appendix C) and applying industry standard costing factors. The cost to construct the 2,946 residential units and 9.2 million square feet of non-residential space proposed under Alternative 1 is estimated to be $800.6 million (2009 dollars). The construction costs account for the supplies, materials, overhead, and payroll associated with the proposed construction.

Assuming that the proposed construction would occur evenly throughout the 20-year period, and accounting for a conservative estimate of annual inflation at 2% and a discount factor of 10%, the total net present value of construction proposed under Alternative 1 would be $397.7 million.

Using these construction expenditure figures, it is possible to estimate the number of both direct and indirect/induced jobs that would be created by applying industry standard multipliers customized to the study area. In this case, RIMS II multipliers from the Department of Commerce, Bureau of Economic Analysis, were obtained and applied to the estimated construction expenditures. Under Alternative 1, it is estimated that 368 direct construction-related jobs would be generated on an annual basis through the 20-year build-out of the installation. Appendix N contains additional details on the calculation of employment impacts.

To the extent practicable, renovation and construction projects would utilize local construction firms and labor in order to stimulate and benefit the local economy. The construction-related economic and employment benefits are considered short-term impacts due to the fact that the construction-related jobs and spending would end when construction is complete.

Off-base Short-term Impacts (Indirect and Induced). Utilizing the same methodology as used for the direct employment impacts, it is estimated that an additional 275 indirect and induced jobs would be created in the local community that would support the construction spending associated with redevelopment of the installation. This could include local hiring to support construction-related businesses/suppliers, or hiring to accommodate construction workers and spending (e.g., restaurants). Similar to the construction-related jobs, these indirect and induced jobs are considered short-term due to the fact that construction-related jobs and spending would end when construction is complete.

Long-term Impacts

Under Alternative 1, long-term positive employment impacts would include jobs created by the reuse or redevelopment of the installation, including the proposed airfield operations and aviation-related business area, the professional office space and community mixed-use areas, the business and technology industry areas, and the educational districts. These land use districts would be built-out over the proposed 20-year period and would provide additional jobs in each of these industries. Employment figures were projected by applying industry-specific multipliers to the types of industries proposed in each land use district based on square

footage of non-residential space. In addition, there would be indirect/induced off-base employment impacts associated with the build-out of the former installation property. Detailed descriptions of the methodology and assumptions used in these employment calculations (for both direct and indirect), as well as employment projections by industry and land use district, are provided in Appendix N.

Direct Long-term Impacts. Under Alternative 1, it is projected that 14,160 direct jobs could be created upon full build-out. Table 4.2-2 shows the total projected employment during each phase of redevelopment, as well as existing baseline conditions and the net change in employment as redevelopment occurs.

Table 4.2-2 Alternative 1 – Summary of Projected Employment[1]

	2008 Baseline	5 Years	10 Years	15 Years	20 Years
Projected Employment	3,660	1,336	4,159	7,701	14,160
Net Change	**NA**	**-2,324**	**+499**	**+4,041**	**+10,500**

Note:
[1] This table presents a summary of the projected employment analysis. For a description of methodology and assumptions and detailed tables, see Appendix N.

Initially, the loss of military and civilian jobs associated with the closure of NAS Brunswick would have a significant negative impact on local employment. However, at full build-out after 20 years, it is expected that new employment in a variety of industries could more than offset this initial loss. In addition, short-term construction-related jobs created during redevelopment of the former installation are not included in these employment figures, and these would further mitigate the initial loss in jobs.

Off-base Long-term Impacts (Indirect and Induced). The development on the former installation would result in direct impacts on employment, but not all development would be contained within the property boundaries. Some businesses, either supporting other businesses or supporting the employees/residents on the former installation property, would locate elsewhere in the Brunswick LMA. These are considered indirect and induced employment impacts and were calculated as part of this socioeconomic analysis.

The assumptions and methodology used to calculate the off-base employment impacts are outlined in Appendix N. In summary, three steps were taken to estimate off-base employment impacts: (1) calculate initial indirect/induced impacts based on direct employment impacts using local standard multipliers, (2) subtract the number of indirect and induced jobs that are included within the proposed on-base redevelopment (due to mixed-use development), and (3) subtract the number of lost indirect/induced jobs associated with the former NAS Brunswick. Table 4.2-3 presents the total off-base employment impacts, by phased development, under Alternative 1 utilizing this process.

Table 4.2-3 Alternative 1 – Summary of Projected Off-base Employment[1]

	5 Years	10 Years	15 Years	20 Years
Projected Net Direct Employment (from Table 4.2-2)	-2,324	+499	+4,041	+10,500
Projected Indirect/Induced Off-base Employment (jobs)	**-2,759**	**-1,900**	**+149**	**+2,071**

Note:
[1] This table presents a summary of the projected off-base employment analysis. For descriptions of the methodology and assumptions and detailed tables, see Appendix N.

4.2.1.4 Housing

Recognizing the concerns of local residents and homeowners living around the installation, the Maine State Housing Authority (MaineHousing) conducted a survey assessing the potential impact on housing resulting from the closing and disposal of NAS Brunswick (MaineHousing 2008b). Although the survey did not take into account either of the redevelopment alternatives analyzed in this EIS (the EIS alternatives had not been formalized at the time of the survey), it does offer insight into the decision-making process of current homeowners and what could potentially be experienced in the local housing market.

The survey was sent out in March 2008 to civilian and military personnel stationed or working at NAS Brunswick. The survey asked approximately 20 questions, such as whether the individual was military or non-military, the type of housing they lived in, questions about school children living in the household, and whether they planned on retiring in Maine, moving, or selling their home. There was a 30.3% response rate, and 802 responses were collected in total: 568 military (26.2% response rate) and 230 civilian (46.4% response rate). Of the respondents, approximately 46% identified themselves as homeowners, 31% identified themselves as renters, and 23% identified themselves as residents of base housing.

Of the individuals who responded to the survey, 369 were self-identified as homeowners. Of these 369 responders, 45% planned to sell their home, 30% do not know whether they would sell their home, and 25% do not plan to sell their home (see Table 4.2-4).

Table 4.2-4 Maine State Housing Authority Survey Responses (2008)

Respondent	Homeowners	Plan to Sell Home	Do Not Know Whether will Sell	Do Not Plan to Sell Home
Civilian	194	40%	32%	28%
Military – enlisted	135	55%	23%	22%
Military – officer	37	53%	28%	19%
Unknown	3	34%	33%	33%
Total	**369**	**45%**	**30%**	**25%**

Source: MaineHousing 2008b.

The findings from a variety of information gathered from the survey (such as whether the respondent was military or civilian, whether they were a homeowner, and whether they planned to sell, not sell, or did not know) was then applied to all of the households of military and civilian personnel stationed or working at NAS Brunswick (at the time of the survey, this included 2,165 military and 485 civilian households). This multi-faceted calculation gave approximate results on the total

number of homes that could come on the market due to the closing of NAS Brunswick.

It was estimated that the total number of homes that could come on the market would be between 540 (those who will sell) and 860 (those who will sell plus those that do not know if they will sell). On the high-end, of the 860 homes that might be placed on the market, approximately 56% of them would be in the Brunswick LMA (approximately 480 homes). It should be noted that these figures were determined by utilizing the results of a survey that received a 30% response rate. Although 30% is considered an acceptable rate of response for surveys, applying the results of the survey to the homeowners' decision-making process when the time comes to sell their house may not necessarily represent what ultimately would happen; however, it is the best information available at this time.

The Maine Housing Survey found that there would be a large increase in the number of rental vacancies in the area surrounding NAS Brunswick. It is expected that approximately 890 rental units will be vacated; 56% of them are in the Brunswick LMA (approximately 500 units), and the majority of the impact will be in the towns of Brunswick, Bath, and Topsham. The initial increase in vacancy would include approximately 480 homes and 500 rental units in the Brunswick LMA due to the closure of NAS Brunswick.

At full build-out, Alternative 1 would include a maximum of 2,946 residential housing units at NAS Brunswick and the McKeen Street Housing Annex. This total includes the reuse of 573 existing PPV housing units that are expected to be occupied under the current PPV lease agreement. Reuse and development of residential units at the installation would be phased over a 20-year period as market conditions and other development factors dictate. Table 4.2-5 presents a summary of the number of housing units for the 5-, 10-, 15-, and 20-year build-out of the installation. For more detailed tables regarding housing projections, see the build-out analysis (Appendix C).

Table 4.2-5 Alternative 1 – Summary of Housing Projections[1]

Residential Unit	Build-out Projection			
	5 Years	10 Years	15 Years	20 Years
Single-family Detached Homes	88	176	262	349
Townhome/Condo and Apartments	269	625	1,114	2,035
Student and Senior Apartments (1 bedroom)	108	237	345	562
Total	**465**	**1,038**	**1,721**	**2,946**

Note:
[1] This table represents a summary of the projected housing units. For descriptions of the methodology and assumptions and detailed tables, see Appendix C.

As described in Section 3.2.4 - Housing, in 2007, the Brunswick LMA had a total of 34,173 housing units. The increase of 2,946 units proposed under Alternative 1 would represent an increase of 8.6%. However, the type of housing proposed under Alternative 1 offers more apartments and townhomes/condos compared to single-family homes than the existing housing mix found within the Brunswick LMA. In 2007 single-family detached homes (23,370 homes) comprised ap-

proximately 68% of the housing supply. Alternative 1 includes the reuse of 349 existing PPV single-family homes of various sizes, which would increase the supply by 1.5%. Under Alternative 1, it is also proposed that 2,035 townhomes/ condos and apartments would be reused or constructed. Other apartments (i.e., 1-bedroom, senior, and student apartments) would make up an additional 562 units. Thus, the projected number of apartment units is 2,597, or 88% of the total units to be constructed under Alternative 1. It is assumed that the majority of the apartments and a portion of the townhomes/condos would be units desirable for individuals looking to rent and not necessarily purchase.

Table 4.2-6 presents a summary of the existing and projected future housing mix in the Brunswick LMA.

Table 4.2-6 Alternative 1 – Existing and Projected Housing Mix in the Brunswick LMA

Housing Type	Existing (2007) Mix	Projected (2031) Mix
Single-Family Detached[1]	68%	64%
Apartments[2]	22%	27%
Other[3]	10%	9%

Source: U.S. Census Bureau 2009a.

Notes:
1 Single-family Detached includes all 1-unit detached housing units of all bedroom sizes in the 2005-2007 American Community Survey.
2 Apartments include all attached units in the 2007-2007 American Community Survey. Projected apartments include all townhomes, condos, and apartments of all sizes, including senior and student housing.
3 Includes mobile homes, boats, recreational vehicles, and vans.

In addition to the proposed reuse or construction of 2,946 residential units, according to the MaineHousing Survey, approximately 480 homes and 500 rental units may be sold or vacated as military and civilian personnel formerly employed at NAS Brunswick move from the area. This would add additional residential units to the housing supply in the short term. Redevelopment of the installation and construction of new residential housing units is expected to occur as conditions in the housing market dictate, and after the reoccupation and reuse of existing facilities.

In summary, the combined number of housing units that will be placed on the market by military and civilian personnel leaving the Brunswick LMA after the closure of NAS Brunswick and other proposed residential units coming onto the market as outlined under Alternative 1 was identified as a public concern. A large influx of homes and rental unit vacancies into the housing market in a short period would likely have a short-term impact on home values for those remaining in the area. The influx may also lead to homes staying on the market for a longer period before a new buyer can be found.

However, it is anticipated that the housing market would be able to adjust and that no long-term or significant impact would result from the implementation of Alternative 1. This is based on the phasing of the redevelopment plan over the course of 20 years, the projected growth in the Brunswick LMA regional popula-

tion between 2010 and 2030 (an increase of over 4,000 individuals; see Table 3.2-3), and that the majority of housing units being proposed under Alternative 1 are apartments. A population change of 5,082 individuals was estimated to occupy the 2,946 residential units to be reused or constructed under Alternative 1. This would still result in greater than 1,000 person increase over the anticipated growth in the Brunswick LMA (noted at 4,000 individuals in Table 3.2-3).

Implementation of Alternative 1 is also not anticipated to have a significant or long-term adverse impact on housing prices. Several other factors, such as the area's proximity to the coast, have a positive effect on sale prices in the area. These factors, combined with the fact that redevelopment of the installation would occur incrementally whereby developers would construct new residential units based on perceived need, not speculation (which would result in a significant increase in housing supply without a recognized demand), would keep sales prices in line with historical trends.

4.2.1.5 Taxes and Revenue

Because NAS Brunswick is currently federally owned, the town of Brunswick and Cumberland County do not receive any property tax revenues from the installation. After disposal of the property, land not transferred to other federal agencies would become new taxable land, expanding the municipal property tax base.

Upon full build-out and occupancy of the residential areas under Alternative 1, the overall number of people living on the property would increase. Approximately 2,946 new residential units would be located throughout the installation, including 349 single-family detached residences, 2,035 apartments/townhomes/condominiums, 562 senior and student housing units (see Table 4.2-4). All of these new units would add to the property tax base in the town of Brunswick.

Upon full build-out under Alternative 1, there would also be redevelopment of 9,194,085 square feet of non-residential land uses, including civic and cultural; education; industry, warehouse, and storage; retail and commercial; and airfield-related transportation facilities (see Table 4.1-2). Even though specific uses and tax rates have not yet been defined, it is expected that redevelopment of the installation would generate new property tax revenue for the town of Brunswick.

4.2.1.6 Environmental Justice

As discussed in Section 3.2.6, consistent with Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994), the U.S. Navy's policy is to identify and address any disproportionately high and adverse human health or environmental effects of its actions on minority and low-income populations.

Within the town of Brunswick and Brunswick LMA, respectively, 5.1% and 3.8% of the population is considered to be a minority, 1.8% and 1.5% is Hispanic or Latino, and 8.0% and 8.5% is living below the poverty level (see Table 3.2-20). The town of Brunswick and the Brunswick LMA do not have significant minority, Hispanic, or low-income populations. There are small pockets of low-income populations within both the town of Brunswick and the Brunswick LMA; how-

ever they do not constitute an Environmental Justice community as defined by EPA. In addition, there are no specific impacts on general health or quality of life that would adversely or disproportionately impact the surrounding population. Therefore, it was determined that no disproportionate adverse environmental justice effects would be associated with the implementation of Alternative 1.

4.2.2 Alternative 2

4.2.2.1 Population

As stated previously under Alternative 1, population impacts due to reuse and redevelopment of NAS Brunswick would primarily be direct in nature, as it is expected that the minor off-base employment changes would be absorbed by the regional civilian labor force (see Section 4.2.1.2 and Appendix N for additional details).

Under Alternative 2, the number of housing units (a maximum of 8,220 residential housing units) available at full build-out at NAS Brunswick and the McKeen Street Housing Annex was used to estimate the direct population impacts. Reuse and development of residential units at the installation would be phased over a 20-year period as market conditions and other development factors dictate. At full build-out, it is projected that Alternative 2 would result in 14,500 additional people moving to the area.

Table 4.2-7 presents a summary of the population projection analysis for Alternative 2. It shows the total population projected for the 5-, 10-, 15-, and 20-year build-out of residential units on installation. For more information on the population demographic multiplier and specific housing unit types (including number of bedrooms) and corresponding populations under Alternative 2, see Appendix N.

Table 4.2-7 Projected Population under Alternative 2[1]

Residential Unit	Projected Population			
	5 Years	10 Years	15 Years	20 Years
Single-Family Detached Homes	470	1,049	1,845	3,196
Townhome/Condo and Apartments	1,094	2,645	5,038	9,726
Student and Senior Apartments (1 bedroom)	213	496	857	1,578
Total	**1,777**	**4,190**	**7,740**	**14,500**

Note:
[1] This table represents a summary of the projected population analysis. For descriptions of the methodology and assumptions and detailed tables, see Appendix N.

As identified in Section 4.2.1.1, closure of the installation would result in the loss of approximately 2,234 active-duty Navy military personnel and approximately 2,721 associated active-duty Navy family members, for a total initial loss of 4,955. The loss of other personnel associated with NAS Brunswick, including 868 Navy reservists and the civilian personnel, would not be expected to result in a regional population change (see Section 4.2.1.1 for further discussion population).

In 2007 the total population of the Brunswick LMA was 68,836. Under Alternative 2, the estimated initial population loss due to the closure of NAS Brunswick (4,955) combined with the anticipated increase of 14,500 individuals at full build-out of the installation would result in a total net population increase of 9,545. This equates to an increase of 14% of the total population of the Brunswick LMA. This estimated population growth is based on populating the residential units proposed for construction and reuse; it does not include employment projections or off-installation population changes. Individuals may move into the Brunswick LMA from other regions for employment opportunities at the former installation property. For more information on employment projections under Alternative 2, see Section 4.2.2.3.

As discussed under Alternative 1, the State of Maine and the Brunswick LMA are projected to experience a small degree of population growth over the next 20 years. In addition, the overall population is aging, both the existing population as well as retirees moving to coastal Maine for retirement. This influx of people could help stimulate the development proposed under Alternative 2. Ultimately, however, market conditions would dictate the rate and level of build-out under Alternative 2.

Thus, it is estimated that implementation of Alternative 2 would result in an overall increase in the total population of the region. There would be a short-term loss of population when the Navy personnel and their family members move out of the area, but the population is projected to grow and stabilize as the installation is redeveloped and individuals move to the area.

4.2.2.2 Income

As with Alternative 1, it is expected that under Alternative 2 there would be phased development (construction) and expansion of business opportunities over the course of the 20-year proposed build-out of NAS Brunswick following disposal. The design, renovation, and construction jobs created in the short term, immediately following disposal of the installation, would serve to mitigate a small portion of the local personal income lost due to the departure of military and civilian personnel formerly employed at the installation. Section 4.2.2.3, Employment, outlines the estimated construction spending under Alternative 2 to be over $79.5 million per year (including construction payroll). This would result in an increase in personal income in the region related to the construction sector.

In the long term, as full build-out of the installation is realized, there could be a direct net increase of 17,109 employment opportunities and associated personal income resulting from the development proposed under Alternative 2 (see Section 4.2.2.3). The development proposed under Alternative 2 differs from that proposed under Alternative 1, as there is no reuse of the existing airfield. Although specific businesses and employment opportunities have not yet been defined, Alternative 2 allocates land area to community mixed-use, business and technology industries, and educational districts.

Based on the development proposed under Alternative 2, it is expected that the personal income lost due to closure of NAS Brunswick would be mitigated by

short-term construction jobs and, in the long term, replaced through the establishment of new employment opportunities as the installation is fully redeveloped. For more details on employment, see Section 4.2.2.3, Employment. In addition, as presented in Section 4.2.2.3 and Appendix N, at the end of the 20-year build-out, it is anticipated that an additional 2,934 indirect/induced off-base jobs would be created by the development occurring on the former installation property. This would further mitigate the short-term loss of personal income and increase the projected personal income of those in the civilian labor force of the region.

4.2.2.3 Employment

There would be both short-term and long-term and direct and indirect/induced employment impacts associated with disposal of NAS Brunswick, construction of the new facilities proposed under Alternative 2, and operation and maintenance of the proposed facilities.

The initial impact on employment is associated with relocation of the military and civilian personnel employed at NAS Brunswick. The Maine State Planning Office report stated that the indirect employment impact would be 5,593 employees (Renski and Reilly 2007). A discussion of the Maine State Planning Office study was presented previously in Section 4.2.1.3. The Maine State Planning Office study did not take into consideration redevelopment of the installation property. Therefore, employment projections were estimated based on the phased redevelopment of the NAS Brunswick property as proposed under Alternative 2. For a summary of the assumptions used, see Section 4.2.1.3, and for a description of the methodology, assumptions, and employment multipliers used in the employment projection analysis, see Appendix N.

Short-term Impacts

As under Alternative 1, short-term employment impacts were divided into direct employment impacts associated with construction and redevelopment of the installation, and indirect/induced short-term employment impacts, which would include those jobs created to support both the construction businesses and employees associated with the redevelopment of the base. In this analysis, “short-term” is the 20-year scheduled build-out of the installation.

The construction and renovation of facilities proposed under Alternative 2 would have positive short-term economic and employment impacts in the Brunswick LMA. Under Alternative 2, 1,620 acres of the approximately 3,200 acres being disposed of are proposed for use as recreational and open space or natural areas. In these areas, some construction and earth-moving activities may be required to construct proposed recreational amenities such as expansion of the golf course and to establish trails, bike paths, and ball fields. However, the majority of the construction-related impact would be associated with the balance of the property, consisting of 1,580 acres of community mixed-use space, educational facilities, and residential units. Some existing facilities would be renovated to accommodate new uses, but other facilities would need to be newly constructed.

Direct Short-term Impacts. To calculate the direct short-term employment impacts under Alternative 2, multipliers were applied to the total construction spend-

ing per year (see Appendix N). The total construction costs associated with Alternative 2 were estimated using the build-out analysis performed for Alternative 2 (see Appendix C) and applying industry standard costing factors. The cost to construct the 8,220 residential units and 11.0 million square feet of non-residential space as proposed under Alternative 2 is estimated to be $1,560.2 million (2009 dollars). The construction costs account for the supplies, materials, overhead, and payroll associated with the proposed construction.

Assuming that the proposed construction would occur evenly throughout the 20-year period, and accounting for a conservative estimate of annual inflation at 2% and a discount factor of 10%, the total net present value of the construction proposed under Alternative 2 would be $774.9 million.

Using these construction expenditure figures, it is possible to estimate the number of both direct and indirect/induced jobs that would be created by applying industry standard multipliers customized to the study area. In this case, RIMS II multipliers from the Department of Commerce, Bureau of Economic Analysis, were obtained and applied to the estimated construction expenditures. Under Alternative 2, it is estimated that there would be 718 direct construction-related jobs that would be generated on an annual basis through the 20-year build-out of the installation. Appendix N contains additional details on the calculation of employment impacts.

To the extent practicable, renovation and construction projects would utilize local construction firms and labor in order to stimulate and benefit the local economy. The construction-related economic and employment benefits are considered short-term impacts due to the fact that the construction-related jobs and spending would end when construction is complete.

Off-base Short-term Impacts (Indirect and Induced). Utilizing the same methodology as used for direct employment impacts, it is estimated that an additional 536 indirect and induced jobs would be created in the local community that would support the construction spending associated with redevelopment of the installation. This could include local hiring to support construction-related businesses/suppliers, or hiring to accommodate construction workers and spending (e.g., restaurants). Similar to the construction-related jobs, these indirect and induced jobs are considered short-term due to the fact that construction-related jobs and spending would end when construction is complete.

Long-term Impacts

Under Alternative 2, long-term positive employment impacts would include jobs created by the reuse or redevelopment of the installation, which would include primarily community mixed-use areas, business and technology industry areas, and the educational districts. These areas would be build-out over the proposed 20-year period and result in additional jobs in each of these employment industries. In addition, there would be indirect/induced off-base employment impacts associated with the build-out of the former installation property. For a summary of the employment assumptions, methodology, and employment projection multipliers, see Appendix N. Employment was projected by using industry-specific

multipliers applied to the types of industries proposed in each land use district based on the square footage of non-residential space.

Direct Long-term Impacts. Under Alternative 2, it is projected that 20,769 direct jobs would be created upon full build-out. Table 4.2-8 shows the total projected employment during each phase of redevelopment, as well as existing baseline conditions and the net change in employment as redevelopment occurs.

Table 4.2-8 Alternative 2 – Summary of Projected Direct Employment[1]

	2008 Baseline	5 Years	10 Years	15 Years	20 Years
Employment	3,660	3,131	7,169	11,702	20,769
Net Change	**N/A**	**-529**	**+3,509**	**+8,042**	**+17,109**

Note:
[1] This table represents a summary of the projected employment analysis. For descriptions of the methodology and assumptions and detailed tables, see Appendix N.

Initially, the loss of 3,660 military and civilian jobs associated with the closure of NAS Brunswick would have a significant negative impact on local employment. However, at full build-out after 20 years, it is expected that new employment in a variety of industries would more than offset this initial loss, as shown in Table 4.2-8. In addition, short-term construction-related jobs created during redevelopment of the former installation are not included in these employment figures, and these would further mitigate the initial loss in jobs.

Off-base Long-term Impacts (Indirect and Induced). As stated under Alternative 1 in Section 4.2.1.3, the development on the former installation would result in direct impacts on employment, but not all development would be contained within the property boundaries. Some businesses, either supporting other businesses or supporting the employees/residents on the former installation property, would locate elsewhere in the Brunswick LMA. These are considered indirect and induced employment impacts and were calculated as part of this socioeconomic analysis.

The same assumptions and methodology used to calculate the off-base employment impacts for Alternative 1 were used under Alternative 2 and are outlined in Appendix N. Table 4.2-9 presents the total off-base employment impacts, by phased development, under Alternative 2 utilizing this process.

Table 4.2-9 Alternative 2 – Summary of Projected Off-base Employment[1]

	5 Years	10 Years	15 Years	20 Years
Projected Net Direct Employment (from Table 4.2-8)	-529	+3,509	+8,042	+17,109
Projected Indirect/Induced Off-base Employment (jobs)	**-2,193**	**-1,069**	**266**	**2,934**

Note:
[1] This table presents a summary of the projected off-base employment analysis. For descriptions of the methodology and assumptions and detailed tables, see Appendix N.

4.2.2.4 Housing

At full build-out, implementation of Alternative 2 would result in a maximum of 8,220 residential housing units at NAS Brunswick and the McKeen Street Housing Annex. Reuse and development of residential units at the installation would be phased over a 20-year period as market conditions and other development factors dictate. Table 4.2-10 presents the number of housing units for the 5-, 10-, 15-, and 20-year build-out of the installation.

Table 4.2-10 Alternative 2 – Summary of Housing Projections[1]

Residential Unit	Build-out Projection			
	5 Years	10 Years	15 Years	20 Years
Single-family Detached Homes	157	348	607	1,041
Townhome/Condo and Apartments	633	1,534	2,934	5,676
Student and Senior Apartments (1 bedroom)	202	473	816	1,503
Total	**992**	**2,355**	**4,357**	**8,220**

Note:
[1] This table represents a summary of the projected housing units. For descriptions of the methodology and assumptions and detailed tables, see Appendix C.

As described in Section 3.2.4, Housing, in 2007 the Brunswick LMA had a total of 34,173 housing units. The increase of 8,220 units proposed under Alternative 2 would represent an increase of 24.1%. However, the type of housing proposed under Alternative 2 includes more apartments and townhomes/condos compared to single-family homes than the existing housing mix found within the Brunswick LMA. In 2007 single-family detached homes (23,370 homes) comprised approximately 68% of the housing supply. Alternative 2 includes the reuse of 349 existing PPV single-family homes of varying sizes, as well as the construction of nearly 700 additional single-family homes, which would increase the supply by 4.5%. Under Alternative 2, it is also proposed that 5,676, of the residential units to be developed would be townhomes/condos and apartments. Other apartments (i.e., 1-bedroom senior and student apartments) would make up an additional 1,503 units. Thus, the number of apartment units would be 7,178, or 88% of the total units to be constructed or reused under Alternative 2. It is assumed that the majority of the apartments and a portion of the townhomes/condos would be units desirable for individuals looking to rent and not necessarily purchase.

Table 4.2-11 presents a summary of the existing and projected future housing mix in the Brunswick LMA.

In addition, as stated under Alternative 1, a survey conducted by MaineHousing found that approximately 480 homes and 500 rental units may be sold or vacated as military and civilian personnel formerly employed at NAS Brunswick move from the area (MaineHousing 2008b). For a more detailed description of the housing survey, see Section 4.2.1.4. This would add additional residential units to the housing supply in the short term. Redevelopment of the installation and construction of new residential housing units is expected to occur as conditions in the housing market dictate, and after the reoccupation and reuse of existing facilities.

Table 4.2-11 Alternative 2 – Existing and Projected Housing Mix in the Brunswick LMA

Housing Type	Existing (2007) Mix	Projected (2031) Mix
Single-family Detached[1]	68%	59%
Apartments[2]	22%	35%
Other[3]	10%	7%

Source: U.S. Census Bureau 2009a.

Notes:
[1] Single-family Detached includes all 1-unit detached housing units of all bedroom sizes in the 2005-2007 American Community Survey.
[2] Apartments include all attached units in the 2005-2007 American Community Survey. Projected apartments include all townhomes, condos, and apartments of all sizes, including senior and student housing.
[3] Includes mobile homes, boats, recreational vehicles, and vans.

In summary, Alternative 2 proposes the construction and reuse of more housing units than Alternative 1. Even with the projected population growth from 2010 to 2030 (an increase of over 4,000 individuals, see Table 3.2-3) and redevelopment of the installation, the Brunswick LMA may not be able to support the full build-out proposed under Alternative 2. However, it is assumed that the construction of new residential units on the installation would be initiated only when housing market conditions dictate a need for additional housing in the area, thus mitigating the potential impact of numerous units coming onto the market without sufficient demand.

Assuming that new residential units would not be constructed unless there is sufficient demand in the local housing market, implementation of Alternative 2 is not anticipated to have a significant or long-term adverse impact on housing prices. This, combined with several other factors that have a positive effect on sale prices in the area (e.g., the area's proximity to the coast), would keep sales prices in line with historical trends.

4.2.2.5 Taxes and Revenue

Upon full build-out and occupancy of the residential areas under Alternative 2, the overall number of people living on the property would increase. Approximately 8,220 new residential units would be located throughout the installation, including 1,041 single-family detached residences, 5,676 apartments/townhomes/condominiums, 1,300 senior housing units, and 203 student housing units. All of these new units would add to the property tax base in the town of Brunswick. Under Alternative 2, there would be a greater increase in the property tax base related to residential units than under Alternative 1.

Upon full build-out under Alternative 2, there would also be extensive redevelopment of non-residential land uses, including civic and cultural; education; industry, warehouse, and storage; and retail and commercial facilities. These land uses would occupy a total of approximately 11,013,628 square feet (see Section 4.1.1.2 for specific details on each land use). The value of the redeveloped properties is based on the square footage of each development. Even though specific uses and tax rates have not yet been defined, it is expected that redevelopment of

the installation would generate new property tax revenue for the town of Brunswick, and it is estimated that the tax revenue under Alternative 2 would exceed the tax revenue generated under Alternative 1.

4.2.2.6 Environmental Justice

As discussed in Section 3.2.6, consistent with Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994), the U.S. Navy's policy is to identify and address any disproportionately high and adverse human health or environmental effects of its actions on minority and low-income populations.

Within the town of Brunswick and the Brunswick LMA, respectively, 5.1% and 3.8% of the population is considered to be a minority, 1.8% and 1.5% is Hispanic or Latino, and 8.0% and 8.5% is living below the poverty level (see Table 3.2-20). The town of Brunswick and the Brunswick LMA do not have significant minority, Hispanic, or low-income populations. There are small pockets of low-income populations within both the town of Brunswick and the Brunswick LMA; however, they do not constitute an Environmental Justice community as defined by EPA. In addition, there are no specific impacts on general health or quality of life that would adversely or disproportionately impact the surrounding population. Therefore, it was determined that no disproportionate adverse environmental justice effects would be associated with the implementation of Alternative 2.

4.2.3 No-Action Alternative

Under the No-Action Alternative, NAS Brunswick, the McKeen Street Housing Annex, the East Brunswick Radio Transmitter Site, and the Sabino Hill Rake Station would be retained by the U.S. government in caretaker status. The existing PPV partner housing area would be expected to be occupied under the current PPV lease agreement. No redevelopment would occur at the installation under this alternative.

4.2.3.1 Population

With respect to population, implementation of the No-Action Alternative would be expected to result in the reuse of a maximum of 573 PPV residential housing units. These residential housing units currently exist at NAS Brunswick and the McKeen Street Housing Annex and are expected to be occupied per the PPV lease agreement. After a 20-year period, it is projected that the No-Action Alternative would result in 1,348 additional people moving to the area to live in the existing PPV housing. Table 4.2-12 presents the projected population under the No-Action Alternative.

As identified in Section 4.2.1.1, closure of the installation would result in the loss of approximately 2,234 active-duty Navy personnel and approximately 2,721 associated active-duty Navy family members, for a total initial loss of 4,955. The loss of other personnel associated with NAS Brunswick, including 868 Navy reservists and the civilian personnel, would not be expected to result in a regional population change (see Section 4.2.1.1 for further discussion).

Table 4.2-12 Population Projections[1] under the No-Action Alternative

Residential Unit	Projected Population (after 20 Years)
Single-family Detached Homes	996
Townhome/Condo and Apartments	352
Student and Senior Apartments (1 bedroom)	0
Total	**1,348**

Note:
[1] Assumes that all PPV housing will be re-occupied by non-military personnel by 2031.

In 2007 the total population of the Brunswick LMA was 68,836. The estimated initial population loss due to the closure of NAS Brunswick (4,955) combined with the anticipated population increase after 20 years (1,348) would result in a total net loss of 3,607 individuals. Subtracting the projected decrease in population in the Brunswick LMA that will result from the closure of the installation (3,607) from the Maine State Planning Office's projected natural population increase in the area by 2030 (7,498) results a net increase of approximately 3,891 individuals in the Brunswick LMA by 2030.

4.2.3.2 Income

There would be no redevelopment of the installation under this alternative; therefore, no new job opportunities would be created. Thus, the No-Action Alternative would be expected to result in the greatest loss of local jobs and, therefore, the greatest loss of personal income.

4.2.3.3 Employment

Because no redevelopment of the installation would occur under this alternative, no new job opportunities would be created. Thus, the No-Action Alternative would be expected to result in the greatest direct loss of local jobs (i.e., the jobs held by military and civilian personnel formerly employed by NAS Brunswick) as well as the greatest indirect job losses (i.e., jobs lost in business that offer services to and support the former installation). According to the 2007 Maine State Planning Office's report, an estimated 5,593 direct and indirect jobs would be lost under the No-Action Alternative. For additional information on employment impacts, see Section 4.2.1.3).

4.2.3.4 Housing

Under the No-Action Alternative, the existing PPV housing area would be expected to continue to be occupied under the current PPV lease agreement. Thus, implementation of the No-Action Alternative would provide 573 residential housing units (i.e., the units that currently exist at the installation). These units would be made available to the non-military population upon disposal of the installation. Table 4.2-13 presents the number of housing units through 2031. In addition, the MaineHousing survey projected that 480 homes and 500 rental units would likely become vacant. (For additional information on the methodology of the survey see, Section 4.2.1.4.) In total, the No-Action Alternative would result in 1,053 vacant homes and 500 vacant rental units.

Under the No-Action Alternative, the housing types being reused would include townhomes/condos and single-family detached homes. No multi-unit apartment-style residential units would be constructed. This alternative would result in the least number of residential units available to individuals considering moving into the Brunswick LMA and would offer the least variety in housing styles of any of the alternatives.

Table 4.2-13 No-Action Alternative - Summary of Housing Projections[1]

Residential Unit	2031 Projection (after 20 Years)
Single-family Detached Homes	349
Townhome/condo and Apartments	224
Student and Senior Apartments (1 bedroom)	0
Total	**573**

Note:
[1] This table presents a summary of existing PPV housing units on the installation. For a more detailed description of PPV housing, see Section 3.1.1.

4.2.3.5 Taxes and Revenue

No reuse or redevelopment of non-PPV property would occur at the installation under this alternative. Implementation of the No-Action Alternative would result in approximately 2,985 acres of installation property being left unused or under-utilized. Since the NAS Brunswick property would remain under federal ownership, no new property taxes would be generated for the local municipality.

4.2.3.6 Environmental Justice

As discussed in Section 3.2.6, consistent with Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994), the U.S. Navy's policy is to identify and address any disproportionately high and adverse human health or environmental effects of its actions on minority and low-income populations.

Within the town of Brunswick and the Brunswick LMA, respectively, 5.1% and 3.8% of the population is considered to be a minority, 1.8% and 1.5% is Hispanic or Latino, and 8.0% and 8.5% is living below the poverty level (see Table 3.2-20). The town of Brunswick and the Brunswick LMA do not have significant minority, Hispanic, or low-income populations. There are small pockets of low-income populations within both the town of Brunswick and the Brunswick LMA; however, they do not constitute an Environmental Justice community as defined by EPA. In addition, there are no specific impacts on general health or quality of life that would adversely or disproportionately impact the surrounding population. Therefore, it was determined that no disproportionate adverse environmental justice effects would be associated with the implementation of the No-Action Alternative.

4.3 Community Facilities and Services

This section summarizes the potential impacts on community facilities and services that would result from the implementation of Alternative 1, Alternative 2, and the No-Action Alternative. It includes an examination of educational facili-

ties, healthcare and medical facilities, public safety and emergency services, and parks and recreation. The study area is the town of Brunswick, including NAS Brunswick and the McKeen Street Housing Annex. Although the redevelopment of NAS Brunswick may result in some off-base employment changes (as discussed in Section 4.2), it is not anticipated that this would result in a change in the overall projected population growth in the Brunswick LMA beyond what is presented as a direct impact. This is due to a combination of factors, including the projected growth of the Brunswick LMA, the size of the civilian labor force, the unemployment rate, and the number of individuals who commute to the Brunswick area for employment (see Appendix N). Thus, the analysis of community facilities and services discussed in this section is derived for the direct population change associated with the residential build-out on the former installation. No new building construction or residential development would occur at the East Brunswick Radio Transmitter Site or Sabino Hill Rake Station under any alternative; therefore, these areas are not discussed in detail in this section.

4.3.1 Alternative 1 (Preferred Alternative)

4.3.1.1 Educational Facilities

Elementary and Secondary School Capacity

Implementation of Alternative 1 would provide the land area to develop a maximum of 2,946 residential housing units at full build-out. Any reuse of existing or development of new residential housing on the installation would be expected to potentially result in an increase in the number of school-age children requiring educational services. A growth in the school-age population would require educational services from the existing system of public and private schools located in the town of Brunswick. At full build-out, it is projected that Alternative 1 would result in 453 school-age children requiring educational services. This would be a total net decrease of 250 students from existing 2008 baseline conditions. Population projections are based on full build-out of the property under Alternative 1 and full occupancy of all residential units. Population projections were derived by applying residential demographic multipliers from Rutgers University for the State of Maine to the projected residential units for each 5-year phase of the installation build-out (Rutgers University 2006). Table 4.3-1 presents the school-age population projections under Alternative 1.

The projected school-age population would not result in an impact on educational resources available in the town of Brunswick. Upon closure of NAS Brunswick, public and private school enrollment within the town of Brunswick would be expected to decline after military members and their families are relocated out of the region. Capacity within the public and private school systems would be created by the loss of approximately 703 students (military family members) upon the closure of NAS Brunswick. The projected school-age population (453 students) resulting from the full build-out of Alternative 1 would be expected to be absorbed by the school capacity created through the loss of existing military-family member students (see Table 4.3-2). During the 2008 school year, approximately 673 students from military families attended public schools (21.8% of the total public school population), and 30 students from military families attended private schools (13.2% of the total private school population).

Table 4.3-1 Alternative 1 – School-age Population Projections

Residential Unit	Build-out Projection[1] 5 Years	10 Years	15 Years	20 Years	Grade (residential demographic multiplier)[2]	Projected School-age Population 5 Years	10 Years	15 Years	20 Years
Single-family, detached (2 bedrooms)	31	62	92	123	K-8 (0.19)	6	12	17	23
					9-12 (0.05)	2	3	5	6
Single-family, detached (3 bedrooms)	39	79	118	157	K-8 (0.55)	22	43	65	86
					9-12 (0.20)	8	16	24	31
Single-family, detached (4 bedrooms)	17	33	50	66	K-8 (0.94)	16	31	47	62
					9-12 (0.31)	5	10	16	20
Single-family, detached (5 bedrooms)	1	2	2	3	K-8 (0.98)	1	2	2	3
					9-12 (0.44)	0	1	1	1
Townhome/condo (2 to 4 bedrooms)	56	112	168	224	K-8 (0.04)	2	4	7	9
					9-12 (0.00)	0	0	0	0
Apartment (1 bedroom)	65	162	325	649	K-8 (0.00)	0	0	0	0
					9-12 (0.00)	0	0	0	0
Apartment (2 to 4 bedrooms)	148	351	621	1,162	K-8 (0.16)	24	56	99	186
					9-12 (0.02)	3	7	12	23
Senior apartments (1 bedroom)	65	108	129	129	K- 8 (0.00)	0	0	0	0
					9-12 (0.00)	0	0	0	0
Student apartments (1 bedroom)	43	129	216	433	K-8 (0.00)	0	0	0	0
					9-12 (0.00)	0	0	0	0
Total	**465**	**1,038**	**1,721**	**2,946**	**K-8**	**70**	**149**	**237**	**370**
					9-12	**18**	**37**	**57**	**83**
					Total[3]	**88**	**186**	**294**	**453**

Notes:
1 Construction to begin in 2011.
2 Residential Demographic Multiplier obtained from Rutgers University (2006).
3 Totals may not be exact due to rounding.

Assumptions:
– Senior apartments contain only 1 bedroom per unit.
– No school-age populations reside in one-bedroom apartments, senior apartments, or student apartments.
– Apartments are rental units.

As of the 2008 school year, 9.8% of all students (kindergarten through grade 8 only) in the town of Brunswick attended private schools. There are no private high schools (grades 9 through 12) in the town of Brunswick. If the public and private school enrollment rates remain constant, full build-out under Alternative 1 would result in 334 new public elementary and middle school students (grades K-8), 74 new public high school students (grades 9-12), nine new public vocational school students (grades 9-12), and 36 new private school students (grades K-8). Table 4.3-2 identifies the projected change in school enrollments.

Implementation of Alternative 1 would not be expected to result in the need to expand educational service capacity within the town of Brunswick. Projected 2031 school enrollment levels are below capacity. Because the full build-out of the NAS Brunswick property is projected to occur incrementally over a 20-year period, any increase in enrollment would not occur at once, and the Brunswick School Department would be able to plan accordingly. Therefore, full build-out of Alternative 1 would not be expected to result in an impact on existing school services and capacity.

Table 4.3-2 Alternative 1 – School Enrollments: Net Enrollments at Full Build-out and School Capacities

School	Capacity (2008)[a,b]	2008 School Enrollment[c,d]	Expected Loss due to Closure (military family members)[a,d]	Projected Gain (at Full Build-out)	Net Change	Projected 2031 Enrollment
Brunswick School Department (Public)						
Elementary and Middle School (grades K-8)	2,134	1,990	567	334	-233	1,757
High School (grades 9-12)	1,113	985	94	74	-20	965
Maine Vocational Region Ten, Brunswick High School Students Only (grades 9-12)	NA	118	12	9	-3	115
Subtotal	**3,247**	**3,093**	**673**	**417**	**-256**	**2,837**
St. John's Catholic School (Private)						
Elementary and Middle School (grades K-8)	250	227	30	36	6	233
Total	**3,497**	**3,320**	**703**	**453**	**-250**	**3,070**

Sources:
[a] Underwood 2009.
[b] Maderal 2009b.
[c] Oikle 2008a.
[d] Maderal 2009a.

Assumptions:
– Non-military enrollment trends (2003 through 2008) and the ratio of private school to public school enrollment remain constant.
– Ratio of vocational school enrollment remain constant at 12% of total high-school population.

School District Revenue/Expenses

Implementation of Alternative 1 would not be expected to have a significant long-term impact on school district revenues/expenses. Initially, the school district would lose 673 students (military family members), reducing district-wide demand for educational services. In addition, the district would lose the financial compensation it receives for providing educational services to students from military families via the Federal Impact Aid program (see Section 3.3.1). Federal Impact Aid received for FY 2008 totaled $1.4 million, or 4.4% of the total 2008 school department budget of $32.7 million. St. John's Catholic School would be expected to lose 30 students from military families and the associated tuition revenue generated by these students. However, after this short-term loss, it would be expected that enrollment at both the public and private schools would increase as the installation is redeveloped and people begin to move onto the property. This eventual growth in the student population would increase the demand for educational services within the town of Brunswick, and any growth in educational services would necessitate new municipal spending.

The decline in the student population, the loss of Federal Impact Aid revenues, and the costs associated with the eventual expansion of education services would be offset through the redevelopment of the NAS Brunswick property. While in operation, the installation has been nontaxable federal property, generating no property or school tax revenues for the Town of Brunswick. After disposal and reuse of the property, any land not transferred to other federal agencies would become new taxable land, expanding the municipal property and school tax base.

Any growth in the school-age population resulting from Alternative 1 would be directly related to the rate of re-occupancy of existing residential units by non-military personnel and the development of new housing in the community mixed-use area. It would be expected that any increase in municipal expenses associated with an increased demand for educational services resulting from Alternative 1 would be offset by a proportional growth in the tax base as the installation is redeveloped and people purchase or rent installation housing. St. John's Catholic School would also be expected to see increases in enrollment and associated tuition through the full build-out under Alternative 1.

Post-Secondary Schools

Implementation of Alternative 1 would be expected to have a net beneficial impact on post-secondary educational resources in the town of Brunswick. Alternative 1 includes the establishment of a 200-acre educational district, which is targeted for the development of college-level academic, administrative, and support facilities. Therefore, implementation of Alternative 1 would expand the post-secondary educational resources in the town of Brunswick.

4.3.1.2 Healthcare and Medical Facilities

Implementation of Alternative 1 would be expected to increase the demand on local and regional healthcare and medical services. At full build-out, it is projected that Alternative 1 would directly add 5,082 new residents (a 24.0% increase over the 2007 population) to the population of the town of Brunswick. Any growth in population resulting from the implementation of Alternative 1 would be expected to increase the demand for healthcare and medical services on the exist-

ing healthcare system. Based on existing health service use rates, full build-out under Alternative 1 would be expected to generate 2,769 emergency room visits, 18,131 outpatient visits, and 3,241 inpatient visits per year (Kaiser Family Foundation 2009). Table 4.3-3 presents the projected growth in health care service demand under Alternative 1.

Table 4.3-3 Alternative 1 – Healthcare Service Projections

	Projected Population Growth (2031)[1]	State of Maine Average Health Service Levels (per 1,000 residents)[2]	Projected Health Care Service Demand[3]
Emergency Room Visits per Year	5,082	545	2,769
Outpatient Visits per Year	5,082	3,569	18,131
Inpatient Visits per Year	5,082	638	3,241

Notes:
1 Population projections are based on the full build-out of the property under Alternative 1 and the full occupancy of all residential units. The final build-out is a best-case projection of future conditions based upon planning assumptions and applicable land use zoning regulations. The actual build-out of the property is subject to change due to market conditions and other development factors.
2 State of Maine average per capita health service levels obtained from Kaiser Family Foundation.
3 Projected growth in healthcare service demand derived by multiplying projected population growth by State of Maine average per capita health service levels.

In 2008, Naval Branch Health Clinic (NBHC) Brunswick had 1,570 visits from retired military members and their family members (Joy 2009b). After the closure of NAS Brunswick, NBHC Brunswick would also be closed. These retirees and their family members would need to utilize either a local private healthcare/ medical facility or other regional TRICARE health service centers. A search of the TRICARE service provider directory identified 10 in-network service providers within 20 miles of NAS Brunswick (TRICARE Management Activity 2009). The closing of the clinic would be expected to result in an increase in the number of military retirees and their family members utilizing local and regional medical facilities, further increasing demand on the local and regional healthcare network.

The potential increase in demand for healthcare and medical services in the town of Brunswick from retirees and their family members as a result of closure of the clinic would be expected to be accommodated by the regional service providers. The increase in demand for services associated with full build-out of the NAS Brunswick property under Alternative 1 would be a significant impact. The impact would be partially offset by the 20-year build-out period and the ability of the local and regional system of private healthcare and medical facilities to add capacity as needed to accommodate the additional demand for services

4.3.1.3 Public Safety and Emergency Services

Under the proposed action, NAS Brunswick and its outlying properties would no longer be owned by the federal government. After disposal of the property, the installation would no longer be a secure military facility, and access to the property would be open to the general public. This land area would be integrated into and fall under the jurisdiction of the town of Brunswick, which would be responsible for providing police, fire, and emergency services. The disposal of the installation would expand the service area of the Brunswick police and fire departments by approximately 3,200 acres. This new service area would include a maximum of 2,946 residential housing units and over 9 million square feet of

non-residential building space. Full build-out is also projected to directly add 5,082 residents to the population of Brunswick, a 24.0% increase over the town's 2007 population.

The Brunswick Police and Fire Departments both indicated that with the closure of the installation and the subsequent loss of the NAS Brunswick Fire Department and NAS Brunswick Security Department, the town would lose some shared resources currently provided by the installation.

Currently, the Brunswick Fire Department relies partially on the Navy for mutual aid support (e.g., fire, EMS, HazMat, and other specialty services). The NAS Brunswick Fire Department also currently responds to and provides 'automatic support' emergency services in the town of Brunswick, predominantly in areas immediately surrounding the installation (Labbe 2009). With the closure of the installation, the town would no longer have this support and would be required to respond to these calls, increasing the demand on the town's existing system. In addition, the loss of the NAS Brunswick Fire Department, the only other full-time fire department in the immediate area, would create a service gap for some of these previously shared services, resulting in a possible need to expand town services.

The Brunswick Fire Department also does not currently have the capacity to provide support services for the reuse of the airfield. It is assumed that the future operator of the airfield will be responsible for providing these services. The Brunswick Fire Department also indicated that it does not have any knowledge of the existing installation fire safety infrastructure or the training to operate and maintain it (Labbe 2009). Reuse and redevelopment of the installation, at the density and time frame proposed, would also tax the capacity of the Fire Department's code enforcement division, which inspects facilities for compliance with the Town's life safety codes.

The Brunswick Police Department currently utilizes the installation's airfield for vehicle training and the NAS Brunswick Security Department for K-9 dog support. Both of these resources would be lost with closure of the installation.

Expansion of the Brunswick Fire Department and Police Department service areas and the density of the proposed development would be expected to result in an increase in the demand for public safety and emergency services currently provided by the town of Brunswick. This increased demand for services will necessitate the future expansion of the existing resources of the Brunswick Police Department and Fire Departments. The Town of Brunswick Police and Fire Departments both indicated that they are currently at service capacity and that any expansion of their service areas would require additional staff and equipment (Rizzo 2009; Labbe 2009). In addition, to support an expansion of public safety and emergency services, associated equipment such as streetlights, traffic signals, fire hydrants, and equipment to support expanded police and fire services may also be required. Any expansion in public safety and emergency services would impact municipal spending.

In 2008 the total public safety and emergency service expenditures by the town of Brunswick amounted to approximately $6.9 million dollars, or 13.2% of the town's $52.5 million annual budget (Town of Brunswick 2009b). The costs incurred through an expansion of public safety and emergency services would be expected to be offset through the redevelopment of the NAS Brunswick property. While in operation, the installation has been nontaxable federal property, generating no property tax revenues for the town of Brunswick. After disposal, this property would become new taxable land, expanding the municipal tax base. Any growth in the population resulting from Alternative 1 would be directly related to the redevelopment. It would be expected that any municipal expenses associated with this growth would be offset by a proportional growth in the tax base as the installation is redeveloped. Therefore, implementation of Alternative 1, while necessitating an expansion of municipal services, would not result in a long-term significant impact on public safety and emergency services.

4.3.1.4 Parks and Recreation

Full build-out of Alternative 1 would add approximately 510 acres of recreational and open space land for a variety of commercial and public outdoor active and passive recreation, including an 18-hole golf course, public gardens, public parks, sports fields, and bicycle trails. In addition, Alternative 1 includes 1,060 acres of property designated as conservation and natural areas. The conservation and natural areas would include pedestrian trails, nature centers, and other forms of non-intrusive, passive outdoor recreation. The recreation, conservation, and natural areas would provide a total of 1,570 acres of new recreational opportunities for both the on-site residents and residents of the region. New recreation, park, and conservation space would represent a beneficial increase in the availability of such facilities to the neighboring communities.

Approximately 80% (1,250 acres) of Alternative 1's identified recreation, conservation, and natural areas and three existing buildings have been identified for transfer to the town of Brunswick as a public benefit conveyance for conservation and recreational uses. Upon transfer of the property, the town of Brunswick would be responsible for operating and maintaining the land and facilities. This expansion of town property would be expected to necessitate an expansion in municipal services, resulting in higher municipal expenses as the town provides services to operate these new recreational facilities and maintain 1,250 acres of land. Upon disposal of the installation property, the party responsibility for maintaining the remaining 320 acres of recreation, conservation, and natural areas would need to be defined.

As noted in Section 1.8 – Regulatory Framework, Section 4(f) refers to the original section within the U.S. Department of Transportation Act of 1966 that established the requirement for consideration of park and recreational lands, wildlife and waterfowl refuges, and historic sites in transportation project development. Section 4(f) would apply only if Alternative 1 were selected, as the FAA approval of an Airport Layout Plan would trigger a Section 4(f) determination.

The airfield at NAS Brunswick currently exists; therefore, no construction is anticipated that would physically impact 4(f) resources. However, noise impacts within the 65 DNL contour may result in constructive use impacts on 4(f) properties. To determine the number and location of Section 4(f) resources potentially impacted by noise from the proposed public airfield, a survey was conducted that included potential 4(f) properties within the projected 65 DNL contour associated with Alternative 1. Based on the results of the survey, no potential Section 4(f) properties are located or anticipated within the 65 DNL contour associated with Alternative 1. Therefore, no direct or indirect impacts on 4(f) resources would occur.

4.3.2 Alternative 2

4.3.2.1 Educational Facilities

Implementation of Alternative 2 would provide the land area to develop a maximum of 8,220 residential housing units at full build-out. As with Alternative 1, any reuse or development of new residential housing on the installation would be expected to result in an increase in the number of school-age children. At full build-out, it is projected that Alternative 2 would directly add 1,454 school-age children to the district's population, an increase of approximately 22.1% over the 2008 school-age population. Population projections are based on full build-out of the property under Alternative 2 and full occupancy of all residential units. Population projections were derived by applying residential demographic multipliers from Rutgers University for the State of Maine to the projected residential units for each 5-year phase of the installation build-out (Rutgers University 2006). The final build-out is a best-case projection of future conditions based on planning assumptions and applicable land use zoning regulations. The actual build-out of the property is subject to change due to market conditions and other development factors. Table 4.3-4 identifies the school-age population projections under Alternative 2.

The projected 22.1% growth in the school-age population resulting from full build-out under Alternative 2 would have a significant impact on educational resources, necessitating the need to expand educational services in the town of Brunswick. As with Alternative 1, the closure of NAS Brunswick would result in a short-term decline in total student population, as military members and their families move from the region. Capacity within the public and private school systems would be created from the loss of these military family member students. In the long term, however, the growth in the school-age population under Alternative 2 would result in the demand for educational services that exceeds any capacity gained from the loss of students from military families (see Table 4.3-5). If the public and private school enrollment rates remain constant, full build-out under Alternative 2 would result in 1,056 new public elementary and middle school students (grades K-8), 249 new public high school students (grades 9-12), 34 new public vocational school students (grades 9-12), and 115 new private school students (grades K-8). Table 4.3-5 identifies the projected change in school enrollment.

Table 4.3-4 Alternative 2 – School-age Population Projections

Residential Unit	Build-out Projection[1]				Grade (residential demographic multiplier)[2]	Projected School-age Population			
	5 Years	10 Years	15 Years	20 Years		5 Years	10 Years	15 Years	20 Years
Single-family, detached (2 bedrooms)	31	62	92	123	K-8 (0.19)	6	12	17	23
					9-12 (0.05)	2	3	5	6
Single-family, detached (3 bedrooms)	91	208	377	676	K- 8 (0.55)	50	114	207	372
					9-12 (0.20)	18	42	75	135
Single-family, detached (4 bedrooms)	34	76	136	239	K-8 (0.94)	32	71	128	225
					9-12 (0.31)	11	24	42	74
Single-family, detached (5 bedrooms)	1	2	2	3	K-8 (0.98)	1	2	2	3
					9-12 (0.44)	0	1	1	1
Townhome/condo (2 to 4 bedrooms)	73	155	254	397	K-8 (0.04)	3	6	10	16
					9-12 (0.00)	0	0	0	0
Apartment (1 bedroom)	195	487	975	1,949	K-8 (0.00)	0	0	0	0
					9-12 (0.00)	0	0	0	0
Apartment (2 to 4 bedrooms)	365	892	1,705	3,329	K-8 (0.16)	58	143	273	533
					9-12 (0.02)	7	18	34	67
Senior apartments (1 bedroom)	130	325	650	1,300	K-8 (0.00)	0	0	0	0
					9-12 (0.00)	0	0	0	0
Student apartments (1 bedroom)	72	148	166	203	K-8 (0.00)	0	0	0	0
					9-12 (0.00)	0	0	0	0
Total	**992**	**2,355**	**4,357**	**8,220**	**K- 8**	**150**	**349**	**638**	**1,171**
					9-12	**38**	**87**	**157**	**283**
					Total[3]	**188**	**435**	**795**	**1,454**

Notes:
1 Construction to begin in 2011.
2 Residential Demographic Multiplier obtained from Rutgers University (2006).
3 Totals may not be exact due to rounding.

Assumptions:
– Senior apartments contain only one bedroom per unit.
– No school-age populations reside in one-bedroom apartments, senior apartments, and student apartments.
– Apartments are rental units.

As shown in Table 4.3-5, full build-out of Alternative 2 would impact the capacities of the existing school facilities, with each grade level of public and private schools expected to be over capacity. Public schools (kindergarten through grade 8) would be expected to be 345 students over capacity; Brunswick High School would be expected to be 27 students over capacity; and St. John's Catholic School would be expected to be 62 students over capacity.

This significant growth in the school-age population would require an expansion of school capacity, likely necessitating new school construction and/or expansion of existing facilities. Full build-out of the NAS Brunswick property is projected to occur incrementally over a 20-year period. Therefore, any increase in enrollment would not occur at once, and the Brunswick School Department and St. John's Catholic School would be able to plan accordingly.

Table 4.3-5 Alternative 2 – School Enrollments: Net Enrollments at Full Build-out and School Capacities

School	Capacity (2008)[a,b]	2008 School Enrollment[c,d]	Expected Loss (military family members)[a,d]	Projected Gain	Net Change	Projected 2031 Enrollment
Brunswick School Department (Public)						
Elementary and Middle School (grades K-8)	2,134	1,990	567	1,056	489	2,479
High School (grades 9-12)	1,113	985	94	249	155	1,140
Maine Vocational Region Ten, Brunswick High School Students Only (grades 9-12)	NA	118	12	34	22	140
Subtotal	**3,247**	**3,093**	**673**	**1,339**	**666**	**3,759**
St. John's Catholic School (Private)						
Elementary and Middle School (grades K-8)	250	227	30	115	85	312
Total	**3,497**	**3,320**	**703**	**1,454**	**751**	**4,071**

Sources:
[a] Underwood 2009.
[b] Maderal 2009b.
[c] Oikle 2008a.
[d] Maderal 2009a.

Assumptions:
– Non-military enrollment trends (2003 through 2008) and the ratio of private school to public school enrollment remain constant.
– Ratio of vocational school enrollment remain constant at 12% of total high-school population.

School District Revenue/Expenses

Implementation of Alternative 2 would be expected to have a significant impact on school district revenues/expenses. In the short term, the school district would lose 673 students from military families, reducing district-wide demand for educational services. In addition, the district would lose the approximately $1.2 million in compensation it currently receives for providing educational services to students from military families via the Federal Impact Aid program. St. John's Catholic School would lose 30 students from military families and associated tuition revenue generated by these students.

In the long term, the Brunswick School Department would need to provide educational services for 666 more students than the existing (2008) student population. This significant growth in the school-age population would require an expansion of school capacity, necessitating the need for new school construction and/or expansion of existing facilities. A growth in educational services and expansion of facilities would result in higher municipal spending on educational service delivery than is currently being incurred by the town of Brunswick.

As with Alternative 1, over the long term, a portion of the costs incurred through the expansion of education services and facilities would be offset through the redevelopment of the NAS Brunswick property and the associated growth in the local property and school tax base. Any growth in the school-age population resulting from Alternative 2 would be directly related to the re-occupancy of existing residential units by non-military personnel and the development of new housing in the residential and community mixed-use districts. However, an expansionof existing schools or construction of new educational facilities would require the town of Brunswick to seek funds for new school construction.

Post-Secondary Schools

Alternative 2 would have a beneficial impact on post-secondary educational resources. Alternative 2 includes the establishment of a 315-acre educational district, which is targeted for the development of college-level academic, administrative, and support facilities. Therefore, implementation of Alternative 2 would expand the post-secondary educational resources within the town of Brunswick.

4.3.2.2 Healthcare and Medical Facilities

Implementation of Alternative 2 would increase the demand for healthcare and medical services. At full build-out, it is projected that Alternative 2 would directly add 14,500 new residents (a 68.5% increase from 2007 population projections) to the population of the town of Brunswick. Any growth in population resulting from the reuse of NAS Brunswick would increase the demands on the existing local and regional healthcare systems for healthcare and medical services. Based upon statewide per capita health service levels, it is projected that full build-out of Alternative 2 would generate an additional 7,903 emergency room visits, 51,751 outpatient, and 9,251 inpatient visits per year. Table 4.3-6 presents the healthcare service projections for Alternative 2 (Kaiser Family Foundation 2009).

Table 4.3-6 Alternative 2 – Healthcare Service Projections

	Projected Population Growth (2031)[1]	State of Maine Average Health Service Levels (per 1,000 residents)[2]	Projected Growth in Health Care Service Demand[3]
Emergency Room Visits per Year	14,500	545	7,903
Outpatient Visits per Year	14,500	3,569	51,751
Inpatient Visits per Year	14,500	638	9,251

Notes:
1 Population projections are based on the full build-out of the property under Alternative 1 and the full occupancy of all residential units. The final build-out is a best-case projection of future conditions based upon planning assumptions and applicable land use zoning regulations. The actual build-out of the property is subject to change due to market conditions and other development factors.
2 State of Maine average per capita health service levels obtained from Kaiser Family Foundation (2009).
3 Projected growth in healthcare service demand derived by multiplying projected population growth by State of Maine average per capita health service levels.

In 2008, NBHC Brunswick had 1,570 visits from retired military members and their family members (Joy 2009b). After the closure of NAS Brunswick, NBHC Brunswick would also be closed. These retirees and their family members would need to utilize either a local private healthcare/medical facility or other regional TRICARE health service centers. A search of the TRICARE service provider directory identified 10 in-network service providers within 20 miles of NAS Brunswick (TRICARE Management Activity 2009). The closing of the clinic would be expected to result in an increase in the number of military retirees and their family members utilizing local and regional medical facilities, further increasing demand on the local and regional healthcare network.

The potential increase in the demand for healthcare and medical services in the town of Brunswick from retirees and their family members as a result of closure of the clinic would be expected to be accommodated by the regional service providers. The increase in demand for services associated with full build-out of the NAS Brunswick property under Alternative 2 would be a significant impact. The impact would be partially offset by the 20-year build-out period and the ability of the local and regional system of private healthcare and medical facilities to add capacity as needed to accommodate the additional demand for services.

4.3.2.3 Public Safety and Emergency Services

Impacts on public safety and emergency services would be expected to be greater than under Alternative 1 due to the higher density of development and higher projected population. Expansion of the Brunswick Fire Department and Police Department service areas and the density of the proposed development would be expected to result in an increase in the demand for public safety and emergency services currently provided by the town of Brunswick. This increased demand for services will necessitate the future expansion of existing resources of the Brunswick Police and Fire Departments. The Town Brunswick Police and Fire Departments both indicated that they are currently at service capacity and that any expansion of their service area would require additional staff and equipment (Rizzo 2009; Labbe 2009). It would be expected that any municipal expenses associated with this growth would be offset by a proportional growth in the tax base as the installation is redeveloped. Therefore, implementation of Alternative 2,

while necessitating a need for expanded municipal services, would not result in a long-term significant impact on public safety and emergency services.

4.3.2.4 Parks and Recreation

Full build-out of Alternative 2 would add approximately 340 acres of land, which would be used for a variety of commercial and public, active and passive outdoor recreation, including an 18-hole golf course, public parks, sports fields, and bicycle trails. In addition, Alternative 2 includes 1,280 acres of property designated as conservation and natural areas. The conservation and natural areas would include trails and other non-intrusive, passive outdoor recreation.

The recreation, conservation, and natural areas would provide a total of 1,620 acres of new recreational opportunities for both the on-site residents and residents of the region. New recreation, park, and conservation space would represent a beneficial increase in the availability of such facilities to the neighboring communities.

Approximately 77% (1,250 acres) of the identified recreation, conservation, and natural areas and three existing buildings have been identified for transfer to the town of Brunswick as a public benefit conveyance for conservation and recreational uses. Upon transfer of the property, the town of Brunswick would be responsible for operating and maintaining the land and facilities. This expansion of town property would be expected to necessitate an expansion in municipal services, resulting in higher municipal expenses as the town provides services to operate these new recreational facilities and maintain 1,250 acres of land. Upon disposal of the installation property, the party responsible for maintaining the remaining 370 acres of recreation, conservation, and natural areas would need to be defined.

No airfield is proposed under Alternative 2; therefore, a Section 4(f) analysis would not be required.

4.3.3 No-Action Alternative

4.3.3.1 Educational Facilities

Elementary and Secondary School Capacity

Implementation of the No-Action Alternative would include the continued occupation of the PPV housing area under the preexisting lease agreement. No redevelopment would occur under this alternative. The occupation of the PPV housing area would result in an estimated 243 school-age children requiring educational services from the existing system of public and private schools in the town of Brunswick. Table 4.3-7 presents the school-age population projections for the No-Action Alternative.

Table 4.3-7 No-Action Alternative – School-age Population Projections

Residential Unit	Number of Residential Units (after 20 Years)	Grade (residential demographic multiplier)[1]	Projected School-age Population (after 20 Years)[2]
Single-family, detached (2 bedrooms)	123	K-8 (0.19)	23
		9-12 (0.05)	6
Single-family, detached (3 bedrooms)	157	K-8 (0.55)	86
		9-12 (0.20)	31
Single-family, detached (4 bedrooms)	66	K-8 (0.94)	62
		9-12 (0.31)	20
Single-family, detached (5 bedrooms)	3	K-8 (0.98)	3
		9-12 (0.44)	1
Townhome/condo (2 to 4 bedrooms)	224	K-8 (0.04)	9
		9-12 (0.00)	0
Apartment (1 bedroom)	0	K-8 (0.00)	0
		9-12 (0.00)	0
Apartment (2 to 4 bedrooms)	0	K-8 (0.16)	0
		9-12 (0.02)	0
Senior apartments (1 bedroom)	0	K-8 (0.00)	0
		9-12 (0.00)	0
Student apartments (1 bedroom)	0	K-8 (0.00)	0
		9-12 (0.00)	0
Total	**573**	**K-8**	**184**
		9-12	**59**
		Total[3]	**243**

Notes:
1 Residential Demographic Multiplier obtained from Rutgers University (2006).
2 School-age population projections are based on the re-occupancy of the existing PPV housing units by non-military members. The final build-out is a best-case projection of future conditions based upon planning assumptions and applicable land use zoning regulations. The actual build-out of the property is subject to change due to market conditions and other development factors. School-age population projections were derived by applying residential demographic multipliers for the State of Maine to the projected residential units at final build-out of the installation.
3 Totals may not be exact due to rounding.

Upon closure of NAS Brunswick, public and private school enrollment within the town of Brunswick would be expected to decline after military personnel and their families relocate from the region. As with Alternatives 1 and 2, capacity within the public and private school systems would be created from the loss of military family member students (a loss of 673 public school students), thus providing capacity to accommodate any growth in the school-age population resulting from implementation of the No-Action Alternative. The occupation of the PPV housing area would result in an estimated 243 school-age children, creating a net loss of 430 students from implementation of the No-Action Alternative. As a result, the No-Action Alternative would not have a significant impact on educational resources.

School District Revenue/Expenses

In the short term, the school district would lose 673 students from military families, reducing district-wide demand for educational services. In addition, the district would lose the approximately $1.2 million in compensation it currently receives for providing educational services to students from military families via the

Federal Impact Aid program. St. John's Catholic School would be expected to lose 30 students from military families and the tuition revenue generated by these students. No growth in educational services would be expected in the town of Brunswick; therefore, there would be no increase in education-related municipal spending. It would be expected that the loss in federal compensation resulting from the loss of students from military families would be partially offset by a proportional growth in the tax base as the existing PPV residential units are occupied by non-military personnel. As a result, the No-Action Alternative would not be expected to have a significant impact on school district revenues/expenses.

Post-Secondary Schools

Implementation of the No-Action Alternative would result in approximately 2,985 acres of installation property being left unused and underutilized. Under this alternative, no educational district would be established and post-secondary resources would not be expanded in the town of Brunswick. As a result, no beneficial impact on post-secondary education would be realized.

4.3.3.2 Healthcare and Medical Facilities

The No-Action Alternative would include only the occupancy of the existing 573 units of PPV residential housing under the existing PPV lease agreement. Under the No-Action Alternative, it is projected that the PPV housing area would have a total population of 1,348 residents.

As with Alternatives 1 and 2, any growth in population resulting from the occupancy of existing PPV housing would increase the demands on the existing local and regional healthcare systems for healthcare and medical services. In addition, the retired military community residing in the town of Brunswick and the surrounding region that currently receive its healthcare services from the existing NBHC Brunswick would need to utilize an alternate medical facility to receive their healthcare benefits. The closure of the clinic would be expected to result in an increase in the number of military retirees and family members utilizing local and regional medical facilities, increasing demand on the existing local and regional healthcare systems.

The increase in demand for services associated closure of the clinic and occupancy of the PPV housing under the No Action Alternative would increase the demand for healthcare. The impact would be partially offset by the regional system of private healthcare and medical facilities and the ability to add capacity as needed to accommodate additional demand for services.

4.3.3.3 Public Safety and Emergency Services

Under the No-Action Alternative, the remainder of the installation property would not be reused or redeveloped and would be retained by the U.S. government and placed in caretaker status. The Town of Brunswick Police and Fire Departments' responsibility for safety and emergency services would remain unchanged under the No-Action Alternative.

4.3.3.4 Parks and Recreation

Implementation of the No-Action Alternative would result in approximately 2,985 acres of installation property being left unused and underutilized. No new parks or recreational facilities would be developed, and there would be no public use of existing recreational amenities, including ball fields, hiking trails, and the golf course. As a result, under the No-Action Alternative, there would be a loss of recreational facilities in the town of Brunswick.

4.4 Transportation

The traffic impact study conducted for NAS Brunswick (Gorrill-Palmer 2009, 2010) is included as Appendix D and was based on:

- The build-out analysis prepared for Alternatives 1 and 2 (see Appendix C),
- Traffic count data collected in August 2009, and
- Traffic data and guidance collected from MaineDOT.

This section presents the methodology for calculating trip generation, projected traffic volumes and LOS, the projected impacts on the road network, and recommended mitigation measures.

It is important to note that the following mitigation measures are recommended because of existing roadway design deficiencies (see Table 4.4-1). This mitigation may be needed regardless of redevelopment under Alternative 1, Alternative 2, or the No-Action Alternative.

Table 4.4-1 Recommended Mitigation Measures to Address Existing Transportation Deficiencies

Figure Label	Intersection/Roadway	Recommended Mitigation
I-8	Bath Road and Gurnet Road intersection (signalized)	Extend the northbound dual left-turn lanes (Gurnet Road to Bath Road) from approximately 150 feet to 250 feet, including the removal of some raised median.
I-10	Bath Road and Sills Drive – Harpswell Road/Federal Street intersection (signalized)	Install a queue detector on Bath Road for the eastbound approach so that the queue of the eastbound traffic does not interfere with the functioning of the anticipated changes to the intersection of Bath Road and Maine Street rotary.
I-11	Bath Road and Jordan Avenue intersection (unsignalized)	Provide a westbound right-turn lane on Bath Road and provide two separate approach lanes (left and right) on Jordan Avenue. These modifications would improve the intersection operations and reduce queuing on Jordan Avenue.

Source: Gorrill-Palmer 2009.

In addition, construction of new public surface roads on any portion of NAS Brunswick, the McKeen Street Housing Annex, and the East Brunswick Radio Transmitter Site would require review and approval by the Town of Brunswick and would have to meet the Town's design standards. Similarly, construction of any new public surface roads, driveways, or parking at the Sabino Hill Rake Station would review and approval by the Town of Phippsburg.

Prior to construction, new public streets must be approved through the Town of Brunswick Development Review process, satisfy the Town's Public Works Roadway Dedication Standards, and be reviewed by the Town Engineer, Fire Chief, Police Chief, and Director of Planning and Development. In addition, according to the Town's Zoning Ordinance, all new streets must address pedestrian and bicycle safety and movement. The Town's Zoning Ordinance would require the developer to identify the potential impacts of the proposed development on the street system prior to any development taking place, and the developer would also be responsible for implementing any improvements needed to address those impacts.

The disposal and reuse of NAS Brunswick would expand the network of road infrastructure, requiring proper permits and funds for the construction of new roads, funds for the maintenance and upkeep of existing roads (e.g., repair, snow plowing, etc.), and installation of traffic control devices and signage. It has not yet been determined whether the Town of Brunswick, the developer of the property, or another entity would be responsible for the maintenance of existing roads and costs for the construction of new public transportation infrastructure. Upon disposal of the federally owned and maintained property, the party responsible for maintaining the installation's rights-of-way and associated infrastructure would need to be identified. If the Town of Brunswick is deemed responsible for maintaining the installation's roads and transportation infrastructure, this expansion of municipal service delivery would be expected to result in higher municipal expenses. If the developer is deemed responsible for maintaining the installation's roads and transportation infrastructure, a revenue source to fund these services would need to be identified and secured by the developer.

4.4.1 Methodology

Traffic volumes were projected based on the following assumptions:

- Land use was assumed to be mixed-use development.
- Development was assumed to occur over 20 years in accordance with the build-out analysis (see Appendix C).
- The Institute of Transportation Engineers publication *Trip Generation*, 7th Edition (Institute of Transportation Engineers 2008), was used as the source for determining the trip generation for Alternative 1, Alternative 2, and the No Action Alternative.
- Shared trips between land uses were assumed to be 35% for Alternative 1 and 50% for Alternative 2.

- A 2% reduction was used for bus use and 0.5% for pedestrian/bicycle use.

- Based on a review of the annual average daily traffic history provided by the MaineDOT, the annual traffic growth rate within the traffic study area was less than 1% per year (Gorrill-Palmer 2009). Therefore, a 0% growth rate was utilized in the traffic study.

- To account for off-base indirect impacts associated with the closure, reuse and redevelopment of the former installation, the background traffic count was adjusted based upon the percentage change in Brunswick LMA employment estimated to be associated with off-base development (see Appendix N for additional details).

- Approved projects and projects for which applications have been filed are typically included in the predevelopment design volumes for a project's traffic analysis. For the purposes of disposal and reuse of NAS Brunswick, trip contributions from the Maine Street Station and the redevelopment of Topsham Annex were included.

Projects to improve existing site access were assumed to take place and include:

- **U.S. Route 1 Connector.** By 2016, the capacity analysis shows that this connection or a major redesign of Bath Road between Merrymeeting Plaza and Cooks Corner will be needed. Approximately 90% of the traffic is forecast to use this connector and Route 1. The traffic analysis in this section under Alternative 1 and Alternative 2 presents data for the scenario where the U.S. Route 1 Connector is not built. It should be noted, however, that the adjacent road network could not feasibly handle the forecasted traffic volumes, even with significant improvements. Significant deficiencies and gridlock are identified if this project is not constructed in the early phases of redevelopment.

- **Relocation of the Main Gate Access.** The main access would be relocated to the existing signalized intersection with Merrymeeting Plaza. This modification was assumed to be in place in 2016.

- **New access to Bath Road.** A new access road would extend from the installation onto Bath Road, approximately 1,300 feet east of the Bath Road/Jordan Avenue intersection for Alternative 1, and across Jordan Avenue for Alternative 2. This modification was assumed to be in place by 2026.

- **Widening of Bath Road.** Bath Road would be widened between Gurnet Road and Old Bath Road to provide two lanes in each direction. The two eastbound lanes would consist of one through lane and one right turn lane. The two westbound lanes would consist of two through lanes, one of which would also be a right turn lane.

- **Primary Access on Forrestal Drive.** The emergency access on Forrestal Drive would become the primary access to the redevelopment.

4.4.2 Alternative 1 (Preferred Alternative)

Full build-out of Alternative 1 would add a projected 6,473 vehicle trips to the existing network of roads near NAS Brunswick. However, assuming implementation of appropriate mitigation, traffic conditions (i.e., level of service) would be expected to improve over existing conditions. Alternative 1 would also open the formally secure military installation to public access and would integrate the installation's existing and any new proposed surface road network developed into the surrounding transportation network, which would likely improve overall traffic flow.

4.4.2.1 Road Network and Access

Implementation of Alternative 1 could result in the development of a new and expanded system of internal streets and associated road network infrastructure (e.g., traffic control devices, signage, street lights, etc.) on the installation to provide access to individual land parcels and ensure the safe movement of traffic. At this time, Alternative 1 does not specifically identify which existing roads and infrastructure would be reused or the location of any new surface roads. The improvement and development of road infrastructure is not proposed to be completed at once; improvements and development would be completed in phases as the installation is redeveloped (BLRA 2007a).

The McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station would continue to utilize their existing surface road network and access points. Redevelopment of the McKeen Street Housing Annex would result in occupancy of housing units and traffic associated with redevelopment. However, the trip generation resulting from the occupancy or vacancy of this development would not change the traffic impact conclusions associated with Alternative 1. Redevelopment if the outlying properties (i.e., the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station) would not be expected to have a significant impact on the transportation resources in the project area (Gorrill-Palmer 2009).

Alternative 1 also includes development of a rail spur, which would connect the northern portion of the installation to an existing at-grade railroad right-of-way that parallels Bath Road. The rail spur would require construction of new rail infrastructure and the acquisition of rail right-of-way from the existing rail line paralleling Bath Road, across Bath Road, and extending onto the installation property. Currently, a plan for the implementation of the rail component proposed in the Reuse Master Plan and a specific route for the rail spur and associated infrastructure has not been defined.

A portion of the rail spur and the proposed U.S. Route 1 Connector are located off the installation on privately owned lands. In addition, the rail improvement and connector road projects are currently in the initial planning stages and have not been designed or funded, and the land required for construction has not been acquired. The BRAC and EIS processes are separate and distinct from state and federal processes for the design and construction of new public highways and rail infrastructure. The Navy plays no role and has no responsibilities in the environ-

mental review, planning, design, or construction of highways or rail infrastructure.

Public access onto the installation would improve under Alternative 1, due in part to an increase in the number of vehicle access points onto the existing facility compared to existing conditions. Alternative 1 includes eight proposed access points, including the reuse of two existing access points and the development of six new access points. The existing Main Gate would be closed under this alternative. The eight vehicular access points are described in Table 4.4-2 and identified on Figure 4.4-1.

Table 4.4-2 Alternative 1 – Access Points

Figure Label	Access Point	Description
AP-1	Bath Road and NAS Brunswick Northern Perimeter Road	This new access point would be located along Bath Road, approximately 0.15 mile east of Jordan Avenue, and would provide direct access to the northern portion of the installation (noted as new intersection I-17 on figures and in tables).
AP-2	Proposed U.S. Route 1 Connector	This new access road would directly connect U.S. Route 1 to the NAS Brunswick property. The access road would extend from U.S. Route 1, cross over Bath Road, and connect to the northern boundary of the NAS Brunswick property. The U.S. Route 1 Connector would be located outside of the federally owned NAS Brunswick, on private lands.
AP-3	Bath Road and Merrymeeting Plaza	This new access point would provide direct access to the northern portion of the installation from Bath Road.
AP-4	Gurnet Road and Forrestal Drive	This existing access point is located along Gurnet Road and would continue to provide direct access to the northeastern portion of the installation.
AP-5	Coombs Road and Purinton Road	This new access point would provide access along the eastern boundary of the installation. Coombs Road and Purinton Road are rural residential roads and serve as connectors between the installation and Gurnet Road (Route 24) to the east.
AP-6	Coombs Road and Merriconeag Road	This new access point would provide access along the eastern boundary of the installation.
AP-7	Harpswell Road/ Middle Bay Road/ Merriconeag Road	This existing access point would continue to provide access to the southwestern portion of the installation.
AP-8	Harpswell Road and NAS Brunswick Perimeter Road	This new access point would be located along Harpswell Road, 0.25 mile north of Dan's Way, and would provide direct access to the western portion of the installation.

Source: BLRA 2007a.

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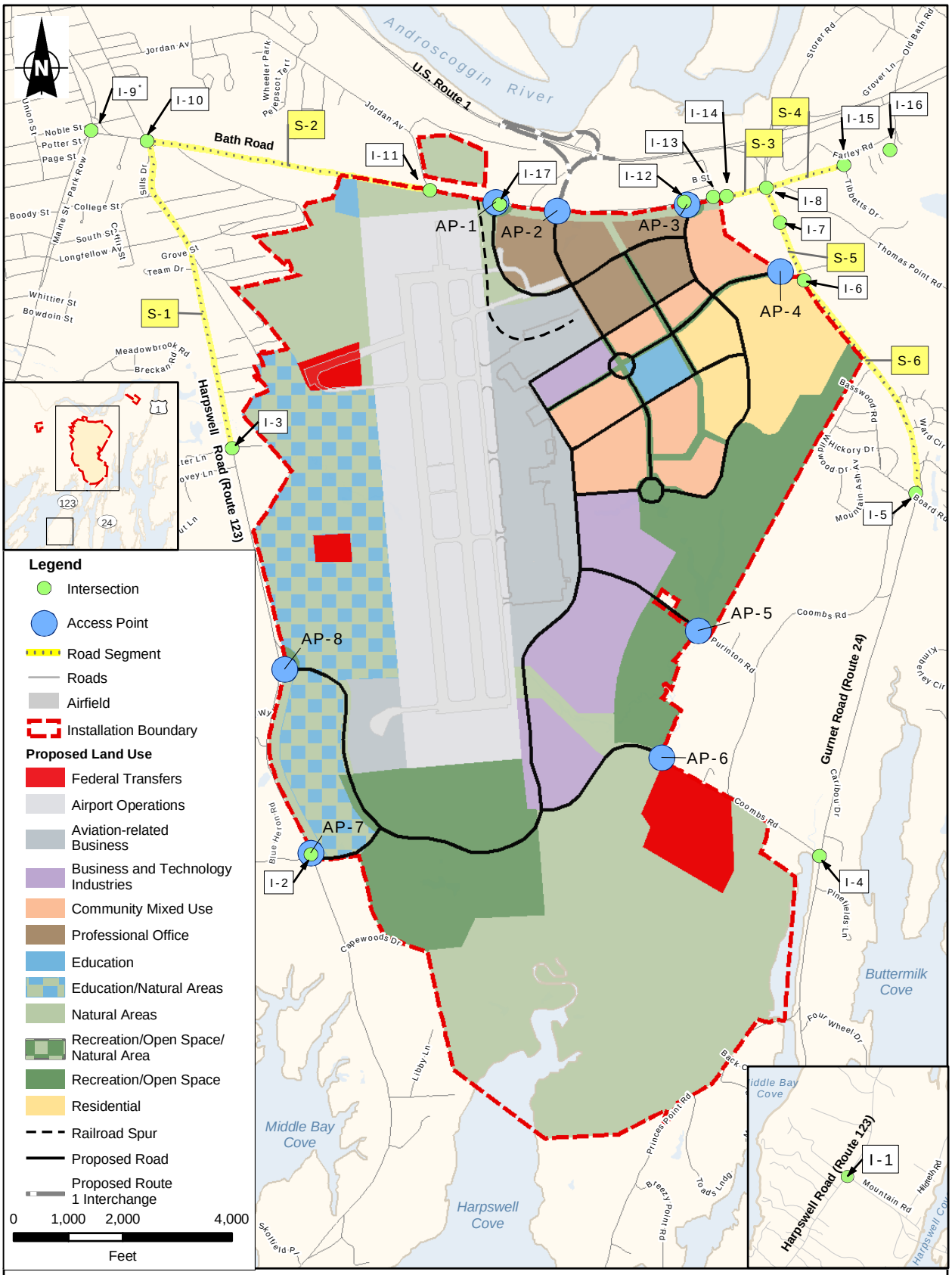

Source: Gorrill-Palmer 2009.

Recent conceptual planning has proposed changing the current intersection at Bath Road and Maine Street (I-9) to a rotary, as outlined in Section 4.4.

Figure 4.4-1
Alternative 1
Surface Road Network and Access Points
Brunswick, Maine

AP-5 and AP-6 would be accessed via Coombs Road and Purinton Road, which are rural residential roads. The majority of people would access the former installation via AP-1 through AP-4 in the northern portion of the former installation or AP-7 and AP-8 on the western side. Although the increase in vehicles on Coombs Road and Purinton Road would be an impact on the rural residential character of the roads, the roads have adequate capacity to accommodate the additional traffic.

4.4.2.2 Projected Traffic Volumes

At the P.M. peak hour, Alternative 1 is projected to add 6,474 vehicle trips to the existing network of roads at full build-out. This is an increase of 5,217 vehicles over the traffic volume currently generated by existing activities at NAS Brunswick (i.e., existing conditions). Traffic volumes would not be expected to exceed existing conditions until after 2016 but before 2021. The volume of traffic entering or exiting the installation during the P.M. peak hour and the volume of site-generated traffic along major travel routes is identified in Table 4.4-3.

Table 4.4-3 Alternative 1 – Adjacent Roadway Traffic Volumes (P.M. Peak Hour[1] Trip Ends)

Roadway	Existing (2008)		5 Years (2016)		10 Years (2021)		15 Years (2026)		20 Years (2031)	
	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit
Harpswell Road	224	203	5	7	14	20	23	35	38	56
Bath Road	109	588	65 (267)	92 (413)	143 (623)	209 (1,063)	234 (1,092)	370 (1,952)	384 (1,710)	614 (3,283)
Gurnet Road	79	54	33 (75)	54 (116)	86 (173)	124 (271)	143 (303)	231 (529)	223 (474)	401 (904)
Proposed U.S. Route 1 Connector	-	-	240	383	567	957	1,018	1,880	1,577	3,181
Total	**412**	**845**	**343 (587)**	**536 (919)**	**810 (1,377)**	**1,310 (2,311)**	**1,418 (2,436)**	**2,516 (4,396)**	**2,222 (3,799)**	**4,252 (7,424)**
	1,257		**879 (1,506)**		**2,120 (3,688)[2]**		**3,934 (6,832)**		**6,474 (11,223)**	

Source: Gorrill-Palmer 2009, 2010.

Notes:
[1] P.M. peak hour = weekdays from 2:30 P.M. to 6:00 P.M.

Key:
"-" = Not applicable.
XX = Traffic projection with completion of U.S. Route 1 Connector.
(XX) = Traffic projection without completion of U.S. Route 1 Connector.

The majority of traffic entering or exiting the site is projected to use the U.S. Route 1 Connector. The majority of site-generated traffic is expected to occur along Bath Road and Gurnet Road; very little traffic is projected to occur along Harpswell Road.

Under Alternative 1, the majority of p.m. peak-hour traffic would likely be generated by activities located within the Community Mixed-Use and Aviation Operations and Aviation-related Business land use districts. This would likely be due to the density of development and activities within each land use district. Table

4.4-4 identifies the origin of P.M. peak-hour traffic entering or exiting the installation.

Table 4.4-4 Alternative 1 – Trip Distribution by Land Use District (P.M. Peak Hour[1])

Land Use District	5 Years (2016)		10 Years (2021)		15 Years (2026)		20 Years (2031)	
	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit
Airport Operations and Aviation-related Business	42	147	73	264	195	741	308	1,175
Business and Technology Industries	40	120	94	287	165	515	311	973
Community Mixed Use (Non-Residential)	116	174	258	385	388	592	653	1,000
Community Mixed Use (Residential)	63	34	144	77	319	171	415	224
Education	46	40	90	75	90	75	90	75
Professional Office	0	0	72	180	144	359	289	721
Residential	40	21	79	42	116	63	155	84
Total	**347**	**536**	**810**	**1,310**	**1,417**	**2,516**	**2,221**	**4,252**

Source: Gorrill-Palmer 2009.

Note:

[1] P.M. peak hour = weekdays from 2:30 P.M. to 6:00 P.M.

Traffic volumes on examined roadway segments would largely remain unchanged from existing 2008 conditions, even under the full build-out scenario. The largest growth in traffic volume, both daily and during the P.M. peak hour, is projected to occur along Gurnet Road, between Bath Road and Forrestal Drive. The directional traffic volume along the examined roadway segment would be expected to increase after 2016 if the U.S. Route 1 Connector is not completed. Table 4.4-5 identifies the projected roadway segment traffic volumes, daily, and P.M. peak-hour, resulting from implementation of Alternative 1.

Upon full build-out of Alternative 1, the total traffic volume entering into the intersections during the P.M. peak hour is projected to increase at most intersections examined in the Traffic Study. Bath Road and Cook's Corner Mall is the only intersection examined that is projected to decline. At full build-out, the intersections with the largest growth in total traffic include three of the proposed access points, including Gurnet Road and Forrestal Drive, Bath Road and Merrymeeting Plaza, and Bath Road and Northern Perimeter Road. Table 4.4-6 identifies the total entering volume of P.M. peak hour traffic within the Traffic Study Area resulting from Alternative 1. The total entering volume represents a sum of the traffic entering into the intersection from each directional approach during the weekday P.M. peak hour.

Table 4.4-5 Alternative 1 – Roadway Segment Directional Traffic Volume (Daily/P.M. Peak Hour[1])

Figure Label	Segment	Existing (2008)	5 Years (2016)	10 Years (2021)	15 Years (2026)	20 Years (2031)
S-1	Harpswell Road between Jonathan Street and Bath Road	10,970/ 1,097	9,960/ 996	10,280/ 1,028	11,010/ 1,101	11,840/ 1,184
S-2	Bath Road between Federal Street and Jordan Avenue	15,320/ 1,532	13,590/ 1,359	14,680/ 1,468	16,400/ 1,640	18,820/ 1,882
S-3	Bath Road between Cooks Corner Mall and Gurnet Road	21,180/ 2,118	(21,100) 15,870/ (2,110) 1,587	(30,060) 17,150/ (3,006) 1,715	(43,760) 19,360/ (4,376) 1,936	(62,140) 22,190/ (6,214) 2,219
S-4	Bath Road between Gurnet Road and Tibbetts Drive	24,310/ 2,431	20,850/ 2,085	21,710/ 2,171	23,560/ 2,356	25,920/ 2,592
S-5	Gurnet Road between Bath Road and Forrestal Drive	11,690/ 1,169	(11,760) 10,760/ (1,176) 1,076	(14,500) 12,160/ (1,450) 1,216	(18,380) 13,800/ (1,838) 1,380	(23,910) 16,370/ (2,391) 1,637
S-6	Gurnet Road between Forrestal Drive and Coombs Road North	10,370/ 1,037	9,060/ 906	9,760/ 976	10,210/ 1,021	11,090/ 1,109

Source: Gorrill-Palmer 2009, 2010.

Notes:
[1] P.M. peak hour = weekdays from 2:30 P.M. to 6:00 P.M.

Key:
XX = Traffic projection with completion of U.S. Route 1 Connector.
(XX) = Traffic projection without completion of U.S. Route 1 Connector.

Table 4.4-6 Alternative 1 – Total Entering Volume, Roadway Intersection (P.M. Peak Hour[1])

Figure Label	Intersection	Existing (2008)	5 Years (2016)	10 Years (2021)	15 Years (2026)	20 Years (2031)
I-1	Harpswell Road and Mountain Road (unsignalized)	583	525	558	617	697
I-2	Harpswell Road and Middle Bay Road/ Merriconeag Road (unsignalized) (installation access point)	691	621	648	698	759
I-3	Harpswell Road and Jonathan Street/Baxter Lane (unsignalized)	491	437	463	495	536
I-4	Gurnet Road and Coombs Road South (unsignalized)	770	663	702	769	856
I-5	Gurnet Road and Coombs Road North (unsignalized)	782	677	705	774	855
I-6	Gurnet Road and Forrestal Drive (unsignalized) (installation access point)	1,182	(1,202)/ 1,102	(1,501) /1,267	(1,912) /1,454	(2,502) /1,748
I-7	Gurnet Road and Cinema/Plaza (signalized)	1,659	(1,600) 1,500	(1,875) 1,641	(2,304) 1,836	(2,906) 2,152
I-8	Bath Road and Gurnet Road (signalized)	4,175	(4,147) /3,586	(5,312) /3,787	(7,147) /4,249	(9,690) /4,841
I-9	Proposed "Rotary Area" (unsignalized)[2]					
I-9a	Bath Road and No Name Road	1,412	1,332	1,440	1,599	1,820
I-9b	Maine Street and Bath Road	1,764	1,631	1,703	1,854	2,058
I-9c	Maine Street and Noble Street	1,672	1,542	1,609	1,757	1,921
I-9d	Maine Street and No Name Road	2,012	1,847	1,919	2,118	2,314
I-10	Bath Road and Sills Drive – Harpswell Road/ Federal Street (signalized)	2,281	2,062	2,198	2,427	2,730
I-11	Bath Road and Jordan Avenue (unsignalized)	1,694	1,560	1,546	1,791	2,047
I-12	Bath Road and Merrymeeting Plaza (signalized) (installation access point)	2,064	(2,396) /1,873	(3,417) /2,119	(5,358) /2,281	(6,639) /2,644
I-13	Bath Road and NAS Brunswick Main Gate (signalized)	2,422	NA	NA	NA	NA
I-14	Bath Road and Cook's Corner Mall (signalized)	2,458	(2,367) /1,844	(3,274) /1,984	(4,654) /2,214	(6,520) /2,525
I-15	Bath Road and Tibbetts Drive (signalized)	2,469	2,093	2,207	2,433	2,632
I-16	Bath Road and Old Bath Road (signalized)	2,198	1,902	1,993	2,171	2,397
I-17	Bath Road and Northern Perimeter Road (installation access point)[3]	-	-	-	(2,327) /1,829	(2,917) /2,110

Source: Gorrill-Palmer 2009, 2010.

Notes:
[1] P.M. peak hour = weekdays from 2:30 P.M. to 6:00 P.M.
[2] In 2004, the State of Maine Department of Transportation (MaineDOT) received a project request for improvement of the Maine Street at Bath Road intersection. As of June 24, 2010, that request has not received planning or construction funding in a MaineDOT Capital Improvement Plan (MaineDOT 2010).
[3] Intersection I-17 is a proposed intersection at Bath Road and Northern Perimeter Road that would be located at AP-1.

Key:
"-" = Not applicable.
XX = Traffic projection with completion of U.S. Route 1 Connector.
(XX) = Traffic projection without completion of U.S. Route 1 Connector.

4.4.2.3 Projected Roadway Intersection Level of Service

With implementation of mitigation, nine of the 10 intersections are projected to operate at an LOS equal to or better than that under current conditions. Nine of 10 intersections are projected to operate at an LOS of C or better. Only one intersection, Bath Road and Sills Drive/Harpswell Road/Federal Street, is projected to operate at an LOS of D. Table 4.4-7 identifies the projected LOS in the Traffic Study Area at full build-out of Alternative 1. (Note: LOS presented without implementation of the recommended mitigation techniques discussed in Section 4.4.2.4.) Signalized intersections are given an average LOS for the entire intersection. Unsignalized intersections are given directional LOS values because through traffic on the main street does not have to stop. As shown in Table 4.4-7, without implementation of the U.S. Route 1 Connector, there would be significant impacts on intersections' LOS. Under Alternative 1, some intersections would have an LOS of D by 2016, F by 2021, and gridlock by 2026 (see Table 4.4-7 for specific intersection details).

Redevelopment of the installation would also generate construction-related traffic that was not captured in the traffic study. Construction traffic would consist of delivery trucks, dump trucks carrying debris to off-site disposal facilities, heavy equipment, and vehicles driven by construction crews. Currently, no construction, operations, and management plan has been developed; therefore, the level and pace of construction activities have not yet been identified. Consequently, projections of future construction-related traffic volumes have not been developed. Construction-related traffic could result in short-term impacts on traffic, including additional truck trips and the presence of slower-moving vehicles. This impact would be spread over the 20-year redevelopment schedule.

4.4.2.4 Recommended Mitigation Measures

The future traffic conditions identified in the traffic study assumed that the mitigation measures listed in Table 4.4-1, as well as the additional measures presented in Table 4.4-8 and identified on Figure 4.4-2, would be completed under Alternative 1. These mitigation measures are recommendations. Some traffic mitigation projects would be required based on either current conditions or projected growth in the town without the redevelopment of the installation. Other projects may need to be implemented by the developer in consultation with MaineDOT and the town as traffic conditions warrant during development of the former installation.

The projected traffic conditions and the recommended mitigation measures are based on the full build-out of the installation. If the projected density of development does not occur, the need for the recommended mitigation measures would need to be reevaluated and some measures may not be necessary. If full build-out of the installation occurs and the recommended mitigation measures are not implemented, traffic conditions would be expected to be worse than projected.

The Gateway Corridor Action Plan, adopted in 2010 by the Town of Brunswick, may also mitigate traffic impacts. The plan encourages a coordinated effort between the Maine DOT, the Maine State Planning Office, and at least 12 municipalities (including the Town of Brunswick) to practice land use and transportation planning that creates compact residential, commercial, and mixed-use core growth

areas that are connected to a variety of transportation options. These options can include walking, bicycling, multi-modal freight, passenger rail, buses, and ride-sharing. Implementation of the Gateway Corridor Plan would be expected to reduce vehicular traffic on the roads in the vicinity of NAS Brunswick.

Table 4.4-7 Alternative 1 – Intersection Level of Service

Figure Label	Intersection	Existing (2008)	5 Years (2016)	10 Years (2021)	15 Years (2026)	20 Years (2031)
I-1	**Harpswell Road and Mountain Road (unsignalized)**					
	Direction: Restaurant Eastbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Mountain Westbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Harpswell Northbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Harpswell Southbound	A	NA (A)	NA (A)	NA (A)	NA (A)
I-2	**Harpswell Road and Middle Bay Road/NAS Brunswick Dyer Gate (unsignalized)**					
	Direction: Middle Bay Eastbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Golf Course Westbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Harpswell Northbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Harpswell Southbound	A	NA (A)	NA (A)	NA (A)	NA (A)
I-3	**Harpswell Road and Jonathan Street/Baxter Lane (unsignalized)**					
	Direction: Baxter Eastbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Jonathan Westbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Harpswell Northbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Harpswell Southbound	A	NA (A)	NA (A)	NA (A)	NA (A)
I-4	**Gurnet Road and Coombs Road South (unsignalized)**					
	Direction: Coombs Road Eastbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Gurnet Northbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Gurnet Southbound	A	NA (A)	NA (A)	NA (A)	NA (A)
I-5	**Gurnet Road and Coombs Road North (unsignalized)**					
	Direction: Coombs Road Eastbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Gurnet Northbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Gurnet Southbound	A	NA (A)	NA (A)	NA (A)	NA (A)

Table 4.4-7 Alternative 1 – Intersection Level of Service (continued)

Figure Label	Intersection	Existing (2008)	5 Years (2016)	10 Years (2021)	15 Years (2026)	20 Years (2031)
I-6	**Gurnet Road and Forrestal Drive (unsignalized)[1]**					
	Direction: Forrestal Eastbound	C	C (C)	C (F)	C (grid)	C (grid)
	Direction: Lee's Tire Westbound	A	B (A)	A (F)	A (grid)	A (grid)
	Direction: Gurnet Road Northbound	A	A (A)	A (E)	A (grid)	B (grid)
	Direction: Gurnet Road Southbound	A	A (A)	A (A)	A (grid)	A (grid)
I-7	**Gurnet Road and Cinema (signalized)**	B	B (B)	B (D)	B (grid)	B (grid)
I-8	**Bath Road and Gurnet Road (signalized)**	C	C (D)	C (F)	C (grid)	D (grid)
I-9	**Vicinity of Proposed Rotary Area**					
I-9i	**No Name Road and Maine Street**					
	Direction: No Name Westbound	B	NA (B)	NA (C)	NA (E)	NA (E)
	Direction: Maine Northbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Maine Southbound	A	NA (A)	NA (A)	NA (A)	NA (A)
I-9ii	**Bath Road and Maine Street**					
	Direction: Maine Northbound	C	NA (C)	NA (C)	NA (D)	NA (F)
	Direction: Maine Southbound	A	NA (A)	NA (A)	NA (A)	NA (A)
I-9iii	**Cleaveland Road and No Name Road**					
	Direction: Cleaveland Westbound	C	NA (C)	NA (E)	NA (F)	NA (F)
	Direction: No Name Northbound	A	NA (A)	NA (A)	NA (C)	NA (D)
I-10	**Bath Road and Sills Drive/Harpswell Road/Federal Street (signalized)[1]**	C	B (B)	C (C)	C (C)	D (F)
I-11	**Bath Road and Jordan Avenue (unsignalized)**					
	Direction: Bath Eastbound	A	A (A)	A (A)	A (grid)	A (grid)
	Direction: Bath Westbound	A	A (A)	A (A)	A (grid)	A (grid)
	Direction: Jordan Southbound	D	C (C)	D (D)	E (grid)	F (grid)
I-12	**Bath Road and Merrymeeting Plaza (signalized)[1] (installation access point)**	B	C (B)	C (E)	B (grid)	B (grid)
I-13	**Bath Road and NAS Brunswick Main Gate (signalized)**	A	NA (D)	NA (F)	NA (grid)	NA (grid)
I-14	**Bath Road and Cook's Corner Mall (signalized)**	B	B (B)	B (F)	B (grid)	B (grid)
I-15	**Bath Road and Tibbetts Drive (signalized)**	B	A (A)	A (F)	B (grid)	B (grid)

Table 4.4-7 Alternative 1 – Intersection Level of Service (continued)

Figure Label	Intersection	Existing (2008)	5 Years (2016)	10 Years (2021)	15 Years (2026)	20 Years (2031)
I-16	**Bath Road and Old Bath Road (signalized)**	B	B (B)	B (C)	B (grid)	B (grid)
I-17	**Bath Road and Northern Perimeter Road[2] (installation access point)**	-	- (-)	- (-)	B (NA)	B (NA)

Source: Gorrill-Palmer 2009, 2010.

Notes:
[1] Assumes the intersection of Bath Road and Harpswell Road/Federal Street will be signalized after 2016.
[2] This intersection is a new access point that is not proposed until the 15-year phase (2026).

Key:
"-" = Not applicable.
NA = No additional analysis is required as the existing intersection configuration provides adequate levels of service.
XX = Traffic projection with completion of U.S. Route 1 Connector.
(XX) = Traffic projection without completion of U.S. Route 1 Connector.
"grid" = Indicates that traffic delays would be so extreme that it is beyond the software's ability to calculate the delay due to gridlock.

4.4.2.5 Pedestrian and Alternative Transportation Amenities

While the approved Reuse Master Plan identifies a general need for and encourages pedestrian circulation, walkability, and transit connectivity in future development, no specific plans or policies have been defined for implementation of pedestrian and alternative transportation features. However, in compliance with the Town of Brunswick Zoning Ordinance, all future development within the town's growth planning area is required to provide sidewalks. Under Alternative 1, the majority of developable land area would be located within the town's Growth Area (Town of Brunswick 2009a) and would require sidewalks.

To facilitate alternative transportation modes and walking and to reduce future vehicular traffic on and off the installation, the developer should consider the following:

- **A Transportation Demand Management (TDM) Program.** TDM is a series of measures that promote alternatives to single occupant vehicles for reducing traffic congestion and improving air quality by maximizing the use of the existing transportation infrastructure. These measures include carpooling, vanpooling, transit, walking, bicycling, telecommuting, compressed workweek, etc. This could also include establishing off-peak start and end of day schedules so that employees avoid the peak hours of the day when traveling to and from work.

- **Pedestrian Amenities**. It is recommended that sidewalks, crosswalks, and other pedestrian accommodations be provided. At a minimum, sidewalks should be considered to internally connect mixed-use areas. Sidewalks and paths are also recommended to connect the sites with the Cook's Corner area.

Table 4.4-8 Alternative 1 – Recommended Mitigation Measures

Figure Label	Intersection/Roadway	Recommended Mitigation
I-6	Gurnet Road and Forrestal Drive intersection (unsignalized) (installation access point)	The access onto Forrestal Drive from Gurnet Road would be expected to become one of the primary access points into the installation. ■ A formal signal warrant analysis would be required before a signal could be installed; however, based on projected traffic volumes at this intersection, it appears that, beginning in 2016, signalization would be necessary for the intersection to function properly. Signalization of the intersection was assumed beginning in 2016. ■ Construction of a southbound right-turn lane on Route 24 for vehicles turning onto Forrestal Drive. Recommended to be completed by the year 2026. ■ Separate left/through and right lanes exiting Forrestal Drive.
I-10[1]	Bath Road and Sills Drive – Harpswell Road/Federal Street intersection (signalized)	Extend the northbound (Federal Street) left-turn lane located on Bath Road from approximately 150 feet to 350 feet. Recommended to be completed by the year 2021.
I-12	Bath Road and Merrymeeting Plaza intersection (signalized) (installation access point)	■ Recommend relocation of the existing Main Gate to the signalized Merrymeeting Plaza intersection prior to 2016. For the traffic study, the existence of this access point was assumed beginning in 2016. ■ Removal of the existing traffic signal at the intersection of Bath Road and the existing NAS Brunswick Main Gate. ■ Include separate left, through, and right exit lanes from the installation onto Bath Road. ■ Construct a formal 175-foot-long left-turn lane and a 100-foot-long right-turn lane on Bath Road. Recommended to be completed by 2016.
AP-1	Bath Road and NAS Brunswick Northern Perimeter Road (installation access point)	■ The exit from the installation should include separate left and right exit lanes. ■ Construct a formal 100-foot-long left-turn lane on Bath Road. ■ Construct a formal 200-foot-long right-turn lane on Bath Road. ■ Though this intersection is signalized, consideration should also be given to a roundabout at this location. ■ Mitigation for this intersection is recommended to be completed by 2026.
AP-2	U.S. Route 1 Connector (installation access point)	■ Traffic projections indicate that the U.S. Route 1 Connector would be needed by 2016, or a major redesign of Bath Road between Merrymeeting Plaza and Cooks Corner would be needed. Beyond the 2016 projection, the adjacent roadway network would be unable to handle the traffic projected to result from the implementation of Alternative 1.
S-7	Bath Road from existing NAS Brunswick Main Gate to 1,000 feet west of the Merrymeeting Plaza intersection	■ Provide two eastbound and two westbound through lanes from the existing NAS Brunswick Main Gate to approximately 1,000 feet west of the Merrymeeting Plaza intersection.

Source: Gorrill-Palmer 2009.

Notes:
[1] Although Figure Label I-10 is included as an intersection/roadway that required mitigation measures under existing conditions, different mitigation measures are recommended under Alternative 1; thus, it is included in this table.

- **Ridesharing Program**. Ridesharing programs encourage commuters to ride in vehicles with other commuters rather than drive alone. The facility could provide ride-matching services through postings in public areas. Reserved parking spaces for vehicles used for carpooling could also be provided.

- **Provision of Bicycling Amenities**. Enclosed and secure bicycling facilities should be provided for employees interested in bicycling to and from work or school (Town of Brunswick 2008a). This could include bike racks at places of business, adequate shoulders on roadways, and incentives to employees to ride their bikes. Wide, paved shoulders or a bike path should be considered to connect the site to downtown Brunswick.

- **On-site Transit Service.** A fixed-route public transit bus service (the Brunswick Explorer) is expected to begin service in the fall of 2010; however, as planned, it will not include a stop at NAS Brunswick (Brunswick Explorer 2010). Therefore, it is still suggested that the developer consider establishing an on-site transit service. In the future, bus service should be provided between the site and downtown Brunswick with a schedule that would accommodate business commuters, as well as coordinate with the railroad schedule in downtown Brunswick. The site should have strategically located bus stops, and discounted bus fares should be offered to employees to encourage ridership.

4.4.2.6 Permits

It is anticipated that the redevelopment of NAS Brunswick would require a Traffic Movement Permit (23 MRSA § 704-A) from the MaineDOT. Any project that generates 100 or more passenger-car-equivalent trips during peak-hour traffic must file a Traffic Movement Permit application with the MaineDOT. It is important to note that this EIS does not necessarily satisfy the requirements for obtaining a Traffic Movement Permit or municipal approval. The developer would be responsible for obtaining a Traffic Movement Permit and implementing any required mitigation.

4.4.3 Alternative 2

Reuse of NAS Brunswick under Alternative 2 would include an increase in total weekday traffic in the vicinity of the installation. Full build-out of Alternative 2 is projected to add 10,593 vehicle trips to the existing network of roads near NAS Brunswick during the P.M. peak hour.

Alternative 2 would not be expected to have a significant impact on transportation resources located on or near the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and the Sabino Hill Rake Station.

4.4.3.1 Road Network and Access

Implementation of Alternative 2 would be expected to result in the development of a new and expanded system of internal streets and associated road network infrastructure (e.g., traffic control devices, signage, street lights, etc.) on the installation to provide access to individual land parcels and ensure the safe movement

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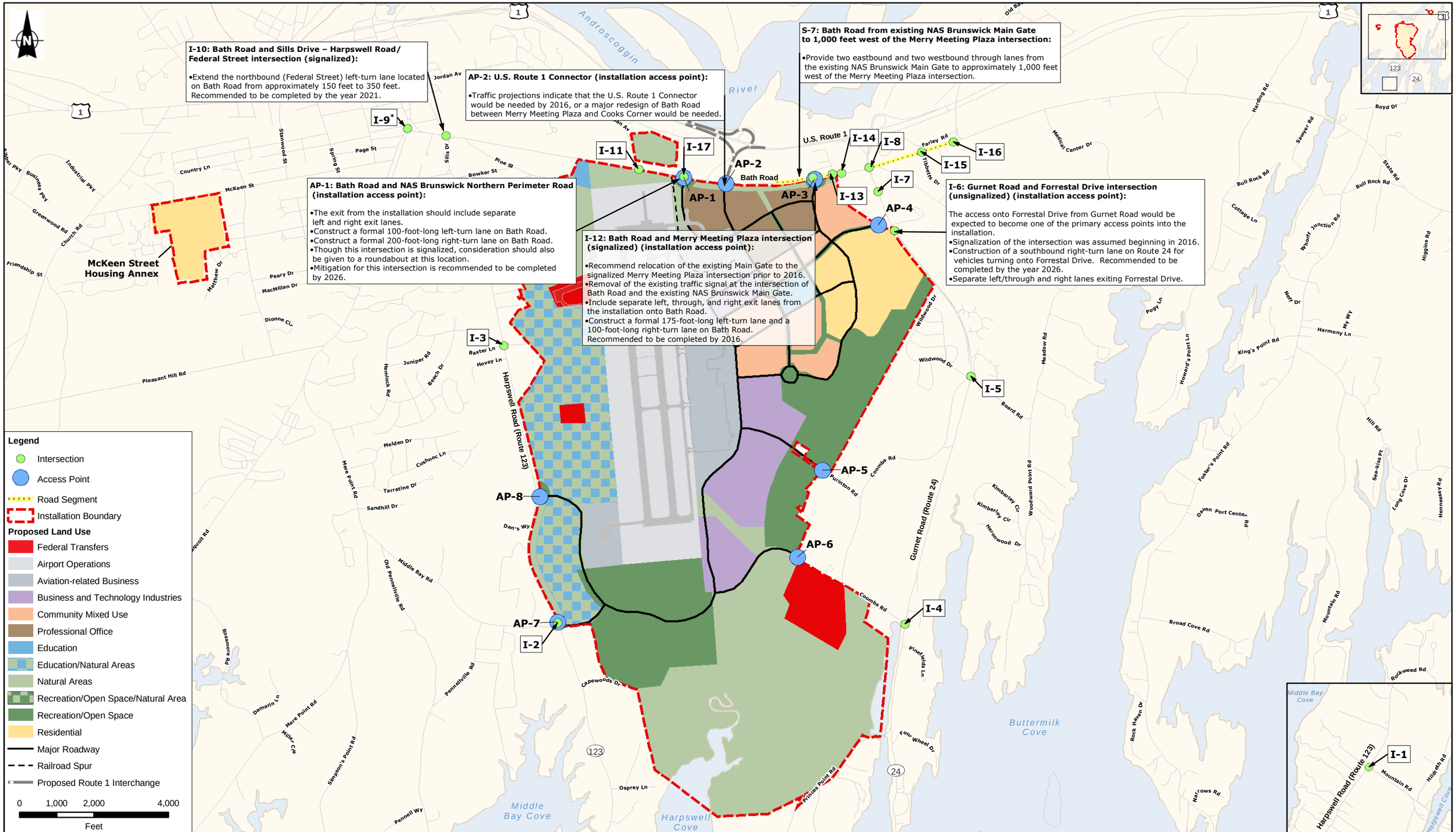

*Recent conceptual planning has proposed changing the current intersection at Bath Road and Maine Street (I-9) to a rotary, as outlined in Section 4.4.

Source: Gorrill-Palmer 2009; BLRA 2007a.

Figure 4.4-2
Alternative 1
Recommended Transportation Mitigation
Brunswick, Maine

of traffic. The improvement and development of road infrastructure would not be completed at once; improvements and development would be completed as necessary as the installation is redeveloped.

The McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station would continue to utilize their existing surface road network and access points. Redevelopment of the McKeen Street Housing Annex would result in occupancy of housing units and traffic associated with redevelopment. However, the trip generation resulting from the occupancy or vacancy of this development would not change the traffic impact conclusions associated with Alternative 2. Redevelopment of the outlying properties (i.e., McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and the Sabino Hill Rake Station) would not be expected to have a significant impact on the transportation resources in the project area (Gorrill-Palmer 2009).

Alternative 2 also includes development of a rail spur, which would connect the northern portion of the installation to an existing at-grade railroad right-of-way that parallels Bath Road. The rail spur would require construction of new rail infrastructure and the acquisition of rail right-of-way from the existing rail line paralleling Bath Road, across Bath Road, and extending onto the installation property. Currently, a plan for the implementation of the rail component proposed in the Reuse Master Plan and a specific route for the rail spur and associated infrastructure has not been defined.

A portion of the rail spur and the proposed U.S. Route 1 Connector are located off the installation on privately owned lands. In addition, the rail improvement and connector road projects are currently in the initial planning stages and have not been designed or funded, and the land required for construction has not been acquired. The BRAC and EIS processes are separate and distinct from state and federal processes for the design and construction of new public highways. The Navy plays no role and has no responsibilities in the environmental review, planning, design, or construction of highways.

Access onto the installation under Alternative 2 would be improved and include an increase in the number of vehicle access points over existing conditions. Alternative 2 includes eight access points, which are described in Table 4.4-9 and identified on Figure 4.4-3.

As with Alternative 1, AP-5 and AP-6 would be accessed via Coombs Road and Purinton Road, which are rural residential roads. The majority of people would access the former installation via AP-1 through AP-4 in the northern portion of the former installation or AP-7 and AP-8 on the western side. Although the increase in vehicles on Coombs Road and Purinton Road would be an impact on the rural residential character of the roads, the roads have adequate capacity to accommodate the additional traffic.

Table 4.4-9 Alternative 2 – Access Points

Figure Label	Access Point	Description
AP-1	Bath Road and NAS Brunswick Northern Perimeter Road	This new access point would be located along Bath Road, approximately 0.15 mile east of Jordan Avenue, and would provide direct access to the northern portion of the installation (noted as new intersection I-17 on figures and in tables).
AP-2	Proposed U.S. Route 1 Connector	This new access point would directly connect U.S. Route 1 to the NAS Brunswick property. The access roadway would extend from U.S. Route 1, cross over Bath Road, and connect to the northern boundary of the NAS Brunswick property. The U.S. Route 1 Connector would be located outside of the federally owned NAS Brunswick, on private lands.
AP-3	Bath Road and Merrymeeting Plaza	This new access point would provide direct access to the northern portion of the installation from Bath Road.
AP-4	Gurnet Road and Forrestal Drive	This existing access point is located along Gurnet Road and would continue to provide direct access to the northeastern portion of the installation.
AP-5	Coombs Road and Purinton Road	This new access point would provide access along the eastern boundary of the installation. Coombs Road and Purinton Road are rural residential roads and serve as connectors between the installation and Route 24 to the east.
AP-6	Coombs Road and Merriconeag Road	This new access point would provide access along the eastern boundary of the installation.
AP-7	Harpswell Road/Middle Bay Road/Merriconeag Road	This existing access point would continue to provide access to the southwestern portion of the installation.
AP-8	Harpswell Road and NAS Brunswick Perimeter Road	This new access point would be located along Harpswell Road and would provide direct access to the western portion of the installation.

Source: BLRA 2007a.

4.4.3.2 Projected Traffic Volume

At the P.M. peak hour, Alternative 2 would add 10,593 vehicle trips to the existing network of roads at full build-out. This is an increase of 9,336 more vehicles than currently generated by existing activities at NAS Brunswick (i.e., existing conditions). The volume of traffic entering or exiting the installation during the P.M. peak hour and the volume of site-generated traffic along major travel routes is presented in Table 4.4-10. These projections assume that the U.S. Route 1 Connector will be completed by 2016. In the event that the connector is not completed by 2016, traffic volumes along the adjacent roadway network would be expected to increase.

Under Alternative 2, the majority of P.M. peak-hour traffic would be generated by the Community Mixed-Use land use district. Table 4.4-11 identifies the origin of P.M. peak-hour traffic entering or exiting the installation.

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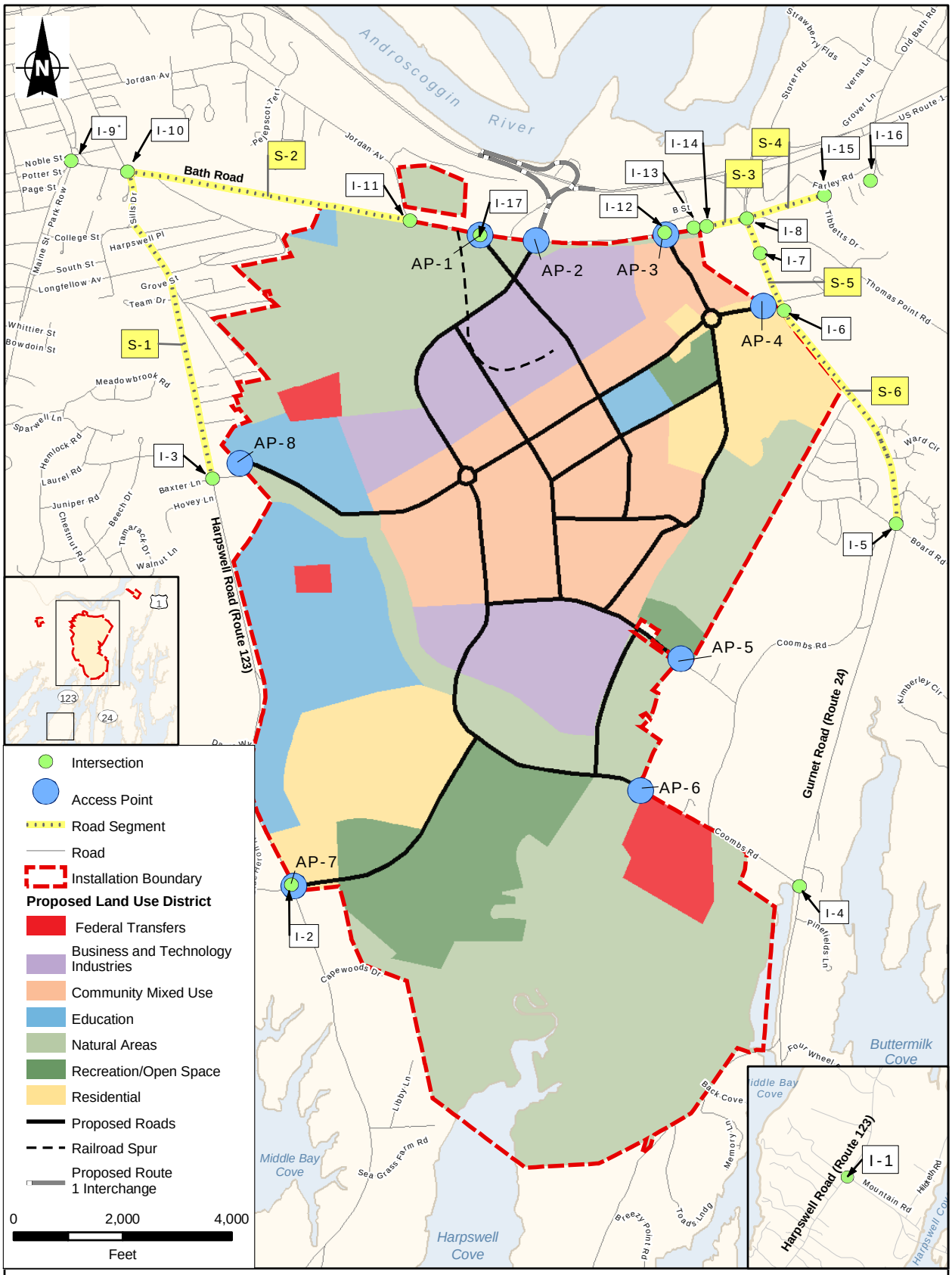

*Recent conceptual planning has proposed changing the current intersection at Bath Road and Maine Street (I-9) to a rotary, as outlined in Section 4.4.

Source: Gorrill-Palmer 2009.

Figure 4.4-3
Alternative 2
Surface Road Network and Access Points
Brunswick, Maine

Table 4.4-10 Alternative 2 – Adjacent Roadway Traffic Volumes (P.M. Peak-Hour[1] Trip Ends)

Roadway	Existing (2008)		5 Years (2016)		10 Years (2021)		15 Years (2026)		20 Years (2031)	
	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit
Harpswell Road	224	203	8	5	23	31	26	57	79	99
Bath Road	109	588	117 (382)	159 (538)	257 (887)	341 (1,236)	474 (1,737)	551 (2,202)	743 (2,667)	969 (3,727)
Gurnet Road	79	54	53 (234)	91 (330)	151 (514)	205 (754)	260 (1,114)	303 (1,363)	411 (1,709)	538 (2,312)
Proposed U.S. Route 1 Connector	-	-	432	618	1,040	1,442	2,127	2,711	3,222	4,532
Total	**412**	**845**	**610 (1,056)**	**873 (1,491)**	**1,471 (2,464)**	**2,019 (3,463)**	**2,887 (5,004)**	**3,622 (6,333)**	**4,455 (7,677)**	**6,138 (10,670)**
	1,257		**1,483 (2,547)**		**3,490 (5,927)**		**6,509 (11,337)**		**10,593 (18,347)**	

Source: Gorrill-Palmer 2009, 2010.

Notes:
[1] P.M. peak hour = weekdays from 2:30 P.M. to 6:00 P.M.

Key:
"-" = Not applicable.
XX = Traffic projection with completion of U.S. Route 1 Connector.
(XX) = Traffic projection without completion of U.S. Route 1 Connector.

Table 4.4-11 Alternative 2 – Trip Distribution by Land Use District (P.M. Peak Hour[1])

Land Use District	5 Years (2016)		10 Years (2021)		15 Years (2026)		20 Years (2031)	
	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit
Airport Operations and Aviation-related Business[2]	-	-	-	-	-	-	-	-
Business and Technology Industries	65	209	158	509	295	949	576	1,828
Community Mixed Use (Non-Residential)	282	487	652	1,105	1,085	1,779	1,948	3,124
Community Mixed Use (Residential)	138	74	329	177	867	467	1,128	608
Education	77	72	167	151	241	220	388	356
Professional Office[2]	-	-	-	-	-	-	-	-
Residential	64	35	142	77	398	215	411	222
Total	**626**	**877**	**1,448**	**2,019**	**2,886**	**3,630**	**4,451**	**6,138**

Source: Gorrill-Palmer 2009.

Notes:
[1] P.M. peak hour = weekdays from 2:30 P.M. to 6:00 P.M.
[2] Alternative 2 does not include Airport Operations, Aviation-related Business, or Professional Office land use districts.

Key:
"-" = Not applicable.

Full build-out of Alternative 2 would increase the daily volume and P.M. peak-hour traffic along examined roadway segments. The highest growth in traffic volume, both daily and during the P.M. peak-hour period, is projected to occur along Bath Road between Federal Street and Jordan Avenue, and along Gurnet Road between Bath Road and Forrestal Drive, each of which is projected to experience more than 5,000 addition daily vehicle trips at full build-out than under existing conditions. Table 4.4-12 identifies the projected roadway segment traffic volumes, daily and P.M. peak hour, resulting from implementation of Alternative 2.

Table 4.4-12 Alternative 2 – Roadway Segment Directional Traffic Volume (Daily/P.M. Peak Hour[1])

Figure Label	Segment	Existing (2008)	5 Years (2016)	10 Years (2021)	15 Years (2026)	20 Years (2031)
S-1	Harpswell Road between Jonathan Street and Bath Road	10,970/ 1,097	10,140/ 1,014	10,530/ 1,053	11,240/ 1,124	12,560/ 1,256
S-2	Bath Road between Federal Street and Jordan Avenue	15,320/ 1,532	14,140/ 1,414	15,790/ 1,579	18,140/ 1,814	22,040/ 2,204
S-3	Bath Road between Cooks Corner Mall and Gurnet Road	21,180/ 2,118	(23,070) 16,630/ (2,307) 1,663	(33,690) 18,440/ (3,369) 1,844	(49,580) 20,440/ (4,958) 2,044	(70,240) 24,420/ (7,024) 2,442
S-4	Bath Road between Gurnet Road and Tibbetts Drive	24,310/ 2,431	21,250/ 2,125	22,540/ 2,254	24,480/ 2,448	28,170/ 2,817
S-5	Gurnet Road between Bath Road and Forrestal Drive	11,690/ 1,169	(15,570) 11,370/ (1,557) 1,137	(23,850) 13,070/ (2,385) 1,307	(33,960) 14,820/ (3,396) 1,482	(48,970) 18,250/ (4,897) 1,825
S-6	Gurnet Road between Forrestal Drive and Coombs Road North	10,370/ 1,037	9,330/ 933	9,790/ 979	10,240/ 1,024	11,410/ 1,141

Source: Gorrill-Palmer 2009, 2010.

Notes:
[1] P.M. peak hour = weekdays from 2:30 P.M. to 6:00 P.M.

Key:
XX = Traffic projection with completion of U.S. Route 1 Connector.
(XX) = Traffic projection without completion of U.S. Route 1 Connector.

The total traffic volume entering into the traffic study area intersections during the P.M. peak-hour period is projected to increase upon full build-out of Alternative 2. Table 4.4-13 identifies the total entering volume of P.M. peak-hour traffic within the traffic study area resulting from Alternative 2. The total entering volume represents a sum of the traffic entering into the intersection from each directional approach during the weekday P.M. peak-hour period.

Table 4.4-13 Alternative 2 – Total Entering Volume, Roadway Intersection (P.M. Peak Hour[1])

Figure Label	Intersection	Existing (2008)	5 Years (2016)	10 Years (2021)	15 Years (2026)	20 Years (2031)
I-1	Harpswell Road and Mountain Road (unsignalized)	583	535	590	605	747
I-2	Harpswell Road and Middle Bay Road/NAS Brunswick Dyer's Gate (unsignalized) (installation access point)	691	633	674	689	776
I-3	Harpswell Road and Jonathan Street/Baxter Lane (unsignalized)	491	450	475	490	592
I-4	Gurnet Road and Coombs Road South (unsignalized)	770	684	740	794	936
I-5	Gurnet Road and Coombs Road North (unsignalized)	782	693	744	792	906
I-6	Gurnet Road and Forrestal Drive (unsignalized) (installation access point)	1,182	(1,595) / 1,175	(2,464) / 1,384	(3,503) / 1,589	(5,067) / 1,995
I-7	Gurnet Road and Cinema/Plaza (signalized)	1,659	(1,987) / 1,581	(2,689) / 1,755	(3,861) / 1,947	(5,407) / 2,335
I-8	Bath Road and Gurnet Road (signalized)	4,175	(4,729) / 3,678	(6,493) / 4,033	(9,268) / 4,440	(12,893) / 5,239
I-9	Proposed "Rotary Area" (unsignalized)[2]					
I-9a	Bath Road and No Name Road	1,412	1,393	1,542	1,735	2,121
I-9b	Maine Street and Bath Road	1,764	1,678	1,810	1,923	2,260
I-9c	Maine Street and Noble Street	1,672	1,588	1,690	1,818	2,078
I-9d	Maine Street and No Name Road	2,012	1,889	2,022	2,219	2,513
I-10	Bath Road and Sills Drive/Harpswell Road/ Federal Street (signalized)	2,281	2,136	2,331	2,622	3,106
I-11	Bath Road and Jordan Avenue (unsignalized)	1,694	1,557	1,758	1,977	2,585
I-12	Bath Road and Merrymeeting Plaza (signalized) (installation access point)	2,064	(2,664) / 2,020	(3,895) / 2,370	(5,405) / 2,491	(7,758) / 3,076
I-13	Bath Road and NAS Brunswick Main Gate (signalized)	2,422	NA	NA	NA	NA
I-14	Bath Road and Cooks Corner Mall (signalized)	2,458	(2,572) / 1,929	(3,645) / 2,120	(4,920) / 2,322	(7,450) / 2,768
I-15	Bath Road and Tibbetts Drive (signalized)	2,469	2,178	2,300	2,483	2,852
I-16	Bath Road and Old Bath Road (signalized)	2,198	1,950	2,082	2,254	2,596
I-17	Bath Road and Northern Perimeter Road (installation access point)[3]	-	-	-	(2,284) / 1,997	(3,091) / 2,623

Source: Gorrill-Palmer 2009, 2010.

Notes:
1 p.m. peak hour = weekdays from 2:30 p.m. to 6:00 p.m.
2 In 2004, the State of Maine Department of Transportation (MaineDOT) received a project request for improvement of the Maine Street at Bath Road intersection. As of June 24, 2010, that request has not received planning or construction funding in a MaineDOT Capital Improvement Plan (MaineDOT 2010).
3 Intersection I-17 is a proposed intersection at Bath Road and Northern Perimeter Road that would be located at AP-1.

Key:
"-" = Not Applicable.
XX = Traffic projection with completion of U.S. Route 1 Connector.
(XX) = Traffic projection without completion of U.S. Route 1 Connector.

4.4.3.3 Projected Roadway Level of Service

Assuming implementation of all recommended mitigation, seven of the ten intersections are projected to operate at an equivalent or improved LOS. Only one intersection is projected to operate at an LOS of F, Bath Road and Sills Drive/ Harpswell Road/Federal Street. Table 4.4-14 identifies the projected LOS in the traffic study area at full build-out of Alternative 2. (Note: LOS presented is without implementation of the recommended mitigation techniques discussed in Section 4.4.3.4.) As shown in Table 4.4-14, without implementation of the U.S. Route 1 Connector, there would be significant impacts on intersection's LOS. Some intersections, under Alternative 2, would have a LOS of F by 2016 and gridlock by 2021 (see Table 4.4-14 for specific intersection details).

Table 4.4-14 Alternative 2 – Intersection Level of Service

Figure Label	Intersection	Existing (2008)	5 Years (2016)	10 Years (2021)	15 Years (2026)	20 Years (2031)
I-1	**Harpswell Road and Mountain Road (unsignalized)**					
	Direction: Restaurant Eastbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Mountain Westbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Harpswell Northbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Harpswell Southbound	A	NA (A)	NA (A)	NA (A)	NA (A)
I-2	**Harpswell Road and Middle Bay Road/ NAS Brunswick Dyer Gate (unsignalized)**					
	Direction: Middle Bay Eastbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Golf Course Westbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Harpswell Northbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Harpswell Southbound	A	NA (A)	NA (A)	NA (A)	NA (A)
I-3	**Harpswell Road and Jonathan Street/ Baxter Lane (unsignalized)**					
	Direction: Baxter Eastbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Jonathan Westbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Harpswell Northbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Harpswell Southbound	A	NA (A)	NA (A)	NA (A)	NA (A)
I-4	**Gurnet Road and Coombs Road South (unsignalized)**					
	Direction: Coombs Road Eastbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Gurnet Northbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Gurnet Southbound	A	NA (A)	NA (A)	NA (A)	NA (A)

Table 4.4-14 Alternative 2 – Intersection Level of Service (continued)

Figure Label	Intersection	Existing (2008)	5 Years (2016)	10 Years (2021)	15 Years (2026)	20 Years (2031)
I-5	**Gurnet Road and Coombs Road North (unsignalized)**					
	Direction: Coombs Road Eastbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Gurnet Northbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Gurnet Southbound	A	NA (A)	NA (A)	NA (A)	NA (A)
I-6	**Gurnet Road and Forrestal Drive (unsignalized)[1]**					
	Direction: Forrestal Eastbound	C	C (F)	C (grid)	C (grid)	C (grid)
	Direction: Lee's Tire Westbound	A	A (A)	B (grid)	A (grid)	A (grid)
	Direction: Gurnet Road Northbound	A	B (A)	A (grid)	A (grid)	B (grid)
	Direction: Gurnet Road Southbound	A	A (A)	A (grid)	A (grid)	B (grid)
I-7	**Gurnet Road and Cinema (signalized)**	B	B (B)	B (grid)	B (grid)	B (grid)
I-8	**Bath Road and Gurnet Road (signalized)**	C	D (D)	C (grid)	C (grid)	D (grid)
I-9	**Proposed Rotary Area**					
I-9i	**No Name Road and Maine Street**					
	Direction: No Name Westbound	B	NA (B)	NA (D)	NA (E)	NA (E)
	Direction: Maine Northbound	A	NA (A)	NA (A)	NA (A)	NA (A)
	Direction: Maine Southbound	A	NA (A)	NA (A)	NA (A)	NA (A)
I-9ii	**Bath Road and Maine Street**					
	Direction: Maine Northbound	C	NA (C)	NA (D)	NA (F)	NA (F)
	Direction: Maine Southbound	A	NA (A)	NA (A)	NA (A)	NA (A)
I-9iii	**Cleaveland and No Name Road**					
	Direction: Cleaveland Westbound	C	NA (D)	NA (F)	NA (F)	NA (F)
	Direction: No Name Northbound	A	NA (A)	NA (B)	NA (C)	NA (D)
I-10	**Bath Road and Sills Drive/Harpswell Road/ Federal Street (signalized)[1]**	C	B (C)	C (C)	D (D)	D (F)
I-11	**Bath Road and Jordan Avenue (unsignalized)**					
	Direciton: Bath Eastbound	A	A (A)	A (grid)	A (grid)	C (grid)
	Direction: Bath Westbound	A	A (A)	A (grid)	A (grid)	A (grid)
	Direction: Jordan Southbound	D	D (D)	E (grid)	F (grid)	F (grid)

Table 4.4-14 Alternative 2 – Intersection Level of Service (continued)

Figure Label	Intersection	Existing (2008)	5 Years (2016)	10 Years (2021)	15 Years (2026)	20 Years (2031)
I-12	**Bath Road and Merrymeeting Plaza (signalized) (proposed installation access point)**	B	C (B)	C (grid)	B (grid)	C (grid)
I-13	**Bath Road and NAS Brunswick Main Gate (signalized)**	A	NA (F)	NA (grid)	NA (grid)	NA (grid)
I-14	**Bath Road and Cooks Corner Mall (signalized)**	B	B (C)	B (grid)	B (grid)	B (grid)
I-15	**Bath Road and Tibbetts Drive (signalized)**	B	A (A)	A (grid)	B (grid)	B (grid)
I-16	**Bath Road and Old Bath Road (signalized)**	B	B (B)	B (C)	B (grid)	B (grid)
I-17	**Bath Road and Northern Perimeter Road (proposed installation access point)[2]**	-	- (-)	- (-)	B (NA)	C (NA)

Source: Gorrill-Palmer 2009, 2010.

Notes:
[1] Assumes the intersection of Bath Road and Harpswell Road/Federal Street will be signalized after 2016.
[2] This intersection is a new access point that is not proposed until the 15-year phase (2026).

Key:
"-" = Not applicable.
NA = No additional analysis is required as the existing intersection configuration provides adequate levels of service.
XX = Traffic projection with completion of U.S. Route 1 Connector.
(XX) = Traffic projection without completion of U.S. Route 1 Connector.
"grid" = Indicates that traffic delays would be so extreme that it is beyond the software's ability to calculate the delay due to gridlock.

Redevelopment of the installation would also generate construction-related traffic that was not captured in the traffic study. Construction traffic would consist of delivery trucks, dump trucks carrying debris to off-site disposal facilities, heavy equipment, and vehicles driven by construction crews. Currently, no construction, operations, and management plan has been developed; therefore, the level and pace of construction activities have not yet been identified. Consequently, projections of future construction-related traffic volumes have not been developed. Construction traffic could result in short-term impacts on traffic, including additional truck trips and the presence of slower moving vehicles. This impact would be spread over the 20-year development schedule.

4.4.3.4 Recommended Mitigation Measures

The future traffic conditions identified in the traffic study assumed that the mitigation measures listed in Table 4.4-1, as well as the additional measures presented in Table 4.4-15 and identified on Figure 4.4-4, would be completed under Alternative 2. These mitigation measures are recommendations. Some traffic mitigation projectswould be required based on either current conditions or projected growth in the town without the redevelopment of the installation. Other projects may need to be implemented by the developer in consultation with MaineDOT and the town as traffic conditions warrant during development of the former installation. With implementation of the recommended mitigation measures noted in Table 4.4-15 under Alternative 2, the LOS for I-6 would remain unchanged at

LOS B, the I-10 LOS would improve from F to D, and the I-12 LOS would remain C.

Table 4.4-15 Alternative 2 – Recommended Mitigation Measures

Figure Label	Intersection/Roadway	Recommended Mitigation
I-6	Gurnet Road and Forrestal Drive intersection (unsignalized) (installation access point)	The access onto Forrestal Drive from Gurnet Road would be expected to become one of the primary access points into the installation. ■ A formal signal warrant analysis would be required before a signal could be installed; however, based on projected traffic volumes at this intersection, it appears that, beginning in 2016, signalization would be necessary for the intersection to function properly. Signalization of the intersection was assumed beginning in 2016. ■ Construction of a southbound right-turn lane on Route 24 for vehicles turning onto Forrestal Drive. Recommended to be completed by the year 2026. ■ Separate left/through and right lanes exiting Forrestal Drive.
I-8	Bath Road and Gurnet Road (signalized)	■ Northbound New Gurnet through lanes should be extended back to Sear's Drive (needed by 2031).
I-10[1]	Bath Road and Sills Drive/ Harpswell Road/Federal Street intersection (signalized)	■ Extend the northbound (Federal Street) left-turn lane located on Bath Road from approximately 150 feet to 350 feet. Recommended to be completed by the year 2021. ■ Construct a westbound (Bath Road) right turn lane off Federal Street (needed by 2031) ■ Extend the eastbound Bath Road left lane to 300 feet (needed by 2031). ■ Convert the eastbound Bath Road right lane to a shared through/right lane (needed by 2031). ■ Widen Bath Road east of Federal Street for two receiving eastbound lanes (needed by 2031). ■ Construct an additional Bath Road westbound 325-foot-long left lane (needed by 2031). ■ Widen Sills Drive south of Bath Road for two receiving southbound lanes (needed by 2031). ■ Construct a Bath Road westbound 325-foot-long right turn lane (needed by 2031).
I-12	Bath Road and Merrymeeting Plaza intersection (signalized) (installation access point)	■ Recommend relocation of the existing Main Gate to the signalized Merrymeeting Plaza intersection prior to 2016. For the traffic study, the existence of this access point was assumed beginning in 2016. ■ Removal of the existing traffic signal at the intersection of Bath Road and the existing NAS Brunswick Main Gate. ■ Include separate left, through, and right exit lanes from the installation onto Bath Road. ■ Construct a formal 350-foot-long left-turn lane and a 100-foot-long right-turn lane on Bath Road. Recommended to be completed by 2016.

Table 4.4-15 Alternative 2 – Recommended Mitigation Measures (continued)

Figure Label	Intersection/Roadway	Recommended Mitigation
AP-1	Bath Road and NAS Brunswick Northern Perimeter Road (installation access point)	■ The exit from the installation should include separate left and right exit lanes. ■ Construct a formal 100-foot-long left-turn lane on Bath Road. ■ Construct a formal 200-foot-long right-turn lane on Bath Road. ■ Though this intersection is signalized, consideration should also be given to a roundabout at this location. ■ Mitigation for this intersection is recommended to be completed by 2026.
AP-2	U.S. Route 1 Connector (installation access point)	■ Traffic projections indicate that the U.S. Route 1 Connector would be needed by 2016, or a major redesign of Bath Road between Merrymeeting Plaza and Cooks Corner would be needed. Beyond the 2016 projection, the adjacent roadway network would be unable to handle the traffic projected to result from the implementation of Alternative 2.
S-7	Bath Road from existing NAS Brunswick Main Gate to 1,000 feet west of the Merrymeeting Plaza intersection	■ Provide two eastbound and two westbound through lanes from the existing NAS Brunswick Main Gate to approximately 1,000 feet west of the Merrymeeting Plaza intersection.

Source: Gorrill-Palmer 2009, 2010.

Note:
[1] Although Figure Label I-10 is included as an intersection/roadway that required mitigation measures under existing conditions, different mitigation measures are recommended under Alternative 2; thus, it is included in this table.

In addition, the projected traffic conditions and the recommended mitigation measures are based on full build-out of the installation. If the projected density of development does not occur, the need for the recommended mitigations would need to be reevaluated and some measures may not be necessary.

4.4.3.5 Pedestrian and Alternative Transportation Amenities

In compliance with the Town of Brunswick Zoning Ordinance, all future development within the town's growth planning area is required to provide sidewalks. The majority of developable land under Alternative 2 is located with the town's Growth Area (Town of Brunswick 2009a) and would require sidewalks if they do not currently exist.

To facilitate alternative transportation modes, walking, and to reduce future vehicular traffic on and off the installation, the developer should consider the following:

- **A Transportation Demand Management Program (TDM).** Consideration should be given to implementing a TDM program.
- **Pedestrian Amenities.** Sidewalks, crosswalks, and other pedestrian accommodations should be provided.
- **Ridesharing Program.** Ridesharing programs encourage commuters to ride in vehicles with other commuters rather than drive alone. The facility could provide ride-matching services through postings in public areas. Reserved parking spaces for vehicles that are used for carpooling could also be provided.

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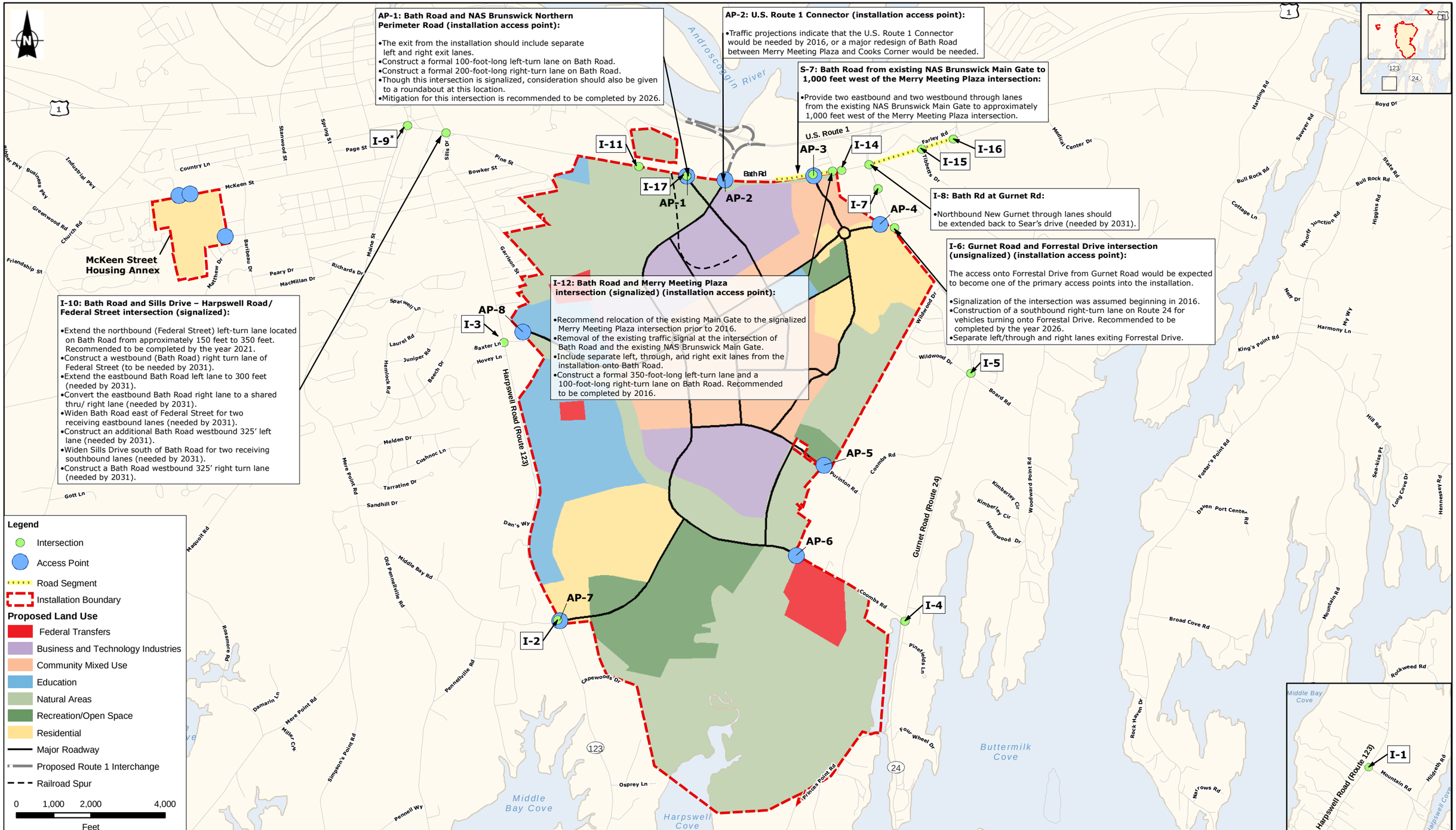

*Recent conceptual planning has proposed changing the current intersection at Bath Road and Maine Street (I-9) to a rotary, as outlined in Section 4.4.

Source: Gorrill-Palmer 2009.

Figure 4.4-4
Alternative 2
Recommended Transportation Mitigation
Brunswick, Maine

- **Provision of Bicycling Amenities.** Enclosed and secure bicycle facilities should be provided for employees interested in bicycling to and from work or school (Town of Brunswick 2008a).

- **On-site Transit Service.** A fixed-route public transit bus service (the Brunswick Explorer) is expected to begin service in the fall of 2010; however, as planned, it will not include a stop at NAS Brunswick (Brunswick Explorer 2010). Therefore, it is still suggested that the developer consider establishing an on-site transit service.

4.4.3.6 Permits

The redevelopment of NAS Brunswick would require a Traffic Movement Permit (23 M.R.S.A. § 704-A) from the Maine Department of Transportation. Any project that generates 100 or more passenger-car-equivalent trips during peak hour traffic must file a Traffic Movement Permit application with the Maine Department of Transportation. It is important to note that this EIS does not necessarily satisfy the requirements for obtaining a Traffic Movement Permit or municipal approval. The developer would be responsible for obtaining a Traffic Movement Permit and implementing any required mitigation.

4.4.4 No-Action Alternative

Under the No-Action Alternative, the property would be retained by the U.S. government and placed in caretaker status. Existing structures and land would not be reused or developed; however, the existing PPV residential housing would continue to be occupied, per the lease agreement.

4.4.4.1 Road Network and Access

The federal government sold, transferred, and conveyed to the PPV housing lessee all facilities and improvements, including existing housing, any equipment, alterations, additions, streets, sidewalks, driveways, related infrastructure, and attached fixtures except for primary utilities. Maintenance and upkeep of the existing network of surface roads (e.g., repairs, snow plowing, etc.) for use by residents of the PPV housing would continue to be the responsibility of the lessee.

The existing installation access points and road network would not change under the No-Action Alternative. The existing PPV housing would continue to operate under the current PPV lease agreement. The remainder of the installation, including the East Brunswick Radio Transmitter Site and the Sabino Hill Rake Station, would remain unoccupied and be placed in caretaker status. No new access points or changes to the existing road network would occur. It is assumed that the majority of traffic entering NAS Brunswick would do so at the existing Gurnet Road/ Forrestal Drive access point, which is located in proximity to the existing PPV housing.

4.4.4.2 Projected Traffic Volume

At the P.M. peak hour, the No-Action Alternative is projected to generate 282 vehicle trips along Gurnet Road. This is 975 fewer vehicle trips than existing conditions. The No-Action Alternative would not be expected to generate a noticeable volume of traffic along Harpswell Road or Bath Road. Traffic generated from

this alternative would likely use the Gurnet Road/Forrestal Drive access point located along Gurnet Road, near the existing residential area. Site-generated traffic would be the result of the re-occupancy of the PPV housing area by non-military personnel. The remainder of the installation would be unoccupied and in caretaker status. Compared to the existing conditions, the No-Action Alternative would result in a reduction in the traffic volume along Harpswell Road and Gurnet Road during the P.M. peak hour. The volume of traffic entering or exiting the installation during the P.M. peak hour and the volume of site-generated traffic along major travel routes is identified in Table 4.4-16.

Table 4.4-16 No-Action Alternative – Adjacent Roadway Traffic Volumes (P.M. Peak Hour[1] Trip Ends)

Roadway	Existing (2008)		20 Years (2031)	
	Enter	Exit	Enter	Exit
Harpswell Road	224	203	-	-
Bath Road	109	588	-	-
Gurnet Road	79	54	111	99
Total	**412**	**845**	**111**	**99**
	1,257		**210**	

Source: Gorrill-Palmer 2009, 2010.

Note:
[1] P.M. peak hour = weekdays from 2:30 P.M. to 6:00 P.M.

Traffic volume on examined roadway segments would decline from existing 2008 conditions. The only growth in traffic volume, both daily and during the P.M. peak hour, is projected to occur along Gurnet Road, between Bath Road and Forrestal Drive. Table 4.4-17 identifies the projected daily and P.M. peak hour roadway segment traffic volumes resulting from implementation of the No-Action Alternative.

Table 4.4-17 No-Action Alternative – Roadway Segment Directional Traffic Volume (Daily/P.M. Peak Hour[1])

Figure Label	Segment	Existing (2008)	20 Years (2031)
S-1	Harpswell Road between Jonathan Street and Bath Road	10,970/ 1,097	10,860/ 1,086
S-2	Bath Road between Federal Street and Jordan Avenue	15,320/ 1,532	14,670/ 1,467
S-3	Bath Road between Cooks Corner Mall and Gurnet Road	21,180/ 2,118	17,370/ 1,737
S-4	Bath Road between Gurnet Road and Tibbetts Drive	24,310/ 2,431	23,250/ 2,325
S-5	Gurnet Road between Bath Road and Forrestal Drive	11,690/ 1,169	13,890/ 1,389
S-6	Gurnet Road between Forrestal Drive and Coombs Road North	10,370/ 1,037	9,930/ 993

Source: Gorrill-Palmer 2009.

Note:
[1] P.M. peak hour = weekdays from 2:30 P.M. to 6:00 P.M.

Under the No-Action Alternative, the total traffic volume entering the intersections evaluated in the traffic study would decrease slightly during the p.m. peak hour. Gurnet Road/Forrestal Drive and Gurnet Road/Cinema were the only intersections projected to experience an increase in traffic. Both intersections are on the eastern side of the installation, closest to the PPV housing area. Table 4.4-18 identifies the total entering volume of P.M. peak-hour traffic within the traffic study area resulting from implementation of the No-Action Alternative.

Table 4.4-18 No-Action Alternative – Total Entering Volume, Roadway Intersection (P.M. Peak Hour[1])

Figure Label	Intersection	Existing (2008)	20 Years (2031)
I-1	Harpswell Road and Mountain Road (unsignalized)	583	572
I-2	Harpswell Road and Middle Bay Road/ Merriconeag Road (unsignalized) (installation access point)	691	680
I-3	Harpswell Road and Jonathan Street/Baxter Lane (unsignalized)	491	480
I-4	Gurnet Road and Coombs Road South (unsignalized)	770	726
I-5	Gurnet Road and Coombs Road North (unsignalized)	782	738
I-6	Gurnet Road and Forrestal Drive (unsignalized) (installation access point)	1,182	1,406
I-7	Gurnet Road and Cinema/Plaza(signalized)	1,659	1,857
I-8	Bath Road and Gurnet Road (signalized)	4,175	3,994
I-9	Proposed "Rotary Area" (unsignalized)[2]		
I-9a	Bath Road and No Name Road	1,412	1,440
I-9b	Maine Street and Bath Road	1,764	1,786
I-9c	Maine Street and Noble Street	1,672	1,687
I-9d	Maine Street and No Name Road	2,012	2,029
I-10	Bath Road and Sills Drive - Harpswell Road/Federal Street (signalized)	2,281	2,234
I-11	Bath Road and Jordan Avenue (unsignalized)	1,694	1,621
I-12	Bath Road and Merrymeeting Plaza (signalized)	2,064	1,967
I-13	Bath Road and NAS Brunswick Main Gate (signalized)	2,422	1,801
I-14	Bath Road and Cooks Corner Mall (signalized)	2,458	2,019
I-15	Bath Road and Tibbetts Drive (signalized)	2,469	2,363
I-16	Bath Road and Old Bath Road (signalized)	2,198	2,124

Source: Gorrill-Palmer 2009, 2010.

Notes:
[1] P.M. peak hour = weekday from 2:30 P.M. to 6:00 P.M.
[2] In 2004, the Maine Department of Transportation (MaineDOT) received a project request for improvement of the Maine Street at Bath Road intersection. As of June 24, 2010, that request has not received planning or construction funding in a MaineDOT Capital Funding Plan (MaineDOT 2010).

4.4.4.3 Projected Roadway Level of Service

Assuming implementation of all recommended mitigation measures, all 10 intersections are projected to operate at an LOS equal to or better than current conditions. Table 4.4-19 identifies the projected LOS in the traffic study area.

Implementation of the No-Action Alternative would result in no construction-related traffic impacts.

Table 4.4-19 No-Action Alternative – Intersection Level of Service

Figure Label	Intersection	Existing (2008)	20 Years (2031)
I-1	**Harpswell Road and Mountain Road (unsignalized)**		
	Direction: Restaurant Eastbound	A	A
	Direction: Mountain Westbound	A	A
	Direction: Harpswell Northbound	A	A
	Direction: Harpswell Southbound	A	A
I-2	**Harpswell Road and Middle Bay Road/ NAS Brunswick Dyer Gate (unsignalized)**		
	Direction: Middle Bay Eastbound	A	A
	Direction: Golf Course Westbound	A	A
	Direction: Harpswell Northbound	A	A
	Direction: Harpswell Southbound	A	A
I-3	**Harpswell Road and Jonathan Street/Baxter Lane (unsignalized)**		
	Direction: Baxter Eastbound	A	A
	Direction: Jonathan Westbound	A	A
	Direction: Harpswell Northbound	A	A
	Direction: Harpswell Southbound	A	A
I-4	**Gurnet Road and Coombs Road South (unsignalized)**		
	Direction: Coombs Road Eastbound	A	A
	Direction: Gurnet Northbound	A	A
	Direction: Gurnet Southbound	A	A
I-5	**Gurnet Road and Coombs Road North (unsignalized)**		
	Direction: Coombs Road Eastbound	A	A
	Direction: Gurnet Northbound	A	A
	Direction: Gurnet Southbound	A	A
I-6	**Gurnet Road and Forrestal Drive (unsignalized)**		
	Direction: Forestal Eastbound	C	D
	Direction: Lee's Tire Westbound	A	B
	Direction: Gurnet Road Northbound	A	A
	Direction: Gurnet Road Southbound	A	A
I-7	**Gurnet Road and Cinema (signalized)**	B	B
I-8	**Bath Road and Gurnet Road (signalized)**	C	C
I-9	**Proposed Rotary Area**		
I-9i	**No Name Road and Maine Street**		
	Direction: No Name Road Westbound	B	B
	Direction: Maine Northbound	A	A
	Direction: Maine Southbound	A	A
I-9ii	**Bath Road and Maine Street**		
	Direction: Maine Northbound	C	D
	Direction: Maine Southbound	A	A

Table 4.4-19 No-Action Alternative – Intersection Level of Service (continued)

Figure Label	Intersection	Existing (2008)	20 Years (2031)
I-9iii	**Cleaveland and No Name Road**		
	Direction: Cleaveland Westbound	C	C
	Direction: No Name Northbound	A	A
I-10	**Bath Road and Sills Drive/Harpswell Road/Federal Street (signalized)[1]**	C	C
I-11	**Bath Road and Jordan Avenue (unsignalized)**		
	Direction: Bath Road Eastbound	A	A
	Direction: Bath Road Westbound	A	A
	Direction: Jordan Southbound	D	D
I-12	**Bath Road and Merrymeeting Plaza (signalized)**	B	B
I-13	**Bath Road and NAS Brunswick Main Gate (signalized)**	A	A
I-14	**Bath Road and Cooks Corner Mall (signalized)**	B	B
I-15	**Bath Road and Tibbetts Drive (signalized)**	B	B
I-16	**Bath Road and Old Bath Road (signalized)**	B	B

Source: Gorrill-Palmer 2009, 2010.

Notes:
[1] Assumes the intersection of Bath Road and Sills Drive/Harpswell Road/Federal Street will be signalized after 2016.

4.4.4.4 Recommended Mitigation

It is important to note that mitigation measures are needed for existing design deficiencies as well as for the projected long-term growth (see Table 4.4-1). This mitigation could be needed regardless of redevelopment under Alternative 1, Alternative 2, or the No Action Alternative. Under the No-Action Alternative, no site access modifications would occur as under Alternatives 1 and 2. Mitigation measures recommended to reduce transportation impacts that would result from the implementation of the No-Action Alternative are described in Table 4.4-20 and identified on Figure 4.4-5. With implementation of the recommended mitigation measures noted in Table 4.4-20 under the No-Action Alternative, the LOS for I-6 would remain unchanged at LOS A.

Table 4.4-20 No-Action Alternative – Recommended Mitigation Measures

Figure Label	Intersection/Roadway	Recommended Mitigation
I-6	Gurnet Road and Forrestal Drive intersection (unsignalized) (installation access point)	■ Signalize the intersection. ■ Construct a southbound right-turn lane on Gurnet for vehicles turning onto Forrestal Drive. ■ Separate left/through and right lanes exiting Forrestal Drive.

Source: Gorrill-Palmer 2009.

4.5 Environmental Management

This section was prepared utilizing 2008 as a baseline (existing) year. The Environmental Restoration Program at NAS Brunswick is a continuing and ever changing program. The management, investigation, and cleanup activities are ongoing; therefore, this section presents the latest data available at the time of preparation. The most current data regarding the cleanup activities are published as part of the environmental restoration process and can be found in the local information repository at the Brunswick local library (Curtis Memorial Library) or on NAS Brunswick's Environmental Restoration Program Web site (http://nasbrunswick.navy-env.com/index.htm).

CERCLA requires federal agencies to conduct any needed response actions to clean up contamination from past releases of hazardous substances that pose an unacceptable risk to human health and the environment. In preparing to dispose of the NAS Brunswick property, the Navy will follow the provisions of CERCLA, Section 120(h)(3). These provisions require that the deed transferring the property contain a covenant warranting that all remedial actions necessary to protect human health and the environment with respect to contaminants remaining on the property has been taken prior to the date of transfer.

Whenever a Military Department enters into a transfer of real property outside the federal government where CERCLA 120(h)(3) hazardous substances were stored for 1 year or longer, known to have been released, or disposed of, Section 120(h) of CERCLA reference (f) applies. The Department of Defense has no authority under Section 120(h) to increase or decrease the commitment required by that section. Any deed transferring title to real property shall contain, to the extent required by law, the notices, descriptions, and covenants specified in Section 120(h). While all property must comply with CERCLA 120 requirements for transfer, the cleanup itself may proceed under CERCLA or RCRA, when appropriate (DoD 2006). All such remedial action is considered to have been taken if the construction and installation of an approved remedial design has been completed and the remedy has been demonstrated to EPA to be operating properly and successfully.

Since NAS Brunswick was placed on the National Priorities List in 1984, investigation and remedial actions have been performed at NAS Brunswick under the Environmental Restoration Program. This program was undertaken in compliance with CERCLA and is ongoing, regardless of whether the installation was recommended for disposal under BRAC. Past Navy activities that were acceptable practice at the time have, as a result of leaks, spills, or other occurrences, left behind chemicals in the soil, groundwater, and sediment in certain areas of NAS Brunswick. In total, 24 sites/areas of concern have been identified to date at NAS Brunswick and have been or are being investigated. A Restoration Advisory Board (RAB) consisting of community representatives and state and federal regulators was formed to advise the Navy on environmental cleanup strategies as NAS Brunswick progresses toward closure as designated under the authority of BRAC.

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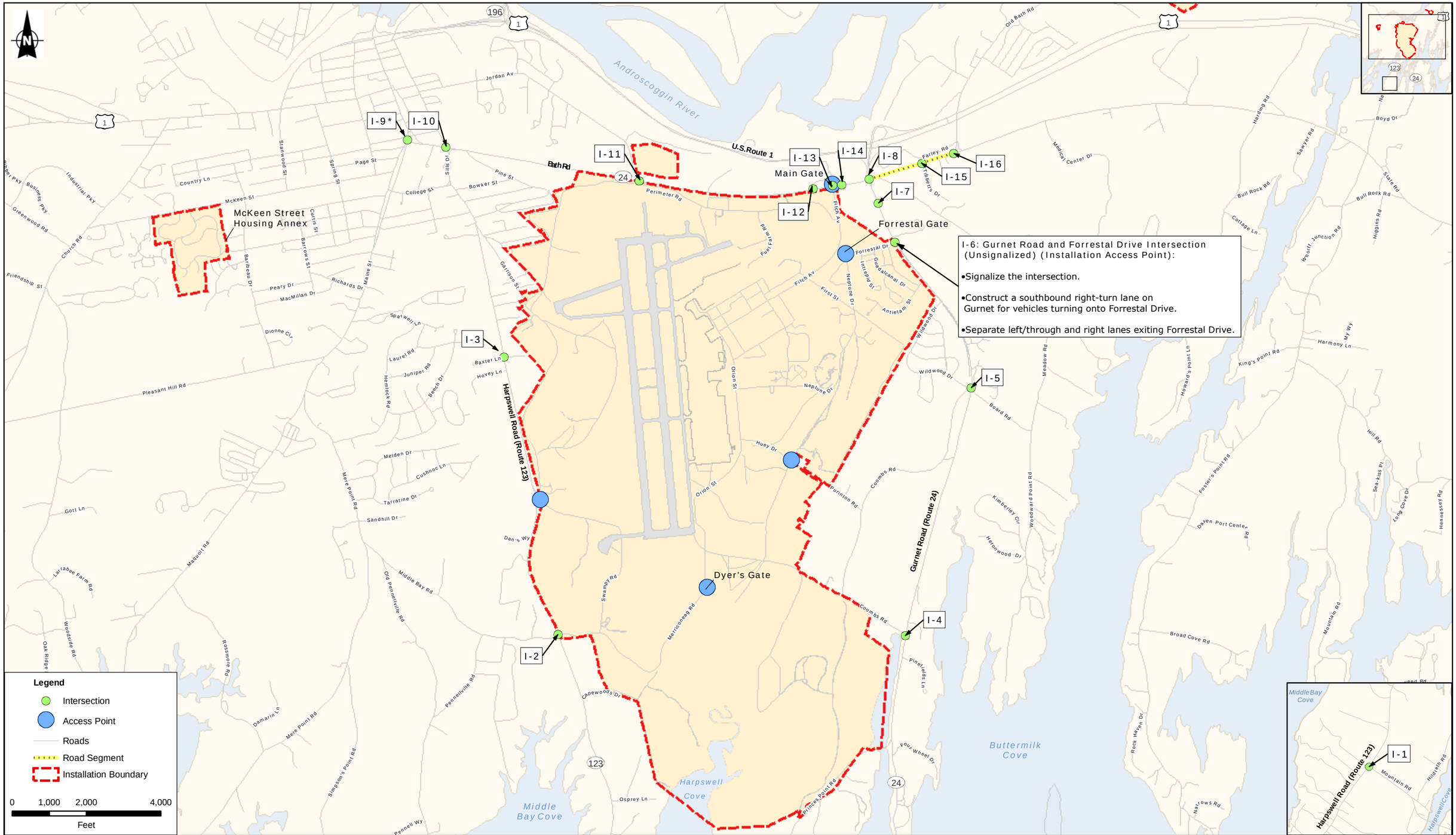


*Recent conceptual planning has proposed changing the current intersection at Bath Road and Maine Street (I-9) to a rotary, as outlined in Section 4.4.

Source: Gorrill-Palmer 2009.

Figure 4.4-5
No-Action Alternative
Recommended Transportation Mitigation
Brunswick, Maine

Long-term monitoring of some areas of the installation have begun, and the data is evaluated yearly. The first and second Five Year Review of all sites was performed in 2000 and 2005, respectively. The review found that all remedies implemented were protective of human health and the environment, but several modifications to increase remedy effectiveness were recommended. These modifications have been partially completed as of 2007.

Through other environmental programs, the Navy is cleaning up petroleum contamination associated with the old Navy Fuel Farm, the Navy Exchange Service station, and military munitions sites.

In support of the BRAC process, the Navy has prepared an Environmental Condition of Property (ECP) Report (Navy BRAC PMO 2006) documenting existing hazardous materials and waste sites located at NAS Brunswick and its outlying properties. The ECP provides baseline information to the BRAC PMO to support disposal decisions and to prospective buyers to support purchase decisions. Property determined to be uncontaminated is defined as "real property on which no hazardous substances and no petroleum products or their derivatives were known to have been released or disposed of" (Section 120 [h] [4], as amended). The purpose of this process is to determine which real property is uncontaminated and can subsequently be transferred through a Finding of Suitability for Transfer (FOST). Potentially contaminated property can still be transferred under the early transfer process of CERCLA. The Navy can also prepare a Finding of Suitability for Early Transfer (FOSET) to transfer property prior to cleanup actions. In these cases, the Navy or the property recipient may conduct cleanup actions. The benefit of a FOSET is that the property can be transferred sooner in order to begin redevelopment while still being assured of property cleanup.

The Navy also prepared a final Site Management Plan (SMP) to identify the current status of IR Program sites and areas of concern (AOCs). This report supplements the information in the May 2006 *Condition of Property Report for the Naval Air Station Brunswick, Maine*. It presents a road map for environmental remediation considering disposal and property transfer schedules; planned work, including conducting Remedial Investigations (RI), Feasibility Studies (FS), and Remedial Actions (RA); the Community Environmental Response Facilitation Act (CERFA); and other actions as required by CERCLA at a BRAC activity.

Prior to transfer of custody and control of parcels, NAS Brunswick will remove and dispose of all hazardous materials in accordance with applicable laws and regulations. The Navy will inform future property owners of the locations of the hazardous waste 90-day accumulation areas, the SAAs, and the UWSAs at NAS Brunswick. The Navy will be required to close or transfer these areas in accordance with CERCLA, RCRA, and all other applicable federal, state, and local laws and regulations. Where appropriate, restrictions, notifications, or covenants in deeds related to ACM, lead, PCBs, radon, and pesticides will be included in property transfer documents to ensure the protection of human health and the environment.

Prior to the transfer or lease of NAS Brunswick and the outlying properties, the Navy will prepare a Finding of Suitability to Lease (FOSL) or Finding of Suitability to Transfer (FOST). The FOST/FOSL summarizes how the applicable requirements and notifications for hazardous substances, petroleum products, and other regulated materials have been satisfied and whether the property is environmentally suitable for transfer or lease. Information will also be provided regarding any long-term remedies and the responsibilities for maintenance and reporting (DoD 2006). The FOSL will document that the property is suitable for lease in that the uses contemplated for the lease are consistent with protection of human health and the environment, and that there are adequate assurances that all necessary remedial action has been taken or will be taken after the execution of the lease. The FOST/FOSL will be forwarded to the EPA and MEDEP for review, as appropriate (DoD 2006).

The Navy is coordinating with the EPA, MEDEP, and MRRA to address the environmental restoration related to transferring NAS Brunswick parcels under Alternative 1. The deed transferring title to real property will contain, to the extent required by law, the notices, descriptions, and covenants specified in Section 120(h) of CERCLA. While all property must comply with CERCLA 120 requirements for transfer, the cleanup itself may proceed under CERCLA or RCRA, when appropriate.

In accordance with the Reuse Master Plan Guiding Principles, proposed land use districts in Alternative 1 were integrated with known environmental constraints where appropriate. The following planning concepts were incorporated into Alternative 1 to minimize the impacts of Environmental Restoration Program sites on human health and the environment:

- Minimization of residential development in areas with known environmental contamination;
- Location of the proposed golf course over the Eastern Plume to provide recreational outdoor activities while limiting the potential for structures that may result in indoor air issues and elevated risk to human health;
- Modification of boundaries around Sites 1 and 3 landfills to avoid segregation of the landfill into several different land uses;
- Identification of the need for future zoning or long-term planning for the landfill areas to incorporate use designations that are compatible with the landfill (e.g., a parking lot over the landfill may require limited cap revisions, whereas placement of new buildings would be more difficult); and
- The EOD area (Site 12) and other uninvestigated munitions areas have been designated as open space.

4.5.1 Alternative 1 (Preferred Alternative)
4.5.1.1 Hazardous Materials and Waste Management

Hazardous Materials and Waste

Under Alternative 1, the quantity of hazardous materials used, generated, stored, and disposed of would be expected to be less than the quantity generated during the Navy's operation at NAS Brunswick. This is based on the amount of airfield and industrial land use proposed for redevelopment (approximately 920 acres) compared to the acreage currently associated with the NAS Brunswick airfield, industrial and maintenance, and weapons storage land uses (2,587 acres).

The property owner/developer would be required to manage hazardous materials and wastes in accordance with applicable federal and state regulations. No hazardous waste would be expected to be generated at the McKeen Street Housing other than small quantities of household hazardous waste. Based on their proposed reuse as recreation areas, no hazardous waste would be expected to be generated at the East Brunswick Radio Transmitter Site or Sabino Hill Rake Station.

Storage Tanks and Oil/Water Separators

Under Alternative 1, redevelopment of NAS Brunswick would have to consider the locations of tanks and oil/water separators. Some may require removal to accommodate the laying of foundations for new buildings or relocating utility lines. In addition, some industrial developments may require the installation of new tanks and/or oil/water separators. The number of tanks needed would be based on the types of processes and heating requirements. The development will need to comply with all applicable federal, state, and local laws and regulations. Any new tanks or oil/water separators that would be installed would comply with applicable MEDEP regulations.

The Navy is conducting an Environmental Condition of Property Update (U.S. Navy 2009a) for the East Brunswick Radio Transmitter Site, including the collection of soil and groundwater samples. The fuel oil and diesel USTs were removed in 1989; however, no documentation on confirmatory sample collection was available. Soil samples will be collected in the area of these former USTs, and the samples will be analyzed for volatile organic compounds, semi-volatile organic compounds, and extractable petroleum hydrocarbons. The sample results will be provided in the Final EIS. No tanks or oil/water separators are located at the McKeen Street Housing since the housing units are heated by natural gas. Tanks have been removed from the East Brunswick Radio Transmitter Site, and no tanks are located at the Sabino Hill Rake Station. Recreational land uses at the East Brunswick Radio Transmitter Site and Sabino Hill Rake Station would not likely require installation of any new tanks.

In general, under Alternative 1 there would be a beneficial long-term impact based on the assumption that numerous storage tanks and oil/water separators would be removed during development of the land use districts. Some storage tanks and oil/water separators may remain in place or be installed and put into service, depending on the needs identified in the land use districts. There would also be a benefit from the sampling and testing effort being conducted under the

Navy's Environmental Condition of Property Update, the results of which will be included in the FEIS.

ACM, LBP, PCBs, Radon, and Pesticides

Alternative 1 includes the renovation and reuse of existing structures, including 43 existing nonresidential structures and 653 residential units. Any modification, renovation, and/or demolition of the existing buildings at NAS Brunswick will have to address ACM and LBP. NAS Brunswick has conducted some ACM and LBP surveys of buildings and maintains records. Contractors will need to comply with regulatory requirements during the demolition of structures and materials containing ACM and LBP. The requirements address engineering controls and protective measures that will be employed during demolition to ensure that ACM and LBP are removed by qualified contractors in a manner that prevents the airborne release of asbestos and lead and that these materials are disposed of properly. Contractors will also need to comply with regulatory requirements during any renovation projects on structures containing ACM and LBP.

The National Emissions Standards for Hazardous Air Pollutants (NESHAPs) (40 CFR Part 61) require that each owner or operator of a demolition activity subject to NESHAPs remove regulated ACM from the facility being demolished prior to any activity that would break up, dislodge, or disturb the materials. Regulated ACM need not be removed before demolition if the ACM is considered nonfriable (e.g., vinyl asbestos floor tiles), is not in poor condition, and would not be rendered friable during the demolition process. Contractual specifications for demolition involving ACM also will be developed by an accredited Asbestos Hazard Emergency Response Act (AHERA) professional to further ensure the proper removal of regulated ACM.

In accordance with RCRA, demolition waste streams that might contain lead would be evaluated, either by applying knowledge of the waste or by testing using the toxicity characteristic leaching procedure (TCLP), to determine whether hazardous waste disposal regulations are applicable. LBP-containing hazardous wastes generated from demolition would be temporarily stored on-site in compliance with RCRA requirements before being transported and disposed of off- site by a licensed contractor.

In general, new construction would not involve the introduction of these materials, although some materials may contain some ACM or LBP.

Under Alternative 1, there would be a beneficial long-term impact from the removal of ACM and LBP because it would no longer be present, or present but in minimal quantities, within the built environment.

NAS Brunswick does not have any transformers containing PCBs at concentrations greater than 50 ppm; therefore, Alternative 1 would have no impact on PCBs. Radon testing results of nonresidential structures showed levels to be below the EPA action level. As a result, implementation of Alternative 1 would not be impacted by radon levels. Pesticide use would likely continue for management

of the golf course under Alternative 1. A certified pest control applicator would be required to handle and apply any pesticides.

No ACM has been identified at the Sabino Hill Rake Station. At the East Brunswick Radio Transmitter Site, pre-demolition ACM abatement of the buildings was conducted in 1998 (U.S. Navy 2009a). Additional soil sampling at the East Brunswick Radio Transmitter Site will be conducted for LBP prior to transfer (U.S. Navy 2009a).

The analytical results for soil and paint samples collected at the Sabino Hill Rake Station in 2007 showed the presence of lead in soil samples, as well as paint samples from the tower. This rake station is scheduled for demolition and soil removal in spring 2010.

4.5.1.2 Environmental Restoration Program

Twenty-four sites and AOCs on the NAS Brunswick property fall under the Environmental Restoration Program: 18 IR Program sites, four MMRP AOCs, and two POL AOCs. Under Alternative 1, remedial action will continue after disposal of NAS Brunswick as required under CERCLA. On-site remedial activities may preclude development of certain parcels of the property and inhibit the use and transfer of selected parcels until cleanup is complete.

In compliance with CERCLA, remedial actions on the NAS Brunswick property would continue under Alternative 1, as appropriate. On-site remedial activities may preclude development of certain parcels of the property and inhibit the use and transfer of selected parcels until cleanup is complete. Figure 4.5-1 identifies the locations of the Environmental Restoration Program sites relative to the proposed land use districts identified in Alternative 1. Table 4.5-1 shows the proposed land use districts for each site in the Environmental Restoration Program.

Sites and AOCs located within the natural areas land use district would be the least likely to be impacted, as only passive recreation activities are proposed for this district. Five sites would be located within the open space/recreation land use district, which could include development of an 18-hole golf course and development of community garden, recreation fields, and other facilities. No Environmental Restoration Program

Sites are located within the residential land use district; however, six sites are located in the community mixed-use and education/natural areas land use districts, both of which include residential components. New structures and facilities will need to be sited to avoid or minimize disturbance of these sites. Land use controls may need to be established within land use districts to protect human health and the environment. Golf course design and siting would have to consider the location of the Eastern Plume Operable Unit.

Development of the transportation system, including pedestrian trails, under Alternative 1 could impact Environmental Restoration Program Sites. The future property owner/developer would be informed of the location of Environmental

Restoration Program sites. Roads and pedestrian trails will need to be sited to avoid or minimize disturbance of these sites.

As a result of the reuse planning process with respect to selecting compatible land uses and redevelopment options and Navy commitment to clean up hazardous materials and wastes, Alternative 1 would be compatible with the ongoing environmental restoration program.

4.5.2 Alternative 2

4.5.2.1 Hazardous Materials and Waste Management

Hazardous Materials and Waste

Under Alternative 2, the quantity of hazardous materials used, generated, stored, and disposed of would be less than the quantity generated during the Navy's operation at NAS Brunswick and the outlying properties. This is based on the amount of industrial land use proposed for redevelopment (approximately 375 acres) compared to the acreage currently associated with the NAS Brunswick airfield, industrial and maintenance, and weapons storage land uses (2,587 acres). Since there would be no aviation component under this alternative, processes needed to support air operations that may use hazardous materials or generate hazardous waste would no longer be required. Hazardous materials used to support other uses would be managed in accordance with applicable federal and state regulations. Hazardous wastes generated or transported for disposal and stored for more than 90 days would be managed under RCRA. The reduction in the generation of hazardous materials and waste under Alternative 2 would be a beneficial impact.

Storage Tanks and Oil/Water Separators

The impacts of disposal and redevelopment under Alternative 2 would be the same as the impacts discussed under Alternative 1.

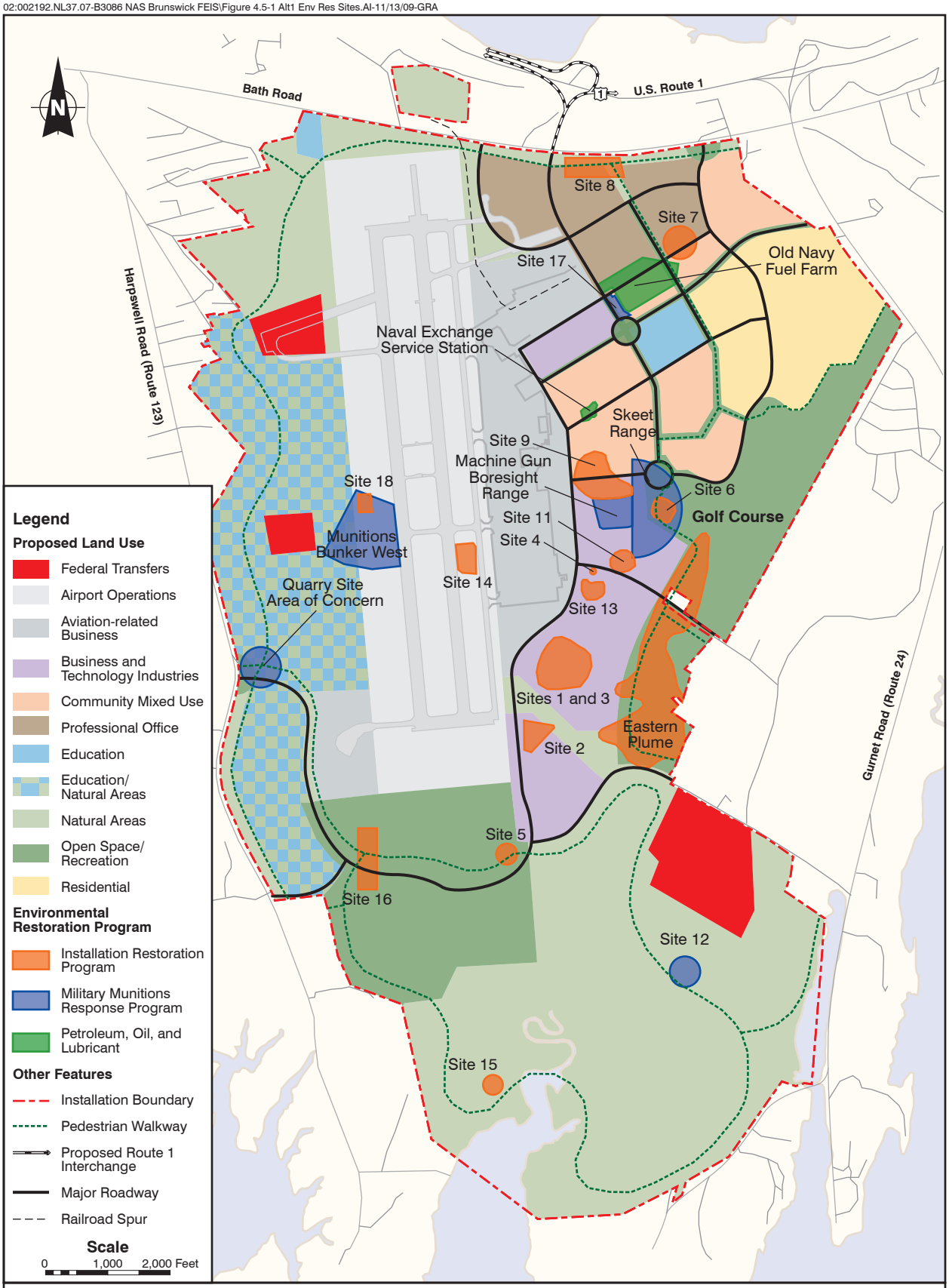
ACM, Lead, PCBs, Radon, and Pesticides

The impacts of disposal and redevelopment under the Alternative 2 would be the same as the impacts discussed under Alternative 1.

4.5.2.2 Environmental Restoration Program

The impacts of disposal and redevelopment under Alternative 2 would be similar to the impacts discussed under Alternative 1, except that there would be no airport operations or the aviation-related business land use district. The current airfield and flight operations area would be redeveloped as community mixed-use, business and technology, residential, and natural areas. Converting the existing airfield and airfield support land use to different land uses, including community mixed-use, business and technology, and natural areas, may require more stringent cleanup standards. Alternative 2 did not take into account the location of Environmental Restoration Program sites to the same extent as Alternative 1; however, Alternative 2 would still need to manage and clean up environmental AOCs in accordance with applicable federal and state laws and regulations. Figure 4.5-2 identifies the locations of the Environmental Restoration Program sites relative to the proposed land use districts. Table 4.5-2 shows the proposed reuse for each site in the environmental restoration program.

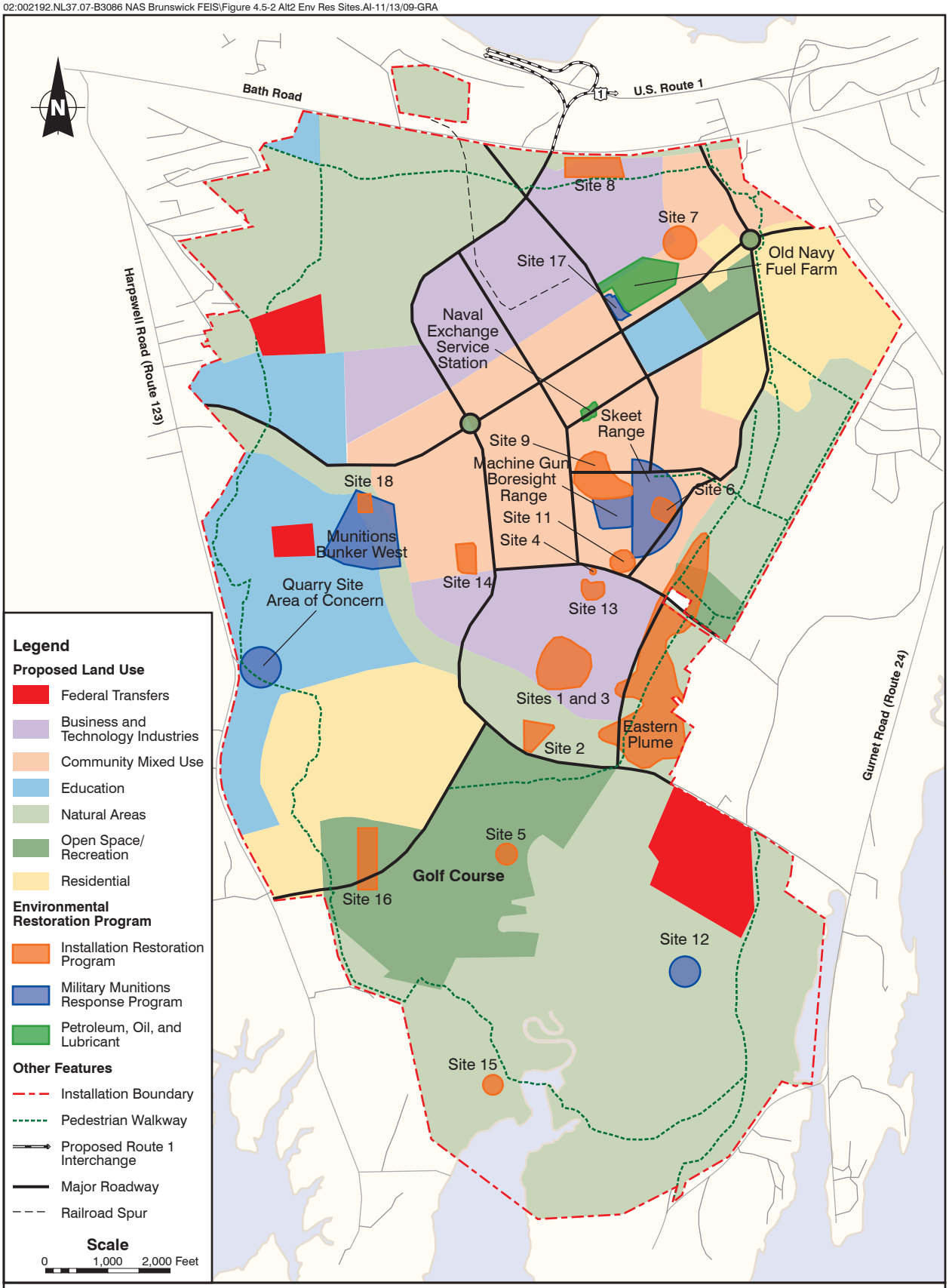
02:002192.NL37.07-B3086 NAS Brunswick FEIS\Figure 4.5-1 Alt1 Env Res Sites.AI-11/13/09-GRA



SOURCE: BLRA 2007a; ECC 2008

Figure 4.5-1
Alternative 1, Environmental Restoration Program Sites
Brunswick, Maine

02:002192.NL37.07-B3086 NAS Brunswick FEIS\Figure 4.5-2 Alt2 Env Res Sites.AI-11/13/09-GRA



SOURCE: ECC 2008

Figure 4.5-2
Alternative 2, Environmental Restoration Program Sites
Brunswick, Maine

Table 4.5-1 Environmental Restoration Program Sites and Proposed Alternative 1 Land Use Districts

Site Number	Site Name	Alternative 1
Sites 1 and 3	Orion Street Landfill and Hazardous Waste Burial Area	Business and Technology Industries
Site 2	Orion Street Landfill South	Business, Technology Industries, and Natural Areas
Site 4	Acid/Caustic Pit	Business and Technology Industries
Site 5	Orion Street Asbestos Disposal Area	Open Space/Recreation
Site 6	Sandy Road Rubble and Asbestos Disposal Area	Open Space/Recreation
Site 7	Old Acid Caustic Pit	Professional Office, Community Mixed Use
Site 8	Perimeter Road Disposal	Professional Office, Natural Areas
Site 9	Neptune Drive Disposal Area	Community Mixed Use, Business, and Technology Industries
Site 11	Fire Training Area	Business and Technology Industries
Site 12	Explosive Ordnance Disposal Area	Natural Areas
Site 13	Defense Reuse and Marketing Office	Business and Technology Industries
Site 14	Old Dump Number 3	Airport Operations
Site 15	Merriconeag Extension Debris Area	Natural Areas
Site 16	Swampy Road Debris Area	Open Space/Recreation
Site 17	Former Building 95	Community Mixed Use
Site 18	Westside Runway Operable Unit	Airport Operations
	Eastern Plume Operable Unit	Open Space/Recreation, Business and Technology Industries
UST 001	Old Navy Fuel Farm	Community Mixed Use, Professional Office
UST 002	Navy Exchange Service Station	Community Mixed Use
	Main Base MEC Areas	Airport Operations, Education/Natural Areas, Business and Technology Industries, Open Space/Recreation
	Quarry Site Area of Concern	Education/Natural Areas, Natural Areas

Key:
Shading = undergoing remediation or investigation.

Table 4.5-2 Environmental Restoration Program Sites and Proposed Alternative 2 Land Use Districts

Site Number	Site Name	Alternative 2
Sites 1 and 3	Orion Street Landfill and Hazardous Waste Burial Area	Business and Technology Industries
Site 2	Orion Street Landfill South	Natural Areas
Site 4	Acid/Caustic Pit	Business and Technology Industries
Site 5	Orion Street Asbestos Disposal Area	Open Space/Recreation
Site 6	Sandy Road Rubble and Asbestos Disposal Area	Community Mixed Use
Site 7	Old Acid Caustic Pit	Community Mixed Use, Business, and Technology Industries
Site 8	Perimeter Road Disposal	Business, Technology Industries, and Natural Areas
Site 9	Neptune Drive Disposal Area	Community Mixed Use
Site 11	Fire Training Area	Community Mixed Use
Site 12	Explosive Ordnance Disposal Area	Natural Areas
Site 13	Defense Reuse and Marketing Office	Business and Technology Industries
Site 14	Old Dump Number 3	Community Mixed Use
Site 15	Merriconeag Extension Debris Area	Natural Areas
Site 16	Swampy Road Debris Area	Open Space/Recreation
Site 17	Former Building 95	Community Mixed Use
Site 18	Westside Runway Operable Unit	Education
	Eastern Plume Operable Unit	Natural Areas, Open Space/Recreation, Business, and Technology Industries
UST 001	Old Navy Fuel Farm	Community Mixed Use, Professional Office
UST 002	Navy Exchange Service Station	Community Mixed Use
	Main Base MEC Areas	Community Mixed Use, Education, Natural Areas
	Quarry Site Area of Concern	Education

Key:
Shading = undergoing remediation or investigation.

As with Alternative 1, sites within the natural areas land use district would be the least likely to be impacted, as only passive recreation activities are proposed for this district. Three sites would be located within the open space/recreation land use district, which could include the expansion of the existing golf course, community garden, recreation fields, and other facilities. Although no Environmental Restoration Program Sites are located within the residential land use district, 10 sites are located in community mixed-use and education land use districts, both of which include residential components. The development of the transportation system and pedestrian trails could also impact Environmental Restoration Program Sites. New structures, roads, and trails will need to be sited to avoid or minimize disturbance of these sites. Depending on the specific uses proposed in each land use district, land use controls may need to be established to protect human health and the environment.

As a result of the Navy commitment to clean up waste sites, Alternative 2 would be compatible with the ongoing environmental restoration program.

4.5.3 No-Action Alternative

Under this alternative, existing mission and support operations would be relocated, and the property would be retained by the government in caretaker status. The No-Action Alternative would not take advantage of the site's location, physical characteristics, and infrastructure and would not foster any local redevelopment. Reuse or redevelopment of existing structures and land on the NAS Brunswick property would not occur; however, the housing areas would continue to be occupied under the current PPV lease agreement. Compliance with applicable laws and regulations would still be necessary.

Under the No-Action Alternative (as under Alternatives 1 and 2), the Navy would be required to close all facilities in accordance with RCRA standards. As part of the building layaway process, the USTs would be closed in accordance with MEDEP regulations, thereby reducing environmental liability and eliminating inspection requirements. ASTs would be handled in accordance with SPCC regulations. Periodic monitoring of the ACM, LBP, radon, and pesticides would continue.

Under the No-Action Alternative, the Navy would continue in its role as lead agency for site investigations and remediation, with oversight by the EPA and MEDEP, at all sites identified through the Environmental Restoration Program. Currently planned cleanup activities at all Environmental Restoration Program sites would continue in order to achieve the cleanup standards established under CERCLA and SARA.

4.6 Air Quality

The town of Brunswick, located in Cumberland County, is currently in attainment for all criteria pollutants (EPA 2009c). Cumberland County is subject to a maintenance plan for ozone under Section 110(a)(1) of the CAA anti-backsliding provisions (EPA 2009d). The General Conformity Rule requires demonstration that a federal action will not interfere the applicable SIP.

For this action, only the disposal of NAS Brunswick facilities would be carried out under federal action and, therefore, must be considered under the Conformity Rule (EPA 2008). To determine the applicability of the Conformity Rule, emission changes from the disposal of NAS Brunswick properties were considered. As mentioned in Section 3, the final year of MEDEP's SIP emission inventory analysis was 2016, which coincides with the completion of the first phase of MRRA's development plan. The change in annual emissions that results from disposal of NAS Brunswick would occur within the full first year after disposal, as well as in subsequent years.

Because the disposal action would result in decreases in NO_X and VOC emissions under Alternative 1, Alternative 2, and the No-Action Alternative, the action is

exempt from a Conformity Rule Determination. A Record of Non-Applicability (RONA) has been attached (see Appendix E).

Following disposal, the Navy would not retain control of the property; therefore, the implementation of either Alternative 1 or Alternative 2 would not be considered a federal action under the jurisdiction of the Navy, and the General Conformity Rule has not been applied to these portions of the proposed action.

The FAA has reviewed the proposed Airport Layout Plan (see Appendix K) as part of the FAA's independent review and approval process. The FAA has determined that General Conformity applies to the FAA's approval of the Airport Layout Plan considered under Alternative 1, although the final design is not considered part of this action.

The annual emissions of criteria pollutants from direct and indirect sources associated with Alternative 1 and Alternative 2 have been estimated to assess the air quality impacts at the completion of Phase 1 in 2016 and final build-out in 2031. Due to the lack of emission factors for $PM_{2.5}$ emissions, PM_{10} totals are used for $PM_{2.5}$ analysis. Temporary emission increases would be expected from construction. New permanent changes in emissions would be associated with new aircraft operations under Alternative 1, and an increase in motor vehicle use and new homes and businesses under Alternative 1 and Alternative 2. Total estimated emissions at the end of the first phase and at the end of the build-out are compared to baseline emission estimates (see Section 3) to provide a net change in projected direct and indirect emissions from disposal and reuse of NAS Brunswick.

For some proposed reuses of NAS Brunswick (e.g., airport operations, aviation-related business, and business and technology industries), it may be necessary to analyze projected air emissions, apply for an air quality permit, and undergo permit review. In addition, some reuses may be subject to permit conditions and other air quality regulations, including further analysis of emission controls.

4.6.1 Alternative 1 (Preferred Alternative)

Full build-out of Alternative 1 would develop a maximum of 2,946 residential units, over 9 million square feet of new non-residential floor space, and 1,570 acres of recreation, open space, and natural areas. Section 4.1 identifies the maximum build-out projections for Alternative 1 in 5-year increments.

4.6.1.1 Construction Emissions

Under Alternative 1, demolition and construction would generate an increase in air emissions. Construction-related emissions would be short term and primarily occur within the boundaries of NAS Brunswick. However, surrounding areas could also be impacted by exhaust emissions from the increased number of construction vehicles on the roadways. Air quality impacts during construction at the outlying properties would be insignificant due to the small area affected and use of the properties as recreation or natural areas.

Construction-related impacts would include emissions generated from building and road construction equipment and vehicles, demolition, site preparation, and

construction-related vehicle traffic on local roads. Construction-related emissions would be primarily exhaust emissions from construction vehicles (e.g., bulldozers, tractors, dump trucks) and dust resulting from ground disturbance and road traffic. All air emission sources will be required to meet applicable state and federal air quality regulations and pollution control requirements before operation to prevent exceedances of air quality standards during construction and operation.

Construction-related emission levels would depend on the type and number of pieces of construction equipment being operated, the size and type of the development, the duration of the project, and the number of projects occurring simultaneously. Impacts would vary widely, depending on the phase of construction (e.g., demolition, land clearing and excavations, foundation and capping, construction of new building walls, etc.). Due to a lack of specific details regarding future development of the site (i.e., building size and type, location, use, and construction time line), it is not possible to accurately predict levels of future construction emissions.

Construction emissions can be mitigated using best management practices. As outlined in its "Community Design Guidelines Summary," MRRA recommends that sustainable and energy conservation elements be incorporated into the overall design of the installation's redevelopment. These elements may include guidelines for the control of air emissions and energy efficiency related to construction (MRRA 2010). Exhaust emissions from construction vehicles can be reduced by using fuel-efficient vehicles with emission controls and ensuring that all equipment is properly maintained. Dust emissions from ground disturbance and road traffic should be controlled by spraying water on soil piles and graded areas and keeping roadways clean. Other possible mitigation includes:

- Minimizing idling of construction vehicles;
- Utilizing existing power sources (e.g., power poles) or clean fuel generators rather than diesel-powered generators;
- Ensuring that all construction equipment is properly tuned and maintained prior to and during on-site operation;
- Developing a project-specific dust control plan for each project to control dust in accordance with Maine's Erosion and Sediment Control Best Management Practices (MEDEP 2003). Specific practices include:
  - Using traffic control to restrict traffic to predetermined routes.
  - Maintaining as much natural vegetation as is practicable.
  - Phasing of construction to reduce the area of land disturbed at any one time.
  - Using temporary mulching, permanent mulching, temporary vegetative cover, permanent vegetative cover, or sodding to reduce the need for dust control.
  - Using mechanical sweepers on paved surfaces where necessary to prevent dirt buildup, which can create dust.

- Periodically moistening exposed soil surfaces with adequate water to control dust.
- Repeatedly applying treatments, as needed, to control dust when temporary dust control measures are used (MEDEP 2003, B-5).

4.6.1.2 Building Use Emissions

As discussed in Section 3.6, stationary source emissions at NAS Brunswick are reported under the sitewide Synthetic Minor Air Quality Permit (license number A-268-71-AA-R) as required by the MEDEP. Upon disposal of the installation property, some existing sources of stationary emissions, such as painting and aircraft engine testing facilities, may no longer be used and, therefore, would be shut down in accordance with permit requirements. New industrial operations, which are not specifically identified in the Reuse Master Plan and are, therefore, not quantifiable at this time, may be subject to MEDEP permitting and air quality control requirements, which would be evaluated in coordination with the MEDEP prior to construction.

New stationary sources would be associated with the heating and operation of residential and commercial buildings. Most heating operations in commercial and residential buildings are small and would not require an air emissions permit, although a central or large heating plant may require an air permit under MEDEP regulations. The need to acquire an air permit would assessed by the developer during the design phase of each specific development project.

For the purposes of this analysis, it is assumed that all existing emission sources would no longer operate. Future emission sources were estimated based on U.S. averages for typical energy types (i.e., electricity, fuel oil, and natural gas) for energy use per square foot, obtained from the U.S. Department of Energy's Energy Information Agency (EIA) for specific types of building use. Average energy use for different classifications of commercial and residential buildings included the use of electricity, natural gas, and fuel oil, which were used to estimate total energy use by the proposed new building spaces. AP-42 emission factors for fuel use (EPA 1995) and EIA average emissions per kilowatt-hour (kWh) of electricity were used to estimate total emissions resulting from operation of the proposed residential and commercial spaces. It was assumed that commercial emission factors would remain the same and that new residential buildings would be 25% more efficient than existing residences, based on the Reuse Master Plan, which recommends efficient housing. The U.S. Department of Energy's Energy Star program also suggests that built space can be 25% more efficient if minimum guidelines are followed (Energy Star 2009). Detailed information on the energy estimates and emission factors are provided in Appendix E.

Emissions from full build-out conditions were estimated to assess the maximum air quality impacts of Alternative 1, since the projected redevelopment would occur over a 20-year period. In addition, the first phase of redevelopment was also estimated for comparison. These emission estimates are provided in Table 4.6-1.

Table 4.6-1 Alternative 1 – Estimated Direct and Indirect Building Use Air Emissions

Emission Source		Emissions (tons per year)				
		CO	NO_X	HC	SO_2	PM_{10}
Existing Conditions (2008)						
NAS Brunswick Buildings (1.4 million sq ft)	Electricity	NA	16.61	NA	34.40	NA
	Reported Existing Site Emissions[1] (includes natural gas and fuel oil use)	8.80	14.22	11.82	1.85	2.44
Total Annual Existing Building Emissions		**8.80**	**30.83**	**11.82**	**36.25**	**2.44**
Phase 1 (2016)						
Residential (464 units)	Fuel Oil	0.61	2.21	0.09	5.24	0.13
	Natural Gas	0.43	1.01	0.06	0.01	0.02
	Electricity	NA	2.11	NA	4.36	NA
Total Annual Residential Emissions		**1.04**	**5.33**	**0.15**	**9.61**	**0.15**
Non-residential (1.1 million sq ft)	Fuel Oil	0.13	0.46	0.02	1.10	0.03
	Natural Gas	1.08	2.53	0.15	0.02	0.05
	Electricity	NA	13.44	NA	27.84	NA
Total Annual Non-residential Emissions		**1.21**	**16.44**	**0.17**	**28.96**	**0.08**
Total Annual Building Emissions		**2.25**	**21.77**	**0.31**	**38.56**	**0.23**
Total Change in Annual Building Emissions		**-6.55**	**-9.06**	**-11.51**	**2.31**	**-2.20**
Full Build-out (2031)						
Residential (2,946 units)	Fuel Oil	3.87	13.93	0.54	32.97	0.84
	Natural Gas	2.75	6.46	0.38	0.04	0.13
	Electricity	NA	12.66	NA	26.22	NA
Total Annual Residential Emissions		**6.62**	**33.05**	**0.92**	**59.23**	**0.97**
Non-residential (9.2 Million sq ft)	Fuel Oil	0.95	3.42	0.13	8.10	0.21
	Natural Gas	7.19	16.89	0.99	0.11	0.34
	Electricity	NA	96.83	NA	200.58	NA
Total Annual Non-residential Emissions		**8.14**	**117.14**	**1.12**	**208.80**	**0.55**
Total Annual Building Emissions		**14.76**	**150.20**	**2.04**	**268.03**	**1.51**
Total Change in Annual Building Emissions		**5.96**	**119.36**	**-9.78**	**231.78**	**-0.92**

Notes:
[1] U.S. Navy 2009. See Section 3.6 for NAS Brunswick Air Emission Inventory information.
[2] Totals may not be exact due to rounding.

Key:
NA = Not available.

To mitigate emissions from buildings, modern building construction and renovation methods can be used to provide energy efficiencies. Improved energy efficiency means that less energy would be necessary to operate the buildings, thereby reducing the potential increases in criteria pollutant emissions from the increased building space. Energy Star (www.energystar.org) and LEED programs (www.USGBC.org) are examples of programmatic systems that can be employed to ensure that buildings are using the best reasonable energy efficiency techniques. While Energy Star predicts that built space can be 25% more efficient if minimum guidelines are followed, 50% efficiency is attainable (Energy Star 2009). As outlined in its "Community Design Guidelines Summary," MRRA recommends that sustainable and energy conservation elements be incorporated into the overall design of the installation's redevelopment. These elements may include guidelines for the control of air emissions and energy efficiency related to construction (MRRA 2010). Some of techniques include:

- **Effective Insulation.** Properly installed and inspected insulation in floors, walls, and roofs ensures even temperatures throughout buildings, reduced energy use, and increased comfort.

- **High-Performance Windows.** Energy-efficient windows employ advanced technologies (e.g., protective coatings and improved frames) to help keep heat in during winter and out during summer. These windows also block damaging ultraviolet sunlight, which can discolor carpets and furnishings.

- **Tight Construction and Ducts.** Sealing holes and cracks in the home's "envelope" and in heating and cooling duct systems helps reduce drafts, moisture, dust, pollen, and noise. A tightly sealed building/home improves comfort and indoor air quality while reducing utility and maintenance costs.

- **Efficient Heating and Cooling Equipment.** In addition to using less energy to operate, energy-efficient heating and cooling systems can be quieter, reduce indoor humidity, and improve overall comfort. The use of natural gas rather than heating oil for heating can significantly reduce SO_2 emissions.

- **Efficient Products.** Energy Star-qualified electronic products save energy compared to other electronics. Such products include computers, lighting fixtures, compact fluorescent bulbs, ventilation fans, and appliances such as refrigerators, dishwashers, and washing machines (Energy Star 2009).

Depending on the type and amount of new industry developed during reuse, mitigation of process and industrial emissions can be accomplished using operational controls or emission control equipment. These mitigation measures would be considered as specific project plans and design details are developed in the future. All air emission sources will be required to meet applicable state and federal air quality regulations and pollution control requirements before operation to prevent exceedances of air quality standards.

4.6.1.3 Mobile Sources

Another major source of emissions associated with the planned redevelopment of NAS Brunswick is mobile source emissions from aircraft and motor vehicles. Mobile source NAAQS emission estimates are presented in Table 4.6-2.

Under Alternative 1, the type of aircraft operating at the airfield would change from military to commercial. Aircraft emissions were estimated using EDMS version 5.1.2 (FAA 2009a) and the total projected operations for the various types of commercial aircraft. Total emissions consider departures, arrivals, and touch-and-go operations, as well as ground taxi times and the use of ground-support equipment. (See Appendix E for operations data and EDMS input and output information, including estimated HAP emissions.)

Table 4.6-2 Alternative 1 – Estimated Air Emissions from Mobile Sources for Phase 1 (2016) and Full Build-out (2031)

Emission Source	Emissions (tons per year)				
	CO	NO_X	VOCs	SO_2	PM_{10}
Existing					
Aircraft Emissions	71.42	75.15	36.43	11.55	33.79
Vehicle Emissions	38.83	4.06	3.01	0.07	0.12
Total Existing Mobile Emissions	**110.25**	**79.21**	**39.44**	**11.62**	**33.91**
Phase 1 (2016)					
Aircraft Emissions	189.22	2.48	5.07	0.55	0.07
Vehicle Emissions	44.42	4.65	3.44	0.08	0.14
Total Projected Mobile Emissions	**233.64**	**7.12**	**8.51**	**0.63**	**0.21**
Total Change in Mobile Emissions, 2016	**123.39**	**-72.09**	**-30.93**	**-10.99**	**-33.70**
Full Build-out (2031)					
Aircraft Emissions	374.63	4.63	10.06	1.10	0.13
Vehicle Emissions	287.78	5.66	16.47	0.44	0.73
Total Projected Mobile Emissions	**662.41**	**10.30**	**26.53**	**1.54**	**0.86**
Total Change in Mobile Emissions, 2031	**552.16**	**-68.92**	**-12.91**	**-10.08**	**-33.05**

Note:
[1] Totals may not be exact due to rounding.

Vehicle traffic patterns and volumes would change as a result of this alternative, and there would be increases in emissions from automobiles and trucks. Vehicle volume increases resulting from Alternative 1 were reported in the *Traffic Impact Study, Disposal, and Reuse of Property at Naval Air Station Brunswick, Maine and Traffic Impact Study Updates* (Gorrill-Palmer 2009, 2010), which is provided as Appendix D. Vehicle emissions were estimated based on this report and using the EPA's MOBILE6 emission model (EPA 2003). The MOBILE6 model and the registered vehicle mix for MOBILE6 from the MEDEP Web site were used to calculate average vehicle emission factors. Average vehicle miles traveled (VMTs) were estimated based on an average daily 25-mile trip per vehicle (Gorrill-Palmer 2009, 2010). Table 4.6-2 provides a summary of emissions from mobile sources and the projected change in emissions from existing conditions.

Emissions from aircraft would be reduced as a result of Navy aircraft no longer operating at NAS Brunswick. In general, the smaller commercial aircraft projected to use the airfield would, on an annual basis, generate lower emissions compared to the Navy aircraft. Because the commercial aircraft have different engines and emission rates and generally lower fuel-flow rates, the change in aircraft would generate less air emissions per operation. Only CO emissions would increase as a result of the change in aircraft. Specific aircraft, flight tracks, and operations are not available to accurately model CO emissions at or around the proposed airfield. Further analysis would be conducted by the airfield owner or operator once airfield design is complete and prior to construction to assess air quality impacts and permitting requirements.

Because the increase in commercial and residential space would result in more employees, customers, and residents and, consequently, more car and truck use for commuting and deliveries, these emissions would increase under Alternative 1. The impacts of mobile emissions can be reduced by increasing vehicle fuel

efficiency and reducing VMT. The Energy Independence and Security Act of 2007 (EISA 2007) updated the federal Corporate Average Fuel Economy Standards (CAFE) for the first time in 30 years. The new CAFE standard removes exemptions for most sport utility vehicles (SUVs) and light trucks and requires fleetwide fuel economy for all new cars and light trucks of 35 miles per gallon (mpg) by 2020 (versus the current 27.5 mpg for cars and 20.7 mpg for trucks). This increase in vehicle fuel efficiency would result in lower criteria emissions from vehicles. VMT can be reduced with "smart" community planning that reduces commuting trips and the establishment of public transportation and carpooling programs.

Intersections that are congested because of more traffic could generate increased levels of CO emissions. Sufficient details are not available to accurately assess the impact at new and existing intersections around or within the project sites. If intersections were improved to minimize congestion and prevent transportation impacts as recommended in the Traffic Study (Gorrill-Palmer 2009), these mitigation measures would also reduce air quality impacts at these intersections. Further analysis should be conducted once roadway design is complete and prior to road construction to assess air quality impacts at specific intersections.

4.6.1.4 Estimated Total Air Emissions

Table 4.6-3 provides a summary of direct and indirect stationary and mobile emissions associated with projected operations under Alternative 1 for 2016 (Phase 1) and 2031 (final build-out). The projected change in these emissions from existing conditions at NAS Brunswick is also presented. In 2016, annual emissions under Alternative 1 would represent a decrease in all NAAQS emissions except CO. In 2031, under Alternative 1, VOC and PM_{10}/$PM_{2.5}$ emissions would decrease from existing emission levels as a result of the discontinuation of Navy aircraft operations. However, CO, NO_X, and SO_2 emissions are estimated to increase, primarily the result of an increase in the use of energy in new building space, operations of the new aircraft and increased vehicle use.

Mitigation measures would reduce emissions and partially offset impacts due to an increase of emissions of CO and SO_2. Specific analysis of the development projects and mitigation strategies would be necessary during build-out to accurately assess and effectively mitigate impacts during construction and operation of the new facilities. If applicable, emission sources would be required to meet MEDEP permitting requirements prior to construction and during operation.

Given the large scale of this development and the large increase in built space and associated vehicle use compared to existing conditions, there could potentially be an increase in emissions upon full build-out of Alternative 1. It is expected that VOC, NO_X, and PM_{10}/$PM_{2.5}$ emissions would be reduced under this alternative due to the discontinuation of Navy aircraft operations and maintenance. However, CO and SO_2 emissions could be expected to increase, primarily due to the use of heating fuels for the large residential development, emissions from the new aircraft, and increased vehicle use. The increases in CO and SO_2 emissions could pose an air quality impact in the region. These impacts would be partially offset by implementing mitigation measures.

Table 4.6-3 Alternative 1 – Estimated Total Annual Air Emissions

Source	Emissions (tpy)				
	CO	NO_X	VOCs	SO_2	PM_{10}
Existing Emissions (2008)					
Building Use	8.80	30.83	11.82	36.25	2.44
Mobile	110.25	79.21	39.44	11.62	33.91
Total	**119.05**	**110.05**	**51.26**	**47.87**	**36.35**
Phase 1 (2016)					
Building Use	2.25	21.77	0.31	38.56	0.23
Mobile	233.64	7.12	8.51	0.63	0.21
Total	**235.89**	**28.89**	**8.82**	**39.19**	**0.44**
Change	**116.85**	**-81.15**	**-42.45**	**-8.68**	**-35.91**
Final Build-out (2031)					
Building Use	14.76	150.20	2.04	268.03	1.51
Mobile	662.41	10.30	26.53	1.54	0.86
Total	**677.17**	**160.49**	**28.57**	**269.57**	**2.37**
Change	**558.12**	**50.45**	**-22.69**	**221.70**	**-33.98**

Note:
[1] Totals may not be exact due to rounding.

4.6.1.5 Greenhouse Gas Emissions

Federal agencies are, on a national scale, addressing emissions of GHGs through reductions mandated by Executive Orders, most recently, Executive Order 13514. In addition, recent federal laws and regulations will require the inventorying and tracking of GHG emissions from large sources (74FR56260) and CAA Prevention of Significant Deterioration (PSD) and Title V permitting (74FR55292). In February of 2010, the White House Council on Environmental Quality (CEQ) issued draft guidance on the types of projects that should consider the effects of climate change and GHG emissions in agency decision making (CEQ 2010). The draft guidance explains that if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO2-equivalent GHG emissions on an annual basis, then agencies should consider this as an indicator that a quantitative and qualitative assessment may be meaningful to the decision maker and the public. This is not meant to be a NEPA significance threshold, but rather a reference point to serve as an indicator of a minimum level of GHG emissions that may warrant some description in the appropriate NEPA analysis.

This analysis compares GHG emission that could result from Alternative 1 to the U.S. GHG baseline inventory of 2007, the most recent inventory published by the EPA (EPA 2009f). Emission totals are also compared to Maine's Stationary Source GHG inventory for 2005, which is the most recent inventory published by the MEDEP (MEDEP 2007). The Maine GHG Emissions do not include mobile emissions.

The operation of stationary and mobile sources using fossil fuels would produce GHG emissions, mostly in the forms of carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). These GHG emissions are not currently regulated at the federal level, but federal regulations currently proposed by the EPA (74FR55292) would require PSD and Title V review of stationary GHG emission sources. GHG emissions were calculated for commercial and residential buildings using

average EIA energy intensity factors, as discussed in Section 4.6.2.2, and EPA GHG emission factors (EPA 2009f). GHG emissions from vehicles were calculated using MOBILE6 CO_2 emission factors and the traffic study prepared by Gorrill-Palmer (2010).

The FAA's EDMS 5.0.2 provides factors to calculate fuel use totals for operations at an airfield. The resulting totals were multiplied by CO_2 fuel emission factors (EPA 2009f) to determine CO_2 emissions from the aircraft. This provides an estimate of GHG emissions from aircraft, which can be compared to existing and projected emissions of alternative development scenarios. A summary of annual existing and projected GHG emissions is provided in Table 4.6-4. Note that GHG emissions are reported in metric tons of global warming potential (GWP) in CO_2e per year.

Table 4.6-4 Alternative 1 – Estimated Annual GHG Emissions for Existing Conditions, Phase 1 (2016), and Final Build-out (2031)

Emission Source	Annual GHG Emissions, Metric Tons CO_2e per year ($MTCO_2e$)		
	2008 Existing Baseline Conditions	5 Years (2016)	20 Years (2031)
Building Use Emissions			
Residential	0	4,656	29,094
Non-residential	15,991	10,913	77,111
Total Building Use Emissions	**15,991**	**15,569**	**106,206**
Change in Building Use Emissions		**-422**	**90,215**
Mobile Emissions			
Aircraft Emissions	24,039	1,194	2,623
Vehicle Emissions	3,890	4,450	21,732
Total Mobile Emissions	**27,930**	**5,644**	**24,355**
Change in Mobile Emissions		**-22,281**	**-3,570**
Total Annual Emissions	**43,921**	**21,212**	**130,560**
Change in Annual Emissions		**-22,703**	**86,645**
Total U.S. GHG Emissions, 2007[a]	**7,150,100,000**	**7,150,100,000**	**7,150,100,000**
% of U.S. GHG Emissions	**0.0006%**	**0.0003%**	**0.0018%**
Total Maine Stationary Sources, 2005[b]	**21,671,922**	**21,671,922**	**21,671,922**
% of Maine Stationary GHG Emissions	**0.2%**	**0.1%**	**0.6%**

Sources:
[a] EPA 2009f.
[b] MEDEP 2007.

Note:
[1] Totals may not be exact due to rounding.

As shown in the table, full build-out of Alternative 1 would increase the amount of GHG emissions compared to the emissions from existing Navy operations. Overall, total GHG emissions represent a small percentage of U.S and the State of Maine GHG emissions. Mitigation measures described in Sections 4.6.2.2 and 4.6.2.3 to reduce building energy use and VMT would also reduce emissions of CO_2.

4.6.2 Alternative 2

Implementation of Alternative 2 would result in the redevelopment of NAS Brunswick with a higher density of residential and community mixed-use development compared to Alternative 1 and would not reuse the existing airfield. Approximately 1,580 acres of the total installation property would be redeveloped. The remaining portion of the installation, 1,620 acres, would be dedicated to a variety of active and passive land uses, including recreation, open space, and natural areas. It is anticipated that full build-out of Alternative 2 would be implemented over a 20-year period.

Given the large scale of this development and the large increase in built space and associated vehicle use compared to existing conditions, there would be an increase in emissions upon full build-out of Alternative 2. It is likely that the increase in emissions would be greater than the increase under Alternative 1. It is estimated that VOC, PM_{10}, and $PM_{2.5}$ emissions would be reduced under this alternative due to the discontinuation of aircraft operations and associated maintenance. However, NO_X, CO, and SO_2 emissions would be estimated to increase, the result of an increase in the use of energy in buildings and vehicle use. Emissions for Alternative 2 were estimated in the same manner as described for Alternative 1. Mitigation measures described under Alternative 1 would also apply to Alternative 2.

The MEDEP is responsible for maintaining air quality in the State of Maine. The licensing section of the Air Bureau writes air emission licenses for air emission sources throughout the state. For some proposed reuses of NAS Brunswick (e.g., business and technology industries), it may be necessary to analyze projected air emissions, apply for an air quality permit, and undergo permit review, and some uses may be subject to permit conditions, including emission controls.

4.6.2.1 Construction Emissions

Under Alternative 2, demolition and construction would generate an increase in air emissions. Construction-related emissions would be short term and would primarily occur within the boundaries of NAS Brunswick. However, surrounding areas could also be impacted by exhaust emissions from the increased number of construction vehicles on the roadways. Air quality impacts during construction at the outlying properties would be minor due to the small area affected and use of the properties as recreation or natural areas.

More commercial building space and homes would be constructed under Alternative 2 than under Alternative 1, potentially resulting in more emissions from construction activities compared to Alternative 1. However, due to a lack of specific details regarding the future development of the site (i.e., building size and type, location, use, and construction timeline), it is not possible to accurately predict levels of future construction emissions.

The mitigation measures recommended for construction emissions are the same as those presented for Alternative 1.

4.6.2.2 Building Use Emissions

More commercial building space and homes would be constructed under Alternative 2 than under Alternative 1, resulting in greater air emissions from building use. Emissions from final build-out conditions were estimated to assess the maximum air quality impacts for Alternative 2 since the projected redevelopment would occur over a 20-year period. In addition, the first phase of redevelopment was also estimated for comparison. These emission estimates are provided in Table 4.6-5.

Table 4.6-5 Alternative 2 – Estimated Building Use Air Emissions

Emission Source		Emissions (tpy)				
		CO	NO_X	HC	SO_2	PM_{10}
Existing Conditions (2008)						
NAS Brunswick Buildings (1.4 million sq ft)	Electricity	NA	16.61	NA	34.40	NA
	Reported Existing Site Emissions[1] (includes natural gas and fuel oil use)	8.80	14.22	11.82	1.85	2.44
Total Annual Existing Building Emissions		**8.80**	**30.83**	**11.82**	**36.25**	**2.44**
Phase 1 (2016)						
Residential (992 units)	Fuel Oil	1.31	4.71	0.18	11.15	0.28
	Natural Gas	0.92	2.17	0.13	0.01	0.04
	Electricity	NA	4.37	NA	9.05	NA
Total Annual Residential Emissions		**2.23**	**11.26**	**0.31**	**20.22**	**0.33**
Non-residential (1.1 million sq ft)	Fuel Oil	0.20	0.72	0.03	1.70	0.04
	Natural Gas	1.11	2.60	0.15	0.02	0.05
	Electricity	NA	19.09	NA	39.54	NA
Total Annual Commercial Emissions		**1.31**	**22.41**	**0.18**	**41.26**	**0.10**
Total Annual Building Emissions		**3.54**	**33.67**	**0.49**	**61.48**	**0.42**
Total Change in Annual Building Emissions		**-5.26**	**2.84**	**-11.33**	**25.23**	**-2.01**
Full Build-out (2031)						
Residential (8,220 units)	Fuel Oil	10.82	38.94	1.51	92.15	2.34
	Natural Gas	7.69	18.08	1.06	0.12	0.37
	Electricity	NA	35.31	NA	73.14	NA
Total Annual Residential Emissions		**18.51**	**92.33**	**2.57**	**165.41**	**2.70**
Non-Residential (11.3 million sq ft)	Fuel Oil	1.51	5.43	0.21	12.86	0.33
	Natural Gas	7.18	16.87	0.99	0.11	0.34
	Electricity	NA	110.21	NA	228.29	NA
Total Annual Non-Residential Emissions		**8.69**	**132.52**	**1.20**	**241.26**	**0.67**
Total Annual Building Use Emissions		**27.20**	**224.85**	**3.77**	**406.67**	**3.37**
Total Change in Annual Building Use Emissions		**18.40**	**194.02**	**-8.05**	**370.42**	**0.93**

Notes:
[1] Estimated existing emissions are listed above in Table 4.6-3.
[2] Totals may not be exact due to rounding.

To mitigate emissions from buildings, modern building construction and renovation methods can be used to provide energy efficiencies that result in lower criteria pollutant emissions from new and existing buildings. Energy Star (www.energystar.org) and LEED programs (www.USGBC.org) are examples of pro-

grammatic systems that can be employed to ensure that buildings are using the best reasonable energy efficiency techniques. While Energy Star predicts that built space can be 25% more efficient if minimum guidelines are followed, 50% efficiency is attainable (Energy Star 2009). The mitigation measures recommended are the same as those presented for Alternative 1.

4.6.2.3 Mobile Emissions

Under Alternative 2, the airfield would be removed; therefore, no aircraft emissions would be associated with this alternative. Vehicle traffic patterns and volumes would change as a result of this alternative, and there would be increases in emissions from automobiles and trucks. It is estimated that, under Alternative 2, the increase in vehicle use after final implementation would be 40% greater than the increase under Alternative 1 (Gorrill-Palmer 2009, 2010) and, therefore, emissions from vehicles would be greater. Emissions were calculated as described for Alternative 1 (see Table 4.6-6). Mitigation measures would be the same as those presented for Alternative 1.

Table 4.6-6 Alternative 2: Estimated Air Emissions from Mobile Sources for Phase I (2016) and Full Build-out (2031)

Emission Source	Emissions (tpy)				
	CO	NO_X	VOCs	SO_2	PM_{10}
Existing(2008)					
Aircraft Emissions	71.42	75.15	36.43	11.55	33.79
Vehicle Emissions	38.83	4.06	3.01	0.07	0.12
Total Existing Emissions	**110.25**	**79.21**	**39.44**	**11.62**	**33.91**
Phase 1 (2016)					
Aircraft Emissions	0.00	0.00	0.00	0.00	0.00
Vehicle Emissions	75.61	7.91	5.85	0.14	0.24
Total Projected Mobile Emissions	**75.61**	**7.91**	**5.85**	**0.14**	**0.24**
Total Change in Mobile Emissions, 2016	**-34.64**	**-71.31**	**-33.59**	**-11.48**	**-33.67**
Full Build-out (2031)					
Aircraft Emissions	0.00	0.00	0.00	0.00	0.00
Vehicle Emissions	463.11	17.79	29.61	0.97	1.34
Total Projected Mobile Emissions	**463.11**	**17.79**	**29.61**	**0.97**	**1.34**
Total Change in Mobile Emissions, 2031	**352.86**	**-61.43**	**-9.83**	**-10.65**	**-32.57**

Note:
[1] Totals may not be exact due to rounding.

4.6.2.4 Estimated Total Annual Emissions

Table 4.6-7 provides a summary of direct and indirect stationary and mobile emissions associated with operations projected under Alternative 2 for 2016 (Phase 1) and 2031 (Final Build-out). The projected change in these emissions from existing conditions at NAS Brunswick is also presented. In 2016, annual emissions under Alternative 2 would represent a decrease in overall emissions from existing conditions, a result of the discontinuation of aircraft operations. In 2031, it is estimated that VOC, PM_{10}, and $PM_{2.5}$ emissions would decrease from existing levels. However, NO_X, CO, and SO_2 emissions are estimated to increase because of an increase in the use of energy in buildings and vehicle use. The increases in NO_X, CO, and SO_2 emissions could have an impact on air quality in the

region. Mitigation measures would be the same as those presented for Alternative 1 and would partially offset the impact.

Table 4.6-7 Alternative 2 – Estimated Total Annual Air Emissions

Source	Emissions (tons per year)				
	CO	NO_X	VOCs	SO_2	PM_{10}
Existing Emissions					
Building Use	8.80	30.83	11.82	36.25	2.44
Mobile	110.25	79.21	39.44	11.62	33.91
Total	**119.05**	**110.05**	**51.26**	**47.87**	**36.35**
Phase 1 (2016)					
Building Use	3.54	33.67	0.49	61.48	0.42
Mobile	75.61	7.91	5.85	0.14	0.24
Total	**79.15**	**41.58**	**6.34**	**61.62**	**0.66**
Change	**-39.90**	**-68.47**	**-44.92**	**13.75**	**-35.68**
Final Build-out (2031)					
Building Use	27.20	224.85	3.77	406.67	3.37
Mobile	463.11	17.79	29.61	0.97	1.34
Total	**490.31**	**242.64**	**33.38**	**407.64**	**4.71**
Change	**371.26**	**132.59**	**-17.88**	**359.77**	**-31.63**

Note:
[1] Totals may not be exact due to rounding.

4.6.2.5 Greenhouse Gas Emissions

GHG emissions from Alternative 2 were estimated as described in Section 4.6.1.5. Since there would be no airfield under Alternative 2, there would be no aircraft emissions. A summary of annual existing and projected GHG emissions is provided in Table 4.6-8. Note that GHG emissions are reported in metric tons of global warming potential (GWP) in CO_2e per year.

As shown in the table, full build-out of Alternative 2 would increase the amount of GHG emissions compared to the emissions from existing Navy operations. Overall, Total GHG emissions represent a small percentage of U.S and the State of Maine GHG emissions. Mitigation measures described in Sections 4.6.2.2 and 4.6.2.3 to reduce building energy use and VMT would also reduce emissions of CO_2.

4.6.3 No-Action Alternative

Under this alternative, NAS Brunswick property would be retained in caretaker status. Existing structures would not be reused or developed, and no construction would take place under this alternative. For this air analysis, it was assumed that all Navy activities and facilities would cease operation (see Table 4.6-9). Some mobile emissions associated with maintenance activities would continue. As shown, air emissions would be reduced for all criteria pollutant emissions, including GHG emission, representing a beneficial impact on air quality.

Table 4.6-8 Alternative 2 – Estimated Annual GHG Emissions for Existing Conditions, Phase 1 (2016), and Final Build-out (2031)

Emission Source	Annual GHG Emissions, Metric Tons CO_2e per year ($MTCO_2e$)		
	2008 Existing Baseline Conditions	5 Years (2016)	20 Years (2031)
Building Use Emissions			
Residential	0	9,877	81,304
Non-residential	15,991	14,404	86,643
Total Building Use Emissions	**15,991**	**24,281**	**167,947**
Change in Building Use Emissions		**8,290**	**151,956**
Mobile Emissions			
Aircraft Emissions	24,039	0	0
Vehicle Emissions	3,890	7,574	53,380
Total Mobile Emissions	**27,929**	**7,574**	**53,380**
Change in Mobile Emissions		**-20,351**	**25,455**
Total Annual Emissions	**43,920**	**31,855**	**221,327**
Change in Annual Emissions		**-12,061**	**177,411**
Total U.S. GHG Emissions, 2007[a]	7,150,100,000	7,150,100,000	7,150,100,000
% of U.S. GHG Emissions	**0.0006%**	**0.0004%**	**0.0031%**
Total Maine Stationary Sources, 2005[b]	21,671,922	21,671,922	21,671,922
% of Maine Stationary GHG Emissions	**0.2%**	**0.1%**	**1.0%**

Sources:
[a] EPA 2009c.
[b] MEDEP 2007.

Note:
[1] Totals may not be exact due to rounding.

Table 4.6-9 No-Action Alternative: Change in Air Emissions Resulting from Discontinued Operations

Emission Source	Criteria Pollutant Emissions (tons per year)					GHG Emissions (MT)
	CO	NO_X	VOC	SO_2	PM	CO_2e
Change in Annual Building Use Emissions	-8.80	-30.83	-11.82	-36.25	-2.44	-15,991
Change in Annual Mobile Emissions	-106.78	-78.85	-39.17	-11.61	-33.90	-27,945
Total Change in Emissions	**-115.58**	**-109.68**	**-50.99**	**-47.86**	**-36.33**	**-43,936**

4.6.4 General Conformity Analysis

Under Alternative 1, Alternative 2, and the No-Action Alternative, only the disposal of NAS Brunswick facilities would be carried out by the Navy and, therefore, be considered under the Conformity Rule. Following disposal, the Navy would not retain control of the property; therefore, the implementation of either Alternative 1 or Alternative 2 is not considered a part of this federal action.

In accordance with revisions to 40 CFR 93.153 published April 5, 2010, General Conformity requirements shall not apply to federal actions that involve the transfer of ownership, interests, and titles in land, facilities, and real and personal properties, regardless of the form or method of transfer (40 CFR 93.153(c)(2)(xiv) (Federal Register 2010).)Therefore, the action would be exempt from a Conformity Rule Determination. A RONA is provided as Appendix E.

The FAA has reviewed the air quality analysis and the proposed Airport Layout Plan (see Appendix K) as part of its independent review and approval process. The FAA has determined that the Navy's analysis shows that project emissions for Alternative 1 do not exceed the NO_X and VOC emission *de minimis* thresholds of 100 TPY for NO_X and 50 TPY for VOCs, as established by 40 CFR 93.153(b)(2) for a maintenance area within an ozone transport region. Therefore, these emission levels are presumed to conform to the SIP. The FAA does not require a General Conformity determination for the purposes of approving the Airport Layout Plan. The FAA anticipates that it will find this EIS adequate for purposes of unconditionally approving the Airport Layout Plan to depict existing facilities at the airport. Proposed new airport improvements and facilities that are part of the ultimate plan for redevelopment at the airport will be conditionally approved by the FAA and subject to appropriate additional environmental review.

4.7 Noise

This section summarizes the potential noise impacts resulting from the implementation of Alternative 1, Alternative 2, and the No-Action Alternative. It includes an examination of the potential impacts resulting from future traffic, aviation activities (Alternative 1 only), and construction. The study area includes the NAS Brunswick property and the land immediately adjacent to it. The McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and the Sabino Hill Rake Station properties are located in a less densely developed area and generally experience less traffic and noise than NAS Brunswick and the land area surrounding its boundary. In addition, these properties are proposed to be reused in a manner similar to their current use. Therefore, no significant impact would be expected from the disposal of these properties, and noise impacts at these properties will not be examined in detail in this section.

FHWA provides policies and guidance for the abatement of highway traffic noise that were adopted by the Maine Department of Transportation (MaineDOT). Noise impacts occur when the predicted traffic noise levels approach or exceed (higher than 1 dBA) the noise abatement criteria corresponding equivalent sound level, or when the predicted traffic noise levels substantially exceed (greater than 15 dBA) the existing noise levels. Traffic noise impacts can occur below the noise abatement criteria. The noise abatement criteria should not be viewed as Federal standards or desirable noise levels. The noise abatement criteria should only be used as absolute values which, when approached or exceeded, require the consideration of traffic noise abatement measures.

The FAA recommends using the DNL noise descriptor to delineate "noise contours" between the source and any receptor located near an airport or in the flight path. Criteria to determine whether the impacts of aircraft noise experienced at a receptor would be considered significant are established in FAA Order 1050.1E, Environmental Impacts: Policies and Procedures (FAA 2006). A significant noise impact would occur if the results of an assessment show that aircraft activity associated with a proposed action would, in comparison with the No-Action condition, cause noise-sensitive areas to experience an increase in noise of DNL 1.5

dBA or more within a 65 dBA or greater DNL noise contour. As outlined in FAA Order 1050.1E, the No-Action Alternative typically serves as the baseline comparison for assessing potential environmental consequences. However, in this document the baseline consists of DoD operations in 2008 at the installation, whereas the No-Action Alternative is a closure of the installation with no activities (other than the existing housing) or redevelopment of the property. As presented in the following sections, future aviation operations would be isolated to the Aviation Operations district and would include a smaller land area than under existing conditions. Aircraft noise associated with the aviation component of Alternative 1 would not be expected to have a significant impact, as the nosie contours would be limited to the airfield area and would decrease compared to existing conditions.

Modeling was not completed for Alternative 2 and the No-Action Alternative, since they do not include an aviation reuse component.

4.7.1 Alternative 1 (Preferred Alternative)

4.7.1.1 Traffic-Related Noise Impacts

Implementation of Alternative 1 would not be expected to generate significant traffic-related noise impacts within the study area. Under Alternative 1, traffic-related noise would occur in areas already experiencing vehicular noise and would not be expected to cause additional impacts. The predicted traffic noise levels for the Alternative 1 build-out years are summarized below in Table 4.7-1. The largest estimated increase in traffic noise would be less than 1 dBA. An increase in noise of 3 dBA is considered to be barely noticeable. As shown in Table 4.7-1, projected traffic noise levels do not exceed FHWA noise abatement criteria thresholds for land uses proposed under Alternative 1 or substantially exceed (greater than 15 dBA) existing conditions. Land uses proposed under Alternative 1 would include FHWA activity categories ‘B’ and ‘C’. Traffic noise abatement criteria threshold for activity category B is 67 dBA and 72 dBA for category C. For more information of FHWA traffic noise abatement criteria, refer to Section 3.7.3.2.

Table 4.7-1 Alternative 1 – Traffic Noise (Equivalent Sound Level – dBA)

Receptor	Location	Existing (2008)	5 Years (2016)	10 Years (2021)	15 Years (2026)	20 Years (2031)
1	Gurnet Road Coombs Road (north)	66.0	65.8	65.8	65.9	66.0
2	Gurnet Road and Coombs Road (south)	65.1	64.9	64.9	65.0	65.1
3	Maine Pine Racquet and Fitness (120 Harpswell Road)	66.1	66.0	66.0	66.1	66.1
4	Harpswell Road and Merriconeag Road	63.8	63.8	63.8	63.9	63.9

In addition, as a person moves away from a roadway, traffic noise levels are reduced by distance, terrain, vegetation, and natural and man-made obstacles. Traffic noise is not usually a serious problem for people who live more than 500 feet from heavily traveled freeways or more than 100 to 300 feet from lightly traveled roads (FHWA 1995). It is assumed that no noise-sensitive land uses (e.g., residential) would be constructed within 500 feet of any major roadway. Therefore,

traffic noise associated with the full implementation of Alternative 1 would not result in a noticeable long-term change from existing noise conditions.

Temporary increases in construction-related vehicle noise would, however, be expected. Truck and construction vehicle (e.g., dump trucks, material deliveries, debris removal, etc.) traffic within and near the installation would produce localized noise for brief periods, but this would not be expected to create any long-term, adverse noise impacts on the neighboring community.

4.7.1.2 Aircraft

Upon full build-out of Alternative 1 (2031), annual aircraft operations are projected to increase to 45,500 operations per year, up from 24,709 operations in 2008. Noise associated with future aircraft operations would not be expected to have a significant impact on resources located outside of the Airfield Operations land use districts. As modeled, all DNL noise contours above 65 dBA are located within the Airfield Operations land use district; none of the projected 65 dBA noise exposure contours are located outside of the installation boundary or within any other land use district on the installation. While the number of annual operations is projected to increase, the noise impact from future aircraft operations are expected to decrease compared to existing 2008 baseline conditions. This is because the majority of future aircraft operations are assumed to involve smaller, quieter aircraft as opposed to the large military aircraft (e.g., P-3C Orion) that currently operate at NAS Brunswick.

Future Aircraft Activity

Future aviation noise exposure contours were modeled utilizing INM 7.0 and were based on future aircraft activity assumptions provided by MRRA, including future airfield activity projections, aircraft type, type of operation, and runway and flight track utilization rates (see Appendix L). Furthermore, the aviation assumptions were reviewed and approved by the FAA (Nicosia-Rusin 2009). The FAA determined that the assumptions represented a realistic expectation of future aviation operations resulting from the implementation of Alternative 1, particularly for the purpose of describing impacts of anticipated airport activity on the environment and adjacent community (Nicosia-Rusin 2009). Section 3.7 provides information on the methodology used in this EIS to assess aircraft noise. The following assumptions were utilized to model future noise exposure contours resulting from the implementation of Alternative 1.

- **Aircraft Operations.** Annual flight operations are projected to increase from 24,709 in 2008 to 45,500 at full build-out of Alternative 1 (see Table 4.7-2). Approximately 95% of future aircraft operating from the installation would be fixed-wing aircraft. The remaining aircraft would be rotary-wing aircraft, or helicopters. It is projected that the vast majority of future operations, approximately 90%, would include small propeller aircraft such as the Cessna 150, Piper PA-18 Super Club, Cessna 180, and the Beech Baron. Other aircraft projected to operate from the installation include medium-sized turboprop aircraft such as the Saab 2000 and small jet aircraft such as the Cessna Mustang, Lear 31, and the Gulfstream V. Medium-sized turboprop and small jet aircraft would comprise approximately 5% of all future operations. Only a

very small percentage, about 0.25%, of future operations would involve larger jet aircraft such as the Airbus 319 and the B757. The majority of rotary-wing aircraft operations are projected to be performed by the Robinson R22, a single-engine light utility helicopter. Figure 4.7-1 represents examples of typical aircraft projected to operate from the installation.

Table 4.7-2 Alternative 1 – Total Projected Annual Aircraft Operations

Build-out Phase (Year)	Operations per Year
Existing Conditions (2008)	24,709
5 Years (2016)	22,500
10 Years (2021)	30,200
15 Years (2026)	37,800
20 Years (2031)	45,500

Source: Jordan 2009.

Cessna 150[a]

Cessna 180[b]

Gulfstream V[b]

Robinson R22[b]

Sources:
a AOPA 2009.
b Wikipedia 2009.
Note:
[1] Future representative aircraft identified by the Midcoast Regional Redevelopment Authority (Jordan 2009).

Figure 4.7-1 Alternative 1 – Representative Future Aircraft

Future aircraft operations would include departure, arrival, and touch-and-go flight operations. (A touch-and-go operation is when an aircraft flies a pattern route, and is typically associated with flight training.) Approximately 55.5% of all future flight operations are projected to be arrivals or departures of aircraft, and 45.5% would be touch-and-go operations. The majority of all operations would take place during daytime hours (07:00 A.M. to 10:00 P.M.). The aircraft mix, operation type, and number and time of projected aircraft operations, for the build-out years 2016, 2021, 2026, and 2031, are identified in Appendix L.

- **Runway and Flight Track Utilization.** Approximately 90% of future aircraft operations would utilize runway 01R/19L, and the remaining operations would occur on runway 01L/19R. Severe weather or air traffic needs may result in different runway utilization on a short-term basis, and utilization of both runways is being preserved in the airport master plan. Projected runway utilization for both fixed- and rotary-wing aircraft operations is shown in Table 4.7-3.

Table 4.7-3 Alternative 1 – Runway Utilization

Runway	Utilization
01R	45%
19L	45%
01L	5%
19R	5%

Source: Jordan 2009.

The future flight tracks for both fixed- and rotary-wing aircraft are expected to include approach, departure, touch-and-go routes. Figure 4.7-2 depicts the anticipated flight tracks under Alternative 1. Flight track utilization rates are identified in Appendix L. Flight track utilization was provided by MRRA and approved by the FAA (Jordan 2009; Nicosia-Rusin 2009). The primary utilization of only one runway generally represents a worst-case scenario for modeling noise contours. Any future increased use of the secondary runway would not be expected to result in a significant change to noise contours.

- **Stage Length.** Stage length refers to the distance an aircraft travels from takeoff to landing. Each stage is associated with a takeoff weight that represents a typical fuel load required for each trip. The INM accounts for these various load factors based upon the initial distance traveled. The standard stage length for future flight operations at NAS Brunswick was set to stage 1, which equals 0 to 500 nautical miles.

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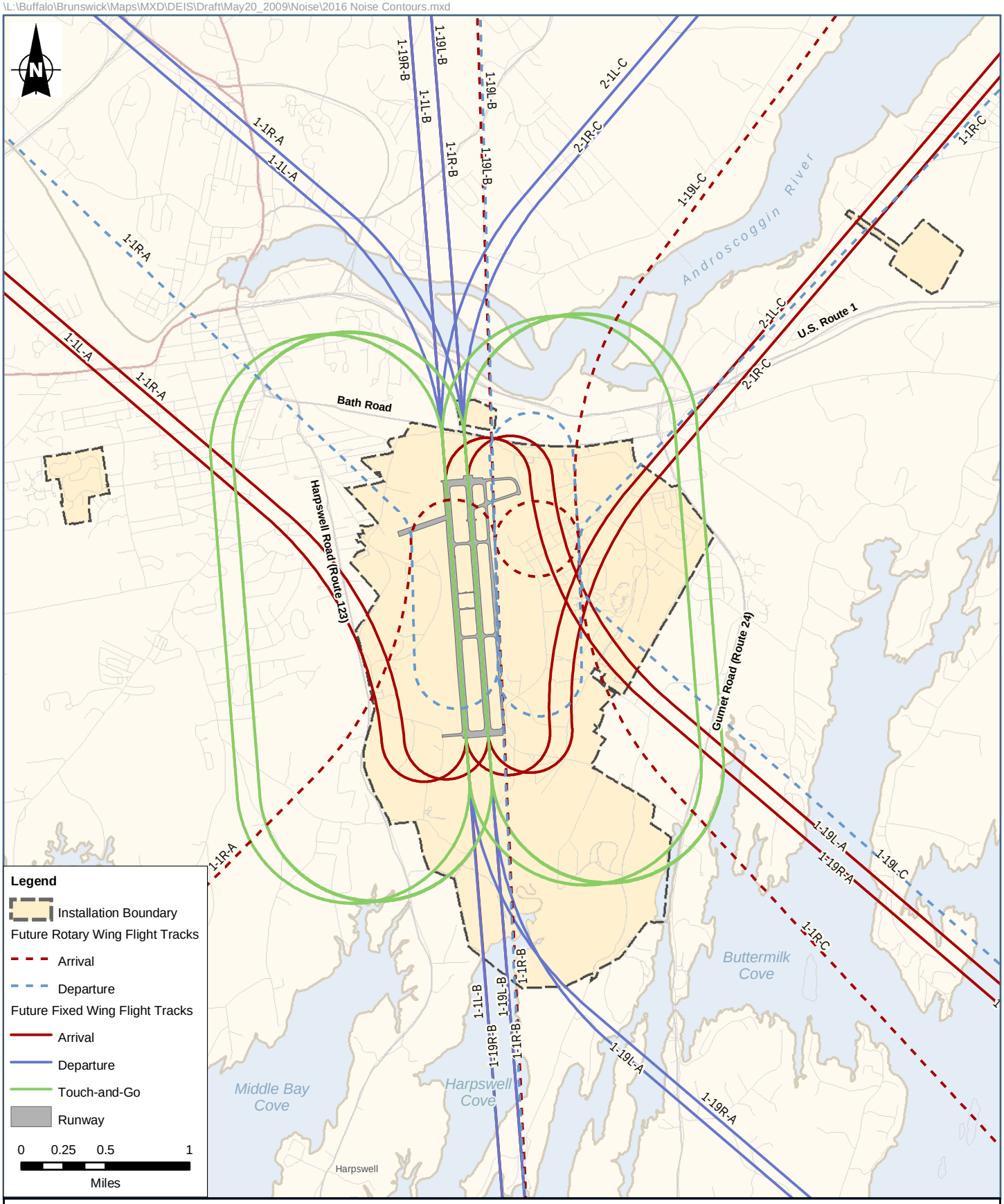

Figure 4.7-2
Alternative 1
Projected Flight Tracks
Brunswick, Maine

- Standard departure and arrival profile data contained in the INM were applied to the projected future aircraft operations. Profile data particular to the aircraft type include altitude (in feet) relative to the airport elevation, power level as a function of track distance, and speed as a function of track distance. In general, following the standard profiles, the projected future airplanes would be arriving at 6,000 feet in altitude and departing to an altitude of 10,000 feet. Helicopters would be arriving at 1,000 feet and departing up to 1,000 feet.

Future Noise Exposure Contours

While the number of annual operations is projected to increase upon full build-out, the overall noise impact from aircraft operations is expected to decrease compared to existing 2008 baseline conditions. This is because future aircraft operations are assumed to involve smaller, quieter aircraft compared to the large military aircraft that currently operate at NAS Brunswick. Figure 4.7-3 presents the aircraft noise exposure contours for the build-out years 2016, 2021, 2026, and 2031. For each of the build-out years, aircraft noise greater than 65 DNL is projected to occur entirely within the Aviation Operations land use district. This district includes the existing runways and aircraft operational areas and would not include any noise sensitive land uses (e.g., residential, education, etc.). No noise contour greater than 65 DNL is projected to occur outside of this land use district or within any of Alternative 1's other land use districts. In addition, the total land area impacted by aircraft noise greater than 65 DNL would be less than currently experienced under existing 2008 baseline conditions. As shown in Table 4.7-4, the total land area within the three noise exposure zones decreases by approximately 301 acres between 2008 and 2031.

Table 4.7-4 Alternative 1 – Land Area (acres[1]) within Noise Exposure Contours

Noise Zone	Existing Conditions (2008)	5 Years (2016)	10 Years (2021)	15 Years (2026)	20 Years (2031)
65 to 70 DNL	355	48	137	165	194
70 to 75 DNL	178	13	24	33	47
Greater than 75 DNL	21	3	6	10	13
Total	**554**	**64**	**167**	**208**	**254**

Note:
[1] Acreage calculations are approximate and are rounded to the nearest acre.

The Town of Brunswick Zoning Ordinance outlines restrictions on noise output in specific districts and areas in the town of Brunswick (Town of Brunswick 2009a). Appendix III of the Zoning Ordinance outlines the restrictions in the BNAS Reuse District, including aviation-related land use districts. Activities in the BNAS Reuse District shall conform to the noise standards of the Zoning Ordinance, and noise levels in the aviation-related land use districts shall not exceed the equivalent sound level measurement of 75 dBA (daytime) or 65 dBA (nighttime); however, routine aircraft operations, including take-offs, landings, and taxiing, are exempt from the requirements of both the Town's noise ordinance (Town of Brunswick 2009a, Article 109.4) and the BNAS Reuse District's noise ordinance (Town of Brunswick 2009a, Appendix III). Land use districts neighboring the

aviation-related reuse districts may have a lower equivalent sound level requirement. The maximum equivalent sound level on both sides of the boundary between such districts and the aviation-related districts shall not exceed 65 dBA (Town of Brunswick 2009a, Appendix III). As noted above, all noise levels of greater than 65 dBA occur only within the Aviation Operations District; therefore, the Aviation Operations District is in compliance with the Town of Brunswick's zoning ordinance. With proper siting and incorporation of sound-attenuation measures into facility construction, it is not expected that there would be any restrictions on construction of buildings in the surrounding land use districts.

Because future aviation operations would be confined to the Aviation Operations district, include a smaller land area than under existing conditions, and be in compliance with the Town of Brunswick's noise requirements, aircraft noise associated with the aviation component of Alternative 1 would not be expected to have a significant impact.

4.7.1.3 Construction

Under Alternative 1, demolition, construction, and renovation noise would occur within the boundaries of NAS Brunswick, and the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station. The majority of redevelopment proposed under Alternative 1 is concentrated on approximately 1,630 acres of land, in areas that have already been developed by the Navy. The majority of construction-related noise would be expected to take place within these areas during the 20-year build-out period. Construction would not have a significant long-term noise impact. Only short-term noise impacts would be expected during construction activities, which would be managed to meet local noise standards. Therefore, extended disruption of normal activities would not be anticipated.

Noise impacts during construction activities would include construction equipment operating on the installation and delivery vehicles traveling to and from the site. Construction-related noise levels at any given location would depend on the type and number of pieces of construction equipment being operated and the receptor's distance from the construction site. Noise impacts would vary widely, depending on the phase of construction (e.g., demolition, land clearing and excavations, foundation and capping, construction of new building walls, etc.) and the specific task being undertaken. Increased noise levels would be most significant during the early stages of each construction phase, although these periods would be of relatively short duration.

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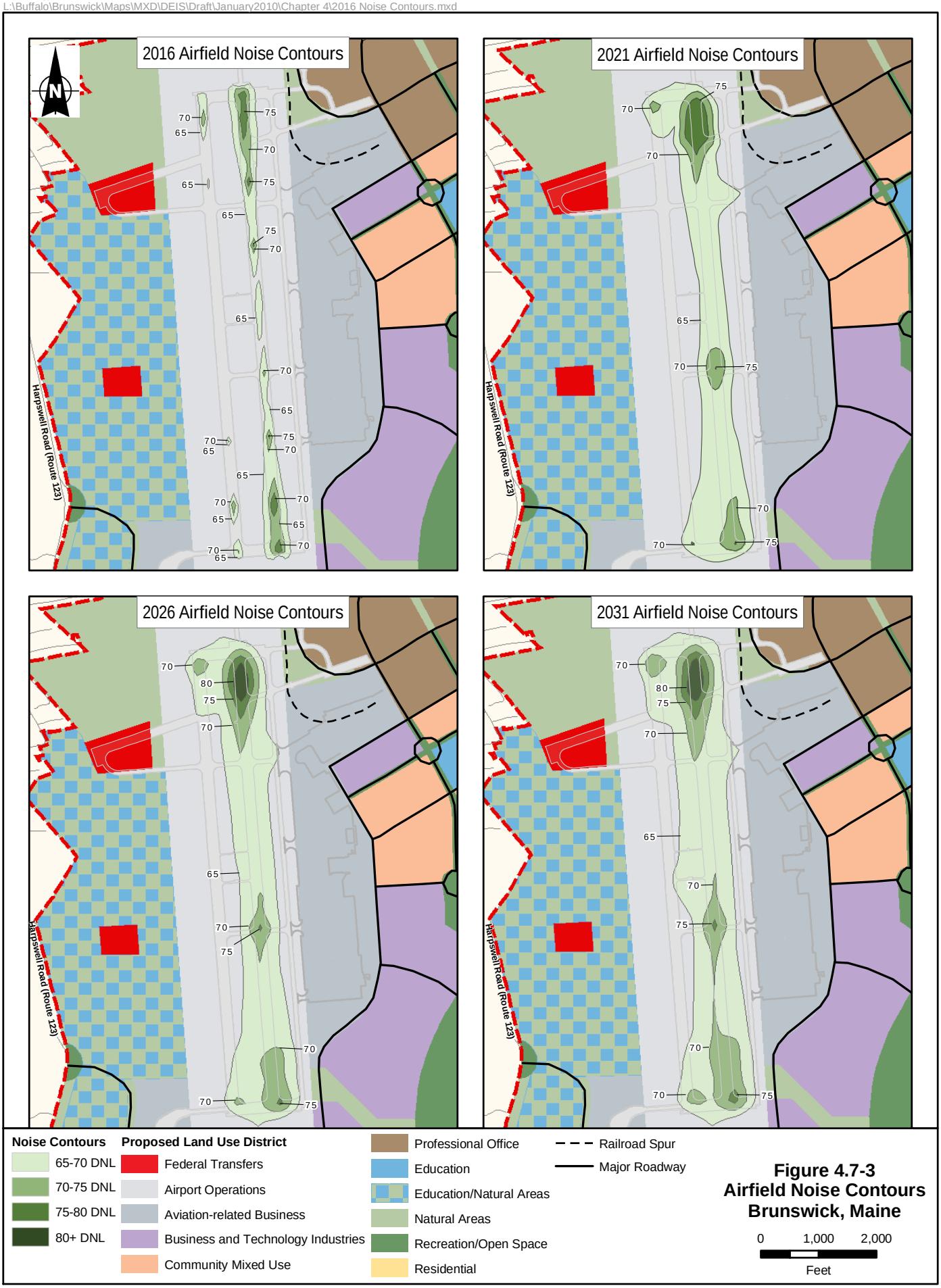


Figure 4.7-3
Airfield Noise Contours
Brunswick, Maine

Typical noise levels for construction equipment are shown in Table 4.7-5. The listed noise levels represent the A-weighted maximum sound level (L_{max}), measured at a distance of 50 feet from the construction equipment.

Table 4.7-5 Typical Construction Noise Levels

Equipment Description	Maximum Sound Level (L_{max}), dBA at 50 feet
Backhoe	80
Chainsaw	85
Compressor (air)	80
Concrete mixer truck	85
Concrete saw	90
Crane	85
Dozer	85
Dump Truck	84
Excavator	85
Flatbed truck	84
Front-end loader	80
Generator	82
Grader	85
Jackhammer	85
Pickup truck	55
Pneumatic tools	85
Sand blasting (single nozzle)	85
Vacuum street sweeper	80
Warning horn	85
Welder/torch	73

Source: Modified from FHWA 2006.

Noise associated with construction should not exceed a maximum equivalent sound level of 75 dBA between the hours of 7:00 A.M. and 7:00 P.M. (Town of Brunswick 2009a). As required by the Town's zoning ordinance, any construction noise anticipated to exceed this threshold would require the review and/or approval of the Town of Brunswick before any construction activities could begin. The Town requires that adequate provisions must be made to control unnecessary noise from and at the construction site. The Planning Board may require the developer to establish pre- and post-development noise levels. In addition, the Town's zoning ordinance restricts construction activities during the following periods:

- Operating or permitting the operation of any tools or equipment used in construction, drilling, or demolition work is prohibited on Sundays and days on which the following holidays are observed: New Years, Memorial Day, 4th of July, Labor Day, Thanksgiving, and Christmas.

- All construction, drilling, or demolition work shall be conducted between 7:00 A.M. and 7:00 P.M. except when prior, written approval has been obtained from the Codes Enforcement Officer. The Codes Enforcement Officer shall only grant approval for work after hours in the case of special circumstances and such approval shall not be granted on a regular basis.

To reduce construction-related noise impacts, it is expected that the developer would implement, as appropriate, best management practices to minimize adverse construction noise impacts to the community. Appropriate best management practices may include:

- **Truck Traffic.** Designate routes that would not carry truck traffic related to the construction past noise-sensitive areas.
- **Portable Noise Barriers.** During Project construction, use portable barriers to enclose noisier stationary equipment.
- **Limit Heavy Equipment Activity near Residences**. Limit heavy equipment activity adjacent to residences or other sensitive receptors to the shortest possible period required to complete the work activity.
- **Mufflers and Intake Silencers**. Ensure that proper mufflers and other noise-reduction equipment are in good working condition.
- **Establish Telephone Hotline.** Establish and publicize a phone number for members of the public to call if they have a noise complaint.
- **Modify Backup Alarms**. Lay out construction sites to minimize the need for backup alarms; use broadband noise backup alarms; and use flagmen to keep the area behind maneuvering vehicles clear.
- **Stationary Equipment**. Where practical, locate stationary equipment such as compressors, generators, and welding machines away from sensitive receptors or behind barriers.
- **Construction Management Strategies.** Sequence operations to combine noisy operations within the same time period. Implement alternative construction methods to reduce the transmission of high noise levels to noise-sensitive areas (e.g., use special low noise emission level equipment, select and specify quieter demolition or deconstruction methods).

4.7.2 Alternative 2

4.7.2.1 Traffic

Under Alternative 2, traffic-related noise impacts would occur in areas already experiencing vehicular noise and would not be expected to substantially exceed existing noise levels.

The predicted traffic noise levels for the build-out years are summarized below in Table 4.7-6 for Alternative 2. As shown in Table 4.7-6, there is no significant change in the equivalent sound level from existing conditions. Temporary increases in construction-related vehicle noise would, however, be expected. Truck and construction vehicle (e.g., dump trucks, material delivery, debris removal, etc.) traffic within and near the installation would produce localized noise for brief periods, but this would not be expected to create any long-term, adverse noise impacts on the neighboring community.

Table 4.7-6 Alternative 2 – Traffic Noise (L_{eq})

Receptor	Location	Existing (2008)	5 Years (2016)	10 Years (2021)	15 Years (2026)	20 Years (2031)
1	Gurnet Road and Coombs Road (north)	66.0	65.8	65.9	65.9	66.0
2	Gurnet Road and Coombs Road (south)	65.1	64.9	65.0	65.0	65.1
3	Maine Pine Racquet and Fitness (120 Harpswell Road)	66.1	66.0	66.1	66.2	66.3
4	Harpswell Road and Merriconeag Road	63.8	63.8	63.8	63.9	64.0

4.7.2.2 Aircraft

Alternative 2 does not include an aviation component. Therefore, implementation of Alternative 2 would have no aircraft-related noise impacts.

4.7.2.3 Construction

Under Alternative 2, demolition, construction, and renovation noise would occur within the boundaries of NAS Brunswick, the McKeen Street Housing Annex, the East Brunswick Radio Transmitter Site, and the Sabino Hill Rake Station. Similar to Alternative 1, the majority of redevelopment proposed is concentrated on approximately 1,580 acres of land, in areas that have already been developed by the Navy. The majority of construction-related noise would be expected to take place within these areas during the 20-year build-out period. Construction would not have a significant long-term noise impact. Only short-term noise impacts would be expected during construction, which would be managed to meet local noise standards. Therefore, extended disruption of normal activities is not anticipated.

Noise impacts during construction would include noise from construction equipment operating on the installation and delivery vehicles traveling to and from the site. Noise impacts would vary widely, depending on the phase of construction and the specific task being undertaken. Increased noise levels would occur during the early stages of each construction phase, although these periods would be of relatively short duration.

Typical noise levels for construction equipment are identified in Table 4.7-5. The listed noise levels represent the A-weighted maximum sound level (L_{max}), measured at a distance of 50 feet from the construction equipment.

Noise associated with construction should not exceed a maximum equivalent sound level of 75 dBA between the hours of 7:00 A.M. and 7:00 P.M. (Town of Brunswick 2009a). As required by Town's zoning ordinance, any construction noise anticipated to exceed this threshold would require the review and/or approval of the Town of Brunswick before any construction activities could begin. The town requires that adequate provisions must be made to control unnecessary noise from and at the construction site. The Planning Board may require the developer to establish pre- and post-development noise levels.

To reduce construction-related noise impacts, the developer would implement, as appropriate, the same best management practices as identified under Alternative 1 to minimize or eliminate adverse construction noise impacts to the community.

4.7.3 No-Action Alternative

Under the No-Action Alternative, NAS Brunswick, and the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station would be retained by the U.S. government in caretaker status. No reuse or redevelopment would occur at the installation under this alternative. Therefore, no impacts related to noise would be expected to occur from implementation of the No-Action Alternative.

4.8 Infrastructure

This section presents an analysis of the potential impacts on infrastructure and utility systems (water, wastewater, and storm water; and electricity, natural gas, and telecommunications) resulting from the implementation of Alternative 1, Alternative 2, and the No-Action Alternative. Implementation of any of these alternatives could directly impact infrastructure and utility systems on the installation property, and because utility services are offered regionally, there could also be indirect impacts on the distribution area in which the service is provided (e.g., Brunswick Topsham Water District).

Projections for water demand, wastewater generation, and impervious surface area presented in this section were based on resource-specific multipliers and the build-out analysis. Refer to Section 2 (Alternatives, Including the Proposed Action) and Appendix C (Build-out Analysis) for more information on the build-out analysis. A summary description of the methodology used in calculating these projections, along with the assumptions and definitions of multipliers is presented both within this section, and a more comprehensive discussion is provided in Appendix N. Although the redevelopment of NAS Brunswick may result in some off-base employment changes (as discussed in Section 4.2), it is not anticipated that this would result in a change in the overall projected population growth in the Brunswick LMA beyond what is presented as a direct impact. This is due to a combination of factors, including the projected growth of the Brunswick LMA, the size of the civilian labor force, the unemployment rate, and the number of individuals who commute to the Brunswick area for employment (see Appendix N). Thus, the analysis of infrastructure capacity and demands discussed in this section is derived for the direct population change associated with the residential build-out on the former installation.

Under all alternatives, no new buildings or residential units would be constructed at the East Brunswick Radio Transmitter Site or Sabino Hill Rake Station; therefore, they are not discussed as part of the infrastructure analysis. The McKeen Street Housing Annex is included in all residential projections, but it is otherwise not specifically discussed as it will continue to be utilized for residential land uses.

4.8.1 Alternative 1 (Preferred Alternative)

4.8.1.1 Water Supply

The existing BTWD system would be expected to have sufficient capacity to meet any future water supply demands resulting from implementation of Alternative 1

(Frasier 2009). However, upon disposal of the installation, ownership and the entity responsible for managing and operating the installation's future water infrastructure would need to be identified.

Water Demand

Full build-out of Alternative 1 would develop a maximum of 2,946 residential units and over 9 million square feet of non-residential floor space. This is an increase over existing conditions (573 housing units, 266 bachelor residential units, and 2.5 million square feet of non-residential floor space). Based on the density of development at full build-out, Alternative 1 would require water at a rate of approximately 1.31 million gpd. This is in excess of existing 2008 baseline conditions (209,000 gpd). In addition, it would be expected that Alternative 1 would generate water demands for fire protection and irrigation for general landscaping, recreational fields, and the proposed 18-hole golf course.

Projections of water demand were estimated using generic planning multipliers for each land use district and associated square footages and number of hotel units within those land use districts. Water demand was also projected for residential units, including single-family homes, apartments, townhomes/condos, and senior and student housing. For more information on the methodology, assumptions, and multipliers used to project water demand, see Appendix N. Table 4.8-1 identifies the projected water demand resulting from the implementation of Alternative 1.

Table 4.8-1 Alternative 1 – Projected Water Demand (gpd)

	Existing Baseline Condition (2008)	5 Years (2016)	10 Years (2021)	15 Years (2026)	20 Years (2031)
Water Demand	209,000	181,969	454,244	757,066	1,305,544
Net Change	NA	-27,031	+245,244	+548,066	+1,096,544

Note:
[1] This table presents a summary of the projected water demand. For descriptions of the methodology and assumptions and the detailed tables used to project water demand, see Appendix N.

Key:
NA = Not applicable.

Implementation of Alternative 1 would not be expected to have a significant impact on the future capacity of the BTWD. The average water flow of the BTWD during 2008 was 1.8 million gpd. The BTWD projects that demand (excluding demand from the installation) would increase to approximately 2.22 million gpd by 2030 (Frasier 2009). The existing water supply system currently has a 'safe pumping capacity' to provide 4.80 million gpd, resulting in the capacity to increase daily flows by up to 2.58 million gpd (Frasier 2009). Full build-out of Alternative 1 would result in a projected demand of approximately 1.31 million gpd (a net increase of approximately 1.10 million gpd of water over baseline (2008) conditions), which is less than the projected 2.58 million gpd excess future capacity of the BTWD system. As indicated by the BTWD, there is sufficient existing and future capacity to safely meet the projected demand for water resulting from the full build-out of Alternative 1 (Frasier 2009).

Furthermore, any water supply demand impacts resulting from the implementation of Alternative 1 would be further reduced since any redevelopment of the installation would require the review and/or approval of the Town of Brunswick. Before approving a project, the Town of Brunswick Planning Board may require the developer to estimate potential impacts on the water system, including changes in flow rate, capacity, and water pressure. In addition, the full build-out of the installation is projected to occur incrementally over a 20-year period. Therefore, any expansion in the demand for water would not occur at once, and the BTWD, as the local utility service provider, would be expected to upgrade and/or expand its distribution system as needed to meet any increases in service demand.

Distribution System

Redevelopment of the installation would require upgrading and expansion of the existing water supply infrastructure to meet BTWD and Town of Brunswick standards. The following would need to be addressed:

- The majority of the installation's water distribution system was installed prior to 1980, and portions may contain asbestos-cement pipe, which requires special handling during removal (Douglas 2008).

- The distribution pipelines do not follow specified routes except for those located within the residential housing areas. In other areas of the installation, the lines were run as needed and are not along generally accepted rights-of-way such as roadways (Town of Brunswick 2005).

- The installation is metered at only two locations. Reuse of the property would require upgrading the existing water distribution system, metering of individual structures or end users, and the installation of new water supply infrastructure.

Detailed plans, preliminary or final, for these improvements are not included in the Reuse Master Plan and are not known at this time. It is estimated that the cost of the improvements needed to bring the existing system up to local standards could be as high as $9.1 million (BLRA 2007a).

The entity responsible for implementing any water distribution system improvements has not been determined, and funding for these improvements has not been secured. Upon disposal of the federally owned and maintained property, the party responsible for making the water supply infrastructure improvements would need to be identified. In addition, the design and installation of any new water supply infrastructure would require, if applicable, municipal review and approval and would need to comply with applicable local codes, ordinances, and regulations.

Operation and Management

Under Alternative 1, any property not transferred to other federal agencies would no longer be owned or managed by the federal government. Upon completion of the BRAC disposal process, the future property owner and/or local utility provider would be responsible for the infrastructure located on the property and for its ser-

vice and maintenance. Following the disposal of NAS Brunswick and the McKeen Street Housing Annex, the BTWD would be expected to continue to supply water to these properties. However, the entity responsible for management of the installation's water distribution system after disposal has not yet been determined. The Reuse Master Plan identifies three potential ownership and management options after disposal of NAS Brunswick and the McKeen Street Housing Annex: Transfer of ownership and management of the installation's infrastructure to (1) the LRA as a bulk water customer of the BTWD, (2) a "for profit" operating entity (the LRA or another entity), or (3) the BTWD. The ownership and management of the water supply infrastructure and delivery of service to customers will need to be determined prior to the disposal and reuse of the installation.

4.8.1.2 Wastewater

Implementation of Alternative 1 would be expected to have an adverse impact on the municipal wastewater system. The existing BTWD system does not have sufficient capacity to meet future wastewater flows resulting from the full build-out of Alternative 1. In addition, upon disposal of the installation, ownership and the entity responsible for managing and operating the installation's wastewater infrastructure will need to be identified.

Wastewater Volume

Full build-out of Alternative 1 would result in a denser built environment (i.e., higher intensity of residential and non-residential development) than currently exists on the installation. Based on the increased density of development, it would be expected that Alternative 1 would generate wastewater flows of approximately 1.20 million gpd at full build-out. This exceeds the 328,652 gpd generated by the installation in 2008.

Projections were estimated using generic planning multipliers for each land use district and associated square footages and number of hotel units within those land use districts. Wastewater volume was also projected for residential units, including single-family homes, apartments, townhomes/condos, and senior and student housing. For more information on the methodology, assumptions, and multipliers used in the wastewater volume projection process, see Appendix N. Table 4.8-2 identifies the projected wastewater flows resulting from the implementation of Alternative 1.

Table 4.8-2 Alternative 1 – Projected Wastewater Volume (gpd)

	Existing Baseline Condition (2008)	5 Years (2016)	10 Years (2021)	15 Years (2026)	20 Years (2031)
Projected Wastewater	328,652	165,546	415,963	694,258	1,200,805
Net Change	NA	-163,106	+87,311	+365,606	+872,153

Note:
[1] This table presents a summary of the wastewater projections. For descriptions of the methodology and assumptions and the detailed tables used to project wastewater volumes, see Appendix N.

Key:
NA = Not applicable.

The wastewater flows resulting from the full build-out of Alternative 1 would be expected to have an adverse impact on the future processing and infrastructure capacity of the Brunswick Sewer District. Currently, the Brunswick Sewer District has the district-wide capacity to process only an additional 90,000 gpd before exceeding their sensitivity level (approximately 80% of capacity) of 3.08 million gpd. Permitted processing capacity would allow for an additional 860,000 gpd district-wide before exceeding their permitted processing capacity of 3.85 million gpd. The district treatment plant would have the capacity to treat the projected wastewater resulting from Alternative 1 up to 2021, when there would be a net increase of 87,311 gpd. However, Alternative 1 is projected to generate net increase of 365,606 gpd by 2026 and 872,153 gpd by 2031. At full build-out, the wastewater generated by Alternative 1 would exceed the Brunswick Sewer District's sensitivity level capacity by 782,153 gpd and its maximum permitted capacity by 12,153 gpd. Furthermore, wastewater flows originating from the NAS Brunswick property would exceed the capacity of the Brunswick Sewer Districts intake infrastructure, including the property's wastewater flow meter (maximum capacity of 450,432 gpd) and the Cooks Corner pump station (maximum capacity of 768,000 gpd). Sewer infrastructure surrounding the McKeen Street would be expected to have the capacity to handle future wastewater flows since future land use is not expected to change from existing uses.

In order to handle the projected wastewater flows and to provide capacity for other projects district-wide, it would be expected that an expansion of district's processing capacity and intake infrastructure would be needed upon full build-out of Alternative 1. However, any capacity impacts resulting from implementation of Alternative 1 could be reduced since any redevelopment of the installation would require the review and/or approval of the Town of Brunswick. Before approving a project, the Town of Brunswick Planning Board may require the developer to estimate potential impacts on the water treatment system, including changes in flow rate, capacity, and water pressure. In addition, full build-out of the installation is projected to occur incrementally over a 20-year period. Therefore, any increase in wastewater flows would not occur at once, and the Brunswick Sewer District, as the local utility service provider, would be expected upgrade and/or expand its distribution system as needed to meet any increases in service demand.

Wastewater System

As with the water distribution system, reuse of the property would require an upgrade of the existing installation wastewater system and the construction of new wastewater infrastructure. Detailed plans, preliminary or final, for these improvements are not included in the Reuse Master Plan and are not known at this time. However, it is estimated that the improvements necessary to bring the existing system up to local standards could be as high as $6.4 million (BLRA 2007a).

The entity responsible for implementing any infrastructure improvements has not been determined, and funding for these improvements has not been secured. Upon disposal of the federally owned and maintained property, the party responsible for making the wastewater system improvements would need to be identified. In addition, the design and installation of any new infrastructure would re-

quire, if applicable, municipal review and approval and would need to comply with applicable local codes, ordinances, and regulations.

Operation and Management

Under the proposed action, any property not transferred to other federal agencies would no longer be owned or managed by the federal government. Upon completion of the BRAC disposal process, the future property owner, the Town of Brunswick, or the Brunswick Sewer District would be responsible for the wastewater infrastructure located on the property and for its service and maintenance. The ownership and management of the installation's wastewater system after disposal of the property has not yet been determined. The ownership and management of the wastewater system on the installation will need to be determined prior to the disposal and reuse of the installation.

4.8.1.3 Storm Water

It would be expected that full build-out of Alternative 1 would result in an increase in the total impervious surface area on the installation, resulting in higher volumes of storm water runoff. In addition to the impervious surface area that already exists, new impervious surface area would be created as a result of new construction (i.e., buildings, structures, parking lots, and roadways).

Specific project plans and details have not yet been developed. However, for planning purposes, the total impervious surface area was projected utilizing the Town of Brunswick Zoning Ordinance and the Build-Out Analysis (Appendix C). Full build-out of Alternative 1 is projected to result in a total of 859 acres of impervious surface area (27% of total land area), which would be predominantly comprised of building roofs, parking areas, and roadways. This would be an addition of approximately 343 acres to the existing (2008) baseline conditions of 516 acres of impervious surface (16% of the total land area). Thus, the net change from existing to full build-out under Alternative 1 would be an approximately 11% increase (27% - 16% = 11%). For more information on the methodology, assumptions, and calculations used to project the impervious surface area resulting from implementation of Alternative 1, see Appendix N.

It would not be expected that full build-out would have a significant impact on storm water resources. Almost all of the proposed redevelopment and resulting impervious surface area would be concentrated in the following land use districts: aviation operations, aviation-related business, professional office, community mixed use, business and technology industries, education, and residential. The locations of the above-listed land use districts (see Figure 4.1-1) were proposed in areas that have been previously developed by the Navy. Under Alternative 1, impervious surface areas would cover approximately 859 acres of this developed area, which includes 229 acres of existing airfield runway, taxiways, and aircraft movement areas. The remaining 73% of the installation's land area which is designated as education/natural areas, natural areas, recreational areas, and open space, would have mostly non-impervious surfaces (e.g., lawns, woodlands, etc.).

Any storm water impacts resulting from implementation of Alternative 1 would be reduced through the implementation of storm water management practices re-

quired by local and state regulations. The Town of Brunswick would require the developer to prepare a storm water management plan, preferably using a watershed approach rather than a site-by-site approach. The plan would likely be prepared as part of the facility design. The storm water management plan would describe measures to control the volume and quality of storm water runoff in a manner consistent with MEDEP storm water management policy. The plan could include measures to mitigate other impacts as identified by the Town (e.g., restricted passage for fish due to construction and operation of storm water infrastructure). Impacts on aquatic organisms inhabiting waterbodies in the developed reuse area are discussed in Section 4.12.1.2.

The storm water management plan would be required to include measures to comply with the Urban Impaired Stream Standard listed in Chapter 500 of Maine's Stormwater Management Law (06-096 CMR Chapter 500, Section 4(D) Urban Impaired Stream Standard)). Under the Urban Impaired Stream Standard, if a project is located within the direct watershed of an urban impaired stream or stream segment, as listed in Chapter 502, and results in 3 or more acres of impervious area or 20 or more acres of developed area, this standard must be met. Therefore, for development/redevelopment on NAS Brunswick within the watersheds of Mere Brook and the unnamed tributary of the Androscoggin River, the provisions of the Urban Impaired Stream Standard must be met[2]. As per the Urban Impaired Stream Standard, additional storm water treatment controls are necessary in urban watersheds of impaired streams because proposed storm water sources in urban and urbanizing areas contribute to the further degradation of stream water quality.

Compliance with the Urban Impaired Stream Standard would minimize further degradation of stream water quality by limiting additional sources of sedimentation and other contaminants during construction and operation of future redevelopment. As noted in Section 3.11.1, Surface Water, Mere Brook is listed in Maine's 2008 Integrated Water Quality Monitoring and Assessment Report to the EPA under Section 303(d) of the CWA (2008 303[d] list) as being in non-attainment for the designated use of aquatic life use support due to low dissolved oxygen levels and excess nutrients. In addition, the unnamed tributary to the Androscoggin River (near Jordan Avenue) is also included on the 2008 303(d) list as being in non-attainment for the designated use of aquatic life use support. Therefore, controlling exposed sediment and other potential contaminants during construction and operation of future redevelopment within the watersheds of these two streams would be necessary to prevent further degradation of stream water quality.

Mitigation measures for redevelopment within the watersheds of Urban Impaired Streams may include paying a compensation fee, or treating, reducing, or elimi-

[2] Under Chapter 502 of Maine's Stormwater Management Law, a stream is considered impaired if it fails to meet water quality standards because of effects of storm water runoff from developed land. Additional storm water treatment controls are necessary in urban watersheds of impaired streams because proposed storm water sources in urban and urbanizing areas contribute to the further degradation of stream water quality.

nating an off-site or on-site pre-development impervious storm water source. If an existing impervious area is to be redeveloped, it may not be necessary to meet the Urban Impaired Stream Standard if the MEDEP determines that the new use of the existing impervious area is unlikely to increase impacts on the proposed project's storm water runoff above the levels already present in the runoff from the existing impervious area.

The developer will be required to implement best management practices (BMPs) during construction activities to control the release of storm water runoff from exposed construction sites. Post-construction BMPs also would be required to control the average annual load of total suspended solids in storm water runoff. If spillage of fuels or lubricating oils occurs, it would be cleaned up immediately by the removal and proper disposal of any contaminated soils pursuant to applicable regulatory requirements.

In addition, all future development would be required to undergo Town of Brunswick development review. As required by the Town of Brunswick Zoning Ordinance, development plans would be accompanied by a Storm Water Management Plan developed in accordance with the best management practices for stormwater management in Maine. Development plans would also be accompanied by an erosion and sedimentation control plan developed in accordance with best management practices. The Town may also require a facility impact analysis that addresses estimated impacts on the existing storm water management system, including flow and water quality (Town of Brunswick 2009a).

Disturbance of more than 1 acre of land would require adherence to the standards set forth in Maine's Stormwater Management Law (38 MRSA § 420-D) and the submittal of a Notice of Intent and an Erosion and Sediment Control Plan to the MEDEP. If demolition and construction activities under Alternative 1 were to disturb more than 1 acre, they would be subject to these requirements.

The potential also exists for soil contamination to occur as a result of spills or leaks of lubricants and fuels used in the construction process and during facility operation. Procedures to prevent spills and to respond to spills that occur would be included in the Storm Water Pollution Prevention Plan (SWPPP), which would be developed in compliance with a National Pollutant Discharge Elimination System (NPDES) permit for storm water discharges. The CWA, Section 402, established the NPDES to limit pollutant discharges into waterbodies, including streams and rivers. The NPDES program regulates storm water discharges from separate municipal storm sewer systems, construction activities, and industrial activities.

The existing NPDES Multi-sector General Permit for storm water discharges associated with industrial activites for NAS Brunswick was issued by MEDEP on October 11, 2005, and would have been eligible for renewal in October 2010. However, because airfield operations at NAS Brunswick have been terminated, the NDPES permit has been terminated and will not be renewed.

NPDES permits are non-transferrable and, due to the early termination of the existing permit, the developer will need to file for a new permit. This process includes filing a Notice of Intent for the General Permit and the completion of an associated SWPPP. The existing SWPPP can be obtained from NAS Brunswick and used to update the new permit application.

In addition to compliance with the regulations previously outlined in this section (i.e., Urban Impaired Stream Standard, Maine's Stormwater Management Law, and CWA, Section 202), future reuse would need to comply with the Natural Resources Protection Act (NRPA) and the Site Location of Development Act (SLDA). The SLDA requires a planning permit, which includes specific requirements for storm water management, as well as compliance with Chapter 500 Stormwater Management. The NRPA, SLDA, and other requirements are also discussed in Section 4.11 (Water Resources).

Section 438 of the Energy Independence and Security Act (EISA) of 2007

Land cover changes that result from development include increased imperviousness, soil compaction, loss of vegetation, and loss of natural drainage patterns, all of which result in increased runoff volumes and peak runoff rates. An increased volume of runoff results from conversion of pervious area to impervious area on which infiltration and evapotranspiration are decreased. Increasing the amount of impervious area results in storm water discharges with higher flow rates and an increased energy and velocity of these discharges which, in turn, results in increased peak flows of runoff. Detention systems designed to hold the storm water can generate greater flow volumes and rates. These higher discharge rates, which occur over longer periods of time, can be detrimental to the stability of stream channel systems. Lastly, impervious surfaces absorb and store heat and can transfer that heat to storm water runoff, which can have negative impacts on receiving streams.

Under Section 438 of the Energy Independence and Security Act of 2007, federal agencies have new requirements to reduce storm water runoff from federal development and redevelopment projects exceeding 5,000 square feet, in order to protect water resources from the negative effects of higher flows, increased temperature of runoff, and other impacts. Federal agencies can comply using a variety of storm water management practices, commonly referred to as "green infrastructure (GI)" or "low-impact development (LID)" practices. The goal is for the development/redevelopment projects to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with respect to temperature, rate, volume, and duration of flow.

The GI/LID management approaches and technologies that can be used by federal agencies generally enhance or serve to mimic the natural hydrologic cycle process of infiltration and evapotransporation. GI/LID approaches include both biological and engineered systems, which include but are not limited to the following (EPA 2009a):

- Rain gardens
- Bioretention
- Infiltration planters
- Porous pavements
- Vegetated swales and bioswales
- Green roofs
- Trees and tree boxes
- Pocket wetlands
- Reforestation/revegetation using native plants
- Protection and enhancement of riparian buffers and floodplains
- Rainwater harvesting for use

In accordance with Executive Order (EO) 13514, "Federal Leadership in Environmental, Energy, and Economic Performance," signed on October 5, 2009, federal agencies are to lead by example in the areas of clean energy and safeguarding the health of our environment. EO 13514 sets as policy that federal agencies shall "…conserve and protect water resources through efficiency, reuse, and storm water management." The EO also specifically requires the EPA to issue guidance on the implementation of Section 438 of EISA. The EPA therefore issued *Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act* (EPA 2009a). This technical guidance focuses on designing, implementing, and maintaining storm water practices. It sets forth two options for meeting the performance objective of preserving or restoring the hydrology of the site during the development/redevelopment process. Under Option 1, Retaining the 95th Percentile Rainfall Event, to manage rainfall on site and prevent the off-site discharge of storm water from all rainfall events less than or equal to the 95th percentile rainfall event. (A 95th percentile rainfall event is an event whose precipitation total is greater than or equal to 95 percent of all storm events over a given period of record.) Under Option 2, Site-specific Hydrologic Analysis, a site-specific hydrologic analysis is used to determine pre-development runoff conditions instead of using the estimated volume approach under Option 1. Under Option 2, pre-development hydrology is determined based on site-specific conditions and local meteorology by using continuous simulation modeling techniques, published data, studies, or other established tools (EPA 2009a). The GI/LID practices listed above can be used under Options 1 or 2.

Section 438 applies to the "sponsor of any development or redevelopment project involving a Federal facility…." The act of transferring the installation per BRAC law will result in the property being no longer federally owned; consequently, Section 438 would not apply to the redevelopment of the installation. However, as outlined in MRRA's *Community Design Guidelines Summary*, the implementation of sustainable development strategies, smart-growth principles, and other best management practice would result in low-impact development and minimization of storm water runoff impacts (MRRA 2010). Thus, although not required through federal ownership of the property, it is expected that the redevelopment of the installation would be consistent with the terms contained within Section 438 of the EISA.

Storm Water System

The existing storm water collection system may require modifications, depending on the amount of redevelopment and project phases. Although a portion of existing structures and built areas would be reused, new storm water infrastructure may be necessary to offset new impervious surfaces associated with redevelopment under this alternative.

The entity responsible for implementing any storm water system improvements has not yet been determined and funding for these improvements has not been secured. Upon disposal of the federally owned and maintained property, the party responsible for making the system improvements would need to be identified. If the developer is deemed responsible for upgrading the infrastructure, a revenue source to fund these services would need to be identified and secured by the developer.

Management

Under Alternative 1, any property not transferred to other federal agencies would no longer be owned or managed by the federal government. Upon completion of the BRAC disposal process, the future property owner or the Town of Brunswick would be responsible for the storm water infrastructure located on the property and for its service and maintenance. Ownership and management of the installation's storm water system after disposal has not yet been determined. The ownership and management of the system would need to be determined upon disposal of the installation.

4.8.1.4 Other Utility Systems

Electric

Ownership of the electric power distribution system on NAS Brunswick would transfer to the Central Maine Power Company following disposal of the installation. Prior to transfer, the Central Maine Power Company would identify any improvements required to bring the distribution system up to local standards. The Central Maine Power Company would also identify any additional regulatory and operational considerations that would need to be addressed prior to transfer (BLRA 2007a).

Upon redevelopment under Alternative 1, the electric power distribution system on the installation may need to be either expanded or relocated to accommodate the final design at full build-out. Estimates of future electricity usage were calculated for the 5-year (2016) and 20-year (2031) phases of the build-out scenario as proposed under Alternative 1 using U.S averages for energy use per square foot, obtained from the U.S. Department of Energy's Energy Information Agency (EIA) for specific types of building use. These averages were used to estimate total energy use by the proposed new building spaces. The same assumptions were applied in Section 4.6, Air Quality.

Under Alternative 1, it is anticipated that, at the 5-year phase of build-out (2016), the development would require 22,209,213 kWh of electricity, which is a 9% decrease from what NAS Brunswick used in electricity in 2008 (24,523,440 kWh).

At the 20-year phase of build-out (2031), it is anticipated that the development would require 156,417,298 kWh of electricity, which would be a 538% increase in electricity usage. Thus, electricity usage under Alternative 1 at the 5-year phase would be comparable to the electricity usage of NAS Brunswick in 2008 and would not require significant upgrades but, depending on final design, may require alterations or moving of lines to accommodate construction. However, at full-build out of Alternative 1 (2031), there would be a significant increase in electricity usage, which would require expansion of the existing infrastructure to accommodate the increased capacity requirements. Without knowing the final design, it is not possible to determine the degree or location of these improvements or the cost of any such expansion and/or relocation. The phased nature of the development would allow the electricity infrastructure to grow in accordance with the needs of the development.

Natural Gas

Redevelopment under Alternative 1 may require the expansion or relocation of natural gas lines on the installation to accommodate the final design at full build-out. Similar to electricity usage, estimates of future natural gas usage were calculated for the 5-year (2016) and 20-year (2031) phases of the build-out scenario as proposed under Alternative 1 using U.S averages for natural gas use per square foot, which were obtained from the U.S. Department of Energy's Energy Information Agency (EIA) for specific types of building use. These averages were used to estimate total natural gas use by the proposed new building spaces. The same assumptions were applied in Section 4.6, Air Quality. It should be noted that a portion of the building spaces are assumed to be heated with fuel oil.

Under Alternative 1, it is anticipated that, at the 5-year phase of the build-out (2016), the development would require 754,165 ccf (hundred cubic feet) of natural gas, which represents a 34% decrease from what NAS Brunswick used in natural gas in 2008 (1,142,117 ccf). At the 20-year phase of build-out (2031), it is anticipated that the development would require 4,967,771 ccf of natural gas, which would be a 335% increase in natural gas usage. Thus, natural gas usage at the 5-year phase of Alternative 1 would be comparable to the usage of natural gas at NAS Brunswick in 2008 and would not require significant upgrades but, depending on final design, may require alterations or moving of lines to accommodate construction. However, under the 20-year full build-out of Alternative 1 (2031), there would be a significant increase in natural gas usage, which would require expansion of the existing infrastructure to accommodate the increased capacity requirements. Without knowing the final design, it is not possible to determine the degree or location of these improvements or the cost of any such expansion and/or relocation. The phased nature of the development would allow the natural gas infrastructure to grow in accordance with the needs of the development.

Natural gas meters may need to be assigned to each new facility so that individual customers can be tracked and billed. However, without knowing the final design, it is not possible to determine the extent and cost of such expansion and relocation.

4.8.2 Alternative 2

4.8.2.1 Water Supply

Potential impacts on water supply resources under Alternative 2 would be similar to those described under Alternative 1. Implementation of Alternative 2 would not be expected to have a significant impact on the regional water supply system. However, the BTWD's safe pumping capacity would be exceeded by approximately 70,000 gpd upon full build-out of Alternative 2, requiring an expansion of the water supply pumping capacity. In addition, upon disposal of the installation, ownership and the entity responsible for managing and operating the installation's future water infrastructure would need to be identified.

Water Demand

Water demand at full build-out of Alternative 2 would be approximately 2.85 million gpd. This exceeds the existing (2008) baseline condition (209,000 gpd). In addition, it would be expected that Alternative 2 would generate water demands for fire protection and irrigation for general landscaping, recreational fields, and the expanded golf course.

As with Alternative 1, projections were estimated using generic planning multipliers. For more information on the methodology, assumptions, and multipliers used to project water demand, see Appendix N. Table 4.8-3 identifies the projected water demand resulting from the implementation of Alternative 2.

Table 4.8-3 Alternative 2 – Projected Water Demand (gpd)

	Existing Baseline Condition (2008)	5 Years (2016)	10 Years (2021)	15 Years (2026)	20 Years (2031)
Projected Water Demand	209,000	385,556	896,505	1,562,213	2,854,700
Net Change	NA	+176,556	+687,505	+1,353,213	+2,645,700

Note:
[1] This table presents a summary of the projected water demand. For descriptions of methodology and assumptions and detailed tables used to project water demand, see Appendix N.

Key:
NA = Not applicable.

Implementation of Alternative 2 would not be expected to have a significant impact on the future capacity of the BTWD. The average water flow of the BTWD during 2008 was 1.8 million gpd. The BTWD projects that demand (excluding demand from the installation) would increase to approximately 2.22 million gpd by 2030 (Frasier 2009). The existing water supply system currently has a 'safe pumping capacity' to provide 4.80 million gpd, resulting in the capacity to increase daily flows by up to 2.58 million gpd (Frasier 2009). In the short term, there is sufficient capacity to safely meet the projected demand for water resulting from Alternative 2. However, full build-out of Alternative 2 would result in a projected demand of approximately 2.85 million gpd (a net increase of approximately 2.65 million gpd of water over baseline (2008) conditions). Water demand resulting from full build-out would exceed the district's safe pumping capacity by approximately 70,000 gpd. Therefore, full build-out would require an expansion of existing resources.

As indicated previously under Alternative 1, any water supply demand impacts would be expected to be reduced since any redevelopment of the installation would require the review and/or approval of the Town of Brunswick. Before approving a project, the Town of Brunswick Planning Board may require the developer to estimate potential impacts on the water system, including changes in flow rate, capacity, and water pressure. In addition, full build-out of the installation is projected to occur incrementally over a 20-year period. Therefore, any expansion in the demand for water would not occur at once, and the BTWD, as the local utility service provider, would be expected upgrade and/or expand its distribution system as needed to meet any increases in service demand.

Distribution System

As identified under Alternative 1, redevelopment of the installation would require upgrading and expansion of the existing water supply infrastructure to meet BTWD and Town of Brunswick standards.

The entity responsible for implementing any water distribution system improvements has not been determined, and funding for these improvements has not been secured. Upon disposal of the federally owned and maintained property, the party responsible for making the water supply infrastructure improvements would need to be identified. In addition, the design and installation of any new water supply infrastructure would require, if applicable, municipal review and approval and would need to comply with applicable local codes, ordinances, or regulations.

Operation and Management

Under the proposed action, any property not transferred to other federal agencies would no longer be owned or managed by the federal government. Upon completion of the BRAC disposal process, the future property owner and/or local utility provider would be responsible for the infrastructure located on the property and for its service and maintenance. Following the disposal of NAS Brunswick and the McKeen Street Housing Annex, the BTWD would be expected to continue to supply water to these properties. However, the entity responsible for management of the installation's water distribution system after disposal has not yet been determined.

4.8.2.2 Wastewater

Implementation of Alternative 2 would be expected to have an adverse impact on the municipal wastewater system. The existing BTWD system does not have sufficient capacity to meet future wastewater flows that would result from full build-out of Alternative 2. In addition, upon disposal of the installation, ownership and the entity responsible for managing and operating the installation's wastewater infrastructure will need to be identified.

Wastewater Volume

Full build-out of Alternative 2 would result in a denser built environment (i.e., higher intensity of residential and non-residential development) than currently exists on the installation or as proposed under Alternative 1. Based on the increased density of development, it would be expected that Alternative 2 would

generate wastewater flows of approximately 2.60 million gpd at full build-out. This is in excess of the 328,652 gpd generated by the installation in 2008.

As with Alternative 1, wastewater flow projections were estimated using generic planning multipliers. Table 4.8-4 identifies the projected wastewater flows that would result from the implementation of Alternative 2.

Table 4.8-4 Alternative 2 – Summary of Projected Wastewater Volume (gpd)

	Existing Baseline Condition (2008)	5 Years (2016)	10 Years (2021)	15 Years (2026)	20 Years (2031)
Projected Wastewater	328,652	351,573	817,492	1,421,654	2,597,382
Net Change	NA	+22,921	+488,840	+1,093,002	+2,268,730

Note:
[1] This table presents a summary of the wastewater projections. For descriptions of the methodology and assumptions and the detailed tables used to project wastewater volumes, see Appendix N.

Key:
NA = Not applicable.

The wastewater flows resulting from the full build-out of Alternative 2 would be expected to have an adverse impact on the future processing and infrastructure capacity of the Brunswick Sewer District. Currently, the Brunswick Sewer District has the capacity to process only an additional 90,000 gpd district-wide before exceeding their sensitivity level (approximately 80% capacity) of 3.08 million gpd. Permitted processing capacity would allow for an additional 860,000 gpd district-wide before exceeding their permitted processing capacity of 3.85 million gpd. The district treatment plant would have the capacity to meet the projected wastewater resulting from Alternative 2 up to 2016, when there would be a net increase of 22,921 gpd. However, Alternative 2 is projected to generate net increases of 488,840 gpd by 2021, 1.09 million gpd by 2026, and 2.29 million gpd by 2031. At full build-out, the wastewater generated by Alternative 2 would exceed the Brunswick Sewer District's sensitivity level capacity by 2.18 million gpd and its maximum permitted capacity by 1.41 million gpd. Furthermore, wastewater flows originating from the NAS Brunswick property would exceed the capacity of the Brunswick Sewer Districts intake infrastructure, including the property's wastewater flow meter (maximum capacity of 450,432 gpd) and the Cooks Corner pump station (maximum capacity of 768,000 gpd). Sewer infrastructure surrounding the McKeen Street would be expected to have the capacity to handle future wastewater flows since future land use is not expected to change from existing uses.

In order to meet the projected wastewater flows and to provide for other projects district wide, it would be expected that an expansion of district's processing capacity and intake infrastructure would be needed upon the implementation of Alternative 2. However, any capacity impacts resulting from the implementation of Alternative 2 could be reduced since any redevelopment of the installation would require the review and/or approval of the Town of Brunswick. Before approving a project, the Town of Brunswick Planning Board may require the developer to estimate potential impacts on the water system, including changes in flow rate, capacity, and water pressure. In addition, full build-out of the installation is pro-

jected to occur incrementally over a 20-year period. Therefore, any increase in wastewater flows would not occur at once, and the Brunswick Sewer District, as the local utility service provider, would be expected to upgrade and/or expand its distribution system as needed to meet any increases in service demand.

Wastewater System

As identified under Alternative 1, redevelopment of the installation would require the upgrading and expansion of the existing NAS Brunswick wastewater infrastructure to meet Brunswick Sewer District and Town of Brunswick standards.

The entity responsible for implementing any system improvements has not been determined, and funding for these improvements has not been secured. Upon disposal of the federally owned and maintained property, the party responsible for making the wastewater infrastructure improvements would need to be identified. In addition, the design and installation of any new infrastructure would require, if applicable, municipal review and approval and would need to comply with applicable local codes, ordinances, and regulations.

Operation and Management

Under Alternative 2, any property not transferred to other federal agencies would no longer be owned or managed by the federal government. Upon completion of the BRAC disposal process, the future property owner, the Town of Brunswick, or the Brunswick Sewer District would be responsible for the wastewater infrastructure located on the property and for its service and maintenance. The ownership and management of the installation's wastewater system after disposal of the property has not yet been determined. The ownership and management of the wastewater system on the installation will need to be determined prior to the disposal and reuse of the installation.

4.8.2.3 Storm Water

The potential storm water impacts under Alternative 2 would be similar to those described under Alternative 1. In addition to the impervious surface area that already exists, it is assumed that full build-out would result in the construction of buildings, structures, roadways, parking lots, and other impervious surface areas. However, this alternative does not include reuse of the existing airfield, which it is assumed would be removed. Specific project plans and details have not yet been developed. Full build-out of Alternative 2 is projected to result in a total of 944 acres of impervious surface area (approximately 30%), which would be predominantly comprised of building roofs, parking, and roadways. This would be an addition of approximately 428 acres to the existing (2008) baseline conditions of 516 acres of impervious surface (16% of the total land area). Thus, the net change from existing to full build-out under Alternative 2 would be approximately a 14% increase (30% - 16% = 14%). For more information on the methodology, assumptions, and calculations used to project the impervious surface area resulting from implementation of Alternative 2, see Appendix N.

Full build-out of Alternative 2 would not be expected to have a significant impact on storm water resources. The majority of the proposed redevelopment and resulting impervious surface area would be concentrated in the following land use

districts: professional office, community mixed use, business and technology industries, education, and residential. The locations of the above-listed land use districts (see Figure 4.1-6) were proposed in areas that have been previously developed by the Navy. Impervious surface area resulting from Alternative 2 would cover approximately 944 acres of this area, or 30% of the 3,200-acre installation. The remaining 70% of the installation's land area, including areas of the installation designated as natural areas, recreational areas, and open space, would be comprised mostly of non-impervious surfaces (e.g., lawns, woodlands, etc.).

Under Alternative 2, a 0.6-mile-long segment of Mere Brook would be restored and incorporated into the natural areas land use district. This segment of the stream currently flows through culverts under the runways and, through restoration, fish passage is likely to be facilitated.

Any storm water impacts resulting from implementation of Alternative 2 would be reduced through the implementation of storm water management practices required by local and state regulations. The town of Brunswick would require the developer to prepare a storm water management plan for the entire developed reuse area. This plan would be developed using a watershed approach, rather than a site-by-site approach. The storm water management plan will describe measures to control the volume and quality of storm water runoff in a manner consistent with MEDEP storm water management policy. The plan could include measures to mitigate other impacts, including restricted passage for fish due to construction and operation of storm water infrastructure. Impacts on aquatic organisms inhabiting waterbodies in the developed reuse area are discussed in Section 4.12.2.2.

The storm water management plan would be required to include measures to comply with the Urban Impaired Stream Standard listed in Chapter 500 of Maine's Stormwater Management Law (06-096 CMR Chapter 500, Section 4(D)) for development within the watersheds of Mere Brook and the unnamed tributary of the Androscoggin River near Jordan Avenue. Mitigation measures for redevelopment within the watersheds of Urban Impaired Streams may include paying a compensation fee, or treating, reducing, or eliminating an off-site or on-site predevelopment impervious storm water source. If an existing impervious area is to be redeveloped, it may not be necessary to meet the Urban Impaired Stream Standard if the MEDEP determines that the new use of the existing impervious area is unlikely to increase impacts on the proposed project's storm water runoff above the levels already present in the runoff from the existing impervious area.

The developer will also be required to implement BMPs during construction activities to control the release of storm water runoff from exposed construction sites. Post-construction BMPs also would be required to control the average annual load of total suspended solids in storm water runoff. If spillage of fuels or lubricating oils occurs, it would be cleaned up immediately by the removal and proper disposal of any contaminated soils pursuant to applicable regulatory requirements.

In addition, all future development would be required to undergo Town of Brunswick development review. As required by the Town of Brunswick Zoning

Ordinance, development plans would be accompanied by a Storm Water Management Plan developed in accordance with the best management practices for stormwater management in Maine. Development plans would also be accompanied by an erosion and sedimentation control plan developed in accordance with best management practices. The Town may also require a facility impact analysis that addresses estimated impacts on the existing storm water management system, including flow and water quality (Town of Brunswick 2009a).

Disturbance of more than 1 acre of land would require adherence to the standards set forth in Maine's Stormwater Management Law (38 MRSA § 420-D) and the submittal of a Notice of Intent and an Erosion and Sediment Control Plan to the MEDEP. If demolition and construction activities under Alternative 2 were to disturb more than 1 acre, they would be subject to these requirements.

The potential also exists for soil contamination to occur as a result of spills or leaks of lubricants and fuels used in the construction process and during facility operation. Procedures to prevent spills and to respond to spills that occur would be included in the SWPPP, which would be developed in compliance with an NPDES permit for storm water discharges. The CWA, Section 402, established the NPDES to limit pollutant discharges into waterbodies, including streams and rivers. The NPDES program regulates storm water discharges from separate municipal storm sewer systems, construction activities, and industrial activities.

As discussed under Alternative 1, the existing NPDES Multi-sector General Permit for storm water discharges associated with industrial activites for NAS Brunswick was issued by MEDEP on October 11, 2005, and would have been eligible for renewal in October 2010. However, because airfield operations at NAS Brunswick have been terminated, the NDPES permit has been terminated and will not be renewed.

NPDES permits are non-transferrable, and due to the early termination of the existing permit, the developer will need to file for a new permit. This process will include filing a Notice of Intent for the General Permit and the completion of an associated SWPPP. The existing SWPPP can be obtained from NAS Brunswick and used to update the new permit application.

In addition to compliance with the regulations previously outlined in this section (i.e., Urban Impaired Stream Standard, Maine's Stormwater Management Law, and CWA, Section 202), future reuse would need to comply with the NRPA and SLDA. The SLDA requires a planning permit, which includes specific requirements for storm water management, as well as compliance with Chapter 500 Stormwater Management. The NRPA, SLDA, and other requirements are also discussed in Section 4.11 (Water Resources).

Section 438 of the Energy Independence and Security Act of 2007

Similar to Alternative 1, the developer would not be subject to the requirements of Section 438, because the act of transferring the installation per BRAC law will result in the property no longer being federally owned; consequently, Section 438 would not apply to the redevelopment of the installation. However, as outlined in

MRRA's *Community Design Guidelines Summary*, the implementation of sustainable development strategies, smart-growth principles, and other best management practice would result in low-impact development and minimization of stormwater runoff impacts (MRRA 2010). Thus, although not required through federal ownership of the property, it is expected that the redevelopment of the installation would be consistent with the terms contained within Section 438 of the EISA.

Storm Water System

The existing storm water collection system may require modifications, depending on the amount of redevelopment and project phases. Although a portion of existing structures and built areas would be reused, new storm water infrastructure may be necessary to offset new impervious surfaces associated with redevelopment under this alternative.

The entity responsible for implementing any storm water system improvements has not yet been determined, and funding for these improvements has not been secured. Upon disposal of the federally owned and maintained property, the party responsible for making the system improvements would need to be identified. If the developer is deemed responsible for upgrading the infrastructure, a revenue source to fund these services would need to be identified and secured by the developer.

Management

Under the proposed action, any property not transferred to other federal agencies would no longer be owned or managed by the federal government. Upon completion of the BRAC disposal process, the future property owner or the Town of Brunswick would be responsible for the storm water infrastructure located on the property and for its service and maintenance. Ownership and management of the installation's storm water system after disposal has not yet been determined. The ownership and management of the system would need to be determined before disposal and reuse of the installation.

4.8.2.4 Other Utility Systems

Electric

Ownership of the electric power distribution system on NAS Brunswick would transfer to the Central Maine Power Company following disposal of the installation. Prior to transfer, the Central Maine Power Company would identify any improvements required to bring the distribution system up to local standards. The Central Maine Power Company would also identify any additional regulatory and operational considerations that would need to be addressed prior to transfer (BLRA 2007a).

Upon redevelopment under Alternative 2, the electric power distribution system on the installation may need to be either expanded or relocated to accommodate the final design at full build-out. Estimates of future electric usage were calculated for the 5-year (2016) and 20-year (2031) phases of the build-out scenario as proposed under Alternative 2 using U.S averages for energy use per square foot,

which were obtained from the U.S. Department of Energy's Energy Information Agency (EIA) for specific types of building use. These averages were used to estimate total energy use by the proposed new building spaces. The same assumptions were applied in Section 4.6, Air Quality.

Under Alternative 2, it is anticipated that, at the 5-year phase of build-out (2016), the development would require 33,514,279 kWh of electricity, which is a 37% increase from what NAS Brunswick used in electricity in 2008 (24,523,440 kWh). At the 20-year phase of build-out (2031), it is anticipated that the development would require 207,889,113 kWh of electricity, which would be a 748% increase in electricity usage. Thus, electricity usage under Alternative 2 at the 5-year phase may require upgrades to the existing electricity infrastructure, and depending on final design, may require alterations or moving of lines to accommodate construction. Under the 20-year, full build-out of Alternative 2, there would be a significant increase in electricity usage, which would require expansion of the existing infrastructure to accommodate the increased capacity requirements. Without knowing the final design, it is not possible to determine the degree or location of these improvements or the cost of any such expansion and/or relocation. The phased nature of the development would allow the electricity infrastructure to grow in accordance with the needs of the development.

Natural Gas

Redevelopment under Alternative 2 may require the expansion or relocation of natural gas lines on the installation to accommodate the final design at full build-out. Similar to electricity usage, estimates of future natural gas usage were calculated for the 5-year (2016) and 20-year (2031) phases of the build-out scenario as proposed under Alternative 2 using U.S averages for natural gas use per square foot, which were obtained from the U.S. Department of Energy's Energy Information Agency (EIA) for specific types of building use. These averages were used to estimate total natural gas use by the proposed new building spaces. The same assumptions were applied in Section 4.6, Air Quality. It should be noted that a portion of the building spaces are assumed to be heated with fuel oil.

Under Alternative 2, it is anticipated that, at the 5-year phase of the build-out (2016), the development would require 1,016,174 ccf of natural gas, which represents an 11% decrease from what NAS Brunswick used in natural gas in 2008 (1,142,117 ccf). At the 20-year phase of the build-out (2031), it is anticipated that the development would require 7,437,542 ccf of natural gas, which would be a 551% increase in natural gas usage. Thus, natural gas usage under Alternative 2 at the 5-year phase of Alternative 2 would be comparable to the usage of natural gas at NAS Brunswick in 2008 and would not require significant upgrades, but, depending on final design, may require alterations or moving of lines to accommodate construction. However, under the 20-year, full-buildout of Alternative 2, there would be a significant increase in natural gas usage, which would require expansion of the existing infrastructure to accommodate the increased capacity requirements. Without knowing the final design, it is not possible to determine the degree or location of these improvements or the cost of any such expansion and/or relocation. The phased nature of the development would allow the natural gas infrastructure to grow in accordance with the needs of the development.

Natural gas meters may need to be assigned to each new facility so that individual customers can be tracked and billed. However, without knowing the final design, it is not possible to determine the extent and cost of such expansion and relocation.

4.8.3 No-Action Alternative

No reuse or redevelopment would occur at the installation under the No-Action Alternative; however, the PPV residential housing would continue to be occupied under the current PPV lease agreement.

4.8.3.1 Water Supply

Implementation of the No-Action Alternative would be expected to have no significant impact on the municipal water supply system.

4.8.3.2 Wastewater

Implementation of the No-Action Alternative would be expected to have no significant impact. Under the No-Action Alternative, there would be minimal demand for utilities since the majority of the installation would be closed and in caretaker status.

4.8.3.3 Storm Water

Under the No-Action Alternative, no new impervious surface would be created. Therefore, there would be no impacts on storm water.

4.8.3.4 Other Utilities

Under the No-Action Alternative, there would be minimal demand for utilities since the majority of the installation would be closed and in caretaker status.

4.9 Cultural Resources

The effects on historic properties listed or eligible for listing in the NRHP were evaluated with respect to the Criteria of Adverse Effect pursuant to 36 CFR 800.5(a)(1) (see Table 4.9-1). The Navy has determined that the proposed action would have an adverse effect on NRHP-eligible properties. As a result, the Navy initiated consultation with the Maine SHPO pursuant to Section 106 of the NHPA and cooperatively finalized and executed a *Programmatic Agreement (PA), Between the United State Navy and the Maine State Historic Preservation Officer (SHPO) on the Lease and Property Transfer of Properties Located at Naval Air Station Brunswick, Maine and Topsham Annex, Topsham, Maine*, that identifies measures to avoid, reduce, or mitigate the adverse effects of the proposed action on historic properties (see Appendix O).

Table 4.9-1 Criteria of Adverse Effects

"An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of an historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of an historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative" (36 CFR 800.5(a)(1)).
Examples of Adverse Effects
Adverse effects on historic properties include but are not limited to: 1. Physical destruction of or damage to all or part of the property. 2. Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR 68) and applicable guidelines. 3. Removal of the property from its historic location. 4. Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance. 5. Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features. 6. Neglect of a property that causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization. 7. Transfer, lease, or sale of property out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance" (36 CFR 800.5(a)(2)).

The Navy also initiated consultation with the Advisory Council on Historic Preservation (ACHP), Aroostook Band of Micmac Indians of Maine, Houlton Band of Maliseet Indians of Maine, Indian Township Reservation of the Passamaquoddy Tribe of Maine, Penobscot Tribe of Maine, the Pleasant Point Reservation of the Passamaquoddy Tribe of Maine, the Pejepscot Historical Society, and the Town of Brunswick. Results of consultation with these parties are summarized below. Section 106 consultation responses are included in Appendix B.

The ACHP received the Navy's notification and supporting documentation regarding the proposed action and the PA and determined that the ACHP does not need to participate further in the Section 106 process unless otherwise requested (US Navy 2010). In accordance with 36 CFR 800.6(b)(1)(iv), the Navy will file the executed PA and related documentation, developed in consultation with the

Maine SHPO and any other consulting parties, with the ACHP at the conclusion of the consultation process to complete the requirements of NHPA Section 106.

The Aroostook Band of Micmac Indians of Maine, Houlton Band of Maliseet Indians of Maine, Indian Township Reservation of the Passamaquoddy Tribe of Maine, Penobscot Tribe of Maine, and the Pleasant Point Reservation of the Passamaquoddy Tribe of Maine received the Navy's letters of notification and supporting documentation regarding the proposed action and PA on January 26, 2010 (see Appendix B). To date, the Tribal Historic Preservation Office for the Penobscot Tribe of Maine is the only respondent to the Navy's consultation efforts with Native American tribes. On March 12, 2010, the Navy responded to the request that the Penobscot Tribe of Maine receive a copy of the final survey reports (Preston 2010).

The Pejepscot Historical Society and the Town of Brunswick received the Navy's notification and supporting documentation regarding the proposed action and PA during a Section 106 consultation meeting held on August 4, 2010. The Pejepscot Historical Society and the Town of Brunswick had no comments on the proposed scope of work and requested to receive a copy of the final survey reports.

4.9.1 Alternative 1 (Preferred Alternative)

The U.S. Navy has determined that disposal and subsequent redevelopment of the property has the potential to result in direct and indirect impacts on cultural resources, including archaeological and architectural resources and cultural resources identified as historic properties (Drozd 2008). These potential direct and indirect impacts on cultural resources include the loss of federal protection due to changes in ownership from a federal to a private entity; potential destruction of archaeological resources as a result of redevelopment; potential demolition of architectural resources as a result of redevelopment; and changes to the setting of cultural resources that are outside of, but in the vicinity of, areas of redevelopment.

The U.S. Navy has initiated consultation with the Maine SHPO to identify the potential impacts on cultural resources and measures to avoid, reduce, or mitigate adverse effects on historic properties. The results of the consultations are discussed below and are included in the *PA Between the United State Navy and the Maine State Historic Preservation Officer (SHPO) on the Lease and Property Transfer of Properties Located at Naval Air Station Brunswick, Maine and Topsham Annex, Topsham, Maine* (U.S. Navy 2010) (see Appendix O).

As discussed previously, a Section 4(f) analysis would not be required as part of this environmental review. As noted in Section 1.8 (Regulatory Framework), Section 4(f) refers to the original section within the U.S. Department of Transportation Act of 1966 that established the requirement for consideration of park and recreational lands, wildlife and waterfowl refuges, and historic sites in transportation project development. Section 4(f) would apply only if Alternative 1 were selected, as the FAA approval of an Airport Layout Plan would trigger a Section 4(f) determination.

The airfield at NAS Brunswick currently exists; therefore, no construction is anticipated that would physically impact 4(f) resources. However, noise impacts within the 65 DNL contour may result in constructive use impacts on 4(f) properties. To determine the number and locations of Section 4(f) resources potentially impacted by noise from the proposed public airfield, a survey was conducted that included potential 4(f) properties within the projected 65 DNL contour associated with Alternative 1. Based on the results of the survey, no potential Section 4(f) properties are located or anticipated within the 65 DNL contour associated with Alternative 1. Therefore, no direct or indirect impacts on 4(f) resources would occur. Section 4(f) will not be analyzed further in this cultural resources section.

4.9.1.1 Archaeological Resources

As described in Section 3.9.1.1, the Navy initiated comprehensive archaeological identification surveys, the findings of which are presented in *Comprehensive Archaeological Identification Survey at NAS Brunswick, Brunswick, Maine* dated February 2010 (SEARCH 2010a) and *Modification 01: Comprehensive Archaeological Identification Survey at NAS Brunswick, Brunswick, Maine* dated June 2010 (SEARCH 2010c). The comprehensive archaeological identification surveys included the main NAS Brunswick property, the East Brunswick Radio Transmitter Site, and the Sabino Hill Rake Station. The McKeen Street Housing Annex was not included in these surveys based on findings in previous surveys, which indicated a low sensitivity for archaeological resources (LBA 1996). The project included Phase I archaeological surveys at 29 Areas of Prehistoric Archaeological Sensitivity (ASAs) and at 44 Areas of Historic Sensitivity (HSAs) (SEARCH 2010a,c). All 73 archaeologically sensitive areas are within the boundaries of the main NAS Brunswick property. The final reports conform to the SHPO's requirements for archaeological survey projects in Maine.

The combined efforts of these surveys resulted in the recordation of 35 archaeological sites (19 prehistoric and 16 historic), 27 of which were recommended for Phase II archaeological evaluation for NRHP eligibility as per Maine guidelines (SEARCH 2010a,c). The Maine SHPO concurred with the recommended eligibility of these historic resources at NAS Brunswick (U.S. Navy 2010).

In accordance with Section 106 of the NHPA, the Navy has, in consultation with the Maine SHPO, developed specific measures to avoid, reduce, or mitigate any direct or indirect impacts on cultural resources and any adverse effects on historic properties. Mitigation measures for archaeologically sensitive properties are discussed in the PA (see Appendix O) and are summarized below:

- Per Stipulation B of the PA, due to the potential adverse effect on identified archaeological sites or historic resources from the disposal and reuse of these properties, property recipients shall be required to contact the SHPO prior to any development that may affect these sites. Mitigation for any adverse effect resulting from the development will be negotiated between the developer and the Maine SHPO (U.S. Navy 2010).

- Per Stipulation C of the PA, in order to ensure the further protection of the historic properties, covenants will be included in any long-term lease in fur-

therance of conveyance and/or deed of transfer by the Navy on which any archaeological sites or historic resources are located. The convenants provide for enforcement by either the Navy or the SHPO and shall be binding on all property recipients and future transferees (U.S. Navy 2010).

4.9.1.2 Architectural Resources

As described in Section 3.9.1.2, the Navy has conducted a comprehensive architectural survey update of the buildings and structures at NAS Brunswick, the findings of which are contained within *Historic Architecture Comprehensive Survey Update of Buildings and Structures at NAS Brunswick, Maine* dated May 2010 (SEARCH 2010b). This investigation is an update to the architectural survey and NRHP-eligibility evaluations conducted in 1996 (LBA 1996, 1999). As part of the surveys and assessments, the architectural resources within this historic context were evaluated to determine their eligibility for listing in the NRHP. The final report conforms to the SHPO's requirements for architectural survey projects in Maine.

The 2009 survey update identified 15 ammunition magazines that were recommended as eligible for listing in the NRHP under the 2006 Program Comment for World War II and Cold War Era (1939-1974) Ammunition Storage Facilities: Facilities 44, 63, 64, 285, 286, 287, 288, 289, 290, 291, 543, 544, 548, 549, and SEARCH-1 (SEARCH 2010b). Facilities 44, 63, and 64 were previously identified as NRHP-eligible in the 1996 survey. An additional five magazines (59, 60, 62, 71, and 626) not documented as part of the 2009 comprehensive architectural survey update were also recommended as eligible for listing in the NRHP under the 2006 Program Comment (SEARCH 2010b). The Maine SHPO concurs with the findings regarding the recommended eligibility of historic resources at NAS Brunswick (US Navy 2010).

Per the conditions of the 2006 Program Comment for World War II and Cold War Era (1939-1974) Ammunition Storage Facilities, these 20 NRHP-eligible facilities require no further compliance with Section 106 of the NHPA (SEARCH 2010b).

4.9.2 Alternative 2

The potential direct and indirect impacts of Alternative 2 on cultural resources, including archaeological and architectural resources, are identical to those identified for Alternative 1. The potential Section 106 effects of Alternative 2 on historic properties and the additional Section 106 consultation and mitigation required for any adverse effects on historic properties are also identical to those identified for Alternative 1.

4.9.3 No-Action Alternative

No reuse or redevelopment would occur under the No-Action Alternative. Structures currently owned and operated as PPV housing at the installation would continue to be maintained and utilized by private contractors. The remaining property and facilities would be placed in caretaker status by the U.S. Navy.

Under caretaker status, a military-procured contractor would perform maintenance of the remaining property and facilities. Systems would be operated at the minimum level required to sustain caretaker operations.

4.10 Topography, Geology, and Soils

This section summarizes the potential impacts on topography, geology, and soil resources resulting from the implementation of Alternative 1, Alternative 2, or the No Action Alternative. The study area includes NAS Brunswick and the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station.

4.10.1 Alternative 1 (Preferred Alternative)

The majority of proposed development would be located on approximately 1,630 acres of land, in areas that have already been developed by the Navy. Therefore, implementation of Alternative 1 would not be expected to result in significant long-term impacts on topography, geology, and soil resources. However, minor temporary impacts on these resources would be expected due to redevelopment of the property (e.g., construction of new buildings, roads, utilities).

4.10.1.1 Topography

Under Alternative 1, development would largely occur in areas that have already been developed by the Navy. These areas have either been previously graded for development or are generally flat (minimal topographic relief).

Some alteration of existing topography would be expected as a result of grading and associated cut-and–fill activities necessary to accommodate new building sites. The extent of grading and cut-and-fill activities would be localized and would depend on the building design and location. The alteration would also be spread out over the 20-year build-out duration.

The remaining portion of the installation, about 1,570 acres, would be dedicated to preserving open space and natural areas and providing a variety of active and passive recreation amenities. Only minimal topographic changes would be expected to occur within this land area as a result of the development of recreational amenities, including pedestrian trail ways, park benches, playgrounds, etc. As a result of previous development associated with the installation, preservation of natural areas, and the 20-year build-out duration, impacts on topography could be minor to moderate depending on the size of the redevelopment project.

4.10.1.2 Geology

Alternative 1 would not impact geologic resources at NAS Brunswick or the outlying properties.

4.10.1.3 Soils

The majority of redevelopment proposed under Alternative 1 would be concentrated on approximately 1,630 acres of land, in areas that have already been developed by the Navy. This area has already been built upon and contains numerous existing buildings and infrastructure. Because the urban/man-made soils lo-

cated within these areas have been highly modified from their original condition, implementation of Alternative 1 would not be expected to result in a significant impact on soils. However, based on the scale of development at full build-out, it would be expected that temporary and permanent minor to moderate impacts, depending on the size of the development projects, could occur over a 20-year build-out period as existing structures are demolished and new structures and supporting infrastructure is constructed.

Erosion Potential

All soil types located on the installation have the potential to be impacted by development, including erosion from wind, water, and construction activities. However, approximately 10% (297 acres) of the installation has soils that have a moderate potential for erosion due to their slopes. Less than 1% (22 acres) of the soils are steep enough to have a severe potential for erosion. To varying degrees, all such soils may require specific measures to control soil erosion and limit runoff of sediment during clearing and construction activities. In addition, construction activities (clearing, grading, landscaping, and movement of equipment, material, and vehicles) would expose soils to wind and storm water erosion, compaction, and rutting. Soils that are heavily modified may suffer losses in fertility and productivity.

Soils would be impacted during implementation of Alternative 1, but the impact would be mitigated through the implementation of temporary erosion and sediment control measures during construction, permanent storm water management measures, and appropriate building site location and design. Project construction would result in the removal of existing vegetation in some areas, requiring stabilization of slopes created by cutting and filling, and reestablishment of vegetation. If slope stabilization and vegetation are not properly implemented and maintained, soil erosion and sedimentation could result. Soils can be affected by sedimentation when soils from exposed areas are deposited over undisturbed areas following runoff events.

To mitigate these impacts, it is expected that the developer would implement appropriate erosion and sediment control measures at construction and demolition sites in accordance with Maine's Erosion and Sediment Control Law (38 MRSA § 420-C) and other applicable state laws. In addition, the MEDEP requires a Maine Construction General Permit for construction projects that disturb (i.e., clear, grade, or excavate) more than 1 acre of soil in a given watershed. Prior to approval of a Construction General Permit, the MEDEP requires submittal of an NOI and an Erosion and Sediment Control Plan (MEDEP 2003). The MEDEP provides descriptions of standard erosion control guidelines, or BMPs (e.g., silt fencing, seeding, sediment basins), that will be incorporated into the Erosion and Sediment Control Plan (MEDEP 2003).

Farmland

There are 34 acres of prime farmland and 1,068 acres of identified farmland of statewide importance on the installation. The majority of identified farmlands, including 726 acres (70%) of the identified farmland of statewide importance and 31 acres (91%) of prime farmland, would be located within the Recreation and

Open Space and Natural Area land use districts. Upon full build-out, the majority of this land area would remain undeveloped and would therefore not result in an impact on these soils. The remaining designated farmland soils would be located in areas identified for redevelopment. New construction could have impacts on these soils, depending on site location and design. However, no significant impact would be expected since the majority of this area has already been developed by the Navy. Reuse of the existing facilities on the installation would have no impact on soils designated as prime farmland or farmland of statewide importance.

The FPPA requires that federal actions identify and consider adverse effects on protected farmland. Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a federal agency or with assistance from a federal agency. Assistance from a federal agency includes:

- Acquiring or disposing of land
- Providing financing or loans
- Managing property
- Providing technical assistance

Farmland subject to FPPA requirements does not have to be currently used for crop production. Projects planned and completed without the assistance of a federal agency and projects on land already in urban development or used for water storage are not subject to the FPPA.

Currently, the site locations and details of individual projects associated with the implementation of Alternative 1 are unknown. Per the FPPA Rule, 7 CFR 658, for any individual projects that have received federal assistance, as defined by the FPPA, and that may result in adverse effects on prime farmland areas, the federal agency will make a request to the NRCS on Form AD–1006, the Farmland Conversion Impact Rating Form, available at NRCS offices, for a determination of whether the site is farmland subject to the FPPA. If neither the entire site nor any part of it are subject to the FPPA, then the FPPA will not apply and NRCS will notify the agency.

In cases where either a private party or a non-federal unit of government applies for federal assistance to convert farmland to a nonagricultural use, the federal agency will use the criteria set forth in the FPPA to identify and take into account any adverse effects on farmland of the assistance requested and develop alternative actions that would avoid or mitigate such adverse effects. If, after consideration of the adverse effects and suggested alternatives, the landowners want to proceed with conversion, the federal agency, on the basis of the analysis set forth in the FPPA and any agency policies or procedures for implementing the Act, may provide or deny the requested assistance. Only assistance and actions that would convert farmland to nonagricultural uses are subject to this Act. Assistance and

actions related to the purchase, maintenance, renovation, or replacement of existing structures and sites converted prior to the time of an application for assistance from a federal agency, including assistance and actions related to the construction of minor new ancillary structures (such as garages or sheds), are not subject to the Act.

The State of Maine and the Town of Brunswick do not currently regulate the use of prime or statewide important farmland (Yamartino 2009).

Hydric Soils

Approximately 20% (614 acres) of the installation soils can be classified as hydric. Hydric soils may be associated with wetlands that are subject to regulation by federal and/or state regulation. Reuse of the existing structures at the installation would have no impact on hydric soils. However, new construction under Alternative 1 could impact hydric soils. Hydric soils may require special measures during construction or other uses to overcome limitations caused by wetness. Limitations may include a high water table or low strength for supporting construction equipment and structures. Hydric soils may also present limitations to development activities (e.g., excavation and movement of heavy equipment) due to wet conditions. See Section 4.11 for more information on water resources.

Constructability

Nearly 70% (2,144 acres) of the installations soils are considered to have very limited constructability. However, because much of the area wherein those soils are located may be highly modified, it is not possible to determine the magnitude or severity of the limitations based on available information. In addition, some limitations may be easier and less costly to overcome than others.

Maine statutes (38 MRSA Article 6, Site Location of Development Act) require that proposed developments be constructed on soil types that are suitable for the type of development. It is expected that the developer would submit an application for approval to the MEDEP that will include a soil map indicating the soil types present on the proposed construction site and all major limitations to construction presented by the characteristics of soils on the site. The application will also include the techniques that would be used to overcome identified limitations. Appropriate engineering techniques will also be used to mitigate soil limitations before any construction begins.

4.10.2 Alternative 2

Implementation of Alternative 2 would result in minor temporary impacts on these resources due to redevelopment (e.g., construction of new buildings, roads, utilities). Similar to Alternative 1, the majority of proposed development would be located on approximately 1,580 acres of land, in areas that have already been developed by the Navy.

4.10.2.1 Topography

Alternative 2 would result in alterations to topography due to the grading, clearing, and filling associated with these additional structures and new/improved paved areas. In addition, with the airfield not being reused under this alternative,

the 8,000-foot runways would need to be removed. As a result of previous development, preservation of natural areas, and the 20-year build-out duration, impacts on topography could be minor to moderate depending on the size of the redevelopment project. The airfield removal would result in impacts to soils as a result of the extent of concrete removal, earthmoving equipment, regrading, and duration of this effort but would be partially offset with the use of BMPs.

4.10.2.2 Geology

Alternative 2 would not impact the geologic resources at NAS Brunswick or the outlying properties.

4.10.2.3 Soils

Implementation of Alternative 2 would be expected to have similar impacts on soils as described for Alternative 1, including impacts associated with erosion potential, hydric soils, and constructability. As with Alternative 1, the majority of proposed redevelopment (approximately 1,580 acres) would be concentrated in areas that have already been developed by the Navy. Of note, Alternative 2 does not include an aviation component. Under this alternative, the existing airfield and aircraft movement areas would be removed and the underlying land would be redeveloped. Land uses proposed for this area include residential, community mixed use, business and technology industries, and natural areas. Removal of the airfield would increase the total soil area and would eliminate a large portion of the existing impervious surface area on the installation.

The majority of identified farmlands, including 533 acres (50%) of the identified farmland of statewide importance and 29 acres (85%) of prime farmland, would be located within the Recreation and Open Space and Natural Area land use districts. Upon full build-out, the majority of this land area would remain undeveloped and would therefore not result in an impact on these soils. The remaining designated farmland soils would be located in areas identified for redevelopment. New construction could have impacts on these soils, depending on site location and design. However, no significant impact would be expected since the majority of this area has already been developed by the Navy. Reuse of the existing facilities on the installation would have no impact on soils designated as prime farmland or farmland of statewide importance.

Demolition and construction activities resulting from implementation of Alternative 2 would impact soils located within the boundary of NAS Brunswick and its outlying properties. However, based on the scale of development at full build-out, it would be expected that temporary and permanent minor to moderate impacts, depending on the size of the development projects, could occur over a 20-year build-out period as existing structures are demolished and new structures and supporting infrastructure is constructed. The airfield removal would result in impacts to soils as a result of the extent of concrete removal, earthmoving equipment, regrading, and duration of this effort but would be partially offset with the use of BMPs.

4.10.3 No-Action Alternative

Under the No-Action Alternative, NAS Brunswick, the McKeen Street Housing Annex, the East Brunswick Transmitter Site, and the Sabino Hill Rake Station would be retained by the U.S. government in caretaker status. No reuse or redevelopment of non-PPV property would occur at the installation under this alternative. As a result, the No-action Alternative would be expected to have no direct or indirect impacts on topography, geology, or soils.

4.11 Water Resources

This section summarizes the potential impacts on water resources from the implementation of Alternative 1, Alternative 2, and the No-Action Alternative. It includes an examination of potential impacts on surface waters, groundwater, floodplains, and wetlands from the disposal and future reuse of NAS Brunswick and the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station. The principal surface waters in the vicinity of NAS Brunswick include the Androscoggin River, Mere Brook and its tributaries, Harpswell Cove, and Buttermilk Cove. In addition, the installation includes approximately 389 acres of undeveloped wetlands. No surface water features are present on any of the outlying properties.

When evaluating the potential impacts of Alternatives 1 and 2 and the No-Action Alternative on water resources, the following assumptions were made:

- The developer would avoid or minimize impacts on waterbodies, wetlands, and floodplains to the maximum extent practicable when considering the locations of individual construction projects;
- The developer would apply for and receive applicable water quality and wetland permits, as necessary; and
- The developer/contractor would use BMPs to minimize water quality impacts during construction.

Upon completion of the BRAC disposal process under Alternatives 1 and 2, the properties not transferred to other federal agencies would fall under the jurisdiction of the local government in which they are located. Any future reuse of these properties will be required to comply with applicable local, state, and federal laws and regulations pertaining to water resources. Specifically, future reuse may need to comply with the following:

- The Clean Water Act (33 U.S.C. 1251, et seq.) (CWA) is the primary federal statute for the protection of surface water quality. The CWA designates water quality standards and establishes permitting and certification processes. Water quality standards are the foundation of a water-quality-based pollution control program, which is implemented through the states for waterbodies within their jurisdiction. These standards define the goals for a waterbody by designating its uses and setting criteria to protect water quality.

- Section 401 of the CWA applies to federal actions that would impact waters of the U.S. including wetlands. A 401 Water Quality Certification is required by the State of Maine. This approval serves to ensure that a proposed project meets water quality standards.

- Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES) permit program, which provides requirements for the discharge of storm water and wastewater into waters of the United States. The program is administered by the EPA in partnership with state agencies. Under a Memorandum of Agreement (effective January 12, 2001) between the EPA and the MEDEP, the MEDEP is the primary authority for operating the NPDES within the State of Maine (MEDEP 2005c). Consequently, any activities under Alternatives 1 or 2 that would result in the discharge of pollutants from point sources into waters of the United States would require a permit from the MEDEP.

- Section 404 of the CWA authorizes the USACE to issue permits regulating the discharge of dredged or fill materials into waters of the United States, including wetlands. Wetlands with a hydrological connection to waters of the United States are regulated under the CWA. Wetlands that do not have a hydrological connection to waters of the United States may not be subject to federal jurisdiction and are referred to as isolated.

- Executive Order 11990, Protection of Wetlands, directs federal agencies to take action to minimize the destruction, loss, or degradation of wetlands on their property and mandates the review of the effects of proposed actions on wetlands. All disturbances of wetlands would be regulated under the federal CWA, the Maine NRPA, and the Town of Brunswick Zoning Ordinance.

- The Maine Natural Resources Protection Act (NRPA) stipulates that a permit is required for activities located "in, on, or over any protected natural resource or located adjacent to a) a coastal wetland, great pond, river, stream or brook or significant wildlife habitat contained within a freshwater wetland; or b) certain freshwater wetlands." Generally, a permit is required for any project located within 75 feet of a protected natural resource.

- The Development Act (Site Law) requires a permit for developments that may have "a substantial effect upon the environment in order to insure that such developments will be located in a manner which will have a minimal adverse impact on the natural environment….and protect the health, safety and general welfare of the people" (38 MRSA Chapter 3, Section 481). This law applies to any development over 20 acres and requires a planning permit.

- The Mandatory Shoreland Zoning Act requires that municipalities establish land use controls for all activities within 250 feet of ponds and non-forested freshwater wetlands that are 10 acres or larger; rivers with watersheds at least 25 square miles in drainage area; coastal wetlands and tidal waters; and all land area within 75 feet of certain streams (38 MRSA Sec 435).

- The Maine Stormwater Management Law stipulates standards for projects disturbing more than 1 acre of land. Per Maine's regulations, a storm water management plan would be required for Alternatives 1 and 2 (38 MRSA § 420-D).

- The Waste Discharge Law requires that a license be obtained for the discharge of pollutants to a stream, river, wetland, or lake of the state or to the ocean. A Maine Construction General Permit (MCGP) for projects that disturb 1 or more acres of soil in a given watershed would be required. Prior to approval of an MCGP, the MEDEP requires submittal of a Notice of Intent (NOI) and an Erosion and Sedimentation Control Plan (ESCP). The MEDEP provides descriptions of standard erosion control guidelines and BMPs that should be incorporated into the ESCP (MEDEP 2003).

- The Maine NRPA regulates activities within wetlands and on properties within 75 feet of the normal high water line of wetlands. All wetlands are afforded some level of protection. Wetlands such as those associated with Harpswell Cove and Buttermilk Cove are considered wetlands of special significance (i.e., coastal wetlands, wetlands associated with streams, and open-water wetlands) and are given higher levels of protection. Disturbances of wetlands must be authorized by the MEDEP. In accordance with NRPA, all projects within or adjacent to wetlands would require implementation of erosion control measures, maintenance of a 25-foot buffer between the activity and any river, stream, or brook, and compliance with any applicable water quality standards and water classification standards.

- The Town of Brunswick regulates wetlands under the home rule provisions of the Maine Constitution and under Maine's Municipal Shoreland Zoning statute. Areas within 250 feet of a wetland have been incorporated into the Town's NRPZ (see Figure 3.11-2). Activities within the NRPZ require a permit from the Town of Brunswick.

4.11.1 Alternative 1 (Preferred Alternative)

4.11.1.1 Surface Water

Under Alternative 1, the disposal of NAS Brunswick and redevelopment of the property would not significantly impact surface water during construction or operation based on planning efforts to minimize disturbance of surface waters and the developers' adherence to federal and state regulations and use of appropriate BMPs. Alternative 1 was developed with the goal of minimizing impacts on natural resources such as surface waters. As part of the planning process, surface waters were identified as "areas least suitable for development" (BLRA 2007a). Where practicable, surface waters were incorporated into the land use districts of the Reuse Master Plan with the lowest potential for impacting these resources (BLRA 2007a). Under Alternative 1, surface waters would be located within the following land use districts: residential, professional office, education, community mixed use, natural areas, and open space/recreation. These proposed land uses are consistent with existing land uses at the installation. No demolition or construction of buildings is planned within surface waters; therefore, no rerouting of surface waters has been proposed.

Impacts on surface water would vary based on specific development within each of the major land use districts. Surface waters such as Harpswell Cove and Buttermilk Cove, which are classified by the MEDEP as Class SA for exceptional natural resources, would be located within the natural areas district. Such areas would be the least likely to be impacted, as minimal development would occur in this district. Therefore, impacts on Class SA surface waters would be expected to be minor.

Development of the professional office district, construction of the proposed golf course on the eastern side of the installation (recreation district), and construction of roads and pedestrian trails throughout the installation would have the greatest potential for impacting surface waters. In addition, construction activities adjacent to or near surface waters could result in indirect impacts resulting from erosion and sedimentation. Two tributaries to the Androscoggin River and a series of storm water treatment ponds are located within the proposed professional office district. Although new facilities would not be constructed directly in surface waters or require rerouting of surface waters, construction activities could occur adjacent to these areas and thus could impact water resources as a result of erosion and sedimentation and the development of new impervious surfaces. The developer will be required to develop a storm water management plan and an erosion and sediment control plan in accordance with local and state regulations. Given that the Androscoggin River (Class C water) would be least susceptible to impacts from development, and through the implementation of appropriate storm water and soil management, it is not expected that redevelopment activities would significantly impact surface water quality.

The proposed 18-hole golf course would be located around Picnic Pond and its tributaries. It is expected that these surface waters would be incorporated into the design of the golf course. Impacts on the pond and its tributaries could result from the construction of crossings to provide access for equipment during construction or golf carts during operation of the golf course. Operation of the golf course could also result in impacts on surface waters from the use of pesticides and fertilizers. It is expected the developer would implement an integrated pest management plan and/or a nutrient management plan to mitigate potential impacts from pesticides and fertilizer used on the golf course.

Under Alternative 1, surface waters could be directly impacted by the construction of roads and pedestrian trails. The potential for soil erosion and sedimentation from the construction of bridges and or culverts would result in direct disturbance to surface waters. Figure 4.11-1 identifies the location of surface water features in relation to the proposed location of roads and trails identified under Alternative 1.

In addition, under Alternative 1, construction activities adjacent to surface waters and an increase in impervious surfaces on the installation would indirectly impact surface waters. During construction, short-term, minor impacts on water quality could result from the discharge of sediments. During construction, demolition, and renovation activities (clearing, grading, landscaping, and movement of

equipment, material and vehicles) adjacent to or near surface waters, short-term, minor impacts on water quality could result from the discharge of sediments.

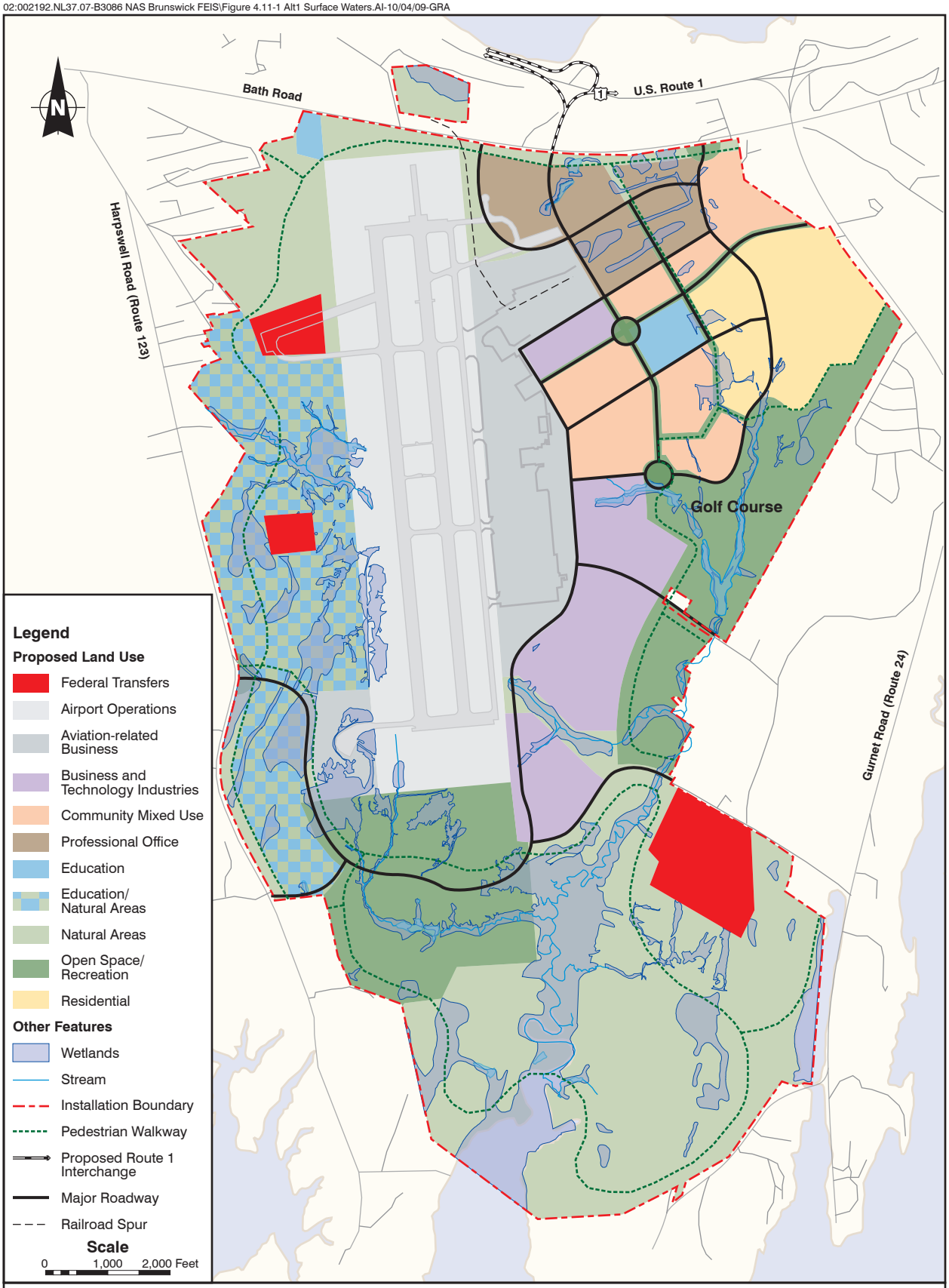
Full build-out of Alternative 1 is projected to result in a total of 859 acres of impervious surface area, which would predominantly comprise building roofs, parking areas, and roadways. This would be a net increase of approximately 343 acres above existing (2008) baseline conditions (516 acres). The additional impervious surface area would generate a long-term increase in precipitation runoff into waterbodies in the area, including Mere Brook, the Androscoggin River, Harpswell Cove, and Buttermilk Cove. It would be expected that full build-out would not have a significant impact since the majority of the proposed redevelopment would be concentrated on approximately 1,630 acres of land in areas that have already been developed by the Navy. For more information on the methodology, assumptions, and calculations used to project the impervious surface area resulting from implementation of Alternative 1, see Appendix N.

Prior to siting or constructing roads, pedestrian trails, or other facilities, the developer will be required to comply with applicable federal and state laws and regulations. Activities within 75 feet of surface waters would be regulated under Maine's NRPA. In addition, the Town of Brunswick has established 250-foot-wide Natural Resource Protection Zones (NRPZs) around sensitive natural resources, including surface waters. In the natural areas and education/natural areas land use, the NRPZ would remain undeveloped. In other land use districts, activities within an NRPZ and within 75 feet of a surface water body may require permits from the Town of Brunswick and the MEDEP, respectively.

Existing land uses at the McKeen Street Housing Annex would remain the same, and no new construction on this property is planned under Alternative 1. Therefore, there would be no impacts on surface water resources.

Although no surface water features are located on the East Brunswick Radio Transmitter Site or Sabino Hill Rake Station, indirect impacts on surface waters adjacent to or near these properties could temporarily result from construction activities. The East Brunswick Radio Transmitter Site would be reused for recreation and open space, which may include athletic fields and associated ancillary facilities such as a parking lot and restrooms. The Town of Phippsburg proposes to construct a gravel parking lot at the Sabino Hill Rake Station to support recreational uses in the area. Development for recreation would require compliance with applicable federal and state laws and regulations and implementation of ESCPs and Maine's BMPs. Therefore, implementation of Alternative 1 would result in temporary and minor impacts on surface water resources.

02:002192.NL37.07-B3086 NAS Brunswick FEIS\Figure 4.11-1 Alt1 Surface Waters.AI-10/04/09-GRA



SOURCE: BLRA 2007a; E & E 2008a; USGS 1999

Figure 4.11-1
Alternative 1, Surface Waters
Brunswick, Maine

As discussed in Section 3.11, Mere Brook and an unnamed tributary to the Androscoggin River are both considered Urban Impaired Streams under Maine's Stormwater Management Law. Any action under Alternative 1 that would result in 3 or more acres of impervious area, or 20 or more acres of developed area, within the watershed of an Urban Impaired Stream would require approval pursuant to the Site Location of Development Act and would need to meet the Urban Impaired Stream standard (Maine Rule Chapter 500, Section 4D). Prior to construction within the watershed of an Urban Impaired Stream, the developer would be required to consult with the MEDEP. Additional storm water treatment controls would likely be necessary in these watersheds because storm water sources may be contributing to the further degradation of stream water quality (06-096 Code of Maine Rules [CMR] Chapter 502). Mitigation measures may include paying a compensation fee, or treating, reducing, or eliminating an off-site or on-site pre-development impervious storm water source. Redevelopment of an existing impervious area might not be required to meet the Urban Impaired Stream standard if the MEDEP determines that the new use of the existing impervious area is not likely to increase impacts on the proposed project's storm water runoff above the levels already present in the runoff from the existing impervious area. Compliance with applicable federal, state, and local laws and regulations and implementation of mitigation measures would minimize impacts on water quality.

4.11.1.2 Groundwater

As discussed in Chapter 3.11, drinking water for NAS Brunswick is provided primarily by the Brunswick Topsham Water District, a municipal water supply system. However, one domestic groundwater well located on the southern end of the installation currently supplies drinking water to the golf course. In addition, a significant sand and gravel aquifer used by the town of Brunswick exists beneath the northwest portion of the installation. Groundwater depths at the installation range from just below the surface to 20 to 30 feet below the surface. Proposed redevelopment above the Aquifer Protection Zone would need to comply with the Town of Brunswick's zoning ordinance. Generally, the reuses proposed under Alternative 1 for areas that coincide with Aquifer Protection Zone 1 (i.e., airport operations, natural areas) would be compatible with the land use restrictions in this zone. A PBC for the 26-acre northern Clear Zone, which is located in Aquifer Protection Zone 1, has been approved for use as conservation land by the Brunswick-Topsham Water District. Land uses proposed within Aquifer Protection Zone 2 would be similar to those proposed within Aquifer Protection Zone 1 but would also include the Aviation-Related Businesses and Professional Office land use districts. Proposed transportation improvements, including the railroad spur, a new access road off Bath Road, and the U.S. Route 1 Connector on NAS Brunswick property, would cross Aquifer Protection Zones 1 and 2. Existing uses of land, buildings, or structures within either Aquifer Protection Zone would be considered non-conforming under the zoning ordinance and would be allowed to continue, even though such use does not conform to the ordinance. Expansion of non-conforming uses would be permitted provided that the proposed uses would not adversely affect the water supply. Disposal of NAS Brunswick and redevelopment under Alternative 1 would not significantly impact groundwater due to the redevelopment being compatible with the land use restrictions in the Aquifer

Protection Zone and the allowance for the continued use of land or structures under the Town of Brunswick zoning ordinance.

Redevelopment of the McKeen Street Housing Annex and East Brunswick Radio Transmitter Site would not impact an Aquifer Protection Zone. The town of Brunswick, including these sites and the installation, however, is located above the Sand and Gravel (Glaciated Regions) National Aquifer. Disposal and redevelopment of these properties under Alternative 1 would not significantly impact groundwater resources for the same reasons previously identified. Under Alternative 1, redevelopment of the Sabino Hill Rake Station would not impact groundwater resources.

The creation of new impervious surface at NAS Brunswick and the outlying properties (net increase of approximately 343 acres over existing (2008) baseline conditions) located in the town of Brunswick could impact groundwater recharge in the area.

Construction activities could also extend below ground surface to a depth that would directly impact the underlying water table. The developer/contractor would be required to use standard dewatering techniques and follow the ESCPs and Maine's BMPs that would involve preventing erosion, selecting an appropriate discharge location, removing sediment from collected water, and preserving downgradient natural resources. Potential spills of fuels or other chemicals and hazardous materials could occur during construction activities. Impacts on groundwater resources would be minimized through compliance with Maine's Stormwater Management Law and rules; the Town of Brunswick's zoning ordinance; and implementation of Maine's BMPs. In addition, development subject to the Site Law would require preparation of a groundwater protection plan.

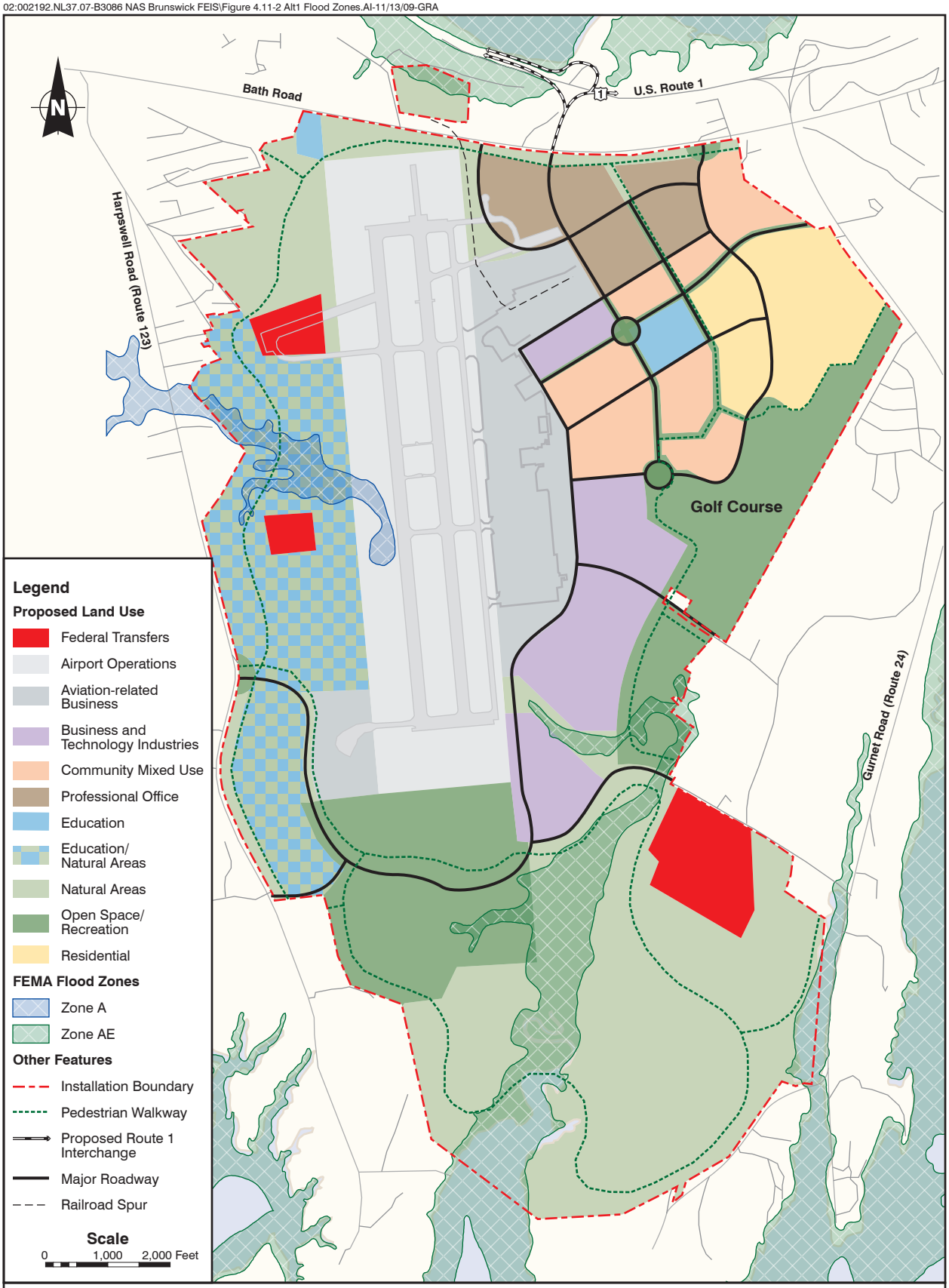
4.11.1.3 Floodplains

Most of the NAS Brunswick property is located in a Federal Emergency Management Agency (FEMA) Zone X, meaning it falls outside the 100-year floodplain. Several areas are located within the 100-year floodplain (see Figure 4.11-2), specifically along Mere Brook, Merriconeag Stream, Harpswell Cove, and Buttermilk Cove. The 100-year floodplain also coincides with a Town of Brunswick NRPZ. Proposed land use districts that would be located within the 100-year floodplain include natural areas, education/natural areas, airport operations, open space, and a small portion of the business and technology district. Proposed land uses within the natural areas land use district and education/natural areas would not impact floodplains. New structures to be used for recreation (e.g., bathroom facilities, storage shed, and club houses) would not be constructed within floodplains.

Development within the NRPZ would be regulated by the Town of Brunswick. In accordance with EO 11988, the conveyance for properties in floodplains proposed for disposal for non-federal parties would indicate restricted uses under floodplain regulations. Therefore, Alternative 1 would not result in significant impacts on floodplains.

No floodplains are located on the outlying properties.

02:002192.NL37.07-B3086 NAS Brunswick FEIS\Figure 4.11-2 Alt1 Flood Zones.AI-11/13/09-GRA



SOURCE: Federal Emergency Management Agency, 2002.

Figure 4.11-2
Alternative 1, FEMA Flood Zones
Brunswick, Maine

4.11.1.4 Wetlands

Implementation of Alternative 1 could impact the existing wetland resources at NAS Brunswick. As noted in Section 3.11.4, Wetlands, approximately 389 acres of wetlands were identified at NAS Brunswick during a 2008 reconnaissance survey. As part of the reuse planning process, wetlands were considered "areas least suitable for development," and areas on the installation with large contiguous wetlands have been dedicated to recreation/open space and natural areas (BLRA 2007a). These areas include the expansive coastal wetlands located in Harpswell Cove and Buttermilk Cove and the freshwater wetland complexes located in the eastern and western portions of the installation. Approximately 338 acres of wetlands, including approximately 17 acres of Subtidal Estuary, are located within these proposed land use districts and would have limited potential for future development.

The remaining 51 acres of wetlands are scattered throughout the installation within each of the other land use districts and could potentially be impacted by future development. In accordance with Section 4 of Executive Order 11990, during the property conveyance process, the Navy will identify development restrictions under federal, state, or local wetland regulations.

A wetland reconnaissance survey was completed for the purposes of this EIS; however, as part of the final design and permitting processes, the developer would be expected to perform a full wetland delineation study prior to obtaining the necessary permits. Any wetland disturbance resulting from implementation of Alternative 1 would require that the developer obtain a permit from the MEDEP and the USACE. In addition, per the NRPA, any encroachment within a 75-foot buffer around a "Wetland of Special Significance" as defined by the state of Maine (see Section 3.11.4) would require a permit. Wetland permit applications would require a surveyed wetland boundary, an alternatives analysis, a mitigation plan, impact analysis, and a storm water management analysis. In accordance with the CWA and NRPA, wetland alterations must be avoided where possible, and an alternatives analysis would be required by the developer. If it can be demonstrated that no practicable alternative exists, the developer would be required to show that the amount of the wetland affected has been minimized. Compensation (mitigation) may be required for any lost functions and values of the wetlands. As discussed in Section 3.11, the primary wetland functions identified for wetlands at NAS Brunswick include groundwater recharge, wildlife habitat, production export, floodflow alteration, sediment/toxicant/pathogen retention, sediment/shoreline stabilization, and nutrient removal/retention/transformation. Mitigation may take the form of restoring degraded wetlands, enhancing the functions of existing wetlands, preserving wetlands on adjacent uplands that have similar functions and are vulnerable to development, or creating wetlands from upland areas.

As part of the permitting process, the developer will be required to coordinate wetland mitigation plans with the USACE and MEDEP. On April 10, 2008, the EPA and USACE issued regulations governing compensatory mitigation for authorized impacts on wetlands, streams, and other waters of the United States under Section 404 of the CWA. These regulations, as codified in the CFR (40 CFR

Part 230) as the Final Rule for Compensatory Mitigation for Losses of Aquatic Resources, are designed to improve the effectiveness of compensatory mitigation to replace lost aquatic resource functions and area, expand public participation in compensatory mitigation decision-making, and increase the efficiency and predictability of the mitigation project review process. While this policy has placed a renewed focus on the avoidance and minimization of wetland and stream impacts, key changes regarding the methodology of mitigation have been implemented. The guidance outlines policies that support the use of private mitigation banks and authorized use of state-run in-lieu fee programs only if on-site restoration or private mitigation-bank-derived credits are unavailable. Limited opportunities for wetland restoration and creation exist on the installation. Areas deemed potentially suitable for mitigation are either located in an incompatible land use (i.e., air operations land use district) or are located within an Environmental Restoration Program site that is still under investigation (i.e., Quarry Area of Concern and Site 12). If on-site mitigation is not feasible, it is expected that the developer would need to identify a potential mitigation site within the same watershed as the impacts or negotiate an in-lieu fee agreement. Currently, no wetland mitigation banks are located in the state of Maine; therefore, buying credits from a mitigation bank would not be possible.

Compensation requirements typically vary based on the impacted wetland communities. A mitigation ratio of 2:1 (a USACE requirement) is typically required for permanent impacts on forested wetlands. Mitigation requirements for forested wetland conversion normally depend on the quality of the impacted wetland community, but the ratio is not likely to be greater than 1:1. Specific mitigation requirements for future development projects would be determined in coordination with the USACE and MEDEP. Based on the preservation of approximately 338 acres of wetlands and the requirement to avoid, minimize, and mitigate impacts on other wetlands on the installation as required under federal, state, and local permit programs, no significant impacts on wetlands would be expected under Alternative 1.

4.11.2 Alternative 2

4.11.2.1 Surface Water

Impacts on surface water would vary based on specific development within each of the major land use districts. Surface waters such as Harpswell Cove and Buttermilk Cove, which are classified by the MEDEP as Class SA for exceptional natural resources, would be located within the natural areas district. Such areas would be the least likely to be impacted, as minimal development would occur in this district. Therefore, impacts on Class SA surface waters would be expected to be minor.

Under Alternative 2, surface waters would be located in all of the proposed land use districts (see Figure 4.11-3). Specific impacts of Alternative 2 would vary based on site-specific development within each of the land use districts. Unlike Alternative 1, the existing runways would be removed and redeveloped into residential and natural areas land uses. Specifically, the 0.6-mile portion of Mere Brook that currently flows through culverts under the runways would be incorporated into the natural areas land use district. Under this alternative, the culverts could be removed and the stream banks and channel could be restored to their natural state. Therefore, implementation of Alternative 2 could result in beneficial impacts on some surface water resources.

Development of the business and technology industries, education, and residential districts, expansion of the existing 9-hole golf course, construction of roads and pedestrian trails, and removal of the existing airfield could have the greatest potential for impacting surface waters. In addition, construction activities adjacent to or near surface waters could result in indirect impacts resulting from erosion and sedimentation. Two tributaries of the Androscoggin River and a series of storm water treatment ponds are located within the proposed professional office district; Mere Brook and several tributaries of Mere Brook area located within the proposed education land use district; and two unnamed tributaries of Harpswell Cove are located within the proposed residential land use district. Although new facilities would not be constructed directly in surface waters or require rerouting of surface waters, construction activities could occur adjacent to these areas and thus could impact water resources as a result of erosion and sedimentation and the development of new impervious surfaces. The developer would be required to develop a storm water management plan and an erosion and sediment control plan in accordance with local and state regulations. Given that the Androscoggin River (Class C water) would be least susceptible to impacts from development, and through the implementation of appropriate storm water and soil management, it is not expected that redevelopment activities would significantly impact surface water quality.

Several ponds and tributaries of Mere Brook are located in the area of the proposed expansion of the existing 9-hole golf course to an 18-hole golf course. It is expected that these ponds and tributaries would be incorporated into the golf course as part of its design. Impacts on the pond and its tributaries could result from the construction of crossings to provide access for equipment during construction and for golf carts during operation. Operation of the golf course could also result in impacts on surface waters from the use of pesticides and fertilizers. The developer would implement an integrated pest management plan and/or a nutrient management plan to mitigate potential impacts from pesticides and fertilizer used on the golf course.

Similar to Alternative 1, siting of new buildings would avoid direct impacts on surface waters; however, roads and pedestrian trails could be directly impacted. The potential for soil erosion and sedimentation from the construction of bridges and culverts could result in direct disturbance to surface waters. Figure 4.11-3 identifies the location of surface water features in relation to the locations of roads and trails proposed for Alternative 2. Due to the potential for direct impacts on

surface waters, the developer will be required to obtain a permit from the MEDEP and USACE, comply with permit conditions, and mitigate unavoidable impacts.

Under Alternative 2, construction activities adjacent to surface waters and an increase in the amount of impervious surfaces on the installation would indirectly impact surface waters. Short-term, minor impacts on water quality could result during construction from the discharge of sediments. Indirect impacts would result from construction, demolition, and renovation activities (i.e., clearing, grading, landscaping, and movement of equipment, material, and vehicles) adjacent or near surface waters. In addition, Alternative 2 would result in a higher density of development. Therefore, the amount of impervious surface created in each of the land use categories would be expected to be higher than proposed under Alternative 1. Full build-out of Alternative 2 is projected to result in a total of 944 acres of impervious surface area, which would predominantly be comprised of building roofs, parking areas, and roadways. This would be a net increase of approximately 428 acres over existing (2008) baseline conditions (516 acres). The increased amount of impervious surface would generate a long-term increase in precipitation runoff into waterbodies in the area, including Mere Brook, the Androscoggin River, Harpswell Cove, and Buttermilk Cove.

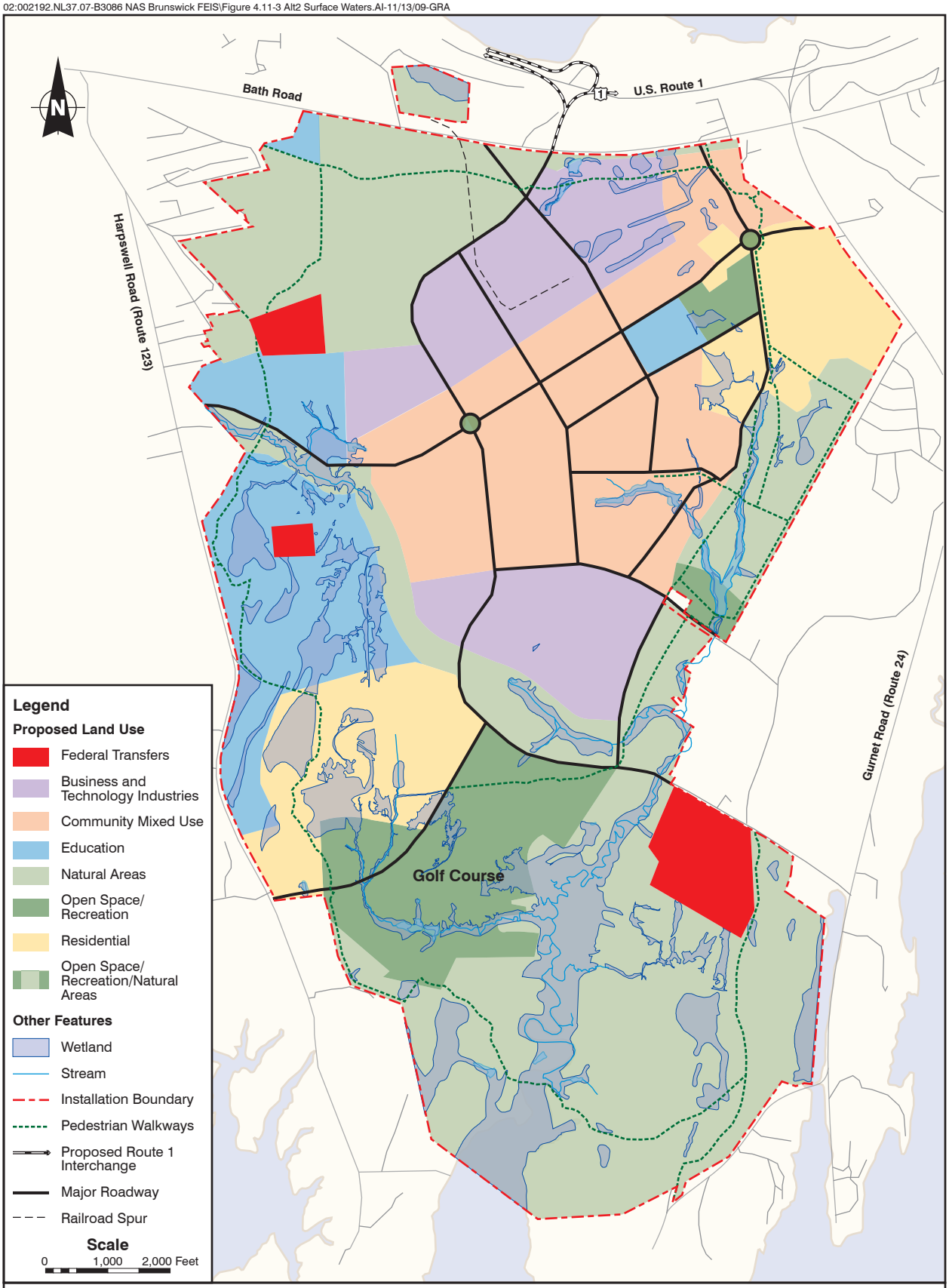
Impacts resulting from redevelopment of the outlying properties under Alternative 2 would be the same as described under Alternative 1.

Prior to siting or constructing roads, pedestrian trails, or other facilities, the developer would be required to comply with applicable federal and state laws and regulations. Activities within 75 feet of surface waters would be regulated under Maine's NRPA. In addition, the Town of Brunswick has established 250-foot-wide NRPZs around sensitive natural resources, including surface waters. In the conservation and education/natural area land uses, the NRPZ would remain undeveloped; therefore, there would be no direct impacts on surface waters. In other land use districts, any activity within an NRPZ and within 75 feet of a surface water body may require a permit from the Town of Brunswick, and the MEDEP, respectively.

Redevelopment of the installation would be consistent with MEDEP and Town of Brunswick regulations. Compliance with applicable laws and regulations would minimize impacts on surface water resources. Therefore, Alternative 2 would have impacts on surface water resources; however, impacts would be minimized through avoidance, compliance with regulatory requirements, and implementation of ESCPs and BMPs.

The impacts of Alternative 2 on water quality would be similar to those under Alternative 1. However, the higher density of development would likely result in greater direct impacts on surface waters as well as potential indirect impacts. The removal of the 0.6-mile of culverts associated with the airfield and subsequent restoration of Mere Brook under Alternative 2 could result in positive impacts on the water quality of Mere Brook.

02:002192.NL37.07-B3086 NAS Brunswick FEIS\Figure 4.11-3 Alt2 Surface Waters.AI-11/13/09-GRA



SOURCE: E & E 2008a; USGS 1999

Figure 4.11-3
Alternative 2, Surface Waters
Brunswick, Maine

4.11.2.2 Groundwater

Disposal and redevelopment of NAS Brunswick under Alternative 2 would not significantly impact groundwater. The reuses proposed under Alternative 2 (natural areas) would be compatible with Aquifer Protection Zone 1. Reuses proposed within Aquifer Protection Zone 2 would also include the business and technology industries and education districts. Both proposed land uses would differ from the existing land uses; however, it is not expected that Alternative 2 would significantly impact groundwater, since the redevelopment would need to be compatible with the land use restrictions in the Aquifer Protection Zone.

Under Alternative 2, the impacts associated with redevelopment of the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and the Sabino Hill Rake Station would be the same as under Alternative 1.

Under Alternative 2, the creation of new impervious surfaces at NAS Brunswick and the outlying properties (net increase of approximately 428 acres over existing (2008) baseline conditions) located in the town of Brunswick could impact groundwater recharge in the area. Construction activities could also extend below ground surface to a depth that would directly impact the underlying aquifer. The developer/contractor will be required to use standard dewatering techniques and follow the ESCPs and Maine's BMPs, which would involve preventing erosion, selecting an appropriate discharge location, removing sediment from collected water, and preserving downgradient natural resources (MEDEP 2003). Potential spills of fuels or other chemicals and hazardous materials could occur during construction activities. Impacts on groundwater resources would be minimized through compliance with Maine's Stormwater Management Law and rules; the Town of Brunswick's Zoning Ordinance; and implementation of Maine's BMPs. In addition, development subject to the Site Law would require the preparation of a groundwater protection plan. As a result of these requirements, impacts on groundwater would be minimized and would not be expected to be significant.

4.11.2.3 Floodplains

Proposed land use districts that would be located within the 100-year floodplain under Alternative 2 include natural areas, education, and recreation/open space (golf course) (see Figure 4.11-4). Proposed land uses within the natural areas land use district would not impact floodplains. As previously discussed, the 100-year floodplain coincides with the Town of Brunswick's NRPZ. For other land use districts, activities within the NRPZ would be regulated by the Town of Brunswick. New structures used for recreation (e.g., restrooms, storage sheds, club houses) would not be constructed within floodplains. In accordance with EO 11988, the conveyance for properties in floodplains proposed for disposal for non-federal parties would indicate restricted uses under floodplain regulations. Therefore, Alternative 2 would not result in significant impacts on floodplains.

4.11.2.4 Wetlands

As noted in Section 3.11.4, Wetlands, approximately 389 acres of wetlands were identified at NAS Brunswick during a 2008 reconnaissance survey. Approximately 265 acres of wetlands, including approximately 17 acres of Subtidal Estu-

ary, are located within the proposed recreation/open space and natural areas land use districts and would have limited potential for future development.

The remaining 124 acres of wetlands, which are scattered throughout the installation within each of the other land use districts, could potentially be impacted by future development. As discussed in Section 4.11.1.4, the developer(s) would be required to comply with various federal, state, and local regulations prior to impacting wetlands. As part of the final design and permitting processes, the developer would be expected to perform a full wetland delineation study prior to obtaining the necessary permits.

Based on the preservation of approximately 265 acres of wetlands and the requirement to avoid, minimize, and mitigate impacts on other wetlands on the installation as required under federal, state, and local permit programs, no significant impacts on wetlands are expected under Alternative 2.

4.11.3 No-Action Alternative

Under the No-Action Alternative, existing mission and support operations at NAS Brunswick would be relocated and the installation and outlying properties would be retained by the U.S. Government in caretaker status. No reuse or redevelopment would occur at the facility. Under the No-Action Alternative, no demolition or construction activities would occur, and there would be no increase in impervious surface. Therefore, there would be no additional impacts on surface water, groundwater, floodplains, or wetlands compared with existing conditions.

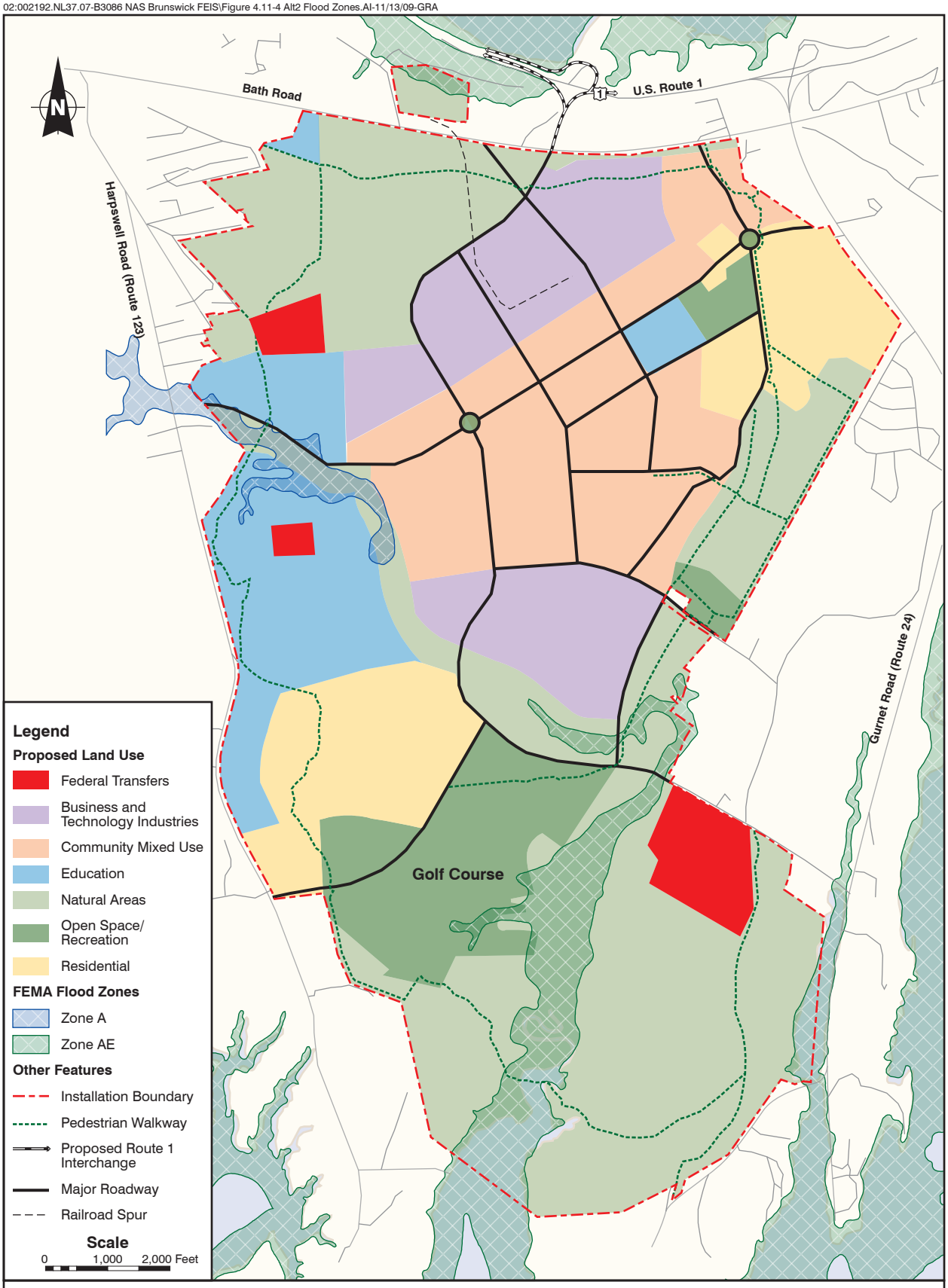
4.12 Biological Resources

This section summarizes the potential impacts on biological resources from the implementation of Alternative 1, Alternative 2, or the No-Action Alternative. It includes an examination of impacts on vegetation, wildlife, threatened and endangered species, and Significant Wildlife Habitat from disposal and future reuse of NAS Brunswick, the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station.

Geographic information system (GIS) analysis was used to determine the maximum extent of potential impacts on vegetation communities and wildlife habitat from development of each land use district. Refer to Section 2 (Alternatives, Including the Proposed Action) for more information on the proposed land use districts.

Upon completion of the BRAC disposal process under both Alternatives 1 and 2, the properties not transferred to other federal agencies would fall under the jurisdiction of the local government in which they are located. Any future reuse of these properties would be required to comply with local, state, and federal laws and regulations pertaining to biological resources. Specifically, consultation with the MDIFW under the Maine Endangered Species Act (MESA) would be required for any activities proposed within habitat known to support state-listed threatened

02:002192.NL37.07-B3086 NAS Brunswick FEIS\Figure 4.11-4 Alt2 Flood Zones.AI-11/13/09-GRA



SOURCE: Federal Emergency Management Agency, 2002.

Figure 4.11-4
Alternative 2, FEMA Flood Zones
Brunswick, Maine

or endangered species. Likewise, an NRPA permit would be required from MEDEP for any disturbance to MDIFW-designated Significant Wildlife Habitat. In addition, any future reuse and development would require the review and/or approval of the Town of Brunswick and would be subject to MRRA's Community Design Guidelines (Town of Brunswick 2009a). According to MRRA's *Community Design Guidelines Summary*, the implementation of sustainable development strategies, smart-growth principles, and other best management practices would result in low-impact development (MRRA 2010).

4.12.1 Alternative 1 (Preferred Alternative)

4.12.1.1 Vegetation

NAS Brunswick

Implementation of Alternative 1 would require the permanent removal of vegetation to accommodate new facilities and supporting infrastructure. In most areas, the removal of vegetation is not expected to have a significant impact because previously developed areas for new construction would be used and new development would be sited immediately adjacent to previously developed areas. Some impacts on vegetation communities would be further reduced through the long-term conservation and preservation of 1,060 acres of natural ecological communities within the natural areas districts.

Impacts could occur where new development would result in new clearing or removal of vegetation. In areas where critically imperiled habitat is removed, however, siginificant impacts on state-listed threatened and endangered species could occur (see Section 4.12.1.3).

Maximum potential impacts on vegetation communities, which would result from complete ground disturbance, have been assessed for each proposed land use district through GIS analysis; and the results of the analysis are presented in Table 4.12-1. Proposed construction activities could result in the long-term loss or alteration of up to approximately 1,146 acres, or 50%, of the undeveloped land at the base. However, this is the maximum acreage anticipated to be impacted based on the proposed size and dimensions of development areas. In some areas, impacts would likely be significantly less. For example, 120 acres of the critically imperiled Little Bluestem-Blueberry Sandplain Grassland and 214 acres of maintained grass communities within the buffer zone of the existing airfield are not likely to be impacted by reuse of the airfield. As described in Section 3.1.2, future land development at NAS Brunswick and the outlying properties would be subject to the *Town of Brunswick Zoning Ordinance* (Town of Brunswick 2009a) and MRRA's Design Guidelines (MRRA 2010). Future developers would need to prepare site development plans for approval by the Town of Brunswick. These plans could reduce impacts on vegetation by maximizing the use of existing cleared area and minimizing encroachment into vegetated areas. The maximum impact acreages are presented in the absence of site-specific development plans.

Table 4.12-1 Alternative 1 – Maximum Potential Impacts on Vegetation Communities, NAS Brunswick

Land Use District	Vegetation Cover Type						
	Upland Forest	Little Bluestem Blueberry Sandplain Grassland	Maintained Land	Successional Shrubland	Freshwater Wetland	Estuarine Wetland	Total
Airport Operations	25	120[1]	214[1]	0	16	0	375
Aviation-Related Business	24	10	10	0	13	0	57
Professional Office	41	14	0	0	15	0	70
Community Mixed Use	21	0	0	0	2	0	23
Business and Technology Industries	95	0	36	0	4	0	135
Education	7	1	0	0	0	0	8
Education/Natural Area[2]	175	0	0	0	0	0	175
Residential	17	0	0	0	1	0	18
Recreation and Open Space[3]	285	0	0	0	0	0	285
Natural Areas	0	0	0	0	0	0	0
Total	**690**	**145**	**260**	**0**	**51**	**0**	**1,146**

Notes:

[1] It is assumed that minimal changes would be made to the runways and taxiways located within the airfield by the future operator and the buffer zones would be maintained as grassland. Consequently, impacts on these communities would likely be significantly less.

[2] Development of the education/natural area district would likely require removal of upland forest for creation of various facilities and athletic fields. However, large areas of upland forest would likely be preserved within this district. Furthermore, it is assumed that all sensitive vegetation communities, including sandplain grasslands and wetlands, would be preserved in this district.

[3] Development of the recreation and open space district would likely require removal of upland forest for creation of athletic fields, public gardens, and a golf course. However, large areas of upland forest would likely be preserved within this district. Furthermore, it is assumed that all sensitive vegetation communities, including sandplain grasslands and wetlands, would be preserved in this district.

Up to approximately 690 acres of upland forest could be removed under Alternative 1. The majority of impacts on upland forest would occur to Red Oak-Northern Hardwood and White/Red Pine Plantation communities, which are common communities in the mid-coast region of Maine. Some upland forest would likely be removed from each land use district, with the exception of the natural areas district. The 285 acres of upland forest impacts in the recreation and open space district would likely be reduced through preservation of forest community buffers between athletic fields, public gardens, and the golf course. Similarly, the 175 acres of upland forest impacts in the education/natural area district would likely be offset and/or reduced through preservation of forestland buffers between new facilities.

As indicated in Section 3.12.1, the MNAP has not verified the presence of the critically imperiled Pitch Pine-Heath Barren community at NAS Brunswick. However, based on recent vegetation community mapping, approximately 5 acres and 2 acres of this community could be impacted in the education and education/natural area land use districts, respectively. It is expected that the developer for the education and education/natural area would minimize the impact on the Pitch Pine-Heath Barren community. It should be noted that the Pitch Pine-Heath Barren community, as described in Section 3.12.1, is considered critically imperiled. Further delineation of this critically imperiled community would likely be required as part of any applicable State environmental permits such as those required by the SLDA and NRPA. Any party proposing development or other land disturbance within this community would need to consult with the MNAP to receive appropriate permits and clearances. The MDIFW should also be consulted due to known occurrences of rare butterfly and moth species in the immediate vicinity of the installation that are dependent on pitch pine. In addition, MRRA's *Community Design Guidelines Summary* sustainable development strategies, smart-growth principles, and other best management practices would encourage low-impact development (MRRA 2010).

Approximately 543 acres of upland forest would be preserved within the natural areas district, including 51 acres of Pitch Pine-Heath Barren community.

Approximately 145 acres of critically imperiled Little Bluestem-Blueberry Sandplain Grassland occur within the airport operations, aviation-related business, professional office, and residential land use districts and could potentially be impacted by future development. It is assumed that minimal changes would be made to the runways and taxiways located within the airfield by the future operator and the buffer zones would be maintained as grassland. As a result, most or all of the 120 acres of Little Bluestem-Blueberry Sandplain Grassland within the airport operations district would likely be maintained in its current condition. Future civilian airport operators would be expected to follow all applicable federal, state, and local laws with respect to wildlife hazard assessments and would need to consult with the MDIFW as part of any habitat management or wildlife control activities that take place in the Sandplain Grassland habitat around the airfield.

The remaining 25 acres, or approximately 12% of the total available Sandplain Grassland habitat on the installation, may be permanently removed to develop the professional office, education, and aviation-related uses land use districts. Loss of this habitat could have a significant impact on state-listed species. As discussed further in Section 4.12.1.3, this habitat is considered a significant wildlife habitat under the NRPA. Therefore, a permit would likely be required for any development within this area. Such permitting would require review and approval from MDIFW and MNAP. MDIFW considers impacts on the actual habitat and 100-meter buffer as part of its environmental review process. The developer would likely be required to conduct additional surveys to verify the extent of the protected species habitat.

An additional approximately 260 acres of maintained land, comprised mainly of the regularly maintained grass areas around the runways, are within the land use districts identified for redevelopment. It is expected that approximately 214 acres of this habitat would continue to be maintained in its current condition by the future airport operator. The remaining approximately 46 acres would likely be removed to establish the business and technology industries district.

No successional shrubland would be impacted under Alternative 1. Approximately 53 acres of this community would be preserved within the natural areas district.

Up to approximately 51 acres of freshwater wetlands could be impacted by future development within the airport operations, aviation-related business, professional office, community mixed use, business and technology, and residential land use districts. No estuarine wetlands would be impacted under Alternative 1. Approximately 338 acres of wetlands, including approximately 17 acres of Subtidal Estuary, are located within recreation/open space and natural areas land use districts and would be preserved from future development. Impacts on wetland communities are discussed further in Section 4.11.

As discussed above, some impacts on vegetation communities would be reduced by establishment of the 1,060-acre natural areas district. This district was created to preserve, maintain, and enhance rare communities and large, intact ecosystems for the overall long-term benefit of area residents and the natural environment (BLRA 2007a). The natural areas district would preserve wetland communities associated with Buttermilk Cove and Harpswell Cove, Pitch Pine-Heath Barren, Little Bluestem-Blueberry Sandplain Grassland, and several large, intact forested communities on the southern portion of the installation. Activities proposed within this land use district, such as the development of pedestrian trails and nature and interpretive centers, would have minor impacts on vegetation communities, primarily as a result of the construction of pedestrian trails. The trails would also provide access to the marshes and bays, opening up recreational opportunities for canoeing and kayaking (BLRA 2007a). Foot traffic within the marshes would result in the trampling of vegetation at the water access points; however, impacts would be minor. Other activities proposed for this land use district, including environmental education and passive outdoor recreation, would not impact vegetation. Future land owners would be expected to comply with applicable local,

state, and federal regulations and should consult with the MNAP and MDIFW regarding appropriate management of these natural communities, especially as it applies to threatened and endangered species.

Outlying Properties

The McKeen Street Housing Annex would remain residential. Any redevelopment of this site would primarily impact existing maintained lawn and landscaped areas. The Red Oak-Northern Hardwoods-White Pine Forest that exists on the southern portion of the site could be impacted if this property were completely redeveloped.

The East Brunswick Radio Transmitter Site would be redeveloped as recreation/ open space and natural area land use districts. Potential uses of this site include the development of athletic fields, parking, support amenities, and pedestrian trails (BLRA 2007a). Development of such facilities could result in the conversion of up to approximately 64 acres of the critically imperiled Little Bluestem-Blueberry Sandplain Grassland to maintained lawn or impervious surfaces. Utilizing the parcel for natural area preservation would result in no direct impacts on the Sandplain Grassland; however, without management of the grassland, the habitat would eventually succeed into forestland. Loss of this habitat could impact several state-listed species of special concern, as discussed further in Section 4.12.1.3.

The Sabino Hill Rake Station property would be conveyed to the Town of Phippsburg. A portion of this site would be cleared for the construction of a gravel parking lot. Because the property is already partially developed with an observation tower, it is expected that there would be minimal impact on vegetation. There could be a small impact on white-pine oak woodlands, as a small area of this ecological community is present.

4.12.1.2 Wildlife

NAS Brunswick

Implementation of Alternative 1 would cause both short- and long-term impacts on resident wildlife. Long-term impacts may be related to species mortality, habitat loss, and habitat fragmentation. Mortality of less-mobile species such as small mammals, reptiles, and amphibians would be possible during construction; however, overall impacts on species diversity and abundance on the property from construction activities would be minor since the majority of wildlife would avoid the construction areas.

Terrestrial wildlife species are closely associated with vegetative communities. For this reason, the loss of vegetation and modifications to land use, as discussed in Section 4.12.1.1, would also affect the wildlife communities at NAS Brunswick. Potential impacts on wildlife would be primarily from loss of habitat due to clearing and grading during construction and maintenance of future development projects. Permanent removal of habitat would directly affect wildlife communities on the site. No long-term significant impacts from habitat fragmentation are expected for common wildlife species, since most of the new development would

be located in previously developed areas, and because the proposed action would preserve large tracts of natural areas. However, removal of the critically imperiled Sandplain Grassland community could have a significant impact on state-listed species, as discussed further in Section 4.12.1.3.

As noted above, a maximum of approximately 1,146 acres of vegetation, or approximately 50% of the undeveloped land on the property, could be removed by implementing Alternative 1. Wildlife that use these habitats would be forced to migrate to other areas with suitable habitat. Small mammals, amphibians, and reptiles would be most affected. White-tailed deer, coyotes, wild turkey, and passerine birds would also be affected, but to a lesser extent because of their ability to move on to other habitat. However, some individuals of these species may be impacted if unoccupied habitat of equal quality is not available in the immediate vicinity. Upon completion of construction, recolonization would be expected in these areas by species of small mammals, amphibians, reptiles, and birds adapted to urban conditions. The preservation of approximately 1,060 acres of natural areas, which include a mix of contiguous upland forest, freshwater wetlands, and estuarine wetlands, would have a long-term beneficial affect on wildlife in these areas.

Wildlife species may be temporarily displaced in peripheral areas during construction, when noise and human activity levels increase. Species that would be most affected include those with relatively small home ranges, such as small mammals, reptiles, and amphibians, as well as those that rely on specific habitat types or a specific size of habitat for resources (e.g., forest interior-breeding birds). During construction, short-term impacts may include displacement of mobile species such as white-tailed deer, raccoon, opossum, red fox, coyote, and various avian species. These species would avoid areas of construction where equipment and human activities create disturbance.

Although much of the high-quality wildlife habitat would be preserved as natural areas, pedestrian trails through these areas would cause localized changes to the habitat and species composition. Forest-interior species tend to avoid trails due to the disturbance created by human activity and would likely decline in abundance in the vicinity of the trail. Bird species that occupy the forest-edge, including hermit thrush (*Catharus guttatus*) and white-throated sparrow (*Zonotrichia albicollis*), would increase in abundance.

Aquatic species would be affected where construction activities occur within or adjacent to waterbodies. The greatest diversity and abundance of aquatic species occur within the tidally influenced portion of Mere Brook and in Harpswell Cove and Buttermilk Cove. Each of these waterbodies is located within the natural areas district, where ecological communities would be preserved and minimal development would occur. Consequently, implementation of Alternative 1 would have minor or no impacts on aquatic species in these waterbodies.

Development of the 18-hole golf course around Picnic Pond and its tributaries could impact aquatic species inhabiting these waterbodies. Without appropriate mitigation, construction activities have the potential to increase storm water pol-

lutant loading and stream turbidity and alter stream hydrology, all of which can affect the suitability of aquatic habitats to support aquatic organisms. In addition, fertilizers and pesticides applied on the golf course may cause excess nutrient loading in receiving waterbodies, resulting in loss of aquatic species.

Section 4.8.1.3 presents information about storm water regulations and the developer's obligation to implement BMPs during and after construction to minimize storm water runoff. BMPs specific to golf course construction that should be implemented to reduce impacts on aquatic species in Picnic Pond and its tributaries include the following:

- A qualified construction contractor who is experienced in the special requirements of golf course construction should be employed;
- Construction techniques to control the erosion of sediment should be implemented;
- Vegetative buffer zones should be maintained or created between golf course "play areas" and surface water resources;
- When chemical or nutrient treatments must be applied at the golf course, best management practices should be implemented so that chemicals are applied at the proper time and under the proper conditions to both maximize the effectiveness of the application and minimize any potential environmental impacts. Soil conditions should be closely monitored, and nutrient treatments should be chosen to meet, not exceed, the requirements of the turfgrass.

The developer would be required to comply with various federal, state, and local laws to reduce impacts on surface waters, including protection of riparian buffer zones, development of ESCPs, and implementation of BMPs. Compliance with these mitigation measures would reduce the potential for impacts on aquatic species, including temporary impacts on water quality during construction and long-term impacts such as loss of habitat/fisheries.

Compliance with the Urban Impaired Stream Standard (Chapter 500 of the Maine Stormwater Management Law, as explained in Section 4.8.1.3) would also be required for the development of a golf course around Picnic Pond. Picnic Pond and its tributaries are located in the direct watershed of Mere Brook, an urban impaired stream. Under the Urban Impaired Stream Standard, additional storm water treatment controls would be required. The MEDEP, Bureau of Land and Water Quality, would determine which standards (Chapter 500: Section 4 - Storm Water Standards) would also apply. Development of the golf course may also require an SLDA planning permit, which includes specific requirements for storm water management, as well as compliance with Chapter 500 storm water management.

In addition, development of the golf course would be required to comply with the standards outlined in Section 480-D of the NRPA. These standards include provisions regarding soil erosion, habitats/fisheries, and water quality.

Refer to Section 4.12.1.4 for more information on impacts on significant vernal pools.

As Alternative 1 includes the reuse of the airfield, it is expected that the operator of the airport would continue to maintain the habitat within the airfield to control wildlife as part of a Wildlife Hazard Management Plan in accordance with FAA Guidance.

Important Bird Areas. As discussed in Section 3.12.2.1, two portions of the Freeport/Brunswick IBA are present at NAS Brunswick, including the salt marsh habitat at the mouth of Harpswell Cove and grassland habitat around the airfield. The Harpswell Cove portion of the IBA would not be impacted by implementation of Alternative 1 because the area would be preserved as a natural area.

It is expected that much of the existing grassland habitat around the airfield would be maintained by the future airport operator. Furthermore, the developer would be required to consult with the MDIFW and MNAP before implementing habitat management or any potential development within this habitat due to the presence of state-protected grassland species, as discussed further in Section 4.12.1.3. Consequently, implementation of the Alternative 1 is not expected to significantly impact birds within this portion of the Freeport/Brunswick IBA or significantly degrade the overall value of the IBA to attract and support diverse assemblages of grassland bird species. However, there may be the potential for a short-term decrease in the number of breeding grassland birds in portions of the IBA as a result of construction noise.

Migratory Bird Treaty Act. The Migratory Bird Treaty Act (MBTA) is the primary legislation in the United States established to conserve migratory birds. The MBTA prohibits the taking, killing, or possessing of migratory birds except under the terms of a valid permit issued pursuant to federal regulations.

As discussed in Section 3.12.2, a number of migratory bird species occur at NAS Brunswick. These include various species of passerines, waterfowl, and waterbirds. The potential exists for a limited number of species to be directly impacted through loss or mortality of young during construction activities within the breeding season. The loss of habitat on the property under Alternative 1, primarily upland forest and grassland, would result in the loss of nesting areas for breeding birds and stopover areas for migrating bird species.

None of the impacts identified above would result in significant adverse effects on a population of migratory bird species. Furthermore, significant opportunities for management and preservation of migratory bird habitat will be present through the preservation of approximately 1,060 acres of high quality habitat on the property, including upland forest, freshwater wetlands, and estuarine wetlands.

Bird-Aircraft Strike Hazard. The grassland areas within the airport operations and aviation-related business district support a variety of grassland-dependent birds and is habitat for a variety of mammals, insects, and reptiles. It is expected

that the operator of the airport would continue to maintain the habitat within the airfield to control wildlife as part of a Wildlife Hazard Management Plan in accordance with FAA Guidance. The airfield operator should consult with MDIFW to ensure that the implementation of BASH procedurce comply with the Maine ESA.

Essential Fish Habitat. As discussed in Section 3.12.2.3, Harpswell Cove and Buttermilk Cove have been designated as EFH for several species of fish. The portions of both waterbodies within or adjacent to the installation would be preserved in the natural area district under Alternative 1. The ecological communities surrounding Harpswell Cove and Buttermilk Cove, including freshwater and estuarine wetlands and mature upland forests, would be designated natural areas and preserved from future development. The long-term preservation of these habitats would have an indirect beneficial impact on EFH within Harpswell Cove and Buttermilk Cove by maintaining the natural vegetated buffers of these waterbodies.

New construction within the natural areas district would be limited to a pedestrian walkway. The walkway would cross Mere Brook approximately 1,500 feet upstream of the confluence with Harpswell Cove. The developer would be required to implement erosion and sediment controls during any construction activities within Mere Brook, which would prevent any adverse water quality impacts downstream within Harpswell Cove.

Based on the absence of in-water work in Harpswell Cove and Buttermilk Cove and the preservation of wetland and upland communities adjacent to these waterbodies, the Navy has determined that implementation of Alternative 1 would not adversely affect EFH. The NMFS, Northeast Region, has stated that the lack of in-water work associated with the proposed action precludes any effects on EFH (Colligan 2009; see also Appendix B).

Marine Mammals. Certain Maine coastal waters support marine mammals protected under the MMPA, including several species of seals. As discussed above, no in-water work would occur within Harpswell Cove or Buttermilk Cove, and the natural habitats surrounding these waterbodies would be designated as natural areas and preserved from future development. Consequently, the Navy has determined that implementation of Alternative 1 would not result in reasonably foreseeable “takes” of marine mammals by harassment, injury or mortality as defined under the MMPA.

Outlying Properties

Impacts on wildlife at the McKeen Street Housing Annex and Sabino Hill Rake Station would be minor, as these sites are currently primarily developed. The McKeen Street Housing Annex would remain residential. Any redevelopment of this site would primarily impact existing maintained lawn and landscaped areas. Wildlife in the Red Oak-Northern Hardwoods-White Pine Forest in the southern portion of the site could be impacted if this property were completely redeveloped. The Sabino Hill Rake Station property would be conveyed to the Town of Phippsburg. A portion of this site would be cleared for the construction of a

gravel parking lot. Because the property is already partially developed with an observation tower, it is expected that there would be minimal impact on wildlife. Small impacts on wildlife in the White Pine-Oak Woodlands could occur, as a small area of this ecological community is present.

The East Brunswick Radio Transmitter Site would be redeveloped as recreation/ open space and natural area land use districts. Potential uses of this site include the development of athletic fields, parking, support amenities, and pedestrian trails (BLRA 2007a). As discussed in Section 3.12.1, with the exception of the access road, the entire parcel is Sandplain Grassland. Removal of this habitat to develop recreation land uses could impact several state-listed special concern species, as discussed further in Section 4.12.1.3.

4.12.1.3 Threatened and Endangered Species

NAS Brunswick

Federally Listed Threatened and Endangered Species

No federally threatened or endangered species are located on NAS Brunswick and its outlying properties (Nordstrom 2008; see also Appendix B). Certain Maine coastal waters support various federally listed species, including sea turtles, whales, and the Gulf of Maine Distinct Population Segment of Atlantic salmon (Colligan 2009). Implementation of Alternative 1 would not involve any direct work in waterbodies that could potentially support federally listed sea turtles, whales, or Atlantic salmon. Furthermore, natural habitats surrounding coastal waters at NAS Brunswick would be designated as natural areas and preserved from future development. Consequently, implementation of Alternative 1 would have no effect on federally listed threatened or endangered species.

State-Listed Threatened and Endangered Species

Three state-listed threatened or endangered species are known to occur at NAS Brunswick: the grasshopper sparrow (state endangered), upland sandpiper (state threatened), and clothed sedge (state endangered) (Camuso 2009; Gannon 2009; see also Appendix B).

As discussed in Section 3.12.3, grasshopper sparrows and upland sandpipers are documented as breeding at NAS Brunswick (Siegel and Kaschube 2005). Although grasshopper sparrows are known to nest in the northern portion of the airfield, they have not been reported at NAS Brunswick since 2005 and may have been extirpated from the property (E & E 2008b). Grasshopper sparrows may also be avoiding NAS Brunswick due to recent BASH management activities, in particular the use of predator bird calls (Moore 2009). Upland sandpipers were observed during surveys in 2008 and 2009 (E & E 2008b, 2009a). Both species are grassland dependent and either historically or currently utilize the grassland habitat on the north end of the airfield and the interior grassy areas between the runways. Annual mowing of the airfield buffer zones has provided suitable habitat conditions for both species. The MDIFW may request that additional surveys be conducted as part of airfield management to determine the presence of grass-

hopper sparrows and upland sandpipers prior to any activities which may impact their habitat.

Figure 4.12-1 shows the MDIFW grasshopper sparrow and upland sandpiper Significant Wildlife Habitat areas overlaid on the Alternative 1 land use districts. As described in Section 3.12.4, for environmental review purposes, the MDIFW typically evaluates a 100-meter buffer around Significant Wildlife Habitat potentially containing threatened and endangered species to determine whether impacts would be experienced in these transitional areas. However, for the purposes of this EIS, acreage impacts are presented only for the areas contained within the actual habitat and do not include acreages within the buffer areas. These habitat areas comprise critically imperiled Sandplain Grassland and other maintained grassy areas surrounding the airfield (called grassland habitat). Grassland habitat covers approximately 566 acres of the installation, of which approximately 335 acres are located within the proposed airport operations district. It is expected that reuse of the airfield within this district would result in the routine maintenance of the grassland habitat, thereby preserving a large area of suitable habitat for grasshopper sparrows and upland sandpipers. Approximately 51 acres of additional grassland habitat on the installation would be preserved in the natural areas district. These grassland areas would need to be disturbed on a regular basis through mowing or prescribed burning to maintain the habitat.

Up to approximately 25 acres of critically imperiled Sandplain Grassland habitat on NAS Brunswick is located within the proposed professional office, education, and aviation-related uses land use districts. The MDIFW has stated that these proposed land uses in areas of Sandplain Grassland habitat would be incompatible with protections afforded state-listed species (e.g., grasshopper sparrow) under the MESA. Furthermore, the MDIFW stated that development of these land use districts in areas of critically imperiled Sandplain Grassland habitat would constitute an illegal taking of state-listed species (e.g., grasshopper sparrow) and recommended that all areas of Sandplain Grassland be included in the proposed conservation districts (Camuso 2009).

The Sandplain Grassland community at NAS Brunswick is one of four known grasshopper sparrow breeding sites in the State of Maine. Although only 12% of the available Sandplain Grassland habitat could be impacted by future development, the MDIFW has stated that the Sandplain Grassland habitat within the development districts is part of an historic core breeding area for grasshopper sparrows. In addition, the current acreage of the habitat at NAS Brunswick is near the minimum size necessary to support multiple grasshopper sparrow territories. Further reduction of available habitat, particularly historic core breeding areas, would significantly impact species recovery on the property. Since this habitat is considered a significant wildlife habitat under the NRPA, a permit would likely be required for any development within this area. Such permitting would require review and approval from the MDIFW and MNAP. MDIFW considers impacts on the actual habitat and 100-meter buffer as part of its environmental review process. The developer would likely be required to conduct additional surveys to verify the extent of the protected species' habitat.

Routine maintenance of the runway buffer zones at NAS Brunswick has preserved the Sandplain Grassland habitat by preventing the natural succession of this community into shrub or forestland. In addition, NAS Brunswick has worked closely with the MDIFW in the past on the maintenance of the airfield grasslands for the benefit of state-listed species (Camuso 2009; see also Appendix B). Accordingly, MDIFW has recommended that the future party responsible for managing the runway buffer zones maintain close coordination with MDIFW for the continued management of the grassland communities (Camuso 2009).

As discussed in Section 3.12.3, populations of the state-endangered clothed sedge have been documented at NAS Brunswick in the critically imperiled Little Bluestem-Blueberry Sandplain Grassland community. It is expected that reuse of the airfield within the airport operations district would result in the routine maintenance of the grassland habitat, thereby preserving the majority of available clothed sedge habitat at the installation. Up to approximately 25 acres of Sandplain Grassland habitat, or approximately 12% of the total available Sandplain Grassland habitat on the installation, may be permanently removed to develop the professional office, education, and aviation-related uses land use districts. Since this habitat is considered a significant wildlife habitat under the NRPA, a permit would likely be required for any development within this area. Such permitting would require review and approval from the MDIFW and MNAP. MDIFW considers impacts on the actual habitat and 100-meter buffer as part of its environmental review process. The developer would likely be required to conduct additional surveys to verify the extent of the protected species' habitat.

Outlying Properties

No impacts on federally-listed threatened or endangered species are expected at the outlying properties under Alternative 1, since no federally-listed threatened or endangered species have been identified on these properties.

State-Listed Species of Special Concern

No state-listed species are located at the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, or Sabino Hill Rake Station. However; as discussed in Section 3.12.3, a number of state species of special concern have been identified as potentially occurring at NAS Brunswick and the East Brunswick Radio Transmitter site. Implementation of Alternative 1 would cause both short- and long-term impacts on bird species listed as state species of special concern. Long-term impacts may be related to species mortality, habitat loss, and habitat fragmentation.

NAS Brunswick

Under Alternative 1, loss of grassland habitat at NAS Brunswick would have a negative impact on state species of special concern documented during the 2008 and 2009 grassland bird surveys, including grassland bird species (e.g., horned lark and eastern meadowlark) and species that rely on open habitats (e.g., eastern kingbird and tree swallow). Forest fragmentation resulting from new construction would negatively impact forest-interior bird species (e.g., wood thrush and black-and-white warbler). The loss of the grassland habitat and clearing of forests would also impact species typically found in shrubby fields and second-growth

02:002192.NL37.07-B3086 NAS Brunswick FEIS\Figure 4.12-1 Alt1 Natural Resources.AI-08/20/10-GRA

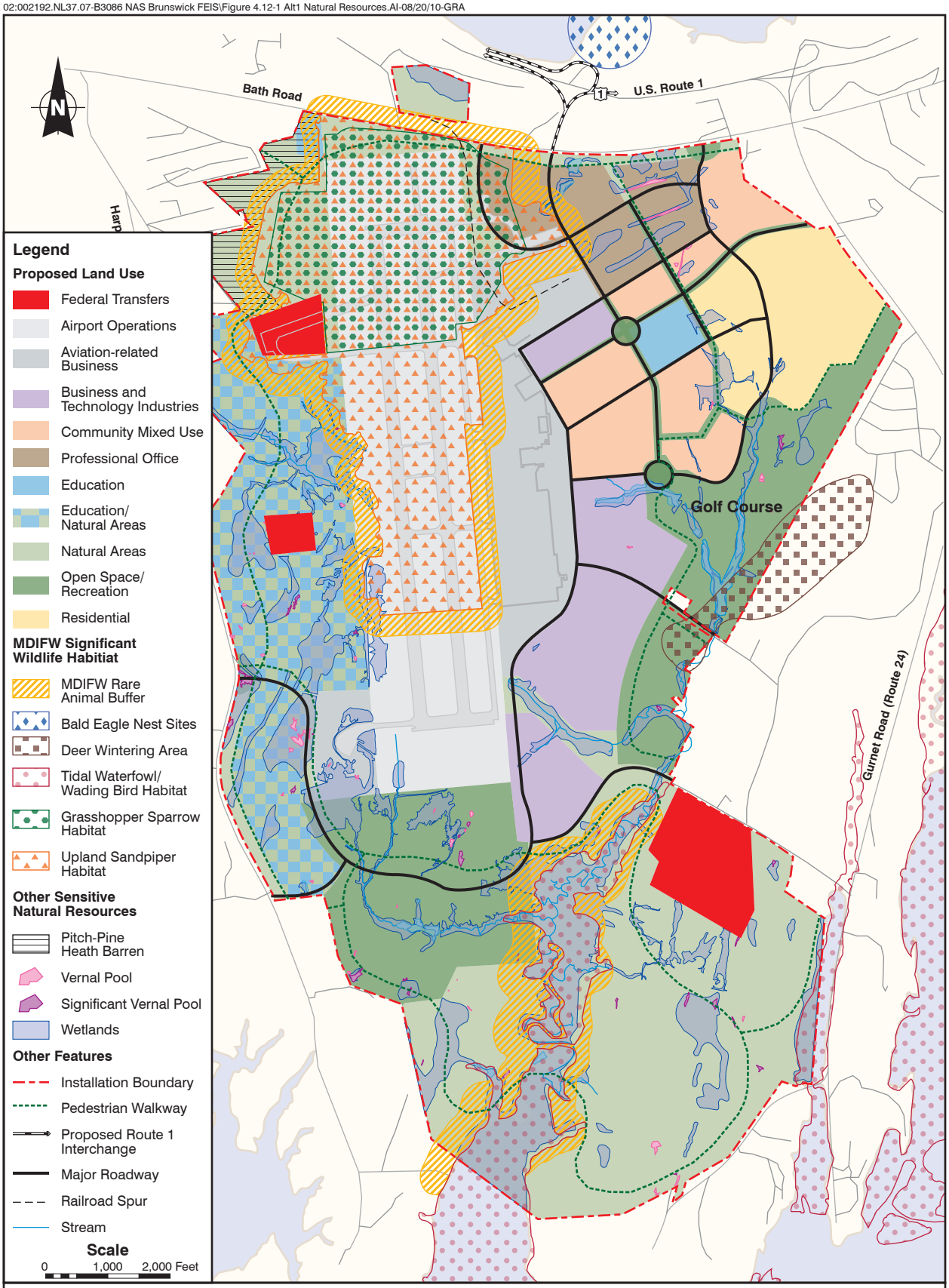


Figure 4.12-1
Alternative 1, Sensitive Natural Resources
Brunswick, Maine

SOURCE: E & E 2009a; TRC 2008; E & E 2008a; Nordstrom 2008; Camuso 2009; MDIFW 2009; Gawler and Cutco 2004; BLRA 2007a.

forests (e.g., yellow warbler, chestnut-sided warbler, and prairie warbler). Species such as the eastern towhee may benefit from these activities through the creation of edge habitat. Impacts on the great blue heron would be minor, as wetland impacts would likely be minimized.

Impacts on the saltmash sharp-tailed sparrow and Nelson's sharp-tailed sparrow would be minor under Alternative 1. The saltmarsh community and associated forested buffers along Harpswell Cove would be preserved within the Natural Areas district. The Mere Brook area is within the natural areas, education/natural areas, and open space/recreation districts. Some development would occur within the Education Area but would likely avoid direct impacts on Mere Brook. Planned recreational facilities would also likely avoid direct impacts on Mere Brook.

Under Alternative 1, the dry land sedge would not be impacted, as it occurs in a portion of the Sandplain Grassland that would be maintained. The small reedgrass could be impacted as it occurs within the proposed aviation-related business district; however, wetland permitting requirements may provide some protection.

Future developers would also be required to consult with the MDIFW for any development activities within the critically imperiled Pitch Pine-Heath Barren community due to known occurrences of rare butterfly and moth species in the immediate vicinity of the installation that are dependent on pitch pine (Camuso and Walker 2010).

Any party proposing development or other land disturbance in natural communities where state species of special concern could occur would need to consult with the MNAP and MDIFW to receive appropriate permits and clearances.

Outlying Properties

Under Alternative 1, development of facilities in support of recreation/open space land uses at the East Brusnwick Radio Transmitter Site could result in the conversion of up to approximately 64 acres of the critically imperiled Little Bluestem-Blueberry Sandplain Grassland to maintained lawn or impervious surfaces. Loss of the Sandplain Grassland habitat at the East Brunswick Radio Transmitter Site would have a negative impact on state species of special concern documented during the 2008 and 2009 grassland bird surveys, including grassland bird species (e.g., eastern meadowlark) and species that rely on open habitats (e.g., eastern kingbird and tree swallow). The loss of the grassland habitat would also impact species typically found in shrubby fields and second-growth forests (e.g., brown thrasher, yellow warbler, chestnut-sided warbler, prairie warbler, and eastern towhee). Forest-interior bird species (e.g., wood thrush and black-and-white warbler) would not be impacted as they occur in the forested areas surrounding the site, which would not be impacted under Alternative 1. No impacts on the great blue heron would be expected as no wetlands are present at the East Brunswick Radio Transmitter Site.

Under Alternative 1, the dry land sedge may be impacted if Sandplain Grassland habitat is removed and/or allowed to transition to another community type. Loss

of this habitat could also have a significant impact on the cobweb skipper. As described in Section 3.12.3, this site is one of only two locations in the state known to contain populations of this species (Walker 2009).

Any party proposing development or other land disturbance at the East Brunswick Radio Transmitter Site would need to consult with the MNAP and MDIFW to receive appropriate permits and clearances.

No impacts on state species of special concern are expected at the McKeen Street Housing Annex or Sabino Hill Rake Station, since no state species of special concern have been identified on these properties.

Bald and Golden Eagle Protection Act

The bald eagle was removed from the federal endangered species list in 2007 (USFWS 2007), but this species is still protected by the USFWS under the Bald and Golden Eagle Protection Act (BGEPA).

As discussed in Section 3.12.3, one bald eagle nest is located approximately 0.3 mile north of the installation, along the Androscoggin River, and two bald eagle nests are located approximately 0.75 mile and 2 miles east of the installation, near Buttermilk Cove (see Figures 3.12-2 and 4.12-1). Bald eagle management guidelines typically recommend that a minimum 660-foot-wide buffer be maintained between construction activities and bald eagle nests to avoid or minimize disturbance (USFWS 2007). Based on the 0.3-mile-wide buffer between the closest nest and NAS Brunswick, construction activities associated with implementation of Alternative 1 would not affect the bald eagle nests.

It is likely that transient eagles will occasionally fly over the installation or feed within the estuaries located in Harpswell Cove and Buttermilk Cove (Nordstrom 2009; see also Appendix B). This foraging habitat would be preserved through establishment of the natural areas district. Consequently, the availability of bald eagle foraging habitat would not be affected.

Because there would be no direct impact on bald eagles, a take permit as authorized under the BGEPA would not be applicable to reuse of NAS Brunswick under Alternative 1.

4.12.1.4 Significant Wildlife Habitat

As discussed in Section 3.12.4, the MDIFW has identified Significant Wildlife Habitat at NAS Brunswick, including threatened and endangered species habitats, tidal waterfowl and wading bird habitats, and deer wintering areas (Camuso 2009; see also Appendix B).

Vernal pools, or “spring pools,” are shallow depressions that usually contain water for only part of the year. “Significant vernal pools” are a subset of vernal pools with particularly valuable habitat. Significant vernal pools (i.e., those that support a certain abundance of indicator species [i.e., wood frogs, spotted salamander, blue-spotted salamander, or fairy shrimp] or support a threatened, endangered, or rare species for a critical part of its life history) are also protected as

Significant Wildlife Habitat under the NRPA (38 MRSA 480-B Chapter 335). Thirty significant vernal pools were identified during recent surveys (TRC 2008; E & E 2009b; see Appendix H). The Navy conducted vernal pool surveys in order to assess potential impacts from redevelopment of NAS Brunswick under Alternatives 1 and 2. Field verification of vernal pool boundaries and classifications were not conducted because the surveys were completed for planning-level purposes only. More detailed vernal pool surveys would be required by the NRPA for specific site development plans. According to the MDIFW, no Significant Wildlife Habitat exists at the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, or Sabino Hill Rake Station.

Stated-Listed Threatened and Endangered Habitat

Potential impacts on grasslands at NAS Brunswick considered Significant Wildlife Habitat due to the presence of state-listed threatened and endangered species are discussed in Section 4.12.1.3. In summary, it is expected that impacts on most of the grassland habitat would be avoided by continued use of the airfield and management of the airfield Clear Zones by the future airport operator. Furthermore, because this habitat is considered a significant wildlife habitat under the NRPA, a permit would likely be required for any development within this area. Such permitting would require review and approval from the MDIFW and MNAP. The MDIFW considers impacts on the actual habitat and 100-meter buffer as part of its environmental review process. The developer would likely be required to conduct additional surveys to verify the extent of the protected species' habitat.

Deer Wintering Areas

The mapped deer wintering area at the installation is located within the proposed open space/recreation district (see Figure 4.12-1). It is expected that sensitive natural resource habitats within this district would be avoided to the extent practicable by the developer. However, development of the 18-hole golf course in this district would likely remove a portion of the deer wintering area on the property. It is expected that the golf course would be designed to avoid impacting this area to the maximum extent practicable. If avoidance is not possible, the developer would be required to consult with the MEDEP. An NRPA permit would be required prior to clearing any portion of the deer wintering area.

Waterfowl and Wading Bird Habitat

The tidal waterfowl and wading bird habitat located at the southern end of the installation would be preserved as a natural area; therefore, this habitat would not be impacted (see Figure 4.12-1).

Vernal Pools

Forty-six vernal pools and 30 significant vernal pools were recently identified on NAS Brunswick. Of these pools, 34 vernal pools and 15 significant vernal pools are located within the development districts (i.e., professional office, business and technology industries, community mixed use, recreation/open space, and educational/natural areas districts) (see Figure 4.12-1). Twelve vernal pools and 13 significant vernal pools are located in the natural area district and would be preserved from future development. The remaining two significant vernal pools are

located in a parcel that will be transferred to the Department of the Army. Impacts on these two significant vernal pools have been analyzed in separate Army NEPA documentation (Maine Army National Guard 2010). Significant vernal pools harbor large breeding populations of spotted salamander and wood frogs. The filling in of vernal pools during development or the loss of the forested buffer around a given pool for the terrestrial portion of an amphibian's life cycle would lead to the loss of amphibian populations in a given area. The developer would likely avoid these pools or, alternatively, be required to perform further surveys and consult with the MEDEP and USACE. According to 38 MRSA 480-B, Chapter 335, significant vernal pool habitat consists of a vernal pool depression and the portion of the critical terrestrial habitat within 250 feet of the spring or fall high-water mark of the depression. However, the MEDEP regulates vernal pools up to 500 feet from the edge of the pool depression, while the USACE regulates vernal pools up to 750 feet from the edge of the pool depression (Elowe and Docherty 2010; Camuso and Walker 2010). An NRPA permit would be required prior to impacting a vernal pool or constructing within the regulated buffer. Under Alternative 1, 12 vernal pools and 13 significant vernal pools would be preserved in the natural area district. The consultation process and the requirement for obtaining an NRPA permit would result in avoidance, minimizing, or mitigating any impacts on vernal pools or significant vernal pools.

4.12.2 Alternative 2

4.12.2.1 Vegetation

NAS Brunswick

Implementation of Alternative 2 would require the permanent removal of vegetation to accommodate new facilities and supporting infrastructure. Some impacts would be reduced through the long-term conservation and preservation of 1,280 acres of natural ecological communities within the natural areas districts. Some impacts, however, would occur where new development results in the clearing or removal of vegetation.

The maximum potential impacts on vegetation communities (assuming complete ground disturbance) under Alternative 2 have been assessed for each land use district through GIS analysis. The results are presented in Table 4.12-2. Proposed construction activities could result in the long-term loss or alteration of up to approximately 1,068 acres, or 46%, of the undeveloped land at the base. However, this is the maximum acreage anticpated to be impacted based on the proposed size and demensions of development areas. In some areas, impacts would likely be significantly less. For example, all or portions of the upland forest and freshwater wetland communities within the recreation/open space district would likely be maintained by incorporating these communities into the reuse designs. As described in Section 3.1.2, future land development at NAS Brunswick and the outlying properties would be subject to the *Town of Brunswick Zoning Ordinance* (Town of Brunswick 2009a) and MRRA's Design Guidelines (MRRA 2010). Future developers would need to prepare site development plans for approval by the Town of Brunswick. These plans could reduce impacts on vegetation by

Table 4.12-2 Alternative 2 – Maximum Potential Impacts on Vegetation Communities, NAS Brunswick

Land Use District	Vegetation Cover Type						
	Upland Forest	Little Bluestem Blueberry Sandplain Grassland	Maintained Land	Successional Shrubland	Freshwater Wetland	Estuarine Wetland	Total
Business and Technology Industries	67	49	86	0	14	0	216
Community Mixed Use	73	10	52	0	2	0	137
Education	222	6	3	0	63	0	294
Natural Areas	0	0	0	0	0	0	0
Recreation/Open Space[1]	109	0	111	0	0	0	220
Residential	107	0	49	0	45	0	201
Total	**578**	**65**	**301**	**0**	**124**	**0**	**1,068**

Note:
[1] Development of the recreation and open space district would likely require removal of upland forest for creation of athletic fields, public gardens, and expansion of the golf course. However, portions of the existing 109 acres of upland forest would likely be preserved within this district. Furthermore, it is assumed that all sensitive vegetation communities, including wetlands, would be preserved in this district.

maximizing use of the existing cleared area and minimizing encroachment into vegetated areas. The maximum impact acreages are presented in the absence of site-specific development plans.

Up to approximately 578 acres of upland forest could be removed under Alternative 2. Some upland forest would likely be removed from each land use district, with the exception of the natural areas district. The majority of impacts on upland forest would affect Red Oak-Northern Hardwood and White/Red Pine Plantation communities, which are common communities in the mid-coast region of Maine.

As indicated in Section 3.12.1, the MNAP has not verified the presence of the critically imperiled Pitch Pine-Heath Barren community at NAS Brunwick. However, based on recent vegetation community mapping, approximately 7 acres of this community could potentially be removed in the education district. It is expected that the developer for the education area would limit development and minimize the impact on the Pitch Pine-Heath Barren. It should be noted that the Pitch Pine-Heath Barren community, as described in Section 3.12.1, is considered critically imperiled. Further delineation of this critically imperiled community would likely be required as part of any applicable State environmental permits such as those required by the SLDA and NRPA. Any party proposing development or other land disturbance within this community would need to consult with the MNAP to receive appropriate permits and clearances. The MDIFW should also be consulted due to known occurrences of rare butterfly and moth species in the immediate vicinity of the installation that are dependent on pitch pine. In addition, MRRA's *Community Design Guidelines Summary* sustainable development strategies, smart-growth principles, and other best management practices would encourage low-impact development (MRRA 2010).

The 109 acres of upland forest impacts in the recreation and open space district would likely be reduced through preservation of forest community buffers between athletic fields, public gardens, and expansion of the existing golf course. Approximately 543 acres of upland forest would be preserved within the natural areas district, including 51 acres of the critically imperiled Pitch Pine-Heath Barren community.

Approximately 65 acres of critically imperiled Little Bluestem-Blueberry Sandplain Grassland occurs within the proposed business and technology, community mixed use, and education land use districts, and this community could potentially be impacted by future development. Loss of this habitat could have a significant impact on state-liested species, as discussed in Section 4.12.2.3. Approximately 145 acres of Little Bluestem-Blueberry Sandplain Grassland would be preserved within the natural areas district; however, indirect impacts on this community could still occur if routine management activities are not conducted to maintain the habitat. In both the development districts and natural areas, the future owner/manager of the property would need to regularly disturb the grassland habitat through mowing or prescribed burning to prevent natural succession and loss of the community. If the Little Bluestem-Blueberry Sandplain Grassland habitat is not maintained, there may be other indirect negative impacts on the upland sandpiper, grasshopper sparrow, and clothed sedge.

Approximately 301 acres of additional maintained land, comprised predominantly of the regularly maintained short grass areas around the runways, are within land use districts identified for redevelopment. Most or all of this habitat would likely be permanently removed. However, as with potential impacts on the Little Bluestem-Blueberry Sandplain Grassland community, the developer would be required to consult with the MDIFW and MNAP regarding any potential development plans within this habitat due to the presence of state-protected grassland species. Approximately 55 acres of maintained land would be preserved in the natural areas district.

No successional shrubland would be impacted by Alternative 2. Approximately 53 acres of this community would be preserved within the natural areas district.

Up to approximately 124 acres of freshwater wetlands could be impacted by future development within the community mixed use, business and technology, education, and residential land use districts. No estuarine wetlands would be impacted under Alternative 2. Approximately 265 acres of wetlands, including approximately 17 acres of Subtidal Estuary, are located within recreation/open space and natural areas land use districts and would be preserved from future development. Impacts on wetland communities are discussed further in Section 4.11.

As discussed above, some impacts on vegetation communities would be reduced through establishment of the 1,280-acre natural areas district. This district is proposed to preserve, maintain, and enhance rare communities and large intact ecosystems for the overall long-term benefit of area residents and the natural environment (BLRA 2007a). This district would preserve wetland communities associated with Buttermilk Cove and Harpswell Cove, the critically imperiled Pitch Pine-Heath Barren and Little Bluestem-Blueberry Sandplain Grassland communities, and several large intact forested communities on the southern portion of the installation. Activities proposed within this land use district (e.g., development of pedestrian trails and nature and interpretive centers) would have minor impacts on vegetation communities primarily as a result of the construction of pedestrian trails. The trails would also provide access to the marshes and bays, opening up recreational opportunities for canoeing and kayaking (BLRA 2007a). Foot traffic within the marshes would result in the trampling of vegetation at the water access points; however, these impacts would be minor. Other activities proposed for this land use district, including environmental education and passive outdoor recreation, would not impact vegetation. Future land owners would be expected to comply with applicable local, state, and federal regulations and should consult with the MNAP and MDIFW regarding appropriate management of these natural communities, especially as it applies to threatened and endangered species.

Outlying Properties

Impacts on the outlying properties under Alternative 2 would be the same as those discussed above for Alternative 1.

4.12.2.2 Wildlife

NAS Brunswick

Impacts on wildlife under Alternative 2 would be similar to those discussed above for Alternative 1.

As noted above, a maximum of approximately 1,068 acres of vegetation could be removed by implementing Alternative 2, which accounts for approximately 46% of the developed land on the property. Wildlife that use these habitats would be forced to migrate to other areas with suitable habitat. Small mammals, amphibians, and reptiles would be most affected. White-tail deer, coyotes, wild turkey, and passerine birds would also be affected, but to a lesser extent because of their ability to move on to other habitat. However, some individuals of these species may be impacted if unoccupied habitat of equal quality is not available in the immediate vicinity. Upon completion of construction, recolonization would be expected in theses areas by species of small mammals, amphibians, reptiles, and birds adapted to urban conditions. The preservation of approximately 1,280 acres of natural areas, which include a mixture of contiguous upland forest, freshwater wetlands, and estuarine wetlands, would have a long-term beneficial affect on wildlife in these areas.

Approximately 65 acres of critically imperiled Little Bluestem-Blueberry Sandplain Grassland occurs within the proposed business and technology, community mixed-use, and education land use districts, and this community could potentially be impacted by future development. Loss of this habitat could have a significant impact on state-listed species, as discussed further in Secion 4.12.2.3. Approximately 145 acres of critically imperiled Little Bluestem-Blueberry Sandplain Grassland would be preserved within the natural areas district; however, indirect impacts on this community could still occur if routine management activities are not conducted to maintain the habitat. In both the development districts and natural areas, the future owner/manager of the property would need to regularly disturb the grassland habitat through mowing or prescribed burning to prevent natural succession and loss of the community. If the Little Bluestem-Blueberry Sandplain Grassland habitat is not maintained, there may be other indirect negative impacts on the upland sandpiper, grasshopper sparrow, and clothed sedge.

During construction, when noise and human activity levels increase, some wildlife species may temporarily move out of areas peripheral to the construction sites. Species that would be most affected would include those with relatively small home ranges, such as small mammals, reptiles and amphibians, as well as those that rely on specific habitat types or a specific size of habitat for resources (e.g., birds that breed in forest interiors). Short-term impacts may include displacement of mobile species such as white-tailed deer, raccoon, opossum, red fox, coyote, and various birds during construction. These species would avoid construction areas where equipment and human activity would create disturbance.

Although much of the high-quality wildlife habitat would be preserved as natural area, pedestrian trails through these areas would cause localized changes to the habitat and species composition. Forest-interior species tend to avoid trails due to

the disturbance created by human activity and would likely decline in abundance in the vicinity of the trail. Bird species that occupy the forest-edge, including hermit thrush (*Catharus guttatus*) and white-throated sparrow (*Zonotrichia albicollis*), would increase in abundance.

Aquatic species would be affected where construction activities occur within or adjacent to waterbodies. The greatest diversity and abundance of aquatic species occur in the tidally influenced portion of Mere Brook and in Harpswell Cove and Buttermilk Cove. These waterbodies are located within the proposed natural areas district, where ecological communities would be preserved and minimal development would occur. Consequently, implementation of Alternative 2 would have minor or no impacts on aquatic species in these waterbodies.

There is potential during construction for the degradation of aquatic habitats found in the ponds and streams located within and adjacent to the community mixed use district, business and technologies district, education district, and residential district. Without appropriate mitigation, construction activities have the potential to increase storm water pollutant loading and stream turbidity and alter stream hydrology, all of which can affect the suitability of aquatic habitats to support aquatic organisms. In addition, fertilizers and pesticides applied on the golf course may cause excess nutrient loading in receiving waterbodies, resulting in loss of aquatic species.

The developer would be required to comply with various federal, state, and local laws to reduce impacts on surface waters, including protection of riparian buffer zones, development of ESCPs, and implementation of BMPs. Compliance with these mitigation measures would reduce the potential for impacts on aquatic species. Futhermore, under Alternative 2, the 0.6-mile portion of Mere Brook that currently flows through culverts under the runways would be incorporated into the natural areas land uses. Following demolition of the runways, the culverts could be removed, and the stream banks and channel could be restored to their natural states. Restoration of Mere Brook would have a beneficial effect on aquatic species because it would increase access to this portion of the stream as well as the amount of available natural habitat.

Important Bird Areas. Reuse of NAS Brunswick under Alternative 2 could result in the permanent removal of up to approximately 366 acres of grassland habitat that is part of the Freeport/Brunswick IBA. This loss of habitat could significantly impact the number of birds using this portion of the IBA and significantly degrade the overall ability of this portion of the IBA to attract and support a diverse assemblage of grassland bird species. The developer would be required to consult with the MDIFW and MNAP regarding proposed development plans within this habitat due to the presence of state-protected grassland species, as discussed further in Section 4.12.1.3.

The Harpswell Cove portion of the IBA would not be impacted under Alterative 2 because the area would be preserved as a natural area.

Migratory Bird Treaty Act. Similar to Alternative 1, the potential exists for a limited number of migratory bird species to be directly impacted through loss or mortality of young during construction activities within the breeding season. The loss of habitat on the property under Alternative 2, primarily upland forest and grassland, would result in the loss of nesting areas for breeding birds and stopover areas for migrating bird species.

None of the impacts identified above would result in significant adverse effects on a population of migratory bird species. Furthermore, significant opportunities for management and preservation of migratory bird habitat will be present through the preservation of approximately 1,280 acres of high quality habitat on the property, including upland forest, freshwater wetlands, and estuarine wetlands.

Bird-Aircraft Strike Hazard. A BASH program would not be implemented under Alternative 2 because the existing airfield would not be reused.

Essential Fish Habitat. Similar to Alternative 1, under Alternative 2 the portions of Harpswell Cove and Buttermilk Cove within or adjacent to the installation would be preserved in the natural areas district. The ecological communities surrounding Harpswell Cove and Buttermilk Cove, including freshwater and estuarine wetlands and mature upland forests, would be designated natural areas and preserved from future development. The long-term preservation of these habitats would have an indirect beneficial impact on EFH within Harpswell Cove and Buttermilk Cove by maintaining the natural vegetated buffers of these waterbodies.

New construction within the natural areas district would be limited to a pedestrian walkway. The walkway would cross Mere Brook approximately 1,500 feet upstream of the confluence with Harpswell Cove (see Figure 4.12-2). The developer would be required to implement erosion and sediment controls during any construction activities within Mere Brook, which would prevent any adverse water quality impacts downstream within Harpswell Cove.

Based on the absence of in-water work in Harpswell Cove and Buttermilk Cove and preservation of wetland and upland communities adjacent to these waterbodies, the Navy has determined that implementation of Alternative 2 would not adversely affect EFH. The NMFS, Northeast Region, has stated that the lack of in-water work associated with the proposed action precludes any effects on EFH (Colligan 2009; see also Appendix B).

Marine Mammals. Certain Maine coastal waters support marine mammals protected under the MMPA, including several species of seals. As discussed above, no in-water work would occur within Harpswell Cove or Buttermilk Cove, and the natural habitats surrounding these waterbodies would be designated as natural areas and preserved from future development. Consequently, the Navy has determined that implementation of Alternative 2 would not result in reasonably foreseeable “takes” of marine mammals by harassment, injury, or mortality as defined under the MMPA.

02:002192.NL37.07-B3086 NAS Brunswick FEIS\Figure 4.12-2 Alt2 Natural Resources.AI-08/20/10-GRA

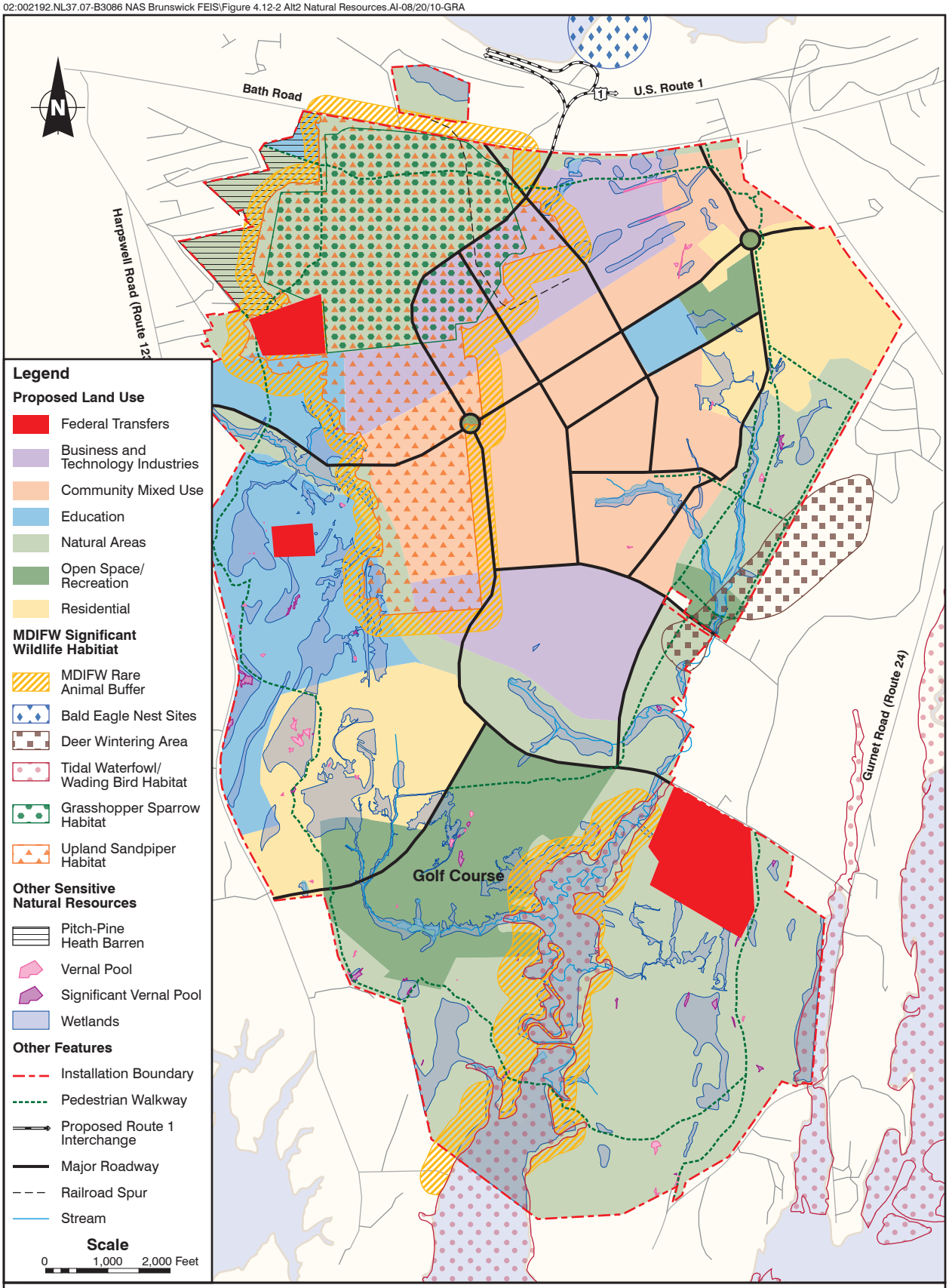


Figure 4.12-2
Alternative 2, Sensitive Natural Resources
Brunswick, Maine

SOURCE: E & E 2009a; TRC 2008; E & E 2008a; Nordstrom 2008; Camuso 2009; MDIFW 2009; Gawler and Cutco 2004.

Outlying Properties

Under Alternative 2, impacts on wildlife at the outlying properties would be the same as those discussed above for Alternative 1.

4.12.2.3 Threatened and Endangered Species

NAS Brunswick

Federally Listed Threatened and Endangered Species. No federally threatened or endangered species are present on NAS Brunswick or its outlying properties (Nordstrom 2008; see also Appendix B). Certain Maine coastal waters support various federally listed species, including sea turtles, whales, and the Gulf of Maine Distinct Population Segment of Atlantic salmon (Colligan 2009). Implementation of Alternative 2 would not involve any direct work in waterbodies that could potentially support federally listed sea turtles, whales, or Atlantic salmon. Furthermore, natural habitats surrounding coastal waters at NAS Brunswick would be designated as natural areas and preserved from future development. Consequently, implementation of Alternative 2 would have no effect on federally listed threatened and endangered species.

State-Listed Threatened and Endangered Species. Three state-listed threatened or endangered species are known to occur at NAS Brunswick: the grasshopper sparrow (state endangered), upland sandpiper (state threatened), and clothed sedge (state endangered) (Camuso 2009; Gannon 2009; see also Appendix B).

As discussed in Section 3.12.3, grasshopper sparrows and upland sandpipers have been documented as breeding at NAS Brunswick (Siegel and Kaschube 2005). Although grasshopper sparrows are known to nest in the northern portion of the airfield, they have not been reported at NAS Brunswick since 2005 and may potentially be extirpated from the property (E & E 2008b). Grasshopper sparrows may also be avoiding NAS Brunswick due to BASH management activities, in particular the use of predator bird calls (Moore 2009). Upland sandpipers were observed during surveys in 2008 and 2009 (E & E 2008b, 2009a). Both are grassland-dependent species and either historically utilized or currently utilize the grassland habitat on the north end of the airfield. Regular mowing of the airfield buffer zones has provided suitable habitats for both species. The MDIFW may request that additional surveys be conducted to determine whether grasshopper sparrows and upland sandpipers are present prior to any activities that may impact their habitat.

Figure 4.12-2 shows the MDIFW grasshopper sparrow and upland sandpiper Significant Wildlife Habitat areas overlaid on the Alternative 2 land use districts. As described in Section 3.12.4, for environmental review purposes, the MDIFW typically evaluates a 100-meter buffer around Significant Wildlife Habitat potentially containing threatened and endangered species to determine whether impacts would be experienced in these transitional areas. However, for the purposes of this EIS, acreage impacts are presented only for the areas contained within the actual habitat and do not include acreages within the buffer areas. Up to ap-

proximately 366 acres, or 65%, of the existing grassland habitat on the installation could be removed under Alternative 2 in the community mixed use and business and technology industries land use districts. This loss of grassland would result in the reduction of breeding pairs of grasshopper sparrows and upland sandpipers and the possible extirpation of both species from the installation. Development of these land use districts in areas of Sandplain Grassland habitat would constitute an illegal taking of grasshopper sparrows under the MESA. Since this habitat is considered a significant wildlife habitat under NRPA, a permit would likely be required for any development within this area. Such permitting would require review and approval from the MDIFW and MNAP. The MDIFW considers impacts on the actual habitat and 100-meter buffer as part of its environmental review process. The developer would likely be required to conduct additional surveys to verify the extent of the protected species' habitat.

The existing population of the state-listed endangered clothed sedge would be preserved in a natural areas district; therefore, impacts on this species would be avoided.

Outlying Properties

No impacts on federally listed or endangered species are expected at the outlying properties under Alternative 2, since no federally listed threatened or endingered species have been identified on these properties.

State-Listed Species of Special Concern. There are no state-listed species located at the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, or Sabino Hill Rake Station. However; as discussed in Section 3.12.3, a number of state species of special concern have been identified as potentially occurring at NAS Brunswick and the East Brunswick Radio Transmitter site. Implementation of Alternative 2 would cause both short- and long-term impacts on bird species liested as state species of special concern. Long-term impacts may be related to species mortality, habitat loss, and habitat fragmentation.

NAS Brunswick

Implementation of Alternative 2 would likely have a greater impact on state species of special concern than Alternative 1, as the grassland communities at NAS Brunswick could be impacted by development in the proposed business and technology, community mixed-use, and education land use ditricts. Approximately 145 acres of the Sandplain Grassland habitat would be preserved within the natural areas district, but this area could eventually succeed to forest if the habitat is not maintained. Loss of the grassland habitat would impact grassland-dependent species such as horned lark and eastern meadowlark, and species that rely upon open habitats, such as the eastern kingbird and tree swallow. The loss of the grassland habitat would also impact species typically found in shrubby fields and second-growth forests, such as the yellow warbler, chestnut-sided warbler, prairie warbler, and eastern towhee. Forest fragmentation resulting from new construction in other areas would negatively impact forest-interior bird species such as the wood thrush and black-and-white warbler. Impacts on the great blue heron would be minor, as wetland impacts would likely be minimized.

Impacts on the saltmash sharp-tailed sparrow and Nelson's sharp-tailed sparrow would be minor under Alternative 2. The saltmarsh community and associated forested buffers along Harpswell Cove would be preserved within the natural areas district. The Mere Brook area is within the natural areas and education districts. Some development would occur within the education area but would avoid impacts on Mere Brook to the extent practicable.

Under Alternative 2, the dry land sedge would occur in the proposed natural areas district but could be impacted if the grassland habitat is not maintained. The small reed-grass could also be impacted as it occurs within the proposed residential district; however wetland permitting requirements may provide some protection.

Future developers would also be required to consult wilth the MDIFW for any development activities within the critically imperiled Pitch Pine-Heath Barren communitiy due to known occurances of rare butterfly and moth species in the immediate vicinity of the installation that are dependent on pitch pine (Camuso and Walker 2010).

Any party proposing development or other land disturbance in natural communities where state species of special concern could occur would need to consult with the MNAP and MDIFW to receive appropriate permits and clearances.

Outlying Properties

Impacts on state species of special concern at the outlying properties under Alternative 2 would be the same as those discussed above for Alternative 1.

Bald and Golden Eagle Protection Act

The bald eage was removed from the federal endangered species list in 2007 (USFWS 2007), but this species is still protected by the USFWS under the Bald and Golden Eagle Protection Act (BGEPA).

As discussed in Section 3.12.3, one bald eagle nest is located approximately 0.3 mile north of the installation, along the Androscoggin River, and two bald eagle nests are located approximately 0.75 mile and 2 miles east of the installation, near Buttermilk Cove (see Figure 3.12-2 and 4.12-2). Bald eagle management guidelines typically recommend that a minimum 660-foot-wide buffer be maintained between construction activities and bald eagle nests to avoid or minimize disturbance (USFWS 2007). Based on the 0.3-mile buffer between the closest nest and NAS Brunswick, construction activities associated with implementation of Alternative 2 would not affect the bald eagle nests.

It is likely that transient eagles occasionally will fly over the installation or feed within the estuaries located in Harpswell Cove and Buttermilk Cove (Nordstrom 2009; see also Appendix B). This foraging habitat would be preserved through establishment of the natural areas district. Consequently, the availability of bald eagle foraging habitat would not be affected.

Because there would be no direct impact on bald eagles, a take permit as authorized under the BGEPA would not be applicable to reuse of NAS Brunswick under Alternative 2.

4.12.2.4 Significant Wildlife Habitat

As discussed in Section 3.12.4, the MDIFW has identified Significant Wildlife Habitat at NAS Brunswick, including threatened and endangered species habitats, tidal waterfowl and wading bird habitats, and deer wintering areas (Camuso 2009; see also Appendix B).

Vernal pools, or "spring pools," are shallow depressions that usually contain water for only part of the year. "Significant vernal pools" are a subset of vernal pools with particularly valuable habitat. Significant vernal pools (i.e., those that support a certain abundance of indicator species [i.e., wood frogs, spotted salamander, blue-spotted salamander, or fairy shrimp] or support a threatened, endangered, or rare species for a critical part of its life history) are also protected as Significant Wildlife Habitat under the NRPA (38 MRSA 480-B Chapter 335). Thirty significant vernal pools were identified during recent surveys (TRC 2008; E & E 2009b; see Appendix H). The Navy conducted vernal pool surveys in order to assess potential impacts from redevelopment of NAS Brunswick under Alternatives 1 and 2. Field verification of vernal pool boundaries and classifications were not conducted because the surveys were completed for planning-level purposes only. More detailed vernal pool surveys would be required by the NRPA for specific site development plans. According to the MDIFW, no Significant Wildlife Habitat exists at the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, or Sabino Hill Rake Station.

State-Listed Threatened and Endangered Habitat

Potential impacts on grasslands at NAS Brunswick considered Significant Wildlife Habitat due to the presence of state-listed threatened and endangered species are discussed in Section 4.12.1.3. In summary, the loss of up to approximately 366 acres of grassland habitat at the installation under Alternative 2 would result in the reduction of breeding pairs of grasshopper sparrows and upland sandpipers and the possible extirpation of both species from the installation. Since this habitat is considered a significant wildlife habitat under NRPA, a permit would likely be required for any development within this area. Such permitting would require review and approval from MDIFW and MNAP. MDIFW considers impacts to the actual habitat and 100-meter buffer as part of its environmental review process. The developer would likely be required to conduct additional surveys to verify the extent of the protected species habitat.

Deer Wintering Areas

The mapped deer wintering area at the installation is located within the proposed open space/recreation and natural areas districts (see Figure 4.12-2). It is expected that sensitive natural resource habitats within these districts, such as the deer wintering area, would be avoided by the developer. Currently, the wintering area is bisected by a high perimeter fence delineating the installation's boundary. It is anticipated that this fence would be removed as part of the installation's

reuse, thereby joining the two fragmented habitats and having a positive affect on the wintering area.

Waterfowl and Wading Bird Habitat

The tidal waterfowl and wading bird habitat located at the southern end of the installation would be preserved as a natural area (see Figure 4.12-2); therefore, this habitat would not be impacted.

Vernal Pools

There are 46 vernal pools and 30 significant vernal pools (and their associated protective buffers) at NAS Brunswick, and these could be impacted by new development under Alternative 2. Of these pools, 33 vernal pools and 12 significant vernal pools are located within the residential and developmental districts (i.e., professional office, business and technology industries, community mixed-use, recreation/open space, and educational/natural areas districts) (see Figure 4.12-2). Thirteen vernal pools and 16 significant vernal pools are located in the natural area district and would be preserved from future development. The remaining two significant vernal pools are located in a parcel that will be transferred to the Department of the Army. Impacts on these two significant vernal pools have been analyzed in separate Army NEPA documentation (Maine Army National Guard 2010). Significant vernal pools harbor large breeding populations of spotted salamander and wood frogs. The filling in of vernal pools during development or the loss of their forested buffers around a given pool during the terrestrial portion of an amphibian's life cycle would lead to the loss of amphibian populations in a given area. The developer would likely avoid these pools or, alternatively, be required to perform further surveys of the vernal pools in the project area and consult with the MEDEP and USACE to obtain an NRPA permit to impact a vernal pool or construct within its regulated buffer. According to 38 MRSA 480-B Chapter 335, significant vernal pool habitat consists of a vernal pool depression and the portion of the critical terrestrial habitat within 250 feet of the spring or fall high-water mark of the depression. However, MEDEP regulates vernal pools up to 500 feet from the edge of the pool depression, while the USACE regulates vernal pools up to 750 feet from the edge of the pool depression (Elowe and Docherty 2010; Camuso and Walker 2010). An NRPA permit would be required prior to impacting a vernal pool or consturctiong within the regulated buffer. Under Alternative 2, 13 vernal pools and 16 significant vernal pools would be preserved in the natural area district. The consultation process and the requirement for obtaining an NRPA permit would result in avoidance, minimizing, or mitigating any impacts on vernal pools or significant vernal pools.

4.12.3 No-Action Alternative

4.12.3.1 Vegetation

NAS Brunswick

Under the No-Action Alternative, existing mission and support operations at NAS Brunswick and the outlying properties would be relocated and the properties would be retained by the U.S. Government in caretaker status. Reuse or redevelopment of NAS Brunswick or the outlying properties would not occur; however, the housing areas would be expected to be occupied under the current PPV lease

agreement. In accordance with the BRAC PMO *Building, Vacating, Facility Layaway and Caretaker Maintenance Guidance*, only conditions adversely affecting public health, the environment, and safety would be corrected in non-residential areas. As such, vegetation maintenance would be limited to prevention of fire hazards and damage to building and utility lines. The grassland habitat surrounding the airfield would no longer be maintained as part of the BASH program, as air operations would cease under this alternative. However, the grounds around the airfield would be maintained according to the guidelines in *The Department of the Navy Base Realignment and Closure Implementation Guidance* (DoN 2007). According to these guidelines, the area around the airfield should "be maintained to the minimum extent necessary to protect against fire and erosion, and to assure proper forest and wildlife management where applicable." The guidelines require that the grass around the airfield be mowed at least once anually to a height no shorter than 8 inches and no longer than 12 inches. Mowing will not be conducted between May 1 and August 15 to protect nesting birds. This maintenance would be sufficient to prevent hardwood encroachment and maintain the grassland habitat around the runway, including habitat for the rare clothed sedge and other grassland plant species.

Outlying Properties

The McKeen Street Housing Annex would remain residential. The Red Oak-Northern Hardwoods-White Pine Forest that exists on the southern portion of the site would be left in a natural state.

The Little Bluestem-Blueberry Sandplain Grassland located at the East Brunswick Radio Transmitter Site would be left in a natural state. In the absence of management, trees and other species of shrubs not associated with sandplain grasslands would colonize the site. The quality of the grassland would decrease over time as the trees and shrubs mature, creating a canopy and shading out the grassland species. The site would eventually succeed into a forest.

The Sabino Hill Rake Station would also be left in a natural state, but some vegetation maintenance would be required in the immediate vicinity of the tower. However, most of the site would be left in a natural state. Blueberries, sweet fern, and other early successional species would colonize the site in the short term. Trees such as red oak and white pine would eventually regenerate, integrating the 0.23-acre lot into the adjacent Oak-Pine Woodland.

4.12.3.2 Wildlife

Under the No-Action Alternative, the property would be retained by the U.S. government in caretaker status. Overall wildlife abundance would likely increase as a result of decreased human activity. Diversity would likely remain constant, as the variety of habitats at the installation would be maintained.

Outlying Properties

Implementation of the No-Action Alternative would not be expected to result in a significant impact on wildlife located on NAS Brunswick's outlying properties. The McKeen Street Housing Annex would remain residential; therefore, no change in wildlife species would occur. The East Brunswick Radio Transmitter

Site would likely go thorough succession and revert to a forested area, potentially resulting in an increase in wildlife abundance and a decrease in the variety of species. The cleared area located at the Sabino Hill Rake Station property would be colonized by grasses, shrubs, and trees, allowing more wildlife to utilize the site.

4.12.3.3 Threatened and Endangered Species Habitat

The Little Bluestem-Blueberry Sandplain Grassland and maintained land adjacent to the airfield that provides habitat for the upland sandpiper (state threatened), grasshopper sparrow (state endangered), and the clothed sedge (state endangered) would be maintained through annual mowing. Therefore, no impacts on these species would be expected. The species would likely benefit from decreased human activity in the area.

4.12.3.4 Significant Wildlife Habitat

The Significant Wildlife Habitats identified at NAS Brunswick include the estuarine wetlands and subtidal estuaries located in Harpswell Cove and Buttermilk Cove (see Figure 3.12-1); the grasslands that support the upland sandpiper (state threatened), grasshopper sparrow (state endangered), and the clothed sedge (state endangered), a deer wintering area located west of Coombs Road (see Figure 3.12-2); and significant vernal pools (see Figure 3.12-3). The grassland habitat supporting the state-listed threatened and endangered species would be maintained through annual mowing, resulting in no impact. The estuarine wetlands and subtidal estuaries would be left in a natural state, resulting in no impact. The significant vernal pools would also be left in a natural state, resulting in no impact. The deer wintering area would remain bisected by the perimeter fence, which would not be removed under caretaker status.

5 Cumulative Impacts

This section examines the potential cumulative effects resulting from the disposal of NAS Brunswick, the McKeen Street Housing Annex, and the East Brunswick Radio Transmitter Site. Under all alternatives, no new buildings or residential units would be constructed at the Sabino Hill Rake Station; therefore, this property is not discussed as part of cumulative impacts. This cumulative impact analysis was developed to be consistent with guidance published by the Council on Environmental Quality (CEQ) (January 1997) and the U.S. Environmental Protection Agency (May 1999). In addition, the CEQ issued further guidance to federal agencies in June 2005 regarding the consideration of past actions in cumulative effects analysis. The guidance directs the agency preparing a NEPA document to determine what relevant information pertaining to past actions could be useful in illuminating or predicting the reasonably foreseeable direct and indirect effects of a proposed action.

A cumulative impact is the effect on the environment that could result from the incremental impact of the proposed action when added to other past, present, or reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions that take place over time. Accordingly, a cumulative impact analysis identifies and defines the scope of other actions and their interrelationship with the proposed action or its alternatives if there is an overlap in space and time. Cumulative impacts are most likely to occur when a proposed action is related to actions that could occur in the same or an overlapping geographic location and at the same or similar time.

Research, literature reviews, and contacts with applicable government and non-government agencies were used to determine impacts and to identify past, present, and future actions within the project area.

5.1 Cumulative Impact Study Area

The study area for this cumulative impacts analysis was identified by first determining the geographic area that includes the resources that would be directly affected by the proposed action and, second, by extending the boundaries of the initial geographic area to include the same and other resources affected by the combined impacts of the project and other actions. The geographic range varies depending on the resource area analyzed; resource-specific geographic study areas are specifically described. The cumulative impact analysis is provided by resource areas that can be evaluated meaningfully and that are of concern to re-

source agencies, local officials, and/or the public. Resource areas evaluated for cumulative impacts include land use and zoning, socioeconomics, community facilities and services, water resources, biological resources, and transportation. The cumulative impact analysis includes a description and evaluation of the past, present, and reasonably foreseeable future actions that could potentially have direct or indirect impacts in combination with the proposed action on these resource areas.

5.2 Reasonably Foreseeable Future Actions

U.S. Navy representatives met with county officials to identify and discuss any recently completed or reasonably foreseeable future actions in the vicinity of NAS Brunswick. Local land use and development plans and project-specific environmental documents were also reviewed to identify other reasonably foreseeable future actions near NAS Brunswick. Specific projects or actions that were either recently implemented or considered reasonably foreseeable in the future are listed and described in Table 5-1. The locations of these projects in relation to NAS Brunswick are shown on Figure 5-1.

This section identifies foreseeable non-project actions and long-term trends in or near the study area that may pose a cumulative effect on the resources, ecosystems, and human environment in the project area when considered with the effects of the proposed action. Actions are considered reasonably foreseeable future actions if they have been formally proposed, environmental documents have been prepared, or the relevant authorization and/or permits have been obtained but construction has not yet started.

5.2.1 Federal Transfers

The BRAC process allows for various federal, state, and local agencies and other non-profit organizations to apply for and be considered for property at a closing military base. Base Redevelopment and Planning is the first phase of the BRAC Process. During this phase, the NAS Brunswick property and buildings were offered to other federal agencies. Through the process, about 72 acres will be transferred to the U.S. Army, U.S. Coast Guard, and the FAA. The federal transfers are described below.

5.2.1.1 U.S. Army

The U.S. Army will build two structures on 12.12 acres of the 51-acre parcel (see Figure 5-1). The parcel will be owned by the Army National Guard, and the Marine Corps will be a tenant. The parcel will be fenced. The Armed Forces Reserve Center project includes associated parking, storm water management, a guard booth at the entrance of the site, and landscaping.

The 51-acre parcel includes some forested wetlands and two vernal pools. The layout of the proposed structures incorporates measures to reduce environmental impacts while maintaining a functional layout for the facilities, including limited development within vernal pool protection areas (MEARNG 2010). The Maine Army National Guard (MEARNG) completed an Environmental Assessment (EA) for both the MEARNG and United States Marine Corps Reserve (USMCR)

Table 5-1 Recently Completed or Reasonably Foreseeable Actions

Project Name	Description	Location	Distance to NAS Brunswick (miles)	Status
Federal Transfer: U.S. Army	Transfer of a 51-acre parcel for construction of a new Marine Corps Reserve and Maine Army National Guard Readiness Centers	NAS Brunswick	0	Completed
Federal Transfer: U.S. Coast Guard	Transfer of 11.2 acres, including Buildings 517 and 518 and the exiting national Differential Global Positioning System site, to the U.S. Coast Guard	NAS Brunswick	0	Completed
Federal Transfer: FAA	Transfer of 10 acres of property and the air traffic control tower to the FAA	NAS Brunswick	0	Pending
Disposal and Reuse of Topsham Annex	Disposal of a 74-acre outlying property of NAS Brunswick	Town of Topsham	Approximately 2.7 miles north-northwest of NAS Brunswick	Must be closed before September 15, 2011
Casco Bay Pipeline	Transfer of a 7.25-mile-long, 30-foot-wide pipeline easement to private ownership	Towns of Brunswick and Harpswell, Cumberland County	0	Ongoing
Downeaster Portland North Expansion Project	Updates to existing freight rail line from Portland to Brunswick and construction of new platforms in Freeport and Brunswick. Rail line will end at Maine Street Station	From Portland to Brunswick, Cumberland County, Maine	2.3	FONSI signed on July 1, 2009
Stowe Elementary School, McKeen Street	Construction of a new elementary school for 600 students, grades 3-5, at the site of the old high school	Town of Brunswick	2.7	Demolition of the old high school (summer 2009) followed by new construction
Safe Routes to School	MaineDOT will improve bicycle and pedestrian ways. Sidewalks will be constructed on Richards Drive near Brunswick Junior High School and Coffin Elementary.	Town of Brunswick	2.4	Work began in summer 2009
Brunswick Maine Street Station Redevelopment	23-acre mixed-use redevelopment, including retail/office space, hotel, residential units, and passenger train station.	Town of Brunswick	2.3	Ongoing
9 Industrial Parkway Redevelopment	Redevelopment of an existing parcel	Town of Brunswick	3.9	Site plan approved in summer 2009
Brunswick Nursing Home	Construction of a new nursing home	Maurice Drive Town of Brunswick	3.0	Site plan approved in summer 2009

Table 5-1 Recently Completed or Reasonably Foreseeable Actions (continued)

Project Name	Description	Location	Distance to NAS Brunswick (miles)	Status
Commerce Center	Construction of a 19-lot mixed-use subdivision	U.S. Route 1 Town of Brunswick	5.1	Site plan approved in summer 2009
MaineDOT Project	Road construction along 20 miles of I-295	Between Brunswick and Gardiner	3.7	Completed
Reuse Master Plan U.S. Route 1 Access Roadway	Proposed new surface road interchange directly connecting NAS Brunswick to U.S. Route 1	U.S. Route 1 Town of Brunswick	0	In planning stages
Reuse Master Plan Passenger/Freight Rail Spur	Connects NAS Brunswick to an existing rail line north of the property boundary	Town of Brunswick	0	In planning stages
Reuse Master Plan Relocation of Main Gate	The main gate would be relocated to the existing signalized intersection with Merry Meeting Plaza.	Town of Brunswick	0	In planning stages
Reuse Master Plan New Access to Bath Road	A new access road would extend from the installation onto Bath Road approximately 1,300 feet east of the Bath Road and Jordan Avenue intersection for Alternative 1 and across Jordan Avenue for Alternative 2.	Town of Brunswick	0	In planning stages
Reuse Master Plan Widening of Bath Road	Bath Road would be widened between Gurnet Road and Old Bath Road to provide two lanes in each direction.	Town of Brunswick	0.2-0.6	In planning stages
Reuse Master Plan Primary Access on Forrestal Drive	The emergency access on Forrestal Drive would become the primary access to the redeveloped NAS Brunswick property.	Town of Brunswick	0	In planning stages

L:\Buffalo\Brunswick\Maps\MXD\DEIS\Draft\January 2009\Figure 5-1.mxd

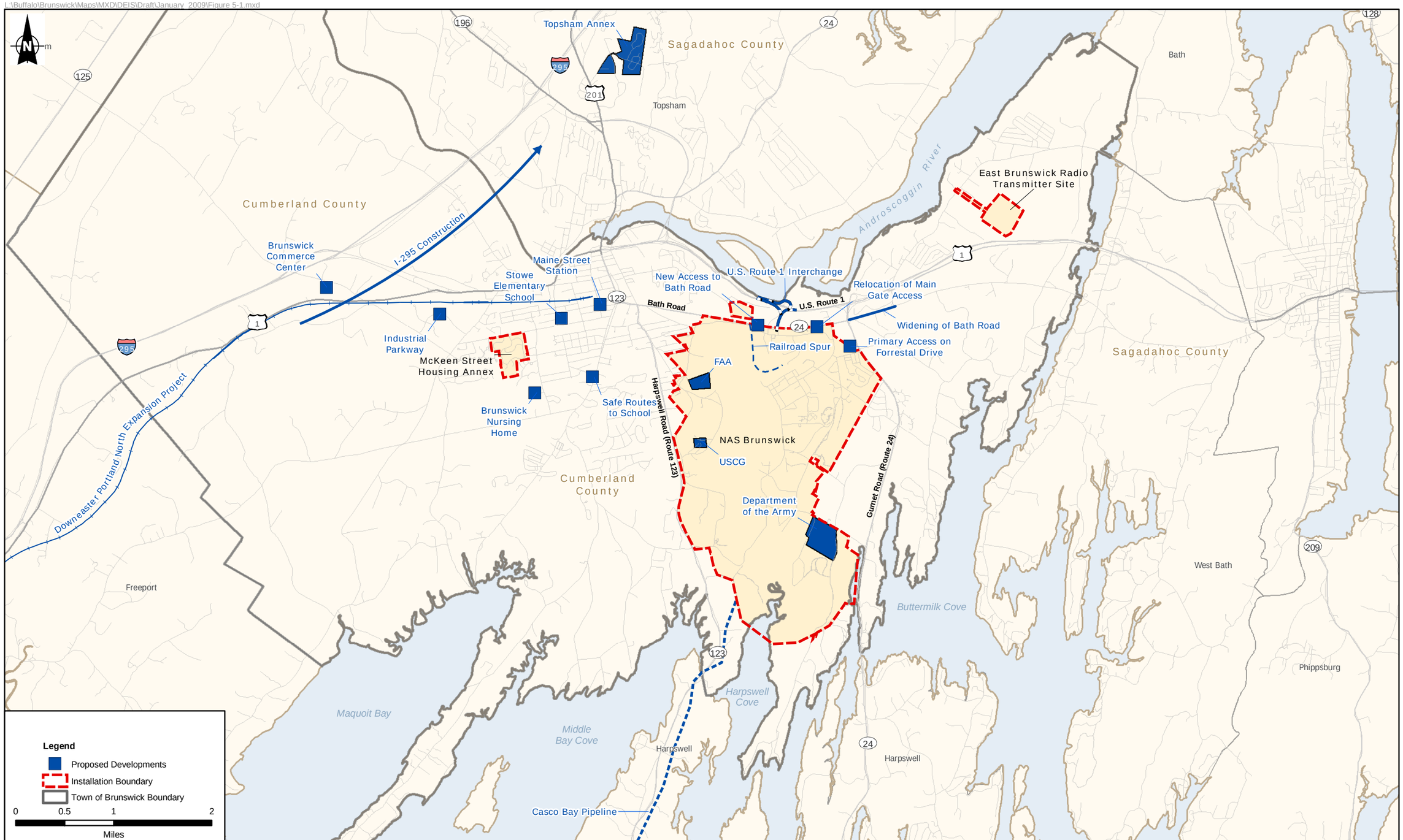


Figure 5-1
Other Forseeable Non-Project Actions
in the Vicinity of NAS Brunswick
Brunswick, Maine

and signed a Finding of No Significant Impact (FONSI) on July 19, 2010 (MEARNG 2010).

Phase I involves the construction of an 18,600-square-foot, one-story building for the USMCR Readiness Center. Phase I would also include 9,400 square feet of parking with 152 spaces. Construction is expected to start for Phase I in spring 2010 and be completed by summer 2011. Phase I may impact approximately 1,500 square feet (0.3 acre) of wetlands.

Phase II involves the construction of a 56,535-square-foot, two-story building for the MEARNG Readiness Center. The footprint of the building is 37,313 square feet. There would also be 86,200 square feet of parking and 10 additional parking spaces designated for people with disabilities. Phase II may impact approximately 37,950 square feet (0.87 acre) of wetland.

5.2.1.2 U.S. Coast Guard

Two buildings (Buildings 517 and 518) are located on the parcel of land that the U.S. Coast Guard received during transfer.

5.2.1.3 Federal Aviation Administration

Ten acres of property will be transferred to the FAA. This property includes the parcel where the current airport traffic control (ATC) tower and radar approach control (RAPCON) equipment are located. The FAA will not operate the current airport traffic control tower. The FAA, as the recipient of this parcel and buildings, intends to only use of the RAPCON equipment. Due to the comingled nature of the ATC tower and RAPCON equipment and the need for a secure facility, it is not feasible to transfer the RAPCON without the ATC tower. Thus, the building where the former ATC tower was located at the airfield will be transferred to the FAA; however, it will no longer serve as the ATC tower for the airfield operated by FAA or any other entity. In addition to RAPCON/Tower building and equipment, the federal transfer to the FAA would also include the remote transmitter/receiver (RTR) site with equipment and the airport surveillance radar-8 (ASR-8) site with equipment, all of which are located on the same 10-acre parcel.

5.2.2 Other BRAC Actions

Topsham Annex

Topsham Annex, which is an outlying property of NAS Brunswick, has also been designated for disposal as a result of BRAC 2005. The 74-acre property contains both improved and unimproved land and is considered a surplus DoD property. The impacts of the disposal and reuse of the Topsham Annex have been addressed in a separate NEPA document. This action was considered a separate NEPA action because the reuse plan was prepared by the Topsham Local Redevelopment Authority while the Brunswick Local Redevelopment Authority prepared the Brunswick Reuse Master Plan. Subsequently, the Midcoast Regional Redevelopment Authority assumed responsibility for both reuse plans.

Potential redevelopment of the Topsham Annex would be consistent with the *Topsham Annex Reuse Master Plan* (Topsham LRA 2007). The implementation of the *Topsham Annex Reuse Master Plan* is the responsibility of MRRA. The objective of the proposed reuse is to provide the local community the opportunity for economic development and job creation while ensuring smart growth, natural resource conservation, and sustainable development. Full build-out would take place over 20 years.

The preferred reuse of the Topsham Annex consists of mixed use. The *Topsham Annex Reuse Master Plan* calls for development of approximately 60 acres (81%) of the total Annex property. The other 14 acres (19%) would be dedicated to a variety of active and passive uses, including recreation, open space, and natural areas. Of the 60 acres that would be developed, 46 acres would be developed as residential and 14 acres would be developed as a mix of office, commercial, retail, light industrial, and other similar uses that would be consistent with current adjacent residential and educational land uses.

At full build-out (20 years), the preferred plan would entail:

- 148 housing units,
- 70,000 square feet of renovated/reused business space,
- 200,000 square feet of new floor space,
- On-site roadway upgrades,
- Replacement of water distribution and wastewater collection systems,
- Installation of new storm water infrastructure, and
- New traffic signals and parking spaces as needed.

5.2.3 Other Federal Actions

5.2.3.1 Casco Bay Pipeline, Department of the Navy

A 7.25-mile-long, 30-foot-wide pipeline easement through privately held properties in the towns of Brunswick and Harpswell, Maine, is scheduled for transfer to private ownership. The Casco Bay Pipeline easement, obtained by condemnation in 1952, connected Mitchell Field (formerly Defense Fuel Support, Casco Bay) to NAS Brunswick. The easement includes two buried carbon steel, tar-coated, asbestos-wrapped pipes with welded joints.

The preferred action for the Casco Bay Pipeline would include removal of the entire pipeline, which would involve clearing the surface right-of-way, excavating the pipes, and properly disposing of the asbestos wrapping on the exterior of the pipeline. Following removal of the pipeline and the completion of any required restoration and/or remediation work, the Navy would relinquish the Government's interest in the pipeline by the execution and recordation in the Cumberland County land records of a Notice of Abandonment. A copy of the recorded Notice

of Abandonment would then be provided to all owners of record of land through which the easement route passed.

5.2.3.2 Downeaster Expansion Project, Federal Railroad Administration

An Environmental Assessment (EA) was prepared and a Finding of No Significant Impacts (FONSI) has been signed for a transportation project that will expand the Amtrak Downeaster (Downeaster) train service to include a route between Portland and Brunswick, Maine (FRA and NNEPRA 2009). The need for this project stems partially from traffic congestion along the I-295 corridor, which include delays and increased traffic accidents.

The Downeaster train currently provides round-trip service between Boston, Massachusetts, and Portland, Maine, five times a day. The Federal Railroad Administration (FRA) and Northern New England Passenger Rail Authority (NNEPRA) propose to extend the service of four of the five existing round trips to include Brunswick, Maine. The FRA and NNEPRA also propose to add two additional routes between Portland and Brunswick, Maine. Therefore, at completion of the project, the Downeaster would make two round-trips between Portland and Brunswick, Maine, and four round-trips between Boston, Massachusetts, and Brunswick, Maine, including a stop each way in Portland, Maine. The new Amtrak train service between Portland and Brunswick, Maine, would use the existing freight train rail lines. The existing freight train rail operation consists of six trains per day between Portland and Royal Junction, Maine (approximately half the distance between Portland and Brunswick, Maine), and two trains per week between Royal Junction and Brunswick, Maine.

The preferred, and selected plan consists of rehabilitating approximately 30 miles of existing rail line between the Portland Transportation Center (PTC) and Maine Street Station in Brunswick. The plan consists of track upgrades, special track work, the construction of platforms at Brunswick and Freeport, a siding at Brunswick (i.e., an auxiliary track adjacent to and north of the existing track, which will be used by freight trains passing the platform area), rehabilitation of three stone arch culverts, replacement or repair of 14 culverts, drainage improvements north of Freeport, and signal upgrades. The EA states that passenger rail services has the potential to play an important role in keeping Maine's economy competitive for the future by enhancing quality of life for Maine's employers, employees, and visitors. Investment in the passenger rail system helps fulfill state and federal transportation policies, and the improvements in the existing rail system will also benefit existing freight train operations, which also use the rail line (FRA and NNEPRA 2009).

5.2.4 Town of Brunswick

5.2.4.1 Stowe Elementary School, McKeen Street

A new elementary school building committee was formed in 2006 (Brunswick School Department 2009). Construction of Stowe Elementary School in Brunswick began in September 2009 (Brogan 2009b). The elementary school is being constructed on the site of the old high school due to its central location and lot size (Building Committee 2007a; Building Committee 2007c). Demolition of the

old high school occurred in July 2009 and construction of the new elementary school began after demolition was completed (Building Committee 2009).

The new school will have the capacity to serve 600 students in grades 3 through 5 (PDT Architects 2009). The school was originally going to be designed to serve 720 students, but this number was reduced because of the announced disposal of NAS Brunswick. The best fit is now estimated to be 200 students per grade (Building Committee 2007b).

The new school is estimated to be between 92,000 and 95,000 square feet in area (Building Committee 2007d). The school's location on the site is intended to maximize safety, with separate bus and car drop-off areas and a single entrance. The new facility will be LEED certified and will participate in the Efficiency Maine High Performances Grant Program (PDT Architects 2009).

Stowe Elementary School is scheduled to open in September of 2011 (Building Committee 2008). Coffin Elementary and Jordan Acres Elementary will be converted from K-5 elementary schools to K-2 (Brogan 2009b). Longfellow School is scheduled to close following the opening of Stowe Elementary School. Longfellow School was chosen to close for many reasons, including, but not limited to, state financing, which would not become available for a new school unless another was closed; Longfellow School cannot be expanded and would be very costly to renovate to a K-2 building; and traffic safety, with busses stopping traffic on a main artery near Longfellow School (Building Committee 2007c).

5.2.4.2 Safe Routes to School

In July 2009, Maine DOT began improving bicycle and pedestrian ways. Sidewalks will be constructed on Richards Drive near Brunswick Junior High School and Coffin Elementary (MaineDOT 2009).

5.2.4.3 Brunswick Maine Street Station Redevelopment

The mixed-use redevelopment project is situated on approximately 23 acres in downtown Brunswick (Maine Street) and includes the development of retail/office space, hotel, residential condominiums, and a train station (MACTEC Engineering, Inc. 2006). Full build-out would include 122 residential units, 110,000 square feet of commercial/retail space, 60 hotel rooms, a train station, and 710 vehicle parking spaces. The first phase of the project includes the development of the 5.26-acre east side of the site, which includes approximately 60,000 square feet of commercial/retail space, 16 residential units, 60 hotel rooms, and a train station (JHR Development of Maine 2008). As of winter 2009, construction of approximately 40,000 square feet of retail/office space and the train station has been completed and occupied by tenants. Planning for the 16 residential units is ongoing, with completion and occupation of these residential units planned for 2010. No date has been set for completion of the hotel or the remaining commercial/retail space on the east side of the site (JHR Development of Maine 2009). The 15.20-acre west side of the site and the remaining residential and commercial/retail space would be developed at a future undetermined date.

5.2.4.4 9 Industrial Parkway Redevelopment

This project involves the redevelopment of a parcel located on 9 Industrial Parkway. The redevelopment includes expansion of on-site parking, adding a 9,700-square-foot fenced storage area for Maine Natural Gas, and making access improvements (Brunswick Planning Board 2009a). A 19,500-square-foot building will be renovated but not expanded (Hultgren 2009). The proposed development will be serviced by municipal water and sewer facilities. The final plan review for the project by the Town of Brunswick occurred on July 28, 2009 (Brunswick Planning Board 2009c). The project was approved with the following exceptions (Brunswick Planning Board 2009d):

- Any changes to the approved plan not considered a minor modification shall require review and approval in accordance with the Brunswick Zoning Ordinance.
- Prior to issuance of a building permit, the Amendment to the Site Location of Development Permit shall be approved by the MEDEP.
- The existing trees and landscape are to be maintained to the greatest practical extent.
- Emergency access is reserved for the southeast portion of the building where the storage area is located by noting on the final plan that the 15-foot concrete sidewalk is an area not intended for storage.
- The future cell tower facility shall be separately reviewed and approved by the Planning Board.

5.2.4.5 Brunswick Nursing Home

The Brunswick Nursing Home proposal and final plan was approved by the Town of Brunswick's Planning Board on July 14, 2009. The 7.3-acre lot will accommodate a 37,950-square-foot building, 63 parking spaces, and indoor and outdoor common areas. The lot is located at the end of Maurice Drive. The nursing home will consist of three wings, and amenities include a fenced-in garden and an outdoor dining area. The nursing home will be serviced by public water and public sewers (Hultgren 2009). Gas and power will be connected at Baribeau Drive and run underground along Maurice Drive. The proposed storm water drain system, which will collect all the runoff from the site, will consist of five treatment beds, underground soil filters, and pipes to convey surface water away from the site. One underground soil filter will be located at the center of the parking lot, a second will be located adjacent to the parking lot, and the other three will be located around the perimeter of the parking lot (Brunswick Planning Board 2009b). There will also be an additional drip-line soil filter, which is a part of the roof system. The design incorporated BMPs required by the MEDEP (Brunswick Planning Board 2009b). As of July 14, 2009, the Brunswick Nursing Home Final Site Plan had been approved but no building permits had been issued.

5.2.4.6 Brunswick Commerce Center

In June 2009, the Town of Brunswick's Planning Board approved the Brunswick Commerce Center (Brogan 2009a). According to the Brunswick Commerce Center's Web site, the 94-acre Brunswick Commerce Center is a 19-lot, mixed-use subdivision containing 15 commercial lots ranging from 2 acres to over 12 acres, providing many options for various sized commercial and light industrial uses. The larger lots could be subdivided by another developer. The zoning is Mixed Use 5 under Brunswick's Zoning Ordinance. The density requirements call for a minimum lot size of 2 acres, and the maximum building size is 10,000 square feet per 2-acre lot. Clustering is both allowed and encouraged.

The Commerce Center is situated less than a mile from Pleasant Street, on U.S. Route 1 in Brunswick. The site is also less than a mile from the access/exit ramp for I-295. The development is located between I-295, U.S. Route 1, and Durham Road. A 2,250-foot loop road for the center was scheduled to be built in fall 2009. The purpose of the Commerce Center is to attract qualified employees from Portland, Augusta, Lewiston, and Bath, all of which are less than a half-hour commute from the Commerce Center (Brunswick Commerce Center 2009).

5.2.4.7 MaineDOT Projects

- **I-295 Construction from Brunswick to Gardiner.** The MaineDOT completed about 20 miles of road improvements and upgrades along I-295 between the towns of Brunswick and Gardiner during the fall of 2009. Construction included concrete rubblization, hot-mix asphalt overlay, pavement milling, and installation of drainage, lighting, and safety features (Mann 2009).

- **Gateway 1 Corridor Action Plan, Brunswick to Stockton Springs.** The Gateway 1 Corridor Action Plan (the Plan) was developed by the Gateway 1 Steering Committee, which includes representatives from the U.S. DOT, MaineDOT, and the Maine State Planning Office, and community members in Mid-Coast Maine. The purpose of the plan is to address regional and local land use character and transportation issues along U.S. Routes 1 and 90. The corridor encompasses 20 municipalities and extends from Brunswick to Stockton Springs, Maine (Gateway 1 Steering Committee 2009). The Town of Brunswick has adopted the Gateway 1 Corridor Action Plan (Brown 2010).

  The preferred development concept involves concentrating job growth within compact areas defined for each of the 20 Gateway 1 communities. The compact residential, commercial, and mixed-use core growth areas were connected to a variety of transportation methods, including ride-sharing, transit, multi-modal freight, passenger rail where available, walking, and bicycling. This concept also emphasizes rural land preservation across large areas between the core growth areas of development (Gateway 1 Steering Committee 2009).

5.2.4.8 Off-site Reuse Master Pan Projects

- **U.S. Route 1 Access Roadway.** An off-site access road, known as the U.S. Route 1 Access Roadway, is proposed to be constructed as part of the Reuse Master Plan. The access roadway would be located on private lands, outside of the property boundary of NAS Brunswick. The roadway would directly connect the NAS Brunswick property to U.S. Route 1 and would serve as the primary access point to the property. Conceptually, the roadway would extend from U.S. Route 1, west of the present interchange at Cook's Corner, cross Bath Road, and then connect with the roadway system to be constructed on the site (see Figure 5-1). At this time, however, the project is only in the initial planning stages. The project has not been designed or funded, a lead agency has not been identified, the land required for construction has not been acquired, required permitting and review has not been completed, and a construction schedule has not been identified.

- **Passenger/Freight Rail Spur.** A Passenger/Freight Rail Spur is proposed to be constructed as part of the Reuse Master Plan. The rail spur would be located both in the northern portion of the NAS Brunswick property and outside its boundary, on private lands. The rail spur would directly connect the NAS Brunswick property to an existing rail line north of Bath Road. Conceptually, the rail spur would extend from this existing rail line, cross Bath Road, and then connect with a rail line to be constructed on the site. At this time, however, the project is only in the initial planning stages. Figure 5-1 shows the proposed location for the rail spur. The project has not been designed or funded, a lead agency has not been identified, the land required for construction has not been acquired, required permitting and review has not been completed, and a construction schedule has not been identified.

- **Relocation of the Main Gate Access.** The main access would be relocated to the existing signalized intersection with Merry Meeting Plaza. This modification was assumed to be in place by 2016.

- **New Access to Bath Road.** A new access road would extend from the installation onto Bath Road, approximately 1,300 feet east of the Bath Road/Jordan Avenue intersection for Alternative 1, and across Jordan Avenue for Alternative 2. This modification was assumed to be in place by 2026.

- **Widening of Bath Road.** Bath Road would be widened between Gurnet Road and Old Bath Road to provide two lanes in each direction.

- **Primary Access on Forrestal Drive.** The emergency access on Forrestal Drive would become the primary access to the redevelopment.

5.3 Cumulative Impact Analysis

This section identifies the cumulative effects associated with redevelopment of NAS Brunswick and the projects listed in Section 5.2. This analysis focuses on the human environment. If redevelopment of NAS Brunswick does not result in a

direct or indirect impact, then no further analysis of potential cumulative effects is necessary.

5.3.1 Land Use

5.3.1.1 Geographic Study Area

The geographic study area for land use included NAS Brunswick and the planning areas surrounding the facility as designated in the *2008 Town of Brunswick Comprehensive Plan* (Town of Brunswick 2008a). This area was extended to the north to include the town of Topsham, the location of the Topsham Annex, and to the south from NAS Brunswick to the Town of Harpswell, to include the Casco Bay Pipeline easement. Topsham Annex is an outlying property of NAS Brunswick but is the subject of a separate NEPA document. The Casco Bay Pipeline easement is also the subject of a separate NEPA document. These projects are included in this EIS for cumulative impacts only.

5.3.1.2 Cumulative Impact Analysis

To assess cumulative impacts to land use, the following actions were considered:

- Future actions that could change land ownership. Changes in ownership can affect the amount of land that the Town regulates, which can impact land use planning, zoning, and site plan review. Ownership change is also discussed under socioeconomics, community services, and infrastructure.

- Future actions that would convert existing land uses to new uses. Projects identified include new residential, commercial, and industrial development, which could convert land use types, and transportation projects, which could result in indirect land use impacts.

Upon full build-out of NAS Brunswick, approximately 3,200 acres of federal land would be reintegrated back into the town of Brunswick. The majority of proposed redevelopment is concentrated on approximately 1,630 acres of land in areas that have already been developed by the Navy. The remaining property, about 1,504 acres, would be dedicated to preserving open space and natural areas.

The federal-to-federal transfers associated with NAS Brunswick would include approximately 72.2 acres that would remain in federal ownership. The only other projects that may result in a cumulative impact on ownership is the disposal of the Topsham Annex and the Casco Bay Pipeline. The Topsham Annex would include the disposal of approximately 74 acres by the Navy. The Casco Bay Pipeline would transfer approximately 26 acres from federal ownership back to private ownership within the towns of Brunswick and Harpswell. The disposal of the Topsham Annex and NAS Brunswick and the transfer of the Casco Bay Pipeline easement to private ownership would cumulatively reduce the total amount of land held by the federal government.

Under Alternative 1 or Alternative 2, existing land use conditions within the boundaries of NAS Brunswick, the McKeen Street Housing Annex, and the East Brunswick Radio Transmitter Site would change. NAS Brunswick, the McKeen Street Housing Annex, and the East Brunswick Radio Transmitter Site properties

would be incorporated into the town of Brunswick. Redevelopment of the Topsham Annex would convert military land into a mix of business/community use, residential, and parks and recreation in the town of Topsham. Under the No-Action Alternative, land use conditions would remain as a built military installation, but public access would be curtailed, even for use of the golf course. Land ownership would be retained by the U.S. government.

Conversions of land use types would also result from the following community projects:

- **Brunswick Maine Street Station** – Brownfield to residential/commercial development
- **Brunswick Nursing Home** – Open space to medical facility
- **Commerce Center** – Open space to mixed-use subdivision

The cumulative impacts of land use changes proposed for NAS Brunswick under Alternative 1 or Alternative 2, when considered along with changes in land use associated with the Topsham Annex, the Casco Bay Pipeline, and the community projects, would result in cumulative impacts on land use. These impacts would be offset by the locations of the developments in four different towns. In addition, preservation and incorporation of open space/conservation/recreation uses into redevelopment, primarily at NAS Brunswick but also at Topsham Annex, would help maintain a balance of development and open space. The Gateway 1 Corridor Action Plan as adopted by the Town of Brunswick identifies growth and rural areas along the U.S. Route 1 corridor (Gateway 1 Corridor Steering Committee 2009). Implementation and compliance with the Plan would help mitigate cumulative impacts on land use along the corridor and within the defined rural and growth areas.

5.3.2 Socioeconomics

5.3.2.1 Geographic Study Area

For the purposes of this analysis, the study area includes the NAS Brunswick property, the town of Brunswick, and the extent of the Brunswick LMA.

5.3.2.2 Cumulative Impact Analysis

Population

The projected population changes for NAS Brunswick and other projects are shown in Table 5-2. The closure of NAS Brunswick initially would create an estimated population loss of 6,037 within the Brunswick LMA. Upon full build-out under Alternative 1, it is expected that there would be an estimated net population increase of 127 from existing (2008) baseline conditions. Under Alternative 2, it is expected that there would be an estimated net increase of 9,545 people relocating to the areas surrounding the installation. It is not anticipated that off-base, indirect impacts would significantly change the population.

Table 5-2 Projected Cumulative Population Impacts

Project	Net Change from Existing (2008) Baseline Conditions	
	Alternative 1	Alternative 2
Redevelopment of NAS Brunswick	127	9,545
Redevelopment of Topsham Annex	113	113
Brunswick Maine Street Station[1]	192	192
Cumulative Total	**432**	**9,850**

Note:
[1] Assumes townhome/condo multiplier of 1.57.

The disposal of Topsham Annex would result in an initial population loss of 225 in the town of Topsham. However, it is estimated that there could be a minor population increase (a net increase of 113 people over existing conditions) upon full build-out.

Full build-out of the Brunswick Maine Street Station would include a maximum of 122 residential units.

The disposal of NAS Brunswick and Topsham Annex and the development of the Brunswick Maine Street Station would be expected to result in a cumulative population gain within the Brunswick LMA. The cumulative gain in population would be a beneficial impact on the region.

Income and Employment

The closure of NAS Brunswick would initially result in the loss of approximately 3,660 jobs in the town of Brunswick and a consequent reduction in annual payroll in the town. In addition, the closure of the Topsham Annex is anticipated to result in the loss of approximately 80 jobs. This reduction would, however, be mitigated in the short-term through jobs created by construction and in the long-term by jobs created by new businesses resulting from the redevelopment of the installation. In addition, indirect off-base employment growth related to both construction and redevelopment of the installation would further mitigate the initial losses associated with closure. Overall, the short-term decline in jobs resulting from the closure of NAS Brunswick and Topsham Annex would pose cumulative impacts on employment. This effect would be partially offset by construction work associated with redevelopment of these two facilities, the removal of the Casco Bay Pipeline and by the new jobs that would be available with the proposed community projects. For example, the Maine Street Station would create new jobs in the area through its development of 110,000 square feet of commercial land use. The Brunswick Nursing Home is also estimated to create a maximum of 60 new employment opportunities in the town of Brunswick.

With redevelopment at Topsham Annex, at full build-out under Alternative 1, between $17.9 million and $40.6 million would be spent on renovation and construction. Other construction jobs in the area include but are not limited to the removal of the Casco Bay Pipeline, development of the Maine Street Station, building the Brunswick Nursing Home, construction of Stowe Elementary School, redevelopment of 9 Industrial Parkway, construction-related development for ex-

pansion of the Downeaster service, and road construction on I-295 from Brunswick to Gardiner.

Housing

At NAS Brunswick, at full build-out there could be as many as 2,946 housing units under Alternative 1 (see Table 5-3) and 8,219 residential units under Alternative 2. Redevelopment of the Topsham Annex could increase housing on the annex from 129 to 148 units, an increase of 19 units.

Table 5-3 Projected Cumulative Housing Units

Project	Alternative 1	Alternative 2
Redevelopment of NAS Brunswick	2,946	8,219
Redevelopment of Topsham Annex	148	148
Brunswick Maine Street Station	122	122
Cumulative Total	**3,216**	**8,489**

The redevelopment of Brunswick Maine Street Station would, upon full build-out, include 122 new residential units.

The impact of the construction of the new residential units on NAS Brunswick, the Topsham Annex, and Brunswick Maine Street Station could create a cumulative impact. However, this effect would be offset by the duration of full build-out (20 years) under Alternative 1 or Alternative 2. In addition, for the redevelopment of NAS Brunswick, the Brunswick LMA may not be able to support the number of housing units, specifically at full build-out under Alternative 2. Construction of new residential units under Alternative 2 would be initiated only when housing market conditions dictate a need for additional housing in the area, thereby mitigating the potential cumulative impact of numerous units coming onto the market without sufficient demand.

Taxes and Revenues

Upon disposal of all property not transferred to other federal agencies, including NAS Brunswick, the McKeen Street Housing Annex, and the East Brunswick Radio Transmitter Site, under Alternatives 1 or 2, and disposal of the Topsham Annex, all property would be subject to local property taxes, thereby expanding the local property tax base over existing conditions. The disposal of the Casco Bay Pipeline easement would also contribute to the local tax base as federal lands would be transferred to private ownership and thus be subject to local tax laws. The proposed community projects would also contribute to taxes. Overall, the taxes paid would pose a beneficial cumulative impact to the region.

5.3.3 Community Facilities and Services

5.3.3.1 Geographic Study Area

For the purposes of this analysis, the study area includes the NAS Brunswick property, the town of Brunswick, and the extent of the Brunswick LMA.

5.3.3.2 Cumulative Impact Analysis

Education

At full build-out, implementation of Alternative 1 could result in a net loss of 250 students from existing (2008) baseline conditions and would not have an impact on the Brunswick School Department's capacity, and implementation of Alternative 2 could result in a net gain of 751 students, requiring an expansion of the district's capacity (see Table 5-4). Full build-out of the Topsham Annex could result in a net increase of 46 students, which would be expected to have no impact on the capacity of the Maine School Administrative District (MSAD) 75.

Table 5-4 Projected Cumulative School-Age Population (Student) Impacts (at Full Build-out)

Project	Net Change from Existing (2008) Baseline Conditions	
	Alternative 1	Alternative 2
Brunswick School Department		
Redevelopment of NAS Brunswick	-250	751
Brunswick Maine Street Station[1]	5	5
Cumulative Total	-245	756
Maine School Administrative District 75		
Redevelopment of Topsham Annex	46	46

Note:
[1] Assumes student-age population multiplier of 0.04 per townhome/condo (2 to 4 bedrooms). Demographic Multiplier obtained from Rutgers University (2006). Calculation: 122 residential units x 0.04 = 4.88 school-age students (K-12).

Other community projects would not result in additional children requiring education, with the exception of the Maine Street Station, which is projected to add only approximately five children to the population. No cumulative impact on educational resources would be expected. Only Alternative 2 would result in an impact on school district capacity, and this would not impact MSAD 75, which is a separate school district. The Brunswick Maine Street Station project is projected to result in five additional students. This number of students in combination with the redevelopment of NAS Brunswick under Alternative 2 would pose only a minor cumulative impact.

Healthcare and Medical Facilities

Alternative 1 or Alternative 2 would be expected to increase the demand on local and regional healthcare and medical services and potentially result in a significant impact. A cumulative impact on healthcare and medical services could occur when considering the Topsham Annex redevelopment and the additional local projects that would generate a population increase, such as the Maine Street Station. Cumulative impacts on healthcare and medical facilities would be offset by the 20-year build-out period and the ability of the local and regional system of private healthcare and medical facilities to add capacity as needed to accommodate the additional demand. In addition, the construction of the new nursing home would increase the capacity of this type of medical care.

Public Safety and Emergency Services

With the closure of NAS Brunswick under Alternative 1 or Alternative 2, the Brunswick Police and Fire Departments would be required to provide services to an increased amount of land. At the same time, these departments would lose any mutual aid support. In addition, the Brunswick Fire Department does not have the capacity and training to provide the services associated with operation of an airfield, which would be required under Alternative 1. These gaps in service would worsen when considering other proposed community projects. These cumulative impacts would be offset by the 20-year build-out period and the generation of new taxable land associated with the redevelopment and community projects that could support expansion of these departments.

Parks and Recreation

Under Alternative 1 or Alternative 2, there would be an increase in the amount recreational and open space land in the Town of Brunswick. This beneficial impact would offset any new development projects proposed in the town that would reduce open space, such as the Brunswick Nursing Home and the Commerce Center.

5.3.4 Transportation

5.3.4.1 Geographic Study Area

The transportation analysis incorporates the Traffic Study Area as defined in the *Traffic Impact Study* conducted by Gorrill-Palmer in 2009 and the *Updated Traffic Analysis* completed by Gorrill-Palmer in 2010. The traffic study area encompasses the roadway network in the vicinity of NAS Brunswick. NAS Brunswick is located southwest of the intersection of Bath Road and Gurnet Road, both of which are part of ME Route 24. ME Route 24 connects the towns of Brunswick and Bath and provides access to the main gate for NAS Brunswick. The intersection of Bath Road and Gurnet Road is known locally as Cook's Corner, a regional commercial/retail corridor that comprises various retail strip plazas and "big box" retail outlets. Highway access to NAS Brunswick is provided via the Route 1 Connector, which links Cook's Corner to U.S. Route 1. Harpswell Road provides access to the west side of the installation.

5.3.4.2 Cumulative Impact Analysis

This section describes the projected cumulative traffic impacts of reuse of NAS Brunswick when combined with the Topsham Annex reuse as described in the *Traffic Impact Study* (Gorrill-Palmer 2009) and the *Updated Traffic Analysis* (Gorrill-Palmer 2010), both of which are included in Appendix D. The purpose of the traffic study was to evaluate the existing roadway network and to identify impacts and any mitigation that may be necessary to accommodate traffic associated with implementation of the reuse of NAS Brunswick and Topsham Annex. The *Updated Traffic Analysis* included potential off-base indirect employment impacts and data for both the construction of the Route 1 Connector project and without the construction of the Connector project. In addition, other local community projects were evaluated for the potential to produce cumulative impacts on traffic and transportation.

The capacity analysis (level of service [LOS]) for NAS Brunswick and Topsham Annex for intersections was completed using the Synchro/SimTraffic Version 6 analysis software package. Levels of service rankings range from 'A' to 'F,' where 'A' is very good and 'F' indicates very poor conditions. A level of service of 'D' or higher is desirable for a signalized intersection. At an unsignalized intersection, if the level of service falls below a 'D,' an evaluation should be made to determine if mitigation is warranted.

At full build-out, there could be an additional 6,474 or 10,593 vehicle trips during the P.M. peak hour under Alternatives 1 and 2, respectively (under the scenario where U.S. Route 1 is constructed). The majority of traffic entering/exiting the site is expected to use a connector from U.S. Route 1. Projections assume the U.S. Route 1 connector is built by 2016. If not, there would be a larger traffic impact on the existing network of adjacent streets. Specifically, at full build-out, there could be an additional 11,223 or 18,347, vehicle trips during the P.M. peak hour under Alternatives 1 and 2, respectively.

In order to reduce future transportation resource impacts in the Traffic Study Area either during or before full build-out of Alternative 1 there are some recommended mitigation measures. It is important to note that some identified mitigation measures may be needed because of design deficiencies in the existing roadway system; thus, a particular measure may be needed regardless of the disposal and reuse of NAS Brunswick. For example, the roadway segment between Cook's Corner (intersection of Bath Road and Gurnet Road) and Merry Meeting Plaza currently does not operate well due to existing road conditions and is expected to operate very poorly in the future, regardless of the disposal of NAS Brunswick. The future traffic conditions identified in the traffic study assumed that mitigation measures would be completed with the implementation of Alternative 1. These measures are listed in Table 5-1 and include access and roadway improvements such as relocating the main gate to the existing signalized intersection to Merry Meeting Plaza, providing access to Bath Road, widening Bath Road, and changing the emergency access to a primary access. If the mitigation measures are not implemented, traffic conditions would be expected to be worse than projected. In addition, the projected traffic conditions and the recommended mitigation measures are based on the full build-out of the installation. If the projected density of development does not occur, the need for the recommended mitigations would need to be reevaluated.

The cumulative capacity analysis for the Topsham Annex reuse included Alternative 1 in 2031: implementation of the preferred reuse plan for NAS Brunswick and the combination of 146 dwelling units and 70,000 square feet of office space at Topsham Annex in the adjacent town.

The capacity analyses conducted for the preferred reuse plan for Topsham Annex when considering the preferred reuse alternative at NAS Brunswick showed a double to triple increase in the projected traffic volumes along the Route 196 to I-295 corridor. As a result, cumulative traffic impacts would be expected, so mitigation would be required to maintain an acceptable level of service.

The proposed railroad spur has not been designed and is only in the preliminary planning stages. The installation was previously served by rail with a line parallel to the main base entrance with an at-grade crossing of Bath Road. The Reuse Master Plan indicated that re-creation of rail access would present a key incentive for certain future development, although, the proposed new location of the rail spur presents a design challenge (see Figure 5-1 for proposed location of the rail spur). The intent of the rail spur would be to provide options for deliveries and shipping, and potentially to serve passengers. This could reduce large truck deliveries to the installation but could increase local, small truck traffic on the installation. If passenger service is provided, vehicle usage could be reduced.

At full build-out of the Brunswick Maine Street Station, approximately 4,400 daily trips would, on average, be generated in the downtown area. When completed, passenger rail service could also generate 100 to 200 additional trips per day.

The reuse of NAS Brunswick, Topsham Annex, the proposed community projects, and projected population growth over a 20-year period would pose cumulative impacts on transportation that would need to be mitigated. The Gateway 1 Corridor Action Plan would help to mitigate cumulative impacts on transportation along the U.S. Routes 1 and 90 corridors. Land use developments would be concentrated to reduce transportation impacts, and rural land would be preserved. The compact residential, commercial, and mixed-use core growth areas would be connected to a variety of transportation methods, including ride-sharing, transit, multi-modal freight, passenger rail where available, walking, and bicycling.

5.3.5 Air Quality

5.3.5.1 Geographic Study Area

The geographic study area for cumulative air quality impacts includes the NAS Brunswick property, the town of Brunswick, the extent of the Brunswick LMA, and the locations of the development projects. The attainment status of Cumberland County and the SIP were evaluated to determine whether an Air Conformity Determination was required and whether this federal action would interfere with the state air quality planning efforts. In addition, for the GHG analysis, projected emissions were compared to emissions for the State of Maine and the United States.

5.3.5.2 Cumulative Impact Analysis

Construction Emissions

Under Alternative 1 or Alternative 2, construction emissions would temporarily increase. When considering the redevelopment along with the disposal and reuse of the Topsham Annex, the proposed construction of the MEARNG and USMCR Readiness Centers, the U.S. Route 1 Access Roadway, the Passenger/Freight Rail Spur, other road/access improvements, and community development projects, there could be the potential for temporary cumulative impacts on air emissions. With the build-out duration of 20 years, the extent of cumulative impacts on air quality would depend on concurrent construction schedules of projects located in the same geographic area. For the redevelopment of NAS Brunswick, specific

data regarding construction schedules and final configurations of project size, type, and location are unavailable; thus, potential cumulative impacts cannot be quantified. It is expected that construction of the MEARNG and USMCR Readiness Centers, approved community projects, and roadway improvement projects could occur during the next five years and may pose cumulative air quality impacts. The U.S. Route 1 Access Roadway, Passenger/Freight Rail Spur, and 10 to 20 year build-out of the installation could also pose cumulative air quality impacts during construction. Cumulative construction emissions would be reduced by complying with the Maine Erosion and Sediment Control Best Management Practices.

Building Use Emissions

Under Alternative 1, building use emissions would be generated from heating and operation of residential and commercial buildings. Under Phase 1, building use emissions other than SO_2 would decrease compared to existing conditions. At full build-out, emissions could increase for CO, NO_x, and SO_2 compared to the 2008 existing conditions.

Under Alternative 2, more commercial building space and homes would be constructed compared to Alternative 1, resulting in greater building use emissions.

Under Phase 1, building use emissions other than SO_2 would decrease compared to 2008 existing conditions. At full build-out, emissions could increase for CO, NO_x, SO_2 compared to the existing conditions.

When considering the redevelopment along with the disposal and reuse of the Topsham Annex and the proposed construction of the MEARNG and USMCR Readiness Centers and community development projects, building use could have potential cumulative impacts on air emissions. The extent of cumulative impacts on air quality would depend on building size and type, location, use, and timeline during the 20-year build-out. This information is not available; therefore, the extent of cumulative impacts cannot be quantified. It is expected that construction of the MEARNG and USMCR Readiness Centers and the approved community projects could pose cumulative building use air quality impacts. These impacts could be reduced by using modern building construction techniques and installing energy-efficient heating and cooling systems and appliances.

Mobile Sources

Under Alternative 1, mobile source emissions would be generated by the use of aircraft and motor vehicles. Vehicle traffic patterns and volumes would change, and there would be an increase in the number of automobiles and trucks at full build-out. Under Phase 1, all mobile source emissions except CO would decrease compared to existing conditions. At full build-out, only CO emissions would increase compared to the existing conditions (see Greenhouse Gas Emissions below).

Under Alternative 2, the airfield would be removed; therefore, there would be no emissions from aircraft. Vehicle traffic patterns and volumes would change, and there would be an increase in the number of automobiles and trucks at full build-

out. Alternative 2 would generate 40% more vehicle use compared to Alternative 1 because of the density of development. Under Phase 1, all mobile source emissions would decrease compared to existing conditions. At full build-out, only CO emissions would increase compared to the existing conditions.

When considering the redevelopment along with the disposal and reuse of the Topsham Annex, the proposed construction of the MEARNG and USMCR Readiness Centers, the Downeaster expansion project, and community development projects, there could be potential for cumulative air quality impacts from mobile air emission sources. Projects such as the U.S. Route 1 Access Roadway, the Passenger/Freight Rail Spur, and other road/access improvements would help to alleviate traffic congestion. The Downeaster expansion project would result in 12 trains entering or leaving the town of Brunswick each day. The mobile air emissions from the train would increase air emissions and pose a cumulative impact. However, the emissions resulting from the train service would be partially mitigated by the corresponding decrease in vehicle trips taken by those using the train as transportation. Cumulative mobile source emissions could be mitigated by further reducing the number of vehicles through the provision of public transportation and carpooling programs.

Greenhouse Gas Emissions

Federal agencies are, on a national scale, addressing emissions of GHGs through reductions mandated by Executive Orders, most recently Executive Order 13514. In addition, recent federal laws and regulations will require the inventorying and tracking of GHG emissions from large sources (74FR56260) and CAA Prevention of Significant Deterioration (PSD) and Title V permitting (74FR55292). In February of 2010, the White House Council on Environmental Quality (CEQ) issued draft guidance on the types of projects that should consider the effects of climate change and greenhouse gas emissions in agency decision making (CEQ 2010). The draft guidance explains that if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO2-equivalent GHG emissions on an annual basis, then agencies should consider this as an indicator that a quantitative and qualitative assessment may be meaningful to the decision maker and the public. This is not meant to be a NEPA significance threshold, but rather a reference point to serve as an indicator of a minimum level of GHG emissions that may warrant some description in the appropriate NEPA analysis.

This analysis compares GHG emission that could result from Alternative 1 and Alternative 2 to the U.S. GHG baseline inventory of 2007, the most recent inventory published by the EPA (EPA 2009b). Emission totals are also compared to Maine's Stationary Source GHG inventory for 2005, which is the most recent inventory published by the MEDEP (MEDEP 2007). The Maine GHG Emissions do not include mobile source emissions.

A summary of annual existing and projected GHG emissions is provided in Table 5-5. Note that GHG emissions are reported in metric tons of global warming potential (GWP) in CO_2e per year.

As shown in Table 5-5, full build-out of Alternative 1 would increase the amount of GHG emissions compared to the emissions from existing Navy operations. Overall, total GHG emissions represent a small percentage of U.S and the State of Maine GHG emissions. The mitigation measures described in Sections 4.6.1.2 and 4.6.1.3 to reduce building energy use and VMT would also reduce CO_2 emissions.

A summary of annual existing and projected GHG emissions for Alternative 2 is provided in Table 5-6. Note that GHG emissions are reported in metric tons of global warming potential (GWP) in CO_2e per year.

Table 5-5 Alternative 1 – Estimated Annual GHG Emissions for Existing Conditions, Phase 1 (2016), and Final Build-out (2031)

	Annual GHG Emissions, Metric Tons CO_2e per year ($MTCO_2e$)		
Emission Source	**2008 Existing Baseline Conditions**	**2016**	**2031**
Building Use Emissions			
Residential	0	4,656	29,094
Non-residential	15,991	10,913	77,111
Total Building Use Emissions	**15,991**	**15,569**	**106,206**
Change in Building Use Emissions		**-422**	**90,215**
Mobile Emissions			
Aircraft Emissions	24,039	1,194	2,623
Vehicle Emissions	3,890	4,450	21,732
Total Mobile Emissions	**27,930**	**5,644**	**24,355**
Change in Mobile Emissions		**-22,281**	**-3,570**
Total Annual Emissions	**43,921**	**21,212**	**130,560**
Change in Annual Emissions		**-22,703**	**86,645**
Total U.S. GHG Emissions, 2007[a]	7,150,100,000	7,150,100,000	7,150,100,000
% of U.S. GHG Emissions	**0.0006%**	**0.0003%**	**0.0018%**
Total Maine Stationary Sources, 2005[b]	21,671,922	21,671,922	21,671,922
% of Maine Stationary GHG Emissions	**0.2%**	**0.1%**	**0.6%**

Sources:
[a] EPA 2009b.
[b] MEDEP 2007.

Note:
[1] Totals may not be exact due to rounding.

As shown in the table, full build-out of Alternative 2 would increase the amount of GHG emissions compared to the emissions from existing Navy operations. Overall, total GHG emissions represent a small percentage of U.S and the State of Maine GHG emissions. The mitigation measures described in Sections 4.6.2.2 and 4.6.2.3 to reduce building energy use and VMT would also reduce CO_2 emissions.

Table 5-6 Alternative 2 – Estimated Annual GHG Emissions for Existing Conditions, Phase 1 (2016), and Final Build-out (2031)

Emission Source	Annual GHG Emissions, Metric Tons CO_2e per year ($MTCO_2e$)		
	2008 Existing Baseline Conditions	2016	2031
Building Use Emissions			
Residential	0	9,877	81,304
Non-residential	15,991	14,404	86,643
Total Building Use Emissions	**15,991**	**24,281**	**167,947**
Change in Building Use Emissions		**8,290**	**151,956**
Mobile Emissions			
Aircraft Emissions	24,039	0	0
Vehicle Emissions	3,890	7,574	53,380
Total Mobile Emissions	**27,929**	**7,574**	**53,380**
Change in Mobile Emissions		**-20,351**	**25,455**
Total Annual Emissions	**44,920**	**31,855**	**221,327**
Change in Annual Emissions		**-12,061**	**177,411**
Total U.S. GHG Emissions, 2007[a]	7,150,100,000	7,150,100,000	7,150,100,000
% of U.S. GHG Emissions	**0.0006%**	**0.0004%**	**0.0031%**
Total Maine Stationary Sources, 2005[b]	21,671,922	21,671,922	21,671,922
% of Maine Stationary GHG Emissions	**0.2%**	**0.1%**	**1.0%**

Sources:
[a] EPA 2009b.
[b] MEDEP 2007.

Note:
[1] Totals may not be exact due to rounding.

5.3.6 Water Resources

5.3.6.1 Geographic Study Area

For the purposes of this analysis, the study area includes water resources present on or in the vicinity of NAS Brunswick, the McKeen Street Housing Annex, and the East Brunswick Radio Transmitter Site. The water resources evaluated include surface water, groundwater, floodplains, and wetlands.

5.3.6.2 Cumulative Impact Analysis

Under Alternative 1 or Alternative 2, redevelopment of the property could impact surface water during construction or operation; however, impacts would be reduced based on planning efforts to avoid, to the extent practicable, disturbance of surface waters and the developer's adherence to federal and state regulations and use of appropriate BMPs. Under Alternative 2, the 0.6-mile portion of Mere Brook that currently flows through culverts under the runways would be incorporated into the natural areas land use district. Under this alternative, the culverts could be removed and the stream banks and channel could be restored to their natural state. Therefore, implementation of Alternative 2 could result in beneficial impacts on some surface water resources.

It would be expected that Alternative 1 or Alternative 2 would have no impact on groundwater and floodplains. Under Alternative 1, 338 acres of wetlands (located around Harpswell Cove and Buttermilk Cove) would be excluded from future development. An additional 51 acres of wetlands scattered throughout the property

could be potentially impacted by future development. Under Alternative 2, 265 acres of wetlands would be preserved. An additional 124 acres of wetlands scattered throughout the property could be potentially impacted by future development (see Table 5-7). Any wetland disturbance resulting from implementation of Alternatives 1 or 2 would require the developer to obtain a permit from the MEDEP and the USACE. In addition, per the NRPA, any encroachment within a 75-foot-wide buffer around a wetland would require a permit. In accordance with the CWA and NRPA, wetland alterations must be avoided where practicable. Compensation (mitigation) may be required for any lost functions and values of the wetlands.

Table 5-7 Potential Cumulative Wetland Impacts (acres)

Project	Alternative 1	Alternative 2
Redevelopment of NAS Brunswick	51	124
Redevelopment of Topsham Annex	4	4
Army National Guard Readiness and Marine Corps Reserve Centers	1	1
U.S. Route 1 Access Roadway	Unknown	Unknown
Passenger/Freight Rail Spur	Unknown	Unknown
Relocation of Main Gate	Unknown	Unknown
New Access to Bath Road	Unknown	Unknown
Widening of Bath Road	Unknown	Unknown
Primary Access on Forrestal Drive	Unknown	Unknown
Cumulative Total	**56+**	**129+**

Disposal and reuse of the Topsham Annex would not have direct impacts on surface waters; however, indirect impacts could result from construction activities and changes in impervious surfaces on the site. Indirect impacts on wetlands onsite and adjacent to the site could result from construction activities. Approximately 1 acre of wetlands would be impacted by construction of the MEARNG and USMCR Readiness Centers. The expansion of the Downeaster train service could have short-term impacts on surface water quality during the rehabilitation and replacement/repair of 17 culverts along the 30-mile route; however, this impact would be expected to cease after the project is completed.

Based on the potential wetland impacts resulting from implementation of either Alternative 1 or Alternative 2, disposal of the Topsham Annex, construction of the MEARNG and USMCR Readiness Centers, the Downeaster expansion project, and the proposed sites of the U.S. Route 1 Access Roadway, Passenger/Freight Rail Spur, and other roadway/access improvement projects, there is potential for cumulative impacts on water resources. To date, no environmental studies have been completed for the U.S. Route 1 Access Roadway, Passenger/Freight Rail Spur, or other roadway/access improvement projects. As a result, potential water resource impacts resulting from their implementation cannot be identified at this time. It would be likely that the gate access projects could be sited to avoid wetlands. The other recently completed or reasonably foreseeable actions would be located on previously developed sites and thus would not be expected to result in impact on water resources. Cumulative impacts would be par-

tially offset by avoiding wetlands to the extent practicable when designing the individual projects, obtaining permits for wetland disturbance, as needed, and providing compensation as required by permit. In addition, adherence to BMPs during construction would minimize temporary impacts on water resources.

5.3.7 Biological Resources

5.3.7.1 Geographic Study Area

For the purposes of this analysis, the study area includes biological resources present on or in the vicinity of NAS Brunswick and the McKeen Street Housing Annex, East Brunswick Radio Transmitter Site, and Sabino Hill Rake Station.

5.3.7.2 Cumulative Impact Analysis

Vegetation

At full build-out under Alternative 1, 1,146 acres of undeveloped land and 690 acres of upland forest could be affected, and 25 acres of critically imperiled Sandplain Grassland and 46 acres of maintained grass could be developed. A total of 1,060 acres would be preserved in the natural areas districts. One hundred and twenty acres of the critically imperiled Little Bluestem-Blueberry Sandplain Grassland habitat and 214 acres of other grassland habitat within the airport operations district would likely be maintained in its current condition. However, approximately 25 acres of the critically imperiled Sandplain Grassland community could be impacted by new development. The critically imperiled Sandplain Grassland habitat at NAS Brunswick is one of only four known grasshopper sparrow breeding sites in the State of Maine. In addition, the current acreage of the habitat at NAS Brunswick is near the minimum size necessary to support multiple grasshopper sparrow territories. Further reduction of available habitat would significantly impact the species. As previously discussed, future land development at NAS Brunswick and the outlying properties would be subject to the *Town of Brunswick Zoning Ordinance* (Town of Brunswick 2009a) and MRRA's Design Guidelines (MRRA 2010). Future developers would need to prepare site development plans for approval by the Town of Brunswick. By utilizing previously developed areas for new development, preserving sensitive communities in the open space and natural areas districts, and maintaining forested buffers between areas such as the golf course, athletic fields, and educational buildings, some impacts on the vegetative communities would be reduced. If impacts on the critically imperiled Sandplain Grassland habitat were to occur, the developer would be required to consult with the MDIFW and MNAP due to the potential presence of state-protected grassland species. Impacts on this critically imperiled habitat may be reduced as part of any applicable State environmental permit process.

Under Alternative 2, 1,068 acres of undeveloped land and 578 acres of upland forest could be removed, and 65 acres of critically imperiled Sandplain Grassland and 301 acres of maintained grass could be developed. A total of 1,280 acres would remain preserved within the natural areas districts. Approximately 65 acres of the critically imperiled Little Bluestem-Blueberry Sandplain Grassland, as well as other grassland habitat, occur within the proposed business and technology, community mixed-use, and educational land use districts and could be potentially impacted by development. The critically imperiled Sandplain Grass-

land habitat at NAS Brunswick is one of only four known grasshopper sparrow breeding sites in the State of Maine. In addition, the current acreage of the habitat at NAS Brunswick is near the minimum size necessary to support multiple grasshopper sparrow territories. Further reduction of available habitat would significantly impact the species. Approximately 145 acres of this habitat would be preserved within the natural area district, but without routine management of this habitat indirect impacts could occur. As previously discussed, future land development at NAS Brunswick and the outlying properties would be subject to the *Town of Brunswick Zoning Ordinance* (Town of Brunswick 2009a) and MRRA's Design Guidelines (MRRA 2010). Future developers would need to prepare site development plans for approval by the Town of Brunswick. By utilizing previously developed areas for new development, preserving sensitive communities in the open space and natural areas districts, and maintaining forested buffers between areas such as the golf course, athletic fields, and educational buildings, some impacts on the vegetative communities would be reduced. If impacts on the critically imperiled Sandplain Grassland habitat were to occur, the developer would be required to consult with the MDIFW and MNAP due to the potential presence of state-protected grassland species. Impacts on this critically imperiled habitat may be reduced as part of any applicable State environmental permit process.

Approximately 51 acres of land could be impacted by construction of the MEARNG and USMCR Readiness Centers. This area consists of Red Oak-Northern Hardwoods-White Pine forest. It would be expected that much of the forested land would be preserved, but there could be a small cumulative impact under Alternative 1 or Alternative 2.

Disposal and reuse of the Topsham Annex would result in an impact on vegetation due to removing or clearing of vegetation for development. Given that most of the vegetation on the Annex property is either regularly maintained or has been previously disturbed, long-term impacts from a loss of vegetation during construction would be minor.

With disposal of the Topsham Annex and construction of the MEARNG and USMCR Readiness Centers, U.S. Route 1 Access Roadway, Passenger/Freight Rail Spur, other roadway/access improvement projects, and community development projects, there is potential for significant cumulative impacts on vegetation, particularly the critically imperiled Sandplain Grassland community. To date, no environmental studies have been completed for the U.S. Route 1 Access Roadway, Passenger/Freight Rail Spur, and other roadway/access improvement projects, and any potential resource impacts resulting from their implementation cannot be identified at this time. The other recently completed or reasonably foreseeable actions, i.e., the community development projects, would be located on previously developed sites and would not be expected to result in an impact on vegetation. Some of these cumulative impacts would be partially offset by the amount of property maintained in its natural state within the natural area districts.

Wildlife

Under Alternative 1 or Alternative 2, small terrestrial mammals, amphibians, and reptiles could potentially be impacted during construction. Upon completion of construction, recolonization would be expected. Alternative 1 could result in impacts on approximately 25 acres of critically imperiled Sandplain Grassland. Alternative 2 could also result in an impact on IBAs, as 366 acres of grassland habitat, including 65 acres of the critically imperiled Sandplain Grassland, could be removed. The critically imperiled Sandplain Grassland habitat at NAS Brunswick is one of only four known grasshopper sparrow breeding sites in the State of Maine. In addition, the current acreage of the habitat at NAS Brunswick is near the minimum size necessary to support multiple grasshopper sparrow territories. Further reduction of available habitat would significantly impact the species. None of the alternatives would be expected to have an impact on aquatic wildlife or EFH. If impacts on the Sandplain Grassland habitat occur, the developer would be required to consult with the MDIFW and MNAP due to the potential presence of state-protected grassland species. Impacts on this critically imperiled habitat may be reduced as part of any applicable State environmental permit process.

The Topsham Annex does not provide suitable habitat to support diverse or abundant wildlife populations because of a relative lack of vegetative cover and habitat diversity. In addition, there are no large habitat blocks on the Annex that could be fragmented by development. Given that the land uses and development intensities proposed are similar to existing conditions, there would be no long-term adverse impacts on wildlife as a result of implementing the Topsham Annex project.

Based on the potential wildlife impacts resulting from implementation of Alternative 1 or Alternative 2, disposal of the Topsham Annex, and the proposed sites of the MEARNG and USMCR Readiness Centers, U.S. Route 1 Access Roadway, Passenger/Freight Rail Spur, other road/access improvements, and community development projects, there is the potential for temporary cumulative impacts on wildlife resources. To date, no environmental studies have been completed for the U.S. Route 1 Access Roadway, Passenger/Freight Rail Spur, and other road/access improvements; therefore, any potential resource impacts resulting from their implementation cannot be identified at this time. The other recently completed or reasonably foreseeable actions, i.e., the community development projects, would be located on previously developed sites and would not be expected to result in an impact on wildlife resources. Impacts would be partially offset by the temporary nature of the impacts and likely different time periods of construction.

Threatened or Endangered Species

No federally listed threatened or endangered species are located on NAS Brunswick or its outlying properties. Three state-listed species are present: the upland sandpiper, grasshopper sparrow, and clothed sedge. In addition, 17 state species of special concern could potentially occur at NAS Brunswick and the East Brunswick Radio Transmitter Site. Under Alternative 1, continued use and maintenance of the habitat surrounding and within the airfield would be part of the proposed Reuse Master Plan. However, up to approximately 25 acres of Sand-

plain Grassland habitat, as well as other grassland habitat, is designated for potential professional office and educational land use and could be impacted. Under Alternative 2, the Sandplain Grassland and other grassland habitats would no longer be maintained as part of the airfield, and portions could be developed for business and technology industries, community mixed-use, education, and residential land uses. Under Alternative 2, a potentially significant impact on the grasshopper sparrow and state species of special concern (e.g., Horned Lark, Prairie Warbler, and Eastern Meadowlark) could occur, as 366 acres of grassland habitat, including identified grasshopper sparrow breeding habitat could be permanently removed. The proposed Passenger/Freight Rail Spur could also impact the Sandplain Grassland and other grassland habitat and could pose a significant cumulative impact under Alternative 1 or Alternative 2. As previously discussed, future land development at NAS Brunswick and the outlying properties would be subject to the *Town of Brunswick Zoning Ordinance* (Town of Brunswick 2009a) and MRRA's Design Guidelines (MRRA 2010). Future developers would need to prepare site development plans for approval by the Town of Brunswick. By utilizing previously developed areas for new development, preserving sensitive communities in the open space and natural areas districts, and maintaining forested buffers between areas such as the golf course, athletic fields, and educational buildings, some impacts on the vegetative communities, including the critically imperiled Sandplain Grassland, would be reduced. If impacts on the critically imperiled Sandplain Grassland habitat were to occur, the developer would be required to consult with the MDIFW and MNAP due to the potential presence of state-protected grassland species. Impacts on this critically imperiled habitat may be reduced as part of any applicable State environmental permit process.

The direct loss of habitat, increased vehicular traffic, and other development-associated disturbances (e.g., light, noise, invasive species) that could potentially result from implementation of Alternative 1 or Alternative 2, disposal of the Topsham Annex, and the proposed sites of the MEARNG and USMCR Readiness Centers, U.S. Route 1 Access Roadway, and Passenger/Freight Rail Spur projects would likely have significant cumulative impacts on state-listed threatened and endangered species and state species of special concern that inhabit grasslands, particularly the grasshopper sparrow, which is state-listed as threatened. The critically imperiled Sandplain Grassland habitat at NAS Brunswick is one of only four known grasshopper sparrow breeding sites in the State of Maine. In addition, the current acreage of the habitat at NAS Brunswick is near the minimum size necessary to support multiple grasshopper sparrow territories. Further reduction of available habitat would significantly impact the species. Forest fragmentation associated with the development may also have a significant cumulative impact on forest interior species of concern, such as the wood thrush. To date, no environmental studies have been completed for the U.S. Route 1 Access Roadway and Passenger/Freight Rail Spur projects, and any potential resource impacts resulting from their implementation cannot be identified at this time. The only project that could impact grasslands habitat is the Passenger/Freight Rail Spur. The other recently completed or reasonably foreseeable actions would be located on previously developed sites and would not be expected to result in a cumulative impact.

Significant Wildlife Habitat

The Reuse Master Plan considered Significant Wildlife Habitat when developing land use districts, including the critically imperiled Sandplain Grassland and other grassland habitat associated with threatened and endangered species, tidal waterfowl and wading bird habitat, and deer wintering habitat, into natural areas or open space and recreation areas. Potential impacts on habitat for the state-listed threatened and endangered species at NAS Brunswick would be mostly avoided under Alternative 1 because of continued use and maintenance of the habitat surrounding and within the airfield. Although some land use districts (e.g., professional office district) contain potential Significant Wildlife Habitat, the developer would be required to submit a site development plan to the Town of Brunswick; comply with MRRA's Design Guidelines, emphasizing on low-impact development; and comply with applicable local, state, and federal regulations. The developer should also consult with MNAP and MDIFW regarding appropriate management of these natural communities, especially as it applies to threatened and endangered species.

Threatened and Endangered Species Habitats

Under Alternative 1, a portion of the critically imperiled Sandplain Grassland habitat is designated in the Reuse Master Plan for potential professional office and educational land uses and could be impacted. These land uses could result in loss of up to approximately 25 acres, or approximately 12% of the total available critically imperiled Sandplain Grassland habitat at NAS Brunswick. Under Alternative 2, 366 acres of grassland could be impacted as the critically imperiled Sandplain Grassland and other grassland habitats would no longer be maintained as part of the airfield, and portions could be developed for business and technology industries, community mixed-use, and education and residential land uses. The proposed Passenger/Freight Rail Spur could also impact the critically imperiled Sandplain Grassland and other grassland habitat and could pose a significant cumulative impact under Alternative 1 or Alternative 2. Under Alternatives 1 and 2, approximately 5 and 7 acres, respectively, of the critically imperiled Pitch Pine-Heath Barren community could be impacted in the education land use district. No cumulative impacts on the Pitch Pine-Heath Barren community would occur, as none of the identified past, present, or future actions occur within this community type. As previously discussed, future land development at NAS Brunswick and the outlying properties would be subject to the *Town of Brunswick Zoning Ordinance* (Town of Brunswick 2009a) and MRRA's Design Guidelines (MRRA 2010). Future developers would need to prepare site development plans for approval by the Town of Brunswick. By utilizing previously developed areas for new development, preserving sensitive communities in the open space and natural areas districts, and maintaining forested buffers between areas such as the golf course, athletic fields, and educational buildings, some impacts on the vegetative communities, including the critically imperiled Sandplain Grassland and Pitch Pine-Heath Barren, would be reduced. If impacts on the critically imperiled Sandplain Grassland and Pitch Pine-Heath Barren habitat were to occur, the developer would be required to consult with the MDIFW and MNAP due to the potential presence of state-protected grassland species. Impacts on this critically imperiled habitat may be reduced as part of any applicable State environmental permit process.

Implementation of Alternative 1 or Alternative 2 could pose a significant cumulative impact on the critically imperiled Sandplain Grassland and other grassland habitat when considered along with the proposed Passenger/Freight Rail Spur. The critically imperiled Sandplain Grassland habitat at NAS Brunswick is one of only four known grasshopper sparrow breeding sites in the State of Maine. In addition, the current acreage of the habitat at NAS Brunswick is near the minimum size necessary to support multiple grasshopper sparrow territories. Further reduction of available habitat would significantly impact the species. To date, no environmental studies have been completed for the U.S. Route 1 Access Roadway and Passenger/Freight Rail Spur projects, and any potential resource impacts resulting from their implementation cannot be identified at this time. The other community development projects would be located on previously developed sites and would not be expected to result in a cumulative impact on Significant Wildlife Habitat. Any party proposing development or other land disturbance in these habitats would be required to consult with the MDIFW and MNAP to receive the appropriate permits and clearances.

Vernal Pools

The 2008 and 2009 vernal pool surveys conducted at NAS Brunswick and a 2010 wetland delineation of the 51-acre parcel to be transferred to the Department of the Army identified 46 vernal pools and 30 significant vernal pools (TRC 2008; E & E 2009b). Under Alternative 1, 15 significant vernal pools are located within the professional office, business and technology industries, community mixed-use, recreation/open space, and educational/natural areas districts and could potentially be impacted. Thirteen significant vernal pools are located in the natural area districts and would be excluded from future development. The remaining two significant vernal pools are located in a parcel that will be transferred to the Department of the Army. Impacts on these two significant vernal pools were analyzed separately in an MEARNG NEPA document (MEARNG 2010). Under Alternative 2, 12 significant vernal pools and associated buffer areas are located within residential and development districts and could potentially be impacted. Sixteen significant vernal pools are located in the natural area districts and would be excluded from future development. The remaining two significant vernal pools are located in a parcel that will be transferred to the Department of the Army. Impacts on these two significant vernal pools were analyzed in a separate MEARNG NEPA document (MEARNG 2010). According to 38 MRSA 480-B, Chapter 335, significant vernal pool habitat consists of a vernal pool depression and the portion of the critical terrestrial habitat within 250 feet of the spring or fall high-water mark of the depression. However, MEDEP regulates vernal pools up to 500 feet from the edge of the pool depression, while the USACE regulates vernal pools up to 750 feet from the edge of the pool depression (Elowe and Docherty 2010; Camuso and Walker 2010). An NRPA permit would be required prior to impacting a vernal pool or constructing within the regulated buffer. Impacts on vernal pools may be reduced through this permitting process.

Implementation of Alternative 1 or Alternative 2 would not pose a cumulative impact on significant vernal pools. Although two significant vernal pools have been identified on the 51-acre parcel federal transfer property to the Department

of the Army, there would be no new impact on on-site significant vernal pools or vernal pool habitat, including areas within 250 feet of vernal pools (MEARNG 2010).

Deer Wintering Area

Under Alternative 1, the mapped deer wintering area is located within the proposed open space/recreation district. Development of the 18-hole golf course in this district would likely remove a portion of the deer wintering area on the property. Prior to impacting this area, the developer would be required to consult with the MEDEP. An NRPA permit would be required prior to clearing any portion of the deer wintering area. Under Alternative 2, the mapped deer wintering area is located within the proposed open space/recreation and natural areas districts. It is expected that sensitive natural resource habitats within these districts, such as the deer wintering area, would be avoided by the developer. Currently, the wintering area is bisected by a high perimeter fence delineating the installation's boundary. It is anticipated that this fence would be removed under Alternative 1 or Alternative 2, thereby joining the two fragmented habitats, which would have a positive affect on the wintering area.

Implementation of Alternative 1 or Alternative 2 is not expected to pose a cumulative impact on the deer wintering areas located throughout the Brunswick LMA, as no additional identified past, present, or future actions are proposed in identified deer wintering areas within the Brunswick LMA (Walker 2010c).

Waterfowl and Wading Bird Habitat

Under Alternatives 1 and 2, the tidal waterfowl and wading bird habitat located at the southern end of the installation would be preserved as a natural area; therefore, this habitat would not be impacted and no cumulative impacts would occur.

6 Other Considerations

6.1 Consistency with Other Federal, State, and Local Plans, Policies, and Regulations

Disposal of NAS Brunswick would comply with existing federal regulations and state and local policies and programs.

As discussed in Section 1, this EIS has been prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, as amended; the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] 1500-1508); and Navy procedures for implementing NEPA (32 CFR 775).

Other federal laws, regulations, and Executive Orders with which the proposed action must demonstrate compliance include the following:

- Clean Air Act
- Federal Water Pollution Control Act (Clean Water Act)
- Noise Control Act
- Endangered Species Act of 1973 (ESA)
- Migratory Bird Treaty Act
- National Historic Preservation Act of 1966, as amended (NHPA)
- Archaeological Resources Protection Act
- Resource Conservation and Recovery Act (RCRA)
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
- Superfund Amendments and Reauthorization Act (SARA)
- Toxic Substances Control Act

- Community Environmental Response Facilitation Act (CERFA)
- Coastal Zone Management Act (CZMA)
- Toxic Substances Control Act (TSCA)
- Executive Order 11988, Floodplain Management
- Executive Order 11990, Protection of Wetlands
- Executive Order 12088, Federal Compliance with Pollution control Standards
- Executive Order 12580, Superfund Implementation
- Executive Order 12898, Environmental Justice
- Executive Order 13045, Protection of Children from Environmental Health and Safety Risks
- Executive Order 13423, Strengthening Federal Environmental, Energy and Transportation Management
- Executive Order 13186, Consultation and Coordination with Indian Tribal Governments
- Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds

If Alternative 1 or Alternative 2 is implemented, the Navy would need to demonstrate compliance with applicable state and local plans, policies, and controls. State requirements may include, but are not limited to, the following:

- Natural Resources Protection Act
- Mandatory Shoreland Zoning Law
- Site Location of Development Act
- Erosion Control and Sedimentation Law
- Storm Water Management Law
- Subdivision Law
- Maine Rivers Act
- Maine Waterway Development and Conservation Act
- Coastal Management Policies Act

- Protection and Improvement of Air Law
- Protection and Improvement of Waters Act
- Land Use Regulation Law
- Maine Endangered Species Act

6.2 Unavoidable Adverse Environmental Effects and Considerations that Offset Adverse Effects

This section identifies unavoidable adverse effects that may occur as a result of implementing Alternative 1 or Alternative 2. The potential for short- and long-term impacts would be localized in the vicinity of the project site and are described below.

Land Use

Alternatives 1 and 2 would both result in changes to existing land use conditions on the installation, including a more intensively built environment; new land uses (i.e., professional office district); and open public access to the formerly secure and restricted military property. In addition, the local government would be responsible for providing municipal services (i.e., education, police, and fire protection) and administration (i.e., land use zoning) for the former federal property.

Alternative 2 would conflict with the locally developed *Brunswick Naval Air Station Reuse Master Plan* and with the land use regulations identified in the amended Town of Brunswick Zoning Ordinance. Alternative 2 would require a reevaluation of the Town's zoning ordinance.

Socioeconomics

- **Population.** At full build-out, considering losses due to the disposal of NAS Brunswick and projected population gains resulting from reuse of the property, Alternative 1 would result in a net gain of 127 individuals in the Brunswick Labor Market Area (LMA) over existing (2008) baseline conditions. Alternative 2 would result in a net gain of 9,545 individuals in the Brunswick LMA.

- **Income and Employment.** Initial disposal of NAS Brunswick under either Alternatives 1 or 2 would result in a short-term reduction of income and employment, which would be mitigated through construction spending and new development. Alternative 1 could result in a net gain of 10,500 jobs over existing (2008) baseline conditions and a Net Present Value (NPV) of $397.7 million in new construction (including supplies and labor). Alternative 2 could result in a net gain of 17,109 jobs over existing (2008) baseline conditions and a NPV of $774.9 million in new construction (including supplies and labor).

There would also be indirect and induced off-base employment impacts in both the short-term (associated with direct construction spending and employment) and the long-term (associated with redevelopment and occupancy of residential units).

- **Housing.** Alternative 1 would provide a maximum of 2,946 housing units, while Alternative 2 could result in a maximum of 8,220 housing units. Under each of the alternatives, there is the potential for short-term impacts due to the closure of NAS Brunswick, which would involve an initial loss of population and an increase in the housing supply. However, these impacts would be mitigated by anticipated population growth and redevelopment of the property at full build-out.

Community Facilities and Services

- **Educational Facilities.** Alternative 1 is projected to result in a net loss of 250 school students from existing (2008) baseline conditions. Alternative 2 is projected to result in a net gain of 751 public school students. Any growth in the school-aged population resulting from Alternative 1 would be offset by the capacity created by the loss of military family member students. However, Alternative 2 would be expected to require an expansion in school system capacity. In the short term, the Brunswick School District would lose any Federal Impact Aid received for providing educational services to military family member students. In the long-term, reuse of the installation would expand the municipal tax base, offsetting the loss of Federal Impact Aid and any expenses associated with providing educational services to new students living on the installation.

- **Healthcare and Medical Services.** Alternative 1 would result in an increased demand on local and regional healthcare and medical services. Alternative 2 would have the greatest impact, potentially resulting in a greater increase in demand for local and regional healthcare and medical services.

- **Public Safety and Emergency Services.** The Town of Brunswick Police and Fire Departments would be expected to expand their respective service areas to meet additional demands associated with reuse under Alternatives 1 and 2. In the long term, reuse of the installation would expand the municipal tax base, offsetting costs associated with an expansion of municipal services.

Transportation

Alternatives 1 and 2 would open the formerly secure military installation to public access and would be expected to increase total weekday traffic near the installation. It is projected that there could be a net gain of 5,217 vehicle trips during the P.M. peak hour on the existing network of roads near NAS Brunswick over existing (2008) baseline conditions. Under Alternative 2, it is projected that there could be a net gain of 9,336 trips over existing (2008) baseline conditions.

The traffic analysis was conducted analyzing scenarios where the proposed Route 1 Connector project was built and a scenario where the connector was not built.

However, given the projected rate of redevelopment and build-out analyzed in this EIS, if the Route 1 Connector is not constructed by 2016, many of the road segments and intersections in the vicinity of the installation would fail. Assuming implementation of appropriate mitigation measures, no significant impact would be expected on the level of service (LOS) of the adjacent roadway system.

Traffic conditions (i.e., LOS) would be expected to improve over existing conditions. However, one intersection at Bath Road and Jordan Avenue is projected to have an LOS rating of "F" upon the full build-out of Alternative 2. Only short-term construction-related traffic impacts would be expected with the implementation of Alternatives 1 or 2.

Environmental Management

- **Environmental Restoration Program.** Under all alternatives, the Navy would continue in its role as lead agency for site investigations and remediation, with oversight by the EPA and MEDEP, at all sites identified through the Environmental Restoration Program. Currently, planned cleanup activities at all Environmental Restoration Program sites would continue in order to achieve the cleanup standards established under CERCLA and SARA.

Air Quality

- **Construction Emissions.** Construction-related air emissions for the build-out under both Alternatives 1 and 2 would be short-term and primarily occur within the boundaries of NAS Brunswick.

- **Total Emissions.** Both Alternatives 1 and 2 would potentially result in an increase in emissions upon full build-out. Under Alternative 1, it is expected that VOC, NO_X, and PM_{10}/$PM_{2.5}$ emissions would be reduced due to the discontinuation of Navy aircraft operations and maintenance. However, CO and SO_2 emissions would be expected to increase, primarily due to the use of heating fuels for the large residential development, emissions from the new aircraft, and vehicle use. Alternative 2 would be expected to result in a greater increase in emissions than Alternative 1. It is estimated that VOC, PM_{10}, and $PM_{2.5}$ emissions would be reduced under this alternative due to the discontinuation of aircraft operations and associated maintenance. However, NO_X, CO, and SO_2 emissions would be expected to increase, the result of an increase in the use of energy in buildings and vehicle use.

- **Greenhouse Gas Emissions.** Under Alternatives 1 and 2, the operation of stationary and mobile sources using fossil fuels would produce GHG emissions, mostly as carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). In February of 2010, the White House Council on Environmental Quality (CEQ) issued draft guidance on the types of projects that should consider the effects of climate change and GHG emissions in agency decision making (CEQ 2010). The draft guidance explains that if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO2-equivalent GHG emissions on an annual basis, then

agencies should consider this as an indicator that a quantitative and qualitative assessment may be meaningful to the decision maker and the public. This is not meant to be a NEPA significance threshold, but rather a reference point to serve as an indicator of a minimum level of GHG emissions that may warrant some description in the appropriate NEPA analysis.

Noise

Under Alternative 1, annual aircraft operations are projected to increase to 45,500 operations per year, up from 24,709 operations in 2008. Noise associated with future aircraft operations would not be expected to have a significant impact on resources located outside of the airfield operations area. While the number of annual operations is projected to increase, the noise impact from aircraft operations is expected to decrease compared to existing conditions. This is because the majority of future aircraft operations are assumed to involve smaller, quieter aircraft as opposed to the large military aircraft (e.g., P-3C Orion) that currently operate at NAS Brunswick. There is no aviation reuse component under Alternative 2. Alternatives 1 and 2 would both be expected to result in short-term construction-related noise impacts, which would be managed to meet local noise standards.

Infrastructure

- **Water Supply.** Under Alternatives 1 and 2, water demand would be expected to exceed existing demand. Alternative 1 is projected to result in a net increase of 1.10 million gpd over existing (2008) baseline conditions. The existing Brunswick Topsham Water District (BTWD) system is expected to have sufficient capacity to meet any future water supply demands associated with Alternative 1. Alternative 2 would result in a net increase of 2.65 million gpd over existing (2008) conditions, requiring a small increase in district capacity (70,000 gpd). Both alternatives would require upgrading the existing water supply infrastructure on the installation to meet BTWD and Town of Brunswick standards.

- **Wastewater.** Upon full build-out, Alternatives 1 and 2 would require an expansion of the Brunswick Sewer District's treatment processing and intake infrastructure. At full build-out, Alternative 1 would generate a net increase of 872,153 gpd of wastewater, and Alternative 2 would generate a net increase of 2.27 million gpd. Currently, the Brunswick Sewer District does not have the capacity to sufficiently process the projected volume of wastewater that would be generated by either alternative. Both alternatives would require an upgrade of the installation's existing wastewater system and construction of new wastewater infrastructure.

- **Storm Water.** Full build-out of Alternative 1 is projected to result in a total of 859 acres of impervious surface area, which would be predominately comprised of building roofs, parking areas, and roadways. This would be a net increase of approximately 343 acres over the existing (2008) baseline condition (516 acres), representing an 11% increase in total impervious surface area. Full build-out of Alternative 2 is projected to result in a total of 944 acres of impervious surface area, which would be predominately comprised of build-

ing roofs, parking areas, and roadways. This would be a net increase of approximately 428 acres over existing (2008) baseline conditions (516 acres), representing a 14% increase in the total impervious surface area.

Any storm water impacts would be mitigated by the developer through storm water management. The developer of the installation will be required to prepare a storm water management plan to control the volume and quality of storm water runoff in a manner consistent with MEDEP storm water management policy. The town of Brunswick would encourage the developer to prepare an installation-wide storm water watershed management plan. The developer will also be required to implement BMPs during construction activities to control the release of storm water runoff from exposed construction sites.

- **Other Utility Systems.** Full build-out of Alternative 1 is projected to result in a net increase of 131.89 kWh (kilowatt hours) of electricity usage and a net increase of 3.83 million ccf (hundred cubic feet) of natural gas usage over existing (2008) baseline conditions. Alternative 2 is projected to result in an increase of 183.37 kWh of electricity usage and 6.30 million ccf of natural gas usage over existing (2008) baseline conditions. Under both Alternative 1 and 2, the electric and gas utility infrastructure on the installation property would have to be expanded, upgraded, and possibly relocated to accommodate the final design at full build-out.

Cultural Resources

There would be an adverse effect on cultural resources under both Alternatives 1 and 2, but the adverse effect would be mitigated through the implementation of the P*rogrammatic Agreement Between the United States Navy and the Maine State Historic Preservation Office (SHPO) on the Lease and Property Transfer of Properties Located at Naval Air Station Brunswick, Maine and Topsham Annex, Topsham, Maine* dated August (US Navy 2010) (see Appendix O). Under the No-Action Alternative, no reuse or redevelopment would occur at the installation; thus, there would be no effect.

Topography, Geology, and Soils

Soils would be impacted under both Alternatives 1 and 2, but the impacts would be mitigated through the implementation of erosion and sediment control measures, storm water management measures, appropriate site location, and building design.

Water Resources

Under Alternative 1, 338 acres of wetlands (located around Harpswell Cove and Buttermilk Cove) would be excluded from future development. An additional 51 acres of wetlands scattered throughout the property could be potentially impacted by future development. Under Alternative 2, 265 acres of wetlands would be preserved. An additional 124 acres of wetlands scattered throughout the property could be potentially impacted by future development. Any wetland disturbance resulting from implementation of Alternatives 1 or 2 would require that the developer obtain a permit from the MEDEP and the U.S. Army Corps of Engineers. In

addition, per the Maine Natural Resources Protection Act (NRPA), any encroachment within a 75-foot buffer around a wetland would require a permit. In accordance with the Clean Water Act and NRPA, wetland alterations must be avoided where possible. Compensation (mitigation) may be required for any lost functions and values of the wetlands.

Biological Resources

- **Vegetation.** At full build-out under Alternative 1, 1,146 acres of undeveloped land including 690 acres of upland forest could be affected, and 25 acres of critically imperiled Sandplain Grassland and 50 acres of maintained grass associated with the airfield could be developed. A total of 1,060 acres would remain in its natural state within the natural area districts. Under Alternative 2, 1,068 acres of undeveloped land, including 578 acres of upland forest, could be affected and 65 acres of critically imperiled Sandplain Grassland and 301 acres of maintained grass could be developed. A total of 1,280 acres would remain in its natural state within the natural area districts.

  At the McKeen Street Housing Annex there would be no significant impact. At the East Brunswick Radio Transmitter Site, 64 acres of critically imperiled Sandplain Grassland could be impacted under Alternatives 1 and 2. At the Sabino Hill Rake Station, all 0.23 acres would be impacted under Alternatives 1 and 2, as it would become a gravel parking lot.

  Impacts on the critically imperiled Sandplain Grassland habitat would likely have significant impacts on the state-listed endangered grasshopper sparrow. The Sandplain Grassland community at NAS Brunswick is one of only four known grasshopper sparrow breeding sites in the State of Maine. In addition, the current acreage of the habitat at NAS Brunswick is near the minimum size necessary to support multiple grasshopper sparrow territories. Further reduction of available habitat would significantly impact the species. Any party proposing development or other land disturbance in these districts would be required to consult with the MDIFW and MNAP to receive the appropriate permits and clearances.

- **Wildlife.** Under Alternatives 1 and 2, small terrestrial mammals, amphibians, and reptiles could be potentially impacted during construction. Upon completion of construction, recolonization would be expected. Alternative 2 could result in a significant impact on important bird areas, as 366 acres of habitat could be removed. The Bird Aircraft Strike Hazard program would no be needed, as airfield operations would cease. None of the alternative would be expected to have a significant impact on aquatic wildlife or essential fish habitat.

- **Threatened or Endangered Species.** Under Alternative 1, up to approximately 25 acres of critically imperiled Sandplain Grassland habitat may be permanently removed to develop the professional office, education, and aviation-related uses land use districts. Under Alternative 2, a potentially significant impact on the grasshopper sparrow and state species of concern (e.g.,

horned lark, prairie warbler, and Eastern meadowlark) could occur, as 366 acres of grassland habitat, including identified grasshopper sparrow breeding habitat, could be permanently removed. The Sandplain Grassland community at NAS Brunswick is one of only four known grasshopper sparrow breeding sites in the State of Maine. In addition, the current acreage of the habitat at NAS Brunswick is near the minimum size necessary to support multiple grasshopper sparrow territories. Further reduction of available habitat would significantly impact the species. Any party proposing development or other land disturbance in these districts would be required to consult with the MDIFW and MNAP to receive the appropriate permits and clearances.

- **Bald and Golden Eagle Protection Act.** None of the alternatives would impact nesting and foraging areas.

- **Significant Wildlife Habitat.** Thirty significant vernal pools were recently identified on NAS Brunswick. Under Alternative 1, 15 significant vernal pools and associated buffer areas are located within the professional office, business and technology industries, community mixed use, recreation/open space, and educational/natural areas districts. Thirteen significant vernal pools are located in the natural area districts and would be preserved from future development. The remaining two significant vernal pools are located in a parcel that will be transferred to the Department of the Army. Impacts on these two significant vernal pools will be analyzed in separate Army NEPA documentation following property transfer. In addition, 25 acres and 64 acres of critically imperiled Sandplain Grassland at NAS Brunswick and the East Brunswick Radio Transmitter Site, respectively, could potentially be impacted under Alternative 1.

  Of the thirty significant vernal pools identified on NAS Brunswick, twelve significant vernal pools and associated buffer areas could potentially be impacted under Alternative 2. Sixteen significant vernal pools are located within the natural area districts and would be preserved from future development. The remaining two significant vernal pools are located in a parcel that will be transferred to the Department of the Army. Impacts on these two significant vernal pools will be analyzed in separate Army NEPA documentation following property transfer. Three hundred and sixty-six acres of grassland, including 65 acres of critically imperiled Sandplain Grassland habitat, at NAS Brunswick could potentially be impacted under Alternative 2. Sixty-four acres of critically imperiled Sandplain Grassland at the East Brunswick Radio Transmitter Site could also potentially be impacted under Alternative 2.

6.3 Relationships between Local Short-term Uses of the Environment and the Enhancement of Long-term Productivity

Implementation of either Alternative 1 or Alternative 2 would result in new development requiring various services, depending on the alternative selected. Long-term benefits resulting from implementation of either of these alternatives would occur at the expense of short-term impacts in the vicinity of the project

sites. These short-term impacts would occur during the construction period of the selected alternative. Implementation of either alternative would require an estimated 20-year construction period. During the construction period, the following types of construction activities would occur: demolition, clearing, excavating, surfacing, road and parking paving, erection of structures, and landscaping. Short-term impacts on local noise, air quality, and natural resources, as well as possible traffic detours and delays, could occur in the vicinity of the installation. However, these impacts would be temporary, and proper controls would be utilized to prevent these effects from having significant impacts on the environment. In addition, short-term gains to the local economy would occur if local workers are hired and if local businesses provide services and supplies during the construction period. Upon completion of the project, the gains to the local economy would evolve into long-term benefits from the reuse of the installation properties, including an expanded municipal tax base and potentially new residential, employee, and business spending in the region.

6.4 Irreversible and Irretrievable Commitment of Resources

Irreversible commitments of resources are those that cannot be reversed except over an extremely long period of time. Short-term irreversible commitments of resources associated with the construction activities include the use of energy and utilities and the generation of increased noise levels. Construction materials and building supplies would be committed to the redevelopment and reuse of NAS Brunswick and its outlying properties. The use of these materials, such as gravel, concrete, steel, glass, etc., represents a long-term commitment of these resources that would not be available for other projects. Fuel, lubricants, and electricity would be required during construction activities for the operation of the various types of construction equipment and vehicles, and for the transportation of workers and materials to the construction sites. However, these resources are not in short supply, and their use would not have an adverse effect upon their continued availability.

In the long-term, implementation of either Alternative 1 or Alternative 2 would result in irreversible or irretrievable commitments of resources if land development were to physically eliminate or diminish the character of natural resources on or immediately adjacent to the installation. Specifically, this would include the critically imperiled Sandplain Grassland habitat, threatened and endangered species, and Significant Wildlife Habitat. At full build-out under Alternative 1, 1,146 acres of undeveloped land, including 690 acres of upland forest, could be affected, and 25 acres of critically imperiled Sandplain Grassland and 50 acres of maintained grass associated with the airfield could be developed. Three state-listed species are present: the upland sandpiper, grasshopper sparrow, and clothed sedge. In addition, 17 state species of special concern could potentially occur at NAS Brunswick and the East Brunswick Radio Transmitter Site. Under Alternative 1, up to approximately 25 acres of Sandplain Grassland habitat, as well as other grassland habitat, is designated for potential professional office and educational land use and could be impacted. In addition, significant vernal pools could be impacted. Under Alternative 1, 15 significant vernal pools and associated

buffer areas are located within the professional office, business and technology industries, community mixed use, recreation/open space, and educational/natural areas districts.

Under Alternative 2, 1,068 acres of undeveloped land, including 578 acres of upland forest, could be affected and 65 acres of critically imperiled Sandplain Grassland and 301 acres of maintained grass could be developed. The Sandplain Grassland and other grassland habitats would no longer be maintained as part of the airfield, and portions could be developed for business and technology industries, community mixed-use, education, and residential land uses. Under Alternative 2, potentially significant impacts on the grasshopper sparrow and state species of special concern (e.g., horned lark, prairie warbler, and Eastern meadowlark) could occur, as 366 acres of grassland habitat, including identified grasshopper sparrow breeding habitat, could be permanently removed. In addition, significant vernal pools could be impacted. Twelve significant vernal pools and associated buffer areas could potentially be impacted under Alternative 2.

Under either Alternative 1 or 2, any party proposing development or other land disturbance in these districts would be required to consult with the MDIFW and MNAP to receive the appropriate permits and clearances.

The disposal of property, although an irreversible action, does not represent an irretrievable commitment of land resources, since this action makes resources available for future reuses. The proposed action also represents the irretrievable commitment of human resources and materials requiring the use of fossil fuels, electrical energy, and other energy resources during construction and operation of facilities. These resources would be irretrievably committed to the action.

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